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# ProTech™ Bearing Isolators

EPS 5275

aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



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**Engineered Polymer Systems  
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## Unmatched Corrosion Resistance

Advanced proprietary PTFE compounds mean ProTech™ is well suited for caustic environments such as citric acids found in juice processing and strong sulfides in pulp and paper processing. ProTech's superior chemical resistance allows for the standardization of a single material within a plant, eliminating the need to stock duplicate sizes in expensive stainless steel, Hastelloy® or other exotic materials. PTFE is compatible with over 160 chemicals vs. 11 for bronze and 30 for stainless steel.



## Superior Bearing Protection Even In Harsh Operating Environments

Parker developed the unique ProTech design to provide unmatched **two way** sealing for zero lubricant leakage and total exclusion of contaminants. This is accomplished by using non-contact labyrinth seal technology. ProTech features the most effective labyrinth design for both dirt exclusion and oil retention and is far superior to isolators that rely on internal o-rings or other internal seals for sealability. If you want more than just an o-ring for bearing protection – step up to ProTech!

01/01/2014



**Parker Hannifin Corporation**  
EPS Division  
Salt Lake City, Utah

## Ultimate Performance

The isolator protection you rely on for protecting bearings in pumps and motors is also available for gearbox applications. ProTech™ 360 is a hybrid design that incorporates an outboard labyrinth for contaminant exclusion and PTFE lip technology for positive oil retention, even in vertical down applications. ProTech 360 is used by numerous OEM's for their most demanding gearbox applications.



### BEFORE



Severe and costly damage to internal gearbox components, including gear teeth, routinely occurred (approx. every 90 days) due to lip seal's failure to exclude contaminants.

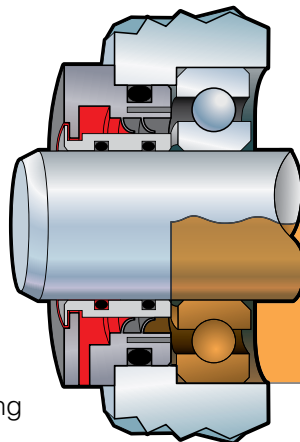
### AFTER



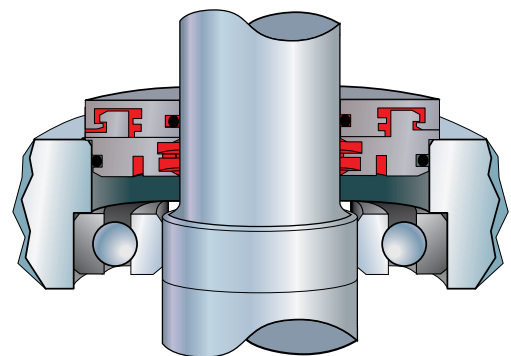
Inspection of same gearbox 13 months after installation of ProTech. Photo taken as-is after cover removed.

## Cooling Tower Gearboxes Sealed From Top To Bottom

Upgrading gearboxes that drive cooling tower fans with the ProTech 360 design on the input shaft and the ProTech LX design (LW without drain port) for the vertical up location is becoming the industry standard for preventing failure due to moisture intrusion.



**Input Shaft**  
**ProTech 360**



**Output Shaft**  
**ProTech LX**

01/01/2014

## The Best Solutions For Food Processing Applications

ProTech™'s unique designs and superior performance are eating the competition's lunch in the food processing market. The WD is an economical profile for high volume, disposable equipment such as wash down grade motors and drives. It also greatly reduces maintenance costs and down time in food processing applications such as picker hubs in poultry processing. Anti-microbial and FDA materials are readily available.



*ProTech WD meets IP69k*



## Prefer A Metallic Isolator?

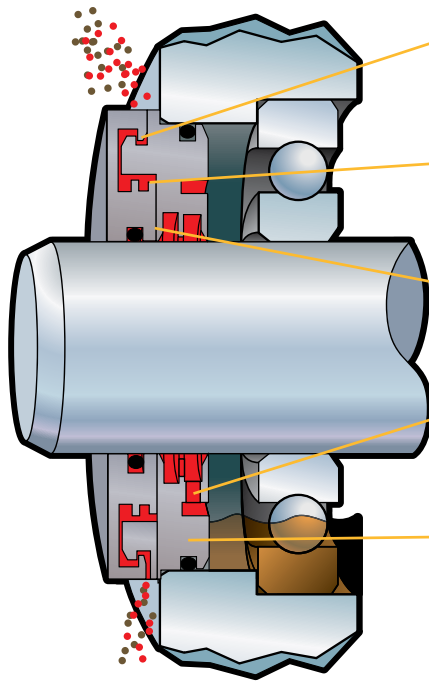
Parker's Millennium® bearing isolator is much more than just a bronze o-ring holder. Based on patented labyrinth seal technology, Millennium's robust non-contact isolator needs no internal o-ring seal to exclude heavy water spray. No internal seal means zero wear and longer life. Severe oil splash retention grooves, unitized cartridge design and tool-free installation are also standard features. If you demand metallic isolators, demand Millennium!

01/01/2014

## ProTech™ Seal Design

With years of experience in the design and manufacture of sealing solutions for industrial applications, Parker is an industry leader in seal design technology and is *the* innovation leader when it comes to bearing isolator design.

**Parker's ProTech design innovations** include the first bearing isolator with a two-piece unitized design, complete wrap around rotor, severe splash oil grooves and a hybrid isolator for flooded applications.



**ProTech "LW"**

- First to offer two piece unitized construction. Patented design locks seal together and won't wear like internal o-rings, PTFE elements or other locking rings.
- Contaminant exclusion relies on labyrinth technology, not an internal seal. ProTech does not rely on a simple internal o-ring to protect your bearings.
- Superior chemical resistance provided by proprietary PTFE materials.
- Setting the standard for oil retention. Inboard labyrinth is the most efficient design for retaining oil splash. Far superior to the single groove concept.
- External o-rings provide press fit at shaft and seal housing for zero wear of shaft and housing. Also allows for easy installation.

*First Isolator U.L. tested to IEEE 841, meets or exceeds IP55, IP56, IP66, IP69k and API 610.*

### ProTech Materials

ProTech is constructed of proprietary reinforced PTFE, and is made to perform in high speed, high temperature, and extreme chemical environments. PTFE fillers extend the range of operating conditions by delivering enhanced physical properties to meet specialized environmental conditions such as those found in pulp and paper, petrochemical and food service applications.

### Quality

ProTech is manufactured under strict quality control processes — from raw material selection to finished product. The highest quality and absolute consistency from lot-to-lot are assured by:

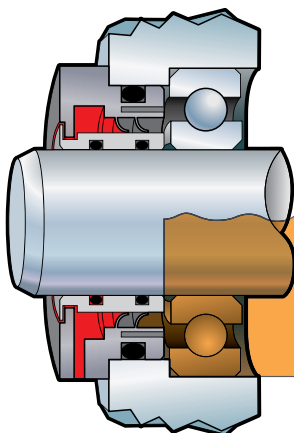
- Our many years of seal manufacturing experience
- Use of only first-grade virgin PTFE resins
- Sophisticated system for controlling critical sintering process
- Specialized CNC production equipment
- QS-9000 certification



## Reliable Performance

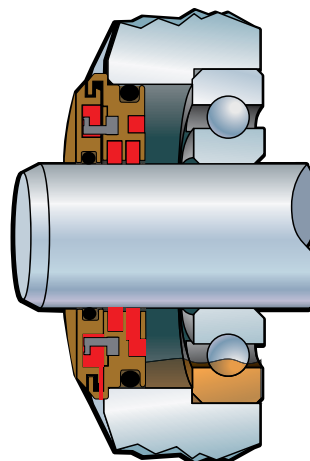
CHARACTERISTICS	FEATURES	BENEFITS
ProTech™ can replace radial lip oil seals when performance and reliability are critical. In addition, ProTech can be made for a wide range of industrial applications.	<b>Non-Contact Design</b>	<ul style="list-style-type: none"> <li>■ Virtually no torque consumption</li> <li>■ Will not wear or groove shafts</li> </ul>
	<b>Two-Piece Unitized Construction</b>	<ul style="list-style-type: none"> <li>■ Complete exclusion of dust and water</li> <li>■ Zero oil leakage</li> <li>■ Fewer components and ease of installation</li> </ul>
	<b>Accommodates Greatest Axial Movement in Industry</b>	<ul style="list-style-type: none"> <li>■ Reduces a major factor causing labyrinth seal leakage</li> </ul>
	<b>Fluoroelastomer O-rings</b>	<ul style="list-style-type: none"> <li>■ Static elastomer seal for the most severe services</li> </ul>
	<b>No Lubrication Required</b>	<ul style="list-style-type: none"> <li>■ Can run dry because of non-contact design</li> </ul>
	<b>High Shaft Speeds</b>	<ul style="list-style-type: none"> <li>■ Operates far beyond shaft speed limits of standard radial lip seals</li> <li>■ Liberal specifications for shaft and bore finish result in low shaft cost</li> </ul>
	<b>Precision-Machined Seal</b>	<ul style="list-style-type: none"> <li>■ Allows retrofit of most bore and shaft combinations</li> <li>■ No tooling charges</li> </ul>

### PROTECH 360



The **ProTech 360** profile is the first and only hybrid isolator designed for flooded oil and oil mist applications. Used by numerous gearbox OEMs as standard equipment, the ProTech 360 features internal dual PTFE lips on an internal SS sleeve for zero shaft wear.

### MILLENNIUM®



The **Millennium** profile is the first and only metallic isolator that is unitized without internal o-rings or locking rings. Millennium's patented labyrinth technology does not rely on a simple o-ring for bearing protection.

©1/01/2014



## Extreme Testing

Laboratory testing has significant advantages over field testing. The lab effectively compresses time and more easily explores limits. Before ProTech™ saw its first field test, it was put through laboratory tests far more severe than conditions ever encountered in the field. ProTech's effectiveness is also validated by independent laboratory testing.

