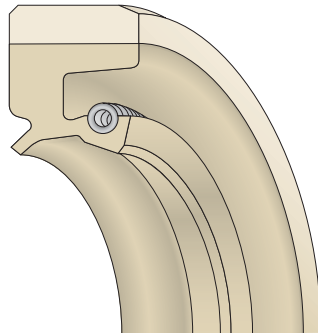


Product Line

Clipper® Oil Seal

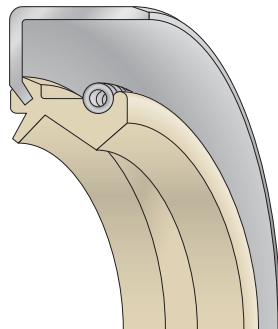
- Single Lip LUP, RUP
- Double Lip LDS
- Large Diameter MIST, STLUP
- Medium Pressure MP
- High Pressure HP
- Clipper Split Seal
- Custom Designs
- Wipers H & P
- High Misalignment LUPW, LDSW
- PTFE Bonded to Elastomer Lip



Clipper Oil Seal

Parker Oil Seal

- Single Lip Seals SA, SB, SC, SD, SM
- Double Lip TA, TB, TC, TD, TM
- Dual Lip DB, DC
- Springless VA, VB, VC, VM
- Outside Lip OSA, OSB, OSC
- Cassette Seals
- Wipers
- High Misalignment SAE, SCE, SME
- Custom Designs



Parker Oil Seal

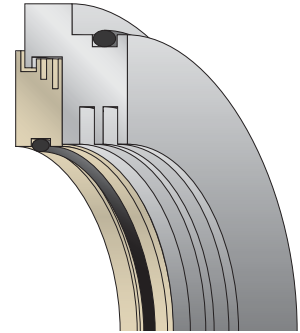
Shaft Repair Sleeves

- Quick Sleeve (0.010" wall)
- Wear Sleeves (0.125" wall)

Bearing Isolators

ProTech™ PTFE

- Flanged LS
- Non-flanged LN
- Vertical UP LW, LX
- Split SL
- Pillow Block LM
- Flooded FS-360
- Custom Designs



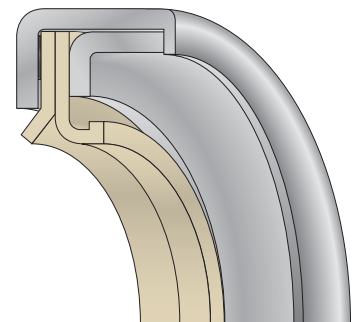
ProTech Bearing Isolator

ProTech Millennium Bronze

- Flanged ML
- Non-flanged MN
- Split MS
- Custom Designs

PTFE Seals

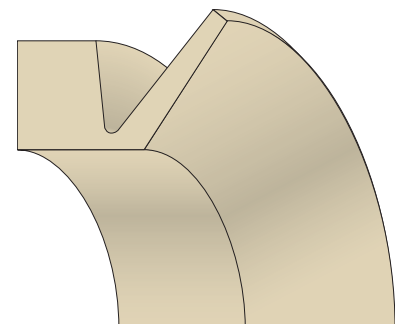
- FlexiCase™ Metal Clad & TMAL
- Metal w/o Spring TMAS
- Nonmetallic w/o Spring FlexiLip™
- Custom Designs
- 3 A Sanitary
- Food Grade
- Anti-Microbial



