CAT® SEALS

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CAT® SEALS

INTRODUCTION

Metal Face Seals

For more than 60 years industrial original equipment manufacturers and equipment users have turned to Cat® Seals to protect their components from extreme, abrasive, and corrosive environments. Caterpillar is the leading manufacturer of metal face seals providing the best solutions for tough applications. Cat Seals innovative designs and engineering protect a broad range of equipment and machinery working in adverse conditions such as mud, rock, sand, chemicals, water, heat and cold.

Cat Seals are proven to provide long service life with low maintenance resulting in increased equipment up time, productivity and customer satisfaction.

Caterpillar offers Cat Duo-Cone and Heavy Duty Dual Face seals. Both designs use various elastomeric load rings and various seal ring material. Cat Duo-Cone seals require less space radially and Heavy Duty Dual Face seals require less space axially in a housing. Cat Duo-Cone seals incorporate a round toric while Cat Heavy Duty Dual Face seals have a trapezoidal Belleville Washer.

Protecting Products

Cat Seals provide protection for internal working components like bearings and gears in abrasive applications and permit the use of oil as a lubricant instead of grease resulting in less friction and longer life. In most applications, the lubricant installed at the factory is permanent with no periodic lubrication or adjustment required.

Unscheduled equipment down time is very costly. Cat Seals provide superior performance in extreme applications where lubricant retention and protection from damaging surroundings is essential. Years of proven field experience has shown Cat Seals provide long life in many applications. Manufacturers in a variety of industries have utilized Cat Seals in their equipment for decades.

Design

The design of a Cat seal compensates for many manufacturing and operating variables. Two metal sealing rings float in position; two elastomeric torics or Belleville washers exert uniform pressure to accurately position the metal rings and serve as the static seal between the housing and the seal ring. The load rings also transmits the turning torque from the drive housing to the seal ring.

Cat Seals Features

- Corrosion-resistant seal rings
- Precision machined, self-renewing sealing surfaces
- Minimum face load variations
- Special seal and load ring materials to match application requirements

Rotating speed, lubrication, temperature, and differential pressure are factors to consider when determining seal face loads. Cat Seals provide good performance across a wide range of face loads, therefore, compensating for considerable assembly tolerance buildup, misalignment, and wear.

Long Life

Extensive laboratory and field testing has confirmed Cat Seals last much longer than other radial lip seals. Used for decades by manufacturers of heavy construction equipment, Cat Seals have reached over 30,000 hours of operation without maintenance, in some applications. As wear occurs, machined metal seal faces are automatically and continually renewed.

Problem Solver

The high cost of equipment downtime requires the best quality seal available. Cat Seals provide superior performance in extreme applications where lubricant retention and the ability to keep out damaging and/or abrasive materials are essential. Construction, mining, industrial, forestry, petrochemical, paper, agriculture, sewage treatment, landfill, and many more applications are all examples where Cat Seals have improved bearing protection and overall performance.

Application Engineering

Caterpillar Engineers are available to understand and analyze your sealing requirements, work with your engineering department, and recommend the Cat seal that will best meet your needs. You need only complete an application data sheet (found at www.cat.com/cat-seals) and provide drawings of the area containing the seal.

Seal Ring Materials

Caterpillar offers the widest choice of seal ring and elastomeric material options in the industry. The materials have been engineered to excel in the many different applications in which Cat Seals are integrated.

For further information on any seal ring material please consult Caterpillar at catseals@cat.com

Shown below is a general comparison between seal ring materials available.

	C6	Stellite	NiHard	Formed	Forged
Material	Nickel-Alloy	Iron-Alloy	Iron-Alloy	SAE 1074	SAE 52100
Process	Cast	Cast	Cast	Stamped	Forged
Wear Life	High	High	Low/Medium	Low	Low
Corrosion Resistance	High	Medium/High	Low/Medium	Medium	Low
Scoring Resistance	High	Low	Medium/High	Low	Low

C6

C6 was developed for applications that require high speed and superior corrosion resistance. This alloy offers greater speed capabilities over Stellite with higher resistance to scoring, wear, and corrosion. The C6 alloy is available only from Caterpillar. It is the material of choice around the world in large diameter wheel applications.

Stellite

Stellite has been designed for the harshest operating environments where abrasive and corrosive elements are present. Stellite's formulation is iron based with a high alloy content designed to provide better corrosion resistance. Stellite cast seals are typically found in applications frequently exposed to abrasive and corrosive conditions with moderate rotational speeds. Typical applications include crawler tractor final drives and various undercarriage applications.

NiHard

NiHard is another iron based casting alloy offered by Caterpillar. Pressure velocity characteristics are slightly greater than Stellite, but wear life and corrosion resistance have shown to be less, in tests conducted by Caterpillar. Typical applications would include undercarriage and final drive applications where corrosion resistance is not essential, but seal surface speeds prohibit the use of Stellite.

Formed (Cat Duo-Cone only)

Formed seals were developed for applications that do not require the high levels of corrosion and abrasion resistance, but the versatility of a face seal is desired. Formed seals are used extensively in axle, winch, and final drive applications. Formed seals are interchangeable with cast seal retainers, provide similar load and speed capability as the Stellite seals, at a significantly lower cost.

Forged

Forged seals are available on a limited basis from Caterpillar. These seals have been used successfully on undercarriage applications where minor wear is present and seal cost is critical.

PRODUCT DESIGN REVIEW

Load Ring Materials

Several load ring materials are available to meet a variety of application requirements. The most common materials are Nitrile and silicone, while fluoroelastomer (FKM) and Hydrogenated Nitrile (HNBR) are available for more specialized applications. The table below provides a brief comparison between Cat Seals load ring options.

	Nitrile	LT-NBR	Silicone	HNBR	FKM
Min Temp. (°C/°F)	-17/1	-35/-31	-55/-67	-40/-40	-7/20
Max Temp. (°C/°F)	100/212	100/212	150/302	135/275	160/320
Tear Resistance	Medium	Medium	Low	High	Medium
Abrasion Resistance	Medium	Medium	Low	High	Medium
Oil Resistance	Medium	Medium	Low	High	Superior
Water Resistance	Superior	Superior	Superior	Superior	Medium

Nitrile (NBR)

Nitrile is compatible with most mineral-based lubricant oils and offers the maximum resistance to abrasion. It is the most common load ring material choice and is used in most standard axle, final drive, and undercarriage applications.

Low-Temperature Nitrile (LT-NBR)

Low-temperature Nitrile was specifically developed for highly abrasive, low-temperature applications. Typical applications include undercarriage idlers, rollers and final drives.

Silicone

Silicone uses are extreme high (wet disc brake systems) or extreme low (arctic environment) temperature applications.

Hydrogenated Nitrile (HNBR)

Hydrogenated Nitrile is a Nitrile-based material and has very similar abrasion resistance characteristics to standard Nitrile, but Hydrogenated Nitrile has better temperature resistance to permanent deformation.

Fluoroelastomer (FKM)

FKM is a fluoroelastomer and is typically used where extremely high temperatures are a concern and low temperatures are never a problem.

Consult Caterpillar when researching your seal load ring options at catseals@cat.com

Seal Group Size (Class) Options

Seals are available in various radial cross sections with toric sections from 4.30 to 16.00 mm (0.170" to 0.630"). Always specify the largest toric/seal group section that can be accommodated in the housing design envelope. Larger section torics will accommodate greater deflection and are less sensitive to tolerances and environmental effects. The table shown below gives a brief summary of available design options.

Class	Toric Size (mm)	Seal Ramp Angle (°)	Housing Ramp Angle (°)	Common Application
A	4.30	20	15	Specialized
B	6.22	15	10	Small Axles and Wheels
C	9.47	8/15/20	10	Undercarriage
D	12.70	8/15/20	10	Large Axles, Wheels, Final Drives
K	BW	Load Ring	Square Bore	Square Bore All Applications
L	16.00	15	10	Large Wheels

Class A - 4.30mm (0.17")

Cat Duo-Cone seals utilizing the 4.30 mm cross-section toric ring have very limited applications. They are used in small diameter applications with extreme axial and radial spacial and tolerance constraints (e.g. cartridge pins). Seals of this type have very little end play capability.

Class B - 6.22mm (0.24")

Cat Duo-Cone seals with 6.22 mm cross section toric rings are typically used in small axle or rock bit applications. They are used where sealing is needed in extreme environments, but where there is insufficient space to put a larger (and more typical) cross section Cat Duo-Cone seal. While these seals do have some end play capability, they have less than seals utilizing larger cross section load rings.

Class C - 9.47mm (0.37")

9.47 mm cross-section Cat Duo-Cone seals are typically used in moving undercarriages for crawler tractor and excavator applications. These seals have good end play capability. Seals are available with 8°, 15°, and 20° seal ramps to serve different operating environments.

Class D - 12.70mm (0.50")

This style Cat Duo-Cone seal is very common in axle, wheel, and final drive applications in construction and earth moving equipment. These seals have very good end play capability. Seals are available with both 8°, 15°, and 20° seal ramps for optimized performance in your application.

Class L - 16.00mm (0.63")

Currently, the largest cross section toric ring offered by Caterpillar, the 16.0 mm cross section diameter Cat Duo-Cone seal is for the largest of sealing applications.

Class K - Cat Heavy Duty Dual Faced Seals

The Cat Heavy Duty Dual Faced Seal uses a square bore housing design and a Belleville Washer load ring to provide loads to the metal seal faces. This seal is designed for demanding environments and is available in many sizes. Because of the design, there is no rolling of the loading member. This seal type is used in a wide variety of products, including undercarriage, axles, final drives, gear boxes, wheels, etc.

Contact Caterpillar with your seal class questions at catseals@cat.com

PRODUCT DESIGN REVIEW

Cat Duo-Cone Seal Ramp Angles

A unique feature of Cat Duo-Cone seals is the changing of sealing ramp angles to tailor the seal to various operating environments. Below is a brief summary of the purpose of various ramp angles.

8° Seal Ramp

Cat Duo-Cone seals with 8° seal ramps were originally developed for applications that are exposed to high-pressure differentials and external pressure, such as “Mud Packing”. This design offers increased toric retention and a more linear face load profile over its range of operation. The 8° Cat Duo-Cone seal is available in both cast alloy and formed steel designs. Formed Cat Duo-Cone seals are interchangeable with cast Cat Duo-Cone seal retainers.

15° Seal Ramp

The 15° Cat Duo-Cone seal is the most common design offered by Caterpillar. This sealing design offers resistance to internal operating pressure and is most commonly used in final drive, axle, and wheel applications.

20° Seal Ramp

Similar to the 15° seal design in that it resists internal pressures. The 20° design produces less compression on the toric and because of its bore requirements being shallow, requiring less room axially in its application, the 20° seal ramp is commonly found in undercarriage applications.

Load Deflection

The combination of the seal ring flange thickness and gage diameter or Heavy Duty Dual Faced Seals neck diameter and elastomeric materials dictate the allowable operating conditions the seal can be used in. The sealing system, the nominal Duo-Cone gap between housings or HDDF operating range and axial tolerance stack will ensure the seal will perform. The Cat seal options are based on those operating conditions. *Caterpillar Engineering should be consulted at catseals@cat.com for proper seal selection and design.*

Speed Capability

The face load required to keep the metal seal rings in contact is related to the targeted speed of the application. Many factors influence this relationship, including seal ring material, seal ring diameter, operating temperature, lubricant viscosity, differential pressure across the load rings and action of centrifugal force on the load ring.

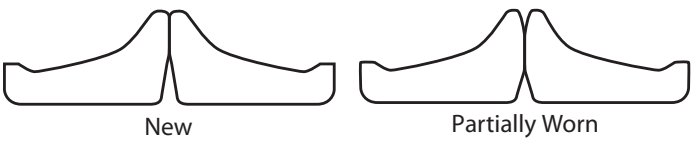
In low speed applications or with light lubricants, face pressures are generally increased to ensure seal ability. The same is true when seals are exposed to high differential pressures and/or large end play or deflections. Lower face loads are specified for applications producing high rotational speeds or high ambient outside temperatures.

