CAT® SEALS

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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 materials. 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. This results 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
Material	Nickel-Alloy	Iron-Alloy	Iron-Alloy	SAE 1074
Process	Cast	Cast	Cast	Stamped
Wear Life	High	High	Low/Medium	Low
Corrosion Resistance	High	Medium/High	Low/Medium	Medium
Scoring Resistance	High	Low	Medium/High	Low

(All measurements and tests performed under laboratory conditions.)

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.

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 and Hydrogenated Nitrile are available for more specialized applications. The table below provides a brief comparison between Cat® Seals load ring options.

	NBR	LT-NBR	VMQ	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
Material Hardness (shore A)	60 / 65	60/70	65/70	60 / 70	60
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
(All measurements and rests performed under laboratory conditions.)					

Nitrile (NBR)

Nitrile is compatible with most mineral based lubricant oils. Nitrile load rings offer maximum resistance to abrasion and is the most common load ring material found in most standard axle, final drive and undercarriage applications.

Low-Temperature Nitrile (LTN)

Low-temperature Nitrile was specifically developed for highly abrasive, low-temperature applications. Typical applications include undercarriage idlers, rollers and final drives. LTN can also be found in wheel and axle applications.

Silicone (VMQ)

Silicone uses are extreme high (wet disc brake systems) or extreme low (arctic environment) temperature applications. Silicone is not compatible with fuels or certain types of gear lubricants. Silicone also has inferior abrasion resistance compared to Nitrile.

Hydrogenated Nitrile (HNBR)

Hydrogenated Nitrile is typically used in applications requiring additional high temperature capability compared to Nitrile. (Only available for Duo-Cone™ Seals)

Fluoroelastomer (FKM)

FKM is a fluoroelastomer and is typically used where extremely high temperatures are a concern and low temperatures are never a problem. FKM has poor low temperature capability and will harden at temperatures approaching freezing.

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

Seal Group Description

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

Standard Toric Size (mm)	Comparable Toric Size Range (mm)	Seal Ring Ramp Angle (°)	Common Applications
4.3 (Class A)	4.3-5.3	20	Specialized
6.22 (Class B)	5.6-7.9	15	Small Axles and Wheels
9.47 (Class C)	8-10.5	8/15/20	Undercarriage
12.70 (Class D)	11.3-13.1	8/15/20	Large Axles, Wheels, Final Drives
16.00 (Class L)	-	15	Large Wheels

Toric Sizes

4.3 mm - Class A

Comparable: 4.3-5.3 mm

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 constraints and tolerance constraints (e.g. cartridge pins). Seals of this type have very little end play capability.

6.22 mm - Class B

Comparable: 5.6-7.9 mm

Cat® Duo-Cone™ seals with 6.22 mm cross-section toric rings are typically used in small axle 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 toric rings.

9.47 mm - Class C

Comparable: 8-10.5 mm

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.

12.70 mm - Class D

Comparable: 11.3-13.1 mm

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 8°, 15°, and 20° seal ramps for optimized performance in your application.

16.00 mm - Class L

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

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° degree 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° degree 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 it most commonly used in final drive, axle, and wheel applications.

20° degree Seal Ramp

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

Cat Heavy Duty Dual Faced Seals

The Cat® Heady Duty Dual Faced Seals 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. This seal type is used in a wide variety of products, including undercarriage, axles, final drives, gear boxes, and wheels to name a few.

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.

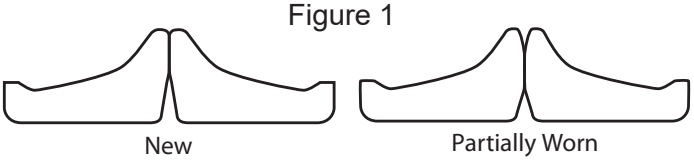
In low speed applications or with light lubricants, face pressures are generally increased to ensure seal ability. The same is true when seals are exposed to high differential pressures and/or large end play or deflections. Lower face loads are specified for applications producing high rotational speeds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

