





*Linear Motion. Optimized.*

**Thomson -**  
*Linear Motion. Optimized.*

Often the ideal design solution is not about finding the fastest, sturdiest, most accurate or even the least expensive option. Rather, the ideal solution is the optimal balance of performance, life and cost.

Thomson is best positioned to help you most quickly configure the optimal linear motion solution for your application.

- Thomson invented anti-friction linear bearing technology. We own the broadest standard product offering of mechanical motion technologies in the industry.
- Modified versions of standard product are routine. White sheet design solutions available across our entire portfolio.
- Choose Thomson and gain access to over 70 years of global application experience in diverse industries including packaging, factory automation, material handling, medical, clean energy, printing, automotive, machine tool, aerospace and defense.
- As part of Danaher Corporation, we are financially strong and unique in our ability to bring together control, drive, motor, power transmission and precision linear motion technologies.

Thomson is the name you can trust for quality, innovation, on-time delivery, controlled costs, and reduced risk.

In addition to the information contained in this document, a wealth of product and application information is available online at [www.thomsonlinear.com](http://www.thomsonlinear.com). For assistance in Europe contact us at +44 1271 334 500 or email us at [sales.uk@thomsonlinear.com](mailto:sales.uk@thomsonlinear.com)

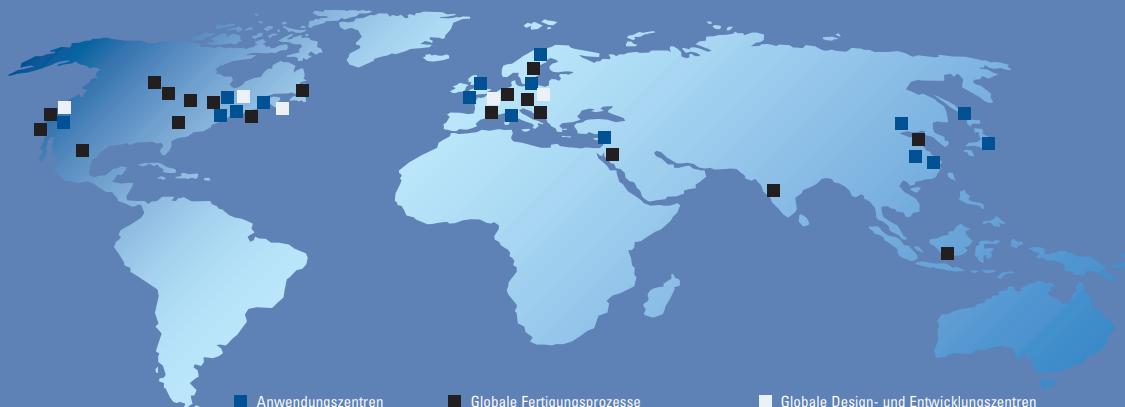
Talk to us early in the design process to see how Thomson can help identify the optimal balance of performance, life and cost for your next application. And, call us or any of our 2000+ distribution partners around the world for fast delivery of replacement parts.

### **The Danaher Business System -** Building sustainable competitive advantage into your business

The Danaher Business System (DBS) was established to increase the value we bring to customers. It is a mature and successful set of tools we use daily to continually improve manufacturing operations and product development processes. DBS is based on the principles of Kaizen which continuously and aggressively eliminate waste in every aspect of our business. DBS focuses the entire organization on achieving breakthrough results that create competitive advantages in quality, delivery and performance – advantages that are passed on to you. Through these advantages Thomson is able to provide you faster times to market as well as unsurpassed product selection, service, reliability and productivity.

### **Local Support Around the Globe**

Application Centers Global Manufacturing Operations Global Design & Engineering Centers



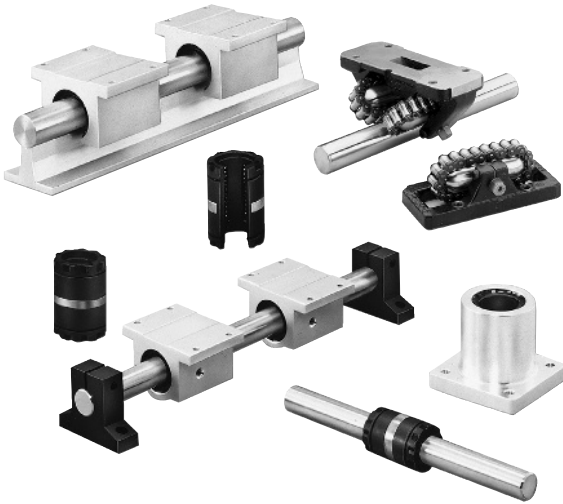
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## Thomson RoundRail Linear Guides and Components Overview

### Linear Bearings



Thomson offers an extensive family of Linear Bearings. Super Smart Ball Bushing Bearings are available in Inch and Metric sizes. Thomson uses the latest technology - Universally self-aligning Bearings. These Bearings are offered in a Dual Track Design and offer Load Capacities up to 7,760 lb<sub>f</sub> (30,000N). The Super Smart Ball Bushing Bearings are available in sizes .5 in to 1.5 in, 8 mm to 40mm. Super Ball Bushing Pillow Blocks are available in closed, adjustable and open styles in both single and twin versions. These are the original self aligning precision anti-friction linear bearing with load capacities up to 4,000 lb<sub>f</sub> and speed up to 10 ft/sec (3 m/s). Danaher offers the largest selection of sizes. 'A' Bearings are the original precision anti-friction linear bearing all steel construction with load capacities up to 5,000 lb<sub>f</sub> and high operating temperature capabilities. Thomson Die Set Ball Bushing Bearings offer high operating temperature

capabilities, all steel construction and load capacities up to 1100 lb<sub>f</sub>. Roundway Bearings are capable of load capacities up to 24,000 lb<sub>f</sub>, with travel speeds up to 100 ft/sec. These Bearings offer high performance in highly contaminated environments. FluoroNyliner Ball Bushing Bearings are recommended for washdown and contaminated environments. These Bearings and pillow blocks offer load capacities up to 14,000 lb<sub>f</sub>.

### Shafting

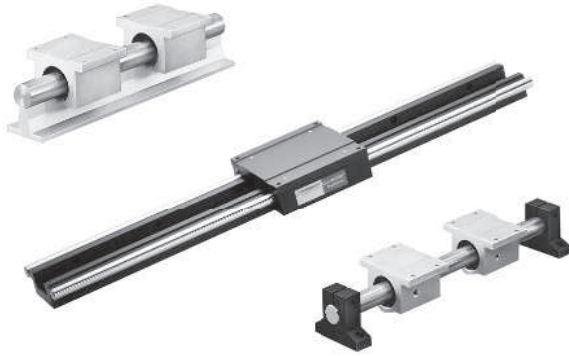


While Shafts may appear the same, there are significant performance differences due to the manufacturer's selected standards, and the manufacturing processes used to achieve them. The linear inner race demands the highest levels of material cleanliness, surface topography, surface hardening, diameter, taper and roundness, surface finish and straightness to provide optimum performance, minimal maintenance and long life. Unlike common shafting, Thomson 60 Case LinearRace shafting is manufactured to the highest quality standards. Our techniques are continuously upgraded with proprietary know-how gained from over 53 years of linear bearing design and manufacture. Using 60 Case LinearRace shafting with Thomson Ball Bushing Bearings ensures optimal bearing performance and travel life.

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## Thomson Product Line Overview

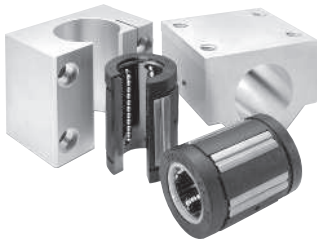
## RoundRail Linear Guides



Pre-assembled, ready to install stages providing low friction, smooth, accurate motion for a wide range of moment or normal loading configurations. Market applications include factory automation, medical, packaging, machine tool, semiconductor, printing, automotive assembly, aerospace and food processing. Slide tables are available as customizable RoundRail Linear Guides to multiaxis, turnkey systems complete with motors, drives, controls and electromechanical accessories.

- Applications-typically on factory machinery where accurate, smooth linear positioning is required
- Available with servo/stepper motor & drive packages
- Max thrust to 3100 lb
- Strokes to 120"
- Loads from 5 - 2000 lb
- Repeatability to 0.0002"

## New Thomson Linear Ball Bushing Bearings



Metric Super Ball Bushing Bearings offer high performance from superior design

A coefficient of friction as low as 0,001. This allows the use of smaller less expensive motors, belts, gears and ball screws, when replacing high friction, plain bearings. A self-aligning capability up to 0,5° compensates for inaccuracies in base flatness or carriage machining. Achieved with Thomson Super Bearing plates which have defined radius crowns for maximized self-alignment accuracy. Accelerations as high as 150m/s<sup>2</sup> and steady state travel speeds up to 3 m/s without the derating factors commonly required with linear guides. Quick to ship, drop-in replacement parts for existing applications.




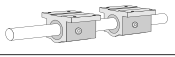
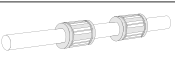
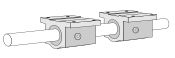
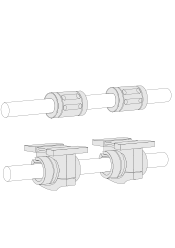
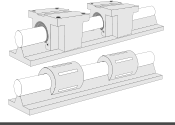

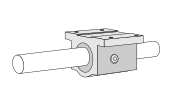
Stainless Steel MultiTrac and "A" Ball Bushing Bearings are ideal for harsh environments

Stainless steel (440) components resist rust and corrosion. "A" bearing withstands up to 600 degrees F (315°C). MultiTrac Ball Bushing bearings are rated at a maximum of 180 degrees F (82°C). MultiTrac has wear-resistant, engineered-polymer retainers to reduce inertia and noise levels. Quick to ship, drop-in replacement parts for existing applications:

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## Thomson Product Line Overview

### Ball Bushing Bearings

|   | Page Number   | Imperial (Inch)              |      |     |          |          |          |          |          |          |
|---|---|------------------------------|------|-----|----------|----------|----------|----------|----------|----------|
|   |   | 1/8                          | 3/16 | 1/4 | 3/8      | 1/2      | 5/8      | 3/4      | 1        |          |
| <b>Super Smart</b>  |   |                              |      |     |          |          |          |          |          |          |
|    | <b>Ball Bushing Bearings</b><br>corrosion resistant option available      | inch: 20<br>metric: 120      |      |     |          |          | ○        | ○        | ○        | ○        |
|    | <b>Ball Bushing Pillow Blocks</b><br>corrosion resistant option available | inch: 27<br>metric: 126      |      |     |          |          | ○<br>STA | ○<br>STA | ○<br>STA | ○<br>STA |
| <b>Super</b>  |   |                              |      |     |          |          |          |          |          |          |
|    | <b>Ball Bushing Bearings</b><br>corrosion resistant option available      | inch: 43 & 56<br>metric: 141 |      | ●   | ●        | ●        | ○        | ○        | ○        | ○        |
|    | <b>Ball Bushing Pillow Blocks</b><br>corrosion resistant option available | inch: 52 & 61<br>metric: 144 |      |     | ●<br>STA | ●<br>STA | ○<br>STA | ○<br>STA | ○<br>STA | ○<br>STA |
| <b>Precision Bearings</b>   |   |                              |      |     |          |          |          |          |          |          |
|   | <b>A-Bearings and Pillow Blocks</b><br>available in stainless steel       | 73                           |      |     | ●        | ●<br>SA  | ○<br>SA  | ○<br>SA  | ○<br>SA  | ○<br>SA  |
|   | <b>MultiTrac</b><br>available in stainless steel                          | 134                          |      |     |          |          |          |          |          |          |
|   | <b>Instrument</b>   | 177                          | ●    | ●   | ●        |          |          |          |          |          |
|   | <b>Die Set</b>  | 79                           |      |     |          |          |          |          |          | ●        |
| <b>XR Extra Rigid</b>   |   |                              |      |     |          |          |          |          |          |          |
|  | <b>Ball Bushing Bearings and Pillow Blocks</b>                            | 87                           |      |     |          |          |          |          |          |          |
| <b>Specialty</b>  |   |                              |      |     |          |          |          |          |          |          |
|  | Cartridge bearing   | 50                           |      |     | ●<br>ST  | ●<br>ST  | ●<br>ST  |          |          |          |
|   | RoundWay  | 94                           |      |     |          |          | ●        |          |          | ●        |
| <b>FluoroNyliner</b>  |   |                              |      |     |          |          |          |          |          |          |
|  | <b>Bushing bearings</b>   | 102                          |      |     | ○        | ○        | ○        | ○        | ○        | ○        |
|   | <b>Pillow Blocks</b>  | 107                          |      |     | ○<br>STF | ○<br>STF | ○<br>STF | ○<br>STF | ○<br>STF | ○<br>STF |

- Closed Type
- Open Type
- ◎ Closed and Open Type
- S Single Configuration
- T Twin Configuration
- A Adjustable Configuration
- F Flanged Configuration

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## Thomson Product Line Overview

| Imperial (Inch) |       |     |       |    |    | Metric (mm) |     |    |     |     |     |     |     |    |     |     |
|-----------------|-------|-----|-------|----|----|-------------|-----|----|-----|-----|-----|-----|-----|----|-----|-----|
| 1 1/4           | 1 1/2 | 2   | 2 1/2 | 3  | 4  | 5           | 8   | 10 | 12  | 16  | 20  | 25  | 30  | 35 | 40  | 50  |
| ○               | ○     |     |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   |     |
| ○               | ○     |     |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   |     |
| STA             | STA   |     |       |    |    |             | STA |    | STA | STA | STA | STA | STA |    | STA |     |
| ○               | ○     | ○   |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   | ○   |
| ○               | ○     | ○   |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   | ○   |
| STA             | STA   | STA |       |    |    |             | STA |    | STA | STA | STA | STA | STA |    | STA | STA |
| ○               | ○     | ○   | ○     | ○  | ○  |             |     |    |     |     |     |     |     |    |     |     |
| SA              | SA    | SA  | SA    | SA | SA |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   |     |
|                 |       |     |       |    |    |             | SA  |    | SA  | SA  | SA  | SA  | SA  |    | SA  |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
| ●               | ●     | ●   |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       | ○   |       |    | ○  |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       | ●   | ●     |    | ●  |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
| ○               | ○     | ○   |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
| ○               | ○     | ○   |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
| STF             | STF   | STF |       |    |    |             |     |    |     |     |     |     |     |    |     |     |

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## Thomson Product Line Overview

### Standard 60 Case Shaft Size and Availability Chart

| Material          | Carbon Steel |     |         |      |     |     |     |     |     |     |     | 440 C Stainless Steel |     |     |            | 52100 Tubular |     | 316 SS |     |
|-------------------|--------------|-----|---------|------|-----|-----|-----|-----|-----|-----|-----|-----------------------|-----|-----|------------|---------------|-----|--------|-----|
|                   | 60 min.      |     |         |      |     |     |     |     |     |     |     | 50 min.               |     |     | 55 min.    | 58 min.       |     | 20-25  |     |
| Tolerance Class   | L            |     |         |      | S   | N   |     |     | D   | XL  | G   | L                     | S   | G   | Instrument | L             | S   | L      |     |
| Optional Features | L            | DC  | PD CPPE | CPPE | PD  | S   | DC  | N   |     |     |     | L                     | PD  |     |            |               |     |        |     |
| 1/8"              |              |     |         |      |     |     |     |     |     |     |     |                       |     |     |            |               |     |        |     |
| 3/16"             | •            |     |         |      |     |     |     |     |     |     |     |                       |     |     | •          |               |     |        |     |
| 1/4"              | •            |     |         |      |     | •   |     | •   |     |     | •   | •                     |     | •   | •          |               |     |        |     |
| 3/8"              | •            |     |         |      |     | •   |     | •   |     |     | •   | •                     |     | •   | •          |               |     |        | •   |
| 1/2"              | •            |     | •       | •    | •   | •   |     | •   |     |     | •   | •                     | •   | •   | •          |               |     |        | •   |
| 5/8"              | •            |     | •       | •    | •   | •   |     | •   |     |     | •   | •                     | •   | •   | •          |               |     |        | •   |
| 3/4"              | •            | •   | •       | •    | •   | •   | •   | •   |     |     | •   | •                     | •   | •   | •          |               | •   | •      | •   |
| 7/8"              | •            | •   |         |      |     |     |     | •   | •   |     |     |                       |     |     |            |               |     |        |     |
| 1"                | •            | •   | •       | •    | •   | •   | •   | •   | •   |     | •   | •                     | •   | •   | •          |               | •   | •      | •   |
| 1 1/8"            | •            | •   |         |      |     |     |     | •   | •   |     |     |                       |     |     |            |               |     |        |     |
| 1 1/4"            | •            | •   | •       | •    | •   | •   | •   | •   | •   |     |     | •                     | •   | •   |            |               |     |        | •   |
| 1 3/8"            | •            |     |         |      |     |     |     |     | •   |     |     |                       |     |     |            |               |     |        |     |
| 1 1/2"            | •            | •   | •       | •    | •   | •   | •   | •   | •   |     |     | •                     | •   | •   |            | •             | •   | •      |     |
| 1 5/8"            | •            |     |         |      |     |     |     |     | •   |     |     |                       |     |     |            |               |     |        |     |
| 1 3/4"            | •            | •   |         |      |     |     |     | •   | •   |     |     |                       |     |     |            |               |     |        |     |
| 2"                | •            | •   | •       | •    | •   | •   | •   | •   | •   | •   |     | •                     | •   | •   |            | •             | •   |        |     |
| 2 1/4"            | •            | •   |         |      |     |     |     | •   | •   |     |     |                       |     |     |            |               |     |        |     |
| 2 1/2"            | •            | •   |         |      |     | •   | •   | •   |     |     |     | •                     |     | •   |            | •             | •   |        |     |
| 3"                | •            | •   |         |      |     | •   | •   | •   |     |     | •   |                       |     |     |            | •             | •   |        |     |
| 3 1/2"            | •            | •   |         |      |     |     |     |     |     |     |     |                       |     |     |            | •             | •   |        |     |
| 4"                | •            |     |         |      |     | •   |     |     |     |     | •   |                       |     |     |            | •             | •   |        | 168 |
| Catalog Page      | 163          | 165 | 164     | 164  | 164 | 163 | 165 | 163 | 163 | 163 | 165 | 166                   | 166 | 166 | 167        | 167           | 167 | 167    | 168 |

| Material          | Carbon Steel |     |     | 440 C SS    |
|-------------------|--------------|-----|-----|-------------|
|                   | 60 min.      |     |     | 50 min.     |
| Tolerance Class   | MM (ISO h6)  |     |     | MM (ISO h6) |
| Optional Features | MM           | T1  | T2  |             |
| 5 mm              | •            |     |     | •           |
| 8 mm              | •            |     |     | •           |
| 10 mm             | •            |     |     | •           |
| 12 mm             | •            | •   | •   | •           |
| 15 mm             | •            |     |     |             |
| 16 mm             | •            | •   | •   | •           |
| 20 mm             | •            | •   | •   | •           |
| 25 mm             | •            | •   | •   | •           |
| 30 mm             | •            | •   | •   | •           |
| 40 mm             | •            | •   | •   | •           |
| 50 mm             | •            |     |     | •           |
| 60 mm             | •            |     |     | •           |
| 80 mm             | •            |     |     |             |
| Catalog Page      | 176          | 177 | 177 | 178         |

Thomson 60 Case shafting is sold as cut-to-length (CTL), random length (RL), special machined (SM), and as quick shaft (QS).

Since Thomson grinds and hardens all of its own shafting, diameters and tolerances not listed are available as special grind and are made to order. Minimum lots may apply.

**Tolerance Classes:**

- L - For use with XA, Open and Adjustable Ball Bushing Bearings and Pillow Blocks as well as Super Ball Bushing Bearings and Super Smart Ball Bushing Bearings
- S - For use with A type ball bushings
- N - For use with needle roller Bearings
- D - For use with Thomson Die Set Ball Bushing Bearings
- G - Ball Grooved for use with Thomson Super Ball bushing
- XL - For use with XR bearing (Carbon Steel)

**Optional Features:**

- PD - Predrilled
- CPPE - Chrome Plated Plain Ends
- DC - Deep Case

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## Thomson Product Line Overview

### Standard Support Rail Size and Availability Chart

| Type         | SR                    | SR-PD                                       | SRA                                      | SRA-SS                                       | SRA-TU                                    | LSR                      | LSR-PD   | LSRA   | LSRA-CR   | XSR                                 | XSRA   |
|--------------|-----------------------|---|--|--|---|--------------------------|--|--|---|-------------------------------------|--|
| Description  | Aluminum Support Rail | Aluminum Support Rail with Predrilled Holes | Aluminum Support Rail Carbon Steel Shaft | Aluminum Support Rail Assembly 440C SS Shaft | Aluminum Support Rail 51200 Tubular Shaft | Steel Lower Support Rail | Steel Lower Support Rail with Predrilled Holes | Steel Lower Support Rail Assembly Carbon Steel Shaft | Corrosion Resistant Steel Lower Support Rail Assembly 440C SS Shaft | Extra Rigid Cast Steel Support Rail | Extra Rigid Cast Steel Support Rail Assembly |
| 1/2"         | •                     | •   | •  | •  |   | •                        | •  |  |   |                                     |  |
| 5/8"         | •                     | •   | •  | •  |   | •                        | •  | •  | •   |                                     |  |
| 3/4"         | •                     | •   | •  | •  | •   | •                        | •  | •  | •   |                                     |  |
| 1"           | •                     | •   | •  | •  | •   | •                        | •  | •  | •   |                                     |  |
| 1 1/4"       | •                     | •   | •  | •  |   | •                        | •  | •  | •   |                                     |  |
| 1 1/2"       | •                     | •   | •  | •  | •   | •                        | •  | •  | •   |                                     |  |
| 2"           | •                     | •   | •  | •  | •   | •                        | •  |  |   | •                                   | •  |
| 2 1/2"       |                       |   |  |  |   | •                        | •  |  |   |                                     |  |
| 3"           |                       |   |  |  |   | •                        | •  |  |   | •                                   | •  |
| 4"           |                       |   |  |  |   | •                        | •  |  |   |                                     |  |
| Catalog Page | 171                   | 171   | 172                                      | 172  | 172                                       | 171                      | 171  | 172  | 172   | 171                                 | 172  |

### Standard Support Rail Assembly Size and Availability Chart

| Type         | SRM | SRM T1   | SRM T2   | SRAM T1  | SRAM T2  | LSRM                     | LSRM T1  | LSRM T2  | LSRA M   | LSRA M CR                 |
|--------------|-----|--|--|--|--|--------------------------|--|--|--|---------------------------|
| Description  |     | Steel Lower Support Rail Assembly Carbon Steel Shaft T1 Hole Pattern | Steel Lower Support Rail with Predrilled Holes T2 Hole Pattern | Aluminum Support Rail Assembly with Predrilled Holes T1 Hole Pattern | Aluminum Support Rail Assembly with Predrilled Holes T2 Hole Pattern | Steel Lower Support Rail | Steel Lower Support Rail with Predrilled Holes T1 Hole Pattern | Steel Lower Support Rail with Predrilled Holes T2 Hole Pattern | Steel Lower Support Rail Assembly Carbon Steel Shaft | Corrosion Resistant Steel |
| 12mm         | •   | •  | •  | •  | •  | •                        | •  | •  |  |                           |
| 16mm         | •   | •  | •  | •  | •  | •                        | •  | •  | •  | •                         |
| 20mm         | •   | •  | •  | •  | •  | • <sup>1</sup>           | • <sup>1</sup>   | • <sup>1</sup>   | • <sup>1</sup>                                       | • <sup>1</sup>            |
| 25mm         | •   | •  | •  | •  | •  | •                        | •  | •  | •  | •                         |
| 30mm         | •   | •  | •  | •  | •  | •                        | •  | •  | •  | •                         |
| 40mm         | •   | •  | •  | •  | •  | • <sup>1</sup>           | • <sup>1</sup>   | • <sup>1</sup>   | • <sup>1</sup>                                       | • <sup>1</sup>            |
| Catalog Page | 181 | 181  | 181  | 181  | 181  | 181                      | 181  | 181  | 181  | 181                       |

### Standard Support Block Size and Availability Chart

| Type         | ASB                    | FSB                            | SB                  | WM               | Type         | ASBM                   | SBM                 |
|--------------|------------------------|--------------------------------|---------------------|------------------|--------------|------------------------|---------------------|
| Description  | Aluminum Support Block | Flanged Aluminum Support Block | Steel Support Block | Waymount Support | Description  | Aluminum Support Block | Steel Support Block |
| 1/4"         | •                      |                                | •                   |                  | 8mm          | •                      | •                   |
| 3/8"         | •                      |                                | •                   |                  | 12mm         | •                      | •                   |
| 1/2"         | •                      | •                              | •                   | •                | 16mm         | •                      | •                   |
| 5/8"         |                        |                                | •                   |                  | 20mm         | •                      | •                   |
| 3/4"         | •                      | •                              | •                   |                  | 25mm         | •                      | •                   |
| 1"           | •                      | •                              | •                   | •                | 30mm         | •                      | •                   |
| 1 1/4"       |                        | •                              | •                   |                  | 40mm         | •                      | •                   |
| 1 1/2"       | •                      |                                | •                   | •                | Catalog Page | 182                    | 182                 |
| 2"           |                        |                                |                     | •                |              |                        |                     |
| 3"           |                        |                                |                     | •                |              |                        |                     |
| 4"           |                        |                                |                     | •                |              |                        |                     |
| Catalog Page | 174                    | 175                            | 174                 | 175              |              |                        |                     |

<sup>1</sup> Not all sizes are stocked, minimum order quantities may apply.

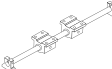
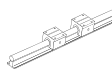
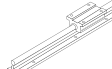
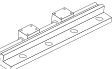
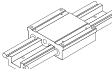
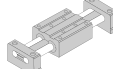
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## Thomson Product Line Overview

RoundRail Linear Guides are the non-driven building blocks for linear slide tables. They offer the end user flexibility to fit specific envelopes by allowing customized separations between shafts and between Bearings on shafts to produce higher moment capacity. When combined with ballscrew assemblies, they become a driven slide table.

Because RoundRail Linear Guides are offered in a wide range of sizes, bearing types, and mounting configurations, they are typically selected by the qualitative attributes that are most appropriate for a given application (i.e. environmental considerations, mounting footprint). For this reason, we are providing the following selection chart and selection criteria for consideration:

## Systems Quick Reference Guide

| Application Criteria                         |               | End Support   | Continuous Support  | FluoroNyliner   | Side Mounted   | Dual Shaft Rail   | Twin Shaft Web  |
|--|---------------|---|---|---|--|---|---|
|  |               |  |  |  |  |  |  |
|  |               | <b>1BA / 1NA</b>  | <b>1 CA / 1PA</b>   | <b>1 VA</b>   | <b>1 DA</b>  | <b>2DA</b>  | <b>2CA</b>  |
| <b>High Loads</b>                            |               |   | •   | •   |  |   |   |
| <b>Equivalent Loads in All Directions</b>    |               | •   |   |   |  | •   |   |
| <b>Ultra Compactness</b>                     |               | •   |   |   |  |   | •   |
| <b>Extreme Smoothness</b>                    |               | •   | •   |   | •  |   | •   |
| <b>End Supported</b>                         |               | •   |   |   |  | •   | •   |
| <b>Single Rail</b>                           |               |   |   |   |  |   | •   |
| <b>Harsh Environment</b>                     |               |   |   | •   |  |   |   |
| <b>Low Cost Installation (multiple rail)</b> |               | •   | •   | •   | •  |   |   |
| <b>Complete Axis Solution</b>                |               |   |   |   |  |   | •   |
| <b>Available Sizes:</b>                      | <b>Inch</b>   | 4 thru 24   | 8 thru 24   | 8 thru 24   | •  | •   |   |
|  | <b>Metric</b> | 8 thru 40   | 12 thru 40  |   | 8 thru 16  | 8 thru 16   | 8 thru 16   |
| <b>Page Number</b>                           |               | 220/222   | 225/227   | 230   | 233  | 236   | 239   |

## Linear Guide Selection Criteria

- Load/Life
- Smoothness of Travel
- Cost of Product
- Travel Accuracy
- Speed & Acceleration
- Cost of Installation
- Rigidity
- Envelope
- Environment
- Cost of Replacement

## Application Examples

- Machine Tools
- Semiconductor Equipment
- Packaging Machinery
- Medical Equipment
- Automotive Assembly Equipment
- Food Processing Equipment

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# Round or Square?

## Thomson Product Line Overview

### Let Thomson help you choose the right rail type and carriage.

Since the introduction of the square, or profile rail, linear guide in the 1970's, the design engineer has been faced with the pivotal question: **round or square?**

While square rails initially cost many times more than round technology due to the extensive grinding requirements inherent in the design, new manufacturing techniques and economies of scale have allowed square rails to compete effectively in a broader application space. Once subjugated to the realm of machine tools, profile rails can now be found in many of the same applications that were once only supported by round rail. However, ball bushing guides remain popular due to some intrinsically unique and often advantageous characteristics that lend themselves to specific applications.

In order to apply the correct type of linear guide in a particular application, the design engineer must consider the advantages and capabilities of each. The cost of selecting the wrong technology can result in a lot of additional design complexity, poor function and cost in the overall assembly. As a first cut it is useful to have a general understanding of the strengths and weaknesses of each type of product.

The table below outlines typical performance characteristics of round and profile rails and where one is superior.





| Attribute                               | Round                  | Square                     |
|---|------------------------|----------------------------|
| <b>Performance</b>                      |                        |                            |
| Load Capacity                           | medium                 | <b>high</b>                |
| Accuracy                                | medium                 | <b>medium - high</b>       |
| Stiffness                               | medium                 | <b>high</b>                |
| Available preload                       | yes (light)            | <b>yes (light - heavy)</b> |
| Single guide supports moments           | no                     | <b>yes</b>                 |
| Same load capacity in all directions    | no                     | <b>available (typical)</b> |
| Seal effectiveness                      | <b>high</b>            | medium                     |
| Smoothness                              | <b>high</b>            | medium - high              |
| Drag                                    | <b>low</b>             | medium - high              |
| <b>Total Cost of Ownership</b>          |                        |                            |
| Ease of installation                    | <b>high</b>            | medium                     |
| Required precision of mating component  | <b>low</b>             | high                       |
| Self aligning                           | <b>yes</b>             | no                         |
| Life Expectancy                         | medium                 | <b>high</b>                |
| Material Cost                           | <b>low</b>             | medium                     |
| <b>Design Flexibility</b>               |                        |                            |
| Ability to span gaps                    | <b>yes</b>             | no                         |
| Can be used as structural frame member  | <b>yes</b>             | no                         |
| Ability to use as single rail & guide   | no                     | <b>yes<sup>1</sup></b>     |
| Compactness (load capacity to size)     | medium                 | <b>high</b>                |
| Ease of modification/Interchangeability | <b>high</b>            | low                        |
| <b>Rail Mounting</b>                    |                        |                            |
| Available end support mounting          | <b>yes (preferred)</b> | no                         |
| Available continuous support mounting   | yes                    | <b>yes (preferred)</b>     |
| Available mounting from top of rail     | yes                    | <b>yes (preferred)</b>     |
| Available mounting from bottom of rail  | <b>yes</b>             | <b>yes</b>                 |

This catalog includes detailed ordering information for RoundRail Linear Guides. Refer to the separate Thomson Profile Rail catalog for detailed square rail linear guides information.

1. Depending on the application. Most square rail applications use dual rails.


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## RoundRail Bearings

|   | Description  | Product Overview   | Comments  |
|---|--|--|---|
| <p><b>Plain Contact</b></p>      | <p>Provides self-lubricating, low friction, smooth motion for high load conditions.</p>  | <ul style="list-style-type: none"> <li>• PTFE tape is bonded to the ID of an aluminum housing.</li> <li>• Suitable for wash-down &amp; food applications.</li> <li>• Can withstand high vibration &amp; shock loads.</li> <li>• Extremely smooth running; does not require an overly smooth surface to run on.</li> <li>• Compensated</li> <li>• Sizes ¼" – 2", closed, open, adjustable</li> </ul>  |   |
| <p><b>Steel Sleeve (A)</b></p>  | <p>The steel sleeve anti-friction recirculating ball bushing provides rigid low drag movement – ~100x lower drag coefficient than a plain contact bearing.</p>                                 | <ul style="list-style-type: none"> <li>• A-Bearings – all steel (operates up to 450 °F) with 3 grades of precision available (A, XA, B); sizes ¼" – 4", closed, open, adjustable.</li> <li>• MAM (MultiTrac A Metric) – twin track configuration, 440C Stainless Steel sleeve and a Delrin retainer; size 8 – 40mm, closed open, adjustable.</li> <li>• INST BRGS – precision miniature stainless steel (corrosion resistant) - sizes: 1/8" – 1/4".</li> <li>• Die Sets – designed specifically for die movement applications; size: 1" – 2".</li> </ul> | <ul style="list-style-type: none"> <li>• The patented MAM is the smoothest and highest load capacity A-type bearing in the market.</li> <li>• Corrosion resistant versions available.</li> </ul>  |
| <p><b>Super</b></p>            | <p>The self-aligning 52100 bearing plate has a ball conforming groove that, with the Delrin sleeve and retainer provide high load capacity smooth motion.</p>                                  | <ul style="list-style-type: none"> <li>• The ball conforming groove enables the Super bearing to provide 3x the load capacity or 27X the L10 travel life of a conventional steel ball bushing bearing .</li> <li>• Sizes ¼" – 2", 5 – 50mm, open/closed</li> <li>• Ball Groove, Cartridge, Out- Rigger, Segment Bearings, XR's</li> </ul>  | <ul style="list-style-type: none"> <li>• Additional seal option on outside of bearing and on the pillow blocks offers sealing preferred over competitors by our customers.</li> <li>• Thomson has the largest installed base in North America.</li> <li>• Competitors have modeled their products after Thomson.</li> </ul>   |
| <p><b>Super Smart</b></p>      | <p>Truly self-aligning twin track linear bearing.</p> <p>The 52100 Steel plate pitches, rocks and rolls on a precision hardened steel band to provide universal type alignment capability.</p> | <ul style="list-style-type: none"> <li>• 3 industry standards</li> <li>• Imperial Sizes ½" – 1 1/2 "</li> <li>• ISO Metric 16 – 40mm</li> <li>• JIS Metric 16 – 40mm</li> <li>• SS6U, E, J's available 16 – 40mm</li> <li>• Closed and Open</li> </ul>   | <ul style="list-style-type: none"> <li>• This patented product provides smooth, quiet, low drag linear movement at 6x the load capacity or 216 x the L10 travel life of a conventional steel linear ball bushing bearing.</li> <li>• Also available in a low cost 6 track version.</li> <li>• Its unique design with the steel band enables the bearing to preserve it's ID fit-up and self-aligning capability over extended use.</li> </ul> |





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## 60 Case Shafting

|  | Description  | Product Overview   | Comments   |
|--|--|--|--|
|  <p><b>Specialty Bearings</b></p> | <p>There are a multitude of specialty Bearings that can be configured or developed to suit almost any customers needs.</p> | <ul style="list-style-type: none"> <li>Round Way - all steel construction and a chain that connects the rolling elements; Sizes ½" – 3".</li> <li>CMB Bearings (combination radial &amp; linear Bearings), NB (nylon ball) Bearings, Smart MultiTracs, Cartridge Bearings, etc.</li> </ul> | <p>Round Way</p> <ul style="list-style-type: none"> <li>Highest load rating of the linear bearings. The ratings are based on a longer travel than other linear Bearings use.</li> <li>The chain enables the bearing to withstand very high speeds and accelerations.</li> <li>Temperatures up to 450°F.</li> <li>Suitable for extremely harsh environments.</li> </ul> |

|   |  |  |   |
|---|--|--|---|
|  <p><b>Accessories/Options</b></p> | <p>The host of accessories and options associated with RoundRail Bearings are multitudinous.</p> | <ul style="list-style-type: none"> <li>Steel Pillow Blocks, Aluminum Pillow Blocks, Singles, Twins, Closed, Opens, Adjustable, Flanged Pillow Blocks, Self-Aligning PB's, XPB's, XPB0's, RSPB's, RSPB0's, CR's, wipers, seals, DD's, stainless steel options, resilient mounts, Lube Fittings, etc.</li> </ul> | <ul style="list-style-type: none"> <li>Largest variety in the industry of customized offerings, accessories, and options that allow for new and broader uses of Bearings in unusual, harsh, and state-of-the-art applications.</li> </ul> |
|---|--|--|---|

## 60 Case Shafting

|   | Description                         | Product Overview  | Comments  |
|---|-------------------------------------|---|---|
|  | 60 Case Shafting                    | <ul style="list-style-type: none"> <li>AISI 1566</li> <li>Sizes: 3/16" – 4" and 5–80mm</li> <li>Bolt down from the top Smart Rail</li> </ul>  | <p><i>(applies to 60 Case Shafting, 440C &amp; 300 Stainless Steel Shafting, 60 Case Tubular Shafting and their Accessories/Options)</i></p> <ul style="list-style-type: none"> <li>High grade steel used for standard product – 1566 vs. competitor's 1060.</li> <li>Coil-to-bar mfg. technology permits sourcing of hot rolled material, lower costs, sourcing flexibility, high straightness levels, and controlled sizing prior to induction hardening.</li> </ul>  |
|  | 440C & 300 Stainless Steel Shafting | <ul style="list-style-type: none"> <li>AISI 440C</li> <li>Sizes: 1/8" – 3" and metric available</li> <li>AISI 316</li> <li>Sizes: 3/8" – 2"</li> </ul>  | <ul style="list-style-type: none"> <li>Precisely controlled case hardening to max. hardness (&gt;62 HRC at highest bearing stress depth &amp; Hertzian stress levels).</li> <li>Low stress precision grinding techniques to produce:                             <ul style="list-style-type: none"> <li>- Dia. tolerance control (&lt;0.0002" - classes D &amp; N)</li> <li>- Roundness variation (&lt;0.00080")</li> <li>- Taper var. on 17' L or ½" dia. tolerance (&lt;0.0002")</li> <li>- Surface finish (&lt;6 Ra) defect free surface</li> <li>- Straightness (capability to &lt;0.0005" / foot)</li> </ul> </li> </ul> |
|  | 60 Case Tubular Shafting            | <ul style="list-style-type: none"> <li>AISI 52100 Tubular</li> <li>Size: ¾" – 4"</li> </ul>   | <ul style="list-style-type: none"> <li>Value added machining capabilities of hard turning, radial drill and tapping, milling; journal machining to 0.0002" max. dia. variation and &lt;0.001" concentricity variation.</li> <li>Random lengths, cut to length, and special machined forms available.</li> <li>Engineered assembly solutions -- SR(M) and LSR (M).</li> <li>Standard product available for next day shipping.</li> </ul>   |
|  | Accessories/Options                 | <ul style="list-style-type: none"> <li>PD, SM, classes (S, L, D, N, XL, M, MN, G), deep case, SB, ASB, ASBM, FSB, Way Mounts, SR, SRA, LSR, LSRA, SRM, LSRM, XSR's, platings, coatings, metric, etc.</li> </ul> |   |

- Largest product breadth in the industry.
- Most technically advanced product offering that conforms to extremely stringent tolerance specifications.
- 60+ years of manufacturing experience.
- Thomson brand name known for consistent and unparalleled quality.

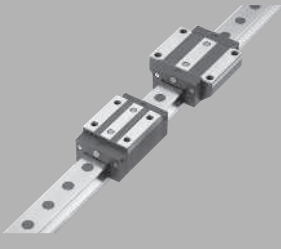
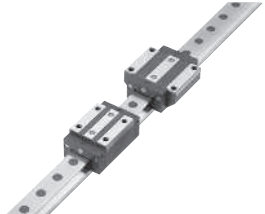
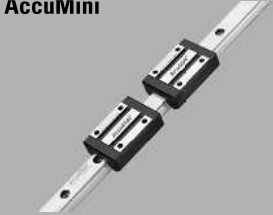
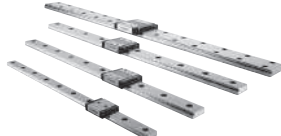

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## Profile Rail

# Profile Rail

### Overview of Thomson Profile RoundRail Linear Guides

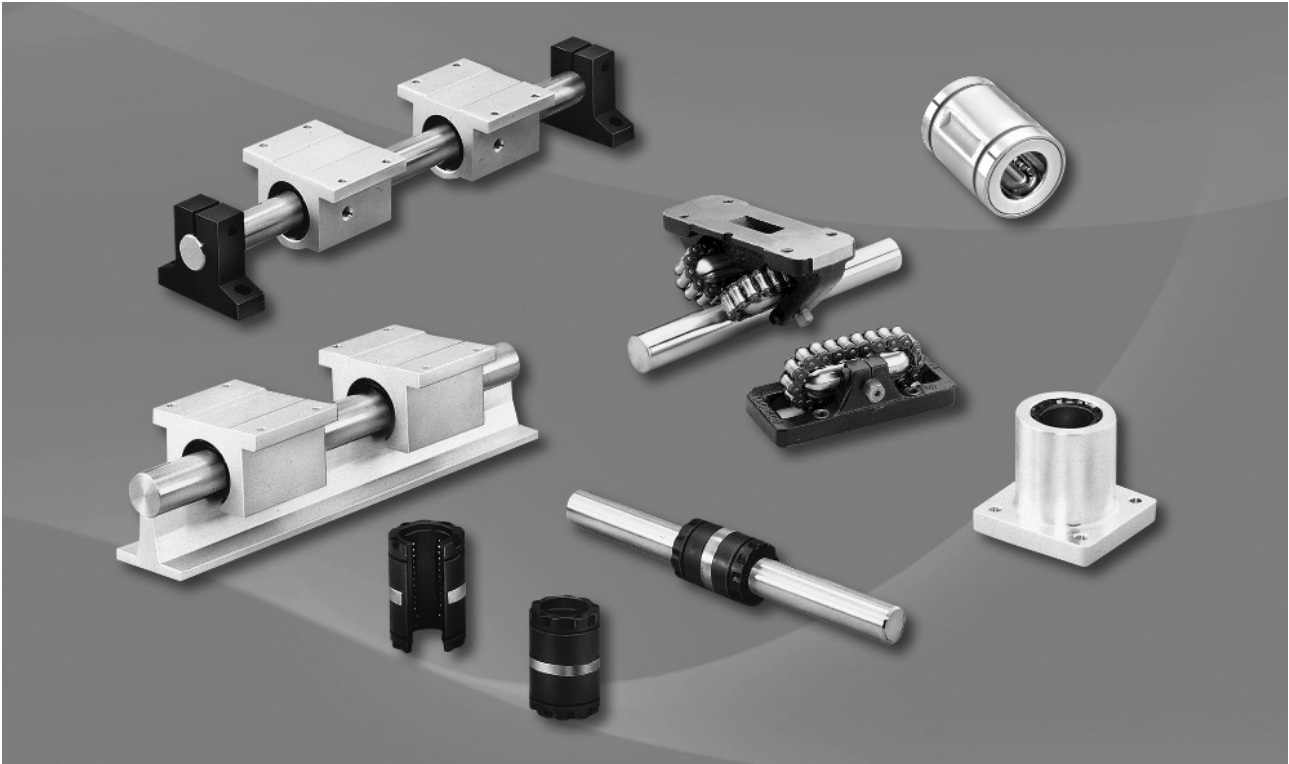
Since the invention of the linear anti-friction Ball Bushing bearing by Thomson over 50 years ago, the Thomson precision linear products have meant high quality, innovative products. Today, Thomson continues producing and developing these high quality, innovative products. The Thomson Profile Rail assortment consists of the Next Generation Profile Rail “500 Series” Ball and Roller Linear Guides, compact miniature “MicroGuide,™” lightweight “T-Series,” and AccuMini. This page is a quick overview of Thomson Profile Rail, complete details of which can be found in the Thomson Profile Rail Catalog.

|   | Description   | Product Overview  | Comments  |
|---|---|---|---|
| <b>500 Series Ball</b><br>    | Highly configurable standard ball guidance system designed per DIN standard 645 to support a load and allow low friction, precise linear translation of that load.  | <ul style="list-style-type: none"> <li>• High rigidity with high dynamic and static load capacities.</li> <li>• 7 carriage designs with multiple accuracies and preloads available.</li> <li>• Replaces Thomson AccuGlide.</li> <li>• Sizes 15, 20, 25, 30, 35, 40mm</li> </ul> | <p><i>(Applies to 500 Series Ball and 500 Series Roller)</i></p> <ul style="list-style-type: none"> <li>• Standard 6m lengths are longest offered in the industry - minimizes need for butt joints.</li> <li>• “Lube for life” lubrication block allows for low maintenance and eliminates need for lube lines.</li> <li>• Modular accessories allow for on-site upgrade without having to remove carriages from rail.</li> <li>• Double back configuration provides high roll moment resistance - removes the need for dual or wide rails in some applications.</li> </ul> |
| <b>500 Series Roller</b><br> | Highly configurable standard roller guidance system designed per DIN standard 645 to support a load and allow low friction, precise linear translation of that load - larger contact surface of roller elements (versus ball) results in greater load capacity. | <ul style="list-style-type: none"> <li>• Extremely high rigidity and dynamic/static load capacities</li> <li>• 4 carriage designs with multiple accuracies and preloads</li> <li>• Replaces Thomson AccuMax</li> <li>• Sizes 25, 35, 45, 55, 65mm</li> </ul>                    |   |
| <b>AccuMini</b><br>          | Low profile design that provides high roll moment capacity in a smaller envelope.   | <ul style="list-style-type: none"> <li>• Sizes 10, 15, 20mm</li> </ul>  | <ul style="list-style-type: none"> <li>• Gothic arch ball design allows for quiet, low friction movement at high speeds.</li> <li>• Full-length integral wiper protects bearing from contaminants.</li> </ul>   |
| <b>MicroGuide</b><br>        | Stainless steel miniature guidance system that provides corrosion resistance for clean room and wash-down applications.   | <ul style="list-style-type: none"> <li>• 440C SS construction</li> <li>• High precision accuracy (up to <math>\pm 0.010\text{mm}</math>)</li> <li>• Standard and wide carriage styles</li> <li>• Sizes 5, 7, 9, 12, 15mm</li> </ul>   | <ul style="list-style-type: none"> <li>• Ideal for small design envelope requirements in semiconductor processing equipment and medical diagnostic equipment.</li> <li>• Quiet operation</li> </ul>   |
| <b>T-Series</b><br>          | Aluminum guidance system utilizing hardened steel inserts in carriages and rails that, in turn, provide a low-weight solution for critical, high performance applications.  | <ul style="list-style-type: none"> <li>• U-channel design accommodates misalignment from machine bases or installation errors.</li> <li>• Sizes 20, 25, 35mm</li> </ul>   | <ul style="list-style-type: none"> <li>• An excellent high precision guide alternative for low-weight applications.</li> <li>• No special tools or gauges to align rail, allowing for low cost of installation.</li> </ul>  |

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**Ball Bushing Bearings Overview**

**Linear Bearings Overview**



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## Ball Bushing Bearings Overview

# Thomson Linear Motion Components

The RoundRail Advantage...



### Super Smart Ball Bushing Bearings

**Thomson Super Smart Ball Bushing Bearings represent a major advancement for Linear bearing technology, worldwide.**

This patented self-aligning linear bearing provides twice the load carrying capacity or eight times the travel life of the industry standard Thomson Super Ball Bushing bearing. This dramatic increase in load capacity allows the use of less expensive drive motors, linkages, gears and ball screws. The unique Super Smart design allows the bearing to maintain its diametrical fit up when installed in housings that are soft or slightly out-of-round. Super Smart Bearings utilize the RoundRail Advantage that eliminates the need for derating factors commonly used with linear guides. The Bearings are called "Smart" because their universally self-aligning, double-track design incorporates engineering concepts that literally render old style conventional Bearings obsolete. Available in inch and metric sizes from over 1800 distributors worldwide. (See Page 20)



### Super Smart Ball Bushing Pillow Blocks

**Thomson Super Smart Ball Bushing Pillow Blocks available in closed, adjustable and open styles in both single and twin versions.**

To minimize installation time and cost, the Super Smart Ball Bushing bearing can be ordered factory-installed in an industry standard single or twin pillow block. The closed type pillow block is used in end supported applications for spanning or bridging a gap. The open style is used in continuously supported applications when maximum rigidity and stiffness is required. Each Super Smart Pillow block is complete with integral double acting seals which keep out contaminants, retain lubrication and maximize bearing life. Since each Pillow Block is dimensionally interchangeable with the industry standard Thomson Super Ball Bushing Pillow Block, system performance improvements can be realized immediately. All Pillow Blocks are available and in stock from over 1800 authorized distributors worldwide. (See Page 27)



### Super Ball Bushing Bearings

**Industry standard self-aligning Super Ball Bushing Bearings available in twenty three sizes and configurations.**

Super Ball Bushing Bearings offer three times the load capacity or twenty seven times the life of conventional linear Bearings. Industry standard self-aligning Super Ball Bushing Bearings ease installation and minimize wear from minor bore misalignment. Super Ball Bushing Bearings can achieve speeds up to 10 ft/s and accelerations up to 450 ft/s<sup>2</sup> without the derating factors commonly found in linear guide products. With a coefficient of friction as low as .001, Super Ball Bushing Bearings provide a quick easy replacement for high friction plain Bearings. The wear-resistant, engineered-polymer retainers and outer sleeves reduce inertia and noise in critical, high speed applications. Super Ball Bushing Bearings are available in both open and closed versions from over 1800 distributors worldwide. (See Page 43)



## Ball Bushing Bearings Overview

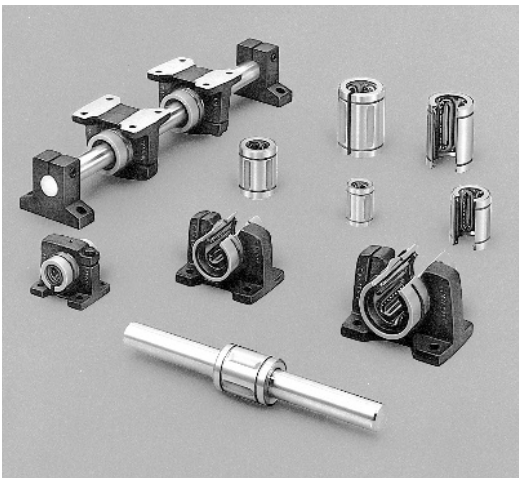
... **The RoundRail Advantage** - The inherent ability of a RoundRail Ball Bushing bearing system to accommodate torsional misalignment (caused by inaccuracies in carriage or base machining or by machine deflection) with little increase in stress to the bearing components.



### Super Ball Bushing Bearing Pillow Blocks

Available in closed, adjustable and open styles in both single and twin versions.

Thomson Super Ball Bushing Bearings are also available factory installed in single or twin pillow blocks. Super Ball Bushing bearing pillow blocks are provided with integral, double acting seals that keep out contaminants and retain lubrication, maximizing system performance and life. Twin versions provide up to twice the load capacity or eight times the life of single versions, allowing the use of smaller and less expensive drives, motors and ball screws. When replacing v-ways and flat-ways, the Super Pillow Block's low coefficient of friction reduces power consumption and provides important design economies. In stock and available in sizes from 1/4 to 2 inch from over 1800 distributors worldwide. (See Page 52)



### Precision Steel Ball Bushing Bearing Products

Rigid, Precision Steel Ball Bushing Bearing design eliminates binding and chatter found in high friction plain Bearings.

Precision Steel Ball Bushing Bearings are available in an open version for continuously supported applications and a closed version for end supported applications. Extra precision and adjustable versions are available for end supported applications requiring higher precision and repeatability. Precision Steel Ball Bushing bearing products are also available factory installed in a self-aligning, malleable iron pillow block minimizing installation time and cost. The all-steel design makes the Precision Steel Ball Bushing bearing product line perfect for replacing plain Bearings in high temperature applications. Available in 72 sizes and configurations from over 1800 distributors worldwide. Now available in 440 stainless steel, ideal for harsh and high temperature environments. (See Page 66)



### Miniature Instrument Ball Bushing Bearings

High Accuracy and Compactness for Instrumentation Level Applications.

The accuracy level and compact size make the Instrument Ball Bushing bearing ideal for small mechanisms or devices that require high repeatability and responsiveness. When replacing high friction plain Bearings, the Instrument Ball Bushing Bearings' constant low coefficient of friction eliminates stick-slip and provides smooth linear performance. Each Instrument Ball Bushing bearing can be provided with a matched 60 Case LinearRace shafting for minimum fit-up, optimizing system performance and accuracy. In stock and available in sizes 1/8, 3/16 and 1/4 inch from over 1800 distributors, worldwide. (See Page 77)

## Thomson Linear Motion Components

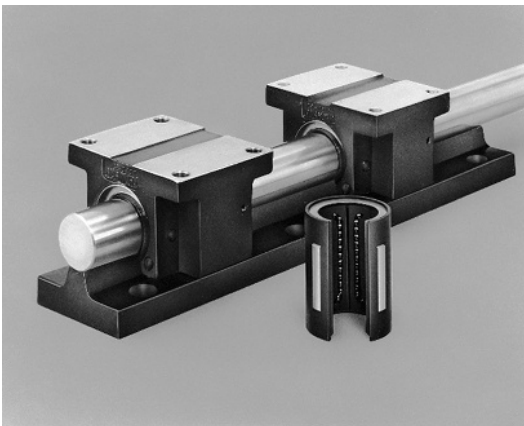
The RoundRail Advantage...



### Die Set Ball Bushing Bearings

**Available in two accuracy classes and suitable for a variety of industrial applications.**

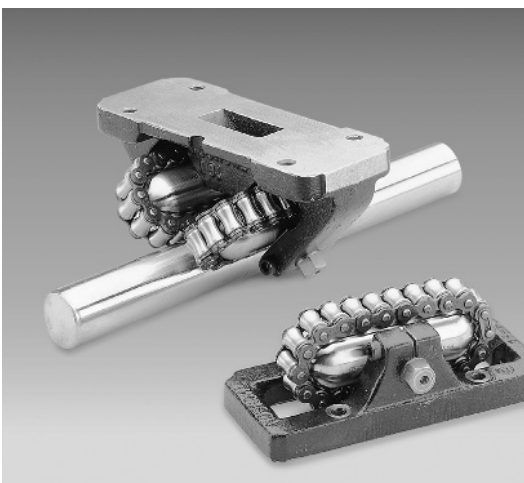
Thomson Die Set Ball Bushing Bearings are designed to fit the mounting holes of the punch holder in standard dies. When replacing high friction plain Bearings in standard dies, the result is less machine downtime and increased efficiency. With steady state speeds up to 10 ft/s, the Die Set bearing will provide faster cycle times, with improvements in production rates realized immediately. Matched precision ground 60 Case LinearRace allows for a close fit-up between the shaft and the LinearRace shafting and bearing providing critical die alignment. When normal machine service requires bearing replacement, the Die Set bearing can be removed by simply unbolting the toe clamps. Available in 1, 1 1/4, 1 1/2 and 2 inch sizes from over 1800 distributors worldwide. (See Page 79)



### XR Ball Bushing Bearing Products

**High load capacity and rigidity combined with the RoundRail Advantage.**

The XR Ball Bushing bearing provides five times the load capacity or 125 times the life of conventional linear Bearings. This increase in bearing performance significantly reduces downtime and maintenance, while increasing machine reliability. When replacing v-ways and flat-ways, XR Ball Bushing Bearings allow travel speeds up to 5 ft/s and accelerations up to 225 ft/s<sup>2</sup> without a sharp increase in power consumption. XR Ball Bushing Bearings also provide three times the rigidity of conventional Ball Bushing Bearings reducing deflection in critical machining applications. Pillow Blocks are available with factory installed XR Ball Bushing Bearings and integral seals. 60 Case LinearRace shafting available pre-mounted on standard extra rigid LinearRace support rails. Available in 2, 3 and 4 inch sizes from over 1800 distributors worldwide. (See Page 87)



### RoundWay Linear Roller Bearings

**Low friction roller Bearings with up to 20 times the load capacity of conventional linear Bearings.**

These patented, self-aligning linear roller Bearings have over 20 times the load capacity of a conventional linear ball bearing. This dramatic increase in bearing load capacity allows designers to optimize system compactness and minimize hardware costs. Combining the self-aligning feature with the RoundRail Advantage minimizes installation time and assures trouble-free operation. RoundWay and RoundWay II Bearings can achieve operating speeds up to 10 ft/s without the derating factors commonly seen with linear guides. When normal machine maintenance is required, RoundWay Bearings can be quickly and cost-effectively replaced, without scrapping the entire system, a major problem when servicing some linear guides. RoundWay Bearings are available from over 1800 authorized distributors worldwide. (See Page 94)

## Thomson Linear Motion Components

The RoundRail Advantage...




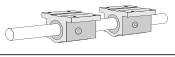
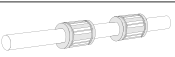
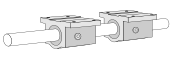
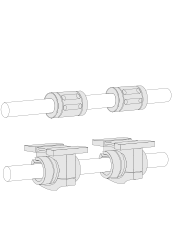
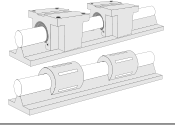
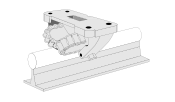
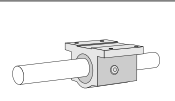
### FluoroNyliner Bushing Bearings

**Thomson FluoroNyliner Bushing Bearings offer:**

- High performance in contaminated, washdown, or submerged environments
- Proprietary, self-lubricating, composite bearing liner TEP 950
- Low friction, ideally suited for linear and rotary motion
- Precision machined aluminum sleeve
- Excellent performance in high vibration and mechanical shock applications
- Corrosion resistance
- Product availability in industry standard sizes from 0.25" to 2.00"
- Eight bearing configurations, include closed, open, self-aligning, precision and compensated IDs
- Load capacities up to 14,000 lb<sub>f</sub>
- Integral seals
- Closed, Open, and Flanged Pillow Blocks available in single or twin versions
- Available from over 1800 distributors worldwide

## Thomson Product Line Overview

### Ball Bushing Bearings

|   | Page Number   | Imperial (Inch)              |      |     |          |          |          |          |          |          |
|---|---|------------------------------|------|-----|----------|----------|----------|----------|----------|----------|
|   |   | 1/8                          | 3/16 | 1/4 | 3/8      | 1/2      | 5/8      | 3/4      | 1        |          |
| <b>Super Smart</b>  |   |                              |      |     |          |          |          |          |          |          |
|    | <b>Ball Bushing Bearings</b><br>corrosion resistant option available      | inch: 20<br>metric: 120      |      |     |          |          | ○        | ○        | ○        | ○        |
|    | <b>Ball Bushing Pillow Blocks</b><br>corrosion resistant option available | inch: 27<br>metric: 126      |      |     |          |          | ○<br>STA | ○<br>STA | ○<br>STA | ○<br>STA |
| <b>Super</b>  |   |                              |      |     |          |          |          |          |          |          |
|    | <b>Ball Bushing Bearings</b><br>corrosion resistant option available      | inch: 43 & 56<br>metric: 141 |      | ●   | ●        | ●        | ○        | ○        | ○        | ○        |
|    | <b>Ball Bushing Pillow Blocks</b><br>corrosion resistant option available | inch: 52 & 61<br>metric: 144 |      |     | ●<br>STA | ●<br>STA | ○<br>STA | ○<br>STA | ○<br>STA | ○<br>STA |
| <b>Precision Bearings</b>   |   |                              |      |     |          |          |          |          |          |          |
|   | <b>A-Bearings and Pillow Blocks</b><br>available in stainless steel       | 73                           |      |     | ●        | ●<br>SA  | ○<br>SA  | ○<br>SA  | ○<br>SA  | ○<br>SA  |
|   | <b>MultiTrac</b><br>available in stainless steel                          | 134                          |      |     |          |          |          |          |          |          |
|   | <b>Instrument</b>   | 177                          | ●    | ●   | ●        |          |          |          |          |          |
|   | <b>Die Set</b>  | 79                           |      |     |          |          |          |          |          | ●        |
| <b>XR Extra Rigid</b>   |   |                              |      |     |          |          |          |          |          |          |
|  | <b>Ball Bushing Bearings and Pillow Blocks</b>                            | 87                           |      |     |          |          |          |          |          |          |
| <b>Specialty</b>  |   |                              |      |     |          |          |          |          |          |          |
|  | Cartridge bearing   | 50                           |      |     | ●<br>ST  | ●<br>ST  | ●<br>ST  |          |          |          |
|   | RoundWay  | 94                           |      |     |          |          | ●        |          |          | ●        |
| <b>FluoroNyliner</b>  |   |                              |      |     |          |          |          |          |          |          |
|  | <b>Bushing bearings</b>   | 102                          |      |     |          | ○        | ○        | ○        | ○        | ○        |
|   | <b>Pillow Blocks</b>  | 107                          |      |     |          | ○<br>STF | ○<br>STF | ○<br>STF | ○<br>STF | ○<br>STF |

- Closed Type
- Open Type
- ◎ Closed and Open Type
- S Single Configuration
- T Twin Configuration
- A Adjustable Configuration
- F Flanged Configuration

Thomson Product Line Overview

| Imperial (Inch) |       |     |       |    |    | Metric (mm) |     |    |     |     |     |     |     |    |     |     |
|-----------------|-------|-----|-------|----|----|-------------|-----|----|-----|-----|-----|-----|-----|----|-----|-----|
| 1 1/4           | 1 1/2 | 2   | 2 1/2 | 3  | 4  | 5           | 8   | 10 | 12  | 16  | 20  | 25  | 30  | 35 | 40  | 50  |
| ○               | ○     |     |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   |     |
| ○               | ○     |     |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   |     |
| STA             | STA   |     |       |    |    |             | STA |    | STA | STA | STA | STA | STA |    | STA |     |
| ○               | ○     | ○   |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   | ○   |
| ○               | ○     | ○   |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   |    | ○   | ○   |
| STA             | STA   | STA |       |    |    |             | STA |    | STA | STA | STA | STA | STA |    | STA | STA |
| ○               | ○     | ○   | ○     | ○  | ○  |             |     |    |     |     |     |     |     |    |     |     |
| SA              | SA    | SA  | SA    | SA | SA |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             | ●   |    | ○   | ○   | ○   | ○   | ○   | ○  | ○   |     |
|                 |       |     |       |    |    |             | SA  |    | SA  | SA  | SA  | SA  | SA  | SA | SA  |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
| ●               | ●     | ●   |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       | ○   |       |    | ○  |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       |     |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
|                 |       | ●   |       | ●  |    | ●           |     |    |     |     |     |     |     |    |     |     |
| ○               | ○     | ○   |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
| ○               | ○     | ○   |       |    |    |             |     |    |     |     |     |     |     |    |     |     |
| STF             | STF   | STF |       |    |    |             |     |    |     |     |     |     |     |    |     |     |

## Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Bearing Products

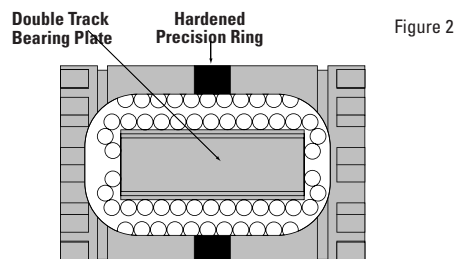
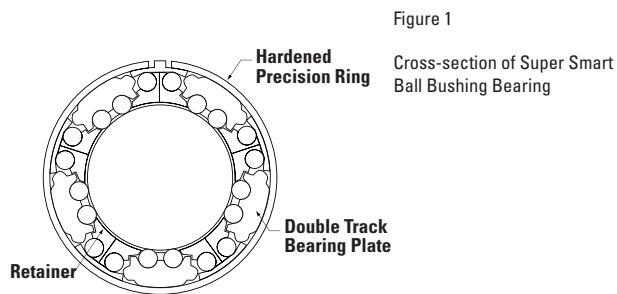


### Thomson Super Smart Ball Bushing Bearing products offer:

- Up to six times the load capacity or 216 times the travel life of conventional linear bearings.
- Twice the load capacity or eight times the travel life of industry standard Thomson Super Ball Bushing bearings.
- A precision super finished, dual track bearing plate for optimum system smoothness and performance.
- A universal self-alignment feature, that compensates for misalignment of housing bores and 60 Case LinearRace shaft deflection, optimizes load distribution between ball tracks and assures uniform ball loading over the entire length of the bearing plate. Installation time and cost is minimized while bearing performance and life is maximized.
- A technologically advanced design that allows the bearing to maintain its diametrical fit-up when installed in a housing that is slightly out-of-round.
- Longer travel life and minimal machine downtime when replacing conventional linear bearings or the industry standard Super Ball Bushing bearing.
- The RoundRail Advantage combined with universal self-alignment eliminating the need for derating factors commonly required when using linear guides.
- A coefficient of friction as low as .001. This allows the use of smaller less expensive motors, belts, gears and ball screws, when replacing high friction, plain bearings.
- Closed and open configurations.
- Double lip integral wipers that keep out dirt while retaining lubrication. Travel life is maximized.
- Worldwide availability from over 1500 authorized distributors.

## Super Smart Ball Bushing Bearings

The new Super Smart Ball Bushing Bearing represents a major advancement in linear bearing technology worldwide. The Super Smart Ball Bushing Bearing offers twice the load capacity or eight times the travel life of the industry standard Thomson Super Ball Bushing bearing. An enormous technological breakthrough, considering the Super Ball Bushing bearing already offers three times the load capacity or twenty-seven times the travel life of conventional linear bearings.



### Technologically Advanced Design

The load carrying component of the Super Smart Ball Bushing Bearing is the combination of four hardened bearing quality steel components (Figures 1 & 2).

The first component is the steel outer ring, which allows the bearing to maintain its diametrical fit-up even when installed in a housing that is slightly out-of-round. The unique ring design also allows for bearing adjustment and the removal of diametrical clearance. The second component is the precision super finished double track bearing plate that provides twice the load capacity and features universal self-alignment.

The third component is the rolling element. Each Super Smart Ball Bushing Bearing utilizes precision ground balls manufactured to the highest quality standards for roundness and sphericity. The result is maximum load capacity, travel life and performance.

The last component is the 60 Case LinearRace shaft that acts as the inner race to the Super Smart Ball Bushing Bearing. Each 60 Case LinearRace shaft is manufactured to the highest quality standards for roundness, straightness, surface finish and hardness. Roundness is held under eighty millionths of an inch; straightness to .002 inches per foot; surface finish under twelve microinch and hardness between 60-65 HRC. The combination of inner and outer race or 60 Case LinearRace shaft and Super Smart Ball Bushing Bearing provides the basis for the RoundRail Advantage.

### The RoundRail Advantage

The RoundRail Advantage is the inherent ability of a Super Smart Ball Bushing Bearing system to accommodate torsional misalignment (caused by inaccuracies in carriage or base machining or by machine deflection) with little increase in stress to bearing components. Installation time and cost are minimized and system performance is maximized.

## Super Smart Ball Bushing Bearings

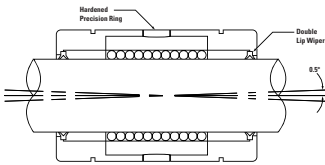


Figure 3

### Universal Self-Alignment

The bearing plate of the Super Smart Ball Bushing Bearing is designed with many unique and technologically advanced features. The universal self-alignment feature assures that the Super Smart Ball Bushing Bearing will achieve maximum performance regarding load capacity, travel life, smooth operation and coefficient of friction. The three components that make up universal self-alignment are **Rock**, **Roll** and **Yaw**.

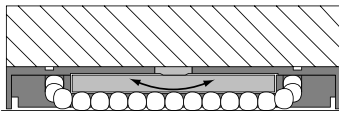


Figure 4

Close-up of hardened precision ring, showing how the bearing plate self-aligns (rocks) about the curved surface of the ring.

### Rock

The bearing plate is designed to rock  $0.5^\circ$  about the hardened precision ground outer ring (Figures 3 & 4). This self-aligning feature allows the Super Smart Ball Bushing Bearing to absorb misalignment caused by inaccuracies in housing bore alignment or 60 Case LinearRace shaft deflection. This rocking capability provides smooth entry and exit of the precision balls into and out of the load zone assuring a constant low coefficient of friction. By compensating for misalignment, each bearing ball in the load carrying area is uniformly loaded providing maximum load capacity.

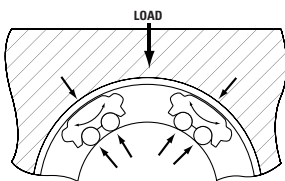


Figure 5

Close-up of double track bearing plates showing how they self-align (roll) to evenly distribute the load on each of their two ball tracks.

### Roll

The second key design feature of the Super Smart Ball Bushing Bearing plate is its ability to **Roll**. The bearing plate is designed with the radius of its outer surface smaller than the inside radius of the precision outer ring (Figure 5). This allows the bearing plate to compensate for torsional misalignment and evenly distribute the load on each of its two ball tracks. The roll component assures maximum load capacity and travel life.

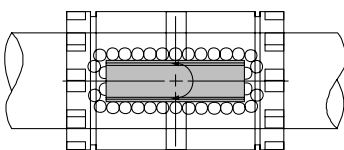


Figure 6

Bearing plates rotate about their center to prevent skewing relative to the 60 Case LinearRace shaft.

### Yaw

The shape formed by the **Rock** and **Roll** features allows the Super Smart Ball Bushing Bearing plate to rotate about its center (Figure 6). This allows the Super Smart Ball Bushing Bearing to absorb skew caused by misalignment. The result is a constant low coefficient of friction and maximum bearing performance.

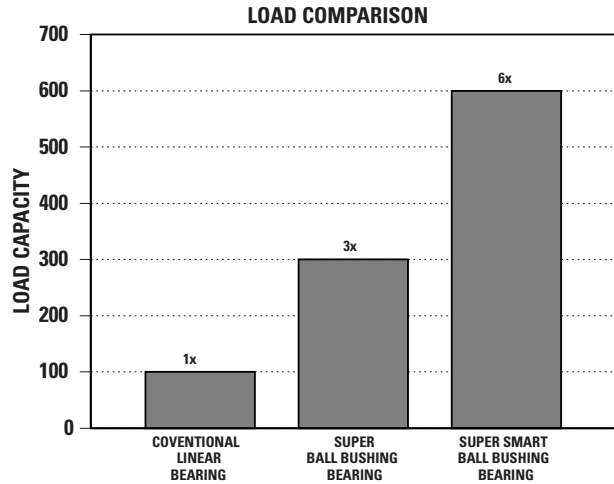


## Super Smart Ball Bushing Bearings

# The Super Smart Advantage

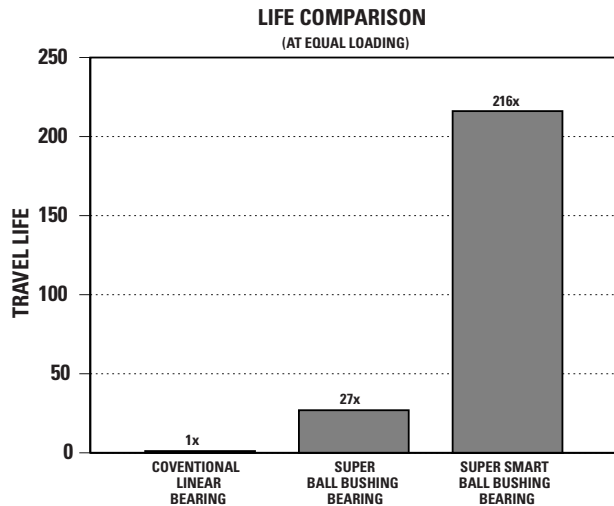
### Advantage: Load Capacity

The Super Smart Ball Bushing Bearing provides twice the load capacity of the industry standard Thomson Super Ball Bushing bearing and six times the load capacity of conventional linear bearings.



### Advantage: Travel Life

The Super Smart Ball Bushing Bearing provides eight times the travel life of the industry standard Thomson Super Ball Bushing bearing and 216 times the travel life of conventional linear bearings.



**Inch – Super Smart Ball Bushing Bearings**

**Part Number Description and Specification**

**Super Smart Ball Bushing Bearings (Closed Type) for End Supported Applications**

**SSU-16-WW-CR**

| Type | Description                       | Size | Nominal Diameter | Option | Description         | Option | Description                        |
|------|-----------------------------------|------|------------------|--------|---------------------|--------|------------------------------------|
| SSU  | Super Smart Ball Bushing bearings | 8    | .500             | –      | No Wipers           | –      | Standard                           |
|      |                                   | 10   | .625             | W      | One Integral Wiper  | CR     | Corrosion Resistant                |
|      |                                   | 12   | .750             | WW     | Two Integral Wipers | NB     | Nylon Balls                        |
|      |                                   | 16   | 1.000            |        |                     | DP     | Dry Packed                         |
|      |                                   | 20   | 1.250            |        |                     | LL     | Lubricated with Thomson LinearLube |
|      |                                   | 24   | 1.500            |        |                     |        |                                    |

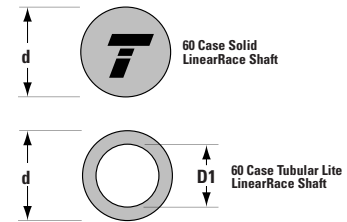
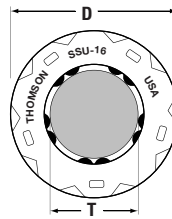
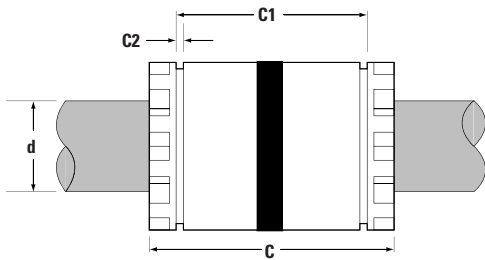
**Super Smart Ball Bushing Pillow Blocks (Closed Type) for End Supported Applications**

**SSUPB-16-CR**

| Type    | Description  | Size | Nominal Diameter | Option | Description                        |
|---------|--|------|------------------|--------|------------------------------------|
| SSUPB   | Super Smart Ball Bushing Pillow Blocks                 | 8    | .500             | –      | Standard                           |
| SSUPBA  | Super Smart Ball Bushing Adjustable Pillow Blocks      | 10   | .625             | CR     | Corrosion Resistant                |
| SSUTWN  | Super Smart Ball Bushing Twin Pillow Blocks            | 12   | .750             | NB     | Nylon Balls                        |
| SSUTWNA | Super Smart Ball Bushing Twin Adjustable Pillow Blocks | 16   | 1.000            | LL     | Lubricated with Thomson LinearLube |
| SSUFB   | Super Smart Ball Bushing Flanged Pillow Blocks         | 20   | 1.250            |        |                                    |
| SSUTFB  | Super Smart Ball Bushing Flanged Twin Pillow Blocks    | 24   | 1.500            |        |                                    |

Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Bearings (Closed Type) for End Supported Applications



Super Smart Ball Bushing Bearings (Closed Type) and 60 Case LinearRace Shafting (Dimensions in inches)

| Part Number <sup>(2)</sup> |                         |                          |                     | Nominal Diameter | Length C    | C1          | C2 min. | Number of Ball Circuits | Ball Bushing bearing Mass lb | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|----------------------------|-------------------------|--------------------------|---------------------|------------------|-------------|-------------|---------|-------------------------|------------------------------|--|-------------------------------------|--|---------------------------------------|
| Without Integral Wipers    | With one Integral Wiper | With two Integral Wipers | 60 Case Linear Race |                  |             |             |         |                         |                              |  |                                     |  |                                       |
| SS6U-8                     | SS6U-8-W                | SS6U-8-WW                | 1/2 L               | .500             | 1.250/1.230 | 1.032/1.012 | .050    | 6                       | .07                          | .04  | .06                                 | –  | –                                     |
| SSU-10                     | SSU-10-W                | SSU-10-WW                | 5/8 L               | .625             | 1.500/1.480 | 1.125/1.095 | .055    | 10                      | .12                          | .04  | .09                                 | –  | –                                     |
| SSU-12                     | SSU-12-W                | SSU-12-WW                | 3/4 L               | .750             | 1.625/1.605 | 1.285/1.255 | .055    | 10                      | .16                          | .06  | .13                                 | .08  | .46/.41                               |
| SSU-16                     | SSU-16-W                | SSU-16-WW                | 1 L                 | 1.000            | 2.250/2.230 | 1.901/1.871 | .068    | 10                      | .29                          | .08  | .22                                 | .16  | .62/.56                               |
| SSU-20                     | SSU-20-W                | SSU-20-WW                | 1 1/4 L             | 1.250            | 2.625/2.600 | 2.031/1.991 | .068    | 10                      | .52                          | .08  | .35                                 | –  | –                                     |
| SSU-24                     | SSU-24-W                | SSU-24-WW                | 1 1/2 L             | 1.500            | 3.000/2.970 | 2.442/2.402 | .086    | 10                      | .99                          | .08  | .50                                 | .33  | .93/.84                               |

| Part Number <sup>(2)</sup> |                         |                          |               | Working Bore Diameter T | Recommended Housing Bore |                        | 60 Case LinearRace Diameter d | Ball Bushing bearing/60 Case LinearRace Fit Up ‡ |      | Dynamic <sup>(1)</sup> Load Capacity lb <sub>i</sub> |
|----------------------------|-------------------------|--------------------------|---------------|-------------------------|--------------------------|------------------------|-------------------------------|--|------|--|
| Without Integral Wipers    | With one Integral Wiper | With two Integral Wipers | Fixed D       |                         | Adjustable D             | Fixed Diameter Housing |                               | Adjustable Diameter Housing (Before Adjustment)  |      |  |
| SS6U-8                     | SS6U-8-W                | SS6U-8-WW                | .5000/.4995   | .8755/.8750             | .8760/.8750              | .4995/.4990            | .0015C/.0000                  | .002C/.0000                                      | 265  |  |
| SSU-10                     | SSU-10-W                | SSU-10-WW                | .6250/.6245   | 1.1255/1.1250           | 1.1260/1.1250            | .6245/.6240            | .0015C/.0000                  | .002C/.0000                                      | 620  |  |
| SSU-12                     | SSU-12-W                | SSU-12-WW                | .7500/.7495   | 1.2505/1.2500           | 1.2510/1.2500            | .7495/.7490            | .0015C/.0000                  | .002C/.0000                                      | 1130 |  |
| SSU-16                     | SSU-16-W                | SSU-16-WW                | 1.0000/.9995  | 1.5630/1.5625           | 1.5635/1.5625            | .9995/.9990            | .0015C/.0000                  | .002C/.0000                                      | 1900 |  |
| SSU-20                     | SSU-20-W                | SSU-20-WW                | 1.2500/1.2494 | 2.0008/2.0000           | 2.0010/2.0000            | 1.2495/1.2490          | .0018C/.0001P                 | .002C/.0001P                                     | 2350 |  |
| SSU-24                     | SSU-24-W                | SSU-24-WW                | 1.5000/1.4994 | 2.3760/2.3750           | 2.3760/2.3750            | 1.4994/1.4989          | .0021C/.0000                  | .0021C/.0000                                     | 3880 |  |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

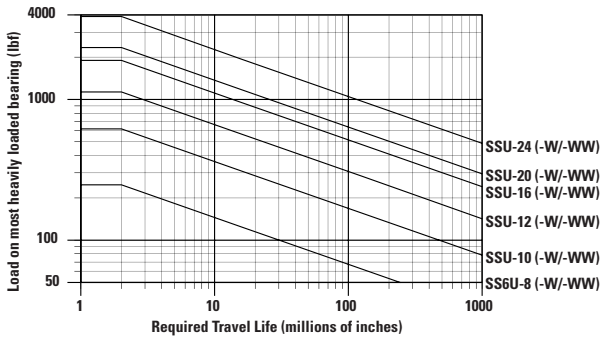
(2) For part number description and specifications see page 24. For specifications on seals and retaining rings see the Accessories section.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Smart Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

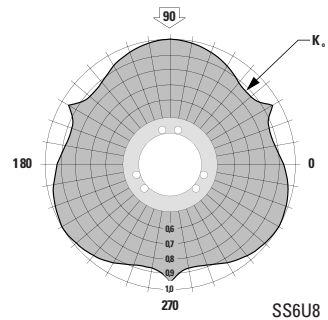
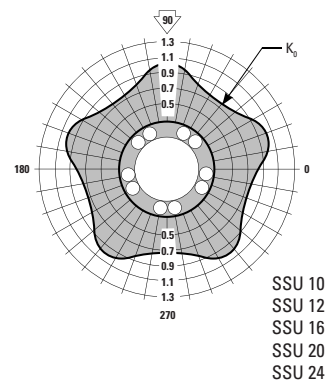
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

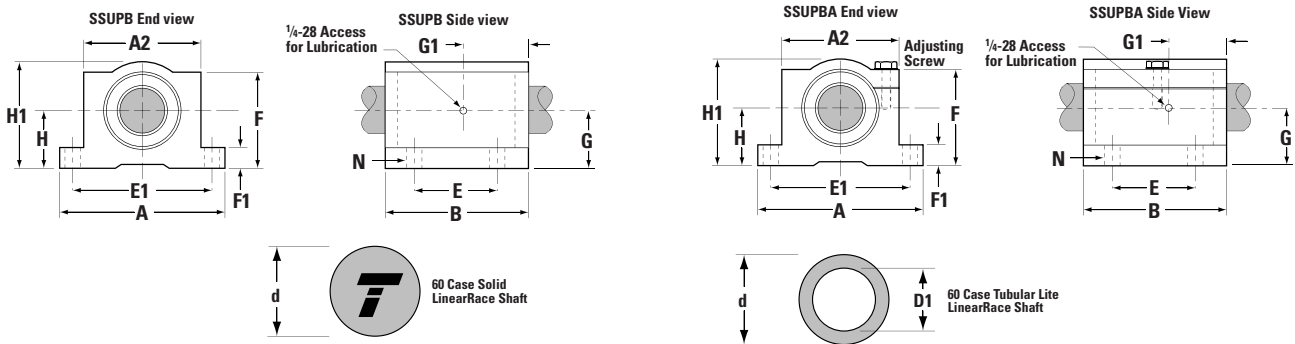
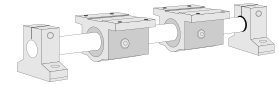
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Pillow Blocks (Closed and Adjustable Type) for End Supported Applications



**Super Smart Ball Bushing Pillow Blocks (Closed & Adjustable Types, seal at both ends) and LinearRace** (Dim. in inches)

| Part Number <sup>(2)</sup> |            | 60 Case LinearRace | Nominal Diameter | H ±.003 | H1   | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|----------------------------|------------|--------------------|------------------|---------|------|-------------------------------|--|-------------------------------------|--|---------------------------------------|
| Fixed                      | Adjustable |                    |                  |         |      |                               |  |                                     |  |                                       |
| SS6UPB-8                   | SS6UPBA-8  | 1/2 L              | .500             | .687    | 1.25 | .4995/.4990                   | .04  | .06                                 | –  | –                                     |
| SSUPB-10                   | SSUPBA-10  | 5/8 L              | .625             | .875    | 1.63 | .6245/.6240                   | .04  | .09                                 | –  | –                                     |
| SSUPB-12                   | SSUPBA-12  | 3/4 L              | .750             | .937    | 1.75 | .7495/.7490                   | .06  | .13                                 | .08  | .46/.41                               |
| SSUPB-16                   | SSUPBA-16  | 1 L                | 1.000            | 1.187   | 2.19 | .9995/.9990                   | .08  | .22                                 | .16  | .62/.56                               |
| SSUPB-20                   | SSUPBA-20  | 1 1/4 L            | 1.250            | 1.500   | 2.81 | 1.2495/1.2490                 | .08  | .35                                 | –  | –                                     |
| SSUPB-24                   | SSUPBA-24  | 1 1/2 L            | 1.500            | 1.750   | 3.25 | 1.4994/1.4989                 | .08  | .50                                 | .33  | .93/.84                               |

| Part Number <sup>(2)</sup> |            | A    | A2   | B    | E ±.010 | E1 ±.010 | F    | F1  | G    | G1   | N    |      | Pillow Block Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>f</sub> |
|----------------------------|------------|------|------|------|---------|----------|------|-----|------|------|------|------|----------------------|--|
| Fixed                      | Adjustable |      |      |      |         |          |      |     |      |      | Hole | Bolt |                      |  |
| SS6UPB-8                   | SS6UPBA-8  | 2.00 | 1.38 | 1.69 | 1.000   | 1.688    | 1.13 | .25 | .69  | .72  | .16  | #6   | .23                  | 265  |
| SSUPB-10                   | SSUPBA-10  | 2.50 | 1.75 | 1.94 | 1.125   | 2.125    | 1.44 | .28 | .88  | .83  | .19  | #8   | .51                  | 620  |
| SSUPB-12                   | SSUPBA-12  | 2.75 | 1.88 | 2.06 | 1.250   | 2.375    | 1.56 | .31 | .94  | .89  | .19  | #8   | .62                  | 1130   |
| SSUPB-16                   | SSUPBA-16  | 3.25 | 2.38 | 2.81 | 1.750   | 2.875    | 1.94 | .38 | 1.19 | 1.27 | .22  | #10  | 1.24                 | 1900   |
| SSUPB-20                   | SSUPBA-20  | 4.00 | 3.00 | 3.63 | 2.000   | 3.500    | 2.50 | .44 | 1.50 | 1.68 | .22  | #10  | 2.57                 | 2350   |
| SSUPB-24                   | SSUPBA-24  | 4.75 | 3.50 | 4.00 | 2.500   | 4.125    | 2.88 | .50 | 1.75 | 1.86 | .28  | .25  | 3.94                 | 3880   |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

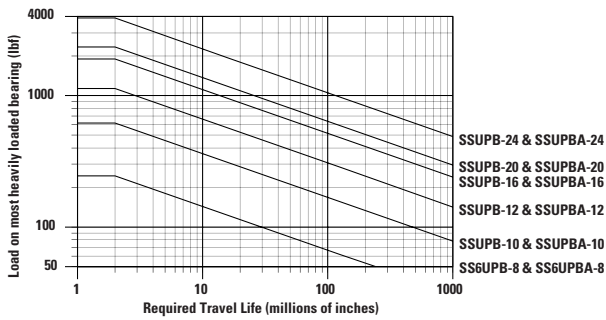
(2) For part number description and specifications see page 24.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Smart Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

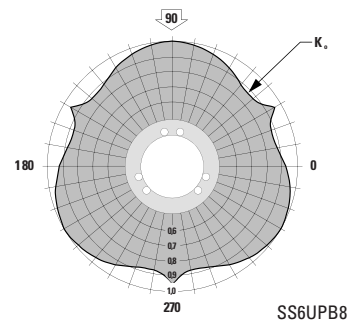
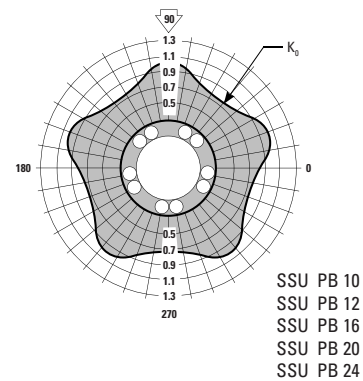
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

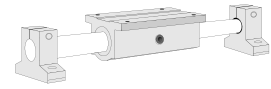
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

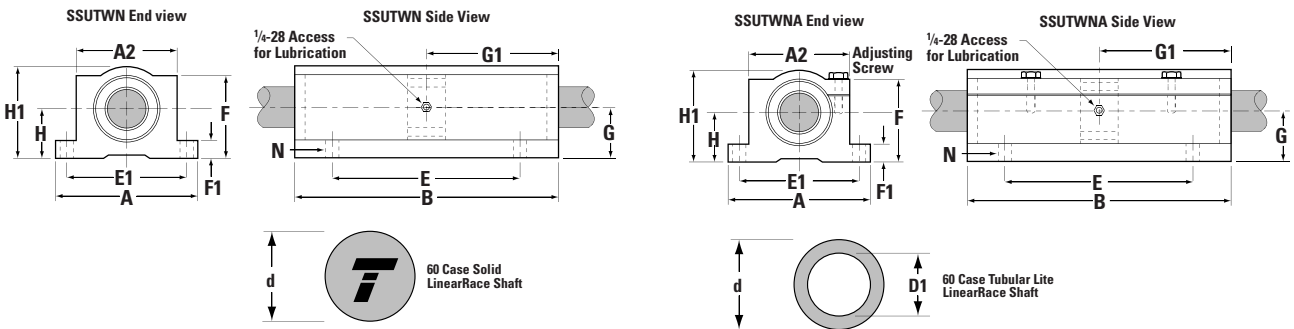


Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Twin Pillow Blocks (Closed and Adjustable Type) for End Supported Applications



Inch Ball Bearing Bushing



Super Smart Ball Bushing Twin Pillow Blocks (Closed Type, seal at both ends) and 60 Case LinearRace Shaft (Dim. in in.)

| Part Number <sup>(2)</sup> |            | 60 Case LinearRace | Nominal Diameter | H ±.003 | H1   | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|----------------------------|------------|--------------------|------------------|---------|------|-------------------------------|--|-------------------------------------|--|---------------------------------------|
| Fixed                      | Adjustable |                    |                  |         |      |                               |  |                                     |  |                                       |
| SS6UTWN-8                  | SS6UTWNA-8 | 1/2 L              | .500             | .687    | 1.25 | .4995/.4990                   | .04  | .06                                 | –  | –                                     |
| SSUTWN-10                  | SSUTWNA-10 | 5/8 L              | .625             | .875    | 1.63 | .6245/.6240                   | .04  | .09                                 | –  | –                                     |
| SSUTWN-12                  | SSUTWN-12  | 3/4 L              | .750             | .937    | 1.75 | .7495/.7490                   | .06  | .13                                 | .08  | .46/.41                               |
| SSUTWN-16                  | SSUTWN-16  | 1 L                | 1.000            | 1.187   | 2.19 | .9995/.9990                   | .08  | .22                                 | .16  | .62/.56                               |
| SSUTWN-20                  | SSUTWN-20  | 1 1/4 L            | 1.250            | 1.500   | 2.81 | 1.2495/1.2490                 | .08  | .35                                 | –  | –                                     |
| SSUTWN-24                  | SSUTWN-24  | 1 1/2 L            | 1.500            | 1.750   | 3.25 | 1.4994/1.4989                 | .08  | .50                                 | .33  | .93/.84                               |

| Part Number <sup>(2)</sup> |            | A    | A2   | B    | E ±.010 | E1 ±.010 | F    | F1  | G    | G1   | N    |      | Pillow Block Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>r</sub> |
|----------------------------|------------|------|------|------|---------|----------|------|-----|------|------|------|------|----------------------|--|
| Fixed                      | Adjustable |      |      |      |         |          |      |     |      |      | Hole | Bolt |                      |  |
| SS6UTWN-8                  | SS6UTWN-8  | 2.00 | 1.38 | 3.50 | 2.500   | 1.688    | 1.13 | .25 | .59  | 1.75 | .16  | #6   | .46                  | 530  |
| SSUTWN-10                  | SSUTWN-10  | 2.50 | 1.75 | 4.00 | 3.000   | 2.125    | 1.44 | .28 | .85  | 2.00 | .19  | #8   | 1.02                 | 1240   |
| SSUTWN-12                  | SSUTWN-12  | 2.75 | 1.88 | 4.50 | 3.500   | 2.375    | 1.56 | .31 | .94  | 2.25 | .19  | #8   | 1.24                 | 2260   |
| SSUTWN-16                  | SSUTWN-16  | 3.25 | 2.38 | 6.00 | 4.500   | 2.875    | 1.94 | .38 | 1.19 | 3.00 | .22  | #10  | 2.48                 | 3800   |
| SSUTWN-20                  | SSUTWN-20  | 4.00 | 3.00 | 7.50 | 5.500   | 3.500    | 2.50 | .44 | 1.50 | 3.75 | .22  | #10  | 5.14                 | 4700   |
| SSUTWN-24                  | SSUTWN-24  | 4.75 | 3.50 | 9.00 | 6.500   | 4.125    | 2.88 | .50 | 1.75 | 4.50 | .28  | .25  | 8.08                 | 7760   |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below. Dynamic load capacity is based on two bearings equally loaded.

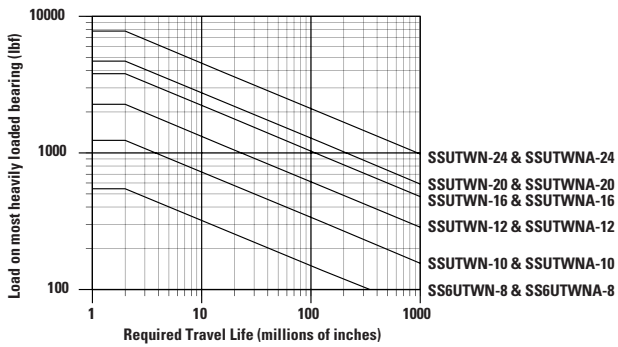
(2) For part number description and specifications see page 24.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Smart Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



#### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

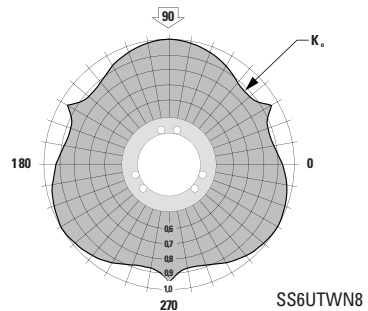
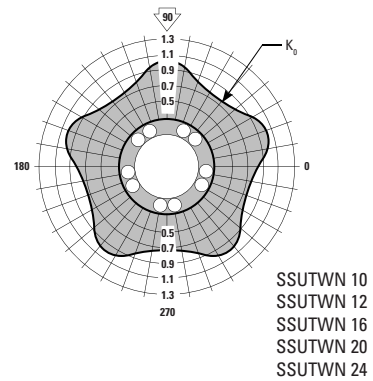
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

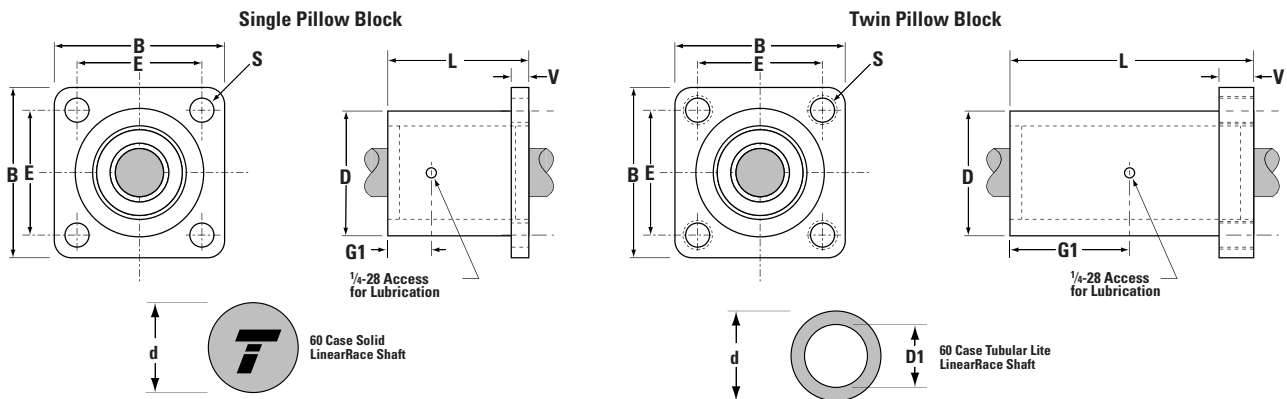
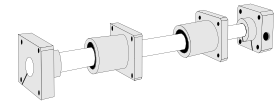
The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.





Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Flanged Single and Twin Pillow Blocks for End Supported Applications



Super Smart Ball Bushing Flanged Pillow Blocks and 60 Case LinearRace Shaft (Dimensions in inches)

| Part Number <sup>(2)</sup>                    |                    | Nominal Diameter | B    | E ±.010 | L    | D    | V   | G1   | S Hole Dia. | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 | Pillow Block Mass lb | Dyn. <sup>(1)</sup> Load Cap. lb <sub>f</sub> |
|---|--------------------|------------------|------|---------|------|------|-----|------|-------------|-------------------------------|--|-------------------------------------|--|---------------------------------------|----------------------|---|
| Super Smart Ball Bushing Flanged Pillow Block | 60 Case LinearRace |                  |      |         |      |      |     |      |             |                               |  |                                     |  |                                       |                      |   |
| SS6UFB-8                                      | 1/2 L              | .500             | 1.63 | 1.250   | 1.69 | 1.25 | .25 | .72  | .19         | .4995/.4990                   | .04  | .06                                 | –  | –                                     | .23                  | 265   |
| SSUFB-12                                      | 3/4 L              | .750             | 2.38 | 1.750   | 2.06 | 1.75 | .38 | .89  | .22         | .7495/.7490                   | .06  | .13                                 | .08  | .460/.416                             | .52                  | 1130  |
| SSUFB-16                                      | 1 L                | 1.000            | 2.75 | 2.125   | 2.81 | 2.25 | .50 | 1.27 | .28         | .9995/.9990                   | .08  | .22                                 | .16  | .629/.569                             | 1.04                 | 1900  |
| SSUFB-20                                      | 1 1/4 L            | 1.250            | 3.50 | 2.750   | 3.63 | 3.00 | .63 | 1.67 | .35         | 1.2495/1.2490                 | .08  | .35                                 | –  | –                                     | 2.21                 | 2350  |
| SSUFB-24                                      | 1 1/2 L            | 1.500            | 4.00 | 3.125   | 4.00 | 3.62 | .75 | 1.86 | .41         | 1.4994/1.4989                 | .08  | .50                                 | .33  | .93/.84                               | 3.68                 | 3880  |

Super Smart Ball Bushing Flanged Twin Pillow Blocks and 60 Case LinearRace Shaft (Dimensions in inches)

| Part Number <sup>(2)</sup>                         |                    | Nominal Diameter | B    | E ±.010 | L    | D    | V    | G1   | S Thread | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 | Pillow Block Mass lb | Dyn. <sup>(1)</sup> Load Cap. lb <sub>f</sub> |
|--|--------------------|------------------|------|---------|------|------|------|------|----------|-------------------------------|--|-------------------------------------|--|---------------------------------------|----------------------|---|
| Super Smart Ball Bushing Flanged Twin Pillow Block | 60 Case LinearRace |                  |      |         |      |      |      |      |          |                               |  |                                     |  |                                       |                      |   |
| SS6UTFB-8  | 1/2 L              | .500             | 1.63 | 1.250   | 3.20 | 1.25 | .90  | 1.48 | 1/4-20   | .4995/.4990                   | .04  | .06                                 | –  | –                                     | .45                  | 530   |
| SSUTFB-12  | 3/4 L              | .750             | 2.38 | 1.750   | 3.95 | 1.75 | .90  | 1.98 | 1/4-20   | .7495/.7490                   | .06  | .13                                 | .08  | .460/.416                             | 1.05                 | 2260  |
| SSUTFB-16  | 1 L                | 1.000            | 2.75 | 2.125   | 5.33 | 2.25 | .90  | 2.67 | 5/16-18  | .9995/.9990                   | .08  | .22                                 | .16  | .629/.569                             | 1.95                 | 3800  |
| SSUTFB-20  | 1 1/4 L            | 1.250            | 3.50 | 2.750   | 6.70 | 3.00 | .90  | 3.35 | 5/16-18  | 1.2495/1.2490                 | .08  | .35                                 | –  | –                                     | 4.06                 | 4700  |
| SSUTFB-24  | 1 1/2 L            | 1.500            | 4.00 | 3.125   | 7.50 | 3.62 | 1.00 | 3.75 | 3/8-16   | 1.4994/1.4989                 | .08  | .50                                 | .33  | .93/.84                               | 6.84                 | 7760  |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below. Dynamic load capacity of Twin Super Smart Flanged Pillow blocks is based on two bearings equally loaded.

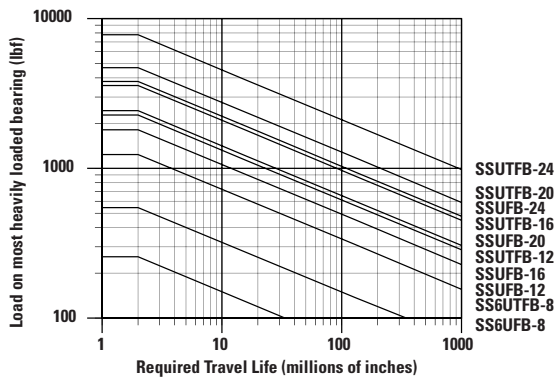
(2) For part number description and specifications see page 24.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Smart Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

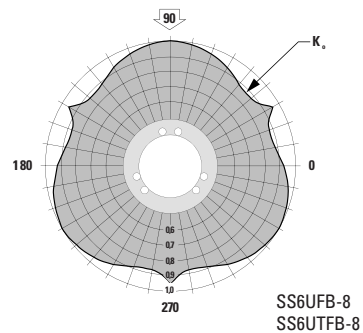
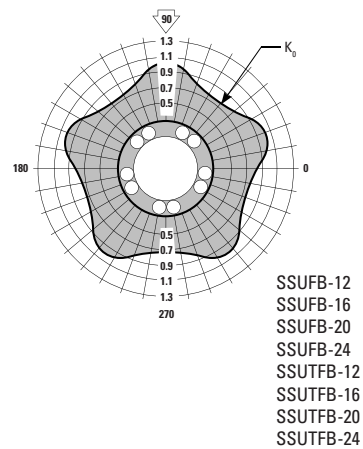
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

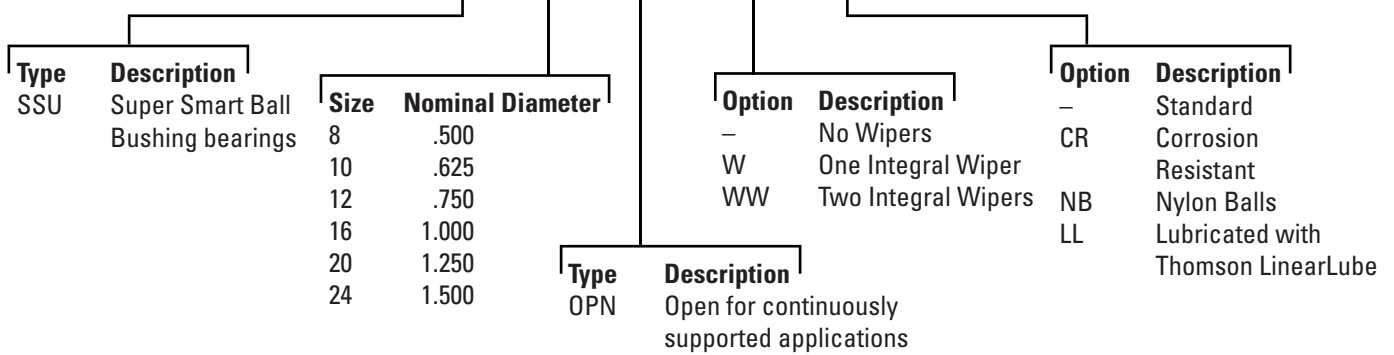


Inch – Super Smart Ball Bushing Bearings

# Part Number Description and Specification

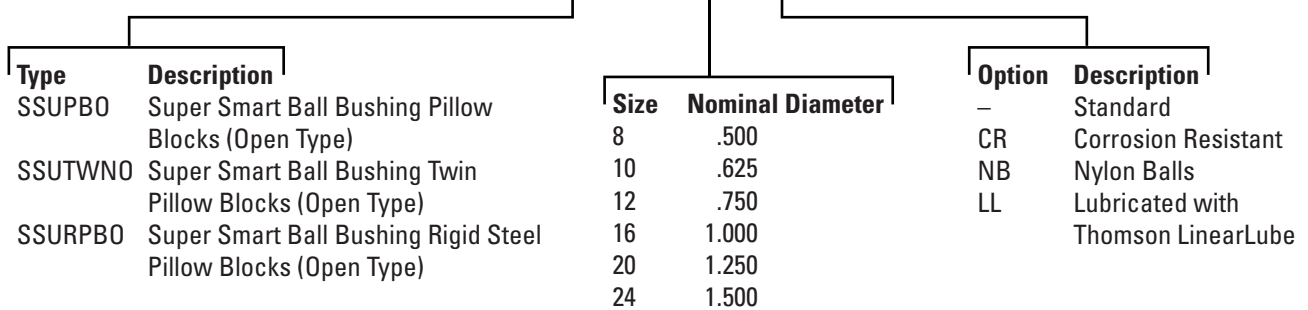
## Super Smart Ball Bushing Bearings (Open Type) for Continuously Supported Applications

### SSU-16-OPN-WW-CR



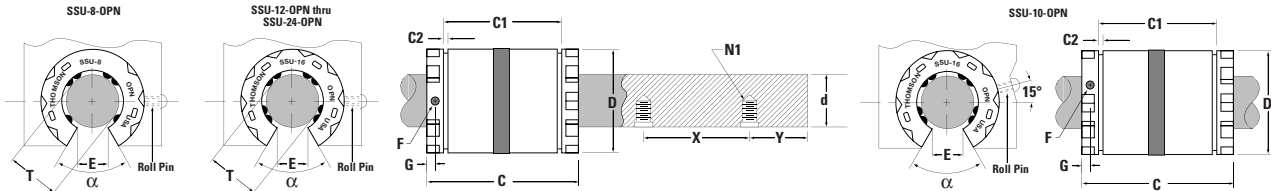
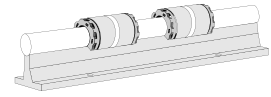
## Super Smart Ball Bushing Pillow Blocks (Open Type) for Continuously Supported Applications

### SSUPBO-16-CR



## Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Bearings (Open Type) for Continuously Supported Applications



### Super Smart Ball Bushing Bearings (Open Type) and 60 Case LinearRace Shafting (Dimensions in inches)

| Part Number <sup>(3)</sup> |                         |                          |                     | Nom. Dia. | Length C    | C1          | C2 min. | Min. Slot Width E | Retention Hole |        | Angle deg α | Number of Ball Circuits | Ball Bushing bearing Mass lb | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |         |
|----------------------------|-------------------------|--------------------------|---------------------|-----------|-------------|-------------|---------|-------------------|----------------|--------|-------------|-------------------------|------------------------------|--|-------------------------------------|-----------------------------------|---|---------|
| Without Integral Wipers    | With one Integral Wiper | With two Integral Wipers | 60 Case Linear Race |           |             |             |         |                   | Di. F          | Loc. G |             |                         |                              |  |                                     | X                                 | Y | N1      |
| SSU-8-OPN                  | SSU-8-OPN-W             | SSU-8-OPN-WW             | 1/2 L PD            | .500      | 1.250/1.230 | 1.032/1.012 | .050    | .31               | .13            | .62    | 40          | 6                       | .07                          | .04  | .06                                 | 4                                 | 2 | #6-32   |
| SSU-10-OPN                 | SSU-10-OPN-W            | SSU-10-OPN-WW            | 5/8 L PD            | .625      | 1.500/1.480 | 1.125/1.095 | .055    | .34               | .11            | .13    | 30          | 8                       | .09                          | .04  | .09                                 | 4                                 | 2 | #8-32   |
| SSU-12-OPN                 | SSU-12-OPN-W            | SSU-12-OPN-WW            | 3/4 L PD            | .750      | 1.625/1.605 | 1.285/1.255 | .055    | .41               | .14            | .13    | 30          | 8                       | .13                          | .06  | .13                                 | 6                                 | 3 | #10-32  |
| SSU-16-OPN                 | SSU-16-OPN-W            | SSU-16-OPN-WW            | 1 L PD              | 1.000     | 2.250/2.230 | 1.901/1.871 | .068    | .53               | .14            | .13    | 30          | 8                       | .24                          | .08  | .22                                 | 6                                 | 3 | 1/4-20  |
| SSU-20-OPN                 | SSU-20-OPN-W            | SSU-20-OPN-WW            | 1 1/4 L PD          | 1.250     | 2.625/2.600 | 2.031/1.991 | .068    | .62               | .20            | .19    | 30          | 8                       | .43                          | .08  | .35                                 | 6                                 | 3 | 5/16-18 |
| SSU-24-OPN                 | SSU-24-OPN-W            | SSU-24-OPN-WW            | 1 1/2 L PD          | 1.500     | 3.000/2.970 | 2.442/2.402 | .086    | .74               | .20            | .19    | 30          | 8                       | .80                          | .08  | .50                                 | 8                                 | 4 | 3/8-16  |

| Part Number <sup>(3)</sup> |                         |                          | Working Bore Diameter T | Recommended Housing Bore Dia. |               | 60 Case LinearRace Diameter d | Ball Bushing bearing/LinearRace Fit Up ‡ |   | Dynamic Load Capacity lb <sub>f</sub> <sup>(††)</sup> |
|----------------------------|-------------------------|--------------------------|-------------------------|-------------------------------|---------------|-------------------------------|--|---|---|
| Without Integral Wipers    | With one Integral Wiper | With two Integral Wipers |                         | Fixed D                       | Adjustable D  |                               | Fixed Diameter Housing                   | Adjustable Diameter Housing (Before Adjustment) |   |
| SSU-8-OPN                  | SSU-8-OPN-W             | SSU-8-OPN-WW             | .5000/.4995             | .8755/.8750                   | .8760/.8750   | .4995/.4990                   | .0015C/.0000                             | .002C/.0000                                     | 360   |
| SSU-10-OPN                 | SSU-10-OPN-W            | SSU-10-OPN-WW            | .6250/.6245             | 1.1255/1.1250                 | 1.1260/1.1250 | .6245/.6240                   | .0015C/.0000                             | .002C/.0000                                     | 620   |
| SSU-12-OPN                 | SSU-12-OPN-W            | SSU-12-OPN-WW            | .7500/.7495             | 1.2505/1.2500                 | 1.2510/1.2500 | .7495/.7490                   | .0015C/.0000                             | .002C/.0000                                     | 1130  |
| SSU-16-OPN                 | SSU-16-OPN-W            | SSU-16-OPN-WW            | 1.0000/.9995            | 1.5630/1.5625                 | 1.5635/1.5625 | .9995/.9990                   | .0015C/.0000                             | .002C/.0000                                     | 1900  |
| SSU-20-OPN                 | SSU-20-OPN-W            | SSU-20-OPN-WW            | 1.2500/1.2494           | 2.0008/2.0000                 | 2.0010/2.0000 | 1.2495/1.2490                 | .0018C/.0001P                            | .002C/.0001P                                    | 2350  |
| SSU-24-OPN                 | SSU-24-OPN-W            | SSU-24-OPN-WW            | 1.5000/1.4994           | 2.3760/2.3750                 | 2.3760/2.3750 | 1.4994/1.4989                 | .0021C/.0000                             | .0021C/.0000                                    | 3880  |

‡ P = Preload, C = Clearance

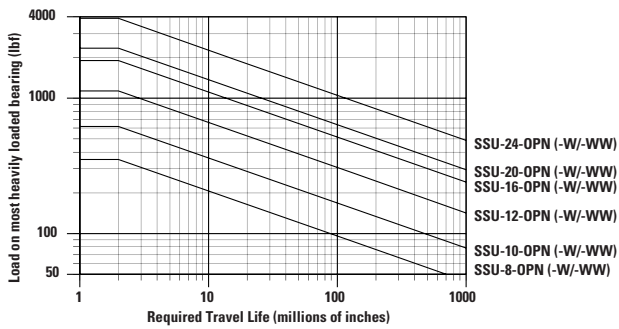
(††) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs to the right.

(3) For part number description and specifications see page 33.

## Inch – Super Smart Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

**Note:** For the purpose of using this chart.

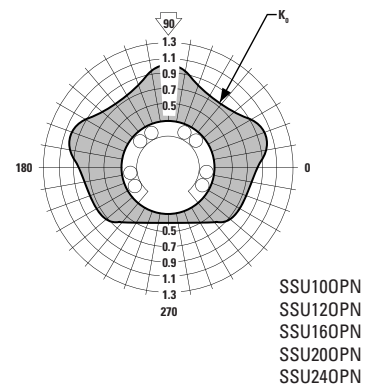
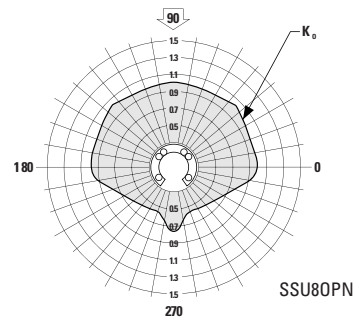
**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

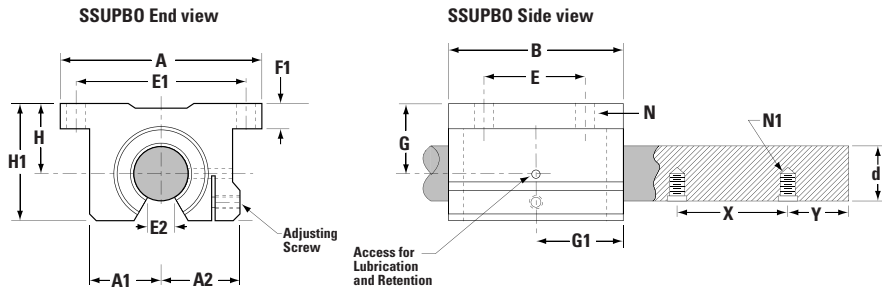
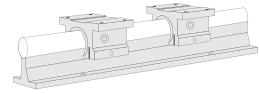
The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

**Note:** For Super Smart Ball Bushing bearings and other extremely high load bearings, the bearing load capacity as indicated by the polar charts may be practically limited by the degree of shaft flexure acceptable, or the capacity of the shaft rail assembly fasteners. In such cases, the loads should be kept below these practical limits, however, the full corresponding life capacity benefits are still realized!



## Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Pillow Blocks (Open Type) for Continuously Supported Applications



### Super Smart Ball Bushing Pillow Blocks (Open Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(3)</sup>            |                    | Nominal Diameter | H<br>±.003 | H1   | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |         |
|---------------------------------------|--------------------|------------------|------------|------|-------------------------------|--|-------------------------------------|-----------------------------------|---|---------|
| Super Smart Ball Bushing Pillow Block | 60 Case LinearRace |                  |            |      |                               |  |                                     | X                                 | Y | N1      |
| SSUPBO-8                              | 1/2 L PD           | .500             | .687       | 1.13 | .4995/.4990                   | .04  | .06                                 | 4                                 | 2 | #6-32   |
| SSUPBO-10                             | 5/8 L PD           | .625             | .875       | 1.44 | .6245/.6240                   | .04  | .09                                 | 4                                 | 2 | #8-32   |
| SSUPBO-12                             | 3/4 L PD           | .750             | .937       | 1.56 | .7495/.7490                   | .06  | .13                                 | 6                                 | 3 | #10-32  |
| SSUPBO-16                             | 1 L PD             | 1.000            | 1.187      | 2.00 | .9995/.9990                   | .08  | .22                                 | 6                                 | 3 | 1/4-20  |
| SSUPBO-20                             | 1 1/4 L PD         | 1.250            | 1.500      | 2.56 | 1.2495/1.2490                 | .08  | .35                                 | 6                                 | 3 | 5/16-18 |
| SSUPBO-24                             | 1 1/2 L PD         | 1.500            | 1.750      | 2.94 | 1.4994/1.4989                 | .08  | .50                                 | 8                                 | 4 | 3/8-16  |

| Part Number <sup>(3)</sup> | A    | A1   | A2   | B    | E<br>±.010 | E1<br>±.010 | E2<br>min. | F1  | G    | G1   | N<br>Hole | N1<br>Bolt | Pillow Block Mass lb | Dynamic <sup>(††)</sup> Load Capacity lb <sub>f</sub> |
|----------------------------|------|------|------|------|------------|-------------|------------|-----|------|------|-----------|------------|----------------------|---|
| SSUPBO-8                   | 2.00 | .69  | .75  | 1.50 | 1.000      | 1.688       | .31        | .25 | .69  | .69  | .16       | #6         | .23                  | 360   |
| SSUPBO-10                  | 2.50 | .88  | .94  | 1.75 | 1.125      | 2.125       | .34        | .28 | .88  | .88  | .19       | #8         | .41                  | 620   |
| SSUPBO-12                  | 2.75 | .94  | 1.00 | 1.88 | 1.250      | 2.375       | .41        | .31 | .94  | .94  | .19       | #8         | .51                  | 1130  |
| SSUPBO-16                  | 3.25 | 1.19 | 1.25 | 2.63 | 1.750      | 2.875       | .53        | .38 | 1.19 | 1.32 | .22       | #10        | 1.03                 | 1900  |
| SSUPBO-20                  | 4.00 | 1.50 | 1.63 | 3.38 | 2.000      | 3.500       | .62        | .44 | 1.50 | 1.69 | .22       | #10        | 2.15                 | 2350  |
| SSUPBO-24                  | 4.75 | 1.75 | 1.88 | 3.75 | 2.500      | 4.125       | .74        | .50 | 1.75 | 1.88 | .28       | .25        | 3.29                 | 3880  |

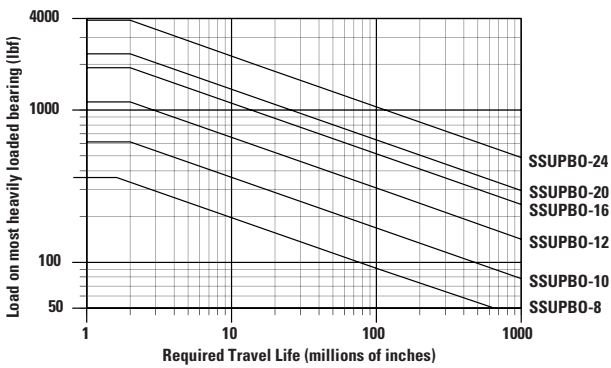
(††) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

(3) For part number description and specifications see page 33.

## Inch – Super Smart Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



#### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

**Note:** For the purpose of using this chart.

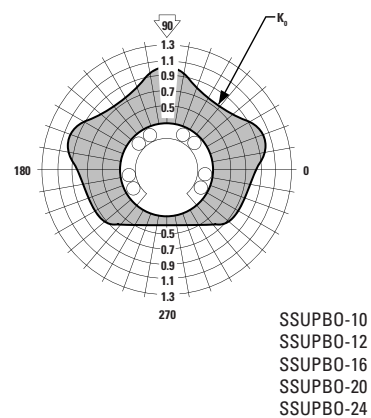
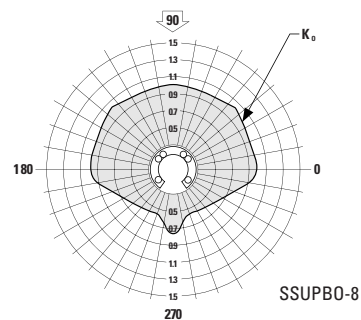
**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

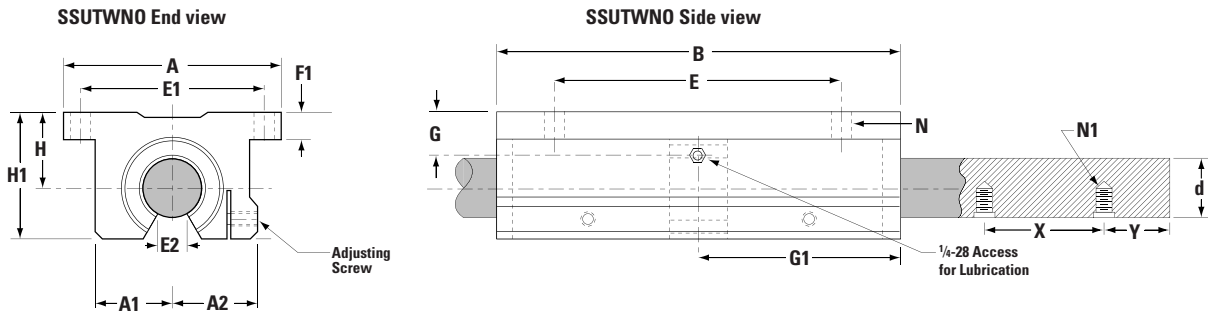
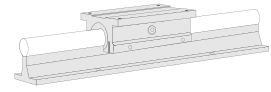
The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

**Note:** For Super Smart Ball Bushing bearings and other extremely high load bearings, the bearing load capacity as indicated by the polar charts may be practically limited by the degree of shaft flexure acceptable, or the capacity of the shaft rail assembly fasteners. In such cases, the loads should be kept below these practical limits, however, the full corresponding life capacity benefits are still realized!



## Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Twin Pillow Blocks (Open Type) for Continuously Supported Applications



### Super Smart Ball Bushing Twin Pillow Blocks (Open Type, seal at both ends) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(3)</sup>            |                    | Nominal Diameter | H<br>±.003 | H1   | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |         |
|---------------------------------------|--------------------|------------------|------------|------|-------------------------------|--|-------------------------------------|-----------------------------------|---|---------|
| Super Smart Ball Bushing Pillow Block | 60 Case LinearRace |                  |            |      |                               |  |                                     | X                                 | Y | N1      |
| SSUTWNO-8                             | 1/2 L PD           | .500             | .687       | 1.13 | .4995/.4990                   | .04  | .06                                 | 4                                 | 2 | #6-32   |
| SSUTWNO-10                            | 5/8 L PD           | .625             | .875       | 1.44 | .6245/.6240                   | .04  | .09                                 | 4                                 | 2 | #8-32   |
| SSUTWNO-12                            | 3/4 L PD           | .750             | .937       | 1.56 | .7495/.7490                   | .06  | .13                                 | 6                                 | 3 | #10-32  |
| SSUTWNO-16                            | 1 L PD             | 1.000            | 1.187      | 2.00 | .9995/.9990                   | .08  | .22                                 | 6                                 | 3 | 1/4-20  |
| SSUTWNO-20                            | 1 1/4 L PD         | 1.250            | 1.500      | 2.56 | 1.2495/1.2490                 | .08  | .35                                 | 6                                 | 3 | 5/16-18 |
| SSUTWNO-24                            | 1 1/2 L PD         | 1.500            | 1.750      | 2.94 | 1.4994/1.4989                 | .08  | .50                                 | 8                                 | 4 | 3/8-16  |

| Part Number <sup>(3)</sup> | Super Smart Ball Bushing Pillow Block |      |      | B    | E<br>±.010 | E1<br>±.010 | E2<br>min. | F1  | G    | G1   | N<br>Hole | N1<br>Bolt | Pillow Block Mass lb | Dynamic <sup>(††)</sup> Load Capacity lb <sub>f</sub> |
|----------------------------|---------------------------------------|------|------|------|------------|-------------|------------|-----|------|------|-----------|------------|----------------------|---|
|                            | A                                     | A1   | A2   |      |            |             |            |     |      |      |           |            |                      |   |
| SSUTWNO-8                  | 2.00                                  | .69  | .75  | 3.50 | 2.500      | 1.688       | .31        | .25 | .56  | 1.75 | .16       | #6         | .46                  | 720   |
| SSUTWNO-10                 | 2.50                                  | .88  | .94  | 4.00 | 3.000      | 2.125       | .34        | .28 | .67  | 2.00 | .19       | #8         | .82                  | 1240  |
| SSUTWNO-12                 | 2.75                                  | .94  | 1.00 | 4.50 | 3.500      | 2.375       | .41        | .31 | .94  | 2.25 | .19       | #8         | 1.02                 | 2260  |
| SSUTWNO-16                 | 3.25                                  | 1.19 | 1.25 | 6.00 | 4.500      | 2.875       | .53        | .38 | 1.20 | 3.00 | .22       | #10        | 2.06                 | 3800  |
| SSUTWNO-20                 | 4.00                                  | 1.50 | 1.63 | 7.50 | 5.500      | 3.500       | .62        | .44 | 1.50 | 3.75 | .22       | #10        | 4.30                 | 4700  |
| SSUTWNO-24                 | 4.75                                  | 1.75 | 1.88 | 9.00 | 6.500      | 4.125       | .74        | .50 | 1.75 | 4.50 | .28       | .25        | 6.88                 | 7760  |

(††) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

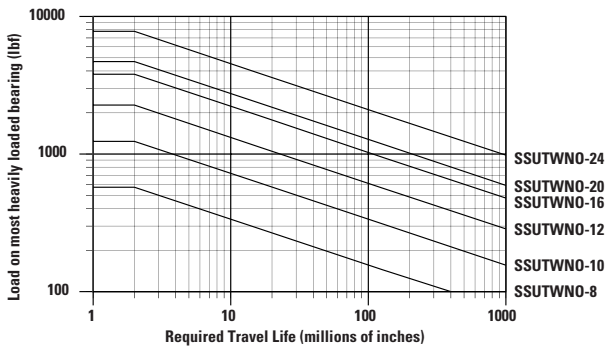
(3) For part number description and specifications see page 33.



## Inch – Super Smart Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

**Note:** For the purpose of using this chart.

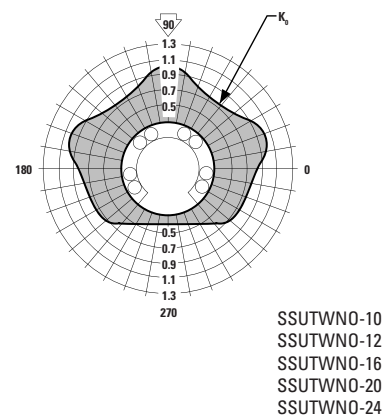
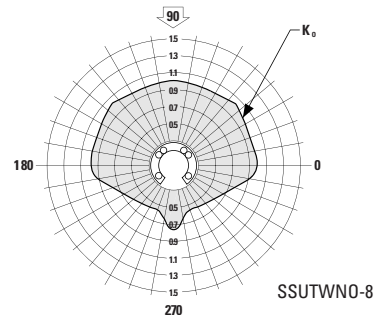
**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

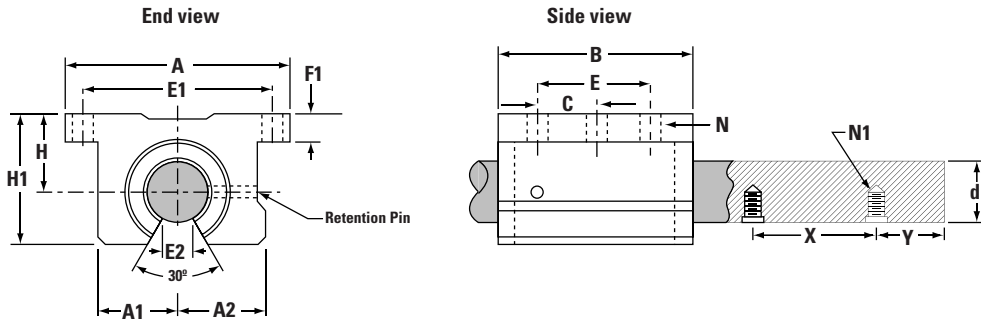
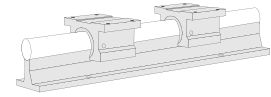
The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

**Note:** For Super Smart Ball Bushing bearings and other extremely high load bearings, the bearing load capacity as indicated by the polar charts may be practically limited by the degree of shaft flexure acceptable, or the capacity of the shaft rail assembly fasteners. In such cases, the loads should be kept below these practical limits, however, the full corresponding life capacity benefits are still realized!