FlexiCase Rotary Seal

Slings & Excluders

- V-Seals
- SSW Excluder
- DS Excluder



V-Seal

Profiles

Table 4-1. Product Profiles

Standard Profiles		Other Profiles Available				Features	Applications
Clipper and Parker Oil Seals							
LUP	SB	SC	SA	SM	SD	General purpose. Spring-loaded single lip. For oil retention or grease retention.	Electric motors, gearboxes, pumps, fans, runout tables, paper rolls, mixers and custom equipment.
RUP	RPD					Spring-loaded, single lip design. Available split or solid. Splits — for grease retention — with oil, some seepage may occur. Positive bore retention. NO COVER PLATE REQUIRED.	Electric motors, gearboxes, pumps, fans, runout tables, paper rolls, mixers and custom equipment. Split seals are designed for applications where equipment is unable to be disassembled due to time constraints.
LUPW	LPDW					Spring-loaded single lip. Features nonmetallic composite OD for damage-free installation.	High runout conditions for applications up to 1" (25.4 mm) total eccentricity. For oil retention and low speeds.
LDS	TB	TC	TA	TM	TD	General purpose. Spring-loaded dual lip. For oil retention. Excludes light dust and fluid.	Electric motors, gearboxes, pumps, fans, runout tables, paper rolls, mixers and custom equipment.
LDSW	SCE	SAE	SME			Spring-loaded, single or double lip.	High runout conditions up to 0.125" (3.175 mm) total eccentricity. For oil or grease retention and low speeds. Typical applications: electric motors, gearboxes, pumps, fans, runout tables, paper rolls, mixers and custom equipment.
SDS	KB	KC	KA	KM		General purpose. Dual lip springless design.	For grease retention and exclusion of light dust and fluids. Typical light duty applications.
SS	VB	VC	VA	VM		General purpose. Springless single lip.	For grease retention and exclusion of light dust and fluid. Typical light duty applications.
OL	OSB	OSC	OSA			Outside lip design. Spring-loaded single lip. For rotating bores.	For applications where the bore rotates. Generally used in grease applications.
MIST		STMIST	STMIST w/Buttons			Single lip w/molded-in spring. Eliminates spring dumping. Available with metal bands for severe shock loads. Spacer buttons available.	For heavy duty applications. Work rolls, paper rolls, runout tables and custom equipment.
STLUP		STLUP w/Buttons				Spring-loaded single lip. Metal bands for severe shock loads. Spacer buttons available.	For heavy duty applications. Work rolls, paper rolls, runout tables and custom equipment.

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Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 3200 (16.3)	1/4 – 62.5 (5 – 1587)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-14, 6-12
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2000 (10.2)	1/2 – 65 (13 – 1651)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 3 (0 – 0.20) <i>Depending on Shaft Speed</i>	5-27
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 1000 (5.1) <i>Speed Depends on Runout</i>	1 – 50 (41 – 1270)	0.020 – 1.125" (0.508 – 28.58 mm)	0.020 – 1.125" (0.508 – 28.58 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-15
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2500 (12.7)	3/4 – 25 (19 – 635)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-14, 6-12
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2500 (12.7) <i>Speed Depends on Runout</i>	3/4 – 25 (19 – 635)	0.020 – 0.125" (0.508 – 3.175 mm)	0.010 – 0.125" (0.508 – 3.175 mm)	0 – 3 (0 – 0.20) <i>Depending on Shaft Speed</i>	5-15, 6-17
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2000 (10.2)	1/2 – 12.835 (12.7 – 326)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-23, 6-13
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2000 (10.2)	1/4 – 6 (6.4 – 152)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-23, 6-13
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 1000 (5.1)	1 – 65 (25 – 1651)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-17, 6-18
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 3200 (16.3)	6 – 48 (152 – 1219)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-26
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 3200 (16.3)	5 – 57.875 (127 – 1470)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-18














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Product Offering

Table 4-1. Product Profiles (Continued)

Standard Profiles	Other Profiles Available	Features	Applications
Clipper and Parker Oil Seals (Continued)			
LifeLine 		Single lip w/molded-in spring. Eliminates spring dumping. Molded-in steel reinforcing bar. All rubber construction. For shock installations. Spacer buttons available.	For heavy duty applications. Work rolls, paper rolls, runout tables and custom equipment.
P 		Shallow cavity rod wiper for reciprocating service. Designed to exclude dust and contamination.	Applications for reciprocating service and low speed.
H 	W 	General purpose rod wiper. For rotary and reciprocating service. Springless single lip. For dust exclusion.	Applications for rotary and reciprocating service.
DS 		DS is designed for internal deflection of heavy oil splash or external exclusion of dust or spray. The design is pressed fit onto the shaft. DS is known as a deflector seal.	Used internally on gearboxes or other industrial equipment with internal splash.
SSW 		SSW is designed for applications for external washdowns or severe dusty environments. The seal rides against the face of the housing to keep contamination from the primary seals.	Electric motors, mining or washdown applications.
HP 		High pressure with a fluoro-elastomer sealing element, outer metal case, and a PTFE backup element for pressure. Standard with carbon steel case. Stainless steel and other alloys available.	The High Pressure (HP) seal is designed to handle rotary and reciprocating motions at high speeds and temperatures. Typical applications: pumps, compressors and custom equipment.
MP 	TDN3 SEC NTC 	Medium Pressure (MP) seal. MP seals come with FKM material for high temperatures normally associated with friction caused by pressure.	Pumps, washers and compressors.
DB 	DC 	Dual spring-loaded lips.	Used to separate two fluids.