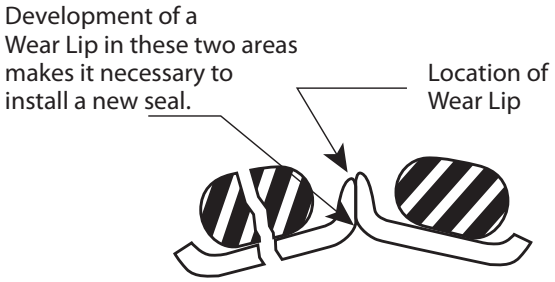
Cast Cat® Seals automatically compensate for wear. The mating faces form a contact band approximately 0 .50 (0.02“) to 1.00 mm (0.04”) wide that retains the oil lubricant and seals out all foreign material. As wear occurs, the contact band will widen slightly and migrate inward until the inside diameter 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



As-Cast vs. Profile-Cut

Cat® Seals are provided “As-Cast” and “Profile-Cut”. As-Cast refers to the seal ramp which is cleaned and the natural roughness is used to prevent toric slippage.
Profile-Cut are machined in order to obtain more precise seal ramp angle and diameter control.
A roughing process is then required to provide resistance to prevent toric slippage.

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.

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

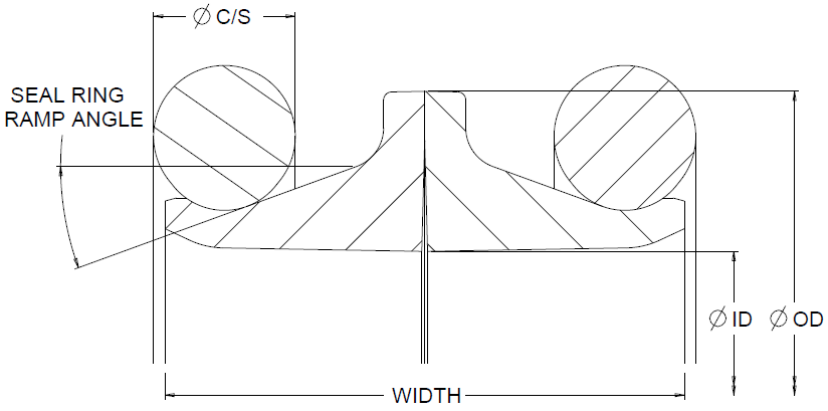
Load Ring Abrasion

Abrasion of the load ring can occur in applications where it is exposed to abrasive conditions like corrosion, dust, dirt, sand, and rock. 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

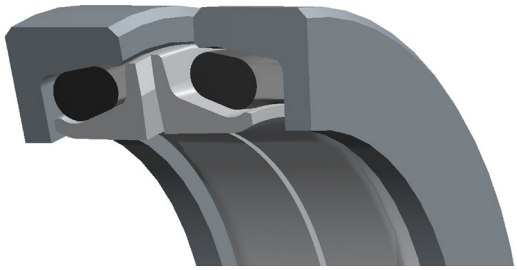
All measurements and tests performed under laboratory conditions.