## Inch – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Rigid Steel Pillow Blocks (Open Type) for Continuously Supported Applications



Rigid steel housing and high performance Super Smart Ball Bushing Bearing combine to reduce deflection and cost up to 66%.

### Super Smart Ball Bushing Bearing Rigid Steel Pillow Blocks (Open Type, seal at both ends) and LinearRace (Dim. in in.)

| Part Number <sup>(3)</sup>                        |                          | Nominal Diameter | H<br>±.003 | H1   | A    | A1   | A2   | B    | 60 Case LinearRace Shaft Minimum Depth of Hardness | 60 Case Solid LinearRace Shaft Mass lb/in | 60 Case LinearRace Shaft Mounting Holes |   |        |
|---|--------------------------|------------------|------------|------|------|------|------|------|--|---|---|---|--------|
| Super Smart Ball Bushing Rigid Steel Pillow Block | 60 Case LinearRace Shaft |                  |            |      |      |      |      |      |  |   | X                                       | Y | N1     |
| SSURPB012   | 3/4 L PD                 | .750             | .937       | 1.56 | 2.75 | .94  | 1.00 | 1.88 | .06  | .13                                       | 6                                       | 3 | #10-32 |
| SSURPB016   | 1 L PD                   | 1.000            | 1.187      | 2.00 | 3.25 | 1.19 | 1.25 | 2.63 | .08  | .22                                       | 6                                       | 3 | 1/4-20 |
| SSURPB024   | 1 1/2 L PD               | 1.500            | 1.750      | 2.94 | 4.75 | 1.75 | 1.88 | 3.75 | .08  | .50                                       | 8                                       | 4 | 3/8-16 |

| Part Number <sup>(3)</sup> | 60 Case LinearRace Diameter d | E<br>±.010 | C<br>±.010 | E1<br>±.010 | E2<br>min. | F1  | N    |      | Pillow Block Mass lb | Dynamic <sup>(††)</sup> Load Capacity lb <sub>f</sub> |
|----------------------------|-------------------------------|------------|------------|-------------|------------|-----|------|------|----------------------|---|
|                            |                               |            |            |             |            |     | Hole | Bolt |                      |   |
| SSURPB012                  | .7495/.7490                   | 1.250      | .625       | 2.375       | .43        | .31 | .19  | #8   | 1.10                 | 1130  |
| SSURPB016                  | .9995/.9990                   | 1.750      | .875       | 2.875       | .56        | .38 | .22  | #10  | 2.30                 | 1900  |
| SSURPB024                  | 1.4994/1.4989                 | 2.500      | 1.250      | 4.125       | .81        | .50 | .28  | .25  | 7.00                 | 3880  |

(††) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

(3) For part number description and specifications see page 33.

### Super Smart Ball Bushing Rigid Steel Pillow Blocks provide:

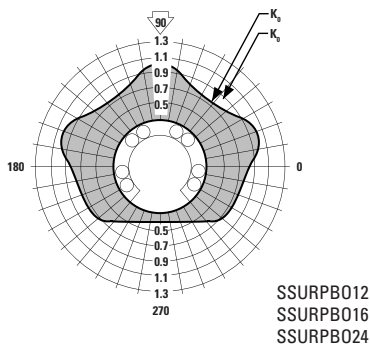
- **Faster settling time... Greater Productivity**
- **Less deflection... Greater Accuracy**
- **Highest Load Capacity... Smallest Envelope**
- **Longest Bearing Life... Greater Reliability**

## Inch – Super Smart Ball Bushing Bearings

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

Note: For Super Smart Ball Bushing bearings and other extremely high load bearings, the bearing load capacity as indicated by the polar charts may be practically limited by the degree of shaft flexure acceptable, or the capacity of the shaft rail assembly fasteners. In such cases, the loads should be kept below these practical limits, however, the full corresponding life capacity benefits are still realized!



## Inch – Super Smart Ball Bushing Bearings

# Pick and Place X-Y System

### Objective

Build an X-Y System that transfers the work piece between two separate machining stations.

### Solution

Assemble the X-Y System utilizing Super Smart pillow blocks on end supported 60 Case LinearRace for the X-axis and continuously supported 60 Case LinearRace on the Y-axis. Utilize Thomson Ball Screw Assemblies for high speed positioning.

### Benefits

The 60 Case LinearRace and 60 Case LinearRace end support blocks provided an important bridge between machining stations. The Super Smart Ball Bushing pillow blocks and Thomson ball screws provided uninterrupted high speed movement of the work piece. Productivity increased by 200%.

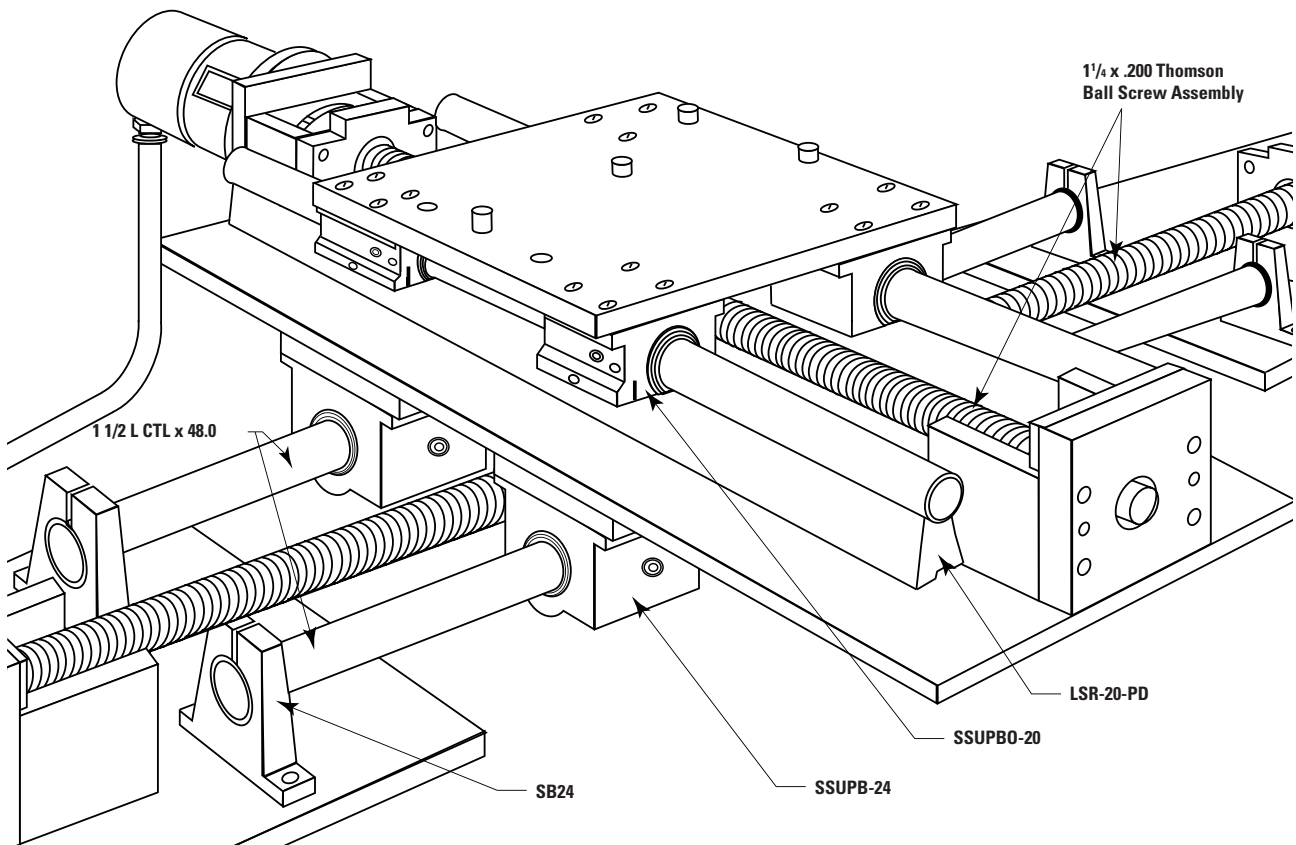
### Products Specified

#### X-axis

- 2 - 1 1/2 L CTL x 48.00 in (60 Case LinearRace)
- 4 - SB24 (60 Case LinearRace End Support Blocks)
- 4 - SSUPB-24 (Super Smart Ball Bushing Pillow Blocks)
- 1 - 1 1/4 x .200 (Thomson Ball Screw Assembly)

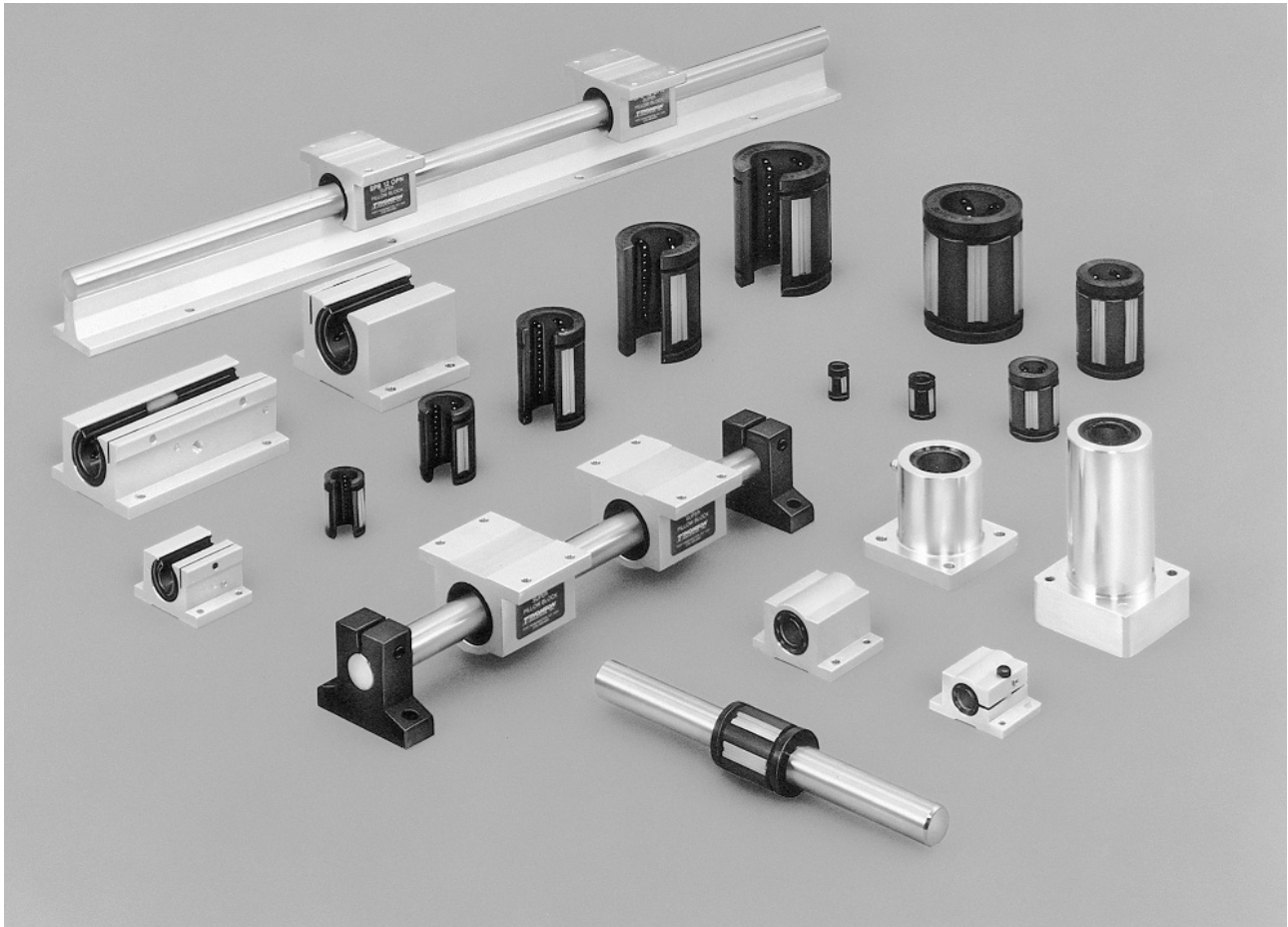
#### Y-axis

- 2 - LSR-20 x 48.00 in (Low Profile 60 Case LinearRace Support Rail)
- 4 - SSUPBO-20 (Super Smart Ball Bushing Pillow Blocks)
- 1 - 1 1/4 x .200 (Thomson Ball Screw Assembly)
- 2 - 1 1/4 L CTL x 48.00 in (60 Case LinearRace)



Inch – Super Ball Bushing Bearings

# Super Ball Bushing Bearing Products



**Thomson Super Ball Bushing Bearing products offer:**

- A self-aligning capability up to  $.5^\circ$  compensating for inaccuracies in base flatness or carriage machining.
- The RoundRail Advantage combined with the self-aligning feature, eliminating the need for derating factors commonly required for linear guides.
- Travel speeds up to 10 ft/s without a reduction in load capacity.
- Light weight, wear-resistant, engineered-polymer retainers and outer sleeves that reduce inertia and noise.
- Radially floating bearing plates. When installed in an adjustable housing, the Super Ball Bushing Bearing may be adjusted to a specific diametrical fit-up for accurate and repeatable movement.
- A constant coefficient of friction as low as .001.
- The use of smaller, less expensive drive motors, belts, linkages, gears and ball screws, when replacing high friction plain bearings.
- A closed configuration for end supported applications and an open configuration for continuously supported applications.
- Ready to install pillow blocks with double acting seals and an access for lubrication. Installation and downtime is minimized.
- Availability from over 1800 distributors, worldwide.

## Inch – Super Ball Bushing Bearings

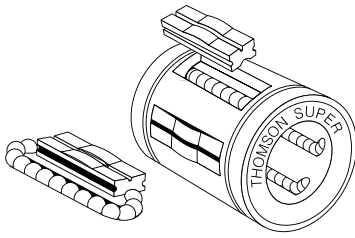


Figure 1

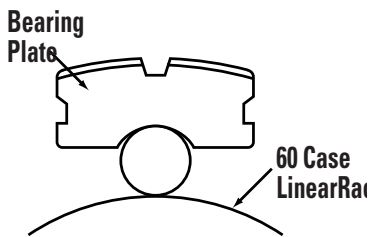


Figure 2

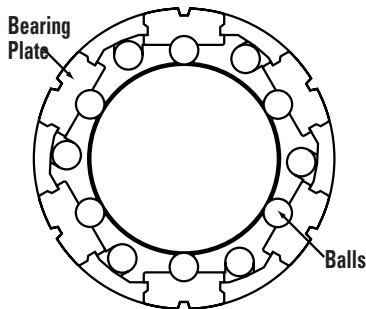


Figure 3

Cross-section of Super Ball Bushing Bearing

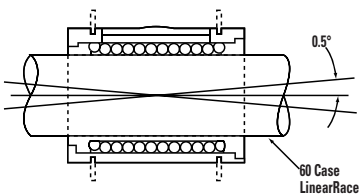


Figure 4

The Super Ball Bushing Bearing has been the industry standard for self-aligning linear bearings for over twenty years. This bearing provides three times the load capacity or 27 times the travel life of conventional linear bearings. This dramatic improvement in bearing performance significantly reduces downtime and maintenance, while increasing machine reliability. Thomson Industries, Inc. invented the Super Ball Bushing Bearing with many unique design features. Besides the dramatic increase in load capacity, the Super Ball Bushing Bearing is self-aligning, light weight and adjustable with a low coefficient of friction (Figure 1).

### Three Times the Load Capacity

The bearing plates are hardened, bearing quality steel with ball conforming grooves (Figure 2). The groove is slightly larger than the ball diameter, providing an optimal area for ball contact. The greater ball to bearing plate contact provides the increase in load capacity or travel life.

### Zero Clearance Fit

The bearing plates are also designed to float radially (Figure 3). When the bearing is mounted in an adjustable housing, selected fit-ups can be achieved on the 60 Case LinearRace (shaft).

### Self-Aligning

The Super Ball Bushing Bearing plates pivot  $.5^\circ$  about their centers (Figure 4) to assure smooth entry and exit of the precision bearing balls. Each plate aligns itself automatically to compensate for inaccurate housing bore alignment, base flatness or carriage machining. This provides uniform ball loading, smooth ball recirculation and a constant coefficient of friction.

### Smooth, Quiet Operation

The Super Ball Bushing Bearing's outer sleeve and retainer are made of wear-resistant, low-friction engineering polymer. It reduces inertia and operating noise levels significantly.

Inch – Super Ball Bushing Bearings

# Part Number Description and Specification

## Super Ball Bushing Bearings (Closed Type) for End Supported Applications

### SUPER 16-CR

| Type  | Description                           | Size | Nominal Diameter | Option | Description                        |
|-------|---------------------------------------|------|------------------|--------|------------------------------------|
| SUPER | Super Ball Bushing bearings           | 3    | .188             | -      | Standard                           |
| SCB   | Super Ball Bushing Cartridge bearings | 4    | .250             | CR     | Corrosion Resistant                |
|       |                                       | 6    | .375             | DD     | Integral Seals                     |
|       |                                       | 8    | .500             | NB     | Nylon Balls                        |
|       |                                       | 10   | .625             | TWN    | Twin (SCB Only)                    |
|       |                                       | 12   | .750             | DP     | Dry Packed                         |
|       |                                       | 16   | 1.000            | LL     | Lubricated with Thomson LinearLube |
|       |                                       | 20   | 1.250            |        |                                    |
|       |                                       | 24   | 1.500            |        |                                    |
|       |                                       | 32   | 2.000            |        |                                    |

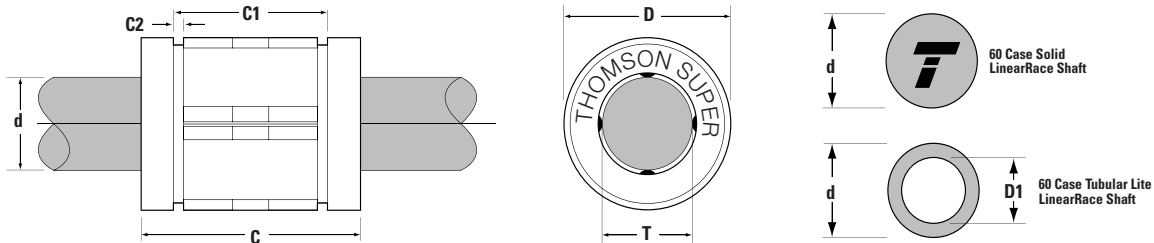
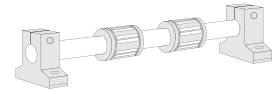
## Super Ball Bushing Pillow Blocks (Closed Type) for End Supported Applications

### SPB-16-ADJ-CR

| Type | Description                           | Size | Nominal Diameter | Option | Description                        |
|------|---------------------------------------|------|------------------|--------|------------------------------------|
| SPB  | Super Ball Bushing Pillow Blocks      | 8    | .500             | -      | Standard                           |
| TWN  | Super Ball Bushing Twin Pillow Blocks | 10   | .625             | CR     | Corrosion Resistant                |
|      |                                       | 12   | .750             | NB     | Nylon Balls                        |
|      |                                       | 16   | 1.000            | LL     | Lubricated with Thomson LinearLube |
|      |                                       | 20   | 1.250            |        |                                    |
|      |                                       | 24   | 1.500            |        |                                    |
|      |                                       | 32   | 2.000            |        |                                    |
| Type | Description                           |      |                  |        |                                    |
| -    | Closed Type, Non-Adjustable           |      |                  |        |                                    |
| ADJ  | Closed Type, Adjustable Pillow Block  |      |                  |        |                                    |

## Inch – Super Ball Bushing Bearings

# Super Ball Bushing Bearings (Closed Type) for End Supported Applications



### Super Ball Bushing Bearings (Closed Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup> |                     | 60 Case Linear Race | Nominal Diameter | Length C    | Distance Between Retaining Ring Grooves C1 | Retaining Ring Groove min. C2 | Number of Ball Circuits | Ball Bushing Bearing Mass lb | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|----------------------------|---------------------|---------------------|------------------|-------------|--|-------------------------------|-------------------------|------------------------------|--|-------------------------------------|--|---------------------------------------|
| Ball Bushing Bearing       | 60 Case Linear Race |                     |                  |             |  |                               |                         |                              |  |                                     |  |                                       |
| SUPER 3                    | 3/16 L              | .188                | .562/.547        | –           | –  | 4                             | .003                    | .027                         | .008   | –                                   | –  |                                       |
| SUPER 4                    | 1/4 L               | .250                | .750/.735        | .511/.501   | .039                                       | 4                             | .01                     | .027                         | .01  | –                                   | –  |                                       |
| SUPER 6                    | 3/8 L               | .375                | .875/.860        | .699/.689   | .039                                       | 4                             | .02                     | .027                         | .03  | –                                   | –  |                                       |
| SUPER 8                    | 1/2 L               | .500                | 1.250/1.230      | 1.032/1.012 | .050                                       | 4                             | .04                     | .04                          | .06  | –                                   | –  |                                       |
| SUPER 10                   | 5/8 L               | .625                | 1.500/1.480      | 1.105/1.095 | .056                                       | 5                             | .10                     | .04                          | .09  | –                                   | –  |                                       |
| SUPER 12                   | 3/4 L               | .750                | 1.625/1.605      | 1.270/1.250 | .056                                       | 6                             | .14                     | .06                          | .13  | .08                                 | .46/.41                                    |                                       |
| SUPER 16                   | 1 L                 | 1.000               | 2.250/2.230      | 1.884/1.864 | .070                                       | 6                             | .25                     | .08                          | .22  | .16                                 | .62/.56                                    |                                       |
| SUPER 20                   | 1 1/4 L             | 1.250               | 2.625/2.600      | 2.004/1.984 | .068                                       | 6                             | .45                     | .08                          | .35  | –                                   | –  |                                       |
| SUPER 24                   | 1 1/2 L             | 1.500               | 3.000/2.970      | 2.410/2.390 | .086                                       | 6                             | .85                     | .08                          | .50  | .33                                 | .93/.84                                    |                                       |
| SUPER 32                   | 2 L                 | 2.000               | 4.000/3.960      | 3.193/3.163 | .105                                       | 6                             | 1.45                    | .10                          | .89  | .54                                 | 1.31/1.18                                  |                                       |

| Part Number <sup>(2)</sup> | Working Bore Diameter T | Recommended Housing Bore |               | 60 Case LinearRace Diameter d | Ball Bushing Bearing/LinearRace Fit Up ‡ |   | Dynamic <sup>(1)</sup> Load Capacity lb <sub>r</sub> |
|----------------------------|-------------------------|--------------------------|---------------|-------------------------------|--|---|--|
|                            |                         | Fixed D                  | Adjustable D  |                               | Fixed Diameter Housing                   | Adjustable Diameter Housing (Before Adjustment) |  |
| SUPER 3                    | .1875/.1870             | .3755/.3750              | .3760/.3750   | .1870/.1865                   | .0015C/.0000                             | .002C/.0000                                     | 35   |
| SUPER 4                    | .2500/.2495             | .5005/.5000              | .5010/.5000   | .2495/.2490                   | .0015C/.0000                             | .002C/.0000                                     | 60   |
| SUPER 6                    | .3750/.3745             | .6255/.6250              | .6260/.6250   | .3745/.3740                   | .0015C/.0000                             | .002C/.0000                                     | 100  |
| SUPER 8                    | .5000/.4995             | .8755/.8750              | .8760/.8750   | .4995/.4990                   | .0015C/.0000                             | .002C/.0000                                     | 255  |
| SUPER 10                   | .6250/.6245             | 1.1255/1.1250            | 1.1260/1.1250 | .6245/.6240                   | .0015C/.0000                             | .002C/.0000                                     | 450  |
| SUPER 12                   | .7500/.7495             | 1.2505/1.2500            | 1.2510/1.2500 | .7495/.7490                   | .0015C/.0000                             | .002C/.0000                                     | 600  |
| SUPER 16                   | 1.0000/.9995            | 1.5630/1.5625            | 1.5635/1.5625 | .9995/.9990                   | .0015C/.0000                             | .002C/.0000                                     | 1050   |
| SUPER 20                   | 1.2500/1.2494           | 2.0008/2.0000            | 2.0010/2.0000 | 1.2495/1.2490                 | .0018C/.0001P                            | .002C/.0001P                                    | 1500   |
| SUPER 24                   | 1.5000/1.4994           | 2.3760/2.3750            | 2.3760/2.3750 | 1.4994/1.4989                 | .0021C/.0000                             | .0021C/.0000                                    | 2000   |
| SUPER 32                   | 2.0000/1.9992           | 3.0010/3.0000            | 3.0010/3.0000 | 1.9994/1.9987                 | .0023C/.0002P                            | .0023C/.0002P                                   | 3000   |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

(2) For part number description and specifications see page 45.

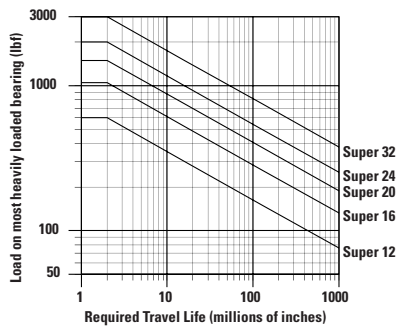
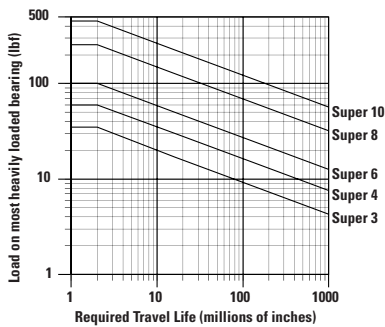
Note: For additional technical information, see the Engineering section beginning on page 245.



## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



#### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

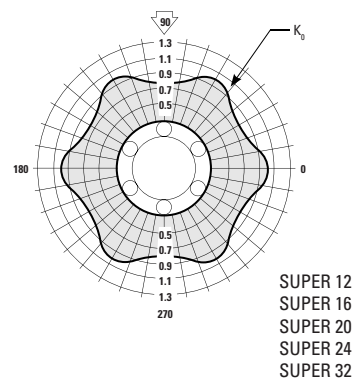
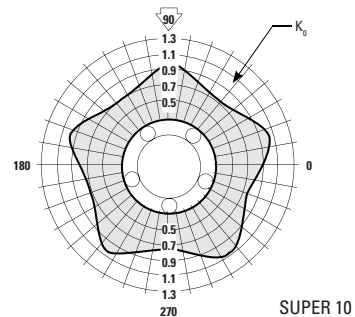
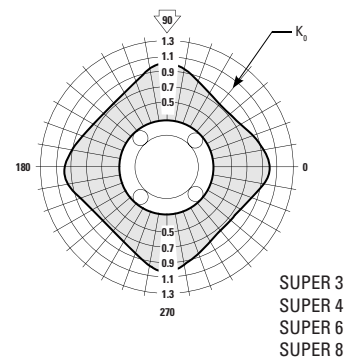
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

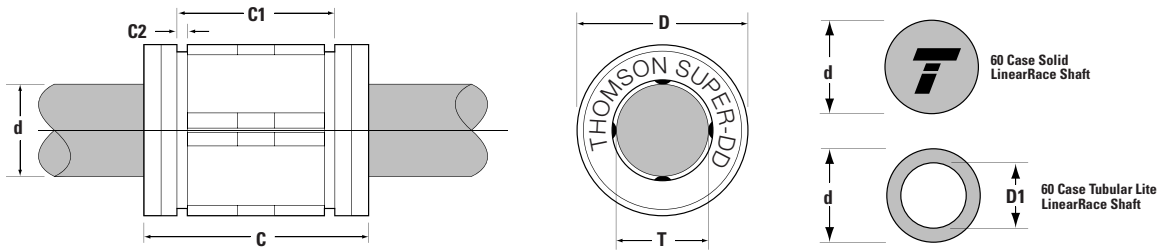
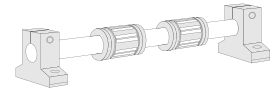
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



## Inch – Super Ball Bushing Bearings

# Sealed Super Ball Bushing Bearings (Closed Type) for End Supported Applications



### Sealed Super Ball Bushing Bearings (Closed Type, seal at both ends) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup> |                     | 60 Case Linear Race | Nominal Diameter | Length C    | Distance Between Retaining Ring Grooves C1 | Retaining Ring Groove min. C2 | Number of Ball Circuits | Ball Bushing Bearing Mass lb | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|----------------------------|---------------------|---------------------|------------------|-------------|--|-------------------------------|-------------------------|------------------------------|--|-------------------------------------|--|---------------------------------------|
| Ball Bushing Bearing       | 60 Case Linear Race |                     |                  |             |  |                               |                         |                              |  |                                     |  |                                       |
| SUPER-8-DD                 | 1/2 L               | .500                | 1.500/1.460      | 1.032/1.012 | .050                                       | 4                             | .05                     | .04                          | .06  | –                                   | –  |                                       |
| SUPER-10-DD                | 5/8 L               | .625                | 1.750/1.710      | 1.105/1.095 | .056                                       | 5                             | .11                     | .04                          | .09  | –                                   | –  |                                       |
| SUPER-12-DD                | 3/4 L               | .750                | 1.875/1.835      | 1.270/1.250 | .056                                       | 6                             | .15                     | .06                          | .13  | .08                                 | .46/.41                                    |                                       |
| SUPER-16-DD                | 1 L                 | 1.000               | 2.625/2.585      | 1.884/1.864 | .070                                       | 6                             | .27                     | .08                          | .22  | .16                                 | .62/.56                                    |                                       |

| Part Number <sup>(2)</sup> | Working Bore Diameter T | Recommended Housing Bore Dia. |               | 60 Case LinearRace Diameter d | Ball Bushing Bearing/LinearRace Fit Up ‡ |   | Dynamic <sup>(1)</sup> Load Capacity lb <sub>r</sub> |
|----------------------------|-------------------------|-------------------------------|---------------|-------------------------------|--|---|--|
|                            |                         | Fixed D                       | Adjustable D  |                               | Fixed Diameter Housing                   | Adjustable Diameter Housing (Before Adjustment) |  |
| SUPER-8-DD                 | .5000/.4995             | .8750/.8755                   | .8750/.8760   | .4995/.4990                   | .0015C/.0000                             | .002C/.0000                                     | 255  |
| SUPER-10-DD                | .6250/.6245             | 1.1250/1.1255                 | 1.1250/1.1260 | .6245/.6240                   | .0015C/.0000                             | .002C/.0000                                     | 450  |
| SUPER-12-DD                | .7500/.7495             | 1.2500/1.2505                 | 1.2500/1.2510 | .7495/.7490                   | .0015C/.0000                             | .002C/.0000                                     | 600  |
| SUPER-16-DD                | 1.0000/.9995            | 1.5625/1.5630                 | 1.5625/1.5635 | .9995/.9990                   | .0015C/.0000                             | .002C/.0000                                     | 1050   |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

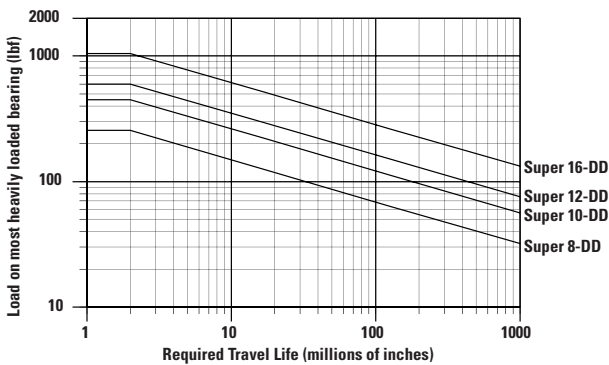
(2) For part number description and specifications see page 45.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing bearing)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

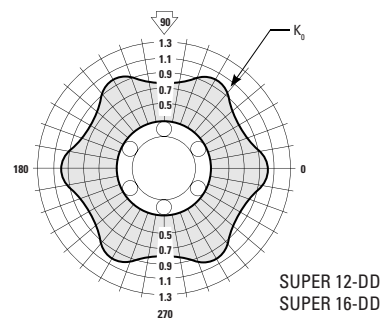
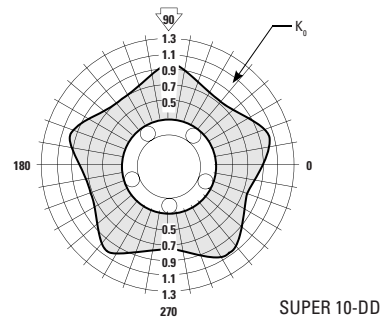
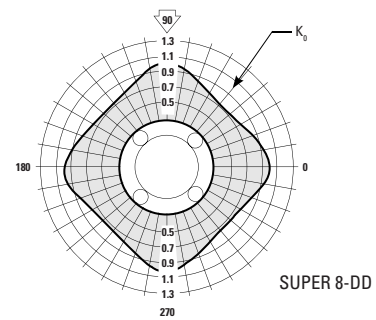
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

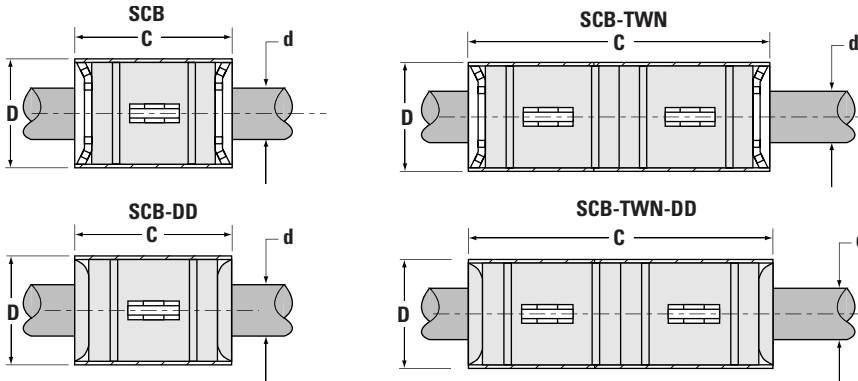
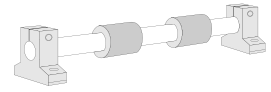
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



## Inch – Super Ball Bushing Bearings

# Super Ball Bushing Cartridge Bearings (Closed Type) for End Supported Applications



### Super Ball Bushing Cartridge Bearings and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup> |            |                     | Nominal Diameter | Length C ±.005 | Number of Ball Circuits | Ball Bushing Mass w/out Seals lb | Ball Bushing Mass with Seals lb | 60 Case LinearRace Diameter d | Nominal Outside Diameter D | Rec. Housing Bore Dia. Fixed | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | Dynamic Load Capacity lb <sub>i</sub> <sup>(1)</sup> |
|----------------------------|------------|---------------------|------------------|----------------|-------------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------|------------------------------|--|-------------------------------------|--|
| Without Seals              | With Seals | 60 Case Linear Race |                  |                |                         |                                  |                                 |                               |                            |                              |  |                                     |  |
| SCB-4                      | SCB-4-DD   | 1/4 L               | .250             | 1.000          | 4                       | .01                              | .02                             | .2495/.2490                   | .531/.529                  | .535/.533                    | .027   | .01                                 | 60   |
| SCB-6                      | SCB-6-DD   | 3/8 L               | .375             | 1.125          | 4                       | .02                              | .03                             | .3745/.3740                   | .656/.654                  | .660/.658                    | .027   | .03                                 | 100  |
| SCB-8                      | SCB-8-DD   | 1/2 L               | .500             | 1.500          | 4                       | .06                              | .07                             | .4995/.4990                   | .906/.904                  | .910/.908                    | .04  | .06                                 | 255  |

### Super Ball Bushing Twin Cartridge Bearings and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup> |              |                     | Nominal Diameter | Length C ±.005 | Number of Ball Circuits | Ball Bushing Mass w/out Seals lb | Ball Bushing Mass with Seals lb | 60 Case LinearRace Diameter d | Nominal Outside Diameter D | Rec. Housing Bore Dia. Fixed | 60 Case LinearRace Minimum Depth of Hardness | 60 Case LinearRace Mass lb/in | Dynamic Load Capacity lb <sub>i</sub> <sup>(1)</sup> |
|----------------------------|--------------|---------------------|------------------|----------------|-------------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------|------------------------------|--|-------------------------------|--|
| Without Seals              | With Seals   | 60 Case Linear Race |                  |                |                         |                                  |                                 |                               |                            |                              |  |                               |  |
| SCB-4-TWN                  | SCB-4-TWN-DD | 1/4 L               | .250             | 1.750          | 4                       | .02                              | .04                             | .2495/.2490                   | .531/.529                  | .535/.533                    | .027   | .01                           | 120  |
| SCB-6-TWN                  | SCB-6-TWN-DD | 3/8 L               | .375             | 2.000          | 4                       | .03                              | .04                             | .3745/.3740                   | .656/.654                  | .660/.658                    | .027   | .03                           | 200  |
| SCB-8-TWN                  | SCB-8-TWN-DD | 1/2 L               | .500             | 2.750          | 4                       | .12                              | .13                             | .4995/.4990                   | .906/.904                  | .910/.908                    | .04  | .06                           | 510  |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below. Dynamic load capacity of Twin Super Cartridge bearing is based on two bearings equally loaded.

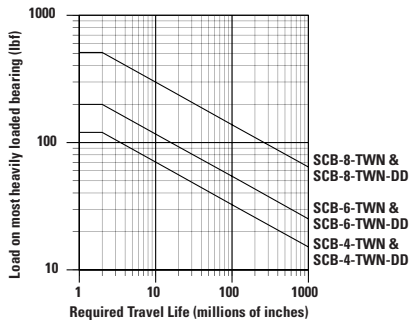
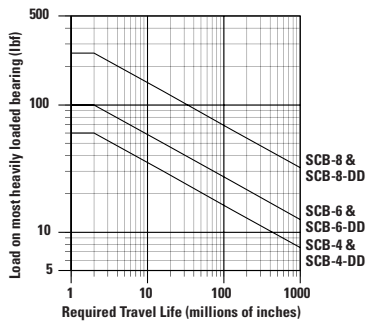
(2) For part number description and specifications see page 45.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Ball Bushing Bearings

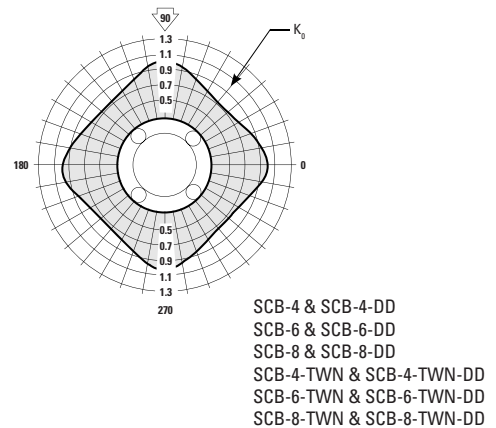
### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Cartridge bearing)



### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

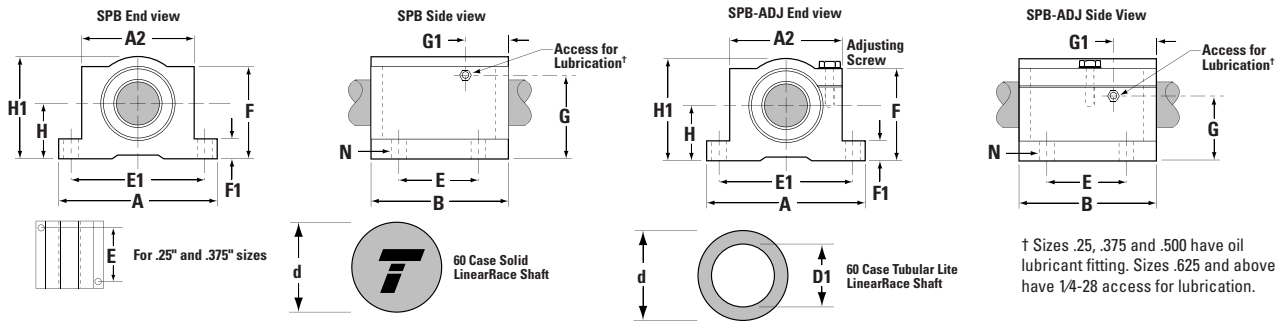
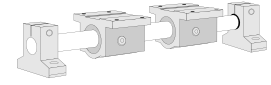
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

## Inch – Super Ball Bushing Bearings

# Super Ball Bushing Pillow Blocks (Closed and Adjustable Type) for End Supported Applications



### Super Ball Bushing Pillow Blocks (Closed and Adjustable Types, seal at both ends) and 60 Case LinearRace (Dim. in in.)

| Part Number <sup>(2)</sup> |            | 60 Case LinearRace | Nominal Diameter | H ±.003 | H1   | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|----------------------------|------------|--------------------|------------------|---------|------|-------------------------------|--|-------------------------------------|--|---------------------------------------|
| Fixed                      | Adjustable |                    |                  |         |      |                               |  |                                     |  |                                       |
| SPB-4                      | SPB-4-ADJ  | 1/4 L              | .250             | .437    | .81  | .2495/.2490                   | .027   | .01                                 | –  | –                                     |
| SPB-6                      | SPB-6-ADJ  | 3/8 L              | .375             | .500    | .94  | .3745/.3740                   | .027   | .03                                 | –  | –                                     |
| SPB-8                      | SPB-8-ADJ  | 1/2 L              | .500             | .687    | 1.25 | .4995/.4990                   | .04  | .06                                 | –  | –                                     |
| SPB-10                     | SPB-10-ADJ | 5/8 L              | .625             | .875    | 1.63 | .6245/.6240                   | .04  | .09                                 | –  | –                                     |
| SPB-12                     | SPB-12-ADJ | 3/4 L              | .750             | .937    | 1.75 | .7495/.7490                   | .06  | .13                                 | .08  | .46/.41                               |
| SPB-16                     | SPB-16-ADJ | 1 L                | 1.000            | 1.187   | 2.19 | .9995/.9990                   | .08  | .22                                 | .16  | .62/.56                               |
| SPB-20                     | SPB-20-ADJ | 1 1/4 L            | 1.250            | 1.500   | 2.81 | 1.2495/1.2490                 | .08  | .35                                 | –  | –                                     |
| SPB-24                     | SPB-24-ADJ | 1 1/2 L            | 1.500            | 1.750   | 3.25 | 1.4994/1.4989                 | .08  | .50                                 | .33  | .93/.84                               |
| SPB-32                     | SPB-32-ADJ | 2 L                | 2.000            | 2.125   | 4.06 | 1.9994/1.9987                 | .10  | .89                                 | .54  | 1.31/1.18                             |

| Part Number <sup>(2)</sup> |            | A    | A2   | B    | E ±.010 | E1 ±.010 | F    | F1  | G    | G1   | N    |      | Pillow Block Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>r</sub> |
|----------------------------|------------|------|------|------|---------|----------|------|-----|------|------|------|------|----------------------|--|
| Fixed                      | Adjustable |      |      |      |         |          |      |     |      |      | Hole | Bolt |                      |  |
| SPB-4                      | SPB-4-ADJ  | 1.63 | 1.00 | 1.19 | .750    | 1.313    | .75  | .19 | .61  | .22  | .16  | #6   | .10                  | 60   |
| SPB-6                      | SPB-6-ADJ  | 1.75 | 1.13 | 1.31 | .875    | 1.438    | .88  | .19 | .72  | .22  | .16  | #6   | .13                  | 100  |
| SPB-8                      | SPB-8-ADJ  | 2.00 | 1.38 | 1.69 | 1.000   | 1.688    | 1.13 | .25 | .69  | .84  | .16  | #6   | .20                  | 255  |
| SPB-10                     | SPB-10-ADJ | 2.50 | 1.75 | 1.94 | 1.125   | 2.125    | 1.44 | .28 | .70  | .68  | .19  | #8   | .50                  | 450  |
| SPB-12                     | SPB-12-ADJ | 2.75 | 1.88 | 2.06 | 1.250   | 2.375    | 1.56 | .31 | .94  | .72  | .19  | #8   | .60                  | 600  |
| SPB-16                     | SPB-16-ADJ | 3.25 | 2.38 | 2.81 | 1.750   | 2.875    | 1.94 | .38 | 1.20 | .86  | .22  | #10  | 1.20                 | 1050   |
| SPB-20                     | SPB-20-ADJ | 4.00 | 3.00 | 3.63 | 2.000   | 3.500    | 2.50 | .44 | 1.50 | 1.20 | .22  | #10  | 2.50                 | 1500   |
| SPB-24                     | SPB-24-ADJ | 4.75 | 3.50 | 4.00 | 2.500   | 4.125    | 2.88 | .50 | 1.75 | 1.25 | .28  | 1/4  | 3.80                 | 2000   |
| SPB-32                     | SPB-32-ADJ | 6.00 | 4.50 | 5.00 | 3.250   | 5.250    | 3.63 | .63 | 2.12 | 1.58 | .41  | 3/8  | 7.00                 | 3000   |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

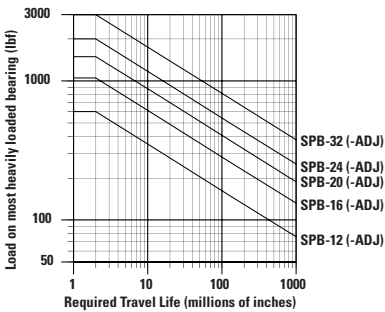
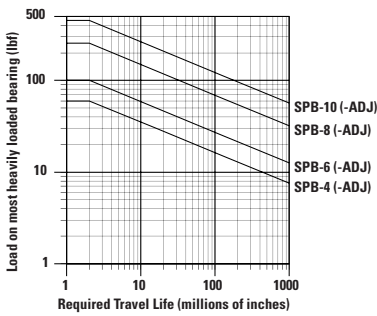
(2) For part number description and specifications see page 45.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Pillow Block)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

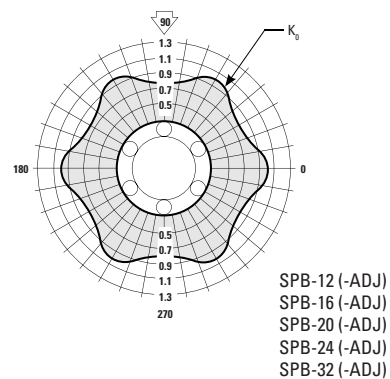
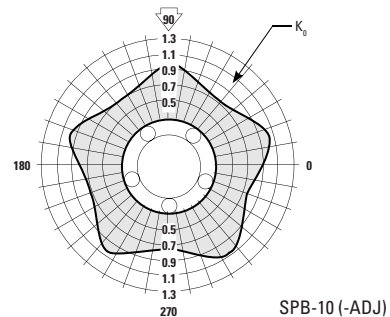
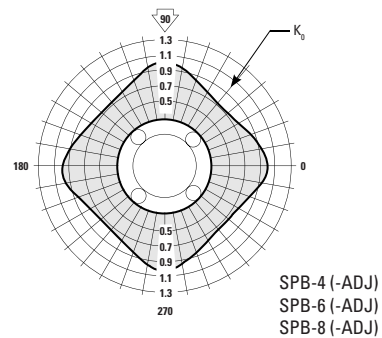
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

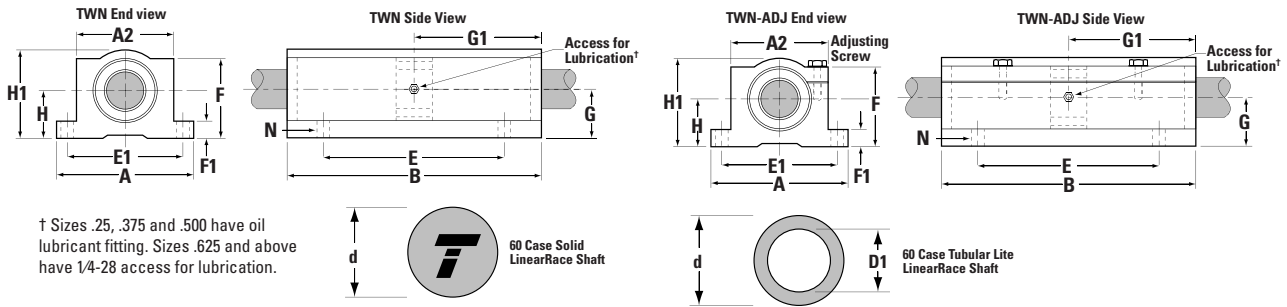
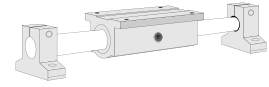
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



## Inch – Super Ball Bushing Bearings

# Super Ball Bushing Twin Pillow Blocks (Closed Type) for End Supported Applications



### Super Ball Bushing Twin Pillow Blocks (Closed and Adjustable Type, seal at both ends) and LinearRace (Dim. in in.)

| Part Number <sup>(2)</sup> |            | 60 Case LinearRace | Nominal Diameter | H ±.003 | H1   | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|----------------------------|------------|--------------------|------------------|---------|------|-------------------------------|--|-------------------------------------|--|---------------------------------------|
| Fixed                      | Adjustable |                    |                  |         |      |                               |  |                                     |  |                                       |
| TWN-4                      | TWN-4-ADJ  | 1/4 L              | .250             | .437    | .81  | .2495/.2490                   | .027   | .01                                 | –  | –                                     |
| TWN-6                      | TWN-6-ADJ  | 3/8 L              | .375             | .500    | .94  | .3745/.3740                   | .027   | .03                                 | –  | –                                     |
| TWN-8                      | TWN-8-ADJ  | 1/2 L              | .500             | .687    | 1.25 | .4995/.4990                   | .04  | .06                                 | –  | –                                     |
| TWN-10                     | TWN-10-ADJ | 5/8 L              | .625             | .875    | 1.63 | .6245/.6240                   | .04  | .09                                 | –  | –                                     |
| TWN-12                     | TWN-12-ADJ | 3/4 L              | .750             | .937    | 1.75 | .7495/.7490                   | .06  | .13                                 | .08  | .46/.41                               |
| TWN-16                     | TWN-16-ADJ | 1 L                | 1.000            | 1.187   | 2.19 | .9995/.9990                   | .08  | .22                                 | .16  | .62/.56                               |
| TWN-20                     | TWN-20-ADJ | 1 1/4 L            | 1.250            | 1.500   | 2.81 | 1.2495/1.2490                 | .08  | .35                                 | –  | –                                     |
| TWN-24                     | TWN-24-ADJ | 1 1/2 L            | 1.500            | 1.750   | 3.25 | 1.4994/1.4989                 | .08  | .50                                 | .33  | .93/.84                               |

| Part Number <sup>(2)</sup> |            | A    | A2   | B    | E ±.010 | E1 ±.010 | F    | F1  | G    | G1   | N    |      | Pillow Block Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>f</sub> |
|----------------------------|------------|------|------|------|---------|----------|------|-----|------|------|------|------|----------------------|--|
| Fixed                      | Adjustable |      |      |      |         |          |      |     |      |      | Hole | Bolt |                      |  |
| TWN-4                      | TWN-4-ADJ  | 1.63 | 1.00 | 2.50 | 2.000   | 1.313    | .75  | .19 | .44  | 1.25 | .16  | #6   | .19                  | 120  |
| TWN-6                      | TWN-6-ADJ  | 1.75 | 1.13 | 2.75 | 2.250   | 1.438    | .88  | .19 | .50  | 1.37 | .16  | #6   | .25                  | 200  |
| TWN-8                      | TWN-8-ADJ  | 2.00 | 1.38 | 3.50 | 2.500   | 1.688    | 1.13 | .25 | .59  | 1.75 | .16  | #6   | .40                  | 510  |
| TWN-10                     | TWN-10-ADJ | 2.50 | 1.75 | 4.00 | 3.000   | 2.125    | 1.44 | .28 | .85  | 2.00 | .19  | #8   | 1.00                 | 900  |
| TWN-12                     | TWN-12-ADJ | 2.75 | 1.88 | 4.50 | 3.500   | 2.375    | 1.56 | .31 | .94  | 2.25 | .19  | #8   | 1.20                 | 1200   |
| TWN-16                     | TWN-16-ADJ | 3.25 | 2.38 | 6.00 | 4.500   | 2.875    | 1.94 | .38 | 1.19 | 3.00 | .22  | #10  | 2.40                 | 2100   |
| TWN-20                     | TWN-20-ADJ | 4.00 | 3.00 | 7.50 | 5.500   | 3.500    | 2.50 | .44 | 1.50 | 3.75 | .22  | #10  | 5.00                 | 3000   |
| TWN-24                     | TWN-24-ADJ | 4.75 | 3.50 | 9.00 | 6.500   | 4.125    | 2.88 | .50 | 1.75 | 4.50 | .28  | 1/4  | 7.80                 | 4000   |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below. Dynamic load capacity of Super Ball Bushing Twin Pillow Blocks is based on two bearings equally loaded.

(2) For part number description and specifications see page 45.

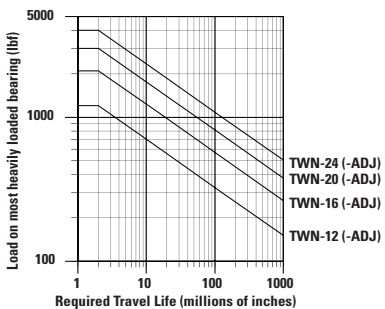
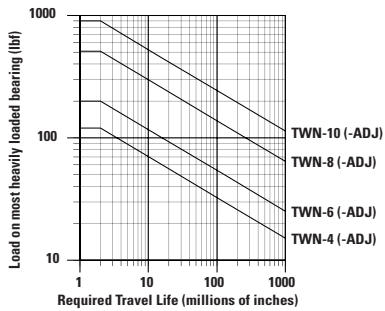
Note: For additional technical information, see the Engineering section beginning on page 245.



## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Pillow Block)



### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

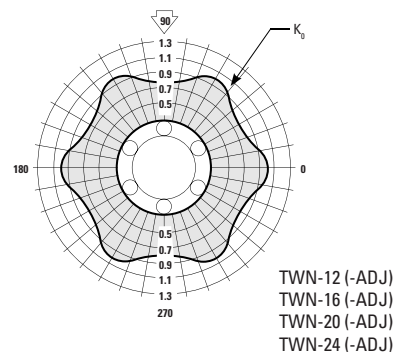
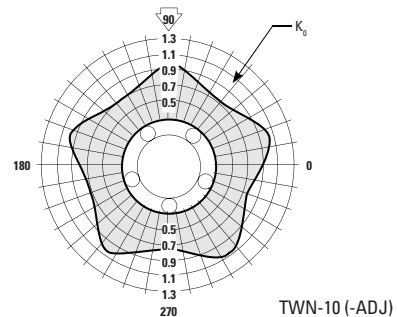
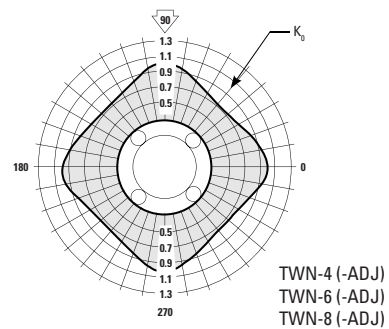
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

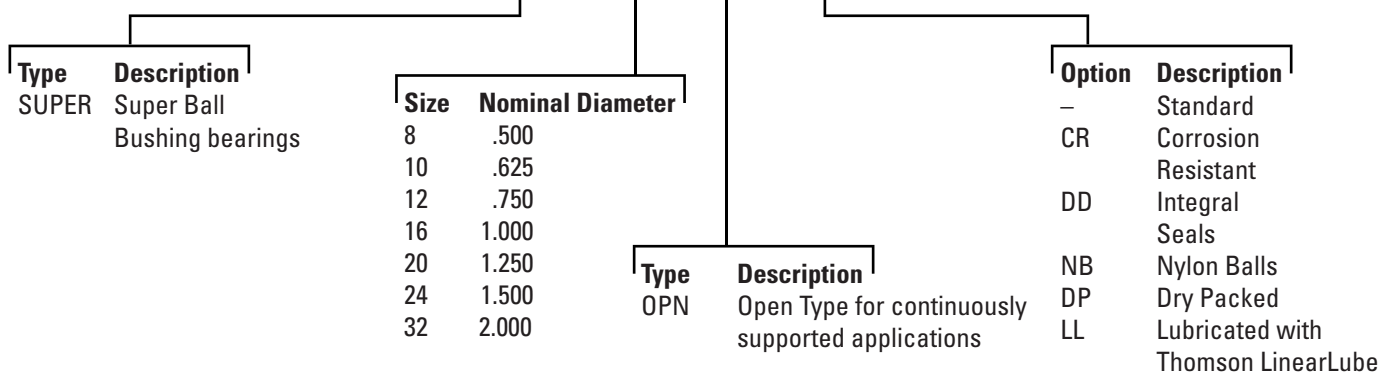


**Inch – Super Ball Bushing Bearings**

**Part Number Description and Specification**

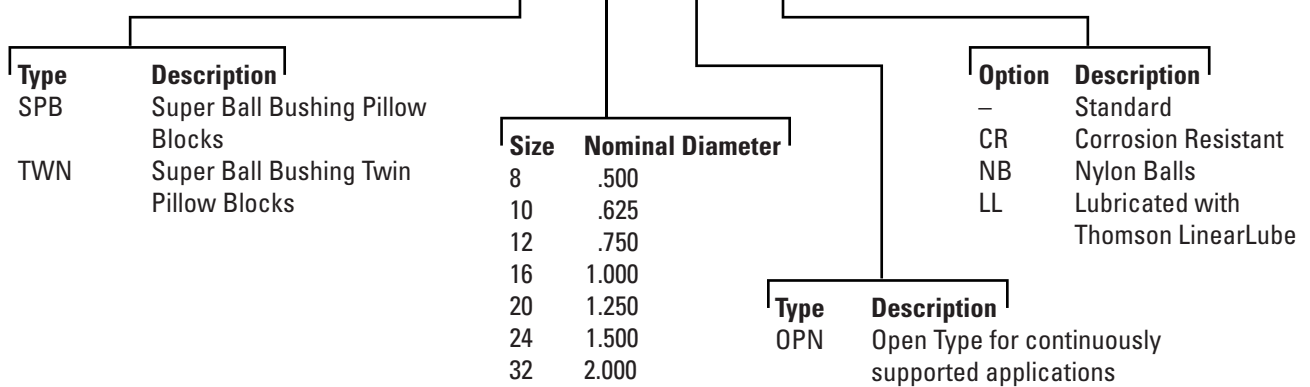
**Super Ball Bushing Bearings (Open Type) for Continuously Supported Applications**

**SUPER 16-OPN-CR**



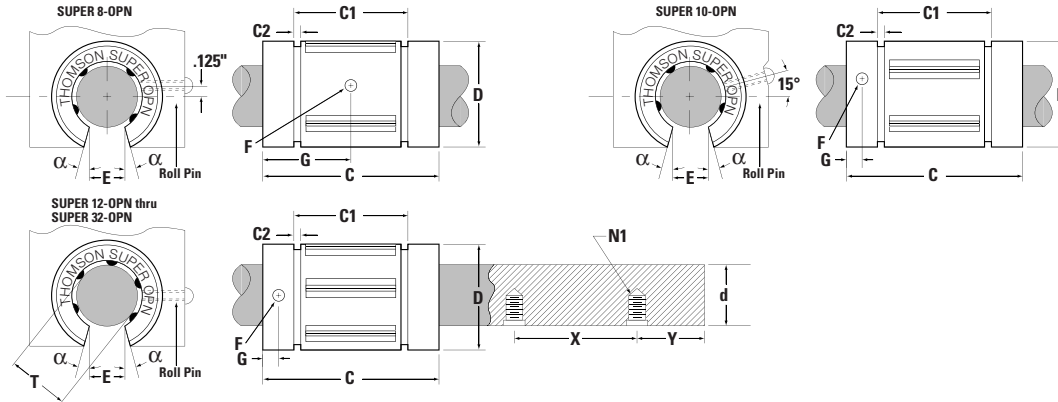
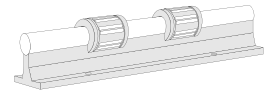
**Super Ball Bushing Pillow Blocks (Open Type) for Continuously Supported Applications**

**SPB 16-OPN-CR**



Inch – Super Ball Bushing Bearings

# Super Ball Bushing Bearings (Open Type) for Continuously Supported Applications



Super Ball Bushing Bearings (Open Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(3)</sup> |                     | Nominal Diameter | Length C    | Distance Between Retaining Rings C1 | Ret. Ring Groove min. C2 | Min. Slot Width E | Retention Hole |        | Angle deg α | Number of Ball Circuits | Ball Bushing Bearing Mass lb | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |         |
|----------------------------|---------------------|------------------|-------------|-------------------------------------|--------------------------|-------------------|----------------|--------|-------------|-------------------------|------------------------------|--|-------------------------------------|-----------------------------------|---|---------|
| Ball Bushing Bearing       | 60 Case Linear Race |                  |             |                                     |                          |                   | Dia. F         | Loc. G |             |                         |                              |  |                                     | X                                 | Y | N1      |
| SUPER80PN                  | 1/2 L PD            | .500             | 1.250/1.230 | 1.032/1.012                         | .050                     | .31               | .14            | .63    | 15          | 4                       | .04                          | .04  | .06                                 | 4                                 | 2 | #6-32   |
| SUPER100PN                 | 5/8 L PD            | .625             | 1.500/1.480 | 1.105/1.095                         | .056                     | .37               | .11            | .13    | 15          | 4                       | .08                          | .04  | .09                                 | 4                                 | 2 | #8-32   |
| SUPER120PN                 | 3/4 L PD            | .750             | 1.625/1.605 | 1.270/1.250                         | .056                     | .43               | .14            | .13    | 15          | 5                       | .12                          | .06  | .13                                 | 6                                 | 3 | #10-32  |
| SUPER160PN                 | 1 L PD              | 1.000            | 2.250/2.230 | 1.884/1.864                         | .070                     | .56               | .14            | .13    | 15          | 5                       | .21                          | .08  | .22                                 | 6                                 | 3 | 1/4-20  |
| SUPER200PN                 | 1 1/4 L PD          | 1.250            | 2.625/2.600 | 2.004/1.984                         | .068                     | .62               | .20            | .19    | 15          | 5                       | .38                          | .08  | .35                                 | 6                                 | 3 | 5/16-18 |
| SUPER240PN                 | 1 1/2 L PD          | 1.500            | 3.000/2.970 | 2.410/2.390                         | .086                     | .75               | .20            | .19    | 15          | 5                       | .71                          | .08  | .50                                 | 8                                 | 4 | 3/8-16  |
| SUPER320PN                 | 2 L PD              | 2.000            | 4.000/3.960 | 3.193/3.163                         | .105                     | 1.00              | .27            | .31    | 15          | 5                       | 1.20                         | .10  | .89                                 | 8                                 | 4 | 1/2-13  |

| Part Number <sup>(3)</sup> | Working Bore Diameter T | Recommended Housing Bore Dia. |               | 60 Case LinearRace Diameter d | Ball Bushing Bearing/LinearRace Fit Up ‡ |   | Dynamic Load Capacity lb <sub>r</sub> |
|----------------------------|-------------------------|-------------------------------|---------------|-------------------------------|--|---|---------------------------------------|
|                            |                         | Fixed D                       | Adjustable D  |                               | Fixed Diameter Housing                   | Adjustable Diameter Housing (Before Adjustment) |                                       |
| SUPER80PN                  | .5000/.4995             | .8755/.8750                   | .8760/.8750   | .4995/.4990                   | .0015C/.0000                             | .002C/.0000                                     | 230                                   |
| SUPER100PN                 | .6250/.6245             | 1.1255/1.1250                 | 1.1260/1.1250 | .6245/.6240                   | .0015C/.0000                             | .002C/.0000                                     | 320                                   |
| SUPER120PN                 | .7500/.7495             | 1.2505/1.2500                 | 1.2510/1.2500 | .7495/.7490                   | .0015C/.0000                             | .002C/.0000                                     | 470                                   |
| SUPER160PN                 | 1.0000/.9995            | 1.5630/1.5625                 | 1.5635/1.5625 | .9995/.9990                   | .0015C/.0000                             | .002C/.0000                                     | 780                                   |
| SUPER200PN                 | 1.2500/1.2494           | 2.0008/2.0000                 | 2.0010/2.0000 | 1.2495/1.2490                 | .0018C/.0001P                            | .002C/.0001P                                    | 1170                                  |
| SUPER240PN                 | 1.5000/1.4994           | 2.3760/2.3750                 | 2.3760/2.3750 | 1.4994/1.4989                 | .0021C/.0000                             | .0021C/.0000                                    | 1560                                  |
| SUPER320PN                 | 2.000/1.9992            | 3.0010/3.0000                 | 3.0010/3.0000 | 1.9994/1.9987                 | .0023C/.0002P                            | .0023C/.0002P                                   | 2350                                  |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

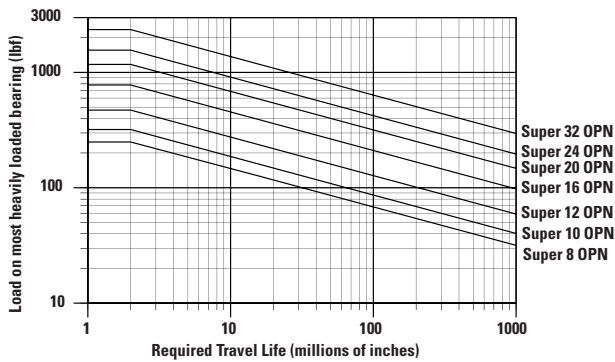
(3) For part number description and specifications see page 56.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Pillow Block)



#### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

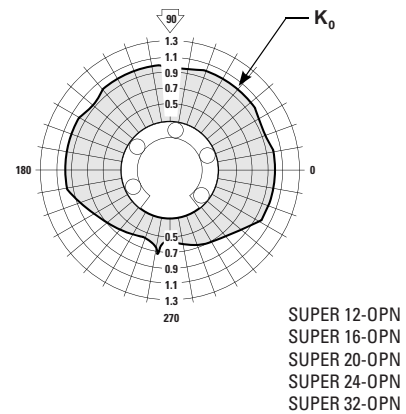
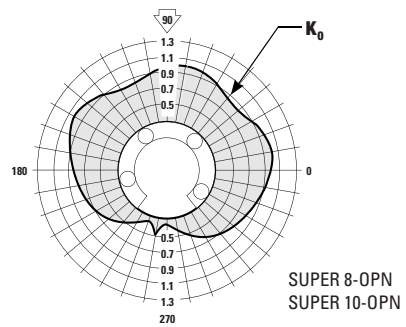
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

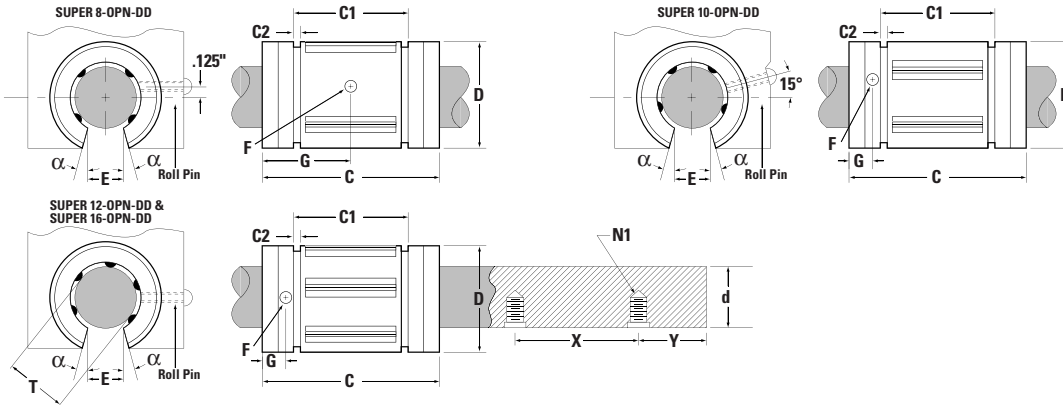
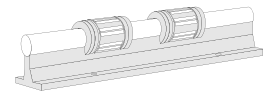
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Super Ball Bushing Bearings

# Sealed Super Ball Bushing Bearings (Open Type) for Continuously Supported Applications



Sealed Super Ball Bushing Bearings (Open Type, seal at both ends) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(3)</sup> | 60 Case Linear Race | Nom. Dia. | Length C    | Distance Between Retaining Rings C1 | Ret. Ring Groove min. C2 | Min. Slot Width E | Retention Hole |        | Angle deg α | Number of Ball Circuits | Ball Bushing Bearing Mass lb | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |        |
|----------------------------|---------------------|-----------|-------------|-------------------------------------|--------------------------|-------------------|----------------|--------|-------------|-------------------------|------------------------------|--|-------------------------------------|-----------------------------------|---|--------|
|                            |                     |           |             |                                     |                          |                   | Dia. F         | Loc. G |             |                         |                              |  |                                     | X                                 | Y | N1     |
| SUPER 8-OPN-DD             | 1/2 L PD            | .500      | 1.500/1.460 | 1.032/1.012                         | .050                     | .31               | .14            | .750   | 15          | 4                       | .03                          | .04  | .06                                 | 4                                 | 2 | #6-32  |
| SUPER 10-OPN-DD            | 5/8 L PD            | .625      | 1.750/1.710 | 1.105/1.095                         | .056                     | .37               | .11            | .250   | 15          | 4                       | .08                          | .04  | .09                                 | 4                                 | 2 | #8-32  |
| SUPER 12-OPN-DD            | 3/4 L PD            | .750      | 1.875/1.835 | 1.270/1.250                         | .056                     | .43               | .14            | .250   | 15          | 5                       | .12                          | .06  | .13                                 | 6                                 | 3 | #10-32 |
| SUPER 16-OPN-DD            | 1 L PD              | 1.000     | 2.625/2.585 | 1.884/1.864                         | .070                     | .56               | .14            | .313   | 15          | 5                       | .21                          | .08  | .22                                 | 6                                 | 3 | 1/4-20 |

| Part Number <sup>(3)</sup> | Working Bore Diameter T | Recommended Housing Bore Dia. |               | 60 Case LinearRace Diameter d | Ball Bushing Bearing/LinearRace Fit Up ‡ |   | Dynamic Load Capacity lb, <sup>(#1)</sup> |
|----------------------------|-------------------------|-------------------------------|---------------|-------------------------------|--|---|---|
|                            |                         | Fixed D                       | Adjustable D  |                               | Fixed Diameter Housing                   | Adjustable Diameter Housing (Before Adjustment) |   |
| SUPER 8-OPN-DD             | .5000/.4995             | .8755/.8750                   | .8760/.8750   | .4995/.4990                   | .0015C/.0000                             | .002C/.0000                                     | 230                                       |
| SUPER 10-OPN-DD            | .6250/.6245             | 1.1255/1.1250                 | 1.1260/1.1250 | .6245/.6240                   | .0015C/.0000                             | .002C/.0000                                     | 320                                       |
| SUPER 12-OPN-DD            | .7500/.7495             | 1.2505/1.2500                 | 1.2510/1.2500 | .7495/.7490                   | .0015C/.0000                             | .002C/.0000                                     | 470                                       |
| SUPER 16-OPN-DD            | 1.0000/.9995            | 1.5630/1.5625                 | 1.5635/1.5625 | .9995/.9990                   | .0015C/.0000                             | .002C/.0000                                     | 780                                       |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

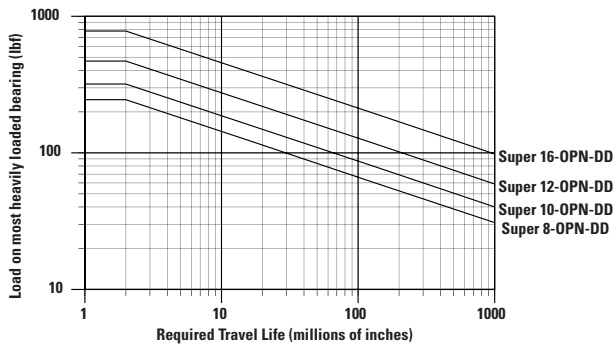
(3) For part number description and specifications see page 56.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Pillow Block)



#### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

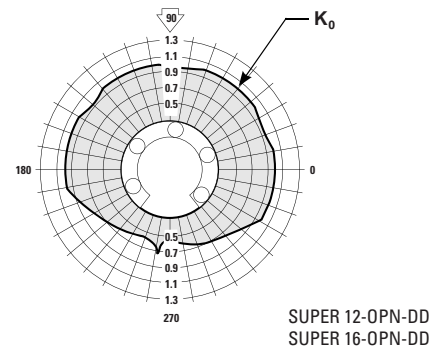
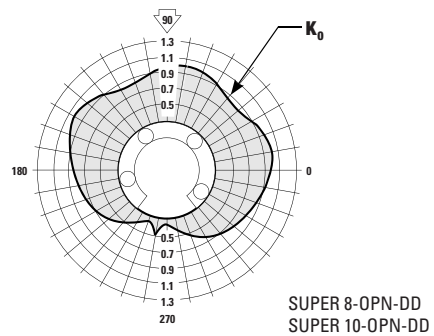
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

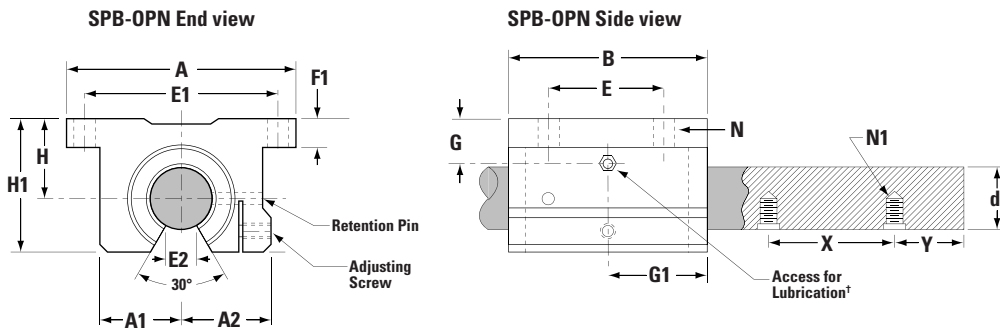
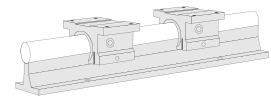
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Super Ball Bushing Bearings

# Super Ball Bushing Pillow Blocks (Open Type) for Continuously Supported Applications



† Size .500 has oil lubricant fitting. Sizes .625 and above have 1/4-28 access for lubrication.

## Super Ball Bushing Pillow Blocks (Open Type, seal at both ends) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(3)</sup>      |                    | Nominal Diameter | H<br>±.003 | H1   | A    | A1   | A2   | B    | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |         |
|---------------------------------|--------------------|------------------|------------|------|------|------|------|------|--|-------------------------------------|-----------------------------------|---|---------|
| Super Ball Bushing Pillow Block | 60 Case LinearRace |                  |            |      |      |      |      |      |  |                                     | X                                 | Y | N1      |
| SPB-8-OPN                       | 1/2 L PD           | .500             | .687       | 1.13 | 2.00 | .69  | .75  | 1.50 | .04  | .06                                 | 4                                 | 2 | #6-32   |
| SPB-10-OPN                      | 5/8 L PD           | .625             | .875       | 1.44 | 2.50 | .88  | .94  | 1.75 | .04  | .09                                 | 4                                 | 2 | #8-32   |
| SPB-12-OPN                      | 3/4 L PD           | .750             | .937       | 1.56 | 2.75 | .94  | 1.00 | 1.88 | .06  | .13                                 | 6                                 | 3 | #10-32  |
| SPB-16-OPN                      | 1 L PD             | 1.000            | 1.187      | 2.00 | 3.25 | 1.19 | 1.25 | 2.63 | .08  | .22                                 | 6                                 | 3 | 1/4-20  |
| SPB-20-OPN                      | 1 1/4 L PD         | 1.250            | 1.500      | 2.56 | 4.00 | 1.50 | 1.63 | 3.38 | .08  | .35                                 | 6                                 | 3 | 5/16-18 |
| SPB-24-OPN                      | 1 1/2 L PD         | 1.500            | 1.750      | 2.94 | 4.75 | 1.75 | 1.88 | 3.75 | .08  | .50                                 | 8                                 | 4 | 3/8-16  |
| SPB-32-OPN                      | 2 L PD             | 2.000            | 2.125      | 3.63 | 6.00 | 2.25 | 2.44 | 4.75 | .10  | .89                                 | 8                                 | 4 | 1/2-13  |

| Part Number <sup>(3)</sup> | 60 Case LinearRace Diameter d | E<br>±.010 | E1<br>±.010 | E2<br>Min. | F1  | G    | G1   | N    |      | Pillow Block Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>r</sub> |
|----------------------------|-------------------------------|------------|-------------|------------|-----|------|------|------|------|----------------------|--|
|                            |                               |            |             |            |     |      |      | Hole | Bolt |                      |  |
| SPB-8-OPN                  | .4995/.4990                   | 1.000      | 1.688       | .31        | .25 | .69  | .75  | .16  | #6   | .2                   | 230  |
| SPB-10-OPN                 | .6245/.6240                   | 1.125      | 2.125       | .37        | .28 | .42  | .53  | .19  | #8   | .4                   | 320  |
| SPB-12-OPN                 | .7495/.7490                   | 1.250      | 2.375       | .43        | .31 | 1.08 | .55  | .19  | #8   | .5                   | 470  |
| SPB-16-OPN                 | .9995/.9990                   | 1.750      | 2.875       | .56        | .38 | 1.37 | .76  | .22  | #10  | 1.0                  | 780  |
| SPB-20-OPN                 | 1.2495/1.2490                 | 2.000      | 3.500       | .62        | .44 | 1.73 | 1.05 | .22  | #10  | 2.1                  | 1170   |
| SPB-24-OPN                 | 1.4994/1.4989                 | 2.500      | 4.125       | .75        | .50 | 2.03 | 1.12 | .28  | .25  | 3.2                  | 1560   |
| SPB-32-OPN                 | 1.9994/1.9987                 | 3.250      | 5.250       | 1.00       | .63 | 2.50 | 1.44 | .41  | .38  | 6.0                  | 2350   |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

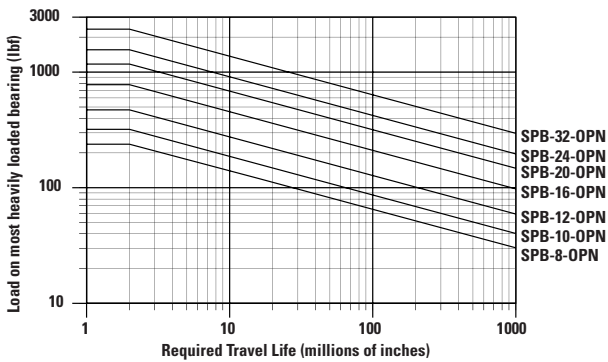
(3) For part number description and specifications see page 56.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Pillow Block)



#### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

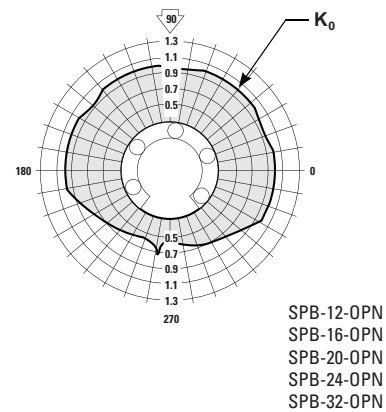
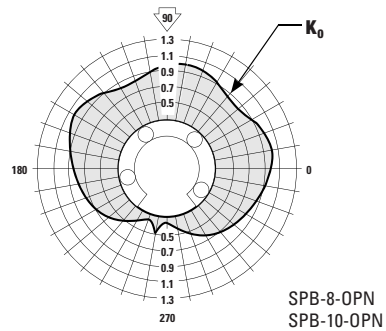
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

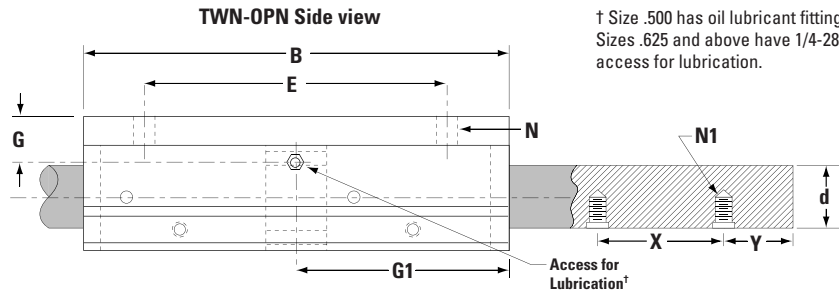
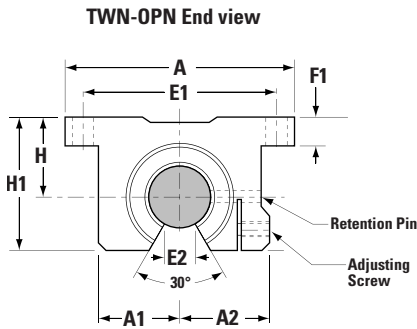
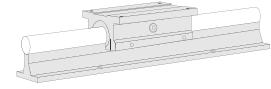
The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.





Inch – Super Ball Bushing Bearings

# Super Ball Bushing Twin Pillow Blocks (Open Type) for Continuously Supported Applications



† Size .500 has oil lubricant fitting. Sizes .625 and above have 1/4-28 access for lubrication.

## Super Ball Bushing Twin Pillow Blocks (Open Type, seal at both ends) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(3)</sup>           |                    | Nominal Diameter | H ±.003 | H1   | A    | A1   | A2   | B    | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |         |
|--------------------------------------|--------------------|------------------|---------|------|------|------|------|------|--|-------------------------------------|-----------------------------------|---|---------|
| Super Ball Bushing Twin Pillow Block | 60 Case LinearRace |                  |         |      |      |      |      |      |  |                                     | X                                 | Y | N1      |
| TWN-8-OPN                            | 1/2 L PD           | .500             | .687    | 1.13 | 2.00 | .69  | .75  | 3.50 | .04  | .06                                 | 4                                 | 2 | #6-32   |
| TWN-10-OPN                           | 5/8 L PD           | .625             | .875    | 1.44 | 2.50 | .88  | .94  | 4.00 | .04  | .09                                 | 4                                 | 2 | #8-32   |
| TWN-12-OPN                           | 3/4 L PD           | .750             | .937    | 1.56 | 2.75 | .94  | 1.00 | 4.50 | .06  | .13                                 | 6                                 | 3 | #10-32  |
| TWN-16-OPN                           | 1 L PD             | 1.000            | 1.187   | 2.00 | 3.25 | 1.19 | 1.25 | 6.00 | .08  | .22                                 | 6                                 | 3 | 1/4-20  |
| TWN-20-OPN                           | 1 1/4 L PD         | 1.250            | 1.500   | 2.56 | 4.00 | 1.50 | 1.63 | 7.50 | .08  | .35                                 | 6                                 | 3 | 5/16-18 |
| TWN-24-OPN                           | 1 1/2 L PD         | 1.500            | 1.750   | 2.94 | 4.75 | 1.75 | 1.88 | 9.00 | .08  | .50                                 | 8                                 | 4 | 3/8-16  |

| Part Number <sup>(3)</sup> | 60 Case LinearRace Diameter d | E ±.010 | E1 ±.010 | E2 Min. | F1  | G    | G1   | N    |      | Pillow Block Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>f</sub> |
|----------------------------|-------------------------------|---------|----------|---------|-----|------|------|------|------|----------------------|--|
|                            |                               |         |          |         |     |      |      | Hole | Bolt |                      |  |
| TWN-8-OPN                  | .4995/.4990                   | 2.500   | 1.688    | .31     | .25 | .56  | 1.75 | .16  | #6   | .4                   | 460  |
| TWN-10-OPN                 | .6245/.6240                   | 3.000   | 2.125    | .37     | .28 | .67  | 2.00 | .19  | #8   | .8                   | 640  |
| TWN-12-OPN                 | .7495/.7490                   | 3.500   | 2.375    | .43     | .31 | .94  | 2.25 | .19  | #8   | 1.0                  | 940  |
| TWN-16-OPN                 | .9995/.9990                   | 4.500   | 2.875    | .56     | .38 | 1.20 | 3.00 | .22  | #10  | 2.0                  | 1560   |
| TWN-20-OPN                 | 1.2495/1.2490                 | 5.500   | 3.500    | .62     | .44 | 1.50 | 3.75 | .22  | #10  | 4.2                  | 2340   |
| TWN-24-OPN                 | 1.4994/1.4989                 | 6.500   | 4.125    | .75     | .50 | 1.75 | 4.50 | .28  | .25  | 6.7                  | 3120   |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

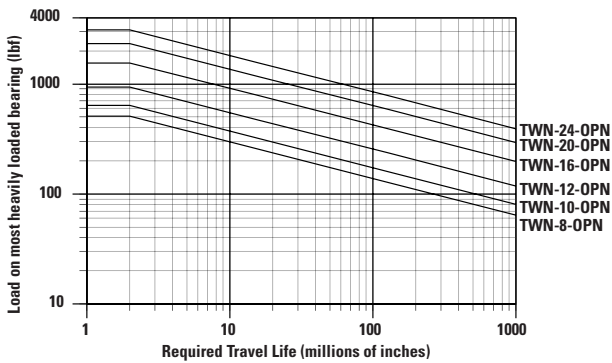
(3) For part number description and specifications see page 56.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Super Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Pillow Block)



#### Determining Ball Bushing bearing Size

To determine the proper Ball Bushing bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing bearing sizes that pass through or above and to the right of this point may be suitable for this application.

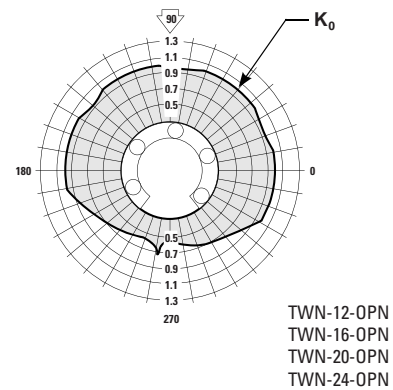
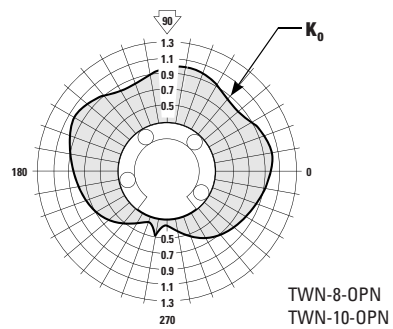
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Super Ball Bushing Bearings

# Cam-Actuated Part Transfer Mechanism for Multiple-Transfer Press

## Objective

Improve production rate and increase the service life of a transfer table mechanism.

## Solution

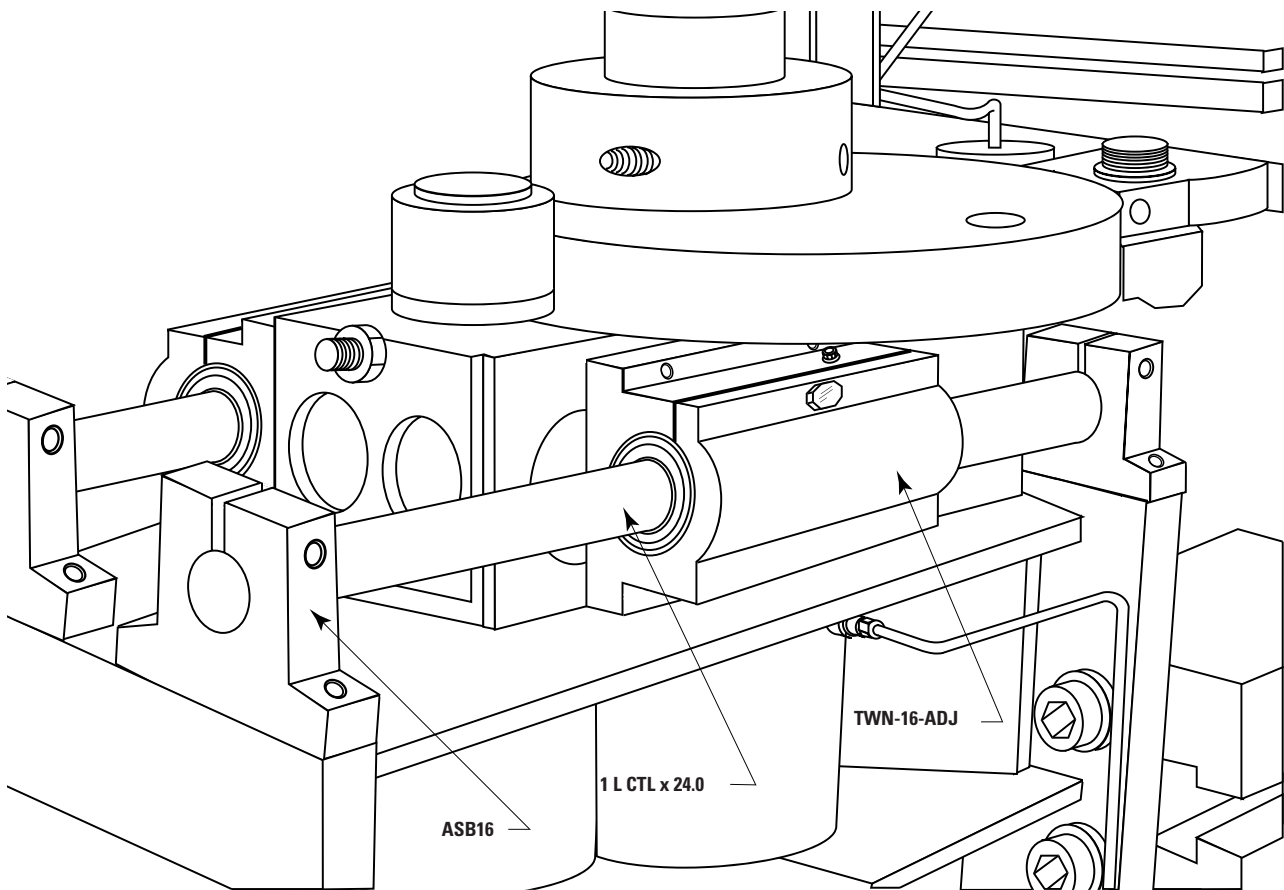
Replace the conventional linear bearings with Adjustable Super Ball Bushing Twin Pillow Blocks. Bearing service life increased to 5 years.

## Products Specified

2 - TWN16-ADJ (Super Ball Bushing Twin Pillow Blocks)  
4 - ASB16 (60 Case LinearRace End Support Blocks)  
2 - 1 L CTL x 24.00 in (60 Case LinearRace)

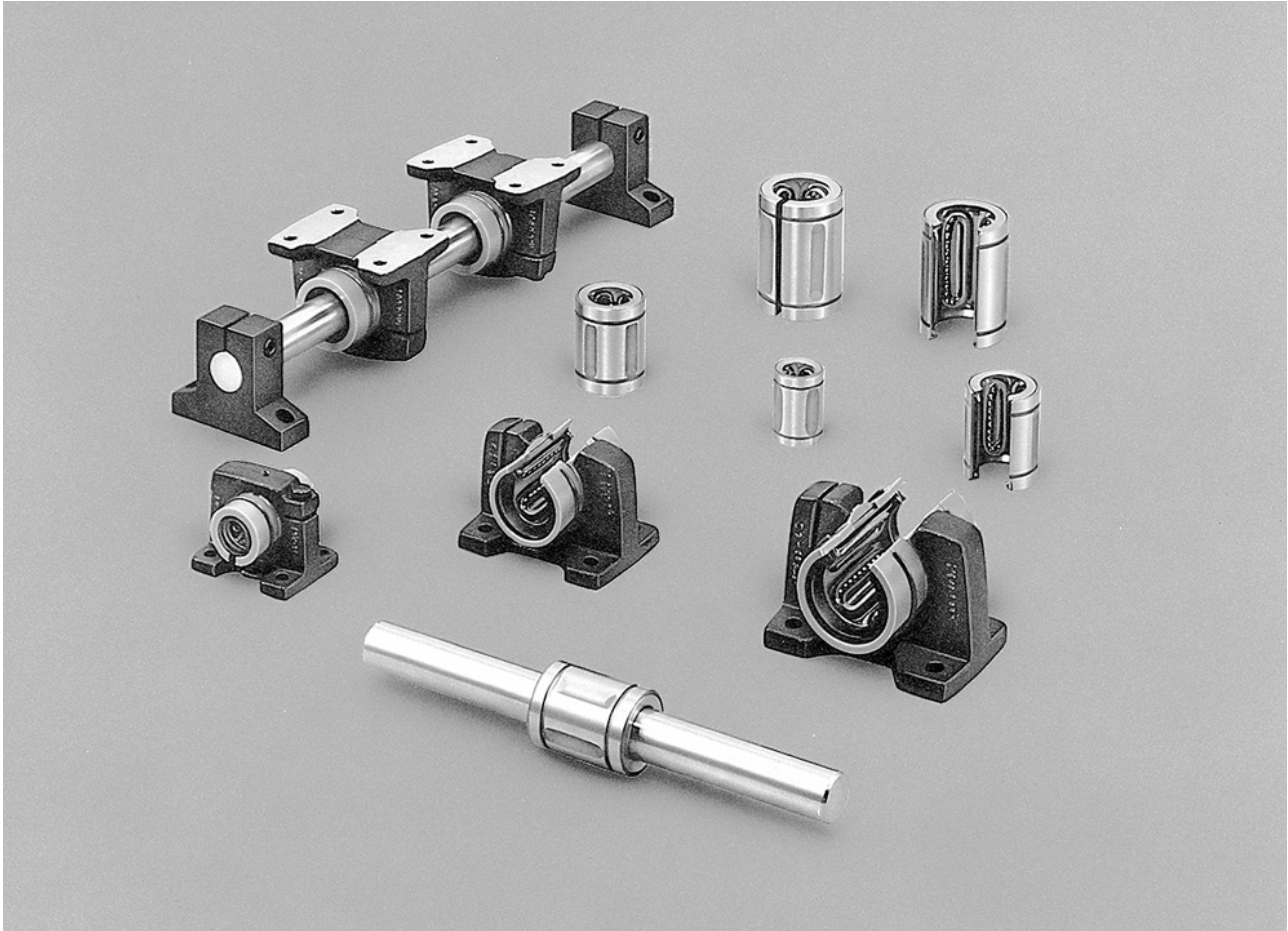
## Benefits

The table achieved maximum cycle efficiency by reducing costly downtime and improving service life.



## Inch – Precision Steel Ball Bushing Bearings

# Precision Steel Ball Bushing Bearing Products



### Thomson Precision Steel Ball Bushing Bearing Products offer:

- A coefficient of friction as low as .001. When replacing high friction plain bearings, Precision Steel Ball Bushing Bearings dramatically improve machine productivity and efficiency.
- All-steel construction, for maximum system rigidity.
- Two accuracy classes allowing for immediate improvements in system positioning and repeatability.
- Availability in fourteen bore sizes and nine configurations.
- The RoundRail Advantage which minimizes installation time and cost.
- Steady state travel speeds up to 10 ft/s and accelerations to 450 ft/s<sup>2</sup> without the use of derating factors.
- An operating temperature up to 600° F.
- Availability in a self-aligning pillow block housing for ease of installation and use.
- Worldwide availability from over 1800 authorized distributors.

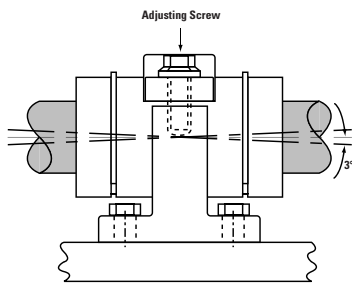


Figure 1

When the Precision Steel Ball Bushing Bearing is installed in its standard Pillow Block it will self-align up to 3 degrees in all directions.

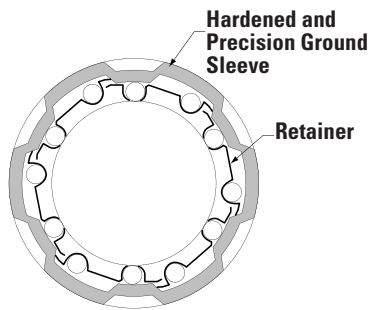


Figure 2

Precision Steel Ball Bushing Bearing Cross-section

## Inch – Precision Steel Ball Bushing Bearings

The basis for the performance of all Precision Steel Ball Bushing Bearings is a simple but ingenious system of ball recirculation that permits almost frictionless, unlimited travel.

### Replace High Friction Plain Bearings

Plain bearings cause friction, stick-slip, binding and chatter. The Precision Steel Ball Bushing Bearing's patented ball recirculation virtually eliminates wear and provides a constant coefficient of friction as low as .001. This dramatic reduction in friction allows the designer to use smaller less expensive drive motors, ball screws, belts, linkages and gears.

### Lasting Precision Alignment

High friction plain bearings cause wear resulting in a loss in system alignment and repeatability. Each Precision Steel Ball Bushing Bearing is manufactured with high quality bearing steel that is hardened and precision ground. The rolling elements of each Ball Bushing Bearing are precision ground bearing balls that recirculate freely into and out of the load zone. The balls are guided through their recirculation path by a steel retainer and hardened sleeve. The inherent non-wear characteristics of each Precision Steel Ball Bushing Bearing assures maximum system accuracy and repeatability.

### High Travel Speeds

Precision Steel Ball Bushing can operate at travel rates as high as 10 ft/s and accelerations as high as 450 ft/s<sup>2</sup>. When replacing inefficient v-way or flat-way systems, this travel rate capability provides immediate improvements in machine efficiency and productivity.

### Ease of Installation

The Precision Steel Ball Bushing Bearing can be retained in a housing, internally or externally. The retaining ring groove on the outside diameter allows the bearing to be captured and retained by an external retaining ring. If internal retention is required, the Ball Bushing Bearing can be installed in a housing and held in place with an internal retaining ring.

### Protection from Contamination

Precision Steel Ball Bushing Bearings most popular sizes are available with double acting integral wipers that keep out contamination, retain lubrication and maximize travel life.

**Inch – Precision Steel Ball Bushing Bearings**

**Part Number Description and Specification**

**Precision Steel Ball Bushing Bearings (Closed Type) for End Supported Applications**

**A-162536-DD**

| Type | Description                                      | Size    | Nom. Dia. | Option | Description                                   |
|------|--|---------|-----------|--------|---|
| A    | Precision Steel Ball Bushing Bearings            | 4812    | .250      | –      | Standard                                      |
|      |  | 61014   | .375      | DD     | With Integral Wipers (1/2", 3/4" and 1" only) |
| XA   | Extra Precision Ball Bushing Bearings            | 81420   | .500      | NB     | Nylon Balls                                   |
|      |  | 101824  | .625      | DP     | Dry Packed                                    |
| ADJ  | Adjustable Precision Steel Ball Bushing bearings | 122026  | .750      | SS     | Stainless Steel (up to and including 1")      |
|      |  | 162536  | 1.000     | LL     | Lubricated with Thomson LinearLube            |
|      |  | 203242  | 1.250     |        |   |
|      |  | 243848  | 1.500     |        |   |
|      |  | 324864  | 2.000     |        |   |
|      |  | 406080  | 2.500     |        |   |
|      |  | 487296  | 3.000     |        |   |
|      |  | 6496128 | 4.000     |        |   |

**Precision Steel Ball Bushing Pillow Blocks (Closed Type) for End Supported Applications**

**SPB-16-ADJ-CR**

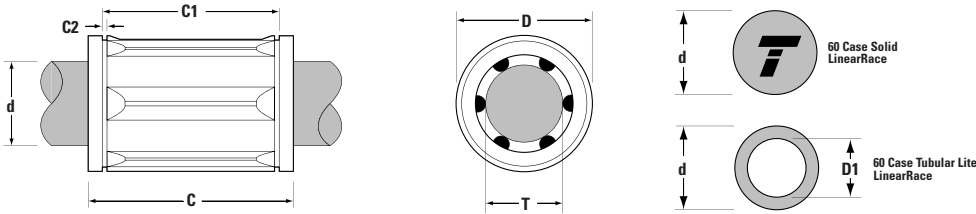
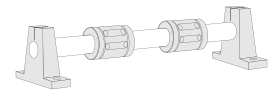
| Type | Description                                | Size | Nominal Diameter | Option | Description                        |
|------|--|------|------------------|--------|------------------------------------|
| PB   | Precision Steel Ball Bushing Pillow Blocks | 8    | .500             | –      | Standard                           |
|      |  | 10   | .625             | SS     | Stainless Steel                    |
|      |  | 12   | .750             | LL     | Lubricated with Thomson LinearLube |
|      |  | 16   | 1.000            |        |                                    |
|      |  | 20   | 1.250            |        |                                    |
|      |  | 24   | 1.500            |        |                                    |
|      |  | 32   | 2.000            |        |                                    |

| Type | Description     |
|------|-----------------|
| A    | Standard        |
| ADJ  | Adjustable Type |

Inch – Precision Steel Ball Bushing Bearings

# Precision Steel Ball Bushing Bearings (Closed Type) for End Supported Applications



Sizes .250 thru 1.00 available in Corrosion Resistant Stainless Steel

Precision Steel Ball Bushing Bearings (Closed Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup>            |             | 60 Case Linear Race | Nominal Diameter | Length C    | Distance Between Retaining Grooves C1 | Retaining Ring Groove min. C2 | Number of Ball Circuits | D             | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|---------------------------------------|-------------|---------------------|------------------|-------------|---------------------------------------|-------------------------------|-------------------------|---------------|-------------------------------------|--|---------------------------------------|
| Precision Steel Ball Bushing Bearings |             |                     |                  |             |                                       |                               |                         |               |                                     |  |                                       |
| w/o Seals                             | with Seals  |                     |                  |             |                                       |                               |                         |               |                                     |  |                                       |
| A-4812                                | –           | 1/4 S               | .250             | .750/.735   | .515/.499                             | .039                          | 3                       | .5000/.4996   | .01                                 | –  | –                                     |
| A-61014                               | –           | 3/8 S               | .375             | .875/.860   | .640/.624                             | .039                          | 4                       | .6250/.6246   | .03                                 | –  | –                                     |
| A-81420                               | A-81420-DD  | 1/2 S               | .500             | 1.250/1.235 | .967/.951                             | .046                          | 4                       | .8750/.8746   | .06                                 | –  | –                                     |
| A-101824                              | –           | 5/8 S               | .625             | 1.500/1.485 | 1.108/1.092                           | .056                          | 4                       | 1.1250/1.1246 | .09                                 | –  | –                                     |
| A-122026                              | A-122026-DD | 3/4 S               | .750             | 1.625/1.610 | 1.170/1.154                           | .056                          | 5                       | 1.2500/1.2496 | .13                                 | .08  | .46/.41                               |
| A-162536                              | A-162536-DD | 1 S                 | 1.000            | 2.250/2.235 | 1.759/1.741                           | .068                          | 5                       | 1.5625/1.5621 | .22                                 | .16  | .62/.56                               |
| A-203242                              | –           | 1 1/4 S             | 1.250            | 2.625/2.605 | 2.009/1.991                           | .068                          | 6                       | 2.0000/1.9995 | .35                                 | –  | –                                     |
| A-243848                              | –           | 1 1/2 S             | 1.500            | 3.000/2.980 | 2.415/2.397                           | .086                          | 6                       | 2.3750/2.3745 | .50                                 | .33  | .93/.84                               |
| A-324864                              | –           | 2 S                 | 2.000            | 4.000/3.980 | 3.195/3.177                           | .103                          | 6                       | 3.0000/2.9994 | .89                                 | .54  | 1.31/1.18                             |
| A-406080                              | –           | 2 1/2 S             | 2.500            | 5.000/4.975 | 3.978/3.958                           | .120                          | 6                       | 3.7500/3.7492 | 1.39                                | .75  | 1.84/1.66                             |
| A-487296                              | –           | 3 S                 | 3.000            | 6.000/5.970 | 4.728/4.708                           | .120                          | 6                       | 4.5000/4.4990 | 2.00                                | 1.11                                       | 2.20/1.80                             |
| A-6496128                             | –           | 4 S                 | 4.000            | 8.000/7.960 | 6.265/6.235                           | .139                          | 6                       | 6.0000/5.9988 | 3.56                                | 1.56                                       | 3.30/2.70                             |

| Part Number <sup>(2)</sup>            |             | Working Bore Diameter T | Recommended Housing Bore |                          | 60 Case LinearRace Diameter d | Precision Steel Ball Bushing Bearing/ LinearRace Fit Up ‡ | Precision Steel Ball Bushing Bearing Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>f</sub> |
|---------------------------------------|-------------|-------------------------|--------------------------|--------------------------|-------------------------------|---|--|--|
| Precision Steel Ball Bushing Bearings |             |                         | Normal Fit               | Press Fit                |                               |   |  |  |
| w/o Seals                             | with Seals  |                         |                          |                          |                               |   |  |  |
| A-4812                                | –           | .2500/.2495             | .5005/.5000              | .4995/.4990              | .2490/.2485                   | .0015C/.0005C   | .02  | 19   |
| A-61014                               | –           | .3750/.3745             | .6255/.6250              | .6245/.6240              | .3740/.3735                   | .0015C/.0005C   | .06  | 37   |
| A-81420                               | A-81420-DD  | .5000/.4995             | .8755/.8750              | .8745/.8740              | .4990/.4985                   | .0015C/.0005C   | .08  | 85   |
| A-101824                              | –           | .6250/.6245             | 1.1255/1.1250            | 1.1245/1.1240            | .6240/.6235                   | .0015C/.0005C   | .16  | 150  |
| A-122026                              | A-122026-DD | .7500/.7495             | 1.2505/1.2500            | 1.2495/1.2490            | .7490/.7485                   | .0015C/.0005C   | .21  | 200  |
| A-162536                              | A-162536-DD | 1.0000/.9995            | 1.5630/1.5625            | 1.5620/1.5615            | .9990/.9985                   | .0015C/.0005C   | .38  | 350  |
| A-203242                              | –           | 1.2500/1.2494           | 2.0010/2.0000            | 1.9993/1.9983            | 1.2490/1.2485                 | .0015C/.0004C   | 1.10   | 520  |
| A-243848                              | –           | 1.5000/1.4994           | 2.3760/2.3750            | 2.3743/2.3733            | 1.4989/1.4984                 | .0016C/.0005C   | 1.43   | 770  |
| A-324864                              | –           | 2.0000/1.9992           | 3.0010/3.0000            | 2.9992/2.9982            | 1.9987/1.9980                 | .0020C/.0005C   | 2.75   | 1100   |
| A-406080                              | –           | 2.5000/2.4990           | 3.7510/3.7500            | Not Normally Recommended | 2.4985/2.4977                 | .0023C/.0005C   | 5.50   | 1800   |
| A-487296                              | –           | 3.0000/2.9988           | 4.5010/4.5000            |                          | 2.9983/2.9974                 | .0026C/.0005C   | 9.50   | 2600   |
| A-6496128                             | –           | 4.0000/3.9980           | 6.0010/6.0000            |                          | 3.9976/3.9964                 | .0036C/.0004C   | 20.20  | 5000   |

<sup>(1)</sup> The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

<sup>(2)</sup> For part number description and specifications see page 68.

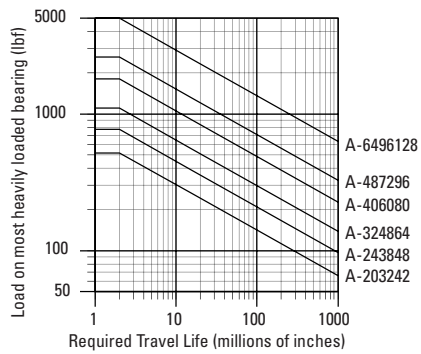
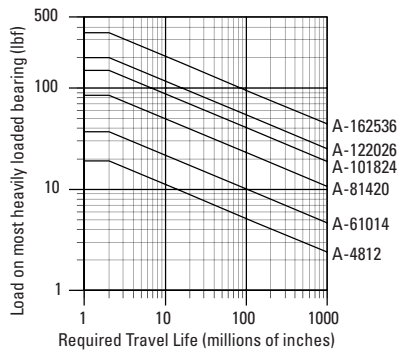
Note: Precision Steel Ball Bushing Bearings are available in corrosion resistant stainless steel in diameters up to 1 inch. Dynamic load ratings are reduced by 30% when using stainless steel Ball Bushing Bearings. For additional technical information, see the Engineering section beginning on page 245.

‡ P = Preload, C = Clearance

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

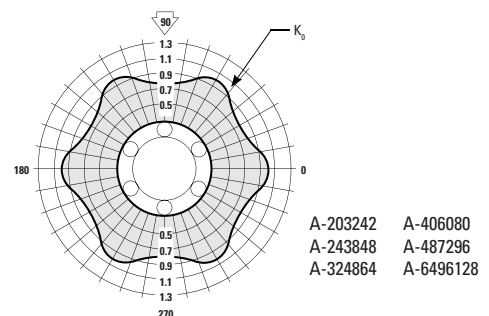
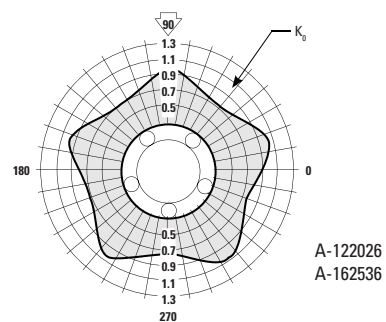
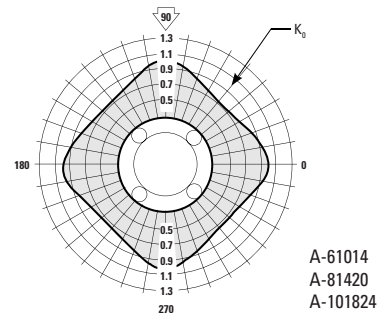
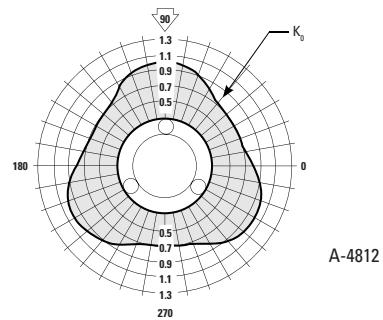
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

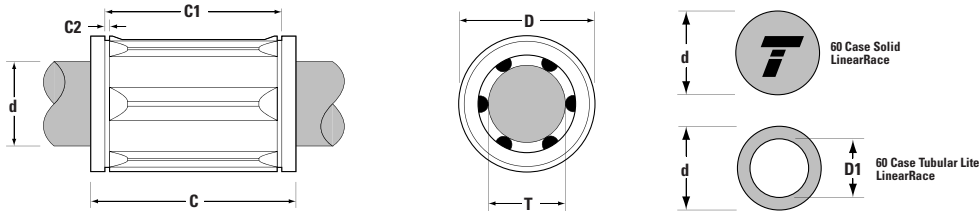
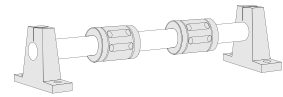
The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.





Inch – Precision Steel Ball Bushing Bearings

Extra Precision Steel Ball Bushing Bearings (Closed Type) for End Supported Applications



Sizes .250 thru 1.00 available in Corrosion Resistant Stainless Steel

Extra Precision Steel Ball Bushing Bearings (Closed Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup>                 |              | 60 Case Linear Race | Nominal Diameter | Length C    | Distance Between Retaining Grooves C1 | Retaining Ring Groove min. C2 | Number of Ball Circuits | D             | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|--|--------------|---------------------|------------------|-------------|---------------------------------------|-------------------------------|-------------------------|---------------|-------------------------------------|--|---------------------------------------|
| Extra Precision Steel Ball Bushing Bearing | w/o Wipers   |                     |                  |             |                                       |                               |                         |               |                                     |  |                                       |
| XA-4812                                    | -            | 1/4 L               | .250             | .750/.735   | .515/.499                             | .039                          | 3                       | .5000/.4996   | .01                                 | -  | -                                     |
| XA-61014                                   | -            | 3/8 L               | .375             | .875/.860   | .640/.624                             | .039                          | 4                       | .6250/.6246   | .03                                 | -  | -                                     |
| XA-81420                                   | XA-81420-DD  | 1/2 L               | .500             | 1.250/1.235 | .967/.951                             | .046                          | 4                       | .8750/.8746   | .06                                 | -  | -                                     |
| XA-101824                                  | -            | 5/8 L               | .625             | 1.500/1.485 | 1.108/1.092                           | .056                          | 4                       | 1.1250/1.1246 | .09                                 | -  | -                                     |
| XA-122026                                  | XA-122026-DD | 3/4 L               | .750             | 1.625/1.610 | 1.170/1.154                           | .056                          | 5                       | 1.2500/1.2496 | .13                                 | .08  | .46/.41                               |
| XA-162536                                  | XA-162536-DD | 1 L                 | 1.000            | 2.250/2.235 | 1.759/1.741                           | .068                          | 5                       | 1.5625/1.5621 | .22                                 | .16  | .62/.56                               |
| XA-203242                                  | -            | 1 1/4 L             | 1.250            | 2.625/2.605 | 2.009/1.991                           | .068                          | 6                       | 2.0000/1.9995 | .35                                 | -  | -                                     |
| XA-243848                                  | -            | 1 1/2 L             | 1.500            | 3.000/2.980 | 2.415/2.397                           | .086                          | 6                       | 2.3750/2.3745 | .50                                 | .33  | .93/.84                               |
| XA-324864                                  | -            | 2 L                 | 2.000            | 4.000/3.980 | 3.195/3.177                           | .103                          | 6                       | 3.0000/2.9994 | .89                                 | .54  | 1.31/1.18                             |
| XA-406080                                  | -            | 2 1/2 L             | 2.500            | 5.000/4.975 | 3.978/3.958                           | .120                          | 6                       | 3.7500/3.7492 | 1.39                                | .75  | 1.84/1.66                             |
| XA-487296                                  | -            | 3 L                 | 3.000            | 6.000/5.970 | 4.728/4.708                           | .120                          | 6                       | 4.5000/4.4990 | 2.00                                | 1.11                                       | 2.20/1.80                             |
| XA-6496128                                 | -            | 4 L                 | 4.000            | 8.000/7.960 | 6.265/6.235                           | .139                          | 6                       | 6.0000/5.9988 | 3.56                                | 1.56                                       | 3.30/2.70                             |

| Part Number <sup>(2)</sup> |              | Working Bore Diameter T | Recommended Housing Bore |                          | 60 Case LinearRace Diameter d | Precision Steel Ball Bushing Bearing/ LinearRace Fit Up ‡ | Precision Steel Ball Bushing Bearing Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>r</sub> |
|----------------------------|--------------|-------------------------|--------------------------|--------------------------|-------------------------------|---|--|--|
| w/o Seals                  | with Seals   |                         | Normal Fit               | Press Fit                |                               |   |  |  |
| XA-4812                    | -            | .2500/.2497             | .5005/.5000              | Not Normally Recommended | .2495/.2490                   | .0010C/.0002C   | .02  | 19   |
| XA-61014                   | -            | .3750/.3747             | .6255/.6250              |                          | .3745/.3740                   | .0010C/.0002C   | .06  | 37   |
| XA-81420                   | XA-81420-DD  | .5000/.4997             | .8755/.8750              |                          | .4995/.4990                   | .0010C/.0002C   | .08  | 85   |
| XA-101824                  | -            | .6250/.6247             | 1.1255/1.1250            |                          | .6245/.6240                   | .0010C/.0002C   | .16  | 150  |
| XA-122026                  | XA-122026-DD | .7500/.7497             | 1.2505/1.2500            |                          | .7495/.7490                   | .0010C/.0002C   | .21  | 200  |
| XA-162536                  | XA-162536-DD | 1.0000/.9997            | 1.5630/1.5625            |                          | .9995/.9990                   | .0010C/.0002C   | .38  | 350  |
| XA-203242                  | -            | 1.2500/1.2496           | 2.0010/2.0000            |                          | 1.2495/1.2490                 | .0010C/.0001C   | 1.10   | 520  |
| XA-243848                  | -            | 1.5000/1.4996           | 2.3760/2.3750            |                          | 1.4994/1.4989                 | .0011C/.0002C   | 1.43   | 770  |
| XA-324864                  | -            | 2.0000/1.9996           | 3.0010/3.0000            |                          | 1.9994/1.9987                 | .0013C/.0002C   | 2.75   | 1100   |
| XA-406080                  | -            | 2.5000/2.4995           | 3.7510/3.7500            |                          | 2.4993/2.4985                 | .0015C/.0002C   | 5.50   | 1800   |
| XA-487296                  | -            | 3.0000/2.9994           | 4.5010/4.5000            |                          | 2.9992/2.9983                 | .0017C/.0002C   | 9.50   | 2600   |
| XA-6496128                 | -            | 4.0000/3.9990           | 6.0010/6.0000            |                          | 3.9988/3.9976                 | .0024C/.0002C   | 20.20  | 5000   |

‡ P = Preload, C = Clearance

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

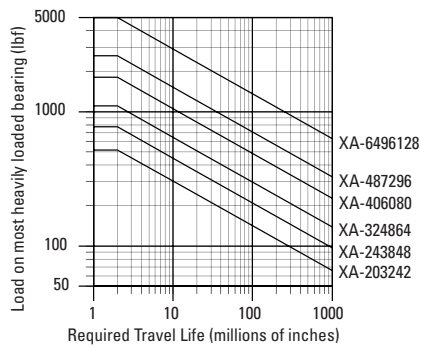
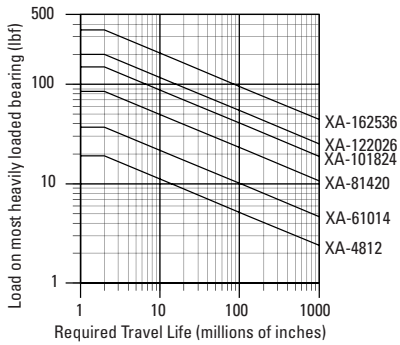
(2) For part number description and specifications see page 68.

Note: Precision Steel Ball Bushing Bearings are available in corrosion resistant stainless steel in diameters up to 1 inch. Dynamic load ratings are reduced by 30% when using stainless steel Ball Bushing Bearings. For additional technical information, see the Engineering section beginning on page 245.

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

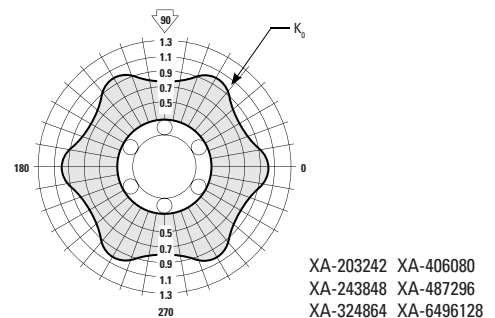
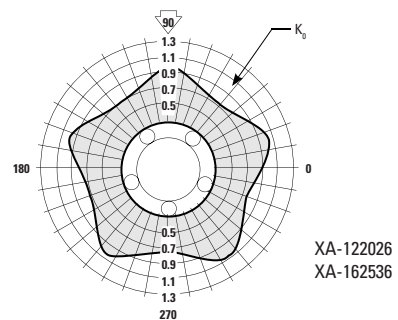
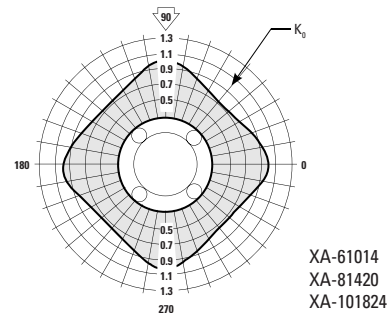
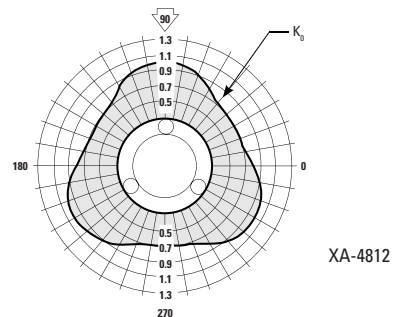
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

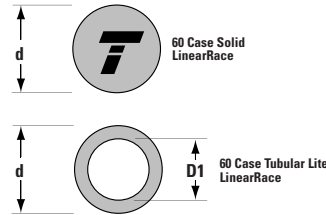
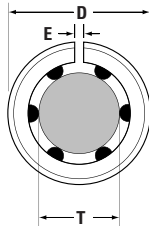
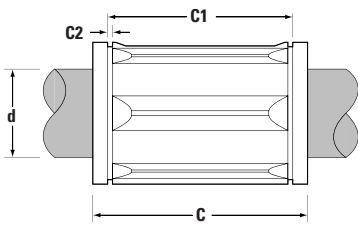
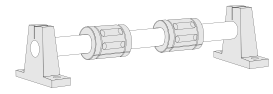
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Precision Steel Ball Bushing Bearings

# Adjustable Precision Steel Ball Bushing Bearings (Closed Type) for End Supported Applications



Sizes .250 thru 1.00 available in Corrosion Resistant Stainless Steel

Adjustable Precision Steel Ball Bushing Bearings and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup>           |                    | Nominal Diameter | Length C    | Distance Between Retaining Grooves C1 | Retaining Ring Groove min. C2 | Min. Slot Width E | Number of Ball Circuits | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace Mass lb/in | 60 Case Tubular Lite LinearRace ID D1 |
|--------------------------------------|--------------------|------------------|-------------|---------------------------------------|-------------------------------|-------------------|-------------------------|--|-------------------------------------|--|---------------------------------------|
| Precision Steel Ball Bushing Bearing | 60 Case LinearRace |                  |             |                                       |                               |                   |                         |  |                                     |  |                                       |
| ADJ-81420                            | 1/2 L              | .500             | 1.250/1.235 | .967/.951                             | .046                          | .06               | 4                       | .04  | .06                                 | –  | –                                     |
| ADJ-101824                           | 5/8 L              | .625             | 1.500/1.485 | 1.108/1.092                           | 0.56                          | .09               | 4                       | .04  | .09                                 | –  | –                                     |
| ADJ-122026                           | 3/4 L              | .750             | 1.625/1.610 | 1.170/1.154                           | .056                          | .09               | 5                       | .06  | .13                                 | .08  | .46/.41                               |
| ADJ-162536                           | 1 L                | 1.000            | 2.250/2.235 | 1.759/1.741                           | 0.68                          | .09               | 5                       | .08  | .22                                 | .16  | .62/.56                               |
| ADJ-203242                           | 1 1/4 L            | 1.250            | 2.625/2.605 | 2.009/1.991                           | .068                          | .09               | 6                       | .08  | .35                                 | –  | –                                     |
| ADJ-243848                           | 1 1/2 L            | 1.500            | 3.000/2.980 | 2.415/2.397                           | 0.86                          | .13               | 6                       | .08  | .50                                 | .33  | .93/.84                               |
| ADJ-324864                           | 2 L                | 2.000            | 4.000/3.980 | 3.195/3.177                           | .103                          | .13               | 6                       | .10  | .89                                 | .54  | 1.31/1.18                             |
| ADJ-406080                           | 2 1/2 L            | 2.500            | 5.000/4.975 | 3.978/3.958                           | .120                          | .13               | 6                       | .10  | 1.39                                | .75  | 1.84/1.66                             |
| ADJ-487296                           | 3 L                | 3.000            | 6.000/5.970 | 4.728/4.708                           | .120                          | .13               | 6                       | .10  | 2.00                                | 1.11                                       | 2.20/1.80                             |
| ADJ-6496128                          | 4 L                | 4.000            | 8.000/7.960 | 6.265/6.235                           | .139                          | .13               | 6                       | .10  | 3.56                                | 1.56                                       | 3.30/2.70                             |

| Part Number <sup>(2)</sup> | Working Bore Diameter T | Recommended Housing Bore Diameter D | 60 Case LinearRace Diameter d | Precision Steel Ball Bushing Bearing Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>i</sub> |
|----------------------------|-------------------------|-------------------------------------|-------------------------------|--|--|
|                            |                         | Normal Fit                          |                               |  |  |
| ADJ-81420                  | .5000/.4995             | .8755/.8750                         | .4995/.4990                   | .08  | 85   |
| ADJ-101824                 | .6250/.6245             | 1.1255/1.1250                       | .6245/.6240                   | .16  | 150  |
| ADJ-122026                 | .7500/.7495             | 1.2505/1.2500                       | .7495/.7490                   | .21  | 200  |
| ADJ-162536                 | 1.0000/.9995            | 1.5630/1.5625                       | .9995/.9990                   | .38  | 350  |
| ADJ-203242                 | 1.2500/1.2494           | 2.0010/2.0000                       | 1.2495/1.2490                 | 1.10   | 520  |
| ADJ-243848                 | 1.5000/1.4994           | 2.3760/2.3750                       | 1.4994/1.4989                 | 1.43   | 770  |
| ADJ-324864                 | 2.0000/1.9992           | 3.0010/3.0000                       | 1.9994/1.9987                 | 2.75   | 1100   |
| ADJ-406080                 | 2.5000/2.4990           | 3.7510/3.7500                       | 2.4993/2.4985                 | 5.50   | 1800   |
| ADJ-487296                 | 3.0000/2.9988           | 4.5010/4.5000                       | 2.9992/2.9983                 | 9.50   | 2600   |
| ADJ-6496128                | 4.0000/3.9980           | 6.0010/6.0000                       | 3.9988/3.9976                 | 20.20  | 5000   |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

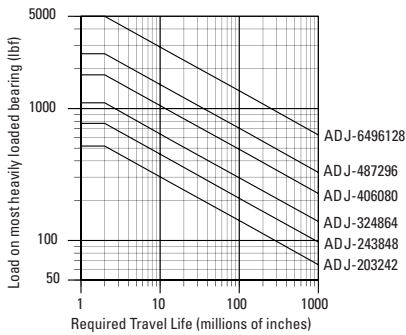
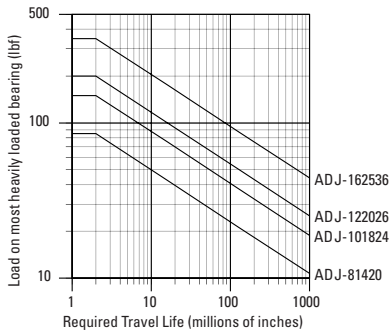
(2) For part number description and specifications see page 68.

