TIMKEN







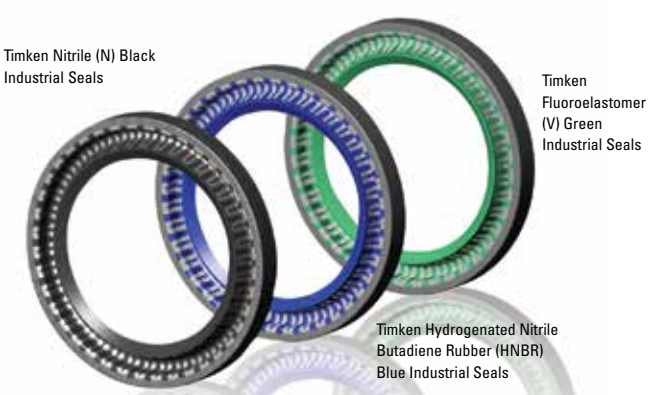
# Sealing Technology for Primary Metals

# Timken Industrial Seals for Primary Metals

Smelting and steel making is a tough job in an even tougher environment. Extreme temperatures and high levels of contamination can make or break your equipment and productivity. Choose from our selection of sealing products and Prophet software diagnostic tool to help improve the performance of your bearings and equipment while reducing downtime and maintenance costs.

## Oil Seals

Timken's complete line of high-performance oil seals for primary metals applications helps improve machine efficiency, bearing life and productivity while reducing your maintenance time and costs.




- Three varieties to accommodate different requirements
- Color-coded materials for easy identification
- Provides excellent wear resistance
- Features a wide temperature range
- Promotes longer seal and bearing life

## Software Package

Prophet is a custom engineered software program that enables the customer to predict cost savings. Prophet utilizes customer driven data, such as annual power consumption and maintenance cost, to determine the total value of Timken Industrial Seals.




- Production losses
- Downtime costs
- Equipment repair expenditures
- Labor costs
- Power consumption

## Metallic Bearing Isolators

Timken's metallic bearing isolators will help extend equipment life by blocking contaminants and decreasing frictional drag on the shaft.

**Small Cross Section**
Part #29607



**Narrow Width**
Part #29609



**Flangeless**
Part #29619



**Vertical**
Part #29620



**Split Pillow Block**
Part #29616



**Step Shaft**
Part #29697



To learn more about our full line of Industrial Seals, call your Timken sales representative or visit us at **www.timken.com/industrialseals.**