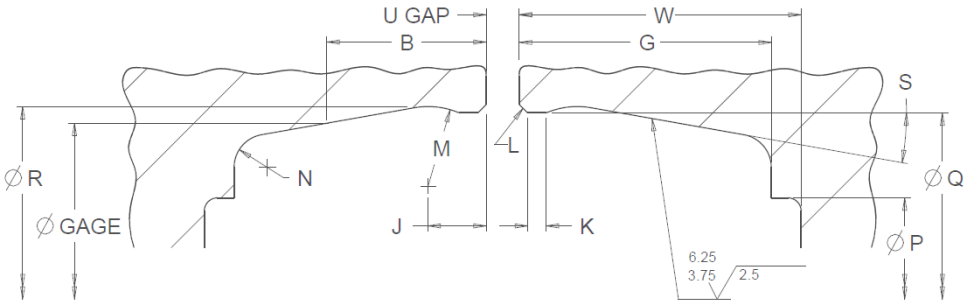
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
JS0380SI	38	51	STELLITE	NITRILE (65)	20	6	21			9±0.1	1.6±0.1
386-0992	38	51	STELLITE	NITRILE (65)	20	6	21			9±0.1	1.6±0.1
386-0993	43.5	58	STELLITE	NITRILE (60)	20	7.3	24			10.5±0.1	2±0.1
JS0430RK	43.5	58	NI-HARD	NITRILE (60)	20	7.3	24			10.5±0.1	2±0.1
423-4792	45	58	STELLITE	NITRILE (65)	19	6.25	21			10±0.1	1.8±0.1
JS0450SJ	45	58	STELLITE	LT-NBR (70)	19	6.4	22.8			10±0.1	1.8±0.1
JS0450SH	45	58	STELLITE	NITRILE (65)	19	6.25	21			10±0.1	1.8±0.1
386-0995	45	59	STELLITE	LT-NBR (70)	15	6.22	26.8	60.80	7.6	11.85±0.5	2.9±0.25
386-0996	48	62	STELLITE	NITRILE (65)	20	7.5	25			12±0.1	2±0.1
JS0480UH	48	62	STELLITE	NITRILE (65)	20	7.5	26			11±0.1	2±0.1
JS0480SJ	48	63	STELLITE	NITRILE (65)	20	7.5	26			12±0.1	2±0.1
JS0510S	51	65	STELLITE	NITRILE (65)	20	6.22	23			10±0.1	1.9±0.1
8E-5610	51	65.67	STELLITE	NITRILE (60)	15	6.22	26.8	66.8	7.6	11.85±0.5	2.9±0.25
8E-5611*	51	65.67	NI-HARD	NITRILE (60)	15	6.22	26.8	66.80	7.6	11.85±0.5	2.9±0.25
386-0999	55.3	67	STELLITE	NITRILE (65)	18	5.3	18			9±0.1	1.8±0.1
386-1000	55.5	70	STELLITE	NITRILE (65)	20	7.5	22			10±0.1	2.4±0.1
386-1001	56	70	STELLITE	NITRILE (65)	20	7.5	25			12±0.1	2±0.1
JS0560S	56	70	STELLITE	NITRILE (65)	20	7.5	25			12±0.1	2±0.1
JS0560SK	56	70	STELLITE	NITRILE (65)	20	7.5	25			12±0.1	2±0.1
JS0560R	56	70	NI-HARD	NITRILE (65)	20	7.5	25			12±0.1	2±0.1
423-4775	58	74	STELLITE	NITRILE (60)	20	8.4	27			13.5±0.1	2±0.1
386-1004	58	74	STELLITE	NITRILE (65)	20	8.5	25			13±0.1	3.56±0.1
JS0580SK	58	74	STELLITE	NITRILE (60)	20	8.6	24.8			12.4±0.1	3.82±0.1
JS0580SKA	58	74	STELLITE	NITRILE (65)	20	8.6	24.8			12.4±0.1	3.82±0.1
JS0580RK	58	74	NI-HARD	NITRILE (60)	20	8.6	24.8			12.4±0.1	3.82±0.1
JS0580SM	58	75	STELLITE	NITRILE (65)	20	8.2	27			13.5±0.1	2±0.1
386-1002	58	77.5	STELLITE	NITRILE (65)	8	9.47	36			15.2±0.1	3.5±0.1
473-1457	58.02	77.5	STELLITE	LT-NBR (70)	8	9.47	35.6	79.44	9.6	15.2±0.5	3.5±0.25