Note: Precision Steel Ball Bushing Bearings are available in corrosion resistant stainless steel in diameters up to 1 inch. Dynamic load ratings are reduced by 30% when using stainless steel Ball Bushing Bearings. For additional technical information, see the Engineering section beginning on page 245.

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



#### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

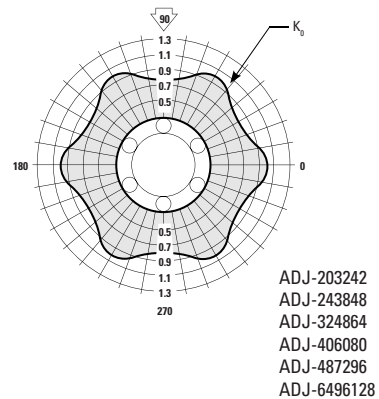
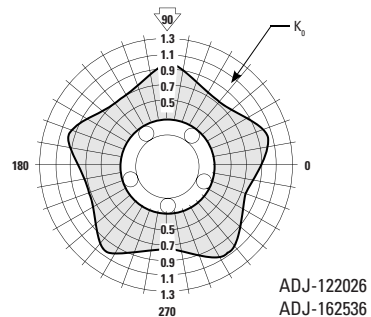
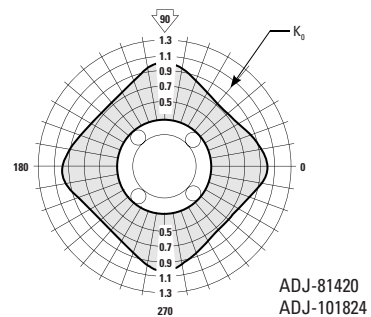
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

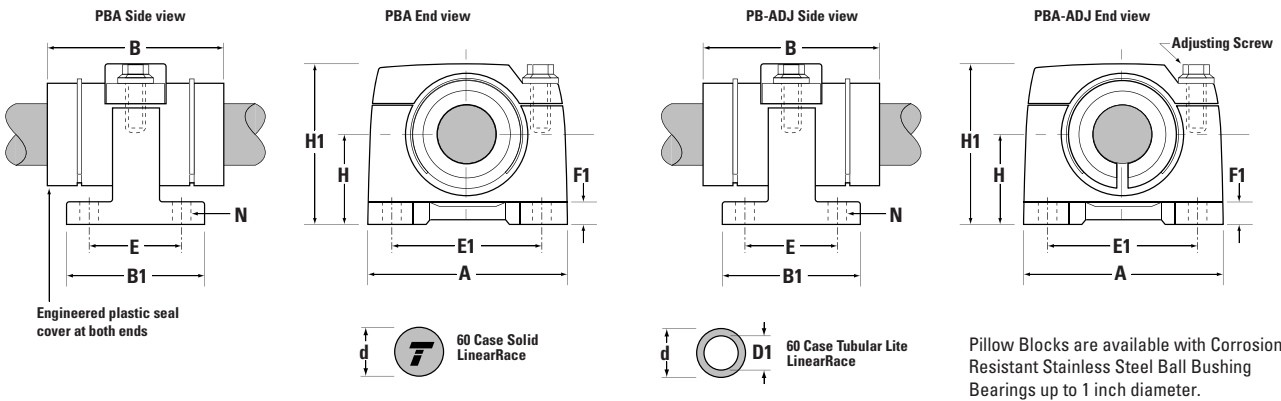
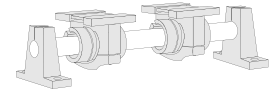
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Precision Steel Ball Bushing Bearings

# Precision Steel Ball Bushing Pillow Blocks (Closed and Adjustable Type) for End Supported Applications



## Precision Steel Ball Bushing Pillow Blocks (Closed and Adjustable Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(2)</sup>                         |                                  |  |                                  | Nom. Dia. | H ±.005 | H1   | Class S<br>60 Case<br>LinearRace<br>Diameter<br>d | Class L<br>60 Case<br>LinearRace<br>Diameter<br>d | 60 Case<br>LinearRace<br>Minimum<br>Depth of<br>Hardness | 60 Case<br>Solid<br>LinearRace<br>Mass<br>lb/in | 60 Case<br>Tubular Lite<br>LinearRace<br>Mass<br>lb/in | 60 Case<br>Tubular Lite<br>LinearRace<br>ID<br>D1 |
|--|----------------------------------|--|----------------------------------|-----------|---------|------|---|---|--|---|--|---|
| Precision<br>Steel Ball<br>Bushing<br>Pillow Block | 60 Case<br>LinearRace<br>Class S | Precision<br>Steel Ball<br>Bushing<br>Pillow Block | 60 Case<br>LinearRace<br>Class L |           |         |      |   |   |  |   |  |   |
| Closed   |                                  | Adjustable   |                                  |           |         |      |   |   |  |   |  |   |
| PB-8-A   | 1/2 S                            | PB-8-ADJ   | 1/2 L                            | .500      | .875    | 1.63 | .4990/.4985                                       | .4995/.4990                                       | .04  | .06   | –  | –   |
| PB-12-A  | 3/4 S                            | PB-12-ADJ  | 3/4 L                            | .750      | 1.125   | 2.13 | .7490/.7485                                       | .7495/.7490                                       | .06  | .13   | .08  | .46/.41   |
| PB-16-A  | 1 S                              | PB-16-ADJ  | 1 L                              | 1.000     | 1.375   | 2.56 | .9990/.9985                                       | .9995/.9990                                       | .08  | .22   | .16  | .62/.56   |
| PB-20-A  | 1 1/4 S                          | PB-20-ADJ  | 1 1/4 L                          | 1.250     | 1.750   | 3.25 | 1.2490/1.2485                                     | 1.2495/1.2490                                     | .08  | .35   | –  | –   |
| PB-24-A  | 1 1/2 S                          | PB-24-ADJ  | 1 1/2 L                          | 1.500     | 2.000   | 3.75 | 1.4989/1.4984                                     | 1.4994/1.4989                                     | .08  | .50   | .33  | .93/.84   |
| PB-32-A  | 2 S                              | PB-32-ADJ  | 2 L                              | 2.000     | 2.500   | 4.75 | 1.9987/1.9980                                     | 1.9994/1.9987                                     | .10  | .89   | .54  | 1.31/1.18   |

| Part Number <sup>(2)</sup>                |            | A    | B    | B1   | E ±.010 | E1 ±.010 | F1  | H    |      | Pillow<br>Block<br>Mass<br>lb | Dynamic <sup>(1)</sup><br>Load<br>Capacity<br>lb <sub>i</sub> |
|---|------------|------|------|------|---------|----------|-----|------|------|-------------------------------|---|
| Precision Steel Ball Bushing Pillow Block |            |      |      |      |         |          |     | Hole | Bolt |                               |   |
| Closed                                    | Adjustable |      |      |      |         |          |     |      |      |                               |   |
| PB-8-A                                    | PB-8-ADJ   | 2.00 | 1.69 | 1.50 | 1.000   | 1.500    | .25 | .19  | #8   | .5                            | 85  |
| PB-12-A                                   | PB-12-ADJ  | 2.75 | 2.06 | 2.00 | 1.375   | 2.000    | .31 | .22  | #10  | 1.3                           | 200   |
| PB-16-A                                   | PB-16-ADJ  | 3.25 | 2.88 | 2.25 | 1.500   | 2.500    | .38 | .28  | 1/4  | 2.1                           | 350   |
| PB-20-A                                   | PB-20-ADJ  | 4.00 | 3.63 | 2.75 | 1.875   | 3.000    | .44 | .34  | 5/16 | 4.4                           | 520   |
| PB-24-A                                   | PB-24-ADJ  | 4.75 | 4.00 | 3.00 | 2.000   | 3.500    | .50 | .34  | 5/16 | 5.7                           | 770   |
| PB-32-A                                   | PB-32-ADJ  | 6.00 | 5.00 | 3.50 | 2.500   | 4.500    | .63 | .41  | 3/8  | 10.5                          | 1100  |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

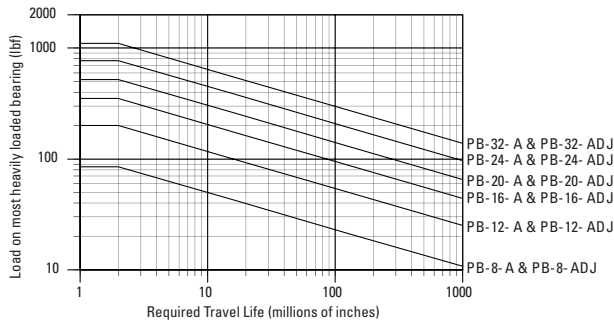
(2) For part number description and specifications see page 68.

Note: Precision Steel Ball Bushing Bearings are available in corrosion resistant stainless steel in diameters up to 1 inch. Dynamic load ratings are reduced by 30% when using stainless steel Ball Bushing Bearings. For additional technical information, see the Engineering section beginning on page 245.

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

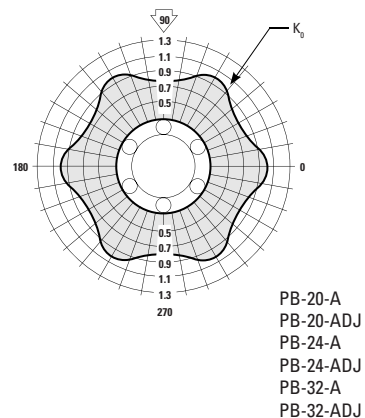
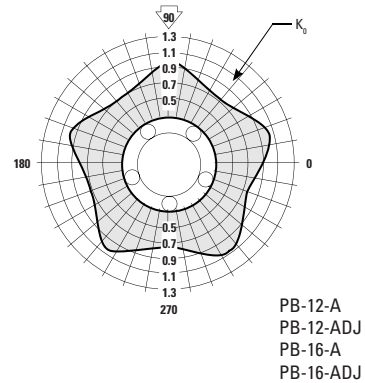
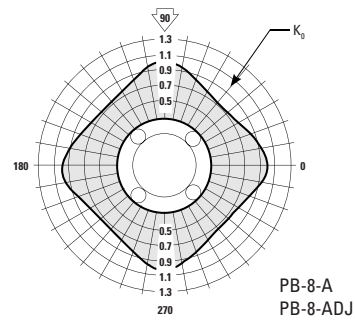
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

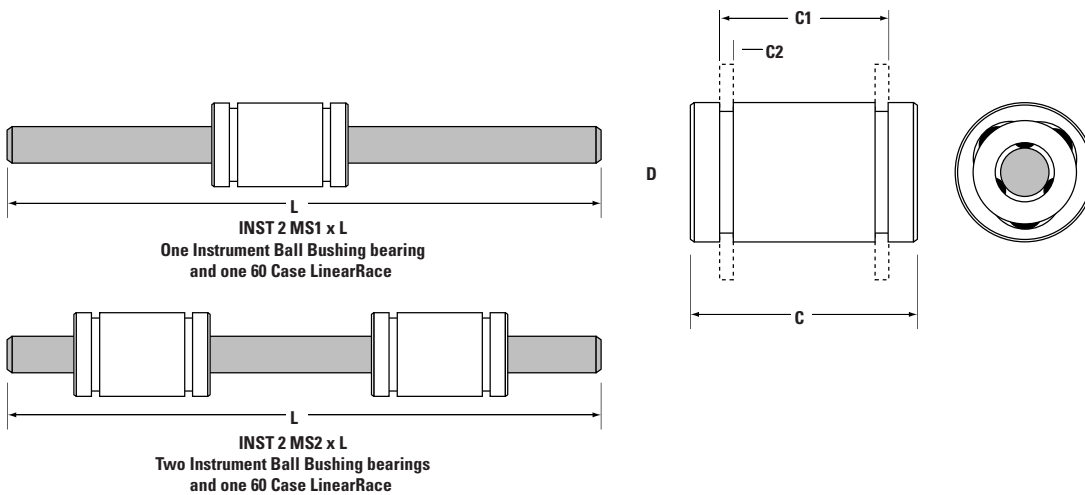
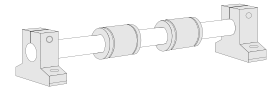
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Precision Steel Ball Bushing Bearings

# Miniature Instrument Ball Bushing Bearing and 60 Case LinearRace Sets



## Miniature Instrument Ball Bushing Bearings and 60 Case LinearRace Sets (Dimensions in inches)

| Part Number |              | Nominal Diameter | Outside Diameter D | Ball Bushing Bearing Length C | Distance Between Retaining Rings C1 | Retaining Ring Groove min. C2 | Recommended $\pm$ Housing Bore | Number of Ball Circuits | Ball Bushing Bearing Mass lb/in | 60 Case LinearRace Mass lb/in |
|-------------|--------------|------------------|--------------------|-------------------------------|-------------------------------------|-------------------------------|--------------------------------|-------------------------|---------------------------------|-------------------------------|
| One Bearing | Two Bearings |                  |                    |                               |                                     |                               |                                |                         |                                 |                               |
| INST 2 MS1  | INST 2 MS2   | .1250            | .3125/.3121        | .500/.485                     | .354                                | .028                          | .3130/.3124                    | 3                       | .007                            | .004                          |
| INST 3 MS1  | INST 3 MS2   | .1875            | .3750/.3746        | .562/.547                     | .417                                | .028                          | .3755/.3749                    | 3                       | .011                            | .008                          |
| INST 4 MS1  | INST 4 MS2   | .2500            | .5000/.4996        | .750/.735                     | .499                                | .039                          | .5005/.4999                    | 3                       | .025                            | .014                          |

## Miniature Instrument Ball Bushing Bearings (Dimensions in inches)

| Part Number  | Working Bore Diameter | 60 Case LinearRace Part Number | LinearRace Maximum Length | 60 Case LinearRace Diameter d | Instrument Ball Bushing Bearing/LinearRace Set Fit Up | Dynamic <sup>(1)</sup> Load Capacity lb <sub>f</sub> |
|--------------|-----------------------|--------------------------------|---------------------------|-------------------------------|---|--|
| INST 258-SS  | .1250/.1247           | LRI 2                          | 12                        | .1248/.1247                   | .0003C/.0001C   | 7  |
| INST 369-SS  | .1875/.1872           | LRI 3                          | 12                        | .1873/.1872                   | .0003C/.0001C   | 9  |
| INST 4812-SS | .2500/.2497           | LRI 4                          | 12                        | .2498/.2497                   | .0003C/.0001C   | 19   |

‡ Press fit not recommended.

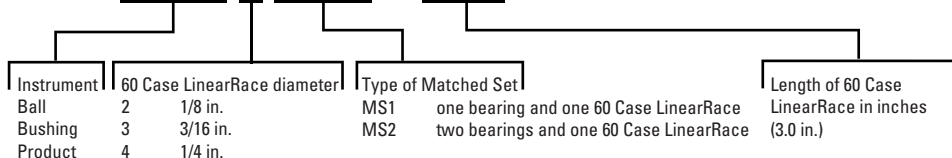
(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches.

The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below. The dynamic load capacity for MS2 configurations are based on two bearings equally loaded.

Note: For additional technical information, see the Engineering section beginning on page 245.

## Part Number Description

### INST 2 MS1 x L3.0

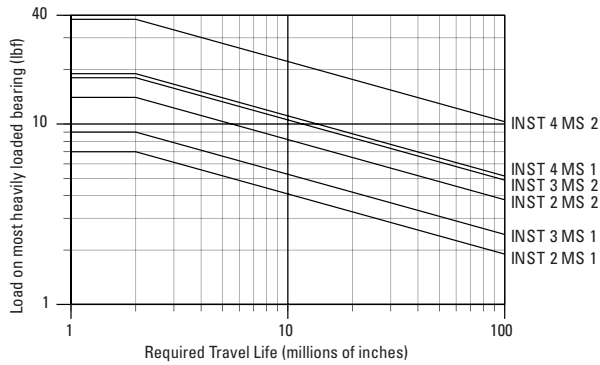


**60 Case LinearRace Specifications**  
 Material: 440 Stainless Steel  
 Hardness: 55 HRC minimum  
 Surface Finish: 4 R<sub>3</sub> microinch  
 Straightness: .0001 inch per inch

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



#### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

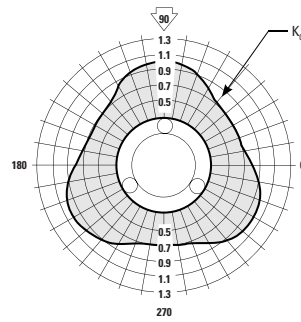
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.

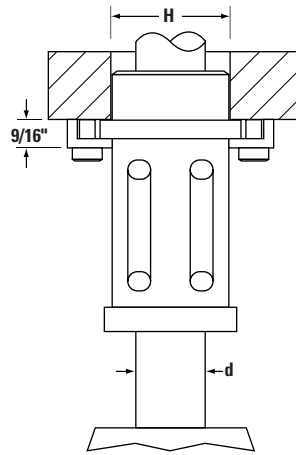
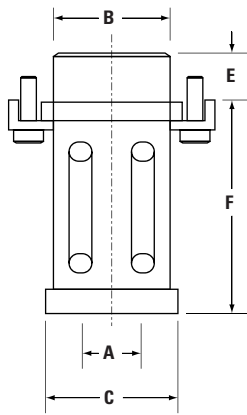
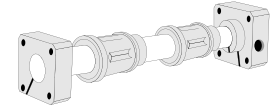




Inch – Precision Steel Ball Bushing Bearings

# Die Set Ball Bushing Bearings

for End Supported Applications



**Precision Series Die Set Ball Bushing Bearings and 60 Case LinearRace** (Dimensions in inches)

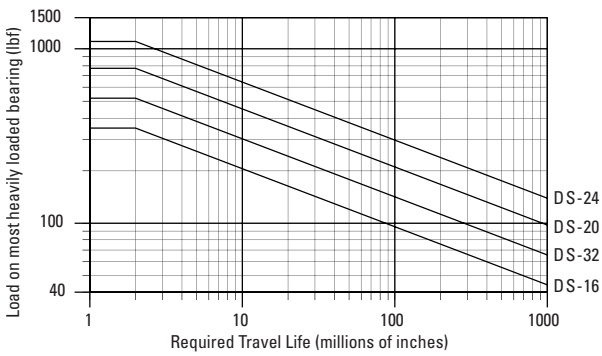
| Part Number             |                     | Nominal Diameter | 60 Case LinearRace Diameter d | Working Bore Diameter A | Ball Bushing Pilot Diameter B | O.D. C | Ball Bushing Bearing Pilot Length E | F    | Recommended Mounting Hole Diameter H | Concentricity of Pilot (B) to Bearing Bore (A) (TIR) | Dynamic <sup>(1)</sup> Load Capacity lb <sub>i</sub> |
|-------------------------|---------------------|------------------|-------------------------------|-------------------------|-------------------------------|--------|-------------------------------------|------|--------------------------------------|--|--|
| DS Ball Bushing Bearing | 60 Case Linear Race |                  |                               |                         |                               |        |                                     |      |                                      |  |  |
| DS-16                   | 1 D                 | 1.000            | 1.0003/1.0000                 | .9999/.9996             | 1.5007/1.5003                 | 1.91   | .94                                 | 3.17 | 1.5005/1.5000                        | .0007  | 350  |
| DS-20                   | 1 1/4 D             | 1.250            | 1.2503/1.2500                 | 1.2498/1.2495           | 1.7507/1.7503                 | 2.31   | 1.19                                | 3.67 | 1.7505/1.7500                        | .0007  | 520  |
| DS-24                   | 1 1/2 D             | 1.500            | 1.5003/1.5000                 | 1.4997/1.4994           | 2.0007/2.0003                 | 2.72   | 1.44                                | 4.17 | 2.0005/2.0000                        | .0007  | 770  |
| DS-32                   | 2 D                 | 2.000            | 2.0003/2.0000                 | 1.9995/1.9992           | 2.5007/2.5003                 | 3.53   | 1.94                                | 4.42 | 2.5005/2.5000                        | .0007  | 1100   |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.  
 Note: For additional technical information, see the Engineering section beginning on page 245.

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



#### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

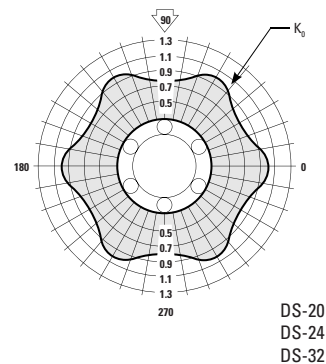
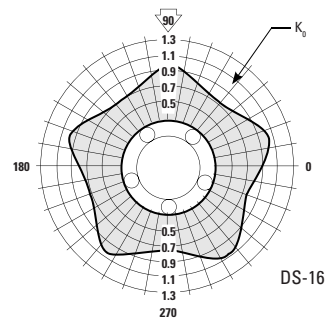
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – Precision Steel Ball Bushing Bearings

# Part Number Description and Specification

## Precision Steel Ball Bushing Bearings (Open Type) for Continuously Supported Applications

### OPN-162536-DD

| Type | Description                                       | Size    | Nominal Diameter | Option | Description  |
|------|---|---------|------------------|--------|--|
| OPN  | Precision Steel Ball Bushing Bearings (Open type) | 81420   | .500             | -      | Standard   |
|      |   | 101824  | .625             | SP     | Stainless Steel Balls, Black Oxide Sleeve and Retainer |
|      |   | 122026  | .750             | NB     | Nylon Balls  |
|      |   | 162536  | 1.000            | DP     | Dry Packed   |
|      |   | 203242  | 1.250            | SS     | Stainless Steel With Integral Wipers                   |
|      |   | 243848  | 1.500            | LL     | Lubricated with Thomson LinearLube                     |
|      |   | 324864  | 2.000            |        |  |
|      |   | 406080  | 2.500            |        |  |
|      |   | 487296  | 3.000            |        |  |
|      |   | 6496128 | 4.000            |        |  |

## Precision Steel Ball Bushing Pillow Blocks (Open Type) for Continuously Supported Applications

### PBO-8-OPN-SS

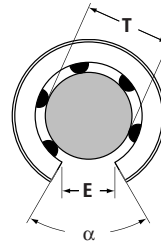
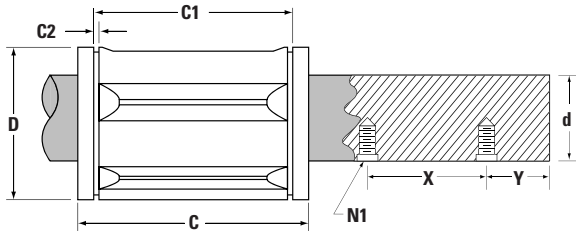
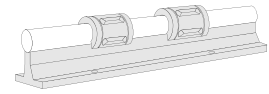
| Type | Description  | Size | Nominal Diameter | Option | Description                        |
|------|--|------|------------------|--------|------------------------------------|
| PBO  | Precision Steel Ball Bushing Pillow Blocks (Open Type) | 8    | .500             | SS     | Stainless Steel                    |
|      |  | 10   | .625             | LL     | Lubricated with Thomson LinearLube |
|      |  | 12   | .750             |        |                                    |
|      |  | 16   | 1.000            |        |                                    |
|      |  | 20   | 1.250            |        |                                    |
|      |  | 24   | 1.500            |        |                                    |
|      |  | 32   | 2.000            |        |                                    |

| Type | Description |
|------|-------------|
| OPN  | Open Type   |

## Inch – Precision Steel Ball Bushing Bearings

# Precision Steel Ball Bushing Bearings (Open Type) for Continuously Supported Applications



Sizes .500 thru 1.00 available  
in Corrosion resistant  
Stainless Steel.

### Precision Steel Ball Bushing Bearings (Open Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number <sup>(3)</sup>           |                     | Nominal Diameter | Length C    | Distance Between Retaining Rings C1 | Ret. Ring Groove min. C2 | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |                   |
|--------------------------------------|---------------------|------------------|-------------|-------------------------------------|--------------------------|--|-------------------------------------|-----------------------------------|---|-------------------|
| Precision Steel Ball Bushing Bearing | 60 Case Linear Race |                  |             |                                     |                          |  |                                     | X                                 | Y | N1                |
| OPN-81420                            | 1/2 L PD            | .500             | 1.250/1.235 | .967/.951                           | .046                     | .04  | .06                                 | 4                                 | 2 | #6-32             |
| OPN-101824                           | 5/8 L PD            | .625             | 1.500/1.485 | 1.108/1.092                         | .056                     | .04  | .09                                 | 4                                 | 2 | #8-32             |
| OPN-122026                           | 3/4 L PD            | .750             | 1.625/1.610 | 1.170/1.154                         | .056                     | .06  | .13                                 | 6                                 | 3 | #10-32            |
| OPN-162536                           | 1 L PD              | 1.000            | 2.250/2.235 | 1.759/1.741                         | .068                     | .08  | .22                                 | 6                                 | 3 | 1/4-20            |
| OPN-203242                           | 1 1/4 L PD          | 1.250            | 2.625/2.605 | 2.009/1.991                         | .068                     | .08  | .35                                 | 6                                 | 3 | 5/16-18           |
| OPN-243848                           | 1 1/2 L PD          | 1.500            | 3.000/2.980 | 2.415/2.397                         | .086                     | .08  | .50                                 | 8                                 | 4 | 3/8-16            |
| OPN-324864                           | 2 L PD              | 2.000            | 4.000/3.980 | 3.195/3.177                         | .103                     | .10  | .89                                 | 8                                 | 4 | 1/2-13            |
| OPN-406080                           | 2 1/2 L             | 2.500            | 5.000/4.975 | 3.978/3.958                         | .120                     | .10  | 1.39                                | 8                                 | 4 | specify hole size |
| OPN-487296                           | 3 L                 | 3.000            | 6.000/5.970 | 4.728/4.708                         | .120                     | .10  | 2.00                                | 8                                 | 4 | specify hole size |
| OPN-6496128                          | 4 L                 | 4.000            | 8.000/7.960 | 6.265/6.235                         | .139                     | .10  | 3.56                                | 8                                 | 4 | specify hole size |

| Part Number <sup>(3)</sup> | Working Bore Diameter T | Recommended Housing Bore Before Adjustment D | 60 Case LinearRace Diameter d | Minimum Slot Width E | Angle deg alpha | Number of Ball Circuits | Ball Bushing Bearing Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>i</sub> |
|----------------------------|-------------------------|--|-------------------------------|----------------------|-----------------|-------------------------|------------------------------|--|
| OPN-81420                  | .5005/.4995             | .8760/.8740                                  | .4995/.4990                   | .31                  | 50              | 3                       | .07                          | 60   |
| OPN-101824                 | .6255/.6245             | 1.1260/1.1240                                | .6245/.6240                   | .38                  | 60              | 3                       | .11                          | 105  |
| OPN-122026                 | .7505/.7495             | 1.2510/1.2490                                | .7495/.7490                   | .44                  | 60              | 4                       | .17                          | 140  |
| OPN-162536                 | 1.0005/.9995            | 1.5635/1.5615                                | .9995/.9990                   | .56                  | 60              | 4                       | .32                          | 240  |
| OPN-203242                 | 1.2506/1.2494           | 2.0010/1.9990                                | 1.2495/1.2490                 | .63                  | 50              | 5                       | .90                          | 400  |
| OPN-243864                 | 1.5006/1.4994           | 2.3760/2.3740                                | 1.4994/1.4989                 | .75                  | 50              | 5                       | 1.12                         | 600  |
| OPN-324864                 | 2.0008/1.9992           | 3.0010/2.9990                                | 1.9994/1.9987                 | 1.00                 | 50              | 5                       | 2.16                         | 860  |
| OPN-406080                 | 2.5010/2.4990           | 3.7515/3.7485                                | 2.4993/2.4985                 | 1.25                 | 50              | 5                       | 4.24                         | 1380   |
| OPN-487296                 | 3.0012/2.9988           | 4.5015/4.4985                                | 2.9992/2.9983                 | 1.50                 | 50              | 5                       | 7.33                         | 2000   |
| OPN-6496128                | 4.0020/3.9980           | 6.0020/5.9980                                | 3.9988/3.9976                 | 2.00                 | 50              | 5                       | 17.25                        | 3800   |

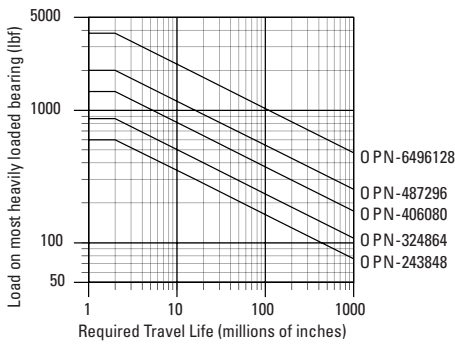
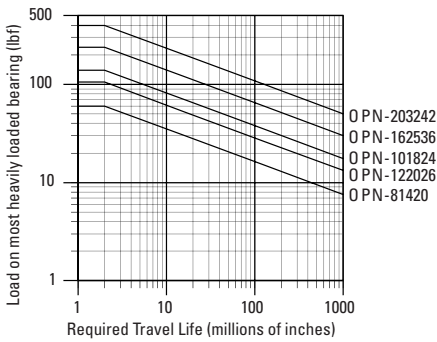
(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below. See page 136 for Stainless Steel bearing derating.

(3) For part number description and specifications see page 81.

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

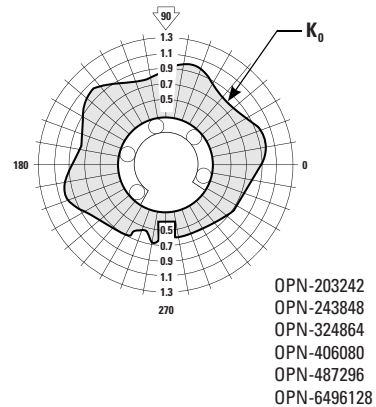
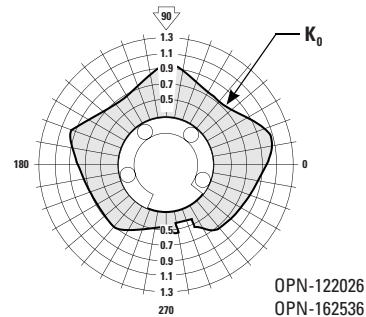
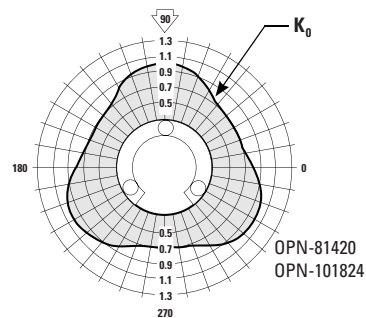
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

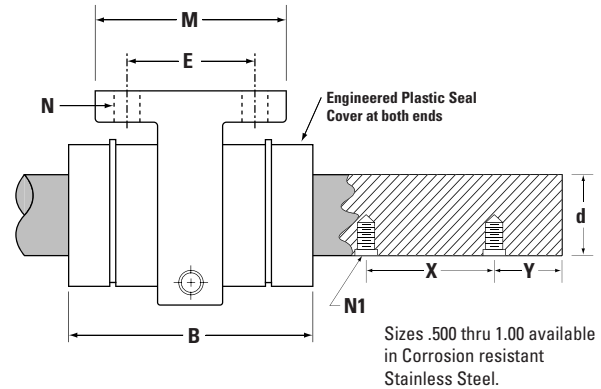
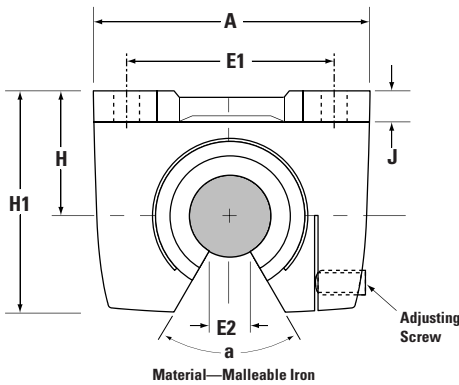
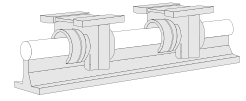
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



## Inch – Precision Steel Ball Bushing Bearings

# Precision Steel Ball Bushing Bearing Pillow Block (Open Type) for Continuously Supported Applications



### Precision Steel Ball Bushing Bearing Pillow Blocks (Open Type, seal at both ends) and 60 Case LinearRace (Dim. in inches)

| Part Number <sup>(3)</sup>                |                    | Nominal Diameter | H<br>±.005 | H1   | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |         |
|---|--------------------|------------------|------------|------|--|-------------------------------------|-----------------------------------|---|---------|
| Precision Steel Ball Bushing Pillow Block | 60 Case LinearRace |                  |            |      |  |                                     | X                                 | Y | N1      |
| PBO-8-OPN                                 | 1/2 L PD           | .500             | .875       | 1.50 | .04  | .06                                 | 4                                 | 2 | #6-32   |
| PBO-12-OPN                                | 3/4 L PD           | .750             | 1.125      | 2.00 | .06  | .13                                 | 6                                 | 3 | #10-32  |
| PBO-16-OPN                                | 1 L PD             | 1.000            | 1.375      | 2.38 | .08  | .22                                 | 6                                 | 3 | 1/4-20  |
| PBO-20-OPN                                | 1 1/4 L PD         | 1.250            | 1.750      | 3.06 | .08  | .35                                 | 6                                 | 3 | 5/16-18 |
| PBO-24-OPN                                | 1 1/2 L PD         | 1.500            | 2.000      | 3.50 | .08  | .50                                 | 8                                 | 4 | 3/8-16  |
| PBO-32-OPN                                | 2 L PD             | 2.000            | 2.500      | 4.50 | .10  | .89                                 | 8                                 | 4 | 1/2-13  |

| Part Number <sup>(3)</sup> | 60 Case LinearRace Diameter d | A    | B    | E<br>±.010 | E1<br>±.010 | E2<br>min. | J   | α<br>deg | M    | N    |      | Pillow Block Weight lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>i</sub> |
|----------------------------|-------------------------------|------|------|------------|-------------|------------|-----|----------|------|------|------|------------------------|--|
|                            |                               |      |      |            |             |            |     |          |      | Hole | Bolt |                        |  |
| PBO-8-OPN                  | .4995/.4990                   | 2.00 | 1.69 | 1.000      | 1.500       | .37        | .25 | 50       | 1.50 | .19  | #8   | .4                     | 60   |
| PBO-12-OPN                 | .7495/.7490                   | 2.75 | 2.06 | 1.375      | 2.000       | .43        | .31 | 60       | 2.00 | .22  | #10  | 1.0                    | 140  |
| PBO-16-OPN                 | .9995/.9990                   | 3.25 | 2.88 | 1.500      | 2.500       | .56        | .38 | 60       | 2.25 | .28  | 1/4  | 1.8                    | 240  |
| PBO-20-OPN                 | 1.2495/1.2490                 | 4.00 | 3.63 | 1.875      | 3.000       | .67        | .44 | 50       | 2.75 | .34  | 5/16 | 3.8                    | 400  |
| PBO-24-OPN                 | 1.4994/1.4989                 | 4.75 | 4.00 | 2.000      | 3.5000      | .81        | .50 | 50       | 3.00 | .34  | 5/16 | 4.8                    | 600  |
| PBO-32-OPN                 | 1.9994/1.9987                 | 6.00 | 5.00 | 2.500      | 4.500       | 1.00       | .63 | 50       | 3.50 | .41  | 3/8  | 8.5                    | 860  |

(1) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs below.

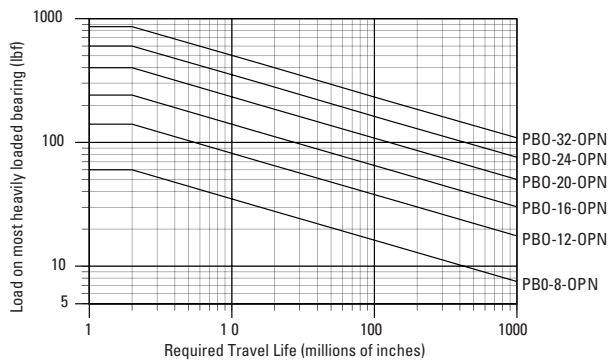
(3) For part number description and specifications see page 81.

Note: Precision Steel Ball Bushing Bearings are available in corrosion resistant stainless steel in diameters up to 1 inch. Dynamic load ratings are reduced by 30% when using stainless steel Ball Bushing Bearings. For additional technical information, see the Engineering section beginning on page 245.

## Inch – Precision Steel Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

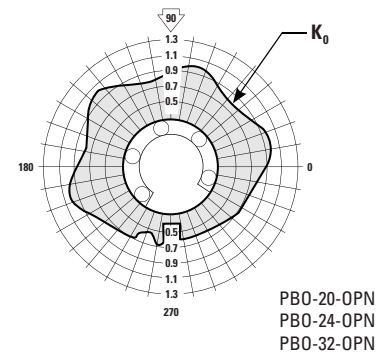
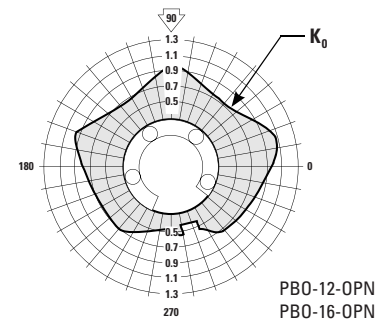
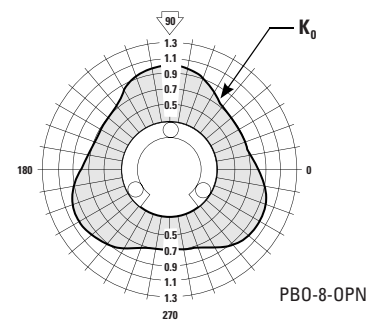
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



## Inch – Precision Steel Ball Bushing Bearings

# Wire Straightening/Feeding Mechanism

### Objective

Redesign a wire straightening/feeding mechanism for a wire drawing machine that improves cycle time and minimizes downtime.

### Solution

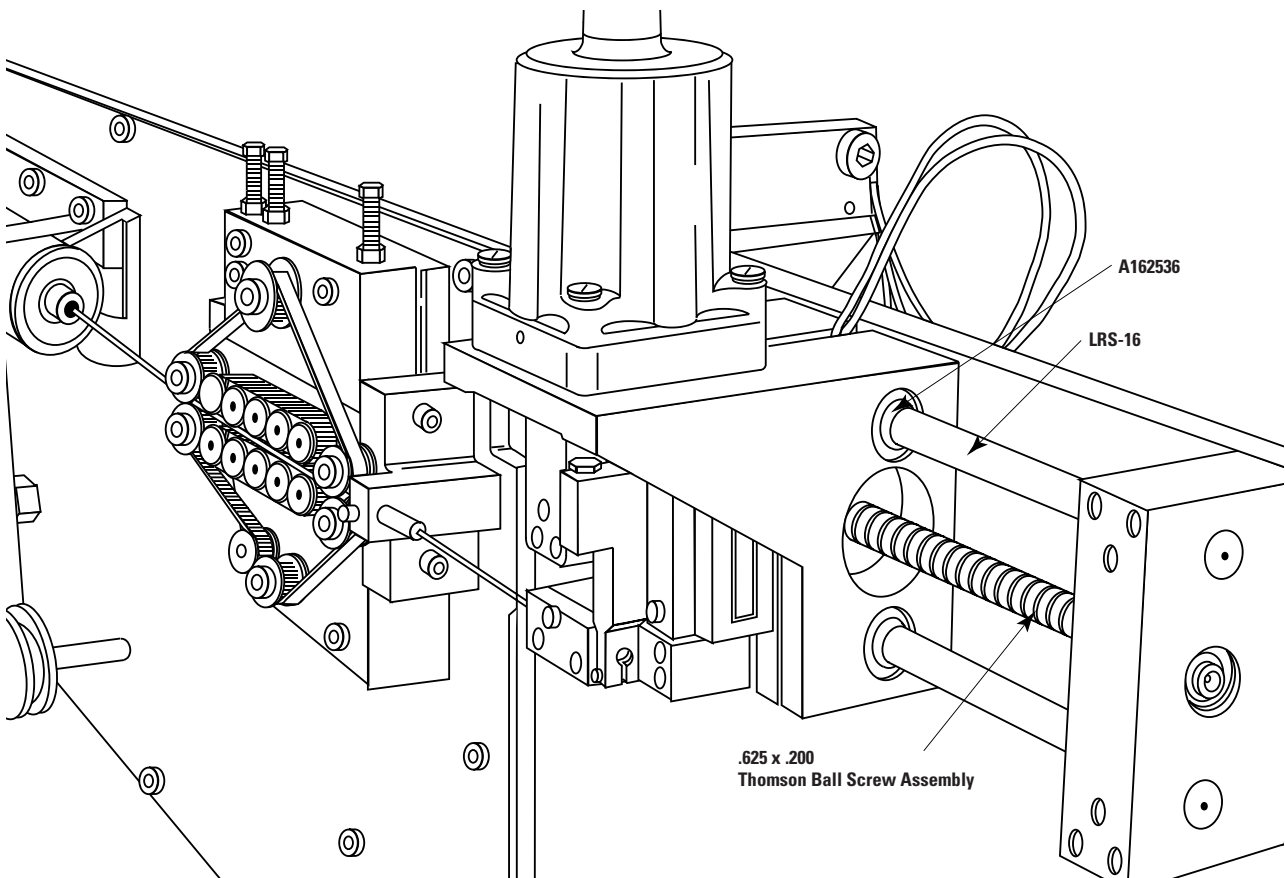
Combine the performance advantages of the Precision Steel Ball Bushing Bearing with the operating efficiency of Thomson ball screws.

### Products Specified

- 4 - A162536 (Precision Steel Ball Bushing Bearings)
- 2 - 1 S CTL (60 Case LinearRace )
- 1 - .625 x .200 (Thomson ball screw assembly)

### Benefits

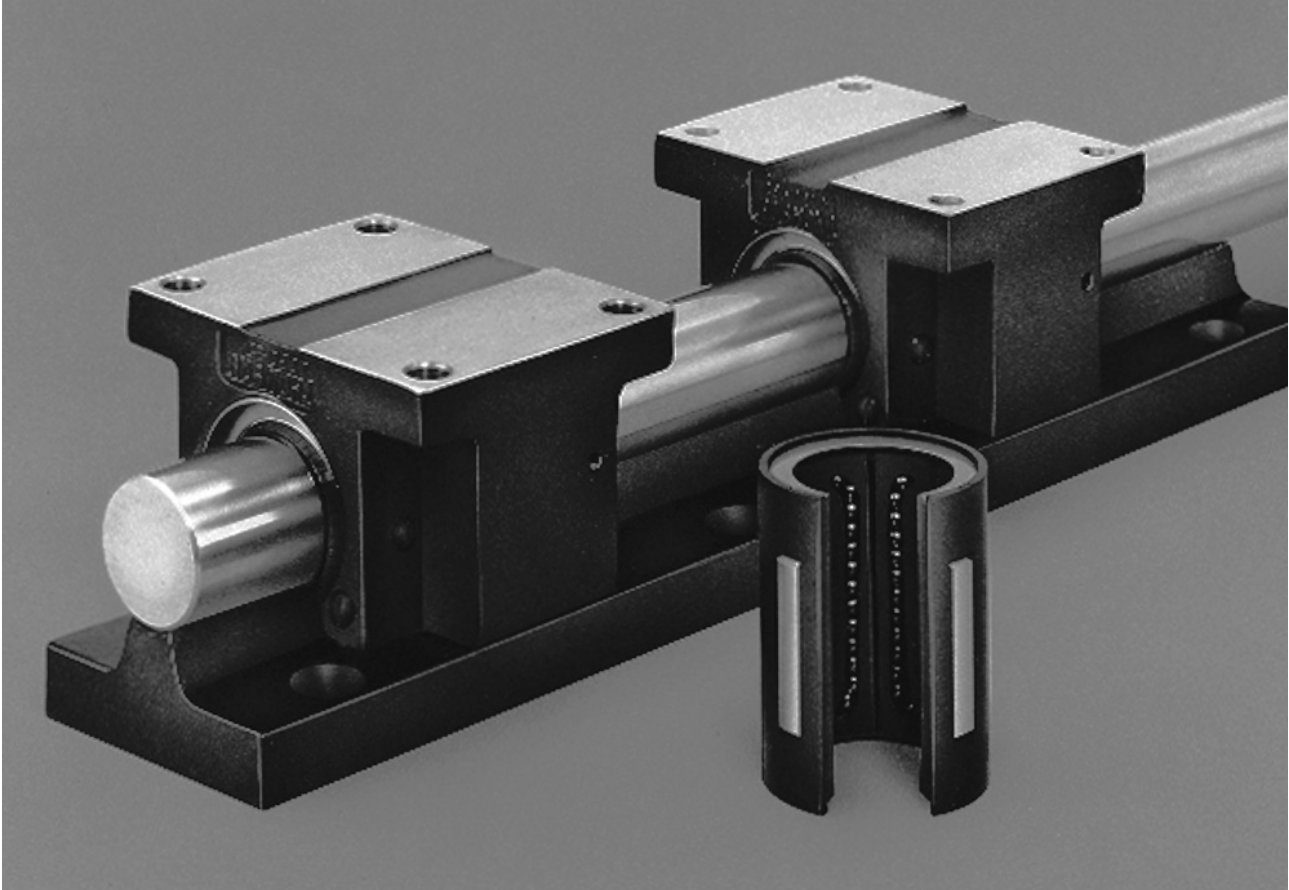
By replacing high friction plain bearings with Precision Steel Ball Bushing Bearings, service life increased from six months to four years. This significantly reduced downtime and maintenance requirements and provided increased productivity with substantial.





## Inch – XR Ball Bushing Bearings

## XR Ball Bushing Bearing Products

**Thomson XR Ball Bushing Bearing products offer:**

- Five times the load capacity or 125 times the travel life of conventional linear bearings. This dramatic increase in travel life reduces downtime and maximizes productivity.
- Three times the rigidity of conventional linear bearings. This increase in stiffness provides immediate improvements in machine positioning accuracy and repeatability.
- The RoundRail Advantage combined with travel speeds up to 5 ft/s. Derating factors commonly found in linear guide products are eliminated.
- Ease of maintenance. When normal maintenance requires bearing replacement, XR Ball Bushing Bearings can be quickly and cost-effectively replaced without scrapping the entire system – another shortcoming of some linear guides.
- Double acting seals at both ends that keep out contamination and retain lubrication.
- Lasting precision alignment by combining the non-wear characteristics of the XR Ball Bushing Bearing with a rigid ductile iron pillow block.
- High accelerations and operating speeds without a dramatic increase in the power consumption commonly seen with high friction v-way and flat-way systems.

## Inch – XR Ball Bushing Bearings

XR Ball Bushing Bearing products provide five times the load capacity or 125 times the travel life and three times the rigidity of conventional linear bearings. These improvements are centered around four technologically advanced components, the XR Ball Bushing Bearing, the XPBO Ball Bushing pillow block, the XL 60 Case LinearRace (shaft) and the XSR 60 Case LinearRace support rail.

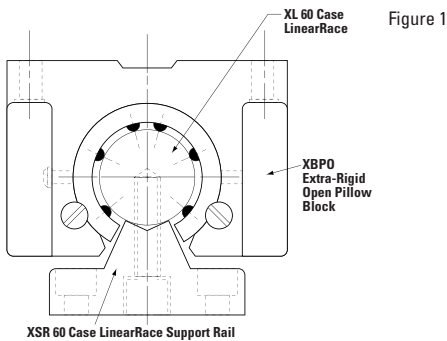


Figure 1

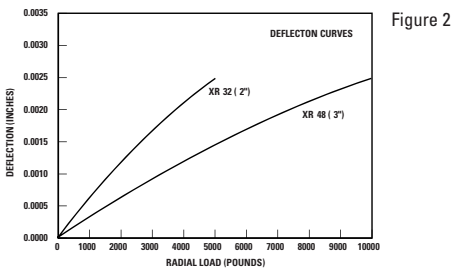


Figure 2

### XR Ball Bushing Bearing

The dramatic increase in load capacity and/or travel life is provided by the XR Ball Bushing Bearing's advanced plate design. Each ball conforming bearing plate is precision ground providing smooth and virtually friction free linear movement. The bearing plate length has also been maximized to increase the number of rolling elements in the load carrying zone. The position of each XR bearing plate helps to maximize the load capacity in both pull-off and down loading conditions.

### XPBO Ball Bushing Pillow Block

Each XR Ball Bushing Bearing can be housed in a rigid ductile iron pillow block (Figure 1). The XPBO pillow block provides the stiffness required in high load applications (Figure 2). Each XPBO is equipped with four mounting holes for easy assembly to the table surface.

### XL 60 Case LinearRace

Available factory mounted to XSR 60 Case LinearRace support rail is a hardened and precision ground 60 Case LinearRace (Figure 1). Each 60 Case LinearRace is ground to a surface finish less than 10 Ra microinch and is straight to .001 inch per foot cumulative. Roundness of each 60 Case LinearRace is controlled through proprietary techniques that results in a roundness of 80 millionths of an inch. Each XL 60 Case LinearRace is held to these world class quality standard to assure maximum system performance and travel life.

### XSR 60 Case LinearRace Support Rails

Rigidity always starts by continuously supporting the 60 Case LinearRace and bearing system (Figure 1). The large ductile iron alloy cross-section of the XSR provides maximum rigidity and stiffness (Figure 2). The increased number of standard 60 Case LinearRace mounting holes add further stiffness and stability to the system.

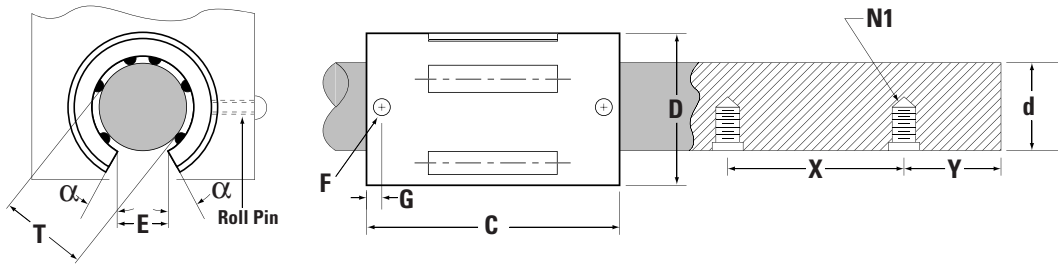
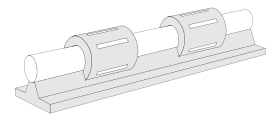
### The RoundRail Advantage

The RoundRail Advantage is the inherent ability of an XR Ball Bushing Bearing system to accommodate torsional misalignment (caused by inaccuracies in carriage or base machining or by machine deflection) with little increase in stress to bearing components. Installation time and cost are minimized and system performance is maximized.

Inch – XR Ball Bushing Bearings

# XR Ball Bushing Bearings

## for Continuously Supported Applications



**XR Ball Bushing Bearings and 60 Case LinearRace** (Dimensions in inches)

| Part Number             |                        | Nom. Dia. | Length C    | 60 Case LinearRace Diameter d | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case Solid LinearRace Maximum Length | 60 Case LinearRace Mounting Holes |   |        |
|-------------------------|------------------------|-----------|-------------|-------------------------------|--|-------------------------------------|---|-----------------------------------|---|--------|
| XR Ball Bushing Bearing | 60 Case Linear Race    |           |             |                               |  |                                     |   | X                                 | Y | N1     |
| XR-32-OPN               | 2 XL PD <sup>(4)</sup> | 2         | 4.000/3.970 | 1.9994/1.9991                 | .100   | .89                                 | 178                                     | 4                                 | 2 | 1/2-13 |
| XR-48-OPN               | 3 XL PD <sup>(4)</sup> | 3         | 6.000/5.940 | 2.9992/2.9989                 | .100   | 2.00                                | 178                                     | 6                                 | 3 | 3/4-10 |

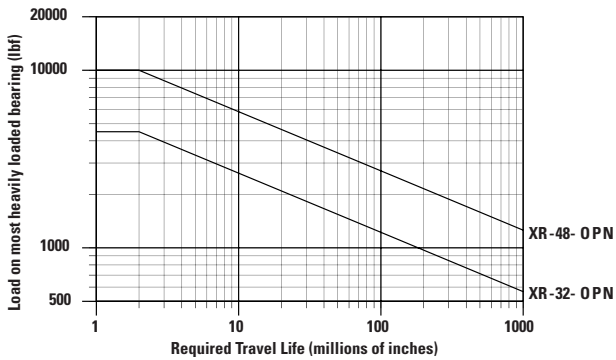
| Part Number | Working Bore Diameter T | Recommended Housing Bore Diameter D | Minimum Slot Width E | Retention Hole <sup>(2)</sup> |        | Angle deg alpha | Number of Ball Circuits | Ball Diameter | Bearing Mass lb | Dynamic <sup>(3)</sup> Load Capacity lb <sub>f</sub> |
|-------------|-------------------------|-------------------------------------|----------------------|-------------------------------|--------|-----------------|-------------------------|---------------|-----------------|--|
|             |                         |                                     |                      | Diameter F                    | Loc. G |                 |                         |               |                 |  |
| XR-32-OPN   | 2.0000/1.9992           | 3.0000                              | 1.00                 | .27                           | .31    | 27              | 6                       | .25           | 1.3             | 4500   |
| XR-48-OPN   | 3.0000/2.9988           | 4.5000                              | 1.50                 | .27                           | .42    | 30              | 6                       | .38           | 4.4             | 10000  |

- (1) When installed in a nominal housing bore D, before adjustment. Any deviation from nominal housing bore diameter will change the working bore T, an equal amount. Minimum recommended housing bores are 2.9980 for XR-32-OPN and 4.4975 for XR-48-OPN.
- (2) Retention hole does not go through bearing retainer.
- (3) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs opposite.
- (4) Contact factory for availability.

## Inch – XR Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

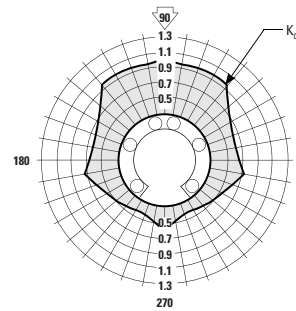
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

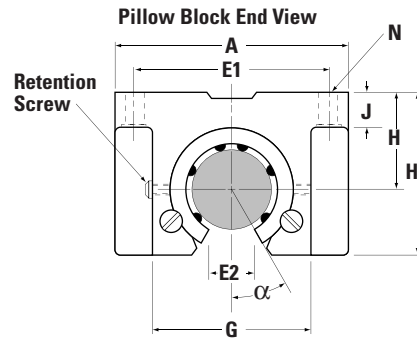
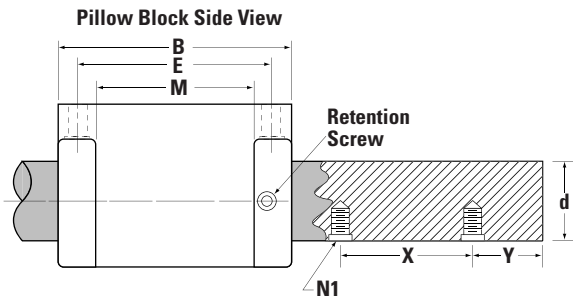
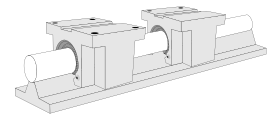
### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



Inch – XR Ball Bushing Bearings

# XR Ball Bushing Pillow Blocks for Continuously Supported Applications



**XR Ball Bushing Pillow Blocks (seal at both ends) and 60 Case LinearRace** (Dimensions in inches)

| Part Number                      |                        | Nominal Diameter | H<br>+.000<br>-.001 | H1    | 60 Case LinearRace Minimum Depth of Hardness | 60 Case Solid LinearRace Mass lb/in | 60 Case LinearRace Mounting Holes |   |        |
|----------------------------------|------------------------|------------------|---------------------|-------|--|-------------------------------------|-----------------------------------|---|--------|
| Extra Rigid Ball Bushing Bearing | 60 Case LinearRace     |                  |                     |       |  |                                     | X                                 | Y | N1     |
| XPBO-32-OPN                      | 2 XL PD <sup>(3)</sup> | 2                | 2.375               | 3.875 | .10  | .89                                 | 4                                 | 2 | 1/2-13 |
| XPBO-48-OPN                      | 3 XL PD <sup>(3)</sup> | 3                | 3.500               | 5.875 | .10  | 2.00                                | 6                                 | 3 | 3/4-10 |

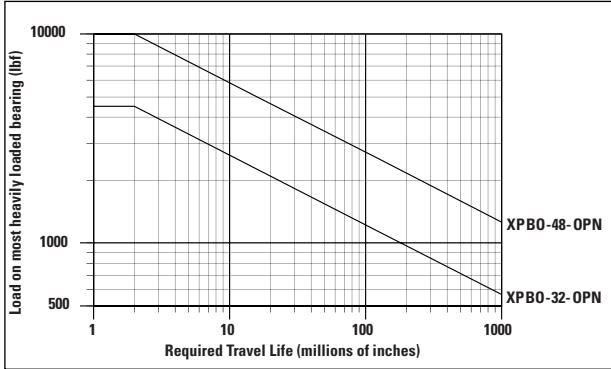
| Part Number | Working Bore Diameter T | 60 Case LinearRace Diameter d | Ball Bushing <sup>(1)</sup> Bearing/LinearRace Fit Up | A    | B    | E ±.010 | E1 ±.010 | E2 min. | G    | J    | $\alpha$ deg | M    | N   | Pillow Block Mass lb | Dynamic Load Capacity lb <sub>r</sub> <sup>(2)</sup> |       |
|-------------|-------------------------|-------------------------------|---|------|------|---------|----------|---------|------|------|--------------|------|-----|----------------------|--|-------|
| XPBO-32-OPN | 1.9985/1.9972           | 1.9994/1.9991                 | .0022P/.006P  | 6.00 | 4.88 | 3.750   | 5.000    | 1.00    | 3.75 | .88  | 27           | 2.63 | .53 | 1/2                  | 18   | 4500  |
| XPBO-48-OPN | 2.9980/2.9963           | 2.9992/2.9989                 | .0029/.0009P  | 8.38 | 7.25 | 5.875   | 7.000    | 1.50    | 5.50 | 1.25 | 30           | 4.13 | .66 | 5/8                  | 55   | 10000 |

- (1) XPBO pillow blocks are designed to give extra rigid support and are therefore dimensioned to provide the interference fits when used with 60 Case LinearRace class XL. If used with class L 60 Case LinearRace the fit-up values would be .0022P/.0002P for the 2 inch size and .0029P/.0003P for the 3 inch size.
- (2) The Dynamic Load Capacity is based on a rated travel life of 2 million inches. The actual Dynamic Load Capacity can be affected by the orientation of the bearing or the direction of the applied load. For dynamic load correction factors see polar graphs opposite.
- (3) Contact factory for availability.

## Inch – XR Ball Bushing Bearings

### Load/Life Graph

(Lines indicate limiting load for given Ball Bushing Bearing)



#### Determining Ball Bushing Bearing Size

To determine the proper Ball Bushing Bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All Ball Bushing Bearing sizes that pass through or above and to the right of this point may be suitable for this application.

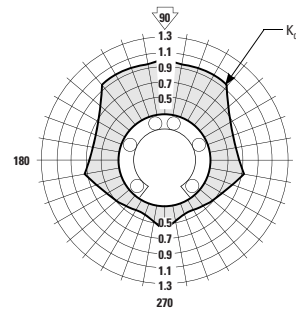
**Note:** For the purpose of using this chart.

**Load on most heavily loaded bearing = maximum applied load/ $K_0$ .**

Where  $K_0$  can be determined from the Polar Graph to the right.

### Polar Graphs

The actual Dynamic Load Capacity of a Ball Bushing Bearing is determined by the orientation of the bearing or direction of the applied load. The load Correction Factor  $K_0$  is found by knowing the direction of the applied load relative to the orientation of the bearings ball tracks and referring to the polar graph. To determine the actual Dynamic Load Capacity, multiply the proper correction factor by the Dynamic Load Capacity listed in the product table on the previous page.



## Inch – XR Ball Bushing Bearings

## X-Y-Z System

### Objective

Build a rigid X-Y-Z System designed to perform welding and flame cutting tasks.

### Solution

Extra Rigid Ball Bushing Bearings will be used on the X-axis to minimize deflection of the cantilevered Y-axis. Self-aligning Super Smart Ball Bushing Bearings are used on the Y and Z axis to simplify the assembly.

### Products Specified

#### X-axis

- 4 - XR-32-OPN (XR Ball Bushing Bearing)
- 2 - XSRA-32 x 108 in (60 Case LinearRace Support Rail Assembly)

#### Y-axis

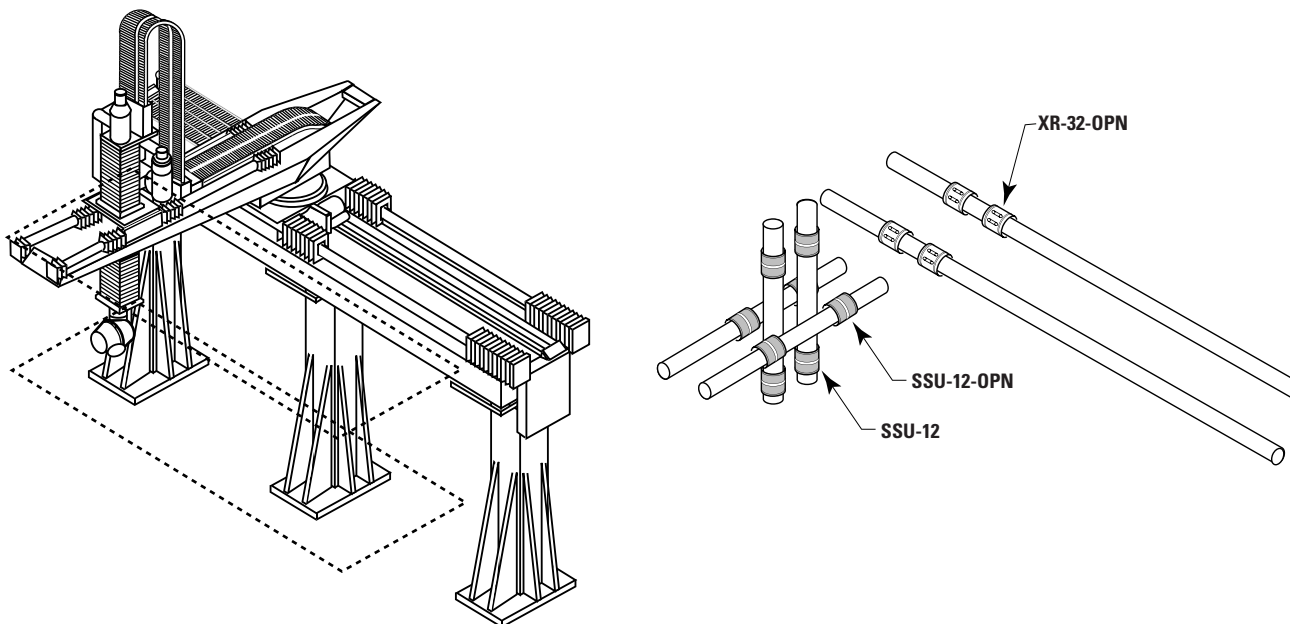
- 4 - SSU-12-OPN (Super Smart Ball Bushing Bearing [Open Type])
- 2 - LSR-12-PD x 48 in (Low Profile 60 Case LinearRace Support Rail)
- 2 - 3/4 L PD CTL x 48 in (60 Case LinearRace)

#### Z-axis

- 4 - SSU-12 (Super Smart Ball Bushing Bearing)
- 2 - 3/4 L CTL x 36 in (60 Case LinearRace)

### Benefits

The high load capacity, rigidity and RoundRail Advantage of the Super Smart and XR Ball Bushing Bearings provided an easy to assemble system with a repeatability of  $\pm 0.005$  in.



## Inch – RoundWay Linear Roller Bearings

# RoundWay Linear Roller Bearing Products



### Thomson RoundWay Linear Roller Bearings offer:

- Up to twenty times the load capacity of conventional linear ball bearings. This dramatic increase allows for more compact machine designs with a reduction in hardware costs.
- A rigid design that provides high accuracy while tolerating the high shock loads common to machine tool applications.
- A coefficient of friction as low as .005. When replacing v-ways or flat-ways, RoundWay linear roller bearings allow for the use of smaller less expensive drives, motors, belts, gears and ball screws.
- A self-aligning capability that reduces installation time and cost.
- An eccentric trunnion pin that adjusts bearing height to compensate for minor inaccuracies in mounting base flatness or machining accuracy. Installation is quicker and easier than old style, conventional way systems.
- Availability of an integral wiper that protects against contamination while retaining lubrication.
- Interchangeable components for quick, cost-effective machine maintenance. There is no need to scrap the entire way system, a problem with some linear guide products.
- The RoundRail Advantage combined with the self aligning feature, eliminates the need for derating factors commonly seen with linear guides.
- Availability from over 1800 distributors worldwide.



## Inch – RoundWay Linear Roller Bearings

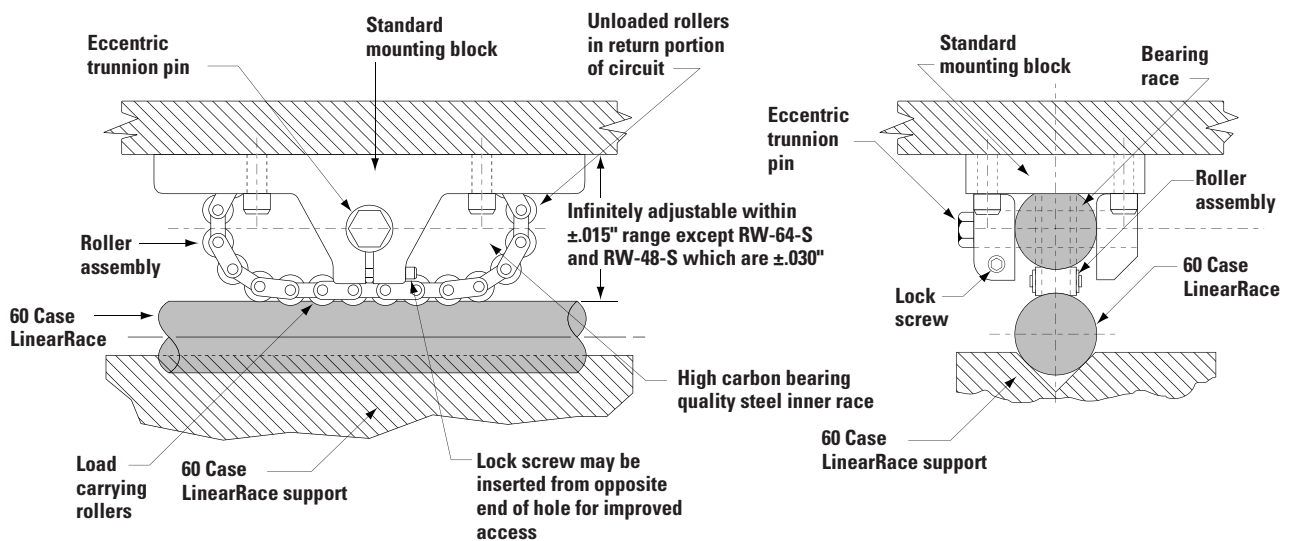


Figure 1

RoundWay Operating Principle

Thomson invented the RoundWay Linear roller bearing for use in high load, heavy duty applications. Each RoundWay bearing combines the high load capacity of hardened and ground steel recirculating rollers with a rigid malleable iron pillow block providing extremely high load capacity with smooth linear travel. The RoundWay linear roller bearing comes in both a single and dual version. A single RoundWay linear roller bearing does not resist side loads and is therefore always used in conjunction with a dual version, unless used in a configuration as shown in Figures 2, 3 and 4 on page 96.

Each RoundWay linear roller bearing is designed for use on 60 Case LinearRace. The 60 Case LinearRace shaft can be continuously supported using type LSR, SR, FLSR or XSR 60 Case LinearRace support rails or intermittently supported using the adjustable Waymount\* LinearRace supports type WM.

The RoundWay linear roller bearing consists of four basic parts: the bearing race, the roller assembly, the eccentric trunnion pin and the mounting block. The rolling elements of a RoundWay linear roller bearing are a series of concave rollers interconnected and linked by a chain assembly. As load is applied to the mounting block it is transferred through the bearing race and roller assembly to the supported 60 Case LinearRace. Connecting the mounting block to the RoundWay bearing and roller assembly is an eccentric trunnion pin that allows the height of the RoundWay linear roller bearing to be adjusted to compensate for variations in the mounting surfaces or the build-up of tolerances between component elements. The eccentric trunnion pin can also be used to preload the RoundWay bearing by eliminating internal bearing clearance. After the eccentric trunnion pin has been adjusted it can be held in place by simply tightening the lock screw.

### Self-Aligning

The RoundWay single and dual bearings are designed with a built-in self-aligning capability that absorbs misalignment caused by inaccuracies in carriage or base machining. The RoundWay single bearing has an additional built-in self-aligning capability that allows it to absorb misalignment caused by two slightly out of parallel 60 Case LinearRace ways. This feature is realized when two RoundWay single bearings are mounted on one 60 Case LinearRace and two dual RoundWay bearings are on a parallel 60 Case LinearRace (Figure 1 on page 96).

\* Trademark of Thomson. THOMSON is registered in the U.S. Patent and Trademark Office and in other countries.

## Inch – RoundWay Linear Roller Bearings

# RoundWay Linear Roller Bearing Mounting Configurations

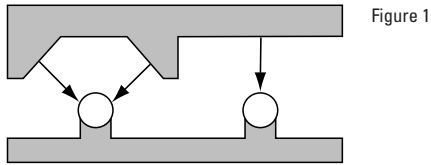


Figure 1

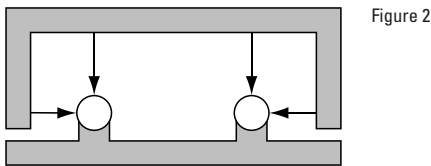


Figure 2

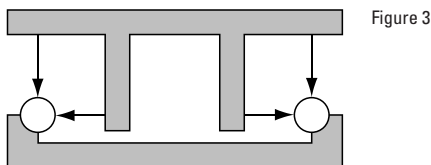


Figure 3

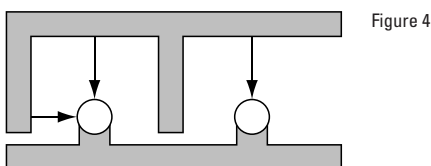


Figure 4

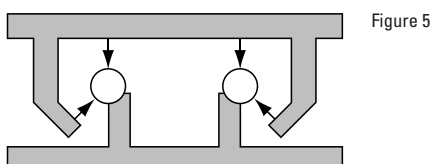


Figure 5

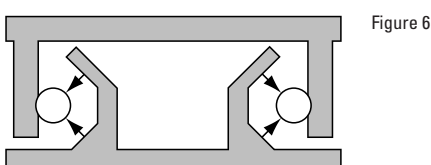


Figure 6

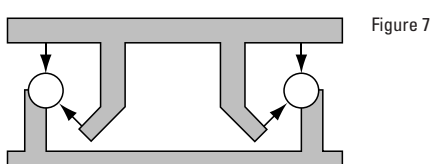


Figure 7

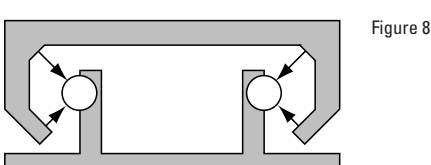


Figure 8

### RoundWay Bearing Mounting Arrangements

RoundWay bearings are available in single mounting blocks or dual V-blocks. The basic race and roller assembly can be purchased separately, along with the suitable type of trunnion pin for mounting directly in the carriage or other machine elements (see page 110). When using either type of cantilever mounting trunnion pin, deflection may be experienced under heavy loads.

The above illustrations are a few schematic suggestions for arrangements of RoundWay bearings and 60 Case LinearRace ways. The load directions of the bearings are indicated by arrows.

The first group (Figs. 1 through 4) depends on gravity to hold the carriage on the ways.

The second group shows arrangements which will carry loads in any direction. The first two figures (Figs. 5 and 6) are similar to the second two figures (Figs. 7 and 8), except for reverse orientation of horizontal load-carrying bearings.

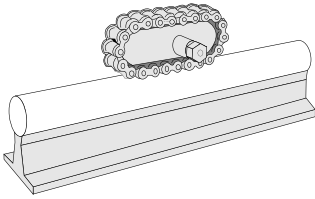
All schematics on this page can be pre-loaded except Fig. 1. In the Fig. 1 arrangement, the maximum side load permitted is 50% of the applied vertical load on the Dual RoundWay bearing.

### IMPORTANT!

A single RoundWay bearing does not resist side loads. Therefore, dual RoundWay bearings or the equivalent are always used in combination with single units.

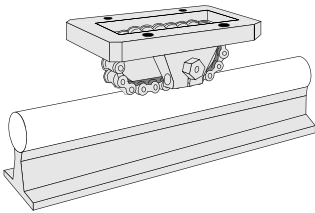
## Inch – RoundWay Linear Roller Bearings

## RoundWay Linear Roller Bearings for Continuously Supported Applications



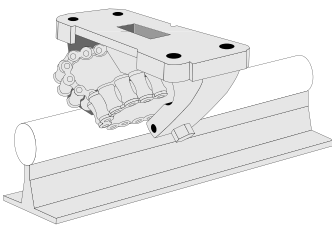
### RoundWay Linear Roller Bearing Type (Type A,B,C)

- Available in 1/2 through 3 inch diameters.
- Load capacity range between 970 and 24,000 lb<sub>r</sub>.
- Travel speeds up to 100 ft/s.
- Accelerations up to 450 ft/s<sup>2</sup>.
- Can be adjusted to compensate for variations in the mounting surface.
- Self-aligning in all directions.
- Designed to compensate for two 60 Case LinearRace ways that are slightly out of parallel
- Can be mounted in a custom housing.
- Available with a two piece seal that retains lubrication while protecting the bearing from the ingress of dirt or contaminants.



### RoundWay Linear Roller Bearing (Single Type)

- Available in 1/2 through 3 inch diameters.
- Load capacity range between 970 and 24,000 lb<sub>r</sub>.
- Travel speeds up to 100 ft/s.
- Accelerations up to 450 ft/s<sup>2</sup>.
- Can be adjusted to compensate for variations in the mounting surface.
- Self-aligning in all directions.
- Designed to compensate for two 60 Case LinearRace ways that are slightly out of parallel
- Should always be used in conjunction with RoundWay Dual version.
- Can be mounted in a custom housing.
- Available with a two piece seal that retains lubrication while protecting the bearing from the ingress of dirt or contaminants.
- Easily mounted to carriage with four mounting bolts.



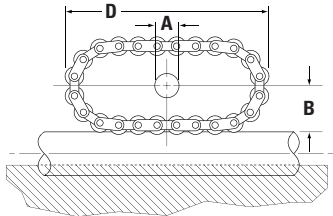
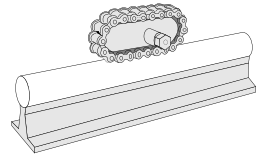
### RoundWay Linear Roller Bearing (Dual Type)

- Available in 1/2 through 3 inch diameters.
- Load capacity range between 1370 and 35,000 lb<sub>r</sub>.
- Travel speeds up to 100 ft/s.
- Accelerations up to 450 ft/s<sup>2</sup>.
- Can be adjusted to compensate for variations in the mounting surface.
- Self-aligning in all directions.
- Available with a two piece seal that retains lubrication while protecting the bearing from the ingress of dirt or contaminants.
- Easily mounted to carriage with four mounting bolts.

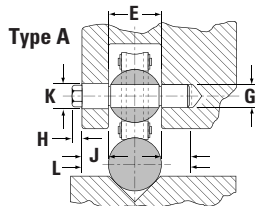
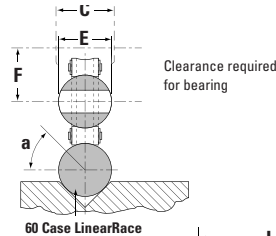
## Inch – RoundWay Linear Roller Bearings

# RoundWay Linear Roller Bearing

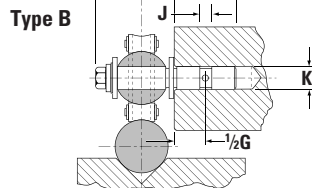
## Type A, B and C



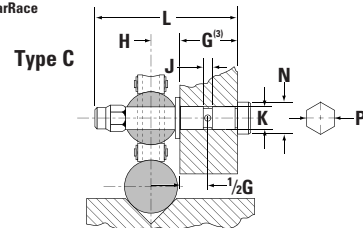
All Trunnion Pins make height of bearings infinitely adjustable within  $\pm .015"$  RW-48-A, B or C which are  $\pm .030"$



If set screws are used to lock pin they should be at right angles to applied load  
Straddle Type Trunnion Pin



If set screws are used to lock pin they should be at right angles to applied load  
Cantilever Type Trunnion Pin—Blind Hole



If set screws are used to lock pin they should be at right angles to applied load  
Cantilever Type Trunnion Pin—Thru-hole

### RoundWay Linear Roller Bearing (Type A, B and C) and 60 Case LinearRace (Dimensions in inches)

| Part Number    |                |                |                    | Nom. Dia. | A<br>+.0005<br>-.0000 | B    | C    | D     | E<br>±.001 | F    | α<br>deg | 60 Case LinearRace Diameter d | 60 Case LinearRace Maximum Length | 60 Case Solid LinearRace Mass lb/in | Dynamic (1) Load Capacity lb <sub>f</sub> |
|----------------|----------------|----------------|--------------------|-----------|-----------------------|------|------|-------|------------|------|----------|-------------------------------|-----------------------------------|-------------------------------------|---|
| Bearing Type A | Bearing Type B | Bearing Type C | 60 Case LinearRace |           |                       |      |      |       |            |      |          |                               |                                   |                                     |   |
| RW-8-A         | RW-8-B         | RW-8-C         | 1/2 L PD           | .500      | .2500                 | .45  | .63  | 2.38  | .502       | .56  | 50       | .4995/.4990                   | 168                               | .06                                 | 970                                       |
| RW-16-A        | RW-16-B        | RW-16-C        | 1 L PD             | 1.000     | .4688                 | .80  | 1.00 | 3.75  | 1.002      | .94  | 50       | .9995/.9990                   | 180                               | .22                                 | 3020                                      |
| RW-24-A        | RW-24-B        | RW-24-C        | 1 1/2 L PD         | 1.500     | .7188                 | 1.15 | 1.50 | 5.38  | 1.502      | 1.38 | 55       | 1.4994/1.4989                 | 204                               | .50                                 | 6020                                      |
| RW-32-A        | RW-32-B        | RW-32-C        | 2 L PD             | 2.000     | .9688                 | 1.50 | 2.00 | 7.38  | 2.002      | 1.75 | 55       | 1.9994/1.9987                 | 204                               | .89                                 | 12360                                     |
| RW-48-A        | RW-48-B        | RW-48-C        | 3 L PD (2)         | 3.000     | 1.5626                | 2.30 | 3.00 | 11.00 | 3.002      | 2.75 | 50       | 2.9992/2.9983                 | 204                               | 2.00                                | 24000                                     |

#### Trunnion Type A

| Round Way Bearing Part Number | G      | H   | J    | K<br>+.0000<br>-.0005 | L    | Bearing Mass lb |
|-------------------------------|--------|-----|------|-----------------------|------|-----------------|
| RW-8-A                        | .2187  | .19 | .31  | .2812                 | 1.13 | .30             |
| RW-16-A                       | .4375  | .25 | .50  | .5000                 | 2.00 | 1.10            |
| RW-24-A                       | .6875  | .31 | .63  | .7500                 | 2.75 | 3.10            |
| RW-32-A                       | .9375  | .38 | .75  | 1.0000                | 3.50 | 7.3             |
| RW-48-A                       | 1.5000 | .59 | 1.25 | 1.6250                | 5.53 | 24.0            |

#### Trunnion Type B

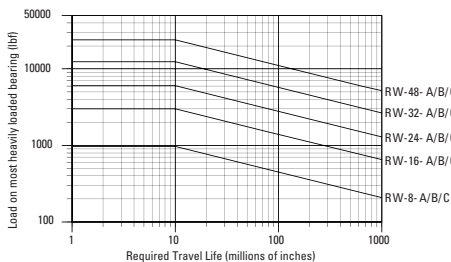
| Round Way Bearing Part Number | G (2) | H    | J   | K<br>+.000<br>-.001 | L    | Bearing Mass lb |
|-------------------------------|-------|------|-----|---------------------|------|-----------------|
| RW-8-B                        | .75   | .31  | .13 | .3105               | 1.63 | .30             |
| RW-16-B                       | 1.25  | .59  | .19 | .498                | 2.78 | 1.10            |
| RW-24-B                       | 1.75  | .88  | .25 | .748                | 3.94 | 3.10            |
| RW-32-B                       | 2.25  | 1.13 | .31 | .998                | 5.06 | 7.70            |
| RW-48-B                       | 3.50  | 1.75 | .50 | 1.623               | 8.00 | 24.80           |

#### Trunnion Type C

| Round Way Bearing Part Number | G (2) | H    | J   | K<br>+.000<br>-.001 | L    | M    | N    | P<br>Std. Hex across Flats | Bearing Mass lb |
|-------------------------------|-------|------|-----|---------------------|------|------|------|----------------------------|-----------------|
| RW-8-C                        | .719  | .31  | .13 | .311                | 1.69 | .22  | .44  | —                          | .30             |
| RW-16-C                       | 1.188 | .59  | .19 | .498                | 2.88 | .31  | .75  | —                          | 1.10            |
| RW-24-C                       | 1.656 | .88  | .25 | .748                | 4.13 | .50  | 1.00 | —                          | 3.20            |
| RW-32-C                       | 2.094 | 1.13 | .31 | .998                | 5.25 | .63  | 1.31 | —                          | 7.90            |
| RW-48-C                       | 3.063 | 1.75 | .50 | 1.623               | 7.25 | 1.00 | —    | 2.25                       | 25.60           |

(1) Dynamic Load Capacity is based on 10 million inches of travel. (2) Thickness of mounting member.

### Load/Life Graph (Lines indicate limiting load for given RoundWay bearing)

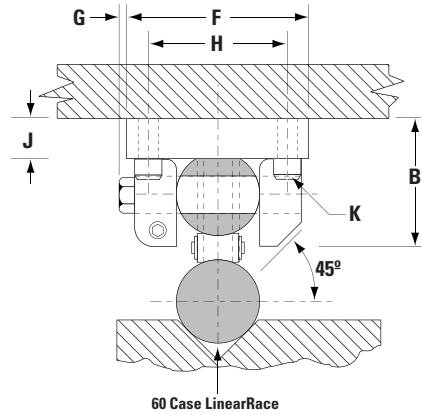
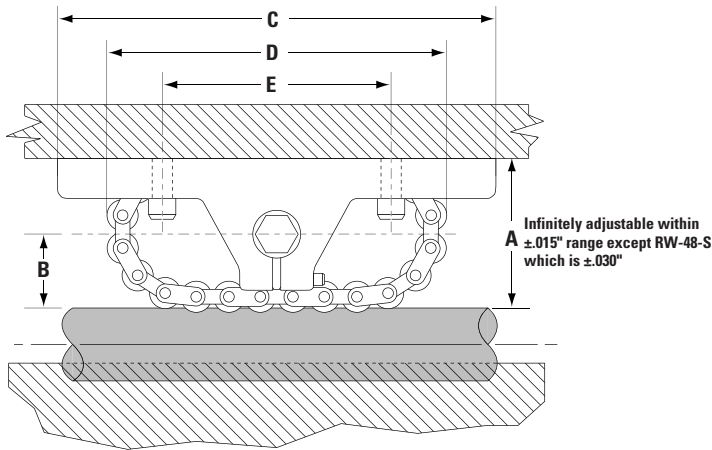
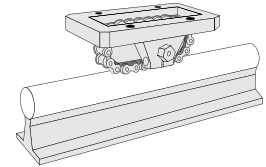


#### Determining RoundWay Bearing Size

The primary factors that influence the choice of bearing size are maximum load on a single RoundWay bearing and the required travel life. To determine the proper RoundWay bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All RoundWay bearing sizes that pass through or above and to the right of this point may be suitable for this application.

Inch – RoundWay Linear Roller Bearings

# RoundWay Linear Roller Bearing (Single Type)

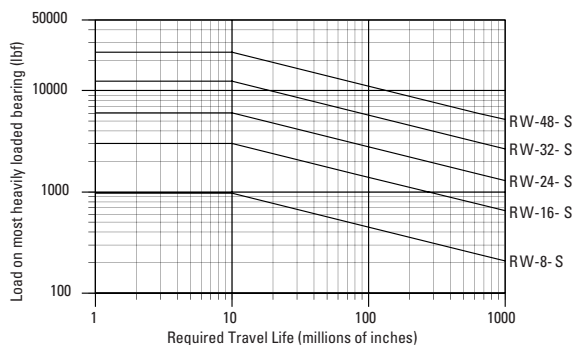


RoundWay Linear Roller Bearing (Single Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number      |                    | Nom. Dia. | A    | B    | C    | D     | E    | F    | G   | H    | J    | K    |      | L    | 60 Case LinearRace Diameter d | 60 Case LinearRace Maximum Length | 60 Case Solid LinearRace Mass lb/in | Bearing Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>f</sub> |
|------------------|--------------------|-----------|------|------|------|-------|------|------|-----|------|------|------|------|------|-------------------------------|-----------------------------------|-------------------------------------|-----------------|--|
| RoundWay Bearing | 60 Case LinearRace |           |      |      |      |       |      |      |     |      |      | Bolt | Hole |      |                               |                                   |                                     |                 |  |
| RW-8-S           | 1/2 L PD           | .500      | 1.00 | .45  | 3.0  | 2.38  | 1.50 | 1.25 | .19 | .94  | .31  | #6   | .16  | .88  | .4995/.4990                   | 168                               | .06                                 | .50             | 970  |
| RW-16-S          | 1 L PD             | 1.000     | 1.75 | .80  | 5.0  | 3.75  | 2.50 | 2.13 | .25 | 1.63 | .50  | #10  | .25  | 1.50 | .9995/.9990                   | 180                               | .22                                 | 2.20            | 3020   |
| RW-24-S          | 1 1/2 L PD         | 1.500     | 2.50 | 1.15 | 6.5  | 5.38  | 3.50 | 2.88 | .31 | 2.13 | .63  | .31  | .38  | 2.13 | 1.4994/1.4989                 | 204                               | .50                                 | 5.60            | 6020   |
| RW-32-S          | 2 L PD             | 2.000     | 3.25 | 1.50 | 8.5  | 7.38  | 4.50 | 3.63 | .38 | 2.75 | .75  | .38  | .44  | 2.88 | 1.9994/1.9987                 | 204                               | .89                                 | 12.40           | 12360  |
| RW-48-S          | 3 L PD             | 3.000     | 5.00 | 2.30 | 13.0 | 11.00 | 7.00 | 6.00 | .50 | 4.25 | 1.25 | .63  | .69  | 4.25 | 2.9992/2.9983                 | 204                               | 2.00                                | 48.00           | 24000  |

(1) Dynamic Load Capacity is based on 10 million inches of travel.

## Load/Life Graph (Lines indicate limiting load for given RoundWay bearing)

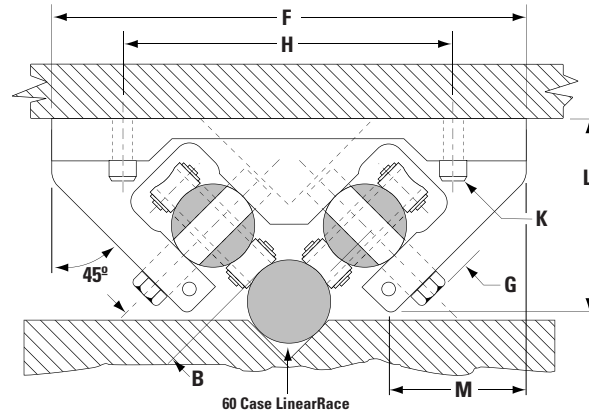
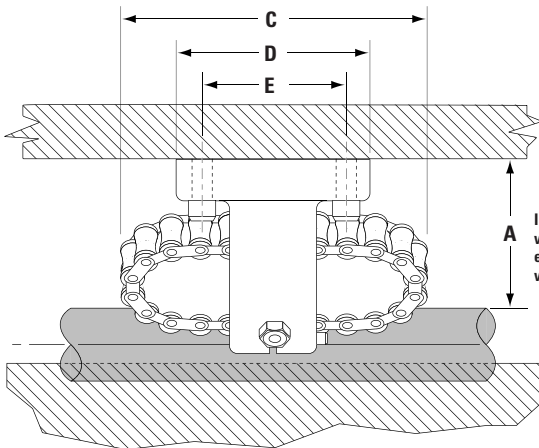
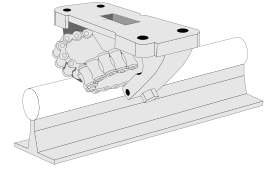


### Determining RoundWay Bearing Size

The primary factors that influence the choice of bearing size are maximum load on a single RoundWay bearing and the required travel life. To determine the proper RoundWay bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All RoundWay bearing sizes that pass through or above and to the right of this point may be suitable for this application.

## Inch – RoundWay Linear Roller Bearings

# RoundWay Linear Roller Bearing (Dual Type)

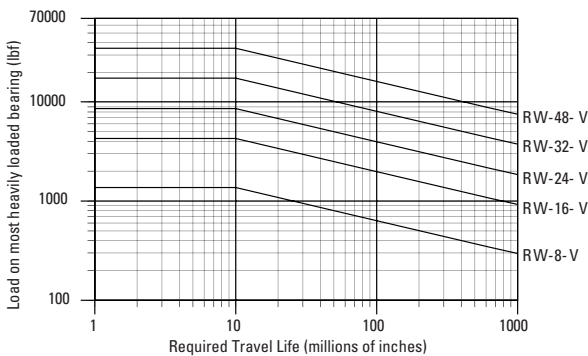


### RoundWay Linear Roller Bearing (Dual Type) and 60 Case LinearRace (Dimensions in inches)

| Part Number      |                    | Nom. Dia. | A    | B    | C     | D    | E    | F     | G   | H    | J    | K    |      | L    | M    | 60 Case LinearRace Diameter d | 60 Case LinearRace Maximum Length | 60 Case Solid LinearRace Mass lb/in | Bearing Mass lb | Dynamic <sup>(1)</sup> Load Capacity lb <sub>r</sub> |
|------------------|--------------------|-----------|------|------|-------|------|------|-------|-----|------|------|------|------|------|------|-------------------------------|-----------------------------------|-------------------------------------|-----------------|--|
| RoundWay Bearing | 60 Case LinearRace |           |      |      |       |      |      |       |     |      |      | Bolt | Hole |      |      |                               |                                   |                                     |                 |  |
| RW-8-V           | 1/2 L PD           | .500      | 1.00 | .45  | 2.38  | 1.38 | 1.00 | 3.00  | .19 | 2.25 | .31  | #8   | .19  | 1.38 | .69  | .4995/.4990                   | 168                               | .06                                 | 1.10            | 1370   |
| RW-16-V          | 1 L PD             | 1.000     | 1.75 | .80  | 3.75  | 2.25 | 1.63 | 5.75  | .25 | 4.0  | .50  | #10  | .25  | 2.38 | 1.56 | .9995/.9990                   | 180                               | .22                                 | 4.90            | 4300   |
| RW-24-V          | 1 1/2 L PD         | 1.500     | 2.50 | 1.15 | 5.38  | 2.75 | 2.00 | 7.88  | .31 | 6.0  | .63  | .31  | .38  | 3.38 | 2.13 | 1.4994/1.4989                 | 204                               | .50                                 | 11.70           | 8600   |
| RW-32-V          | 2 L PD             | 2.000     | 3.25 | 1.50 | 7.38  | 3.50 | 2.50 | 9.75  | .38 | 7.5  | .75  | .38  | .44  | 4.38 | 2.50 | 1.9994/1.9987                 | 204                               | .89                                 | 25.20           | 17500  |
| RW-48-V          | 3 L PD             | 3.000     | 5.00 | 2.30 | 11.00 | 5.50 | 4.00 | 15.50 | .63 | 1.25 | 1.25 | .63  | .69  | 7.00 | 4.25 | 2.9992/2.9983                 | 204                               | 2.00                                | 90.00           | 35000  |

(1) Dynamic Load Capacity is based on 10 million inches of travel.

### Load/Life Graph (Lines indicate limiting load for given RoundWay bearing)



#### Determining RoundWay Bearing Size

The primary factors that influence the choice of bearing size are maximum load on a single RoundWay bearing and the required travel life. To determine the proper RoundWay bearing size enter the chart with the maximum load of the most heavily loaded bearing and the required travel life. Mark where the two lines intersect. All RoundWay bearing sizes that pass through or above and to the right of this point may be suitable for this application.

## Inch – RoundWay Linear Roller Bearings

## Overhead Carriage for Log-Processing Machine

### Objective

Design overhead carriage system using RoundWay linear roller bearings mounted on 60 Case LinearRace ways.

### Solution

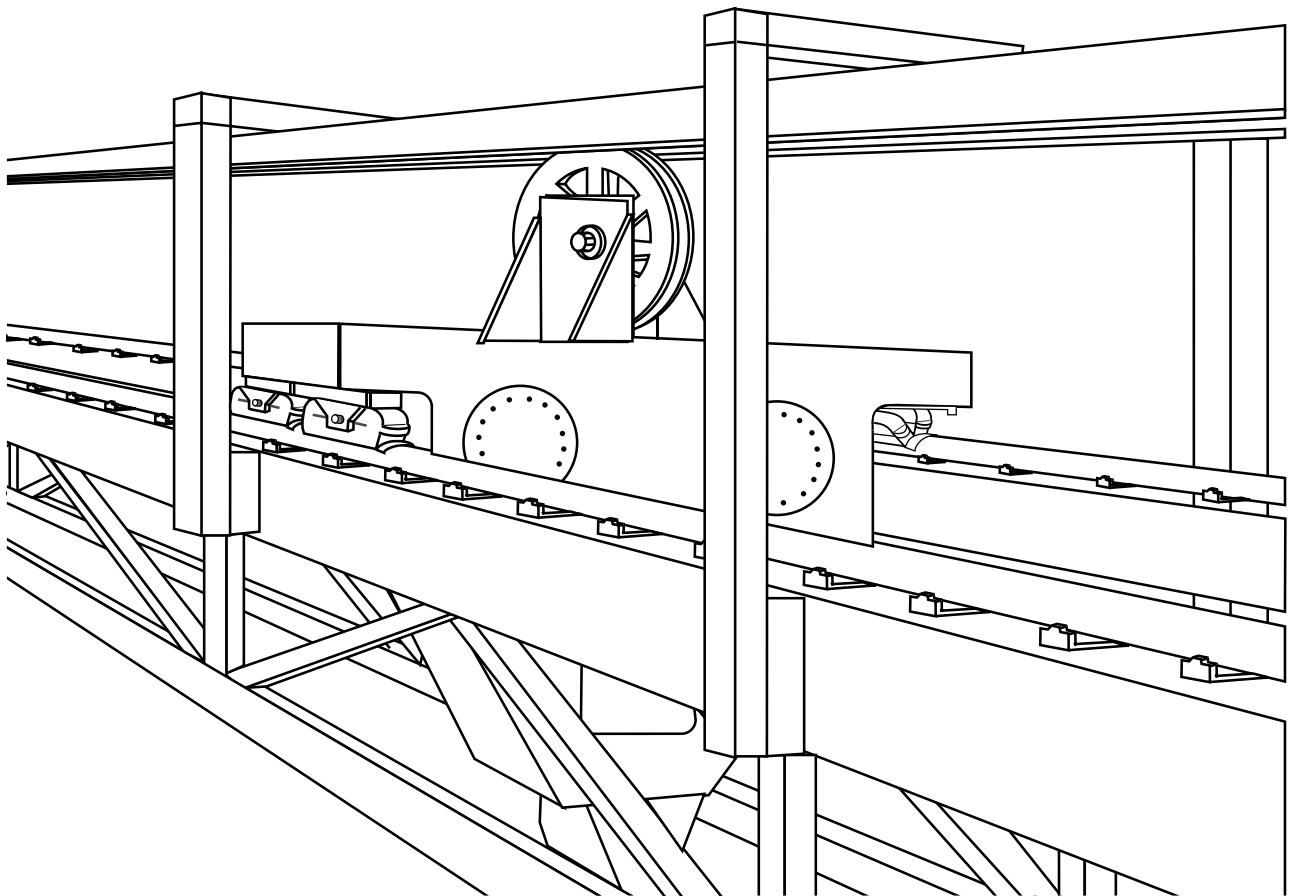
RoundWay linear roller bearings' high load capacity will be used to move heavy logs into and out of the band saws. The carriages shuttle back and forth on 100 foot long 60 Case LinearRace ways until the final cut is made.

### Products specified

- 2 - RW-32-V (RoundWay Linear Roller bearing Dual Type)
- 2 - RW-32-S (RoundWay Linear Roller bearing Single Type)
- 2 - 2 L PD CTL x 100 ft (60 Case LinearRace)

### Benefits

RoundWay linear roller bearings provide operating speeds up to 100 ft/s, optimizing productivity and minimizing cost. The RoundWay bearings' low coefficient of friction allows the use of smaller, less expensive drive motors, belts, linkages and gears. The seal keeps out wood chips and other contaminants and maximizes bearing life.



## Inch – FluoroNyliner Bushing Bearings

# FluoroNyliner Bushing Bearings



### Thomson FluoroNyliner Bushing Bearings offer:

- High performance in contaminated, washdown, or submerged environments
- Proprietary, self-lubricating, composite bearing liner TEP 950
- Low friction, ideally suited for linear and rotary motion
- Precision machined aluminum sleeve
- Excellent performance in high vibration and mechanical shock applications
- Corrosion resistance
- Product availability in industry standard sizes from 0.25" to 2.00"
- Eight bearing configurations, include closed, open, self-aligning, precision and compensated IDs
- Load capacities up to 14,000 lb<sub>f</sub>
- Integral seals
- Closed, Open, and Flanged Pillow Blocks available in single or twin versions
- Available from over 1800 distributors worldwide



Inch – FluoroNyliner Bushing Bearings

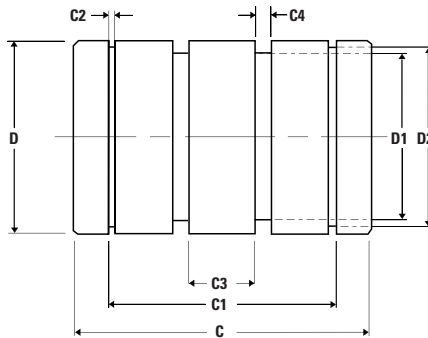
# FluroNyliner Bushing Bearings

## Common Specifications

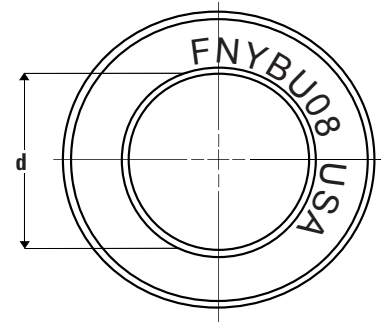
| Nominal Bearing Diameter (in.) | 60 Case LinearRace Shafting |                     | Recommended Shaft Diameter (in.) |        | Weight (lbs.) | Effective Surface Area (in <sup>2</sup> ) | Max. Static Load <sup>1</sup> (lb.) |
|--------------------------------|-----------------------------|---------------------|----------------------------------|--------|---------------|---|-------------------------------------|
|                                | Carbon Steel                | 316 Stainless Steel | Min.                             | Max.   |               |   |                                     |
| .250                           | 1/4 L                       | 1/4 L 316 SS        | .2490                            | .2495  | .008          | .19                                       | 300                                 |
| .375                           | 3/8 L                       | 3/8 L 316 SS        | .3740                            | .3745  | .013          | .33                                       | 500                                 |
| .500                           | 1/2 L                       | 1/2 L 316 SS        | .4990                            | .4995  | .030          | .63                                       | 970                                 |
| .625                           | 5/8 L                       | 5/8 L 316 SS        | .6240                            | .6245  | .072          | .94                                       | 1450                                |
| .750                           | 3/4 L                       | 3/4 L 316 SS        | .7490                            | .7495  | .090          | 1.22                                      | 1900                                |
| 1.000                          | 1 L                         | 1 L 316 SS          | .9990                            | .9995  | .190          | 2.25                                      | 3500                                |
| 1.250                          | 1 1/4 L                     | 1 1/4 L 316 SS      | 1.2490                           | 1.2495 | .380          | 3.28                                      | 5100                                |
| 1.500                          | 1 1/2 L                     | 1 1/2 L 316 SS      | 1.4989                           | 1.4994 | .610          | 4.51                                      | 7000                                |
| 2.000                          | 2 L                         | 2 L 316 SS          | 1.9987                           | 1.9994 | 1.230         | 8.01                                      | 12500                               |

(1) Open bearings operating in shear should be derated by 40%. Open bearings operating in tension should be derated by 70%.

## Closed Bearing

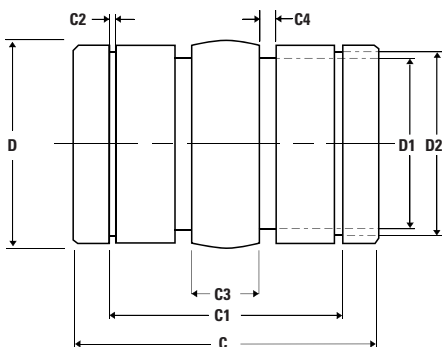


Side View



Front View

## Self-Aligning Bearing



Side View



## Inch – FluoroNyliner Bushing Bearings

### Standard Bearings

| Precision I.D. |         |        | Compensated I.D. <sup>1</sup> |         |        |                   | Closed Bearing Dimensions (in.) |        |       |       |       |       |         |         |       |      |
|----------------|---------|--------|-------------------------------|---------|--------|-------------------|---------------------------------|--------|-------|-------|-------|-------|---------|---------|-------|------|
| Part Number    | d (in.) |        | Part Number                   | d (in.) |        | Nom. Bearing Dia. | D                               |        | D1    | D2    | C     |       | C1 Min. | C2 Min. | C3    | C4   |
|                | Min.    | Max.   |                               | Min.    | Max.   |                   | Min.                            | Max.   |       |       | Min.  | Max.  |         |         |       |      |
| FNYBU-04       | .2510   | .2520  | FNYBU-04-L                    | .2530   | .2540  | .250              | .4990                           | .5000  | .399  | .467  | .735  | .750  | .519    | .041    | .125  | .080 |
| FNYBU-06       | .3760   | .3770  | FNYBU-06-L                    | .3780   | .3790  | .375              | .6240                           | .6250  | .524  | .596  | .860  | .875  | .634    | .041    | .187  | .080 |
| FNYBU-08       | .5010   | .5020  | FNYBU-08-L                    | .5030   | .5040  | .500              | .8740                           | .8750  | .712  | .833  | 1.235 | 1.250 | .956    | .046    | .250  | .125 |
| FNYBU-10       | .6260   | .6270  | FNYBU-10-L                    | .6280   | .6290  | .625              | 1.1240                          | 1.1250 | .962  | 1.070 | 1.485 | 1.500 | 1.101   | .056    | .312  | .125 |
| FNYBU-12       | .7510   | .7520  | FNYBU-12-L                    | .7540   | .7550  | 1.750             | 1.2490                          | 1.2500 | 1.187 | 1.195 | 1.610 | 1.625 | 1.163   | .056    | .312  | .125 |
| FNYBU-16       | 1.0010  | 1.0010 | FNYBU-16-L                    | 1.0040  | 1.0050 | 1.000             | 1.5614                          | 1.5625 | 1.402 | 1.490 | 2.235 | 2.250 | 1.745   | .068    | .500  | .125 |
| FNYBU-20       | 1.2520  | 1.2520 | FNYBU-20-L                    | 1.2550  | 1.2560 | 1.250             | 1.9990                          | 2.0000 | 1.837 | 1.889 | 2.605 | 2.625 | 2.015   | .070    | .625  | .125 |
| FNYBU-24       | 1.5010  | 1.5022 | FNYBU-24-L                    | 1.5050  | 1.5062 | 1.500             | 2.3740                          | 2.3750 | 2.152 | 2.265 | 2.985 | 3.000 | 2.402   | .086    | .750  | .165 |
| FNYBU-32       | 2.0010  | 2.0024 | FNYBU-32-L                    | 2.0060  | 2.0074 | 2.000             | 2.9990                          | 3.0000 | 2.775 | 2.860 | 3.985 | 4.000 | 3.180   | .103    | 1.000 | .188 |

### Standard Self-Aligning Bearings

| Precision I.D. |         |        | Compensated I.D. <sup>1</sup> |         |        |                   | Closed Bearing Dimensions (in.) |        |       |       |       |       |         |         |       |      |
|----------------|---------|--------|-------------------------------|---------|--------|-------------------|---------------------------------|--------|-------|-------|-------|-------|---------|---------|-------|------|
| Part Number    | d (in.) |        | Part Number                   | d (in.) |        | Nom. Bearing Dia. | D                               |        | D1    | D2    | C     |       | C1 Min. | C2 Min. | C3    | C4   |
|                | Min.    | Max.   |                               | Min.    | Max.   |                   | Min.                            | Max.   |       |       | Min.  | Max.  |         |         |       |      |
| FNYBU-04-A     | .2510   | .2520  | FNYBU-04-AL                   | .2530   | .2540  | .250              | .4990                           | .5000  | .399  | .467  | .735  | .750  | .519    | .041    | .125  | .080 |
| FNYBU-06-A     | .3760   | .3770  | FNYBU-06-AL                   | .3780   | .3790  | .375              | .6240                           | .6250  | .524  | .596  | .860  | .875  | .634    | .041    | .187  | .080 |
| FNYBU-08-A     | .5010   | .5020  | FNYBU-08-AL                   | .5030   | .5040  | .500              | .8740                           | .8750  | .712  | .833  | 1.235 | 1.250 | .956    | .046    | .250  | .125 |
| FNYBU-10-A     | .6260   | .6270  | FNYBU-10-AL                   | .6280   | .6290  | .625              | 1.1240                          | 1.1250 | .962  | 1.070 | 1.485 | 1.500 | 1.101   | .056    | .312  | .125 |
| FNYBU-12-A     | .7510   | .7520  | FNYBU-12-AL                   | .7540   | .7550  | 1.750             | 1.2490                          | 1.2500 | 1.187 | 1.195 | 1.610 | 1.625 | 1.163   | .056    | .312  | .125 |
| FNYBU-16-A     | 1.0010  | 1.0010 | FNYBU-16-AL                   | 1.0040  | 1.0050 | 1.000             | 1.5614                          | 1.5625 | 1.402 | 1.490 | 2.235 | 2.250 | 1.745   | .068    | .500  | .125 |
| FNYBU-20-A     | 1.2520  | 1.2520 | FNYBU-20-AL                   | 1.2550  | 1.2560 | 1.250             | 1.9990                          | 2.0000 | 1.837 | 1.889 | 2.605 | 2.625 | 2.015   | .070    | .625  | .125 |
| FNYBU-24-A     | 1.5010  | 1.5022 | FNYBU-24-AL                   | 1.5050  | 1.5062 | 1.500             | 2.3740                          | 2.3750 | 2.152 | 2.265 | 2.985 | 3.000 | 2.402   | .086    | .750  | .165 |
| FNYBU-32-A     | 2.0010  | 2.0024 | FNYBU-32-AL                   | 2.0060  | 2.0074 | 2.000             | 2.9990                          | 3.0000 | 2.775 | 2.860 | 3.985 | 4.000 | 3.180   | .103    | 1.000 | .188 |

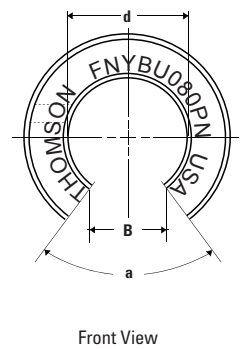
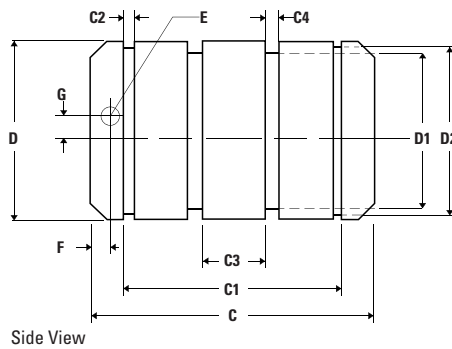
<sup>1</sup> Compensated I.D. bearings have additional running clearance, ideally suited for high speed and non-parallel shaft applications.

## Inch – FluoroNyliner Bushing Bearings

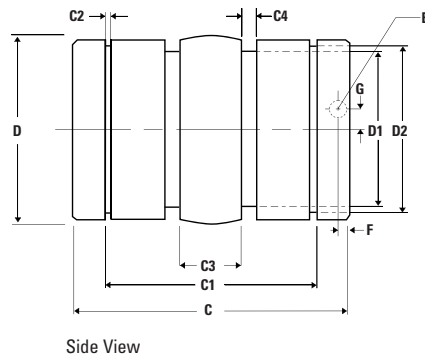
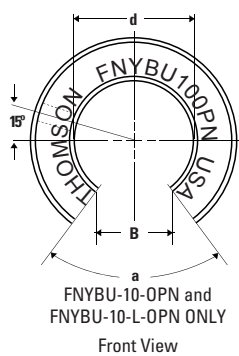
### Common Open Bearing Dimensions (in.)

| Nominal Bearing Diameter (in.) | E    | F    | G    | B     | a (*) |
|--------------------------------|------|------|------|-------|-------|
| .250                           | .094 | .375 | .125 | .188  | 60    |
| .375                           | .094 | .438 | .146 | .250  | 60    |
| .500                           | .136 | .625 | .000 | .313  | 66    |
| .625                           | .104 | .125 | .000 | .375  | 60    |
| .750                           | .136 | .125 | .000 | .438  | 66    |
| 1.000                          | .136 | .125 | .000 | .563  | 64    |
| 1.250                          | .201 | .197 | .000 | .625  | 60    |
| 1.500                          | .201 | .193 | .000 | .750  | 60    |
| 2.000                          | .265 | .292 | .000 | 1.000 | 60    |

### Open Bearing



### Self-Aligning Open Bearing



## Inch – FluoroNyliner Bushing Bearings

### Standard Open Bearings

| Precision I.D. |         | Compensated I.D. <sup>1</sup> |                |         |        | Open Bearing Dimensions (in.) |        |        |       |       |       |       |         |         |       |      |
|----------------|---------|-------------------------------|----------------|---------|--------|-------------------------------|--------|--------|-------|-------|-------|-------|---------|---------|-------|------|
| Part Number    | d (in.) |                               | Part Number    | d (in.) |        | Nom. Bearing Dia.             | D      |        | D1    | D2    | C     |       | C1 Min. | C2 Min. | C3    | C4   |
|                | Min.    | Max.                          |                | Min.    | Max.   |                               | Min.   | Max.   |       |       | Min.  | Max.  |         |         |       |      |
| FNYBU-04-OPN   | .2510   | .2520                         | FNYBU-04-L-OPN | .2530   | .2540  | .250                          | .4990  | .5000  | .399  | .467  | .735  | .750  | .519    | .041    | .125  | .080 |
| FNYBU-06-OPN   | .3760   | .3770                         | FNYBU-06-L-OPN | .3780   | .3790  | .375                          | .6240  | .6250  | .524  | .596  | .860  | .875  | .634    | .041    | .187  | .080 |
| FNYBU-08-OPN   | .5010   | .5020                         | FNYBU-08-L-OPN | .5030   | .5040  | .500                          | .8740  | .8750  | .712  | .833  | 1.235 | 1.250 | .956    | .046    | .250  | .125 |
| FNYBU-10-OPN   | .6260   | .6270                         | FNYBU-10-L-OPN | .6280   | .6290  | .625                          | 1.1240 | 1.1250 | .962  | 1.070 | 1.485 | 1.500 | 1.101   | .056    | .312  | .125 |
| FNYBU-12-OPN   | .7510   | .7520                         | FNYBU-12-L-OPN | .7540   | .7550  | 1.750                         | 1.2490 | 1.2500 | 1.187 | 1.195 | 1.610 | 1.625 | 1.163   | .056    | .312  | .125 |
| FNYBU-16-OPN   | 1.0010  | 1.0010                        | FNYBU-16-L-OPN | 1.0040  | 1.0050 | 1.000                         | 1.5614 | 1.5625 | 1.402 | 1.490 | 2.235 | 2.250 | 1.745   | .068    | .500  | .125 |
| FNYBU-20-OPN   | 1.2520  | 1.2520                        | FNYBU-20-L-OPN | 1.2550  | 1.2560 | 1.250                         | 1.9990 | 2.0000 | 1.837 | 1.889 | 2.605 | 2.625 | 2.015   | .070    | .625  | .125 |
| FNYBU-24-OPN   | 1.5010  | 1.5022                        | FNYBU-24-L-OPN | 1.5050  | 1.5062 | 1.500                         | 2.3740 | 2.3750 | 2.152 | 2.265 | 2.985 | 3.000 | 2.402   | .086    | .750  | .165 |
| FNYBU-32-OPN   | 2.0010  | 2.0024                        | FNYBU-32-L-OPN | 2.0060  | 2.0074 | 2.000                         | 2.9990 | 3.0000 | 2.775 | 2.860 | 3.985 | 4.000 | 3.180   | .103    | 1.000 | .188 |

### Standard Self-Aligning Open Bearings

| Precision I.D. |         | Compensated I.D. <sup>1</sup> |                 |         |        | Self-Aligning Bearing Dimensions (in.) |        |        |       |       |       |       |         |         |       |      |
|----------------|---------|-------------------------------|-----------------|---------|--------|--|--------|--------|-------|-------|-------|-------|---------|---------|-------|------|
| Part Number    | d (in.) |                               | Part Number     | d (in.) |        | Nom. Bearing Dia.                      | D      |        | D1    | D2    | C     |       | C1 Min. | C2 Min. | C3    | C4   |
|                | Min.    | Max.                          |                 | Min.    | Max.   |  | Min.   | Max.   |       |       | Min.  | Max.  |         |         |       |      |
| FNYBU-04-OPN   | .2510   | .2520                         | FNYBU-04-AL-OPN | .2530   | .2540  | .250                                   | .4990  | .5000  | .399  | .467  | .735  | .750  | .519    | .041    | .125  | .080 |
| FNYBU-06-OPN   | .3760   | .3770                         | FNYBU-06-AL-OPN | .3780   | .3790  | .375                                   | .6240  | .6250  | .524  | .596  | .860  | .875  | .634    | .041    | .187  | .080 |
| FNYBU-08-OPN   | .5010   | .5020                         | FNYBU-08-AL-OPN | .5030   | .5040  | .500                                   | .8740  | .8750  | .712  | .833  | 1.235 | 1.250 | .956    | .046    | .250  | .125 |
| FNYBU-10-OPN   | .6260   | .6270                         | FNYBU-10-AL-OPN | .6280   | .6290  | .625                                   | 1.1240 | 1.1250 | .962  | 1.070 | 1.485 | 1.500 | 1.101   | .056    | .312  | .125 |
| FNYBU-12-OPN   | .7510   | .7520                         | FNYBU-12-AL-OPN | .7540   | .7550  | 1.750                                  | 1.2490 | 1.2500 | 1.187 | 1.195 | 1.610 | 1.625 | 1.163   | .056    | .312  | .125 |
| FNYBU-16-OPN   | 1.0010  | 1.0010                        | FNYBU-16-AL-OPN | 1.0040  | 1.0050 | 1.000                                  | 1.5614 | 1.5625 | 1.402 | 1.490 | 2.235 | 2.250 | 1.745   | .068    | .500  | .125 |
| FNYBU-20-OPN   | 1.2520  | 1.2520                        | FNYBU-20-AL-OPN | 1.2550  | 1.2560 | 1.250                                  | 1.9990 | 2.0000 | 1.837 | 1.889 | 2.605 | 2.625 | 2.015   | .070    | .625  | .125 |
| FNYBU-24-OPN   | 1.5010  | 1.5022                        | FNYBU-24-AL-OPN | 1.5050  | 1.5062 | 1.500                                  | 2.3740 | 2.3750 | 2.152 | 2.265 | 2.985 | 3.000 | 2.402   | .086    | .750  | .165 |
| FNYBU-32-OPN   | 2.0010  | 2.0024                        | FNYBU-32-AL-OPN | 2.0060  | 2.0074 | 2.000                                  | 2.9990 | 3.0000 | 2.775 | 2.860 | 3.985 | 4.000 | 3.180   | .103    | 1.000 | .188 |

<sup>1</sup> Compensated I.D. bearings have additional running clearance, ideally suited for high speed and non-parallel shaft applications.

<sup>2</sup> Open bearings operating in shear should be derated by 40%. Open bearings operating in tension should be derated by 70%.

Inch – FluoroNyliner Bushing Bearings

# FluoroNyliner Bushing Bearing Pillow Blocks



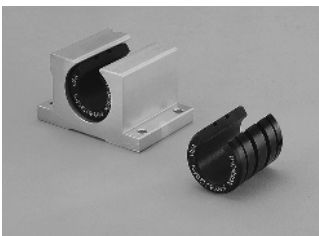
For the easiest installation, order Pillow Blocks with factory installed FluoroNyliner Bushing Bearings.

## Three Pillow Block Configurations



### Closed Bearing Pillow Blocks

- For end supported applications
- Choose twin pillow blocks for twice the load capacity
- Order with seals for heavily contaminated environments
- Available as single or twin pillow blocks



### Open Bearing Pillow Blocks

- For continuously supported applications
- Choose compensated I.D. bearings for non-parallel shafting
- Order with seals for heavily contaminated environments
- Available as single or twin pillow blocks

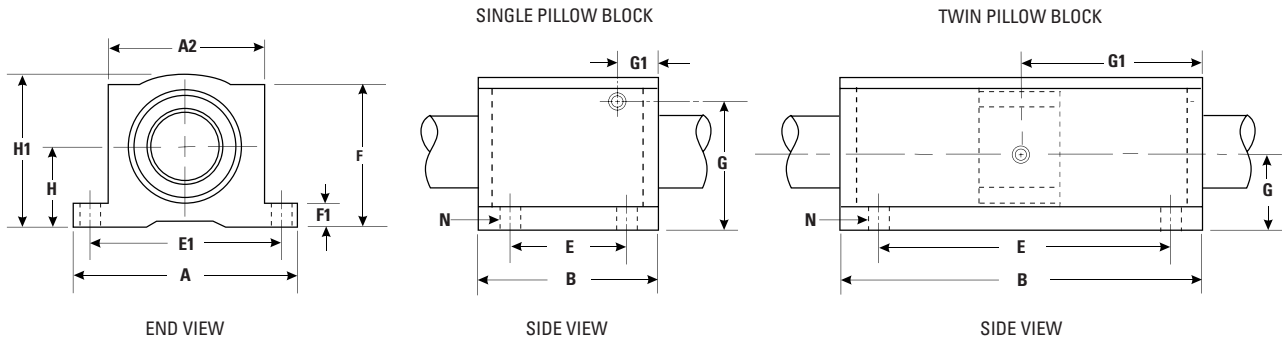


### Flanged Pillow Blocks with Closed Bearings

- For low profile applications such as packaging equipment
- Choose precision I.D. bearings for precision fit-up
- Available with self-aligning or compensated I.D. bearings
- Available as single or twin pillow blocks

## Inch – FluoroNyliner Bushing Bearings

### Closed Pillow Blocks with Self-Aligning Bearings



### Closed Single Pillow Blocks with Self-Aligning Bearings

| Precision I.D.   |                   | Compensated I.D. <sup>1</sup> |      | Single Pillow Block Dimensions (in.) |      |      |         |          |      |     |      |      |     |      |      |       | Pillow Block Mass (lb) | Max. Static Load (lb <sub>f</sub> ) |
|------------------|-------------------|-------------------------------|------|--------------------------------------|------|------|---------|----------|------|-----|------|------|-----|------|------|-------|------------------------|-------------------------------------|
| Part Number      | Part Number       | H ±.003                       | H1   | A                                    | A2   | B    | E ±.010 | E1 ±.010 | F    | F1  | G    | G1   | N   |      |      |       |                        |                                     |
|                  |                   |                               |      |                                      |      |      |         |          |      |     |      |      |     | Hole | Bolt |       |                        |                                     |
| FNYBU-PB-04-A-LS | FNYBU-PB-04-AL-LS | .437                          | .81  | 1.63                                 | 1.00 | 1.19 | .750    | 1.313    | .75  | .19 | .44  | .22  | .16 | #6   | .10  | 300   |                        |                                     |
| FNYBU-PB-06-A-LS | FNYBU-PB-06-AL-LS | .500                          | .94  | 1.75                                 | 1.13 | 1.31 | .875    | 1.438    | .88  | .19 | .50  | .22  | .16 | #6   | .13  | 500   |                        |                                     |
| FNYBU-PB-08-A-LS | FNYBU-PB-08-AL-LS | .687                          | 1.25 | 2.00                                 | 1.38 | 1.69 | 1.000   | 1.688    | 1.13 | .25 | .59  | .84  | .16 | #6   | .40  | 970   |                        |                                     |
| FNYBU-PB-10-A-LS | FNYBU-PB-10-AL-LS | .875                          | 1.63 | 2.50                                 | 1.75 | 1.94 | 1.125   | 2.125    | 1.44 | .28 | .85  | .68  | .19 | #8   | 1.00 | 1450  |                        |                                     |
| FNYBU-PB-12-A-LS | FNYBU-PB-12-AL-LS | .937                          | 1.75 | 2.75                                 | 1.88 | 2.06 | 1.250   | 2.375    | 1.56 | .31 | .94  | .72  | .19 | #8   | 1.20 | 1900  |                        |                                     |
| FNYBU-PB-16-A-LS | FNYBU-PB-16-AL-LS | 1.187                         | 2.19 | 3.25                                 | 2.38 | 2.81 | 1.750   | 2.875    | 1.94 | .38 | 1.19 | .86  | .22 | #10  | 2.40 | 3500  |                        |                                     |
| FNYBU-PB-20-A-LS | FNYBU-PB-20-AL-LS | 1.500                         | 2.81 | 4.00                                 | 3.00 | 3.63 | 2.000   | 3.500    | 2.50 | .44 | 1.50 | 1.20 | .22 | #10  | 5.00 | 5100  |                        |                                     |
| FNYBU-PB-24-A-LS | FNYBU-PB-24-AL-LS | 1.750                         | 3.25 | 4.75                                 | 3.50 | 4.00 | 2.500   | 4.125    | 2.88 | .50 | 1.75 | 1.25 | .28 | 1/4  | 7.80 | 7000  |                        |                                     |
| FNYBU-PB-32-A-LS | FNYBU-PB-32-AL-LS | 2.125                         | 4.06 | 6.00                                 | 4.50 | 5.00 | 3.250   | 3.250    | 3.63 | .63 | 2.12 | 1.58 | .41 | 1/4  | 7.80 | 12500 |                        |                                     |

### Closed Twin Pillow Blocks with Self-Aligning Bearings

| Precision I.D.    |                    | Compensated I.D. <sup>1</sup> |      | Twin Pillow Block Dimensions (in.) |      |      |         |          |      |     |      |      |     |      |      |       | Pillow Block Mass (lb) | Max. Static Load (lb <sub>f</sub> ) |
|-------------------|--------------------|-------------------------------|------|------------------------------------|------|------|---------|----------|------|-----|------|------|-----|------|------|-------|------------------------|-------------------------------------|
| Part Number       | Part Number        | H ±.003                       | H1   | A                                  | A2   | B    | E ±.010 | E1 ±.010 | F    | F1  | G    | G1   | N   |      |      |       |                        |                                     |
|                   |                    |                               |      |                                    |      |      |         |          |      |     |      |      |     | Hole | Bolt |       |                        |                                     |
| FNYBU-TWN-04-A-LS | FNYBU-TWN-04-AL-LS | .437                          | .81  | 1.63                               | 1.00 | 2.50 | 2.000   | 1.313    | .75  | .19 | .44  | 1.25 | .16 | #6   | .19  | 600   |                        |                                     |
| FNYBU-TWN-06-A-LS | FNYBU-TWN-06-AL-LS | .500                          | .94  | 1.75                               | 1.13 | 2.75 | 2.050   | 1.438    | .88  | .19 | .50  | 1.37 | .16 | #6   | .25  | 1000  |                        |                                     |
| FNYBU-TWN-08-A-LS | FNYBU-TWN-08-AL-LS | .687                          | 1.25 | 2.00                               | 1.38 | 3.50 | 2.000   | 1.688    | 1.13 | .25 | .59  | 1.75 | .16 | #6   | .40  | 1940  |                        |                                     |
| FNYBU-TWN-10-A-LS | FNYBU-TWN-10-AL-LS | .875                          | 1.63 | 2.50                               | 1.75 | 4.00 | 3.000   | 2.125    | 1.44 | .28 | .85  | 2.00 | .19 | #8   | 1.00 | 2900  |                        |                                     |
| FNYBU-TWN-12-A-LS | FNYBU-TWN-12-AL-LS | .937                          | 1.75 | 2.75                               | 1.88 | 4.50 | 3.500   | 2.375    | 1.56 | .31 | .94  | 2.25 | .19 | #8   | 1.20 | 3800  |                        |                                     |
| FNYBU-TWN-16-A-LS | FNYBU-TWN-16-AL-LS | 1.187                         | 2.19 | 3.25                               | 2.38 | 6.00 | 4.500   | 2.875    | 1.94 | .38 | 1.19 | 3.00 | .22 | #10  | 2.40 | 7000  |                        |                                     |
| FNYBU-TWN-20-A-LS | FNYBU-TWN-20-AL-LS | 1.500                         | 2.81 | 4.00                               | 3.00 | 7.50 | 5.500   | 3.500    | 2.50 | .44 | 1.50 | 3.75 | .22 | #10  | 5.00 | 10200 |                        |                                     |
| FNYBU-TWN-24-A-LS | FNYBU-TWN-24-AL-LS | 1.750                         | 3.25 | 4.75                               | 3.50 | 9.00 | 6.500   | 4.125    | 2.88 | .50 | 1.75 | 4.50 | .28 | 1/4  | 7.80 | 14000 |                        |                                     |

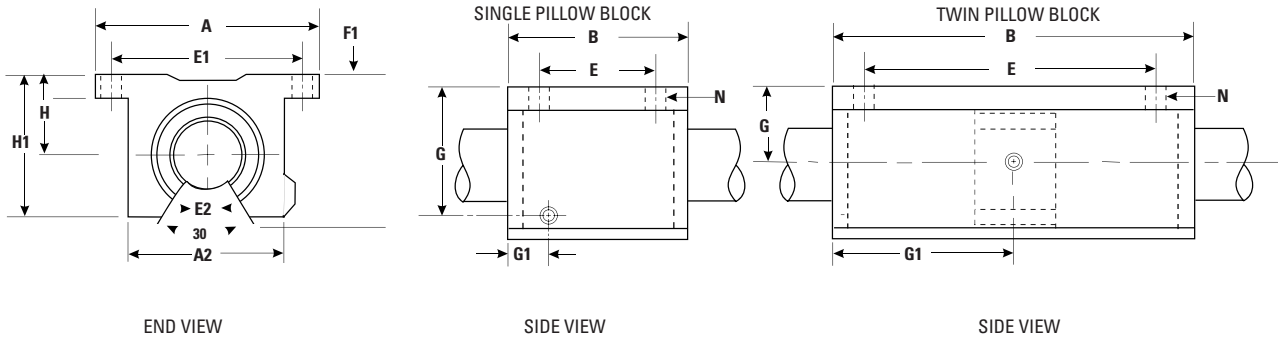
<sup>1</sup> Compensated I.D. bearings have additional running clearance, ideally suited for high speed and non-parallel shaft applications.