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









Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 3200 (16.3)	6 – 48 (152 – 1219)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-26
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Reciprocating: Up to 300 (1.5)	3/8 – 30 (10 – 762)	N/A	0.008" (0.20 mm)	0	5-22
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Rotary: Up to 2000 (10.2) Reciprocating: Up to 300 (1.5)	3/8 – 30 (10 – 762)	N/A	0.008" (0.20 mm)	0	5-22, 6-20
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2500 (12.7)	3/4 – 15 (19 – 381)	N/A	N/A	0	12-9
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2500 (12.7)	1 – 25 (25 – 635)	N/A	N/A	0	12-9
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 4000 (20.3)	1/4 – 8 (6.4 – 203)	0.003" (0.076 mm)	0.003" (0.076 mm)	300 (20)	5-16
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 4000 (20.3)	1/4 – 12.500 (6.4 – 317)	0.005" (0.127 mm)	0.005" (0.127 mm)	100 (7)	5-16, 6-15
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2000 (10.2)	1/4 – 4 (6.4 – 101)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	6-14

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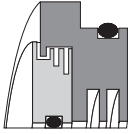
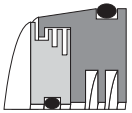
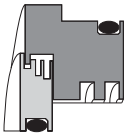
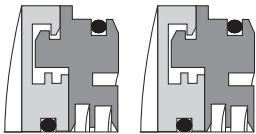
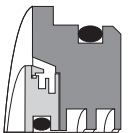
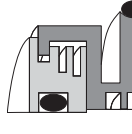
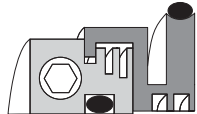
Table 4-1. Product Profiles (Continued)

Standard Profiles	Other Profiles Available	Features	Applications
Clipper and Parker Oil Seals (Continued)			
Clipper Sliptite 	SBF SCF TBF TCF 	The Clipper Sliptite is a specially designed seal that utilizes a layer of PTFE bonded to the sealing lip to reduce excessive wearing on the shaft and seal.	With the PTFE lip the seal can be utilized in dry running applications, at higher speeds, and accepts a broader range of chemical compatibility. Typical applications: electric motors, gearboxes, pumps, fans and custom equipment.
TMAL 	TMAS 	The stainless steel outer case contains a machined PTFE element with and without a spring to activate the lip.	TMAL & TMAS seals are designed for corrosive chemical service and FDA application.
TN 		The TN seal comes with a single lip element that combines the low friction properties of PTFE with the flexibility and durability of rubber. The seal comes with an outer metal case.	The TN seal was specially developed for severe service applications.
CB 	CL (Low Speed) CH (High Speed) 	Unitized seal offered with a rubber covered or metal OD. Sealing elements ride on a proper internal sealing surface which offers the advantage of eliminating the cost of preparing or resurfacing the shaft for a lip seal and makes seal replacement easier.	Gearboxes, reducers, agricultural equipment and pumps.
RPDT 		General purpose spring-loaded single lip seal. Available in splits only.	Typical applications: steel mills, pillow blocks.
TSS 		Features nonmetallic composite OD for damage-free installation. Provides a soft flexible lip which provides low friction sealing contact to give extended service life.	Typical applications: overhead cranes in steel mills, rotary drilling crown and travel blocks, draglines, hoist and elevators. Also used on mine cart wheels, flywheels and idler wheels.
Shaft Sleeves			
Quick Sleeve 		Ultra thin, 0.010" (0.25 mm), hard chrome plated stainless steel shaft repair sleeve.	Grooved or unfinished shafts.
WS — Wear Sleeve, Non-flanged 	WS — Wear Sleeve, Flanged 	Carbon sleeve phosphate coated or ground finish.	Grooved or unfinished shafts.

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Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 5000 (25.4)	1/2 – 10 (12.7 – 254)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-24, 6-19
PTFE - 40 °F to 500 °F -40 °C to 260 °C	Up to 2500 (12.7)	1/2 – 14 (10 – 350)	0.006" (0.152 mm)	0.006" (0.152 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-25
PTFE - 40 °F to 500 °F -40 °C to 260 °C	Up to 2500 (12.7)	3/8 – 6 (9.5 – 152)	0.006" (0.152 mm)	0.010" (0.254 mm)	10 (0.69)	6-19
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 3200 (16.3)	1/2 – 14 (10 – 350)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	6-16
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2000 (10.2)	3.375 – 16 (85.73 – 406)	0.010" (0.254 mm)	0.010" (0.254 mm)	0	5-21
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 2000 (10.2)	1.274 – 17.500 (32.36 – 445)	0.010" (0.254 mm)	0.010" (0.254 mm)	0	5-19
N/A	N/A	N/A	N/A	N/A	N/A	7-1
N/A	N/A	N/A	N/A	N/A	N/A	7-1

Table 4-1. Product Profiles (Continued)