**** Denotes Part Number is available within the Cat Dealer Network***





K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.8	0.8±0.25	0.8	46		53.7±0.1	10°	11	38	JS0380SI
	R0.3	2±0.25	0.8	46	53±0.1	53.6±0.1	10°	11	38	386-0992
	R0.8	0.8±0.25	0.8	51		62±0.1	10°	12.5	43.5	386-0993
	R0.8	0.8±0.25	0.8	51		62±0.1	10°	12.5	43.5	JS0430RK
	R0.3	2.5±0.25	0.8	53.4	60.8±0.1	61.6±0.1	10°	12	45	423-4792
	R0.3	2.5±0.25	0.8	53.4	60.8±0.1	61.6±0.1	10°	12	45	JS0450SJ
	R0.4	2.5±0.25	0.8	53.4	60.7±0.1	61.3±0.1	10°	12	45	JS0450SH
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	55.4	61.62±0.13	(62.38)	10°	13.85	45	386-0995
	R0.3	3±0.25	0.8	58	67.2±0.1	68±0.1	10°	14	48	386-0996
	R0.3	3±0.25	3	57.2	67.2±0.1	68.2±0.1	12°	14.5	48	JS0480UH
	R0.3	3±0.25	0.8	58	67.2±0.1	68±0.1	10°	14	48	JS0480SJ
	R0.3	2.5±0.25	3.2	60	67.4±0.1	68.2±0.1	10°	12	51	JS0510S
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	61.4	67.62±0.13	(68.38)	10°	14.5	51	8E-5610
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	61.4	67.62±0.13	(68.38)	10°	14.5	51	**8E-5611***
	R0.4	2.5±0.25	1	63	68.2±0.1	68.9±0.1	12°	11	55.3	386-0999
	R0.8	1±0.25	0.8	65.5		73.8±0.1	10°	11.5	55.5	386-1000
	R0.3	3±0.25	0.8	66	75.2±0.1	76±0.1	10°	14	56	386-1001
	R0.3	3±0.25	0.8	66	75.2±0.1	76±0.1	10°	14	56	JS0560S
	R0.3	3±0.25	0.8	66	75.2±0.1	76±0.1	10°	14	56	JS0560SK
	R0.3	3±0.25	0.8	66	75.2±0.1	76±0.1	10°	14	56	JS0560R
	R0.3	3±0.25	0.8	67	78.6±0.1	79.4±0.1	10°	15.5	58	423-4775
	1.53±0.2x45°	4±0.25	0.8	70	78.9±0.1	79.5±0.1	17°	14.5	58	386-1004
0.4±0.4	30°	3±0.25	3	67	74.3±0.1	79.28±0.1	17°	15	58	JS0580SK
0.4±0.4	30°	3±0.25	3	67	78.2±0.1	79.28±0.1	17°	15	58	JS0580SKA
0.4±0.4	30°	3±0.25	3	67	78.2±0.1	79.28±0.1	17°	15	58	JS0580RK
	R0.3	3±0.25	1	67	78±0.1	78.8±0.1	10°	15.5	58	JS0580SM
	0.5±0.2x45°	4.8±0.25	2 MAX	68.44	80.68±0.1	81.44±0.1	10°	19	58	386-1002
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	68.44	80.68±0.13	(81.44)	10°	19	58.02	473-1457

