

Clipper® Oil Seals Introduction



Catalog EPS 5350/USA

Contents

Engineering	5-3
Materials	5-6
Product Offering	5-9
Part Numbering	
Nomenclature	5-9

Solid Clipper Oil Seals

LUP, LPD, LDS Profiles	5-14
LUPW, LPDW, LDSW Profiles	5-15
HP, MP Profiles	5-16
OL Profile	5-17
ST-LUP, ST-LPD Profiles	5-18
TSS Profile	5-19
DL Profile	5-20
RPDT Profile	5-21
P, H Profiles	5-22
SS, SDS Profiles	5-23
Clipper Sliptite Profile	5-24
TMAL, TMAS Profiles	5-25
MIST, LifeLine Profile	5-26
RUP, RPD Profiles	5-27

Split Clipper Oil Seals 5-28

Clipper Oil Seals provide superior performance in the most demanding and critical applications.

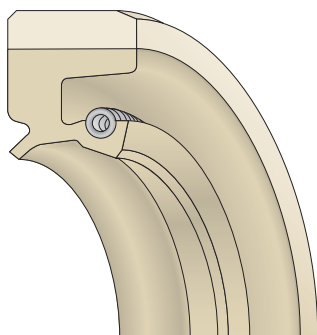
OEMs worldwide know Clipper Oil Seals for their ability to provide superior performance in the most demanding and critical applications. A one-piece molded construction and the ability to provide application-specific designs, if needed, are just a few of the reasons Clipper seals are specified for critical applications. These applications include as aircraft landing gear, military vehicles, underground mining equipment and roll chocks used in the steel industry.

Clipper seals are available for shaft diameters from 0.250" (6.35 mm) to over 65" (1651 mm) in both standard and high performance elastomer compounds. With over 10,000 tooled sizes, Clipper seals are readily available for most applications in either a solid or split design.

The most unique feature of the Clipper oil seal is nonmetallic construction. The metal case that is common with traditional lip seals is replaced with an aramid fiber and elastomer composite material.

A wide range of lip profiles are available with the aramid composite OD to suit virtually any application need. For standard profiles, see **Table 5-7** on **Page 5-10**.

Stainless Steel Springs Are Standard on all Clipper Oil Seals where the industry standard is a lower quality carbon steel. Clipper's spring material provides improved lip loading at higher temperatures and resists the rust and corrosion that is common with lower quality materials. The upgraded spring ensures consistent lip loading over the life of the seal.



Clipper Oil Seal



03/28/06



Applications

Clipper Oil Seals are used in a wide range of industries including light industrial, mining, paper, steel, food processing, marine, aerospace and petrochemical.

Application equipment includes:

- Pumps
- Motors
- Gearboxes
- Crushers
- Fans
- Pillow blocks
- Runout tables
- Paper rolls
- Work rolls
- Mixers
- Compressors
- Overhead cranes
- Drag lines
- Hoists
- Elevators
- Mine cart wheels
- Flywheels
- Idler wheels
- Tapered bearings
- Custom equipment

5

Features, Advantages and Benefits

The Clipper Oil Seal can be used as a direct replacement for metal case seals and provides the following benefits:

1. Composite OD provides gasket-type seal at OD for improved sealing in worn housings. Compression plates are not required for seal retention or lip loading. The tight press fit eliminates the need for a cover plate.
2. Will not rust or corrode.
3. Consists of a seal lip and seal OD to form a one-piece molded construction across entire size range and a more robust design compared to gluing or crimping the seal lip to a metal case.
4. Resists problems caused by thermal expansion when seal case and housing are different materials.
5. Eliminates seal damage during installation. The Clipper seal is known for its user-friendly installation.
6. Nonmetallic construction allows splittable design.
7. Composite material provides unique design capabilities; i.e. flange, buttons, mounting holes.
8. Allows for faster delivery of non-stock items with no manufacturing delays caused by waiting on metal components. Seals 14" and over ship in under 10 days and typically less than four weeks for small diameter.



Shaft Recommendations

Material — Parker recommends a shaft material of carbon steel with a minimum hardness of Rockwell C30 (30 Rc). Soft materials such as bronze, aluminum or plastic should be avoided because they are susceptible to grooving and will cause premature seal failure. If a soft shaft material must be used, a Parker Quick Sleeve or Parker Wear Sleeve can be installed over the soft shaft material to provide a durable sealing surface. See **Section 7** for details.

Shaft Finish — Parker recommends a plunge ground finish of 8 to 17 $\mu\text{in Ra}$ (0.20 to 0.43 $\mu\text{m Ra}$) with zero lead. A shaft finish significantly smoother or rougher will shorten the service life of the seal. For additional information on shaft finish refer to **Page 2-6**.

Shaft Profile — The shaft profile should include a lead-in chamfer per the following example. The leading edge helps prevent lip roll-back and spring dumping. The leading edge and trailing edges should be free of burrs or sharp edges that could cut the contact point of the seal lip. See **Table 2-2a** on **Page 2-8** for recommended minimum chamfer length.

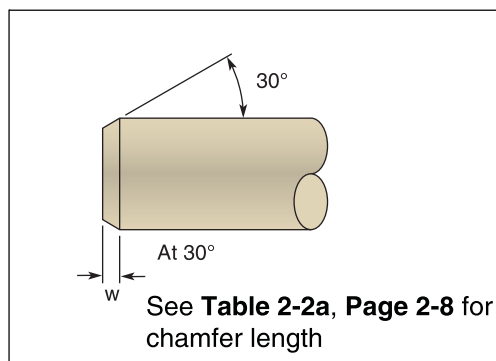


Figure 5-1. Shaft Profile

Shaft Tolerance — To ensure the proper lip-to-shaft interference is maintained, shaft diameters should fall within the tolerances specified in **Tables 5-1** and **5-2**. Shafts significantly over the tolerance will increase the underlip temperatures and lead to premature failure. An undersized shaft compromises the amount of lip interference available to maintain a positive seal.

Table 5-1. Shaft Tolerance for Inch/Fractional

Shaft Diameter	Tolerance
Up to 4.000"	$\pm .003$ "
4.001 – 6.000"	$\pm .004$ "
6.001 – 10.000"	$\pm .005$ "
Over 10.000"	$\pm .006$ "

Table 5-2. Shaft Tolerance for Metric*

Shaft Diameter	Tolerance
Up to 10 mm	+0 to -.09 mm
Over 10 – 18	+0 to -.11 mm
Over 18 – 30	+0 to -.13 mm
Over 30 – 50	+0 to -.16 mm
Over 50 – 80	+0 to -.19 mm
Over 80 – 120	+0 to -.22 mm
Over 120 – 180	+0 to -.25 mm
Over 180 – 250	+0 to -.29 mm
Over 250 – 315	+0 to -.32 mm
Over 315 – 400	+0 to -.36 mm
Over 400 – 500	+0 to -.40 mm

*ISO Standard 286-2, h11



Housing Recommendations

Material — The most commonly used materials for seal housings are steel and cast iron. Care must be taken when softer housing materials such as aluminum, bronze or plastic are used.