TIMKEN INDUSTRIAL SEALS

# Oil Seals

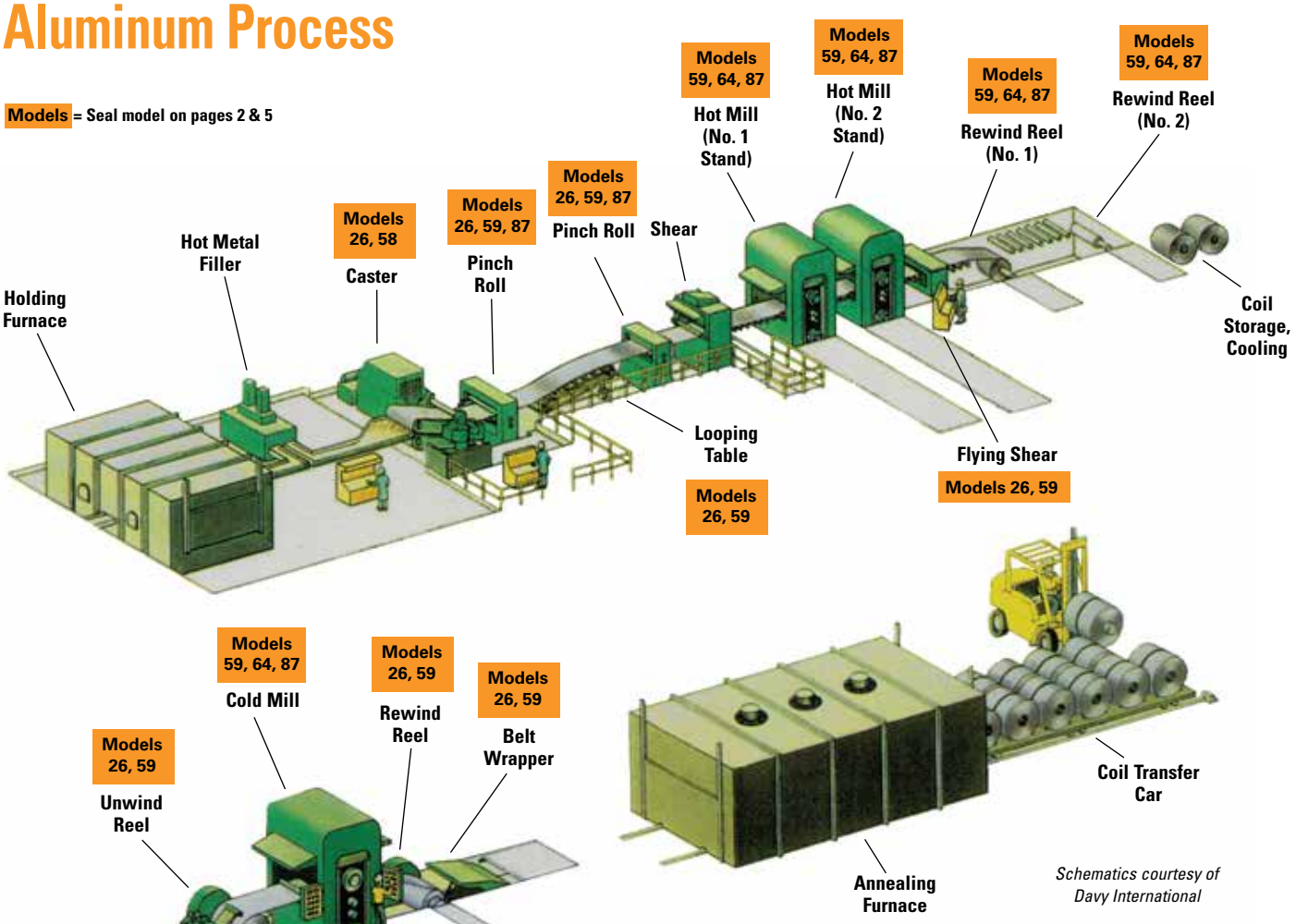
| Oil Seals | Model | Features | Materials | Temp | Shaft Dia. inches (mm) | Surface Speed | Spring Material | Misalign & Runout in.@ fpm (mm @ mps) | Pressure |
|---|---|---|---|---|---|---|---|---|---|
|  | 23 | • General purpose, split seal<br>• Cover plate required<br>• Over 300,000+ sizes, readily available | Timken N Black<br>Timken ES Blue<br>Timken V Green<br>Silicone | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C)<br>-75°F (-59.4°C) to 350°F (176.6°C) | 3.000 and up (76.2 and up) | 2,000 fpm (10.2 m/s) | Molded-in stainless steel finger | 0.010 @ 1,000 (0.25 @ 5.10)<br>0.005 @ 2,000 (0.13 @ 10.20) | Ambient |
|  | 26 | • General purpose seal<br>• Solid or split design<br>• Reverse bevel lip design prevents lip rollover<br>• Reinforced rubber OD<br>• Single and dual lip configurations available | Timken N Black<br>Timken ES Blue<br>Timken V Green | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C) | 0.750 to 60.000 (19.0 to 1524.0) | 5,000 fpm (25.4 m/s) | Molded-in stainless steel finger | 0.015 @ 1,000 (0.38 @ 5.10)<br>0.010 @ 2,000 (0.25 @ 10.20)<br>0.008 @ 5,000 (0.20 @ 25.40) | To 7 psi (0.4 bar) |
|  | 53/63 | • General purpose assembled seal<br>• Heavy-duty metal outer case<br>• Single and dual lip configurations available | Timken N Black<br>Timken ES Blue<br>Timken V Green<br>Silicone | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C)<br>-75°F (-59.4°C) to 350°F (176.6°C) | 0.250 to 90.000 (6.4 to 2286.0) | 3,000 fpm (15.2 m/s) | Stainless steel finger | 0.015 @ 1,000 (0.38 @ 5.10)<br>0.010 @ 2000 (0.25 @ 10.20)<br>0.005 @ 3000 (0.13 @ 15.20) | To 7 psi (0.4 bar) |
|  | 58 | • High-temperature, assembled seal<br>• Heavy-duty metal outer case<br>• THERMO-CERAM™ sealing element<br>• Ideal for abrasive environments<br>• Grease lubricated applications only | Thermo-Ceram™ | To 1600°F (871°C) | 2.000 to 12.000 (50.8 to 304.8) | 500 fpm (2.5 m/s) | N/A | 0.015 @ 500 (0.38 @ 2.50) | Ambient |