<sup>2</sup> All dimensions in inches unless otherwise noted.

Note: For Pillow Block Seals or non-self-aligning bearings see Part Number Matrix on page 110.

## Inch – FluoroNyliner Bushing Bearings

### Open Pillow Blocks with Self-Aligning Bearings



### Open Single Pillow Blocks with Self-Aligning Bearings

| Precision I.D.    | Compensated I.D. <sup>1</sup> | Single Pillow Block Dimensions (in.) |      |      |      |      |            |             |     |      |      |      |      |                           |  |
|-------------------|-------------------------------|--------------------------------------|------|------|------|------|------------|-------------|-----|------|------|------|------|---------------------------|--|
| Part Number       | Part Number                   | H<br>±.003                           | H1   | A    | A2   | B    | E<br>±.010 | E1<br>±.010 | F1  | G    | G1   | N    |      | Pillow Block<br>Mass (lb) | Max. Static<br>Load (lb <sub>f</sub> ) |
|                   |                               |                                      |      |      |      |      |            |             |     |      |      | Hole | Bolt |                           |  |
| FNYBU-PBO-08-A-LS | FNYBU-PBO-08-AL-LS            | .687                                 | 1.13 | 2.00 | 1.38 | 1.69 | 1.000      | 1.688       | .25 | .69  | .84  | .16  | #6   | .20                       | 970                                    |
| FNYBU-PBO-10-A-LS | FNYBU-PBO-10-AL-LS            | .875                                 | 1.44 | 2.50 | 1.75 | 1.94 | 1.125      | 2.125       | .28 | .70  | .68  | .19  | #8   | .50                       | 1450                                   |
| FNYBU-PBO-12-A-LS | FNYBU-PBO-12-AL-LS            | .937                                 | 1.56 | 2.75 | 1.88 | 2.06 | 1.250      | 2.375       | .31 | .94  | .72  | .19  | #8   | .60                       | 1900                                   |
| FNYBU-PBO-16-A-LS | FNYBU-PBO-16-AL-LS            | 1.187                                | 2.00 | 3.25 | 2.38 | 2.81 | 1.750      | 2.875       | .38 | 1.20 | .86  | .22  | #10  | 1.20                      | 3500                                   |
| FNYBU-PBO-20-A-LS | FNYBU-PBO-20-AL-LS            | 1.500                                | 2.56 | 4.00 | 3.00 | 3.63 | 2.000      | 3.500       | .44 | 1.50 | 1.20 | .22  | #10  | 2.50                      | 5100                                   |
| FNYBU-PBO-24-A-LS | FNYBU-PBO-24-AL-LS            | 1.750                                | 2.94 | 4.75 | 3.50 | 4.00 | 2.500      | 4.125       | .50 | 1.75 | 1.25 | .28  | 1/4  | 3.80                      | 7000                                   |
| FNYBU-PBO-32-A-LS | FNYBU-PBO-32-AL-LS            | 2.125                                | 3.63 | 6.00 | 4.50 | 5.00 | 3.250      | 5.250       | .63 | 2.12 | 1.58 | .41  | 3/8  | 7.00                      | 12500                                  |

### Open Twin Pillow Blocks with Self-Aligning Bearings

| Precision I.D.     | Compensated I.D. <sup>1</sup> | Twin Pillow Block Dimensions (in.) |      |      |      |      |            |             |     |      |      |      |      |                           |  |
|--------------------|-------------------------------|------------------------------------|------|------|------|------|------------|-------------|-----|------|------|------|------|---------------------------|--|
| Part Number        | Part Number                   | H<br>±.003                         | H1   | A    | A2   | B    | E<br>±.010 | E1<br>±.010 | F1  | G    | G1   | N    |      | Pillow Block<br>Mass (lb) | Max. Static<br>Load (lb <sub>f</sub> ) |
|                    |                               |                                    |      |      |      |      |            |             |     |      |      | Hole | Bolt |                           |  |
| FNYBU-TWNO-08-A-LS | FNYBU-TWNO-08-AL-LS           | .687                               | 1.13 | 2.00 | 1.38 | 3.50 | 2.000      | 1.688       | .25 | .59  | 1.75 | .16  | #6   | .40                       | 1940                                   |
| FNYBU-TWNO-10-A-LS | FNYBU-TWNO-10-AL-LS           | .875                               | 1.44 | 2.50 | 1.75 | 4.00 | 3.000      | 2.125       | .28 | .85  | 2.00 | .19  | #8   | 1.00                      | 2900                                   |
| FNYBU-TWNO-12-A-LS | FNYBU-TWNO-12-AL-LS           | .937                               | 1.56 | 2.75 | 1.88 | 4.50 | 3.500      | 2.375       | .31 | .94  | 2.25 | .19  | #8   | 1.20                      | 3800                                   |
| FNYBU-TWNO-16-A-LS | FNYBU-TWNO-16-AL-LS           | 1.187                              | 2.00 | 3.25 | 2.38 | 6.00 | 4.500      | 2.875       | .38 | 1.20 | 3.00 | .22  | #10  | 2.40                      | 7000                                   |
| FNYBU-TWNO-20-A-LS | FNYBU-TWNO-20-AL-LS           | 1.500                              | 2.56 | 4.00 | 3.00 | 7.50 | 5.500      | 3.500       | .44 | 1.50 | 3.75 | .22  | #10  | 5.00                      | 10200                                  |
| FNYBU-TWNO-24-A-LS | FNYBU-TWNO-24-AL-LS           | 1.750                              | 2.94 | 4.75 | 3.50 | 9.00 | 6.500      | 4.125       | .50 | 1.75 | 4.50 | .28  | 1/4  | 7.80                      | 14000                                  |

1 Compensated I.D. bearings have additional running clearance, ideally suited for high speed and non-parallel shaft applications.

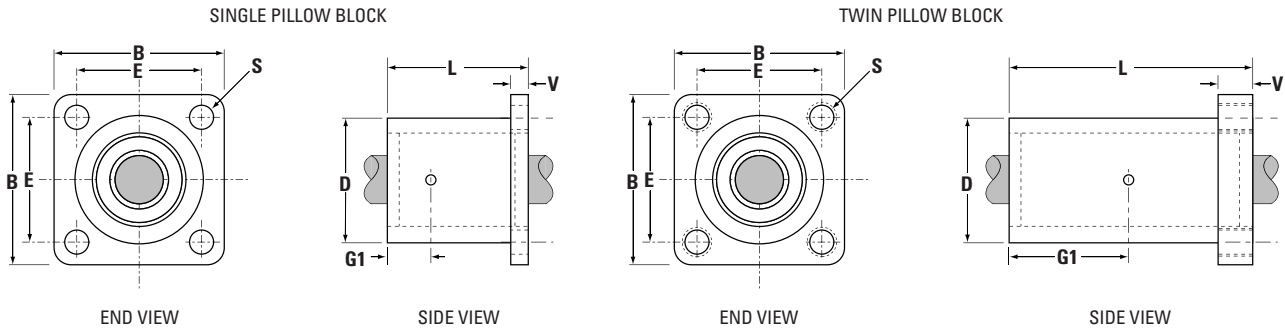
2 All dimensions in inches unless otherwise noted.

3 Open bearings operating in shear should be derated by 40%. Open bearings operating in tension should be derated by 70%.

Note: For Pillow Block Seals or non-self-aligning bearings see Part Number Matrix on page 110.

## Inch – FluoroNyliner Bushing Bearings

### Flanged Pillow Blocks with Self-Aligning Bearings



### Flanged Single Pillow Blocks with Self-Aligning Bearings

| Precision I.D.   | Compensated I.D. <sup>1</sup> | Single Pillow Block Dimensions (in.) |      |         |      |      |     |          |                       |                                   |        |
|------------------|-------------------------------|--------------------------------------|------|---------|------|------|-----|----------|-----------------------|-----------------------------------|--------|
| Part Number      | Part Number                   | Nominal Bearing Diameter             | B    | E ±.010 | L    | D    | V   | G1 ±.010 | S Shaft Hole Diameter | 60 Case LinearRace Shaft Diameter |        |
|                  |                               |                                      |      |         |      |      |     |          |                       | Min.                              | Mx.    |
| FNYBU-FB-08-A-LS | FNYBU-FB-08-AL-LS             | .500                                 | 1.63 | 1.250   | 1.69 | 1.25 | .25 | .72      | .19                   | .4990                             | .4995  |
| FNYBU-FB-12-A-LS | FNYBU-FB-12-AL-LS             | .750                                 | 2.38 | 1.750   | 2.06 | 1.75 | .38 | .89      | .22                   | .7490                             | .7495  |
| FNYBU-FB-16-A-LS | FNYBU-FB-16-AL-LS             | 1.00                                 | 2.75 | 2.125   | 2.81 | 2.25 | .50 | 1.27     | .28                   | .9990                             | .9995  |
| FNYBU-FB-20-A-LS | FNYBU-FB-20-AL-LS             | 1.25                                 | 3.50 | 2.750   | 3.63 | 3.00 | .63 | 1.67     | .35                   | 1.2490                            | 1.2495 |
| FNYBU-FB-24-A-LS | FNYBU-FB-24-AL-LS             | 1.50                                 | 4.00 | 3.125   | 4.00 | 3.62 | .75 | 1.86     | .41                   | 1.4989                            | 1.4994 |

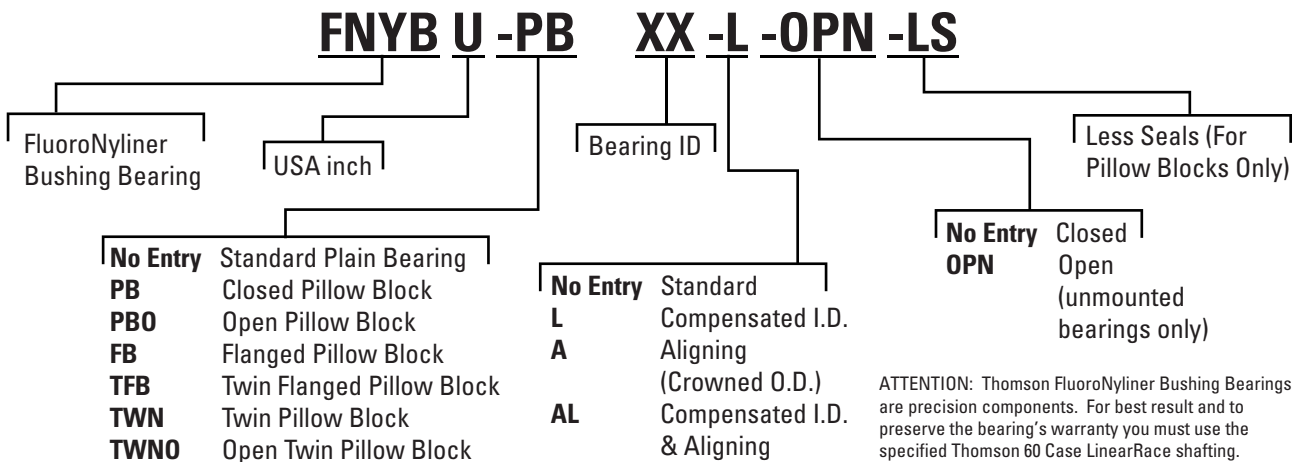
### Flanged Twin Pillow Blocks with Self-Aligning Bearings

| Precision I.D.    | Compensated I.D. <sup>1</sup> | Twin Pillow Block Dimensions (in.) |      |         |      |      |      |          |           |                                   |        |
|-------------------|-------------------------------|------------------------------------|------|---------|------|------|------|----------|-----------|-----------------------------------|--------|
| Part Number       | Part Number                   | Nominal Bearing Diameter           | B    | E ±.010 | L    | D    | V    | G1 ±.010 | S Thread  | 60 Case LinearRace Shaft Diameter |        |
|                   |                               |                                    |      |         |      |      |      |          |           | Min.                              | Mx.    |
| FNYBU-TFB-08-A-LS | FNYBU-FB-08-AL-LS             | .500                               | 1.63 | 1.250   | 3.20 | 1.25 | .90  | 1.48     | 1/4 - 20  | .4990                             | .4995  |
| FNYBU-TFB-12-A-LS | FNYBU-FB-10-AL-LS             | .750                               | 2.38 | 1.750   | 3.95 | 1.75 | .90  | 1.98     | 1/4 - 20  | .7490                             | .7495  |
| FNYBU-TFB-16-A-LS | FNYBU-FB-12-AL-LS             | 1.00                               | 2.75 | 2.125   | 5.33 | 2.25 | .90  | 2.67     | 1/4 - 18  | .9990                             | .9995  |
| FNYBU-TFB-20-A-LS | FNYBU-FB-16-AL-LS             | 1.25                               | 3.50 | 2.750   | 6.70 | 3.00 | .90  | 3.35     | 5/16 - 18 | 1.2490                            | 1.2495 |
| FNYBU-TFB-24-A-LS | FNYBU-FB-24-AL-LS             | 1.50                               | 4.00 | 3.125   | 7.50 | 3.62 | .100 | 3.75     | 5/16 - 16 | 1.4989                            | 1.4994 |

1 Compensated I.D. bearings have additional running clearance, ideally suited for high speed and non-parallel shaft applications.

2 All dimensions in inches unless otherwise noted.

Note: For Pillow Block Seals or non-self-aligning bearings see Part Number Matrix at bottom of this page.



ATTENTION: Thomson FluoroNyliner Bushing Bearings are precision components. For best result and to preserve the bearing's warranty you must use the specified Thomson 60 Case LinearRace shafting.



## Inch – FluoroNyliner Bushing Bearings

### Frictional Characteristics:

I) Static: Tests performed on dry FNYBU-16 bearings indicate that the force required to initiate motion is dependent upon the applied load according to the following equation:

$$F_f = 1.3 + 0.18 F_a$$

Where:

- $F_f$  = Friction force, static (lb<sub>f</sub>)
- $F_a$  = Applied force (lb<sub>f</sub>)

II) Dynamic: The coefficient of friction is dependent upon both the pressure and the velocity.

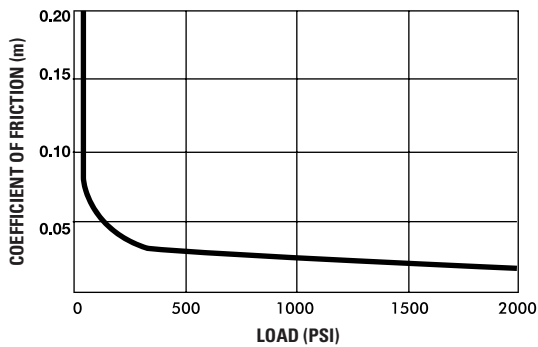
Pressure: Coefficient of friction decreases rapidly with increase in pressure.

Velocity: Coefficient of friction increases with an increase in velocity, and quickly stabilizes.

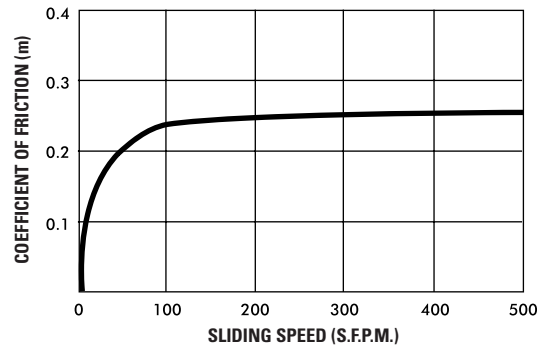
For example, at 100 psi, the coefficient of friction is approximately 0.25 for velocities of 100ft/min and higher.

| Characteristic           | Limit                                 |
|--------------------------|---------------------------------------|
| Linear Temperature Range | -400° F to 550° F (-240° C to 288° C) |
| Velocity, dry            | 140 ft/min. Continuous                |
| Velocity, dry            | 400 ft/min. Intermittent              |
| Velocity, Lubricated     | 400 ft/min. Continuous                |
| Pressure                 | 1500 psi                              |
| PV                       | 10,000 psi ft/min                     |

**COEFFICIENT OF FRICTION VS. LOAD**  
(AT LOW SPEEDS)



**COEFFICIENT OF FRICTION VS. SPEED**  
(AT 100 P.S.I.)



### Wear Rates and Life Expectancy:

I) Wear rates: The wear rates of a plain bearing are dependent upon a number of variables, including characteristics of the counter-face, velocity, lubrication, load and contamination. Tests conducted on FNYBU-16 bearings operating in the linear mode at approximately 70 ft/min, and at a pressure of approximately 33 psi, demonstrated an average radial wear change of 0.0011 inches, after 80 million inches of travel. This yields the following formula:

$$W_R = 14 \times (10^{-6}) \times T$$

Where:

- $W_R$  = Radial Wear (micro-inches)
- $T$  = Travel (inches)

II) Life expectancy: The life expectancy may be calculated from the wear rate. This is normally associated with the allowable radial clearance for a given application. The absolute wear limit is the bearing material thickness, which is 0.028 inches.

## Inch – FluoroNyliner Bushing Bearings

# FluoroNyliner Bushing Bearing Chemical Resistance Chart

| Chemical                             | Part Number | Rating **         |                                     |
|--------------------------------------|-------------|-------------------|-------------------------------------|
|                                      |             | Standard Aluminum | Optional Hardcoat Anodized Aluminum |
| 2-butanone                           | A           |                   |                                     |
| Acetic Acid, 20%                     | A           | C                 | C                                   |
| Acetone                              | A           | B                 | B                                   |
| Acetylene                            | A           |                   |                                     |
| Alkalines                            | E           |                   |                                     |
| Ammonia                              | E           |                   |                                     |
| Ammonia Anhydrous                    |             | B                 | B                                   |
| Ammonium Chloride, 10%               |             | D                 | D                                   |
| Ammonium Hydroxide, 10%              |             | D                 | D                                   |
| Amyl Chloride                        | A           |                   |                                     |
| Aniline                              | A           |                   |                                     |
| Barium Hydroxide                     |             | D                 | D                                   |
| Beer                                 | A           | B                 | B                                   |
| Benzaldehyde or Benzonitrile         | A           |                   |                                     |
| Benzenesulfonic Acid                 | A           | A                 | A                                   |
| Boric Acid Solutions                 | A           | B                 | B                                   |
| Bromine                              | A           |                   |                                     |
| Butane                               |             | C                 | C                                   |
| Calcium Chloride, 20%                | A           | C                 | C                                   |
| Calcium Hydroxide, 10%               | E           | C                 | C                                   |
| Calcium Hypochlorite                 | A           | C                 | C                                   |
| Camphor Oil or Carbon Sulfide        | A           |                   |                                     |
| Carbon Dioxide                       | A           |                   |                                     |
| Carbon Monoxide                      | A           | B                 | B                                   |
| Carbon Tetrachloride                 | A           | B                 | B                                   |
| Chloral Hydrate or Chloroacetic Acid | A           |                   |                                     |
| Chlorine gas, dry                    | A           | C                 | C                                   |
| Chlorine gas, wet                    | A           | D                 | D                                   |
| Chloroform or Chlorosulfonic Acid    | A           |                   |                                     |
| Chromic Acid, 10%                    | A           | C                 | B                                   |
| Citric Acid, 5%                      | A           | B                 | B                                   |
| Concentrated Oxidizing Acids         | A           |                   |                                     |
| Creosote or Cresol                   | A           |                   |                                     |
| Decalin or Dichlorobenzene           | A           |                   |                                     |
| Diethyl Ether or Dimethylamine       | A           |                   |                                     |
| Dimethyl Sulfoxide                   | A           |                   |                                     |
| Ethyl Acetate                        | A           |                   |                                     |
| Ethyl Alcohol                        | A           | B                 | B                                   |
| Ethylene Glycol                      | A           | B                 | B                                   |
| Ferric Chloride, 50%                 | A           | D                 | D                                   |
| Ferric Nitrate                       | A           |                   |                                     |
| Ferric Sulfate                       | A           |                   |                                     |
| Ferrous Sulfate                      | A           |                   |                                     |
| Fluoboric Acid                       | E           |                   |                                     |
| Fluorinating Agents, strong          | E           |                   |                                     |
| Fluorine > 140°F & dry gas > 250°F   | E           |                   |                                     |
| Fluosilicic Acid                     | E           |                   |                                     |
| Gasoline                             | A           | C                 | C                                   |
| Hydrobromic Acid                     | A           |                   |                                     |

| Chemical                             | Part Number | Rating **         |                                     |
|--------------------------------------|-------------|-------------------|-------------------------------------|
|                                      |             | Standard Aluminum | Optional Hardcoat Anodized Aluminum |
| Hydrochloric Acid, 20% or 35%        | A           | D                 | D                                   |
| Hydrocyanic Acid                     | A           | D                 | D                                   |
| Hydrocyanic Acid, 10%                |             | C                 | C                                   |
| Hydrofluoric Acid                    | E           | D                 | D                                   |
| Hydrofluosilicic Acid                | E           |                   |                                     |
| Hydrogen Fluoride, dry > 250°F       | E           |                   |                                     |
| Hydrogen Peroxide - dilute           | A           | B                 | B                                   |
| Hydrogen Sulfide, dry                | A           | C                 | B                                   |
| Hydrogen Sulfide, moist              | A           |                   |                                     |
| Hydroxides                           | E           |                   |                                     |
| Kerosene                             |             | C                 | C                                   |
| Lactic Acid, 10%                     | A           | C                 | C                                   |
| Magnesium Chloride, 50%              | A           | D                 | D                                   |
| Mercury or Silver Salts              | A           | D                 | D                                   |
| Methyl Alcohol                       |             | C                 | C                                   |
| Methylene Chloride                   | A           | B                 | B                                   |
| Methylethyl Ketone                   | A           | C                 | C                                   |
| Mineral Oil                          | A           | C                 | C                                   |
| Molten Alkali Metals                 | E           |                   |                                     |
| Molten Anhydrous Base                | E           |                   |                                     |
| Naptha                               | A           | C                 | C                                   |
| Nitric Acid, 70%                     | E           | D                 | D                                   |
| Nitro Benzene                        | A           |                   |                                     |
| Oleum                                | A           |                   |                                     |
| Phosphoric Acid, 10%                 | A           | D                 | D                                   |
| Potassium Chlorate                   | E           |                   |                                     |
| Potassium or Sodium Cyanide          | A           |                   |                                     |
| Potassium Dichromate or Nitrate      | A           |                   |                                     |
| Potassium Hydroxide                  | E           |                   |                                     |
| Sea Water                            | A           | C                 | B                                   |
| Sodium Chlorate                      | A           |                   |                                     |
| Sodium Chloride                      | A           |                   |                                     |
| Sodium Hydroxide, 20%                | C           | D                 | D                                   |
| Sodium Hypochlorite, 20%             | A           | C                 | C                                   |
| Sodium Peroxide, 10%                 |             | C                 | C                                   |
| Stannous Chloride                    | A           |                   |                                     |
| Sulfur Dioxide, dry                  | A           | C                 | C                                   |
| Sulfur Dioxide, 5% +H <sub>2</sub> O | A           | D                 | D                                   |
| Sulfuric Acid, 50%                   | A           | D                 | D                                   |
| Trichlorethylene                     | A           |                   |                                     |
| Toluene (122°F/50°C)                 | A           | B                 | B                                   |
| Trifluoroacetic Acid                 | A           |                   |                                     |
| Turpentine                           | A           | C                 | B                                   |
| Water, demineralized                 | A           | C                 | B                                   |
| Water, distilled                     | A           | D                 | C                                   |
| Water, sewage                        |             | D                 | C                                   |
| Xylene                               | A           | C                 | C                                   |
| Zinc Chloride solutions              | A           | D                 | D                                   |

**\*\* Rating Key**

A = No Attack    B = Minimal Material Loss    C = Moderate Material Loss    D = Significant Material Loss    E = Not Recommended  
Chemical effects are at room temperature unless otherwise noted.

All information contained herein is believed to be correct but is presented without any guaranty, warranty or representation of any kind, express or implied. Changes in temperature, concentration and/or combinations of chemicals may cause different results. Prior to use, it is recommended that the material be tested to determine its compatibility with a specific application. Contact Thomson applications engineers for more detailed information at +44 1525 243 243.

## Accessories



Described here are accessories for Linear Ball Bushing Bearings and pillow blocks including retaining rings, external seals, integral seals and resilient mounts.

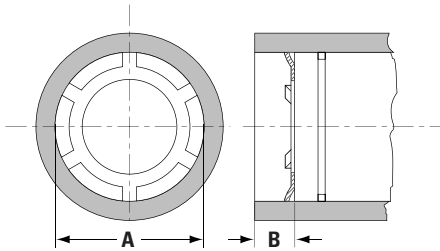
## Inch – Accessories

# Retaining Rings

### Internal Retaining Rings (Type PR)

Push-in retaining rings, as shown, are for use with Super Smart, Super and Precision Steel Ball Bushing closed type bearings. Each retaining ring is installed inside the housing bore at each end of the Ball Bushing bearing.

(Dimensions in inches)



| Part Number | Use with Ball Bushing bearing Part Number   | Nominal Housing Bore A | Minimum End Space required B |
|-------------|---|------------------------|------------------------------|
| PR-250      | SUPER-4 or 4812 <sup>(1)</sup>              | .500                   | .060                         |
| PR-375      | SUPER-6 or 61014 <sup>(1)</sup>             | .625                   | .060                         |
| PR-500      | SUPER-8 or 81420 <sup>(1)</sup>             | .875                   | .080                         |
| PR-625      | SSU-10 or SUPER-10 or 101824 <sup>(1)</sup> | 1.125                  | .080                         |
| PR-750      | SSU-12 or SUPER-12 or 122026 <sup>(1)</sup> | 1.250                  | .080                         |
| PR-1000     | SSU-16 or SUPER-16 or 162536 <sup>(1)</sup> | 1.563                  | .080                         |
| PR-1250     | SSU-20 or SUPER-20 or 203242 <sup>(1)</sup> | 2.000                  | .080                         |
| PR-1500     | SSU-24 or SUPER-24 or 243848 <sup>(1)</sup> | 2.375                  | .100                         |
| PR-2000     | SUPER-32 or 324864 <sup>(1)</sup>           | 3.000                  | .100                         |

<sup>(1)</sup>Applies to A and XA Type Precision Steel Ball Bushing Bearings

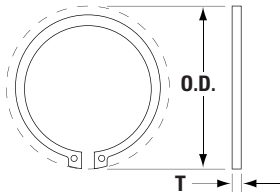
### External Retaining Rings (Types C and W)

**Type W:** External retaining rings fit into the retaining ring grooves on the outside diameter of Super Smart, Super and Precision Steel Ball Bushing Bearings to provide external mounting retention. Available in standard and stainless steel versions.

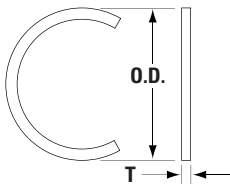
**Type C:** External retaining rings fit into the retaining ring grooves on the outside diameter of Super Smart, Super and Precision Steel Ball Bushing Bearings (Open and Closed Type) to provide external mounting retention. Available in standard and stainless steel versions.

(Dimensions in inches)

#### External Retaining Rings (Type W)



#### External Retaining Rings (Type C)



| Standard Steel Part Number | Stainless Steel Part Number | Use with Ball Bushing bearing Part Number   | T    | O.D.  |
|----------------------------|-----------------------------|---|------|-------|
| -                          | W-125-SS                    | INST-258-SS <sup>(1)</sup>                  | .025 | .520  |
| -                          | W-187-SS                    | INST-369-SS <sup>(1)</sup>                  | .025 | .560  |
| W-250                      | W-250-SS                    | SUPER-4 or 4812 <sup>(1)</sup>              | .035 | .720  |
| C-250                      | C-250-SS                    |   | .035 | .550  |
| W-375                      | W-375-SS                    | SUPER-6 or 61014 <sup>(1)</sup>             | .035 | .850  |
| C-375                      | C-375-SS                    |   | .035 | .673  |
| W-500                      | W-500-SS                    | SUPER-8 or 81420 <sup>(1)</sup>             | .042 | 1.150 |
| C-500                      | C-500-SS                    |   | .042 | .923  |
| W-625                      | W-625-SS                    | SSU-10 or SUPER-10 or 101824 <sup>(1)</sup> | .050 | 1.510 |
| C-625                      | C-625-SS                    |   | .050 | 1.180 |
| W-750                      | W-750-SS                    | SSU-12 or SUPER-12 or 122026 <sup>(1)</sup> | .050 | 1.620 |
| C-750                      | C-750-SS                    |   | .050 | 1.301 |
| W-1000                     | W-1000-SS                   | SSU-16 or SUPER-16 or 162536 <sup>(1)</sup> | .062 | 2.040 |
| C-1000                     | C-1000-SS                   |   | .062 | 1.620 |
| W-1250                     | -                           | SSU-20 or SUPER-20 or 203242 <sup>(1)</sup> | .062 | 2.500 |
| C-1250                     | -                           |   | .062 | 2.040 |
| W-1500                     | -                           | SSU-24 or SUPER-24 or 243848 <sup>(1)</sup> | .078 | 2.910 |
| C-1500                     | -                           |   | .078 | 2.429 |
| W-2000                     | -                           | SUPER-32 or 324864 <sup>(1)</sup>           | .093 | 3.600 |
| W-2500                     | -                           | 406080 <sup>(1)</sup>                       | .109 | 4.420 |
| W-3000                     | -                           | 487296 <sup>(1)</sup>                       | .109 | 5.310 |
| W-4000                     | -                           | 6496128 <sup>(1)</sup>                      | .125 | 7.100 |

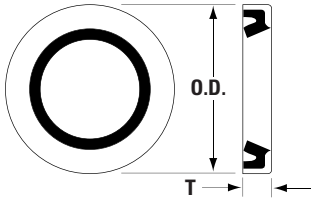
<sup>(1)</sup>Applies to A, XA and OPN Type Precision Steel Ball Bushing Bearings

## External Seals

### Seals for Fixed Diameter Housings

Double acting seals for Super Smart, Super and Precision Steel closed type Ball Bushing Bearings. Standard and stainless versions. Sizes 1 1/2 inch and above use spring fingers to reinforce sealing capability which could add to seal drag.

(Dimensions in inches)



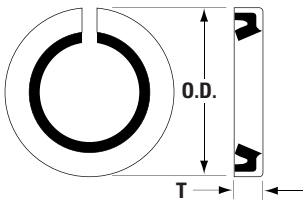
| Standard Steel Seal Part Number | Stainless Steel Seal Part Number | Use with Ball Bushing Bearing Part Number   | Nominal LinearRace Diameter | T    | O.D.  |
|---------------------------------|----------------------------------|---|-----------------------------|------|-------|
| S-250                           | S-250-SS                         | SUPER-4 or 4812 <sup>(1)</sup>              | .250                        | .125 | .504  |
| S-375                           | S-375-SS                         | SUPER-6 or 61014 <sup>(1)</sup>             | .375                        | .125 | .629  |
| S-500                           | S-500-SS                         | SUPER-8 or 81420 <sup>(1)</sup>             | .500                        | .125 | .879  |
| S-625                           | S-625-SS                         | SSU-10 or SUPER-10 or 101824 <sup>(1)</sup> | .625                        | .125 | 1.129 |
| S-750                           | S-750-SS                         | SSU-12 or SUPER-12 or 122026 <sup>(1)</sup> | .750                        | .125 | 1.254 |
| S-1000                          | S-1000-SS                        | SSU-16 or SUPER-16 or 162536 <sup>(1)</sup> | 1.000                       | .187 | 1.567 |
| S-1250                          | -                                | SSU-20 or SUPER-20 or 203242 <sup>(1)</sup> | 1.250                       | .375 | 2.004 |
| S-1500                          | -                                | SSU-24 or SUPER-24 or 243848 <sup>(1)</sup> | 1.500                       | .375 | 2.379 |
| S-2000                          | -                                | SUPER-32 or 324864 <sup>(1)</sup>           | 2.000                       | .375 | 3.004 |
| S-2500                          | -                                | 406080 <sup>(1)</sup>                       | 2.500                       | .375 | 3.756 |
| S-3000                          | -                                | 487296 <sup>(1)</sup>                       | 3.000                       | .500 | 4.506 |
| S-4000                          | -                                | 6496128 <sup>(1)</sup>                      | 4.000                       | .500 | 6.006 |

<sup>(1)</sup>Applies to Aand XA Precision Steel Ball Bushing Bearings

### Seals for Adjustable Housing

Double acting seals for Super Smart, Super and Precision Steel Ball Bushing Bearings. Seals have a radial slot through the circumferences to facilitate diameter adjustment. Standard and stainless steel versions.

(Dimensions in inches)



<sup>(2)</sup>Applies to ADJ Type Precision Steel Ball Bushing Bearings

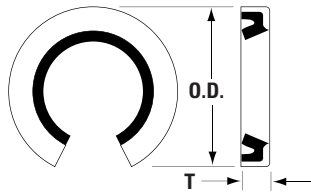
| Standard Steel Seal Part Number | Stainless Steel Seal Part Number | Use with Adjustable Type Ball Bushing Bearing Part Number | Nominal LinearRace Diameter | T    | O.D.  |
|---------------------------------|----------------------------------|---|-----------------------------|------|-------|
| ADJ-S-500                       | ADJ-S-500-SS                     | SUPER-8 or 81420 <sup>(2)</sup>                           | .500                        | .125 | .879  |
| ADJ-S-625                       | ADJ-S-625-SS                     | SSU-10 or SUPER-10 or 101824 <sup>(2)</sup>               | .625                        | .125 | 1.129 |
| ADJ-S-750                       | ADJ-S-750-SS                     | SSU-12 or SUPER-12 or 122026 <sup>(2)</sup>               | .750                        | .125 | 1.254 |
| ADJ-S-1000                      | ADJ-S-1000-SS                    | SSU-16 or SUPER-16 or 162536 <sup>(2)</sup>               | 1.000                       | .187 | 1.567 |
| ADJ-S-1250                      | -                                | SSU-20 or SUPER-20 or 203242 <sup>(2)</sup>               | 1.250                       | .375 | 2.004 |
| ADJ-S-1500                      | -                                | SSU-24 or SUPER-24 or 243848 <sup>(2)</sup>               | 1.500                       | .375 | 2.379 |
| ADJ-S-2000                      | -                                | SUPER-32 or 324864 <sup>(2)</sup>                         | 2.00                        | .375 | 3.004 |
| ADJ-S-2500                      | -                                | 406080 <sup>(2)</sup>                                     | 2.500                       | .375 | 3.756 |
| ADJ-S-3000                      | -                                | 487296 <sup>(2)</sup>                                     | 3.000                       | .500 | 4.506 |
| ADJ-S-4000                      | -                                | 6496128 <sup>(2)</sup>                                    | 4.000                       | .500 | 6.006 |

<sup>(2)</sup>Applies to ADJ type Precision Steel Ball Bushing Bearings

### Seals for Open Type Housing

Double acting seals for Super Smart, Super and Precision Steel Ball Bushing Open Type bearings. Standard and stainless steel versions.

(Dimensions in inches)



<sup>(3)</sup>Applies to OPN Type Precision Steel Ball Bushing Bearings

| Standard Steel Seal Part Number | Stainless Steel Seal Part number | Use with Adjustable Type Ball Bushing Bearing Part Number | Nominal LinearRace Diameter | T    | O.D.  |
|---------------------------------|----------------------------------|---|-----------------------------|------|-------|
| OPN-S-500                       | OPN-S-500-SS                     | SUPER-8 or 81420 <sup>(3)</sup>                           | .500                        | .125 | .879  |
| OPN-S-625                       | OPN-S-625-SS                     | SSU-10 or SUPER-10 or 101824 <sup>(3)</sup>               | .625                        | .125 | 1.129 |
| OPN-S-750                       | OPN-S-750-SS                     | SSU-12 or SUPER-12 or 122026 <sup>(3)</sup>               | .750                        | .125 | 1.254 |
| OPN-S-1000                      | OPN-S-1000-SS                    | SSU-16 or SUPER-16 or 162536 <sup>(3)</sup>               | 1.000                       | .187 | 1.567 |
| OPN-S-1250                      | -                                | SSU-20 or SUPER-20 or 203242 <sup>(3)</sup>               | 1.250                       | .375 | 2.004 |
| OPN-S-1500                      | -                                | SSU-24 or SUPER-24 or 243848 <sup>(3)</sup>               | 1.500                       | .375 | 2.379 |
| OPN-S-2000                      | -                                | SUPER-32 or 324864 <sup>(3)</sup>                         | 2.000                       | .375 | 3.004 |
| OPN-S-2500                      | -                                | 406080 <sup>(3)</sup>                                     | 2.500                       | .375 | 3.756 |
| OPN-S-3000                      | -                                | 487296 <sup>(3)</sup>                                     | 3.000                       | .500 | 4.506 |
| OPN-S-4000                      | -                                | 6496128 <sup>(3)</sup>                                    | 4.000                       | .500 | 6.006 |

<sup>(3)</sup>Applies to OPN type Precision Steel Ball Bushing Bearings

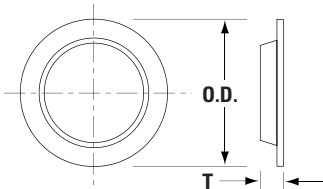
## Inch – Accessories

# Integral Seals

### Seals for Sealed Super Ball Bushing Bearings (Closed Type)

Double acting replacement seals for the Sealed Super Ball Bushing\* bearing.

(Dimensions in inches)

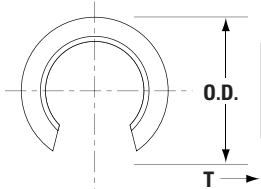


| Part number | Use with Super Ball Bushing Bearing Number | Nominal LinearRace Diameter | T    | O.D.  |
|-------------|--|-----------------------------|------|-------|
| S-500-DD    | SUPER-8-DD                                 | .500                        | .120 | .770  |
| S-625-DD    | SUPER-10-DD                                | .625                        | .120 | 1.010 |
| S-750-DD    | SUPER-12-DD                                | .750                        | .120 | 1.110 |
| S-1000-DD   | SUPER-16-DD                                | 1.000                       | .180 | 1.390 |

### Seals for Sealed Super Ball Bushing Bearings (Open Type)

Double acting replacement seals for the Sealed Super Ball Bushing bearing.

(Dimensions in inches)

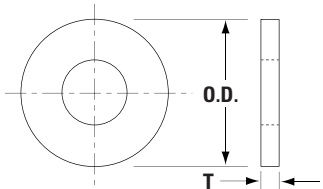


| Part Number   | Use with Super Ball Bushing Bearing Number | Nominal LinearRace Diameter | T    | O.D.  |
|---------------|--|-----------------------------|------|-------|
| S-500-OPN-DD  | SUPER-8-DD-OPN                             | .500                        | .120 | .770  |
| S-625-OPN-DD  | SUPER-10-DD-OPN                            | .625                        | .120 | 1.010 |
| S-750-OPN-DD  | SUPER-12-DD-OPN                            | .750                        | .120 | 1.110 |
| S-1000-OPN-DD | SUPER-16-DD-OPN                            | 1.000                       | .180 | 1.390 |

### Felt Seals for Closed Type Ball Bushing Bearings

Felt seals for Super Smart, Super and Precision Steel closed type Ball Bushing Bearings. Felt seals reduce drag for applications where reduced friction is critical. Felt seals provide minimal protection from the ingress of contamination. Use PR type external retaining rings for retention.

(Dimensions in inches)



<sup>(1)</sup>Applies to A, XA and ADJ Type Precision Steel Ball Bushing Bearings

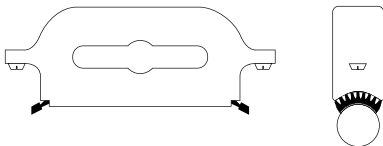
| Standard Felt Seal Part Number | Use with Ball Bushing Bearing Part Number   | Nominal LinearRace Diameter | T    | O.D.  |
|--------------------------------|---|-----------------------------|------|-------|
| FS-250                         | SUPER-4 or 4812 <sup>(1)</sup>              | .250                        | .125 | .500  |
| FS-375                         | SUPER-6 or 61014 <sup>(1)</sup>             | .375                        | .125 | .625  |
| FS-500                         | SUPER-8 or 81420 <sup>(1)</sup>             | .500                        | .125 | .875  |
| FS-625                         | SSU-10 or SUPER-10 or 101824 <sup>(1)</sup> | .625                        | .125 | 1.125 |
| FS-750                         | SSU-12 or SUPER-12 or 122026 <sup>(1)</sup> | .750                        | .125 | 1.250 |
| FS-1000                        | SSU-16 or SUPER-16 or 162536 <sup>(1)</sup> | 1.000                       | .125 | 1.563 |
| FS-1250                        | SSU-20 or SUPER-20 or 203242 <sup>(1)</sup> | 1.250                       | .188 | 2.000 |
| FS-1500                        | SSU-24 or SUPER-24 or 243848 <sup>(1)</sup> | 1.500                       | .188 | 2.375 |
| FS-2000                        | SUPER-32 or 324864 <sup>(1)</sup>           | 2.000                       | .188 | 3.000 |

<sup>(1)</sup>Applies to A, XA and ADJ type Precision Steel Ball Bushing Bearings

### Seals for Roundway Linear Roller Bearings

Standard seals for both single and dual types.

(Dimensions in inches)

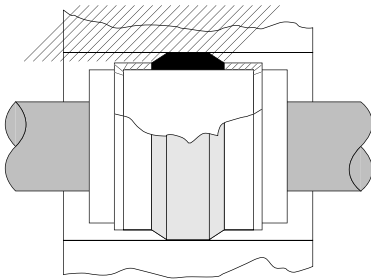


| Seal Number | Nominal LinearRace Diameter | Overall Length L | Overall Width W | Overall Height from Centerline of LinearRace H |
|-------------|-----------------------------|------------------|-----------------|--|
| RS-16       | 1.000                       | 5.00             | 1.00            | 2.25   |
| RS-24       | 1.500                       | 6.50             | 1.38            | 3.25   |
| RS-32       | 2.000                       | 8.50             | 1.88            | 4.25   |
| RS-48       | 3.000                       | 13.00            | 2.63            | 6.50   |
| RS-64       | 4.000                       | 17.00            | 3.38            | 8.50   |

# Resilient Mounts

## Resilient Ball Bushing Bearing Mounts for Ease of Installation

Used with Precision Steel Ball Bushing Bearings Type A and XA. Resilient Ball Bushing bearing mounts are sometimes used when absolute rigidity is not essential and where a slightly larger housing bore can be accommodated. The self-aligning feature of these mounts guarantee uniform load distribution over the entire length of the load carrying balls and compensates for slight errors in housing bores and parallel 60 Case LinearRace alignment. The mount consists of a band of resilient material that can be easily mounted to the outside diameter of the Ball Bushing bearing. After it is installed in the housing bore it provides permanent resilient, self-aligning support for the bearing. Resilient mounts consist of one rubber ring, 2 spacers and 2 retaining rings. Ball Bushing Bearings must be purchased separately.



(Dimensions in inches)

| Resilient Mount Assembly Part Number | Use with Ball Bushing Bearing Number | Nominal LinearRace Diameter | Recommended Housing Bore ±.005 |
|--------------------------------------|--------------------------------------|-----------------------------|--------------------------------|
| RSL-250                              | A or XA-4812                         | .250                        | .625                           |
| RSL-375                              | A or XA-61014                        | .375                        | .750                           |
| RSL-500                              | A or XA-81420                        | .500                        | 1.000                          |
| RSL-625                              | A or XA-101824                       | .625                        | 1.313                          |
| RSL-750                              | A or XA-122026                       | .750                        | 1.438                          |
| RSL-1000                             | A or XA-162536                       | 1.000                       | 1.813                          |
| RSL-1250                             | A or XA-203242                       | 1.250                       | 2.313                          |
| RSL-1500                             | A or XA-243848                       | 1.500                       | 2.750                          |

## Metric - General Product Overview

# Thomson Linear Motion Metric Components

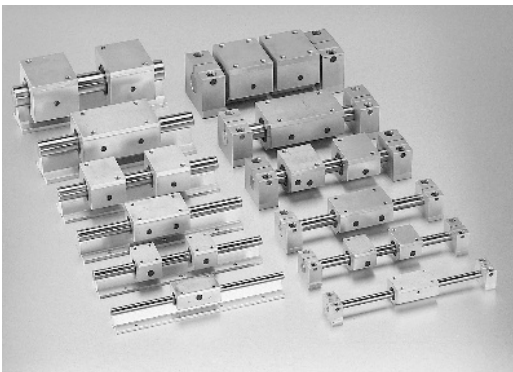
**The RoundRail Advantage** - The inherent ability of a RoundRail Ball Bushing bearing system to absorb torsional misalignment caused by inaccuracies in carriage or base machining or machine deflection...with little increase in stress to bearing components.



### Super Smart Ball Bushing Bearings

**Thomson Super Smart Ball Bushing Bearings represent a major advancement for Linear bearing technology, worldwide.**

This patented self-aligning linear bearing provides two times the load carrying capacity of the industry standard Thomson Super Ball Bushing bearing. Super Smart Ball Bushing Bearings also provide eight times the bearing life and up to five times the LinearRace shaft life when used in place of standard Super type bearings. (See page 120)



### Super Smart Ball Bushing Pillow Blocks

**Thomson Super Smart Ball Bushing Pillow Blocks available in closed, adjustable and open styles in both single and twin versions.**

To minimize installation time and cost, the Super Smart Ball bushing bearing can be ordered factory-installed in an industry standard single or twin pillow block. The closed type pillow block is used in end supported applications for spanning or bridging a gap. The open style is used in continuously supported applications when maximum rigidity and stiffness is required. Each Super Smart Pillow Block is complete with integral double acting seals which keep out contaminants, retain lubrication and maximize bearing life. Since each pillow block is dimensionally interchangeable with industry standard pillow blocks, system performance improvements can be realized immediately. All pillow blocks are available and in stock from 1800 authorized distributors worldwide. (See page 126)

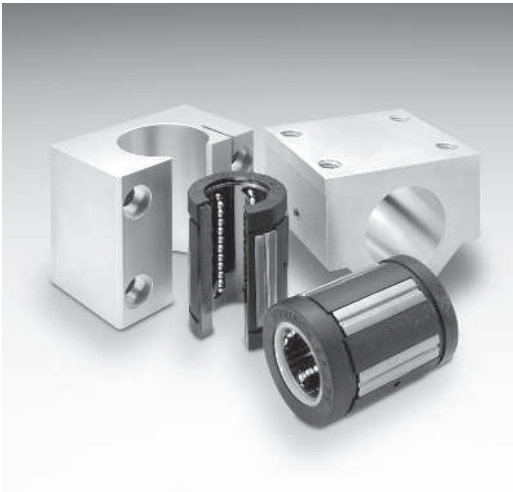


### MultiTrac Ball Bushing Bearings

**Rigid, high load capacity, linear bearings**

Extremely rigid MultiTrac Ball Bushing Bearing gives you less deflection and twice the load capacity or eight times the travel life of conventional Ball Bushing bearings. This increased bearing performance significantly reduces downtime and maintenance, while increasing machine reliability. The improvement in bearing capacity permits designers to optimize system compactness and minimizes hardware costs. The bearing's patented ball control technology eliminates binding and chatter (stick-slip) common to high friction, plain bushings. Available and stocked in 7 standard sizes from over 1800 distributor locations worldwide. (See page 134)





## NEW: Super Ball Bushing Bearings and Pillow Blocks

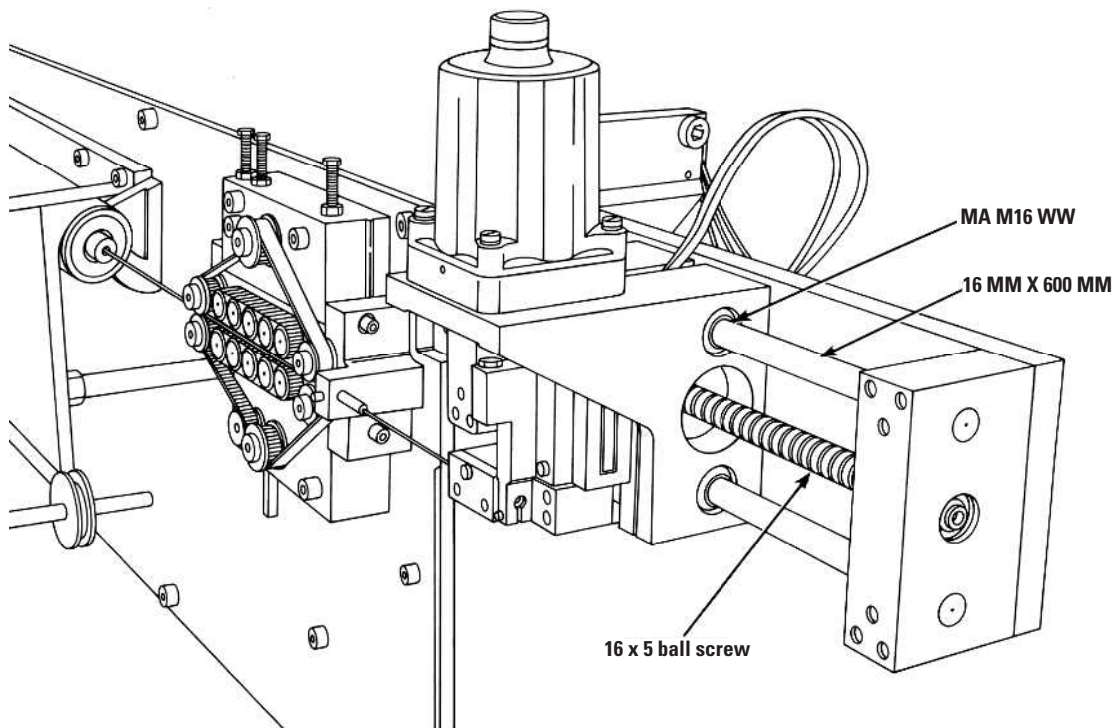
### High performance from superior design:

A coefficient of friction as low as 0,001. This allows the use of smaller less expensive motors, belts, gears and ball screws, when replacing high friction, plain bearings. A self-aligning capability up to 0,5° compensates for inaccuracies in base flatness or carriage machining. Achieved with Thomson Super Bearing plates which have defined radius crowns for maximized self-alignment accuracy. Accelerations as high as 150m/s<sup>2</sup> and steady state travel speeds up to 3 m/s without the derating factors commonly required with linear guides. Quick to ship, drop-in replacement parts for existing applications. Twin version with two Super Ball Bushing bearings providing twice the load capacity or 8 times more travel life than the single version. (See page 141)

## Application

Thomson products are engineered to world-class performance standards, so that you can specify them with confidence worldwide. This Engineering Support section provides charts, formulas and technical information for:

- Ball Bushing bearing selection
- Load considerations for horizontal, side and vertical mounted applications
- Shaft deflection
- Installation
- Tolerance zones for internal and external diameters



## Metric – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Bearings



### Thomson Super Smart Ball Bushing Bearing products offer:

- Up to six times the load capacity or 216 times the travel life of conventional linear bearings.
- Twice the load capacity or eight times the travel life of industry standard Thomson Super Ball Bushing Bearings.
- Universal self-alignment feature, that compensates for misalignment of housing bores and 60 Case LinearRace shaft deflection, optimizes load distribution between ball tracks and assures uniform ball loading over the entire length of the bearing plate. Installation time and cost is minimized while bearing performance and life is maximized.
- Technologically advanced design that allows the bearing to maintain its diametral fit-up when installed in a housing that is slightly out-of-round.
- Up to 400% longer LinearRace shaft life and minimal machine downtime when replacing conventional linear bearings or the standard Super Ball Bushing Bearing.
- RoundRail Advantage combined with universal self-alignment eliminating the need for derating factors commonly required when using linear guides.
- Coefficient of friction as low as 0,001. This allows the use of smaller less expensive motors, belts, gears and ball screws, when replacing high friction, plain bearings.
- Closed and open configurations.
- Double lip integral wipers that keep out dirt while retaining lubrication. Travel life is maximized.
- Worldwide availability from over 1800 authorized distributors.

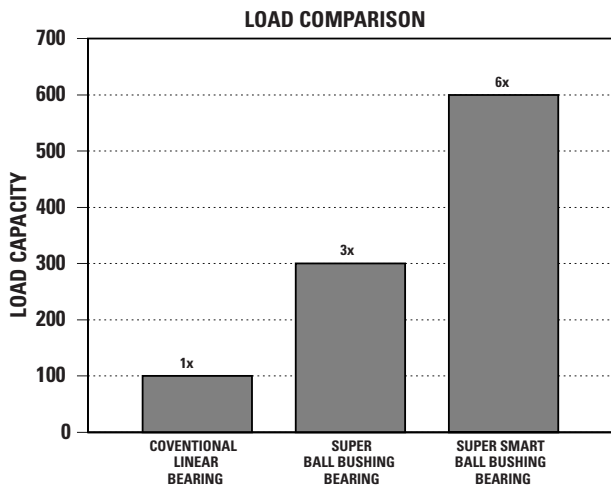
**Metric – Super Smart Ball Bushing Bearings**

Metric Ball Bushing Bearing

# The Super Smart Advantage

## Advantage: Load Capacity

The Super Smart Ball Bushing Bearing provides twice the load capacity of the industry standard Thomson Super Ball Bushing Bearing and six times the load capacity of conventional linear bearings.

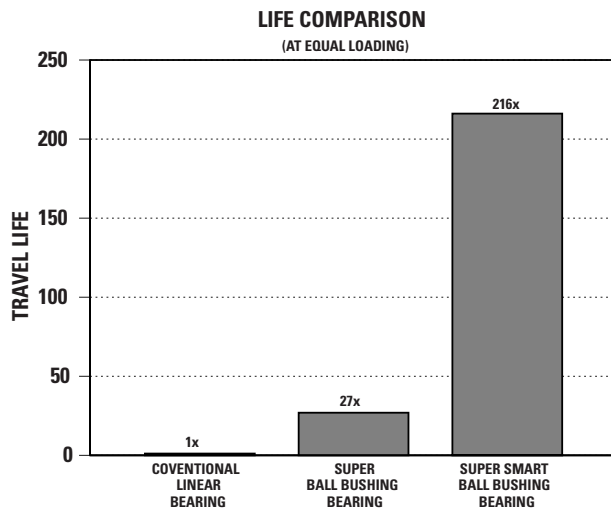


## Downsizing

The photograph above shows a conventional Ball Bushing bearing, Super Ball Bushing Bearing and Super Smart Ball Bushing Bearing, all of which have the same load capacity.

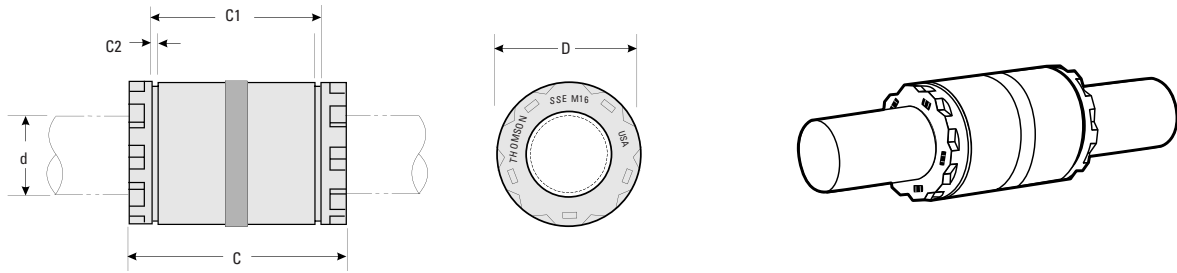
## Advantage: Travel Life

The Super Smart Ball Bushing Bearing provides eight times the travel life of the industry standard Thomson Super Ball Bushing Bearing and 216 times the travel life of conventional linear bearings.



## Metric – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Bearings (Closed Type)



### Super Smart Ball Bushing Bearings (Closed Type) (Dimensions in mm)

| Part Number                |                            |                             | d <sup>(4)</sup> | D  | C<br>h14 | C1<br>H13 | C2<br>min. | Number of<br>Ball Tracks | Mass (kg) | Dynamic<br>Load W <sup>(1)(3)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(3)</sup><br>(N) |
|----------------------------|----------------------------|-----------------------------|------------------|----|----------|-----------|------------|--------------------------|-----------|--|---|
| Without<br>Integral Wipers | With one<br>Integral Wiper | With two<br>Integral Wipers |                  |    |          |           |            |                          |           |  |   |
| SSE M16                    | SSE M16 W                  | SSE M16 WW                  | 16               | 26 | 36       | 24,6      | 1,30       | 10                       | 0,030     | 2200                                       | 2400  |
| SSE M20                    | SSE M20 W                  | SSE M20 WW                  | 20               | 32 | 45       | 31,2      | 1,60       | 10                       | 0,066     | 4000                                       | 4400  |
| SSE M25                    | SSE M25 W                  | SSE M25 WW                  | 25               | 40 | 58       | 43,7      | 1,85       | 10                       | 0,135     | 6700                                       | 7300  |
| SSE M30                    | SSE M30 W                  | SSE M30 WW                  | 30               | 47 | 68       | 51,7      | 1,85       | 10                       | 0,206     | 8300                                       | 9100  |
| SSE M40                    | SSE M40 W                  | SSE M40 WW                  | 40               | 62 | 80       | 60,3      | 2,15       | 10                       | 0,392     | 13700                                      | 15000   |

(1) For rated travel life of 100 km. For longer travel lives, reduce load to  $\sqrt[3]{(100/L)^{0.33}}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.

(2) The Load Limit is the maximum load that may be applied to a bearing/shaft. It is important to analyze the application so that peak and/or shock do not exceed the Load Limit.

(3) The load capacities W and W<sub>q</sub> are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor K<sub>q</sub> should be applied to W and W<sub>q</sub> respectively. Open type bearings have reduced load capacities when used in pull-off situations.

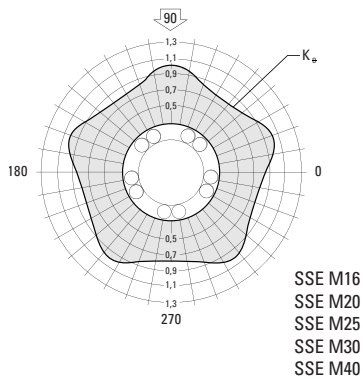
(4) Internal bearing diameter is affected by the housing bore, see Table 1.

(5) Hole for anti-rotation pin is below centerline.

NOTE: External seals and retaining rings are available. See page 151 for specifications.

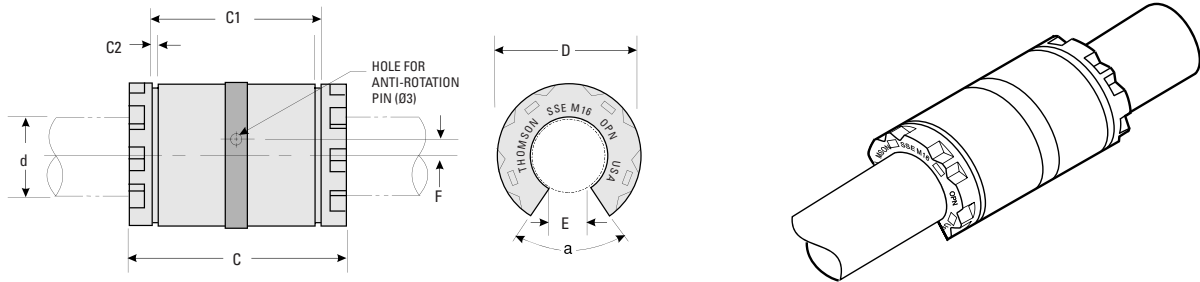
NOTE: For additional technical information, see the Engineering section beginning on page 245.

NOTE: For a corrosion resistant bearing add suffix-cr to the part number and reduce the load capacity by 30%.



Metric – Super Smart Ball Bushing Bearings

# Super Smart Ball Bushing Bearings (Open Type)



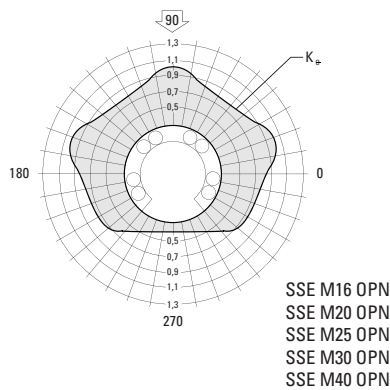
Super Smart Ball Bushing Bearings (Open Type) (Dimensions in mm)

| Part Number                |                            |                             | d <sup>(4)</sup> | D  | C<br>h14 | C1<br>H13 | C2<br>min. | E    | F                   | Angle<br>α<br>(deg) | Number<br>of Ball<br>Tracks | Mass<br>(kg) | Dynamic<br>Load W <sup>(1)(3)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(3)</sup><br>(N) |
|----------------------------|----------------------------|-----------------------------|------------------|----|----------|-----------|------------|------|---------------------|---------------------|-----------------------------|--------------|--|---|
| Without<br>Integral Wipers | With one Integral<br>Wiper | With two Integral<br>Wipers |                  |    |          |           |            |      |                     |                     |                             |              |  |   |
| SSE M16 OPN                | SSE M16 OPN W              | SSE M16 OPN WW              | 16               | 26 | 36       | 24,6      | 1,30       | 9,0  | 0                   | 70                  | 8                           | 0,023        | 2200                                       | 2400  |
| SSE M20 OPN                | SSE M20 OPN W              | SSE M20 OPN WW              | 20               | 32 | 45       | 31,2      | 1,60       | 10,0 | 0                   | 50                  | 8                           | 0,054        | 4000                                       | 4400  |
| SSE M25 OPN                | SSE M25 OPN W              | SSE M25 OPN WW              | 25               | 40 | 58       | 43,7      | 1,85       | 12,5 | 1,50 <sup>(5)</sup> | 60                  | 8                           | 0,107        | 6700                                       | 7300  |
| SSE M30 OPN                | SSE M30 OPN W              | SSE M30 OPN WW              | 30               | 47 | 68       | 51,7      | 1,85       | 13,7 | 2,00                | 55                  | 8                           | 0,163        | 8300                                       | 9100  |
| SSE M40 OPN                | SSE M40 OPN W              | SSE M40 OPN WW              | 40               | 62 | 80       | 60,3      | 2,15       | 19,0 | 1,50                | 54                  | 8                           | 0,315        | 13700                                      | 15000   |

- (1) For rated travel life of 100 km. For longer travel lives, reduce load to  $\sqrt[3]{(100/L)^{0.33}}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.
  - (2) The Load Limit is the maximum load that may be applied to a bearing/shaft. It is important to analyze the application so that peak and/or shock do not exceed the Load Limit.
  - (3) The load capacities W and Wq are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor Kq, should be applied to W and Wq respectively. Open type bearings have reduced load capacities when used in pull-off situations.
  - (4) Internal bearing diameter is affected by the housing bore, see Table 1.
  - (5) Hole for anti-rotation pin is below centerline.
- NOTE: External seals and retaining are available. See page 151 for specifications.  
 NOTE: For additional technical information, see the Engineering section beginning on page 245.

Table 1 - Standard Diametral Clearances

| Nominal Shaft Diameter d (mm) | Nominal Housing Bore Diameter d (mm) | Diametral Clearance  |                      |
|-------------------------------|--------------------------------------|----------------------|----------------------|
|                               |                                      | Housing Bore H7 (µm) | Housing Bore H6 (µm) |
| 16                            | 26                                   | +33 +4               | +26 +3               |
| 20                            | 32                                   | +37 +6               | +30 +4               |
| 25                            | 40                                   | +37 +6               | +30 +4               |
| 30                            | 47                                   | +37 +6               | +30 +4               |
| 40                            | 62                                   | +44 +7               | +35 +5               |



For Super Smart Ball Bushing Bearings mounted in a housing and with LinearRace shafts, h6 tolerance

## Metric – Super Smart Ball Bushing Bearings

# Application

## Cam-Actuated Part Transfer Mechanism for Multiple-Transfer Press

### Objective

Improve production rate and increase the service life of a transfer table mechanism.

### Solution

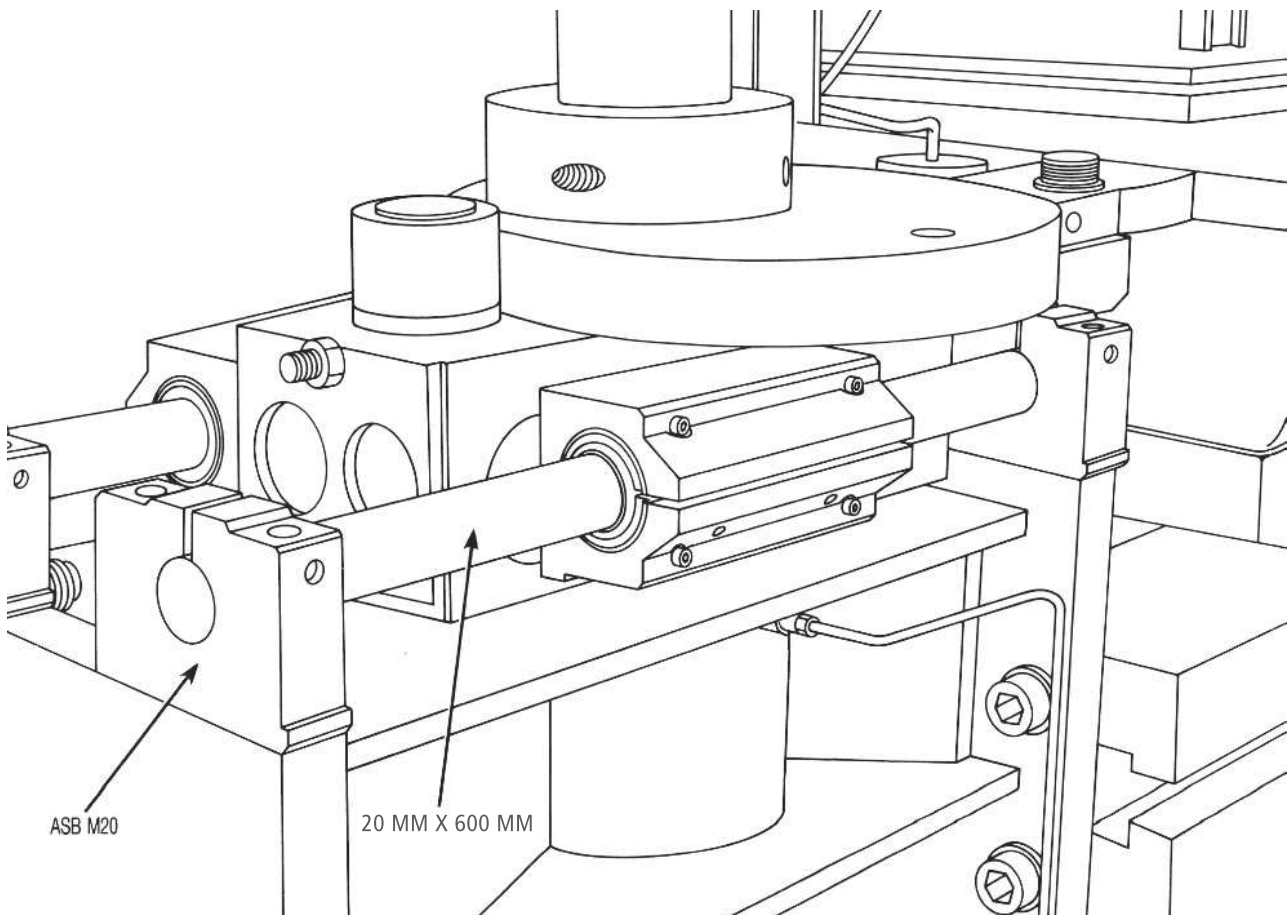
Replace the conventional linear bearings with adjustable Super Smart twin pillow blocks.

### Products Specified

2 - SSE TWNA M20 DD (Super Smart Twin Pillow Blocks)  
4 - ASB M20 (Shaft support blocks) Blocks  
2 - 20 MM X 600 mm 60 Case LinearRace Shaft

### Benefits

The table achieved maximum cycle efficiency by reducing costly downtime and improving service life. Bearing life is increased from 1 to 8 years.



## Metric – Super Smart Ball Bushing Bearings

# X-Y Inspection System

### Objective

Accurately position an inspection probe of an X-Y system over small electronic components.

### Solution

Design an X-Y system with Super Smart Ball Bushing pillow blocks to provide accurate and repeatable movement of the test probe. Utilize Thomson Industries linear motion systems on the Y-axis to reduce cost and installation time.

### Benefits

Outstanding positioning accuracy and repeatability was provided by the adjustable pillow blocks and ball screws. The use of a pre-engineered, pre-assembled linear motion system on the Y-axis saved valuable design and assembly time.

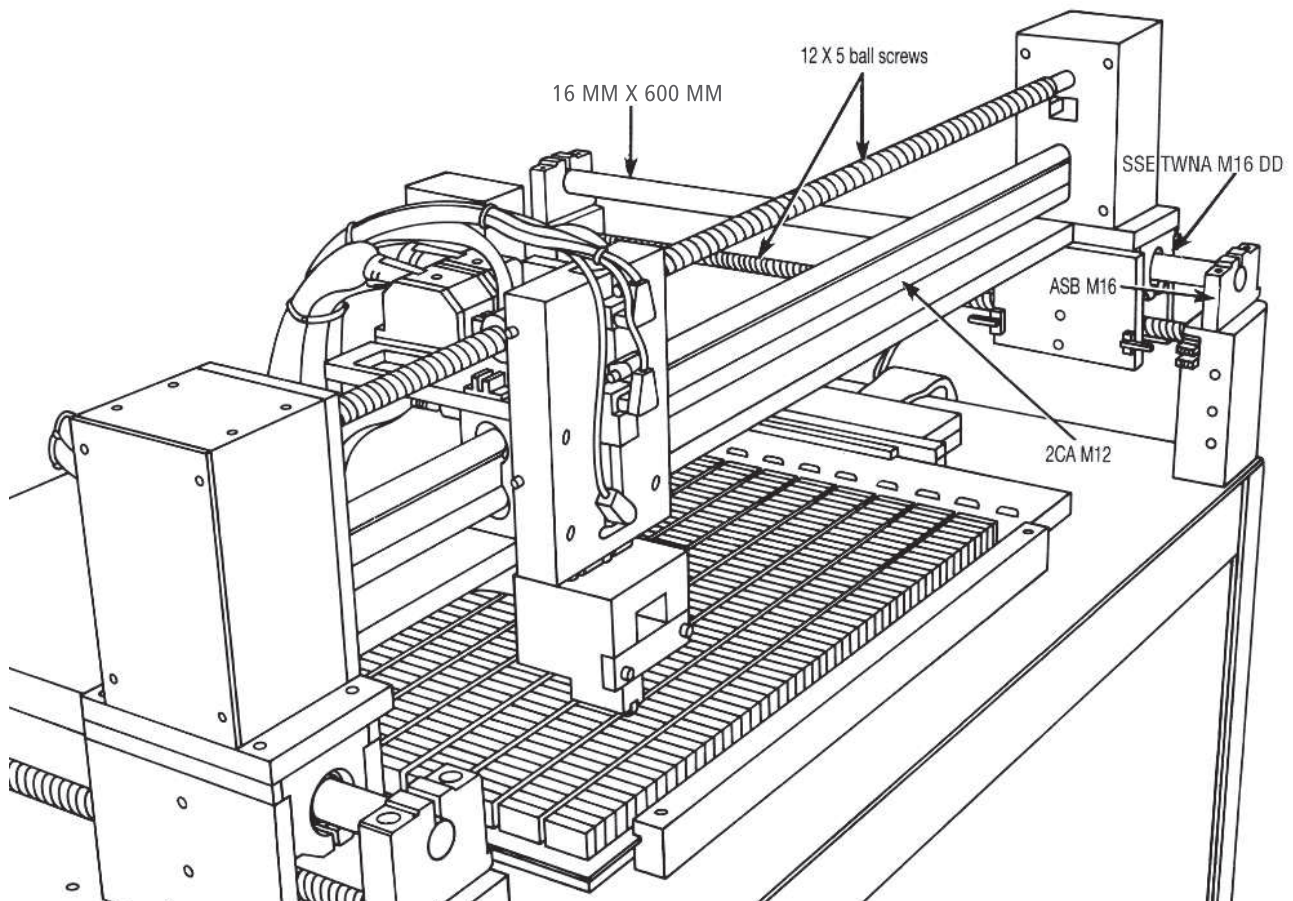
### Products Specified

#### X-axis

- 2 - SSE TWNA M16 DD (Super Smart Twin pillow blocks)
- 4 - ASB M16 (Shaft support blocks)
- 2 - 16 MM X 600 MM (60 Case LinearRace shaft)
- 2 - 12 x5 Thomson ball screw assemblies

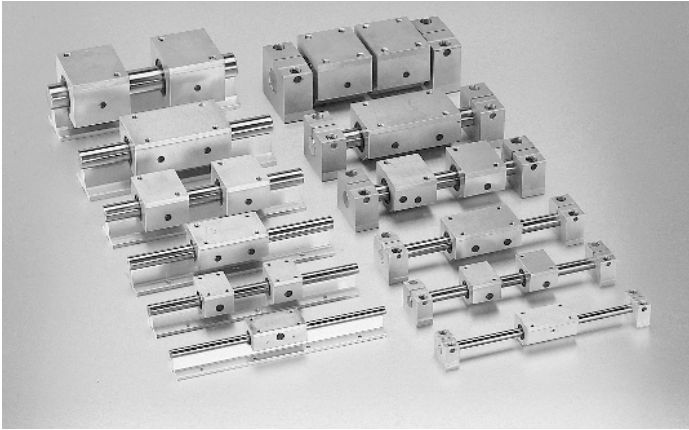
#### Y-axis

- 1 - 2CA M12 (pre-assembled linear motion system)
- 1 - 12 x5 Thomson ball screw assembly



## Metric – Super Smart Pillow Blocks

# Super Smart Pillow Blocks



### Thomson Pillow Blocks with factory-installed Super Smart Ball Bushing Bearings offer:

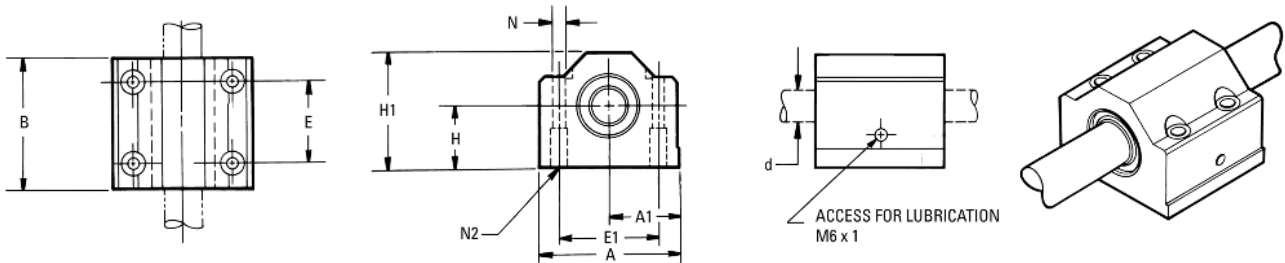
- Up to 6 times the load capacity or 216 times the travel life and 5 times the LinearRace shaft life when replacing conventional linear bearing pillow blocks.
- Accelerations as high as 150 m/s<sup>2</sup> and steady state travel speeds up to 3 m/s without the derating factors commonly required with linear guides.
- Replaceable bearing components for quick, cost effective machine maintenance and minimal downtime.
- Standard, double-acting, integral seals at both ends which keep out dirt, grit and other contaminants, retain lubrication and maximize bearing life.
- Adjustable, closed, and open styles.
- Lubrication hole for easy maintenance.
- Tapped or thru hole mounting configuration for ease of installation.
- Twin version with two Super Smart Ball Bushing Bearings providing twice the load capacity or 8 times more travel life than the single version.
- A single bearing version that self aligns in all directions, minimizing installation time and cost.

Note: See page 120 for information on Thomson Super Smart Ball Bushing Bearings.



Metric – Super Smart Pillow Blocks

# Super Smart Pillow Blocks (Closed Type)



Super Smart Pillow Blocks (Closed Type) (Dimensions in mm)

| Part Number   | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B  | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Mass (kg) | Dynamic Load W <sup>(1)(3)</sup><br>(N) | Load Limit W <sub>s</sub> <sup>(2)(3)</sup><br>(N) |
|---------------|------------------|--------------|----|-----|---------------|----|------------|-------------|-----------|-----|-----------|---|--|
| SSE PB M16 DD | 16               | 22           | 42 | 53  | 26,5          | 43 | 26         | 40          | 5,3       | M6  | 0,21      | 2200                                    | 2400   |
| SSE PB M20 DD | 20               | 25           | 50 | 60  | 30,0          | 54 | 32         | 45          | 6,6       | M8  | 0,35      | 4000                                    | 4400   |
| SSE PB M25 DD | 25               | 30           | 60 | 78  | 39,0          | 67 | 40         | 60          | 8,4       | M10 | 0,67      | 6700                                    | 7300   |
| SSE PB M30 DD | 30               | 35           | 71 | 87  | 43,5          | 79 | 45         | 68          | 8,4       | M10 | 0,99      | 8300                                    | 9100   |
| SSE PB M40 DD | 40               | 45           | 91 | 108 | 54,0          | 91 | 58         | 86          | 10,5      | M12 | 1,84      | 13700                                   | 15000  |

(1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0,33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100km.

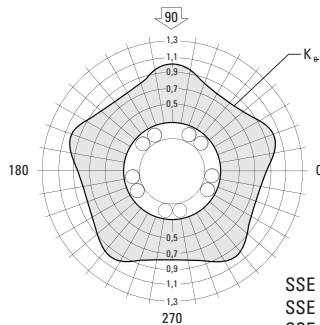
(2) The Load Limit is the maximum load that may be applied to a bearing/shaft. It is important to analyze the application so the peak and/or shock loads do not exceed the Load Limit.

(3) For bearing diametral clearances, see Table 1.

NOTE: For additional technical information, see the Engineering section beginning on page 245.

Table 1- Standard  
Diametral Clearances  
(Closed Type)

| Nominal Size d (mm) | Diametral Clearance (µm) |
|---------------------|--------------------------|
| 16                  | +26 +3                   |
| 20                  | +30 +4                   |
| 25                  | +30 +4                   |
| 30                  | +30 +4                   |
| 40                  | +35 +5                   |



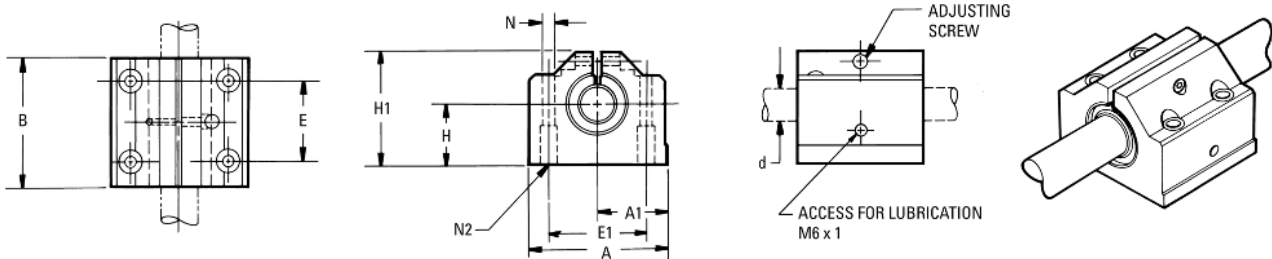
SSE PB M16 DD  
SSE PB M20 DD  
SSE PB M25 DD  
SSE PB M30 DD  
SSE PB M40 DD

For Pillow Blocks used with LinearRace Shaft, h6 tolerance

## Metric – Super Smart Pillow Blocks

# Super Smart Pillow Blocks

(Closed Adjustable Type)



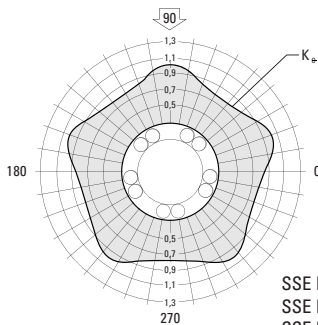
### Super Smart Pillow Blocks (Closed Adjustable Type) (Dimensions in mm)

| Part Number   | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B  | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Mass (kg) | Dynamic<br>Load W <sup>(1)(2)</sup><br>(N) | Load Limit<br>W <sub>3</sub> <sup>(2)(4)</sup><br>(N) |
|---------------|------------------|--------------|----|-----|---------------|----|------------|-------------|-----------|-----|-----------|--|---|
| SSE PB M16 DD | 16               | 22           | 42 | 53  | 26,5          | 43 | 26         | 40          | 5,3       | M6  | 0,21      | 2200                                       | 2400  |
| SSE PB M20 DD | 20               | 25           | 50 | 60  | 30,0          | 54 | 32         | 45          | 6,6       | M8  | 0,35      | 4000                                       | 4400  |
| SSE PB M25 DD | 25               | 30           | 60 | 78  | 39,0          | 67 | 40         | 60          | 8,4       | M10 | 0,67      | 6700                                       | 7300  |
| SSE PB M30 DD | 30               | 35           | 71 | 87  | 43,5          | 79 | 45         | 68          | 8,4       | M10 | 0,99      | 8300                                       | 9100  |
| SSE PB M40 DD | 40               | 45           | 91 | 108 | 54,0          | 91 | 58         | 86          | 10,5      | M12 | 1,84      | 13700                                      | 15000   |

(4) The load capacities W and W<sub>3</sub> are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor, K<sub>q</sub>, should be applied to W and W<sub>3</sub> respectively. Open type bearings have reduced load capacities when used in pull-off situations.

(5) Adjusted to nominal.

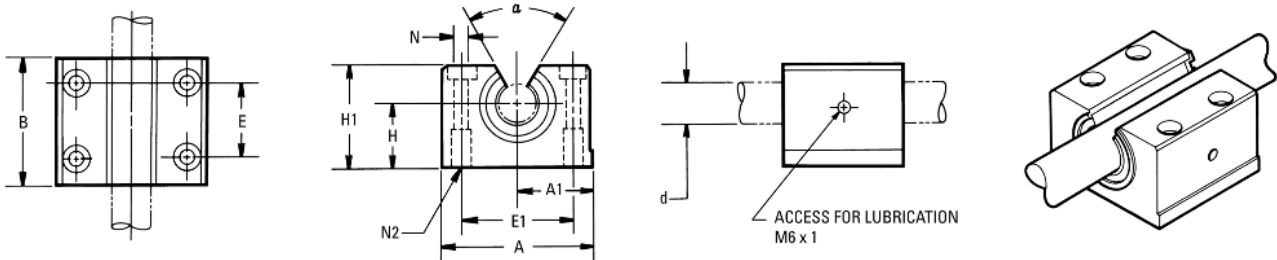
NOTE: For additional technical information, see the Engineering section beginning on page 245.



SSE PBA M16 DD  
SSE PBA M20 DD  
SSE PBA M25 DD  
SSE PBA M30 DD  
SSE PBA M40 DD

Metric – Super Smart Pillow Blocks

# Super Smart Pillow Blocks (Open Type)



Super Smart Pillow Blocks (Open Type) (Dimensions in mm)

| Part Number    | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B  | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Angle α<br>α<br>(deg) | Mass<br>(kg) | Dynamic<br>Load W <sup>(1)(2)</sup><br>(N) | Load Limit<br>W <sub>3</sub> <sup>(2)(4)</sup><br>(N) |
|----------------|------------------|--------------|----|-----|---------------|----|------------|-------------|-----------|-----|-----------------------|--------------|--|---|
| SSE PBO M16 DD | 16               | 22           | 35 | 53  | 26,5          | 43 | 26         | 40          | 5,3       | M6  | 70                    | 0,19         | 2200                                       | 2400  |
| SSE PBO M20 DD | 20               | 25           | 42 | 60  | 30,0          | 54 | 32         | 45          | 6,6       | M8  | 50                    | 0,30         | 4000                                       | 4400  |
| SSE PBO M25 DD | 25               | 30           | 51 | 78  | 39,0          | 67 | 40         | 60          | 8,4       | M10 | 60                    | 0,60         | 6700                                       | 7300  |
| SSE PBO M30 DD | 30               | 35           | 60 | 87  | 43,5          | 79 | 45         | 68          | 8,4       | M10 | 55                    | 0,93         | 8300                                       | 9100  |
| SSE PBO M40 DD | 40               | 45           | 77 | 108 | 54,0          | 91 | 58         | 86          | 10,5      | M12 | 54                    | 1,66         | 13700                                      | 15000   |

(1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0,33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100km.

(2) The Load Limit is the maximum load that may be applied to a bearing/shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.

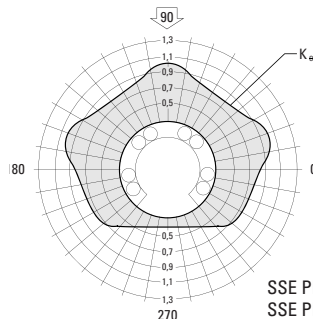
(3) For bearing diametral clearances, see Table 2.

NOTE: For additional technical information, see the Engineering section beginning on page 245.

Table 2 - Standard Diametral Clearances (Open Type)

| Nominal Size d (mm) | Diametral Clearance (µm) |
|---------------------|--------------------------|
| 16                  | +26 +3                   |
| 20                  | +30 +4                   |
| 25                  | +30 +4                   |
| 30                  | +30 +4                   |
| 40                  | +35 +5                   |

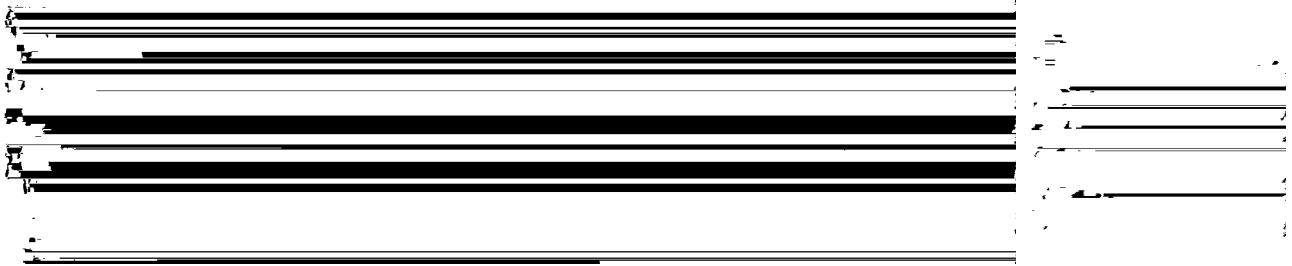
For Pillow Blocks used with LinearRace Shaft, h6 tolerance



SSE PBO M16 DD  
SSE PBO M20 DD  
SSE PBO M25 DD  
SSE PBO M30 DD  
SSE PBO M40 DD

## Metric – Super Smart Pillow Blocks

# Super Smart Pillow Blocks (Open Adjustable Type)



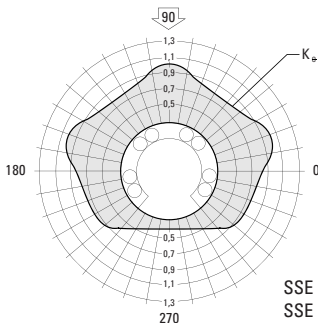
### Super Smart Pillow Blocks (Open Adjustable Type) (Dimensions in mm)

| Part Number     | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B  | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Angle<br>$\alpha$<br>(deg) | Mass<br>(kg) | Dynamic<br>Load W <sub>d</sub> <sup>(1)(2)</sup><br>(N) | Load Limit<br>W <sub>s</sub> <sup>(2)(4)</sup><br>(N) |
|-----------------|------------------|--------------|----|-----|---------------|----|------------|-------------|-----------|-----|----------------------------|--------------|---|---|
| SSE PBOA M16 DD | 16               | 22           | 35 | 53  | 26,5          | 43 | 26         | 40          | 5,3       | M6  | 70                         | 0,19         | 2200  | 2400  |
| SSE PBOA M20 DD | 20               | 25           | 42 | 60  | 30,0          | 54 | 32         | 45          | 6,6       | M8  | 50                         | 0,30         | 4000  | 4400  |
| SSE PBOA M25 DD | 25               | 30           | 51 | 78  | 39,0          | 67 | 40         | 60          | 8,4       | M10 | 60                         | 0,60         | 6700  | 7300  |
| SSE PBOA M30 DD | 30               | 35           | 60 | 87  | 43,5          | 79 | 45         | 68          | 8,4       | M10 | 55                         | 0,93         | 8300  | 9100  |
| SSE PBOA M40 DD | 40               | 45           | 77 | 108 | 54,0          | 91 | 58         | 86          | 10,5      | M12 | 54                         | 1,66         | 13700   | 15000   |

(4) The load capacities  $W$  and  $W_0$  are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor,  $K_q$ , should be applied to  $W$  and  $W_0$  respectively. Open type bearings have reduced load capacities when used in pull-off situations.

(5) Adjusted to nominal.

NOTE: For additional technical information, see the Engineering section beginning on page 245.



SSE PBOA M16 DD  
SSE PBOA M20 DD  
SSE PBOA M25 DD  
SSE PBOA M30 DD  
SSE PBOA M40 DD

Metric – Super Smart Pillow Blocks

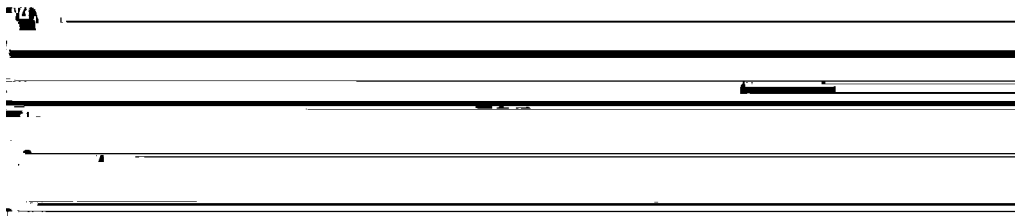
# Super Smart Twin Pillow Blocks (Closed Type)



**Super Smart Twin Pillow Blocks (Closed Type)** (Dimensions in mm)

| Part Number    | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B   | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Mass (kg) | Dynamic<br>Load W <sup>(1)(2)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(4)</sup><br>(N) |
|----------------|------------------|--------------|----|-----|---------------|-----|------------|-------------|-----------|-----|-----------|--|---|
| SSE TWN M16 DD | 16               | 22           | 42 | 53  | 26,5          | 84  | 64         | 40          | 5,3       | M6  | 0,41      | 4400                                       | 4800  |
| SSE TWN M20 DD | 20               | 25           | 51 | 60  | 30,0          | 104 | 76         | 45          | 6,6       | M8  | 0,67      | 8000                                       | 8800  |
| SSE TWN M25 DD | 25               | 30           | 60 | 78  | 39,0          | 130 | 94         | 60          | 8,4       | M10 | 1,24      | 13400                                      | 14600   |
| SSE TWN M30 DD | 30               | 35           | 71 | 87  | 43,5          | 152 | 106        | 68          | 8,4       | M10 | 1,94      | 16600                                      | 18200   |
| SSE TWN M40 DD | 40               | 45           | 91 | 108 | 54,0          | 176 | 124        | 86          | 10,5      | M12 | 3,63      | 27400                                      | 30000   |

## (Closed Adjustable Type)



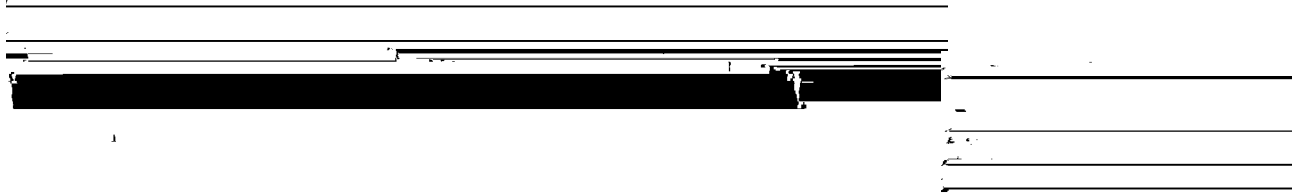
**Super Smart Twin Pillow Blocks (Closed Adjustable Type)** (Dimensions in mm)

| Part Number     | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B   | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Mass (kg) | Dynamic<br>Load W <sup>(1)(2)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(4)</sup><br>(N) |
|-----------------|------------------|--------------|----|-----|---------------|-----|------------|-------------|-----------|-----|-----------|--|---|
| SSE TWNA M16 DD | 16               | 22           | 42 | 53  | 26,5          | 84  | 64         | 40          | 5,3       | M6  | 0,41      | 4400                                       | 4800  |
| SSE TWNA M20 DD | 20               | 25           | 50 | 60  | 30,0          | 104 | 76         | 45          | 6,6       | M8  | 0,67      | 8000                                       | 8800  |
| SSE TWNA M25 DD | 25               | 30           | 60 | 78  | 39,0          | 130 | 94         | 60          | 8,4       | M10 | 1,24      | 13400                                      | 14600   |
| SSE TWNA M30 DD | 30               | 35           | 71 | 87  | 43,5          | 152 | 106        | 68          | 8,4       | M10 | 1,94      | 16600                                      | 18200   |
| SSE TWNA M40 DD | 40               | 45           | 91 | 108 | 54,0          | 176 | 124        | 86          | 10,5      | M12 | 3,63      | 27400                                      | 30000   |

See footnotes (1) (2) (3) (4) (5) on pages 129-130. For diametral clearances, see single versions of pillow block.

## Metric – Super Smart Pillow Blocks

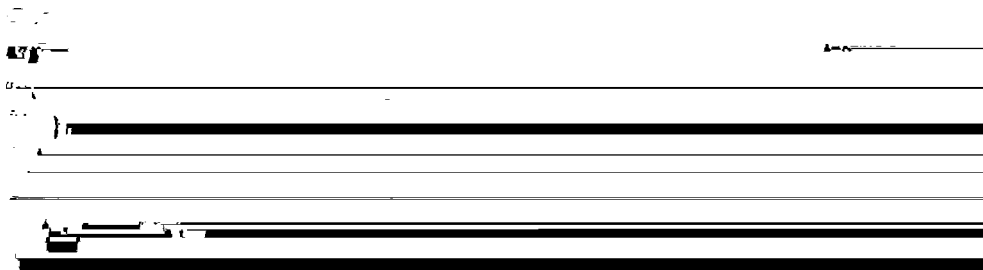
# Super Smart Twin Pillow Blocks (Open Type)



### Super Smart Twin Pillow Blocks (Open Type) (Dimensions in mm)

| Part Number     | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B   | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Angle<br>α<br>(deg) | Mass<br>(kg) | Dynamic<br>Load W <sub>0</sub> <sup>(1)(2)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(4)</sup><br>(N) |
|-----------------|------------------|--------------|----|-----|---------------|-----|------------|-------------|-----------|-----|---------------------|--------------|---|---|
| SSE TWNO M16 DD | 16               | 22           | 35 | 53  | 26,5          | 84  | 64         | 40          | 5,3       | M6  | 70                  | 0,37         | 4400  | 4800  |
| SSE TWNO M20 DD | 20               | 25           | 41 | 60  | 30,0          | 104 | 76         | 45          | 6,6       | M8  | 50                  | 0,58         | 8000  | 8800  |
| SSE TWNO M25 DD | 25               | 30           | 50 | 78  | 39,0          | 130 | 94         | 60          | 8,4       | M10 | 60                  | 1,16         | 13400   | 14600   |
| SSE TWNO M30 DD | 30               | 35           | 60 | 87  | 43,5          | 152 | 106        | 68          | 8,4       | M10 | 55                  | 1,78         | 16600   | 18200   |
| SSE TWNO M40 DD | 40               | 45           | 77 | 108 | 54,0          | 176 | 124        | 86          | 10,5      | M12 | 54                  | 3,25         | 27400   | 30000   |

### (Open Adjustable Type)



### Super Smart Twin Pillow Blocks (Open Adjustable Type) (Dimensions in mm)

| Part Number      | d <sup>(5)</sup> | H<br>± 0,020 | H1 | A   | A1<br>± 0,020 | B   | E<br>± 0,1 | E1<br>± 0,1 | N<br>Dia. | N2  | Angle<br>α<br>(deg) | Mass<br>(kg) | Dynamic<br>Load W <sub>0</sub> <sup>(1)(2)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(4)</sup><br>(N) |
|------------------|------------------|--------------|----|-----|---------------|-----|------------|-------------|-----------|-----|---------------------|--------------|---|---|
| SSE TWNOA M16 DD | 16               | 22           | 35 | 53  | 26,5          | 84  | 64         | 40          | 5,3       | M6  | 70                  | 0,37         | 4400  | 4800  |
| SSE TWNOA M20 DD | 20               | 25           | 41 | 60  | 30,0          | 104 | 76         | 45          | 6,6       | M8  | 50                  | 0,58         | 8000  | 8800  |
| SSE TWNOA M25 DD | 25               | 30           | 50 | 78  | 39,0          | 130 | 94         | 60          | 8,4       | M10 | 60                  | 1,16         | 13400   | 14600   |
| SSE TWNOA M30 DD | 30               | 35           | 60 | 87  | 43,5          | 152 | 106        | 68          | 8,4       | M10 | 55                  | 1,78         | 16600   | 18200   |
| SSE TWNOA M40 DD | 40               | 45           | 77 | 108 | 54,0          | 176 | 124        | 86          | 10,5      | M12 | 54                  | 3,25         | 27400   | 30000   |

See footnotes (1) (2) (3) (4) (5) on pages 129-130. For diametral clearances, see single versions of pillow block.

## Metric – Super Smart Pillow Blocks

# Application

## Punch Press

### Objective

Reduce deflection of plate loader to minimize scrap and improve cycle speed.

### Solution

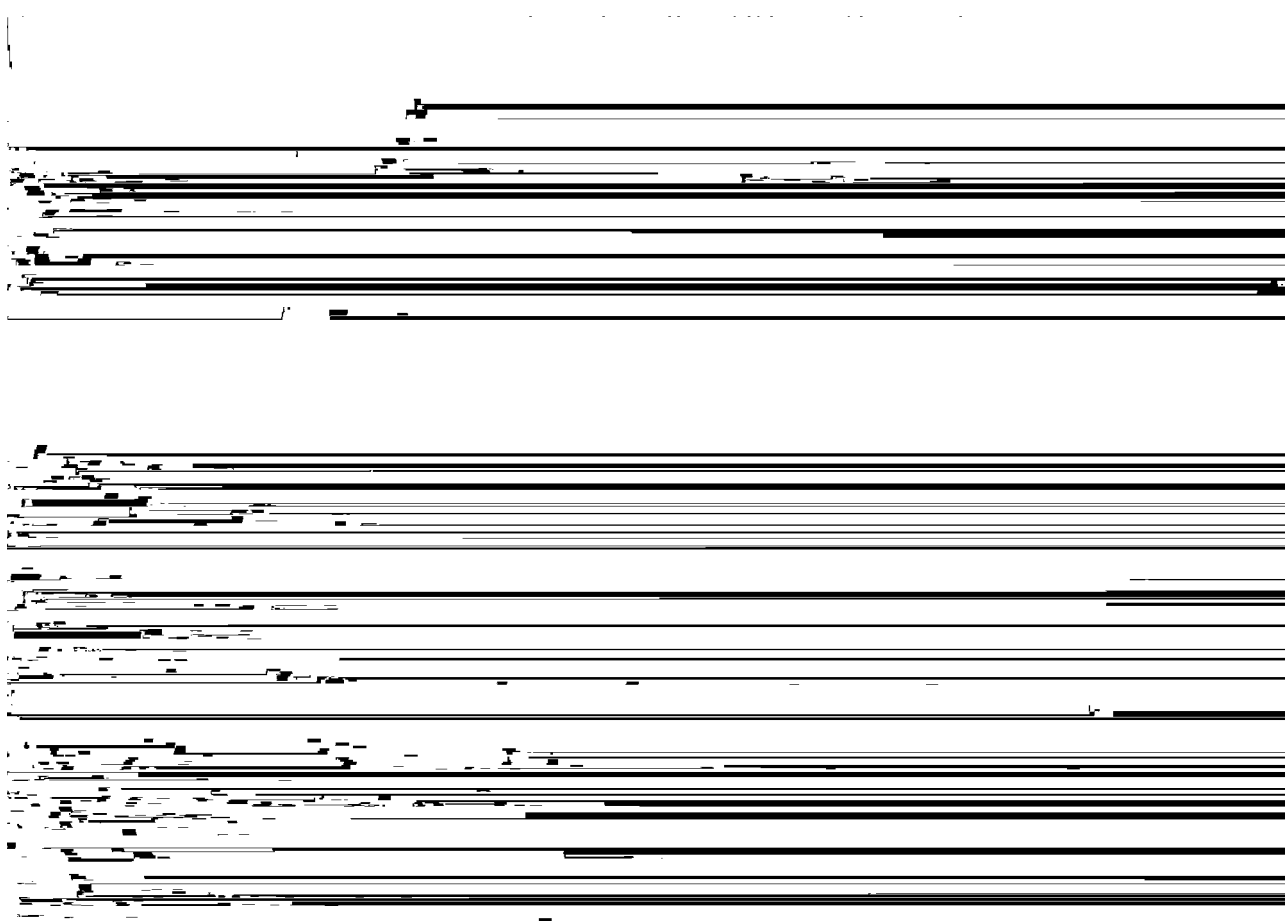
Replace super type linear bearings with Super Smart pillow blocks and Smart Rail assemblies to improve accuracy, load capacity, service life, efficiency and reduce downtime.

### Products Specified

4 - SSE PBOA M25 DD (Super Smart Pillow Blocks)  
2 - LSRA M25 T4 900 mm Smart Rail assemblies

### Benefits

By retrofitting with Super Smart Pillow Blocks, machine productivity increased 700%. Smart Rail assemblies provided reduced deflection during plate loading. The retrofit required minimum downtime due to the pillow blocks' ease of installation.



## Metric – MultiTrac Ball Bushing Bearings

# MultiTrac Ball Bushing Bearings



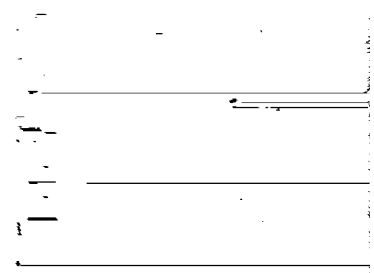
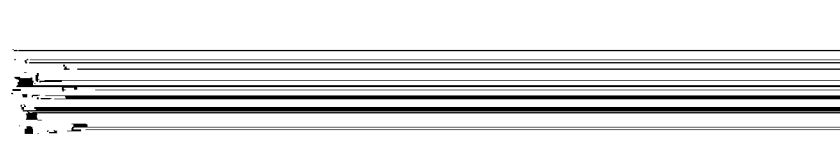
### Thomson MultiTrac Ball Bushing Bearings offer:

- Patented, multiple-track design with up to twice the load carrying capacity, or 8 times the life, of conventional linear bearings.
- Rigid design for minimal deflection assuring accurate, precise positioning.
- Coefficient of friction as low as 0,001.
- Patented ball control technology which eliminates binding and chatter (stick-slip) common to high-friction, plain bushings and sliding-way bearings.
- RoundRail Advantage which, combined with the advanced MultiTrac Ball Bushing Bearing design, eliminates the need for the derating factors commonly required with square rail linear guides.
- Steady state speeds up to 3 m/s and accelerations up to 150 m/s<sup>2</sup>, without the use of derating factors.
- Wear-resistant, engineered-polymer retainers to reduce inertia and noise levels.
- Adjustable, closed and open configurations.
- Stainless steel (440C) option available in all sizes for for corrosive environments.



Metric – MultiTrac Ball Bushing Bearings

# MultiTrac Ball Bushing Bearings (Closed Type)



Metric Ball Bearing Bushing

**MultiTrac Ball Bushing Linear Bearings (Closed Type)** (Dimensions in mm)

| Part Number                |                            |                             | d <sup>(4)</sup> | D  | C<br>h14 | C1<br>H13 | C2<br>min. | Number of<br>ball tracks | Mass (kg) | Dynamic<br>Load W <sub>d</sub> <sup>(1)(3)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(3)</sup><br>(N) |
|----------------------------|----------------------------|-----------------------------|------------------|----|----------|-----------|------------|--------------------------|-----------|---|---|
| Without<br>Integral Wipers | With one<br>Integral Wiper | With two<br>Integral Wipers |                  |    |          |           |            |                          |           |   |   |
| MA M08                     | MA M08 W                   | MA M08 WW                   | 8                | 16 | 25       | 16,2      | 1,10       | 4                        | 0,02      | 180   | 330   |
| MA M12                     | MA M12 W                   | MA M12 WW                   | 12               | 22 | 32       | 22,6      | 1,30       | 5                        | 0,04      | 350   | 880   |
| MA M16                     | MA M16 W                   | MA M16 WW                   | 16               | 26 | 36       | 24,6      | 1,30       | 8                        | 0,06      | 550   | 1300  |
| MA M20                     | MA M20 W                   | MA M20 WW                   | 20               | 32 | 45       | 31,2      | 1,60       | 8                        | 0,11      | 1000  | 2360  |
| MA M25                     | MA M25 W                   | MA M25 WW                   | 25               | 40 | 58       | 43,7      | 1,85       | 8                        | 0,20      | 1980  | 5100  |
| MA M30                     | MA M30 W                   | MA M30 WW                   | 30               | 47 | 68       | 51,7      | 1,85       | 8                        | 0,33      | 2060  | 5800  |
| MA M40                     | MA M40 W                   | MA M40 WW                   | 40               | 62 | 80       | 60,3      | 2,15       | 8                        | 0,63      | 3820  | 9250  |

(1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0.33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.

(2) The load Limit is the maximum load that may be applied to a bearing/shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.

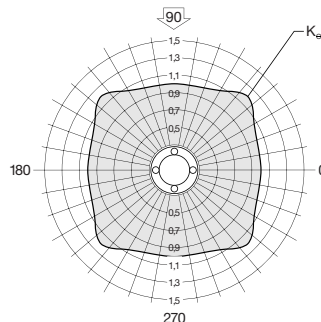
(3) For diametral clearance, see Table 1.

NOTE: External seals and retaining rings are available. See page 151 for specifications.

NOTE: For additional technical data, see Engineering Support section.

**Table 1 - Standard Diametral Clearances Closed Type**

| Nominal Size<br>d (mm) | Diametral<br>Clearance<br>(µm) |
|------------------------|--------------------------------|
| 8                      | +15 +3                         |
| 12                     | +19 +3                         |
| 16                     | +19 +3                         |
| 20                     | +22 +4                         |
| 25                     | +22 +4                         |
| 30                     | +22 +4                         |
| 40                     | +27 +5                         |



MA M16  
MA M20  
MA M25  
MA M30  
MA M40

MA M16 ADJ  
MA M20 ADJ  
MA M25 ADJ  
MA M30 ADJ  
MA M40 ADJ

**Table 2 - Stainless Steel Part Numbers**

| Part Number                   |                            |                             |
|-------------------------------|----------------------------|-----------------------------|
| Without<br>Integral<br>Wipers | With One<br>Integral Wiper | With Two<br>Integral Wipers |
| MAM08SS                       | MAM08WSS                   | MAM08WWSS                   |
| MAM12SS                       | MAM12WSS                   | MAM12WWSS                   |
| MAM16SS                       | MAM16WSS                   | MAM16WWSS                   |
| MAM20SS                       | MAM20WSS                   | MAM20WWSS                   |
| MAM25SS                       | MAM25WSS                   | MAM25WWSS                   |
| MAM30SS                       | MAM30WSS                   | MAM30WWSS                   |

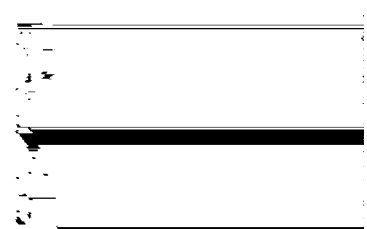
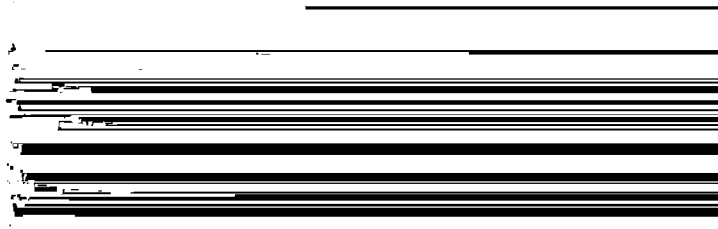
All dimensional information and load ratings for the stainless steel MultiTrac Ball Bushing Bearings are identical to those shown above. If run on stainless steel shafting, load ratings of these bearings are 80% of the above stated values.

For closed type bearings with LinearRace shaft, h6 tolerance

**Metric – MultiTrac Ball Bushing Linear bearings**

**MultiTrac Ball Bushing Linear bearings**

(Closed adjustable type)



**MultiTrac Ball Bushing Linear Bearings (Closed Adjustable Type)** (Dimensions in mm)

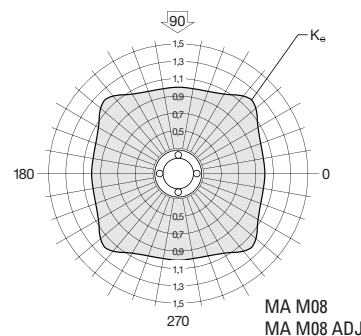
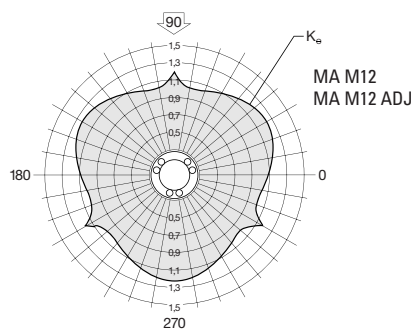
| Part Number                |                            |                             | d <sup>(4)</sup> | D  | C<br>h14 | C1<br>H13 | C2<br>min. | Number of<br>ball tracks | Mass (kg) | Dynamic<br>Load W <sup>(1)(3)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(3)</sup><br>(N) |
|----------------------------|----------------------------|-----------------------------|------------------|----|----------|-----------|------------|--------------------------|-----------|--|---|
| Without<br>Integral Wipers | With one Integral<br>Wiper | With two Integral<br>Wipers |                  |    |          |           |            |                          |           |  |   |
| MA M08 ADJ                 | MA M08 ADJ W               | MA M08 ADJ WW               | 8                | 16 | 25       | 16,2      | 1,10       | 4                        | 0,002     | 180  | 330   |
| MA M12 ADJ                 | MA M12 ADJ W               | MA M12 ADJ WW               | 12               | 22 | 32       | 22,6      | 1,30       | 6                        | 0,04      | 350  | 880   |
| MA M16 ADJ                 | MA M16 ADJ W               | MA M16 ADJ WW               | 16               | 26 | 36       | 24,6      | 1,30       | 8                        | 0,06      | 550  | 1300  |
| MA M20 ADJ                 | MA M20 ADJ W               | MA M20 ADJ WW               | 20               | 32 | 45       | 31,2      | 1,60       | 8                        | 0,11      | 1000                                       | 2360  |
| MA M25 ADJ                 | MA M25 ADJ W               | MA M25 ADJ WW               | 25               | 40 | 58       | 43,7      | 1,85       | 8                        | 0,20      | 1980                                       | 5100  |
| MA M30 ADJ                 | MA M30 ADJ W               | MA M30 ADJ WW               | 30               | 47 | 68       | 51,7      | 1,85       | 8                        | 0,33      | 2060                                       | 5800  |
| MA M40 ADJ                 | MA M40 ADJ W               | MA M40 ADJ WW               | 40               | 62 | 80       | 60,3      | 2,15       | 8                        | 0,63      | 3820                                       | 9250  |

(4) The load capacities W and Wq are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor Kq, should be applied to W and Wq respectively. Open type bearings have reduced load capacities when used in pull-off situations.

(5) Diametral fit-up is determined by the housing diameter. See Table 2.

NOTE: External seals and retaining are available. See page 151 for specifications.

NOTE: For additional technical information, see the Engineering section beginning on page 245.



**Table 3 - Standard Diametral Clearances Adjustable and Open Type**

| Nominal Shaft Diameter d (mm) | Diametral Housing Bore H6 (µm) |
|-------------------------------|--------------------------------|
| 8                             | +28 +7                         |
| 12                            | +33 +9                         |
| 16                            | +33 +9                         |
| 20                            | +40 +10                        |
| 25                            | +40 +10                        |
| 30                            | +40 +10                        |
| 40                            | +48 +12                        |

For adjustable and open type bearings with LinearRace shaft, h6 tolerance

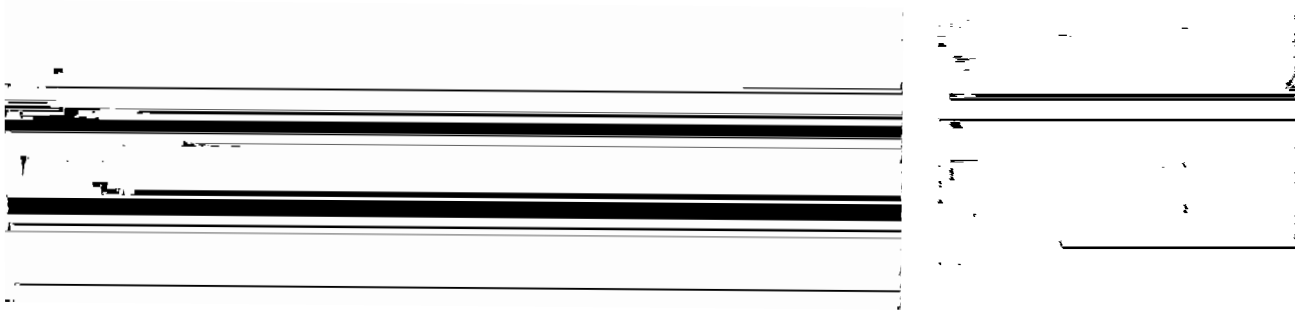
**Table 4 - Stainless Steel Part Numbers**

| Part Number             |                         |                          |
|-------------------------|-------------------------|--------------------------|
| Without Integral Wipers | With One Integral Wiper | With Two Integral Wipers |
| MAM08ADJSS              | MAM08ADJWSS             | MAM08ADJWWSS             |
| MAM12ADJSS              | MAM12ADJWSS             | MAM12ADJWWSS             |
| MAM16ADJSS              | MAM16ADJWSS             | MAM16ADJWWSS             |
| MAM20ADJSS              | MAM20ADJWSS             | MAM20ADJWWSS             |
| MAM25ADJSS              | MAM25ADJWSS             | MAM25ADJWWSS             |
| MAM30ADJSS              | MAM30ADJWSS             | MAM30ADJWWSS             |

All dimensional information and load ratings for the stainless steel MultiTrac Ball Bushing Bearings are identical to those shown above.

Metric – MultiTrac Ball Bushing Bearings

# MultiTrac Ball Bushing Bearings (Open Type)



**MultiTrac Ball Bushing Linear Bearings (Open Type)** (Dimensions in mm)

| Part Number                |                            |                             | d <sup>(4)</sup> | D  | C<br>h14 | C1<br>H13 | C2<br>min. | E    | F                   | Angle<br>$\alpha$<br>(deg) | Number<br>of ball<br>tracks | Mass<br>(kg) | Dynamic<br>Load W <sub>0</sub> <sup>(1)(3)</sup><br>(N) | Load Limit<br>W <sub>0</sub> <sup>(2)(3)</sup><br>(N) |
|----------------------------|----------------------------|-----------------------------|------------------|----|----------|-----------|------------|------|---------------------|----------------------------|-----------------------------|--------------|---|---|
| Without<br>Integral Wipers | With one<br>Integral Wiper | With two<br>Integral Wipers |                  |    |          |           |            |      |                     |                            |                             |              |   |   |
| MA M12                     | MA M12 W                   | MA M12 WW                   | 12               | 22 | 32       | 22,6      | 1,30       | 7,3  | 1,35                | 120                        | 4                           | 0,04         | 440   | 1100  |
| MA M16                     | MA M16 W                   | MA M16 WW                   | 16               | 26 | 36       | 24,6      | 1,30       | 10,6 | 0                   | 90                         | 6                           | 0,06         | 600   | 1500  |
| MA M20                     | MA M20 W                   | MA M20 WW                   | 20               | 32 | 45       | 31,2      | 1,60       | 11,5 | 0                   | 90                         | 6                           | 0,11         | 1100  | 2720  |
| MA M25                     | MA M25 W                   | MA M25 WW                   | 25               | 40 | 58       | 43,7      | 1,85       | 13,9 | 1,50 <sup>(6)</sup> | 90                         | 6                           | 0,20         | 2170  | 5300  |
| MA M30                     | MA M30 W                   | MA M30 WW                   | 30               | 47 | 68       | 51,7      | 1,85       | 20,3 | 2,00                | 90                         | 6                           | 0,33         | 2260  | 6710  |
| MA M40                     | MA M40 W                   | MA M40 WW                   | 40               | 62 | 80       | 60,3      | 2,15       | 20,9 | 1,50                | 90                         | 6                           | 0,63         | 4200  | 10700   |

(6) Hole for anti-rotation pin is below centerline.

For footnotes 1-5, see pages 135-136.

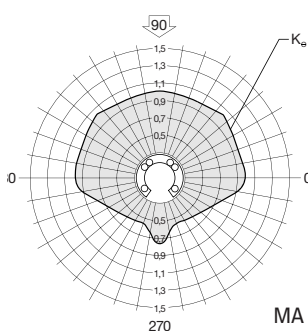
Note: External seals and retaining rings are available. See page 151 for specifications.

NOTE: For additional technical information, see the Engineering section beginning on page 245.

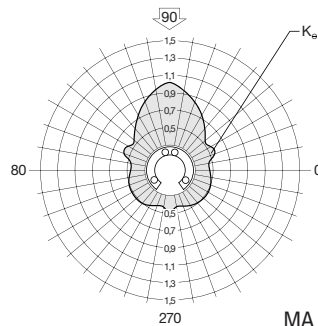
**Table 5 - Stainless Steel Part Numbers**

| Part Number                   |                               |                                |
|-------------------------------|-------------------------------|--------------------------------|
| Without<br>Integral<br>Wipers | With One<br>Integral<br>Wiper | With Two<br>Integral<br>Wipers |
| MAM120PNSS                    | MAM120PNWSS                   | MAM120PNWWSS                   |
| MAM160PNSS                    | MAM160PNWSS                   | MAM160PNWWSS                   |
| MAM200PNSS                    | MAM200PNWSS                   | MAM200PNWWSS                   |
| MAM250PNSS                    | MAM250PNWSS                   | MAM250PNWWSS                   |
| MAM300PNSS                    | MAM300PNWSS                   | MAM300PNWWSS                   |

All dimensional information and load ratings for the stainless steel MultiTrac Ball Bushing Bearings are identical to those shown above.



MA M16 OPN  
MA M20 OPN  
MA M25 OPN  
MA M30 OPN  
MA M40 OPN



MA M12 OPN

## Metric – MultiTrac Ball Bushing Bearings

# MultiTrac Ball Bushing Bearings

Our Thomson MultiTrac Ball Bushing Bearings are designed with greater rigidity and up to twice the load capacity of conventional linear bearings. The design incorporates a one-piece, bearing quality steel sleeve (see Figure 1) for maximum rigidity. The single-piece engineered polymer ball retainer provides smooth, quiet operation.

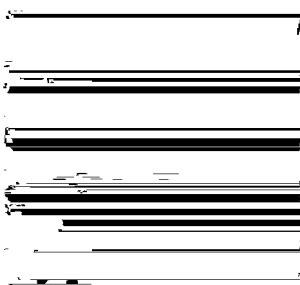


Figure 1

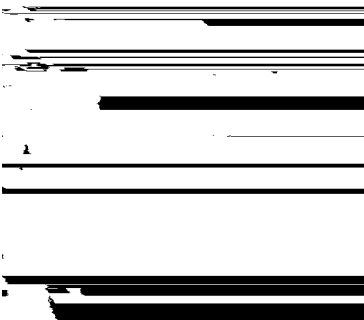


Figure 2

### Twice the Load Capacity

The bearing's load capacity is improved by the optimal positioning of the load tracks. This places the maximum number of load-bearing balls in the load zone (see Figure 1).

### High Speed Operation

The advanced design also improves the bearing's ball control. This allows accelerations as high as 150 m/s<sup>2</sup> and travel speeds up to 3 m/s.

### Integral Seals

The bearing includes double acting integral wipers, which keep out dirt, grit and other contaminants, and retain bearing lubrication.

### Improved Ball Control

Through advanced computer-aided design techniques, ball control improvements assure smooth entry and exit of the balls in and out of the load zone.

### Ideal for Corrosive Environments

Optional stainless steel (440C) resists rust and corrosion.

## Metric – MultiTrac Ball Bushing Bearings

### Application Wire Straightening/Feeding Machine

#### Objective

Redesign a wire straightening/feeding mechanism for a wire drawing machine that improves cycle time and minimizes downtime.

#### Solution

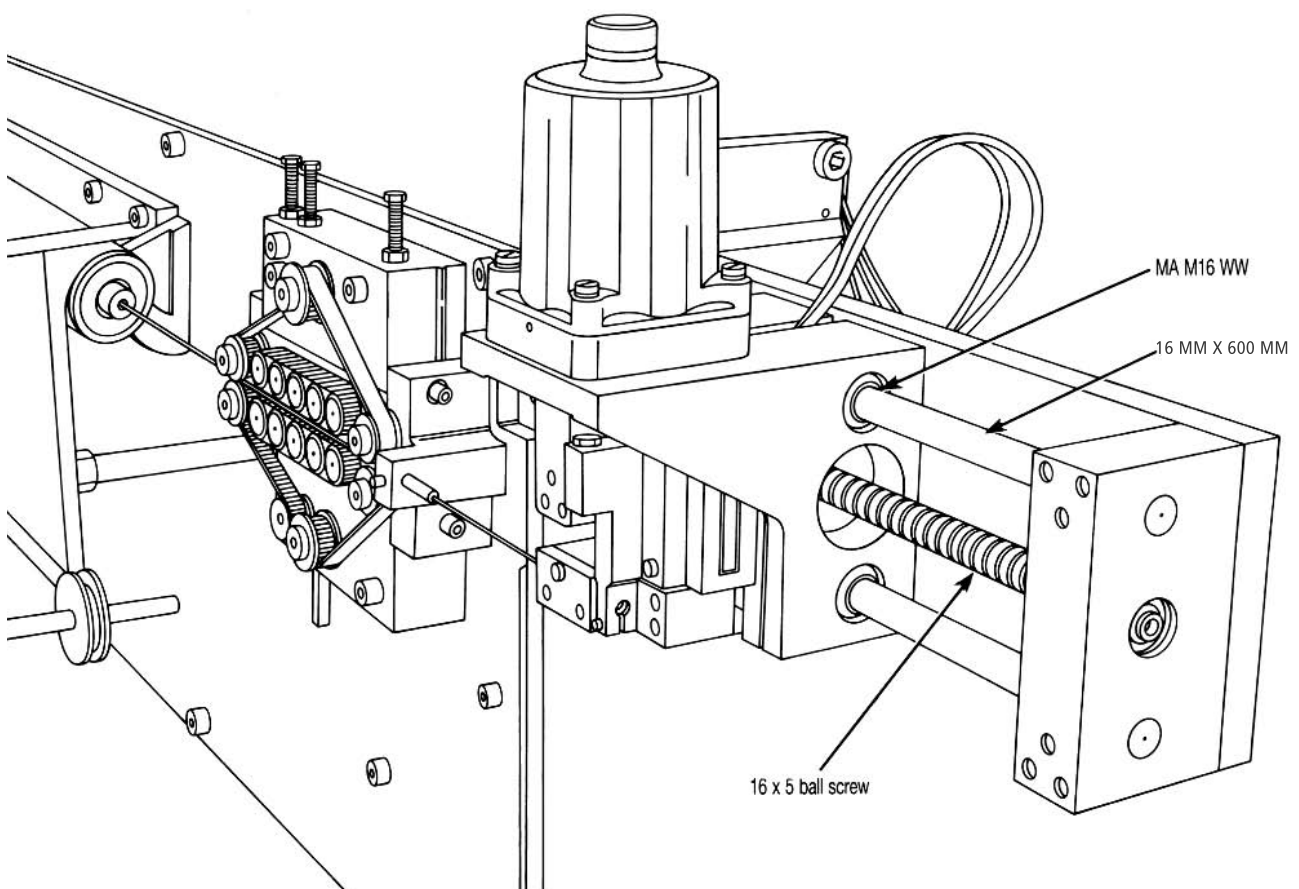
Combine the performance advantages of the Multitrac Ball Bushing Linear bearings with the operating efficiency of Thomson all screws.