Housing Finish — A finish range of 40 to 100 $\mu\text{in Ra}$ (1.0 to 2.5 $\mu\text{m Ra}$) is recommended. The Clipper seal is more tolerant of housing finishes that are toward the upper limit than metal OD seals.

Housing Profile — A lead-in chamfer per the following example is highly recommended for all seal housings. The chamfer aligns the seal during installation and helps prevent the seal from cocking. Both corners of the chamfer should be free of burrs and sharp edges to eliminate OD damage during installation.

Housing Tolerance — The diametrical tolerance of the housing for Clipper Oil Seals should be within the limits specified below.

Table 5-3. Housing Tolerance for Inch/Fractional

Bore Diameter	Diameter Tolerance H1	Diameter Tolerance STH1	Depth Tolerance (-0/+)
Up to 5.9	$\pm.002$	$\pm.002$	+0.031
6.0 – 15.9	$\pm.005$	$\pm.002$	+0.062
16.0 – 30.9	$\pm.008$	$\pm.005$	+0.062
Over 31.0	$\pm.010$	$\pm.005$	+0.062

Table 5-4. Housing Tolerance for Metric

Bore Diameter	Diameter Tolerance H1	Diameter Tolerance STH1	Depth Tolerance (-0/+)
Up to 150.0	$\pm.05$	$\pm.05$	+0.8
151 – 403	$\pm.13$	$\pm.05$	+1.5
404 – 785	$\pm.20$	$\pm.13$	+1.5
Over 786	$\pm.25$	$\pm.13$	+1.5

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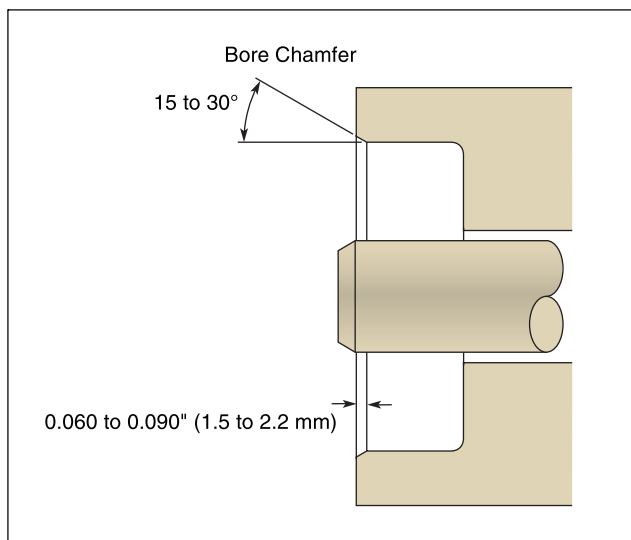


Figure 5-2. Housing Profile

Solid Clipper Seal Installation

1. Clean seal bore and shaft. Remove all burrs and nicks.

2. Pre-lubricate the seal ID and shaft before installing the seal into the cavity. Use a pre-lube that is compatible with the system lubricant. The pre-lube will make the seal easier to install and prevent dry running during initial start-up. **(Do not lubricate the seal OD or housing.)**



3. Protect seal lip against damage from sharp keyways, splines and screw threads. This can be done by either taping the keyway, inserting an element into the keyway or using an assembly sleeve that fits over the shaft.



4. Point seal lip in correct direction and push to edge of the counter bore.



5. Start seal into cavity by finger pressure. After starting seal in housing, tap evenly with a soft-faced mallet all around until seated.

6. Finish installation by using a flat plate tool to drive seal in final position. The plate diameter should be large enough so it contacts the face of seal housing. This will ensure seal is positioned straight and perpendicular to the shaft.



Split (R Series) Clipper Seal Installation

1. Clean the equipment cavity recess area thoroughly. Remove all burrs and sharp corners. Provide adequate lead-in chamfers.



2. Apply light grease or oil coating to the shaft area where the lip will engage. **Do not apply grease or oil to seal OD or equipment bore surface.**

3. Separate the cut ends of the seal sideways so that seal forms a helix. Do not try to form the seal into a "U" shape. Separate ends far enough so that the seal can be slipped over the shaft.



4. Insert the garter spring over the shaft, between the seal and the bore cavity, connecting the ends of the spring with the hook-and-eye connectors. Insert the garter spring into the lip carrier groove with the connection at least 45° from the split juncture. Push the seal toward the bore cavity until it touches, making sure that the split ends are well aligned and positioned at 12 o'clock.



5. Start inserting the seal into the cavity with the split juncture at top, compressing the OD slightly, until the split juncture has been inserted to about one-third of its width. Continue pressing the balance of the seal into the cavity, working away from the split, until the entire seal has been started into the cavity recess. Tap evenly around the back face of the seal with a soft-faced mallet until it is completely seated.



6. Use a flat plate tool that will drive the seal flush with the housing to ensure seal is installed square and perpendicular to the shaft.

5

03/28/06

Clipper[®] Oil Seals Materials

Catalog EPS 5350/USA

Common Materials Used in this Product

Clipper Oil Seals are available in a wide range of materials. The following general material descriptions are for the OD material "H" and corresponding lip material "L".

5

OD and Lip Materials

H1L5 & H1L7 — Nitrile (NBR)

Standard Nitrile is the most commonly used polymer in the rotary shaft seal industry. NBR has very good resistance to oil, fuel and alkali solutions. Nitrile offers excellent resistance to petroleum-based hydraulic fluids and is resistant to hydrocarbon solvents. Standard Nitrile has poor resistance to ozone, ketones, automotive or aircraft brake fluid, and steam or hot water. Standard Nitrile is recommended for operating in temperatures ranging from -20 to +250 °F (-29 to +121 °C) and offers good mechanical properties and abrasion resistance.

H1L50 & H1L70 — Low Temp Nitrile (NBR)

Nitrile compounds can be formulated for applications in extreme cold weather environments. These special formulations of Nitrile allow for operation at minimum temperatures ranging down to -70 °F (-57 °C), while maintaining good chemical and abrasion resistance, but the upper temperature limit is lowered to 212 °F (100 °C).

H1L20 — Carboxylated Nitrile (XNBR)

XNBR is formulated to greatly enhance tear and abrasion resistance over standard Nitrile, while maintaining similar chemical compatibility. It is used in applications where abrasive materials may collect at the point of shaft contact. XNBR is less resilient and flexible at low temperature, and offers poorer compression set resistance than standard Nitrile. Carboxylated Nitriles are recommended for operation at temperatures ranging from -30 to +250 °F (-34 to +121°C).

H1L30 — Hydrogenated Nitrile (HNBR)

Hydrogenated Nitriles offer improved abrasion resistance, excellent chemical resistance and higher operating temperatures than standard NBR. Ozone and weather resistance, as well as resistance to hot water are also increased. HNBR compounds are recommended for operating temperatures ranging from -40 to +300 °F (-40 to +149 °C).

03/28/06

H1L8 — Neoprene (CR)

Neoprene offers very good resistance to weather, ozone and natural aging as well as good flame resistance while maintaining moderate resistance to oil and gasoline. Good abrasion, flex and cracking resistance is available with the Neoprene material. Neoprene is recommended for operating temperatures ranging from -45 to +250 °F (-43 to +121 °C).