Both ProTech and competitive seals were subjected to three extreme in-house tests with ProTech clearly emerging as the seal of choice.

### 1. Oil Leakage Test

ProTech and other seals were subjected to critical oil seal testing using a machine built to SAE J110 standards. One-hundred hour tests were conducted with severe oil splash.

### 2. Water Exclusion Test

The test machine was modified by mounting five nozzles at various positions relative to the exterior of the seal to simulate severe external wash down. Using water at pressures of 30 to 62 psi, these nozzles individually sprayed each seal from a distance of 3" in both a static mode and while the shaft rotated at various speeds up to 3525 rpm. The nozzles tried to force water past the seal for nearly two hours.

### 3. Dust Exclusion Test

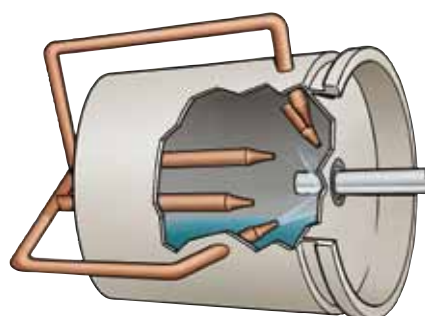
The test machine was modified with an enclosed chamber containing a large quantity of fine dust and sand which was vigorously agitated with the chamber attached to the outside of each seal area. The equipment operated at speeds up to 3525 rpm for a period of 70 hours in an environment that was literally a dense dust storm.

### Conclusions

ProTech was the only seal that passed all three torture tests. In addition to lab testing, field trials confirm ProTech's performance superiority.



**Oil Leakage Test**



**Water Exclusion Test**



**Dust Exclusion Test**

## EXTREME TEST RESULTS

<b>Material: Expulsion Method: Design Type: Brand</b>	<b>PTFE Single-Port 2-Pc. Unitized Parker</b>	<b>Bronze Single-Port 2-Pc. Non-Unitized Brand A</b>	<b>PTFE Multi-Port 3-Pc. Unitized Brand B</b>	<b>Bronze Single-Port 3-Pc. Unitized Brand C</b>
Oil Leak Test	<b>Pass</b>	Fail	Pass	Fail
Water Pressure Test	<b>Pass</b>	Fail	Fail	Fail
Dust Test	<b>Pass</b>	Pass	Fail	Fail

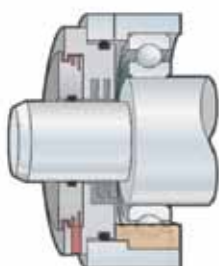
01/01/2014



ProTech™ is available in multiple designs to meet specific design requirements and geometry constraints.

Available with or without flange to provide labyrinth sealing in restricted widths • Single and multiple expulsion ports available when directional installation is a problem • Exceeds IEEE-841 to provide premium bearing protection on severe-duty electric motors • New split pillow block design meets OEM specifications.

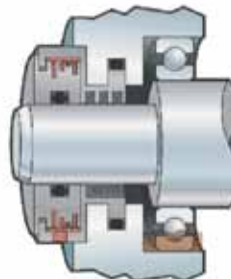
### STANDARD DESIGNS



**LS**  
Flanged



**LN**  
Non-Flanged



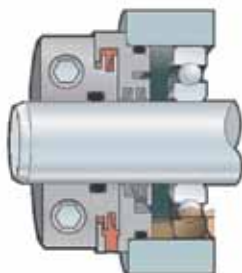
**LB**  
Pillow Block



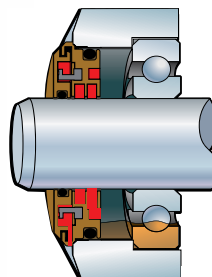
**LW**  
Wrap Around



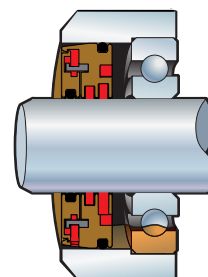
**WD**  
Wash Down



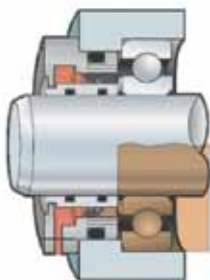
**SL**  
Split



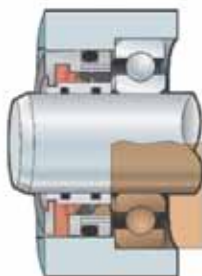
**ML** Flanged  
Millennium®



**MN** Non-Flanged  
Millennium



**FS**  
Flanged 360



**FN**  
Non-Flanged 360

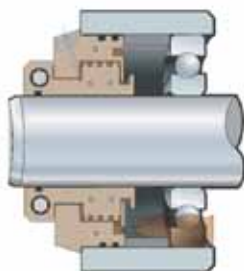


**LD**  
Multi Port

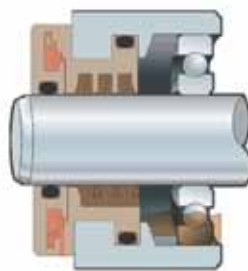


**LM**  
Step Shaft

### CUSTOM DESIGN EXAMPLES



**Split Air**  
Purge



**Turbine**



**Grease**  
Purge

01/01/2014

## Flanged Design – LS

### Standard Operating Parameters

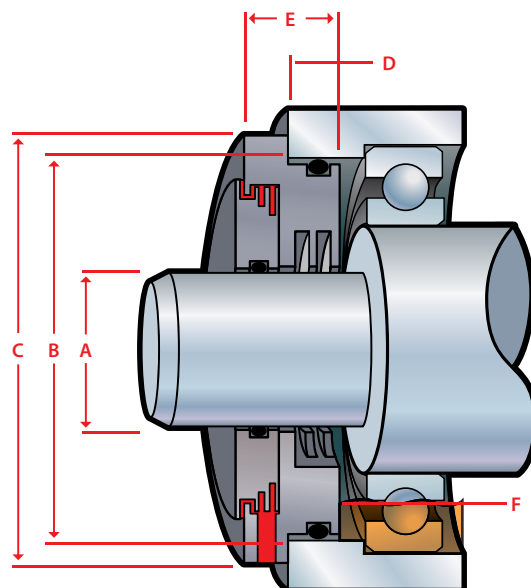
Total Eccentricity: .020" (.51 mm)  
 Shaft Speed: Up to 5,000 fpm (25 m/s)  
 Pressure: 0 psi / bar  
 Temperature Range: -40 to 250 F (-40 to 121 C)  
 Axial Movement: .020" (.51 mm) Special designs up to .070" (1.78 mm)  
 Shaft / Bore Tolerances: ± .002" (± .05 mm)  
 Special designs available

#### Seal Material:

Standard Proprietary PTFE  
 Optional Food grade, Anti microbial, FDA 3A

#### O-Ring Material:

Standard FKM  
 Optional NBR, FDA silicone, EPDM, Afilas®†



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y*	Y	Y	Y
Vertical Down	Y	Y	N	Y

\*If contaminant level is heavy see "LW" design (page 12)

**Retain:** Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F")

**Exclude:** Heavy water spray and dry contaminants from bearing cavity, best for vertical down applications

**Equipment:** Motors, pumps, mixers, gearboxes, blowers and custom equipment

STANDARD DIMENSIONS					
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
LSE	0.500 – 3.000	0.625 – 1.500	0.250	0.313	0.688
LSE	3.001 – 4.000	0.625 – 1.500	0.250	0.375	0.750
LSE	4.001 – 6.000	0.874 – 1.500	0.250	0.375	0.750
LSE	6.001 – 10.000 <sup>2</sup>	0.874 – 1.500	0.250	0.438	0.815

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
LSM	12.0 – 40.0	10.0 – 40.0	6.0 <sup>1</sup>	7.0	16.0
LSM	40.1 – 60.0	12.0 – 40.0	6.0 <sup>1</sup>	8.0	17.0
LSM	60.1 – 80.0	15.0 – 40.0	6.0 <sup>1</sup>	9.0	18.0
LSM	80.1 – 130.0	20.0 – 40.0	6.0	9.0	18.0
LSM	130.1 – 254.0 <sup>2</sup>	24.0 – 40.0	6.0	11.0	20.0

<sup>1</sup> May be larger for small cross sections. Consult factory for dimensions.

<sup>2</sup> Contact factory for requirements outside of standard dimensions listed above

Note: Cross Section = (Bore – Shaft) / 2

† Afilas® is a registered trademark of Asahi Glass Co.

## Flush Mount Design – LN Standard Operating Parameters

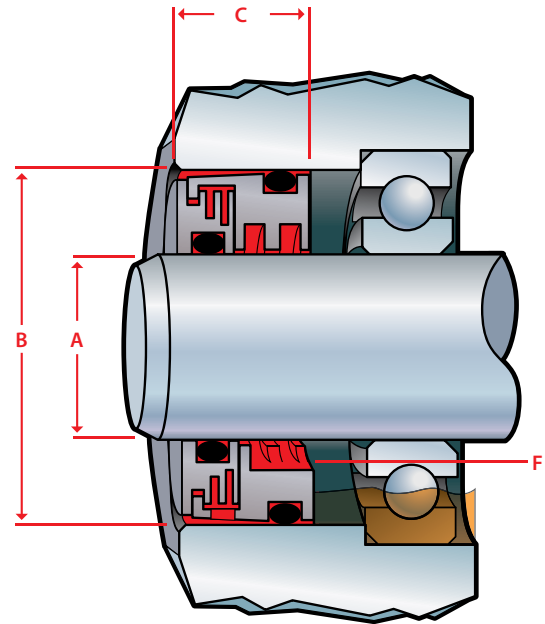
Total Eccentricity: .020" (.51 mm)  
Shaft Speed: Up to 5,000 fpm (25 m/s)  
Pressure: 0 psi / bar  
Temperature Range: -40 to 250 F (-40 to +121 C)  
Axial Movement: .020" (.51 mm) special designs up to .070" (1.78 mm)  
Shaft / Bore Tolerances: ± .002" (± .05 mm)  
Special designs available