Standard Profiles	Features	Applications
ProTech Bearing Isolators		
<p>LSE, LSM</p> 	<p>Flanged — General purpose sealing in flanged designs. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment.</p>
<p>LNE, LNM</p> 	<p>Non-flanged — Specifically designed for flush mount applications. General purpose sealing in non-flanged design. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment.</p>
<p>LME, LMM</p> 	<p>Step Shaft — Specifically designed to accommodate step shaft application. Flanged designs. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment.</p>
<p>LWE, LWM, LXE, LXM</p> 	<p>Wrap Around — Specifically designed for heavier water spray exclusion. Vertical up optional design is “LX,” same as “LW” but with no drain port. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment. LX is without drain port for vertical up applications.</p>
<p>LDE, LDM</p> 	<p>Multi Port — For use in applications where drain port cannot be fixed at six o'clock position. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment.</p>
<p>LBE, LBM</p> 	<p>Pillow Block — Solid seal design for sealing split pillow block bearings. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Drop in replacement for LER ring. Easily interchanged by LER number and shaft diameter.</p>
<p>SB</p> 	<p>Pillow Block — Split seal design for sealing split pillow block bearings. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Drop in replacement for LER ring for split pillow block bearings. Easily interchanged by LER number and shaft diameter.</p>

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Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4)	Standards: 1/2 – 10 (12.7 – 254) Specials: to 20 (508)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	8-22
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4)	Standards: 1/2 – 10 (12.7 – 254) Specials: to 20 (508)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	8-23
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4)	Standards: 1/2 – 10 (12.7 – 254) Specials: to 20 (508)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	See note below.
-40 °F to 250 °F -40 °C to 121 °C	Up to 3,000 (15.2)	Standards: 1/2 – 10 (12.7 – 254) Specials: to 20 (508)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	8-25
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4)	Standards: 1/2 – 10 (12.7 – 254) Specials: to 20 (508)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	See note below.
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4)	Standards: 1/2 – 10 (12.7 – 254) Specials: to 20 (508)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	8-24
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4)	Standards: 1/2 – 10 (12.7 – 254) Specials: to 20 (508)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	8-24

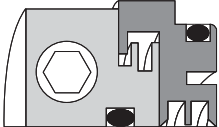

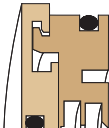
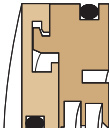
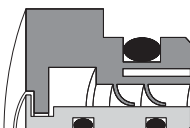


Note: LM Series: Call engineering for step shaft applications.
 LD Series: Call engineering for multi-port applications.

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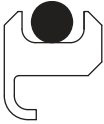
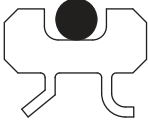
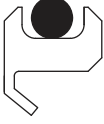
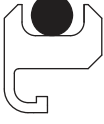
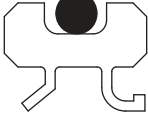
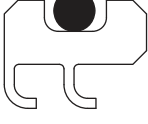

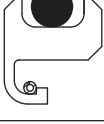
Table 4-1. Product Profiles (Continued)

Standard Profiles	Features	Applications
ProTech Bearing Isolators (Continued)		
<p>SLE, SLM</p> 	<p>Split — Split design for field retrofits where equipment can not be uncoupled or disassembled. Requires no wear sleeves or shaft refurbishment. PTFE material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment.</p>
<p>WDE, WDM</p> 	<p>Wash Down — Wash down purpose in narrow flanged designs. PTFE material. Specifically designed to exclude high pressure water spray and dry contaminants in limited space applications. For grease retention.</p>	<p>Small disposable electric motors and equipment for food processing industry. Economical for 140 & 480 frame IEEE 841 electric motors.</p>
<p>MLE, MLM</p> 	<p>Flanged Millennium — Specifically designed for heavier water spray exclusion. Bronze material. Also excludes dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment.</p>
<p>MNE, MNM</p> 	<p>Non-flanged Millennium — Specifically designed for flush mount applications. General purpose sealing in non-flanged design. Bronze material. Excludes heavy water spray and dry contaminants from the bearing cavity. Retains grease and oil splash (oil level must be below inboard oil drain-back or non-flooded).</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers and custom equipment.</p>
<p>FSE, FSM</p> 	<p>Flanged 360 — Specifically designed for oil flooded and oil mist applications. Maximum 5 psi (0.3 bar) internal pressure. PTFE material with stainless steel rotor. Excludes heavy water spray and dry contaminants from the bearing cavity.</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers, cooling towers, aerators and custom equipment. Oil mist lubrication systems.</p>
<p>FNE, FNM</p> 	<p>Non-flanged 360 — Specifically designed for oil flooded and oil mist applications where seal must be flush mounted. Maximum 5 psi (0.3 bar) internal pressure. PTFE material with stainless steel rotor. Excludes heavy water spray and dry contaminants from the bearing cavity.</p>	<p>Electric motors, pumps, mixers, gear boxes, blowers, cooling towers, aerators and custom equipment. Oil mist lubrication systems.</p>