H1L21 — Ethylene Propylene (EPDM)

EPDM offers excellent heat, ozone and sunlight resistance. EPDM offers very good low temperature flexibility, good resistance to alkalis, acids (such as acetic), and oxygenated solvents (such as MEK). Provides improved resistance to water and steam in applications where NBR and FKM exhibit poor service life. Good replacement for FKM where solvents are a problem. It is not recommended for petroleum oil. EPDM is recommended for operating temperatures of -60 to +300 °F (-51 to +149°C).

H5L16 — Fluoroelastomer (FKM)

FKM provides excellent resistance to oils, fuels and hydraulic fluids at temperatures that far exceed standard Nitrile. It also has very good resistance to flame and excellent impermeability to gases and vapors. FKM is recommended for operating temperatures that range from -40 to +400 °F (-40 to +204 °C).

Case Materials

H1, H3 — Neoprene/Aramid Composite

The aramid fiber-reinforced composite shell will fit a wide range of bore tolerances and provides a rustproof gasket-type seal at the OD. The composite case also will fill slight imperfections in the bore housing, reducing machining cost. Usually combined with a Nitrile lip material.

H5 — Fluoroelastomer/Aramid Composite

Offers the same construction benefits mentioned above. Usually combined with a Fluoroelastomer lip material.

Spring Materials

Springs are available in a wide range of materials from Parker. Clipper Oil Seal designs are furnished with 302 stainless steel springs as standard. Other spring materials are available at an additional cost. **Table 5-5** shows general operating parameters for the most common spring materials.

Table 5-5. Spring Material Parameters

Wire Type	Maximum Service Temperature		Application
	°C	°F	
Carbon Steel	120	250	General purpose
Monel 400	230	450	Saltwater
Inconel 750	675	1250	Extreme temperature
Phosphor Bronze	95	200	Saltwater
302/304 Stainless Steel	260	500	Corrosion resistance
316 Stainless Steel	315	600	Hi-temp corrosion resistance



Spring Type

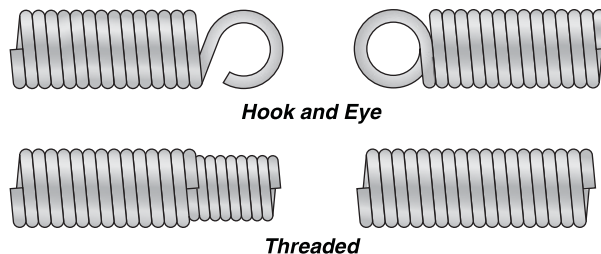
For lip loading, the Clipper Oil seal uses a coil wire spring (garter spring).

Garter spring benefits:

- Provides a more uniform load to sealing lip
- Heat treated — stress relieved
- Constant load with minimum load variations
- Able to adjust the spring in the field to increase load

Two types of spring connections are used:

1. Threaded type is used on most solid seals.
2. Hook and eye type are used on splits seals because they are easier for the end user to connect during installation.



03/28/06

Table 5-6. Clipper Oil Seal Standard Material

Matl. Code Case/Lip	Material Description	Abrasion Resistance	Min. Temp	Cont. Temp	Peak Temp
H1L5	Nitrile (75 Duro NBR) Standard NBR offering. The NBR lip material has very good resistance to oil and gasoline. Superior resistance to petroleum based hydraulic fluids. Good resistance to hydrocarbon solvents. Very good resistance to alkalis and solvents. Poor resistance to oxygenated solvents.	Very Good	-20 °F -29 °C	212 °F 100 °C	250 °F 121 °C
H1L7	Nitrile (85 Duro NBR) The L7 lip material has a lower minimum temperature capability than the L5 material.	Very Good	-30 °F -34 °C	212 °F 100 °C	250 °F 121 °C
H1L20	Carboxylated Nitrile (83 Duro XNBR) The XNBR lip material is generally tougher and more resistant to tear and abrasion than standard NBR.	Outstanding	-30 °F -34 °C	212 °F 100 °C	250 °F 121 °C
H1L30	Hydrogenated Nitrile (75 Duro HNBR) The HNBR lip material offers improved abrasion resistance, chemical resistance, higher operating temperature and better ozone resistance than standard NBR.	Outstanding	-40 °F -40 °C	250 °F 121 °C	300 °F 149 °C
ALLL5	Nitrile (75 Duro NBR) Homogenous NBR material without aramid fiber OD provides a very pliable seal that can be stretched over flanges or other obstructions on the shaft. A cover plate is recommended to keep the seal retained in the housing bore.	Very Good	-20 °F -29 °C	212 °F 100 °C	250 °F 121 °C
H1L50	Arctic Nitrile (85 Duro Low Temp NBR) Low temperature Nitrile lip material allows for lower minimum temperatures while providing good chemical and abrasion resistance.	Very Good	-50 °F -46 °C	200 °F 93 °C	212 °F 100 °C
H1L70	Alaska Nitrile (75 Duro Low Temp NBR) Same characteristics as L50, but softer with lower minimum temperature range.	Very Good	-70 °F -57 °C	200 °F 93 °C	212 °F 100 °C
H5L16	Fluoroelastomer (90 Duro FKM) FKM lip material offers outstanding resistance to high heat. Excellent resistance to oil, gasoline, petroleum hydraulic fluids and hydrocarbon solvents. Very good impermeability to gases and vapors. Very good resistance to flame, weather, oxygen, ozone and sunlight. Very little resistance to oxygenated solvents. Poor tear resistance.	Good	-40 °F -40 °C	325 °F 163 °C	400 °F 204 °C
H5L89	Fluoroelastomer (90 Duro FKM) Improved steam resistance.	Good	-40 °F -40 °C	325 °F 163 °C	400 °F 204 °C
N/P	PTFE bonded to NBR lip — PTFE layer provides improved dry running capability, chemical resistance, and reduces torque consumption.	Very Good	-20 °F -29 °C	212 °F 100 °C	250 °F 121 °C
F/P	PTFE bonded to FKM lip	Very Good	40 °F -40 °C	325 °F 163 °C	400 °F 204 °C
H1L21	Ethylene Propylene (75 Duro EPDM) Excellent heat, ozone and sunlight resistance. Very good low temperature flexibility, good resistance to alkalis, acids (such as acetic) and oxygenated solvents (such as MEK). Provides improved resistance to water and steam in applications where NBR and FKM exhibit poor service life. Good replacement for FKM where solvents are a problem. Not recommended for petroleum oil.	Very Good	-60 °F -51 °C	250 °F 121 °C	300 °F 149 °C

03/28/06

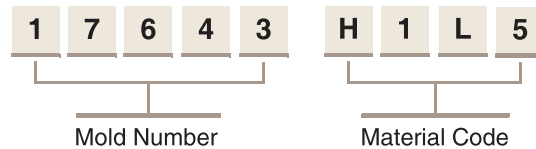
Clipper® Oil Seals Product Offering

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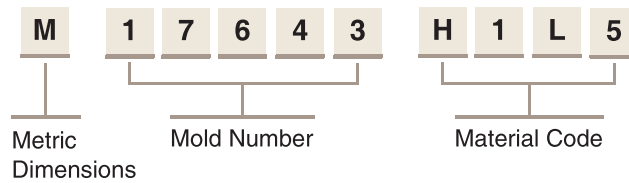
Part Number Nomenclature — Clipper Oil Seals