### Seal Material:

Standard Proprietary PTFE  
Optional Food grade, Anti microbial, FDA 3A

### O-Ring Material:

Standard FKM  
Optional NBR, FDA silicone, EPDM, Aflas®



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	NR*	Y	Y	Y
Vertical Down	Y	Y	N	Y

\*Not Recommended (NR). If contaminant level is heavy see "LW" design (page 12)

**Retain:** Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F")

**Exclude:** Heavy water spray and dry contaminants from bearing cavity

**Equipment:** Applications requiring seal to be flush mounted to equipment housing. Motors, pumps, mixers, gearboxes, blowers and custom equipment

STANDARD DIMENSIONS			
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" In Bore Depth
LNE	0.500 – 4.000	0.750 – 1.500	0.562
LNE	4.001 – 10.000 <sup>1</sup>	0.874 – 1.500	0.625

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" In Bore Depth
LNM	12.0 – 80.0	14.0 – 40.0	10.0
LNM	80.1 – 130.0	16.0 – 40.0	12.0
LNM	130.1 – 250.0 <sup>1</sup>	18.0 – 40.0	15.0

<sup>1</sup> Contact factory for requirements outside of standard dimensions listed above

Note: Cross Section = (Bore – Shaft) / 2



## Split Pillow Block Design – LB Standard Operating Parameters

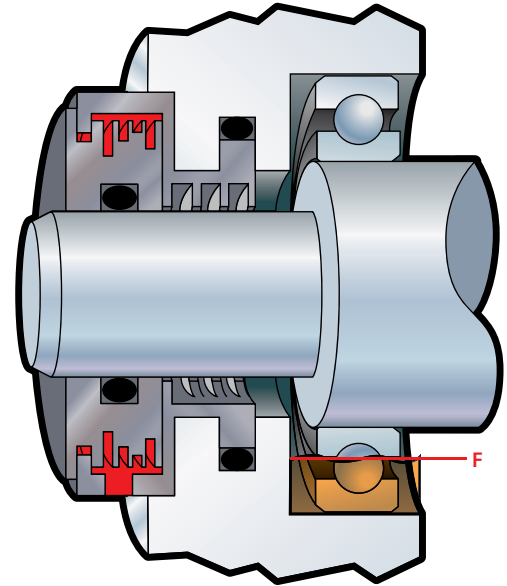
Total Eccentricity: .020" (.51 mm)  
Shaft Speed: Up to 5,000 fpm (25 m/s)  
Pressure: 0 psi / bar  
Temperature Range: -40 to 250 F (-40 to 121 C)  
Axial Movement: .020" (.51 mm) special designs up to  
.070" (1.78 mm)  
Shaft / Bore Tolerances: ± .002" (± .05 mm)  
Special designs available

### Seal Material:

Standard Proprietary PTFE  
Optional Food grade, Anti microbial, FDA 3A

### O-Ring Material:

Standard FKM  
Optional NBR, FDA silicone, EPDM, Aflas®



**Split Seal Design (SB) Also Available**

MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y	Y	Y	Y
Vertical Down	Y	Y	N	Y

**Retain:** Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F")

**Exclude:** Heavy water spray and dry contaminants from bearing cavity. Excellent for taconite exclusion

**Equipment:** Drop-in replacement for LER seal. Available as a solid (LB) or split (SB) seal. Easily interchanged by LER No. and shaft diameter. Contact authorized distributor for complete interchange

SPLIT PILLOW BLOCK BEARING			
HOUSING	SHAFT	LER	PROTECH PART NO.
SAF 211, 209, 212, 309, 311, 513	2-1/4	30	LBE-2250-2823-J64
SAF 210, 310	2-3/8	35	LBE-2375-2948-M07
SAF 213, 313, 515, 615	2-7/16	37	LBE-2438-3188-D96
SAF 213, 313, 515, 615	2-1/2	38	LBE-2500-3188-J61
SAF 211, 311	2-9/16	40	LBE-2563-3198-K90
SAF 215, 312, 314, 516, 616	2-5/8	43	LBE-2625-3563-AI58
SAF 215, 312, 314, 516, 616	2-11/16	44	LBE-2688-3563-D97
SAF 215, 312, 314, 516, 616	2-3/4	45	LBE-2750-3563-R52
SAF 213, 216, 313, 517	2-15/16	53	LBE-2938-3813-B77
SAF 520, 620	3-7/16	102	LBE-3438-4460-C65
SAF 317, 522, 622	3-15/16	109	LBE-3938-4960-AT04
SAF 220, 224, 320, 324, 526, 626	4-7/16	117	LBE-4438-5543-AT65
SAF 222, 226, 322, 326, 528, 625	4-15/16	122	LBE-4938-5980-AS34
SAF 224, 228, 324, 328, 530, 630	5-5/16	127	LBE-5313-6375-C97
SAF 532, 632	5-7/16	130	LBE-5438-6750-E30
SAF 232, 332, 534, 634	5-15/16	140	LBE-5938-7343-E92
SAF 234, 334, 536	6-7/16	148	LBE-6437-7780-E45
SAF 332, 336, 538, 638	6-15/16	224	LBE-6938-8282-K52
SAF 238, 338, 540, 640	7-5/16	228	LBE-7313-8570-G56
SAF 234, 240, 334, 340	7-7/16	161	LBE-7438-8945-D02

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## Wrap Around Design – LW Standard Operating Parameters

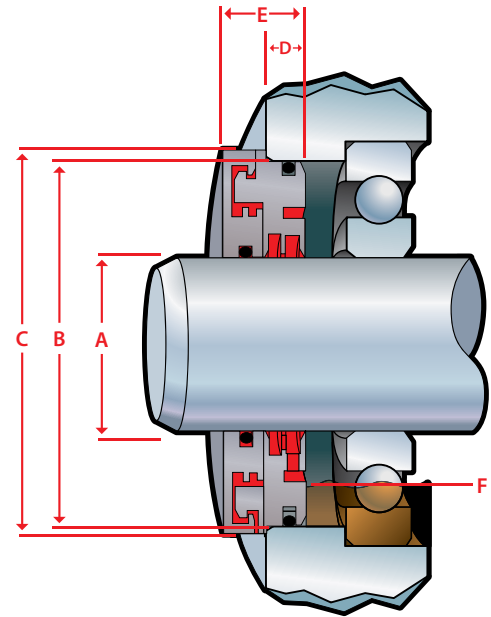
Total Eccentricity: .020" (.51 mm)  
Shaft Speed: Up to 5,000 fpm (25 m/s)  
Pressure: 0 psi / bar  
Temperature Range: -40 to 250 F (-40 to 121 C)  
Axial Movement: .020" (.51 mm) special designs up to  
.070" (1.78 mm)  
Shaft / Bore Tolerances: ± .002" (± .05 mm)  
Special designs available

### Seal Material:

Standard Proprietary PTFE  
Optional Food grade, Anti microbial, FDA 3A

### O-Ring Material:

Standard FKM  
Optional NBR, FDA silicone, EPDM, Aflas®



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y*	Y	Y	Y
Vertical Down	Y	Y	N	Y

\*Optional "LX" design (w/o drain port) recommended

**Retain** Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F")

**Exclude Equipment** Heavy water spray and dry contaminants from bearing cavity  
Motors, pumps, mixers, gearboxes, blowers and custom equipment.

STANDARD DIMENSIONS					
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
LWE <sup>3</sup>	0.492 – 1.575	0.394 – 1.575	0.236 <sup>1</sup>	0.276	0.630
LWE <sup>3</sup>	1.576 – 2.362	0.472 – 1.575	0.236 <sup>1</sup>	0.315	0.669
LWE <sup>3</sup>	2.363 – 3.150	0.630 – 1.575	0.236 <sup>1</sup>	0.354	0.709
LWE	3.151 – 5.118	0.866 – 1.575	0.236	0.354	0.709
LWE	5.119 – 10.000 <sup>2</sup>	0.945 – 1.575	0.236	0.433	0.787

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
LWM <sup>3</sup>	12.5 – 40.0	10.0 – 40.0	6.0 <sup>1</sup>	7.0	16.0
LWM <sup>3</sup>	40.1 – 60.0	12.0 – 40.0	6.0 <sup>1</sup>	8.0	17.0
LWM <sup>3</sup>	60.1 – 80.0	16.0 – 40.0	6.0 <sup>1</sup>	9.0	18.0
LWM	80.1 – 130.0	22.0 – 40.0	6.0	9.0	18.0
LWM	130.1 – 254.0 <sup>2</sup>	24.0 – 40.0	6.0	11.0	20.0

<sup>1</sup> May be larger for small cross sections, consult factory for dimensions

<sup>2</sup> Contact factory for requirements outside of standard dimensions listed above

<sup>3</sup> Shaft diameters under 1.575" (40 mm) or cross sections under .433" (11 mm) have standard inboard oil splash grooves  
Note: Cross Section = (Bore – Shaft) / 2

## Wash Down Motor Design – WD Standard Operating Parameters

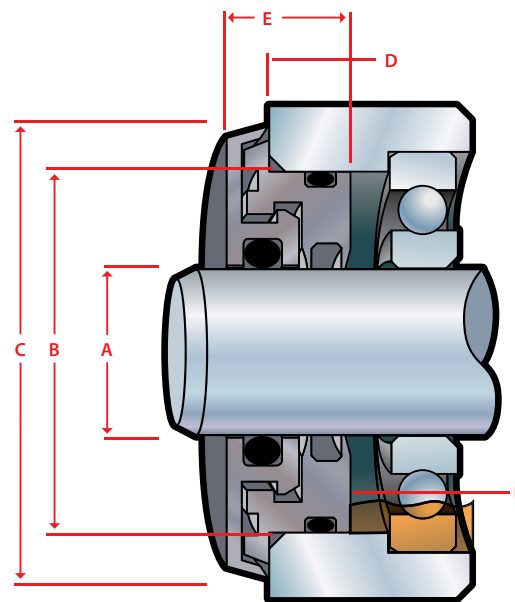
Total Eccentricity: .020" (.51 mm)  
 Shaft Speed: Up to 3,000 fpm<sup>3</sup> (15 m/s)  
 Pressure: 0 psi / bar  
 Temperature Range: -40 to 250 F (-40 to 121 C)  
 Axial Movement: .020" (.51 mm) special designs up to  
 .070" (1.78 mm)  
 Shaft / Bore Tolerances: ± .002" (± .05 mm)  
 Special designs available