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Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
-40 °F to 250 °F -40 °C to 121 °C	Up to 3,000 (15.2) <i>Contact Factory for Speeds Over 3,000 (15.2)</i>	1/2 – 10 (12.7 – 254) Specials: to 38 (965)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	8-27
-40 °F to 250 °F -40 °C to 121 °C	Up to 3,000 (15.2) <i>Contact Factory for Speeds Over 3,000 (15.2)</i>	0.492 – 5 (12.5 – 130)	0.020" (0.51 mm)	± 0.020" (± 0.51 mm) <i>Special Designs Available</i>	0	8-26
-40 °F to 400 °F -40 °C to 204 °C	Up to 7,000 (35.6) SM Design: 3,000 (15.2)	0.610 – 6 (15.5 – 152)	0.010" (0.25 mm)	± 0.010" (± 0.25 mm) <i>Special Designs Available</i>	0	8-29
-40 °F to 400 °F -40 °C to 204 °C	Up to 7,000 (35.6) SM Design: 3,000 (15.2)	0.610 – 6 (15.5 – 152)	0.010" (0.25 mm)	± 0.010" (± 0.25 mm) <i>Special Designs Available</i>	0	8-30
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4) <i>Contact Factory for Speeds Over 3,000 (15.2)</i>	1/2 – 10 (12.7 – 254)	0.003" (0.08 mm)	± 0.005" (± 0.13 mm) <i>Special Designs Available</i>	5 (0.3)	8-31
-40 °F to 250 °F -40 °C to 121 °C	Up to 5,000 (25.4) <i>Contact Factory for Speeds Over 3,000 (15.2)</i>	1/2 – 10 (12.7 – 254)	0.003" (0.08 mm)	± 0.005" (± 0.13 mm) <i>Special Designs Available</i>	5 (0.3)	8-32

Table 4-1. Product Profiles (Continued)

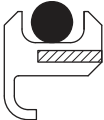
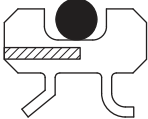
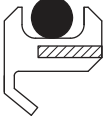
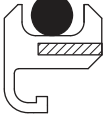
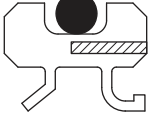
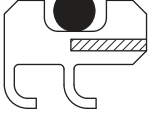
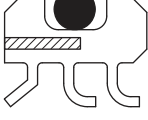
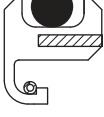
Standard Profiles	Features	Applications
FlexiLip Seals		
LFN-N 	Formed Primary Lip	Multipurpose Seal
LFE-N 	Formed Primary Lip w/ Excluder Lip	Multipurpose Seal
LMN-N 	Machined Primary Lip	Low Friction
LEN-N 	Elf-Toe Primary Lip	Abrasive Media
LEE-N 	Elf-Toe Primary Lip w/ Excluder Lip	Abrasive Media
LDN-N 	Dual Primary Lips	Oil Seal — Flooded, Severe Splash
LDE-N 	Dual Primary Lips w/ Excluder Lip	Oil Seal — Flooded, Severe Splash
LGN-N 	Primary Lip Energized with Garter Spring	0.020" ^{g r a a s} (0.51 mm) TIR

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Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
0 °F to 250 °F (-18 °C to 120 °C)	5000 (25.4)	Min 0.625 (16) Max 12 (305)	.003 (.07)	.005 (.12)	60 (4.14)	9-1
0 °F to 250 °F (-18 °C to 120 °C)	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	60 (4.14)	9-1
0 °F to 250 °F (-18 °C to 120 °C)	6000 (30.5)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	30 (2.07)	9-1
0 °F to 250 °F (-18 °C to 120 °C)	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.004 (.101)	.005 (.12)	60 (4.14)	9-1
0 °F to 250 °F (-18 °C to 120 °C)	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.004 (.101)	.005 (.12)	60 (4.14)	9-1
0 °F to 250 °F (-18 °C to 120 °C)	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	150 (10.35)	9-1
0 °F to 250 °F (-18 °C to 120 °C)	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	150 (10.35)	9-1
0 °F to 250 °F (-18 °C to 120 °C)	2000 (10.2)	Min 0.750 (19) Max 12 (305)	.020 (.508) Max based on shaft speed < 100 sfpm (0.5 m/s)	.010 (.25)	60 (4.14)	9-1

Product Offering

Table 4-1. Product Profiles (Continued)