Solid Seals

English

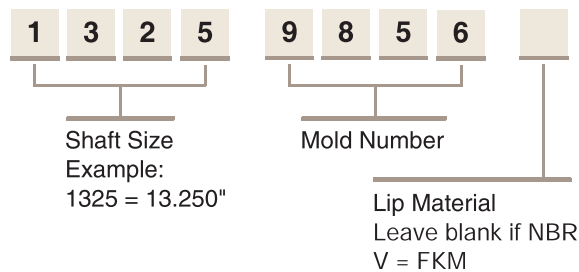


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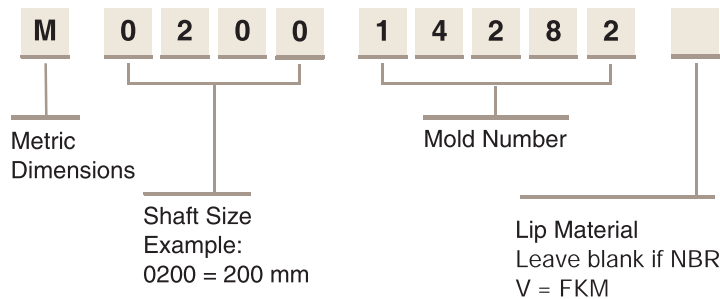


Split Seals

English



Metric













03/28/06



Profiles

The following standard Clipper Oil Seal profiles can be used in a wide range of applications for both MRO and OEM requirements. Parker's experienced design and engineering teams are available to assist with standard and custom designs that meet both cost and performance objectives. For traditional metal clad designs, refer to Parker Oil Seals in **Section 6**.

Table 5-7. Product Profiles

Standard Profiles	Features	Applications
LUP LPD 	General purpose spring-loaded single lip seal. Features nonmetallic composite OD for damage-free installation. LPD can be furnished with/without spring retainer feature.	For oil retention or grease retention. Typical applications: electric motors, gearboxes, pumps, fans, runout tables, paper rolls, work rolls, mixers and custom equipment.
RUP RPD 	General purpose spring-loaded single lip seal. Features nonmetallic OD for damage-free installation. Available in solid or split. Splits feature a positive bore retention and require no cover plate.	Splits — for grease retention — with oil, some seepage may occur. Typical applications: 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 	General purpose double lip features nonmetallic composite OD for damage-free installation. LDS profile has a primary spring-loaded lip with a non-spring-loaded secondary lip for exclusion of light dust or contamination.	For oil retention. Excludes light dust and fluid. Typical applications: electric motors, gearboxes, pumps, fans, runout tables, paper rolls, mixers, and custom equipment.
LDSW 	Specialized double lip features non-metallic composite OD for damage-free installation. Primary lip features molded in spring for lubricant retention. Springless secondary lip for excluding light dust. Floating lip accommodates high misalignment conditions.	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 	General purpose springless dual lip. Features nonmetallic composite OD for damage-free installation.	For grease retention and exclusion of light dust and fluids. Typical light duty applications.
SS 	General purpose springless single lip seal. Features nonmetallic composite OD for damage-free installation.	For grease retention and exclusion of light dust and fluid. Typical light duty applications.
OL 	Spring-loaded outside lip. Nonmetallic composite ID for tight press fit on shaft. Easy to install.	Generally used in grease applications where bore rotates. Agriculture and ground-engaging equipment.
MIST STMIST w/Buttons 	Heavy duty spring-loaded single lip. MIST features nonmetallic composite OD for damage-free installation. STMIST features composite OD metal band reinforced construction for absorbing shock load and greater bore retention. Both feature molded-in spring to eliminate spring dumping.	For heavy duty applications. Work rolls, paper rolls, backup rolls and custom equipment.
STLUP STLUP w/Buttons 	Spring-loaded single lip with heavy duty metal band inserted in composite OD. ST design features metal bands for absorbing shock load and greater bore retention. Spacer buttons are available for grease purging in applications requiring back-to-back sealing.	For heavy duty applications. Work rolls, paper rolls, backup rolls and custom equipment.

03/28/06








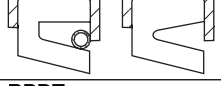


Operating Temperature Range	Shaft Surface Speed fpm (m/s)	Shaft Size Range Inches (mm)	Maximum Shaft Dynamic Runout (TIR)	Maximum (STBM) Misalignment	Maximum Pressure psi (bar)	Page
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 3200 (16.3)	1/4 – 62.5 (6.4 – 1587)	0.010" (0.254 mm)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-14
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
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)	0.020 – 0.125" (0.508 – 3.175 mm)	0 – 3 (0 – 0.20) <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 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
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
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
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



03/28/06



Table 5-7. Product Profiles (Continued)

Standard Profiles	Features	Applications
LifeLine 	Spring-loaded single lip features heavy duty rubber covered metal insert. LifeLine features metal insert for absorbing shock load and greater bore retention. LifeLine features molded-in spring to eliminate spring dumping.	For heavy duty applications. Work rolls, paper rolls, backup rolls and custom equipment.
P 	Features nonmetallic composite OD for damage-free installation. The P wiper scraper lip extends outside the bore face.	Applications for reciprocating service and low speed.
H 	Features nonmetallic composite OD for damage-free installation. Shallow cavity rod wiper designed for excluding dust and contamination.	Applications for rotary and reciprocating service. Reciprocating applications may require bore plate.
HP 	High pressure with a fluoroelastomer 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 	The standard MP is a rubber covered metal design, spring-loaded. Standard profile material FKM, other materials available upon request.	MP is typically used in grease and oil retention applications. Typical applications: electric motors, gearboxes, pumps, fans, mixers and custom equipment.
DL 	Spring-loaded dual lip seal. Features nonmetallic composite OD for damage-free installation.	Dual spring-loaded lips are used when the separation of two fluids is required. The design is also used for high contamination applications in keeping out a dirty environment.
Clipper Sliptite 	The Clipper Sliptite utilizes a layer of PTFE bonded to the sealing lip to reduce excessive wearing on the shaft and seal. Features nonmetallic composite OD.	With the PTFE lip the seal can be used 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 	Features a stainless steel outer case. TMAL contains a machined PTFE spring-loaded sealing element. TMAS contains a machined PTFE non-spring-loaded sealing element.	TMAL & TMAS seals are designed for corrosive chemical service and FDA application.
RPDT 	Spring-loaded single lip seal. Features tapered heel. Available in splits only.	Pillow blocks.
TSS 	Features nonmetallic composite OD for damage-free installation. Soft flexible lip provides low friction sealing contact to give extended service life.	Typical applications: overhead cranes in steel mills, rotary drilling crown and travel blocks, draglines, hoists and elevators. Also used on mine cart wheels, flywheels, idler wheels and tapered bearings.