High speeds produce high temperatures which deteriorates lubricant and changes the properties of the elastomer load rings. Depending on the cavity design, high speeds can centrifuge lubricant away from the seal face. All conditions can contribute to adverse sealing effects. *Consult Caterpillar at catseals@cat.com when selecting face load to ensure appropriate design target for your desired speed.*

Seal Wear Measurement

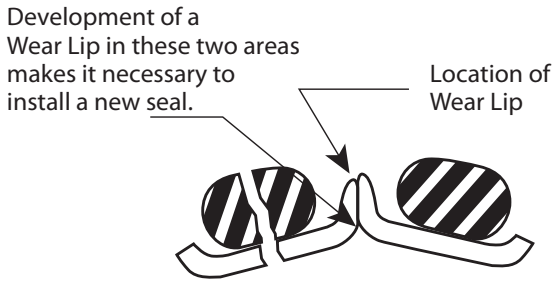
Cast Cat Seals automatically compensate for wear. The mating faces form a contact band approximately 0.5 (0.02") to 1.0 mm (0.04") wide that retains the oil lubricant and seals out all foreign material. As wear occurs, the contact band will widen slightly and migrate inward until the inside diameter is reached. As depicted in figure 1, the cast seals wear down the tapered surface.

Figure 1



Formed seals are more flexible than cast seals and as a result will produce a different wear pattern than cast rings. Typically, formed seals wear in an axial rather than radial direction, as depicted in figure 2, due to their increased flexibility.

Figure 2



Lubricant Requirements

Cat Seals are a mechanical face sealing technology that require lubrication. Oil lubricant should be used with all Cat Seals. Mineral base oils ranging from 10WT to 90WT are commonly used, depending on temperature requirements.

In some slow rotating or oscillating applications, certain types of grease may be used, but mineral base oils are always preferred.

Contact Caterpillar for additional information at catseals@cat.com

Oil not only provides lubrication to the sealing faces, but also serves to cool the seal rings. Lubricants are recommended to cover a minimum of one third of the sealing surface, depending on the diameter of the seal, to properly lubricate and cool the rings. Cat Seals work best in clean, closed systems. To allow adequate volume for thermal expansion, non-vented cavities should not be filled more than 90% full. Maximum care should be taken to ensure lube cavities are clean at assembly – free from dirt, scale and other foreign materials.

DESIGN INFORMATION

Lubricant Viscosities for Ambient (Outside) Temperature Ranges

Oil Viscosity	°C min	°C max	°F min	°F max
10W	-30	0	-22	+32
30W	-20	+25	-4	+77
40W*	-10	+40	+14	+104
50W	0	+50	+32	+122
80W90**	-20	+40	-4	+104
85W140**	-10	+50	+14	+122

* Commercially available CD/TD-2 oils that meets requirements
** EP gear lubricants should not be used with seals having silicone torics. Consult with Caterpillar before specifying an API GL-5 or MIL-L-2105C type lubricant.

NOTE: Arctic Lubricants – For operation with ambient temperatures below –20°C (-4°F), use oils with base stocks that have low temperature flow capabilities. Use oils with a CD/TO-2 rating. If the application requires API GL-5 gear oil, use the EP synthetic gear lubricants that are available. Low temperature lubricants are not recommended for temperatures above 0°C (+32°F). When operating temperatures reach 0°C, the oil should be changed to one of the lubricants indicated above.

Specialty Seals

Caterpillar not only offers "off-the-shelf" designs – our team is also available to work with your engineers to design customized or application specific Cat Seals. Whether developing a new seal size or type to fit your application, or integrating a new metal seal or load ring material, Caterpillar Engineers have the experience necessary to design, procure and test these concepts then produce them.

Product Comparison

In most applications, either Cat Duo-Cone or Heavy Duty Dual Face seals can be utilized. However, there are specific advantages to both designs. These should be considered when designing a Cat seal into your application:

Cat Duo-Cone Seal

- Requires less room radially in application
- Very stable in housing prior to final assembly
- Very good end play capability

Cat Heavy Duty Dual Face Seal

- Requires less room axially in application
- Square bore housing cavity design
- No assembly tool or lubricant required

Supplying Quality

We know quality is important to you and we take pride in supplying our customers highly reliable and durable products. The manufacturing quality of Cat Seals is ensured by our ISO 9001: 2008 accreditation.

Testing

Caterpillar laboratories are equipped with the latest technologies and testing procedures for development and validation of new seal designs. *Contact Caterpillar for testing options at catseals@cat.com*

Reliability Testing

Reliability testing is used for evaluating the operating conditions of the specific seal application including the following: seal face loads, internal operating temperatures, internal operating pressures, rotational speeds, etc. and evaluate the performance of the seal to determine a metal seal ring material's resistance to failure. This test method also determines the maximum speed at which the seal group can perform.

Load Testing

Load tests evaluate the loading characteristics of the elastomeric ring for a given size. This information is used to determine the load ring compression required to obtain optimal loading on the metal seal faces.

Accelerated Wear Tests

Accelerated wear testing employs equipment to evaluate a seal ring material's resistance to abrasive wear. Seals are assembled and submerged in a unique slurry to accelerate the wear process. Wear is quantified by the amount of movement of the sealing band during the test.

Oil Compatibility Testing

Oil compatibility testing evaluates the effects from exposure with the intended system lubricant and compression level of the system design. This procedure will indicate the rate at which the elastomer will relax during operation and cause a change in load at the seal group interface. The test guides Caterpillar Engineers to identifying the correct load to design for maximum seal life.

Contact Caterpillar Engineering to identify correct oil compatibility at catseals@cat.com

A properly installed Cat Seal creates a robust system performing without premature failure. The following considerations should be addressed when designing your system.

Uneven or Excessive Face Load

The seal ring is tilted in the retainer or the toric is twisted result in improper seal installation and can cause uneven loads at the seal interface. This uneven loading can result in premature failure.

Mishandling of Seals

Mishandling of seals can lead to an immediate leak or premature failure. Failure can occur due to cutting or tearing of the elastomeric load ring, breakage of the sealing ring, contamination of the seal face with dirt or lint, etc. When assembling Cat Seals, please carefully observe assembly instructions provided by Caterpillar.

Internal Pressure Spikes

Cat Seals can withstand a varying amount of system pressure, depending on the design. If your application requirements include pressure capability, *consult Caterpillar Engineering at catseals@cat.com*

Improper Housing Design

It is critical that the application seal housing conform to the design information provided by Caterpillar. The relationship between the seal assembly and its mating component is essential to the performance of the sealing system.

The Proper Selection of Oil

Improper selection of oil can have an adverse effect on both the load ring and metal sealing ring. Some oils are incompatible with elastomers and cause long-term degradation with exposure, especially when combined with heat. Improper oil selection can cause metal seal failure due to galling from inadequate lubrication flow.

Mud Packing

Mud packing is a common issue in environments where the Cat Seals are continually exposed to dirt and mud. Debris can pack the cavity between the seal housing, seal ring and load ring. Over time, this can cause the load ring to be pushed out of position.

Seal guarding and labyrinths can prolong seal life if applied correctly. Poor labyrinth application can trap debris against the seal and lead to wearing away of the seal housings.

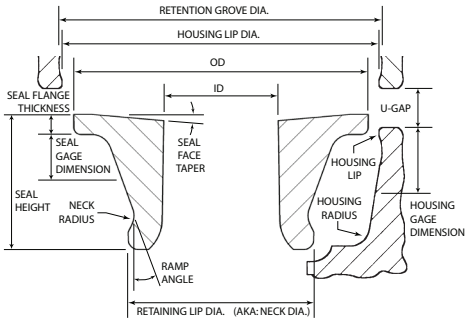
If your application requirements include resistance to excessive debris, contact Caterpillar at catseals@cat.com

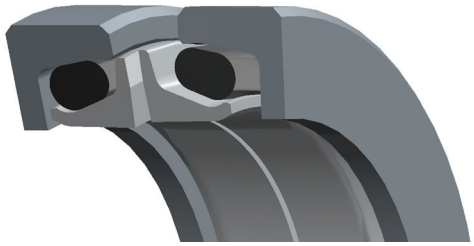
Load Ring Abrasion

Abrasion of the load ring can occur in applications where it is exposed to abrasive conditions like corrosive, dusty, dirty, sandy, and rocky. Abrasion of the load ring causes deterioration and tearing of the elastomer, leading to failure. This can be minimized through proper load ring material selection.

Consult Caterpillar to discuss your seal load ring options at catseals@cat.com

CAT DUO-CONE SEALS





Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
386-0992	6.0	51	37.5	Stellite	LT-NBR	20
108-6997	6.22	51	38	Forged	Nitrile	20
386-0993	7.3	58	43	Stellite	LT-NBR	20
386-0994	6.25	58	45	Stellite	LT-NBR	19
386-0996	7.5	62	47.5	Stellite	LT-NBR	20
8E-5612	6.22	65	51	Stellite	Nitrile	15
8E-5610	6.22	65.67	51	Stellite	Nitrile	15
8E-5611	6.22	65.67	51	Forged	Nitrile	15
386-1000	7.5	70	55.5	Stellite	LT-NBR	20
386-1001	7.5	70	56	Stellite	LT-NBR	20
386-1006	5.2	73	61	Stellite	LT-NBR	20
386-1003	8.4	74	58	Stellite	LT-NBR	20
386-1005	6.6	74	60	Stellite	LT-NBR	20
108-6996	6.22	74	60	Forged	Nitrile	20
136-0296	6.22	74	60	Forged	Nitrile	20
473-1457	9.47	77.5	58.02	Stellite	LT-NBR	8
386-1011	8.1	78	64	Ni-Hard	LT-NBR	17.5
386-1010	9.5	82.5	63.5	Stellite	LT-NBR	20
386-1007	9.47	82.55	63.1	Stellite	LT-NBR	20
171-5883	9.47	82.55	63.1	Stellite	LT-NBR	20
179-1292	9.47	82.55	63.1	Forged	Nitrile	20
212-0440	9.47	82.55	63.1	Stellite	FKM	20
2M-2858	9.47	82.55	63.1	Stellite	Nitrile	20
318-1785	9.47	82.55	63.1	Stellite	LT-NBR	20
356-5452	9.47	82.55	63.1	Stellite	Nitrile	20
5K-6191	9.47	82.55	63.1	Stellite	Silicone	20
8E-1869	9.47	82.55	63.1	Forged	Nitrile	20
8E-1868	9.47	82.55	63.5	Stellite	Rubber	20
386-1014	7.8	84	69	Stellite	LT-NBR	18
386-1013	9.0	85	66	Stellite	LT-NBR	20
386-1024	5.3	90	78	Stellite	LT-NBR	20
1Z-9354	4.3	87.6	77.5	Stellite	Silicone	20
251-3272	4.3	87.6	77.5	Stellite	LT-NBR	20
7G-0519	4.3	87.6	77.5	Stellite	Nitrile	20
251-3272	4.3	87.6	77.5	Stellite	LT Nitrile	20
386-1017	8.0	89	72	Stellite	LT-NBR	20
386-1015	9.2	90	71	Stellite	LT-NBR	20
386-1028	5.3	90	78	Stellite	LT-NBR	20
107-4889	9.47	92	72.52	Stellite	Silicone	8

Contact Caterpillar to determine housing dimensions and custom options at catseals@cat.com