Standard Profiles	Features	Applications
FlexiLip Seals (Continued)		
LFN-S 	Formed Primary Lip w/ Metal Band	Wide temperature ranges or shafts over 4" (100 mm).
LFE-S 	Formed Primary Lip w/ Excluder Lip w/ Metal Band	Wide temperature ranges or shafts over 4" (100 mm).
LMN-S 	Machined Primary Lip w/ Metal Band	Low Friction Wide temperature ranges or shafts over 4" (100 mm).
LEN-S 	Elf-Toe Primary Lip w/ Metal Band	Abrasive Media Wide temperature ranges or shafts over 4" (100 mm).
LEE-S 	Elf-Toe Primary Lip w/ Excluder Lip w/ Metal Band	Abrasive Media Wide temperature ranges or shafts over 4" (100 mm).
LDN-S 	Dual Primary Lips w/ Metal Band	Oil Seal — Flooded, Severe Splash Wide temperature ranges or shafts over 4" (100 mm).
LDE-S 	Dual Primary Lips w/ Excluder Lip w/ Metal Band	Oil Seal — Flooded, Severe Splash Wide temperature ranges or shafts over 4" (100 mm).
LGN-S 	Primary Lip Energized with Garter Spring w/ Metal Band	Slow speed, high runout applications up to 0.020" (0.5 mm) TIR. Wide temperature ranges or shafts over 4" (100 mm).

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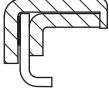

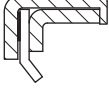





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Operating Temperature Range*	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
Limited by O-ring material. See chart on Page 8-17.	5000 (25.4)	Min 0.625 (16) Max 12 (305)	.003 (.07)	.005 (.12)	60 (4.14)	9-1
Limited by O-ring material. See chart on Page 8-17.	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	60 (4.14)	9-1
Limited by O-ring material. See chart on Page 8-17.	6000 (30.5)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	30 (2.07)	9-1
Limited by O-ring material. See chart on Page 8-17.	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.004 (.101)	.005 (.12)	60 (4.14)	9-1
Limited by O-ring material. See chart on Page 8-17.	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.004 (.101)	.005 (.12)	60 (4.14)	9-1
Limited by O-ring material. See chart on Page 8-17.	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	150 (10.35)	9-1
Limited by O-ring material. See chart on Page 8-17.	5000 (25.4)	Min 0.750 (19) Max 12 (305)	.003 (.07)	.005 (.12)	150 (10.35)	9-1
Limited by O-ring material. See chart on Page 8-17.	2000 (10.2)	Min 0.750 (19) Max 12 (305)	.020 (.508) Max for shaft speeds < 100 sfpm (0.5 m/s)	.010 (.25)	60 (4.14)	9-1

Product Offering

Table 4-1. Product Profiles (Continued)

Standard Profiles	Features	Applications
FlexiCase Seals		
CFN 	Formed Primary Lip	General purpose rotary shaft seal.
CFE 	Formed Primary Lip w/ Excluder Lip	Ideal to keep oil in and water & dirt out.
CMN 	Machined Primary Lip	General purpose rotary shaft seal w/ low breakaway torque.
CME 	Machined Primary Lip w/Excluder Lip	Ideal to keep oil in and water & dirt out. Low Breakaway torque.
CEN 	Elf-Toe Primary Lip	General purpose rotary shaft seal where shaft runout is 0.005 to 0.010" (0.13 to 0.25 mm) or abrasive media.
CEE 	Elf-Toe Primary Lip w/ Excluder Lip	Ideal to keep oil in and water & dirt out where shaft runout is 0.005 to 0.010" (0.13 to 0.25 mm) or abrasive media.
CDN 	Dual Primary Lips	Redundant sealing for aircraft or other low leakage systems.
CDE 	Dual Primary Lips w/ Excluder Lip	Redundant sealing for aircraft or other low leakage systems. Keeps water & dirt out.

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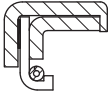
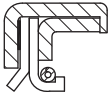
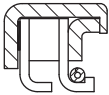






Operating Temperature Range*	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
Limited by gasket material. Use O-ring chart on Page 8-17 .	5000 (25.4)	Min 0.125 (3) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	250 (17.25)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	5000 (25.4)	Min 0.250 (6.4) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	6000 (30.5)	Min 0.250 (6.4) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	6000 (30.5)	Min 0.250 (6.4) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	5000 (25.4)	Min 0.125 (3) Max 6 (152)	0.004 (0.101)	0.005 (0.12)	250 (17.25)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	5000 (25.4)	Min 0.250 (6.4) Max 6 (152)	0.004 (0.101)	0.005 (0.12)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	5000 (25.4)	Min 0.250 (6.4) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	250 (17.25)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	5000 (25.4)	Min 0.250 (6.4) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	250 (17.25)	10-1