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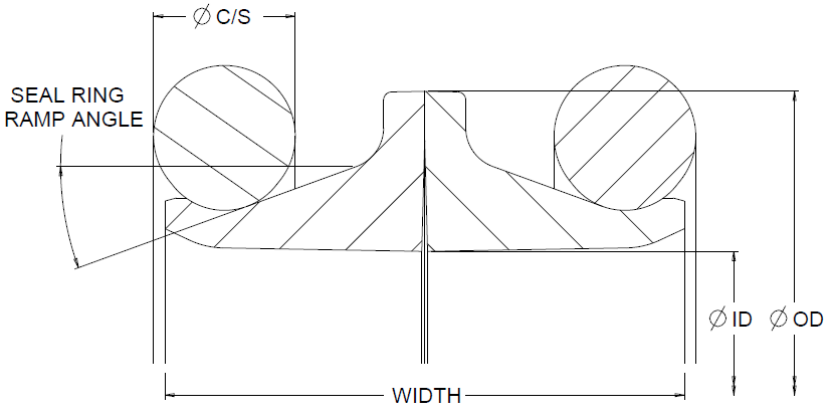
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
161-7247*	58.02	77.5	STELLITE	LT-NBR (70)	8	9.47	35.6	79.44	9.6	15.2±0.5	3.5±0.25
386-1005	60	74	STELLITE	NITRILE (65)	20	6.6	20.6			9±0.1	1.9±0.1
JS0600C	60	74	STELLITE	NITRILE (65)	20	6.6	20.6	74.96	7.6	9±0.1	1.9±0.1
JS0602SB	60.2	73	STELLITE	HNBR (60)	20	6.5	20	75.40	5	8.5±0.1	1.71±0.1
386-1006	61	73	STELLITE	NITRILE (65)	20	5.2	17.6			8±0.1	1.37±0.1
JS0610S	61	73	STELLITE	NITRILE (65)	20	5.2	17.6			6.5±0.1	1±0.1
2M-2858*	63.1	82.55	STELLITE	NITRILE (60)	20	9.47	33	84.48	9.6	15.2±0.5	3.5±0.25
171-5883*	63.1	82.55	STELLITE	LT-NBR (70)	20	9.47	33	84.48	9.6	15.2±0.5	3.5±0.25
212-0440	63.1	82.55	STELLITE	FKM (60)	20	9.47	33	84.48	9.6	15.2±0.5	3.5±0.25
5K-6191*	63.1	82.55	STELLITE	SILICONE (70)	20	9.47	33	84.48	9.6	15.2±0.5	3.5±0.25
179-1292*	63.1	82.55	Ni-HARD	NITRILE (60)	20	9.47	32	84.48	9.6	15.2±0.5	3.5±0.25
386-1010	63.5	82.5	STELLITE	NITRILE (65)	20	9.5	31.8			15±0.1	3±0.1
JS0640SD	64	76	STELLITE	NITRILE (65)	20	5.2	17.6			8±0.1	1.37±0.1
386-1012	64	78	STELLITE	NITRILE (65)	17.5	8.1	25			12.5±0.1	1.74±0.1
422-0824	64	78	Ni-HARD	NITRILE (60)	17.5	8.1	25			12.5±0.1	2±0.1
JS0640R	64	78	NI-HARD	NITRILE (65)	17.5	8.1	25			12.5±0.1	1.74±0.1
386-1013	66	85	STELLITE	NITRILE (65)	20	9	28			14±0.1	2±0.1
JS0660S	66	85	STELLITE	NITRILE (65)	20	9	28			14±0.1	2±0.1
386-1014	69	84	STELLITE	NITRILE (65)	18	7.8	24			11±0.1	1.9±0.1
JS0690C	69	84	STELLITE	NITRILE (65)	20	7.9	24			11±0.1	1.9 ±0.1
JS0710S	71	84	STELLITE	NITRILE (65)	20	6.5	20			8.5±0.1	1.8±0.1
386-1015	71	90	STELLITE	NITRILE (65)	20	9.2	29			13.5±0.1	2±0.1
386-1017	72	89	STELLITE	NITRILE (65)	20	8	24			11±0.1	2.8±0.1
386-1016	72	92	STELLITE	NITRILE (65)	8	9.5	36			15.2±0.1	3.5±0.1
162-7862*	72.52	92	STELLITE	LT-NBR (70)	8	9.47	35.6	93.94	9.6	15.2±0.5	3.5±0.25
320-8917*	72.52	92	STELLITE	LT-NBR (70)	8	9.47	35.6	93.94	9.6	15.2±0.5	3.5±0.25
107-4889*	72.52	92	STELLITE	SILICONE (70)	8	9.47	35.6	93.94	9.6	15.2±0.5	3.5±0.25
466-5103*	72.52	92	STELLITE	SILICONE (70)	8	9.47	35.6	93.94	9.6	15.2±0.5	3.5±0.25

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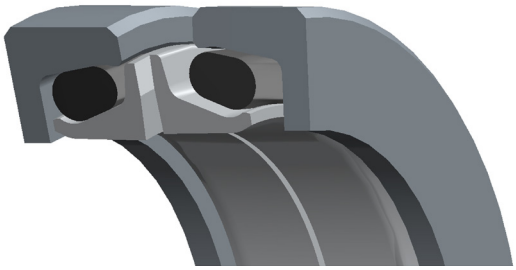