### Seal Material:

Standard Proprietary PTFE  
 Optional Food grade, Anti microbial, FDA 3A

### O-Ring Material:

Standard FKM  
 Optional NBR, FDA silicone, EPDM, Aflas®



Anti Microbial Available

MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	N	Y
Vertical Up	Y	Y	N	Y
Vertical Down	Y	Y	N	Y

### Retain

Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F")

### Exclude Equipment

Heavy water spray and dry contaminants from bearing cavity

Small disposable motors and equipment for food processing industry; economical seal for 140 and 180 frame motors and other high volume OEM equipment requiring wash down protection where cost to upgrade the seal has been a deterrent

STANDARD DIMENSIONS					
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
WDE	0.492 – 1.575	0.551 – 1.575	0.269 <sup>1</sup>	0.248	0.373
WDE	1.576 – 2.362	0.669 – 1.575	0.269 <sup>1</sup>	0.248	0.373
WDE	2.363 – 3.150	0.787 – 1.575	0.269 <sup>1</sup>	0.287	0.412
WDE	3.151 – 5.118	0.866 – 1.575	0.269	0.287	0.412
WDE	5.119 – 10.000 <sup>2</sup>	0.945 – 1.575	0.269	0.287	0.412

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
WDM	12.5 – 40.0	14.0 – 40.0	6.8 <sup>1</sup>	6.3	9.5
WDM	40.1 – 60.0	17.0 – 40.0	6.8 <sup>1</sup>	6.3	9.5
WDM	60.1 – 80.0	20.0 – 40.0	6.8 <sup>1</sup>	7.3	10.5
WDM	80.1 – 130.0	22.0 – 40.0	6.8	7.3	10.5
WDM	130.1 – 254.0 <sup>3</sup>	24.0 – 40.0	6.8	7.3	10.5

<sup>1</sup> May be larger for small cross sections, consult factory for dimensions

<sup>2</sup> Contact factory for requirements outside of standard dimensions listed above

<sup>3</sup> Contact factory for speeds over 3,000 fpm (15 m/s)

Note: Cross Section = (Bore – Shaft) / 2

## Split Design – SL Standard Operating Parameters

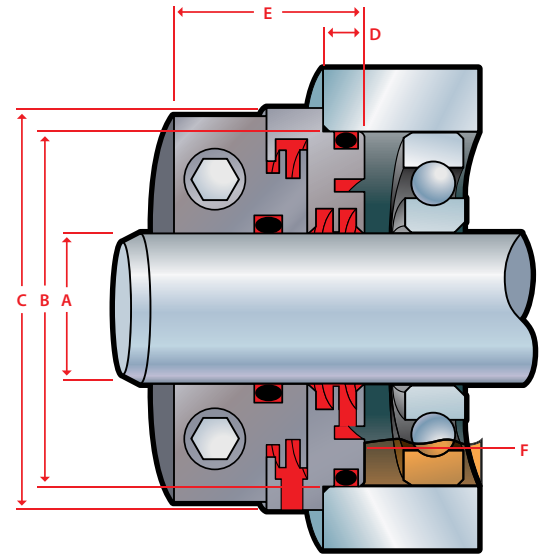
Total Eccentricity: .020" (.51 mm)  
 Shaft Speed: Up to 3,000 fpm<sup>4</sup> (15 m/s)  
 Pressure: 0 psi / bar  
 Temperature Range: -40 to 250 F (-40 to 121 C)  
 Axial Movement: .020" (.51 mm) special designs up to .070" (1.78 mm)  
 Shaft / Bore Tolerances: ± .002" (± .05 mm)  
 Special designs available

### Seal Material:

Standard Proprietary PTFE  
 Optional Food grade, Anti microbial, FDA 3A

### O-Ring Material:

Standard FKM  
 Optional NBR, FDA silicone, EPDM, Atlas®



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y	Y	Y	Y
Vertical Down	Y*	Y	N	Y

\*Locking collar may be required

**Retain** Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F").

**Exclude Equipment** Heavy water spray and dry contaminants from bearing cavity.  
 For field retrofits where equipment cannot be uncoupled or disassembled. Requires no wear sleeves or shaft refurbishment. Motors, pumps, mixers, gearboxes, blowers and custom equipment

## STANDARD DIMENSIONS

Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
SLE <sup>3</sup>	0.492 – 1.575	0.394 – 1.575	0.236 <sup>1</sup>	0.276	1.078
SLE <sup>3</sup>	1.576 – 2.362	0.472 – 1.575	0.236 <sup>1</sup>	0.315	1.117
SLE <sup>3</sup>	2.363 – 3.150	0.551 – 1.575	0.236 <sup>1</sup>	0.354	1.156
SLE	3.151 – 5.118	0.787 – 1.575	0.236 <sup>1</sup>	0.354	1.257
SLE	5.119 – 10.000 <sup>2</sup>	0.945 – 1.575	0.236 <sup>1</sup>	0.433	1.436

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
SLM <sup>3</sup>	12.5 – 40.0	10.0 – 40.0	6.0 <sup>1</sup>	7.0	27.4
SLM <sup>3</sup>	40.1 – 60.0	12.0 – 40.0	6.0 <sup>1</sup>	8.0	28.4
SLM <sup>3</sup>	60.1 – 80.0	14.0 – 40.0	6.0 <sup>1</sup>	9.0	29.4
SLM	80.1 – 130.0	20.0 – 40.0	6.0 <sup>1</sup>	9.0	31.9
SLM	130.1 – 254.0 <sup>2</sup>	24.0 – 40.0	6.0 <sup>1</sup>	11.0	36.5

<sup>1</sup> May be larger for small cross sections, consult factory for dimensions

<sup>2</sup> Contact factory for requirements outside of standard dimensions listed above

<sup>3</sup> Shaft diameters under 1.575" (40 mm) or cross sections under .433" (11 mm) have standard inboard oil splash grooves

<sup>4</sup> Contact factory for speeds over 3,000 fpm (15 m/s)

Note: Cross Section = (Bore – Shaft) / 2



## Split Millennium® Design – SM Standard Operating Parameters

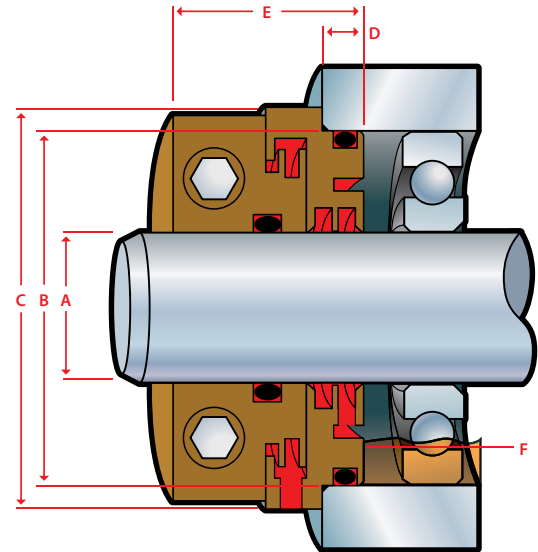
Total Eccentricity: .020" (.51 mm)  
 Shaft Speed: Up to 3,000 fpm<sup>4</sup> (15 m/s)  
 Pressure: 0 psi / bar  
 Temperature Range: -40 to 400 F (-40 to 204 C)  
 Axial Movement: .020" (.51 mm) special designs up to  
 .070" (1.78 mm)  
 Shaft / Bore Tolerances: ± .002" (± .05 mm)  
 Special designs available

### Seal Material:

Standard Bronze  
 Optional 302 SS, 304 SS, 316 SS, Carbon Steel

### O-Ring Material:

Standard FKM  
 Optional NBR, FDA silicone, EPDM, Aflas®



Up to 37" (940 mm) Shaft Diameter

MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y	Y	Y	Y
Vertical Down	Y*	Y	N	Y

\*Locking collar may be required

**Retain** Grease and oil splash (operating oil level in cavity between seal and bearing must remain below inboard oil drain-back port of seal "F")

**Exclude Equipment** Heavy water spray and dry contaminants from bearing cavity  
 For field retrofits where equipment can not be uncoupled or disassembled. Requires no wear sleeves or shaft refurbishment. Motors, pumps, mixers, gearboxes, blowers and custom equipment

STANDARD DIMENSIONS					
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
SME <sup>3</sup>	0.610 – 1.575	0.709 – 1.575	0.236 <sup>1</sup>	0.276	1.078
SME	1.576 – 2.362	0.709 – 1.575	0.236 <sup>1</sup>	0.315	1.117
SME	2.363 – 3.150	0.709 – 1.575	0.236 <sup>1</sup>	0.354	1.156
SME	3.151 – 5.118	0.787 – 1.575	0.236 <sup>1</sup>	0.354	1.257
SME	5.119 – 10.000 <sup>2</sup>	0.945 – 1.575	0.236 <sup>1</sup>	0.433	1.436

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
SMM <sup>3</sup>	15.5 – 40.0	18.0 – 40.0	6.0 <sup>1</sup>	7.0	27.4
SMM	40.1 – 60.0	18.0 – 40.0	6.0 <sup>1</sup>	8.0	28.4
SMM	60.1 – 80.0	18.0 – 40.0	6.0 <sup>1</sup>	9.0	29.4
SMM	80.1 – 130.0	20.0 – 40.0	6.0 <sup>1</sup>	9.0	31.9
SMM	130.1 – 254.0 <sup>2</sup>	24.0 – 40.0	6.0 <sup>1</sup>	11.0	36.5

<sup>1</sup> May be larger for small cross sections, consult factory for dimensions

<sup>2</sup> Contact factory for requirements outside of standard dimensions listed above