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Table 4-1. Product Profiles (Continued)




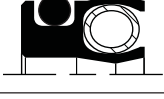





Standard Profiles	Features	Applications
FlexiCase Seals (Continued)		
CGN 	Primary Lip Energized with Garter Spring	Use when shaft runout is 0.010 to 0.020" (0.25 to 0.51 mm) or abrasive media.
CGE 	Primary Lip Energized with Garter Spring w/ Excluder Lip	Use when shaft runout is 0.010 to 0.020" (0.25 to 0.51 mm) or abrasive media. Keeps water & dirt out.
CJN 	Dual Lip Seal w/ Primary Lip Energized with Garter Spring	Use when redundant sealing is needed & shaft runout is 0.010 to 0.020" (0.25 to 0.51 mm) or abrasive media.
CJE 	Dual Lip Seal w/ Primary Lip Energized with Garter Spring w/ Excluder Lip	Use when redundant sealing is needed & shaft runout is 0.010 to 0.020" (0.25 to 0.51 mm) or abrasive media. Keeps water & dirt out.
CHN 	High Pressure Dual-Lip Seal with Metal Backup Washer	Redundant seal for high pressure aircraft or other low leakage systems.
CHE 	High Pressure Dual-lip Seal with Metal Backup Washer w/ Excluder Lip	Redundant seal for high pressure aircraft or other low leakage systems. Keeps water & dirt out.
FlexiSeal Rotary Seals		
FCC-V 	O-Ring Centered in OD, Chamfered ID, Cantilever Spring	Optimum sealability. Available in 125 cross-section and higher.
FCS-V 	O-Ring Centered in OD, Scraper ID, Cantilever Spring	Minimizes contamination threat. Available in 125 cross-section and higher.
FCC-C 	O-Ring Centered in OD, Chamfered ID, Canted-Coil Spring	Reduced friction and sealability. Available in 125 cross-section and higher.

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Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
Limited by gasket material. Use O-ring chart on Page 8-17 .	2000 (10.2)	Min 0.250 (6.4) Max 6 (152)	0.020 (0.508) Max for shaft speeds < 100 sfpm (0.5 m/s)	0.010 (0.25)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	2000 (10.2)	Min 0.250 (6.4) Max 6 (152)	0.020 (0.508) Max for shaft speeds < 100 sfpm (0.5 m/s)	0.010 (0.25)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	2000 (10.2)	Min 0.250 (6.4) Max 6 (152)	0.020 (0.508) Max for shaft speeds < 100 sfpm (0.5 m/s)	0.010 (0.25)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	2000 (10.2)	Min 0.250 (6.4) Max 6 (152)	0.020 (0.508) Max for shaft speeds < 100 sfpm (0.5 m/s)	0.010 (0.25)	125 (8.63)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	2000 (10.2)	Min 0.250 (6.4) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	500 (3.45)	10-1
Limited by gasket material. Use O-ring chart on Page 8-17 .	2000 (10.2)	Min 0.250 (6.4) Max 6 (152)	0.003 (0.07)	0.005 (0.12)	500 (3.45)	10-1
Limited by O-ring material. See chart on Page 8-17 .	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25 .	See Fig. 2-23 on Page 2-25 .	3,000 (210)	11-9
Limited by O-ring material. See chart on Page 8-17 .	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25 .	See Fig. 2-23 on Page 2-25 .	3,000 (210)	11-9
Limited by O-ring material. See chart on Page 8-17 .	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25 .	See Fig. 2-23 on Page 2-25 .	3,000 (210)	11-9



Table 4-1. Product Profiles (Continued)

Standard Profiles	Features	Applications
FlexiSeal Rotary Seals (Continued)		
FCS-C 	O-Ring Centered in OD, Scraper ID, Canted-Coil Spring	Low friction with contamination resistance. Available in 125 cross-section and higher.
FHC-V 	O-Ring in Heel OD, Chamfered ID, Cantilever Spring	Optimum sealability. Available in extended heel option only.
FHS-V 	O-Ring in Heel OD, Scraper ID, Cantilever Spring	Minimizes contamination threat. Available in extended heel option only.
FHC-C 	O-Ring in Heel OD, Chamfered ID, Canted-Coil Spring	Reduced friction and sealability. Available in extended heel option only.
FHS-C 	O-Ring in Heel OD, Scraper ID, Canted-Coil Spring	Low friction with contamination resistance. Available in extended heel option only.
FFC-V 	Flanged Heel OD, Chamfered ID, Cantilever Spring	Optimum sealability. Premium bore retention.
FFS-V 	Flanged Heel OD, Scraper ID, Cantilever Spring	Minimizes contamination threat. Premium bore retention.
FFC-C 	Flanged Heel OD, Chamfered ID, Canted-Coil Spring	Reduced friction and sealability. Premium bore retention.
FFS-C 	Flanged Heel OD, Scraper ID, Canted-Coil Spring	Low friction with contamination resistance. Premium bore retention.