CAT DUO-CONE SEALS

Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
162-7862	9.47	92	72.52	Stellite	LT-NBR	8
386-1022	9.2	92	73	Ni-Hard	LT-NBR	18
386-1020	9.5	92	73	Ni-Hard	LT-NBR	20
320-8917	9.47	92	75.52	Stellite	LT-NBR	8
446-6653	9.47	92.05	72.6	Ni-Hard	LT-NBR	20
386-1018	9.47	92.08	72.6	Stellite	LT-NBR	20
171-5882	9.47	92.08	72.6	Stellite	LT-NBR	20
175-7513	9.47	92.08	72.6	C6	Nitrile	20
1M-8747	9.47	92.08	72.6	Stellite	Nitrile	20
318-1783	9.47	92.08	72.6	Stellite	LT-NBR	20
359-4800	9.47	92.08	72.6	C6	LT-NBR	20
422-1454	9.47	92.08	72.6	C6	LT-NBR	20
4S-8984	9.47	92.08	72.6	Stellite	Silicone	20
6V-1915	9.47	92.08	72.6	Stellite	Nitrile	20
6Y-0925	9.47	92.08	72.6	Forged	Nitrile	20
8E-4535	9.47	92.08	72.6	Stellite	Nitrile	20
9W-1059	9.47	92.08	72.6	Stellite	Silicone	20
9W-1060	9.47	92.08	72.6	Stellite	Nitrile	20
320-8915	9.47	92.08	76.2	Stellite	LT-NBR	20
386-1026	9.80	94	75.1	Stellite	LT-NBR	20
340-8206	9.47	94.48	75	Forged	LT-NBR	20
386-1032	8.0	98	80.1	Stellite	LT-NBR	20
386-1034	7.0	98	81.1	Stellite	LT-NBR	20
386-1029	9.0	99.5	79.6	Ni-Hard	LT-NBR	20
162-7863	9.47	102	82.52	Stellite	LT-NBR	8
386-1033	9.47	102	82.52	Stellite	LT-NBR	8
9W-8878	9.47	102	82.52	Stellite	Silicone	8
386-1036	6.6	103	86	Stellite	LT-NBR	20
386-1035	9.47	104.5	85	Stellite	LT-NBR	20
216-2957	6.22	104.67	90	Stellite	LT-NBR	15
5P-0373	6.22	104.67	90	Stellite	Silicone	15
6S-3285	6.22	104.67	90	Stellite	Nitrile	15
337-3548	6.22	104.82	89	Stellite	LT-NBR	15
386-1047	6.8	106.5	94	Stellite	LT-NBR	20
251-3279	4.3	106.6	96.5	Jinsung	LT-NBR	20
251-3279	4.3	106.6	96.5	Stellite	LT Nitrile	20
252-7909	4.3	106.6	96.5	Jinsung	HNBR	20
9P-9663	4.3	106.6	96.5	Jinsung	Nitrile	20
386-1037	9.5	108	88	Stellite	LT-NBR	20
386-1043	9.2	109	90.5	Ni-Hard	LT-NBR	17.5
386-1038	9.5	109	90.5	Stellite	LT-NBR	17.5
386-1046	9.0	109	92	Stellite	LT-NBR	20
386-1041	9.7	109.5	90.1	Stellite	LT-NBR	20
386-1039	9.47	109.53	90.1	Stellite	LT-NBR	20
204-6277	9.47	109.53	90.1	Forged	Nitrile	20
8E-5029	9.47	109.53	90.1	Forged	Nitrile	20
1M-8746	9.47	109.55	90.1	Stellite	Nitrile	20
206-9211	9.47	109.55	90.1	Stellite	LT-NBR	20

Contact Caterpillar to determine housing dimensions and custom options at catseals@cat.com

CAT DUO-CONE SEALS

Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
434-1920	9.47	109.55	90.1	C6	LT-NBR	20
8S-5656	9.47	109.55	90.1	Stellite	Silicone	20
107-9621	9.47	110	90.04	Stellite	Silicone	8
162-7864	9.47	110	90.04	Stellite	LT-NBR	8
386-1048	9.5	114	95	Ni-Hard	LT-NBR	18
337-3551	6.22	115.82	100	Stellite	LT-NBR	15
386-1054	9.5	119	100	Stellite	LT-NBR	20
171-5811	9.47	119.08	99.6	Stellite	LT-NBR	20
175-8593	9.47	119.08	99.6	Forged	LT-NBR	20
1M-8748	9.47	119.08	99.6	Stellite	Nitrile	20
206-9212	9.47	119.08	99.6	Stellite	LT-NBR	20
273-9595	9.47	119.08	99.6	Stellite	Silicone	20
325-3297	9.47	119.08	99.6	Stellite	LT-NBR	20
3P-1848	9.47	119.08	99.6	Stellite	Silicone	20
5P-7143	9.47	119.08	99.6	Stellite	FKM	8
8E-1881	9.47	119.08	99.6	Stellite	Nitrile	20
386-1051	9.47	119.08	99.6	Stellite	LT-NBR	20
386-1053	9.2	120	100	Stellite	LT-NBR	20
386-1059	7.0	121	104	Stellite	LT-NBR	20
386-1055	10.3	122	102	Ni-Hard	LT-NBR	18
386-1061	9.7	127	109	Ni-Hard	LT-NBR	18
386-1063	9.47	131.5	112.05	Stellite	LT-NBR	20
109-0885	9.47	131.5	112.05	Stellite	Nitrile	20
133-0513	9.47	131.5	112.05	Stellite	Silicone	20
148-3533	9.47	131.5	112.05	Stellite	LT-NBR	20
434-1922	9.47	131.5	112.05	C6	LT-NBR	20
475-8458	9.47	131.5	112.05	Stellite	LT-NBR	20
175-8631	9.47	131.5	112.1	Forged	Nitrile	20
386-1060	10.5	132	109	Stellite	LT-NBR	20
155-9879	9.47	133	114.02	Stellite	LT-NBR	8
161-7525	9.47	133	114.02	Stellite	Silicone	8
386-1066	9.5	137	115	Ni-Hard	LT-NBR	20
386-1068	9.7	138.5	120	Stellite	LT-NBR	20
272-1012	6.22	139.82	124	Stellite	LT-NBR	15
386-1070	7.2	141	124	Ni-Hard	LT-NBR	20
252-7907	6.22	141.25	126.5	Stellite	HNBR	15
315-1147	6.22	141.25	126.5	Stellite	HNBR	15
3S-0303	6.22	141.25	126.5	Stellite	Nitrile	15
8L-5519	6.22	141.25	126.5	Stellite	Silicone	15
386-1074	9.0	146	127	Ni-Hard	LT-NBR	15
6Y-5218	9.47	146	127.07	Formed	Silicone	15
6Y-5219	9.47	146	127.07	Formed	Nitrile	15
109-0881	9.47	146.05	126.6	Stellite	Nitrile	20
142-1579	9.47	146.05	126.6	Stellite	Silicone	8
176-5331	9.47	146.05	126.6	Stellite	LT-NBR	20
273-9594	9.47	146.05	126.6	Stellite	Silicone	20
379-8802	9.47	146.05	126.6	C6	LT-NBR	15
5P-7146	9.47	146.05	126.6	Stellite	Nitrile	8

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CAT DUO-CONE SEALS

Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
5P-9121	9.47	146.05	126.6	Stellite	Nitrile	15
386-1072	9.47	146.05	126.6	Stellite	LT-NBR	20
285-9346	6.22	148.82	133	Stellite	LT-NBR	15
386-1077	11.3	152	130	Ni-Hard	LT-NBR	20
252-7912	6.22	157	142.3	Stellite	HNBR	15
315-1149	6.22	157	142.3	Jinsung	HNBR	15
359-4802	6.22	157	142.3	Stellite	LT-NBR	15
5K-5288	6.22	157	142.3	Stellite	Nitrile	15
5P-0375	6.22	157	142.3	Stellite	Silicone	15
337-3554	6.22	159.82	144	Stellite	LT-NBR	15
386-1079	12.7	168	146	Stellite	LT-NBR	15
386-1087	6.2	168	154	Stellite	LT-NBR	15
186-6531	6.22	168.3	153.6	Stellite	Nitrile	15
351-9947	6.22	168.3	153.6	Stellite	Silicone	15
359-4804	6.22	168.3	153.6	Stellite	LT-NBR	15
424-0676	6.22	168.3	153.6	C6	LT-NBR	15
4C-2002	6.22	168.3	153.6	Stellite	Silicone	15
5K-1078	6.22	168.3	153.6	Stellite	Nitrile	15
8L-5516	6.22	168.3	153.6	Stellite	Silicone	15
386-1081	9.2	170	148	Ni-Hard	LT-NBR	17.5
386-1082	9.6	170	148	Stellite	LT-NBR	15
386-1084	9.2	170	150	Ni-Hard	LT-NBR	17.5
109-0868	9.47	171.5	152.05	Stellite	Nitrile	20
133-0512	9.47	171.5	152.05	Stellite	Silicone	20
176-5332	9.47	171.5	152.05	Stellite	LT-NBR	20
372-2638	9.47	171.5	152.05	Stellite	LT-NBR	20
6T-8440	12.7	171.7	143.76	Stellite	Nitrile	15
6T-9984	12.7	171.7	143.76	Stellite	Silicone	15
9W-6717	12.7	171.7	143.76	Forged	Nitrile	15
6T-2981	12.7	171.7	147.39	Formed	Silicone	15
9G-5311	12.7	171.7	147.39	Formed	Nitrile	15
386-1085	11.3	172	150	Stellite	LT-NBR	17
386-1088	9.5	173.5	154	Stellite	LT-NBR	20
272-6133	6.22	173.82	158	Stellite	LT-NBR	15
386-1089	9.1	180	160	Ni-Hard	LT-NBR	17.5
386-1090	8.5	183.5	165	Ni-Hard	LT-NBR	20
109-0861	9.47	188.5	169.05	Stellite	Nitrile	20
133-0511	9.47	188.5	169.05	Stellite	Silicone	20
171-5825	9.47	188.5	169.05	Stellite	LT-NBR	20
191-6664	12.7	191.26	163.32	C6	Nitrile	15
210-5536	12.7	191.26	163.32	C6	HNBR	15
4C-1494	12.7	191.26	163.32	C6	Silicone	15
6T-8436	12.7	191.26	163.32	Stellite	Nitrile	15
6T-9985	12.7	191.26	163.32	Stellite	Silicone	15
9W-7331	12.7	191.26	163.32	Stellite	Nitrile	8
6T-3377	12.7	191.26	166.95	Formed	Silicone	15
9G-5313	12.7	191.26	166.95	Formed	Nitrile	15
272-6134	6.22	193.82	178	Stellite	LT-NBR	15

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Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
8E-5322	9.47	199	179.55	Stellite	Silicone	15
386-1093	12.7	210	182	Stellite	LT-NBR	15
386-1094	8.2	210	191	Stellite	LT-NBR	20
460-5369	12.7	210.31	182.37	Ni-Hard	Silicone	15
6T-8438	12.7	210.31	182.37	Stellite	Nitrile	15
6T-8439	12.7	210.31	182.37	Stellite	Nitrile	8
6T-9986	12.7	210.31	182.37	Stellite	Silicone	15
331-7073	12.7	210.31	186	Formed	LT-NBR	15
3T-6541	12.7	210.31	186	Formed	Silicone	15
9G-5315	12.7	210.31	186	Formed	Nitrile	15
386-1095	10.5	215	192	Ni-Hard	LT-NBR	20
272-1014	6.22	215.82	200	Stellite	LT-NBR	15
380-4914	6.22	215.82	200	Stellite	LT-NBR	15
177-6717	6.22	222.5	203.18	C6	Nitrile	15
357-7361	6.22	222.5	208.68	Stellite	FKM	15
5N-7639	6.22	222.5	208.68	Stellite	Nitrile	15
386-1097	13.0	228.5	200	Stellite	LT-NBR	15
386-1099	13.0	234	209	Stellite	LT-NBR	14
386-1101	7.70	241.4	218.8	Stellite	LT-NBR	15
171-5897	12.7	251.46	223.52	Stellite	LT-NBR	15
195-3070	12.7	251.46	223.52	C6	Nitrile	8
210-5535	12.7	251.46	223.52	C6	HNBR	8
213-7509	12.7	251.46	223.52	Ni-Hard	Nitrile	15
440-4292	12.7	251.46	223.52	Stellite	Nitrile	8
445-0455	12.7	251.46	223.52	C6	Silicone	8
466-7328	12.7	251.46	223.52	Ni-Hard	Silicone	8
469-9174	12.7	251.46	223.52	Ni-Hard	Silicone	8
6T-8435	12.7	251.46	223.52	Stellite	Nitrile	15
6Y-0859	12.7	251.46	223.52	Stellite	Nitrile	8
9W-4650	12.7	251.46	223.52	Stellite	Silicone	15
383-4232	12.7	251.46	227.15	Formed	Silicone	8
6T-2815	12.7	251.46	227.15	Formed	Silicone	15
9G-5317	12.7	251.46	227.15	Formed	Nitrile	15
9G-5343	12.7	251.46	227.15	Formed	Nitrile	8
9W-5977	12.7	251.46	227.15	Formed	Silicone	8
386-1103	12.7	252	223.5	Stellite	LT-NBR	15
386-1105	12.0	252	225	Stellite	LT-NBR	21
202-3206	12.7	258.58	236.5	Formed	Nitrile	15
195-4446	12.7	259.59	231.65	Cast Steel	Nitrile	15
9W-4098	12.7	259.59	231.65	Stellite	Nitrile	15
9W-6617	12.7	259.59	231.65	Stellite	Silicone	15
200-4059	12.7	259.59	235.28	Formed	Nitrile	15
314-4124	12.7	259.59	235.28	Formed	Silicone	15
6Y-0520	12.7	259.59	235.28	Formed	Silicone	15
309-7664	12.7	264.71	236.77	C6	Silicone	15
386-1109	13.0	276	250	Ni-Hard	LT-NBR	15
137-2429	12.7	292.86	264.82	Ni-Hard	Nitrile	15
145-8032	12.7	292.86	264.82	Ni-Hard	Silicone	15