<sup>3</sup> Shaft diameters under 1.575" (40 mm) or cross sections under .433" (11 mm) have standard inboard oil splash grooves

<sup>4</sup> Contact factory for speeds over 3,000 fpm (15 m/s)

Note: Cross Section = (Bore – Shaft) / 2

## Flanged Millennium® Design – ML Standard Operating Parameters

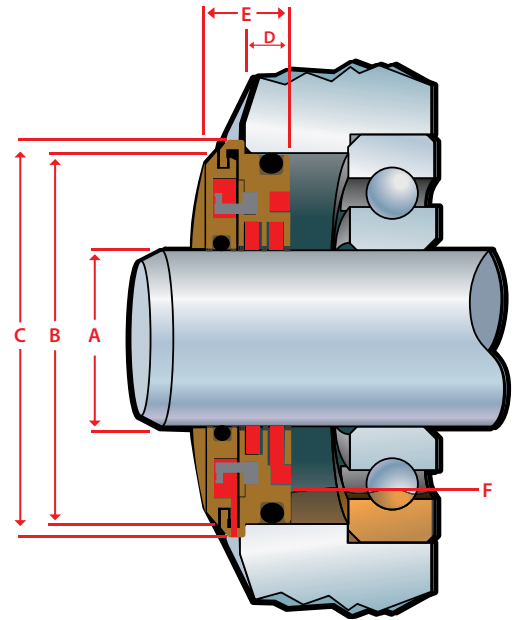
Total Eccentricity: .020" (.51 mm)  
 Shaft Speed: Up to 7,000 fpm (35 m/s)  
 Pressure: 0 psi / bar  
 Temperature Range: -40 to 400 F (-40 to +204 C)  
 Axial Movement: .020" (.51 mm) special designs up to  
 .100" (2.54 mm)  
 Shaft / Bore Tolerances: ± .002" (± .05 mm)  
 Special designs available

### Seal Material:

Standard Bronze  
 Optional 302 SS, 304 SS, 316 SS, Carbon steel

### O-Ring Material:

Standard FKM  
 Optional NBR, FDA silicone, EPDM, Aflas®



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y*	Y	Y	Y
Vertical Down	Y	Y	N	Y

\*Optional "MX" design (w/o drain port) recommended

**Retain** Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F")

**Exclude Equipment** Heavy water spray and dry contaminants from bearing cavity  
 Gearboxes, motors, pumps, mixers, turbines, blowers and custom equipment

STANDARD DIMENSIONS					
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
MLE <sup>1</sup>	0.610 – 1.575	0.394 – 1.575	0.125 <sup>2</sup>	0.276	0.551
MLE <sup>1</sup>	1.576 – 2.362	0.472 – 1.575	0.125 <sup>2</sup>	0.315	0.591
MLE <sup>1</sup>	2.363 – 3.150	0.630 – 1.575	0.125 <sup>2</sup>	0.354	0.630
MLE <sup>1</sup>	3.151 – 5.118	0.866 – 1.575	0.125 <sup>2</sup>	0.354	0.630
MLE	5.119 – 12.000 <sup>3</sup>	0.945 – 1.575	0.125 <sup>2</sup>	0.433	0.709

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
MLM <sup>1</sup>	15.5 – 40.0	10.0 – 40.0	3.2 <sup>2</sup>	7.0	14.0
MLM <sup>1</sup>	40.1 – 60.0	12.0 – 40.0	3.2 <sup>2</sup>	8.0	15.0
MLM <sup>1</sup>	60.1 – 80.0	16.0 – 40.0	3.2 <sup>2</sup>	9.0	16.0
MLM <sup>1</sup>	80.1 – 130.0	22.0 – 40.0	3.2 <sup>2</sup>	9.0	16.0
MLM	130.1 – 304.8 <sup>3</sup>	24.0 – 40.0	3.2 <sup>2</sup>	11.0	18.0

<sup>1</sup> Severe splash not available for cross sections under 0.433" (11 mm) or shafts under 1.098" (27.9 mm).

Note: Cross Section = (Bore – Shaft) / 2

<sup>2</sup> Flange diameter will be larger for cross sections under 0.453" (11.6 mm) with max increase of 0.389" (9.9 mm).

<sup>3</sup> Contact factory for requirements outside of standard dimensions listed above.

## Non-Flanged Millennium® Design – MN Standard Operating Parameters

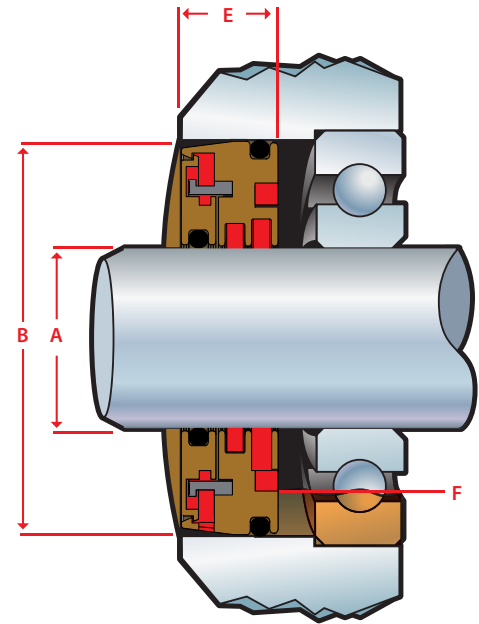
Total Eccentricity: .020" (.51 mm)  
Shaft Speed: Up to 7,000 fpm (35 m/s)  
Pressure: 0 psi / bar  
Temperature Range: -40 to +400 F (-40 to +204 C)  
Axial Movement: .020" (.51 mm) special designs up to  
.100" (2.55 mm)  
Shaft / Bore Tolerances: ± .002" (± .05 mm)  
Special designs available

### Seal Material:

Standard Bronze  
Optional 302 SS, 304 SS, 316 SS, Carbon Steel

### O-Ring Material:

Standard FKM  
Optional NBR, FDA silicone, EPDM, Aflas®



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	NR*	Y	Y	Y
Vertical Down	Y	Y	N	Y

\*Not Recommended (NR) If contaminant level is heavy see "ML" design (page 16)

**Retain:** Grease and oil splash (operating oil level in cavity between seal and bearing must be below inboard oil drain-back port of seal "F")

**Exclude:** Heavy water spray and dry contaminants from bearing cavity

**Equipment:** Gearboxes, motors, pumps, mixers, turbines, blowers and custom equipment

STANDARD DIMENSIONS			
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"E" In Bore Depth
MNE <sup>2</sup>	0.610 – 1.575	0.748 – 1.575	0.551
MNE <sup>2</sup>	1.576 – 2.362	0.748 – 1.575	0.591
MNE <sup>2</sup>	2.363 – 3.150	0.748 – 1.575	0.630
MNE	3.151 – 5.118	0.866 – 1.575	0.630
MNE	5.119 – 12.000 <sup>1</sup>	0.945 – 1.575	0.709

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"E" In Bore Depth
MNM <sup>2</sup>	15.5 – 40.0	19.0 – 40.0	14.0
MNM <sup>2</sup>	40.1 – 60.0	19.0 – 40.0	15.0
MNM <sup>2</sup>	60.1 – 80.0	19.0 – 40.0	16.0
MNM	80.1 – 130.0	22.0 – 40.0	16.0
MNM	130.1 – 304.8 <sup>1</sup>	24.0 – 40.0	18.0

<sup>1</sup> Contact factory for requirements outside of standard dimensions listed above

<sup>2</sup> Shaft diameters under 1.575" (40 mm) or cross sections under .433" (11 mm) have standard inboard oil splash grooves

Note: Cross Section = (Bore – Shaft) / 2

## Flanged Flooded Design – FS-360 Standard Operating Parameters

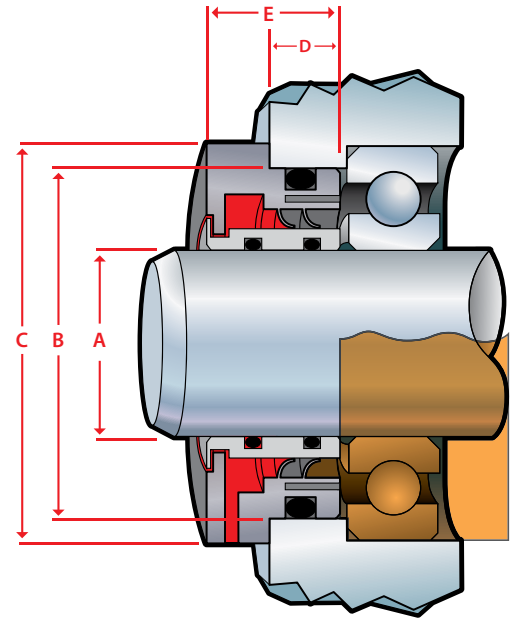
Total Eccentricity: .003" (.08 mm)  
Shaft Speed: Up to 5,000 fpm<sup>1</sup> (25 m/s)  
Pressure: 5 psi (.344 bar)  
Temperature Range: -40 to 250 F (-40 to 121 C)  
Axial Movement: .003" (.08mm)  
Shaft / Bore Tolerances: ± .002" (± .05 mm)  
Special designs available

### Seal Material:

Standard Proprietary PTFE and SS Sleeve  
Optional Food grade PTFE and SS Sleeve  
Anti microbial PTFE and SS Sleeve  
FDA 3A PTFE and SS Sleeve

### O-Ring Material:

Standard FKM  
Optional NBR, FDA silicone, EPDM, Atlas®



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y*	Y	Y	Y
Vertical Down	Y	Y	Y	Y

\*For Vertical Up, contact factory if contaminant level is high

<b>Retain</b>	Grease, oil splash, oil mist or oil flooded
<b>Exclude</b>	Heavy water spray and dry contaminants from bearing cavity
<b>Equipment</b>	Ideal for equipment used in food processing or subjected to frequent wash down where positive oil retention is required. Flooded oil or severe splash retention for gearboxes, motors, pumps, mixers, cooling towers, aerators and custom equipment