|  | 59 | • Severe service assembled seal<br>• Heavy-duty metal outer case<br>• Reverse bevel lip design prevents lip rollover<br>• Aggressive shaft-to-bore misalignment capability | Timken N Black<br>Timken ES Blue<br>Timken V Green | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C) | 6.000 to 90.000 (152.4 to 2286.0) | 5,000 fpm (25.4 m/s) | Molded-in stain-less steel finger | 0.093 Max. (2.36) | To 7 psi (0.4 bar) |
|  | 64® | • Severe service assembled seal<br>• Heavy-duty metal outer case<br>• Unique carrier/garter spring combination<br>• Industry's highest shaft-to-bore misalignment capability | Timken N Black<br>Timken ES Blue<br>Timken V Green<br>Silicone | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C)<br>-75°F (-59.4°C) to 350°F (176.6°C) | 8.000 to 90.000 (203.2 to 2286.0) | 7,000 fpm (35.6 m/s) | Combination stainless steel garter & stainless steel finger | 0.125 @ 5,000 (3.18 @ 25.40)<br>0.093 @ 7,000 (2.36 @ 35.60) | To 7 psi (0.4 bar) |
|  | 87 | • Severe service seal<br>• Metal reinforced rubber OD<br>• Reverse bevel lip design prevents lip roll-over<br>• Agressive shaft-to-bore misalignment capability | Timken Black<br>Timken Blue<br>Timken Green | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C) | 6.000 to 48.000 (152.4 to 1219.2) | 5,000 fpm (25.4 m/s) | Molded-in garter | 0.100 @ 2,500 (2.54 @ 12.70)<br>0.050 @ 5,000 (1.27 @ 25.40) | To 7 psi (0.4 bar) |
|  | 143 | • Face-type, excluder seal<br>• Split design<br>• High-speed service<br>• Stainless steel clamp | Nitrite<br>Timken ES Blue<br>Timken V Green | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C) | 6.000 to 80.000 (152.4 to 2032.0) | 5,000 fpm (25.4 m/s) | Stainless steel clamp | N/A | N/A |
|  | 145 | • Face-type, excluder seal*<br>• Solid design<br>• High-speed service<br>• Several configurations available | Nitrite<br>Timken ES Blue<br>Timken V Green | -40°F (-40°C) to 200°F (93°C)<br>-40°F (-40°C) to 300°F (150°C)<br>-22°F (-30°C) to 400°F (204°C) | 7.000 to 80.000 (177.8 to 2032.0) | 5,000 fpm (25.4 m/s) | Stainless steel garter | N/A | N/A |