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CAT DUO-CONE SEALS

Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
171-5898	12.7	292.86	264.82	Stellite	LT-NBR	15
190-0270	12.7	292.86	264.82	Stellite	FKM	8
204-6452	12.7	292.86	264.82	Ni-Hard	FKM	15
381-0705	12.7	292.86	264.82	Stellite	Silicone	8
6T-8437	12.7	292.86	264.82	Stellite	Nitrile	15
9W-3732	12.7	292.86	264.82	Stellite	Nitrile	8
9W-4651	12.7	292.86	264.82	Stellite	Silicone	15
174-4873	12.7	292.86	268.45	Formed	LT-NBR	15
3T-9117	12.7	292.86	268.45	Formed	Silicone	15
9G-5319	12.7	292.86	268.45	Formed	Nitrile	15
386-1110	12.7	293	265	Ni-Hard	LT-NBR	15
386-1113	12.7	303	275	Stellite	LT-NBR	15
7T-2459	12.7	310.88	282.92	Stellite	Nitrile	15
386-1114	12.7	314	282	Stellite	LT-NBR	15
386-1116	12.7	325	300	Stellite	LT-NBR	15
386-1115	12.7	328	300	Stellite	LT-NBR	20
446-1424	12.7	328	302	Ni-Hard	LT-NBR	15
454-7635	12.7	328	302	Ni-Hard	LT-NBR	15
125-5538	12.7	328	303.57	Formed	Silicone	15
174-4874	12.7	328	303.57	Formed	LT-NBR	15
336-7869	12.7	328	303.57	Formed	LT-NBR	15
386-1118	12.7	341	318.5	Stellite	LT-NBR	15
386-1117	12.7	345	318	Stellite	LT-NBR	15
118-2900	12.7	346.46	318.52	C6	Silicone	8
175-6294	12.7	346.46	318.52	Stellite	FKM	15
186-3277	12.7	346.46	318.52	Ni-Hard	Silicone	8
190-0271	12.7	346.46	318.52	Stellite	FKM	8
191-6128	12.7	346.46	318.52	Jinsung	Nitrile	15
373-1647	12.7	346.46	318.52	C6	Silicone	8
383-1597	12.7	346.46	318.52	Stellite	LT-NBR	8
417-7857	12.7	346.46	318.52	C6	Nitrile	8
6T-8434	12.7	346.46	318.52	Stellite	Nitrile	15
6Y-0857	12.7	346.46	318.52	Stellite	Nitrile	8
6Y-6275	12.7	346.46	318.52	Stellite	Silicone	8
9W-4652	12.7	346.46	318.52	Stellite	Silicone	15
163-7368	12.7	346.46	322.14	Formed	LT-NBR	8
207-1571	12.7	346.46	322.14	Formed	LT-NBR	15
314-4122	12.7	346.46	322.14	Formed	Silicone	8
3T-8500	12.7	346.46	322.14	Formed	Silicone	15
9G-5321	12.7	346.46	322.14	Formed	Nitrile	15
9G-5347	12.7	346.46	322.14	Formed	Nitrile	8
9W-5978	12.7	346.46	322.14	Formed	Silicone	8
166-8815	12.7	347.5	318.52	Ni-Hard	Nitrile	15
462-6304	12.7	347.5	318.52	Ni-Hard	Silicone	15
386-1119	12.0	368	338	Stellite	LT-NBR	15
386-1120	12.9	368	340	Stellite	LT-NBR	15
305-7976	12.7	368.75	341.75	C6	Nitrile	20
386-1123	12.7	375	350	Stellite	LT-NBR	15

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CAT DUO-CONE SEALS

Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
386-1124	12.7	381	356	Stellite	LT-NBR	15
386-1126	12.7	391	366.5	Stellite	LT-NBR	15
255-2272	12.7	394.1	369.77	Formed	LT-NBR	15
314-4120	12.7	394.1	369.77	Formed	Silicone	15
9G-5323	12.7	394.1	369.77	Formed	Nitrile	15
133-0441	12.7	394.46	366.52	C6	HNBR	15
137-2428	12.7	394.46	366.52	Ni-Hard	Nitrile	15
149-8434	12.7	394.46	366.52	C6	Silicone	15
155-1388	12.7	394.46	366.52	Ni-Hard	Silicone	15
205-9115	12.7	394.46	366.52	Stellite	LT-NBR	15
213-4737	12.7	394.46	366.52	Stellite	Rubber	15
314-4119	12.7	394.46	366.52	Ni-Hard	Silicone	15
341-8543	12.7	394.46	366.52	C6	Silicone	15
6T-4316	12.7	394.46	366.52	C6	Nitrile	15
6T-8433	12.7	394.46	366.52	Stellite	Nitrile	15
6Y-0855	12.7	394.46	366.52	Stellite	Nitrile	8
6Y-6273	12.7	394.46	366.52	Stellite	Silicone	8
9G-5349	12.7	394.46	370.05	Formed	Nitrile	8
9W-5979	12.7	394.46	370.05	Formed	Silicone	8
386-1125	12.7	394.5	366.5	Stellite	LT-NBR	15
386-1127	12.2	413.5	384	Stellite	LT-NBR	15
386-1128	12.2	415	387	Stellite	LT-NBR	15
314-4128	12.7	427.2	400.2	C6	Silicone	15
386-1130	13.0	454	429	Stellite	LT-NBR	15
386-1131	13.0	454	429	Stellite	Viton	15
386-1129	13.0	457	429	Stellite	LT-NBR	15
175-6297	12.7	457.2	429.26	Stellite	FKM	15
186-6493	12.7	457.2	429.26	Cast Steel	Nitrile	15
205-9025	12.7	457.2	429.26	Stellite	LT-NBR	15
4D-8960	12.7	457.2	429.26	Stellite	Nitrile	15
201-5468	12.7	457.2	430.35	C6	FKM	8
212-2784	12.7	457.2	430.35	C6	Nitrile	8
137-4343	12.7	458.36	429.26	C6	HNBR	15
175-6299	12.7	458.36	429.26	C6	FKM	15
195-3495	12.7	458.36	429.26	C6	Nitrile	15
195-9706	12.7	458.36	429.26	C6	Silicone	15
314-4126	12.7	458.36	429.26	C6	Silicone	15
365-4924	12.7	482.6	454.66	C6	Silicone	15
319-3887	12.7	482.8	454.66	C6	Silicone	15
386-1132	12.7	533.4	503.5	Stellite	LT-NBR	15
214-7880	12.7	533.4	505.46	C6	LT-NBR	15
365-4922	12.7	533.4	505.46	C6	Silicone	15
147-5509	12.7	534	505.8	C6	Silicone	15
175-6298	12.7	534	505.8	C6	FKM	15
190-4136	12.7	534	505.8	C6	Silicone	15
297-9546	12.7	534	505.8	C6	Silicone	15
6T-6802	12.7	534	505.8	C6	Nitrile	15
172-5284	12.7	567.94	540	C6	Nitrile	15

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Seal Group	Toric Cross Seaction	OD (mm)	ID (mm)	Ring	Toric	Ramp Angle
317-6441	12.7	567.94	540	C6	Silicone	15
365-4920	12.7	567.94	540	C6	Silicone	15
8E-6327	12.7	567.94	540	C6	Silicone	15
459-9259	12.7	623.14	595.2	C6	HNBR	15
147-5510	12.7	700	667.58	C6	Silicone	15
149-7581	12.7	700	667.58	C6	HNBR	15
314-4130	12.7	700	667.58	C6	Silicone	15
433-1348	12.7	700	667.58	C6	Nitrile	15
378-0592	12.7	806.72	773.72	C6	Silicone	15
110-9718	12.7	865	832	C6	Nitrile	16
147-5511	12.7	865	832	C6	Silicone	16
152-9157	12.7	865	832	C6	HNBR	16
314-4132	12.7	865	832	C6	Silicone	16
453-5929	12.7	865.44	832	C6	Silicone	16
422-9076	16.0	939.8	898	C6	Silicone	8
148-6633	16.0	939.8	898.22	C6	HNBR	16
314-4134	16.0	939.8	898.22	C6	Silicone	16

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CAT DUO-CONE SEALS TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (mm)			Nominal	+/- Variation
8E-5608	65.67	15	6.22	9U-5985	7.6	1.5
136-0296	74	20	6.22	123-3800	6.1	1.5
161-7247	77.5	8	9.47	179-7208	10.6	1.5
171-5883	82.55	20	9.47	224-9466	9.3	1.5
179-1292	82.55	20	9.47	224-9466	8.87	1.5
212-0440	82.55	20	9.47	224-9466	9.3	1.5
2M-2858	82.55	20	9.47	224-9466	9.3	1.5
356-5452	82.55	20	9.47	224-9466	9.38	1.5
5K-6191	82.55	20	9.47	224-9466	9.3	1.5
9W-5224	82.55	20	9.47	224-9466	8.84	1.5
093-1414	84	20	6.22	123-3801	8.01	1.5
1Z-9354	87.6	20	4.3	TBD	3.5	1
251-3272	87.6	20	4.3	TBD	3.5	1
7G-0519	87.6	20	4.3	TBD	3.5	1
107-4889	92	8	9.47	224-9467	10.6	1.5
162-7862	92	8	9.47	224-9467	10.6	1.5
20-8917	92	8	9.47	224-9467	10.6	1.5
446-6653	92.05	20	9.47	1U-8840	8.88	1.5
171-5882	92.08	20	9.47	1U-8840	8.88	1.5
175-7513	92.08	20	9.47	1U-8840	8.88	1.5
1M-8747	92.08	20	9.47	1U-8840	8.88	1.5
320-8915	92.08	20	9.47	1U-8840	8.88	1.5
359-4800	92.08	20	9.47	1U-8840	8.88	1.5
422-1454	92.08	20	9.47	1U-8840	8.88	1.5
4S-8984	92.08	20	9.47	1U-8840	8.88	1.5
6Y-0925	92.08	20	9.47	1U-8840	8.9	1.5
8E-4535	92.08	20	9.47	1U-8840	8.9	1.5
340-8207	94.5	20	9.47	1U-6145	8.8	1.5
125-3267	102	8	9.47	227-4755	10.6	1.5
162-7863	102	8	9.47	227-4755	10.6	1.5
9W-8878	102	8	9.47	227-4755	10.6	1.5
099-0159	104.4	20	9.47	1U-8850	9.1	1.5
216-2957	104.67	15	6.22	1U-8850	7.6	1.5
5P-0373	104.67	15	6.22	1U-8850	7.6	1.5
6S-3285	104.67	15	6.22	1U-8850	7.6	1.5
251-3279	106.6	20	4.3	306-5147	3.5	1
252-7909	106.6	20	4.3	306-5147	3.5	1
9P-9663	106.6	20	4.3	306-5147	3.5	1
204-6277	109.53	20	9.47	1U-8841	8.9	1.5
9W-2142	109.53	20	9.47	1U-8841	8.88	1.5
1M-8746	109.55	20	9.47	1U-8841	8.68	1.5
206-9211	109.55	20	9.47	1U-8841	8.68	1.5
434-1920	109.55	20	9.47	1U-8841	8.68	1.5
8S-5656	109.55	20	9.47	1U-8841	8.68	1.5
107-9621	110	8	9.47	129-1340	10.6	1.5
162-7864	110	8	9.47	129-1340	10.6	1.5
5P-7143	119.08	8	9.47	1U-8842	8.8	1.5