#### Products Specified

- 4 - MA M16 WW (MultiTrac Ball Bushing linear bearings)
- 2 - 16 MM X 600 MM (60 Case LinearRace shaft)
- 1 - 16 x 5 Thomson ball screw assembly

#### Benefits

Because MultiTrac Ball Bushing Linear bearings have twice the load capacity of conventional linear bearings, service life increased from six months to four years. This significantly reduced downtime and maintenance requirements and provided increased productivity with substantial cost savings.



## Metric – MultiTrac Ball Bushing Bearings

# Application

## Pick and Place X-Y System

### Objective

Build an X-Y System that transfers the work piece between two separate machining stations.

### Solution

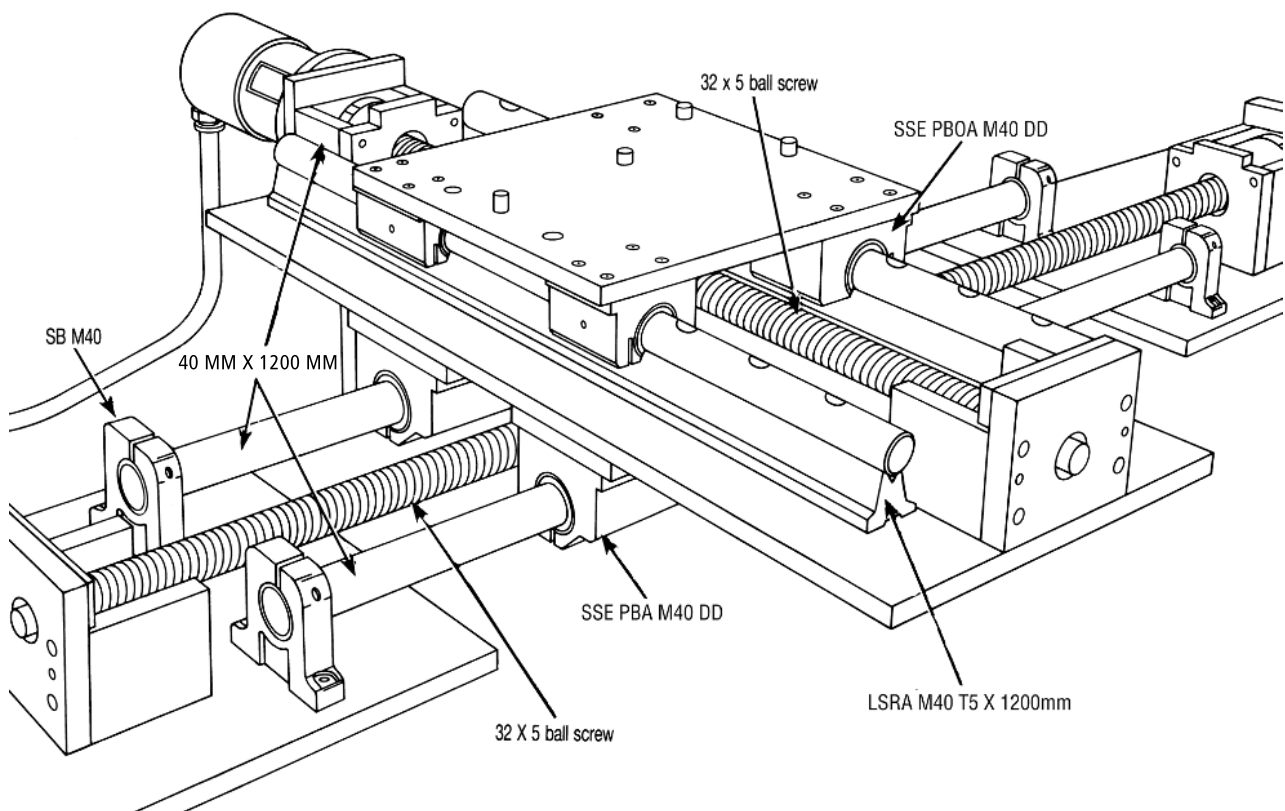
Assemble the X-Y System utilizing Super Smart Ball Bushings Bearing pillow blocks on end supported shafts for the X-axis and continuous supported 60 Case LinearRace shaft on the Y-axis. Utilize Thomson Saginaw\* ball screws for high speed positioning.

### Products Specified

X-axis  
 2 - 40 MM X 1200 MM (60 Case LinearRace)  
 4 - SB M40 (shaft support blocks)  
 4 - SSE PBA M40 DD (Super Smart pillow blocks)  
 1 - 32 x 5 Thomson ball screw assembly Y-axis  
 2 - LSRA M40 T5 X 1200 mm (Smart Rail™ guides)  
 4 - SSE PBOA M40 DD (Super Smart pillow blocks)  
 1 - 32 x 5 Thomson ball screw assembly

### Benefits

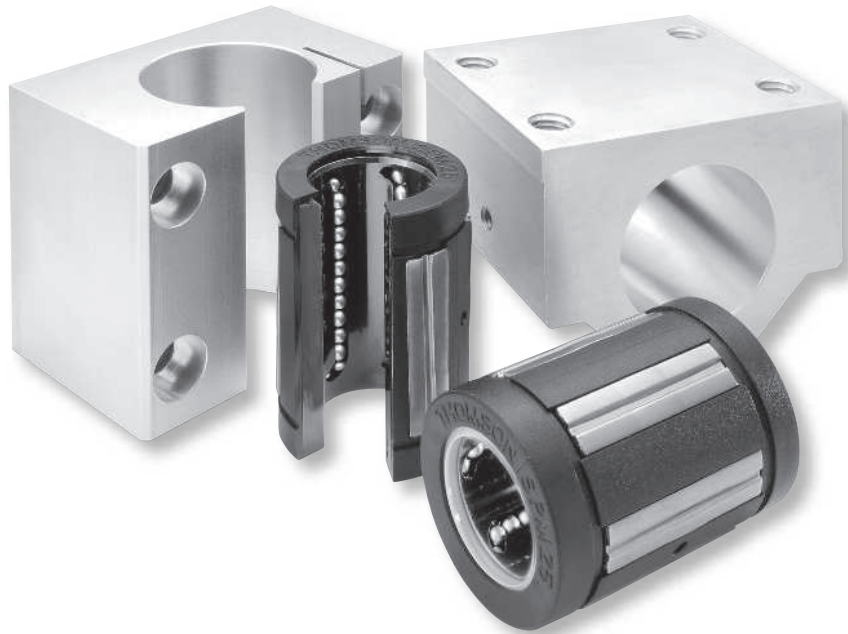
The 60 Case LinearRace shafts and shaft support end blocks provided an important bridge between machining stations. The Super Smart pillow blocks and Thomson ball screws provided uninterrupted high speed movement of the work piece. Productivity increased by 200%



\*Trademark of Thomson. THOMSON is registered in the U.S. Patent and Trademark Office and in other countries.

## Metric – Super Ball Bushing\* Bearings

## Super Ball Bushing\* Bearings



### High performance from superior design:

- A coefficient of friction as low as 0,001. This allows the use of smaller less expensive motors, belts, gears and ball screws, when replacing high friction, plain bearings.
- A self-aligning capability up to 0,5° compensates for inaccuracies in base flatness or carriage machining. Achieved with Thomson Super Bearing plates which have defined radius crowns for maximized self-alignment accuracy.
- Accelerations as high as 150 m/s<sup>2</sup> and steady state travel speeds up to 3 m/s without the derating factors commonly required with linear guides.
- Double lip integral wipers that keep out dirt while retaining lubrication. Travel life is maximized.
- Light weight, wear-resistant, engineered polymer retainers and outer sleeves that reduce inertia and noise.
- Adjustable, closed and open configurations.

### Quick to ship, drop-in replacement parts for existing applications:

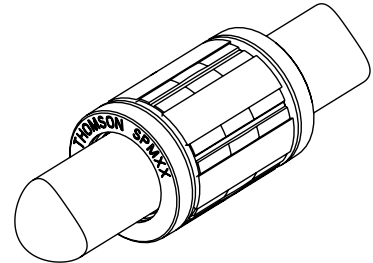
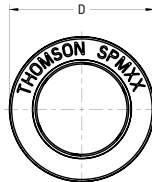
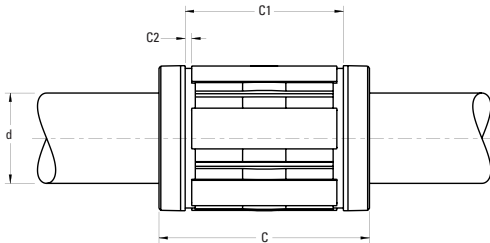
- Dimensional interchangeable with competitive and legacy applications.
- Easy to order with local manufacturer's stock available in Europe and North America.
- Plus worldwide availability from over 1800 authorized distributors.

### Genuine Thomson Quality:

- Thomson Ball Bushing Bearings in combination with 60 Case\* shafting last longer and carry significantly more load than conventional linear bearings, allowing you to reduce component size, saving space and cost. Thomson is the one and only name you'll need when choosing a round rail solution.
- To complete your application with genuine Thomson 60 Case shafting and shaft supports, please visit [www.danahermotion.com/shafting.htm](http://www.danahermotion.com/shafting.htm).
- Thomson is the innovator of linear bearings and has supplied superior quality product to the linear industry for 60 years. Superior Thomson quality translates into better reliability and performance.

## Metric – Super Ball Bushing Bearings

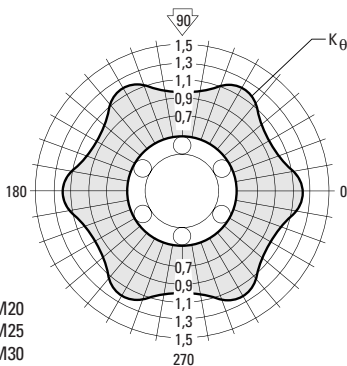
# Super Ball Bushing Bearings (Closed Type) for End Supported Applications



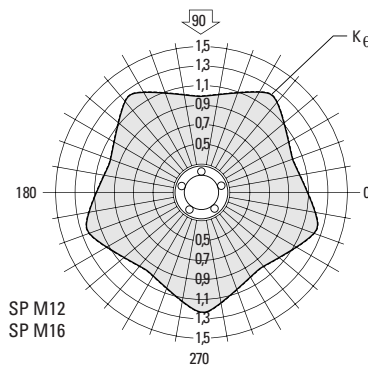
### Super Metric Ball Bushing Bearings (Closed Type)

| Part Number             |                         |                          | Dimensions (mm)       |                 |       |        |        | Number of ball tracks | Mass (kg) | Dynamic Load $W^{(1)(3)}$ (N) | Load Limit $W_0^{(2)(3)}$ (N) |
|-------------------------|-------------------------|--------------------------|-----------------------|-----------------|-------|--------|--------|-----------------------|-----------|-------------------------------|-------------------------------|
| Without Integral Wipers | With One Integral Wiper | With Two Integral Wipers | $\varnothing d^{(4)}$ | $\varnothing D$ | C h14 | C1 h13 | C2 min |                       |           |                               |                               |
| SPM 08                  | SPM 08 W                | SPM 08 WW                | 8                     | 16              | 25    | 16.2   | 1.10   | 4                     | 0.02      | 310                           | 340                           |
| SPM 12                  | SPM 12 W                | SPM 12 WW                | 12                    | 22              | 32    | 22.6   | 1.30   | 5                     | 0.02      | 830                           | 910                           |
| SPM 16                  | SPM 16 W                | SPM 16 WW                | 16                    | 26              | 36    | 24.6   | 1.30   | 5                     | 0.03      | 1020                          | 1120                          |
| SPM 20                  | SPM 20 W                | SPM 20 WW                | 20                    | 32              | 45    | 31.2   | 1.60   | 6                     | 0.06      | 2020                          | 2220                          |
| SPM 25                  | SPM 25 W                | SPM 25 WW                | 25                    | 40              | 58    | 43.7   | 1.85   | 6                     | 0.13      | 3950                          | 4350                          |
| SPM 30                  | SPM 30 W                | SPM 30 WW                | 30                    | 47              | 68    | 51.7   | 1.85   | 6                     | 0.19      | 4800                          | 5280                          |
| SPM 40                  | SPM 40 W                | SPM 40 WW                | 40                    | 62              | 80    | 60.3   | 2.15   | 6                     | 0.36      | 8240                          | 9060                          |
| SPM 50                  | SPM 50 W                | SPM 50 WW                | 50                    | 75              | 100   | 77.3   | 2.65   | 6                     | 0.66      | 12060                         | 13270                         |

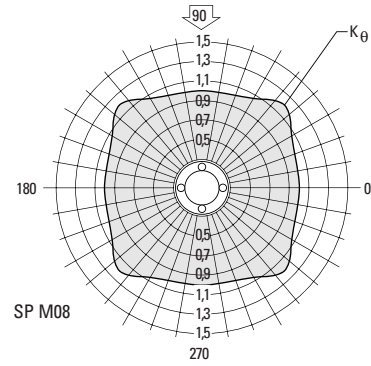
- (1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0.33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.
- (2) The Load Limit is the maximum load that may be applied to a bearing and shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.
- (3) The load capacities  $W$  and  $W_0$  are valid for a resultant load applied at  $90^\circ$  with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor  $K_\theta$  should be applied to  $W$  and  $W_0$  respectively.
- (4) Internal bearing diameter is affected by the housing bore, see Table 1.
- NOTE: External seals and retaining rings are available. See page 151 for specifications.
- NOTE: For additional technical information, see the Engineering section beginning on page 245.
- NOTE: For a corrosion resistant bearing add suffix-CR to the part number and reduce the load capacity by 30%.



SP M20  
SP M25  
SP M30  
SP M40  
SP M50



SP M12  
SP M16

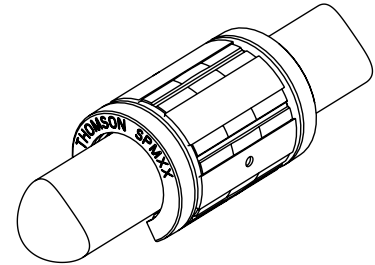
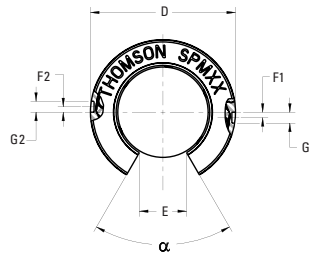
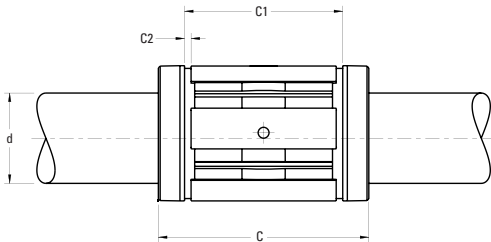


SP M08



Metric – Super Ball Bushing\* Bearings

# Super Ball Bushing Bearings (Open Type) for Continuously Supported Applications



## Super Metric Ball Bushing Bearings (Open Type)

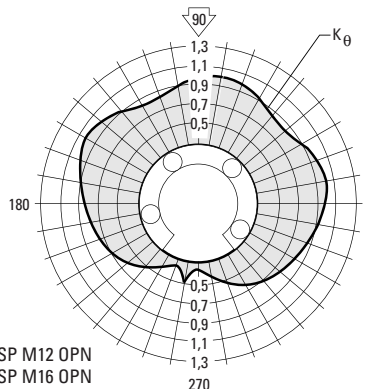
| Part Number             |                         |                          | Dimensions (mm)       |                 |       |        |        |          |                     |                  |     |                  |    | Angle $\alpha$ (deg) | Number of ball tracks | Mass (kg) | Dynamic Load $W^{(1)(3)}$ (N) | Load Limit $W_0^{(2)(3)}$ (N) |
|-------------------------|-------------------------|--------------------------|-----------------------|-----------------|-------|--------|--------|----------|---------------------|------------------|-----|------------------|----|----------------------|-----------------------|-----------|-------------------------------|-------------------------------|
| Without Integral Wipers | With One Integral Wiper | With Two Integral Wipers | $\varnothing d^{(4)}$ | $\varnothing D$ | C h14 | C1 h13 | C2 min | E +/-0,1 | F1                  | $\varnothing G1$ | F2  | $\varnothing G2$ |    |                      |                       |           |                               |                               |
| SPM 12 OPN              | SPM 12 OPN W            | SPM 12 OPN WW            | 12                    | 22              | 32    | 22,3   | 1,30   | 7,0      | 1,35 <sup>(5)</sup> | 3,0              | -   | -                | 70 | 4                    | 0,02                  | 1060      | 1170                          |                               |
| SPM 16 OPN              | SPM 16 OPN W            | SPM 16 OPN WW            | 16                    | 26              | 36    | 24,6   | 1,30   | 9,8      | 0                   | 3,0              | -   | -                | 70 | 4                    | 0,02                  | 1280      | 1410                          |                               |
| SPM 20 OPN              | SPM 20 OPN W            | SPM 20 OPN WW            | 20                    | 32              | 45    | 31,2   | 1,60   | 10,5     | 0                   | 3,0              | -   | -                | 58 | 5                    | 0,05                  | 2100      | 2310                          |                               |
| SPM 25 OPN              | SPM 25 OPN W            | SPM 25 OPN WW            | 25                    | 40              | 58    | 43,7   | 1,85   | 13,0     | 1,50                | 3,0              | 0   | 3,5              | 60 | 5                    | 0,10                  | 4130      | 4540                          |                               |
| SPM 30 OPN              | SPM 30 OPN W            | SPM 30 OPN WW            | 30                    | 47              | 68    | 51,7   | 1,85   | 15,3     | 0                   | 3,5              | 2,0 | 3,0              | 60 | 5                    | 0,15                  | 5020      | 5520                          |                               |
| SPM 40 OPN              | SPM 40 OPN W            | SPM 40 OPN WW            | 40                    | 62              | 80    | 60,3   | 2,15   | 21,4     | 0                   | 3,5              | 1,5 | 3,0              | 58 | 5                    | 0,30                  | 8620      | 9480                          |                               |
| SPM 50 OPN              | SPM 50 OPN W            | SPM 50 OPN WW            | 50                    | 75              | 100   | 77,3   | 2,65   | 24,0     | 0                   | 4,5              | 2,5 | 5,0              | 55 | 5                    | 0,55                  | 12500     | 13750                         |                               |

- (1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0,33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.
  - (2) The Load Limit is the maximum load that may be applied to a bearing and shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.
  - (3) The load capacities  $W$  and  $W_0$  are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor  $K_\theta$ , should be applied to  $W$  and  $W_0$  respectively. Open type bearings have reduced load capacities when used in pull-off situations.
  - (4) Internal bearing diameter is affected by the housing bore, see Table 1.
  - (5) Hole for anti-rotation pin is above centerline.
- NOTE: External seals and retaining are available. See page 151 for specifications.  
 NOTE: For additional technical information, see the Engineering section beginning on page 245.  
 NOTE: For corrosion resistant bearing add suffix-CR to the part number and reduce the load capacity by 30%.

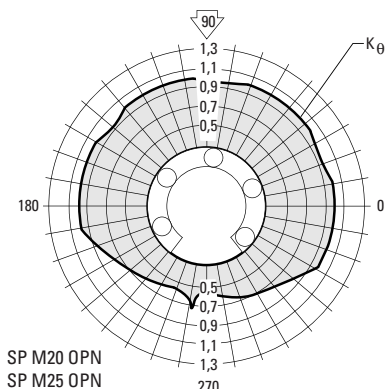
Table 1 - Standard Diametral Clearances

| Nominal Shaft Diameter d (mm) | Nominal Housing Bore Diameter D (mm) | Diametral Clearance |                     |
|-------------------------------|--------------------------------------|---------------------|---------------------|
|                               |                                      | Housing Bore H7 (μ) | Housing Bore H6 (μ) |
| 12                            | 22                                   | +33 +4              | +26 +3              |
| 16                            | 26                                   | +33 +4              | +26 +3              |
| 20                            | 32                                   | +37 +6              | +30 +4              |
| 25                            | 40                                   | +37 +6              | +30 +4              |
| 30                            | 47                                   | +37 +6              | +30 +4              |
| 40                            | 62                                   | +44 +7              | +35 +5              |
| 50                            | 75                                   | +44 +7              | +35 +5              |

For Super Metric Ball Bushing Bearings mounted in a housing and with LinearRace® shafts, h6 tolerance



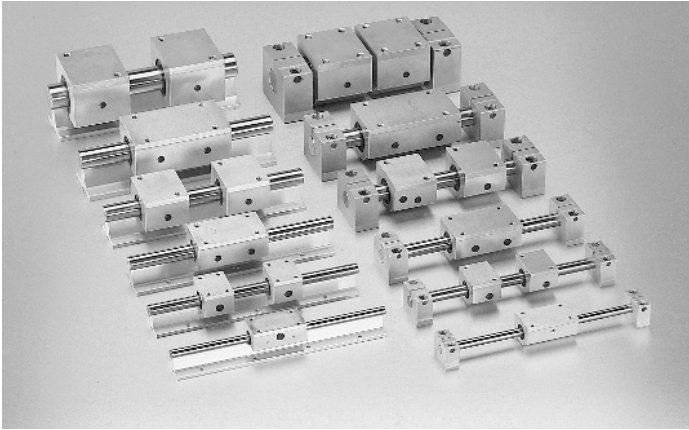
SP M12 OPN  
SP M16 OPN



SP M20 OPN  
SP M25 OPN  
SP M30 OPN  
SP M40 OPN  
SP M50 OPN

## Metric – Super Pillow Blocks

# Super Pillow Blocks



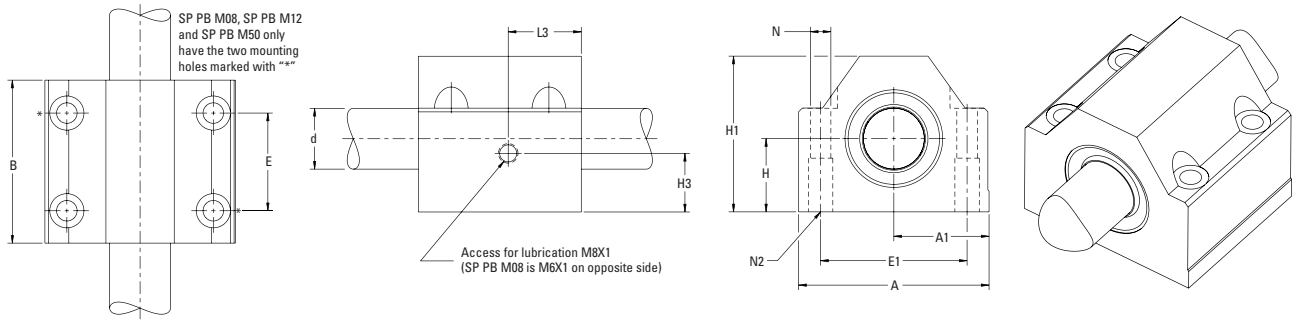
### Thomson Pillow Blocks with factory-installed Super Metric Ball Bushing Bearings offer:

- Accelerations as high as 150 m/s<sup>2</sup> and steady state travel speeds up to 3 m/s without the derating factors commonly required with linear guides.
- Replaceable bearing components for quick, cost-effective machine maintenance and minimal downtime.
- Light weight, wear-resistant, engineered polymer retainers and outer sleeves that reduce inertia and noise.
- Standard, double-acting, integral seals at both ends which keep out dirt, grit and other contaminants, retain lubrication and maximize bearing life.
- Lubrication hole for easy maintenance.
- Tapped or thru hole mounting configuration for ease of installation.
- Twin version with two Super Ball Bushing Bearings providing twice the load capacity or 8 times more travel life than the single version.
- A single bearing version that self aligns in all directions, minimizing installation time and cost.

Note: See page 141 for information on Thomson Super Metric Ball Bushing Bearings.

Metric – Super Pillow Blocks

# Super Pillow Blocks (Closed Type) for End Supported Applications



## Super Pillow Blocks (Closed Type)

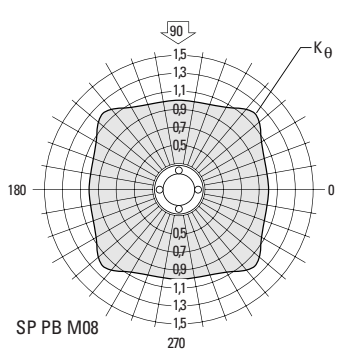
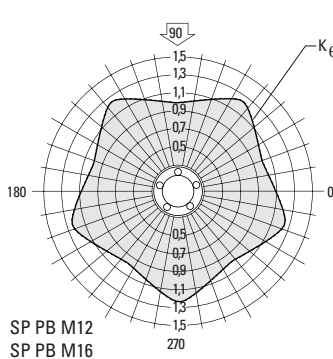
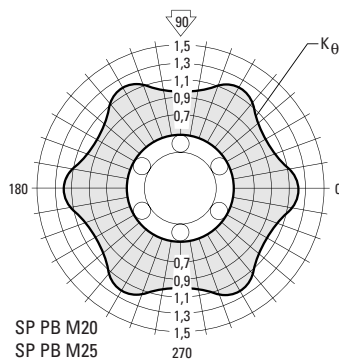
| Part Number | Dimensions (mm)       |               |     |     |                |     |                   |                   |                   |                   |                 |     | Mass (kg) | Dynamic Load $W^{(1)(3)}$ (N) | Load Limit $W_0^{(2)(3)}$ (N) |
|-------------|-----------------------|---------------|-----|-----|----------------|-----|-------------------|-------------------|-------------------|-------------------|-----------------|-----|-----------|-------------------------------|-------------------------------|
|             | $\varnothing d^{(4)}$ | H $\pm 0,020$ | H1  | A   | A1 $\pm 0,020$ | B   | E $\pm 0,1$       | E1 $\pm 0,1$      | H3                | L3 <sup>(5)</sup> | $\varnothing N$ | N2  |           |                               |                               |
| SP PB M08   | 8                     | 15            | 28  | 35  | 17,5           | 32  | 20 <sup>(6)</sup> | 25 <sup>(6)</sup> | 12 <sup>(6)</sup> | 8,5               | 3,3             | M4  | 0,07      | 310                           | 340                           |
| SP PB M12   | 12                    | 18            | 35  | 43  | 21,5           | 39  | 23 <sup>(6)</sup> | 32 <sup>(6)</sup> | 10                | 10,5              | 4,3             | M5  | 0,13      | 830                           | 910                           |
| SP PB M16   | 16                    | 22            | 42  | 53  | 26,5           | 43  | 26                | 40                | 12                | 16,5              | 5,3             | M6  | 0,21      | 1020                          | 1120                          |
| SP PB M20   | 20                    | 25            | 50  | 60  | 30,0           | 54  | 32                | 45                | 13                | 20,5              | 6,6             | M8  | 0,35      | 2020                          | 2220                          |
| SP PB M25   | 25                    | 30            | 60  | 78  | 39,0           | 67  | 40                | 60                | 15                | 23                | 8,4             | M10 | 0,66      | 3950                          | 4350                          |
| SP PB M30   | 30                    | 35            | 71  | 87  | 43,5           | 79  | 45                | 68                | 20                | 27                | 8,4             | M10 | 0,97      | 4800                          | 5280                          |
| SP PB M40   | 40                    | 45            | 91  | 108 | 54,0           | 91  | 58                | 86                | 21,5              | 30                | 10,5            | M12 | 1,81      | 8240                          | 9060                          |
| SP PB M50   | 50                    | 50            | 105 | 132 | 66,0           | 113 | 50                | 108               | 12,5              | 22                | 13,5            | M16 | 3,00      | 12060                         | 13270                         |

- (1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0,33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.
- (2) The Load Limit is the maximum load that may be applied to a bearing and shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.
- (3) The load capacities W and  $W_0$  are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor  $K_\theta$ , should be applied to W and  $W_0$  respectively.
- (4) For bearing diametral clearances, see Table 2.
- (5) SP PB M08 lube hole is M6X1 tapped hole located on opposite side
- (6) SP PB M08, SP PB M12 and SP PB M50 pillow blocks have only 2 mounting holes. The mounting holes on these sizes are marked in the chart above with “\*\*”

Table 2 - Standard Diametral Clearances (Closed Type)

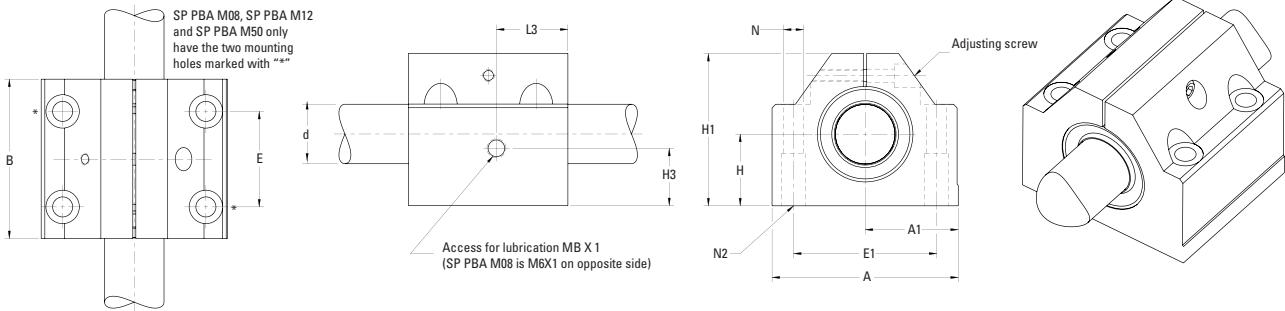
| Nominal Size d (mm) | Diametral Clearance (mm) |
|---------------------|--------------------------|
| 8                   | +23 +2                   |
| 12                  | +26 +3                   |
| 16                  | +26 +3                   |
| 20                  | +30 +4                   |
| 25                  | +30 +4                   |
| 30                  | +30 +4                   |
| 40                  | +35 +5                   |
| 50                  | +35 +5                   |

For Pillow Blocks used with LinearRace Shaft, h6 tolerance



## Metric – Super Pillow Blocks

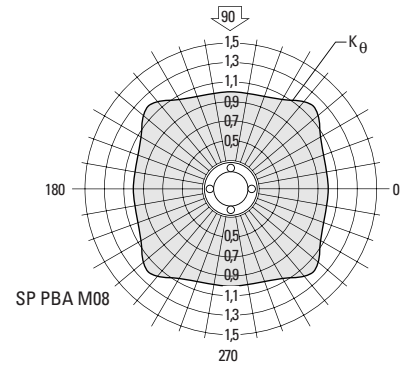
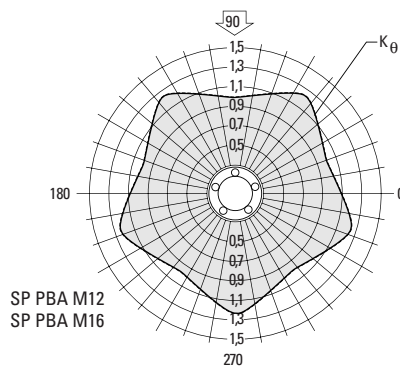
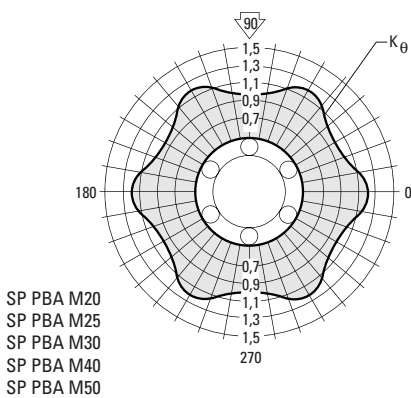
# Super Pillow Blocks (Closed Adjustable Type) for End Supported Applications



### Super Pillow Blocks (Closed Adjustable Type)

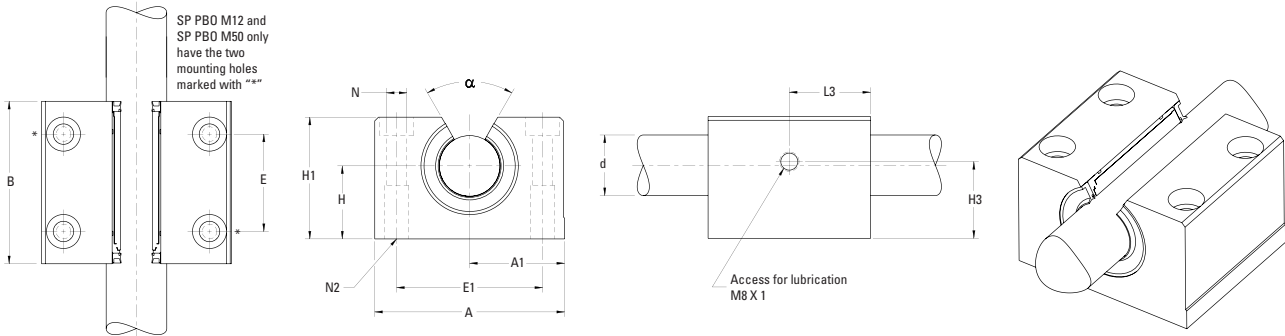
| Part Number | Dimensions (mm) |               |     |     |                |     |                   |                   |                   |                    |                 |     | Mass (kg) | Dynamic Load $W^{(1)(3)}$ (N) | Load Limit $W_0^{(2)(3)}$ (N) |
|-------------|-----------------|---------------|-----|-----|----------------|-----|-------------------|-------------------|-------------------|--------------------|-----------------|-----|-----------|-------------------------------|-------------------------------|
|             | $\varnothing d$ | H<br>+/-0,020 | H1  | A   | A1<br>+/-0,020 | B   | E<br>+/-0,1       | E1<br>+/-0,1      | H3                | L3                 | $\varnothing N$ | N2  |           |                               |                               |
| SP PBA M08  | 8               | 15            | 28  | 35  | 17,5           | 32  | 20 <sup>(6)</sup> | 25 <sup>(6)</sup> | 12 <sup>(5)</sup> | 8,5 <sup>(5)</sup> | 3,3             | M4  | 0,07      | 310                           | 340                           |
| SP PBA M12  | 12              | 18            | 35  | 43  | 21,5           | 39  | 23 <sup>(6)</sup> | 32 <sup>(6)</sup> | 10                | 10,5               | 4,3             | M5  | 0,13      | 830                           | 910                           |
| SP PBA M16  | 16              | 22            | 42  | 53  | 26,5           | 43  | 26                | 40                | 16                | 15,7               | 5,3             | M6  | 0,21      | 1020                          | 1120                          |
| SP PBA M20  | 20              | 25            | 50  | 60  | 30,0           | 54  | 32                | 45                | 13                | 20                 | 6,6             | M8  | 0,35      | 2020                          | 2220                          |
| SP PBA M25  | 25              | 30            | 60  | 78  | 39,0           | 67  | 40                | 60                | 15                | 23                 | 8,4             | M10 | 0,66      | 3950                          | 4350                          |
| SP PBA M30  | 30              | 35            | 71  | 87  | 43,5           | 79  | 45                | 68                | 16                | 26,5               | 8,4             | M10 | 0,97      | 4800                          | 5280                          |
| SP PBA M40  | 40              | 45            | 91  | 108 | 54,0           | 91  | 58                | 86                | 21,5              | 30                 | 10,5            | M12 | 1,81      | 8240                          | 9060                          |
| SP PBA M50  | 50              | 50            | 105 | 132 | 66,0           | 113 | 50                | 108               | 12,5              | 22                 | 13,5            | M16 | 3,00      | 12060                         | 13270                         |

- (1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0,33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.
- (2) The Load Limit is the maximum load that may be applied to a bearing and shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.
- (3) The load capacities W and  $W_0$  are valid for a resultant load applied at 90° with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor  $K_\theta$ , should be applied to W and  $W_0$  respectively.
- (4) For bearing diametral clearances, see Table 2.
- (5) SP PBA M08 lube hole is M6X1 tapped hole located on opposite side
- (6) SP PBA M08, SP PBA M12 and SP PBA M50 pillow blocks have only 2 mounting holes. The mounting holes on these sizes are marked in the chart above with "\*"\*



Metric – Super Pillow Blocks

# Super Pillow Blocks (Open Type) for Continuously Supported Applications



## Super Pillow Blocks (Open Type)

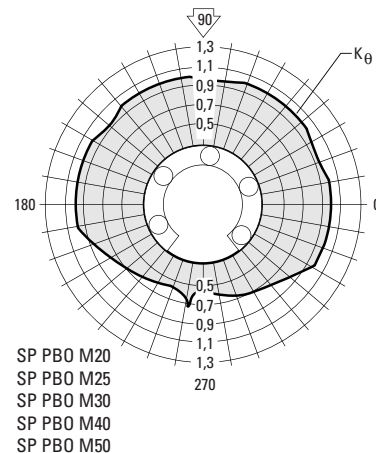
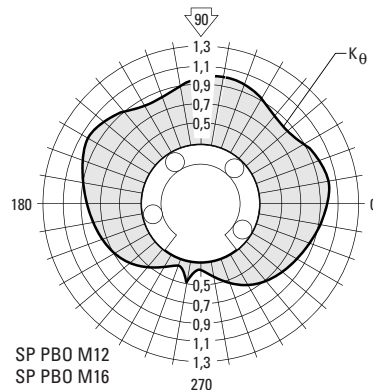
| Part Number | Dimensions (mm)       |               |     |     |                |     |                   |                   |      |      |                 |     | Angle $\alpha$ (deg) | Mass (kg) | Dynamic Load $W^{(1)(3)}$ (N) | Load Limit $W_0^{(2)(3)}$ (N) |
|-------------|-----------------------|---------------|-----|-----|----------------|-----|-------------------|-------------------|------|------|-----------------|-----|----------------------|-----------|-------------------------------|-------------------------------|
|             | $\varnothing d^{(4)}$ | H $\pm 0,020$ | H1  | A   | A1 $\pm 0,020$ | B   | E $\pm 0,1$       | E1 $\pm 0,1$      | H3   | L3   | $\varnothing N$ | N2  |                      |           |                               |                               |
| SP PBO M12  | 12                    | 18            | 35  | 43  | 21,5           | 39  | 23 <sup>(6)</sup> | 32 <sup>(6)</sup> | 10   | 10,5 | 4,3             | M5  | 70                   | 0,11      | 1060                          | 1170                          |
| SP PBO M16  | 16                    | 22            | 42  | 53  | 26,5           | 43  | 26                | 40                | 10,8 | 15,7 | 5,3             | M6  | 58                   | 0,19      | 1280                          | 1410                          |
| SP PBO M20  | 20                    | 25            | 50  | 60  | 30,0           | 54  | 32                | 45                | 13   | 20   | 6,6             | M8  | 60                   | 0,30      | 2100                          | 2310                          |
| SP PBO M25  | 25                    | 30            | 60  | 78  | 39,0           | 67  | 40                | 60                | 15   | 23   | 8,4             | M10 | 60                   | 0,60      | 4130                          | 4540                          |
| SP PBO M30  | 30                    | 35            | 71  | 87  | 43,5           | 79  | 45                | 68                | 20,5 | 27   | 8,4             | M10 | 58                   | 0,92      | 5020                          | 5520                          |
| SP PBO M40  | 40                    | 45            | 91  | 108 | 54,0           | 91  | 58                | 86                | 21,5 | 30   | 10,5            | M12 | 55                   | 1,65      | 8620                          | 9480                          |
| SP PBO M50  | 50                    | 50            | 113 | 132 | 66,0           | 113 | 50                | 108               | 12,5 | 22   | 13,5            | M16 | 55                   | 2,60      | 12500                         | 13750                         |

- (1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0,33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.
- (2) The Load Limit is the maximum load that may be applied to a bearing and shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.
- (3) The load capacities  $W$  and  $W_0$  are valid for a resultant load applied at  $90^\circ$  with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor  $K_\theta$  should be applied to  $W$  and  $W_0$  respectively. Open type bearings have reduced load capacities when used in pull-off situations.
- (4) For bearing diametral clearances, see Table 3.
- (5) SP PBO M12 and SP PBO M50 pillow blocks have only 2 mounting holes. The mounting holes on these sizes are marked in the chart above with "\*"

Table 3 - Standard Diametral Clearances (Open Type)

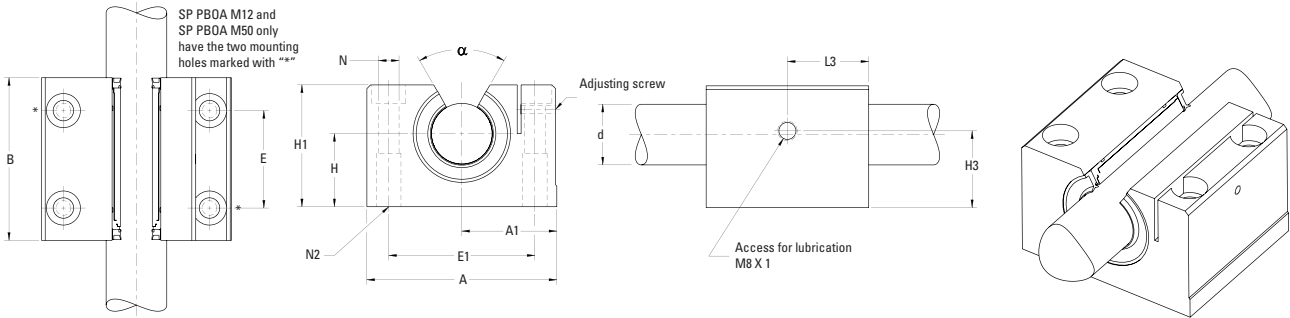
| Nominal Size d (mm) | Diametral Clearance ( $\mu$ ) |
|---------------------|-------------------------------|
| 12                  | +26 +3                        |
| 16                  | +26 +3                        |
| 20                  | +30 +4                        |
| 25                  | +30 +4                        |
| 30                  | +30 +4                        |
| 40                  | +35 +5                        |
| 50                  | +35 +5                        |

For Pillow Blocks used with Linear-Race Shaft, h6 tolerance



## Metric – Super Pillow Blocks

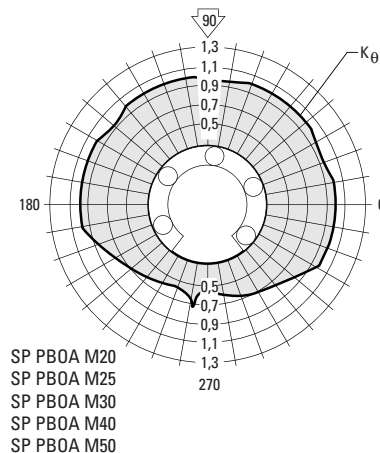
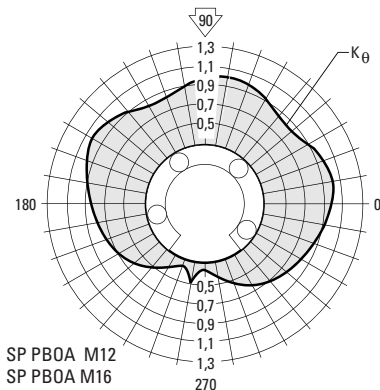
# Super Pillow Blocks (Open Adjustable Type) for Continuously Supported Applications



### Super Pillow Blocks (Open Adjustable Type)

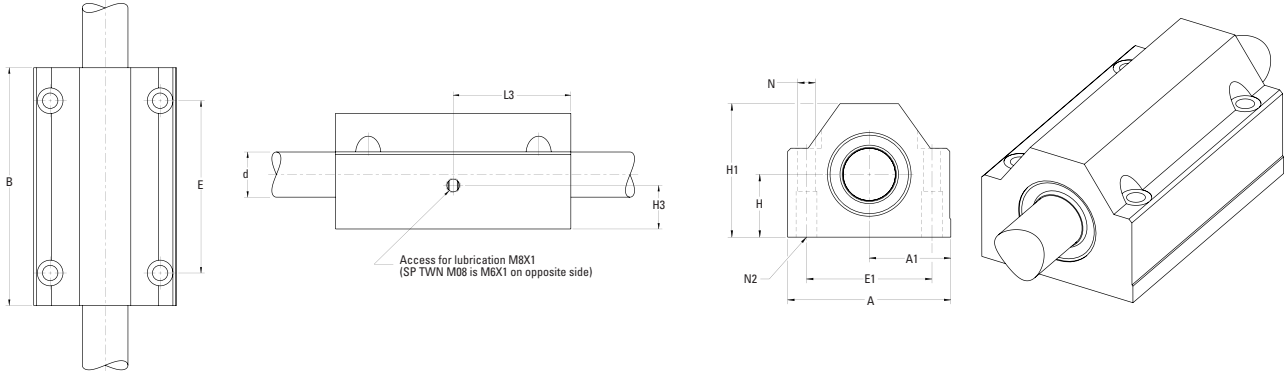
| Part Number                | Dimensions (mm) |               |     |     |                |     |             |              |      |      |                 |     | Angle<br>$\alpha$<br>(deg) | Mass<br>(kg) | Dynamic<br>Load<br>$W^{(1)(3)}$<br>(N) | Load<br>Limit<br>$W_0^{(2)(3)}$<br>(N) |
|----------------------------|-----------------|---------------|-----|-----|----------------|-----|-------------|--------------|------|------|-----------------|-----|----------------------------|--------------|--|--|
|                            | $\varnothing d$ | H<br>+/-0,020 | H1  | A   | A1<br>+/-0,020 | B   | E<br>+/-0,1 | E1<br>+/-0,1 | H3   | L3   | $\varnothing N$ | N2  |                            |              |  |  |
| SP PBOA M12 <sup>(4)</sup> | 12              | 18            | 35  | 43  | 21,5           | 39  | 23          | 32           | 10   | 10,5 | 4,3             | M5  | 70                         | 0,11         | 1060                                   | 1170                                   |
| SP PBOA M16                | 16              | 22            | 42  | 53  | 26,5           | 43  | 26          | 40           | 10,8 | 15,7 | 5,3             | M6  | 58                         | 0,19         | 1280                                   | 1410                                   |
| SP PBOA M20                | 20              | 25            | 50  | 60  | 30,0           | 54  | 32          | 45           | 13   | 20   | 6,6             | M8  | 60                         | 0,30         | 2100                                   | 2310                                   |
| SP PBOA M25                | 25              | 30            | 60  | 78  | 39,0           | 67  | 40          | 60           | 15   | 23   | 8,4             | M10 | 60                         | 0,60         | 4130                                   | 4540                                   |
| SP PBOA M30                | 30              | 35            | 71  | 87  | 43,5           | 79  | 45          | 68           | 20,5 | 27   | 8,4             | M10 | 58                         | 0,92         | 5020                                   | 5520                                   |
| SP PBOA M40                | 40              | 45            | 91  | 108 | 54,0           | 91  | 58          | 86           | 21,5 | 30   | 10,5            | M12 | 55                         | 1,65         | 8620                                   | 9480                                   |
| SP PBOA M50                | 50              | 50            | 113 | 132 | 66,0           | 113 | 50          | 108          | 12,5 | 22   | 13,5            | M16 | 55                         | 2,60         | 12500                                  | 13750                                  |

- (1) For rated travel life of 100 km. For longer travel lives, reduce load to  $W \cdot (100/L)^{0,33}$  where L (km) is the required travel life. Do not exceed the Dynamic Load Rating for travel life of less than 100 km.
- (2) The Load Limit is the maximum load that may be applied to a bearing and shaft. It is important to analyze the application so that peak and/or shock loads do not exceed the Load Limit.
- (3) The load capacities  $W$  and  $W_0$  are valid for a resultant load applied at  $90^\circ$  with the ball tracks oriented as shown in the polar graphs below. If the resultant acts along another direction, the appropriate multiplicative correction factor  $K_\theta$  should be applied to  $W$  and  $W_0$  respectively. Open type bearings have reduced load capacities when used in pull-off situations.
- (4) SP PBOA M12 and SP PBOA M50 pillow blocks have only 2 mounting holes. The mounting holes on these sizes are marked in the chart above with "\*\*\*"



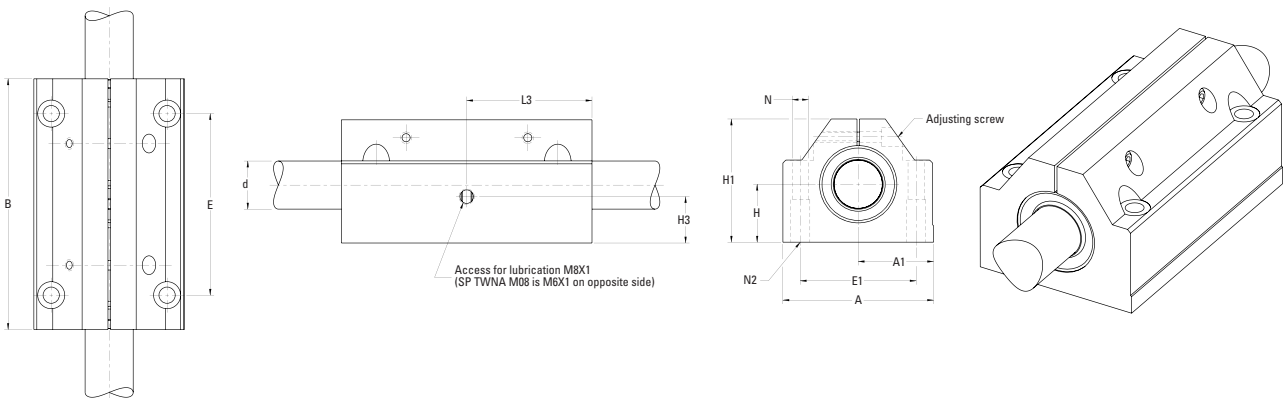
Metric – Super Pillow Blocks

# Super Twin Pillow Blocks (Closed Type) for End Supported Applications



| Part Number | Dimensions (mm)       |               |     |     |                |     |             |              |                   |                   |                 |     | Mass (kg) | Dynamic Load $W^{(1)(3)}$ (N) | Load Limit $W_0^{(2)(3)}$ (N) |
|-------------|-----------------------|---------------|-----|-----|----------------|-----|-------------|--------------|-------------------|-------------------|-----------------|-----|-----------|-------------------------------|-------------------------------|
|             | $\varnothing d^{(4)}$ | H $\pm 0,020$ | H1  | A   | A1 $\pm 0,020$ | B   | E $\pm 0,1$ | E1 $\pm 0,1$ | H3                | L3                | $\varnothing N$ | N2  |           |                               |                               |
| SP TWN M08  | 8                     | 15            | 28  | 35  | 17,5           | 62  | 50          | 25           | 12 <sup>(5)</sup> | 31 <sup>(5)</sup> | 3,3             | M4  | 0,15      | 500                           | 550                           |
| SP TWN M12  | 12                    | 18            | 35  | 43  | 21,5           | 76  | 56          | 32           | 10                | 38                | 4,3             | M5  | 0,27      | 1350                          | 1490                          |
| SP TWN M16  | 16                    | 22            | 42  | 53  | 26,5           | 84  | 64          | 40           | 16                | 42                | 5,3             | M6  | 0,41      | 1660                          | 1830                          |
| SP TWN M20  | 20                    | 25            | 50  | 60  | 30,0           | 104 | 76          | 45           | 13                | 52                | 6,6             | M8  | 0,66      | 3280                          | 3610                          |
| SP TWN M25  | 25                    | 30            | 60  | 78  | 39,0           | 130 | 94          | 60           | 15                | 65                | 8,4             | M10 | 1,22      | 6410                          | 7050                          |
| SP TWN M30  | 30                    | 35            | 71  | 87  | 43,5           | 152 | 106         | 68           | 16                | 76                | 8,4             | M10 | 1,90      | 7800                          | 8580                          |
| SP TWN M40  | 40                    | 45            | 91  | 108 | 54,0           | 176 | 124         | 86           | 21,5              | 88                | 10,5            | M12 | 3,57      | 13380                         | 14720                         |
| SP TWN M50  | 50                    | 50            | 105 | 132 | 66,0           | 224 | 160         | 108          | 20                | 112               | 13,5            | M16 | 6,30      | 19590                         | 21550                         |

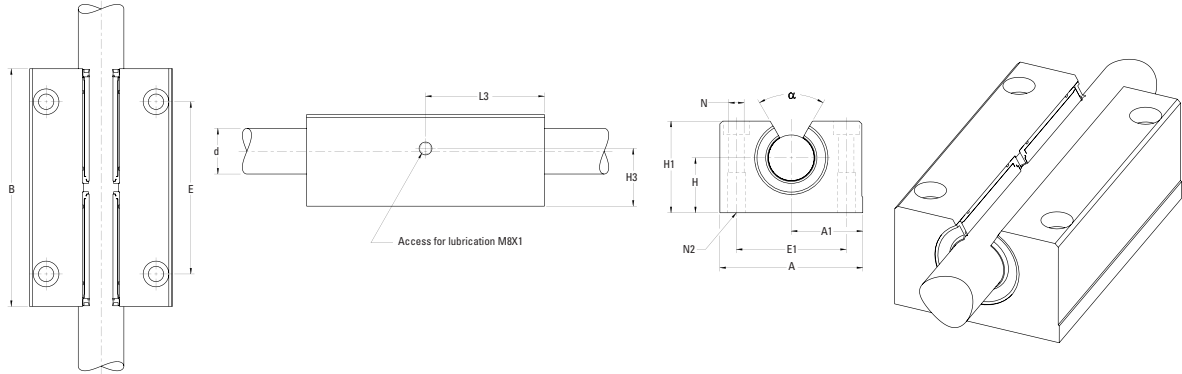
# (Closed Adjustable Type) for End Supported Applications



| Part Number | Dimensions (mm) |               |     |     |                |     |             |              |                   |                   |                 |     | Mass (kg) | Dynamic Load $W^{(1)(3)}$ (N) | Load Limit $W_0^{(2)(3)}$ (N) |
|-------------|-----------------|---------------|-----|-----|----------------|-----|-------------|--------------|-------------------|-------------------|-----------------|-----|-----------|-------------------------------|-------------------------------|
|             | $\varnothing d$ | H $\pm 0,020$ | H1  | A   | A1 $\pm 0,020$ | B   | E $\pm 0,1$ | E1 $\pm 0,1$ | H3                | L3                | $\varnothing N$ | N2  |           |                               |                               |
| SP TWNA M08 | 8               | 15            | 28  | 35  | 17,5           | 62  | 50          | 25           | 12 <sup>(5)</sup> | 31 <sup>(5)</sup> | 3,3             | M4  | 0,15      | 500                           | 550                           |
| SP TWNA M12 | 12              | 18            | 35  | 43  | 21,5           | 76  | 56          | 32           | 10                | 38                | 4,3             | M5  | 0,27      | 1350                          | 1490                          |
| SP TWNA M16 | 16              | 22            | 42  | 53  | 26,5           | 84  | 64          | 40           | 12                | 42                | 5,3             | M6  | 0,41      | 1660                          | 1830                          |
| SP TWNA M20 | 20              | 25            | 50  | 60  | 30,0           | 104 | 76          | 45           | 13                | 52                | 6,6             | M8  | 0,66      | 3280                          | 3610                          |
| SP TWNA M25 | 25              | 30            | 60  | 78  | 39,0           | 130 | 94          | 60           | 15                | 65                | 8,4             | M10 | 1,22      | 6410                          | 7050                          |
| SP TWNA M30 | 30              | 35            | 71  | 87  | 43,5           | 152 | 106         | 68           | 20                | 76                | 8,4             | M10 | 1,90      | 7800                          | 8580                          |
| SP TWNA M40 | 40              | 45            | 91  | 108 | 54,0           | 176 | 124         | 86           | 21,5              | 88                | 10,5            | M12 | 3,57      | 13380                         | 14720                         |
| SP TWNA M50 | 50              | 50            | 105 | 132 | 66,0           | 224 | 160         | 108          | 20                | 112               | 13,5            | M16 | 6,30      | 19590                         | 21550                         |

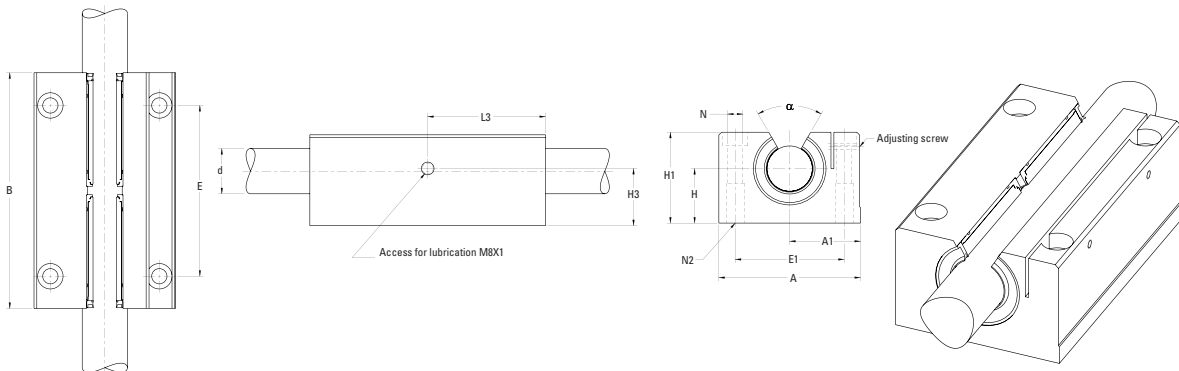
See footnotes (1) (2) (3) (4) (5) (6) on page 146. For diametral clearances, see single versions of pillow block.

# Super Twin Pillow Blocks (Open Type) for Continuously Supported Applications



| Part Number | Dimensions (mm)       |               |    |     |                |     |             |              |      |     |                 |     | Angle<br>$\alpha$<br>(deg) | Mass<br>(kg) | Dynamic<br>Load $W_0^{(1)(3)}$<br>(N) | Load Limit<br>$W_0^{(2)(3)}$<br>(N) |
|-------------|-----------------------|---------------|----|-----|----------------|-----|-------------|--------------|------|-----|-----------------|-----|----------------------------|--------------|---------------------------------------|-------------------------------------|
|             | $\varnothing d^{(4)}$ | H<br>+/-0,020 | H1 | A   | A1<br>+/-0,020 | B   | E<br>+/-0,1 | E1<br>+/-0,1 | H3   | L3  | $\varnothing N$ | N2  |                            |              |                                       |                                     |
| SP TWNO M12 | 12                    | 18            | 28 | 43  | 21.5           | 76  | 56          | 32           | 10   | 38  | 4,3             | M5  | 70                         | 0,22         | 1350                                  | 1490                                |
| SP TWNO M16 | 16                    | 22            | 35 | 53  | 26.5           | 84  | 64          | 40           | 18   | 42  | 5,3             | M6  | 58                         | 0,37         | 1660                                  | 1830                                |
| SP TWNO M20 | 20                    | 25            | 41 | 60  | 30.0           | 104 | 76          | 45           | 16   | 52  | 6,6             | M8  | 60                         | 0,57         | 3280                                  | 3610                                |
| SP TWNO M25 | 25                    | 30            | 50 | 78  | 39.0           | 130 | 94          | 60           | 15   | 65  | 8,4             | M10 | 60                         | 1,15         | 6410                                  | 7050                                |
| SP TWNO M30 | 30                    | 35            | 60 | 87  | 43.5           | 152 | 106         | 68           | 16   | 76  | 8,4             | M10 | 58                         | 1,76         | 7800                                  | 8580                                |
| SP TWNO M40 | 40                    | 45            | 77 | 108 | 54.0           | 176 | 124         | 86           | 21,5 | 88  | 10,5            | M12 | 55                         | 3,22         | 13380                                 | 14720                               |
| SP TWNO M50 | 50                    | 50            | 88 | 130 | 66.0           | 224 | 160         | 108          | 20   | 112 | 13,5            | M16 | 55                         | 5,50         | 19590                                 | 21550                               |

# (Open Adjustable Type) for Continuously Supported Applications



| Part Number  | Dimensions (mm) |               |    |     |                |     |             |              |      |     |                 |     | Angle<br>$\alpha$<br>(deg) | Mass<br>(kg) | Dynamic<br>Load $W_0^{(1)(3)}$<br>(N) | Load Limit<br>$W_0^{(2)(3)}$<br>(N) |
|--------------|-----------------|---------------|----|-----|----------------|-----|-------------|--------------|------|-----|-----------------|-----|----------------------------|--------------|---------------------------------------|-------------------------------------|
|              | $\varnothing d$ | H<br>+/-0,020 | H1 | A   | A1<br>+/-0,020 | B   | E<br>+/-0,1 | E1<br>+/-0,1 | H3   | L3  | $\varnothing N$ | N2  |                            |              |                                       |                                     |
| SP TWNOA M12 | 12              | 18            | 28 | 43  | 21.5           | 76  | 56          | 32           | 10   | 38  | 4,3             | M5  | 70                         | 0,22         | 1350                                  | 1490                                |
| SP TWNOA M16 | 16              | 22            | 35 | 53  | 26.5           | 84  | 64          | 40           | 18   | 42  | 5,3             | M6  | 58                         | 0,37         | 1660                                  | 1830                                |
| SP TWNOA M20 | 20              | 25            | 41 | 60  | 30.0           | 104 | 76          | 45           | 16   | 52  | 6,6             | M8  | 60                         | 0,57         | 3280                                  | 3610                                |
| SP TWNOA M25 | 25              | 30            | 50 | 78  | 39.0           | 130 | 94          | 60           | 15   | 65  | 8,4             | M10 | 60                         | 1,15         | 6410                                  | 7050                                |
| SP TWNOA M30 | 30              | 35            | 60 | 87  | 43.5           | 152 | 106         | 68           | 16   | 76  | 8,4             | M10 | 58                         | 1,76         | 7800                                  | 8580                                |
| SP TWNOA M40 | 40              | 45            | 77 | 108 | 54.0           | 176 | 124         | 86           | 21,5 | 88  | 10,5            | M12 | 55                         | 3,22         | 13380                                 | 14720                               |
| SP TWNOA M50 | 50              | 50            | 88 | 130 | 66.0           | 224 | 160         | 108          | 20   | 112 | 13,5            | M16 | 55                         | 5,50         | 19590                                 | 21550                               |

See footnotes (1) (2) (3) (4) on page 147. For diametral clearances, see single versions of pillow block.



## Accessories



Described here are accessories for Linear Ball Bushing Bearings and pillow blocks including retaining rings, external seals, integral seals and resilient mounts.

## Metric – Accessories

# Retaining Rings

### Internal Retaining Rings

Push-in internal retaining rings, as shown, are for use with Metric Ball Bushing Bearings. Each retaining ring is installed inside the housing bore at each end of the bearing.

(Dimensions in mm)

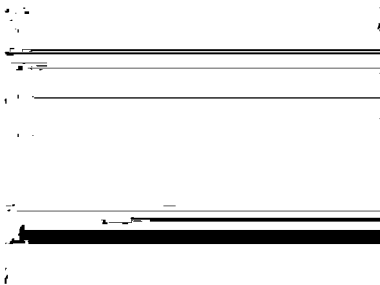


| Part Number | Use with Ball Bushing Bearing Number | Nominal Shaft Diameter | Nominal Housing Bore A | Minimum End Space required B |
|-------------|--------------------------------------|------------------------|------------------------|------------------------------|
| PR M08      | SP M08 or MA M08                     | 8                      | 16                     | 1,5                          |
| PR M12      | SP M12 or MA M12                     | 12                     | 22                     | 2,0                          |
| PR M16      | SSE M16 or MA M16                    | 16                     | 26                     | 2,0                          |
| PR M20      | SSE M20 or MA M20                    | 20                     | 32                     | 2,0                          |
| PR M25      | SSE M25 or MA M25                    | 25                     | 40                     | 2,0                          |
| PR M30      | SSE M30 or MA M30                    | 30                     | 47                     | 2,0                          |
| PR M40      | SSE M40 or MA M40                    | 40                     | 62                     | 2,5                          |

### External Retaining Rings

External retaining rings are used to form one or two shoulders on the O.D. of the Metric Ball Bushing Bearings.

(Dimensions in mm)



| Part Number | Use with Ball Bushing Bearing Number | Nominal Shaft Diameter | T    | Free Diameter D |
|-------------|--------------------------------------|------------------------|------|-----------------|
| WR M08      | SP M08 or MA M08                     | 8                      | 1,00 | 14,7            |
| WR M12      | SP M12 or MA M12                     | 12                     | 1,20 | 20,5            |
| WR M16      | SSE M16 or MA M16                    | 16                     | 1,20 | 24,2            |
| WR M20      | SSE M20 or MA M20                    | 20                     | 1,50 | 29,6            |
| WR M25      | SSE M25 or MA M25                    | 25                     | 1,75 | 36,5            |
| WR M30      | SSE M30 or MA M30                    | 30                     | 1,75 | 43,5            |
| WR M40      | SSE M40 or MA M40                    | 40                     | 2,00 | 57,8            |

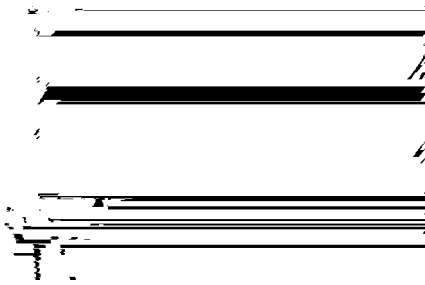
Metric – Accessories

## External Seals

### External Seals for Closed Metric Ball Bushing Bearings

Double-acting seals for use in fixed diameter housings.

(Dimensions in mm)

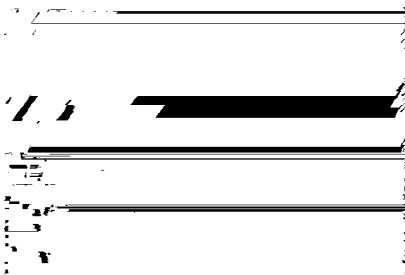


| Part Number | Use with Ball Bushing Bearing Number | Nominal Shaft Diameter | T   | Nominal (1) Housing Diameter D |
|-------------|--------------------------------------|------------------------|-----|--------------------------------|
| SM 08       | SP M08 or MA M08                     | 8                      | 3,0 | 16                             |
| SM 12       | SP M12 or MA M12                     | 12                     | 3,0 | 22                             |
| SM 16       | SSE M16 or MA M16                    | 16                     | 3,0 | 26                             |
| SM 20       | SSE M20 or MA M20                    | 20                     | 4,0 | 32                             |
| SM 25       | SSE M25 or MA M25                    | 25                     | 4,0 | 40                             |
| SM 30       | SSE M30 or MA M30                    | 30                     | 5,0 | 47                             |
| SM 40       | SSE M40 or MA M40                    | 40                     | 5,0 | 62                             |

### External Seals for Adjustable Metric Ball Bushing Bearings

Double-acting seals for use in adjustable diameter housings. Series ADJ seals have a radial slot through the circumference to facilitate diameter adjustment.

(Dimensions in mm)

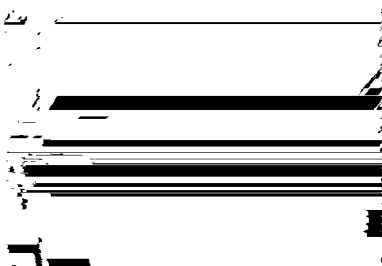


| Part Number | Use with Ball Bushing Bearing Number | Nominal Shaft Diameter | T   | Nominal (1) Housing Diameter D |
|-------------|--------------------------------------|------------------------|-----|--------------------------------|
| SM 08 ADJ   | SP M08 or MA M08                     | 8                      | 3,0 | 16                             |
| SM 12 ADJ   | SP M12 or MA M12                     | 12                     | 3,0 | 22                             |
| SM 16 ADJ   | SSE M16 or MA M16                    | 16                     | 3,0 | 26                             |
| SM 20 ADJ   | SSE M20 or MA M20                    | 20                     | 4,0 | 32                             |
| SM 25 ADJ   | SSE M25 or MA M25                    | 25                     | 4,0 | 40                             |
| SM 30 ADJ   | SSE M30 or MA M30                    | 30                     | 5,0 | 47                             |
| SM 40 ADJ   | SSE M40 or MA M40                    | 40                     | 5,0 | 62                             |

### External Seals for Open Metric Ball Bushing Bearings

Double-acting seals for use in open type housings.

(Dimensions in mm)



| Part Number | Use with Ball Bushing Bearing Number | Nominal Shaft Diameter | T    | Free Diameter D |
|-------------|--------------------------------------|------------------------|------|-----------------|
| SM 12 OPN   | SP M12 or MA M12                     | 12                     | 3,20 | 22              |
| SM 16 OPN   | SSE M16 or MA M16                    | 16                     | 3,20 | 26              |
| SM 20 OPN   | SSE M20 or MA M20                    | 20                     | 4,20 | 32              |
| SM 25 OPN   | SSE M25 or MA M25                    | 25                     | 4,20 | 40              |
| SM 30 OPN   | SSE M30 or MA M30                    | 30                     | 5,15 | 47              |
| SM 40 OPN   | SSE M40 or MA M40                    | 40                     | 5,15 | 62              |

(1) For use in tolerance zones up to H7.

## 60 Case Shafting

# 60 Case Shafting



|                                      |                  |
|--------------------------------------|------------------|
| <b>60 Case Shafting</b> .....        | <b>154 - 208</b> |
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| <b>Inch 60 Case Shafting</b> .....   | <b>162 - 175</b> |
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| Assemblies .....                     | 169 - 172        |
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| Support Rails and Support Rail       |                  |
| Assemblies .....                     | 179 - 181        |
| Support Block .....                  | 182              |
| Quick Shaft .....                    | 183 - 186        |
| Special Machining .....              | 187 - 208        |

### Standard 60 Case Shaft Size and Availability Chart

| Material          | Carbon Steel |     |         |      |     |     |     |     |     |     | 440 C Stainless Steel |     |     |         |            | 52100 Tubular |     | 316 SS |     |
|-------------------|--------------|-----|---------|------|-----|-----|-----|-----|-----|-----|-----------------------|-----|-----|---------|------------|---------------|-----|--------|-----|
| Hardness          | 60 min.      |     |         |      |     |     |     |     |     |     | 50 min.               |     |     | 55 min. |            | 58 min.       |     | 20-25  |     |
| Tolerance Class   | L            |     |         |      |     | S   | N   |     | D   | XL  | G                     | L   | S   | G       | Instrument | L             | S   | L      |     |
| Optional Features | L            | DC  | PD CPPE | CPPE | PD  | S   | DC  | N   |     |     |                       | L   | PD  |         |            |               |     |        |     |
| 1/8"              |              |     |         |      |     |     |     |     |     |     |                       |     |     |         |            |               |     |        |     |
| 3/16"             | •            |     |         |      |     |     |     |     |     |     |                       |     |     |         |            |               |     |        |     |
| 1/4"              | •            |     |         |      |     | •   |     | •   |     |     | •                     | •   |     | •       | •          |               |     |        |     |
| 3/8"              | •            |     |         |      |     | •   |     | •   |     |     | •                     | •   |     | •       | •          |               |     |        | •   |
| 1/2"              | •            |     | •       | •    | •   | •   |     | •   |     |     | •                     | •   | •   | •       | •          |               |     |        | •   |
| 5/8"              | •            |     | •       | •    | •   |     |     | •   |     |     | •                     | •   | •   | •       | •          |               |     |        |     |
| 3/4"              | •            | •   | •       | •    | •   | •   | •   | •   |     |     | •                     | •   | •   | •       | •          |               | •   | •      | •   |
| 7/8"              | •            | •   |         |      |     |     |     | •   | •   |     |                       |     |     |         |            |               |     |        |     |
| 1"                | •            | •   | •       | •    | •   | •   | •   | •   | •   |     | •                     | •   | •   | •       | •          |               | •   | •      | •   |
| 1 1/8"            | •            | •   |         |      |     |     |     | •   | •   |     |                       |     |     |         |            |               |     |        |     |
| 1 1/4"            | •            | •   | •       | •    | •   | •   | •   | •   | •   |     | •                     | •   | •   |         |            |               |     |        |     |
| 1 3/8"            | •            |     |         |      |     |     |     | •   |     |     |                       |     |     |         |            |               |     |        |     |
| 1 1/2"            | •            | •   | •       | •    | •   | •   | •   | •   | •   |     | •                     | •   | •   |         |            | •             | •   | •      |     |
| 1 5/8"            | •            |     |         |      |     |     |     | •   |     |     |                       |     |     |         |            |               |     |        |     |
| 1 3/4"            | •            | •   |         |      |     |     |     | •   | •   |     |                       |     |     |         |            |               |     |        |     |
| 2"                | •            | •   | •       | •    | •   | •   | •   | •   | •   | •   | •                     | •   | •   |         |            | •             | •   |        |     |
| 2 1/4"            | •            | •   |         |      |     |     |     | •   | •   |     |                       |     |     |         |            |               |     |        |     |
| 2 1/2"            | •            | •   |         |      |     |     |     | •   | •   |     |                       | •   |     | •       |            |               | •   | •      |     |
| 3"                | •            | •   |         |      |     |     |     | •   | •   |     | •                     |     |     |         |            | •             | •   |        |     |
| 3 1/2"            | •            | •   |         |      |     |     |     | •   |     |     |                       |     |     |         |            | •             | •   |        |     |
| 4"                | •            |     |         |      |     |     |     |     |     | •   |                       |     |     |         |            | •             | •   |        | 168 |
| Catalog Page      | 163          | 165 | 164     | 164  | 164 | 163 | 165 | 163 | 163 | 163 | 165                   | 166 | 166 | 166     | 167        | 167           | 167 | 167    | 168 |

| Material          | Carbon Steel |     |     | 440 C SS    |
|-------------------|--------------|-----|-----|-------------|
| Hardness          | 60 min.      |     |     | 50 min.     |
| Tolerance Class   | MM (ISO h6)  |     |     | MM (ISO h6) |
| Optional Features | MM           | T1  | T2  |             |
| 5 mm              | •            |     |     | •           |
| 8 mm              | •            |     |     | •           |
| 10 mm             | •            |     |     | •           |
| 12 mm             | •            | •   | •   | •           |
| 15 mm             | •            | •   | •   | •           |
| 16 mm             | •            | •   | •   | •           |
| 20 mm             | •            | •   | •   | •           |
| 25 mm             | •            | •   | •   | •           |
| 30 mm             | •            | •   | •   | •           |
| 40 mm             | •            | •   | •   | •           |
| 50 mm             | •            |     |     | •           |
| 60 mm             | •            |     |     | •           |
| 80 mm             | •            |     |     | •           |
| Catalog Page      | 176          | 177 | 177 | 178         |

Thomson 60 Case shafting is sold as cut-to-length (CTL), random length (RL), special machined (SM), and as quick shaft (QS).

Since Thomson grinds and hardens all of its own shafting, diameters and tolerances not listed are available as special grind and are made to order. Minimum lots may apply.

**Tolerance Classes:**

- L - For use with XA, Open and Adjustable Ball Bushing bearings and Pillow Blocks as well as Super Ball Bushing bearings and Super Smart Ball Bushing bearings
- S - For use with A type ball bushings
- N - For use with needle roller bearings
- D - For use with Thomson Die Set Ball Bushing bearings
- G - Ball Grooved for use with Thomson Super Ball bushing
- XL - For use with XR bearing (Carbon Steel)

**Optional Features:**

- PD - Predrilled
- CPPE - Chrome Plated Plain Ends
- DC - Deep Case

### Standard Support Rail Size and Availability Chart

| Type         | SR                    | SR-PD                                       | SRA                                      | SRA-SS                                       | SRA-TU                                    | LSR                      | LSR-PD   | LSRA   | LSRA-CR   | XSR                                 | XSRA   |
|--------------|-----------------------|---|--|--|---|--------------------------|--|--|---|-------------------------------------|--|
| Description  | Aluminum Support Rail | Aluminum Support Rail with Predrilled Holes | Aluminum Support Rail Carbon Steel Shaft | Aluminum Support Rail Assembly 440C SS Shaft | Aluminum Support Rail 51200 Tubular Shaft | Steel Lower Support Rail | Steel Lower Support Rail with Predrilled Holes | Steel Lower Support Rail Assembly Carbon Steel Shaft | Corrosion Resistant Steel Lower Support Rail Assembly 440C SS Shaft | Extra Rigid Cast Steel Support Rail | Extra Rigid Cast Steel Support Rail Assembly |
| 1/2"         | •                     | •   | •  | •  |   | •                        | •  |  |   |                                     |  |
| 5/8"         | •                     | •   | •  | •  |   | •                        | •  | •  | •   |                                     |  |
| 3/4"         | •                     | •   | •  | •  | •   | •                        | •  | •  | •   |                                     |  |
| 1"           | •                     | •   | •  | •  | •   | •                        | •  | •  | •   |                                     |  |
| 1 1/4"       | •                     | •   | •  | •  |   | •                        | •  | •  | •   |                                     |  |
| 1 1/2"       | •                     | •   | •  | •  | •   | •                        | •  | •  | •   |                                     |  |
| 2"           | •                     | •   | •  | •  | •   | •                        | •  |  |   | •                                   | •  |
| 2 1/2"       |                       |   |  |  |   | •                        | •  |  |   |                                     |  |
| 3"           |                       |   |  |  |   | •                        | •  |  |   | •                                   | •  |
| 4"           |                       |   |  |  |   | •                        | •  |  |   |                                     |  |
| Catalog Page | 171                   | 171   | 172                                      | 172  | 172                                       | 171                      | 171  | 172  | 172   | 171                                 | 172  |

### Standard Support Rail Assembly Size and Availability Chart

| Type         | SRM | SRM T1   | SRM T2   | SRAM T1  | SRAM T2  | LSRM                     | LSRM T1  | LSRM T2  | LSRA M   | LSRA M CR                 |
|--------------|-----|--|--|--|--|--------------------------|--|--|--|---------------------------|
| Description  |     | Steel Lower Support Rail Assembly Carbon Steel Shaft | Steel Lower Support Rail with Predrilled Holes T2 Hole Pattern | Aluminum Support Rail Assembly with Predrilled Holes T1 Hole Pattern | Aluminum Support Rail Assembly with Predrilled Holes T2 Hole Pattern | Steel Lower Support Rail | Steel Lower Support Rail with Predrilled Holes T1 Hole Pattern | Steel Lower Support Rail with Predrilled Holes T2 Hole Pattern | Steel Lower Support Rail Assembly Carbon Steel Shaft | Corrosion Resistant Steel |
| 12mm         | •   | •  | •  | •  | •  | •                        | •  | •  |  |                           |
| 16mm         | •   | •  | •  | •  | •  | •                        | •  | •  | •  | •                         |
| 20mm         | •   | •  | •  | •  | •  | • <sup>1</sup>           | • <sup>1</sup>   | • <sup>1</sup>   | • <sup>1</sup>                                       | • <sup>1</sup>            |
| 25mm         | •   | •  | •  | •  | •  | •                        | •  | •  | •  | •                         |
| 30mm         | •   | •  | •  | •  | •  | •                        | •  | •  | •  | •                         |
| 40mm         | •   | •  | •  | •  | •  | • <sup>1</sup>           | • <sup>1</sup>   | • <sup>1</sup>   | • <sup>1</sup>                                       | • <sup>1</sup>            |
| Catalog Page | 181 | 181  | 181  | 181  | 181  | 181                      | 181  | 181  | 181  | 181                       |

### Standard Support Block Size and Availability Chart

| Type         | ASB                    | FSB                            | SB                  | WM               |
|--------------|------------------------|--------------------------------|---------------------|------------------|
| Description  | Aluminum Support Block | Flanged Aluminum Support Block | Steel Support Block | Waymount Support |
| 1/4"         | •                      |                                | •                   |                  |
| 3/8"         | •                      |                                | •                   |                  |
| 1/2"         | •                      | •                              | •                   | •                |
| 5/8"         |                        |                                | •                   |                  |
| 3/4"         | •                      | •                              | •                   |                  |
| 1"           | •                      | •                              | •                   | •                |
| 1 1/4"       |                        | •                              | •                   |                  |
| 1 1/2"       | •                      |                                | •                   |                  |
| 2"           |                        |                                |                     | •                |
| 3"           |                        |                                |                     | •                |
| 4"           |                        |                                |                     | •                |
| Catalog Page | 174                    | 175                            | 174                 | 175              |

| Type         | ASBM                   | SBM                 |
|--------------|------------------------|---------------------|
| Description  | Aluminum Support Block | Steel Support Block |
| 8mm          | •                      | •                   |
| 12mm         | •                      | •                   |
| 16mm         | •                      | •                   |
| 20mm         | •                      | •                   |
| 25mm         | •                      | •                   |
| 30mm         | •                      | •                   |
| 40mm         | •                      | •                   |
| Catalog Page | 182                    | 182                 |

<sup>1</sup>Not all sizes are stocked, minimum order quantities may apply.

## 60 Case Product Overview

For over 50 years Thomson has been producing Precision Linear Shafting for the Thomson Linear Ball Bushing and various other applications.

- We are one of a few Linear Motion component suppliers producing their own shafting.
- We offer the largest selection of linear shafting, not just the popular sizes.
- We offer a complete Linear Motion solution not just one component of a linear system.
- We offer the widest range of inch and metric shafting, support rails and support blocks in the market today.
- We continually optimize our processes to ensure optimal bearing performance and extended life.
- We perform thousands of hours of laboratory testing per year to continually evaluate our products.

While shafts may appear the same to the untrained eye on the surface, there are significant performance differences due to the manufacturer's selected standards and the manufacturing processes used to achieve them. Thomson 60 Case was developed and is continually enhanced because of our goal to provide a consistent finish, roundness, straightness, cylindricity case hardness and depth on all shafting for the demands of a linear bearing. Unlike common shafting, Thomson 60 Case shafting is manufactured to the highest quality standards in an ISO 9000:2000 registered facility. Our techniques have been continuously upgraded with proprietary knowledge gained from over 50 years of manufacturing experience. Using Thomson 60 Case with Thomson Ball Bushing bearings ensures optimal bearing performance and travel life.

### Assortment

Thomson 60 Case is available from stock in Carbon Steel, 440 C Stainless Steel, 52100 Tubular, 316 Stainless Steel, Carbon Steel Chrome Plated, Carbon Steel Predrilled, and 440 C Stainless Predrilled from 3/16 to 4". Thomson 60 Case can be mounted or delivered pre-assembled, in three configurations: type SR standard support rails, type LSR low profile support rails and type XSR extra rigid support rails. Contact Thomson or review the catalog datasheets to see available diameters for the different materials. Thomson has the widest range of materials and diameters available on the market from one source.



### Material

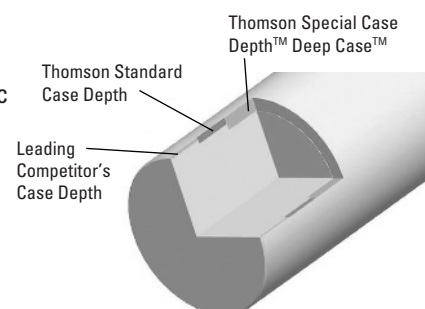
Thomson 60 Case carbon steel shafting is made of high quality specially developed alloy steel. When it comes to linear shafting no other manufacturers have set such high standards or specifications for the raw steel used in the production of linear shafting. The chemical properties of the steel are customized to provide consistent, homogenous microstructure and proper response to thermal processing. When you use Thomson 60 Case you can be confident you get consistent material from shaft to shaft.

### Case Hardness

All Thomson 60 Case is induction hardened and the hardness varies by material type. Thomson 60 Case carbon steel shaft is induction hardened to a 60 Rc min. The Thomson 440C "corrosion resistant" stainless steel shafting is hardened to a min. The 316 Thomson "corrosion proof" stainless steel is not hardened. The Thomson 52100 Tubular shafting is hardened to a 58 Rc min.

### Case Depth

The case depth on all Thomson 60 Case Shafting is precisely controlled for consistent quality and optimal performance. The extremely hard surface minimizes wear when acting as an inner race of a linear bearing, is resistant to seal lip wear, nicks and scratches for your application needs. The Thomson 60 Case standard case depth is, in some cases, double competitor shafting. This deeper standard case depth provides a stronger, more consistent homogenous microstructure for a linear bearing to run on leading to an increase in shaft life. For special applications Thomson offers deep case in carbon steel, where the case depth is two times the normal depth. For specific case depths refer to catalog datasheets.



## Introduction

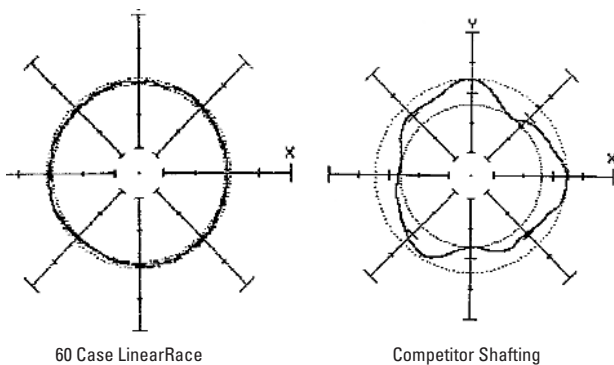
### Surface Finish

Surface is the key factor affecting travel life, load levels, frictional resistance, and smoothness of travel. Thomson 60 Case shafting is centerless ground for a consistent smooth and industry leading cataloged surface finish of 8 Ra max. Excellent surface finish and hardness maximize the efficiency and life of linear bearings, shaft riding seals, and overall visual appearance. When 8 Ra is not good enough we can provide 6 Ra surface finishes at an additional cost. Smoother equals longer bearing life.

### Roundness

Shaft roundness is vital for linear race applications such as spindles and guide rods where accuracy, life or precision is paramount. Roundness ensures uniform distribution of bearing loads for maximized bearing life, longer travel life and improved positional accuracy. Shafts that look round can be deceiving to the eye and anything but round when properly evaluated, using precision tracing techniques. Thomson 60 Case shaft roundness is within 0.000080" for Class L, S, D, M and .000050" for Class N. Our leading competitors don't catalog roundness and some are .0002". Rounder equals longer bearing life.

These two graphs taken from a roundness trace display the major roundness difference between Thomson 60 Case LinearRace shafting products and competitor shafting.

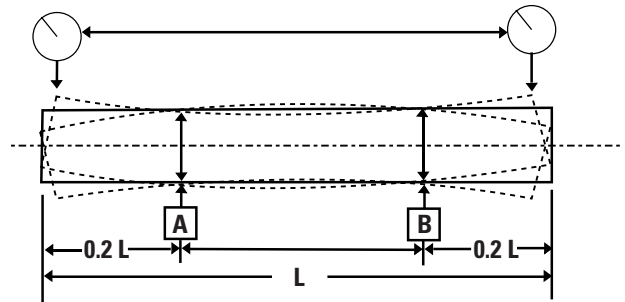


### Straightness

Straightness is the most vital parameter to positioning accuracy for a linear ball bushing system. Thomson 60 Case shafts are straight within 0.001" per foot cumulative (TIR .002") when shipped from the factory. Handling or machining of shafting can cause the material to bend once they leave the factory. When straightness is critical let Thomson provide the special machined shaft; let us machine and straighten the shaft for you using our proprietary straightening and measurement techniques.

Our leading competitor does not catalog straightness. Straighter equals higher precision.

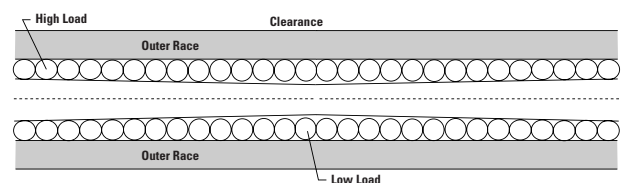
60 Case LinearRace shafting is inspected to ensure that it meets the highest quality standards. Standard straightness for all 60 Case LinearRace shafting is .001 inch per foot (25mm/300mm) cumulative .002 inch (50mm) TIR, with special straightness of .0005 inch per foot (12 mm/300mm) cumulative .001 inch (25mm) TIR available.



### Cylindricity

Cylindricity is a measure of the degree of conformance of the outside surface (diameter along the length of the shaft) to a true cylinder. True conformance (high cylindricity) ensures the benefits of roundness, diameter and straightness are present over the shaft length, or working surface, and not just in a particular location. This ensures uniform distribution of bearing loads, increases load capacity in the working area of the bearing, maximizes bearing life, and increases travel life. Taper is a component of cylindricity and all Thomson 60 Case shafts are produced with a maximum taper of 1/2 the diameter tolerance over the entire length of the shaft.

In linear bearing applications, taper found in competitor shafting can cause one portion of the linear bearing to be loaded higher than the other. This can cause dramatic reduction in travel life or load capacity. As taper increases, balls go in and out of preload causing premature wear and reduction in travel life.





## 60 Case Product Overview (continued)

### Length Tolerance

Thomson 60 Case shafting can be cut to your specified length. It will have a standard length tolerance of  $\pm 1/32$ " for diameters less than 2 inches and  $\pm 1/16$ " for all larger diameters. Special length tolerances are available for an additional charge. All cut shafting is subject to a deburring process to remove sharp edges. The size of the standard chamfer is approximately  $1/32$ " x 45 degrees for diameters less than 1" and  $1/16$ " x 45 degrees for diameters 1" and larger. Special chamfer sizes can be provided for an additional charge.



### Predrilled and Tapped Holes

Thomson 60 Case shafting is stocked with radial holes drilled and tapped to accept a continuous shaft support rail in both carbon steel and 440 C stainless steel. Continuous support prevents shaft deflection when used to support heavy loads or for long travel lengths.

### Precision Special Machining

Thomson 60 Case can be supplied specially machined to your drawing and or application requirements. Leave your special machining needs to us. With over 50 years of experience, we can provide a high quality special machined shaft to your specifications allowing you to focus on your core competency. Fax us a detailed sketch or drawing and let our engineers provide you with a quotation. See page 187 for a sample of machining offered.

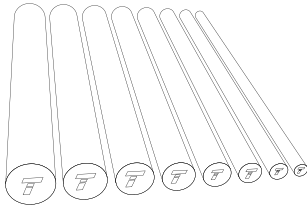
### Special Coatings

Thomson offers a variety of corrosion resistant products to meet the needs of specific corrosive environments. Thomson 60 Case is available as thin dense chrome plated with plain ends from stock or 100% chrome plated, black oxide, or Armoloy™ plated to name a few. Contact our application engineering team or see page 189 for more information.

### How does Thomson 60 Case compare to our leading competitor shafting?

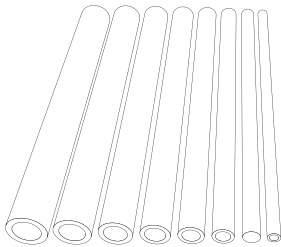
|                            | Thomson           | Competitor 1           | Competitor 2       |
|----------------------------|-------------------|------------------------|--------------------|
| <b>Materials</b>           | Carbon Steel      | Carbon Steel           | Carbon Steel       |
|                            | 440 C SS          | 440 C SS               | 440 C SS or equiv. |
|                            | 316 SS            |                        | 52100 Tubular      |
|                            | 52100 Tubular     |                        |                    |
| <b>Tolerance Classes</b>   | L, N, S, D, G, MM | L, S, MM               | L, S, MM           |
| <b>Case Depth</b>          | .080"             | .080"                  | .035"              |
| <b>Surface Finish</b>      | 8 Ra Max          | 10-12 RMS              | 12 RMS             |
| <b>Roundness (L class)</b> | .000080"          | not cataloged          | .0002"             |
| <b>Straightness</b>        | .001"/foot        | .001-.002"/foot .0012" | not cataloged      |
| <b>Taper</b>               | .0001"            | not cataloged          | .0004"             |

## 60 Case LinearRace Shafting for End Supported Applications



### Solid 60 Case LinearRace Shafting Features:

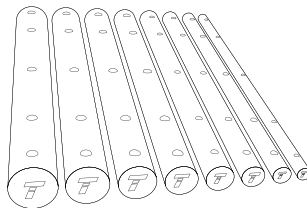
- Diameter range between 3/16 and 4 inch.
- Roundness 80 millionths of an inch.
- Case hardness 60 HRC minimum.
- Surface finish 8 Ra microinch.
- Available in corrosion resistant 440C stainless steel (50 HRC minimum).
- Available with PrePlate\* chrome option.
- Standard straightness is .001 inch per foot cumulative (.002 TIR) with special straightness at .0005 inch per foot cumulative (.001 TIR) available.



### 60 Case Tubular Lite\* LinearRace Shafting Features:

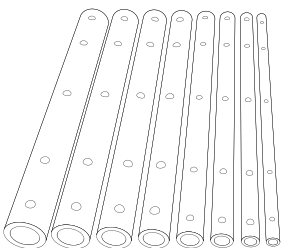
- Hollow inner diameter reduces weight and inertia.
- Diameter range between 3/4 and 4 inch.
- Roundness 80 millionths of an inch.
- Case hardness 58 HRC minimum.
- Surface finish 8 Ra microinch.
- Standard straightness is .001 inch per foot cumulative (.002 TIR) with special straightness at .0005 inch per foot cumulative (.001 TIR) available.

## 60 Case LinearRace Shafting (PreDrilled) for Continuously Supported Applications



### Solid 60 Case LinearRace Shafting with Mounting Holes Features:

- Radial drilled and tapped holes ready for immediate use with standard hole spacing to match standard 60 Case LinearRace support rails.
- Diameter range between 1/2 and 4 inches, special machining (SM) required over 2 inches.
- Surface finish 8 Ra microinch.
- Hardness 60 HRC minimum.
- Roundness 80 millionths of an inch.
- Available in corrosion resistant 440C stainless steel (50 HRC min).
- Available with Preplate chrome option.
- Standard straightness .001 inch per foot cumulative (.002 TIR) with special straightness at .0005 inch per foot cumulative (.001 TIR) available.



### 60 Case Tubular Lite LinearRace Shafting with Mounting Holes Features:

- Hollow design reduces weight and inertia.
- Can be supplied with radial drilled and tapped holes, ready for immediate use.
- Standard hole spacing to match standard 60 Case LinearRace support rails.
- Diameter range between 1 1/2 and 4 inch.
- Roundness 80 millionths of an inch.
- Case hardness 58 HRC minimum.
- Surface finish 8 Ra microinch.
- Standard straightness .001 inch per foot cumulative (.002 TIR) with special straightness at .0005 inch per foot cumulative (.001 TIR) available.

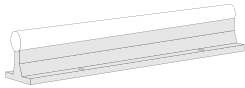
\*Trademark of Thomson. THOMSON is registered in the U.S. Patent and Trademark Office and in other countries.

## 60 Case LinearRace Support Rails and Assemblies for Continuously Supported Applications



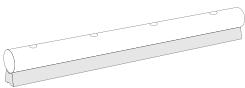
### LSR Low Profile 60 Case LinearRace Support Rail Features:

- Diameter range between 1/2 and 4 inch.
- Available with standard mounting holes for immediate use.
- Available without mounting holes for custom hole spacing.
- Low Profile design.
- Unlimited travel lengths.



### SR 60 Case LinearRace Support Rail and SRA 60 Case LinearRace Support Rail Assembly Features:

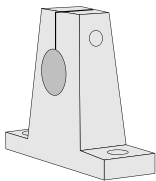
- Diameter range between 1/2 and 2 inch.
- Available with standard mounting holes for immediate use.
- Available without mounting holes for customized hole spacing.
- Available as a pre-engineered, ready to install assembly.
- Light weight, high strength aluminum alloy rail.
- Unlimited travel lengths.



### LSRA Smart Rail\* Assembly Features:

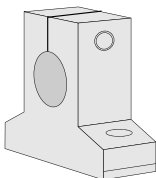
- Diameter range between 5/8 and 1 1/2 inch.
- Bolt-down-from-the-top mounting.
- Single piece lengths up to 15 feet long.
- Low profile design.

## 60 Case LinearRace Supports for End Supported Applications



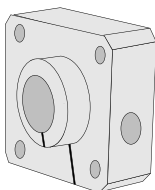
### SB 60 Case LinearRace Shafting End Support Block Features:

- Size range between 1/4 and 2 inch.
- Easily secured with two mounting bolts.
- Malleable iron alloy for sizes 1/2 to 2 inch diameter.
- Protected by corrosion resistant coating.
- Light weight, high strength aluminum alloy construction for sizes 1/4 and 3/8 inch.



### ASB Low Profile 60 Case LinearRace Shafting End Support Block Features:

- Size range between 1/4 and 1 1/2 inch.
- Low profile design.
- Easily secured with two mounting bolts.
- Protected by corrosion resistant anodized coating.
- Light weight, high strength aluminum alloy construction.



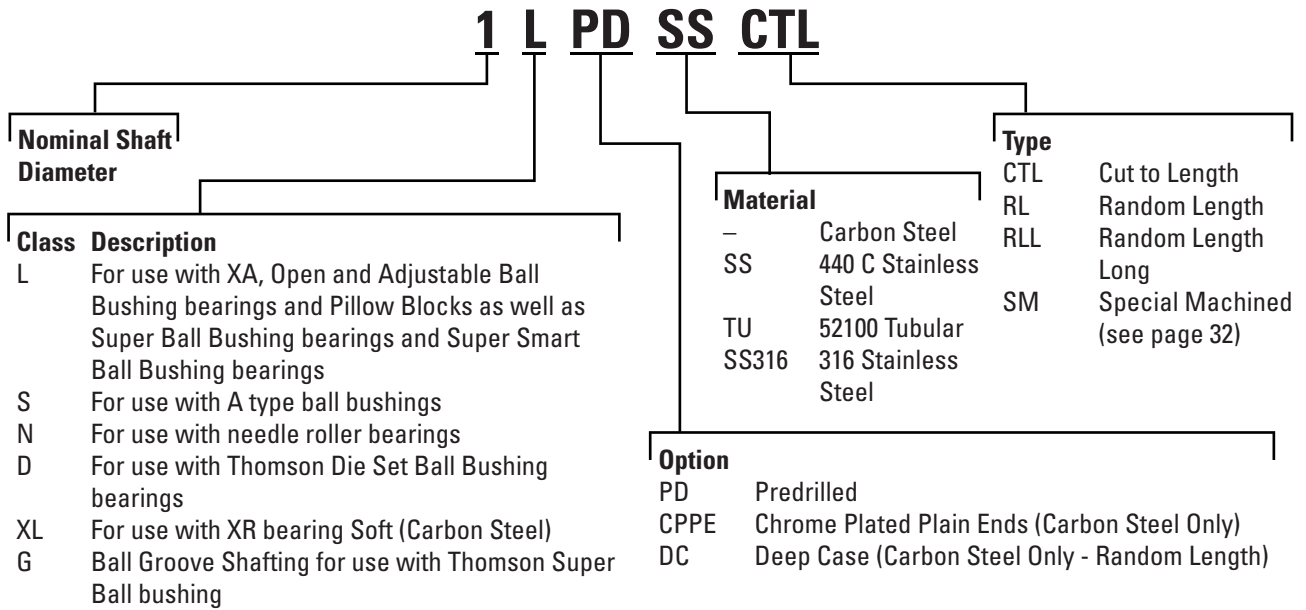
### FSB Flanged 60 Case LinearRace End Support Block Features:

- Available in 1/2, 3/4, 1 and 1 1/4 inch diameters.
- Flanged mounting surface for easy assembly.
- Easily secured with four mounting bolts.
- Designed specifically for use with Super Smart Flanged Pillow Blocks.
- Protected by corrosion resistant coating.
- Light weight, high strength aluminum alloy construction.

## Inch - 60 Case Shafting

# Hardened and Ground 60 Case Precision LinearRace Shafting

### Part Number Description



CTL = Cut to length is Thomson 60 Case cut to your specified length.

RL = Random length is full bar or long length shafting. It is called random length because we start with a raw bar 4" to 6" longer than the min. usable but guarantee only the min. usable. We mark the ends of what is out of our own tolerance. This is the result of the manufacturing process and tightly controlled roundness specifications.

### Look for the Brand Logo



If you specify Thomson, look for the logo. Do not be fooled when ordering linear shafting. All Thomson 60 Case LinearRace shafting is etched with the Thomson logo as shown in the picture. If the shaft you have does not have the logo, it may not be a true Thomson 60 Case. Thomson 60 Case is etched approximately every 18 to 22 inches.

Inch - 60 Case Shafting

**Solid Carbon Steel**

Hardness: 60 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Roundness: .000080" Class L and S / .000050" Class N

Straightness: .001" Per Foot Cumulative (.002" TIR)

Taper: .0001"

| Nominal Diameter (in) | Class L           |                         |                  | Class S           |                         |                  | Class N           |                         |                  | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|------------------|-------------------|-------------------------|------------------|-------------------|-------------------------|------------------|--------------------------|----------------------|
|                       | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) |                          |                      |
| 3/16"                 | 3/16 L            | .1870<br>.1865          | 22               | -                 | -                       | -                | -                 | -                       | -                | .027                     | .008                 |
| 1/4"                  | 1/4 L             | .2495<br>.2490          | 94               | 1/4 S             | .2490<br>.2485          | 94               | 1/4 N             | .2500<br>.2498          | 94               | .027                     | .014                 |
| 3/8"                  | 3/8 L             | .3745<br>.3740          | 166              | 3/8 S             | .3740<br>.3735          | 166              | 3/8 N             | .3750<br>.3748          | 166              | .027                     | .031                 |
| 1/2"                  | 1/2 L             | .4995<br>.4990          | 166              | 1/2 S             | .4990<br>.4985          | 166              | 1/2 N             | .5000<br>.4998          | 166              | .040                     | .055                 |
| 5/8"                  | 5/8 L             | .6245<br>.6240          | 178              | 5/8 S             | .6240<br>.6235          | 178              | 5/8 N             | .6250<br>.6248          | 178              | .040                     | .086                 |
| 3/4"                  | 3/4 L             | .7495<br>.7490          | 178/202          | 3/4 S             | .7490<br>.7485          | 178              | 1/4 N             | .7500<br>.7498          | 178              | .060                     | .125                 |
| 7/8"                  | 7/8 L             | .8745<br>.8740          | 178              | -                 | -                       | -                | 3/8 N             | .8750<br>.8748          | 178              | .060                     | .170                 |
| 1"                    | 1 L               | .9995<br>.9990          | 178/202          | 1 S               | .9990<br>.9985          | 178              | 1/2 N             | 1.0000<br>.9998         | 178              | .080                     | .222                 |
| 1 1/8"                | 1 1/8 L           | 1.1245<br>1.1240        | 178              | -                 | -                       | -                | -                 | 1.1250<br>1.1248        | 178              | .080                     | .281                 |
| 1 1/4"                | 1 1/4 L           | 1.2495<br>1.2490        | 178/202          | 1 1/4 S           | 1.2490<br>1.2485        | 178              | 1 1/4 N           | 1.2500<br>1.2498        | 178              | .080                     | .348                 |
| 1 3/8"                | 1 3/8 L           | 1.3745<br>1.3740        | 178              | -                 | -                       | -                | 1 3/8 N           | 1.3750<br>1.3747        | 178              | .080                     | .420                 |
| 1 1/2"                | 1 1/2 L           | 1.4994<br>1.4989        | 178/202          | 1 1/2 S           | 1.4989<br>1.4984        | 178              | 1 1/2 N           | 1.5000<br>1.4997        | 178              | .080                     | .500                 |
| 1 5/8"                | 1 5/8 L           | 1.6245<br>1.6240        | 178              | -                 | -                       | -                | 1 5/8 N           | 1.6250<br>1.6247        | 178              | .080                     | .587                 |
| 1 3/4"                | 1 3/4 L           | 1.7495<br>1.7490        | 178              | -                 | -                       | -                | 1 3/4 N           | 1.7500<br>1.7497        | 178              | .100                     | .681                 |
| 2"                    | 2 L               | 1.9994<br>1.9987        | 178/202          | 2 S               | 1.9987<br>1.9980        | 178              | 2 N               | 2.000<br>1.9997         | 178              | .100                     | .890                 |
| 2 1/4"                | 2 1/4 L           | 2.2494<br>2.2487        | 178/202          | -                 | -                       | -                | 2 1/4 N           | 2.2500<br>2.2497        | 178              | .100                     | 1.153                |
| 2 1/2"                | 2 1/2 L           | 2.4993<br>2.4985        | 178/202          | 2 1/2 S           | 2.4985<br>2.4977        | 178              | 2 1/2 N           | 2.5000<br>2.4996        | 178              | .100                     | 1.391                |
| 3"                    | 3 L               | 2.9992<br>2.9983        | 178/202          | 3 S               | 2.9983<br>2.9974        | 178              | 3 N               | 3.0000<br>2.9996        | 178              | .100                     | 2.003                |
| 3 1/2"                | 3 1/2 L           | 3.4990<br>3.4980        | 202              | -                 | -                       | -                | -                 | -                       | -                | .100                     | 2.726                |
| 4"                    | 4 L               | 3.9988<br>3.9976        | 202              | 4 S               | 3.9976<br>3.9964        | 202              | -                 | -                       | -                | .100                     | 3.560                |

Standard random length (RL) min usable length is 178", optional extra long random length (RLL) min usable length is 202"

**Solid Carbon Steel**

Hardness: 60 ROCKWELL C Min.

Straightness: .001" Per Foot Cumulative (.002" TIR)

Taper: .0001"

Roundness: .000080" Class D and XL

| Nominal Diameter (in) | Class D           |                         |                |                  | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|----------------|------------------|--------------------------|----------------------|
|                       | Basic Part Number | Diameter Tolerance (in) | Surface Finish | Max. Length (in) |                          |                      |
| 1"                    | 1 D               | 1.0003<br>1.0000        | 8 Ra Max.      | 178              | .080                     | .222                 |
| 1 1/4"                | 1 1/4 D           | 1.2503<br>1.2500        | 8 Ra Max.      | 178              | .080                     | .348                 |
| 1 1/2"                | 1 1/2 D           | 1.5003<br>1.5000        | 8 Ra Max.      | 178              | .080                     | .500                 |
| 2"                    | 2 D               | 2.0003<br>2.0000        | 8 Ra Max.      | 178              | .100                     | .890                 |

| Nominal Diameter (in) | Class XL          |                         |                |                  | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|----------------|------------------|--------------------------|----------------------|
|                       | Basic Part Number | Diameter Tolerance (in) | Surface Finish | Max. Length (in) |                          |                      |
| 2"                    | 2 XL              | 1.9994<br>1.9991        | 4-8 Ra Max.    | 178              | .100                     | .890                 |
| 3"                    | 3 XL              | 2.9992<br>2.9989        | 4-8 Ra Max.    | 178              | .100                     | 2.003                |
| 4"                    | 4 XL              | 3.9988<br>3.9983        | 6-10 Ra Max.   | 202              | .100                     | 3.560                |

## Inch - 60 Case Shafting

### Standard Options for Carbon Steel Shafting

### Chrome Plated Ends (CPPE), Predrilled (PD), Predrilled Chrome Plated Plain Ends (PDCPPE), Solid Steel

Hardness: 60 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Roundness: .000080"

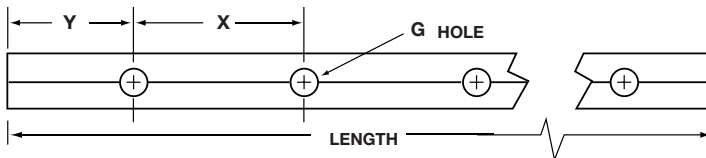
Straightness: .001" Per Foot Cumulative (.002" TIR)

Taper: .0001"

| Nominal Diameter (in) | Chrome Plated Plain Ends |                   | Max. Length (in) | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|--------------------------|-------------------|------------------|--------------------------|----------------------|
|                       | Part Number              | Tolerance Class L |                  |                          |                      |
| 1/2"                  | 1/2 L CPPE               | .4995             | 166              | .040                     | .055                 |
|                       |                          | .4990             |                  |                          |                      |
| 5/8"                  | 5/8 L CPPE               | .6245             | 178              | .040                     | .086                 |
|                       |                          | .6240             |                  |                          |                      |
| 3/4"                  | 3/4 L CPPE               | .7495             | 178              | .060                     | .125                 |
|                       |                          | .7490             |                  |                          |                      |
| 1"                    | 1 L CPPE                 | .9995             | 178              | .080                     | .222                 |
|                       |                          | .9990             |                  |                          |                      |
| 1 1/4"                | 1 1/4 L CPPE             | 1.2495            | 178              | .080                     | .348                 |
|                       |                          | 1.2490            |                  |                          |                      |
| 1 1/2"                | 1 1/2 L CPPE             | 1.4994            | 178              | .080                     | .500                 |
|                       |                          | 1.4989            |                  |                          |                      |
| 2"                    | 2 L CPPE                 | 1.9994            | 178              | .100                     | .890                 |
|                       |                          | 1.9987            |                  |                          |                      |

CPPE - Chrome Plated Plain Ends which means ends and chamfers are not plated.

Completely plated chamfers are available as a special machine part. See page 32.



| Nominal Diameter (in) | Predrilled             |                      | Predrilled Chrome Plated                  |                      | Hole Spacing                      |                 | G Standard Thread Size | Length Tolerance (in) | Max. Length (in) | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|------------------------|----------------------|---|----------------------|-----------------------------------|-----------------|------------------------|-----------------------|------------------|--------------------------|----------------------|
|                       | Part Number Predrilled | L PD Tolerance Class | Part Number Predrilled Chrome Plated Ends | L PD Tolerance Class | X (inch +/- 1/64) (noncumulative) | Standard Y (in) |                        |                       |                  |                          |                      |
| 1/2"                  | 1/2 L PD               | .4995                | 1/2 L PDCPPE                              | .4995                | 4                                 | 2               | #6-32                  | +/- 1/32              | 166              | .040                     | .055                 |
|                       |                        | .4990                |   | .4990                |                                   |                 |                        |                       |                  |                          |                      |
| 5/8"                  | 5/8 L PD               | .6245                | 5/8 L PDCPPE                              | .6245                | 4                                 | 2               | #8-32                  | +/- 1/32              | 178              | .040                     | .086                 |
|                       |                        | .6240                |   | .6240                |                                   |                 |                        |                       |                  |                          |                      |
| 3/4"                  | 3/4 L PD               | .7495                | 3/4 L PDCPPE                              | .7495                | 6                                 | 3               | #10-32                 | +/- 1/32              | 178              | .060                     | .125                 |
|                       |                        | .7490                |   | .7490                |                                   |                 |                        |                       |                  |                          |                      |
| 1"                    | 1 L PD                 | .9995                | 1 L PDCPPE                                | .9995                | 6                                 | 3               | 1/4-20                 | +/- 1/32              | 178              | .080                     | .222                 |
|                       |                        | .9990                |   | .9990                |                                   |                 |                        |                       |                  |                          |                      |
| 1 1/4"                | 1 1/4 L PD             | 1.2495               | 1 1/4 L PDCPPE                            | 1.2495               | 6                                 | 3               | 5/16-18                | +/- 1/32              | 178              | .080                     | .348                 |
|                       |                        | 1.2490               |   | 1.2490               |                                   |                 |                        |                       |                  |                          |                      |
| 1 1/2"                | 1 1/2 L PD             | 1.4994               | 1 1/2 L PDCPPE                            | 1.4994               | 8                                 | 4               | 3/8-16                 | +/- 1/32              | 178              | .080                     | .500                 |
|                       |                        | 1.4989               |   | 1.4989               |                                   |                 |                        |                       |                  |                          |                      |
| 2"                    | 2 L PD                 | 1.9994               | 2 L PDCPPE                                | 1.9994               | 8                                 | 4               | 1/2-13                 | +/- 1/16              | 178              | .100                     | .890                 |
|                       |                        | 1.9987               |   | 1.9987               |                                   |                 |                        |                       |                  |                          |                      |

Holes are drilled and tapped to the center of the shaft. Different 'Y' dimensions are available upon request. Please specify when ordering. Chrome plating is thin, dense chrome with an average thickness of .0005".

Inch - 60 Case Shafting

**Solid Steel Deep Case - Available in Random Length Only**

Hardness: 60 ROCKWELL C Min.

Straightness: .001" Per Foot Cumulative (.002" TIR)

Surface Finish: 8 Ra Max

Taper: .0001"

Roundness: .000080" Class L and S / .000050" Class N

| Nominal Diameter (in) | Class L Deep Case |                         |                  | Class N Deep Case |                         |                  | Min. Hardness SS Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|------------------|-------------------|-------------------------|------------------|-----------------------------|----------------------|
|                       | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) |                             |                      |
| 3/4"                  | 3/4 L DC          | .7495                   | 178/202          | 3/4 N DC          | .7500                   | 178              | .120                        | .125                 |
|                       |                   | .7490                   |                  |                   | .7498                   |                  |                             |                      |
| 7/8"                  | 7/8 L DC          | .8745                   | 178              | 7/8 N DC          | .8750                   | 178              | .120                        | .170                 |
|                       |                   | .8740                   |                  |                   | .8748                   |                  |                             |                      |
| 1"                    | 1 L DC            | .9995                   | 178/202          | 1 N DC            | 1.0000                  | 178              | .160                        | .222                 |
|                       |                   | .9990                   |                  |                   | .9998                   |                  |                             |                      |
| 1 1/8"                | 1 1/8 L DC        | 1.1245                  | 178              | 1 1/8 N DC        | 1.1250                  | 178              | .160                        | .281                 |
|                       |                   | 1.1240                  |                  |                   | 1.1248                  |                  |                             |                      |
| 1 1/4"                | 1 1/4 L DC        | 1.2495                  | 178/202          | 1 1/4 N DC        | 1.2500                  | 178              | .180                        | .348                 |
|                       |                   | 1.2490                  |                  |                   | 1.2498                  |                  |                             |                      |
| 1 1/2"                | 1 1/2 L DC        | 1.4994                  | 178/202          | 1 1/2 N DC        | 1.5000                  | 178              | .180                        | .500                 |
|                       |                   | 1.4989                  |                  |                   | 1.4997                  |                  |                             |                      |
| 1 3/4"                | 1 3/4 L DC        | 1.7495                  | 178              | 1 3/4 N DC        | 1.7500                  | 178              | .250                        | .681                 |
|                       |                   | 1.7490                  |                  |                   | 1.7497                  |                  |                             |                      |
| 2"                    | 2 L DC            | 1.9994                  | 178/202          | 2 N DC            | 2.0000                  | 178              | .250                        | .890                 |
|                       |                   | 1.9987                  |                  |                   | 1.9997                  |                  |                             |                      |
| 2 1/4"                | 2 1/4 L DC        | 2.2494                  | 202              | 2 1/4 N DC        | 2.2500                  | 178              | .250                        | 1.153                |
|                       |                   | 2.2487                  |                  |                   | 2.2497                  |                  |                             |                      |
| 2 1/2"                | 2 1/2 L DC        | 2.4993                  | 178/202          | 2 1/2 N DC        | 2.5000                  | 178              | .250                        | 1.391                |
|                       |                   | 2.4985                  |                  |                   | 2.4996                  |                  |                             |                      |
| 3"                    | 3 L DC            | 2.9992                  | 178/202          | 3 N DC            | 3.0000                  | 178              | .250                        | 2.003                |
|                       |                   | 2.9983                  |                  |                   | 2.9996                  |                  |                             |                      |
| 3 1/2"                | 3 1/2 L DC        | 3.4990                  | 202              | -                 | -                       | -                | .250                        | 2.726                |
|                       |                   | 3.4980                  |                  |                   | -                       |                  |                             |                      |

Standard random length (RL) min usable length is 178", optional extra long random length (RLL) min usable length is 202"

**Ball Groove LinearRace Shaft - Solid Carbon Steel**

Hardness: 60 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Roundness: .000080"

Straightness: Shaft Groove .002" Per Foot Cumulative (.002" TIR)

Taper: .0001"

| Nominal Diameter (in) | Basic Part Number | Class G                 |                  | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|------------------|--------------------------|----------------------|
|                       |                   | Diameter Tolerance (in) | Max. Length (in) |                          |                      |
| 1/4"                  | 1/4 G             | .2495                   | 45               | .027                     | .014                 |
|                       |                   | .2490                   |                  |                          |                      |
| 3/8"                  | 3/8 G             | .3745                   | 45               | .027                     | .031                 |
|                       |                   | .3740                   |                  |                          |                      |
| 1/2"                  | 1/2 G             | .4995                   | 45               | .040                     | .055                 |
|                       |                   | .4990                   |                  |                          |                      |
| 5/8"                  | 5/8 G             | .6245                   | 45               | .040                     | .086                 |
|                       |                   | .6240                   |                  |                          |                      |
| 3/4"                  | 3/4 G             | .7495                   | 45               | .060                     | .125                 |
|                       |                   | .7490                   |                  |                          |                      |
| 1"                    | 1 G               | .9995                   | 45               | .080                     | .222                 |
|                       |                   | .9990                   |                  |                          |                      |

## Inch - 60 Case Shafting

### 440C Stainless Steel

Hardness: 50 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Roundness: .000080"

Straightness: .001" Per Foot Cumulative (.002" TIR)

Taper: .0001"

| Nominal Diameter (in) | Class L           |                         |                  | Class S           |                         |                  | Min. Hardness SS Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|------------------|-------------------|-------------------------|------------------|-----------------------------|----------------------|
|                       | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) |                             |                      |
| 1/4"                  | 1/4 L SS          | .2495<br>.2490          | 54               | 1/4 S SS          | .2490<br>.2485          | 54               | .027                        | .014                 |
| 3/8"                  | 3/8 L SS          | .3745<br>.3740          | 166              | 3/8 S SS          | .3740<br>.3735          | 166              | .027                        | .031                 |
| 1/2"                  | 1/2 L SS          | .4995<br>.4990          | 166              | 1/2 S SS          | .4990<br>.4985          | 166              | .040                        | .055                 |
| 5/8"                  | 5/8 L SS          | .6245<br>.6240          | 178              | 5/8 S SS          | .6240<br>.6235          | 178              | .040                        | .086                 |
| 3/4"                  | 3/4 L SS          | .7495<br>.7490          | 178              | 3/4 S SS          | .7490<br>.7485          | 178              | .060                        | .125                 |
| 1"                    | 1 L SS            | .9995<br>.9990          | 178              | 1 S SS            | .9990<br>.9985          | 178              | .080                        | .222                 |
| 1 1/4"                | 1 1/4 L SS        | 1.2495<br>1.2490        | 178              | 1 1/4 S SS        | 1.2490<br>1.2485        | 178              | .080                        | .348                 |
| 1 1/2"                | 1 1/2 L SS        | 1.4994<br>1.4989        | 178              | 1 1/2 S SS        | 1.4989<br>1.4984        | 178              | .080                        | .500                 |
| 2"                    | 2 L SS            | 1.9994<br>1.9987        | 178              | 2 S SS            | 1.9987<br>1.9980        | 178              | .100                        | .890                 |
| 2 1/2"                | 2 1/2 L SS        | 2.4993<br>2.4985        | 178              | 2 1/2 S SS        | 2.4985<br>2.4977        | 178              | .100                        | 1.391                |

440C stainless is "corrosion resistant"; it contains some carbon which allows for hardening. Carbon can result in corrosion over time.

### Standard Options for 440C Stainless Steel Predrilled (PD)

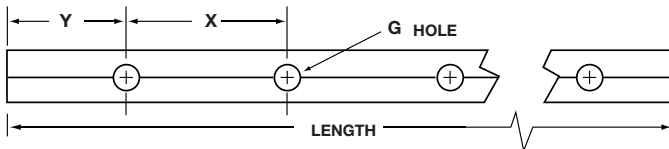
Hardness: 50 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Straightness: .001" Per Foot Cumulative (.002" TIR)

Roundness: .000080"

Taper: .0001"



| Nominal Diameter (in) | Predrilled             |                      | Hole Spacing                      |                 | G Standard Thread Size | Length Tolerance (in) | Max. Length (in) | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|------------------------|----------------------|-----------------------------------|-----------------|------------------------|-----------------------|------------------|--------------------------|----------------------|
|                       | Part Number Predrilled | L PD Tolerance Class | X (inch +/- 1/64) (noncumulative) | Standard Y (in) |                        |                       |                  |                          |                      |
| 1/2"                  | 1/2 L PD SS            | .4995<br>.4990       | 4                                 | 2               | #6-32                  | +/- 1/32              | 166              | .040                     | .055                 |
| 5/8"                  | 5/8 L PD SS            | .6245<br>.6240       | 4                                 | 2               | #8-32                  | +/- 1/32              | 178              | .040                     | .086                 |
| 3/4"                  | 3/4 L PD SS            | .7495<br>.7490       | 6                                 | 3               | #10-32                 | +/- 1/32              | 178              | .060                     | .125                 |
| 1"                    | 1 L PD SS              | .9995<br>.9990       | 6                                 | 3               | 1/4-20                 | +/- 1/32              | 178              | .080                     | .222                 |
| 1 1/4"                | 1 1/4 L PD SS          | 1.2495<br>1.2490     | 6                                 | 3               | 5/16-18                | +/- 1/32              | 178              | .080                     | .348                 |
| 1 1/2"                | 1 1/2 L PD SS          | 1.4994<br>1.4989     | 8                                 | 4               | 3/8-16                 | +/- 1/32              | 178              | .080                     | .500                 |
| 2"                    | 2 L PD SS              | 1.9994<br>1.9987     | 8                                 | 4               | 1/2-13                 | +/- 1/16              | 178              | .100                     | .890                 |

Holes are drilled and tapped to the center of the shaft. Different 'Y' dimensions are available upon request. Please specify when ordering.



Inch - 60 Case Shafting

**Ball Groove LinearRace Shaft - 440C Stainless Steel**

Hardness: 50 ROCKWELL C Min.

Roundness: .000080"

Surface Finish: 8 Ra Max

Taper: .0001"

Straightness: Shaft Groove .002" Per Foot Cumulative

| Nominal Diameter (in) | Basic Part Number | Class G                 |                  | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|------------------|--------------------------|----------------------|
|                       |                   | Diameter Tolerance (in) | Max. Length (in) |                          |                      |
| 1/4"                  | 1/4 G SS          | .2495                   | 45               | .027                     | .014                 |
|                       |                   | .2490                   |                  |                          |                      |
| 3/8"                  | 3/8 G SS          | .3745                   | 45               | .027                     | .031                 |
|                       |                   | .3740                   |                  |                          |                      |
| 1/2"                  | 1/2 G SS          | .4995                   | 45               | .040                     | .055                 |
|                       |                   | .4990                   |                  |                          |                      |
| 5/8"                  | 5/8 G SS          | .6245                   | 45               | .040                     | .086                 |
|                       |                   | .6240                   |                  |                          |                      |
| 3/4"                  | 3/4 G SS          | .7495                   | 45               | .060                     | .125                 |
|                       |                   | .7490                   |                  |                          |                      |
| 1"                    | 1 G SS            | .9995                   | 45               | .080                     | .222                 |
|                       |                   | .9990                   |                  |                          |                      |

**Instrument 440C Stainless Steel LinearRace shafting for use with Thomson Instrument**

**Ball bushing bearings**

Hardness: 55 ROCKWELL C Min.

Straightness: .001" Per Inch Cumulative

Surface Finish: 4 Ra Max

Taper: .0001"

Roundness: .000080"

| Nominal Diameter (in) | Basic Part Number | INST Class              |                  | Max. Length (in) | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|------------------|------------------|--------------------------|----------------------|
|                       |                   | Diameter Tolerance (in) | Max. Length (in) |                  |                          |                      |
| 1/8"                  | 1/8 INST          | .1248                   | +/- .005         | 12               | .027                     | .004                 |
|                       |                   | .1247                   |                  |                  |                          |                      |
| 3/16"                 | 3/16 INST         | .1873                   | +/- .005         | 12               | .027                     | .008                 |
|                       |                   | .1872                   |                  |                  |                          |                      |
| 1/4"                  | 1/4 INST          | .2498                   | +/- .005         | 12               | .027                     | .014                 |
|                       |                   | .2497                   |                  |                  |                          |                      |

**52100 Tubular**

Hardness: 58 ROCKWELL C Min.

Roundness: .000080" Class L and S

Surface Finish: 8 Ra Max

Taper: .0001"

Straightness: .001" Per Foot Cumulative (.002" TIR)

| Nominal Diameter (in) | Nominal I.D. (in) | Class L           |                         |                  | Class S           |                         |                  | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------|-------------------------|------------------|-------------------|-------------------------|------------------|--------------------------|----------------------|
|                       |                   | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) |                          |                      |
| 3/4"                  | .438<br>+/- 5%    | 3/4 L TU          | .7495                   | 142              | 3/4 S TU          | .7490                   | 142              | .060                     | .0754                |
|                       |                   |                   | .7490                   |                  |                   | .7485                   |                  |                          |                      |
| 1"                    | .599<br>+/- 5%    | 1 L TU            | .9995                   | 173              | 1 S TU            | .9990                   | 173              | .080                     | .158                 |
|                       |                   |                   | .9990                   |                  |                   | .9985                   |                  |                          |                      |
| 1 1/2"                | .890<br>+/- 5%    | 1 1/2 L TU        | 1.4994                  | 173              | 1 1/2 S TU        | 1.4989                  | 173              | .080                     | .328                 |
|                       |                   |                   | 1.4989                  |                  |                   | 1.4984                  |                  |                          |                      |
| 2"                    | 1.250<br>+/- 5%   | 2 L TU            | 1.9994                  | 173              | 2 S TU            | 1.9987                  | 173              | .100                     | .542                 |
|                       |                   |                   | 1.9987                  |                  |                   | 1.9980                  |                  |                          |                      |
| 2 1/2"                | 1.750<br>+/- 5%   | 2 1/2 L TU        | 2.4993                  | 173              | 2 1/2 S TU        | 2.4985                  | 173              | .100                     | .749                 |
|                       |                   |                   | 2.4985                  |                  |                   | 2.4977                  |                  |                          |                      |
| 3"                    | 2.000<br>+/- 10%  | 3 L TU            | 2.9992                  | 173              | 3 S TU            | 2.9983                  | 173              | .100                     | 1.112                |
|                       |                   |                   | 2.9983                  |                  |                   | 2.9974                  |                  |                          |                      |
| 4"                    | 3.000<br>+/- 10%  | 4 L TU            | 3.9988                  | 173              | 4 S TU            | 3.9976                  | 173              | .100                     | 1.558                |
|                       |                   |                   | 3.9976                  |                  |                   | 3.9964                  |                  |                          |                      |

## Inch - 60 Case Shafting

### 316 Stainless Steel

Hardness: 20-25 ROCKWELL C Min.