* Assembled Width 145 A1= 2.000" ±0.500" 145 A2 = 0.781"±0.156"

TIMKEN INDUSTRIAL SEALS

# Aluminum Process

Models = Seal model on pages 2 & 5




*Schematics courtesy of Davy International*




Models GD, IG, EQ, P/S-II, PK, 26

| | Usage | Range of Temperature | | |
|---|---|---|---|---|
| | | Min. Operating Temp | Max Spike Temp | Max Cont Operating Temp |
| Timken N Black | General purpose | -40°F (-40°C) | 250°F (122°C) | 200°F (95°C) |
| Timken ES Blue | Excellent heat and abrasion resistance | -40°F (-40°C) | 350°F (175°C) | 300°F (150°C) |
| Timken V Green | Excellent heat and chemical resistance | -22°F (-30°C) | 450°F (232°C) | 400°F (205°C) |
| Silicone | Wide temperature range | -75°F (-60°C) | 400°F (205°C) | 350°F (175°C) |
| PTFE | Superior chemical resistance | -120°F (-85°C) | 450°F (232°C) | 400°F (205°C) |
| THERMO-CERAM™ | Ultra high-temp to 1600°F (871°C) | | | 1600°F (871°C) |

## Other Equipment

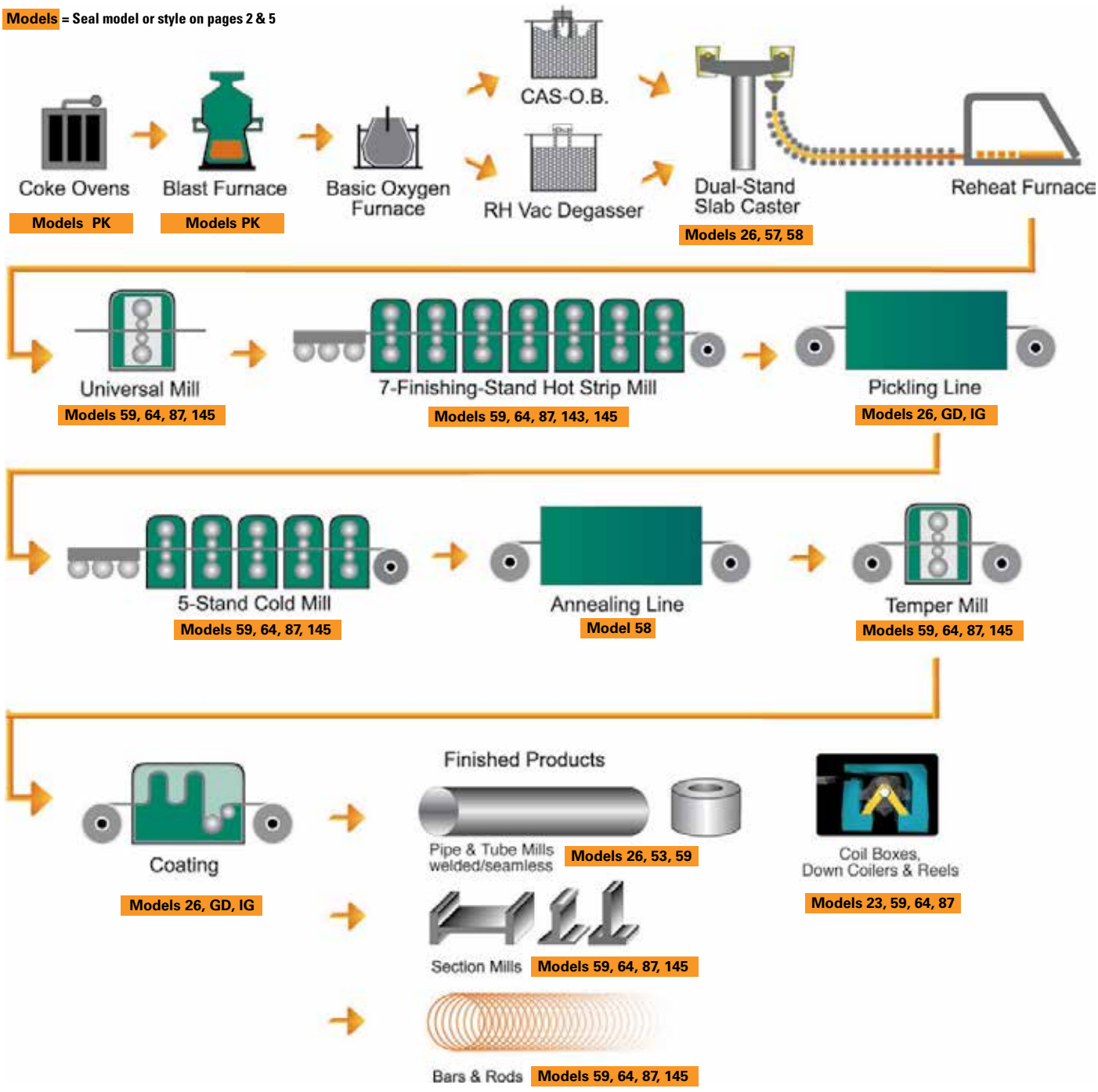
| | | Seal Materials | | | | | |
|---|---|---|---|---|---|---|---|
| | | TIMKEN INDUSTRIAL SEALS | SILICONE | PTFE Filled | THERMO-PTFE | THERMO-CERAM™ | Bronze |
| Furnace Table Rolls | Model 58 | | N/R | | | ● | |
| Run Out Table Rolls | Model 26 & Non-Metallic Bearing Isolator | ● | N/R | | ● | | ● |
| Gearboxes | Model 26 | ● | N/R | | | | |
| Motors | Non-Metallic Bearing Isolator | | N/R | ● | | | ● |
| Pumps | Non-Metallic Bearing Isolator | | N/R | ● | | | ● |
| Drive Systems | Model 26 | ● | N/R | | | | |