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CAT DUO-CONE SEALS TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (mm)			Nominal	+/- Variation
096-4254	119.08	20	9.47	1U-8842	8.8	1.5
171-5811	119.08	20	9.47	1U-8842	8.9	1.5
175-8593	119.08	20	9.47	1U-8842	8.88	1.5
1M-8748	119.08	20	9.47	1U-8842	8.7	1.5
206-9212	119.08	20	9.47	1U-8842	8.7	1.5
273-9595	119.08	20	9.47	1U-8842	8.9	1.5
325-3297	119.08	20	9.47	1U-8842	8.7	1.5
3P-1848	119.08	20	9.47	1U-8842	8.7	1.5
9W-2201	119.08	20	9.47	1U-8842	8.9	1
109-0885	131.5	20	9.47	9U-7537	8.9	1.5
133-0513	131.5	20	9.47	9U-7537	8.88	1.5
148-3533	131.5	20	9.47	9U-7537	8.88	1.5
175-8631	131.5	20	9.47	9U-7537	8.88	1.5
434-1922	131.5	20	9.47	9U-7537	8.88	1.5
436-1439	131.5	20	9.47	9U-7537	8.88	1.5
155-9879	133	8	9.47	159-9843	10.6	1.5
161-7525	133	8	9.47	159-9843	10.6	1.5
252-7907	141.25	15	6.22	1U-8699	7.5	1.5
315-1147	141.25	15	6.22	1U-8699	6.9	1.5
3S-0303	141.25	15	6.22	1U-8699	6.5	1.5
8L-5519	141.25	15	6.22	1U-8699	6.9	1.5
6Y-5218	146	15	9.47	1U-8849	8.9	1.5
6Y-5219	146	15	9.47	1U-8849	8.9	1.5
142-1579	146.05	8	9.47	1U-8849	8.8	1.5
5P-7146	146.05	8	9.47	1U-8849	8.8	1.5
379-8802	146.05	15	9.47	1U-8849	8.85	1.5
5P-9121	146.05	15	9.47	1U-8849	8.8	1.5
109-0881	146.05	20	9.47	1U-8849	8.9	1.5
135-9104	146.05	20	9.47	1U-8849	8.9	1.5
151-9446	146.05	20	9.47	1U-8849	8.9	1.5
156-0620	146.05	20	9.47	1U-8849	8.88	1.5
176-5331	146.05	20	9.47	1U-8849	8.88	1.5
211-2211	146.05	20	9.47	1U-8849	8.9	1.5
273-9594	146.05	20	9.47	1U-8849	8.88	1.5
252-7912	157	15	6.22	1U-8698	7.2	1.5
315-1149	157	15	6.22	1U-8698	7.55	1.5
359-4802	157	15	6.22	1U-8698	7.55	1.5
5K-5288	157	15	6.22	1U-8698	7.55	1.5
5P-0375	157	15	6.22	1U-8698	7.55	1.5
337-3554	159.82	15	6.22	1U-8698	6.5	1.5
186-6531	168.3	15	6.22	1U-8697	7.6	1.5
351-9947	168.3	15	6.22	1U-8697	7.55	1.5
359-4804	168.3	15	6.22	1U-8697	7.6	1.5
424-0676	168.3	15	6.22	1U-8697	7.55	1.5
4C-2002	168.3	15	6.22	1U-8697	7.4	1.5
5K-1078	168.3	15	6.22	1U-8697	7.55	1.5
8L-5516	168.3	15	6.22	1U-8697	7.55	1.5

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CAT DUO-CONE SEALS TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (mm)			Nominal	+/- Variation
109-0868	171.5	20	9.47	4C-6206	8.9	1.5
133-0512	171.5	20	9.47	4C-6206	8.9	1.5
139-6611	171.5	20	9.47	4C-6206	8.9	1.5
151-9447	171.5	20	9.47	4C-6206	8.9	1.5
156-0621	171.5	20	9.47	4C-6206	8.88	1.5
176-5332	171.5	20	9.47	4C-6206	8.88	1.5
372-2638	171.5	20	9.47	4C-6206	8.9	1.5
6T-2981	171.7	15	12.7	1U-6443	11.62	1.5
6T-8440	171.7	15	12.7	1U-6443	11.55	1.5
9G-5311	171.7	15	12.7	1U-6443	11.62	1.5
9W-6717	171.7	15	12.7	1U-6443	11.55	1.5
109-0861	188.5	20	9.47	9U-7538	8.9	1.5
171-5825	188.5	20	9.47	9U-7538	8.88	1.5
9W-7331	191.26	8	12.7	1U-6442	15	1.5
4C-1494	191.26	15	12.7	1U-6441	11.55	1.5
6T-3377	191.26	15	12.7	1U-6441	11.64	1.5
6T-8436	191.26	15	12.7	1U-6441	11.55	1.5
9G-5313	191.26	15	12.7	1U-6441	11.64	1.5
6T-8439	210.31	8	12.7	1U-6440	15	1
331-7073	210.31	15	12.7	1U-6439	11.66	1.5
3T-6541	210.31	15	12.7	1U-6439	11.66	1.5
6T-8438	210.31	15	12.7	1U-6439	11.55	1.5
6T-9986	210.31	15	12.7	1U-6439	11.55	1.5
9G-5315	210.31	15	12.7	1U-6439	11.66	1.5
177-6717	222.5	15	6.22	4C-9527	6.5	1.5
357-7361	222.5	15	6.22	4C-9527	6.5	1.5
5N-7639	222.5	15	6.22	4C-9527	6.5	1.5
195-3070	251.46	8	12.7	1U-6437	15	1.5
326-9200	251.46	8	12.7	1U-6437	15	1.5
383-4232	251.46	8	12.7	1U-6437	15.17	1.5
445-0455	251.46	8	12.7	1U-6437	15	1.5
6Y-0859	251.46	8	12.7	1U-6437	15	1.5
6Y-6277	251.46	8	12.7	1U-6437	15	1.5
9G-5343	251.46	8	12.7	1U-6437	15.17	1.5
9W-5977	251.46	8	12.7	1U-6437	15.17	1.5
171-5897	251.46	15	12.7	1U-6436	11.55	1.5
213-7509	251.46	15	12.7	1U-6436	11.55	1.5
6T-2815	251.46	15	12.7	1U-6436	11.73	1.5
6T-8435	251.46	15	12.7	1U-6436	11.55	1.5
9G-5317	251.46	15	12.7	1U-6436	11.73	1
9W-4650	251.46	15	12.7	1U-6436	11.55	1.5
200-4059	259.59	15	12.7	1U-6438	11.73	1.5
202-3206	259.59	15	12.7	1U-6438	11.73	1.5
314-4124	259.59	15	12.7	1U-6438	11.73	1.5
6Y-0520	259.59	15	12.7	1U-6438	11.73	1.5
9W-4098	259.59	15	12.7	1U-6438	11.55	1.5
381-0705	292.86	8	12.7	1U-6435	15	1.5

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CAT DUO-CONE SEALS TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (mm)			Nominal	+/- Variation
9W-3732	292.86	8	12.7	1U-6435	15	1.5
137-2429	292.86	15	12.7	1U-6434	11.55	1.5
145-8032	292.86	15	12.7	1U-6434	11.55	1.5
171-5898	292.86	15	12.7	1U-6434	11.55	1.5
1C-9747	292.86	15	12.7	1U-6434	11.77	1.5
3T-9117	292.86	15	12.7	1U-6434	11.77	1.5
6T-8437	292.86	15	12.7	1U-6434	11.55	1.5
9G-5319	292.86	15	12.7	1U-6434	11.77	1.5
9G-5349	292.86	15	12.7	1U-6434	11.77	1.5
9W-4651	292.86	15	12.7	1U-6434	11.55	1.5
9W-5979	310.86	15	12.7	220-5726	11.55	1.5
125-5538	328	15	12.7	173-6703	11.83	1.5
174-4874	328	15	12.7	173-6703	11.83	1.5
336-7869	328	15	12.7	173-6703	11.83	1.5
446-1424	328	15	12.7	173-6703	11.45	1.5
118-2900	346.46	8	12.7	1U-5934	15	1.5
130-6889	346.46	8	12.7	1U-5934	15	1.5
163-7368	346.46	8	12.7	1U-5934	15.17	1.5
186-3277	346.46	8	12.7	1U-5934	15	1.5
314-4122	346.46	8	12.7	1U-5934	15.17	1.5
373-1647	346.46	8	12.7	1U-5934	15	1.5
383-1597	346.46	8	12.7	1U-5934	15	1.5
417-7857	346.46	8	12.7	1U-5934	15	1.5
6Y-0857	346.46	8	12.7	1U-5934	15	1.5
6Y-6275	346.46	8	12.7	1U-5934	15	1.5
9G-5347	346.46	8	12.7	1U-5934	15.17	1.5
9W-5978	346.46	8	12.7	1U-5934	15.17	1.5
207-1571	346.46	15	12.7	1U-5933	11.88	1.5
3T-8500	346.46	15	12.7	1U-5933	11.88	1.5
6T-8434	346.46	15	12.7	1U-5933	11.55	1.5
9G-5321	346.46	15	12.7	1U-5933	11.88	1.5
9W-4652	346.46	15	12.7	1U-5933	11.55	1
166-8815	347.5	15	12.7	1U-5933	11.55	1.5
305-7976	368.75	20	12.7	317-3806	11.4	1.5
255-2272	394.1	15.3	12.7	8T-9206	12.1	1.5
314-4120	394.1	15.3	12.7	8T-9206	12.1	1.5
9G-5323	394.1	15.3	12.7	8T-9206	12.1	1.5
6Y-0855	394.46	8	12.7	8T-7789	15	1.5
6Y-6273	394.46	8	12.7	8T-7789	15	1.5
133-0441	394.46	15	12.7	8T-9206	11.55	1.5
137-2428	394.46	15	12.7	8T-9206	11.55	1.5
149-8434	394.46	15	12.7	8T-9206	11.55	1.5
213-4737	394.46	15	12.7	8T-9206	11.55	1.5
314-4119	394.46	15	12.7	8T-9206	11.55	1.5
341-8543	394.46	15	12.7	8T-9206	11.55	1.5
6T-4316	394.46	15	12.7	8T-9206	11.55	1.5
6T-8433	394.46	15	12.7	8T-9206	11.55	1.5

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CAT DUO-CONE SEALS TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (mm)			Nominal	+/- Variation
314-4128	427.2	15	12.7	285-8787	11.5	1.5
212-2784	457.2	8	12.7	176-1724	15	1.5
205-9025	457.2	15	12.7	8T-0531	11.55	1.5
4D-8960	457.2	15	12.7	8T-0531	11.55	1.5
137-4343	458.36	15	12.7	8T-0531	11.54	1.5
195-3495	458.36	15	12.7	8T-0531	11.54	1.5
195-9706	458.36	15	12.7	8T-0531	11.54	1.5
314-4126	458.36	15	12.7	8T-0531	11.54	1.5
319-3887	482.6	15	12.7	340-0988	11.55	1.5
365-4924	482.6	15	12.7	340-0988	11.55	1.5
214-7880	533.4	15	12.7	140-7642	11.55	1.5
365-4922	533.4	15	12.7	140-7642	14.55	1.5
147-5509	534	15	12.7	140-7642	14.55	1.5
297-9546	534	15	12.7	140-7642	14.55	1.5
6T-6802	534	15	12.7	140-7642	14.55	1.5
172-5284	567.94	15	12.7	9U-5691	11.55	1.5
365-4920	567.94	15	12.7	9U-5691	11.55	1.5
8E-6327	567.94	15	12.7	9U-5691	11.55	1.5
147-5510	700	15	12.7	4C-6582	13.65	1.5
314-4130	700	15	12.7	4C-6582	13.65	1.5
433-1348	700	15	12.7	4C-6582	13.65	1.5
449-7480	700	15	12.7	4C-6582	13.78	1.5
378-0592	806.72	15	12.7	264-5067	13.78	1.5
314-4132	865	16	12.7	4C-4907	13.89	1.5
314-4134	939.8	16	16.0	149-0974	17.74	2
449-7481	939.8	16	16.0	149-0974	17.74	2

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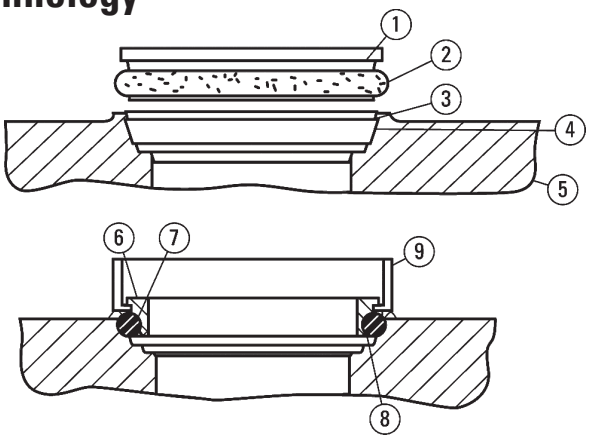
CAT DUO-CONE SEALS INSTALLATION

Cat Duo-Cone Seal Assembly Contents:

- (2) Metal Seal Rings
- (2) Elastomeric Toric Rings

Terminology



1. Seal Ring
2. Rubber Toric
3. Housing Retainer Lip
4. Housing Ramp
5. Seal Ring Housing
6. Seal Ring Face
7. Seal Ring Ramp
8. Seal Ring Retaining Lip
9. Installation Tool

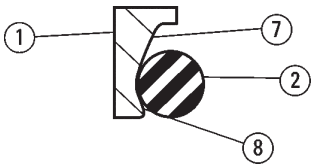
Handling the Seals

The idea is to protect the seal face. The more precausions taken, the more likely the seals will last in the field.