STANDARD DIMENSIONS					
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
FSE	0.500 – 3.000	0.750 – 1.500	0.250	0.313	0.688
FSE	3.001 – 6.000	0.750 – 1.500	0.250	0.375	0.750
FSE	6.001 – 10.000	0.874 – 1.500	0.250	0.438	0.813

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" Flange Diameter = "B" +	"D" In Bore Depth	"E" Overall Seal Width
FSM	13.0 – 76.0	19.0 – 40.0	6.0	8.0	17.0
FSM	76.1 – 152.0	19.0 – 40.0	6.0	9.0	18.0
FSM	152.1 – 250.0 <sup>2</sup>	24.0 – 40.0	6.0	11.0	20.0

<sup>1</sup> Contact factory for speeds over 3,000 fpm (15 m/s)

<sup>2</sup> Contact factory for requirements outside of standard dimensions listed above  
Note: Cross Section = (Bore – Shaft) / 2



## Non-Flanged Flooded Design – FN-360 Standard Operating Parameters

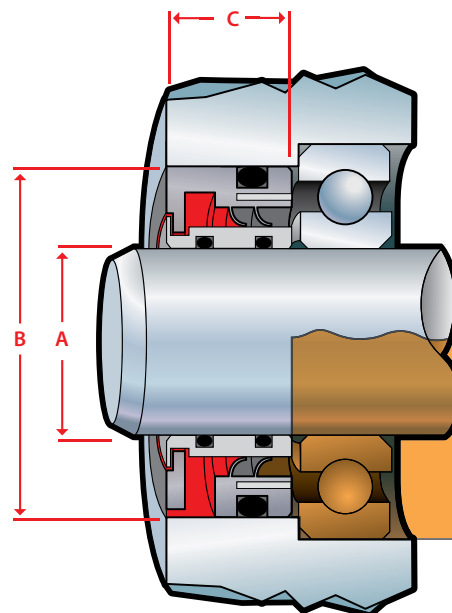
Total Eccentricity: .003" (.08 mm)  
 Shaft Speed: Up to 5,000 fpm<sup>1</sup> (25 m/s)  
 Pressure: 5 psi (.344)  
 Temperature Range: -40 to 250 F (-40 to +121 C)  
 Axial Movement: .003" (.08mm)  
 Shaft / Bore Tolerances: ± .002" (± .05 mm)  
 Special designs available

### Seal Material:

Standard Proprietary PTFE and SS Sleeve  
 Optional Food grade PTFE and SS Sleeve  
 Anti microbial PTFE and SS Sleeve  
 FDA 3A PTFE and SS Sleeve

### O-Ring Material:

Standard FKM  
 Optional NBR, FDA silicone, EPDM, Aflas®



MOUNTING		LUBRICATION		
	Position	Grease	Oil	Dry
Horizontal	Y	Y	Y	Y
Vertical Up	Y*	Y	Y	Y
Vertical Down	Y	Y	Y	Y

\*For Vertical Up, contact factory if contaminant level is high

**Retain:** Grease, oil splash, oil mist or oil flooded  
**Exclude:** Heavy water spray and dry contaminants from bearing cavity  
**Equipment:** Ideal for equipment used in food processing or subjected to frequent wash down where positive oil retention is required. Flooded oil or severe splash retention for gearboxes, motors, pumps, mixers, cooling towers, aerators and custom equipment

STANDARD DIMENSIONS			
Type	"A" Shaft Diameter Range Inch	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" In Bore Depth
FNE	0.500 – 3.000	0.750 – 1.500	0.591
FNE	3.001 – 6.000	0.750 – 1.500	0.591
FNE	6.001 – 10.000	0.874 – 1.500	0.630

Type	"A" Shaft Diameter Range Metric	"B" Bore Diameter Range Is Shaft Diameter "A" + Min-Max	"C" In Bore Depth
FNM	12.7 – 76.2	19.0 – 40.0	15.0
FNM	76.3 – 152.4	19.0 – 40.0	15.0
FNM	152.5 – 254.0 <sup>2</sup>	22.2 – 40.0	16.0

<sup>1</sup> Contact factory for speeds over 3,000 fpm (15 m/s)

<sup>2</sup> Contact factory for requirements outside of standard dimensions listed above  
 Note: Cross Section = (Bore – Shaft) / 2

PROTECH STANDARD LISTING - INCH STANDARDS									
DESIGN TYPE	SHAFT DIA. RANGE		BORE DIAMETER (add to shaft diameter)		IN BORE DEPTH	OVERALL WIDTH	CROSS SECTION		FLANGE DIA. (Bore Dia. +)
	Min.	Max.	Min.	Max.			Min.	Max.	
LSE	0.500	3.000	0.625	1.500	0.313	0.688	0.313	0.750	0.250
LSE	3.001	4.000	0.625	1.500	0.375	0.750	0.313	0.750	0.250
LSE	4.001	6.000	0.874	1.500	0.375	0.750	0.437	0.750	0.250
LSE	6.001	10.000	0.874	1.500	0.438	0.815	0.437	0.750	0.250
LWE	0.492	1.575	0.394	1.575	0.276	0.630	0.197	0.788	0.236
LWE	1.576	2.362	0.472	1.575	0.315	0.669	0.236	0.788	0.236
LWE	2.363	3.150	0.630	1.575	0.354	0.709	0.315	0.788	0.236
LWE	3.151	5.118	0.866	1.575	0.354	0.709	0.433	0.788	0.236
LWE	5.119	10.000	0.945	1.575	0.433	0.787	0.473	0.788	0.236
LNE	0.500	4.000	0.750	1.500	0.562	0.562	0.375	0.750	NA
LNE	4.001	10.000	0.874	1.500	0.625	0.625	0.437	0.750	NA
SLE	0.492	1.575	0.394	1.575	0.276	1.078	0.197	0.788	0.236
SLE	1.576	2.362	0.472	1.575	0.315	1.117	0.236	0.788	0.236
SLE	2.363	3.150	0.551	1.575	0.354	1.156	0.276	0.788	0.236
SLE	3.151	5.118	0.787	1.575	0.354	1.257	0.394	0.788	0.236
SLE	5.119	10.000	0.945	1.575	0.433	1.436	0.473	0.788	0.236
SME	0.610	1.575	0.709	1.575	0.276	1.078	0.355	0.788	0.236
SME	1.576	2.362	0.709	1.575	0.315	1.117	0.355	0.788	0.236
SME	2.363	3.150	0.709	1.575	0.354	1.156	0.355	0.788	0.236
SME	3.151	5.118	0.787	1.575	0.354	1.257	0.394	0.788	0.236
SME	5.119	10.000	0.945	1.575	0.433	1.436	0.473	0.788	0.236
MLE	0.610	1.575	0.394	1.575	0.276	0.551	0.197	0.788	0.125
MLE	1.576	2.362	0.472	1.575	0.315	0.591	0.236	0.788	0.125
MLE	2.363	3.150	0.630	1.575	0.354	0.630	0.315	0.788	0.125
MLE	3.151	5.118	0.866	1.575	0.354	0.630	0.433	0.788	0.125
MLE	5.119	12.000	0.945	1.575	0.433	0.709	0.473	0.788	0.125
MNE	0.610	1.575	0.748	1.575	0.551	0.551	0.374	0.788	NA
MNE	1.576	2.362	0.748	1.575	0.591	0.591	0.374	0.788	NA
MNE	2.363	3.150	0.748	1.575	0.630	0.630	0.374	0.788	NA
MNE	3.151	5.118	0.866	1.575	0.630	0.630	0.433	0.788	NA
MNE	5.119	12.000	0.945	1.575	0.709	0.709	0.473	0.788	NA
FSE	0.500	3.000	0.750	1.500	0.313	0.688	0.375	0.750	0.250
FSE	3.001	6.000	0.750	1.500	0.375	0.750	0.375	0.750	0.250
FSE	6.001	10.000	0.874	1.500	0.438	0.813	0.437	0.750	0.250
FNE	0.500	3.000	0.750	1.500	0.591	0.591	0.375	0.750	NA
FNE	3.001	6.000	0.750	1.500	0.591	0.591	0.375	0.750	NA
FNE	6.001	10.000	0.874	1.500	0.630	0.630	0.437	0.750	NA
WDE	0.492	1.575	0.551	1.575	0.248	0.373	0.273	0.788	0.269
WDE	1.576	2.362	0.669	1.575	0.248	0.373	0.335	0.788	0.269
WDE	2.363	3.150	0.787	1.575	0.287	0.412	0.394	0.788	0.269
WDE	3.151	5.118	0.866	1.575	0.287	0.412	0.433	0.788	0.269
WDE	5.119	10.000	0.945	1.575	0.287	0.412	0.473	0.788	0.269