Roundness: .000080"

Surface Finish: 8 Ra Max

Straightness: .001" Per Foot Cumulative (.002" TIR)

Taper: .0001"

| Nominal Diameter (in) | Class L           |                         |                  | Weight Per Inch (lb) |
|-----------------------|-------------------|-------------------------|------------------|----------------------|
|                       | Basic Part Number | Diameter Tolerance (in) | Max. Length (in) |                      |
| 1/4"                  | 1/4 L SS316       | .2495<br>.2490          | 94               | .014                 |
| 3/8"                  | 3/8 L SS316       | .3745<br>.3740          | 166              | .031                 |
| 1/2"                  | 1/2 L SS316       | .4995<br>.4990          | 166              | .055                 |
| 5/8"                  | 5/8 L SS316       | .6245<br>.6240          | 178              | .086                 |
| 3/4"                  | 3/4 L SS316       | .7495<br>.7490          | 178              | .125                 |
| 1"                    | 1 L SS316         | .9995<br>.9990          | 178              | .222                 |
| 1 1/4"                | 1 1/4 L SS316     | 1.2495<br>1.2490        | 178              | .348                 |
| 1 1/2"                | 1 1/2 L SS316     | 1.4994<br>1.4989        | 178              | .500                 |
| 2"                    | 2 L SS316         | 1.9994<br>1.9987        | 178              | .890                 |

316 Stainless Steel is corrosion proof steel and has no carbon content which will result in corrosion.

### Standard Options for 316 Stainless Steel Predrilled (PD)

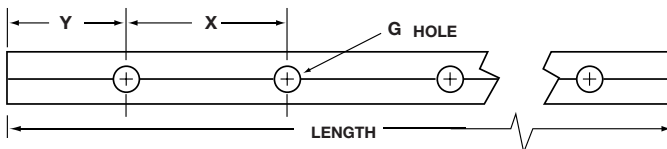
Hardness: 20-25 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Roundness: .000080"

Straightness: .001" Per Foot Cumulative (.002" TIR)

Taper: .0001"



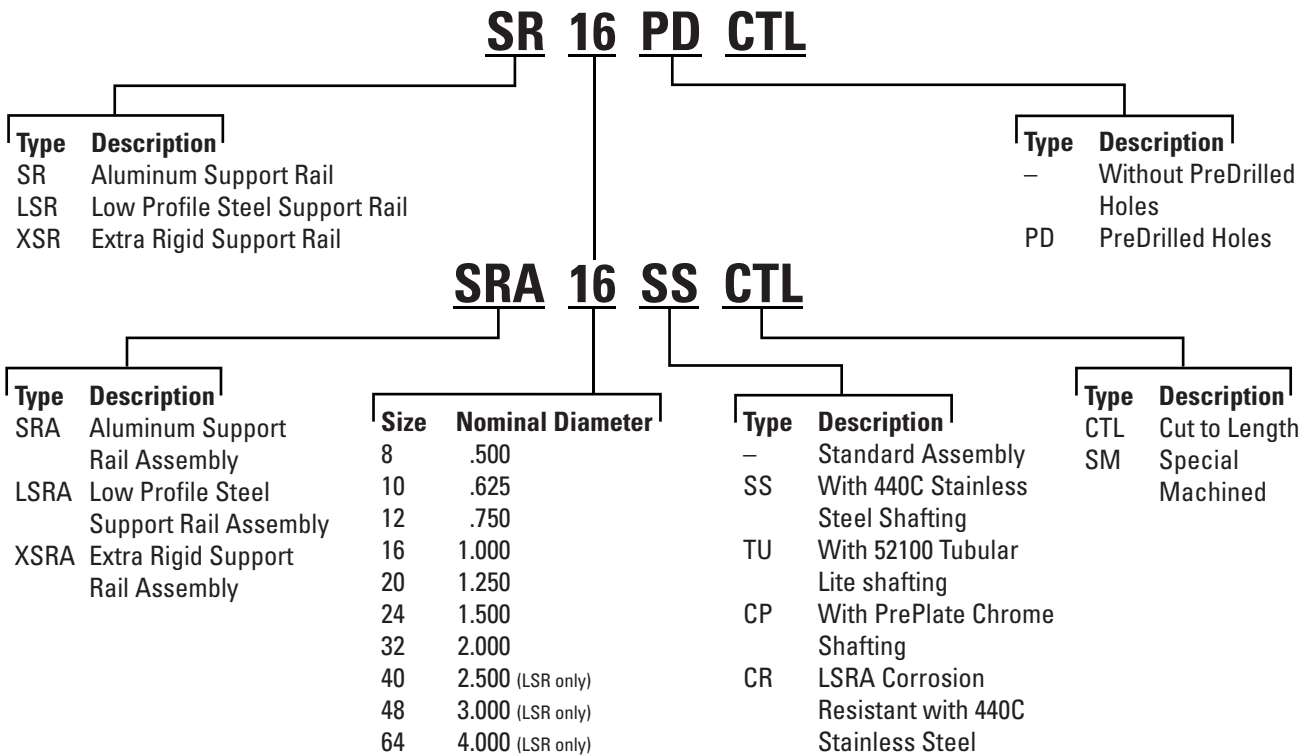
| Nominal Diameter (in) | Predrilled             |                      | Hole Spacing                      |                 | G Standard Thread Size | Length Tolerance (in) | Max. Length (in) | Weight Per Inch (lb) |
|-----------------------|------------------------|----------------------|-----------------------------------|-----------------|------------------------|-----------------------|------------------|----------------------|
|                       | Part Number Predrilled | L PD Tolerance Class | X (inch +/- 1/64) (noncumulative) | Standard Y (in) |                        |                       |                  |                      |
| 1/2"                  | 1/2 L SS316PD          | .4995<br>.4990       | 4                                 | 2               | #6-32                  | +/- 1/32              | 166              | .055                 |
| 5/8"                  | 5/8 L SS316PD          | .6245<br>.6240       | 4                                 | 2               | #8-32                  | +/- 1/32              | 178              | .086                 |
| 3/4"                  | 3/4 L SS316PD          | .7495<br>.7490       | 6                                 | 3               | #10-32                 | +/- 1/32              | 178              | .125                 |
| 1"                    | 1 L SS316PD            | .9995<br>.9990       | 6                                 | 3               | 1/4-20                 | +/- 1/32              | 178              | .222                 |
| 1 1/4"                | 1 1/4 SS316PD          | 1.2495<br>1.2490     | 6                                 | 3               | 5/16-18                | +/- 1/32              | 178              | .348                 |
| 1 1/2"                | 1 1/2 SS316PD          | 1.4994<br>1.4989     | 8                                 | 4               | 3/8-16                 | +/- 1/32              | 178              | .500                 |
| 2"                    | 2 L SS316PD            | 1.9994<br>1.9987     | 8                                 | 4               | 1/2-13                 | +/- 1/16              | 178              | .890                 |

Holes are drilled and tapped to the center of the shaft. Different "Y" dimensions are available upon request. Please specify when ordering.

Inch - Support Rails and Support Rail Assemblies

# Support Rails and Assemblies for Continuously Supported Applications

## Part Number Description



## Inch - Support Rails and Support Rail Assemblies

### Shaft Rail Supports Type SR & SR-PD

#### The low cost way of mounting Thomson 60 Case Shafts

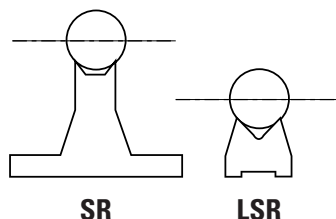
Shaft supports simplify mounting of Thomson 60 Case shafts. Users of Thomson 60 Case shafting should carefully consider the use of these low cost shaft supports. They are standard, available from stock, and simplify shaft mounting. In addition to other benefits, they eliminate many problems encountered in designing and manufacturing shaft supporting devices. These versatile mounts can be used horizontally or vertically, and in many different arrangements. Shaft support rails are available without pre-drilled holes (SR) or pre-drilled (SR-PD) shaft rails to support 1/2 inch through 2 inch diameter shafts are available in standard 24, 48 and 72 inch lengths. Where shorter lengths are needed, rails are easily cut to length. For longer shafts they can be mounted end to end, using shims or grout, if necessary, to compensate for slight variation within manufacturing tolerance. Thomson offers shaft support rails with pre-drilled holes to simplify shaft mounting.

### Low Shaft Support Rails Type LSR & LSR-PD

#### For compact designs

Low Shaft Rails allow the design of more compact linear motion systems. The height from the base to the mean shaft center ranges from 9/16 inch for supporting a 1/2 inch diameter shaft to a maximum 3 1/2 inches when supporting a 4 inch diameter shaft – 40% lower than standard support rails. Low Shaft Rails are made of steel to maintain optimum shaft rigidity. Either continuous or intermittent support is possible when using Thomson open-type linear ball bearings. Low Shaft Rails are furnished in standard 4-foot lengths. Where shorter lengths are required, rails can easily be cut. For supporting longer shafts, rails can be mounted end-to-end without limit. Low Shaft Rails are available without pre-drilled mounting holes (LSR) or with pre-drilled mounting holes (LSR-PD) to match Thomson drilled and tapped shafts (PD). When using LSR-PD, the attachment bolts are underneath, so you must have access under your machine base plate. The LSRA assemblies highlighted below utilize attachment bolts from above. If one of the standard pre-drilled Low Shaft Rails is not appropriate for your design needs, Low Shaft Rails can be custom drilled by Thomson to your specifications.

Send a print with all required dimensions, tolerances, and quantities needed to our application engineering team.



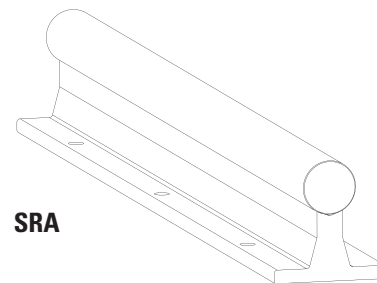
SR

LSR

### Extra-Rigid Shaft Support Rails

#### For XR Ball Bushing bearing systems

Extra-rigid shaft support rails (XSR) are designed specifically for use with our extra-rigid Series XR Ball Bushing bearings. XSR support rails are available in nominal 24 inch lengths and are made of ductile iron and powder epoxy coated to provide the most deflection-resistant shaft support of all Thomson supports. To facilitate quick and easy installation, each extra-rigid shaft support is drilled and counter-bored for securing a drilled and tapped shaft into it and for bolting it to a flat, rigid base. For supporting long shafts, XSR support rails can be mounted end-to-end.



SRA

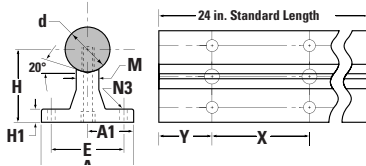
### Pre-Assembled Shaft Rail Assemblies Type SRA & LSRA

Thomson 60 Case steel shafts mounted on shaft support rails are now available for instant bolt-down installation. Assemblies are supplied cut to any length, with no limit on the overall length (long lengths are butt jointed together unless specified otherwise). Either solid or light-weight tubular shafting can be assembled to the standard Thomson support rails, which come with base mounting holes spaced evenly along the overall length of the assembly. The LSRA uses a special shaft unlike the LSR-PD. The attachment bolts for the LSRA are from the top down so you can easily mount into a machine base plate. The LSRA bolt pattern closely matches Profile Rail Linear Guides and can easily be used as a drop-in substitute to replace linear guides (ensure you review loading requirements). Corrosion resistant lower support rail assemblies (LSRA) are available. The support is zinc plated and shaft is 440C.

Inch - Support Rails and Support Rail Assemblies

# Support Rails and Assemblies for Continuously Supported Applications

## Type SR/SR-PD 60 Case LinearRace Support Rails and Assemblies (Dimensions in inches)

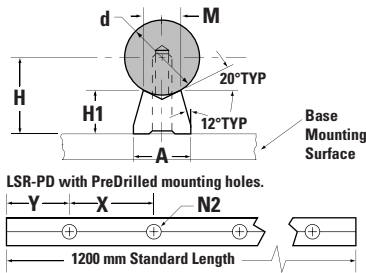


Material: Aluminum Alloy  
(Longer Lengths are Available)

| SR Without Holes | SR-PD With PreDrilled Holes | Nominal LinearRace Diameter d | H ±.002 | H1  | A    | A1    | E    | M   | N3   |      | LinearRace Mounting Bolt N1 (PD only) | X | Y | Weight lb/ft |
|------------------|-----------------------------|-------------------------------|---------|-----|------|-------|------|-----|------|------|---------------------------------------|---|---|--------------|
|                  |                             |                               |         |     |      |       |      |     | Hole | Bolt |                                       |   |   |              |
| SR-8             | SR-8-PD                     | .500                          | 1.125   | .19 | 1.50 | .750  | 1.00 | .25 | .17  | #6   | #6-32 x .88                           | 4 | 2 | .60          |
| SR-10            | SR-10-PD                    | .625                          | 1.125   | .25 | 1.63 | .813  | 1.13 | .31 | .19  | #8   | #8-32 x .88                           | 4 | 2 | .80          |
| SR-12            | SR-12-PD                    | .750                          | 1.500   | .25 | 1.75 | .875  | 1.25 | .38 | .22  | #10  | #10-32 x 1.25                         | 6 | 3 | 1.00         |
| SR-16            | SR-16-PD                    | 1.000                         | 1.750   | .25 | 2.13 | 1.063 | 1.50 | .50 | .28  | 1/4  | 1/4-20 x 1.5                          | 6 | 3 | 1.40         |
| SR-20            | SR-20-PD                    | 1.250                         | 2.125   | .31 | 2.50 | 1.250 | 1.88 | .56 | .34  | 5/16 | 5/16-18 x 1.75                        | 6 | 3 | 2.10         |
| SR-24            | SR-24-PD                    | 1.500                         | 2.500   | .38 | 3.00 | 1.500 | 2.25 | .69 | .34  | 5/16 | 3/8-16 x 1.75                         | 8 | 4 | 2.60         |
| SR-32            | SR-32-PD                    | 2.000                         | 3.250   | .50 | 3.75 | 2.750 | 2.75 | .88 | .406 | 3/8  | 1/2-13 x 2.50                         | 8 | 4 | 4.20         |

N1 Hole Dia. includes counterbore for socket head cap screw. Alignment and location of holes are are ± .010, noncumulative.

## Type LSR and LSR-PD 60 Case LinearRace Support Rails (Dimensions in inches)



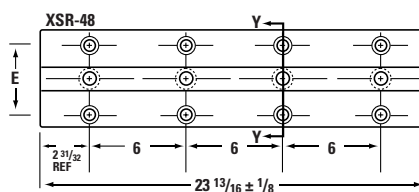
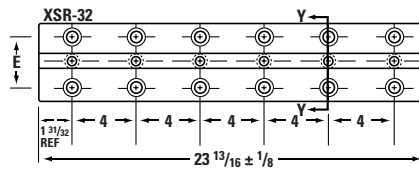
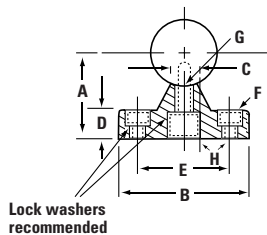
Material: Steel Alloy  
(Longer Lengths are Available)

| LSR Standard Without Holes | LSR-PD Standard w/PreDrilled Holes | Nominal LinearRace Diameter d | H ±.002 | H1    | A     | M     | N2    |         | N1 | X | Y    | Weight lb/ft |
|----------------------------|------------------------------------|-------------------------------|---------|-------|-------|-------|-------|---------|----|---|------|--------------|
|                            |                                    |                               |         |       |       |       | Hole  | Bolt    |    |   |      |              |
| LSR-8                      | LSR-8-PD                           | .500                          | .562    | .34   | .37   | .25   | .17   | #6-32   | 4  | 2 | .32  |              |
| LSR-10                     | LSR-10-PD                          | .625                          | .687    | .41   | .45   | .31   | .19   | #8-32   | 4  | 2 | .49  |              |
| LSR-12                     | LSR-12-PD                          | .750                          | .750    | .42   | .51   | .38   | .22   | #10-32  | 6  | 3 | .59  |              |
| LSR-16                     | LSR-16-PD                          | 1.000                         | 1.000   | .56   | .69   | .50   | .28   | 1/4-20  | 6  | 3 | 1.01 |              |
| LSR-20                     | LSR-20-PD                          | 1.250                         | 1.187   | .63   | .78   | .56   | .34   | 5/16-18 | 6  | 3 | 1.27 |              |
| LSR-24                     | LSR-24-PD                          | 1.500                         | 1.375   | .70   | .93   | .69   | .41   | 3/8-16  | 8  | 4 | 1.68 |              |
| LSR-32                     | LSR-32-PD                          | 2.000                         | 1.750   | .845  | 1.180 | .875  | .531  | 1/2-13  | 8  | 4 | 2.59 |              |
| LSR-40                     | LSR-40-PD                          | 2.500                         | 2.250   | 1.125 | 1.500 | 1.125 | .687  | 5/8-11  | 8  | 4 | 4.48 |              |
| LSR-48                     | LSR-48-PD                          | 3.000                         | 2.750   | 1.404 | 1.875 | 1.375 | .812  | 3/4-10  | 8  | 4 | 6.68 |              |
| LSR-64                     | LSR-64-PD                          | 4.000                         | 3.500   | 1.750 | 2.500 | 1.875 | 1.060 | 1-8     | 8  | 4 | 11.8 |              |

## Type XSR Shaft Support Rails (Dimensions in inches)

| Part Number | Nominal Shaft Diameter | A* ±.000/- .001 | B     | C     | D      | E     | Screw Diameter | F Hole | C Bore         | Recommended Screw | G Hole | C Bore            | H Degrees | Weight lb/ft |
|-------------|------------------------|-----------------|-------|-------|--------|-------|----------------|--------|----------------|-------------------|--------|-------------------|-----------|--------------|
| XSR-32      | 2                      | 2.750           | 4-1/2 | 7/8   | 1      | 3-1/8 | 1/2            | 9/16   | 1 x 5/8 DP     | 1/2-13 x 2        | 9/16   | 1 x 3/4 DP        | 15        | 16           |
| XSR-48      | 3                      | 4.000           | 6     | 1-1/4 | 1-5/16 | 4-1/4 | 5/8            | 11/16  | 1 1/4 x 3/4 DP | 3/4-10 x 2-3/4    | 13/16  | 1 7/16 x 1 1/8 DP | 25        | 31           |

† Centerline of shaft will be parallel to base within .0005.  
Surface dimensions as cast

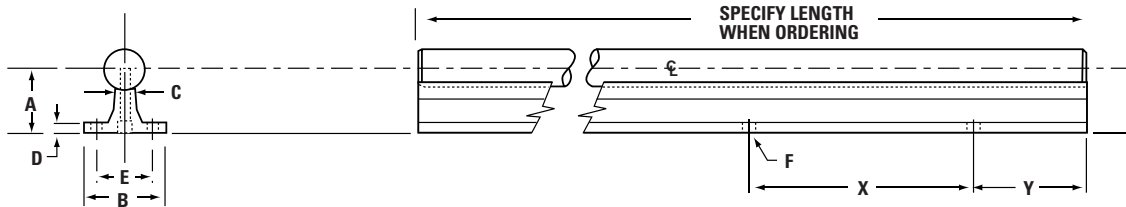


## Inch - Support Rails and Support Rail Assemblies

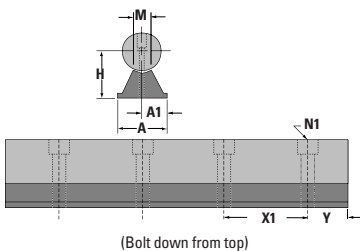
### Standard Shaft Rail Assemblies (Dimensions in inches)

| Assembly Number               |                                  |                    | Nominal Linear Bearing Race Dia. | Dimensions |       |       |      |       |      | Base Holes |   | Weight lb/ft |                |        |
|-------------------------------|----------------------------------|--------------------|----------------------------------|------------|-------|-------|------|-------|------|------------|---|--------------|----------------|--------|
| With Solid Carbon Steel Shaft | With Solid Stainless Steel Shaft | With Tubular 52100 |                                  | A ±.002    | B     | C     | D    | E     | F    |            | X | Y            | SRA and SRA-SS | SRA-TU |
|                               |                                  |                    |                                  |            |       |       |      | Bolt  |      |            |   |              |                |        |
| SRA-8                         | SRA-8-SS                         | —                  | 1/2                              | 1.125      | 1 1/2 | 1/4   | 3/16 | 1     | #6   | .169       | 4 | 2            | 1.26           | —      |
| SRA-10                        | SRA-10-SS                        | —                  | 5/8                              | 1.125      | 1 5/8 | 5/16  | 1/4  | 1 1/8 | #8   | .193       | 4 | 2            | 1.83           | —      |
| SRA-12                        | SRA-12-SS                        | SRA-12-TU          | 3/4                              | 1.500      | 1 3/4 | 3/8   | 1/4  | 1 1/4 | #10  | .221       | 6 | 3            | 2.50           | 1.90   |
| SRA-16                        | SRA-16-SS                        | SRA-16-TU          | 1                                | 1.750      | 2 1/8 | 1/2   | 1/4  | 1 1/2 | 1/4  | .281       | 6 | 3            | 4.06           | 3.30   |
| SRA-20                        | SRA-20-SS                        | —                  | 1 1/4                            | 2.125      | 2 1/2 | 9/16  | 5/16 | 1 7/8 | 5/16 | .343       | 6 | 3            | 6.28           | —      |
| SRA-24                        | SRA-24-SS                        | SRA-24-TU          | 1 1/2                            | 2.500      | 3     | 11/16 | 3/8  | 2 1/4 | 5/16 | .343       | 8 | 4            | 8.60           | 6.54   |
| SRA-32                        | SRA-32-SS                        | SRA-32-TU          | 2                                | 3.250      | 3 3/4 | 7/8   | 1/2  | 2 3/4 | 3/8  | .406       | 8 | 4            | 14.88          | 10.70  |

Support Rail Material: Aluminum alloy extrusion. Base mounting hole locations are within ±.010 (noncumulative).  
Notes: Lengths longer than 48" will use end to end support rails.



### Type LSRA 60 Case Smart Rail Guides (Dimensions in inches)



Material: Steel Alloy (Longer Lengths are Available)

| Part Number <sup>(3)</sup>         |                                    | LinearRace Shafting Diameter | H ±.002 | A   | A1   | M   | Mounting Holes |      | Weight lb/ft |
|------------------------------------|------------------------------------|------------------------------|---------|-----|------|-----|----------------|------|--------------|
| Smart Rail Assembly <sup>(1)</sup> | Smart Rail Assembly <sup>(2)</sup> |                              |         |     |      |     | X1             | N1   |              |
| LSRA10                             | LSRA10 CR                          | .625                         | .687    | .45 | .225 | .31 | 2              | #5   | 1.57         |
| LSRA12                             | LSRA12 CR                          | .750                         | .750    | .51 | .255 | .38 | 3              | #6   | 2.09         |
| LSRA16                             | LSRA16 CR                          | 1.000                        | 1.000   | .69 | .345 | .5  | 3              | #10  | 3.67         |
| LSRA20                             | LSRA20 CR                          | 1.250                        | 1.187   | .78 | .390 | .56 | 3              | 5/16 | 5.86         |
| LSRA24                             | LSRA24 CR                          | 1.500                        | 1.375   | .93 | .465 | .69 | 4              | 3/8  | 7.68         |

(1) Consists of black oxide steel rail and high carbon steel LinearRace shafting (HRC 60 min.).

(2) Consists of zinc plated steel rail and 440C stainless steel LinearRace shafting (HRC 50 min.).

(3) Specify length of assembly when ordering. For example, LSRA12CR x 24.00 inches.

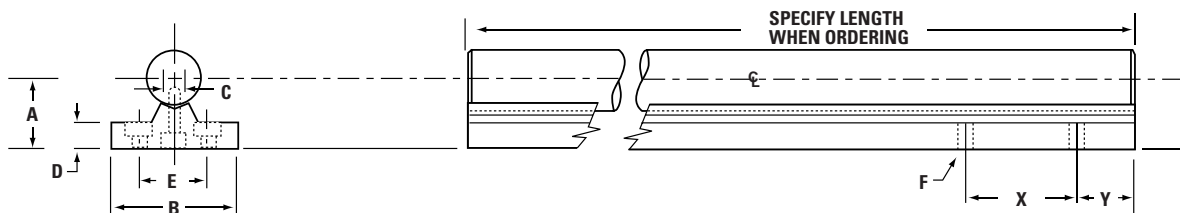
Y dimension is equal on each end unless specified by customer.

NOTE: LSRA's do not use standard "PD" shafting. The shafting requires a different hole pattern and configuration.

### XSRA Extra Rigid Shaft Rail Assemblies (Dimensions in inches)

| Assembly Number               |                                 | LinearRace Shafting Diameter | Dimensions     |       |       |        |       |            | Base Holes |                | Weight lb/ft |         |       |         |
|-------------------------------|---------------------------------|------------------------------|----------------|-------|-------|--------|-------|------------|------------|----------------|--------------|---------|-------|---------|
| With Solid Carbon Steel Shaft | With Tubular Carbon Steel Shaft |                              | A +.000/-0.001 | B     | C     | D      | E     | F          |            |                | X            | Y       | XSRA  | XSRA-TU |
|                               |                                 |                              |                |       |       |        |       | Screw Dia. | Hole       | C Bore         |              |         |       |         |
| XSRA-32                       | XSRA-32-TU                      | 2                            | 2.750          | 4 1/2 | 7/8   | 1      | 3 1/8 | 1/2        | 9/16       | 1 x 5/8 DP     | 4            | 1 31/32 | 40.04 | 22.50   |
| XSRA-48                       | XSRA-48-TU                      | 3                            | 4.000          | 6     | 1 1/4 | 1 5/16 | 4 1/4 | 5/8        | 11/16      | 1 1/4 x 3/4 DP | 6            | 2 31/32 | 73.72 | 49.70   |

Note: Lengths longer than 24" will use end to end support rails.



Inch - Support Blocks

# Support Blocks for End Supported Applications

## Part Number Description

### ASB 16

| Type | Description                                      | Size | Nominal Diameter |
|------|--|------|------------------|
| ASB  | Low Profile 60 Case LinearRace End Support Block | 4    | .250             |
| SB   | Standard 60 Case LinearRace End Support Block    | 6    | .375             |
| FSB  | Flanged 60 Case LinearRace End Support Block     | 8    | .500             |
| WM   | Waymount Support                                 | 10   | .625             |
|      |  | 12   | .750             |
|      |  | 16   | 1.000            |
|      |  | 20   | 1.250            |
|      |  | 24   | 1.500            |
|      |  | 32   | 2.000            |
|      |  | 48   | 3.000            |
|      |  | 64   | 4.000            |

All sizes are not available for all support block types. See specific product charts for size availability.

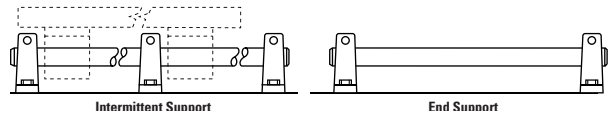
## Inch - Support Blocks

### Shaft Support Blocks – Type ASB and SB For end support or intermittent support

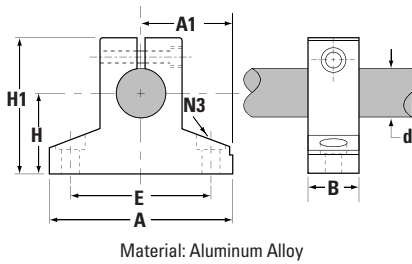
Shaft support blocks are used for end or intermittent support where loads are light and deflection between supports is not a problem. Unlike shaft support rails, blocks do not permit longitudinal passage of open-type Ball Bushing bearings. Type SB shaft support blocks enable clamping of shafts and eliminate the need for bolts, etc. to maintain shaft position. Shimming is suggested for high precision applications to eliminate the effect of variations in surface of base or manufacturing tolerances between supports.



Type ASB shaft blocks, manufactured from high strength extruded aluminum, provide either end or intermittent support in applications where loads are designed with a reference edge on one side of the base. This provides a surface parallel to the center of the shaft within  $\pm .001''$  that can be used to simplify shaft alignment.

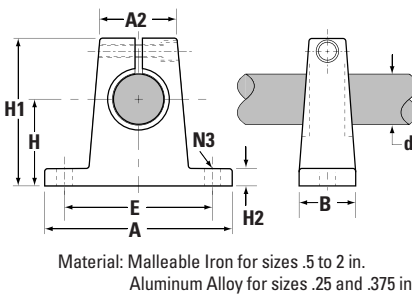


#### Type ASB 60 Case LinearRace Shaft End Support Blocks (Dimensions in inches)



| Part <sup>(2)</sup><br>Number | Nominal<br>LinearRace<br>Diameter<br>d | H<br>$\pm .001$ | H1   | A    | A1<br>$\pm .001$ | B    | E    | N3   |      | Weight<br>lb |
|-------------------------------|--|-----------------|------|------|------------------|------|------|------|------|--------------|
|                               |  |                 |      |      |                  |      |      | Hole | Bolt |              |
| ASB-4                         | .250                                   | .500            | .89  | 1.50 | .750             | .50  | 1.12 | .16  | #6   | .06          |
| ASB-6                         | .375                                   | .562            | 1.00 | 1.62 | .813             | .56  | 1.25 | .16  | #6   | .08          |
| ASB-8                         | .500                                   | .875            | 1.48 | 2.00 | 1.000            | .63  | 1.50 | .19  | #8   | .11          |
| ASB-12                        | .750                                   | 1.125           | 1.95 | 2.50 | 1.250            | .75  | 2.00 | .22  | #10  | .22          |
| ASB-16                        | 1.000                                  | 1.375           | 2.48 | 3.25 | 1.625            | 1.00 | 2.50 | .28  | 1/4  | .44          |
| ASB-24                        | 1.500                                  | 2.000           | 3.50 | 4.75 | 2.375            | 1.25 | 3.50 | .34  | 5/16 | 1.16         |

#### Type SB 60 Case LinearRace Shaft End Support Blocks (Dimensions in inches)



| Part <sup>(2)</sup><br>Number | Nominal<br>LinearRace<br>Diameter<br>d | H<br>$\pm .002$ | H1   | H2  | A    | A2   | B    | E<br>$\pm .010$ | N3   |      | Weight<br>lb |
|-------------------------------|--|-----------------|------|-----|------|------|------|-----------------|------|------|--------------|
|                               |  |                 |      |     |      |      |      |                 | Hole | Bolt |              |
| SB-4                          | .250                                   | .687            | 1.06 | .25 | 1.50 | .63  | .50  | 1.125           | .16  | #6   | .03          |
| SB-6                          | .375                                   | .750            | 1.19 | .25 | 1.63 | .69  | .56  | 1.250           | .16  | #6   | .05          |
| SB-8                          | .500                                   | 1.000           | 1.63 | .25 | 2.00 | .75  | .63  | 1.500           | .19  | #8   | .30          |
| SB-10                         | .625                                   | 1.000           | 1.75 | .31 | 2.50 | .88  | .69  | 1.875           | .22  | #10  | .40          |
| SB-12                         | .750                                   | 1.250           | 2.13 | .31 | 2.75 | 1.00 | .75  | 2.000           | .22  | #10  | .50          |
| SB-16                         | 1.000                                  | 1.500           | 2.56 | .38 | 3.25 | 1.38 | 1.00 | 2.500           | .28  | .25  | 1.0          |
| SB-20                         | 1.250                                  | 1.750           | 3.00 | .44 | 4.00 | 1.75 | 1.13 | 3.000           | .34  | .31  | 2.0          |
| SB-24                         | 1.500                                  | 2.000           | 3.50 | .50 | 4.75 | 2.00 | 1.25 | 3.500           | .34  | .31  | 2.6          |
| SB-32                         | 2.000                                  | 2.500           | 4.50 | .63 | 6.00 | 2.63 | 1.50 | 4.500           | .41  | 3/8  | 4.8          |

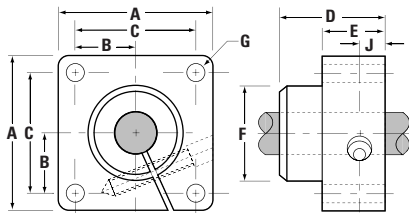


## Inch - Shaft Support Blocks

### Shaft Support Blocks – Type FSB

Thomson Flanged Support Blocks offer perpendicular mounting without the need for special adaptor brackets.

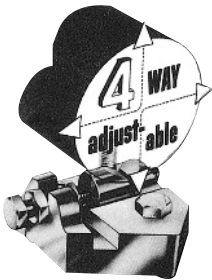
#### Type FSB Flanged 60 Case LinearRace Shaft End Support Blocks (Dimensions in inches)



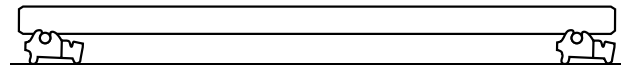
Material: Aluminum Alloy

| Part Number | Nominal LinearRace Diameter d | A ±.001 | B    | C ±.010 | D    | E   | F    | G    |      | J   | Weight lb |
|-------------|-------------------------------|---------|------|---------|------|-----|------|------|------|-----|-----------|
|             |                               |         |      |         |      |     |      | Hole | Bolt |     |           |
| FSB-8       | .500                          | 1.63    | .63  | 1.250   | .88  | .50 | 1.00 | .81  | #8   | .25 | .3        |
| FSB-12      | .750                          | 2.38    | .88  | 1.750   | 1.00 | .63 | 1.25 | .21  | #10  | .31 | .6        |
| FSB-16      | 1.000                         | 2.75    | 1.06 | 2.125   | 1.25 | .63 | 1.50 | .27  | 1/4  | .31 | .8        |
| FSB-20      | 1.250                         | 3.13    | 1.19 | 2.375   | 1.38 | .75 | 1.75 | .27  | 1/4  | .38 | .9        |

### Waymount Support For adjustable support



Designed for use with Roundway bearings. Two or more can be used to provide intermittent support and adjustment along the length of the shaft. Unlike shaft support rails, Waymount supports do not permit longitudinal passage of open-type Ball Bushing bearings. When it is necessary to travel over Waymount supports, Roundway bearings should be used. Open-type Ball Bushing bearings can be used only if side loads are light and an adapter block is used (consult factory for recommendation).



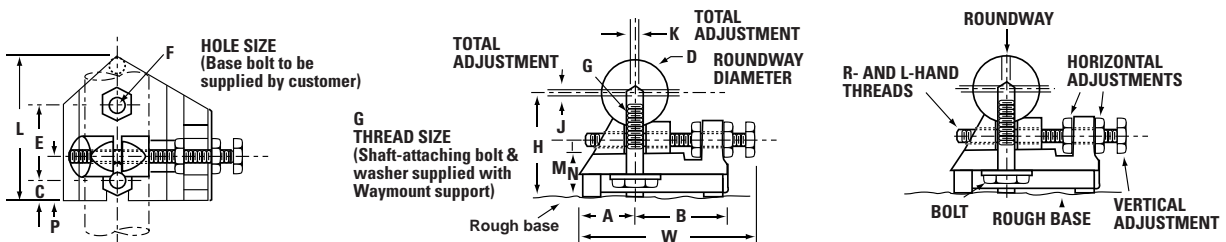
End Support

#### Waymount Supports (Dimensions in inches)

| Waymount Part Number | D RoundWay Diameter | L     | H†     | W     | A      | B     | C    | E      | F     | G       | J    | K    | M     | N     | P     | Weight (lbs) |
|----------------------|---------------------|-------|--------|-------|--------|-------|------|--------|-------|---------|------|------|-------|-------|-------|--------------|
| WM-8                 | 1/2                 | 1 1/2 | 1 1/16 | 1 3/4 | 1/2    | 7/8   | 1/4  | 3/4    | 7/32  | 8-32    | 3/64 | 3/32 | 11/16 | 1/2   | 7/16  | .2           |
| WM-16                | 1                   | 2     | 1 1/2  | 2 1/2 | 3/4    | 1 1/4 | 5/16 | 1 1/16 | 9/32  | 1/4-28  | 1/16 | 1/8  | 13/16 | 11/16 | 11/16 | .5           |
| WM-24                | 1 1/2               | 2 1/2 | 2      | 3 1/2 | 1 3/16 | 1 5/8 | 7/16 | 1 3/16 | 11/32 | 5/16-24 | 1/8  | 1/8  | 1     | 3/4   | 3/4   | 1.1          |
| WM-32                | 2                   | 3     | 2 1/2  | 4     | 1 7/16 | 1 7/8 | 1/2  | 1 3/8  | 13/32 | 3/8-24  | 1/8  | 1/8  | 1 1/4 | 15/16 | 1     | 1.8          |
| WM-48                | 3                   | 5     | 4 5/16 | 6 3/4 | 2 3/8  | 3 3/8 | 3/4  | 2 5/8  | 21/32 | 5/8-18  | 1/8  | 1/8  | 2 1/4 | 1 5/8 | 1 1/2 | 10.2         |
| WM-64                | 4                   | 6 1/2 | 5 7/16 | 8 1/2 | 3      | 4 1/4 | 1    | 3 1/8  | 25/32 | 3/4-16  | 1/8  | 1/8  | 2 3/4 | 2     | 2     | 21.2         |

In-Between Shaft Sizes: Waymount supports will accommodate all shaft sizes from approximately 3/8" to 6" diameter. Use the Waymount support size nearest to your particular shaft diameter. Favor the next largest Waymount support if the shaft size falls midway between two of them. The mean centering height "H" will vary somewhat with different diameter shafts.

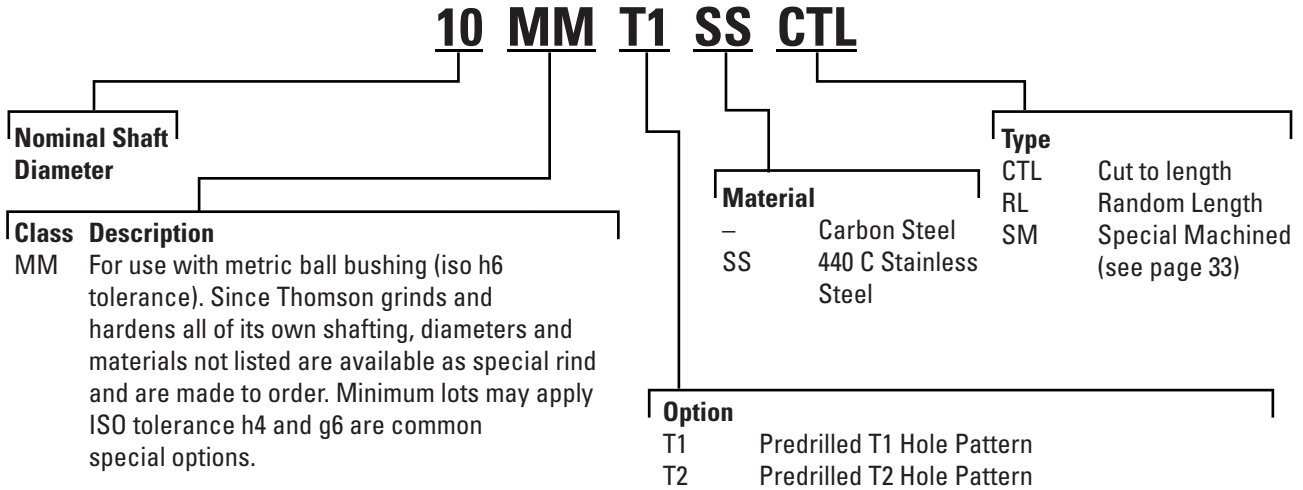
† Please note difference in dimension between shaft centerline of rails, blocks and Waymount supports. Shimming or blocking is suggested when these are used on a single shaft.



## Metric - 60 Case Shafting

# Hardened and Ground 60 Case Precision LinearRace Shafting

### Part Number Description



CTL = Cut to length is Thomson 60 Case cut to your specified length.

RL = Random length is full bar or long length shafting. It is called random length because we start with a raw bar 4" to 6" longer than the minimum usable but guarantee only the minimum visible. We mark the ends of what is out of our own tolerance. This is the result of the manufacturing process and tightly controlled roundness specifications.

### Solid Carbon Steel

Hardness: 60 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Straightness: .0254mm (.001") Per Foot Cumulative  
(.051mm (.002") TIR)

Roundness: .0020mm (.00080") Class MM

Taper: .0025mm (.001")

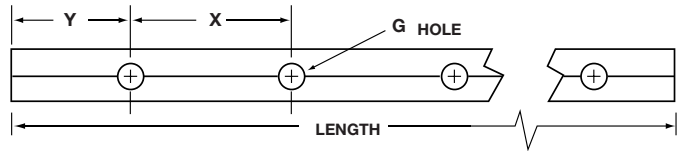
| Nominal Diameter (mm) | Basic Part Number | Diameter Tolerance |        | Min. Usable Length |        | Min. Hardness Depth |        | Weight per mm (kg) | Weight per inch (lb) |
|-----------------------|-------------------|--------------------|--------|--------------------|--------|---------------------|--------|--------------------|----------------------|
|                       |                   | (mm)               | (inch) | (mm)               | (inch) | (mm)                | (inch) |                    |                      |
| 5                     | 5 MM              | 5.00               | .1969  | 1905               | 75     | 0.69                | 0.027  | 0.001              | 0.009                |
|                       |                   | 4.49               | .1965  |                    |        |                     |        |                    |                      |
| 8                     | 8 MM              | 8.00               | .3150  | 4216               | 166    | 0.69                | 0.027  | 0.003              | 0.022                |
|                       |                   | 7.99               | .3146  |                    |        |                     |        |                    |                      |
| 10                    | 10 MM             | 10.00              | .3937  | 4216               | 166    | 0.69                | 0.027  | 0.0035             | 0.035                |
|                       |                   | 9.99               | .3932  |                    |        |                     |        |                    |                      |
| 12                    | 12 MM             | 12.00              | .4724  | 4216               | 166    | 1.02                | 0.04   | 0.0050             | 0.050                |
|                       |                   | 11.99              | .4720  |                    |        |                     |        |                    |                      |
| 15                    | 15 MM             | 15.00              | .5609  | 4521               | 178    | 1.02                | 0.04   | 0.0085             | 0.077                |
|                       |                   | 14.99              | .5902  |                    |        |                     |        |                    |                      |
| 16                    | 16 MM             | 16.00              | .6299  | 4521               | 178    | 1.02                | 0.04   | 0.0096             | 0.088                |
|                       |                   | 15.99              | .6295  |                    |        |                     |        |                    |                      |
| 20                    | 20 MM             | 20.00              | .7874  | 4521               | 178    | 1.52                | 0.06   | 0.012              | 0.138                |
|                       |                   | 19.99              | .7869  |                    |        |                     |        |                    |                      |
| 25                    | 25 MM             | 25.00              | .9843  | 4521               | 178    | 2.03                | 0.08   | 0.019              | 0.216                |
|                       |                   | 24.99              | .9838  |                    |        |                     |        |                    |                      |
| 30                    | 30 MM             | 30.00              | 1.1811 | 4521               | 178    | 2.03                | 0.08   | 0.027              | 0.311                |
|                       |                   | 29.99              | 1.1806 |                    |        |                     |        |                    |                      |
| 40                    | 40 MM             | 40.00              | 1.5748 | 4521               | 178    | 2.03                | 0.08   | 0.048              | 0.553                |
|                       |                   | 39.99              | 1.5743 |                    |        |                     |        |                    |                      |
| 50                    | 50 MM             | 50.00              | 1.9685 | 4521               | 178    | 2.54                | 0.1    | 0.075              | 0.864                |
|                       |                   | 49.98              | 1.9679 |                    |        |                     |        |                    |                      |
| 60                    | 60 MM             | 60.00              | 2.3622 | 4521               | 178    | 2.54                | 0.1    | 0.108              | 1.240                |
|                       |                   | 59.98              | 2.3615 |                    |        |                     |        |                    |                      |
| 80                    | 80 MM             | 80.00              | 3.1496 | 5130               | 178    | 2.54                | 0.1    | 0.192              | 2.210                |
|                       |                   | 79.97              | 3.1486 |                    |        |                     |        |                    |                      |

Standard random length (RL) minimum usable length is 4521mm (178").

Metric - 60 Case Shafting

**Standard Options for Carbon Steel Shafting Predrilled (T1 and T2)**

Hardness: 60 ROCKWELL C Min.  
 Surface Finish: 8 Ra Max  
 Roundness: .0020mm (.00080") Class MM  
 Straightness: .0254mm (.001") Per Foot Cumulative  
 (.051mm (.002") TIR)  
 Taper: .0025mm (.001")



**T1 Predrilled**

| Nominal Diameter (mm) | Basic Part Number | MMT1 Diameter Tolerance |        | X    |        | Standard Y |        | G Standard Size | Min. Usable Length |      | Min. Hardness Depth |      | Weight Per mm (kg) | Weight Per in (lb) |
|-----------------------|-------------------|-------------------------|--------|------|--------|------------|--------|-----------------|--------------------|------|---------------------|------|--------------------|--------------------|
|                       |                   | (mm)                    | (inch) | (mm) | (inch) | (mm)       | (inch) |                 | (mm)               | (in) | (mm)                | (in) |                    |                    |
| 12                    | 12 MM T1          | 12.00                   | 0.4724 | 75   | 2.953  | 37.5       | 1.476  | M4              | 4216               | 166  | 1.02                | 0.04 | 0.0050             | 0.050              |
|                       |                   | 11.99                   | 0.4720 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 16                    | 16 MM T1          | 16.00                   | 0.6299 | 100  | 3.937  | 50         | 1.968  | M5              | 4521               | 178  | 1.02                | 0.04 | 0.0096             | 0.088              |
|                       |                   | 15.99                   | 0.6295 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 20                    | 20 MM T1          | 20.00                   | 0.7874 | 100  | 3.937  | 50         | 1.968  | M6              | 4521               | 178  | 1.52                | 0.06 | 0.012              | 0.138              |
|                       |                   | 19.99                   | 0.7869 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 25                    | 25 MM T1          | 25.00                   | 0.9843 | 120  | 4.724  | 60         | 2.362  | M8              | 4521               | 178  | 2.03                | 0.08 | 0.019              | 0.216              |
|                       |                   | 24.99                   | 0.9838 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 30                    | 30 MM T1          | 30.00                   | 1.1811 | 150  | 5.906  | 75         | 2.953  | M10             | 4521               | 178  | 2.03                | 0.08 | 0.027              | 0.311              |
|                       |                   | 29.99                   | 1.1806 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 40                    | 40 MM T1          | 40.00                   | 1.5748 | 200  | 7.874  | 100        | 3.937  | M10             | 4521               | 178  | 2.03                | 0.08 | 0.048              | 0.553              |
|                       |                   | 39.99                   | 1.5743 |      |        |            |        |                 |                    |      |                     |      |                    |                    |

**T2 Predrilled**

| Nominal Diameter (mm) | Basic Part Number | MMT1 Diameter Tolerance |        | X    |        | Standard Y |        | G Standard Size | Min. Usable Length |      | Min. Hardness Depth |      | Weight Per mm (kg) | Weight Per in (lb) |
|-----------------------|-------------------|-------------------------|--------|------|--------|------------|--------|-----------------|--------------------|------|---------------------|------|--------------------|--------------------|
|                       |                   | (mm)                    | (inch) | (mm) | (inch) | (mm)       | (inch) |                 | (mm)               | (in) | (mm)                | (in) |                    |                    |
| 12                    | 12 MM T2          | 12.00                   | 0.4724 | 120  | 4.724  | 60.0       | 2.362  | M4              | 4216               | 166  | 1.02                | 0.04 | 0.0050             | 0.050              |
|                       |                   | 11.99                   | 0.4720 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 16                    | 16 MM T2          | 16.00                   | 0.6299 | 150  | 5.906  | 75         | 2.953  | M5              | 4521               | 178  | 1.02                | 0.04 | 0.0096             | 0.088              |
|                       |                   | 15.99                   | 0.6295 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 20                    | 20 MM T2          | 20.00                   | 0.7874 | 150  | 5.906  | 75         | 2.953  | M6              | 4521               | 178  | 1.52                | 0.06 | 0.012              | 0.138              |
|                       |                   | 19.99                   | 0.7869 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 25                    | 25 MM T2          | 25.00                   | 0.9843 | 200  | 7.874  | 100        | 2.937  | M8              | 4521               | 178  | 2.03                | 0.08 | 0.019              | 0.216              |
|                       |                   | 24.99                   | 0.9838 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 30                    | 30 MM T2          | 30.00                   | 1.1811 | 200  | 7.874  | 100        | 3.937  | M10             | 4521               | 178  | 2.03                | 0.08 | 0.027              | 0.311              |
|                       |                   | 29.99                   | 1.1806 |      |        |            |        |                 |                    |      |                     |      |                    |                    |
| 40                    | 40 MM T2          | 40.00                   | 1.5748 | 300  | 11.811 | 150        | 5.906  | M10             | 4521               | 178  | 2.03                | 0.08 | 0.048              | 0.553              |
|                       |                   | 39.99                   | 1.5743 |      |        |            |        |                 |                    |      |                     |      |                    |                    |

## Metric - 60 Case Shafting

### 440 C Stainless Steel

Hardness: 50 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Straightness: .0254mm (.001") Per Foot Cumulative  
(.051mm (.002") TIR)

Roundness: .0020mm (.000080") Class MM

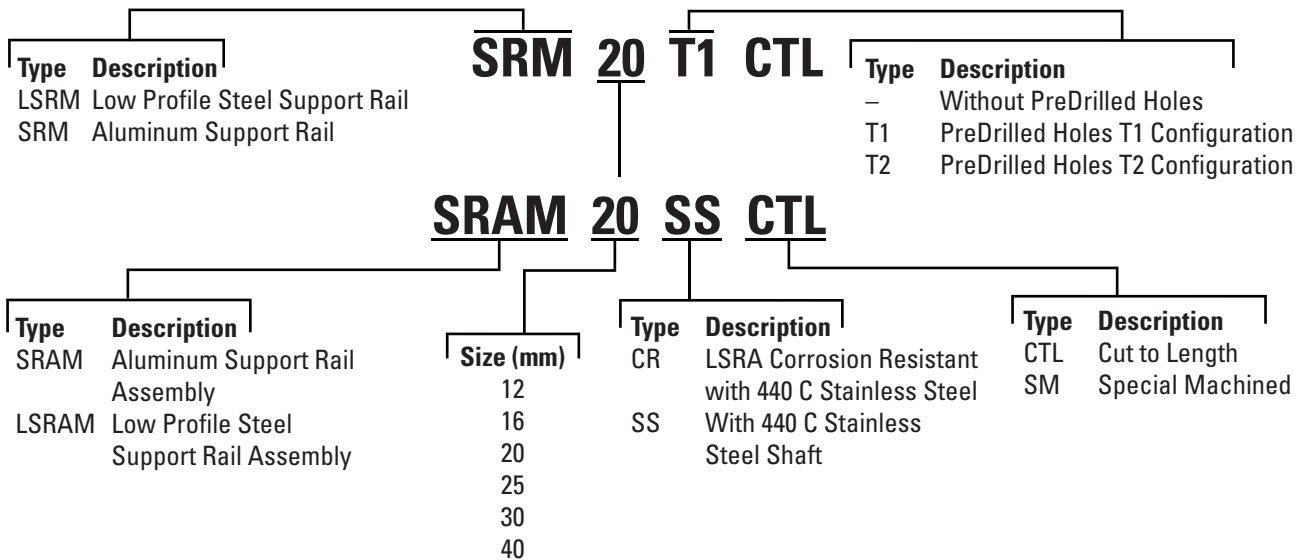
Taper: .0025mm (.001")

| Nominal Dia. (mm) | Basic Part Number | Diameter Tolerance |        | Min. Usable Length |      | Min. Hardness Depth |       | Weight Per mm (kg) | Weight Per in (lb) |
|-------------------|-------------------|--------------------|--------|--------------------|------|---------------------|-------|--------------------|--------------------|
|                   |                   | (mm)               | (inch) | (mm)               | (in) | (mm)                | (in)  |                    |                    |
| 5                 | 5 MM SS           | 5.00               | 0.1969 | 1905               | 75   | 0.69                | 0.027 | 0.001              | 0.009              |
|                   |                   | 4.49               | 0.1965 |                    |      |                     |       |                    |                    |
| 8                 | 8 MM SS           | 8.00               | 0.3150 | 4216               | 166  | 0.69                | 0.027 | 0.003              | 0.022              |
|                   |                   | 7.99               | 0.3146 |                    |      |                     |       |                    |                    |
| 10                | 10 MM SS          | 10.00              | .03937 | 4216               | 166  | 0.69                | 0.027 | 0.0035             | 0.035              |
|                   |                   | 9.99               | 0.3932 |                    |      |                     |       |                    |                    |
| 12                | 12 MM SS          | 12.00              | 0.4724 | 4216               | 166  | 1.02                | 0.04  | 0.0050             | 0.050              |
|                   |                   | 11.99              | 0.4720 |                    |      |                     |       |                    |                    |
| 16                | 16 MM SS          | 16.00              | 0.6299 | 4521               | 178  | 1.02                | 0.04  | 0.0096             | 0.088              |
|                   |                   | 15.99              | 0.6295 |                    |      |                     |       |                    |                    |
| 20                | 20 MM SS          | 20.00              | 0.7874 | 4521               | 178  | 1.52                | 0.06  | 0.012              | 0.138              |
|                   |                   | 19.99              | 0.7869 |                    |      |                     |       |                    |                    |
| 25                | 25 MM SS          | 25.00              | 0.9843 | 4521               | 178  | 2.03                | 0.08  | 0.019              | 0.216              |
|                   |                   | 24.99              | 0.9838 |                    |      |                     |       |                    |                    |
| 30                | 30 MM SS          | 30.00              | 1.1811 | 4521               | 178  | 2.03                | 0.08  | 0.027              | 0.311              |
|                   |                   | 29.99              | 1.1806 |                    |      |                     |       |                    |                    |
| 40                | 40 MM SS          | 40.00              | 1.5748 | 4521               | 178  | 2.03                | 0.08  | 0.048              | 0.553              |
|                   |                   | 39.99              | 1.5743 |                    |      |                     |       |                    |                    |
| 50                | 50 MM SS          | 50.00              | 1.9685 | 4521               | 178  | 2.54                | 0.1   | 0.075              | 0.864              |
|                   |                   | 49.98              | 1.9679 |                    |      |                     |       |                    |                    |
| 60                | 60 MM SS          | 60.00              | 2.3622 | 4521               | 178  | 2.54                | 0.1   | 0.108              | 1.240              |
|                   |                   | 59.98              | 2.3615 |                    |      |                     |       |                    |                    |

Metric - Support Rails and Support Rail Assemblies

# Support Rails and Assemblies for Continuously Supported Applications

## Part Number Description



### Shaft Rail Supports Type SRM, SRM-T1 & SRM-T2

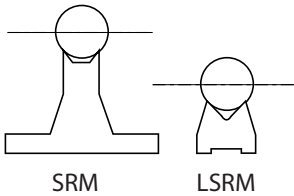
#### The low cost way of mounting Thomson 60 Case shafts

Shaft supports simplify mounting of Thomson 60 Case shafts. Users of Thomson 60 Case shafting should carefully consider the use of these low cost shaft supports. They are standard, available from stock, and simplify shaft mounting. In addition to many other benefits, they eliminate many problems encountered in designing and manufacturing shaft supporting devices. These versatile mounts can be used horizontally or vertically, and in many different arrangements. Shaft support rails are available without pre-drilled holes (SR) or pre-drilled (SR-PD) shaft rails to support 12mm to 40mm diameter shafts are available in standard 600mm where shorter lengths are needed, rails are easily cut to length. For longer shafts they can be mounted end to end, using shims or grout, if necessary, to compensate for slight variation within manufacturing tolerance. Thomson offers shaft support rails with pre-drilled holes to simplify shaft mounting.

## Metric - Support Rails and Support Rail Assemblies

### Low Shaft Support Rails Type LSR, LSR-T2

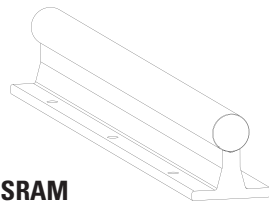
For compact designs



Low Shaft Rails allow the design of more compact linear motion systems. The height from the base to the mean shaft center ranges from 14mm for supporting a 12mm diameter shaft to a maximum 39mm when supporting a 40mm diameter shaft – 40% lower than standard support rails. Low Shaft Rails are made of steel to maintain optimum shaft rigidity. Either continuous or intermittent support is possible when using Thomson open-type linear ball bearings. Low Shaft Rails are furnished in standard 1200mm lengths. Where shorter lengths are required, rails can easily be cut. For supporting longer shafts, rails can be mounted end-to-end without limit. Low Shaft Rails are available without pre-drilled mounting holes (LSRM) or with pre-drilled mounting holes (LSRM-T2) to match Thomson drilled and tapped shafts (T2).

**Note:** When using LSRM-T2, the attachment bolts are from underneath, so you must have access under your machine base plate. The LSRAM assemblies highlighted below utilize attachment bolts from above. If one of the standard pre-drilled Low Shaft Rails is not appropriate for your design needs, Low Shaft Rails can be custom drilled by Thomson to your specifications. Send a print with all required dimensions, tolerances, and quantities needed to our application engineering team.

### Pre-Assembled Shaft Rail Assemblies Type SRAM & LSRAM



**SRAM**

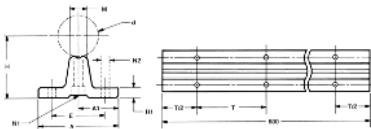
Thomson 60 Case steel shafts mounted on shaft support rails are now available for instant bolt-down installation. Assemblies are supplied cut to any length, with no limit on the overall length (long lengths are butt jointed together unless specified otherwise). Either solid or light-weight tubular shafting can be assembled to the standard Thomson support rails, which come with base mounting holes spaced evenly along the overall length of the assembly. The LSRAM uses a special shaft unlike the LSRM-T2. The attachment bolts for the LSRA are from the top down so you can easily mount into a machine base plate. The LSRAM bolt pattern closely matches Profile Rail Linear Guides and can easily be used as a drop-in substitute to replace linear guides (ensure you review loading requirements).

Metric - 60 Case LinearRace Support Rails

# 60 Case LinearRace Support Rails

## for Continuously Supported Applications

### Type SR/SR-PD LinearRace Support Rails and Assemblies (Dimensions in mm)



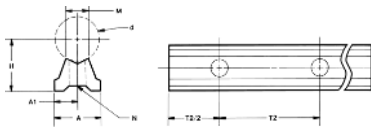
Material: Aluminum Alloy  
(Longer Lengths are Available)

| Without Holes | With T1 Hole Spacing | With T2 Hole Spacing | D h6 | H ±.02 | H1 | A  | A1 ±.02 | M  | E ±.015 | Bolt Hole |     |       |     | Shaft <sup>(1)</sup> Rail Mass (kg) |
|---------------|----------------------|----------------------|------|--------|----|----|---------|----|---------|-----------|-----|-------|-----|-------------------------------------|
|               |                      |                      |      |        |    |    |         |    |         | Spacing   |     | Sizes |     |                                     |
|               |                      |                      |      |        |    |    |         |    |         | T1        | T2  | N1    | N2  |                                     |
| SRM12         | SRM12 T1             | SRM12 T2             | 12   | 28     | 5  | 43 | 21.5    | 9  | 29      | 75        | 120 | M4    | 4.5 | 1.9                                 |
| SRM16         | SRM16 T1             | SRM16 T2             | 16   | 30     | 5  | 48 | 24.0    | 10 | 33      | 100       | 150 | M5    | 5.5 | 2.8                                 |
| SRM20         | SRM20 T1             | SRM20 T2             | 20   | 38     | 6  | 56 | 28.0    | 11 | 37      | 100       | 150 | M6    | 6.6 | 4.2                                 |
| SRM25         | SRM25 T1             | SRM25 T2             | 25   | 42     | 6  | 60 | 30.0    | 14 | 42      | 120       | 200 | M8    | 6.6 | 5.9                                 |
| SRM30         | SRM30 T1             | SRM30 T2             | 30   | 53     | 8  | 74 | 37.0    | 14 | 51      | 150       | 200 | M10   | 8.6 | 8.7                                 |
| SRM40         | SRM40 T1             | SRM40 T2             | 40   | 60     | 8  | 78 | 39.0    | 18 | 55      | 200       | 300 | M10   | 8.6 | 13.6                                |

N1 Hole Dia. includes counterbore for socket head cap screw. Mounting hole patterns for various sizes. Alignment and location of holes are ± .010, noncumulative.

(1) Standard Length 600mm.

### Type LSRM/LSRM-T2 LinearRace Support Rails and Assemblies (Dimensions in mm)



Material: Steel

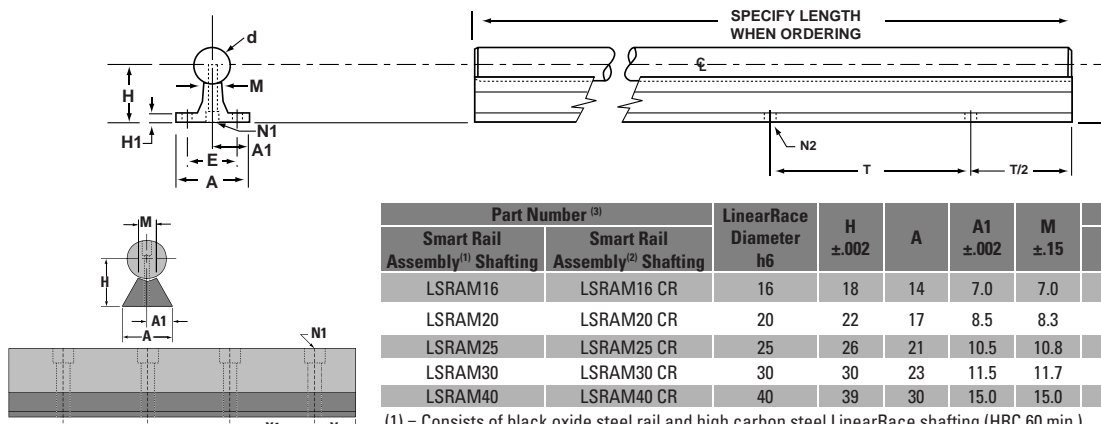
| Without Holes | With T2 Hole Spacing | D h6 | H ±.02 | A  | A1 ±.02 | M ±.15 | Bolt Hole |       | Shaft <sup>(2)</sup> Rail Mass (kg) |
|---------------|----------------------|------|--------|----|---------|--------|-----------|-------|-------------------------------------|
|               |                      |      |        |    |         |        | Spacing   | Sizes |                                     |
|               |                      |      |        |    |         |        | T2        | N     |                                     |
| LSRM12        | LSRM12 T2            | 12   | 14     | 12 | 6.0     | 6.0    | 120       | M4    | 1.5                                 |
| LSRM16        | LSRM16 T2            | 16   | 18     | 14 | 7.0     | 7.0    | 150       | M5    | 2.4                                 |
| LSRM20        | LSRM20 T2            | 20   | 22     | 17 | 8.5     | 8.3    | 150       | M6    | 3.7                                 |
| LSRM25        | LSRM25 T2            | 25   | 26     | 21 | 10.5    | 10.8   | 200       | M8    | 5.6                                 |
| LSRM30        | LSRM30 T2            | 30   | 30     | 23 | 11.5    | 11.0   | 200       | M10   | 9.0                                 |
| LSRM40        | LSRM40 T2            | 40   | 39     | 30 | 15.0    | 15.0   | 300       | M12   | 13.3                                |

(2) Standard Length 1200mm

### Type SRAMT1 or SRAMT2 LinearRace Shafting Support Rail Assemblies (Dimensions in mm)

| Part Number                               |   | d  | H ±.02 | H1 | A  | A1 ±.02 | M  | E ±.015 | N1  | N2  | T1  | T2  | Mass (kg/m) |
|---|---|----|--------|----|----|---------|----|---------|-----|-----|-----|-----|-------------|
| SRAM T1 Assembly with LinearRace shafting | SRAM T2 Assembly with LinearRace shafting |    |        |    |    |         |    |         |     |     |     |     |             |
| SRAM12 T1                                 | SRAM12 T2                                 | 12 | 28     | 5  | 43 | 21.5    | 9  | 29      | M4  | 4.5 | 75  | 120 | 4,06        |
| SRAM16 T1                                 | SRAM16 T2                                 | 16 | 30     | 5  | 48 | 24      | 10 | 33      | M5  | 5.5 | 100 | 150 | 6,24        |
| SRAM20 T1                                 | SRAM20 T2                                 | 20 | 38     | 6  | 56 | 28      | 11 | 37      | M6  | 6.6 | 100 | 150 | 10,44       |
| SRAM25 T1                                 | SRAM25 T2                                 | 25 | 42     | 6  | 60 | 30      | 14 | 42      | M8  | 6.6 | 120 | 200 | 13,69       |
| SRAM30 T1                                 | SRAM30 T2                                 | 30 | 53     | 8  | 74 | 37      | 14 | 51      | M10 | 8.6 | 150 | 200 | 20,02       |
| SRAM40 T1                                 | SRAM40 T2                                 | 40 | 60     | 8  | 78 | 39      | 18 | 55      | M10 | 8.6 | 200 | 300 | 32,54       |

### Type LSRAM Smart Rail Assemblies (Dimensions in mm)



Material: Steel Alloy (Longer Lengths are Available)

| Part Number <sup>(3)</sup>                  |   | LinearRace Diameter h6 | H ±.002 | A  | A1 ±.002 | M ±.15 | Bolt Hole |     | Mass (kg) |
|---|---|------------------------|---------|----|----------|--------|-----------|-----|-----------|
| Smart Rail Assembly <sup>(1)</sup> Shafting | Smart Rail Assembly <sup>(2)</sup> Shafting |                        |         |    |          |        | T4        | N1  |           |
| LSRAM16                                     | LSRAM16 CR                                  | 16                     | 18      | 14 | 7.0      | 7.0    | 40        | M3  | 3.6       |
| LSRAM20                                     | LSRAM20 CR                                  | 20                     | 22      | 17 | 8.5      | 8.3    | 60        | M4  | 5.5       |
| LSRAM25                                     | LSRAM25 CR                                  | 25                     | 26      | 21 | 10.5     | 10.8   | 60        | M5  | 8.5       |
| LSRAM30                                     | LSRAM30 CR                                  | 30                     | 30      | 23 | 11.5     | 11.7   | 80        | M6  | 13.0      |
| LSRAM40                                     | LSRAM40 CR                                  | 40                     | 39      | 30 | 15.0     | 15.0   | 105       | M10 | 21.0      |

(1) = Consists of black oxide steel rail and high carbon steel LinearRace shafting (HRC 60 min.).

(2) = Consists of zinc plated steel rail and 440C stainless steel LinearRace shafting (HRC 50 min.).

(3) = Specify length of Smart Rail when ordering. For example, LSRAM M20 x 1200mm.

S dimension is equal on each end unless specified by customer.

## Metric - Support Block

# Support Block for End Supported Applications

## Part Number Description

### ASBM 16

| Type | Description                                      | Size | mm |
|------|--|------|----|
| ASBM | Low Profile 60 Case LinearRace End Support Block | 8    | 12 |
| SBM  | Standard 60 Case LinearRace End Support Block    | 6    | 20 |
|      |  | 20   | 25 |
|      |  | 30   | 40 |

All sizes are not available for all support block types. See specific product charts for size availability.

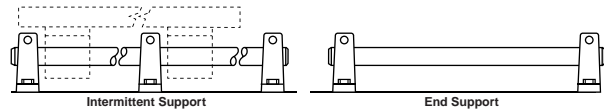
## Shaft Support Blocks – Type SB and ASB

### For end support or intermittent support

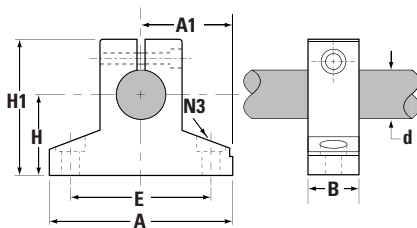
Shaft support blocks are used for end or intermittent support where loads are light and deflection between supports is not a problem. Unlike shaft support rails, blocks do not permit longitudinal passage of open-type Ball Bushing bearings. Type SB shaft support blocks enable clamping of shafts and eliminate the need for bolts, etc. to maintain shaft position. Shimming is suggested for high precision applications to eliminate the effect of variations in surface of base or manufacturing tolerances between supports.



Type ASB shaft blocks, manufactured from high strength extruded aluminum, provide either end or intermittent support in applications where loads are designed with a reference edge on one side of the base. This provides a surface parallel to the center of the shaft within  $\pm 0.01$ " that can be used to simplify shaft alignment.



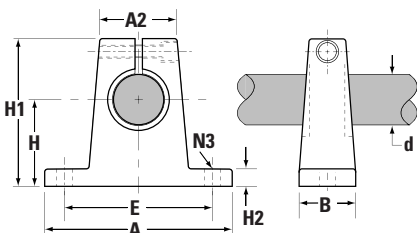
### Type ASB 60 Case LinearRace Shaft End Support Blocks (Dimensions in inches)



Material: Aluminum Alloy

| Part Number | d  | H $\pm 0.001$ | H1 | H2 | A   | A1 $\pm 0.012$ | B  | E $\pm 0.012$ | N    | N2   | Support Block Mass (kg) |
|-------------|----|---------------|----|----|-----|----------------|----|---------------|------|------|-------------------------|
| ASBM08      | 8  | 15            | 28 | 9  | 32  | 16.0           | 18 | 22            | 3.5  | M4   | 0.04                    |
| ASBM12      | 12 | 20            | 36 | 13 | 43  | 21.5           | 20 | 30            | 5.3  | M60  | 0.10                    |
| ASBM16      | 16 | 25            | 43 | 18 | 53  | 26.5           | 24 | 38            | 6.6  | M8   | 0.15                    |
| ASBM20      | 20 | 30            | 51 | 22 | 60  | 30.0           | 30 | 42            | 8.4  | M10  | 0.23                    |
| ASBM25      | 25 | 35            | 61 | 26 | 78  | 39.0           | 38 | 56            | 10.5 | M12  | 0.41                    |
| ASBM30      | 30 | 40            | 71 | 26 | 87  | 43.5           | 40 | 64            | 10.5 | M12  | 0.53                    |
| ASBM40      | 40 | 50            | 88 | 34 | 108 | 54.0           | 48 | 82            | 13.5 | M160 | 0.99                    |

### Type SB 60 Case LinearRace Shaft End Support Blocks (Dimensions in inches)



Material: Malleable Iron for sizes .5 to 2 in.  
Aluminum Alloy for sizes .25 and .375 in.

| Part Number | d  | H $\pm 0.001$ | H1 | H2   | A   | A1 $\pm 0.012$ | B  | E $\pm 0.012$ | N    | Support Block Mass (kg) |
|-------------|----|---------------|----|------|-----|----------------|----|---------------|------|-------------------------|
| SBM08       | 8  | 15            | 27 | 5.2  | 32  | 16             | 10 | 25            | 4.5  | 0.03                    |
| SBM12       | 12 | 20            | 35 | 5.5  | 40  | 21             | 12 | 32            | 5.5  | 0.06                    |
| SBM16       | 16 | 25            | 42 | 6.5  | 50  | 25             | 16 | 40            | 5.5  | 0.11                    |
| SBM20       | 20 | 30            | 50 | 8.0  | 60  | 30             | 20 | 45            | 5.5  | 0.21                    |
| SBM25       | 25 | 35            | 58 | 9.0  | 74  | 37             | 25 | 60            | 6.6  | 0.35                    |
| SBM30       | 30 | 40            | 68 | 10.0 | 84  | 42             | 28 | 68            | 9.0  | 0.52                    |
| SBM40       | 40 | 50            | 86 | 12.0 | 108 | 54             | 32 | 86            | 11.0 | 0.92                    |



Quick Shaft

# Thomson 60 Case Quick Shaft

“Quick shaft” is precut and packaged stock length shafting in popular:

- Inch and metric sizes
- L tolerance class and MM tolerance class
- Materials (carbon steel, 440C stainless steel, lightweight 52100 tubular)
- Standard options (predrilled and chrome plated plain ends)

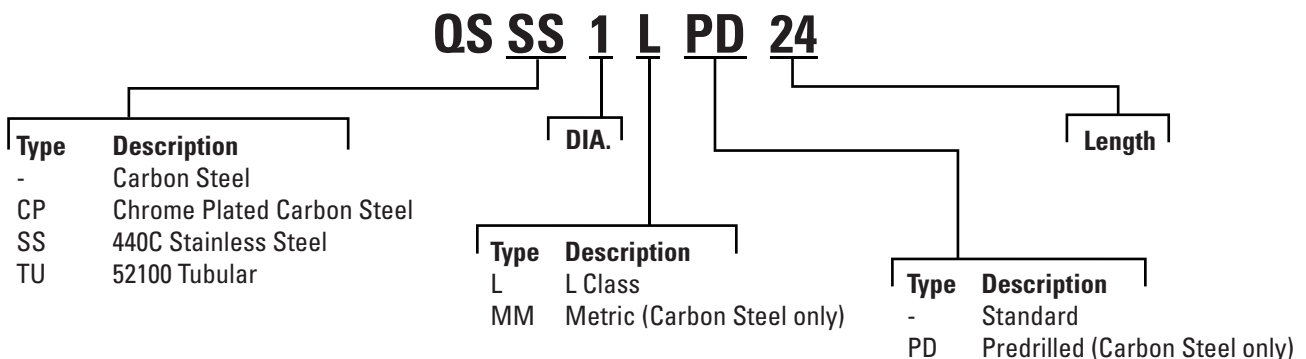


Thomson 60 Case Quick Shaft can be easily stocked by authorized Thomson distributors or end users.

You may want to have a few pieces of Thomson Quick Shaft in your stock room if you are not sure of the exact length you may need for that potential 3rd shift breakdown or you perform your own special machining of various lengths and do not want to carry different cut to length sizes.

All Thomson Quick Shaft shafting are oil preserved and placed in a VCI bag for long-term storage and labeled for your convenience.

## Part Number Description



## Quick Shaft

# 60 Case Quick Shaft

### Carbon Steel - Inch

Hardness: 60 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Straightness: .001" Per Foot Cumulative

Roundness: .000080"

Taper: .0001"

| Part Number | Stock Lengths (in)                           | Diameter Tolerance (in) |  | Min. Hardness Depth (in) |  | Weight Per Inch (lb) |
|-------------|--|-------------------------|--|--------------------------|--|----------------------|
|             |  |                         |  |                          |  |                      |
| QS 1/4 L    | 6, 9, 12, 15, 18, 24, 30, 36, 42, 48, 60     | .2495                   |  | .027                     |  | .014                 |
|             |  | .2490                   |  |                          |  |                      |
| QS 3/8 L    | 6, 12, 18, 24, 30, 36, 48, 60                | .3745                   |  | .027                     |  | .031                 |
|             |  | .3740                   |  |                          |  |                      |
| QS 1/2 L    | 6, 9, 12, 15, 18, 24, 30, 36, 42, 48, 54, 60 | .4995                   |  | .040                     |  | .055                 |
|             |  | .4990                   |  |                          |  |                      |
| QS 5/8 L    | 12, 15, 18, 24, 30, 36, 42, 48, 54, 60       | .6245                   |  | .040                     |  | .086                 |
|             |  | .6240                   |  |                          |  |                      |
| QS 3/4 L    | 12, 15, 18, 24, 30, 36, 42, 48, 60, 66, 72   | .7495                   |  | .060                     |  | .125                 |
|             |  | .7490                   |  |                          |  |                      |
| QS 1 L      | 12, 18, 24, 30, 36, 42, 48, 60, 66, 72       | .9995                   |  | .080                     |  | .222                 |
|             |  | .9990                   |  |                          |  |                      |
| QS 1 1/4 L  | 12, 18, 24, 30, 36, 42, 48, 54, 60, 72       | 1.2495                  |  | .080                     |  | .348                 |
|             |  | 1.2490                  |  |                          |  |                      |
| QS 1 1/2 L  | 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72   | 1.4994                  |  | .080                     |  | .500                 |
|             |  | 1.4989                  |  |                          |  |                      |
| QS 1 3/4 L  | 12, 18, 24, 30, 36, 42, 48, 60, 72           | 1.7495                  |  | .100                     |  | .681                 |
|             |  | 1.7490                  |  |                          |  |                      |
| QS 2 L      | 12, 18, 24, 30, 36, 42, 48, 60, 72           | 1.9994                  |  | .100                     |  | .890                 |
|             |  | 1.9987                  |  |                          |  |                      |

### Carbon Steel - Metric

Hardness: 60 ROCKWELL C Min.

Surface Finish: 8 Ra Max

Straightness: .001" Per Foot Cumulative

Roundness: .000080"

Taper: .0001"

| Part Number | Stock Lengths (mm)                    | Diameter |        | Min. Hardness Depth |      | Weight Per mm | Weight Per inch |
|-------------|---------------------------------------|----------|--------|---------------------|------|---------------|-----------------|
|             |                                       | (mm)     | (in)   | (mm)                | (in) | (kg)          | (lb)            |
| Q10MM       | 500, 1000                             | 10.00    | .3937  | .069                | .027 | .0035         | .035            |
|             |                                       | 9.99     | .3932  |                     |      |               |                 |
|             |                                       |          |        |                     |      |               |                 |
| QS12MM      | 250, 500, 750, 1000, 1200, 1500, 2000 | 12.00    | .4724  | 1.02                | .040 | .005          | .05             |
|             |                                       | 11.99    | .4720  |                     |      |               |                 |
| QS16MM      | 250, 500, 750, 1000, 1200, 1500, 2000 | 16.00    | .6299  | 1.02                | .040 | .0096         | .088            |
|             |                                       | 15.99    | .6295  |                     |      |               |                 |
| QS20MM      | 250, 500, 750, 1000, 1200, 1500, 2000 | 20.00    | .7874  | 1.52                | .060 | .012          | .13             |
|             |                                       | 19.99    | .7869  |                     |      |               |                 |
| QS25MM      | 500, 750, 1000, 1200, 1500, 2000      | 25.00    | .9843  | 2.03                | .080 | .019          | .216            |
|             |                                       | 24.99    | .9838  |                     |      |               |                 |
| QS30MM      | 500, 750, 1000, 1500, 2000            | 30.00    | 1.1811 | 2.03                | .080 | .027          | .311            |
|             |                                       | 29.99    | 1.1806 |                     |      |               |                 |
| QS40MM      | 500, 750, 1000, 1500, 2000            | 40.00    | 1.5748 | 2.03                | .080 | .048          | .553            |
|             |                                       | 39.99    | 1.5743 |                     |      |               |                 |

Quick Shaft

**440C Steel - Inch**

Hardness: 50 ROCKWELL C Min.  
 Surface Finish: 8 Ra Max  
 Roundness: .000080"

Straightness: .001" Per Foot Cumulative  
 Taper: .0001"

| Part Number  | Stock Lengths (in)                         | Diameter Tolerance (in) | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|--------------|--|-------------------------|--------------------------|----------------------|
| QSSS 1/4 L   | 6, 12, 18, 24, 30, 36, 48, 60              | .2495                   | .027                     | .014                 |
|              |  | .2490                   |                          |                      |
| QSSS 3/8 L   | 6, 12, 18, 24, 30, 36, 48, 60              | .3745                   | .027                     | .031                 |
|              |  | .3740                   |                          |                      |
| QSSS 1/2 L   | 12, 18, 24, 30, 36, 42, 48, 54, 60         | .4995                   | .040                     | .055                 |
|              |  | .4990                   |                          |                      |
| QSSS 5/8 L   | 12, 18, 24, 30, 36, 42, 48, 54, 60         | .6245                   | .040                     | .086                 |
|              |  | .6240                   |                          |                      |
| QSSS 3/4 L   | 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72 | .7495                   | .060                     | .125                 |
|              |  | .7490                   |                          |                      |
| QSSS 1 L     | 18, 24, 30, 36, 42, 48, 54, 60, 66, 72     | .9995                   | .080                     | .222                 |
|              |  | .9990                   |                          |                      |
| QSSS 1 1/4 L | 12, 18, 24, 30, 36, 42, 48, 54, 60, 72     | 1.2495                  | .080                     | .348                 |
|              |  | 1.2490                  |                          |                      |
| QSSS 1 1/2 L | 18, 24, 30, 36, 42, 48, 54, 60, 66, 72     | 1.4994                  | .080                     | .500                 |
|              |  | 1.4989                  |                          |                      |

**52100 Tubular - Inch**

Hardness: 58 ROCKWELL C Min.  
 Surface Finish: 8 Ra Max  
 Roundness: .000080"

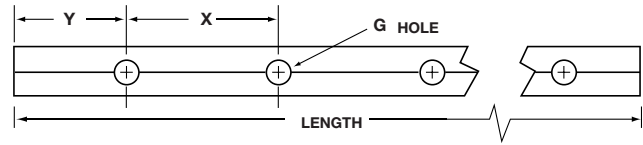
Straightness: .001" Per Foot Cumulative  
 Taper: .0001"

| Part Number  | Stock Lengths (in) | Nominal I.D. | Diameter Tolerance (in) | Min. Hardness Depth (in) | Weight Per Inch (lb/in) |
|--------------|--------------------|--------------|-------------------------|--------------------------|-------------------------|
| QSTU 1 L     | 12, 18, 24, 48, 60 | .599 ± 5%    | .9995                   | .080                     | .158                    |
|              |                    |              | .9990                   |                          |                         |
| QSTU 1 1/2 L | 12, 18, 24, 48, 60 | .890 ± 5%    | 1.4994                  | .080                     | .328                    |
|              |                    |              | 1.4989                  |                          |                         |
| QSTU 2 L     | 12, 24, 48, 60     | 1.250 ± 5%   | 1.9994                  | .100                     | .542                    |
|              |                    |              | 1.9987                  |                          |                         |

## Quick Shaft

### Carbon Steel Predrilled - Inch

Hardness: 60 ROCKWELL C Min.  
Surface Finish: 8 Ra Max  
Straightness: .001" Per Foot Cumulative  
Roundness: .000080"  
Taper: .0001"



| Part Number   | Stock Lengths (in)                     | Diameter Tolerance (in) | X (in) | Y (in) | G Thread Size | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|---------------|--|-------------------------|--------|--------|---------------|--------------------------|----------------------|
| QS 1/2 L PD   | 12, 18, 24, 30, 36, 42, 48, 54, 60, 72 | .4995                   | 4      | 2      | #6-32         | .040                     | .055                 |
|               |  | .4990                   |        |        |               |                          |                      |
| QS 5/8 L PD   | 12, 18, 24, 30, 36, 42, 48, 54, 60, 72 | .6245                   | 4      | 2      | #8-32         | .040                     | .086                 |
|               |  | .6240                   |        |        |               |                          |                      |
| QS 3/4 L PD   | 12, 18, 24, 30, 36, 42, 48, 54, 60, 72 | .7490                   | 6      | 3      | #10-32        | .060                     | .125                 |
|               |  | .7485                   |        |        |               |                          |                      |
| QS 1 L PD     | 18, 24, 30, 36, 42, 48, 54, 60, 72     | .9995                   | 6      | 3      | 1/4-20        | .080                     | .222                 |
|               |  | .9990                   |        |        |               |                          |                      |
| QS 1 1/4 L PD | 18, 24, 30, 36, 42, 48, 54, 60, 72     | 1.2490                  | 6      | 3      | 5/16-18       | .080                     | .348                 |
|               |  | 1.2485                  |        |        |               |                          |                      |
| QS 1 1/2 L PD | 18, 24, 30, 36, 42, 48, 54, 60, 72     | 1.4994                  | 8      | 4      | 3/8-16        | .080                     | .500                 |
|               |  | 1.4989                  |        |        |               |                          |                      |

### 440C Stainless Steel Predrilled - Inch

Hardness: 50 ROCKWELL C Min.  
Surface Finish: 8 Ra Max  
Roundness: .000080"

Straightness: .001" Per Foot Cumulative  
Taper: .0001"

| Part Number     | Stock Lengths (in)                 | Diameter Tolerance (in) | X (in) | Y (in) | G Thread Size | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------|------------------------------------|-------------------------|--------|--------|---------------|--------------------------|----------------------|
| QSSS 1/2 L PD   | 24, 30, 36, 42, 48, 60, 72         | .4995                   | 4      | 2      | #6-32         | .040                     | .055                 |
|                 |                                    | .4990                   |        |        |               |                          |                      |
| QSSS 5/8 L PD   | 24, 30, 36, 42, 48, 54, 60, 72     | .6245                   | 4      | 2      | #8-32         | .040                     | .086                 |
|                 |                                    | .6240                   |        |        |               |                          |                      |
| QSSS 3/4 L PD   | 24, 30, 36, 42, 48, 54, 60, 72     | .7490                   | 6      | 3      | #10-32        | .060                     | .125                 |
|                 |                                    | .7485                   |        |        |               |                          |                      |
| QSSS 1 L PD     | 18, 24, 30, 36, 42, 48, 54, 60, 72 | .9995                   | 6      | 3      | 1/4-20        | .080                     | .222                 |
|                 |                                    | .9990                   |        |        |               |                          |                      |
| QSSS 1 1/4 L PD | 18, 24, 30, 36, 42, 48, 54, 60, 72 | 1.2490                  | 6      | 3      | 5/16-18       | .080                     | .348                 |
|                 |                                    | 1.2485                  |        |        |               |                          |                      |
| QSSS 1 1/2 L PD | 18, 24, 30, 36, 42, 48, 54, 60, 72 | 1.4994                  | 8      | 4      | 3/8-16        | .080                     | .500                 |
|                 |                                    | 1.4989                  |        |        |               |                          |                      |

### Chrome Plated Plain Ends - Inch

Hardness: 60 ROCKWELL C Min.  
Surface Finish: 8 Ra Max  
Straightness: .001" Per Foot Cumulative

Roundness: .000080"  
Taper: .0001"

| Part Number     | Stock Lengths (in)                     | Diameter Tolerance (in) | Min. Hardness Depth (in) | Weight Per Inch (lb) |
|-----------------|--|-------------------------|--------------------------|----------------------|
| QSSS 1/2 L PD   | 6, 12, 18, 24, 30, 36, 42, 48, 60      | .4995                   | .040                     | .055                 |
|                 |  | .4990                   |                          |                      |
| QSSS 5/8 L PD   | 12, 18, 24, 30, 36, 42, 48, 54, 60     | .6245                   | .040                     | .086                 |
|                 |  | .6240                   |                          |                      |
| QSSS 3/4 L PD   | 12, 18, 24, 30, 36, 42, 48, 54, 60     | .7595                   | .060                     | .125                 |
|                 |  | .7490                   |                          |                      |
| QSSS 1 L PD     | 12, 18, 24, 30, 36, 42, 48, 54, 60, 72 | .9995                   | .080                     | .222                 |
|                 |  | .9990                   |                          |                      |
| QSSS 1 1/4 L PD | 18, 24, 30, 36, 42, 48, 54, 60, 66, 72 | 1.2495                  | .080                     | .348                 |
|                 |  | 1.2490                  |                          |                      |
| QSSS 1 1/2 L PD | 18, 24, 30, 36, 42, 48, 54, 60, 66, 72 | 1.4994                  | .080                     | .500                 |
|                 |  | 1.4989                  |                          |                      |

## Special Machining

### Special Machining

For over 50 years Thomson has been providing custom special machining on 60 Case Linear Shafting. Our skilled machinists can perform a wide variety of special machining operations on the ends or along the length of the 60 Case Shaft to provide exactly the part needed for your application.

Standard 60 Case shafting, which is available from stock, can be cut with special length tolerances. 60 Case shafting may also be drilled with a variety of radial holes and tapped if needed. Shafts can be supplied with flats, keyways and reduced diameters. Shafts can also be plated.

There is an extra charge for all special machining operations. For specific prices, send your drawing or technical description to Thomson or utilize a copy of the request for quotation and templates found on pages 37-53.

#### Special Length Tolerances

Standard length tolerance is for  $\pm 1/32''$  for shafts less than 2" diameter and  $\pm 1/16''$  for 2" diameter and larger. Special length tolerances of  $\pm .010''$ ,  $\pm .005''$  and  $\pm .002''$  can be achieved on shafts up to 4" in diameter.

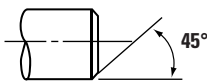
#### Special Straightness Tolerances

Standard straightness is .001" per foot., cumulative (.002" TIR). Special straightness tolerances is .0005" per foot, cumulative (.001" TIR), for all diameters.

#### Special Chamfer

Standard chamfer is  $1/16'' \times 45^\circ$ .

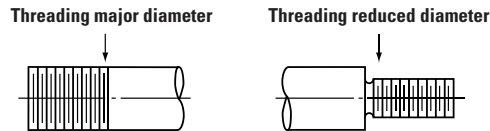
Standard chamfer is approximately  $1/16'' \times 45^\circ$ . Special chamfer at any angle can be supplied for an additional charge.



#### Machining Shaft Ends

For all machining requirements with turned ends, Thomson will anneal the end. The annealing process may cause approximately  $1/4''$  to  $1/2''$  of heat travel from machined area (depending on major shaft O.D.). Hardness of major shaft diameter near the machined area will be below the Rockwell for the material. If annealing effects are objectionable, alternate machining processes can be used which prevent major diameter softening. Contact factory for special options. (See relevant sections following).

#### Threaded Shaft Diameter



Standard threads are either Unified National Coarse or Unified National Fine, Class 2-A fit. Shafts will be annealed and soft around the circumference of threaded areas within the case.

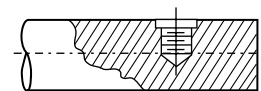
#### Reduced Shaft Diameter



Standard diameter tolerance on turned down diameters is  $\pm .001''$ . Special tolerance of  $\pm .0001''$  is available. Concentricity is within .001" total indicator reading roundness and taper of  $\pm .0001''$  min. capability exists. Shafts are annealed and soft in turned down sections within case. Two-step shaft diameter reduction is also available.

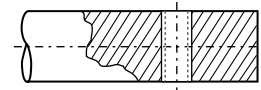
#### Radial Holes Drilled and Tapped to Center of Shaft

U.N.C. or U.N.F. Class 2-B thread. Tolerances for hole alignment and location are  $\pm 1/64''$ ,  $\pm .010''$  and  $\pm .005''$ .



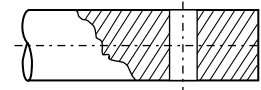
#### Radial Holes Drilled and Tapped thru Shaft

U.N.C. or U.N.F. Class 2-B thread. Alignment and location tolerance  $\pm .010''$  shaft annealed and soft around circumference in hole area.



#### Radial Holes Drilled through Shaft

Alignment and location tolerance  $\pm .010''$ .

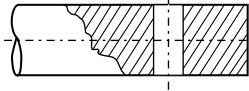


**For requests for quotation and ordering custom machined 60 Case LinearRace shafting see the convenient templates on pages 192 through 208.**

## Special Machining

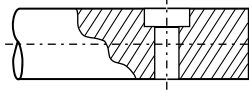
### Radial Holes Drilled and Reamed through Shafts

Alignment and location tolerance  $\pm .010"$ . Hole diameter tolerance  $\pm .001"$ . Shaft annealed and soft around circumference in hole area.



### Radial Holes Drilled through Shaft and Counterbored for Cap Screw

Alignment and location tolerance  $\pm .010"$ . Tolerance for body diameter and head diameter for American Std. cap screw is  $+ 1/32"$ . Shaft remains hard in hole area (not annealed).

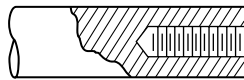


### Radial Hole Location Tolerance

Unless specified standard location tolerance between holes is  $\pm .1/64"$ , optional  $\pm .010"$  capability exists for all through hole  $\pm .005"$  for hole to center.

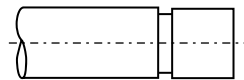
### Coaxial Holes Drilled and Tapped in Center of End of Shaft

U.N.C. or U.N.F. Class 2-B thread. Concentricity  $\pm .005"$ . Certain diameters and materials will be annealed and remain soft around the circumference. Note: Holes may also be located on a "bolt" circle. Location tolerance is  $.010"$ .



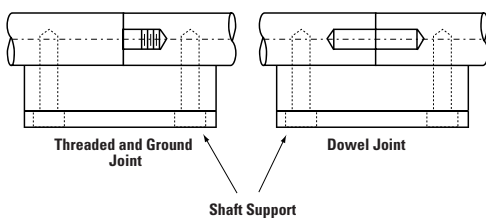
### Retaining Ring Groove

Location tolerances between grooves  $\pm 1/64"$  or  $\pm .005"$ . Tolerance of  $\pm .005"$  for maximum ring groove spacing is  $96"$ .



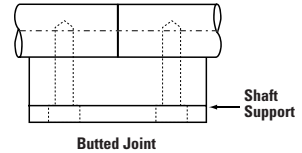
### Joining Shafts to Obtain Longer Lengths

Threaded and ground joints for  $3/4"$  through  $4"$  and  $20\text{mm}$  thru  $80\text{mm}$  diameter shaft for lengths up to 20 feet. Dowled joints with concentricity  $\pm .010"$  for  $1/2"$  thru  $4"$  and  $12\text{mm}$  thru  $80\text{mm}$  diameter shaft. The feasibility of butted joints should be considered as possibly the most economical solution before considering either of the previous alternatives.



### Butted Joints

Ends machined square, no chamfer. Available for all nominal shaft diameters.



### Flats

Flats are available. Flats extending over large portion or entire length of shaft are not available. Cutting into hardened layer would cause considerable warping and subsequent straightening cost is prohibitive.

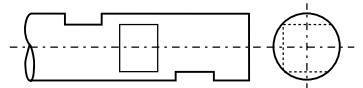
### One Flat on a Shaft

Location tolerance  $\pm .015"$ .



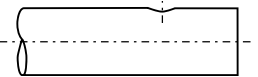
### Multiple Flats on a Shaft

Alignment and location tolerance  $\pm .005"$ .



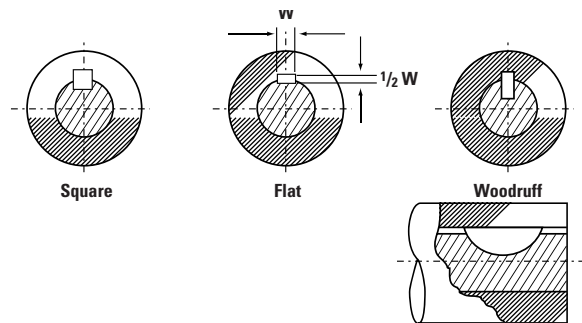
### Drilled Spot for Set Screws

Location tolerance  $\pm .1/64"$ . Capability exists for  $\pm .002"$ . Drill sizes  $1/8"$  thru  $3/4"$ .



### Keyways

Keyways may be square, flat or American Standard Woodruff. Available for nominal shaft diameters from  $1/2"$  through  $4"$ .



For requests for quotation and ordering custom machined 60 Case LinearRace shafting see the convenient templates on pages 192 through 208.

## Example of Our Popular Plating Options

### Chrome Plating

The standard chrome plating option is offered per AMS 2460, Class 1 (Corrosion Protective Plating), Type I (Bright finish). Other plating options are available for quote, including, but not limited to Thin Dense Chrome plating per MIL-S-13165 and MIL-R-81841..

As a result of the plating process and the need to hold parts during plating, coaxial holes may be added as follows:

Up to 1 1/4" diameter shaft any length over 72".

Over 1 1/4" to 2" diameter shaft any length over 48".

Over 2" diameter shaft all lengths.

**Note:** Our CPPE (chrome plated with plain ends) do not have coaxial holes in any length, but the chamfered edges are not plated.

### Black Oxide

The benefits of black oxide is corrosion resistance and black color. Military and industrial specifications satisfied with our Black Oxide are Mil-C13924C and AMS-2485.

### ARMOLOY™

The benefit of Armoloy™ plating are a 78 RC surface finish, reduction of wear and friction in moving parts, and absolute adhesion to base metal (no chipping, cracking, flaking, or peeling will occur). The Armoloy thickness is .0001". Final plated shaft is within specified tolerance class.

As a result of the plating process and the need to hold parts during plating, coaxial holes may be added as follows:

Up to 1 1/4" diameter shaft any length over 66".

Over 1 1/4" all lengths.

Military and industrial specifications satisfied with Armoloy™ plating are AMS-2438, AMS QQ-C-320 and AMS-2406.

Each supplier used for plating has different capabilities to hold the parts, so requirements for coaxial holes may change over time. These should be used as a rule of thumb with an understanding that longer lengths may have coaxial holes. These holes allow the plater to hold the shaft during the plating process. When a coaxial hole is not used it means special tooling is available or the ability exists to pinch the part. If coaxial holes are a problem, please contact us and we can work with our supplier to determine what options exist.

## Special Machining

# Special Machining Quoting

Thomson will be happy to quote any of your special machining needs. In order for us to properly quote the product, we will require an original product drawing or technical description to be sent to our Application Engineering support team at 1-540-639-4162 (fax). Our Application Engineering team will contact you if they have any questions, require more information, or a better drawing or sketch. This drawing is important to us to ensure we quote exactly what is required at time of quotation instead of when you place your order. Upon ordering, it is important that you reference the quotation number listed at the top right of the quote and have reviewed the entire quotation, including all the notes associated and exceptions to the line item you are ordering. Quantity quoted and price listed is based on one time manufacturing lot quantity not blanket order unless otherwise stated. Thomson reserves the right to requote if quantity ordered is less than quoted quantity. Upon receipt of order, Thomson assumes you have read and understand the quotation and Thomson will assume no responsibility of exceptions on quotation and failure by customer to read.

Our standard quotations are in the format shown below.

| <b>QUOTATION</b>  |             |  |  |     |            |
|---|-------------|--|--|-----|------------|
| <b>Customer Information</b><br>Thomson<br>203A West Rock Road<br>Radford, VA 24141 USA<br>Phone: 540 633-3400 Fax: 540-639-4162<br>Email: thomson@thomsonlinear.com   |             |  | <b>Quote Number</b> 20080XXX<br><b>Quote Date</b> 01/01/2007<br><b>Valid From</b> 01/01/2007<br><b>Valid To</b> 01/01/2007 |     |            |
| <b>Customer</b> Customer #<br>Customer Name<br>Customer Address<br><b>Attention</b> Contact Person<br><b>Phone No.</b> Phone<br><b>Fax No.</b> Fax  |             | <b>District Manager</b> District Manager's Name<br>0000000000000<br><b>Payment Terms</b> Payable 30 days net<br><b>Delivery Terms</b> FOB from plant |  |     |            |
| <b>THOMSON IS PLEASED TO SUBMIT THE FOLLOWING QUOTATION SUBJECT TO OUR STANDARD TERMS AND CONDITIONS</b>  |             |  |  |     |            |
| I am pleased to quote Thomson 60 Case LinearRace shafting, the specified inner race for Thomson Ball Bushing bearings, providing superior smoothness, hardness, and straightness. Use of 60 Case will preserve your bearing warranty and significantly extend life. When used with: Thomson SuperSmart Ball Bushing bearings, shaft life is extended up to five times.  |             |  |  |     |            |
| LINE  | PART NUMBER | DESCRIPTION  | QUANTITY   | U/M | UNIT PRICE |
| 10  | 7/8 L SM    | 7/8 L SM X 1.560"<br>Customer Part: PER TEMPLATE   | 88   | EA  | 16.00      |
|   | Length      | 3.500 in.  | SET-UP CHARGE  |     | 25.00      |
| ** SHAFT DIAMETER MAY BE OUT OF TOLERANCE OR DISTORTED ALONG THE LENGTH OF THE 1/2" COAXIAL BORED HOLE<br>** BORED HOLE DIAMETER TOLERANCE WILL BE +/- .005"<br>ESTIMATED SHIPMENT: 3-4 WK<br>Notes:<br>1. Quoted lead items are based on current factory backlog and are subject to change. Please contact Thomson for current lead time.<br>2. Price is net to Customer Name<br>3. Price valid for releases through 01/01/2007  |             |  |  |     |            |
| <b>If you need any further information, please contact me immediately. Thank You.</b>   |             |  |  |     |            |
| <b>Engineer's Name</b><br>Applications Engineer   |             |  |  |     |            |
| IMPORTANT. QUOTATION NO. MUST APPEAR ON ORDER TO INSURE PROPER BILLING. PRICES QUOTED ARE CONSIDERED FIRM FOR 30 DAYS. Prices apply to quantities of each size released for shipment at one time one destination. No returns or cancellations accepted without consent. The terms and conditions set forth herein shall constitute the entire agreement between the Buyer and the Seller. In the event you receive this information by facsimile only, please refer to our Standard Terms and Conditions appearing on the reverse side of our invoices, quotations, order acknowledgements, and product literature. Any provision or condition of Buyer's order which is in any way different from or in addition to these Standard Terms and Conditions is expressly rejected by Seller unless negotiated as part of this quotation and so noted hereon.<br>SEE REVERSE SIDE FOR TERMS AND CONDITIONS<br>Trademark of Thomson. Thomson is a trademark.<br>WORLD'S LARGEST MANUFACTURER OF LINEAR BEARINGS AND SHAFTS |             |  |  |     |            |



**Special Machining**

# Request for Quotation

Custom Machined Thomson 60 Case LinearRace Shafting

Customer: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

| Template Number | Quantity |
|-----------------|----------|
| _____           | _____    |
| _____           | _____    |
| _____           | _____    |
| _____           | _____    |
| _____           | _____    |

1. Send a copy of your drawing or sketch. If you do not have one, select the Thomson 60 Case LinearRace shaft template that best matches your requirements.

- A. Fill in all available data with tolerances in either inch or metric units.
- B. If a feature is not on the template that you are using, add it, and the applicable dimensions.
- C. If a feature is not required but is on the template, draw a line through the feature, and mark the dimension block with a line or N/A.
- D. Make any additional notes to the template to aid in quoting and manufacturing.

2. Fax this information with the template drawing to: Quotation Department at +44 1271 334 501.

For any questions or help in determining the best solution to your Thomson 60 Case LinearRace shafting requirements, please contact Application Engineering at:

Phone: +44 1271 334 500

E-mail: sales.uk@thomsonlinear.com

### Special Machining

|  |   |   |  |   |   |  |   |   |  |  |  |
|--|---|---|--|---|---|--|---|---|--|--|--|
| 1  | 2 | 3 | 4  | F | E | D  | C | B | A  |  |  |
|  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'C' (TYP.)</b></p> |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>A</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>B (TYP)</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>D</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>C</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>E</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>F</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>1</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>2</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>3</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>4</b></p>  |   |   |  |   |   |  |   |   |  |  |  |
| <p><b>LENGTH 'A':</b></p>  |   |   | <p><b>DIAMETER 'D':</b></p>                            |   |   | <p><b>CLASS:</b></p>   |   |   | <p><b>ANGLE 'C':</b></p>                     |  |  |
| <p><b>CHAMFER 'B':</b></p>   |   |   | <p><b>OTHER MATERIALS AVAILABLE (UPON REQUEST)</b></p> |   |   | <p><input type="checkbox"/> 1566   <input type="checkbox"/> 440C   <input type="checkbox"/> 52100 TUBING</p> |   |   | <p><input type="checkbox"/> OTHER: _____</p> |  |  |
| <p><b>DEFAULT PRINT TOL: (INCH)</b></p>                              |   |   | <p><b>DEFAULT PRINT TOL: (METRIC)</b></p>              |   |   | <p><b>MATERIAL:</b></p>  |   |   | <p><b>PLATING TYPE:</b></p>                  |  |  |
| <p>FRACTIONS: ± 1/32"</p>  |   |   | <p>FRACTIONS: ± 1mm</p>                                |   |   | <p><input type="checkbox"/> APPROVAL</p>   |   |   | <p><input type="checkbox"/> DATE</p>         |  |  |
| <p>.H= ±.015"</p>  |   |   | <p>.H= ±.25mm</p>                                      |   |   | <p><input type="checkbox"/> DRAWN BY</p>   |   |   | <p><input type="checkbox"/> DATE</p>         |  |  |
| <p>.HH= ±.010"</p>   |   |   | <p>.HH= ±.13mm</p>                                     |   |   | <p><b>DO NOT SCALE DRAWING</b></p>   |   |   | <p><b>TITLE:</b></p>                         |  |  |
| <p>.HHH= ±.005"</p>  |   |   | <p>ANGLES: ± 1/2°</p>                                  |   |   | <p><b>MACHINED TO LENGTH</b></p>   |   |   | <p><b>60 CASE TEMPLATE 1</b></p>             |  |  |
| <p>ANGLES: ± 1/2°</p>  |   |   | <p><b>CUSTOMER AUTHORIZATION:</b> _____</p>            |   |   | <p><b>THOMSON</b><br/>Linear Motion. Optimized.</p>  |   |   | <p><b>DRAWG NO.</b></p>                      |  |  |
| <p><b>A</b></p>  |   |   | <p><b>B</b></p>  |   |   | <p><b>C</b></p>  |   |   | <p><b>E</b></p>                              |  |  |
| <p><b>B</b></p>  |   |   | <p><b>D</b></p>  |   |   | <p><b>F</b></p>  |   |   | <p><b>F</b></p>                              |  |  |

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Special Machining

|  |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|
| 1  | 2 | 3 | 4 | F | E   | D | C | B | A |
|  |   |   |   |   |   |   |   |   |   |
| <p><b>STD. MACHINED CHAMFERS UNLESS NOTED IN ANGLE 'H' (TYP)</b></p>   |   |   |   |   |   |   |   |   |   |
| <p><b>LENGTH 'A':</b></p>  |   |   |   |   |   |   |   |   |   |
| <p><b>DIAMETER 'D':</b></p>  |   |   |   |   |   |   |   |   |   |
| <p><b>CLASS</b></p>  |   |   |   |   |   |   |   |   |   |
| <p><b>THREAD 'C':</b></p>  |   |   |   |   |   |   |   |   |   |
| <p><b>MIN. DEPTH 'E':</b></p>  |   |   |   |   |   |   |   |   |   |
| <p><b>THREAD 'F':</b></p>  |   |   |   |   |   |   |   |   |   |
| <p><b>MIN. DEPTH 'G':</b></p>  |   |   |   |   |   |   |   |   |   |
| <p><b>ANGLE 'H':</b></p>   |   |   |   |   |   |   |   |   |   |
| <p><b>CHAMFER 'B':</b></p>   |   |   |   |   |   |   |   |   |   |
| <p><b>THOMSON™</b><br/><i>Linear Motion. Optimized.</i></p>  |   |   |   |   | <p><b>CO-AXIAL DRILL and TAP 60 CASE TEMPLATE 2</b><br/>DRUG NO.</p>  |   |   |   |   |
| <p><b>MATERIAL:</b> (OTHER MATERIALS AVAILABLE UPON REQUEST)</p> <p><input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING</p> <p><input type="checkbox"/> OTHER: _____</p> |   |   |   |   | <p><b>PLATING TYPE:</b> _____</p> <p><b>APPROVAL</b> _____ <b>DATE</b> _____</p> <p><b>DRAWN BY</b> _____ <b>DATE</b> _____</p> |   |   |   |   |
| <p><b>DEFAULT PRINT TOL: (METRIC)</b><br/>FRACTIONS: ± 1mm<br/>    .H= ±.25mm<br/>    .HH= ±.13mm</p>  |   |   |   |   | <p><b>DEFAULT PRINT TOL: (INCH)</b><br/>FRACTIONS: ± 1/32"<br/>    .H= ±.015"<br/>    .HH= ±.010"<br/>    .HHX= ±.005"</p>      |   |   |   |   |
| <p><b>ANGLES:</b> ± 1/2°</p>   |   |   |   |   | <p><b>ANGLES:</b> ± 1/2°</p>  |   |   |   |   |
| <p><b>CUSTOMER AUTHORIZATION:</b> _____</p>  |   |   |   |   |   |   |   |   |   |
| <p><b>DO NOT SCALE DRAWING</b></p>   |   |   |   |   |   |   |   |   |   |
| <p><b>FAX A COPY OF THIS FORM TO QUOTATION DEPARTMENT, THOMSON +44 1271 334 501</b></p>  |   |   |   |   |   |   |   |   |   |

**Special Machining**

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|  |  |  |  |

**1** **STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'C' (TYP.)**

**2** **B (TYP)**

**3** **HOLE PATTERN**

**4** **NO. of REPEATS for 'X':**

|                      |  |
|----------------------|--|
| <b>LENGTH 'A':</b>   |  |
| <b>DIAMETER 'D':</b> |  |
| <b>CLASS:</b>        |  |
| <b>THREAD 'E':</b>   |  |
| <b>ANGLE 'C':</b>    |  |
| <b>CHAMFER 'B':</b>  |  |

|                                  |                                    |
|----------------------------------|------------------------------------|
| <b>DEFAULT PRINT TOL: (INCH)</b> | <b>DEFAULT PRINT TOL: (METRIC)</b> |
| <b>FRACTIONS:</b>                | <b>FRACTIONS:</b>                  |
| -R= ±.015"                       | -R= ±.25mm                         |
| -RR= ±.010"                      | -RR= ±.13mm                        |
| -RRR= ±.005"                     | -RRR= ±.13mm                       |
| <b>ANGLES:</b>                   | <b>ANGLES:</b>                     |
| ± 1/2°                           | ± 1/2°                             |

**CUSTOMER AUTHORIZATION:** \_\_\_\_\_

|   |   |
|---|---|
| <b>MATERIAL:</b>  | <b>THOMSON</b><br>Linear Motion. Optimized. |
| <input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING | <b>TITLE:</b>                               |
| <input type="checkbox"/> OTHER:   | <b>RADIAL DRILL &amp; TAP</b>               |
| <b>PLATING TYPE:</b>  | <b>60 CASE TEMPLATE 3</b>                   |
| <b>APPROVAL</b>   | <b>DATE</b>                                 |
| <b>DRAWN BY</b>   | <b>DATE</b>                                 |
| <b>DO NOT SCALE DRAWING</b>   | <b>DRAWG NO.</b>                            |

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|   |   |   |   |   |   |   |   |   |    |  |    |    |    |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|--|----|----|----|----|----|----|----|----|----|
| 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11   | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|   |   |   |   |   |   |   |   |   |    | <p><b>THOMSON</b><br/>Linear Motion. Optimized.</p> <p><b>CO-AXIAL DRILLED HOLES</b><br/><b>60 CASE TEMPLATE 4</b></p> <p>DRAWING NO.</p>  |    |    |    |    |    |    |    |    |    |
| <p>LENGTH 'A':</p> <p>DIAMETER 'D':</p> <p>CLASS:</p> <p>DIAMETER 'C':</p> <p>MIN. DEPTH 'E':</p> <p>DIAMETER 'F':</p> <p>MIN. DEPTH 'G':</p> <p>ANGLE 'H':</p> <p>CHAMFER 'B':</p> |   |   |   |   |   |   |   |   |    | <p>MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)</p> <p><input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING</p> <p><input type="checkbox"/> OTHER: _____</p> <p>PLATING TYPE: _____</p> <p>APPROVAL DATE: _____</p> <p>DRAWN BY DATE: _____</p> <p>DO NOT SCALE DRAWING</p> |    |    |    |    |    |    |    |    |    |
| <p>DEFAULT PRINT TOL: (INCH)</p> <p>FRACTIONS: ± 1/32"</p> <p>.X= ±.015"</p> <p>.XX= ±.010"</p> <p>.XXX= ±.005"</p> <p>ANGLES: ± 1/2°</p>   |   |   |   |   |   |   |   |   |    | <p>DEFAULT PRINT TOL: (METRIC)</p> <p>FRACTIONS: ± 1mm</p> <p>.X= ±.25mm</p> <p>.XX= ±.13mm</p> <p>ANGLES: ± 1/2°</p>  |    |    |    |    |    |    |    |    |    |
| <p>CUSTOMER AUTHORIZATION: _____</p>  |   |   |   |   |   |   |   |   |    |  |    |    |    |    |    |    |    |    |    |

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### Special Machining

|  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
|--|---|---|---|---|---|-------------|--|---------------|--|-------|--|---------------|--|-------------|--|------------|--|------------|--|--------------|--|
| 1  | 2 | 3 | 4   | E | F |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
|  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">LENGTH 'A':</td> <td style="width: 50%;"></td> </tr> <tr> <td>DIAMETER 'D':</td> <td></td> </tr> <tr> <td>CLASS</td> <td></td> </tr> <tr> <td>DIAMETER 'C':</td> <td></td> </tr> <tr> <td>LENGTH 'B':</td> <td></td> </tr> <tr> <td>WIDTH 'C':</td> <td></td> </tr> <tr> <td>ANGLE 'F':</td> <td></td> </tr> <tr> <td>CHAMFER 'B':</td> <td></td> </tr> </table> |   |   |   |   |   | LENGTH 'A': |  | DIAMETER 'D': |  | CLASS |  | DIAMETER 'C': |  | LENGTH 'B': |  | WIDTH 'C': |  | ANGLE 'F': |  | CHAMFER 'B': |  |
| LENGTH 'A':  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| DIAMETER 'D':  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| CLASS  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| DIAMETER 'C':  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| LENGTH 'B':  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| WIDTH 'C':   |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| ANGLE 'F':   |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| CHAMFER 'B':   |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| <p>DEFAULT PRINT TOL: (INCH)<br/>         FRACTIONS: ± 1/32"<br/>         .H= ±.015"<br/>         .XX= ±.010"<br/>         .XXX= ±.005"<br/>         ANGLES: ± 1/2°</p>  |   |   | <p>DEFAULT PRINT TOL: (METRIC)<br/>         FRACTIONS: ± 1mm<br/>         .H= ±.25mm<br/>         .XX= ±.13mm<br/>         ANGLES: ± 1/2°</p>   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| <p>CUSTOMER AUTHORIZATION: _____</p>   |   |   | <p>MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br/> <input type="checkbox"/> 1566    <input type="checkbox"/> 440C    <input type="checkbox"/> 52100 TUBING<br/> <input type="checkbox"/> OTHER: _____</p> |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| <p>PLATING TYPE: _____</p>   |   |   | <p>DO NOT SCALE DRAWING</p>   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| <p><b>THOMSON</b><br/>Linear Motion. Optimized.</p>  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| <p>TITLE:<br/>SNAP RING GROOVE<br/>60 CASE TEMPLATE 5</p>  |   |   |   |   |   |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |
| A  | B | C | D   | E | F |             |  |               |  |       |  |               |  |             |  |            |  |            |  |              |  |

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Special Machining

|  |  |   |   |
|--|--|---|---|
| <p>1</p>   | <p>2</p> <p>LENGTH 'A':</p> <p>DIAMETER 'D':</p> <p>CLASS:</p> <p>DIAMETER 'C':</p> <p>LENGTH 'G':</p> <p>DIAMETER 'E':</p> <p>LENGTH 'F':</p> <p>ANGLE 'H':</p> <p>CHAMFER 'B':</p> | <p>3</p> <p>STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'H'</p> <p>0.15 RAD. TYP.</p>                   | <p>4</p> <p>MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)</p> <p><input type="checkbox"/> 1566 <input type="checkbox"/> 440C</p> <p><input type="checkbox"/> OTHER:</p> <p>PLATING TYPE: _____</p> <p>APPROVAL _____ DATE _____</p> <p>DO NOT SCALE DRAWING</p> <p>DRAWN BY _____ DATE _____</p> |
| <p>DEFAULT PRINT TOL: (INCH) ± 1/32"</p> <p>FRACTIONS: .X= ±.015" .XX= ±.010" .XXX= ±.005"</p> <p>ANGLES: ± 1/2°</p> |  | <p>DEFAULT PRINT TOL: (METRIC) ± 1mm</p> <p>FRACTIONS: .X= ±.25mm .XX= ±.13mm</p> <p>ANGLES: ± 1/2°</p> |   |
| <p>CUSTOMER AUTHORIZATION: _____</p>   |  |   |   |
| <p>THOMSON™</p> <p>Linear Motion. Optimized.</p>   |  | <p>TITLE: <b>SHAFT REDUCTION 60 CASE TEMPLATE 6</b></p> <p>DRAWG NO. _____</p>                          |   |

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**Special Machining**

|  |   |  |   |   |   |   |   |  |   |  |  |
|--|---|--|---|---|---|---|---|--|---|--|--|
| 1  | 2 | 3  | 4 | F   | E | D   | C | B  | A |  |  |
|  |   |  |   |   |   |   |   |  |   |  |  |
| <p>STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'F' (TYP.)</p> <p>.015 RAD. TYP.</p> <p>B (TYP)</p> <p>A</p> <p>E</p> <p>C</p> <p>D</p> |   |  |   |   |   |   |   |  |   |  |  |
| <p>LENGTH 'A':</p> <p>DIAMETER 'D':</p> <p>CLASS:</p> <p>DIAMETER 'C':</p> <p>LENGTH 'E':</p> <p>ANGLE 'F':</p> <p>CHAMFER 'B':</p>    |   | <p>DEFAULT PRINT TOL: (INCH)</p> <p>FRACTIONS: <math>\pm 1/32</math>"</p> <p>.X= <math>\pm .015</math>"</p> <p>.XX= <math>\pm .010</math>"</p> <p>.XXX= <math>\pm .005</math>"</p> <p>ANGLES: <math>\pm 1/2^\circ</math></p> |   | <p>DEFAULT PRINT TOL: (METRIC)</p> <p>FRACTIONS: <math>\pm 1\text{mm}</math></p> <p>.X= <math>\pm .25\text{mm}</math></p> <p>.XX= <math>\pm .13\text{mm}</math></p> <p>ANGLES: <math>\pm 1/2^\circ</math></p> |   | <p>MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)</p> <p><input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING</p> <p><input type="checkbox"/> OTHER: _____</p> |   | <p>PLATING TYPE: _____</p> <p>APPROVAL _____ DATE _____</p> <p>DRAWN BY _____ DATE _____</p> <p>DO NOT SCALE DRAWING</p> |   | <p><b>THOMSON</b><br/>Linear Motion. Optimized.</p> <p>TITLE:<br/><b>SHAFT REDUCTION<br/>60 CASE TEMPLATE 7</b></p> <p>DRAWG NO. _____</p> |  |
| <p>CUSTOMER AUTHORIZATION: _____</p>   |   |  |   |   |   |   |   |  |   |  |  |

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Special Machining

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| A   | B | C   | D | E   | F |
|   |   |   |   |   |   |
| <p>1</p>  |   |   |   |   |   |
| <p>2</p>  |   |   |   |   |   |
| <p>3</p>  |   |   |   |   |   |
| <p>4</p>  |   |   |   |   |   |
| <p>LENGTH 'A':</p>  |   | <p>DIAMETER 'D':</p>  |   | <p>CLASS:</p>   |   |
| <p>MIN. KEYWAY LENGTH 'C':</p>  |   | <p>WIDTH 'E':</p>   |   | <p>KEYWAY DEPTH 'F':</p>  |   |
| <p>ANGLE 'G':</p>   |   | <p>CHAMFER 'B':</p>   |   | <p>OTHER MATERIALS AVAILABLE UPON REQUEST</p>   |   |
| <p>DEFAULT PRINT TOL: (INCH)<br/>                 FRACTIONS: ± 1/32"<br/>                 .H= ±.015"<br/>                 .HX= ±.010"<br/>                 .HHX= ±.005"<br/>                 ANGLES: ± 1/2°</p> |   | <p>DEFAULT PRINT TOL: (METRIC)<br/>                 FRACTIONS: ± 1mm<br/>                 .H= ±.25mm<br/>                 .HX= ±.13mm<br/>                 ANGLES: ± 1/2°</p> |   | <p><b>THOMSON™</b><br/>                 Linear Motion. Optimized.</p> <p>TITLE:<br/> <b>KEY WAY SLOT</b><br/> <b>60 CASE TEMPLATE 8</b></p> |   |
| <p>CUSTOMER AUTHORIZATION: _____</p>  |   | <p>MATERIAL:<br/> <input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING<br/> <input type="checkbox"/> OTHER: _____</p>            |   | <p>APPROVAL DATE<br/>                 DRAWN BY DATE</p>   |   |
| <p>DO NOT SCALE DRAWING</p>   |   | <p>PLATING TYPE: _____</p>  |   | <p>DATE</p>   |   |
| A   | B | C   | D | E   | F |

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**Special Machining**

|          |          |          |          |
|----------|----------|----------|----------|
| <p>1</p> | <p>2</p> | <p>3</p> | <p>4</p> |
| <p>A</p> | <p>B</p> | <p>C</p> | <p>D</p> |
| <p>E</p> | <p>F</p> |          |          |

**STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'F'**

**THOMSON**  
Linear Motion. Optimized.

TITLE:  
**EXTERNAL THREAD  
60 CASE TEMPLATE 9**

DRAWING NO.