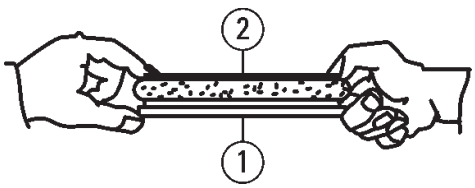
Housing Preparation

The housing components that contact the rubber toric rings (3 and 4) must be free from foreign material (oil, grease, dirt, metal chips, dust or lint particles, etc.) before installing the seal. The housing should be cleaned using a lint-free wipe and a non-petroleum based solvent. Dry with a clean wipe.

Remove any foreign material from the rubber torics (2), the ramps (7) and the lips (8) of both seal rings. This should also be done with a lint-free wipe and a non-petroleum based solvent. Dry with a clean wipe.



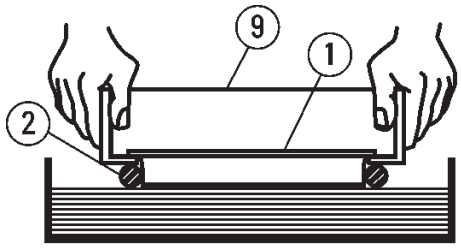
Place the rubber torics on the metal seal ring at the bottom of the seal ring ramp and against the retaining lip.



Make sure the rubber toric is straight on the seal ring and not twisted. Be careful not to nick or cut the torics during the assembly, as this can cause leaks.

Put the installation tool onto the metal seal ring and rubber toric. Lightly dampen the lower half of the rubber toric with the appropriate assembly lubricant.

Techniques to dampen the toric include wiping with a lint-free towel, lubricating using a clean foam brush, or dipping in a container lined with towels saturated in the assembly lubricant (as shown).



Seal groups with silicone torics can be assembled using a freezer to slightly contract the toric rings. Seal groups should be placed in a freezer for 5 minutes at -40°C to -18°C prior to installation. Contraction will be sufficient to allow installation. Groups should warm to room temperature prior to further assembly.

Approved Assembly Lubricants

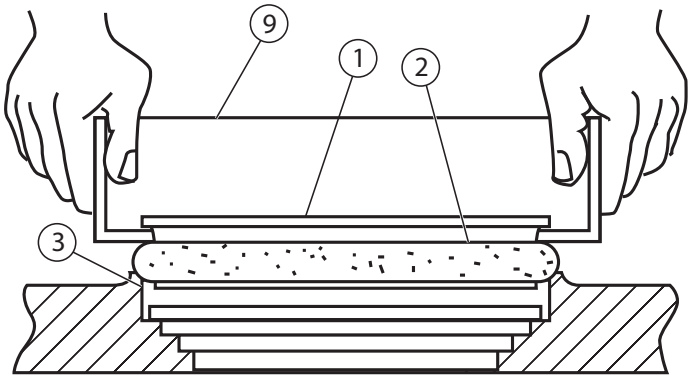
- Isopropyl Alcohol*
- Houghto-Grind 60 CT
- Quaker® Solvo Clean 68-RAH

(*) All applicable safety and disposal guidelines for flammable liquids must be followed.

Note: Do not use Stanosol or any other liquid that leaves an oil film and/or does not evaporate quickly.

Installation Process

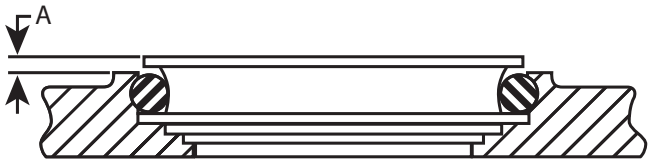
With the lower half of the rubber toric still wet, use the installation tool to position the seal ring and the rubber toric squarely against the application housing (as shown).



CAT DUO-CONE SEALS INSTALLATION

For smaller diameter seals, use sudden and even pressure to push the rubber toric under the retaining lip of the housing. For larger diameter seals, which will not press in with sudden and even pressure, it is acceptable to work the toric past the retaining lip by starting one side and tapping the opposite side of the installation tool with a rubber mallet until it is engaged past the retaining lip of the housing.

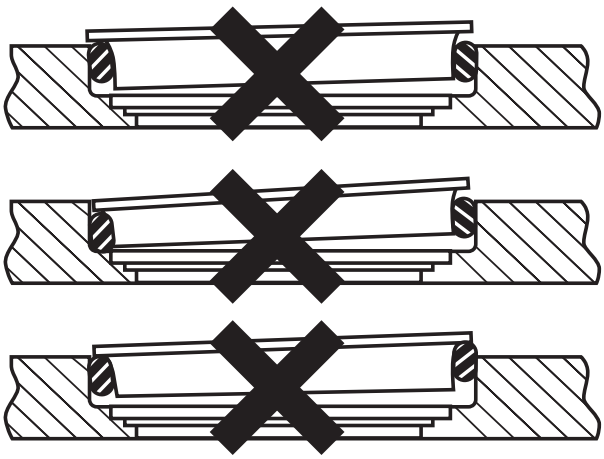
Check the assembled height variation (A) in a least four places, 90° apart, use a caliper, toolmakers' ruler or any other calibrated measuring device.



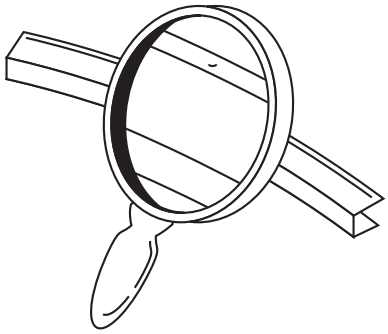
The difference in height around the ring must not be more than 1.0 mm. If small adjustments are necessary, do not push or pull directly on the seal ring. Use the installation tool to push down and your fingers to pull up uniformly on the rubber toric and seal ring.

The rubber toric can twist if it is not wet all around during installation or if there are burrs or fins on the retaining lip of the housing. Twists, misalignment, and bulges of the toric (as shown) will result in seal failure. If correct installation is not obvious, remove the seal from the housing and repeat process.

The rubber torics must never slip on the ramps of either the seal ring or the housing. To prevent slippage, allow adequate evaporation time for the lubricant before proceeding with further assembly.
Once correctly in place, the rubber toric must roll on the ramp only. The following shows incorrect installations resulting in cocked seals.



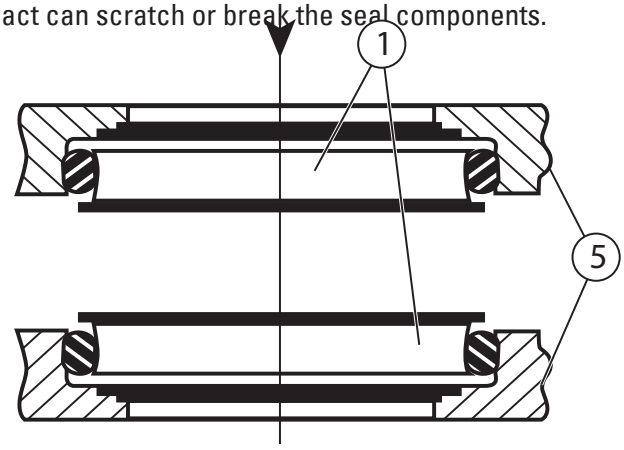
Wipe the face of each seal ring using a lint-free wipe. No particles of any kind are permissible on the sealing surfaces. (Even a hair can hold the seal faces apart and cause a leak)



Apply a thin film of oil on the entire seal face of one or both seals using a lint-free applicator. Oil must not contact surfaces other than the sealing face.

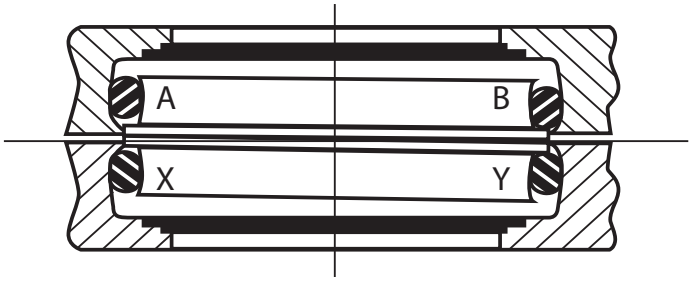
Final Assembly

While completing the final assembly of the unit, make sure that both housings are in correct alignment and are concentric. Slowly bring the two housings together. High impact can scratch or break the seal components.

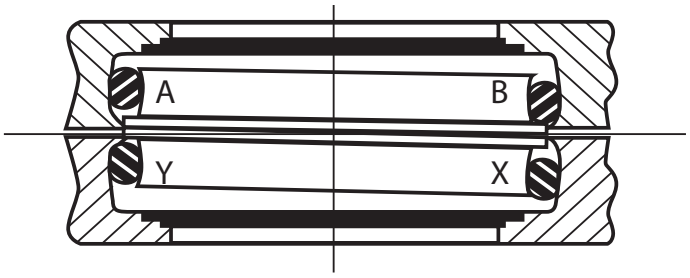


If the rubber toric slips at any location, it will twist, causing the seal rings to cock. Any wobbling motion of the seal is an indication of cocked seals and can cause dirt to enter by pumping mud past the torics.

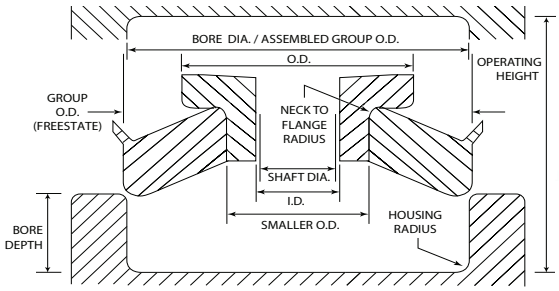
The following examples show the effects of a cocked seal group.

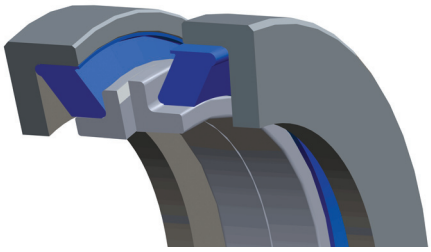


The above depicts how the torics have slipped instead of rolling on the left hand side of the seal. The following shows the same seal after the bottom half is rotated 180°.



CAT HEAVY DUTY DUAL FACED SEALS





Class K Cat Heavy Duty Dual Faced Seals uses a square bore housing design and a Belleville Washer load ring to provide loads to the metal seal faces.

Seal Group	O.D. (mm)	Bore Dia	I.D. (mm)	Shaft Dia	Seal Material	Belleville Washer
132-0356	61.6	70.09 +/-.06	46.86	42.88	STELLITE	Nitrile
132-0358	61.6	70.09 +/-.06	46.86	42.88	STELLITE	Nitrile
132-0362	61.6	70.09 +/-.06	46.86	42.88	STELLITE	LT-NBR
132-0363	61.6	70.09 +/-.06	46.86	42.88	STELLITE	LT-NBR
170-3452	61.6	70.09 +/-.06	46.86	42.88	STELLITE	LT-NBR
192-0052	65.08	76.26 +/-.06	50.6	46.02	C6	Nitrile
132-0365	65.08	76.26 +/-.06	50.86	46.02	STELLITE	Nitrile
132-0367	65.08	76.26 +/-.06	50.86	46.02	STELLITE	Nitrile
132-0368	65.08	76.26 +/-.06	50.86	46.02	STELLITE	Nitrile
132-0369	65.08	76.26 +/-.06	50.86	46.02	STELLITE	Nitrile
132-0371	65.08	76.26 +/-.06	50.86	46.02	STELLITE	Nitrile
215-6276	65.08	76.26 +/-.06	50.86	46.02	STELLITE	LT-NBR
215-6277	65.08	76.26 +/-.06	50.86	46.02	STELLITE	LT-NBR
215-6278	65.08	76.26 +/-.06	50.86	46.02	STELLITE	LT-NBR
132-0377	73	82.55 +/-.06	58.27	53.98	STELLITE	Nitrile
132-0379	73	82.55 +/-.06	58.27	53.98	STELLITE	Nitrile
132-0380	86.36	95.54 +/-.06	67.46	63.5	STELLITE	Nitrile
132-0382	86.36	95.54 +/-.06	67.46	63.5	STELLITE	Nitrile
132-0383	86.36	95.54 +/-.06	67.46	63.5	STELLITE	Nitrile
132-0385	86.36	95.54 +/-.06	67.46	63.5	STELLITE	Nitrile
132-0386	86.36	95.54 +/-.06	67.46	63.5	STELLITE	LT-NBR
132-0388	86.36	95.54 +/-.06	67.46	63.5	STELLITE	LT-NBR
132-0389	86.36	95.54 +/-.06	67.46	63.5	STELLITE	LT-NBR
215-6279	86.36	95.54 +/-.06	67.46	63.5	STELLITE	LT-NBR
215-6280	86.36	95.54 +/-.06	67.46	63.5	STELLITE	LT-NBR
265-5193	90	94.45 +/-.06	76	73.92	STELLITE	Nitrile
269-3358	90	94.20 +/-.06	76	73.92	C6	FKM
132-0397	92.48	102.29 +/-.06	73.81	69.85	STELLITE	Nitrile
132-0399	92.48	102.29 +/-.06	73.81	69.85	STELLITE	Nitrile
132-0400	92.48	102.35 +/-.06	73.81	69.85	STELLITE	Nitrile
132-0402	92.48	102.35 +/-.06	73.81	69.85	STELLITE	Nitrile
132-0404	92.48	102.35 +/-.06	73.81	69.85	STELLITE	LT-NBR
132-0407	92.48	102.35 +/-.06	73.81	69.85	STELLITE	LT-NBR
132-0415	92.48	102.35 +/-.06	73.81	69.85	STELLITE	Nitrile
132-0416	92.48	101.54 +/-.06	73.81	69.85	STELLITE	Nitrile
132-0417	92.48	101.55 +/-.08	73.81	69.85	STELLITE	Nitrile
132-0418	92.48	101.55 +/-.08	73.81	69.85	STELLITE	Nitrile