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<b>PROTECH STANDARD LISTING – METRIC STANDARDS</b>									
<b>DESIGN TYPE</b>	<b>SHAFT DIA. RANGE</b>		<b>BORE DIAMETER (add to shaft diameter)</b>		<b>IN BORE DEPTH</b>	<b>OVERALL WIDTH</b>	<b>CROSS SECTION</b>		<b>FLANGE DIA. (Bore Dia. +)</b>
	<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>			<b>Min.</b>	<b>Max.</b>	
LSM	12.0	40.0	10.0	40.0	7.0	16.0	5.0	20.0	6.0
LSM	40.1	60.0	12.0	40.0	8.0	17.0	6.0	20.0	6.0
LSM	60.1	80.0	15.0	40.0	9.0	18.0	7.5	20.0	6.0
LSM	80.1	130.0	20.0	40.0	9.0	18.0	10.0	20.0	6.0
LSM	130.1	254.0	24.0	40.0	11.0	20.0	12.0	20.0	6.0
LWM	12.5	40.0	10.0	40.0	7.0	16.0	5.0	20.0	6.0
LWM	40.1	60.0	12.0	40.0	8.0	17.0	6.0	20.0	6.0
LWM	60.1	80.0	16.0	40.0	9.0	18.0	8.0	20.0	6.0
LWM	80.1	130.0	22.0	40.0	9.0	18.0	11.0	20.0	6.0
LWM	130.1	254.0	24.0	40.0	11.0	20.0	12.0	20.0	6.0
LNM	12.0	80.0	14.0	40.0	10.0	10.0	7.0	20.0	NA
LNM	80.1	130.0	16.0	40.0	12.0	12.0	8.0	20.0	NA
LNM	130.1	250.0	18.0	40.0	15.0	15.0	9.0	20.0	NA
SLM	12.5	40.0	10.0	40.0	7.0	27.4	5.0	20.0	6.0
SLM	40.1	60.0	12.0	40.0	8.0	28.4	6.0	20.0	6.0
SLM	60.1	80.0	14.0	40.0	9.0	29.4	7.0	20.0	6.0
SLM	80.1	130.0	20.0	40.0	9.0	31.9	10.0	20.0	6.0
SLM	130.1	254.0	24.0	40.0	11.0	36.5	12.0	20.0	6.0
SMM	15.5	40.0	18.0	40.0	7.0	27.4	9.0	20.0	6.0
SMM	40.1	60.0	18.0	40.0	8.0	28.4	9.0	20.0	6.0
SMM	60.1	80.0	18.0	40.0	9.0	29.4	9.0	20.0	6.0
SMM	80.1	130.0	20.0	40.0	9.0	31.9	10.0	20.0	6.0
SMM	130.1	254.0	24.0	40.0	11.0	36.5	12.0	20.0	6.0
MLM	15.5	40.0	10.0	40.0	7.0	14.0	5.0	20.0	3.2
MLM	40.1	60.0	12.0	40.0	8.0	15.0	6.0	20.0	3.2
MLM	60.1	80.0	16.0	40.0	9.0	16.0	8.0	20.0	3.2
MLM	80.1	130.0	22.0	40.0	9.0	16.0	11.0	20.0	3.2
MLM	130.1	304.8	24.0	40.0	11.0	18.0	12.0	20.0	3.2
MNM	15.5	40.0	19.0	40.0	14.0	14.0	9.5	20.0	NA
MNM	40.1	60.0	19.0	40.0	15.0	15.0	9.5	20.0	NA
MNM	60.1	80.0	19.0	40.0	16.0	16.0	9.5	20.0	NA
MNM	80.1	130.0	22.0	40.0	16.0	16.0	11.0	20.0	NA
MNM	130.1	304.8	24.0	40.0	18.0	18.0	12.0	20.0	NA
FSM	13.0	76.0	19.0	40.0	8.0	17.0	9.5	20.0	6.0
FSM	76.1	152.0	19.0	40.0	9.0	18.0	9.5	20.0	6.0
FSM	152.1	250.0	24.0	40.0	11.0	20.0	12.0	20.0	6.0
FNM	12.7	76.2	19.0	40.0	15.0	15.0	9.5	20.0	NA
FNM	76.3	152.4	19.0	40.0	15.0	15.0	9.5	20.0	NA
FNM	152.5	254.0	22.2	40.0	16.0	16.0	11.1	20.0	NA
WDM	12.5	40.0	14.0	40.0	6.3	9.5	7.0	20.0	6.8
WDM	40.1	60.0	17.0	40.0	6.3	9.5	8.5	20.0	6.8
WDM	60.1	80.0	20.0	40.0	7.3	10.5	10.0	20.0	6.8
WDM	80.1	130.0	22.0	40.0	7.3	10.5	11.0	20.0	6.8
WDM	130.1	254.0	24.0	40.0	7.3	10.5	12.0	20.0	6.8

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## Quick Interchange

Call factory for complete pump list and electric motor interchange.

GOULDS PUMP	Location	ProTech Part No.
3138 S	INBOARD	LSE-2125-3000-1-1
3139 S	INBOARD	LSE-2125-3000-1-1
3145 S	OUTBOARD	LSE-2375-3250-1-1
3171 L	OUTBOARD	LPE-1875-5000-B67
3171 M	OUTBOARD	LSE-1375-3625-B66
3171 S	OUTBOARD	LPE-0875-2750-B79
3175 L	OUTBOARD INBOARD	LSE-4125-5250-5-1 LSE-4313-5500-5-1
3175 M	OUTBOARD INBOARD	LSE-3125-4125-1-1 LSE-3313-4125-1-1
3175 S	OUTBOARD INBOARD	LSE-2375-3250-1-1 LSE-2500-3250-1-1
3175 XL	OUTBOARD INBOARD	LPE-4313-5500-C05 LSE-5000-6250-5-1
3180 L	OUTBOARD/ INBOARD	LSM-0700-0950-1-1
3180 M	OUTBOARD	LSM-0480-0700-1-1
3180 S	OUTBOARD INBOARD	LSM-0480-0700-1-1 LSM-0550-0800-1-1
3180 XL	OUTBOARD	LSM-0850-1100-1-1
3185 L	INBOARD	LSM-0700-0950-1-1
3185 M	OUTBOARD	LSM-0600-0850-1-1
3185 S	OUTBOARD INBOARD	LSM-0480-0700-1-1 LSM-0550-0800-1-1
3185 XL	OUTBOARD	LSM-0850-1100-1-1
3196 LT/LTC/LTX	OUTBOARD INBOARD	LSE-1875-2750-1-1 LSE-2125-2875-1-1
3196 MT/MTX	OUTBOARD INBOARD	LSE-1125-2000-1-1 LSE-1750-2875-1-1
3196 ST/STX	OUTBOARD INBOARD	LPE-0875-1250-B48 LPE-1375-2835-B47
3196 XLT/XTX	OUTBOARD INBOARD	LSE-2375-3250-1-1 LSE-2500-3250-1-1
3316 L	OUTBOARD INBOARD	LSE-2062-3000-1-1 LSE-1937-3000-1-1
3316 M	OUTBOARD INBOARD	LSE-1437-2250-1-1 LSE-1375-2125-1-1
3316 S	OUTBOARD INBOARD	LPE-1063-1643-F08 LSE-0937-1500-1-1
3410 L	OUTBOARD INBOARD	LPE-2187-3000-1-1 LPE-2125-3000-1-1
3410 M	OUTBOARD INBOARD	LSE-1375-2125-Q58 LSE-1500-2125-Q57
3410 S	OUTBOARD INBOARD	LPE-1375-2125-Q58 LPE-1500-2125-Q57
3996 M	OUTBOARD INBOARD	LPE-1750-2875-B49 LPE-1250-2000-B50
3996 S	OUTBOARD INBOARD OUTBOARD	LPE-0875-1250-B48 LPE-1375-1875-C56 LPE-1375-2125-B63

DURCO PUMP	Location	ProTech Part No.
MK II GRP I	OUTBOARD INBOARD	LSE-0875-1625-1-1 LPE-1125-2441-C70
MK II GRP II	OUTBOARD INBOARD	LSE-1125-2000-1-1 LSE-1875-2625-1-1
MK II GRP III	OUTBOARD INBOARD	LSE-2625-3675-1-1 LSE-2625-3677-D
MK III GRP I	OUTBOARD INBOARD	LSE-0875-1625-1-1 LDE-1375-2835-1-1
MK III GRP II	OUTBOARD INBOARD	LDE-1125-2000-1-1 LSE-1875-2625-1-1
MK III GRP III	OUTBOARD INBOARD	LDE-2625-3675-1-1 LSE-2625-3675-1-1
ITT-AC PUMP	Location	ProTech Part No.
CSO, F4A1	INBOARD OUTBOARD	LSE-1000-1750-1-1 LSE-1000-1750-1-1
CSO, F4B2	INBOARD OUTBOARD	LSE-1750-2375-1-1 LSE-1125-1750-1-1
CSO, F4B3	INBOARD OUTBOARD	LSE-1750-2375-1-1 LSE-1125-1750-1-1
CSO, F4D1	INBOARD OUTBOARD	LPE-2125-2875-F73 LSE-1250-2000-1-1
PWO, F8B1	INBOARD OUTBOARD	LSE-3250-4000-1-1 LSE-2750-3500-1-1
PWO, F8B2	INBOARD OUTBOARD	LSE-3250-4000-1-1 LSE-2750-3500-1-1
PWO, F8B4	INBOARD OUTBOARD	LSE-3250-4000-1-1 LSE-2750-3500-1-1
PWO, F8M1	INBOARD OUTBOARD	LSE-3250-4000-1-1 LSE-2750-3500-1-1
PWO, F9B1	INBOARD OUTBOARD	LSE-3250-4000-1-1 LSE-2750-3500-1-1
PWO, F9M1	INBOARD OUTBOARD	LSE-3250-4000-1-1 LSE-2750-3500-1-1
PWO, F8C1	INBOARD OUTBOARD	LSE-4500-5500-5-1 LSE-3750-4750-1-1
WARREN PUMP	Location	ProTech Part No.
8 MARK I	INBOARD OUTBOARD	LSE-2875-4125-1-1 LSE-2000-3125-1-1
11 MARK I	INBOARD OUTBOARD	LSE-4500-5750-5-1 LSE-3500-4375-1-1
11 MARK II	INBOARD OUTBOARD	LSE-5000-6000-5-1 LSE-3500-4375-1-1
125 MARK I	INBOARD OUTBOARD	LPE-5250-6750-5-1 LSE-4000-5375-5-1
125 MARK II	INBOARD OUTBOARD	LSE-5875-7125-5-1 LSE-4000-5375-5-1
138 MARK II	INBOARD OUTBOARD	LSE-6250-7750-H19 LSE-4500-6000-5-1

01/01/2014



**Parker Hannifin Corporation**

EPS Division  
Salt Lake City, Utah



## Need Help?

Fill out the required information and fax to (936) 560-8998. Use the information below and other information in Parker EPS catalogs determine the dimensions needed. We will contact you to discuss your specific application and make recommendations. If you need help filling out this form, please call Applications Engineering at (800) 233-3900.