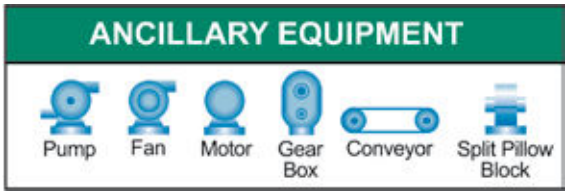
*N/R: Not recommended for service

TIMKEN INDUSTRIAL SEALS

# Steel Process

**Models** = Seal model or style on pages 2 & 5




**Models GD, IG, EQ, P/S-II, PK, 26**

TIMKEN INDUSTRIAL SEALS

# Non-Contact Bearing Isolators

| Isolators | Model | Features | Standard Material | Temp | Shaft Dia inches (mm) | Surface Speed | Axial Motion | Misalign & Runout in.@ fpm (mm @ mps) | Pressure |
|---|---|---|---|---|---|---|---|---|---|
| **Timken Metallic Isolator**  | **GD** | • Meets NEMA MG 1-2003<br>• Surpasses IEEE 841-2001 test standards<br>• Conforms to API 610<br>• No arbor press required for installation<br>• No internal metal-to-metal contact | • Bronze** construction<br>• Filled PTFE unitizing ring<br>• Fluoroelastomer O-rings standard | -30°F (-34°C) to 400°F (204°C) | 0.875 to 10.500* (22.2 to 266.7) | 12,000 fpm (60.9 m/s) | ± 0.025" (0.64mm) | ± 0.020" (0.51mm) | Ambient |
| **Timken Metallic Isolator**  | **MT II** | • Unique microcellular filter technology<br>• Protects against severely dusty environments<br>• Meets NEMA MG 1-2003<br>• Surpasses IEEE 841-2001 test standards<br>• Conforms to API 610<br>• No arbor press required for installation<br>• No internal metal-to-metal contact | • Bronze or 316 stainless steel construction<br>• Silicone foam<br>• Filled PTFE Unitizing Ring<br>• Fluoro-elastomer O-rings standard | -30°F (-34°C) to 400°F (204°C) | 0.875 to 10.500 (22.2 to 266.7) | 4,500 f/m (22.9 m/s) | ±0.025 (0.64) | ±0.020 (0.51) | Ambient |
| **Timken Non-Metallic Isolator**  | **IG** | • Excellent chemical resistance<br>• Meets NEMA MG 1-2003<br>• Meets IEEE 841-2001 test standards<br>• No arbor press required for installation | • FDA-compliant, blue glass-filled PTFE**<br>• Fluoro-elastomer O-rings standard | -40°F (-40°C) to 400°F (204°C) | 0.875 to 11.000* (22.2 to 279.4) | 4,500 fpm (22.9 m/s) | ± 0.015" (0.38mm) | ± 0.020" (0.51mm) | Ambient |
| **Timken Non-Metallic Isolator**  | **EQ** | • Excellent chemical resistance<br>• Multi-position capability<br>• No arbor press required for installation<br>• Unique pumping/fanning action | • Graphite-filled PTFE**<br>• Fluoro-elastomer O-rings standard | -40°F (-40°C) to 400°F (204°C) | 0.875 to 6.000* (22.2 to 152.4) | 4,500 fpm (22.9 m/s) | ± 0.015" (0.38mm) | ± 0.015" (0.38mm) | Ambient |

*For large sizes, contact your Timken sales representative. **Other materials available. Consult the Timken Technical Manual or contact your Timken sales representative.

TIMKEN INDUSTRIAL SEALS

# General Engineering Data Tables

## Table 1 - Shaft Data

| | |
|---|---|
| Hardness | Rockwell C 30 to 40 (Rockwell C 45 minimum will provide extra protection against damage during handling or assembly) |
| Finish (Plunge grind is recommended as most satisfactory) | 10-20 µin. RA (0.25-0.50 µm) with no machine lead, scratches, dents, corrosion, pits or other surface defects |
| Surface speed | Formula:<br>Feet-Per-Min. = Shaft Dia. (in) x RPM x 0.262<br>Meters-Per-Sec. = Shaft Dia. (mm) x RPM x 0.0000524 |
| Safe speed depends on* | 1. Shaft finish<br>2. Misalignment and runout<br>3. Amount and kind of lubricant<br>4. Seal design<br>5. Pressure |

* As shaft speed increases, the factors become more critical.

## Table 2 - Operating Pressure Limits

| Shaft Speed | | Maximum* Pressure | |
|---|---|---|---|
| f/m | m/s | psi | kp (bar) |
| 0 - 1000 | 0 - 5.1 | 7 | 48 (0.48) |
| 1001 - 2000 | 5.2 - 10.2 | 5 | 35 (0.35) |
| 2001 & Up | 10.3 & Up | 3 | 21 (0.21) |

*Timken split oil seals are not recommended for applications involving fluid pressure.