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CAT HEAVY DUTY DUAL FACED SEALS

Seal Group	O.D. (mm)	Bore Dia	I.D. (mm)	Shaft Dia	Seal Material	Belleville Washer
215-6281	92.48	102.35 +/-.06	73.81	69.85	STELLITE	LT-NBR
215-6282	92.48	102.35 +/-.06	73.81	69.85	STELLITE	LT-NBR
192-0061	92.48	101.54 +/-.06	73.81	69.85	C6	Nitrile
215-6284	98.45	125.81 +/-.06	74.22	59.56	STELLITE	LT-NBR
215-6285	98.45	102.28 +0/-.13	74.22	59.56	STELLITE	LT-NBR
215-6286	98.45	102.28 +0/-.13	74.22	59.56	STELLITE	LT-NBR
215-6287	98.45	102.28 +0/-.13	74.22	59.56	STELLITE	LT-NBR
132-0410	98.45	102.28 +/-.06	74.22	69.85	STELLITE	Nitrile
138-4162	98.45	102.28 +/-.06	74.22	69.85	STELLITE	Nitrile
132-0422	100.33	114.30 +/-.06	82.55	77.8	STELLITE	Nitrile
132-0424	100.33	114.30 +/-.06	82.55	77.8	STELLITE	Nitrile
245-4631	100.33	113.70 +/-.06	82.55	77.8	C6	FKM
444-1244	100.33	113.70 +/-.06	82.55	77.8	C6	LT-NBR
253-1727	104	113.00 +/-.05	88	83.5	STELLITE	FKM
377-2188	104	113.00 +/-.05	88	83.5	STELLITE	LT-NBR
132-0433	106.55	117.48 +/-.05	90.25	86.36	STELLITE	Nitrile
132-0435	112.06	125.81 +/-.05	94.64	88.9	STELLITE	Nitrile
132-0437	112.06	125.81 +/-.05	94.64	88.9	STELLITE	Nitrile
132-0438	112.06	125.81 +/-.06	94.64	88.9	STELLITE	Nitrile
132-0440	112.06	125.81 +/-.06	94.64	88.9	STELLITE	Nitrile
132-0442	112.06	125.81 +/-.06	94.64	88.9	STELLITE	LT-NBR
215-6283	112.06	125.81 +/-.06	94.64	88.9	STELLITE	LT-NBR
250-4366	112.06	125.20 +/-.06	94.64	88.9	STELLITE	FKM
266-3142	112.06	125.81 +/-.06	94.64	88.9	STELLITE	Nitrile
377-2182	112.06	125.20 +/-.06	94.64	88.9	C6	FKM
439-2605	112.06	125.20 +/-.06	94.64	88.9	STELLITE	FKM
132-0447	119.46	125.81 +/-.06	94.06	88.9	STELLITE	Nitrile
132-0448	119.46	125.81 +/-.06	94.06	88.9	STELLITE	Nitrile
140-9881	119.46	125.81 +/-.06	94.06	88.9	STELLITE	FKM
215-6288	119.46	125.81 +/-.06	94.06	88.9	STELLITE	LT-NBR
215-6289	119.46	125.81 +/-.06	94.06	88.9	STELLITE	LT-NBR
215-6290	119.46	125.81 +/-.06	94.06	88.9	STELLITE	LT-NBR
132-0463	123.83	141.27 +/-.08	104.78	98.42	STELLITE	Nitrile
132-0464	123.83	141.27 +/-.08	104.78	98.42	STELLITE	Nitrile
132-0466	123.83	141.27 +/-.08	104.78	98.42	STELLITE	Nitrile
132-0467	123.83	141.27 +/-.08	104.78	98.42	STELLITE	Nitrile
132-0469	123.83	141.27 +/-.08	104.78	98.42	STELLITE	Nitrile
199-7214	123.83	141.27 +/-.08	104.78	98.42	STELLITE	LT-NBR
132-0460	123.83	134.92 +/-.08	104.78	98.42	STELLITE	Nitrile
132-0462	123.83	134.92 +/-.08	104.78	98.42	STELLITE	Nitrile
185-8643	123.83	141.27 +/-.08	104.78	98.42	C6	Nitrile
132-0475	132.84	152.40 +/-.08	114.3	109.53	STELLITE	Nitrile
132-0476	132.84	152.40 +/-.08	114.3	109.53	STELLITE	LT-NBR
132-0479	132.84	152.40 +/-.08	114.3	109.53	STELLITE	Nitrile
132-0480	132.84	152.40 +/-.08	114.3	109.53	STELLITE	LT-NBR
132-0481	132.84	152.40 +/-.08	114.3	109.53	STELLITE	Nitrile
132-0471	132.84	148.00 +0/-.2	114.3	109.53	STELLITE	Nitrile
132-0473	132.84	148.00 +0/-.2	114.3	109.53	STELLITE	Nitrile

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CAT HEAVY DUTY DUAL FACED SEALS

Seal Group	O.D. (mm)	Bore Dia	I.D. (mm)	Shaft Dia	Seal Material	Belleville Washer
209-4514	132.84	148.00 +/-.2	114.3	109.53	C6	Nitrile
132-0484	138.91	146.05 +/-.08	117.86	114.3	STELLITE	Nitrile
132-0485	138.91	146.05 +/-.08	117.86	114.3	STELLITE	Nitrile
132-0483	142.24	152.40 +/-.08	114.3	109.53	STELLITE	Nitrile
133-0445	142.24	152.40 +/-.08	114.3	109.53	C6	Nitrile
425-1284	142.24	152.40 +/-.08	114.3	109.53	C6	LT-NBR
132-0490	144.15	162.56 +/-.08	123.83	117.48	STELLITE	Nitrile
132-0492	144.15	162.56 +/-.08	123.83	117.48	STELLITE	Nitrile
132-0493	144.15	162.56 +/-.08	123.83	117.48	STELLITE	Nitrile
077-2898	144.15	162.56 +/-.08	124.33	117.48	STELLITE	Nitrile
132-0488	144.15	162.56 +/-.08	124.33	117.48	STELLITE	Nitrile
377-2186	144.4	158.75 +/-.08	126.37	117.48	C6	FKM
132-0500	155.07	171.45 +/-.08	133.35	128.57	STELLITE	Nitrile
132-0502	155.07	171.45 +/-.08	133.35	128.57	STELLITE	Nitrile
132-0503	155.07	171.45 +/-.08	133.35	128.57	STELLITE	Nitrile
132-0505	155.07	171.45 +/-.08	133.35	128.57	STELLITE	Nitrile
205-8684	155.07	171.45 +/-.08	133.35	128.57	STELLITE	LT-NBR
205-9682	155.58	162.56 +/-.08	134.37	128.57	C6	FKM
132-0506	155.58	162.56 +/-.08	134.37	130.81	STELLITE	Nitrile
132-0497	155.98	162.56 +/-.08	124.33	117.48	STELLITE	Nitrile
132-0513	162.91	173.02 +/-.13	144.17	140.2	C6	Nitrile
132-0510	165.1	177.55 +/-.08	142.88	137.16	STELLITE	Nitrile
132-0512	165.1	177.55 +/-.08	142.88	137.16	STELLITE	Nitrile
132-0524	167.49	174.63 +/-.08	147.32	144.02	STELLITE	Nitrile
132-0508	167.64	173.99 +/-.08	142.88	139.7	STELLITE	Nitrile
132-0509	167.64	173.99 +/-.08	142.88	139.7	STELLITE	Nitrile
132-0520	167.95	184.19 +/-.04	145.54	142.88	C6	Nitrile
132-0515	168.3	184.15 +/-.08	149.4	142.88	STELLITE	Nitrile
132-0516	168.3	184.15 +/-.08	149.4	142.88	STELLITE	Nitrile
132-0518	168.3	184.15 +/-.08	149.4	142.88	STELLITE	Nitrile
132-0519	168.3	184.15 +/-.08	149.4	142.88	STELLITE	Nitrile
132-0521	168.3	188.93 +/-.13	149.4	142.88	STELLITE	Nitrile
132-0522	168.3	188.93 +/-.13	149.4	142.88	STELLITE	Nitrile
133-0449	168.3	184.15 +/-.08	149.4	142.88	STELLITE	Nitrile
133-0476	168.3	184.15 +/-.08	149.4	142.88	STELLITE	Nitrile
132-0528	179.86	194.08 +/-.08	154.46	149.23	STELLITE	Nitrile
132-0529	179.86	194.08 +/-.08	154.46	149.23	STELLITE	Nitrile
132-0531	179.86	194.08 +/-.08	154.46	149.23	STELLITE	Nitrile
139-5535	180.34	190.00 +/-.08	154.94	157.18	STELLITE	Nitrile
139-5542	180.34	190.00 +/-.08	154.94	157.18	STELLITE	Nitrile
132-0532	184.15	190.50 +/-.08	162.86	158.75	STELLITE	Nitrile
132-0534	184.15	190.50 +/-.08	162.86	158.75	STELLITE	Nitrile
132-0535	195.07	206.25 +/-.08	168.91	161.93	STELLITE	Nitrile
132-0536	195.07	206.25 +/-.08	168.91	161.93	STELLITE	Nitrile
132-0537	195.07	206.25 +/-.08	168.91	161.93	STELLITE	FKM
132-0538	195.07	206.25 +/-.08	168.91	161.93	STELLITE	LT-NBR
132-0542	195.07	206.25 +/-.08	168.91	161.93	STELLITE	Nitrile
132-0543	195.07	206.25 +/-.08	168.91	161.93	STELLITE	Nitrile

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CAT HEAVY DUTY DUAL FACED SEALS