5

03/28/06



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
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
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>	5-20
NBR -20 °F to 250 °F -29 °C to 121 °C FKM -40 °F to 400 °F -40 °C to 204 °C	Up to 5000 (25.4)	1/2 – 10 (12.7 – 254)	0.010" (0.254)	0.010" (0.254 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-24
PTFE -40 °F to 500 °F -40 °C to 260 °C	Up to 2500 (12.7)	1/2 – 14 (12.7 – 355)	0.006" (0.152 mm)	0.006" (0.152 mm)	0 – 7 (0 – 0.48) <i>Depending on Shaft Speed</i>	5-25
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



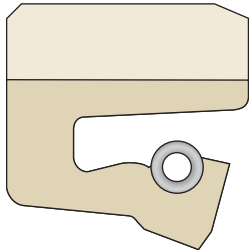
03/28/06



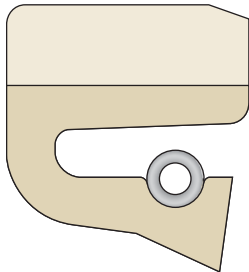
Clipper[®] Oil Seals

LUP, LPD, LDS Profiles

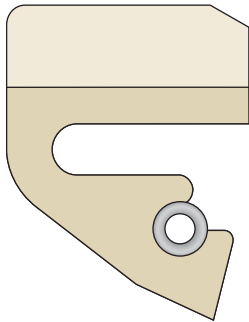
Catalog EPS 5350/USA



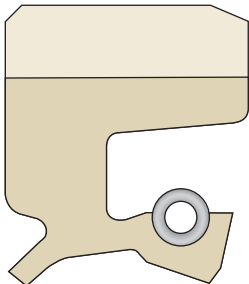
LUP



LPD



LPD — Spring Retainer



LDS

General Purpose Profiles

LUP/LPD — General purpose spring-loaded single lip seal. Features nonmetallic composite OD for damage-free installation. LPD can be furnished with/without spring retainer feature.

LDS — General purpose double lip features nonmetallic composite OD for damage-free installation. LDS profile has a primary spring-loaded lip with a non-spring-loaded secondary lip for exclusion of light dust or contamination.

Application

For oil and grease applications.

Typical applications: electric motors, gearboxes, pumps, fans, runout table, work rolls, paper rolls, mixers and custom equipment.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Common Materials

NBR — H1L5

HNBR — H1L30

XNBR — H1L20

FKM — H5L16

Shaft Surface Speed

LUP/LPD — Up to 3200 fpm (16.25 m/s)

LDS — Up to 2500 fpm (12.7 m/s)

Maximum Pressure

0 to 7 psi (0 to 0.48 bar), depending on shaft speed

Size Range

Available shaft diameter range is 0.375 to 65 inches (10 to 1651 mm).

Important: For full listings of standard sizes, see **Appendices B and C**.

09/01/06

Clipper® Oil Seals

LUPW, LPDW, LDSW Profiles

Catalog EPS 5350/USA

LUPW, LPDW and LDSW Profiles

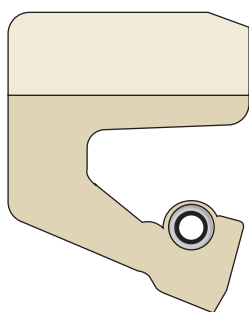
LUPW/LPDW — Spring-loaded single lip. Features nonmetallic composite OD for damage-free installation.

LDSW — Specialized double lip features nonmetallic composite OD for damage-free installation. Primary lip features molded-in springs for lubrication retention. Springless secondary lip for excluding light dust. Floating lip accommodates high misalignment conditions.

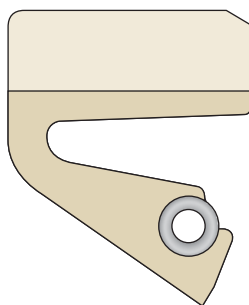
Application

Most commonly used for oil or grease retention where high shaft misalignment is present. LUPW and LPDW accommodate misalignment by use of extended lip profile and may require a wider than normal bore depth to avoid interference of the lip.

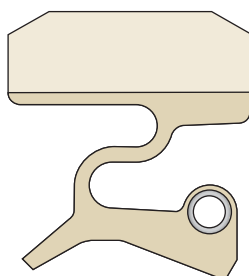
Type LDSW accommodates misalignment using a geometry that allows the lip to float with the shaft.



LUPW



LPDW



LDSW

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Common Materials

NBR – H1L5

HNBR – H1L30

XNBR – H1L20

FKM – H5L16

Shaft Surface Speed

LUPW/LPDW — Up to 1000 fpm (5.1 m/s)

LDSW — 2500 fpm (12.7 m/s)

Maximum Pressure

LUPW/LPDW— 0 to 7 psi (0 to 0.48 bar), depending on shaft and runout

LDSW— 0 to 3 psi (0 to 0.21 bar), depending on shaft speed and runout

Size Range

Available shaft diameter range is 0.1 to 65 inches (25 to 1651 mm).

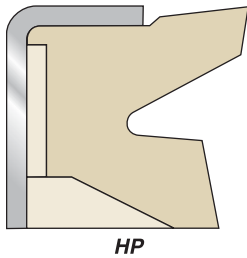
Important: For full listings of standard sizes, see **Page B-86**

09/01/06

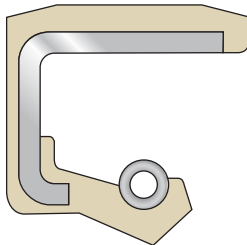
Clipper[®] Oil Seals HP, MP Profiles

Catalog EPS 5350/USA

5



HP



MP

HP and MP Profiles

HP — High pressure with a fluoroelastomer sealing element, outer metal case, and a PTFE backup element for pressure. Standard with carbon steel case. Stainless steel and other alloys available.

MP — The standard MP is a rubber covered metal design, spring-loaded. Standard profile material FKM, other materials available upon request.

Application

HP — Typical applications: oil retention in rotary and oscillating pumps, compressors and custom equipment.

MP — Typical applications: for oil pumps, compressors and custom equipment.

Technical Data

Operating Temperature Range

FKM: -40 to 400 °F (-40 to 204 °C)

Shaft Surface Speed

HP — Up to 4000 fpm (20.3 m/s)

MP — Up to 4000 fpm (20.3 m/s)

Maximum Pressure

HP — 100 to 300 psi (7 to 20 bar)

PV Limit (pressure * velocity) — 300,000

MP — 0 to 100 psi (0 to 7 bar)

PV Limit (pressure * velocity) — 100,000

Size Range

HP — 1/4 to 8 inches (6.4 to 203 mm)

MP — 1/4 to 12.500 inches (6.4 to 317 mm)

Important: For full listings of standard sizes, see **Appendices B and C.**

03/28/06

Clipper® Oil Seals OL Profile

Catalog EPS 5350/USA

OL Profile

Outside Lip (OL) — Spring-loaded outside lip. Non-metallic composite ID for tight press fit on shaft. Easy to install.