**LENGTH 'A':**

**DIAMETER 'D':**

**CLASS:**

**THREAD 'C':**

**MIN. THREAD LENGTH 'E':**

**ANGLE 'F':**

**CHAMFER 'B':**

**OTHER MATERIALS AVAILABLE UPON REQUEST**

MATERIAL:  1566  440C  52100 TUBING  OTHER:

PLATING TYPE: \_\_\_\_\_

APPROVAL \_\_\_\_\_ DATE \_\_\_\_\_

DRAWN BY \_\_\_\_\_ DATE \_\_\_\_\_

DO NOT SCALE DRAWING

**DEFAULT PRINT TOL: (INCH)**  
FRACTIONS: ± 1/32"  
.H= ±.015"  
.HX= ±.010"  
.HXX= ±.005"  
ANGLES: ± 1/2°

**DEFAULT PRINT TOL: (METRIC)**  
FRACTIONS: ± 1mm  
.H= ±.25mm  
.HX= ±.13mm  
ANGLES: ± 1/2°

CUSTOMER AUTHORIZATION: \_\_\_\_\_

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|  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
|--|--|---|---|---|---|--|--|---|-------------------------------|--------|--|---------------|--|-------------|--|-------------|--|-------------------------|--|------------|--|--------------|--|
| A  | B  | C   | D | E | F |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
|  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">LENGTH 'A':</td> <td style="width:50%;"></td> </tr> <tr> <td>DIAMETER 'D':</td> <td></td> </tr> <tr> <td>CLASS:</td> <td></td> </tr> <tr> <td>DIAMETER 'C':</td> <td></td> </tr> <tr> <td>LENGTH 'G':</td> <td></td> </tr> <tr> <td>THREAD 'E':</td> <td></td> </tr> <tr> <td>MIN. THREAD LENGTH 'F':</td> <td></td> </tr> <tr> <td>ANGLE 'H':</td> <td></td> </tr> <tr> <td>CHAMFER 'B':</td> <td></td> </tr> </table>  |  |   |   |   |   | LENGTH 'A':  |  | DIAMETER 'D':   |                               | CLASS: |  | DIAMETER 'C': |  | LENGTH 'G': |  | THREAD 'E': |  | MIN. THREAD LENGTH 'F': |  | ANGLE 'H': |  | CHAMFER 'B': |  |
| LENGTH 'A':  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| DIAMETER 'D':  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| CLASS:   |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| DIAMETER 'C':  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| LENGTH 'G':  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| THREAD 'E':  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| MIN. THREAD LENGTH 'F':  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| ANGLE 'H':   |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| CHAMFER 'B':   |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;">                 DEFAULT PRINT TOL: (INCH)<br/>                 FRACTIONS: ± 1/32"<br/>                 .X= ±.015"<br/>                 .XX= ±.010"<br/>                 .XXX= ±.005"<br/>                 ANGLES: ± 1/2°             </td> <td style="width:33%;">                 DEFAULT PRINT TOL: (METRIC)<br/>                 FRACTIONS: ± 1mm<br/>                 .X= ±.25mm<br/>                 .XX= ±.13mm<br/>                 ANGLES: ± 1/2°             </td> <td style="width:33%;">                 MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br/> <input type="checkbox"/> 1566    <input type="checkbox"/> 440C<br/> <input type="checkbox"/> OTHER: _____<br/>                 PLATING TYPE: _____<br/>                 APPROVAL DATE: _____<br/>                 DRAWN BY DATE: _____<br/>                 DO NOT SCALE DRAWING             </td> </tr> <tr> <td colspan="3">                 CUSTOMER AUTHORIZATION: _____             </td> </tr> </table> |  |   |   |   |   | DEFAULT PRINT TOL: (INCH)<br>FRACTIONS: ± 1/32"<br>.X= ±.015"<br>.XX= ±.010"<br>.XXX= ±.005"<br>ANGLES: ± 1/2° | DEFAULT PRINT TOL: (METRIC)<br>FRACTIONS: ± 1mm<br>.X= ±.25mm<br>.XX= ±.13mm<br>ANGLES: ± 1/2° | MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br><input type="checkbox"/> 1566 <input type="checkbox"/> 440C<br><input type="checkbox"/> OTHER: _____<br>PLATING TYPE: _____<br>APPROVAL DATE: _____<br>DRAWN BY DATE: _____<br>DO NOT SCALE DRAWING | CUSTOMER AUTHORIZATION: _____ |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| DEFAULT PRINT TOL: (INCH)<br>FRACTIONS: ± 1/32"<br>.X= ±.015"<br>.XX= ±.010"<br>.XXX= ±.005"<br>ANGLES: ± 1/2°   | DEFAULT PRINT TOL: (METRIC)<br>FRACTIONS: ± 1mm<br>.X= ±.25mm<br>.XX= ±.13mm<br>ANGLES: ± 1/2° | MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br><input type="checkbox"/> 1566 <input type="checkbox"/> 440C<br><input type="checkbox"/> OTHER: _____<br>PLATING TYPE: _____<br>APPROVAL DATE: _____<br>DRAWN BY DATE: _____<br>DO NOT SCALE DRAWING |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| CUSTOMER AUTHORIZATION: _____  |  |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:60%; text-align: center;"> <b>THOMSON™</b><br/> <i>Linear Motion. Optimized.</i> </td> <td style="width:40%; text-align: center;"> <b>SHAFT REDUCTION with THREAD</b><br/> <b>60 CASE TEMPLATE 10</b><br/>                 DRUG NO. _____             </td> </tr> </table>   |  |   |   |   |   | <b>THOMSON™</b><br><i>Linear Motion. Optimized.</i>  | <b>SHAFT REDUCTION with THREAD</b><br><b>60 CASE TEMPLATE 10</b><br>DRUG NO. _____             |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| <b>THOMSON™</b><br><i>Linear Motion. Optimized.</i>  | <b>SHAFT REDUCTION with THREAD</b><br><b>60 CASE TEMPLATE 10</b><br>DRUG NO. _____             |   |   |   |   |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |
| A  | B  | C   | D | E | F |  |  |   |                               |        |  |               |  |             |  |             |  |                         |  |            |  |              |  |

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### Special Machining

|   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
|---|--|--|---|---|---|---|---|---|---|--|--|--|---|-------------------------------|--|---------------------|---------------------|-------------|--|----------------------|---------------------|-------------|--|------------|--|--------------|--|
| 1   | 2  | 3  | 4   | F | E | D | C | B | A |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
|   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">LENGTH 'A':</td> <td style="width: 50%;"></td> </tr> <tr> <td>DIAMETER 'D':</td> <td></td> </tr> <tr> <td>CLASS:</td> <td></td> </tr> <tr> <td>DIAMETER 'E':</td> <td></td> </tr> <tr> <td>LENGTH 'F':</td> <td></td> </tr> <tr> <td>DIAMETER 'C':</td> <td></td> </tr> <tr> <td>LENGTH 'G':</td> <td></td> </tr> <tr> <td>ANGLE 'H':</td> <td></td> </tr> <tr> <td>CHAMFER 'B':</td> <td></td> </tr> </table>  |  |  |   |   |   |   |   |   |   | LENGTH 'A':  |  | DIAMETER 'D':  |   | CLASS:                        |  | DIAMETER 'E':       |                     | LENGTH 'F': |  | DIAMETER 'C':        |                     | LENGTH 'G': |  | ANGLE 'H': |  | CHAMFER 'B': |  |
| LENGTH 'A':   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| DIAMETER 'D':   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| CLASS:  |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| DIAMETER 'E':   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| LENGTH 'F':   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| DIAMETER 'C':   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| LENGTH 'G':   |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| ANGLE 'H':  |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| CHAMFER 'B':  |  |  |   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
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| DEFAULT PRINT TOL: (INCH)<br>FRACTIONS: ± 1/32"<br>.H= ±.015"<br>.HX= ±.010"<br>.HHH= ±.005"<br>ANGLES: ± 1/2°  | DEFAULT PRINT TOL: (METRIC)<br>FRACTIONS: ± 1mm<br>.H= ±.25mm<br>.HX= ±.13mm<br>ANGLES: ± 1/2° | MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br><input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING<br><input type="checkbox"/> OTHER: _____ | THOMSON<br>Linear Motion. Optimized.<br>TITLE: SHAFT REDUCTION 60 CASE TEMPLATE 11<br>DRAWG NO. _____ |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| CUSTOMER AUTHORIZATION: _____   |  | PLATING TYPE: _____  | APPROVAL DATE _____   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
|   |  | DO NOT SCALE DRAWING   | DRAWN BY DATE _____   |   |   |   |   |   |   |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |
| 1   | 2  | 3  | 4   | F | E | D | C | B | A |  |  |  |   |                               |  |                     |                     |             |  |                      |                     |             |  |            |  |              |  |

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|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1   | 2 | 3 | 4   | E | F |
|   |   |   |   |   |   |
| <b>HOLE PATTERN</b>   |   |   |   |   |   |
| LENGTH 'A':   |   |   |   |   |   |
| DIAMETER 'D':   |   |   |   |   |   |
| CLASS:  |   |   |   |   |   |
| DIAMETER 'E':   |   |   |   |   |   |
| DEPTH 'C':  |   |   |   |   |   |
| DIAMETER 'F':   |   |   |   |   |   |
| ANGLE 'H':  |   |   |   |   |   |
| CHAMFER 'B':  |   |   |   |   |   |
|   |   |   |   |   |   |
| MATERIAL: <small>(OTHER MATERIALS AVAILABLE UPON REQUEST)</small><br><input type="checkbox"/> 1566 <input type="checkbox"/> 440C<br><input type="checkbox"/> OTHER: _____ |   |   | THOMSON™<br>Linear Motion. Optimized.                                   |   |   |
| DEFAULT PRINT TOL: (INCH)<br>FRACTIONS: ± 1/32"<br>.X= ±.015"<br>.XX= ±.010"<br>.XXX= ±.005"<br>ANGLES: ± 1/2°  |   |   | TITLE:<br><b>DRILL &amp; COUNTER BORE</b><br><b>60 CASE TEMPLATE 12</b> |   |   |
| PLATING TYPE: _____<br>APPROVAL DATE: _____<br>DO NOT SCALE DRAWING   |   |   | DRAWN BY: _____<br>DATE: _____  |   |   |
| CUSTOMER AUTHORIZATION: _____   |   |   |   |   |   |
| 1   | 2 | 3 | 4   | E | F |

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|--|--|--|--|---|--|--|--|
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| LENGTH 'A':<br>DIAMETER 'D':<br>CLASS:<br>DIAMETER 'C':<br>LENGTH 'Y':<br>ANGLE 'E':<br>CHAMFER 'B':   | DEFAULT PRINT TOL: (INCH)<br>FRACTIONS: ± 1/52"<br>.X= ±.015"<br>.XX= ±.010"<br>.XXX= ±.005"<br>ANGLES: ± 1/2°   |  |  |   |  |  |  |
| CUSTOMER AUTHORIZATION: _____  | DEFAULT PRINT TOL: (METRIC)<br>FRACTIONS: ± 1mm<br>.X= ±.25mm<br>.XX= ±.13mm<br>ANGLES: ± 1/2°   |  |  |   |  |  |  |
|  | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">                 MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br/> <input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING<br/> <input type="checkbox"/> OTHER: _____             </td> <td style="width: 50%; padding: 5px;">                 APPROVAL: _____ DATE: _____<br/>                 DRAWN BY: _____ DATE: _____<br/>                 DO NOT SCALE DRAWING             </td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 5px;"> <b>THOMSON</b><br/>Linear Motion. Optimized.             </td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 5px;">                 TITLE: <b>THRU PIN HOLE</b><br/> <b>60 CASE TEMPLATE 13</b><br/>                 DRAWG NO. _____             </td> </tr> </table>   | MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br><input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING<br><input type="checkbox"/> OTHER: _____ | APPROVAL: _____ DATE: _____<br>DRAWN BY: _____ DATE: _____<br>DO NOT SCALE DRAWING                             | <b>THOMSON</b><br>Linear Motion. Optimized. |  | TITLE: <b>THRU PIN HOLE</b><br><b>60 CASE TEMPLATE 13</b><br>DRAWG NO. _____ |  |
| MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br><input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING<br><input type="checkbox"/> OTHER: _____ | APPROVAL: _____ DATE: _____<br>DRAWN BY: _____ DATE: _____<br>DO NOT SCALE DRAWING   |  |  |   |  |  |  |
| <b>THOMSON</b><br>Linear Motion. Optimized.  |  |  |  |   |  |  |  |
| TITLE: <b>THRU PIN HOLE</b><br><b>60 CASE TEMPLATE 13</b><br>DRAWG NO. _____   |  |  |  |   |  |  |  |

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Special Machining

|  |   |  |   |  |   |   |   |   |   |   |  |
|--|---|--|---|--|---|---|---|---|---|---|--|
| 1  | 2 | 3  | 4 | F  | E | D   | C | B   | A |   |  |
|  |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'E' (TYP.)</b></p>   |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>LENGTH 'A':</b></p>  |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>DIAMETER 'D':</b></p>  |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>CLASS:</b></p>   |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>THREAD 'C':</b></p>  |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>LENGTH 'Y':</b></p>  |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>ANGLE 'E':</b></p>   |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>CHAMFER 'B':</b></p>   |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>B (TYP)</b></p>  |   |  |   |  |   |   |   |   |   |   |  |
| <p><b>DEFAULT PRINT TOL: (INCH)</b><br/>                 FRACTIONS: ± 1/32"<br/>                 .X= ±.015"<br/>                 .XX= ±.010"<br/>                 .XXX= ±.005"<br/>                 ANGLES: ± 1/2°</p> |   | <p><b>DEFAULT PRINT TOL: (METRIC)</b><br/>                 FRACTIONS: ± 1mm<br/>                 .X= ±.25mm<br/>                 .XX= ±.13mm<br/>                 ANGLES: ± 1/2°</p> |   | <p><b>MATERIAL:</b> (OTHER MATERIALS AVAILABLE UPON REQUEST)<br/> <input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING<br/> <input type="checkbox"/> OTHER: _____</p> |   | <p><b>PLATING TYPE:</b> _____<br/>                 APPROVAL _____ DATE _____<br/>                 DRAWN BY _____ DATE _____</p> |   | <p><b>THOMSON™</b><br/>                 Linear Motion. Optimized.</p> |   | <p>TITLE:<br/> <b>DRILL &amp; TAP</b><br/> <b>60 CASE TEMPLATE 14</b><br/>                 DRUG NO. _____</p> |  |
| <p><b>CUSTOMER AUTHORIZATION:</b> _____</p>  |   |  |   |  |   |   |   |   |   |   |  |
| 1  | 2 | 3  | 4 | A  | B | C   | D | E   | F |   |  |

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## Special Machining

|  |       |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
|--|-------|---|---|---|---|--|---|---|---|---|-------|---------------|--|--------|-------|-------------|-------|-------------|-------|------------|-------|------------|-------|--------------|-------|
| 1  | 2     | 3 | 4   | F | E | D  | C | B | A |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
|  |       |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| <p><b>STANDARD DIMENSIONS:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>LENGTH 'A':</td><td>_____</td></tr> <tr><td>DIAMETER 'D':</td><td>_____</td></tr> <tr><td>CLASS:</td><td>_____</td></tr> <tr><td>LENGTH 'Y':</td><td>_____</td></tr> <tr><td>LENGTH 'C':</td><td>_____</td></tr> <tr><td>DEPTH 'E':</td><td>_____</td></tr> <tr><td>ANGLE 'F':</td><td>_____</td></tr> <tr><td>CHAMFER 'B':</td><td>_____</td></tr> </table> |       |   |   |   |   |  |   |   |   | LENGTH 'A':   | _____ | DIAMETER 'D': | _____  | CLASS: | _____ | LENGTH 'Y': | _____ | LENGTH 'C': | _____ | DEPTH 'E': | _____ | ANGLE 'F': | _____ | CHAMFER 'B': | _____ |
| LENGTH 'A':  | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| DIAMETER 'D':  | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| CLASS:   | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| LENGTH 'Y':  | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| LENGTH 'C':  | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| DEPTH 'E':   | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| ANGLE 'F':   | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| CHAMFER 'B':   | _____ |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| <p><b>DEFAULT PRINT TOL: (INCH)</b></p> <p>FRACTIONS: <math>\pm 1/32</math>"</p> <p>.X= <math>\pm .015</math>"</p> <p>.XX= <math>\pm .010</math>"</p> <p>.XXX= <math>\pm .005</math>"</p> <p>ANGLES: <math>\pm 1/2^\circ</math></p>  |       |   | <p><b>DEFAULT PRINT TOL: (METRIC)</b></p> <p>FRACTIONS: <math>\pm 1</math>mm</p> <p>.X= <math>\pm .25</math>mm</p> <p>.XX= <math>\pm .13</math>mm</p> <p>ANGLES: <math>\pm 1/2^\circ</math></p> |   |   | <p><b>MATERIAL:</b> (OTHER MATERIALS AVAILABLE UPON REQUEST)</p> <p><input type="checkbox"/> 1566 <input type="checkbox"/> 440C <input type="checkbox"/> 52100 TUBING</p> <p><input type="checkbox"/> OTHER: _____</p> |   |   |   | <p><b>PLATING TYPE:</b> _____</p> <p>APPROVAL _____ DATE _____</p> <p>DRAWN BY _____ DATE _____</p> <p>DO NOT SCALE DRAWING</p> |       |               | <p style="text-align: center;"><b>THOMSON</b><br/>Linear Motion. Optimized.</p> <p>TITLE: <b>MACHINED SLOTS</b></p> <p><b>60 CASE TEMPLATE 15</b></p> <p>DRAWG NO. _____</p> |        |       |             |       |             |       |            |       |            |       |              |       |
| <p><b>CUSTOMER AUTHORIZATION:</b> _____</p>  |       |   |   |   |   |  |   |   |   |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |
| 1  | 2     | 3 | 4   | A | B | C  | D | E | F |   |       |               |  |        |       |             |       |             |       |            |       |            |       |              |       |

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Special Machining

|  |          |   |          |
|--|----------|---|----------|
| <p>1</p>   | <p>2</p> | <p>3</p>  | <p>4</p> |
| <p>A</p>   | <p>B</p> | <p>C</p>  | <p>D</p> |
| <p>E</p>   | <p>F</p> |   |          |
| <p>STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'F'. (TYP.)</p>   |          |   |          |
| <p>HOLE PATTERN</p>  |          |   |          |
| <p>SPLICE LOCATION(S)</p>  |          |   |          |
| <p>LENGTH 'A':</p>   |          |   |          |
| <p>DIAMETER 'D':</p>   |          |   |          |
| <p>CLASS:</p>  |          |   |          |
| <p>THREAD 'E':</p>   |          |   |          |
| <p>LENGTH 'Y':</p>   |          |   |          |
| <p>LENGTH 'X':</p>   |          |   |          |
| <p>No. of REPEATS for 'X':</p>   |          |   |          |
| <p>ANGLE 'F':</p>  |          |   |          |
| <p>CHAMFER 'B':</p>  |          |   |          |
| <p>DEFAULT PRINT TOL: (INCH)<br/>FRACTIONS: ± 1/32"<br/>.X= ±.015"<br/>.XX= ±.010"<br/>.XXX= ±.005"<br/>ANGLES: ± 1/2°</p> |          | <p>DEFAULT PRINT TOL: (METRIC)<br/>FRACTIONS: ± 1mm<br/>.X= ±.25mm<br/>.XX= ±.13mm<br/>ANGLES: ± 1/2°</p>   |          |
| <p>CUSTOMER AUTHORIZATION: _____</p>   |          | <p>MATERIAL: (OTHER MATERIALS AVAILABLE UPON REQUEST)<br/><input type="checkbox"/> 1566 <input type="checkbox"/> 440C<br/><input type="checkbox"/> OTHER: _____</p> |          |
| <p>THOMSON™<br/>Linear Motion. Optimized.</p>  |          | <p>TITLE:<br/><b>BUTTED JOINTS</b><br/><b>60 CASE TEMPLATE 16</b></p>   |          |
| <p>APPROVAL DATE</p>   |          | <p>APPROVAL DATE</p>  |          |
| <p>DO NOT SCALE DRAWING</p>  |          | <p>DRAWN BY DATE</p>  |          |
| <p>A</p>   | <p>B</p> | <p>C</p>  | <p>D</p> |
| <p>E</p>   | <p>F</p> | <p>FAX A COPY OF THIS FORM TO QUOTATION DEPARTMENT, THOMSON +44 1271 334 501</p>  |          |

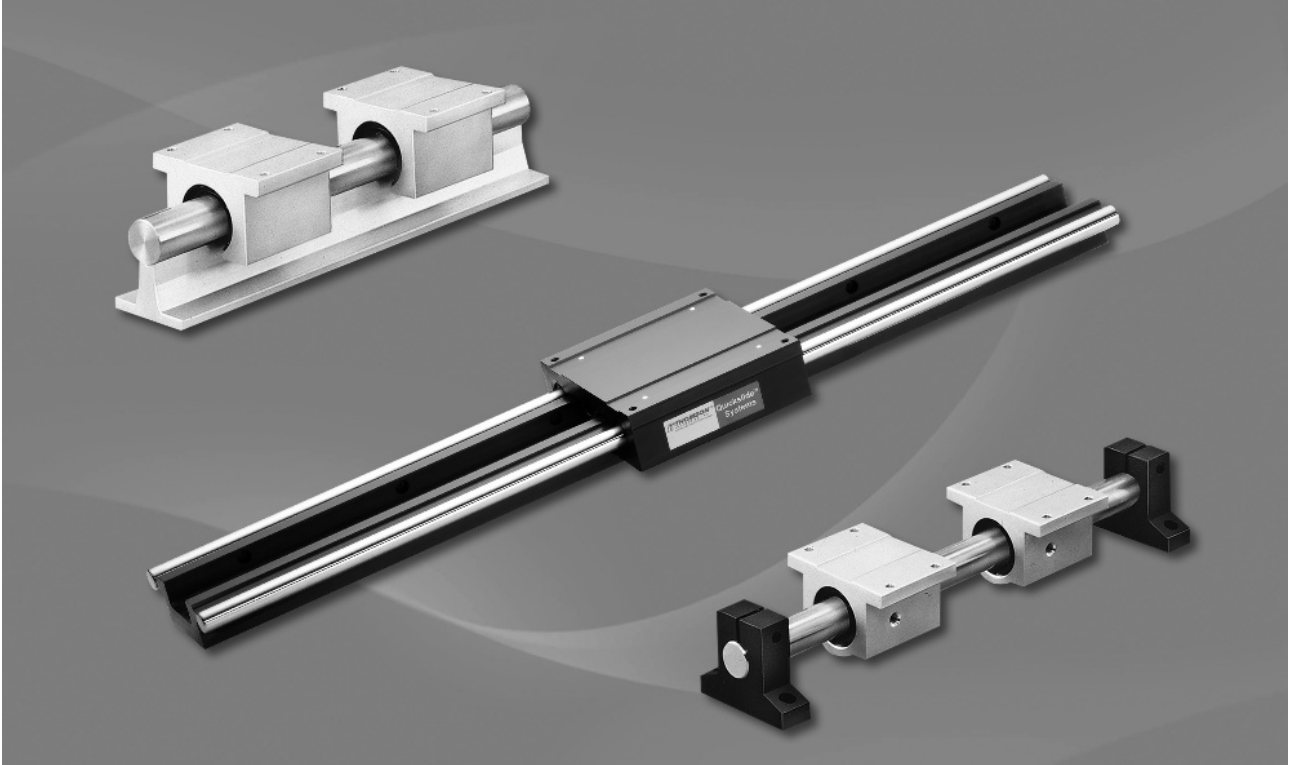
## Special Machining

|  |   |   |  |   |   |  |   |   |   |   |  |  |
|--|---|---|--|---|---|--|---|---|---|---|--|--|
| 1  | 2 | 3 | 4  | E | D | C  | B | A | F |   |  |  |
|  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>STD. MACHINED CHAMFER UNLESS NOTED IN ANGLE 'F' (TYP.)</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>STD. RELIEF</b></p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>SPLICE LOCATION(S)</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>LENGTH 'A':</b></p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>DIAMETER 'D':</b></p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>CLASS:</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>THREAD 'E':</b></p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>LENGTH 'Y':</b></p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>LENGTH 'X':</b></p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>ANGLE 'F':</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>CHAMFER 'B':</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>HOLE PATTERN</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>SPLICE LOCATION(S)</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p>1)</p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p>2)</p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p>3)</p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>NO. of REPEATS for 'X':</b></p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>CHAMFER 'B':</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>DEFAULT PRINT TOL: (INCH)</b><br/>         FRACTIONS: ± 1/32"<br/>         .X= ±.015"<br/>         .XX= ±.010"<br/>         .XXX= ±.005"<br/>         ANGLES: ± 1/2°</p> |   |   | <p><b>DEFAULT PRINT TOL: (METRIC)</b><br/>         FRACTIONS: ± 1mm<br/>         .X= ±.25mm<br/>         .XX= ±.13mm<br/>         ANGLES: ± 1/2°</p> |   |   | <p><b>MATERIAL:</b> (OTHER MATERIALS AVAILABLE UPON REQUEST)<br/> <input type="checkbox"/> 1566 <input type="checkbox"/> 440C<br/> <input type="checkbox"/> OTHER: _____</p> |   |   |   | <p><b>THOMSON</b><br/>Linear Motion. Optimized.</p> |  |  |
| <p><b>CUSTOMER AUTHORIZATION:</b> _____</p>  |   |   |  |   |   |  |   |   |   |   |  |  |
| <p><b>PLATING TYPE:</b> _____</p>  |   |   | <p><b>APPROVAL</b> _____</p>   |   |   | <p><b>TITLE:</b><br/> <b>DOWEL JOINT</b><br/> <b>60 CASE TEMPLATE 17</b></p>   |   |   |   |   |  |  |
| <p><b>DO NOT SCALE DRAWING</b></p>   |   |   | <p>DATE _____</p>  |   |   | <p>DATE _____</p>  |   |   |   |   |  |  |
| <p>DATE _____</p>  |   |   | <p>DATE _____</p>  |   |   | <p>DATE _____</p>  |   |   |   |   |  |  |
| <p><b>DO NOT SCALE DRAWING</b></p>   |   |   |  |   |   |  |   |   |   |   |  |  |
| A  | B | C | D  | E | F | G  | H | I | J |   |  |  |

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RoundRail Linear Guides

# RoundRail Linear Guides

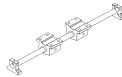
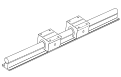
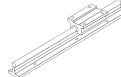
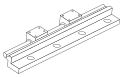
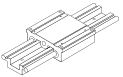
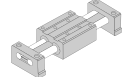


|                              |                  |
|------------------------------|------------------|
| <b>Linear Guides .....</b>   | <b>209 - 243</b> |
| End Support 1BA.....         | 220 - 221        |
| End Support 1NA .....        | 222 - 223        |
| Continuous Support 1CA ..... | 225 - 226        |
| Continuous Support 1PA.....  | 227 - 228        |
| FluoroNyliner 1VA.....       | 230 - 231        |
| Side Mounted 1DA.....        | 233 - 234        |
| Dual Shaft Rail 2DA .....    | 236 - 237        |
| Twin Shaft Web 2CA.....      | 239 - 240        |
| Accessories.....             | 241 - 244        |

RoundRail Linear Guides are the non-driven building blocks for linear slide tables. They offer the end user flexibility to fit specific envelopes by allowing customized separations between shafts and between bearings on shafts to produce higher moment capacity. When combined with ballscrew assemblies, they become a driven slide table.

Because RoundRail Linear Guides are offered in a wide range of sizes, bearing types, and mounting configurations, they are typically selected by the qualitative attributes that are most appropriate for a given application (i.e. environmental considerations, mounting footprint). For this reason, we are providing the following selection chart and selection criteria for consideration:

### Systems Quick Reference Guide

| Application Criteria                         |               | End Support   | Continuous Support  | FluoroNyliner   | Side Mounted   | Dual Shaft Rail   | Twin Shaft Web  |
|--|---------------|---|---|---|--|---|---|
|  |               |  |  |  |  |  |  |
|  |               | <b>1BA / 1NA</b>  | <b>1 CA / 1PA</b>   | <b>1 VA</b>   | <b>1 DA</b>  | <b>2DA</b>  | <b>2CA</b>  |
| <b>High Loads</b>                            |               |   | •   | •   |  |   |   |
| <b>Equivalent Loads in All Directions</b>    |               | •   |   |   |  | •   |   |
| <b>Ultra Compactness</b>                     |               | •   |   |   |  |   | •   |
| <b>Extreme Smoothness</b>                    |               | •   | •   |   | •  |   | •   |
| <b>End Supported</b>                         |               | •   |   |   |  | •   | •   |
| <b>Single Rail</b>                           |               |   |   |   |  |   | •   |
| <b>Harsh Environment</b>                     |               |   |   | •   |  |   |   |
| <b>Low Cost Installation (multiple rail)</b> |               | •   | •   | •   | •  |   |   |
| <b>Complete Axis Solution</b>                |               |   |   |   |  |   | •   |
| <b>Available Sizes:</b>                      | <b>Inch</b>   | 4 thru 24   | 8 thru 24   | 8 thru 24   | •  | •   |   |
|  | <b>Metric</b> | 8 thru 40   | 12 thru 40  |   | 8 thru 16  | 8 thru 16   | 8 thru 16   |
| <b>Page Number</b>                           |               | 220/222   | 225/227   | 230   | 233  | 236   | 239   |

### Linear Guide Selection Criteria

- Load/Life
- Smoothness of Travel
- Cost of Product
- Travel Accuracy
- Speed & Acceleration
- Cost of Installation
- Rigidity
- Envelope
- Environment
- Cost of Replacement

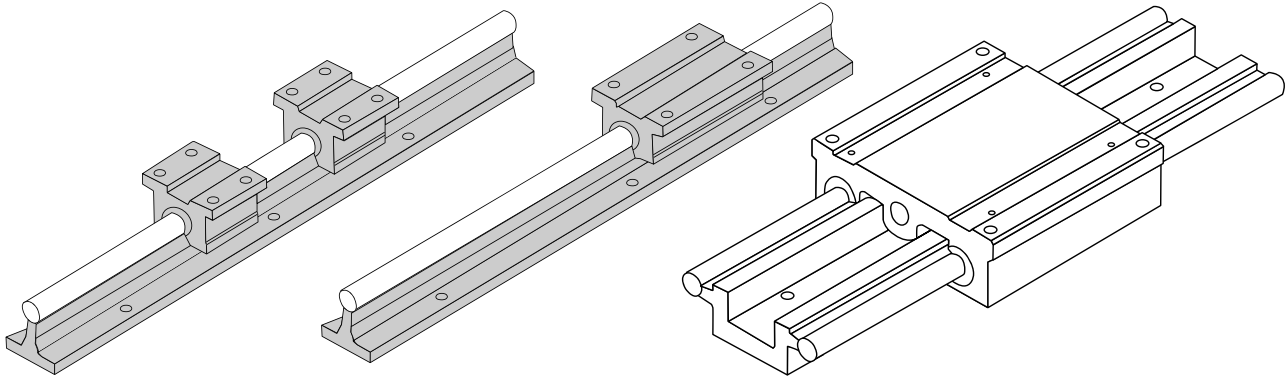
### Application Examples

- Machine Tools
- Semiconductor Equipment
- Packaging Machinery
- Medical Equipment
- Automotive Assembly Equipment
- Food Processing Equipment

## RoundRail Linear Guides

### RoundRail Linear Guides

Thomson RoundRail Linear Guide products offer:



Pre-assembled, ready to install stages providing low friction, smooth, accurate motion for a wide range of moment or normal loading configurations. Market applications include factory automation, medical, packaging, machine tool, semiconductor, printing, automotive assembly, aerospace and food processing. Slide tables are available as customizable linear guides to multi-axis, turnkey systems complete with motors, drives, controls and electromechanical accessories.

- Applications-typically on factory machinery where accurate, smooth linear positioning is required
- Available with servo/stepper motor & drive packages
- Max thrust to 3100 lb
- Strokes to 120"
- Loads from 5 - 2000 lb
- Repeatability to 0.0002"

Linear Guides are the non-driven building blocks for linear slide tables. They offer the end user flexibility to fit specific envelopes by allowing customized separations between shafts and between bearings on shafts to produce higher moment capacity. When combined with ballscrew assemblies, they become a driven slide table.

Because RoundRail Linear Guides are offered in a wide range of sizes, bearing types, and mounting configurations, they are typically selected by the qualitative attributes that are most appropriate for a given application (i.e. environmental considerations, mounting footprint). For this reason, we are providing the following selection chart and selection criteria for consideration:

#### RoundRail Linear Guide Selection Criteria

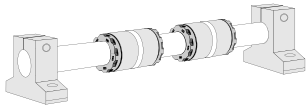
- |                   |                        |                        |
|-------------------|------------------------|------------------------|
| • Load/Life       | • Smoothness of Travel | • Cost of Product      |
| • Travel Accuracy | • Speed & Acceleration | • Cost of Installation |
| • Rigidity        | • Envelope             | • Cost of Replacement  |
|                   | • Environment          |                        |

#### Application Examples

- |                                 |                             |
|---------------------------------|-----------------------------|
| • Machine Tools                 | • Semiconductor Equipment   |
| • Packaging Machinery           | • Medical Equipment         |
| • Automotive Assembly Equipment | • Food Processing Equipment |

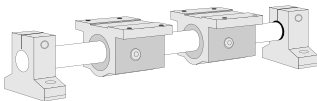
## RoundRail Linear Guides

# Super Smart Ball Bushing Bearings and Pillow Blocks for End Supported Applications



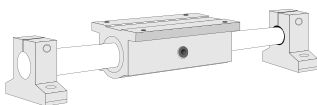
### Super Smart Ball Bushing Bearings (Closed Type) Features:

- Available in sizes 1/2 to 1 1/2 inch diameters.
- Load capacity range from 265 to 3,880 lb<sub>f</sub>.
- Available with one, two or without integral double lip wipers.
- Can be adjusted to take out diametrical clearance.
- Can be mounted in a customized housing.
- Travel speeds up to 10 ft/s.
- Interchangeable with the industry standard Thomson Super Ball Bushing bearing.



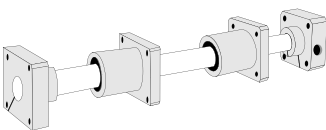
### Super Smart Ball Bushing Pillow Blocks (Closed & Adjustable Type) Features:

- Available in sizes 1/2 to 1 1/2 inch diameters.
- Load capacity range from 265 to 3,880 lb<sub>f</sub>.
- Available with standard integral double acting seals.
- Available with or without adjustment capability.
- Can be adjusted to take out diametrical clearance.
- Easily mounted and secured with four mounting bolts.
- Travel speeds up to 10 ft/s.
- Available with standard lubrication fitting.
- Interchangeable with the industry standard Thomson Super Ball Bushing Pillow Blocks.



### Super Smart Ball Bushing Twin Pillow Blocks (Closed & Adjustable Type) Features:

- Available in sizes 1/2 to 1 1/2 inch diameters.
- Load capacity range from 530 to 7,760 lb<sub>f</sub>.
- Available with standard integral double acting seals.
- Available with or without adjustment capability.
- Can be adjusted to take out diametrical clearance.
- Travel speeds up to 10 ft/s.
- Easily mounted and secured with four mounting bolts.
- Available with standard lubrication fitting.
- Interchangeable with the industry standard Thomson Super Ball Bushing Twin Pillow Block.



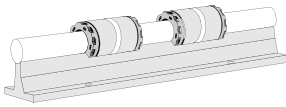
### Super Smart Ball Bushing Flanged Single and Twin Pillow Blocks Features:

- Available in sizes 1/2 and 1 1/2 inch diameters.
- Load capacity range from 265 to 7,760 lb<sub>f</sub>.
- Available with standard integral double acting seals.
- Without adjustment capability.
- Can be mounted perpendicular to table surface.
- Easily mounted and secured with four mounting bolts.
- Travel speeds up to 10 ft/s.
- Available with standard lubrication fitting.
- Interchangeable with the industry standard Thomson Super Ball Bushing Flanged Single and Twin Pillow Block.

## RoundRail Linear Guides

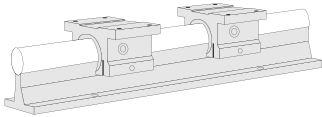
## Super Smart Ball Bushing Bearings and Pillow Blocks (Open Type) for Continuously Supported Applications

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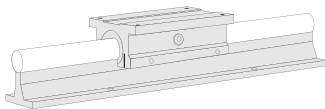
### Super Smart Ball Bushing bearing (Open Type) Features:

- Available in sizes 1/2 to 1 1/2 inch diameter.
  - Load capacity range from 360 to 3,880 lb<sub>f</sub>.
  - Pull off load capacity range from 250 to 1,750 lb<sub>f</sub>.
  - Available with one, two or without double lip integral wipers.
  - Can be adjusted to take out diametrical clearance.
  - Can be mounted in a customized open style pillow block.
  - Travel speeds up to 10 ft/s.
  - Interchangeable with the industry standard Thomson Super Ball Bushing bearing (Open type).
- 



### Super Smart Ball Bushing Pillow Blocks (Open Type) Features:

- Available in sizes 1/2 to 1 1/2 inch diameter.
  - Load Capacity range from 360 to 3,880 lb<sub>f</sub>.
  - Pull off load capacity range from 250 to 1,750 lb<sub>f</sub>.
  - Available with standard double acting integral seals.
  - Can be adjusted to take out diametrical clearance.
  - Easily mounted and secured with four mounting bolts.
  - Travel speeds up to 10 ft/s.
  - Available with standard lubrication access.
  - Interchangeable with the industry standard Thomson Super Ball Bushing Pillow Block (Open Type).
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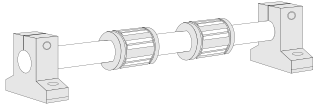


### Super Smart Ball Bushing Twin Pillow Blocks (Open Type) Features:

- Available in sizes 1/2 to 1 1/2 inch diameter.
  - Load Capacity range from 720 to 7,760 lb<sub>f</sub>.
  - Pull off load capacity range from 500 to 3,500 lb<sub>f</sub>.
  - Available with standard double acting integral seals.
  - Can be adjusted to take out diametrical clearance.
  - Easily mounted and secured with four mounting bolts.
  - Travel speeds up to 10 ft/s.
  - Available with standard lubrication access.
  - Interchangeable with the industry standard Thomson Super Ball Bushing Twin Pillow Block (Open Type).
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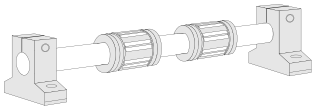
## RoundRail Linear Guides

# Super Ball Bushing Bearings and Pillow Blocks for End Supported Applications



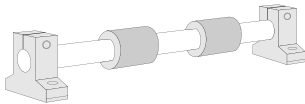
### Super Ball Bushing Bearings (Closed type) Features:

- Available in sizes 3/16 to 2 inch diameter.
- Load Capacity range from 35 to 3,000 lb<sub>f</sub>.
- Self-aligning in all directions.
- Can be mounted in a custom housing.
- Can be adjusted to take out diametrical clearance.
- Travel speeds up to 10 ft/s.
- Available with corrosion resistant components.



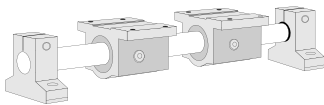
### Sealed Super Ball Bushing Bearings (Closed type) Features:

- Integral double acting seals retain lubrication and keep out contamination.
- Available in sizes 1/2, 3/4 and 1 inch nominal diameter.
- Load capacity range from 255 to 1,050 lb<sub>f</sub>.
- Self-aligning in all directions.
- Can be adjusted to take out diametrical clearance.
- Can be mounted in a custom housing.
- Travel speeds up to 10 ft/s.
- Available with corrosion resistant components.



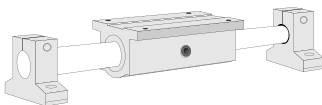
### Super Ball Bushing Cartridge Bearings Features:

- Available in sizes 1/4, 3/8 and 1/2 inch diameter.
- Can be easily installed into a soft or slightly out-of-round housing.
- Available in both single or twin versions and with or without integral double acting seals.
- Single versions are self-aligning in all directions.
- Twin versions minimize installation time and cost.
- Available with corrosion resistant components.



### Super Ball Bushing Pillow Blocks (Closed and Adjustable Type) Features:

- Available in sizes 1/4 to 2 inch diameter.
- Load capacity range between 60 and 3,000 lb<sub>f</sub>.
- Available with standard integral double acting seals.
- Travel speeds up to 10 ft/s.
- Available with or without diameter adjustment capability.
- Easily mounted and secured with four mounting bolts (sizes 1/4 and 3/8 secured with two mounting bolts).
- Available with a standard lubrication access.



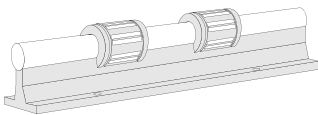
### Super Ball Bushing Twin Pillow Blocks (Closed and Adjustable Type) Features:

- Available in sizes 1/4 to 1 1/2 inch diameter.
- Load capacity range between 120 and 4,000 lb<sub>f</sub>.
- Available with standard integral double acting seals.
- Travel speeds up to 10 ft/s.
- Available with or without diameter adjustment capability.
- Easily mounted and secured with four mounting bolts.
- Available with a standard lubrication access.



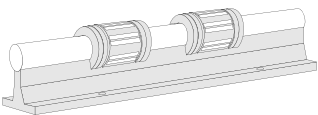
## RoundRail Linear Guides

## Super Ball Bushing Bearings and Pillow Blocks (Open Type) for Continuously Supported Applications



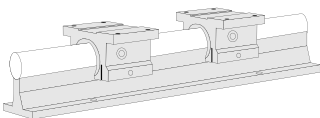
### Super Ball Bushing Bearings (Open Type) Features:

- Available in sizes 1/2-2 inch diameter.
- Load capacity ranges from 230 to 2,350 lb<sub>r</sub>.
- Self-aligning in all directions.
- Can be adjusted to take out diametrical clearance.
- Can be mounted in customized housing.
- Travel speeds up to 10 ft/s.
- Available with corrosion resistant components.



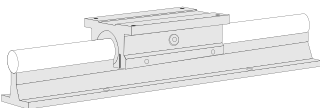
### Sealed Super Ball Bushing Bearings (Open Type) Features:

- Standard integral double acting seals retain lubrication and keep out contaminants.
- Available in sizes 1/2, 3/4 and 1 inch diameter.
- Load capacity ranges from 230 to 780 lb<sub>r</sub>.
- Self-aligning in all directions.
- Can be adjusted to take out diametrical clearance.
- Can be mounted in customized housing.
- Travel speeds up to 10 ft/s.
- Available with corrosion resistant components.



### Super Ball Bushing Pillow Blocks (Open Type) Features:

- Available in sizes 1/2-2 inch diameter.
- Load capacity ranges from 230 to 2,350 lb<sub>r</sub>.
- Self-aligning in all directions.
- Can be adjusted to take out diametrical clearance.
- Travel speeds up to 10 ft/s.
- Standard integral double acting seals retain lubrication and keep out contaminants.
- Available with corrosion resistant components.
- Easily mounted and secured with four mounting bolts.
- Available with standard lubrication access. Sizes .25, .375 and .500 have oil lubricant fitting. Sizes .625 and above have 1/4-28 access for lubrication.

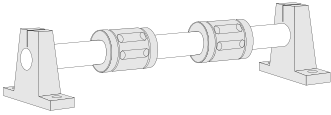


### Super Ball Bushing Twin Pillow Blocks (Open Type) Features:

- Available in sizes 1/2-1 1/2 inch diameter.
- Load capacity ranges from 460 to 3,120 lb<sub>r</sub>.
- Can be adjusted to take out diametrical clearance.
- Available with corrosion resistant components.
- Standard integral double acting seals retain lubrication and keep out contaminants.
- Easily mounted and secured with four mounting bolts.
- Maximum travel speeds up to 10 ft/s.
- Available with standard lubrication access. Sizes .25, .375 and .500 have oil lubricant fitting. Sizes .625 and above have 1/4-28 access for lubrication.
- Built-in lubrication wick for continuous lubrication.

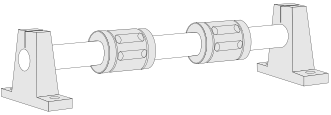
## RoundRail Linear Guides

# Precision Steel Ball Bushing Bearings and Pillow Blocks for End Supported Applications



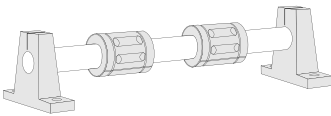
### Precision Steel Ball Bushing Bearings (Closed type) Features:

- Coefficient of friction as low as .001.
- Load capacity range from 19 to 5,000 lb<sub>r</sub>.
- High operating temperature capability.
- Available in sizes 1/4 to 4 inch bore diameter.
- Can be mounted in a custom housing.
- Travel speeds up to 10 ft/s.
- Available in corrosion resistant stainless steel for diameters up to 1 inch
- All steel construction for increased rigidity.
- Sizes 1/2, 3/4 and 1 inch available with integral, double acting wipers.



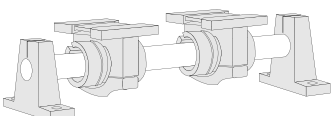
### Extra Precision Steel Ball Bushing Bearings (Closed type) Features:

- Increased precision for high accuracy positioning and repeatability
- Coefficient of friction as low as .001.
- Load capacity range from 19 to 5,000 lb<sub>r</sub>.
- High operating temperature capability.
- Available in sizes 1/4 to 4 inch bore diameter.
- Can be mounted in a custom housing.
- Travel speeds up to 10 ft/s.
- Available in corrosion resistant stainless steel for diameters up to 1 inch.
- All steel construction for increased rigidity.
- Sizes 1/2, 3/4 and 1 inch available with integral, double acting wipers.



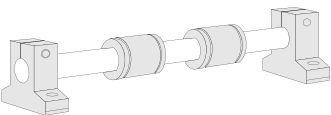
### Adjustable Precision Steel Ball Bushing Bearings (Closed Type) Features:

- Adjustment capability provides minimum 60 Case LinearRace shaft and bearing clearance for improvements in positioning accuracy and repeatability.
- Coefficient of friction as low as .001.
- Load capacity range from 85 to 5,000 lb<sub>r</sub>.
- High operating temperature capability.
- Available in sizes 1/2 to 4 inch bore diameter.
- Can be mounted in a custom housing.
- Travel speeds up to 10 ft/s.
- All steel construction for increased rigidity.
- Available in corrosion resistant stainless steel for diameters up to 1 inch.



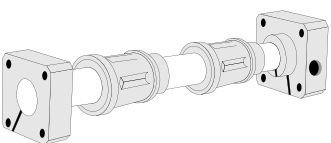
### Precision Steel Ball Bushing Pillow Blocks (Closed and Adjustable Type) Features:

- Coefficient of friction as low as .001.
- Load capacity range from 85 to 1,100 lb<sub>r</sub>.
- High operating temperature capability.
- Available in sizes 1/2 to 2 inch bore diameter.
- Self-aligning for easy installation.
- Travel speeds up to 10 ft/s.
- Pillow Blocks are available with corrosion resistant stainless steel Ball Bushing bearings up to 1 inch.
- Easily mounted and secured with four mounting bolts.
- All metal construction for increased rigidity.
- Available with integral, double acting seals.
- Adjustment capability provides minimum 60 Case LinearRace and bearing clearance for improvements in positioning accuracy and repeatability.



### Miniature Instrument Ball Bushing Bearings Features:

- Available in sizes 1/8, 3/16 and 1/4 inch bore diameter.
- Available with a matched 60 Case LinearRace
- Coefficient of friction as low as .001.
- Compact size for low inertia and weight.
- Precision bearing balls, sleeve and 60 Case LinearRace manufactured of corrosion resistant stainless steel.
- Load Capacity range between 7 and 19 lb<sub>r</sub>.

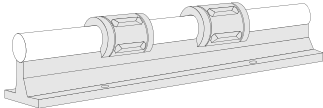


### Die Set Ball Bushing Bearings Features:

- Available in sizes 1, 1 1/4, 1 1/2 and 2 inch bore diameter.
- Load Capacity range between 350 and 1,100 lb<sub>r</sub>.
- All steel construction for maximum rigidity.
- Travel speeds up to 10 ft/s.
- Easily mounted by simply bolting toe clamps in place.
- Can be mounted perpendicular to mounting surface.
- High operating temperature capability.
- Coefficient of friction as low as .001.

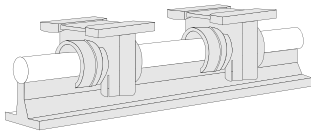
## RoundRail Linear Guides

## Precision Steel Ball Bushing Bearings and Pillow Blocks (Open Type) for Continuously Supported Applications



### Precision Steel Ball Bushing Bearings (Open type) Features:

- Coefficient of friction as low as .001.
- Load Capacity range from 60 to 3,800 lb<sub>f</sub>.
- Can be mounted in a custom housing.
- Available in sizes 1/2 to 4 inch diameter.
- All steel construction for maximum rigidity.
- Can be adjusted to remove clearance between the Ball Bushing bearing and 60 Case LinearRace.
- Available in corrosion resistant stainless steel in sizes up to 1 inch diameter.
- Travel speeds up to 10 ft/s.
- High operating temperature capability.
- Available with corrosion resistant components.

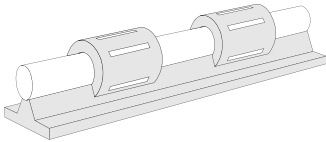


### Precision Steel Ball Bushing Bearings and Pillow Blocks (Open type) Features:

- Self-aligning for easy installation.
- Easily secured to table surface with four mounting bolts.
- Coefficient of friction as low as .001.
- Load capacity range from 60 to 860 lb<sub>f</sub>.
- Available in sizes 1/2 to 2 inch diameter.
- Available with seals at both ends.
- All steel construction for maximum rigidity.
- Can be adjusted to remove clearance between the Ball Bushing bearing and 60 Case LinearRace.
- Available with corrosion resistant stainless steel Ball Bushing bearing in sizes up to 1 inch diameter.
- Travel speeds up to 10 ft/s.

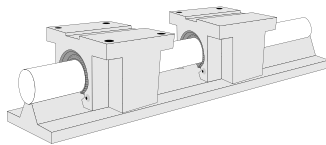
## RoundRail Linear Guides

# XR Ball Bushing bearing Products for Continuously Supported Applications



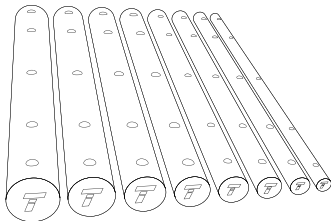
### XR Ball Bushing Bearings Features:

- Available in sizes 2 and 3 inch bore diameter.
- Load capacity range from 4,500 to 10,000 lb<sub>r</sub>.
- Pull of load capacity range between 2,100 to 8,000 lb<sub>r</sub>.
- Can be mounted in a custom housing.
- Travel speeds up to 5 ft/s.
- System accelerations up to 160 ft/s<sup>2</sup>.



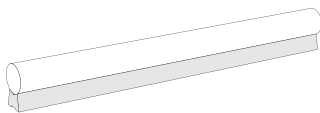
### XPBO Ball Bushing Pillow Blocks Features:

- Available in 2 and 3 inch diameter sizes.
- Load capacity range from 4,500 to 10,000 lb<sub>r</sub>.
- Pull of load capacity range between 2,100 to 4,500 lb<sub>r</sub>.
- Easily secured to table or carriage surface with four mounting bolts.
- Travel speeds up to 5 ft/s.
- System accelerations up to 160 ft/s<sup>2</sup>.
- When used with XL 60 Case LinearRace internal clearance is minimized.
- Integral double acting seals at both ends.



### XL 60 Case LinearRace Features:

- Case hardness to 60 HRC minimum.
- Surface finish is 8 Ra microinch for 2 and 3 inch diameter and 10 Ra microinch for 4 inch diameter.
- Roundness 80 millionths of an inch.
- Straightness of .0005 inch per foot (.001 TIR) cumulative.
- Available with standard radial drilled and tapped holes.
- Minimum depth of hardness is .100 inch.



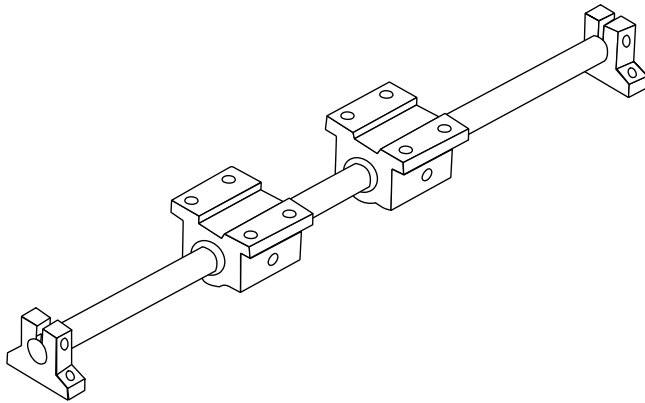
### XSR 60 Case LinearRace Support Rails Features:

- All ductile iron, heavy duty design and construction.
- Available in 2 and 3 inch diameter sizes.
- Equipped with drilled thru and counterbored base mounting holes.
- Can be pre-assembled with a 60 Case LinearRace for quick and easy installation.
- Precision ground surfaces for 60 Case LinearRace and base mounting.
- Reference edge for ease of installation.

## RoundRail Linear Guides

### End Support Linear Ball Guides

**Easy to install, smooth operation,  
self-aligning, high speed**



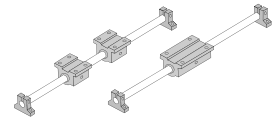
#### **End Support Linear Ball Guides Offer:**

- Increased life within the same envelope. RoundRail linear guides feature the new patented Super Smart Ball Bushing Bearings for up to 216X the life or 6X the load capacity of conventional bearings.
- Cost savings: save time and money preparing your mounting surfaces before bolting down RoundRail linear guides
- End supported for gantry style or 'bridge' applications
- The RoundRail Advantage. The inherent self-aligning-in-all-directions design of the Super Smart Ball Bushing bearing allows for ultra smooth travel when mounted to wider toleranced prepared surfaces
- The Super Smart Ball Bushing bearing... the most technologically advanced and most robust linear bearing in the world
- Corrosion resistant versions for maximum performance in harsh environments.

## RoundRail Linear Guides

# End Support 1BA

## End Supported, Industry Standard Dimension Inch



### Features

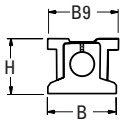
- Requires only one part number to specify entire linear guide.
- Available with 60 Case LinearRace Shaft end support blocks in either light weight aluminum or rigid iron materials
- Used to provide increased stability or torque resistance in linear system applications

### Components

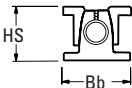
- 2 Super Smart Ball Bushing pillow blocks or 1 Super Smart Ball Bushing twin pillow block.
- 1 60 Case LinearRace shaft
- 2 shaft end support blocks

### Dimensions (Inch)

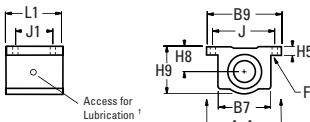
#### Type ASB End Support Block



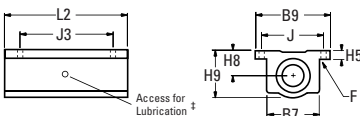
#### Type SB End Support Block



#### Type SSUPB Super Smart and SPB Super Ball Bushing Pillow Blocks



#### Type SSUTWN Super Smart and TWN Super Ball Bushing Twin Pillow Blocks

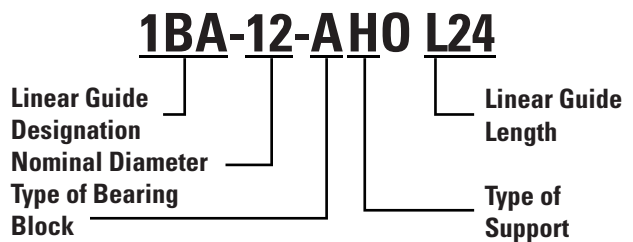


‡ Sizes .250, .375 and .500 have oil lubricant fitting. Sizes .625 and above have 1/4-28 access for lubrication.

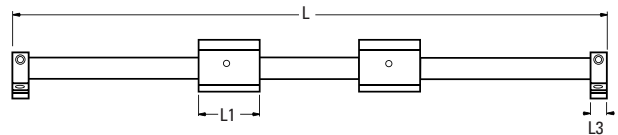
### Specifying this Thomson Linear Guide

1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

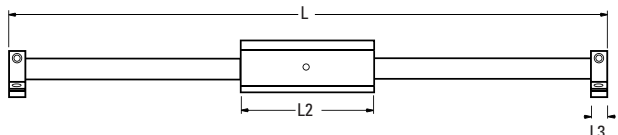
### Part Numbering System



#### Single End Supported Linear Guide with 2 Pillow Blocks

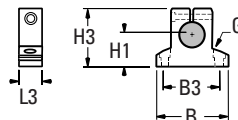


#### Single End Supported Linear Guide with 1 Twin Pillow Block



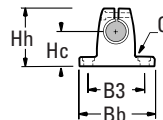
### Aluminum

#### Type ASB LinearRace Shaft End Support Block

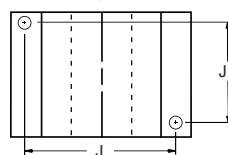


### Steel

#### Type SB LinearRace Shaft End Support Block



#### Type SPB Super Ball Bushing Pillow Block Mounting Hole Position for Sizes .250 and .375



#### View A-A

## RoundRail Linear Guides

### End Support Linear Guide 1BA with 2 Pillow Blocks (Dimensions in inches)

| Part Number                  |                             | Nominal Diameter | L1   | L3   | H     | HS    | B    | Bb   | B9   | Pillow Block | Shaft Support |          |
|------------------------------|-----------------------------|------------------|------|------|-------|-------|------|------|------|--------------|---------------|----------|
| With Type ASB Shaft Supports | With Type SB Shaft Supports |                  |      |      |       |       |      |      |      |              | Type ASB      | Type SB  |
| 1BA-04-AHO                   | –                           | .250             | 1.19 | .50  | .937  | –     | 1.50 | –    | 1.63 | SPB-4-XS     | ASB-4-XS      | –        |
| 1BA-06-AHO                   | –                           | .375             | 1.31 | .56  | 10.62 | –     | 1.63 | –    | 1.75 | SPB-6-XS     | ASB-6-XS      | –        |
| 1BA-08-AHO                   | 1BA-08-AJO                  | .500             | 1.69 | .63  | 1.562 | 1.687 | 2.00 | 2.00 | 2.00 | SSPB-8-XS    | ASB-8-XS      | SB-8-XS  |
| 1BA-12-AHO                   | 1BA-12-AJO                  | .750             | 2.06 | .75  | 2.062 | 2.187 | 2.50 | 2.75 | 2.75 | SSPB-12-XS   | ASB-12-XS     | SB-12-XS |
| 1BA-16-AHO                   | 1BA-16-AJO                  | 1.000            | 2.81 | 1.00 | 2.562 | 2.687 | 3.25 | 3.25 | 3.25 | SSPB-16-XS   | ASB-16-XS     | SB-16-XS |
| –                            | 1BA-20-AJO                  | 1.250            | 3.63 | 1.13 | –     | 3.250 | –    | –    | 4.00 | SSPB-20-XS   | –             | SB-20-XS |
| 1BA-24-AHO                   | 1BA-24-AJO                  | 1.500            | 4.00 | 1.25 | 3.750 | 3.750 | 4.75 | 4.75 | 4.75 | SSPB-24-XS   | ASB-24-XS     | SB-24-XS |

### End Support Linear Guide 1BA with 1 Twin Pillow Block (Dimensions in inches)

| Part Number                  |                             | Nominal Diameter | L2   | L3   | H     | HS    | B    | Bb   | B9   | Max Stroke Length | Pillow Block | Shaft Support |          |
|------------------------------|-----------------------------|------------------|------|------|-------|-------|------|------|------|-------------------|--------------|---------------|----------|
| With Type ASB Shaft Supports | With Type SB Shaft Supports |                  |      |      |       |       |      |      |      |                   |              | Type ASB      | Type SB  |
| 1BA-04-BHO                   | –                           | .250             | 2.50 | .50  | .937  | –     | 1.50 | –    | 1.63 | L-(3.50)          | TWN-4-XS     | ASB-4-XS      | –        |
| 1BA-06-BHO                   | –                           | .375             | 2.75 | .56  | 10.62 | –     | 1.63 | –    | 1.75 | L-(3.88)          | TWN-6-XS     | ASB-6-XS      | –        |
| 1BA-08-BHO                   | 1BA-08-BJO                  | .500             | 3.50 | .63  | 1.562 | 1.687 | 2.00 | 2.00 | 2.00 | L-(4.75)          | SSUTWN-8-XS  | ASB-8-XS      | SB-8-XS  |
| 1BA-12-BHO                   | 1BA-12-BJO                  | .750             | 4.50 | .75  | 2.062 | 2.187 | 2.50 | 2.75 | 2.75 | L-(6.00)          | SSUTWN-12-XS | ASB-12-XS     | SB-12-XS |
| 1BA-16-BHO                   | 1BA-16-BJO                  | 1.000            | 6.00 | 1.00 | 2.562 | 2.687 | 3.25 | 3.25 | 3.25 | L-(8.00)          | SSUTWN-16-XS | ASB-16-XS     | SB-16-XS |
| –                            | 1BA-20-BJO                  | 1.250            | 7.50 | 1.13 | –     | 3.250 | –    | –    | 4.00 | L-(9.75)          | SSUTWN-20-XS | –             | SB-20-XS |
| 1BA-24-BHO                   | 1BA-24-BJO                  | 1.500            | 9.00 | 1.25 | 3.750 | 3.750 | 4.75 | 4.75 | 4.75 | L-(11.50)         | SSUTWN-24-XS | ASB-24-XS     | SB-24-XS |

Shaft Deflection Note: Load limit may be below the dynamic load rating due to shaft deflection. Bearings can accommodate up to 1/2" deflection. See Engineering section (page 257) for Deflection calculations.

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb.) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (lb.) |
|-----------------------------------|---|--------------------------|--|
| 1BA-04-AHO                        | 100   | SPB-4-XS                 | 50                                       |
| 1BA-06-AHO                        | 160   | SPB-6-XS                 | 80                                       |
| 1BA-08-AHO                        | 800   | SSPB-8-XS                | 400                                      |
| 1BA-12-AHO                        | 1800  | SSPB-12-XS               | 900                                      |
| 1BA-16-AHO                        | 3000  | SSPB-16-XS               | 1500                                     |
| –                                 | 3730  | SSPB-20-XS               | 1865                                     |
| 1BA-24-AHO                        | 6160  | SSPB-24-XS               | 3080                                     |

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb.) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (lb.) |
|-----------------------------------|---|--------------------------|--|
| 1BA-04-BHO                        | 100   | TWN-4-XS                 | 100                                      |
| 1BA-06-BHO                        | 160   | TWN-6-XS                 | 160                                      |
| 1BA-08-BHO                        | 800   | SSUTWN-8-XS              | 800                                      |
| 1BA-12-BHO                        | 1800  | SSUTWN-12-XS             | 1800                                     |
| 1BA-16-BHO                        | 3000  | SSUTWN-16-XS             | 3000                                     |
| –                                 | 3730  | SSUTWN-20-XS             | 3730                                     |
| 1BA-24-BHO                        | 6160  | SSUTWN-24-XS             | 6160                                     |

† Super Ball Bushing Bearings are used in .250 and .375 inch size pillow blocks.

## Replacement Component Dimensions

### Type SPB and SSUPB Pillow Blocks (Dimensions in inches)

| Part Number | Nom. Dia. | L1   | H9   | H8    | H5  | B9   | B7   | J    | J1                 | F    |      | Wt. (lb) |
|-------------|-----------|------|------|-------|-----|------|------|------|--------------------|------|------|----------|
|             |           |      |      |       |     |      |      |      |                    | Bolt | Hole |          |
| SPB-4-XS    | .250      | 1.19 | .81  | .437  | .19 | 1.63 | 1.00 | 1.31 | .75 <sup>(2)</sup> | #6   | .16  | .10      |
| SPB-6-XS    | .375      | 1.31 | .94  | .500  | .19 | 1.75 | 1.12 | 1.44 | .88 <sup>(2)</sup> | #6   | .16  | .13      |
| SSPB-8-XS   | .500      | 1.69 | 1.25 | .687  | .25 | 2.00 | 1.38 | 1.69 | 1.00               | #6   | .16  | .20      |
| SSPB-12-XS  | .750      | 2.06 | 1.75 | .937  | .31 | 2.75 | 1.88 | 2.38 | 1.25               | #8   | .19  | .62      |
| SSPB-16-XS  | 1.000     | 2.81 | 2.19 | 1.187 | .38 | 3.25 | 2.38 | 2.88 | 1.75               | #10  | .22  | 1.24     |
| SSPB-20-XS  | 1.250     | 3.63 | 2.81 | 1.500 | .43 | 4.00 | 3.00 | 3.50 | 2.00               | #10  | .22  | 2.57     |
| SSPB-24-XS  | 1.500     | 4.00 | 3.25 | 1.750 | .50 | 4.75 | 3.50 | 4.12 | 2.50               | 1/4  | .28  | 3.94     |

Housing Material: Aluminum Alloy Black Anodized. (2) Two mounting holes as shown in view A-A for sizes .250 and .375. Top plates are sold separately. Please refer to page 243 under Accessories for P/N and dimensions.

### Type TWN and SSUTWN Pillow Blocks

| Part Number  | Nom. Dia. | L2   | J3   | Wt. (lb) |
|--------------|-----------|------|------|----------|
| TWN-4-XS     | .25       | 2.50 | 2.00 | .19      |
| TWN-6-XS     | .375      | 2.75 | 2.25 | .25      |
| SSUTWN-8-XS  | .500      | 3.50 | 2.50 | .40      |
| SSUTWN-12-XS | .750      | 4.50 | 3.50 | 1.24     |
| SSUTWN-16-XS | 1.000     | 6.00 | 4.50 | 2.48     |
| SSUTWN-20-XS | 1.250     | 7.50 | 5.50 | 5.14     |
| SSUTWN-24-XS | 1.500     | 9.00 | 6.50 | 8.08     |

Housing Material: Aluminum Alloy Black Anodized and

### Type ASB LinearRace Shaft End Support Block (Dim. in in.)

| Part Number | Nom. Dia. | L3   | H3   | H1    | B    | B3   | F    |      | Wt. (lb) |
|-------------|-----------|------|------|-------|------|------|------|------|----------|
|             |           |      |      |       |      |      | Bolt | Hole |          |
| ASB-4-XS    | .250      | .50  | .88  | .500  | 1.50 | 1.12 | #6   | .16  | .06      |
| ASB-6-XS    | .375      | .56  | 1.00 | .562  | 1.62 | 1.25 | #6   | .16  | .08      |
| ASB-8-XS    | .500      | .63  | 1.48 | .875  | 2.00 | 1.50 | #8   | .19  | .11      |
| ASB-12-XS   | .750      | .75  | 1.95 | 1.125 | 2.50 | 2.00 | #10  | .22  | .22      |
| ASB-16-XS   | 1.000     | 1.00 | 2.48 | 1.375 | 3.25 | 2.50 | 1/4  | .28  | .44      |
| ASB-24-XS   | 1.500     | 1.25 | 3.50 | 2.000 | 4.75 | 3.50 | 5/16 | .34  | 1.16     |

End Support Material: Aluminum Alloy Black Anodized

### Type SB LinearRace Shaft End Support Block (Dim. in in.)

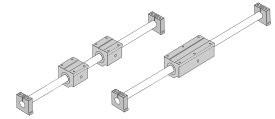
| Part Number | Nom. Dia. | L3   | Hh   | Hc    | Bb   | B3   | F    |      | Wt. (lb) |
|-------------|-----------|------|------|-------|------|------|------|------|----------|
|             |           |      |      |       |      |      | Bolt | Hole |          |
| SB-8-XS     | .500      | .63  | 1.62 | 1.000 | 2.00 | 1.50 | #8   | .16  | .3       |
| SB-12-XS    | .750      | .75  | 2.12 | 1.250 | 2.75 | 2.00 | #10  | .16  | .5       |
| SB-16-XS    | 1.000     | 1.00 | 2.56 | 1.500 | 3.25 | 2.50 | 1/4  | .19  | 1.0      |
| SB-20-XS    | 1.250     | 1.13 | 3.00 | 1.750 | 4.00 | 3.00 | 5/16 | .22  | 2.0      |
| SB-24-XS    | 1.500     | 1.25 | 3.50 | 2.000 | 4.75 | 3.50 | 5/16 | .28  | 2.6      |

Material: Iron

## RoundRail Linear Guides

# End Support 1NA

## End Supported, Industry Standard Dimension Metric



### Features

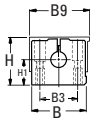
- Requires only one part number to specify entire linear guide.
- Available with 60 Case LinearRace Shaft end support blocks in either light weight aluminum or rigid iron materials
- Used to provide increased stability or torque resistance in linear system applications

### Components

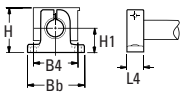
- 2 Super Smart Ball Bushing pillow blocks or 1 Super Smart Ball Bushing twin pillow block.
- 1 60 Case LinearRace shaft
- 2 shaft end support blocks

### Dimensions (Inch)

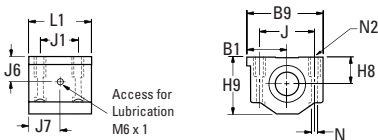
#### Type ASB End Support Block



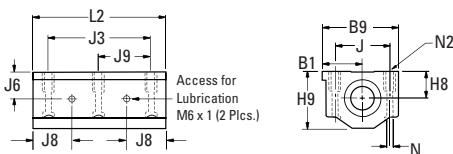
#### Type SB End Support Block



#### Type SPPB Super Plus and SSEPB Super Smart Ball Bushing Pillow Blocks



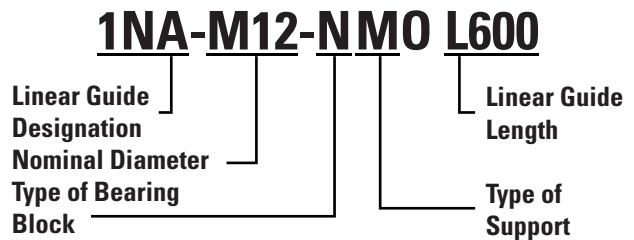
#### Type SPTWN Super Plus and SSETWN Super Smart Ball Bushing Twin Pillow Blocks



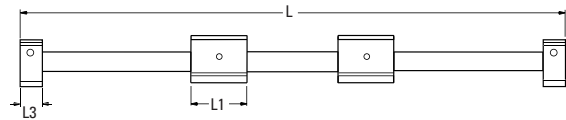
### Specifying this Thomson Linear Guide

1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

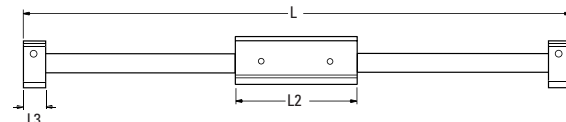
### Part Numbering System



#### Supported Linear Guide with 2 Pillow Blocks



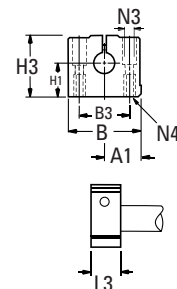
#### Supported Linear Guide with 1 Twin Pillow Block



Maximum Stroke Length is determined by subtracting pillow block length (L2) and 2x support block length (L3) or (L4) from total Linear Guide length (L).

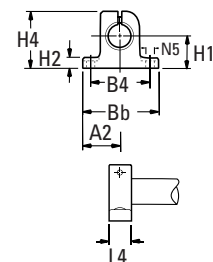
### Aluminum

Type ASB LinearRace Shaft End Support Block



### Steel

Type SB LinearRace Shaft End Support Block





## RoundRail Linear Guides

### End Support Linear Guide 1NA with 2 Pillow Blocks (Dimensions in mm)

| Part Number                  |                             | Nom. Dia. | L1 | L3 | L4 | H  | H1 | B   | Bb  | B9  | Pillow Block | Shaft Support |           |
|------------------------------|-----------------------------|-----------|----|----|----|----|----|-----|-----|-----|--------------|---------------|-----------|
| With Type ASB Shaft Supports | With Type SB Shaft Supports |           |    |    |    |    |    |     |     |     |              | Type ASB      | Type SB   |
| 1NA-M08-NMO                  | 1NA-M08-NNO                 | 8         | 32 | 18 | 10 | 30 | 15 | 32  | 32  | 35  | SPPB-M08-XS  | ASB-M08-XS    | SB-M08-XS |
| 1NA-M12-NMO                  | 1NA-M12-NNO                 | 12        | 39 | 20 | 12 | 38 | 20 | 43  | 42  | 43  | SSEPBM12-XS  | ASB-M12-XS    | SB-M12-XS |
| 1NA-M16-NMO                  | 1NA-08-NNO                  | 16        | 43 | 24 | 16 | 47 | 25 | 43  | 50  | 53  | SSEPBM16-XS  | ASB-M16-XS    | SB-M16-XS |
| 1NA-M20-NMO                  | 1NA-12-NNO                  | 20        | 54 | 30 | 20 | 55 | 30 | 60  | 60  | 60  | SSEPBM20-XS  | ASB-M20-XS    | SB-M20-XS |
| 1NA-M25-NMO                  | 1NA-16-NNO                  | 25        | 67 | 38 | 25 | 65 | 35 | 78  | 74  | 78  | SSEPBM25-XS  | ASB-M25-XS    | SB-M25-XS |
| 1NA-M30-NMO                  | 1NA-20-NNO                  | 30        | 79 | 40 | 28 | 75 | 40 | 87  | 84  | 87  | SSEPBM30-XS  | ASB-M30-XS    | SB-M30-XS |
| 1NA-M40-NMO                  | 1NA-24-NNO                  | 40        | 91 | 48 | 32 | 95 | 50 | 108 | 108 | 108 | SSEPBM40-XS  | ASB-M40-XS    | SB-M40-XS |

### End Support Linear Guide 1NA with 1 Twin Pillow Block (Dimensions in mm)

| Part Number                  |                             | Nom. Dia. | L2  | L3 | L4 | H  | H1 | B   | Bb  | B9  | Pillow Block  | Shaft Support |           |
|------------------------------|-----------------------------|-----------|-----|----|----|----|----|-----|-----|-----|---------------|---------------|-----------|
| With Type ASB Shaft Supports | With Type SB Shaft Supports |           |     |    |    |    |    |     |     |     |               | Type ASB      | Type SB   |
| 1NA-M08-PMO                  | 1NA-M08-PNO                 | 8         | 62  | 18 | 10 | 30 | 15 | 32  | 32  | 35  | SPTWN-M08-XS  | ASB-M08-XS    | SB-M08-XS |
| 1NA-M12-PMO                  | 1NA-M12-PNO                 | 12        | 76  | 20 | 12 | 38 | 20 | 43  | 42  | 43  | SSETWN-M12-XS | ASB-M12-XS    | SB-M12-XS |
| 1NA-M16-PMO                  | 1NA-08-PNO                  | 16        | 84  | 24 | 16 | 47 | 25 | 43  | 50  | 53  | SSETWN-M16-XS | ASB-M16-XS    | SB-M16-XS |
| 1NA-M20-PMO                  | 1NA-12-PNO                  | 20        | 104 | 30 | 20 | 55 | 30 | 60  | 60  | 60  | SSETWN-M20-XS | ASB-M20-XS    | SB-M20-XS |
| 1NA-M25-PMO                  | 1NA-16-PNO                  | 25        | 130 | 38 | 25 | 65 | 35 | 78  | 74  | 78  | SSETWN-M25-XS | ASB-M25-XS    | SB-M25-XS |
| 1NA-M30-PMO                  | 1NA-20-PNO                  | 30        | 152 | 40 | 28 | 75 | 40 | 87  | 84  | 87  | SSETWN-M30-XS | ASB-M30-XS    | SB-M30-XS |
| 1NA-M40-PMO                  | 1NA-24-PNO                  | 40        | 176 | 48 | 32 | 95 | 50 | 108 | 108 | 108 | SSETWN-M40-XS | ASB-M40-XS    | SB-M40-XS |

Shaft Deflection Note: Load limit may be below the dynamic load rating due to shaft deflection. Bearings can accommodate up to 1/2" deflection. See Engineering section (page 257) for Deflection calculations.

### Dynamic Load Capacity Matrix (100 km travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb.) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (lb.) |
|-----------------------------------|---|--------------------------|--|
| 1NA-M08-NMO 1NA-M08-NNO           | 100   | SPPB-M08-XS              | 50                                       |
| 1NA-M12-NMO 1NA-M12-NNO           | 160   | SSEPBM12-XS              | 80                                       |
| 1NA-M16-NMO 1NA-08-NNO            | 800   | SSEPBM16-XS              | 400                                      |
| 1NA-M20-NMO 1NA-12-NNO            | 1800  | SSEPBM20-XS              | 900                                      |
| 1NA-M25-NMO 1NA-16-NNO            | 3000  | SSEPBM25-XS              | 1500                                     |
| 1NA-M30-NMO 1NA-20-NNO            | 3730  | SSEPBM30-XS              | 1865                                     |
| 1NA-M40-NMO 1NA-24-NNO            | 6160  | SSEPBM40-XS              | 3080                                     |

### Dynamic Load Capacity Matrix (100 km travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb.) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (lb.) |
|-----------------------------------|---|--------------------------|--|
| 1NA-M08-PMO 1NA-M08-PNO           | 100   | SPTWN-M08-XS             | 100                                      |
| 1NA-M12-PMO 1NA-M12-PNO           | 160   | SSETWN-M12-XS            | 160                                      |
| 1NA-M16-PMO 1NA-08-PNO            | 800   | SSETWN-M16-XS            | 800                                      |
| 1NA-M20-PMO 1NA-12-PNO            | 1800  | SSETWN-M20-XS            | 1800                                     |
| 1NA-M25-PMO 1NA-16-PNO            | 3000  | SSETWN-M25-XS            | 3000                                     |
| 1NA-M30-PMO 1NA-20-PNO            | 3730  | SSETWN-M30-XS            | 3730                                     |
| 1NA-M40-PMO 1NA-24-PNO            | 6160  | SSETWN-M40-XS            | 6160                                     |

† Super Plus Ball Bushing Bearings are used in 8 mm size pillow blocks.

## Replacement Component Dimensions

### Type SPB and SSUPB Pillow Blocks (Dimensions in mm)

| Part Number | Nom. Dia. | L1   | H9   | H8    | H5  | B9   | B7   | J    | J1                 | F    |      | Wt. (lb) |
|-------------|-----------|------|------|-------|-----|------|------|------|--------------------|------|------|----------|
|             |           |      |      |       |     |      |      |      |                    | Bolt | Hole |          |
| SPPB-M08-XS | .250      | 1.19 | .81  | .437  | .19 | 1.63 | 1.00 | 1.31 | .75 <sup>(2)</sup> | #6   | .16  | .10      |
| SSEPBM12-XS | .375      | 1.31 | .94  | .500  | .19 | 1.75 | 1.12 | 1.44 | .88 <sup>(2)</sup> | #6   | .16  | .13      |
| SSEPBM16-XS | .500      | 1.69 | 1.25 | .687  | .25 | 2.00 | 1.38 | 1.69 | 1.00               | #6   | .16  | .20      |
| SSEPBM20-XS | .750      | 2.06 | 1.75 | .937  | .31 | 2.75 | 1.88 | 2.38 | 1.25               | #8   | .19  | .62      |
| SSEPBM25-XS | 1.000     | 2.81 | 2.19 | 1.187 | .38 | 3.25 | 2.38 | 2.88 | 1.75               | #10  | .22  | 1.24     |
| SSEPBM30-XS | 1.250     | 3.63 | 2.81 | 1.500 | .43 | 4.00 | 3.00 | 3.50 | 2.00               | #10  | .22  | 2.57     |
| SSEPBM40-XS | 1.500     | 4.00 | 3.25 | 1.750 | .50 | 4.75 | 3.50 | 4.12 | 2.50               | 1/4  | .28  | 3.94     |

Housing Material: Aluminum Alloy Grey Anodized.

Top plates are sold separately. Please refer to page 243 under Accessories.

### Type TWN and SSUTWN Pillow Blocks

| Part Number   | Nom. Dia. | L2   | J3   | Wt. (lb) |
|---------------|-----------|------|------|----------|
| SPTWN-M08-XS  | .25       | 2.50 | 2.00 | .19      |
| SSETWN-M12-XS | .375      | 2.75 | 2.25 | .25      |
| SSETWN-M16-XS | .500      | 3.50 | 2.50 | .40      |
| SSETWN-M20-XS | .750      | 4.50 | 3.50 | 1.24     |
| SSETWN-M25-XS | 1.000     | 6.00 | 4.50 | 2.48     |
| SSETWN-M30-XS | 1.250     | 7.50 | 5.50 | 5.14     |
| SSETWN-M40-XS | 1.500     | 9.00 | 6.50 | 8.08     |

Housing Material: Aluminum Alloy Black Anodized

### Type ASB LinearRace Shaft End Support Block (Dim. in mm)

| Part Number | Nom. Dia. | A1   | B   | B3 | H1 | H3 | L3 | N3 Bolt | N4  | Mass (kg) |
|-------------|-----------|------|-----|----|----|----|----|---------|-----|-----------|
| ASB-M08-XS  | 8         | 16.0 | 32  | 22 | 15 | 28 | 18 | 3.5     | M4  | 0,04      |
| ASB-M12-XS  | 12        | 21,5 | 43  | 30 | 20 | 36 | 20 | 5,3     | M6  | 0,10      |
| ASB-M16-XS  | 16        | 26,5 | 53  | 38 | 25 | 43 | 24 | 6,6     | M8  | 0,15      |
| ASB-M20-XS  | 20        | 30,0 | 60  | 42 | 30 | 51 | 30 | 8,4     | M10 | 0,23      |
| ASB-M25-XS  | 25        | 39,0 | 78  | 56 | 35 | 61 | 38 | 10,5    | M12 | 0,41      |
| ASB-M30-XS  | 30        | 43,5 | 87  | 64 | 40 | 71 | 40 | 10,5    | M12 | 0,53      |
| ASB-M40-XS  | 40        | 54,0 | 108 | 82 | 50 | 88 | 48 | 13,5    | M16 | 0,99      |

End Support Material: Aluminum Alloy Grey Anodized

### Type SB LinearRace Shaft End Support Block (Dim. in mm)

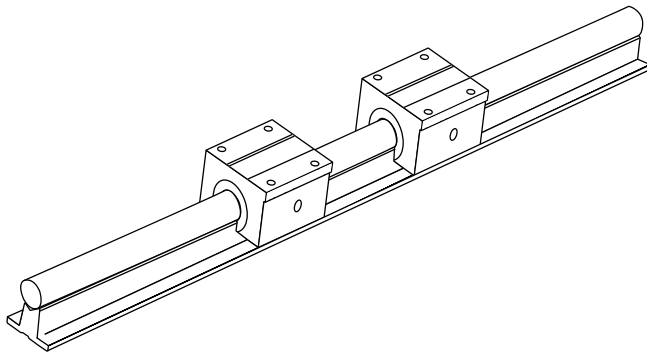
| Part Number | Nom. Dia. | A2 | B4 | Bb  | H1 | H2   | H4 | L4 | N5 Dia. | Mass (kg) |
|-------------|-----------|----|----|-----|----|------|----|----|---------|-----------|
| SB-M08-XS   | 8         | 16 | 25 | 32  | 15 | 5,2  | 27 | 10 | 4,5     | 0,03      |
| SB-M12-XS   | 12        | 21 | 32 | 42  | 20 | 5,5  | 35 | 12 | 5,5     | 0,06      |
| SB-M16-XS   | 16        | 25 | 40 | 50  | 25 | 6,5  | 42 | 16 | 5,5     | 0,11      |
| SB-M20-XS   | 20        | 30 | 45 | 60  | 30 | 8,0  | 50 | 20 | 5,5     | 0,21      |
| SB-M25-XS   | 25        | 37 | 60 | 74  | 35 | 9,0  | 58 | 25 | 6,6     | 0,35      |
| SB-M30-XS   | 30        | 42 | 68 | 84  | 40 | 10,0 | 68 | 28 | 9,0     | 0,52      |
| SB-M40-XS   | 40        | 54 | 86 | 108 | 50 | 12,0 | 86 | 32 | 11,0    | 0,92      |

End Support Material: Iron

## RoundRail Linear Guides

# Continuous Support Linear Ball Guides

**High speed, smooth operation,  
easy to install**



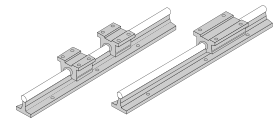
### **Continuous Support Linear Ball Guides Offer:**

- Increased life within the same envelope. RoundRail linear guides feature the new patented Super Smart Ball Bushing Bearings for up to 216X the life or 6X the load capacity of conventional bearings.
- Cost savings: save time and money preparing your mounting surfaces before bolting down RoundRail linear guides
- Superior performance. Continuously supported for maximum (down- & side-) load applications without concerns for shaft deflection
- The RoundRail Advantage. The inherent self-aligning-in-all-directions design of the Super Smart Ball Bushing bearing allows for ultra smooth travel when mounted to wider toleranced prepared surfaces
- Unlimited travel lengths without concerns for machined reference edges or butt joint alignment
- The Super Smart Ball Bushing bearing... the most technologically advanced and most robust linear bearing in the world

RoundRail Linear Guides

# Continuous Support 1CA

Fully Supported, Highest Performance, Industry Standard Dimension Inch



**Features**

- Requires only one part number to specify the entire linear guide
- Used as a load support, transport, and guidance solution
- Used in continuously supported applications when rigidity is required

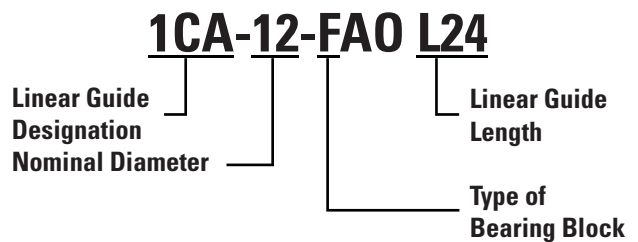
**Components**

- 2 Super Smart Ball Bushing open type pillow blocks or 1 Super Smart Ball Bushing open twin pillow blocks
- 1 60 Case LinearRace shaft support rail assembly

**Specifying this Thomson Linear Guide**

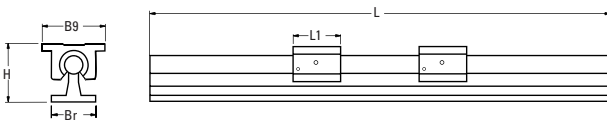
1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

**Part Numbering System**

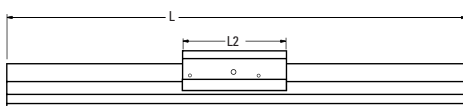


**Dimensions (Inch)**

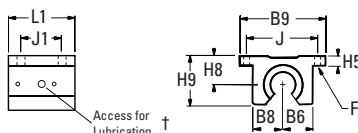
Single Continuously Supported Linear Guide with 2 Pillow Blocks



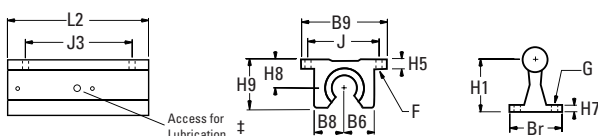
Single Continuously Supported Linear Guide with 1 Twin Pillow Block



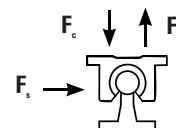
Type SSUPBO Open Type Super Smart and SPB-OPN Open Type Ball Bushing Pillow Blocks



Type SSUTWN Open Type Super Smart and TWN-OPN Open Type Ball Bushing Twin Pillow Blocks



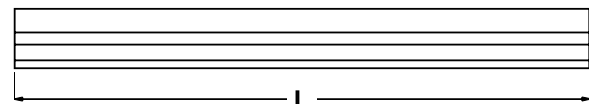
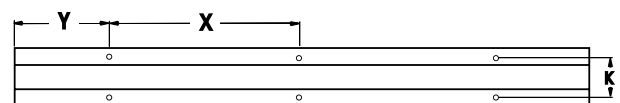
**Load Rating and Limit by Direction**



|       | Dynamic Load Rating | Load Limit |
|-------|---------------------|------------|
| $F_c$ | C                   | C          |
| $F_t$ | 0.5C                | 0.5C       |
| $F_s$ | C                   | 0.5C       |

Dynamic Load Rating: Load value used in life calculation.  
Load Limit: Maximum allowable load applied to bearing.

**Type SRA LinearRace Shaft Support Rail Assembly**



† Size .500 inch has oil lubricant fitting.  
Sizes .625 and above have 1/4-28 access for lubrication.

## RoundRail Linear Guides

### Continuously Supported Linear Guide 1CA Single with 2 Pillow Blocks (Dimensions in inches)

| Part Number | Nominal Diameter | L1   | H     | Br   | B9   | Pillow Block | Shaft Support Rail Assembly |
|-------------|------------------|------|-------|------|------|--------------|-----------------------------|
| 1CA-08-FHO  | .500             | 1.50 | 1.812 | 1.50 | 2.00 | SPB-8-OPN-XS | SRA-8-XS                    |
| 1CA-12-FHO  | .750             | 1.88 | 2.437 | 1.75 | 2.75 | SSUPBO-12-XS | SRA-12-XS                   |
| 1CA-16-FHO  | 1.000            | 2.63 | 2.937 | 2.13 | 3.25 | SSUPBO-16-XS | SRA-16-XS                   |
| 1CA-20-FHO  | 1.250            | 3.38 | 3.625 | 2.50 | 4.00 | SSUPBO-20-XS | SRA-20-XS                   |
| 1CA-24-FHO  | 1.500            | 3.75 | 4.250 | 3.00 | 4.75 | SSUPBO-24-XS | SRA-24-XS                   |

### Continuously Supported Linear Guide 1CA Single with 1 Twin Pillow Block (Dimensions in inches)

| Part Number | Nominal Diameter | L2  | H     | Br   | B9   | Maximum Stroke Length | Pillow Block  | Shaft Support Rail Assembly |
|-------------|------------------|-----|-------|------|------|-----------------------|---------------|-----------------------------|
| 1CA-08-HAO  | .50              | 3.5 | 1.812 | 1.50 | 2.00 | L-(3.5)               | TWN-8-OPN-XS  | SRA-8-XS                    |
| 1CA-12-HAO  | .75              | 4.5 | 2.437 | 1.75 | 2.75 | L-(4.5)               | SSUTWNO-12-XS | SRA-12-XS                   |
| 1CA-16-HAO  | 1.00             | 6.0 | 2.937 | 2.13 | 3.25 | L-(6.0)               | SSUTWNO-16-XS | SRA-16-XS                   |
| 1CA-20-HAO  | 1.25             | 7.5 | 3.625 | 2.50 | 4.00 | L-(7.5)               | SSUTWNO-20-XS | SRA-20-XS                   |
| 1CA-24-HAO  | 1.50             | 9.0 | 4.250 | 3.00 | 4.75 | L-(9.0)               | SSUTWNO-24-XS | SRA-24-XS                   |

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb.) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (lb.) |
|-----------------------------------|---|--------------------------|--|
| 1CA-08-FHO                        | 290   | SPB-8-OPN-XS             | 400                                      |
| 1CA-12-FHO                        | 1800  | SSUPBO-12-XS             | 900                                      |
| 1CA-16-FHO                        | 3000  | SSUPBO-16-XS             | 1500                                     |
| 1CA-20-FHO                        | 3730  | SSUPBO-20-XS             | 1865                                     |
| 1CA-24-FHO                        | 6160  | SSUPBO-24-XS             | 3080                                     |

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb.) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (lb.) |
|-----------------------------------|---|--------------------------|--|
| 1CA-08-HAO                        | 290   | TWN-8-OPN-XS             | 800                                      |
| 1CA-12-HAO                        | 1800  | SSUTWNO-12-XS            | 1800                                     |
| 1CA-16-HAO                        | 3000  | SSUTWNO-16-XS            | 3000                                     |
| 1CA-20-HAO                        | 3730  | SSUTWNO-20-XS            | 3730                                     |
| 1CA-24-HAO                        | 6160  | SSUTWNO-24-XS            | 6160                                     |

† Super Ball Bushing Bearings are used in .500 inch size pillow blocks.

## Replacement Component Dimensions

### Type SPB-OPN and SSUPBO Pillow Blocks (Dimensions in inches)

| Part Number  | Nom. Dia. | L1   | H9   | H8    | H5  | B9   | B8   | B6   | J    | J1   | F    |      | Wt. (lb) |
|--------------|-----------|------|------|-------|-----|------|------|------|------|------|------|------|----------|
|              |           |      |      |       |     |      |      |      |      |      | Bolt | Hole |          |
| SPB-8-OPN-XS | .500      | 1.69 | 1.25 | .687  | .25 | 2.00 | .75  | .69  | 1.69 | 1.00 | #6   | .16  | .20      |
| SSUPBO-12-XS | .750      | 2.06 | 1.75 | .937  | .31 | 2.75 | 1.00 | .94  | 2.38 | 1.25 | #8   | .19  | .62      |
| SSUPBO-16-XS | 1.000     | 2.81 | 2.19 | 1.187 | .38 | 3.25 | 1.25 | 1.19 | 2.88 | 1.75 | #10  | .22  | 1.24     |
| SSUPBO-20-XS | 1.250     | 3.63 | 2.81 | 1.500 | .43 | 4.00 | 1.63 | 1.50 | 3.50 | 2.00 | #10  | .22  | 2.57     |
| SSUPBO-24-XS | 1.500     | 4.00 | 3.25 | 1.750 | .50 | 4.75 | 1.88 | 1.75 | 4.12 | 2.50 | 1/4  | .28  | 3.94     |

Top plates are sold separately. Please refer to page 243 under Accessories for P/N and dimensions.

### Type TWN-OPN and SSUTWNO

### Pillow Blocks (Dimensions in inches)

| Part Number   | Nom. Dia. | L2   | J3   | Wt. (lb) |
|---------------|-----------|------|------|----------|
| TWN-8-OPN-XS  | .500      | 3.50 | 2.50 | .40      |
| SSUTWNO-12-XS | .750      | 4.50 | 3.50 | 1.24     |
| SSUTWNO-16-XS | 1.000     | 6.00 | 4.50 | 2.48     |
| SSUTWNO-20-XS | 1.250     | 7.50 | 5.50 | 5.14     |
| SSUTWNO-24-XS | 1.500     | 9.00 | 6.50 | 8.08     |

Housing Material: Aluminum Alloy Black Anodized

### Type SRA LinearRace Shaft Support Rail Assembly (Dimensions in inches)

| Part Number | Nom. Dia. | H1    | H7  | Br   | K    | X | Y | G    |      | Wt. (lb/ft) |
|-------------|-----------|-------|-----|------|------|---|---|------|------|-------------|
|             |           |       |     |      |      |   |   | Bolt | Hole |             |
| SRA-8-XS    | .500      | 1.125 | .19 | 1.50 | 1.00 | 4 | 2 | #8   | .17  | 1.26        |
| SRA-12-XS   | .750      | 1.500 | .25 | 1.75 | 1.25 | 6 | 3 | #10  | .22  | 2.50        |
| SRA-16-XS   | 1.000     | 1.750 | .25 | 2.13 | 1.50 | 6 | 3 | 1/4  | .28  | 4.06        |
| SRA-20-XS   | 1.250     | 2.125 | .31 | 2.50 | 1.88 | 6 | 3 | 5/16 | .34  | 6.30        |
| SRA-24-XS   | 1.500     | 2.500 | .38 | 3.00 | 2.25 | 8 | 4 | 5/16 | .34  | 8.60        |

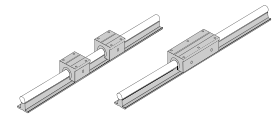
LinearRace Shaft Support Rail Material: Aluminum Alloy Black Anodized

Support rails are supplied in 24 inch lengths unless quoted otherwise. Maximum length of LinearRace Shaft Support Rail is 72 inches. If longer continuous one-piece LinearRace Shaft Support Rails are required, contact the Thomson Linear Guides Application Engineering department.

RoundRail Linear Guides

# Continuous Support 1PA

Fully Supported, Highest Performance, Industry Standard Dimension Metric



**Features**

- Requires only one part number to specify the entire linear guide
- Used as a load support, transport, and guidance solution
- Used in continuously supported applications when rigidity is required

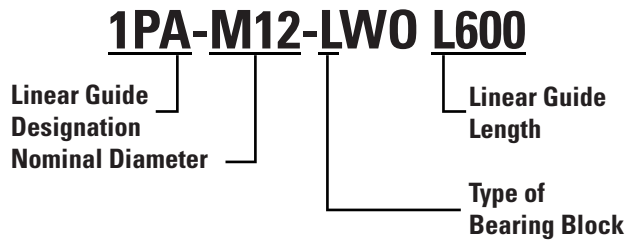
**Components**

- 2 Super Smart Ball Bushing open type pillow blocks or 1 Super Smart Ball Bushing open twin pillow blocks
- 1 60 Case LinearRace shaft support rail assembly

**Specifying this Thomson Linear Guide**

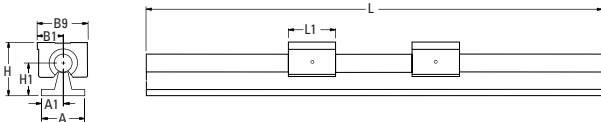
1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

**Part Numbering System**

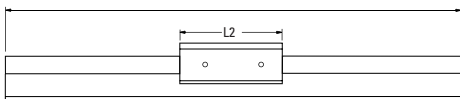


**Dimensions (Inch)**

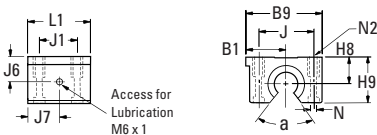
Single Continuously Supported Linear Guide with 2 Pillow Blocks



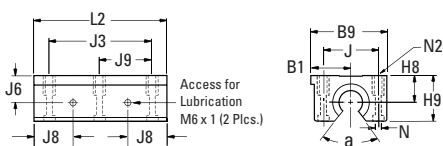
Single Continuously Supported Linear Guide with 1 Twin Pillow Block



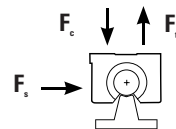
Type SSEPBO Open Type Super Smart Ball Bushing Pillow Blocks



Type SSETWNO Open Type Super Smart Ball Bushing Twin Pillow Blocks



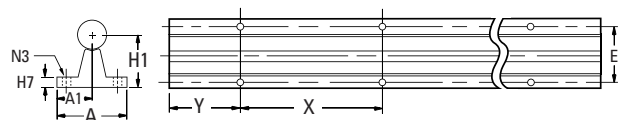
**Load Rating and Limit by Direction**



|       | Dynamic Load Rating | Load Limit |
|-------|---------------------|------------|
| $F_c$ | C                   | C          |
| $F_t$ | 0.5C                | 0.5C       |
| $F_s$ | C                   | 0.5C       |

Dynamic Load Rating: Load value used in life calculation.  
Load Limit: Maximum allowable load applied to bearing.

**Type SRA LinearRace Shaft Support Rail Assembly**



## RoundRail Linear Guides

### Continuously Supported Linear Guide 1PA Single with 2 Pillow Blocks (Dimensions in inches)

| Part Number | Nominal Diameter | L1 | H   | H1 | A  | A1   | B1   | B9  | Pillow Block              | Shaft Support Rail Assembly |
|-------------|------------------|----|-----|----|----|------|------|-----|---------------------------|-----------------------------|
| 1PA-M12-LWO | 12               | 39 | 46  | 28 | 43 | 21,5 | 21,5 | 43  | SPPBO-M12-XS <sup>†</sup> | SRA-M12-XS                  |
| 1PA-M16-LWO | 16               | 43 | 52  | 30 | 48 | 24,0 | 26,5 | 53  | SSEPBO-M16-XS             | SRA-M16-XS                  |
| 1PA-M20-LWO | 20               | 54 | 63  | 38 | 56 | 28,0 | 30,0 | 60  | SSEPBO-M20-XS             | SRA-M20-XS                  |
| 1PA-M25-LWO | 25               | 67 | 72  | 42 | 60 | 30,0 | 39,0 | 78  | SSEPBO-M25-XS             | SRA-M25-XS                  |
| 1PA-M30-LWO | 30               | 79 | 88  | 53 | 74 | 37,0 | 43,5 | 87  | SSEPBO-M30-XS             | SRA-M30-XS                  |
| 1PA-M40-LWO | 40               | 91 | 105 | 60 | 78 | 39,0 | 54,0 | 108 | SSEPBO-M40-XS             | SRA-M40-XS                  |

### Continuously Supported Linear Guide 1PA Single with 1 Twin Pillow Block (Dimensions in inches)

| Part Number | Nominal Diameter | L2  | H   | H1 | A  | A1   | B1   | B9  | Maximum Stroke Length | Pillow Block               | Shaft Support Rail Assembly |
|-------------|------------------|-----|-----|----|----|------|------|-----|-----------------------|----------------------------|-----------------------------|
| 1PA-M12-MWO | 12               | 76  | 46  | 28 | 43 | 21,5 | 21,5 | 43  | L-(76)                | SPTWNO-M12-XS <sup>†</sup> | SRA-M12-XS                  |
| 1PA-M16-MWO | 16               | 84  | 52  | 30 | 48 | 24,0 | 26,5 | 53  | L-(84)                | SSETWNO-M16-XS             | SRA-M16-XS                  |
| 1PA-M20-MWO | 20               | 104 | 63  | 38 | 56 | 28,0 | 30,0 | 60  | L-(104)               | SSETWNO-M20-XS             | SRA-M20-XS                  |
| 1PA-M25-MWO | 25               | 130 | 72  | 42 | 60 | 30,0 | 39,0 | 78  | L-(130)               | SSETWNO-M25-XS             | SRA-M25-XS                  |
| 1PA-M30-MWO | 30               | 152 | 88  | 53 | 74 | 37,0 | 43,5 | 87  | L-(152)               | SSETWNO-M30-XS             | SRA-M30-XS                  |
| 1PA-M40-MWO | 40               | 176 | 105 | 60 | 78 | 39,0 | 54,0 | 108 | L-(176)               | SSETWNO-M40-XS             | SRA-M40-XS                  |

### Dynamic Load Capacity Matrix (100 km travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (N) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (N) |
|-----------------------------------|---|--------------------------|--|
| 1PA-M12-LWO                       | 1500  | SPPBO-M12-XS             | 750                                    |
| 1PA-M16-LWO                       | 4400  | SSEPBO-M16-XS            | 2200                                   |
| 1PA-M20-LWO                       | 8000  | SSEPBO-M20-XS            | 4000                                   |
| 1PA-M25-LWO                       | 13400   | SSEPBO-M25-XS            | 6700                                   |
| 1PA-M30-LWO                       | 16600   | SSEPBO-M30-XS            | 8300                                   |
| 1PA-M40-LWO                       | 27400   | SSEPBO-M40-XS            | 13700                                  |

### Dynamic Load Capacity Matrix (100 km travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (N) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (N) |
|-----------------------------------|---|--------------------------|--|
| 1PA-M12-MWO                       | 1220  | SPTWNO-M12-XS            | 1500                                   |
| 1PA-M16-MWO                       | 4400  | SSETWNO-M16-XS           | 4400                                   |
| 1PA-M20-MWO                       | 8000  | SSETWNO-M20-XS           | 8000                                   |
| 1PA-M25-MWO                       | 13400   | SSETWNO-M25-XS           | 13400                                  |
| 1PA-M30-MWO                       | 16600   | SSETWNO-M30-XS           | 16600                                  |
| 1PA-M40-MWO                       | 27400   | SSETWNO-M40-XS           | 27400                                  |

† Super Plus Ball Bushing Bearings are used in 12 mm size pillow blocks.

## Replacement Component Dimensions

### Type SSEPBO Pillow Blocks (Dimensions in inches)

| Part Number   | Nom. Dia. | L1 | H8 | H9 | B1  | B9  | J6   | J7   | J  | J1 | N Dia. | N2  | a Deg. | Mass (kg) |
|---------------|-----------|----|----|----|-----|-----|------|------|----|----|--------|-----|--------|-----------|
| SPPBO-M12-XS  | 12        | 39 | 18 | 28 | 215 | 43  | 16,7 | 19,5 | 32 | 23 | 43     | M5  | 66     | 0,11      |
| SSEPBO-M16-XS | 16        | 43 | 22 | 35 | 265 | 53  | 22,0 | 21,5 | 40 | 26 | 53     | M6  | 66     | 0,17      |
| SSEPBO-M20-XS | 20        | 54 | 25 | 41 | 300 | 60  | 25,0 | 27,0 | 45 | 32 | 66     | M8  | 60     | 0,30      |
| SSEPBO-M25-XS | 25        | 67 | 30 | 50 | 390 | 78  | 31,5 | 33,5 | 46 | 40 | 84     | M10 | 60     | 0,57      |
| SSEPBO-M30-XS | 30        | 79 | 35 | 60 | 435 | 87  | 33,0 | 39,5 | 68 | 45 | 84     | M10 | 60     | 0,87      |
| SSEPBO-M40-XS | 40        | 91 | 45 | 77 | 540 | 108 | 43,5 | 45,5 | 86 | 58 | 105    | M12 | 60     | 1,62      |

Housing Material: Aluminum Alloy Grey Anodized.

Top plates are sold separately. Please refer to page 243 under Accessories for P/N and dimensions.

### Type SSETWNO Pillow Blocks (Dim. in in.)

| Part Number    | Nom. Dia. | L2  | J3  | J8   | J9 | Mass (kg) |
|----------------|-----------|-----|-----|------|----|-----------|
| SPTWNO-M12-XS  | 12        | 76  | 56  | 19,5 | 28 | 0,22      |
| SSETWNO-M16-XS | 16        | 84  | 64  | 21,5 | 32 | 0,34      |
| SSETWNO-M20-XS | 20        | 104 | 76  | 27,0 | 38 | 0,63      |
| SSETWNO-M25-XS | 25        | 130 | 94  | 33,6 | 47 | 1,18      |
| SSETWNO-M30-XS | 30        | 152 | 106 | 39,5 | 53 | 1,70      |
| SSETWNO-M40-XS | 40        | 176 | 124 | 45,5 | 62 | 3,18      |

Housing Material: Aluminum Alloy Grey Anodized

### Type SRA LinearRace Shaft Support Rail Assembly (Dimensions in inches)

| Part Number | Nom. Dia. | H1 | H7 | A  | A1   | E  | X   | Y   | N3 Dia. | Mass (kg/m) |
|-------------|-----------|----|----|----|------|----|-----|-----|---------|-------------|
| SRA-M12-XS  | 12        | 28 | 5  | 43 | 21,5 | 29 | 75  | 375 | 4,5     | 4,1         |
| SRA-M16-XS  | 16        | 30 | 5  | 48 | 24,0 | 33 | 100 | 50  | 5,5     | 6,2         |
| SRA-M20-XS  | 20        | 38 | 6  | 56 | 28,0 | 37 | 100 | 50  | 6,6     | 9,5         |
| SRA-M25-XS  | 25        | 42 | 6  | 60 | 30,0 | 42 | 120 | 60  | 6,6     | 13,7        |
| SRA-M30-XS  | 30        | 53 | 8  | 74 | 37,0 | 51 | 150 | 75  | 8,6     | 20,0        |
| SRA-M40-XS  | 40        | 60 | 8  | 78 | 39,0 | 55 | 200 | 100 | 8,6     | 32,5        |

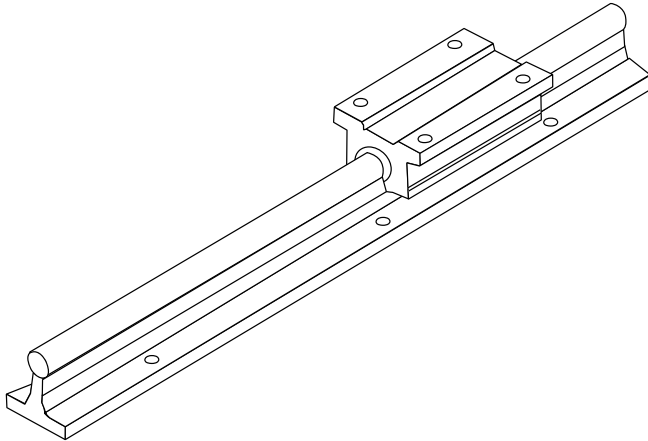
LinearRace Shaft Support Rail Material: Aluminum Alloy Grey Anodized

Support rails are supplied in 600mm lengths unless quoted otherwise. Maximum length of LinearRace Shaft Support Rail is 600mm. If longer continuous one-piece LinearRace Shaft Support Rails are required, contact the Thomson Linear Guides Application Engineering department.

## RoundRail Linear Guides

# FluoroNyliner Linear Guides

**Corrosion resistant, smooth, quiet,  
industry standard envelope**



### FluoroNyliner Linear Guides Offer:

- Thomson's new FluoroNyliner Bushing Bearings that are made from the most advanced polymer components to achieve maximum performance levels
- Contamination resistance. The FluoroNyliner Linear Guides are practically immune to adverse environments, such as water wash-down conditions and magnetic interference
- Self-Aligning Pillow Blocks for ease of use
- Increased bearing load capacities (or 'PV' ratings) and obtainable travel life, when used with Thomson stainless steel, 60 Case Linear Race shaft, when compared to competitive assemblies.
- Specification conformance with FDA and non-lubricated applications
- Use in linear and rotary motion applications
- Operates in temperatures from -400 °F (-240 °C) to 550 °F (270 °C)

## RoundRail Linear Guides

# FluoroNyliner 1VA Corrosive/Contaminated Environments Inch

### Features

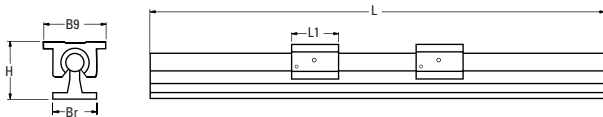
- Requires only one part number to specify the entire linear guide
- Used as a load support, transport, and guidance solution
- Used in continuously supported applications when rigidity is required

### Components

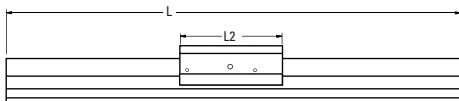
- 2 self-aligning FluoroNyliner Bushing bearing open pillow blocks or
- 1 self-aligning FluoroNyliner Bushing bearing open twin pillow block
- 1 stainless steel 60 Case LinearRace shaft support rail assembly

### Dimensions (Inch)

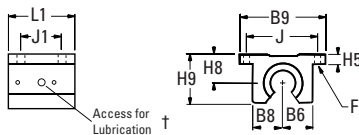
#### Single Continuously Supported Linear Guide with 2 Pillow Blocks



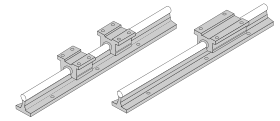
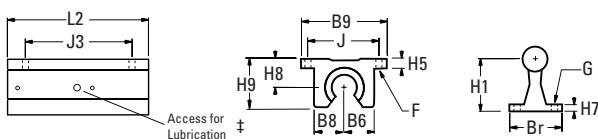
#### Single Continuously Supported System with 1 Twin Pillow Block



#### FluoroNyliner Linear Guide Pillow Block Dimensions



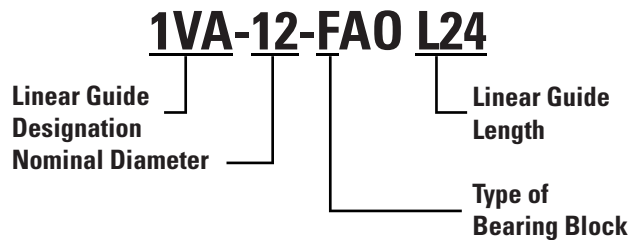
#### FluoroNyliner Linear Guide Twin Pillow Block Dimensions



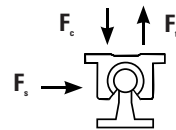
### Specifying this Thomson Linear Guide

1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

### Part Numbering System



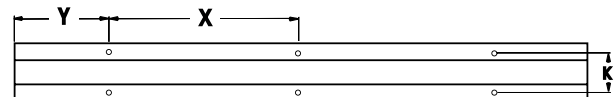
### Load Rating and Limit by Direction



|       | Dynamic Load Rating | Load Limit |
|-------|---------------------|------------|
| $F_c$ | C                   | C          |
| $F_t$ | 0.5C                | 0.5C       |
| $F_s$ | C                   | 0.5C       |

Dynamic Load Rating: PV value used in life calculation.  
Load Limit: Maximum allowable PV applied to bearing.

### Type SRA LinearRace Shaft Support Rail Assembly





## RoundRail Linear Guides

### FluoroNyliner Linear Guide 1VA Single Continuously Supported with 2 Pillow Blocks (Dimensions in inches)

| Part Number | Nominal Diameter | L1   | H     | Br   | B9   | Pillow Block   | Shaft Support Rail Assembly |
|-------------|------------------|------|-------|------|------|----------------|-----------------------------|
| 1VA-08-FAO  | .500             | 1.50 | 1.812 | 1.50 | 2.00 | FNYBUPB008A-XS | SRA-8-XS-SS                 |
| 1VA-12-FAO  | .750             | 1.88 | 2.437 | 1.75 | 2.75 | FNYBUPB012A-XS | SRA-12-XS-SS                |
| 1VA-16-FAO  | 1.000            | 2.63 | 2.937 | 2.13 | 3.25 | FNYBUPB016A-XS | SRA-16-XS-SS                |
| 1VA-20-FAO  | 1.250            | 3.38 | 3.625 | 2.50 | 4.00 | FNYBUPB020A-XS | SRA-20-XS-SS                |
| 1VA-24-FAO  | 1.500            | 3.75 | 4.250 | 3.00 | 4.75 | FNYBUPB024A-XS | SRA-24-XS-SS                |

### FluoroNyliner Linear Guide 1VA Single Continuously Supported with 1 Twin Pillow Block (Dimensions in inches)

| Part Number | Nominal Diameter | L2  | H     | Br   | B9   | Maximum Stroke Length | Pillow Block    | Shaft Support Rail Assembly |
|-------------|------------------|-----|-------|------|------|-----------------------|-----------------|-----------------------------|
| 1VA-08-HAO  | .50              | 3.5 | 1.812 | 1.50 | 2.00 | L-(3.5)               | FNYBUTWNO08A-XS | SRA-8-XS-SS                 |
| 1VA-12-HAO  | .75              | 4.5 | 2.437 | 1.75 | 2.75 | L-(4.5)               | FNYBUTWNO12A-XS | SRA-12-XS-SS                |
| 1VA-16-HAO  | 1.00             | 6.0 | 2.937 | 2.13 | 3.25 | L-(6.0)               | FNYBUTWNO16A-XS | SRA-16-XS-SS                |
| 1VA-20-HAO  | 1.25             | 7.5 | 3.625 | 2.50 | 4.00 | L-(7.5)               | FNYBUTWNO20A-XS | SRA-20-XS-SS                |
| 1VA-24-HAO  | 1.50             | 9.0 | 4.250 | 3.00 | 4.75 | L-(9.0)               | FNYBUTWNO24A-XS | SRA-24-XS-SS                |

### Maximum Operating Parameters per Bearing

| Characteristic           | Limit                                 |
|--------------------------|---------------------------------------|
| Linear Temperature Range | -240° C to 288° C (-400° F to 550° F) |
| Velocity, dry            | 42.7 m/min. Continuous                |
| Velocity, dry            | 122 m/min. Intermittent               |
| Velocity, lubricated     | 122 m/min. Continuous                 |
| Pressure                 | 10.35 MPa                             |
| PV                       | 21 MPa/m/min                          |

## Replacement Component Dimensions

### Self-Aligning Pillow Blocks (Dimensions in inches)

| Part Number    | Nom. Dia. | L1   | H9   | H8    | H5  | B9   | B8   | B7   | J    | J1   | F    |      | Wt. (lb) |
|----------------|-----------|------|------|-------|-----|------|------|------|------|------|------|------|----------|
|                |           |      |      |       |     |      |      |      |      |      | Bolt | Hole |          |
| FNYBUPB008A-XS | .500      | 1.69 | 1.25 | .687  | .25 | 2.00 | .75  | .69  | 1.69 | 1.00 | #6   | .16  | .20      |
| FNYBUPB012A-XS | .750      | 2.06 | 1.75 | .937  | .31 | 2.75 | 1.00 | .94  | 2.38 | 1.25 | #8   | .19  | .51      |
| FNYBUPB016A-XS | 1.000     | 2.81 | 2.19 | 1.187 | .38 | 3.25 | 1.25 | 1.19 | 2.88 | 1.75 | #10  | .22  | 1.03     |
| FNYBUPB020A-XS | 1.250     | 3.63 | 2.81 | 1.500 | .43 | 4.00 | 1.63 | 1.50 | 3.50 | 2.00 | #10  | .22  | 2.15     |
| FNYBUPB024A-XS | 1.500     | 4.00 | 3.25 | 1.750 | .50 | 4.75 | 1.88 | 1.75 | 4.12 | 2.50 | 1/4  | .28  | 3.29     |

Housing Material: Aluminum Alloy Black Anodized

### Self-Aligning Pillow Blocks (Dim. in in.)

| Part Number     | Nom. Dia. | L2   | J3   | Wt. (lb) |
|-----------------|-----------|------|------|----------|
| FNYBUTWNO08A-XS | .500      | 3.50 | 2.50 | .40      |
| FNYBUTWNO12A-XS | .750      | 4.50 | 3.50 | 1.02     |
| FNYBUTWNO16A-XS | 1.000     | 6.00 | 4.50 | 2.06     |
| FNYBUTWNO20A-XS | 1.250     | 7.50 | 5.50 | 4.30     |
| FNYBUTWNO24A-XS | 1.500     | 9.00 | 6.50 | 6.88     |

Housing Material: Aluminum Alloy Black Anodized

Performance Note: For detailed explanations of FluoroNyliner Linear Guide Dynamic and Static Load Capacities, Frictional Characteristics, Wear Rates, Speeds, and Life Expectancy please contact the Thomson Linear Guides Applications Engineering department.

Product Note: FluoroNyliner linear guides are shipped free of all lubricants. It is the responsibility of the product user to determine lubricant compatibility with the FluoroNyliner bearing material.

Product Options: FluoroNyliner linear guides are available with various inner race materials and platings to accommodate different environments.

Top plates are sold separately. Please refer to page 243 under accessories for P/N and dimensions.

### Type SRA LinearRace Shaft Support Rail Assembly (Dimensions in inches)

| Part Number | Nom. Dia. | H1    | H7  | Br   | K    | X | Y | G    |      | Wt. (lb/ft) |
|-------------|-----------|-------|-----|------|------|---|---|------|------|-------------|
|             |           |       |     |      |      |   |   | Bolt | Hole |             |
| SRA-8-XS    | .500      | 1.125 | .19 | 1.50 | 1.00 | 4 | 2 | #8   | .17  | 1.26        |
| SRA-12-XS   | .750      | 1.500 | .25 | 1.75 | 1.25 | 6 | 3 | #10  | .22  | 2.50        |
| SRA-16-XS   | 1.000     | 1.750 | .25 | 2.13 | 1.50 | 6 | 3 | 1/4  | .28  | 4.06        |
| SRA-20-XS   | 1.250     | 2.125 | .31 | 2.50 | 1.88 | 6 | 3 | 5/16 | .34  | 6.30        |
| SRA-24-XS   | 1.500     | 2.500 | .38 | 3.00 | 2.25 | 8 | 4 | 5/16 | .34  | 8.60        |

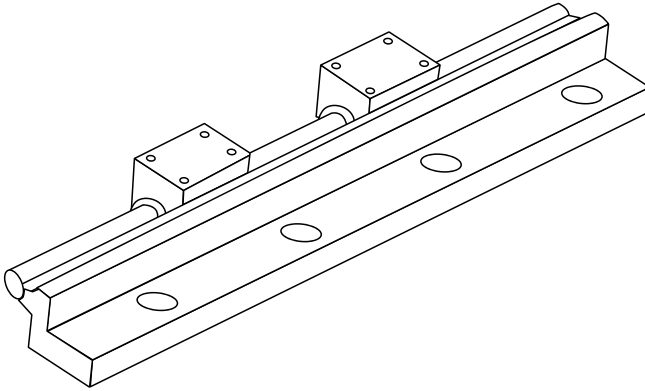
LinearRace Shaft Support Rail Material: Aluminum Alloy Black Anodized

Support rails are supplied in 24 inch lengths unless quoted otherwise. Maximum length of LinearRace Shaft Support Rail is 72 inches. If longer continuous one-piece LinearRace Shaft Support Rails are required, contact the Thomson Linear Guide Application Engineering department.

## RoundRail Linear Guides

# Side Mounted Linear Ball Guides

**Low profile, high loads in all directions,  
easy to install**



### Side Mounted Linear Ball Guides Offer:

- Increased life within the same envelope. RoundRail linear guides feature the new patented Super Smart Ball Bushing Bearings for up to 216X the life or 6X the load capacity of conventional bearings.
- Cost savings: save time and money preparing your mounting surfaces before bolting down RoundRail linear guides
- Slide mounted geometry for increased mounting flexibility
- Superior performance. Continuously supported for maximum (down- & side-) load applications without concerns for shaft deflection
- The RoundRail Advantage. The inherent self-aligning-in-all-directions design of the Super Smart Ball Bushing bearing allows for ultra smooth travel when mounted to wider toleranced prepared surfaces
- Unlimited travel lengths without concerns for machined reference edges or butt joint alignment
- The Super Smart Ball Bushing bearing... the most technologically advanced and most robust linear bearing in the world
- Corrosion resistant versions for maximum performance in harsh environments.

## RoundRail Linear Guides

# Side Mounted 1DA

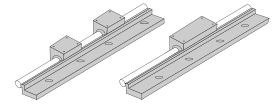
## Side Mounted for Low Profile Inch

### Features

- Continuously supported design increases rigidity and provides for unlimited linear guide travel lengths
- Versatile Side Support Rail Assembly geometry for optimizing mounting ability
- Side mounted design provides an increase in pull-off load capacity

### Components

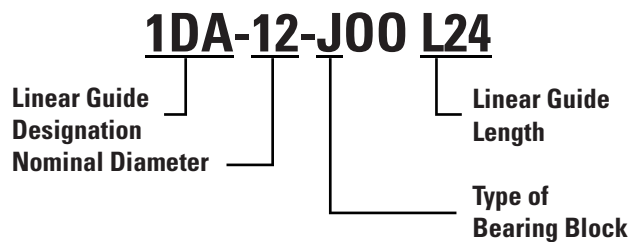
- 2 Super Smart Ball Bushing modified open type pillow blocks or 1 Super Smart Ball Bushing modified open type twin pillow block.
- 1 60 Case LinearRace shaft side mounted support rail assembly



### Specifying this Thomson Linear Guide

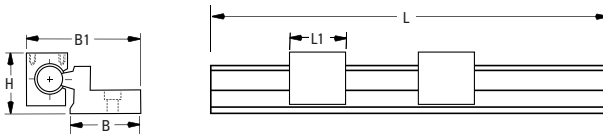
1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

### Part Numbering System

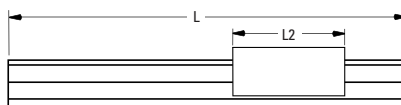


### Dimensions (Inch)

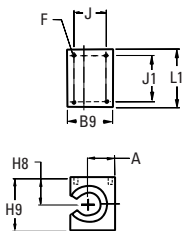
#### Single Side Mounted Linear Guide with 2 Pillow Blocks



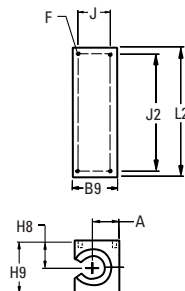
#### Single Side Mounted Linear Guide with 1 Twin Pillow Block



#### Type SSUPBO-MOD and SPB-OPN-MOD Open Type Pillow Blocks



#### Type SSUTWNO-MOD and TWN-OPN-MOD Pillow Blocks

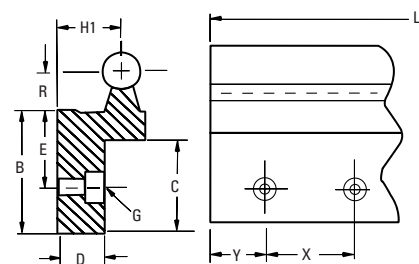


### Load Rating and Limit by Direction

|       | Dynamic Load Rating | Load Limit |
|-------|---------------------|------------|
| $F_c$ | C                   | C          |
| $F_t$ | 0.5C                | 0.5C       |
| $F_s$ | C                   | 0.5C       |

Dynamic Load Rating: Load value used in life calculation.  
Load Limit: Maximum allowable load applied to bearing.

### Type SSRA Side Mounted LinearRace Shaft Support Rail Assembly



## RoundRail Linear Guides

### Side Mounted Linear Guide 1DA Single Side Mounted with 2 Pillow Blocks (Dimensions in inches)

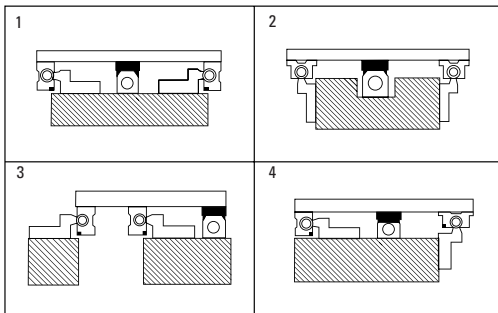
| Part Number | Nominal Diameter | H     | B    | B1   | L1   | Pillow Block  | Shaft Support Rail Assembly |
|-------------|------------------|-------|------|------|------|---------------|-----------------------------|
| 1DA-08-J00  | .500             | 1.562 | 1.44 | 2.61 | 1.50 | SPB-8-OPN-MOD | SSRA-8                      |
| 1DA-12-J00  | .750             | 2.062 | 1.94 | 3.55 | 1.88 | SSUPBO-12-MOD | SSRA-12                     |
| 1DA-16-J00  | 1.000            | 2.562 | 2.44 | 4.49 | 2.63 | SSUPBO-16-MOD | SSRA-16                     |

### Side Mounted Linear Guide 1DA Single Side Mounted with 1 Twin Pillow Block (Dimensions in inches)

| Part Number | Nominal Diameter | H     | B    | B1   | L2  | Maximum Stroke Length | Pillow Block   | Shaft Support Rail Assembly |
|-------------|------------------|-------|------|------|-----|-----------------------|----------------|-----------------------------|
| 1DA-08-K00  | .50              | 1.562 | 1.44 | 2.61 | 3.5 | L-(3.5)               | TWN-8-OPN-MOD  | SSRA-8                      |
| 1DA-12-K00  | .75              | 2.062 | 1.94 | 3.55 | 4.5 | L-(4.5)               | SSUTWNO-12-MOD | SSRA-12                     |
| 1DA-16-K00  | 1.00             | 2.562 | 2.44 | 4.49 | 6.0 | L-(6.0)               | SSUTWNO-16-MOD | SSRA-16                     |

### Mounting Configurations

The following mounting configurations depict ideas for combining the Side Mounted Continuously Supported Linear Guides into your linear motion application. If you need further information, contact the Thomson Application Engineering Department.



Pillow blocks shown are the standard SSUPBO or SPB-OPN style. To order System 1DA with standard pillow blocks, order the Side Mounted Shaft Rail Assembly (SSRA) and the SSUPBO or SPB-OPN separately.

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (N) (Even Distribution) | Pillow Block Part Number | Pillow Block Dynamic Load Capacity (N) |
|-----------------------------------|---|--------------------------|--|
| 1DA-08-J00                        | 240   | SPB-8-OPN-MOD            | 120                                    |
| 1DA-12-J00                        | 1600  | SSUPBO-12-MOD            | 800                                    |
| 1DA-16-J00                        | 2700  | SSUPBO-16-MOD            | 1350                                   |
| 1DA-08-K00                        | 240   | TWN-8-OPN-MOD            | 240                                    |
| 1DA-12-K00                        | 1600  | SSUTWNO-12-MOD           | 1600                                   |
| 1DA-16-K00                        | 2700  | SSUTWNO-16-MOD           | 2700                                   |

† Super Ball Bushing Bearings are used in .500 inch size pillow blocks.

## Replacement Component Dimensions

### Type SPB-OPN-MOD and SSUPBO-MOD Pillow Block (Dimensions in inches)

| Part Number   | Nom. Dia. | H8    | H9   | A    | B9   | L1   | J     | J1    | F      | Wt. (lb) |
|---------------|-----------|-------|------|------|------|------|-------|-------|--------|----------|
| SPB-8-OPN-MOD | .500      | .687  | 1.44 | .67  | 1.12 | 1.50 | .812  | 1.250 | #8-32  | .18      |
| SSUPBO-12-MOD | .750      | .937  | 1.94 | .92  | 1.56 | 1.88 | 1.187 | 1.562 | #10-32 | .45      |
| SSUPBO-16-MOD | 1.000     | 1.187 | 2.44 | 1.17 | 2.00 | 2.63 | 1.438 | 2.250 | 1/4-20 | .98      |

Housing Material: Aluminum Alloy Black Anodized

Top plates are sold separately. Please refer to page 243 under accessories for P/N and dimensions.

### Type TWN-OPN-MOD and SSUTWNO-MOD Pillow Blocks (Dimensions in inches)

| Part Number    | Nom. Dia. | L2  | J2   | Wt. (lb) |
|----------------|-----------|-----|------|----------|
| TWN-8-OPN-MOD  | .500      | 3.5 | 3.00 | .39      |
| SSUTWNO-12-MOD | .750      | 4.5 | 4.00 | 1.00     |
| SSUTWNO-16-MOD | 1.000     | 6.0 | 5.25 | 2.11     |

Housing Material: Aluminum Alloy Black Anodized

### Type SSRA LinearRace Shaft Support Rail Assembly (Dimensions in inches)

| Part Number | Nom. Dia. | H1    | B    | R    | E    | D   | C    | X | Y <sup>(1)</sup> | G    |      | Wt. (lb/ft) |
|-------------|-----------|-------|------|------|------|-----|------|---|------------------|------|------|-------------|
|             |           |       |      |      |      |     |      |   |                  | Bolt | Hole |             |
| SSRA-8-XS   | .500      | .875  | 1.44 | .500 | 1.00 | .49 | 1.06 | 4 | 2                | 1/4  | .28  | 2.05        |
| SSRA-12-XS  | .750      | 1.125 | 1.94 | .688 | 1.31 | .75 | 1.44 | 6 | 3                | 5/16 | .34  | 4.00        |
| SSRA-16-XS  | 1.000     | 1.375 | 2.44 | .875 | 1.63 | .88 | 1.81 | 6 | 3                | 3/8  | .41  | 6.25        |

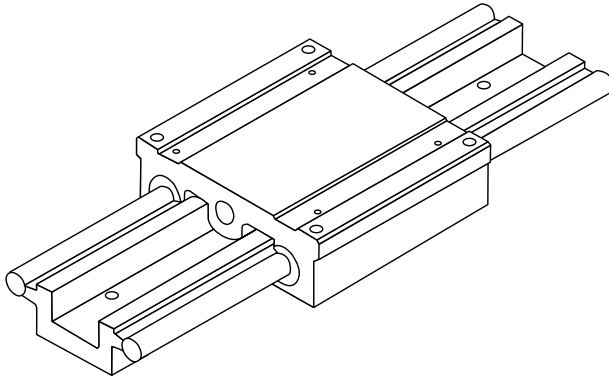
(1) For standard lengths LinearRace Shaft Support Rail Material: Aluminum Black Anodized

Support rails are supplied in 24 inch lengths unless quoted otherwise. Maximum length of LinearRace Shaft Support Rail is 72 inches. If longer continuous one-piece LinearRace Shaft Support Rails are required, contact the Thomson Linear Guides Application Engineering department.