Date: \_\_\_\_\_

WITH REFERENCE TO DIAGRAM BELOW, PROVIDE DIMENSIONS:

Company: \_\_\_\_\_

"A" Shaft Dia. \_\_\_\_\_ Shaft Dia. "B" \_\_\_\_\_

Contact: \_\_\_\_\_

"C" Bore Dia, \_\_\_\_\_ Bore Depth "D" \_\_\_\_\_

Phone: \_\_\_\_\_

"E" Distance to 1st Obstruction \_\_\_\_\_

FAX: \_\_\_\_\_

E-mail: \_\_\_\_\_

"F" Distance from housing to step \_\_\_\_\_

FDA Material Required: ☐ NO ☐ YESLubricant: ☐ Oil ☐ Grease ☐ Dry Running

SHAFT SPEED \_\_\_\_\_ RPM \_\_\_\_\_ FPM

SHAFT MOVEMENT

SHAFT POSITION

LUBRICATION SYSTEM

☐ Rotates☐ Horizontal☐ Splash, oil level at/below centerline of bearing roller☐ Oscillates☐ Vertical Up☐ Flooded, oil level above shaft☐ Reciprocates☐ Vertical Down☐ Oil Mist☐ Static☐ Grease with purge system

Media Sealed Out \_\_\_\_\_

☐ Dry, Moderate Dust☐ Wet, Light Spray☐ Dry, Heavy Dust☐ Wet, Heavy Spray

Internal Pressure:

☐ No ☐ Yes, \_\_\_\_\_ (psi)

Minimum Temperature \_\_\_\_\_

Average Temperature \_\_\_\_\_

Maximum Temperature \_\_\_\_\_

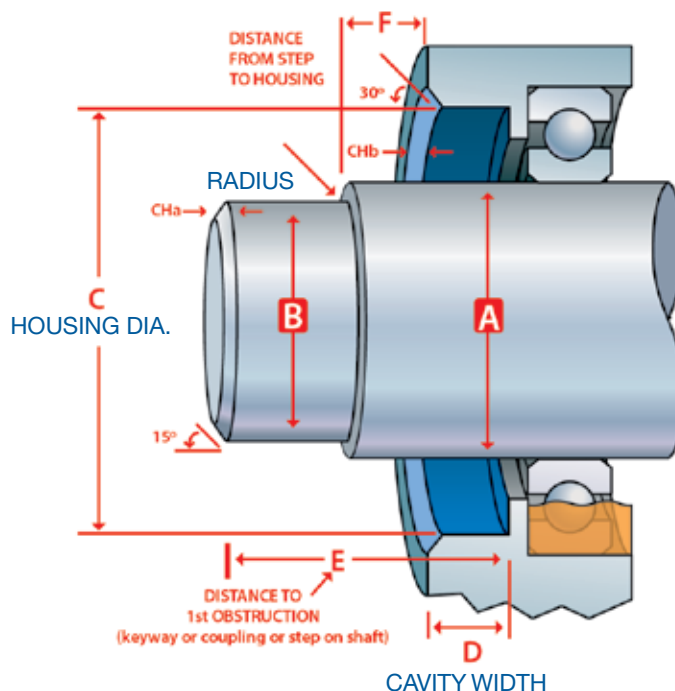
Shaft Axial Movement \_\_\_\_\_

Shaft to Bore Misalignment \_\_\_\_\_

Equipment Type \_\_\_\_\_

Manufacturer \_\_\_\_\_

Model \_\_\_\_\_



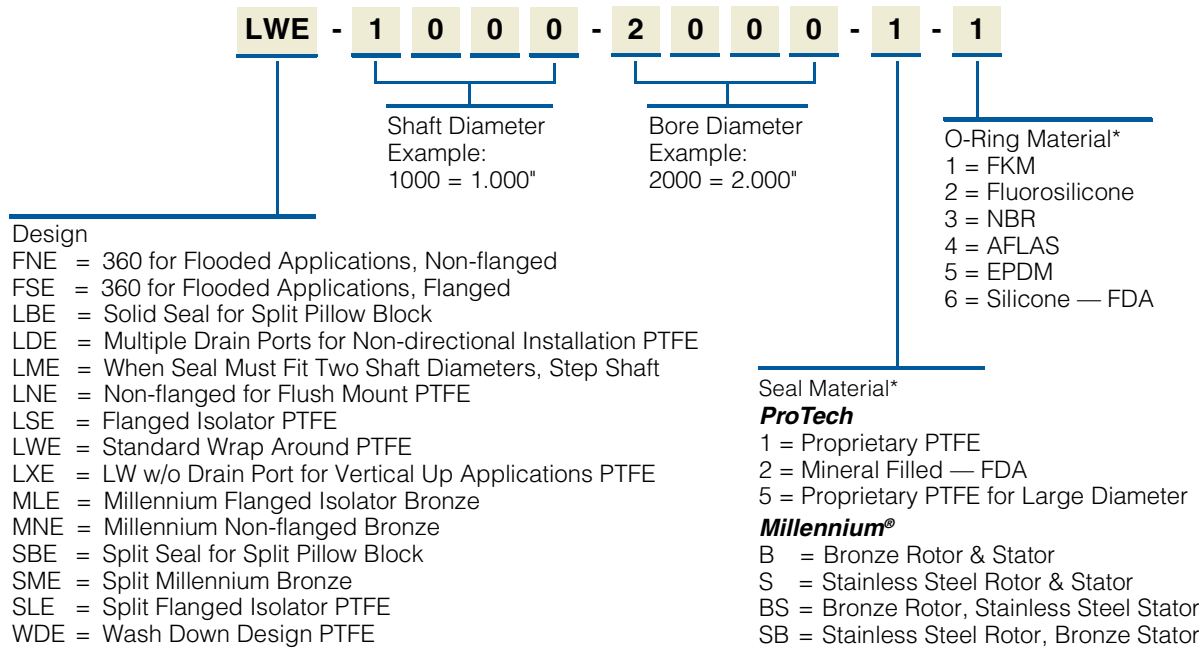
01/01/2014



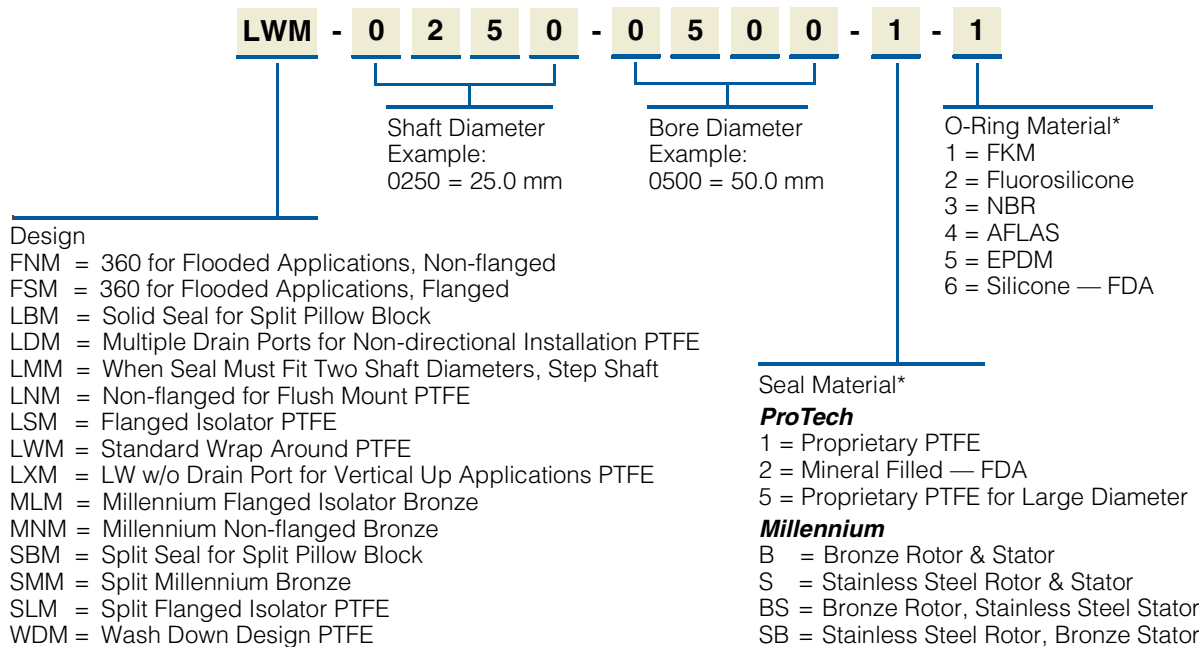
**Parker Hannifin Corporation**  
EPS Division  
Salt Lake City, Utah

# Part Number Nomenclature — ProTech™

## English



## Metric



\* Specials have Alphanumeric suffix here in place of material and O-ring code, example "AG31".

# OFFER OF SALE

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products". See [www.parker.com/saleterms](http://www.parker.com/saleterms)

1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at [www.parker.com/saleterms/](http://www.parker.com/saleterms/). Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.
2. Price Adjustments; Payments. Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.
3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.
4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve months from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**
5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.
6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.
7. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.
8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.
9. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.
10. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.
11. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.
12. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.
13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.
14. Force Majeure. Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.
15. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.
16. Termination. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.
17. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.
18. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.
19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.
20. Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act. Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

01/01/2014



**WARNING:** These products can expose you to chemicals including carbon black (airborne and extracts), antimony trioxide, titanium dioxide, silica (crystalline), di(2-ethylhexyl)phthalate, ethylene thiourea, acrylonitrile, 1,3-butadiene, epichlorohydrin, toluenediisocyanate, tetrafluoroethylene, ethylbenzene, formaldehyde, furfuryl alcohol, glass fibers, methyl isobutyl ketone, nickel (metallic and compounds), lead and lead compounds which are known to the State of California to cause cancer; and 1,3-butadiene, epichlorohydrin, di(2-ethylhexyl)phthalate, di-isodecyl phthalate, ethylene thiourea, methyl isobutyl ketone, methanol, toluene, lead and lead compounds which are known to the State of California to cause birth defects and other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).



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