Application

For positive retention of grease or oil in applications where shaft is stationary and the seal housing rotates, such as conveyors and agricultural and ground engaging equipment. Bore finish is critical since it serves as the dynamic sealing surface.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)
FKM: -40 to 400 °F (-40 to 204 °C)

Shaft Surface Speed

Up to 1000 fpm (5.1 m/s)

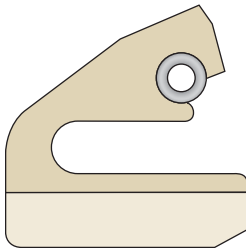
Maximum Pressure

0 to 7 psi (0 to 0.48 bar)

Size Range

Available shaft diameter range is 1 to 65 inches (25 to 1651 mm).

Important: For full listings of standard sizes, see **Appendices B and C**.



OL

5

03/28/06



5-17

www.parkerseals.com

Parker Hannifin Corporation
EPS Division
Toll Free: (800) 233-3900

Clipper[®] Oil Seals

ST-LUP, ST-LPD Profiles

Catalog EPS 5350/USA

ST-LUP and ST-LPD Profiles

ST-LUP/ST-LPD — Spring-loaded single lip with heavy duty metal band inserted in composite OD. ST design features metal bands for absorbing shock load and greater bore retention. Spacer buttons are available for grease purging in applications requiring back-to-back sealing.

Application

For heavy duty applications, work rolls, paper rolls, backup rolls and custom equipment.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

Shaft Surface Speed

Up to 3200 fpm (16.3 m/s)

Maximum Pressure

0 to 7 psi (0 to 0.48 bar), depending on shaft speed

Size Range

Available shaft diameter range is 4 to 65 inches (101 to 1270 mm).

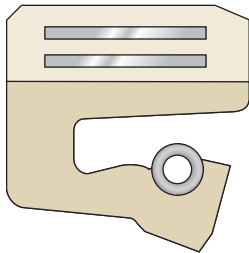
Part Numbering

Part number is mold-specific with material used as the suffix.

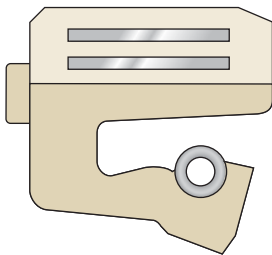
14872 STHIL5

Important: For full listings of standard sizes, see **Appendices B and C.**

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ST-LUP / ST-LPD



ST-LUP with Button Profile

03/28/06

Clipper® Oil Seals TSS Profile

Catalog EPS 5350/USA

TSS Profile

TSS — Features nonmetallic composite OD for damage-free installation. Soft flexible lip provides low friction sealing friction sealing contact to give extended service life.

Application

Typical applications: overhead cranes in steel mills, rotary drilling crown and travel blocks, draglines, hoists and elevators. Also used on mine cart wheels, flywheels and idler wheels.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Shaft Surface Speed

Up to 2000 fpm (10.2 m/s)

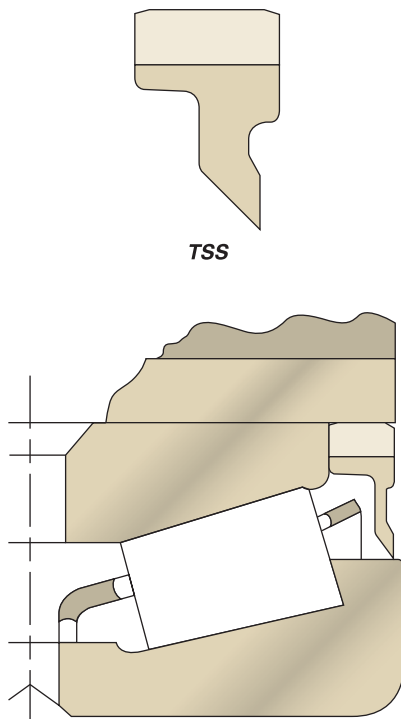
Maximum Pressure

0 psi

Size Range

1.274 to 17.500 inches (32.36 to 445 mm)

Important: For full listings of standard sizes, see **Appendices B and C.**



TSS

Typical TSS Installation

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03/28/06

Clipper® Oil Seals

DL Profile

Catalog EPS 5350/USA

DL Profiles

DL — Spring-loaded dual lip seal. Features nonmetallic composite OD for damage-free installation.

Application

Dual spring-loaded lips are used when the separation of two fluids is required. The design is also used for high contamination applications in keeping out a dirty environment.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Common Materials

NBR – H1L5

HNBR – H1L30

XNBR – H1L20

FKM – H5L16

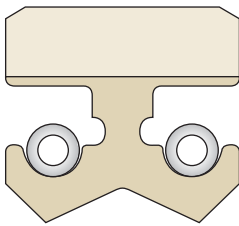
Shaft Surface Speed

Up to 2000 fpm (10.2 m/s)

Maximum Pressure

0 to 7 psi (0 to 0.48 bar), depending on shaft speed

Important: Contact Customer Service for information on size availability.



DL

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09/01/06



5-20

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EPS Division

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Clipper® Oil Seals RPDT Profile

Catalog EPS 5350/USA

RPDT Profile

Spring-loaded single lip seal. Features tapered heel.
Available in splits only.

Application

Typical applications: pillow blocks.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

Common Materials

NBR – ALLL5

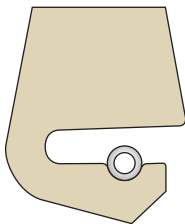
Shaft Surface Speed

Up to 2000 fpm (10.16 m/s)

Maximum Pressure

0 psi

Important: For full listings of standard sizes, see **Appendix D**.



RPDT

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03/28/06

Clipper® Oil Seals P, H Profiles

Catalog EPS 5350/USA

P and H Profiles

P — Features nonmetallic composite OD for damage-free installation. The P wiper scraper lip extends outside the bore face.

H — Features nonmetallic composite OD for damage-free installation. Shallow cavity rod wiper designed for excluding dust and contamination.

Application

P Wiper — Used in reciprocating applications.

H Wiper — Used in reciprocating and rotary applications.

Note: Reciprocating application may require bore plate.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Shaft Surface Speed

P Wiper — Up to 300 fpm reciprocating (1.5 m/s)

H Wiper — Up to 300 fpm reciprocating (1.5 m/s), 2000 fpm rotary (10.2 m/s)

Maximum Pressure

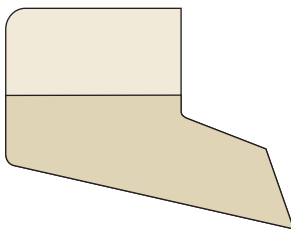
0 psi

Size Range

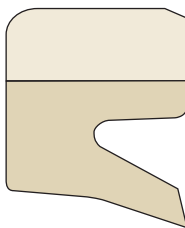
P Wiper — 3/8 to 30 inches (9.5 to 762 mm)

H Wiper — 3/8 to 30 inches (9.5 to 762 mm)

Important: For full listings of standard sizes, see **Appendices B and C**.



P



H

5

03/28/06

Clipper® Oil Seals SS, SDS Profiles

Catalog EPS 5350/USA

SS and SDS Profiles

SS — General purpose springless single lip seal. Features nonmetallic composite OD for damage-free installation.