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

Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
Limited by O-ring material. See chart 8-7 on Page 8-17.	1000 (5.1)	Min 0.125 (3) Max 6 (152)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	3,000 (210)	11-9
Limited by O-ring material. See chart 8-7 on Page 8-17.	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	1,000 (70)	11-9
Limited by O-ring material. See chart 8-7 on Page 8-17.	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	1,000 (70)	11-9
Limited by O-ring material. See chart 8-7 on Page 8-17.	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	1,000 (70)	11-9
Limited by O-ring material. See chart 8-7 on Page 8-17.	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	1,000 (70)	11-9
-450 to 600 °F (-268 to 315 °C)	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	3,000 (210)	11-11
-450 to 600 °F (-268 to 315 °C)	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	3,000 (210)	11-11
-450 to 600 °F (-268 to 315 °C)	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	3,000 (210)	11-11
-450 to 600 °F (-268 to 315 °C)	1000 (5.1)	Min 0.125 (3) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	3,000 (210)	11-11

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03/28/06



Table 4-1. Product Profiles (Continued)

Standard Profiles	Features	Applications
FlexiSeal Rotary Seals (Continued)		
FFN-H 	Flanged Heel OD, Rounded ID, Helical Spring	Static or intermittent rotary only. High sealability and friction.
V-Seals and Excluders		
Style A 	All rubber excluder has stretch fit on shaft. Extended flexible lip seals against counter face.	Small motors, conveyors, appliances, agriculture, automotive, work rolls, rolling mills, pumps and gear boxes.
Style S 	Wide body for higher speed applications	Small motors, conveyors, appliances, agriculture, automotive, work rolls, rolling mills, pumps and gear boxes.
Style L 	Narrow cross-section where space is limited	Small motors, conveyors, appliances, agriculture, automotive, work rolls, rolling mills, pumps and gear boxes, pillow block bearings.
Style E 	Heavy duty design for large diameter applications.	Rolling mills, work rolls, backup rolls.
Style DS 	DS is designed for internal deflection of heavy oil splash or external deflection of dust or spray. The design is press fit onto the shaft. DS is known as a deflector seal.	Used internally on gearboxes or other industrial equipment with internal splash. Also used as external slinger
Style SSW 	SSW is designed for applications for external washdowns or severe dusty environments. The seal rides against the face of the housing to keep contamination from the primary seals.	Electric motors, mining, washdown or roller mill applications.

4

Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
-450 to 600 °F (-268 to 315 °C)	50 (0.25)	Min 0.500 (12) Max 16 (406)	See Fig. 2-23 on Page 2-25.	See Fig. 2-23 on Page 2-25.	3,000 (210)	11-11
NBR -40 °F to 225 °F (-40 °C to 107 °C) FKM -30 °F to 325 °F (-34 °C to 163 °C)	1600 (8.1)	0.110 – 79.530 (2.79 – 2020)	Within limits of dimension B1. See Appendix E.	1° to 4°	N/A	12-5
NBR -40 °F to 225 °F (-40 °C to 107 °C) FKM -30 °F to 325 °F (-34 °C to 163 °C)	1600 (8.1)	0.180 – 8.270 (4.57 – 210)	Within limits of dimension B1. See Appendix E.	1° to 4°	N/A	12-6
NBR -40 °F to 225 °F (-40 °C to 107 °C) FKM -30 °F to 325 °F (-34 °C to 163 °C)	1600 (8.1)	5.320 – 18.70 (135 – 475)	Within limits of dimension B1. See Appendix E.	1° to 4°	N/A	12-7
NBR -40 °F to 225 °F (-40 °C to 107 °C) FKM -30 °F to 325 °F (-34 °C to 163 °C)	1600 (8.1)	17.720 – 79 (450.1 – 2000)	Within limits of dimension B1. See Appendix E.	1° to 4°	N/A	12-8
NBR -20 °F to 250 °F (-29 °C to 121 °C) FKM -40 °F to 400 °F (-40 °C to 204 °C)	Up to 2500 (12.7)	314 – 15 (19 – 381)	N/A	N/A	N/A	12-9
NBR -20 °F to 250 °F (-29 °C to 121 °C) FKM -40 °F to 400 °F (-40 °C to 204 °C)	Up to 2500 (12.7)	1 – 25 (25 – 635)	N/A	N/A	N/A	12-9



Notes

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