## RoundRail Linear Guides

## Dual Shaft

**Low profile, high loads in all directions, easy to install**



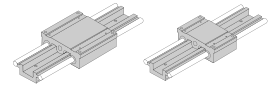
### Dual Shafts Offer:

- This performance proven Linear guide has an extremely low profile and features external rails with maximum bearing spacing. This provides the user with high pitch, yaw and roll moment capability. The load capacity is the same when mounted in the inverted position
- Corrosion resistant options are also available for demanding environmental conditions. These include chrome plated or stainless steel shafting and corrosion resistant bearings
- The inherent self aligning design of the Super Smart Ball Bushing bearings allow for more deviation in the flatness of the mounting surface. This can dramatically reduce the installed cost of the Linear Guide
- The base extrusion has a reference edge for registration in your machine. Unlimited travel lengths can be realized by combining base and shaft segments. The shafts and bases are staggered to allow keying of the subsequent stage.

## RoundRail Linear Guides

# Dual Shaft Rail 2DA

## with Integrated Carriage Unpack and Install Inch



### Features

- Used in continuously supported applications when rigidity is required
- Adaptable to any drive system
- Pre-aligned and preassembled for immediate installation and use
- Designed for medium to heavy loads

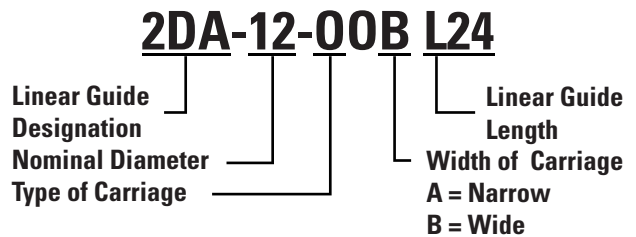
### Components

- 1 Dual LinearRace shaft rail assembly
- 1 integrated carriage with 4 open type Super Smart Ball Bushing Bearings

### Specifying this Thomson Linear Guide

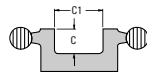
1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

### Part Numbering System

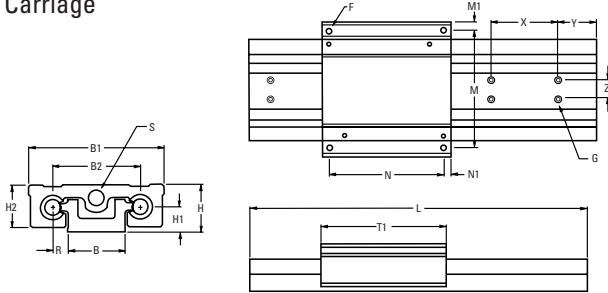


### Dimensions (Inch)

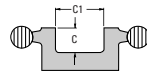
2DA XX 00B  
Rail Cross Section



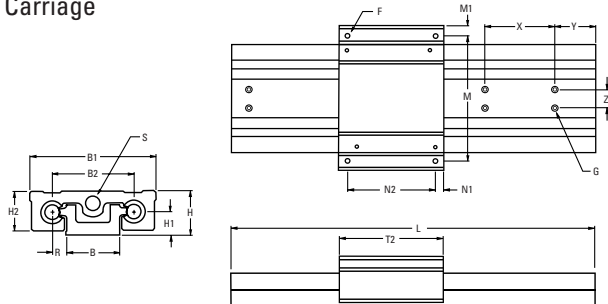
Dual Shaft Rail Linear Guide with Integrated Full Length Carriage



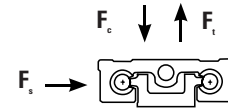
2DA XX 00A  
Rail Cross Section



Dual Shaft Rail Linear Guide with Integrated Short Length Carriage



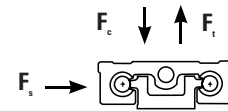
### Load Rating and Limit by Direction



|       | Dynamic Load Rating | Load Limit |
|-------|---------------------|------------|
| $F_c$ | C                   | 0.5C       |
| $F_t$ | C                   | 0.5C       |
| $F_s$ | 0.5C                | 0.5C       |

Dynamic Load Rating: load value used in life calculation.  
Load Limit: Maximum allowable load applied to bearing.

### Load Rating and Limit by Direction



|       | Dynamic Load Rating | Load Limit |
|-------|---------------------|------------|
| $F_c$ | C                   | 0.5C       |
| $F_t$ | C                   | 0.5C       |
| $F_s$ | 0.5C                | 0.5C       |

Dynamic Load Rating: load value used in life calculation.  
Load Limit: Maximum allowable load applied to bearing.

## RoundRail Linear Guides

### Dual Shaft Rail Linear Guide 2DA with Integrated Carriage (Dimensions in inches)

| Part Number | Nominal Diameter | T1  | H     | H1    | H2   | B    | R    | B1  | B2  | C   | C1    |
|-------------|------------------|-----|-------|-------|------|------|------|-----|-----|-----|-------|
| 2DA-08-00B  | .500             | 4.5 | 1.625 | .875  | 1.43 | 2.00 | .500 | 4.6 | 3.0 | .64 | 1.25  |
| 2DA-12-00B  | .750             | 6.0 | 2.125 | 1.125 | 1.93 | 2.63 | .688 | 6.1 | 4.0 | .75 | 1.662 |
| 2DA-16-00B  | 1.000            | 7.5 | 2.625 | 1.375 | 2.44 | 3.25 | .875 | 7.6 | 5.0 | .99 | 2.00  |

### Dual Shaft Rail Linear Guide 2DA with Integrated Carriage (Dimensions in inches)

| Part Number | N    | N1  | M    | M1  | X   | Y   | Z    | S<br>As Extruded | F       | G    |      | Maximum<br>Stroke Length | Carriage   | Dual Shaft Rail<br>Assembly |
|-------------|------|-----|------|-----|-----|-----|------|------------------|---------|------|------|--------------------------|------------|-----------------------------|
|             |      |     |      |     |     |     |      |                  |         | Bolt | Hole |                          |            |                             |
| 2DA-08-00B  | 4.00 | .25 | 4.00 | .30 | 4.0 | 2.0 | .75  | .50              | #10-32  | 1/4  | .28  | L-(4.5)                  | DSRC-08-SB | DSRA-08                     |
| 2DA-12-00B  | 5.25 | .37 | 5.25 | .42 | 6.0 | 3.0 | 1.0  | .70              | 1/4-20  | 5/16 | .34  | L-(6.0)                  | DSRC-12-SB | DSRA-12                     |
| 2DA-16-00B  | 6.75 | .37 | 6.75 | .42 | 6.0 | 3.0 | 1.25 | .90              | 5/16-18 | 3/8  | .41  | L-(7.5)                  | DSRC-16-SB | DSRA-16                     |

Support rails are supplied in 24 inch lengths unless quoted otherwise.

Dual Shaft Rail Support Material: Black Anodized Aluminum Alloy

Maximum continuous length of support rails is 72". If longer continuous shaft support rails are required, please contact the Thomson Linear Guides Application Engineering department.

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly<br>Part Number | Dynamic Load Capacity<br>(lb.)<br>(Even Distribution) | Dynamic Roll Moment<br>(in-lb.) |
|--------------------------------------|---|---------------------------------|
| 2DA-08-00B                           | 480   | 720                             |
| 2DA-12-00B                           | 3200  | 6400                            |
| 2DA-16-00B                           | 5400  | 13500                           |

Note: Above load ratings used for life calculations. Load limit of assembly 50%.

### Dual Shaft Rail Linear Guide 2DA with Integrated Carriage (Dimensions in inches)

| Part Number | Nominal Diameter | T2  | H     | H1    | H2   | B    | R    | B1  | B2  | C   | C1    |
|-------------|------------------|-----|-------|-------|------|------|------|-----|-----|-----|-------|
| 2DA-08-00A  | .500             | 3.5 | 1.625 | .875  | 1.43 | 2.00 | .500 | 4.6 | 3.0 | .64 | 1.25  |
| 2DA-12-00A  | .750             | 4.5 | 2.125 | 1.125 | 1.93 | 2.63 | .688 | 6.1 | 4.0 | .75 | 1.662 |
| 2DA-16-00A  | 1.000            | 6.0 | 2.625 | 1.375 | 2.44 | 3.25 | .875 | 7.6 | 5.0 | .99 | 2.00  |

### Dual Shaft Rail Linear Guide 2DA with Integrated Carriage (Dimensions in inches)

| Part Number | N   | N2   | M    | M1  | X   | Y   | Z    | S<br>As Extruded | F       | G    |      | Maximum<br>Stroke Length | Carriage   | Dual Shaft Rail<br>Assembly |
|-------------|-----|------|------|-----|-----|-----|------|------------------|---------|------|------|--------------------------|------------|-----------------------------|
|             |     |      |      |     |     |     |      |                  |         | Bolt | Hole |                          |            |                             |
| 2DA-08-00A  | .25 | 3.00 | 4.00 | .30 | 4.0 | 2.0 | .75  | .50              | #10-32  | 1/4  | .28  | L-(3.5)                  | DSRC-08-SB | DSRA-08                     |
| 2DA-12-00A  | .37 | 3.75 | 5.25 | .42 | 6.0 | 3.0 | 1.0  | .70              | 1/4-20  | 5/16 | .34  | L-(4.5)                  | DSRC-12-SB | DSRA-12                     |
| 2DA-16-00A  | .37 | 5.25 | 6.75 | .42 | 6.0 | 3.0 | 1.25 | .90              | 5/16-18 | 3/8  | .41  | L-(6.0)                  | DSRC-16-SB | DSRA-16                     |

Support rails are supplied in 24 inch lengths unless quoted otherwise.

Dual Shaft Rail Support Material: Black Anodized Aluminum Alloy

Maximum continuous length of support rails is 72". If longer continuous shaft support rails are required, please contact the Thomson Linear Guides Application Engineering department.

† Super Ball Bushing Bearings are used in 500 inch size carriages.

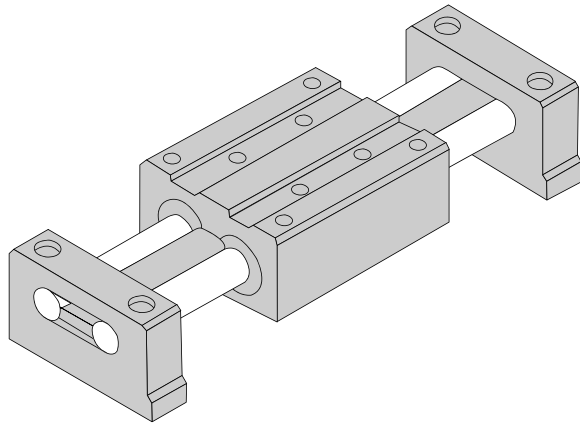
### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly<br>Part Number | Dynamic Load Capacity<br>(lb.)<br>(Even Distribution) | Dynamic Roll Moment<br>(in-lb.) |
|--------------------------------------|---|---------------------------------|
| 2DA-08-00A                           | 480   | 720                             |
| 2DA-12-00A                           | 3200  | 6400                            |
| 2DA-16-00A                           | 5400  | 13500                           |

Note: Above load ratings used for life calculations. Load limit of assembly 50%.

## RoundRail Linear Guides

# Twin Shaft Web



**High roll moment torque resistance,  
high rigidity, smooth, easy to install**

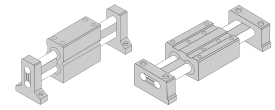
### **Twin Shaft Web Linear Ball Guides Offer:**

- Twin Shaft Web design for high roll moment capacity, high rigidity and ultra smooth travel
- Pre-aligned shafts, end supported for gantry style or 'bridge' applications
- Available in horizontal and vertical orientations for increased mounting flexibility
- End supported for quicker and easy installation
- The Super Smart Ball Bushing bearing... the most technologically advanced and most robust linear bearing in the world
- The RoundRail Advantage. The inherent self-aligning-in-all-directions design of the Super Smart Ball Bushing bearing allows for ultra smooth travel when mounted to wider toleranced prepared surfaces
- Cost savings: save time and money preparing your mounting surfaces before bolting down RoundRail linear guides
- Corrosion resistant versions for maximum performance in harsh environments.



## RoundRail Linear Guides

# Twin Shaft Web 2CA with Universal Carriage Unpack and Install Inch



### Features

- Used when spanning or bridging a gap
- Double LinearRace shaft and welded integral web design maximizes torque and dramatically improves deflection characteristics
- Pre-aligned for quick and easy installation
- Designed to move medium loads with virtually frictionless travel

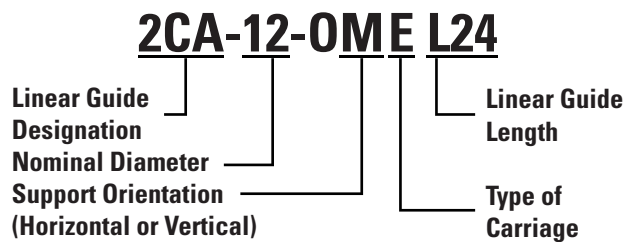
### Components

- Universal integrated, carriage with 4 open type Super Smart Ball Bushing Bearings
- Twin welded 60 Case LinearRace shafts with integral web
- 2 vertical or horizontal double end supports

### Specifying this Thomson Linear Guide

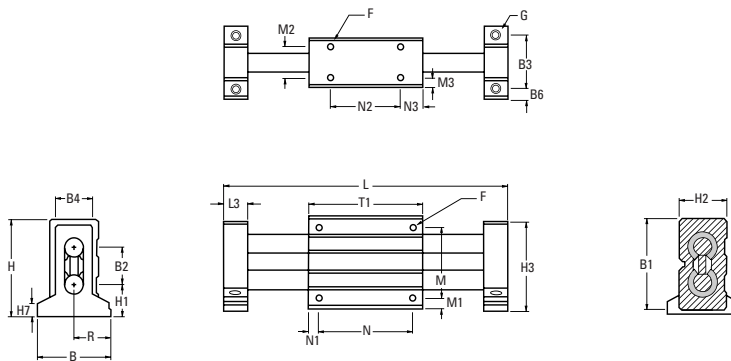
1. Determine the proper Linear Guide for your load and life requirements.
2. Select the part number.
3. Add the letter "L" followed by the overall length in inches, as a suffix to the part number.

### Part Numbering System

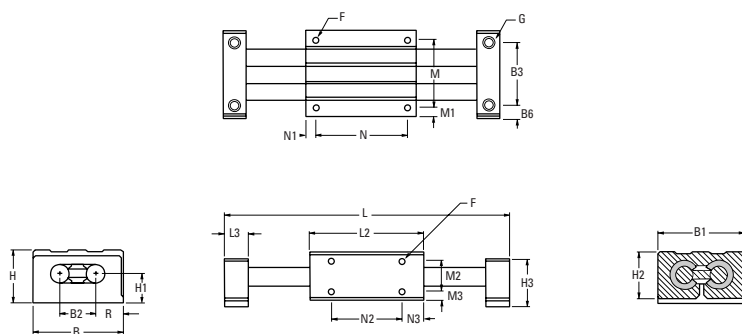


### Dimensions (Inch)

Twin Shaft Web Linear Guide with Universal Carriage (Vertical Configuration)



Twin Shaft Web Linear Guide with Universal Carriage (Horizontal Configuration)



## RoundRail Linear Guides

### Twin Shaft Web Linear Guide End Supported 2CA (Vertical Configuration) (Dimensions in inches)

| Part Number | Nominal Diameter | L3   | H     | H1    | H3   | H7  | B    | R     | B2   | B3   | B4   | B6  | T1  | N    |
|-------------|------------------|------|-------|-------|------|-----|------|-------|------|------|------|-----|-----|------|
| 2CA-08-OKE  | .500             | .63  | 2.750 | .875  | 2.56 | .38 | 2.25 | 1.125 | 1.13 | 1.63 | 1.12 | .31 | 3.5 | 3.00 |
| 2CA-12-OKE  | .750             | .75  | 3.625 | 1.125 | 3.44 | .56 | 3.00 | 1.500 | 1.50 | 2.25 | 1.63 | .38 | 4.5 | 4.00 |
| 2CA-16-OKE  | 1.000            | 1.00 | 4.625 | 1.375 | 4.50 | .75 | 4.00 | 2.00  | 2.00 | 3.00 | 2.25 | .50 | 6.0 | 5.25 |

### Twin Shaft Web Linear Guide End Supported 2CA (Vertical Configuration) (Dimensions in inches)

| Part Number | N1  | N2  | N3  | H2  | B1   | M    | M1  | M2   | M3  | F       | G    |      | Maximum Stroke Length | Dual Shaft Rail Assembly |
|-------------|-----|-----|-----|-----|------|------|-----|------|-----|---------|------|------|-----------------------|--------------------------|
|             |     |     |     |     |      |      |     |      |     |         | Bolt | Hole |                       |                          |
| 2CA-08-OKE  | .25 | 2.5 | .50 | 1.5 | 2.62 | 2.00 | .31 | .88  | .31 | #10-32  | #10  | .22  | L-(4.75)              | TSW-08                   |
| 2CA-12-OKE  | .25 | 3.5 | .50 | 2.0 | 3.50 | 2.87 | .31 | 1.38 | .31 | 1/4-20  | 1/4  | .28  | L-(6.00)              | TSW-12                   |
| 2CA-16-OKE  | .38 | 4.5 | .75 | 2.5 | 4.50 | 3.62 | .44 | 1.62 | .44 | 5/16-18 | 5/16 | .34  | L-(8.00)              | TSW-16                   |

Maximum Length is 72 inches.

### 2CA (Vertical Config.) Carriage and End Support Part No.

| Linear Guide Part Number | Carriage Part Number | End Support Part Number |
|--------------------------|----------------------|-------------------------|
| 2CA-08-OKE               | WC-08                | WSB-08-V                |
| 2CA-12-OKE               | WC-12                | WSB-12-V                |
| 2CA-16-OKE               | WC-16                | WSB-16-V                |

Shaft Deflection Note:

Load limit may be below the dynamic load rating due to shaft deflection.

Bearings can accommodate up to 1/2° deflection.

See Engineering section (page 257) for Deflection calculations.

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb <sub>f</sub> ) (Even Distribution) | Pillow Block Dynamic Load Capacity (lb <sub>f</sub> ) |
|-----------------------------------|--|---|
| 2CA-08-OKE                        | 290  | 165   |
| 2CA-12-OKE                        | 1800   | 1350  |
| 2CA-16-OKE                        | 3000   | 3000  |

† Super Ball Bushing Bearings are used in .500 inch size carriages.

### Twin Shaft Web Linear Guide End Supported 2CA (Horizontal Configuration) (Dimensions in inches)

| Part Number | Nominal Diameter | L3   | H     | H1    | H3   | H7  | B    | R     | B2   | B3   | B4   | B6  | T1  | N    |
|-------------|------------------|------|-------|-------|------|-----|------|-------|------|------|------|-----|-----|------|
| 2CA-08-OME  | .500             | .63  | 2.750 | .875  | 2.56 | .38 | 2.25 | 1.125 | 1.13 | 1.63 | 1.12 | .31 | 3.5 | 3.00 |
| 2CA-12-OME  | .750             | .75  | 3.625 | 1.125 | 3.44 | .56 | 3.00 | 1.500 | 1.50 | 2.25 | 1.63 | .38 | 4.5 | 4.00 |
| 2CA-16-OME  | 1.000            | 1.00 | 4.625 | 1.375 | 4.50 | .75 | 4.00 | 2.00  | 2.00 | 3.00 | 2.25 | .50 | 6.0 | 5.25 |

### Twin Shaft Web Linear Guide End Supported 2CA (Horizontal Configuration) (Dimensions in inches)

| Part Number | N1  | N2  | N3  | H2  | B1   | M    | M1  | M2   | M3  | F       | G    |      | Maximum StrOME Length | Dual Shaft Rail Assembly |
|-------------|-----|-----|-----|-----|------|------|-----|------|-----|---------|------|------|-----------------------|--------------------------|
|             |     |     |     |     |      |      |     |      |     |         | Bolt | Hole |                       |                          |
| 2CA-08-OME  | .25 | 2.5 | .50 | 1.5 | 2.62 | 2.00 | .31 | .88  | .31 | #10-32  | #10  | .22  | L-(4.75)              | TSW-08                   |
| 2CA-12-OME  | .25 | 3.5 | .50 | 2.0 | 3.50 | 2.87 | .31 | 1.38 | .31 | 1/4-20  | 1/4  | .28  | L-(6.00)              | TSW-12                   |
| 2CA-16-OME  | .38 | 4.5 | .75 | 2.5 | 4.50 | 3.62 | .44 | 1.62 | .44 | 5/16-18 | 5/16 | .34  | L-(8.00)              | TSW-16                   |

Maximum Length is 72 inches.

### 2CA (Vertical Config.) Carriage and End Support Part No.

| Linear Guide Part Number | Carriage Part Number | End Support Part Number |
|--------------------------|----------------------|-------------------------|
| 2CA-08-OME               | WC-08                | WSB-08-V                |
| 2CA-12-OME               | WC-12                | WSB-12-V                |
| 2CA-16-OME               | WC-16                | WSB-16-V                |

Shaft Deflection Note:

Load limit may be below the dynamic load rating due to shaft deflection.

Bearings can accommodate up to 1/2° deflection.

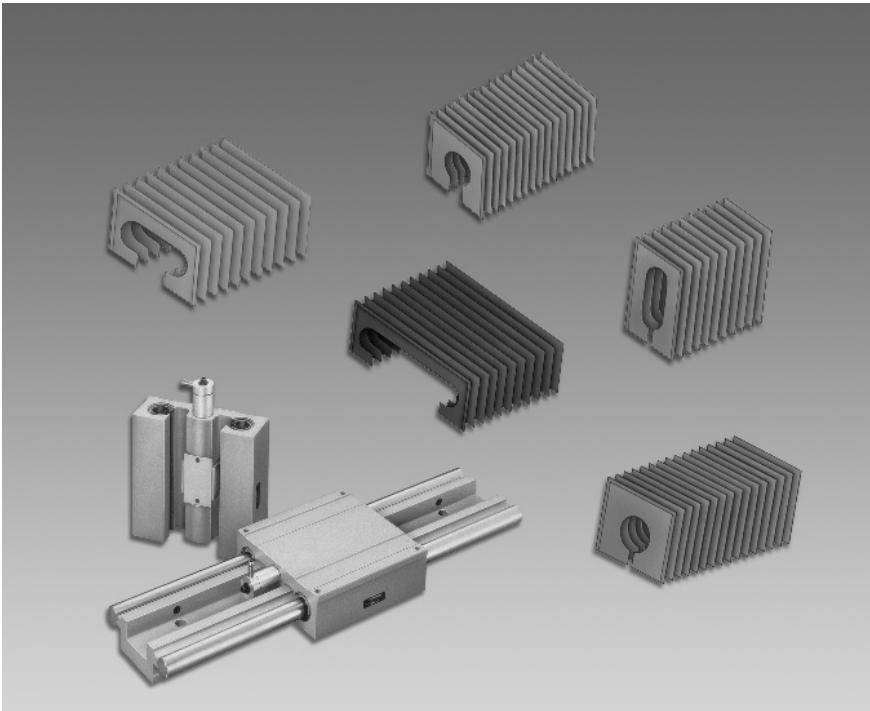
See Engineering section (page 257) for Deflection calculations.

### Dynamic Load Capacity Matrix (4 million inches travel)

| Linear Guide Assembly Part Number | Dynamic Load Capacity (lb <sub>f</sub> ) (Even Distribution) | Pillow Block Dynamic Load Capacity (lb <sub>f</sub> ) |
|-----------------------------------|--|---|
| 2CA-08-OME                        | 290  | 165   |
| 2CA-12-OME                        | 1800   | 1350  |
| 2CA-16-OME                        | 3000   | 3000  |

† Super Ball Bushing Bearings are used in .500 inch size carriages.

## Accessories



**We offer a variety of accessories for the Thomson line of RoundRail Linear Guides.**

- \* Protective bellows are available on select models for applications where protection of the round rail guides and carriage bearings are required within harsh or dirty operating environments.
- \* Some linear guide models are available with manually operated locking brakes for vertical applications and operations requiring unlimited carriage position alignment in the available range of stroke.
- \* We encourage you to inquire about linear guide accessories not shown here or any custom application needs which you may have.

## Accessories

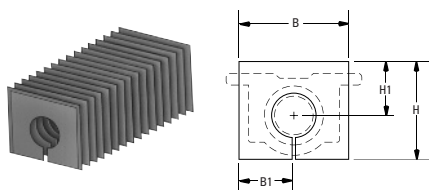
# Collapsible Bellows

Bellows will reduce available stroke length of slide by approximately 28%.  
Bellows P/N should be succeeded by a length when ordering.

Bellows Materials:

- Polyester Cover
- PVC Stiffeners

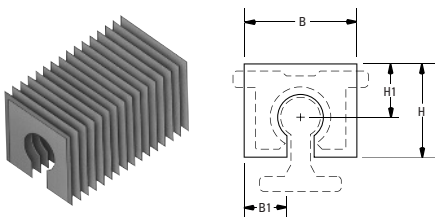
### BEL-1B<sup>†</sup> (For 1BA) Moveable Protective Bellows (Dimensions in inches)



| Part Number | Nominal Shaft Diameter | H     | H1    | B     | CR   |
|-------------|------------------------|-------|-------|-------|------|
| BEL-1B-04   | 1/4                    | 1.187 | .906  | 1.182 | .163 |
| BEL-1B-06   | 3/8                    | 1.312 | .968  | 1.937 | .108 |
| BEL-1B-08   | 1/2                    | 1.687 | 1.156 | 2.062 | .160 |
| BEL-1B-12   | 3/4                    | 2.000 | 1.156 | 2.312 | .108 |
| BEL-1B-16   | 1                      | 2.375 | 1.281 | 2.625 | .163 |
| BEL-1B-24   | 1 1/2                  | 3.062 | 1.531 | 3.125 | .108 |

<sup>†</sup> Each moveable bellows comes with 1 section of bellows and 2 pairs of Velcro<sup>®</sup> Fasteners.

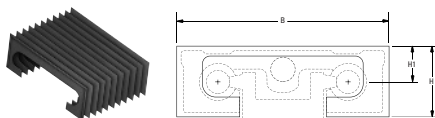
### BEL-1C<sup>†</sup> (For 1CA) Moveable Protective Bellows (Dimensions in inches)



| Part Number | Nominal Shaft Diameter | H     | H1    | B     | CR   |
|-------------|------------------------|-------|-------|-------|------|
| BEL-1C-08   | 1/2                    | 1.375 | .968  | 2.062 | .088 |
| BEL-1C-12   | 3/4                    | 1.812 | 1.062 | 2.312 | .120 |
| BEL-1C-16   | 1                      | 2.375 | 1.218 | 2.625 | .088 |
| BEL-1C-24   | 1 1/2                  | 3.125 | 1.531 | 3.125 | .088 |

<sup>†</sup> Each moveable bellows comes with 1 section of bellows and 2 pairs of Velcro<sup>®</sup> Fasteners.

### BEL-2D (For QuickSlide System 2DA) Dual Shaft Rail Bellows (Dimensions in inches)

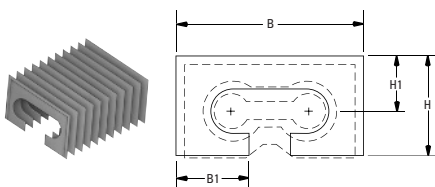


| Part Number | Nominal Shaft Diameter | H     | H1    | B    |
|-------------|------------------------|-------|-------|------|
| BEL-2DA-08  | 1/2                    | 1.50  | .85   | 4.60 |
| BEL-2DB-08  | 1/2                    | 1.89  | 1.34  | 5.13 |
| BEL-2D-12   | 3/4                    | 2.406 | 1.437 | 6.00 |
| BEL-2D-16   | 1                      | 2.875 | 1.687 | 7.50 |

Each moveable bellows comes with 1 section of bellows and 2 mounting brackets and mounting screws.

<sup>†</sup> Appropriate arrangements for affixing the Bellows at each end of the QuickSlide 2DA System are required.

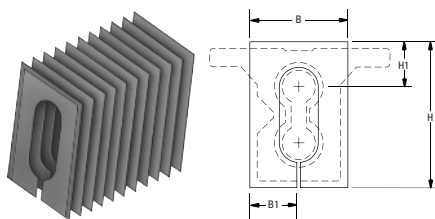
### BEL-2C-H (For Horizontal Twin Shaft Web QuickSlide System 2CA) Moveable Protective Bellows (Dimensions in inches)



| Part Number | Nominal Shaft Diameter | H     | H1    | B     | CR   |
|-------------|------------------------|-------|-------|-------|------|
| BEL-2C-08-H | 1/2                    | 1.688 | 1.031 | 3.250 | .108 |
| BEL-2C-12-H | 3/4                    | 2.062 | 1.156 | 3.812 | .108 |
| BEL-2C-16-H | 1                      | 2.437 | 1.281 | 4.62  | .108 |

Each moveable bellows comes with 1 section of bellows and 2 pairs of Velcro<sup>®</sup> Fasteners.

### BEL-2C-V (For Vertical Twin Shaft Web QuickSlide System 2CA) Dual Shaft Rail Bellows (Dim. in in.)



| Part Number | Nominal Shaft Diameter | H     | H1    | B     | CR   |
|-------------|------------------------|-------|-------|-------|------|
| BEL-2C-08-V | 1/2                    | 2.750 | 1.000 | 2.125 | .163 |
| BEL-2C-12-V | 3/4                    | 3.750 | 1.125 | 2.375 | .163 |
| BEL-2C-16-V | 1                      | 4.375 | 1.250 | 2.625 | .108 |

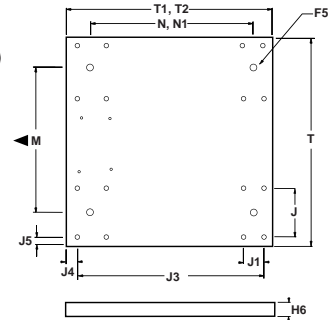
Each moveable bellows comes with 1 section of bellows and 2 pairs of Velcro<sup>®</sup> Fasteners.

# Table Tops

## Carriage Top Plates for Linear Guides

### 1BA Mounting Table Top<sup>(1)</sup> (Two mounting holes as shown in view A-A for sizes .250 and .375. Dim. in inches)

| Nominal Diameter | All Table Tops |      |      |      |         | Table Top Size B |         |     |     |       | Table Top Size A |      |      |     |     |
|------------------|----------------|------|------|------|---------|------------------|---------|-----|-----|-------|------------------|------|------|-----|-----|
|                  | T              | M    | J    | H6   | F5      | T1               | J1      | J4  | J5  | N     | T2               | J3   | J4   | J5  | N1  |
| .250             | 4.0            | 2.25 | 1.31 | .250 | #8-32   | 4.0              | .75 (2) | .22 | .22 | 3.50  | 2.50             | 2.00 | .25  | .22 | 2.0 |
| .375             | 4.5            | 2.50 | 1.44 | .250 | #10-32  | 4.5              | .88 (2) | .22 | .28 | 3.75  | 2.75             | 2.25 | .25  | .28 | 2.0 |
| .500             | 5.5            | 3.25 | 1.69 | .375 | 1/4-20  | 5.5              | 1.00    | .34 | .28 | 4.50  | 3.50             | 2.50 | .50  | .31 | 2.5 |
| .750             | 7.5            | 4.50 | 2.38 | .500 | 5/16-18 | 7.5              | 1.25    | .41 | .31 | 6.00  | 4.50             | 3.50 | .50  | .31 | 3.0 |
| 1.000            | 9.0            | 5.50 | 2.88 | .500 | 3/8-16  | 9.0              | 1.75    | .53 | .31 | 7.00  | 6.00             | 4.50 | .75  | .31 | 4.0 |
| 1.250            | 11.0           | 6.75 | 3.50 | .750 | 1/2-13  | 11.0             | 2.00    | .82 | .38 | 8.50  | 7.50             | 5.50 | 1.00 | .38 | 5.0 |
| 1.500            | 13.0           | 8.00 | 4.12 | .750 | 1/2-13  | 13.0             | 2.50    | .75 | .44 | 10.00 | 9.00             | 6.50 | 1.25 | .44 | 6.0 |



### 1NA Mounting Table Top<sup>(2)</sup> (Custom mounting hole. Dimensions in mm)

| Nominal Diameter | All Table Tops |     |    |    |     | Table Top Size B |    |      |      |     | Table Top Size A |     |    |      |    |    |
|------------------|----------------|-----|----|----|-----|------------------|----|------|------|-----|------------------|-----|----|------|----|----|
|                  | T              | M   | J  | H6 | F5  | T1               | J1 | J4   | J5   | N   | T2               | J3  | J4 | J5   | J9 | N1 |
| 1NC-M08          | 85             | 50  | 25 | 10 | M6  | 85               | 20 | 6,0  | 5,0  | 50  | 62               | 50  | 6  | 5,0  | 25 | 35 |
| 1NC-M12          | 100            | 55  | 32 | 10 | M6  | 100              | 23 | 8,0  | 6,5  | 55  | 76               | 56  | 10 | 6,5  | 28 | 40 |
| 1NC-M16          | 125            | 70  | 40 | 13 | M6  | 125              | 26 | 10,0 | 7,5  | 70  | 84               | 64  | 10 | 7,5  | 32 | 45 |
| 1NC-M20          | 175            | 110 | 45 | 16 | M8  | 175              | 32 | 11,0 | 10,0 | 110 | 104              | 76  | 14 | 10,0 | 38 | 55 |
| 1NC-M25          | 225            | 140 | 60 | 20 | M8  | 225              | 40 | 13,5 | 12,5 | 140 | 130              | 94  | 18 | 12,5 | 47 | 65 |
| 1NC-M30          | 275            | 180 | 68 | 20 | M8  | 275              | 45 | 17,0 | 13,5 | 180 | 152              | 106 | 23 | 13,5 | 53 | 75 |
| 1NC-M40          | 325            | 210 | 86 | 25 | M10 | 325              | 58 | 16,5 | 14,5 | 210 | 176              | 124 | 26 | 14,5 | 62 | 85 |

### 1CA Mounting Table Top<sup>(1)</sup> (Dimensions in inches)

| Nominal Diameter | All Table Tops |      |      |      |         | Table Top Size B |      |     |     |      | Table Top Size A |     |      |     |     |
|------------------|----------------|------|------|------|---------|------------------|------|-----|-----|------|------------------|-----|------|-----|-----|
|                  | T              | M    | J    | H6   | F5      | T1               | J1   | J4  | J5  | N    | T2               | J3  | J4   | J5  | N1  |
| .50              | 5.5            | 3.25 | 1.69 | .375 | 1/4-20  | 5.5              | 1.00 | .34 | .28 | 4.5  | 3.5              | 2.5 | .50  | .31 | 2.5 |
| .75              | 7.5            | 4.50 | 2.38 | .500 | 5/16-18 | 7.5              | 1.25 | .41 | .31 | 6.0  | 4.5              | 3.5 | .50  | .31 | 3.0 |
| 1.00             | 9.0            | 5.50 | 2.88 | .500 | 3/8-16  | 9.0              | 1.75 | .53 | .31 | 7.0  | 6.0              | 4.5 | .75  | .31 | 4.0 |
| 1.25             | 11.0           | 6.75 | 3.50 | .750 | 1/2-13  | 11.0             | 2.00 | .82 | .38 | 8.5  | 7.5              | 5.5 | 1.00 | .38 | 5.0 |
| 1.50             | 13.0           | 8.00 | 4.12 | .750 | 1/2-13  | 13.0             | 2.50 | .75 | .44 | 10.0 | 9.0              | 6.5 | 1.25 | .44 | 6.0 |

### 1PA Mounting Table Top<sup>(2)</sup> (Dimensions in mm)

| Nominal Diameter | All Table Tops |     |    |    |     | Table Top Size B |    |      |      |     | Table Top Size A |     |    |      |    |    |
|------------------|----------------|-----|----|----|-----|------------------|----|------|------|-----|------------------|-----|----|------|----|----|
|                  | T              | M   | J  | H6 | F5  | T1               | J1 | J4   | J5   | N   | T2               | J3  | J4 | J5   | J9 | N1 |
| PC-M12           | 100            | 55  | 32 | 10 | M6  | 100              | 23 | 8,0  | 6,5  | 55  | 76               | 56  | 10 | 6,5  | 28 | 40 |
| 1PC-M16          | 125            | 70  | 40 | 13 | M6  | 125              | 26 | 10,0 | 7,5  | 70  | 84               | 64  | 10 | 7,5  | 32 | 45 |
| 1PC-M20          | 175            | 110 | 45 | 16 | M8  | 175              | 32 | 11,0 | 10,0 | 110 | 104              | 76  | 14 | 10,0 | 38 | 55 |
| 1PC-M25          | 225            | 140 | 60 | 20 | M8  | 225              | 40 | 13,5 | 12,5 | 140 | 130              | 94  | 18 | 12,5 | 47 | 65 |
| 1PC-M30          | 275            | 180 | 68 | 20 | M8  | 275              | 45 | 17,0 | 13,5 | 180 | 152              | 106 | 23 | 13,5 | 53 | 75 |
| 1PC-M40          | 325            | 210 | 86 | 25 | M10 | 325              | 58 | 16,5 | 14,5 | 210 | 176              | 124 | 26 | 14,5 | 62 | 85 |

### 1VA Mounting Table Top<sup>(1)</sup> (2 mounting holes as shown in view A-A for size .375. Dimensions in inches)

| Nominal Diameter | All Table Tops |      |      |      |         | Table Top Size B |         |     |     |       | Table Top Size A |      |      |     |     |
|------------------|----------------|------|------|------|---------|------------------|---------|-----|-----|-------|------------------|------|------|-----|-----|
|                  | T              | M    | J    | H6   | F5      | T1               | J1      | J4  | J5  | N     | T2               | J3   | J4   | J5  | N1  |
| .375             | 4.5            | 2.50 | 1.44 | .250 | #10-32  | 4.5              | .88 (2) | .22 | .28 | 3.75  | 2.75             | 2.25 | .25  | .28 | 2.0 |
| .500             | 5.5            | 3.25 | 1.69 | .375 | 1/4-20  | 5.5              | 1.00    | .34 | .28 | 4.50  | 3.50             | 2.50 | .50  | .31 | 2.5 |
| .625             | N/A            | N/A  | N/A  | N/A  | N/A     | N/A              | N/A     | N/A | N/A | N/A   | N/A              | N/A  | N/A  | N/A | N/A |
| .750             | 7.5            | 4.50 | 2.38 | .500 | 5/16-18 | 7.5              | 1.25    | .41 | .31 | 6.00  | 4.50             | 3.50 | .50  | .31 | 3.0 |
| 1.000            | 9.0            | 5.50 | 2.88 | .500 | 3/8-16  | 9.0              | 1.75    | .53 | .31 | 7.00  | 6.00             | 4.50 | .75  | .31 | 4.0 |
| 1.250            | 11.0           | 6.75 | 3.50 | .750 | 1/2-13  | 11.0             | 2.00    | .82 | .38 | 8.50  | 7.50             | 5.50 | 1.00 | .38 | 5.0 |
| 1.500            | 13.0           | 8.00 | 4.12 | .750 | 1/2-13  | 13.0             | 2.50    | .75 | .44 | 10.00 | 9.00             | 6.50 | 1.25 | .44 | 6.0 |

### 1DA Mounting Table Top (Dimensions in inches)

| Nominal Diameter | All Table Tops |     |      |     |         | Table Top Size D |      |     |     |      | Table Top Size C |      |     |     |                   |
|------------------|----------------|-----|------|-----|---------|------------------|------|-----|-----|------|------------------|------|-----|-----|-------------------|
|                  | T              | M   | J    | H6  | F5      | T1               | J1   | J4  | J5  | N    | T2               | J3   | J4  | J5  | N1 <sup>(3)</sup> |
| .5               | 7.25           | 4.0 | .91  | .50 | 1/4-20  | 5.5              | 1.25 | .25 | .28 | 2.63 | 3.5              | 3.00 | .25 | .28 | .75               |
| .75              | 9.75           | 6.0 | 1.19 | .50 | 5/16-18 | 7.5              | 1.58 | .25 | .38 | 3.50 | 4.5              | 4.00 | .25 | .38 | 1.00              |
| 1.00             | 12.00          | 6.0 | 1.44 | .50 | 3/8-16  | 9.0              | 2.25 | .34 | .40 | 4.38 | 6.0              | 5.25 | .38 | .40 | 1.25              |

(1) Carriage material: Aluminum Alloy Black Anodized

(2) Carriage material: Aluminum Alloy Grey Anodized

(3) Mounting hole spacing facilitates attachment of Dual Shaft Rail 2DA Linear Guide in an X-Y orientation.

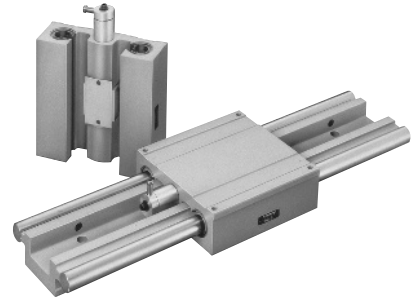
## Accessories

# 2DA QuickSlide System with Brake

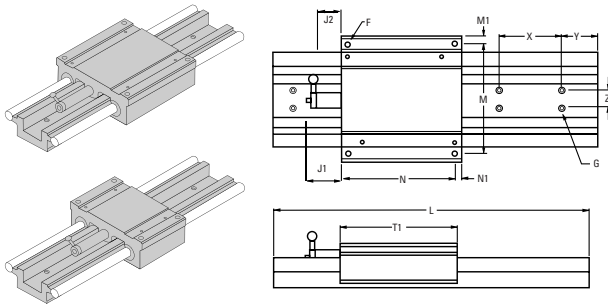
## A manual locking mechanism for the Dual Shaft Rail System

### 2DA QuickSlide System with Brake offers:

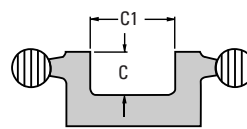
- A manual locking mechanism with infinite positioning capability.
- No carriage mounting surface deflection when the locking mechanism is activated.
- Immediate off-the-shelf availability in 1/2, 3/4 and 1 inch sizes.
- A locking mechanism that, when activated, will not apply an increase in load on the system's Ball Bushing bearing.
- Zero axial movement during the activation of the locking mechanism.
- A fully supported Dual Shaft assembly for maximum rigidity and unlimited travel.
- High load capacity in any direction.



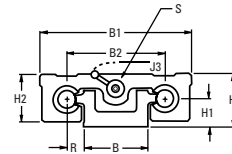
### Dual Shaft Rail Fully Supported System with Integrated Carriage



### Dual Shaft Rail Supported Cross-Section



Maximum Stroke Length is determined by subtracting the carriage length (T1 or T2) plus the brake handle length (J1) from the total system length.



### Dual Shaft Rail Fully Supported System with Integrated Carriage (Long Style) (Dimensions in inches)

| Part Number | Nominal Shaft Diameter | Max. Load on System <sup>(1)</sup> (lb.) | Max. Load on One Bearing <sup>(1)</sup> (lb.) | T1   | H     | H1    | H2   | B    | R     | B1   | B2   | C   | C1   |
|-------------|------------------------|--|---|------|-------|-------|------|------|-------|------|------|-----|------|
| 2DA-08-00L  | 1/2                    | 600                                      | 150   | 4.50 | 1.625 | 0.875 | 1.43 | 2.00 | 0.500 | 4.60 | 3.00 | .64 | 1.25 |
| 2DA-12-00L  | 3/4                    | 1880                                     | 470   | 6.00 | 2.125 | 1.125 | 1.93 | 2.63 | 0.688 | 6.10 | 4.00 | .75 | 1.62 |
| 2DA-16-00L  | 1                      | 3120                                     | 780   | 7.50 | 2.625 | 1.375 | 2.44 | 3.25 | 0.875 | 7.60 | 5.00 | .99 | 2.00 |

(1) For rated travel life of 2 million inches. Note: Manual Brake can be adjusted in order to position handle to any radial location. Dual Shaft Rail Support Material: Aluminum Alloy Black Anodized. Standard length of one-piece Aluminum Dual Shaft Rails is 72".

### Dual Shaft Rail Fully Supported System with Integrated Carriage (Long Style) (Dimensions in inches)

| Part Number | N    | N1  | M    | M1  | X    | Y    | Z    | J1   | J2   | J3   | F       | G    |      | Max. Stroke Length | Carriage Part Number |
|-------------|------|-----|------|-----|------|------|------|------|------|------|---------|------|------|--------------------|----------------------|
|             |      |     |      |     |      |      |      |      |      |      |         | Bolt | Hole |                    |                      |
| 2DA-08-00L  | 4.00 | .25 | 4.00 | .30 | 4.00 | 2.00 | .75  | 1.63 | 1.19 | .88  | #10-32  | 1/4  | .28  | L-(6.13)           | DSRC-08-SL           |
| 2DA-12-00L  | 4.25 | .37 | 5.25 | .42 | 6.00 | 3.00 | 1.00 | 1.63 | 1.19 | 1.00 | 1/4-20  | 5/16 | .34  | L-(7.63)           | DSRC-12-SL           |
| 2DA-16-00L  | 6.75 | .37 | 6.75 | .42 | 6.00 | 3.00 | 1.25 | 1.63 | 1.19 | 1.00 | 5/16-18 | 3/8  | .41  | L-(9.13)           | DSRC-16-SL           |

### Dual Shaft Rail Fully Supported System with Integrated Carriage (Short Style) (Dim. in inches)

| Part Number | Nom. Shaft Diameter | T2   | N2   | Max. Stroke Length | Carriage Part Number |
|-------------|---------------------|------|------|--------------------|----------------------|
| 2DA-08-00M  | 1/2                 | 3.50 | 3.00 | L-(5.13)           | DSRC-08-SM           |
| 2DA-12-00M  | 3/4                 | 4.50 | 3.75 | L-(6.13)           | DSRC-12-SM           |
| 2DA-16-00M  | 1                   | 6.00 | 5.25 | L-(7.63)           | DSRC-16-SM           |

### System 2DA Standard Lengths (Dim. in inches)

| System | 8" | 12" | 16" | 18" | 20" | 24" | 28" | 30" | 32" | 36" | 40" | 42" | 44" | 48" |
|--------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2DA-08 | •  | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   |
| 2DA-12 | •  | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   | •   |

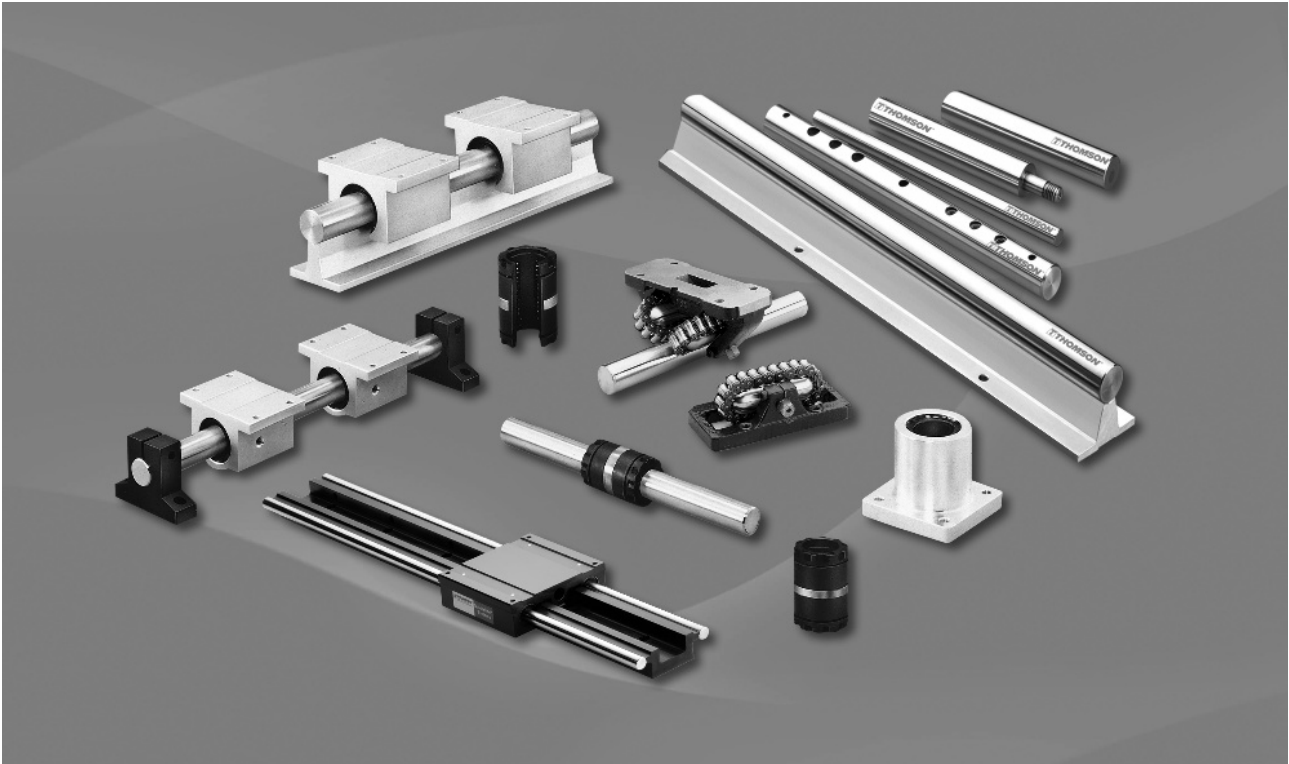
### Quick Slide Brake Holding Force

| System | Axial Holding Force (lb.) |
|--------|---------------------------|
| 2DA-08 | 125                       |
| 2DA-12 | 130                       |
| 2DA-16 | 140                       |

### Custom Lengths and Delivery Information

Custom length systems are available. For special requirements, please contact the Thomson Systems application engineering department.

# Engineering



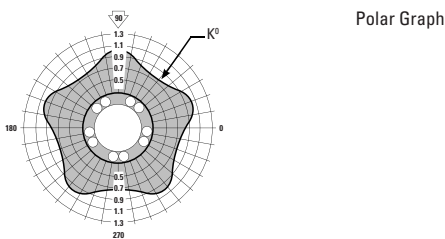
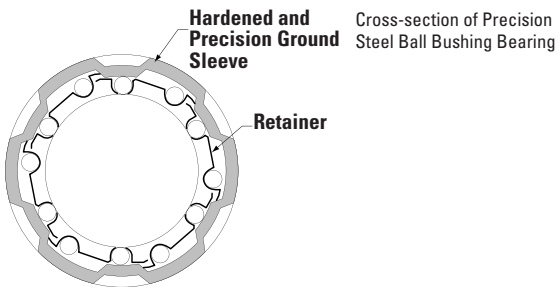
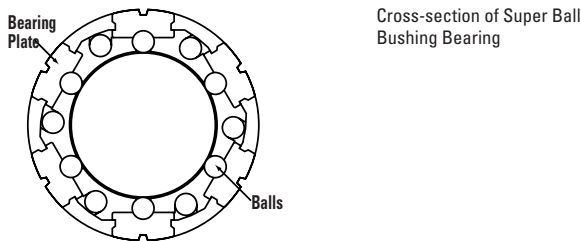
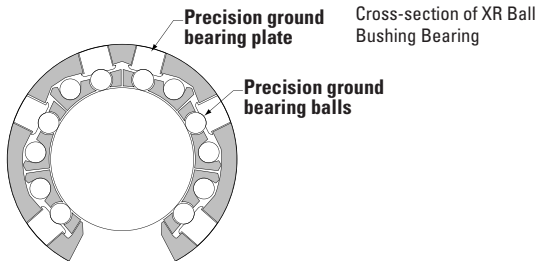
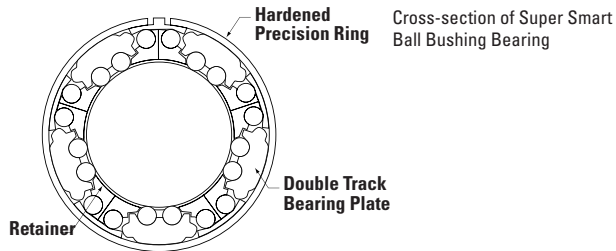
The Engineering Appendix contains valuable information on the application and use of Thomson Ball Bushing Bearings, pillow blocks, 60 Case LinearRace shafts, 60 Case LinearRace supports and accessories.

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## Engineering

# Performance Criteria

The following performance criteria relates to the use, installation and specification of Thomson Ball Bushing Bearings. Each performance criteria plays an important role in maximizing system effectiveness and life.



## Dynamic Load Capacity

The Dynamic load capacity of a Ball Bushing Bearing is determined by the reaction between the rolling elements and the inner and outer race. The rolling elements in a Ball Bushing Bearing are a series of hardened and precision ground bearing balls. The inner race is a hardened and precision ground 60 Case LinearRace.

The outer race can be a hardened and precision ground, ball conforming, steel bearing plate or a hardened and precision ground steel bearing sleeve. The dynamic load capacity is also affected by the orientation of the ball tracks, the size of the balls, the shape of the ball conforming groove, the number of balls that are in load contact and more.

Since the introduction of the Ball Bushing Bearing in 1945, Thomson has designed and developed Ball Bushing Bearing products that have continuously achieved dramatic increases in dynamic load capacity and life. Our most recent innovation is the Super Smart Ball Bushing Bearing which has six times the dynamic load capacity or 216 times greater life than the traditional Ball Bushing Bearing.

This increase in load capacity was achieved by maximizing the load reaction between the inner and outer races. This break-through in load capacity rivals that of linear guides while still retaining the added benefits of the RoundRail Advantage enabling the linear bearing to avoid many of the derating factors that can diminish the load/life performance of square rail products.

The dynamic load capacity of all Thomson Ball Bushing Bearings is based on a L10 life of two million inches (100 km for Metric bearings) of travel. The dynamic load capacity can be affected by the orientation of the bearing with respect to the load or the direction of the applied load. A polar graph is included with each product specification to assist you in optimizing the load capacity as well as the performance of the Ball Bushing Bearing. To determine the resultant load capacity find the angle at which the load is applied to the bearing, and move in radially along that line until it intersects the curve. Move around circumferentially to the polar correction value located on the vertical axis. Next, multiply the proper correction factor by the dynamic load capacity listed in each product specification table.



# Performance Criteria (cont'd)

## The RoundRail Advantage

The RoundRail Advantage is the inherent ability of a RoundRail bearing to accommodate torsional misalignment (caused by inaccuracies in carriage or base machining or by machine deflection) with little increase in stress to bearing components (Figure 1). This important feature to all Thomson Ball Bushing Bearing systems reduces installation time and cost, while maximizing performance.

### Ball Bushing Bearing vs. Linear Guide

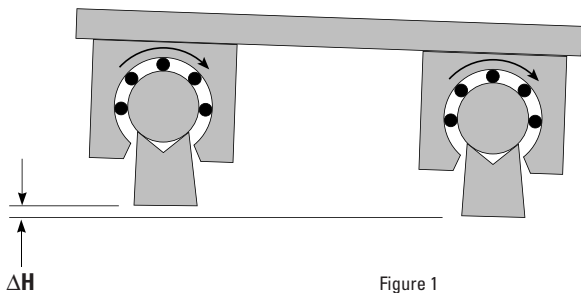


Figure 1

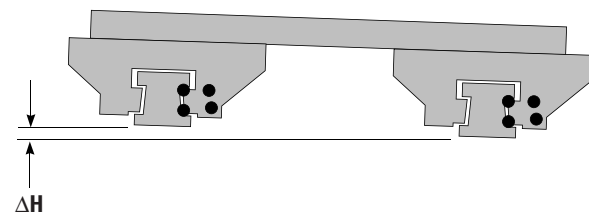


Figure 2

The major difference between a Ball Bushing Bearing and linear guide system is primarily in the design of the inner race. The linear guide inner race has two, four or six ground grooves that guide the carriage and the precision balls. Due to the ball conforming nature of the grooves, the carriage is prevented from accommodating torsional misalignment (Figure 2). If torsional misalignment is introduced to a linear guide system, the component stress increases, reducing life and performance. In a Ball Bushing Bearing system the inner race is a hardened and ground 60 Case LinearRace. Since there are no grooves, the Ball Bushing Bearing system can accommodate torsional misalignment and operate without added stress to bearing components.

### 60 Case LinearRace/Ball Bushing Bearing Fit-up

There are three basic fit-up conditions of a Ball Bushing Bearing and 60 Case LinearRace: clearance, line-to-line and preload. In most product sections there are specification tables that detail the Ball Bushing Bearing working bore diameter and 60 Case LinearRace diameter tolerance as well as the fit-up between them. The clearance, line-to-line and preload conditions are shown by the abbreviation C for clearance, P for preload and .0000 for a line-to-line condition.

### Clearance

The clearance between a Ball Bushing Bearing and a 60 Case LinearRace is a result of the Ball Bushing Bearing working bore diameter and the diameter tolerance of the 60 Case LinearRace. The working bore diameter of a Super Smart or Super Ball Bushing Bearing is a function of the housing bore diameter tolerance. In applications where high accuracy and repeatability is not required, clearance is acceptable. Clearance can be achieved by following the recommended housing bore guidelines found in the product specification sections. To check for a clearance condition, rotate the 60 Case LinearRace inside the Ball Bushing Bearing while installed in a housing bore. If you can freely rotate the 60 Case LinearRace then a clearance condition is present. For more details see the product specification sections.

### Preload

In applications where accuracy and repeatability are critical, the Super Smart, Super and Precision Steel Ball Bushing Bearings can be adjusted to a preload fit-up. The Super Smart and Super Ball Bushing Bearings are inherently adjustable and when installed in an adjustable housing bore a preload condition can be achieved. In a nonadjustable housing a preload condition can be obtained by making the size of the housing bore smaller or by increasing the diameter of the 60 Case LinearRace. To test for a preload condition in an adjustable or nonadjustable housing, simply rotate the 60 Case LinearRace inside the Ball Bushing Bearing while it is installed in the housing bore. If a slight drag is felt then a preload condition is present. When an adjustable housing is used the preload can be altered slightly. The Super Smart and Super Ball Bushing Bearing are more tolerant to preload than the Precision Steel Ball Bushing Bearing. Preload on a Super Smart and Super Ball Bushing Bearing should be a maximum of .001 inch per inch of 60 Case LinearRace diameter. Preload on a Precision Steel Ball Bushing Bearing should be a maximum of .0001 inch per inch of 60 Case LinearRace diameter. When all Ball Bushing Bearings are preloaded, extra care must be taken in mounting the 60 Case LinearRace parallel.

### Line-to-Line

A line-to-line fit-up condition between a Ball Bushing Bearing and 60 Case LinearRace is when no clearance or preload is present. A line-to-line fit-up can be achieved in an adjustable or fixed diameter housing. For more details see the product specification sections.

### Examples of Ball Bushing Bearing/60 Case LinearRace Fit-ups (in.)

| Ball Bushing Bearing Part Number | Working Bore Diameter | Recommended Housing Bore Diameter (fixed) | Actual Working Bore Diameter | 60 Case LinearRace Diameter | Ball Bushing Bearing/60 Case LinearRace Fit Up |
|----------------------------------|-----------------------|---|------------------------------|-----------------------------|--|
| SUPER 20                         | 1.2500/1.2494         | 2.0008/2.0000                             | 1.2508/1.2494                | 1.2495/1.2490               | .0018C/.0001P                                  |
| A-203242                         | 1.2500/1.2494         | —   | 1.2500/1.2494                | 1.2490/1.2485               | .0015C/.0004C                                  |
| XA-203242                        | 1.2500/1.2496         | —   | 1.2500/1.2496                | 1.2495/1.2490               | .0010C/.0001C                                  |

## Engineering

The new Super Smart Ball Bushing Bearing represents a major advancement in linear bearing technology worldwide. The Super Smart Ball Bushing Bearing offers twice the load capacity or eight times the travel life of the industry standard Super Ball Bushing Bearing. An enormous technological breakthrough, considering the Super Ball Bushing Bearing already offers three times the load capacity or twenty-seven times the travel life of conventional Ball Bushing Bearings.

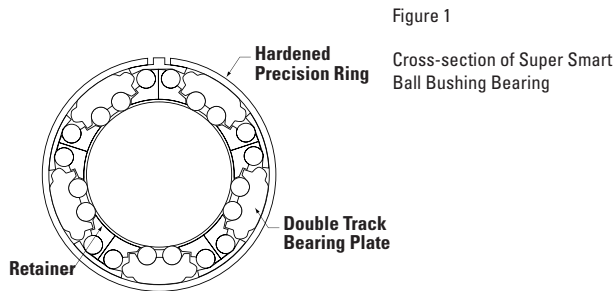


Figure 1  
Cross-section of Super Smart Ball Bushing Bearing

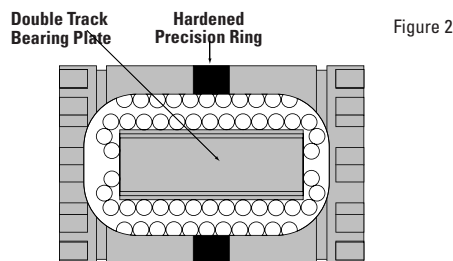


Figure 2

### Technologically Advanced Design

The load carrying component of the Super Smart Ball Bushing Bearing is the combination of four hardened bearing quality steel components (Figures 1 & 2).

The first component is the hardened precision outer ring, which enables the bearing to maintain its diametral fit-up even after extended use, when standard self-aligning bearing plates would imbed into the housing. The unique ring design also allows for bearing adjustment and the removal of diametral clearance. The second component is the precision super finished double track bearing plate that provides twice the load capacity and in combination with the hardened precision steel band provides true universal self-alignment; which means optimum performance even with slight installation imperfections including housing bore out of roundness..

The third component is the rolling element. Each Super Smart Ball Bushing Bearing features precision ground balls manufactured to the highest quality standards for roundness and sphericity. The result is maximum load capacity, travel life and performance.

The last component is the 60 Case LinearRace shaft that functions as the inner race to the Super Smart Ball Bushing Bearing. Each 60 Case LinearRace is manufactured to the highest quality standards for roundness, straightness, surface finish and hardness. Roundness is held under .000080"; straightness to .001" per 12"; surface finish under 8 Ra and hardness between 60-65 HRC. The combination of inner and outer race or 60 Case LinearRace and Super Smart Ball Bushing Bearing provides the fullest embodiment of the RoundRail Advantage.

### Self-Alignment

The Super Smart and Super Ball Bushing Bearings are equipped with a built-in self-alignment feature that allows the bearing to absorb misalignment up to 0.5° per inch (Figure 3 and 4). This self-aligning feature allows the Super Smart and Super Ball Bushing Bearing to absorb misalignment caused by inaccuracies in housing bore alignment or 60 Case LinearRace deflection.

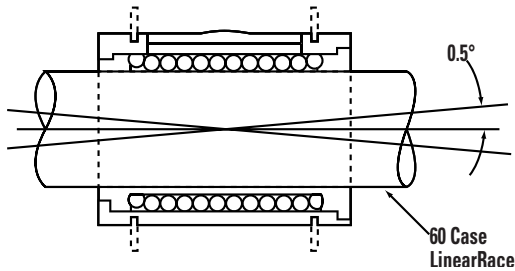


Figure 3  
Super Ball Bushing Bearing Self-Alignment Feature

This rocking capability also provides smooth entry and exit of the precision balls into and out of the load zone assuring a constant low coefficient of friction. By compensating for misalignment, each bearing ball in the load carrying area is uniformly loaded providing maximum load capacity. Besides this rocking capability, only the Super Smart Ball Bushing Bearing provides two additional self-alignment features. They are Roll and Yaw.

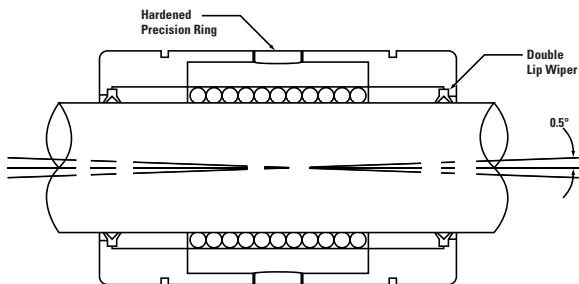


Figure 4  
Super Smart Ball Bushing Bearing Self-Alignment Feature

#### Roll

The Super Smart Ball Bushing Bearing plate is designed with the radius of its outer surface smaller than the inside radius of the precision outer ring (Figure 5). This feature allows the bearing plate to compensate minor torsional misalignment still distribute the load on each of its two ball tracks. The roll component assures maximum load capacity and travel life.

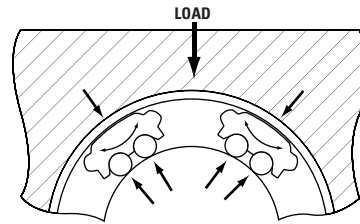


Figure 5  
Super Smart Ball Bushing Bearing Self-Alignment Feature

#### Yaw

The shape formed by the Rock and Roll features enables the Super Smart Ball Bushing Bearing plate to even rotate about its center (Figure 6). This allows the Super Smart Ball Bushing Bearing to also absorb skew caused by misalignment. The result is a constant low coefficient of friction and maximum bearing performance.

Figure 7 below describes the conditions to which Super Smart and Super Ball Bushings automatically self-align. It is important to note that even though the Super Smart and Super Ball Bushing Bearings self-align, they still cannot absorb an out-of-parallel 60 Case LinearRace condition. Tolerance to 60 Case LinearRace out-of-parallelism is a function of clearance between the bearing and its 60 Case LinearRace.

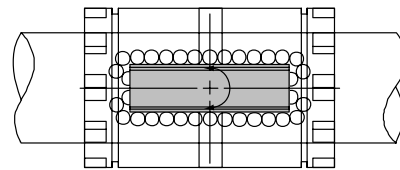


Figure 6  
Bearing plates rotate about their center to prevent skewing relative to the 60 Case LinearRace.

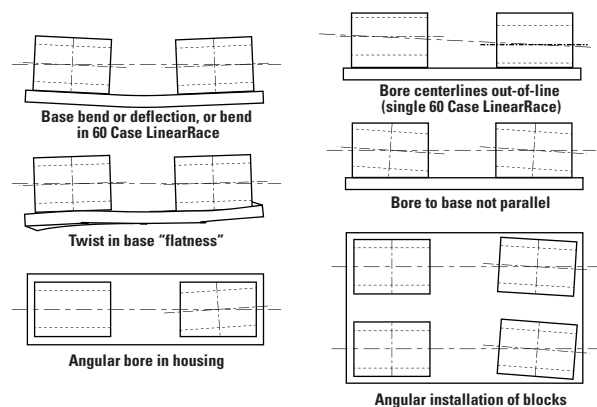


Figure 7

## Engineering

# Ball Bushing Bearing Life Expectancy and Load Capacity

There are many factors that affect Ball Bushing Bearing travel life such as 60 Case LinearRace hardness, the resultant load, the direction of the resultant load and Ball Bushing Bearing orientation. The dynamic load capacities and travel life graphs given in the specification tables found in each product section are based on a load applied at 90° relative to the horizontal plane with the Ball Bushing Bearing oriented as shown in each corresponding polar graph. Note: For Super Smart Ball Bushing Bearings and other extremely high load bearings, the bearing load capacity as indicated by the polar charts may be practically limited by the degree of shaft flexure acceptable, or the capacity of the shaft rail assembly fasteners. In such cases, the loads should be kept below these practical limits, however, the full corresponding life capacity benefits are still realized! The dynamic load capacity is also based on using only Thomson specified 60 Case LinearRace that is hardened to HRC 60 to 65.

For considerations other than those described above, the following formula is used:

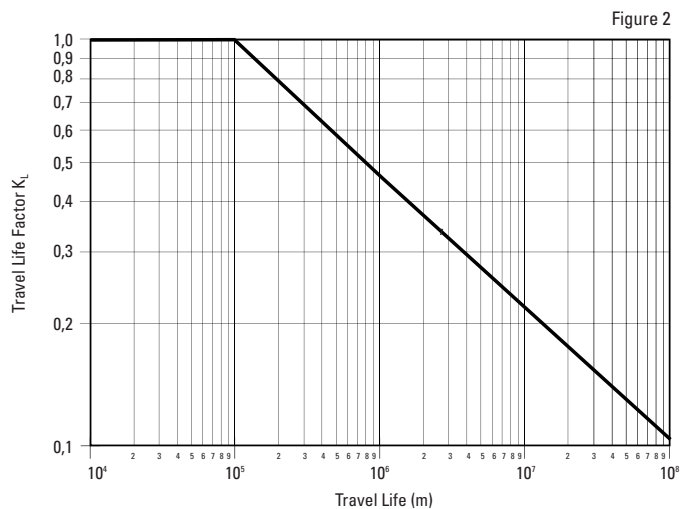
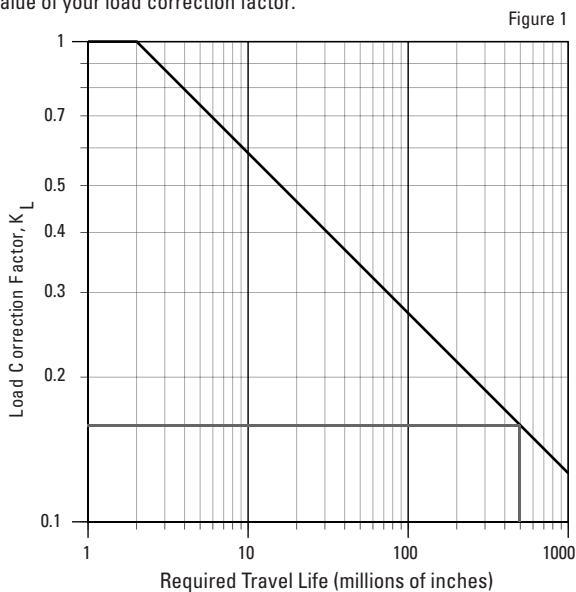
$$W_R = \frac{P}{K_0 \cdot K_S \cdot K_L}$$

Where:

- $W_R$  = required dynamic load capacity (lb<sub>f</sub> or N)
- $P$  = resultant of externally applied loads (lb<sub>f</sub> or N)
- $K_0$  = factor for direction of resultant load
- $K_S$  = shaft hardness factor (Equals 1.0 for 60 Case LinearRace)
- $K_L$  = load correction factor

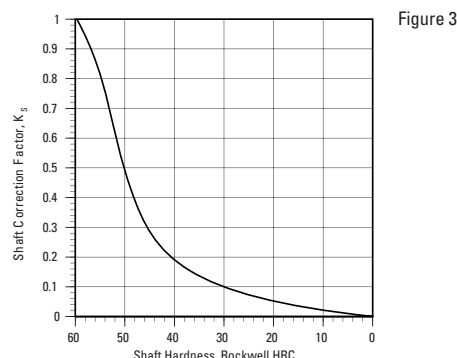
## Travel Life

The load correction factor,  $K_L$ , can be found from Figure 1 for inch product, and Figure 2 for Metric product. To determine  $K_L$  for your required travel life, look for the value on the horizontal axis – Travel Life Factor – left side of the chart. (Interpolate as necessary – this is a Log-Log curve.) That is the value of your load correction factor.



## 60 Case LinearRace Hardness

For shafts that do not meet 60 Case LinearRace hardness specifications of 60 HRC, shaft hardness factor  $K_S$  must be applied. To determine  $K_S$ , simply enter Figure 3 with your shaft Rockwell hardness, find the value on the horizontal axis – Shaft Hardness – bottom of chart. Move vertically up until you intersect the curve. Then move horizontally until you reach the vertical axis – Shaft Correction Factor – left side of chart.



### Load Direction

In applications where the direction of the applied load is known, refer to the polar graphs on the product specification pages for the orientation factor (load correction factor is KL). A polar graph is referenced in Figure 4 for example.

Once you have determined your required dynamic load capacity refer to the product specification table for the proper Ball Bushing Bearing size. Note: For Super Smart Ball Bushing bearings and other extremely high load bearings, the bearing load capacity as indicated by the polar charts may be practically limited by the degree of shaft flexure acceptable, or the capacity of the shaft rail assembly fasteners. In such cases, the loads should be kept below these practical limits, however, the full corresponding life capacity benefits are still realized!

Note: Thomson Linear Ball Bushing Bearings are precision components. To preserve bearing warranty you must use the specified Thomson 60 Case LinearRace.

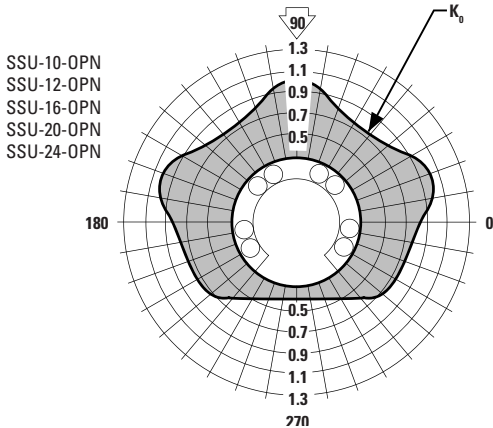


Figure 3

### Load Limit

The load limit is the maximum load which can be applied to the bearing. It is important to analyze your application so that peak and shock loading does not exceed the load limit.

### Dynamic Load Rating

The dynamic load rating is the maximum continuous load that can be applied to the bearing with a 90% reliability of achieving life of two million inches (100 km for Metric bearings) under conventional operating conditions. However, it is important to remember that very short strokes and the direction of the applied load can be significant factors.

The following formula may be used to determine travel life for Metric bearings (SSEM, SPM, and MAM):

$$L_m = \left( \frac{W}{P} \cdot K_o \cdot K_s \right)^3 \cdot 10^5 \text{m}$$

Where:  $L_m$  = travel life (m)  
 $W$  = dynamic load rating from tables (N)  
 $P$  = resultant from externally applied loads (N)  
 $K_o$  = factor for direction of resultant load  
 $K_s$  = shaft hardness factor

### Sample Calculations:

Determine the correct Ball Bushing Bearing size for your application. In this example, the bearing/shaft system is subjected to a load of 2300 N perpendicular to the direction of travel. The load is distributed equally among four closed type MultiTrac Ball Bushing Bearings. The carriage reciprocates over a 0,3 m stroke at a frequency of 100 complete cycles per minute. The minimum service life required is 3500 hours. 60 Case LinearRace shafting is used.

The first step is to determine the average load on each Ball Bushing Bearing.

$$P = \frac{W}{P} = 575 \text{ N}$$

Next, determine the equivalent travel life in meters:

$$\begin{aligned} L_m &= 2 \cdot s \cdot f \cdot L_h \cdot 60 \\ L_m &= 2 \cdot 0,3 \cdot 100 \cdot 3500 \cdot 60 \\ L_m &= 1,26 \cdot 10^7 \text{m} \end{aligned}$$

Where:  $s$  = stroke in meters  
 $f$  = frequency in cycles per minute  
 $L_h$  = required life in hours

From Figure 1 (Travel Life Chart), the travel life factor ( $K_L$ ) is 0,2.

From Figure 2 (Shaft Hardness Chart), the shaft hardness factor ( $K_s$ ) is 1.

For closed type MultiTrac Ball Bushing Bearings, the minimum value of  $K_o$  is 1, the assumed value for this calculation.

The required dynamic load capacity is obtained by using the following formula:

$$W_R = \frac{P}{K_L \cdot K_s \cdot K_o} = 575 \text{ N} \qquad W_R = \frac{575}{2,0 \cdot 1 \cdot 1} = 2875 \text{ N}$$

By referring to the product specification and dimension sections of this catalog, the linear bearing with the next higher load capacity is the MultiTrac MA M40 with a dynamic load capacity of 3820 N.

### Determining the Travel Life

The expected travel life of the MultiTrac MA M40 bearing under the conditions described in the example is:

$W = 3820 \text{ N}$  is the rated dynamic load capacity  
 $P = 575 \text{ N}$  is resultant of external loads  
 $K_o = 1$  is the orientation factor  
 $K_s = 1$  is the shaft hardness factor

The values are substituted into the following formula:

$$L_m = \left( \frac{W}{P} \cdot K_o \cdot K_s \right)^3 \cdot 10^5 \text{m} \qquad L_m = \frac{575}{2,0 \cdot 1 \cdot 1} = 2875 \text{ N}$$

$$L_m = \frac{293 \cdot 10^7}{2 \cdot 60 \cdot 0,3 \cdot 100}$$

This is converted into hours by the following:

$$L_h = \frac{L_m}{2 \cdot 60 \cdot s \cdot f} \qquad L_h = \frac{293 \cdot 10^7}{2 \cdot 60 \cdot 0,3 \cdot 100}$$

$$L_h = 8139 \text{ h}$$

## Engineering

# 60 Case LinearRace Shafting Specifications

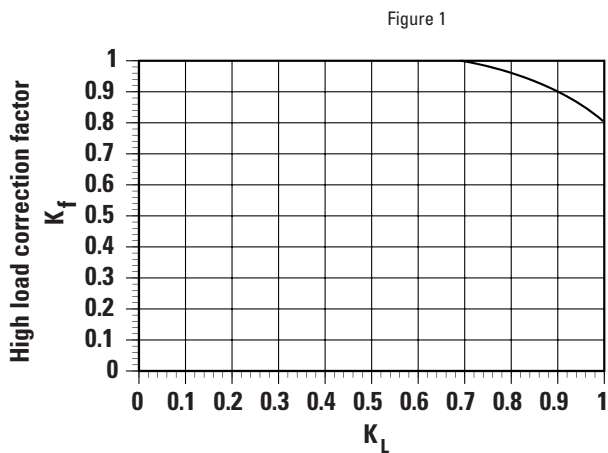
Thomson 60 Case LinearRace provides the inner race for Thomson Ball Bushing Bearings. All 60 Case LinearRace is manufactured to extremely close tolerances for surface finish, roundness, hardness and straightness to provide long service life with reduced maintenance.

### Specifications

Hardness: HRC 60 minimum  
 Surface Finish: 8  $R_a$  microinch  
 Roundness: 80 millionths of an inch  
 Straightness: Standard—.001 inch per foot cumulative (.002 TIR)  
 Special—.0005 inch per foot cumulative (.001 TIR)  
 Length Tolerance: Standard  $\pm$ .030 inch for diameters up to 2 inches  
 and  $\pm$ .060 for diameters 2 inch and over. Special length tolerances available.  
 Chamfer: Standard chamfer on diameters up to 1 inch is .030 x 45° and .060 x 45° for diameters larger than 1 inch.  
 Tensile Strength: Case: 335,000 psi, Core: 100,000 psi  
 Yield Strength: Case: 250,000 psi, Core: 75,000 psi

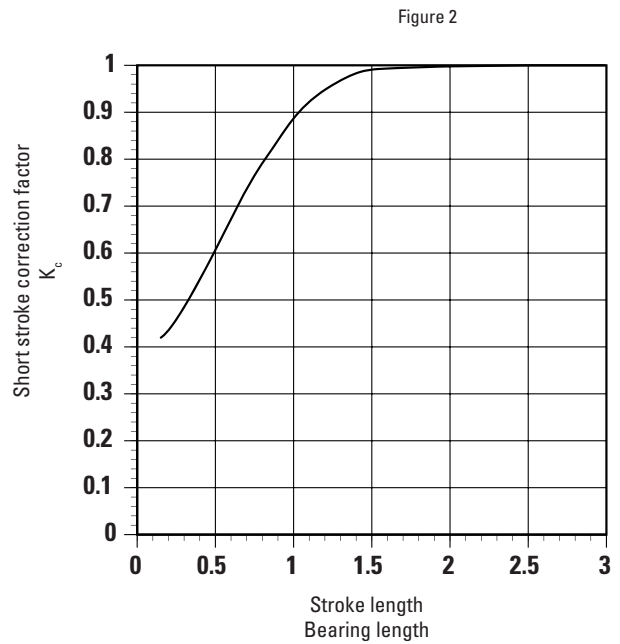
### Load Factor

In applications where the applied load exceeds 70% of the maximum dynamic load capacity of Super Smart Ball Bushing Bearings, a high load correction factor  $K_f$  must be applied to  $W_R$  when calculating travel life. (Figure 1)



### Short Stroke Applications

In applications when the stroke length is short, the life of the shaft is shorter than that of the Ball Bushing Bearing. In short stroke applications, the required dynamic load capacity must be multiplied by the factor  $K_c$  found on Figure 2.



# Load Consideration

When designing a linear motion system it is necessary to consider how the variables of operation will affect performance.

The following examples demonstrate how the position of the load and the center of gravity can influence the product selection. When evaluating your application, review each of the forces acting on your system and determine the product best for your needs.

## Terms:

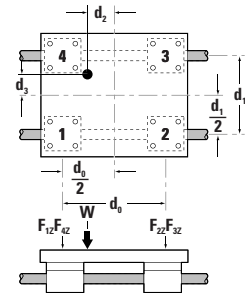
- $d_0$  = distance between centerlines of pillow blocks
- $d_1$  = distance between centerlines of 60 Case LinearRace ways
- $d_2$  = distance from centerline of carriage to load action point
- $d_3$  = distance from centerline of carriage to load action point
- $W$  = Load (lb)
- $F_{NX}$  = Force in the X-axis direction (lb<sub>f</sub> or N)
- $F_{NY}$  = Force in the Y-axis direction (lb<sub>f</sub> or N)
- $F_{NZ}$  = Force in the Z-axis direction (lb<sub>f</sub> or N)

$$F_{1Z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{2Z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{3Z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{4Z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$



### Horizontal Application I

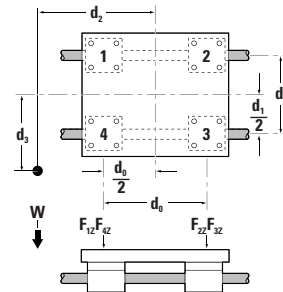
At the time of movement with uniform velocity or at the time of stop.

$$F_{1Z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{2Z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) - \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{3Z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{4Z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right) + \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$



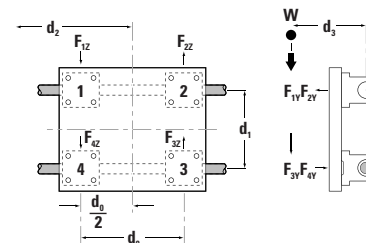
### Horizontal Application II

At the time of movement with uniform velocity or at the time of stop.

$$F_{1Y} \approx F_{4Y} = \left( \frac{W}{2} \cdot \frac{d_3}{d_1} \right)$$

$$F_{1Z} = F_{4Z} = \frac{W}{4} + \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right)$$

$$F_{2Z} = F_{3Z} = \frac{W}{4} - \left( \frac{W}{2} \cdot \frac{d_2}{d_0} \right)$$



### Side Mounted Application

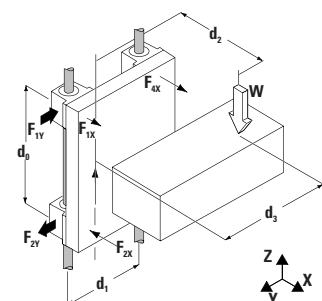
At the time of movement with uniform velocity or at the time of stop.

$$F_{1X} \approx F_{4X} = \frac{W}{2} \cdot \frac{d_2}{d_0}$$

$$F_{1Y} \approx F_{4Y} = \frac{W}{2} \cdot \frac{d_3}{d_0}$$

$$F_{1X} + F_{4X} \approx F_{2X} + F_{3X}$$

$$F_{1Y} + F_{4Y} \approx F_{2Y} + F_{3Y}$$



### Vertical Application

At the time of movement with uniform velocity or at the time of stop. At the time of start and stop, the load varies because of inertia.

## Engineering

# Coefficient of Friction

The coefficient of friction of Thomson Ball Bushing Bearings ranges from 0.001 to 0.004. There are two components of the coefficient of friction: the rolling or operating friction and the static or breakaway friction.

### Coefficient of Rolling Friction

The rolling coefficient of friction is measured by the force required to operate the Ball Bushing at a constant rate of travel. The formula for determining frictional resistance during operation is as follows:

$$P_f = P \times f_r$$

Where,

$P_f$  = Frictional resistance (lb<sub>f</sub>)

$P$  = Resultant of externally applied loads (lb<sub>f</sub>)

$f_r$  = Coefficient of rolling friction

The following table describes the coefficient of rolling friction of Ball Bushing Bearings operating on Thomson 60 Case LinearRace. These values are grouped according to the number of ball circuits in each bearing. Friction coefficients are constant among bearings having three and four ball circuits, but slightly less for bearings with five or six ball circuits. A dry Ball Bushing Bearing has the lowest coefficient of friction due to the complete absence of lubricant surface tension effects. Values for grease lubrication ranges from 100% greater in the smaller sizes to 20% to 50% greater in the larger sizes. Oil lubrication (medium/heavy, viscosity 64 cs @ 100° F) achieves frictional values slightly higher than those for grease lubrication.

Ball Bushing Bearing coefficients of rolling friction ( $f_r$ )

| Bearing I.D.       | Number of Ball Circuits | Condition of Lubrication | Load in % of Rolling Load Rating (for 2,000,000 inches of travel) |       |       |       |       |
|--------------------|-------------------------|--------------------------|---|-------|-------|-------|-------|
|                    |                         |                          | 125%  | 100%  | 75%   | 50%   | 25%   |
| 1/4, 3/8, 1/2, 5/8 | 3 & 4                   | No Lube                  | .0011   | .0011 | .0012 | .0016 | .0025 |
|                    |                         | Grease Lube              | .0019   | .0021 | .0024 | .0029 | .0044 |
|                    |                         | Oil Lube                 | .0022   | .0023 | .0027 | .0032 | .0045 |
| 3/4, 1             | 5                       | No Lube                  | .0011   | .0011 | .0012 | .0015 | .0022 |
|                    |                         | Grease Lube              | .0018   | .0019 | .0021 | .0024 | .0033 |
|                    |                         | Oil Lube                 | .0020   | .0021 | .0023 | .0027 | .0036 |
| 1 1/4 thru 1       | 6                       | No Lube                  | .0011   | .0011 | .0012 | .0014 | .0019 |
|                    |                         | Grease Lube              | .0016   | .0016 | .0017 | .0018 | .0022 |
|                    |                         | Oil Lube                 | .0018   | .0018 | .0019 | .0021 | .0027 |
| 5/8 thru 1 1/2     | 10                      | No Lube                  | .0011   | .0011 | .0012 | .0013 | .0018 |
|                    |                         | Grease Lube              | .0014   | .0014 | .0015 | .0016 | .0019 |
|                    |                         | Oil Lube                 | .0016   | .0016 | .0017 | .0019 | .0025 |

### Coefficient of Static Friction

The coefficient of static or breakaway friction is measured by the force required to initiate Ball Bushing Bearing movement. The formula used to determine static frictional resistance is:

$$P_f = P \times f_0$$

where  $f_0$  = Coefficient of static friction

The values for the coefficient of static friction or breakaway friction are not measurably affected by the number of ball circuits in the bearing or by the lubrication condition.

Ball Bushing Bearing coefficients of static friction ( $f_0$ )

| Load in % of Rolling Load Rating |       |       |       |       |
|----------------------------------|-------|-------|-------|-------|
| 125%                             | 100%  | 75%   | 50%   | 25%   |
| .0028                            | .0030 | .0033 | .0036 | .0040 |

### Seal Drag

Another variable that affects the frictional resistance in a Ball Bushing Bearing system is seal drag. When seals are used to retain lubricant or to prevent entry of foreign particles, frictional resistance must be taken into account for determining total frictional drag. In applications where contamination is minimal, the seals can be removed to reduce frictional drag. In highly contaminated applications, seals, wipers and or scrapers are used to minimize the ingress of contamination into the bearing. This protective measure adds to the frictional drag of the bearing system. There is a fine line between minimizing frictional drag and maximizing contaminant protection which is controlled by the addition or removal of seals, wipers or scrapers. In applications that require low frictional drag in highly contaminated environments, contact Thomson application engineering.

Thomson can provide a specially formulated lubricant, specifically developed to meet a broad range of linear bearing applications. Thomson LinearLube lubricant is a synthetic lubricant that utilizes suspended Teflon® in a specially formulated compound. LinearLube lubricant provides excellent performance characteristics in a wide range of applications. It is FDA listed, non-polluting and non-corrosive. LinearLube lubricant will not stain and adheres tightly to parts forming a virtually water resistant barrier.

- Maintains properties in operating temperatures from -65°F to 450°F
- USDA Rated HL (Non-Toxic)
- Will not oxidize in use
- 100% water resistant



## System Replacement Components

Replacement components for systems are available from Thomson. Assure the accuracy and repeatability of your system by specifying a -XS after the component part number.

Thomson Linear Motion systems are designed and manufactured through advanced processes with high grade materials chosen for their strength, durability, and hardness. The following is a comprehensive list of the materials utilized throughout Thomson systems.

## System Maintenance and Service

All Thomson ball-Bushing Bearings require a small amount of grease or oil to operate. For general applications, EP2 (extreme pressure NLGI grade2) lubricant is recommended to prevent wearing and rusting of the bearing surfaces. For food grade applications, Linear Lube (teflon-based synthetic grease) is recommended. When linear speeds are high, light oil should be used and the bearing should be prevented from running dry for a prolonged period of time. A medium to heavy oil or light grease has greater adhesion properties that afford longer bearing protection and minimize sealing problems.

All Thomson ball-Bushing Bearings are shipped with rust preventative oil. It is recommended that you lubricate the ball bushing prior to installation and periodically during operation to assure that the ball bushing does not run dry. Bearing lube cycle not to exceed 1 year or 100 km of travel (whichever comes first), but more frequent application may be required based on duty cycle, usage, environment and level of contamination. Thomson can provide a specially formulated lubricant, specifically developed to meet a broad range of linear bearing applications. Thomson LinearLube lubricant is a synthetic lubricant that utilizes suspended Teflon® in a specially formulated compound. LinearLube lubricant provides excellent performance characteristics in a wide range of applications. It is FDA listed, non-polluting and non-corrosive. LinearLube lubricant will not stain and adheres tightly to parts forming a virtually water resistant barrier.

- Maintains properties in operating temperatures from -65°F to 450°F
- USDA Rated HL (Non-Toxic)
- Will not oxidize in use
- 100% water resistant

## Engineering

# Material Engineering Specifications

## Ball Bushing Bearing materials

The following is a tabulation of the materials used for the components of the various types of Ball Bushing Bearings

| Type  | Outer Sleeve    | Ball Retainers      | Bearing Plates | Balls        | End Rings/Band |
|---|-----------------|---------------------|----------------|--------------|----------------|
| SSU, SSJM, SSEM, SPM, SUPER Ball Bushing Bearings         | Delrin          | Delrin              | 52100          | Chrome Steel | None/Steel     |
| Series A, B, XA, ADJ, OPN and DS                          | 52100           | Steel               | –              | Chrome Steel | Steel          |
| Stainless Steel (SS) to 1" I.D. Series A, XA, ADJ and OPN | 440A            | Type 305SS          | –              | 440C         | Type 303SS     |
| Series MAM  | –               | Delrin              | –              | Chrome Steel | Steel          |
| Series INST-SS  | 440C            | Brass               | –              | 440C         | None           |
| Series XR   | Reinforce Nylon | Reinforce Polyester | 8620           | Chrome Steel | Steel          |

Note: Materials called out are typical, certain series and sizes may vary.

## Corrosion Resistance

Super and Super Smart Ball Bushing Bearings can be supplied corrosion resistant with hard chrome plated bearing plates and stainless steel balls. Load capacity will be 70% of regular Super Ball Bushing Bearings. To order, add suffix "CR" following the Super Ball Bushing Bearing part number.

Large sizes (over 1" diameter) of series A, XA, ADJ, OPN and B, Ball Bushing Bearings can be supplied with stainless steel balls and black oxide sleeves for limited protection against atmospheric corrosion. Load capacity will be 70% of regular steel bearings. To order, add suffix "SP" following the bearing part number.

## Stainless Steel Ball Bushing Bearings

Precision and Multitrack Ball Bushing Bearings can be supplied with stainless steel ball and end rings. To order, add suffix "SS" following the bearing part number. Precision bearings are made entirely of stainless steel components. Multitrack bearings have stainless steel balls, end rings and outer sleeves.

### Sizes available:

Series A and XA: 1/4", 3/8", 1/2", 5/8", 3/4" and 1"  
Series ADJ and OPN: 1/2", 5/8", 3/4" and 1"  
Series MAM: 8mm, 12mm, 16mm, 20mm, 25mm, 30mm

## Ball Bushing Bearings with nylon balls

For extremely quiet operation, Ball Bushing Bearings fitted with Nylon balls can be supplied in sizes 1/2" and larger. For estimating purposes load ratings should be considered about 10% of those listed for Ball Bushing Bearings with steel balls. Prices and other information available on request.

## 60 Case shafts – hardened and ground

| Material Type         | AISI                                     | Rockwell "C" |
|-----------------------|--|--------------|
| Solid 60 Case         | Bearing-quality, high carbon alloy steel | 60 min       |
| Tubular 60 Case       | Bearing-quality, high carbon alloy steel | 58 min       |
| Solid Stainless Steel | 440C Stainless                           | 50 min       |

## Maximum recommended operating temperatures for RoundRail Bearings

The following are general recommendations. For additional information or more specific recommendations please contact factory with full application details.

| Type of Ball Bushing Bearings   | Maximum Operating Temperature | Load Rating at Maximum Operating Temperature as % of Catalog Load Rating |
|---|-------------------------------|--|
| Series Super Smart, Super, MultiTrac & XR   | 185° F                        | 100%   |
| Series A, B, XA, ADJ & OPN <sup>†</sup> , Series DS, and Series RW S, V, A, B & C           | 500° F                        | 70%  |
| Series A-SS, XA-SS, ADJ-SS, OPN-SS & INST-SS Stainless Steel (through 1" I.D.) <sup>‡</sup> | 600° F                        | 60%  |

<sup>†</sup>Maximum operating temperature for these two series for full catalog load rating is 300°F.

<sup>‡</sup>Note: Type PB-A, PB-ADJ, and PBO-OPN pillow blocks are assembled with Delrin plastic seal covers with a maximum operating temperature at 185°F.

## Pillow blocks and shaft supports

| Part Type  | Material   |
|--|--|
| Type Super Smart and Super – Pillow Blocks, Flanged Blocks and Aluminum Shaft Blocks | Type 6061-T6511 Aluminum                           |
| Type PB pillow blocks  | Ductile Iron                                       |
| Type PBO & XPBO pillow blocks  | Malleable/Ductile Iron                             |
| Type SR shaft support rails (std. lgth. 24")   | Type 6061-T6511 Aluminum                           |
| Type LSR shaft support rails   | 1010 Steel   |
| Type XSR shaft support rails (std. lgth. 24")  | Ductile Iron                                       |
| Type SB shaft support blocks   | Malleable Iron <sup>††</sup>                       |
| Waymount shaft supports  | Malleable Iron Base with steel adjustment elements |

<sup>††</sup>Type 6061-T6511 Aluminum for 1/4" and 3/8" sizes only

|          | Components                     | Material                        |
|----------|--------------------------------|---------------------------------|
| Supports | Type ASB End Support           | Aluminum Alloy <sup>†</sup>     |
|          | Type SB End Support            | Iron                            |
|          | Type SRA End Support           | Aluminum Alloy <sup>†</sup>     |
|          | Twin Shaft End Support         | Aluminum Alloy <sup>†</sup>     |
|          | Twin Shaft Web End Support     | Aluminum Alloy <sup>†</sup>     |
|          | Integrated End Support         | Aluminum Alloy <sup>†</sup>     |
|          | Dual Shaft Support Rail        | Aluminum Alloy <sup>†</sup>     |
|          | Inner Race (60 Case™ Shafting) | Case Hardened High Carbon Steel |
| Carriage | Universal Carriage             | Aluminum Alloy <sup>†</sup>     |
|          | Twin Shaft Carriage            | Aluminum Alloy <sup>†</sup>     |
|          | Twin Shaft Web Carriage        | Aluminum Alloy <sup>†</sup>     |
|          | Modular Dual Shaft Carriage    | Aluminum Alloy <sup>†</sup>     |
|          | Integrated Dual Shaft Carriage | Aluminum Alloy <sup>†</sup>     |

<sup>†</sup> Custom Black Anodized for inch size systems. Custom Grey Anodized for metric size systems. Custom system lengths may require black paint to protect machine cut-off ends on Dual Shaft Rail Assemblies and Shaft support Rails. If a specific surface finish is required contact the Thomson Systems application engineering department.

<sup>††</sup> Limited to a Max. Temperature of 185°F (85°C)

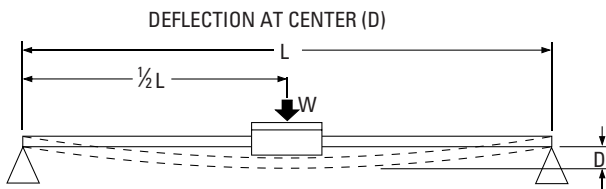
# 60 Case LinearRace Deflection

When Thomson 60 Case LinearRace is used in an end supported configuration it is important to ensure that 60 Case LinearRace deflections at the bearing locations are kept within performance limitations.

These equations give the deflection at the center of an end supported 60 Case LinearRace. Systems with continuous 60 Case LinearRace support are not subject to the same types of deflection.

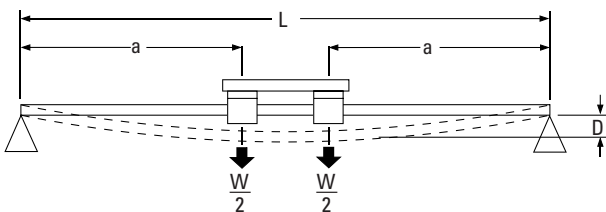
For more detailed information of the deflection characteristics of Thomson linear motion products contact application engineering.

### Simply Supported 60 Case LinearRace with One Block



$$D = \frac{WL^3}{48 EI} + \frac{5SL^4}{384 EI}$$

### Simply Supported 60 Case LinearRace with Two Blocks



$$D = \frac{Wa(3L^2 - 4a)^2}{48 EI} + \frac{5SL^4}{384 EI}$$

**LEGEND:**

- D = (in) (mm)
- W = (lb<sub>f</sub>) (N)
- L = (in) (mm)
- a = (in) (mm)
- S = (lb<sub>f</sub>/in) (N/mm)
- E = (lb<sub>f</sub>/in<sup>2</sup>) (N/mm<sup>2</sup>)
- I = (in<sup>4</sup>) (mm<sup>4</sup>)

### Values for Thomson 60 Case LinearRace

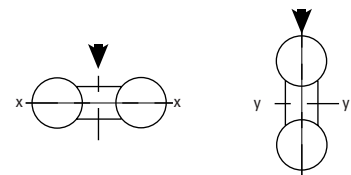
| LinearRace Diameter (In) | Solid                                   |                                   | Tubular                                 |                                   |
|--------------------------|---|-----------------------------------|---|-----------------------------------|
|                          | EI (lb <sub>f</sub> / in <sup>2</sup> ) | Weight (S) (lb <sub>f</sub> / in) | EI (lb <sub>f</sub> · in <sup>2</sup> ) | Weight (S) (lb <sub>f</sub> / in) |
| .187                     | 1.8E+03                                 | .008                              | –                                       | –                                 |
| .250                     | 5.8E+03                                 | .014                              | –                                       | –                                 |
| .375                     | 2.9E+04                                 | .031                              | –                                       | –                                 |
| .500                     | 9.2E+04                                 | .055                              | –                                       | –                                 |
| .625                     | 2.3E+05                                 | .086                              | –                                       | –                                 |
| .750                     | 4.7E+05                                 | .125                              | 4.6E+05                                 | .075                              |
| 1.000                    | 1.5E+06                                 | .222                              | 1.3E+06                                 | .158                              |
| 1.250                    | 3.6E+06                                 | .348                              | –                                       | –                                 |
| 1.500                    | 7.5E+06                                 | .500                              | 6.3E+06                                 | .328                              |
| 2.000                    | 2.4E+07                                 | .890                              | 1.9E+07                                 | .542                              |
| 2.500                    | 5.8E+07                                 | 1.391                             | 4.2E+07                                 | .749                              |
| 3.000                    | 1.2E+08                                 | 2.003                             | 9.3E+07                                 | 1.112                             |
| 4.000                    | 3.8E+08                                 | 3.560                             | 2.5E+08                                 | 1.558                             |

| LinearRace Diameter (mm) | EI (N/m <sup>2</sup> ) | Weight (S) (N / mm) |
|--------------------------|------------------------|---------------------|
| 5mm                      | 5.838                  | 0.0016              |
| 8mm                      | 38.26                  | 0.0038              |
| 10mm                     | 93.41                  | 0.0061              |
| 12mm                     | 193.7                  | 0.0087              |
| 16mm                     | 612.2                  | 0.0154              |
| 20mm                     | 1495                   | 0.0240              |
| 25mm                     | 3649                   | 0.0379              |
| 30mm                     | 7566                   | 0.0542              |
| 40mm                     | 2.391E+04              | 0.0968              |
| 50mm                     | 5.838E+04              | 0.1513              |
| 60mm                     | 1.211E+05              | 0.2172              |
| 80mm                     | 3.826E+05              | 0.3870              |

### Deflection for Twin Shaft Web System

Since the Twin Shaft rail has different stiffness depending on its orientation, an appropriate EI value must be used based upon the direction of loading. Select the orientation of your load from the figure below and then use the appropriate EI value in the deflection equation.

| Shaft Diameter (in) | EI Horizontal (lb <sub>f</sub> · in <sup>2</sup> ) | EI Vertical (lb <sub>f</sub> · in <sup>2</sup> ) |
|---------------------|--|--|
| 1/2                 | 1.9 x 10 <sup>6</sup>                              | 3.7 x 10 <sup>6</sup>                            |
| 3/4                 | 9.4 x 10 <sup>6</sup>                              | 1.5 x 10 <sup>7</sup>                            |
| 1                   | 3.0 x 10 <sup>7</sup>                              | 4.7 x 10 <sup>7</sup>                            |



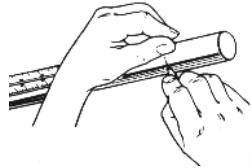
## Engineering

# How to Cut 60 Case LinearRace Shafting

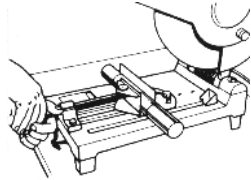
Genuine 60 Case LinearRace shafting has an extremely hard outer surface, HRC 60, and a soft core. The following steps will guide you in cutting 60 Case shafts. Remember: Always use goggles and normal shop safety precautions.

### With an abrasive cut-off saw... (preferred method)

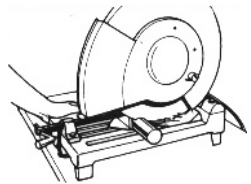
**Step 1:**  
Mark the shaft at the desired length.



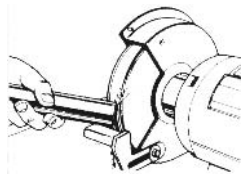
**Step 2:**  
Secure shaft in vise with longer end clamped.



**Step 3:**  
Cut the shaft at the mark.

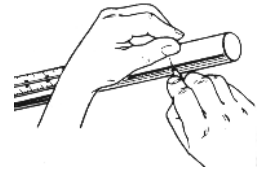


**Step 4:**  
Chamfer the shaft by rotating it by hand while holding it against an abrasive wheel at approximately 45°. Use an emery cloth to remove burrs and discoloration.

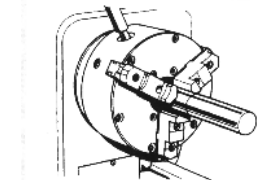


### With a lathe... (using a collect type or standard 3-jaw chuck)

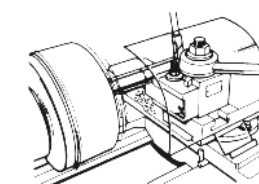
**Step 1:**  
Mark the shaft at the desired length.



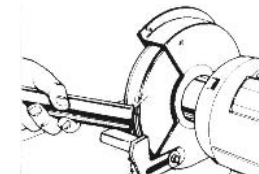
**Step 2:**  
Secure shaft in lathe with longer end in spindle.



**Step 3:**  
Use a sharp, carbide cut-off tool with shaft turning at approx. the following speeds: 400 rpm for dia. 1/4" - 1", and 300 rpm for dia. 1" or larger



**Step 4:**  
Chamfer the shaft using a standard carbide turning tool or an abrasive wheel. Use an emery cloth to remove burrs and discoloration.



## Application Tips

### Two Ball Bushing Bearings per 60 Case LinearRace

When using the Super Smart, Super or Precision Steel Ball Bushing Bearing it is recommended that two Ball Bushings bearings be used on each 60 Case LinearRace. This will assure system stability as well optimum performance. If envelope constraints prohibit the use of two Ball Bushing Bearings per 60 Case LinearRace contact application engineering.

### Ball Bushing Bearing Spacing vs. 60 Case LinearRace Spacing

In parallel 60 Case LinearRace applications, the ratio of 60 Case LinearRace spacing to Ball Bushing Bearing spacing should always be less than three to one. This will assure a constant breakaway and operating friction.

### 60 Case LinearRace Parallelism

In most applications the maximum acceptable out of parallelism condition is .001 inch over the entire full system length. In applications where preload is present (such as when using Die Set Ball Bushing Bearings) a closer 60 Case LinearRace parallelism is recommended.

### Three or More Parallel 60 Case LinearRace Ways

When aligning two 60 Case LinearRace ways parallel great care is required to assure a parallelism within .001 inch over the entire length of travel. When aligning multiple 60 Case LinearRace ways, parallelism between each 60 Case LinearRace should be held within the .001 inch specification.

### Measuring 60 Case LinearRace Alignment

Methods for establishing or checking 60 Case LinearRace straightness and parallelism depends on the accuracy required. Lasers, collimator or alignment telescopes can be used for very precise applications, while accurate levels, straight edges, micrometers and indicators will suffice for the majority of applications which have less stringent accuracy requirements.

### Installation of Super and Precision Steel Adjustable Type Ball Bushing Bearings

When installing a Super Ball Bushing Bearing into a slotted adjustable housing, the bearing plate should not align with the adjustment slot. When installing a Precision Steel Adjustable Type Ball Bushing Bearing into a slotted adjustable housing, the bearing adjustment slot should be 90° to the pillow block adjustment slot. These important steps will assure accurate bearing adjustment.

### Access for Lubrication

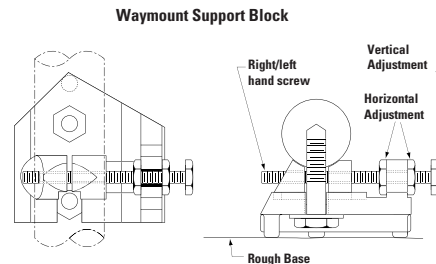
Thomson Super Smart and Super Ball Bushing Pillow Blocks are equipped with either an oil lubrication fitting or a 1/4-28 access for lubrication. To use the oil fitting simply insert a lubrication device into the oil nipple by depressing the spring loaded ball. The 1/4-28 tapped hole is a standard size for most grease and lubrication fittings. Simply install the lubrication fitting of your choice and it is ready for immediate use. Super Ball Bushing Pillow blocks in sizes .250 through .500 inch diameter are equipped with oil lubrication fittings. Super Ball Bushing pillow blocks in sizes .625 inch and above and all Super Smart Ball Bushing Pillow Blocks are equipped with a 1/4-28 access for lubrication. Metric Super Smart Pillow Blocks are equipped with a M6X1 access for lubrication.

### Waymount Support Block for Roundway Bearing Installation

Standard Waymount LinearRace Support Blocks provide 60 Case LinearRace adjustment in both the horizontal and vertical direction. This

product reduces installation time dramatically, while assuring precise 60 Case LinearRace alignment. This versatile design allows the

Waymount support to be mounted vertically or horizontally and in many different Roundway bearing applications. The number of Waymounts to be used is based on the maximum allowable 60 Case LinearRace deflection between supports and the accuracy required. Ordinarily indicators, sensitive levels and straight edges are adequate for most alignment conditions.



### RoundWay Bearing/60 Case LinearRace Installation Using Grout

Grouting is a very simple method of mounting a 60 Case LinearRace on almost any kind of surface, smooth or uneven. Grouting can also be used in conjunction with standard Waymount LinearRace support blocks or other 60 Case LinearRace supports to obtain maximum rigidity. Dams are fastened to the bed parallel to the 60 Case LinearRace which is then aligned with its mating 60 Case LinearRace (Figure 1). A compound, such as Thomson Waystone, is then poured under and around the lower circumference of the 60 Case LinearRace. This dries quickly forming a solid support of high compressive strength (over 12,000 psi) without affecting the initial straightness of the LinearRace.

If the bearing arrangement permits the grout to flow substantially around the circumference of the 60 Case LinearRace and side loads are light, Waymount LinearRace supports or other hold down bolts along the length made be unnecessary (Figure 2). Just one support at each end of the 60 Case LinearRace will usually provide final alignment and hold the 60 Case Linear-Race in position for grouting. If the length to diameter ratio is large, Waymount LinearRace supports should be equally spaced to minimize 60 Case LinearRace deflection. Grout should always be in direct contact with the surface of the bed or whatever base member provides primary rigidity and support.

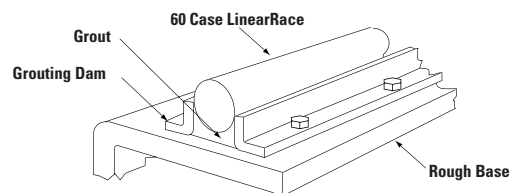


Figure 1

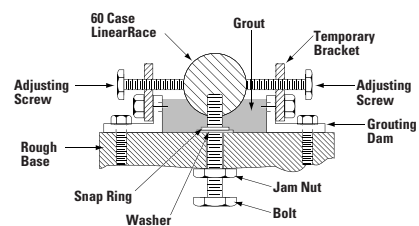


Figure 2

## Engineering

# Installation Guidelines

Thomson Ball Bushing bearings are manufactured to exceptionally close tolerances and offer smooth, virtually friction-free motion. The performance features of the bearings will only be realized, however, if care is taken during their installation.

Two areas of primary importance are the bearings alignment and the shaft parallelism. Two bearings are normally used on each shaft to assure smooth operation. The housing should be carefully aligned using the method given below. If a single twin-type housing is used, these procedures are not necessary. It is also necessary to assure that the height from the housing mounting surface to the shaft is consistent within .001 inch. Shimming may be necessary depending on the accuracy of the mounting surfaces to which the housings are bolted.

The housing can be mounted to the plate using the following procedure:

- a. Prepare the carriage plate with one side having an abutting surface.
- b. Mount two housings with the reference edges located against the abutting surface and tighten the hold down bolts. Figure #1
- c. Mount the second pair of housings on the opposite side of the carriage and tighten the bolts finger tight.
- d. Insert a location shaft of correct diameter and tolerance (h6) through these two housings and reference the distance from the abutting surface in [b] above, to this locating shaft. Figure #2
- e. After appropriate alignment of this pair of housings, tighten bolts to secure housings to carriage.

After the carriage is properly prepared, the shafts must be mounted to the surface. To achieve smooth, accurate motion, the shafts must be mounted parallel within .001 inch over the length of the stroke. This can be done by using the following procedure:

- a. Mount one shaft (either end-supported or fully supported) to the surface with mounting bolts finger tight.
- b. Using an aligning device such as a laser, auto-collimator or other optics, sight the shaft straight and secure to mounting surface.
- c. After this first shaft is fixed, the second shaft can be positioned and held down with bolts finger tight.
- d. The carriage is then mounted and its movement will pull this second shaft parallel to the first. Figures #3 and #4
- e. If the second shaft is then secured into position, the procedure is complete. Note that for fully supported systems, this securing should be done when the carriage is close to the bolts. For end supported systems, the securing should be done when the carriage is at the ends of the shafts. Figure #5
- f. An additional check can be done at this time to assure that the carriage is tracking correctly (i.e., that the carriage edge is moving parallel to the shaft). An indicator touching the carriage edge should not vary, as the carriage is moved along the shafts. Figure #6

Figure 1



Figure 2

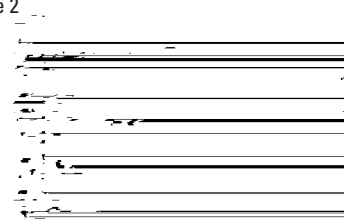


Figure 3

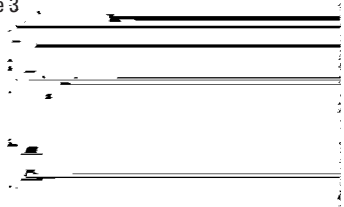


Figure 4

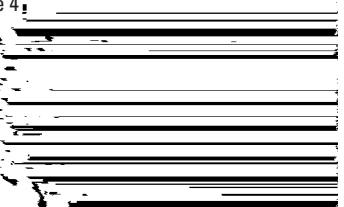


Figure 5

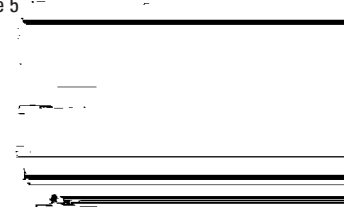


Figure 6

# Tolerance Charts

## Tolerance zones for internal (hole) dimensions (H15 through H5) (Dimensions in mm)

| Basic Size | H15    | H14    | H13    | H12    | H11    | H10    | H9     | H8     | H7     | H6     | H5     |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Over 6     | +0,580 | +0,360 | +0,220 | +0,150 | +0,090 | +0,058 | +0,036 | +0,022 | +0,015 | +0,009 | +0,006 |
| To 10      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 10    | +0,700 | +0,430 | +0,270 | +0,180 | +0,110 | +0,070 | +0,043 | +0,027 | +0,018 | +0,011 | +0,008 |
| To 14      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 14    | +0,700 | +0,430 | +0,270 | +0,180 | +0,110 | +0,070 | +0,043 | +0,027 | +0,018 | +0,011 | +0,008 |
| To 18      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 18    | +0,840 | +0,520 | +0,330 | +0,210 | +0,130 | +0,084 | +0,052 | +0,033 | +0,021 | +0,013 | +0,009 |
| To 24      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 24    | +0,840 | +0,520 | +0,330 | +0,210 | +0,130 | +0,084 | +0,052 | +0,033 | +0,021 | +0,013 | +0,009 |
| To 30      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 30    | +1,000 | +0,620 | +0,390 | +0,250 | +0,160 | +0,100 | +0,062 | +0,039 | +0,025 | +0,016 | +0,011 |
| To 40      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 40    | +1,000 | +0,620 | +0,390 | +0,250 | +0,160 | +0,100 | +0,062 | +0,039 | +0,025 | +0,016 | +0,011 |
| To 50      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 50    | +1,200 | +0,740 | +0,460 | +0,300 | +0,190 | +0,120 | +0,074 | +0,046 | +0,030 | +0,019 | +0,013 |
| To 65      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 65    | +1,200 | +0,740 | +0,460 | +0,300 | +0,190 | +0,120 | +0,074 | +0,046 | +0,030 | +0,019 | +0,013 |
| To 80      | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 80    | +1,400 | +0,870 | +0,540 | +0,350 | +0,220 | +0,140 | +0,087 | +0,054 | +0,035 | +0,022 | +0,015 |
| To 100     | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 100   | +1,400 | +0,870 | +0,540 | +0,350 | +0,220 | +0,140 | +0,087 | +0,054 | +0,035 | +0,022 | +0,015 |
| To 120     | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 120   | +1,600 | +1,000 | +0,630 | +0,400 | +0,250 | +0,160 | +0,100 | +0,063 | +0,040 | +0,025 | +0,018 |
| To 140     | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 140   | +1,600 | +1,000 | +0,630 | +0,400 | +0,250 | +0,160 | +0,100 | +0,063 | +0,040 | +0,025 | +0,018 |
| To 160     | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 160   | +1,600 | +1,000 | +0,630 | +0,400 | +0,250 | +0,160 | +0,100 | +0,063 | +0,040 | +0,025 | +0,018 |
| To 180     | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |
| Over 180   | +1,850 | +1,150 | +0,720 | +0,460 | +0,290 | +0,185 | +0,115 | +0,072 | +0,046 | +0,029 | +0,020 |
| To 200     | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  | 0,000  |

## Tolerance zones for external LinearRace shaft dimensions (h15 through h5) (Dimensions in mm)

| Basic Size | h15    | h14    | h13    | h12    | h11    | h10    | h9     | h8     | h7     | h6     | h5     |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Over 6     | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 10      | -0,580 | -0,360 | -0,220 | -0,150 | -0,090 | -0,058 | -0,036 | -0,022 | -0,015 | -0,009 | -0,006 |
| Over 10    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 14      | -0,700 | -0,430 | -0,270 | -0,180 | -0,110 | -0,070 | -0,043 | -0,027 | -0,018 | -0,011 | -0,008 |
| Over 14    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 18      | -0,700 | -0,430 | -0,270 | -0,180 | -0,110 | -0,070 | -0,043 | -0,027 | -0,018 | -0,011 | -0,008 |
| Over 18    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 24      | -0,840 | -0,520 | -0,330 | -0,210 | -0,130 | -0,084 | -0,052 | -0,033 | -0,021 | -0,013 | -0,009 |
| Over 24    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 30      | -0,840 | -0,520 | -0,330 | -0,210 | -0,130 | -0,084 | -0,052 | -0,033 | -0,021 | -0,013 | -0,009 |
| Over 30    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 40      | -1,000 | -0,620 | -0,390 | -0,250 | -0,160 | -0,100 | -0,062 | -0,039 | -0,025 | -0,016 | -0,011 |
| Over 40    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 50      | -1,000 | -0,620 | -0,390 | -0,250 | -0,160 | -0,100 | -0,062 | -0,039 | -0,025 | -0,016 | -0,011 |
| Over 50    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 65      | -1,200 | -0,740 | -0,460 | -0,300 | -0,190 | -0,120 | -0,074 | -0,046 | -0,030 | -0,019 | -0,013 |
| Over 65    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 80      | -1,200 | -0,740 | -0,460 | -0,300 | -0,190 | -0,120 | -0,074 | -0,046 | -0,030 | -0,019 | -0,013 |
| Over 80    | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 100     | -1,400 | -0,870 | -0,540 | -0,350 | -0,220 | -0,140 | -0,087 | -0,054 | -0,035 | -0,022 | -0,015 |
| Over 100   | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 120     | -1,400 | -0,870 | -0,540 | -0,350 | -0,220 | -0,140 | -0,087 | -0,054 | -0,035 | -0,022 | -0,015 |
| Over 120   | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 140     | -1,600 | -1,000 | -0,630 | -0,400 | -0,250 | -0,160 | -0,100 | -0,063 | -0,040 | -0,025 | -0,018 |
| Over 140   | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 160     | -1,600 | -1,000 | -0,630 | -0,400 | -0,250 | -0,160 | -0,100 | -0,063 | -0,040 | -0,025 | -0,018 |
| Over 160   | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 180     | -1,600 | -1,000 | -0,630 | -0,400 | -0,250 | -0,160 | -0,100 | -0,063 | -0,040 | -0,025 | -0,018 |
| Over 180   | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| To 200     | -1,850 | -1,150 | -0,720 | -0,460 | -0,290 | -0,185 | -0,115 | -0,072 | -0,046 | -0,029 | -0,020 |

## Engineering

| QUANTITY                 | CONVENTIONAL  |  | SI Unit  | Conversion Factors  |
|--------------------------|---|--|--|---|
|                          | Inch Unit   | Metric Unit (MKS)                                  |  |   |
| LENGTH                   | Inch<br>in.   | Meter<br>m   | Metre<br>m                                       | 1 in. = 25.4 mm   |
|                          |   |  |  | 1 mm = 0.03937 in.  |
|                          |   |  |  | 1 m = 3.2808 ft.  |
|                          |   |  |  | 1 ft. = 0.3048 m  |
| AREA                     | Square Inch<br>in. <sup>2</sup>                       | Square Meter<br>m <sup>2</sup>                     | Square Metre<br>m <sup>2</sup>                   | 1 in. <sup>2</sup> = 6.4516 cm <sup>2</sup>   |
|                          |   |  |  | 1 cm <sup>2</sup> = 0.155 in. <sup>2</sup>  |
|                          |   |  |  | 1 m <sup>2</sup> = 10.764 ft <sup>2</sup>   |
| MASS                     | Pound<br>lb <sub>m</sub>                              | Kilogram<br>kg                                     | Kilogram<br>kg                                   | 1 ft. <sup>2</sup> = 0.092903 m <sup>2</sup>  |
|                          |   |  |  | 1 lb <sub>m</sub> = 0.45359237 kg   |
|                          |   |  |  | 1 kg = 2.2046 lb  |
| FORCE                    | Pound Force<br>lb <sub>f</sub>                        | Kilogram Force<br>kg <sub>f</sub>                  | Newton<br>N                                      | 1 lb <sub>f</sub> = 0.45359237 kg <sub>f</sub>  |
|                          |   |  |  | 1 lb <sub>f</sub> = 4.44822 N   |
|                          |   |  |  | 1 kg <sub>f</sub> = 2.2046 lbf  |
|                          |   |  |  | 1 kg <sub>f</sub> = 9.80665 N   |
| STRESS<br>or<br>PRESSURE | Pounds per<br>square inch<br>lb/in. <sup>2</sup>      | Kilograms per<br>square meter<br>kg/m <sup>2</sup> | Pascal<br>Pa                                     | 1 N = 0.1019716 kg <sub>f</sub>   |
|                          |   |  |  | 1 N = 0.224809 lb <sub>f</sub>  |
|                          |   |  |  | 1 MPa = 10 <sup>6</sup> N/m <sup>2</sup> = N/mm <sup>2</sup>                                      |
|                          |   |  |  | 1 kPa = 10 <sup>3</sup> N/m <sup>2</sup>  |
|                          |   |  |  | 1 lb <sub>f</sub> /inch <sup>2</sup> = 0.070307 kg <sub>f</sub> /cm <sup>2</sup>                  |
|                          |   |  |  | 1 lb <sub>f</sub> /inch <sup>2</sup> = 7.0307 x 10 <sup>-4</sup> kg <sub>f</sub> /mm <sup>2</sup> |
|                          |   |  |  | 1 lb <sub>f</sub> /inch <sup>2</sup> = 6.8947 x 10 <sup>-3</sup> N/mm <sup>2</sup> (MPa)          |
| TORQUE<br>or<br>WORK     | Inch Pounds<br>lb <sub>f</sub> -in.                   | Kilogram Meters<br>kg <sub>f</sub> -m              | Newton-<br>Metres<br>Nm                          | 1 kg <sub>f</sub> /cm <sup>2</sup> = 14.2233 lb <sub>f</sub> /in. <sup>2</sup>                    |
|                          |   |  |  | 1 kg <sub>f</sub> /cm <sup>2</sup> = 9.80665 x 10 <sup>-2</sup> N/mm <sup>2</sup> (MPa)           |
|                          |   |  |  | 1 lb <sub>f</sub> -in. = 1.1521 kg <sub>f</sub> -cm   |
|                          |   |  |  | 1 kg <sub>f</sub> -cm = 0.8679 lb <sub>f</sub> -in.   |
|                          |   |  |  | 1 lb <sub>f</sub> -in. = 0.1129848 Nm   |
|                          |   |  |  | 1 kg <sub>f</sub> -m = 9.80665 Nm   |
| POWER                    | Foot pound per<br>minute<br>lb <sub>f</sub> -ft./min. | Force per<br>second<br>kg <sub>f</sub> -m/s        | Newton Metre per<br>second<br>Nm/s               | 1 kg <sub>f</sub> -cm = 9.80665 x 10 <sup>-2</sup> Nm   |
|                          |   |  |  | 1 Nm = 8.85 lb <sub>f</sub> -in.  |
|                          |   |  |  | 1 Nm = 10.19716 kg <sub>f</sub> -cm   |
|                          |   |  |  | 1 kW = 1000 Nm/s  |
|                          |   |  |  | 1 kW = 60,000 Nm/s  |
|                          |   |  |  | 1 kW = 44,220 lb <sub>f</sub> -ft./min.   |
|                          |   |  |  | 1 kW = 1.341 hp   |
| VELOCITY                 | Feet per<br>second<br>ft./s                           | Meters per<br>second<br>m/s                        | Meters per<br>second<br>m/s                      | 1 hp = 75 kg <sub>f</sub> -m/s  |
|                          |   |  |  | 1 hp = 44,741 Nm/min.   |
|                          |   |  |  | 1 hp = 33,000 lb <sub>f</sub> -ft.min.  |
|                          |   |  |  | 1 hp = 0.7457 kW  |
|                          |   |  |  | 1 ft./sec. = 0.3048 m/s   |
| ACCELERATION             | Feet per second<br>squared<br>ft./s <sup>2</sup>      | Meters per second<br>squared<br>m/s <sup>2</sup>   | Metres per second<br>squared<br>m/s <sup>2</sup> | 1 in./sec. = 2.54 cm/s  |
|                          |   |  |  | 1 ft./sec. = 0.00508 m/s  |
|                          |   |  |  | 1 mile/hr. = 0.44704 m/s  |
|                          |   |  |  | 1 km/hr. = 0.27777 m/s  |
|                          |   |  |  | 1 mile/hr = 1.609344 km/hr.   |
|                          |   |  |  | 1 ft./s <sup>2</sup> = 0.3048 m/s <sup>2</sup>  |







## Shafting Color Code Chart

| Material               | Class     | Random Length           |  |
|------------------------|-----------|-------------------------|--|
| Carbon Steel           | S         | Painted                 |    |
| Carbon Steel           | L         | 1/2 Black<br>1/2 Red    |    |
| Carbon Steel           | N         | Gray                    |    |
| Carbon Steel           | D         | 1/2 Gray<br>1/2 Green   |    |
| Carbon Steel           | Metric H6 | Orange                  |    |
| Carbon Steel           | Metric H4 | 1/2 Blue<br>1/2 Orange  |    |
| Carbon Steel           | Metric G6 | 1/2 Green<br>1/2 Orange |  |
| Carbon Steel Chrome    | All       | 1/2 Blue                |  |
| 440C Stainless Steel   | S         | No Color                |  |
| 440C Stainless Steel   | L         | 1/2 Orange              |  |
| 316 Stainless Steel    | L         | 1/2 Cyan                |  |
| 440C Stainless Steel   | Metric    | 1/2 Yellow              |  |
| 52100 Tubular          | S         | No Color                |  |
| 52100 Tubular          | L         | 1/2 Black<br>1/2 Red    |  |
| Carbon Steel Deep Case | L         | 1/2 Beige<br>1/2 Pink   |  |
| Carbon Steel Deep Case | N         | 1/2 Gray<br>1/2 Pink    |  |
| Carbon Steel Deep Case | Metric H6 | Pink                    |  |

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