SDS — General purpose springless dual lip. Features nonmetallic composite OD for damage-free installation.

Application

For grease retention and exclusion of light dust and fluids. Typical light duty applications.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Common Materials

NBR – H1L5

HNBR – H1L30

XNBR – H1L20

FKM – H5L16

Shaft Surface Speed

Up to 2000 fpm (10.2 m/s)

Maximum Pressure

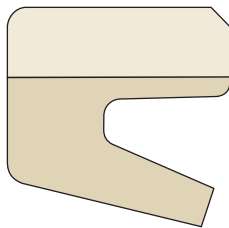
0 to 7 psi (0 to 0.48 bar), depending on shaft speed

Size Range

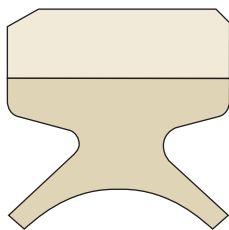
SS — 1/4 to 6 inches (6.4 to 152 mm)

SDS — 1/2 to 12.835 inches (12.7 to 326 mm)

Important: For full listings of standard sizes, see **Appendices B and C**.



SS



SDS

5

09/01/06

Clipper[®] Oil Seals

Clipper Sliptite Profile

Catalog EPS 5350/USA

Clipper Sliptite Profiles

Clipper Sliptite — The Clipper Sliptite utilizes a layer of PTFE bonded to the sealing lip to reduce excessive wearing on the shaft and seal. Features nonmetallic composite OD.

Application

With the PTFE lip, the seal can be utilized in dry running applications, at higher speeds, and exhibits a broader range of chemical compatibility: electric motors, gearboxes, pumps, fans and custom equipment.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Common Materials

NBR – H1L5

HNBR – H1L30

XNBR – H1L20

FKM – H5L16

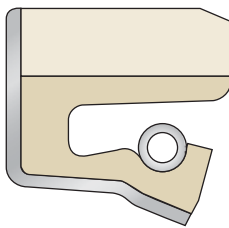
Shaft Surface Speed

Up to 5000 fpm (25.4 m/s)

Maximum Pressure

0 to 7 psi (0 to 0.48 bar), depending on shaft speed

Important: For full listings of standard sizes, see **Appendices B and C.**



Clipper Sliptite

5

09/01/06

Clipper® Oil Seals TMAL, TMAS Profiles

Catalog EPS 5350/USA

TMAL and TMAS Profiles

TMAL — Features a stainless steel outer case containing a machined PTFE spring-loaded sealing element.

TMAS — Features a stainless steel outer case containing a machined PTFE non-spring-loaded sealing element.

Application

TMAL and TMAS seals are designed for corrosive chemical service and FDA application.

Technical Data

Operating Temperature Range

PTFE: -40 to 500 °F (-40 to 260 °C)

Common Materials

Outer Case — Stainless Steel
Sealing Element — PTFE

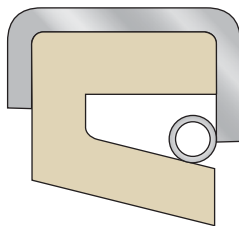
Shaft Surface Speed

Up to 2500 fpm (12.7 m/s)

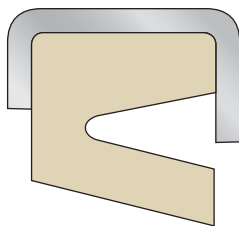
Maximum Pressure

0 to 7 psi (0 to 0.48 bar), depending on shaft speed

Important: For full listings of standard sizes, see **Appendices B and C.**



TMAL



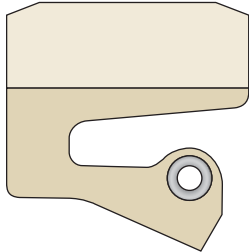
TMAS

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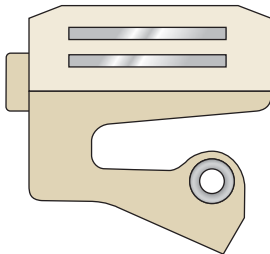
03/28/06

Clipper[®] Oil Seals MIST Profile, LifeLine

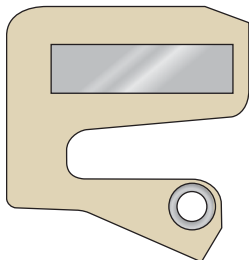
Catalog EPS 5350/USA



MIST



MIST ST with Button



LifeLine

The above profiles available with spacer buttons for grease purging in applications requiring back-to-back sealing.

MIST, MIST ST and LifeLine Profiles

MIST — Heavy duty spring-loaded single lip. Features nonmetallic composite OD for damage-free installation. MIST features molded-in spring to eliminate spring dumping.

STMIST— Heavy duty spring-loaded single lip. Features composite OD metal band reinforced construction for absorbing shock load and greater bore retention. STMIST features molded-in spring to eliminate spring dumping.

LifeLine — Spring-loaded single lip features heavy duty rubber covered metal insert. LifeLine features metal insert for absorbing shock load and greater bore retention. LifeLine features molded-in spring to eliminate spring dumping.

Application

For heavy duty applications, work rolls, paper mills, backup rolls and custom equipment.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

Common Materials

NBR – H1L5
HNBR – H1L30
XNBR – H1L20
FKM – H5L16

Shaft Surface Speed

Up to 3200 fpm (16.3 m/s)

Maximum Pressure

0 to 7 psi (0 to 0.48 bar), depending on shaft speed

Size Range

Available shaft diameter range is 5 to 65 inches (127 to 1651 mm).

Important: For full listings of standard sizes, see **Appendices B and C**.

09/01/06

Clipper® Oil Seals RUP, RPD Profiles

Catalog EPS 5350/USA

RUP/RPD and RPD Profiles

RUP/RPD — General purpose spring-loaded, single lip. Features nonmetallic OD for damage-free installation. Available in solid or split.

Splits — Feature a positive bore retention and require no cover plate.

Application

Typical applications: motors, gearboxes, pumps, fans, industrial rolls and custom equipment. Split seals are designed for applications where equipment is unable to be disassembled due to time constraints.

Technical Data

Operating Temperature Range

NBR: -20 to 250 °F (-29 to 121 °C)

FKM: -40 to 400 °F (-40 to 204 °C)

Common Materials

NBR – H1L5

HNBR – H1L30

XNBR – H1L20

FKM – H5L16

Shaft Surface Speed

Up to 2000 fpm (10.2 m/s)

Maximum Pressure

0 to 3 psi (0 to 0.20 bar), designed for vented applications (solid design), 0 psi on split designs

Size Range

Split seal available shaft diameter range is 0.500 to 65 inches (13 to 1651 mm).

Part Numbering

When ordering, use the shaft diameter of the split seal as the prefix to the mold number.

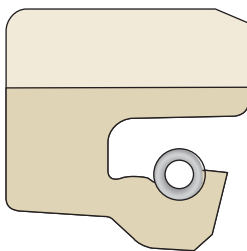
4673 H1L5 is the part number for a solid 4673 seal in NBR.

1100 4673 is the part number for a 4673 seal split down for 11" shaft in NBR.