Seal Group	O.D. (mm)	Bore Dia	I.D. (mm)	Shaft Dia	Seal Material	Belleville Washer
132-0544	195.07	206.25 +/-.08	168.91	161.93	STELLITE	FKM
132-0546	196.85	204.77 +/-.13	174.24	169.06	STELLITE	Nitrile
132-0550	196.85	204.77 +/-.13	174.24	169.06	STELLITE	Nitrile
132-0551	207.16	218.95 +/-.10	179	171.45	STELLITE	Nitrile
132-0552	207.16	218.95 +/-.10	179	171.45	STELLITE	Nitrile
132-0553	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
132-0554	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
132-0555	214.55	238.76 +/-.10	194.18	188.93	STELLITE	FKM
132-0558	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
132-0559	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
132-0560	214.55	238.76 +/-.10	194.18	188.93	STELLITE	FKM
133-0432	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
133-0446	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
133-0469	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
133-0471	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
133-0473	214.55	238.76 +/-.10	194.18	188.93	STELLITE	Nitrile
174-5432	214.55	238.76 +/-.10	194.18	188.93	Ni-HARD	Nitrile
358-0793	214.55	238.76 +/-.10	194.18	188.93	C6	Nitrile
132-0580	214.55	238.76 +/-.10	195.83	190.58	STELLITE	Nitrile
132-0564	220.68	228.60 +/-.13	198.12	192.07	STELLITE	Nitrile
132-0565	220.68	228.60 +/-.13	198.12	192.07	STELLITE	Nitrile
132-0568	220.68	228.60 +/-.13	198.12	192.07	STELLITE	Nitrile
132-0569	220.68	228.60 +/-.13	198.12	192.07	STELLITE	Nitrile
132-0561	222.25	238.76 +/-.10	193.73	188.93	STELLITE	Nitrile
132-0563	222.25	238.76 +/-.10	193.73	188.93	STELLITE	Nitrile
077-4144	229.49	254.00 +/-.10	203.84	198.12	STELLITE	Nitrile
132-0570	229.49	254.00 +/-.10	203.84	198.12	STELLITE	FKM
132-0571	229.49	254.00 +/-.10	203.84	198.12	STELLITE	Nitrile
132-0572	229.49	254.00 +/-.10	203.84	198.12	STELLITE	Nitrile
132-0577	229.49	254.00 +/-.10	203.84	198.12	STELLITE	FKM
132-0578	229.49	254.00 +/-.10	203.84	198.12	STELLITE	Nitrile
161-4343	229.49	254.00 +/-.10	203.84	198.12	STELLITE	FKM
132-0582	242.09	255.57 +/-.10	215	209.55	STELLITE	Nitrile
132-0584	242.09	255.57 +/-.10	215	209.55	STELLITE	Nitrile
132-0587	245.75	277.14 +/-.13	225.43	220.68	STELLITE	Nitrile
132-0590	245.75	277.14 +/-.13	225.43	220.68	STELLITE	Nitrile
133-0433	245.75	266.78 +/-.10	225.43	220.68	STELLITE	Nitrile
423-6536	245.75	277.14 +/-.13	225.43	220.68	STELLITE	LT-NBR
132-0586	249.23	255.57 +/-.10	215.14	209.55	STELLITE	Nitrile
132-0591	260.35	277.14 +/-.13	227.33	220.68	STELLITE	Nitrile
132-0592	260.35	277.14 +/-.13	227.33	220.68	STELLITE	Nitrile
155-8358	261.93	269.88 +/-.08	238.5	236.2	C6	Nitrile
172-1619	261.93	269.88 +/-.08	244.55	240.15	FORMED	LT-NBR
132-0604	270.51	301.22 +/-.13	247.65	242.87	STELLITE	Nitrile
132-0607	270.51	301.22 +/-.13	247.65	242.87	STELLITE	Nitrile
132-0595	273.05	279.40 +/-.13	241.3	236.52	STELLITE	Nitrile
132-0597	273.05	279.40 +/-.13	241.3	236.52	STELLITE	Nitrile
132-0599	273.05	279.40 +/-.13	241.3	236.52	STELLITE	Nitrile

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CAT HEAVY DUTY DUAL FACED SEALS

Seal Group	O.D. (mm)	Bore Dia	I.D. (mm)	Shaft Dia	Seal Material	Belleville Washer
132-0601	273.05	295.28 +/-.13	241.3	236.52	STELLITE	Nitrile
197-9203	273.05	279.40 +/-.13	241.3	236.52	STELLITE	FKM
344-3837	273.05	279.40 +/-.13	241.31	73.92	JINSUNG	Nitrile
132-0609	285.75	292.10 +/-.13	257.18	250.82	STELLITE	Nitrile
132-0610	285.75	292.10 +/-.13	257.18	250.83	STELLITE	Nitrile
132-0611	304.8	329.41 +/-.13	283.21	276.23	STELLITE	Nitrile
132-0613	304.8	329.41 +/-.13	283.21	276.23	STELLITE	Nitrile
132-0617	322.58	329.41 +/-.13	283.21	276.23	STELLITE	Nitrile
133-0447	322.58	329.41 +/-.13	283.21	276.23	STELLITE	Nitrile
164-0341	322.58	292.10 +/-.13	283.21	276.23	STELLITE	Nitrile
422-0069	322.58	329.41 +/-.13	283.21	276.23	STELLITE	LT-NBR
132-0615	329.31	336.55 +/-.13	301.63	295.28	STELLITE	Nitrile
148-9594	352.43	365.12 +/-.13	320.05	314.96	C6	Nitrile
161-4456	352.43	365.12 +/-.13	321	314.96	STELLITE	Nitrile
132-0634	391.16	401.75 +/-.13	355.6	349.25	Ni-HARD	Nitrile
132-0635	391.16	401.75 +/-.13	355.6	349.25	Ni-HARD	Nitrile
132-0626	391.16	401.75 +/-.13	355.6	349.25	STELLITE	FKM
132-0632	391.16	401.75 +/-.13	355.6	349.25	STELLITE	Nitrile
132-0633	391.16	401.75 +/-.13	355.6	349.25	STELLITE	Nitrile
132-0625	391.16	401.75 +/-.13	355.6	349.25	STELLITE	Nitrile
132-0627	391.16	401.75 +/-.13	355.6	349.25	STELLITE	Nitrile
132-0631	391.16	401.75 +/-.13	355.6	349.25	STELLITE	Nitrile
203-0340	391.16	401.75 +/-.13	355.6	349.25	STELLITE	FKM
132-0636	413.46	424.05 +/-.13	379.73	374.65	STELLITE	Nitrile
132-0637	413.46	424.05 +/-.13	379.73	374.65	STELLITE	FKM
149-3957	458.22	477.01 +/-.15	429.64	426.72	STELLITE	Rubber
132-0642	469.9	488.70 +/-.15	441.86	434.98	STELLITE	Nitrile
132-0643	469.9	488.70 +/-.15	441.86	434.98	STELLITE	FKM
132-0646	469.9	488.70 +/-.15	441.86	434.98	STELLITE	FKM
132-0639	481.33	488.57 +.38/-.13	438.15	431.16	STELLITE	Nitrile
139-5949	481.33	488.57 +.38/-.13	441.33	434.98	C6	Nitrile
132-0649	529.5	546.10 +/-.15	491.8	485.78	STELLITE	Nitrile
133-0510	529.5	546.10 +/-.15	491.8	485.78	STELLITE	LT-NBR
132-0650	531	546.10 +/-.15	492.9	485.78	Ni-HARD	Nitrile
205-9683	531	546.10 +/-.15	492.9	485.78	Ni-HARD	FKM
176-1164	531	546.10 +/-.15	497.9	490.78	Ni-HARD	Nitrile
132-0651	651.24	682.62 +/-.15	620	606.43	STELLITE	Nitrile
132-0654	651.24	682.62 +/-.15	620	606.43	STELLITE	FKM
132-0657	651.24	682.62 +/-.15	620	606.43	STELLITE	Nitrile
132-0652	782.3	812.80 +/-.15	749.4	736.6	C6	Nitrile
132-0653	782.3	812.80 +/-.15	749.4	736.6	C6	FKM

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CAT HEAVY DUTY DUAL FACED SEALS INSTALLATION

Cat Heavy Duty Dual Face Seal Assembly Contents:

1. (2) Metal Seal Rings
2. (2) Rubber Belleville Washers

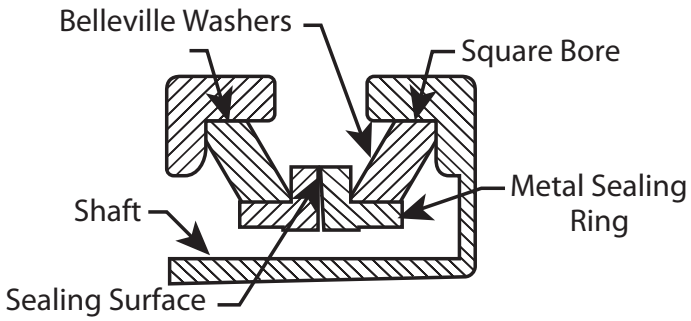
Service Kit Contents:

1. (1) Seal Group
2. Installation Instruction

Field Kit Contents:

1. (2) Rubber Belleville Washers
2. Installation Instructions

Terminology



Handling the Seals

The idea is to protect the seal face. The more precausions taken, the more likely the seals will last in the field.

Housing Preparation

The housing components that contact the Belleville Washers must be free from foreign material (oil, grease, dirt, metal chips, dust or lint particles, etc.) before installing the seal. The housings should be cleaned using a lint-free wipe and a non-petroleum base solvent. Dry with a clean wipe.

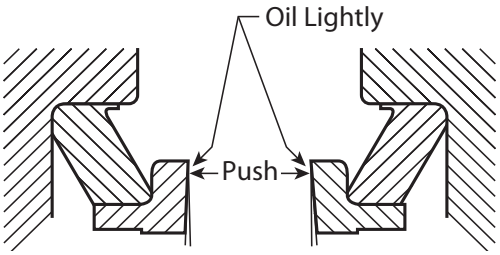
Seal rings must be handled with care. Machined seal faces must not be damaged or scratched. All parts are to be free of grease, oil, dirt and scale.

Seal Preparation

The Belleville washer should be installed with the inside diameter radius in contact with the neck to flange radius of the seal ring.

Installation Process

Install each half seal (Belleville Washer and sealing ring) into the housing by carefully pushing on the seal half until it is fully seated. Using a non petroleum based solvent (isopropyl alcohol is recommended) on the Belleville Washer can help ensure the seal slides all the way into the bore. Check to be sure that the seal is not cocked and that the washer is seated evenly at the bottom of the bore. If the seal is a single barb design, the barbed half goes in the suspended housing to ensure no movement of the seal half during the assembly process.



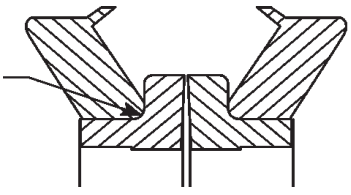
After installing the seal halves into the unit, wipe both metal sealing faces clean with a lint-free wipe. Apply a thin film of oil to the sealing faces with a lint free applicator. Oil must not contact surfaces other than the sealing faces.

Final Assembly

While completing the final assembly of the unit, make sure that both housings are in correct alignment and are concentric. Observe carefully that the rubber rings do not unseat from the bottom of the housing. Slowly bring the two housings together. (High impact can scratch or break the seal components)

To set the seals, hold one-half of the assembly stationary while rotating the other member a minimum of ten complete revolutions. This is very important!

Neck to Flange Radius



NOTES

APPLICATION DATA SHEET

Company Name _____

Address _____ City _____

State/Province_____ Zip / Postal Code _____ Country_____

Contact Name _____

Telephone _____ Email _____

Description of proposed seal application _____

_____

_____

Action _____

Rotating

Normal rotating speed _____ RPM

Maximum rotating speed _____ RPM

Duration of maximum RPM _____ minutes

Time to reach maximum RPM _____ seconds _____

Oscillating

Angular arc _____ degrees _____

Frequency _____ cycles / minute_____

Duration of motion _____ seconds_____

Sealing System _____

Shaft size or internal component diameter (mm) _____ Is seal exposed to the environment? (mm) _____

Radial tolerance stack (mm) _____ Axial tolerance stack _____

Pressure _____

Is oil compartment vented? _____ If no, what is operating pressure (kPa) _____ Maximum (kPa) _____

If pressurized, where is the pressure (inside / outside / both)? _____

Lubrication _____

Type of lubricant to be used _____

List other contacting substances to seal (e.g. grease) _____

What is the oil level with relation to the shaft centerline? (mm) _____

Normal operating temperature °C _____ Maximum operating temperature °C _____

Operating Environment _____

Prolonged muddy conditions? _____Description _____

Prolonged abrasive conditions (e.g. quarry)? _____ Description _____

Prolonged high temperatures (above 100°C)? _____ Prolonged cold temperatures (below 0°C) _____

Other (e.g. landfill) _____

Assembly Drawing _____

To determine tolerance stack-up, end play, surface textures, and axial / radial spatial constraint _____

Gap distance between seals (U-gap) _____

To check design for simplicity, ease of assembly, exposure to, and protection from outside environment

Anticipated Annual Volume: _____

Year 1:_____, Year 2:_____, Year 3: _____

APPLICATION DATA SHEET

SEAL AREA DATA:

Send data sheet to Caterpillar at catseals@cat.com

APPLICATION DATA SHEET

Company Name _____

Address _____ City _____

State/Province_____ Zip / Postal Code _____ Country_____

Contact Name _____

Telephone _____ Email _____

Description of proposed seal application _____

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For more information on Cat Seals

www.cat.com/cat-seals

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