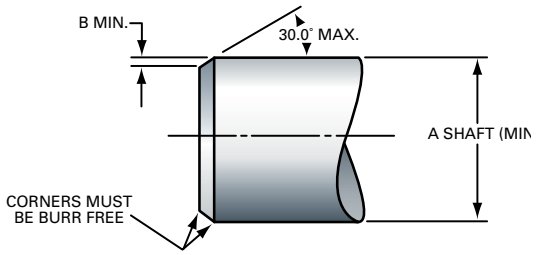
## Table 3 - Shaft Diameter Tolerances

| Shaft Diameter | | Recommended Tolerance | |
|---|---|---|---|
| inch | mm | inch | mm |
| Up to 4.000 | Up thru 101.60 | ± 0.003 | ± 0.08 |
| 4.001 - 6.000 | 101.61 - 152.40 | ± 0.004 | ± 0.10 |
| 6.001 - 10.000 | 152.41 - 254.00 | ± 0.005 | ± 0.13 |
| 10.001 & Up | 254.01 & Up | ± 0.006 | ± 0.15 |

## Table 4 - Bore Tolerance

| Bore Diameter | Bore Tolerances |
|---|---|
| inches (mm) | inches (mm) |
| Up to 2.000 (50.8) | ± 0.001 (± 0.0254) |
| 2.001 to 3.000 (50.8 to 76.2) | ± 0.001 (± 0.0254) |
| 3.001 to 5.000 (76.2 to 127) | ± 0.0015 (± 0.0381) |
| 5.001 to 7.000 (127 to 177.8) | ± 0.0015 (± 0.0381) |
| 7.001 to 12.000 (177.8 to 304.8) | ± 0.002 (± 0.0508) |
| 12.001 to 20.000 (304.8 to 508) | ± 0.003 (± 0.0762) |
| 20.001 to 40.000 (508 to 1016) | ± 0.004 (± 0.1016) |
| 40.001 to 60.000 (1016 to 1524) | ± 0.006 (± 0.1524) |

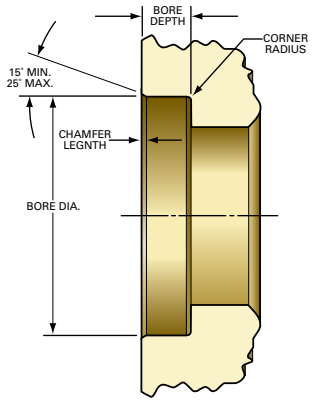
## Table 5 - Recommended Shaft Lead Corner




| A - Shaft Diameter | | B - Minimum* | |
|---|---|---|---|
| inch | mm | inch | mm |
| Thru 0.394 | Thru 10.00 | 0.030 | 0.75 |
| 0.395 - 0.787 | 10.01 - 20.00 | 0.040 | 1.00 |
| 0.788 - 1.181 | 20.01 - 30.00 | 0.050 | 1.25 |
| 1.182 - 1.575 | 30.01 - 40.00 | 0.060 | 1.50 |
| 1.576 - 1.969 | 40.01 - 50.00 | 0.070 | 1.75 |
| 1.970 - 2.756 | 50.01 - 70.00 | 0.080 | 2.00 |
| 2.757 - 3.740 | 70.01 - 95.00 | 0.090 | 2.25 |
| 3.741 - 5.118 | 95.01 - 130.00 | 0.110 | 2.75 |
| 5.119 - 9.449 | 130.01 - 240.00 | 0.140 | 3.50 |
| 9.450 & Up | 240.01 & Up | 0.220 | 5.50 |

*If a shaft lead-in radius is used, maintain the diametral difference to no less than indicated value.

## Table 6 - Housing Bore Dimensions




| Nominal Seal Width | | Chamfer Length | | Max. Housing Corner Radius | |
|---|---|---|---|---|---|
| inch | mm | inch | mm | inch | mm |
| Thru 0.394 | Thru 10.00 | 0.03-0.04 | 0.7-1.0 | 0.020 | 0.50 |
| Over 0.394 | Over 10 | 0.05-0.06 | 1.2-1.5 | 0.030 | 0.75 |

Source: Rubber Manufacturers Association

## Turn to Timken

Like all of our products and services, our seals are backed by our leading technical support and a vast distribution network. Turn to Timken today for a full line of Timken industrial seals that help improve bearing, equipment and bottom-line performance.
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TIMKEN

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Stronger. **Commitment.** Stronger. **Value.** Stronger. **Worldwide.** Stronger. **Together.** | **Stronger.** By Design.

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