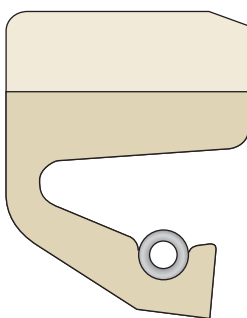
1100 4673 V is the part number for a 4673 seal split down for 11" shaft in FKM.

Important: For full listings of standard sizes, see **Appendices B, C and D.**

03/28/06



RUP



RPD

5

Clipper[®] Oil Seals

Split Clipper Oil Seals

Catalog EPS 5350/USA

Description

Split Clipper Oil Seals have the same superior characteristics as solid, Clipper Oil Seals, but are factory-split at one place in the circumference. This permits installation over the side of a shaft, rather than over the end, and often can save dismantling the equipment in order to replace the existing seals.

Solid Clipper Oil Seals should be used whenever practical to provide maximum bearing protection in rotating shaft applications. However, installing a solid seal in a failed application can be costly and time consuming. In such cases, Split Clipper Oil Seals can be used to minimize unscheduled downtime, specifically where equipment cannot be uncoupled. These seals will provide long and efficient service until major or scheduled machine overhaul permits convenient installation of a regular non-split seal.

Split Clipper Oil Seals are available in Series R, RPD and RUP profiles, depending upon shaft diameter (see **Page 5-27**). They are widely used as replacement seals because they provide superior bearing protection and embody a unique principle of design. The tough, dense outer case and a soft, flexible lip are concentrically molded as a single unit. The seal's nonmetallic outer case forms a leak-free, press fit in the housing, conforming to minor surface irregularities.

Split Clipper seals provide excellent retention of grease and light oil splash. Some weepage in oil splash applications may occur.

Advantages

- Saves costly downtime. Speed repairs.
- Easy installation with no special tools required.
- No backup plates required.
- Corrosion-resistant. Reduce bore surface seizing.
- Stainless steel coil garter spring helps keep split junction tight and compensates for minor shaft irregularities.
- Flat lip contact design compensates for minor split-end misalignment.



5

03/28/06



5-28

www.parkerseals.com

Parker Hannifin Corporation
EPS Division

Toll Free: (800) 233-3900

Important Notes

For Split Clipper Oil Seals to work with reasonable efficiency, the seals must be split at the factory. A precisely calculated wedge-shaped segment must be removed from a pre-molded, oversized seal to assure proper bore cavity and shaft fit. It is not a simple knife-cut. **DO NOT ATTEMPT TO ALTER THE RECEIVED SIZE ON THE JOB SITE.**

Split Clipper Oil Seals are made for use in horizontal shaft applications for grease and oil. The seals are not recommended for bottom installation on vertical shafts where oil is used. The seals can be used for top installation on vertical shafts.

Parker does not recommend Split Clipper Oil Seals for use in pressure service, as the unsupported split junction area will separate, causing leakage.

Split Clipper Oil Seals are not recommended for abnormal shaft runouts or misalignments.

Converting to Split Clipper Oil Seals

Retrofitting Existing Equipment

To convert existing equipment from solid oil seals to Split Clipper Oil Seals, the following procedure should be followed:

1. Establish the nominal shaft diameter bore diameter and housing depth of existing seal or equipment. The original equipment drawings are most helpful. Note that no backup plate is required with Split Clipper Oil Seals.

2. Refer to engineering and design data and the size listings. Determine equipment operating conditions for shaft speed, runout, temperature, etc., to verify they are within recommended application limits.

New Equipment Design

Manufacturers of equipment who wish to provide field service interchangeability with solid oil seal, should consider the following:

1. Design equipment to provide adequate axial spacing, a minimum 2" (5.08 cm), between the outside bore cavity face and adjacent equipment components. This is needed to provide room for removal of the old seal and installation of the new seal.

2. Select a nonmetallic Clipper Seal for original installation having the same shaft, bore and width sizes as the appropriate Split Oil Seal listed. A Clipper Oil Seal should be used for original installation because removal of a conventional metallic-cased oil seal and splitting it to get it off the shaft, would be extremely difficult in the confined space usually encountered.

3. Split Clipper Oil Seals are sized for a press-fit engagement when installed in the bore. It is most important that all equipment dimensions, tolerances, entrance chamfer and mating metal finishes be maintained within limitations specified.

How to Calculate Solid to Split Oil Seals

As an example, assume the current equipment has the following dimensions:

Shaft Diameter = 2.000"
 Housing Diameter = 2.813"
 Housing Width = .375"

To see if a split seal size is available, first check the listing in **Appendix B**. Find the dimension matching the size requirement which has "SPLIT" listed as seal type. For the dimensions above, Part number 0200 7081 is the correct size and can be found in **Appendix B**.

If the split seal size is not listed in **Appendix B** the method below can be used for less popular sizes.

Using Conversion Chart In Appendix D

The solid to split seal calculation chart (**Appendix D**) consists of the following columns. See **Table 5-8** for example.

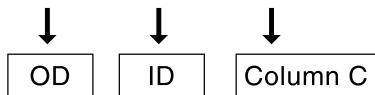
- Column A = Shaft Diameter Range (Min & Max)
- Column B = Mold Number
- Column C = Dimension added to shaft diameter, (Column A) to determine Split OD dimension
- Column D = Width of the seal

Step 1. To determine if shaft size is available find a matching shaft diameter range in column A. In this example all sizes in Table 5.8 can be split for a 2.000" shaft.

Step 2. Subtract the housing O.D. by the shaft diameter. If result is listed in Column C, a seal with the correct O.D. can be supplied. In the example this dimension is .813".

$$(OD - ID = \text{Column C})$$

Example: 2.813 - 2.000 = 0.813



Step 3. Locate a Mold number in column B that matches BOTH the shaft diameter range and the Column C number from the formula. In this example Mold Number 7081 matches both columns and can be split to the required size.

Step 4. Use dimension in Column D for available seal width.

To order the 7081 split for a 2" shaft, a prefix is added to the solid seal mold number to form the part number. See example below:

Split Part No. **Dimensions**
 0200 7081 2.000" x 2.813" x .375"

Additional examples:

Split Part No. **Dimensions**
 0618 4548 6.188" x 7.437" x .615"
 1087 3553 10.875" x 12.875" x .812"
 M 0130 3788 130 mm x 150 mm x 9.5 mm

Contact customer service for assistance if needed.

Table 5-8. Split Seal Guide

Column A		Column B	Column C	Column D
Shaft Diameter		Mold No.	Add to Shaft Dia. for Seal OD	Seal Width
Min.	Max.			
1.875	– 2.000	3625	1.000	0.438
1.875	– 2.000	7081	0.813	0.375
1.875	– 2.000	7131	0.750	0.375
1.875	– 2.000	18759	1.000	0.500
2.000	– 2.125	3930	1.250	0.500
2.000	– 2.125	4868	1.000	0.375
2.000	– 2.125	6207	1.184	0.500
2.000	– 2.125	19359	1.375	0.500

Important: For full listings of standard sizes and splittable solid seals, see **Appendix D**.



03/28/06