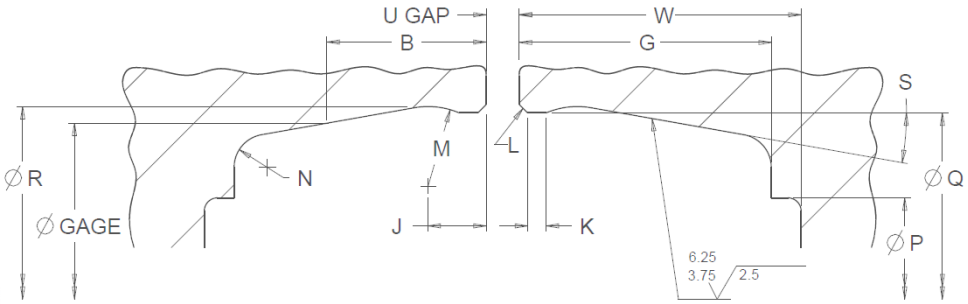

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	68.44	80.68±0.13	(81.44)	10°	19	58.02	**161-7247***
	R0.3	2.5±0.25	1	70	77.4±0.1	78.4±0.1	10°	11	60	386-1005
	R0.3	2.5±0.25	1.5	70	77.4±0.1	(78.4)	10°	11	60	JS0600C
	R0.5	2±0.25	1	72	75.8±0.1	(76.5)	10°	10.5	60.2	JS0602SB
	R0.4	1.5±0.25	1.6	68.5	75.5±0.1	75.8±0.1	10°	9.5	61	386-1006
		1.4±0.25	1	68.5	75.5±0.1	75.8±0.1	10°	7.5	61	JS0610S
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	73.48	85.72±0.13	(86.48)	10°	17.2	63.1	**2M-2858***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	73.48	85.72±0.13	(86.48)	10°	17.2	63.1	**171-5883***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	73.48	85.72±0.13	(86.48)	10°	17.2	63.1	212-0440
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	73.48	85.72±0.13	(86.48)	10°	17.2	63.1	**5K-6191***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	73.48	85.72±0.13	(86.48)	10°	17.2	63.1	**179-1292***
	R0.5	4±0.25	0.8	74	86±0.1	86.8±0.1	10°	17	63.5	386-1010
	R0.5	1.5±0.25	0.8	71.5	78.5±0.1	78.8±0.1	10°	9.5	64	JS0640SD
	0.5±0.2x45°	2.5±0.25	0.8	74	84.1±0.1	84.6±0.1	12°	14.5	64	386-1012
	R0.3	3±0.25	0.8	74	84.1±0.1	84.6±0.1	10°	14.5	64	422-0824
	0.5±0.2x45°	2.5±0.25	0.8	74	84.1±0.1	84.6±0.1	12°	14.5	64	JS0640R
	R0.8	0.8±0.25	0.8	78		89.6±0.1	10°	16	66	386-1013
	R0.3	3±0.25	0.8	78	89.2±0.1	90±0.1	10°	16	66	JS0660S
	R0.5	3±0.25	0.8	78.5	89.2±0.1	89.6±0.1	12°	13	69	386-1014
	R0.3	2.5±0.25	1.2	78.5	88.6±0.1	89.6±0.1	12°	13	69	JS0690C
	R0.8	0.8±0.25	0.8	80		87.4±0.1	10°	10	71	JS0710S
	R0.3	3±0.25	0.8	84	94.7±0.1	95.5±0.1	12°	15.5	71	386-1015
	R0.5	5±0.25	0.8	83	91.8±0.1	92.5±0.1	10°	13.5	72	386-1017
	0.5±0.2x45°	4.8±0.25	2 MAX	83.1	95.18±0.1	95.94±0.1	10°	19	72	386-1016
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	82.94	95.18±0.13	(95.94)	10°	19	72.52	**162-7862***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	82.94	95.18±0.13	(95.94)	10°	19	72.52	**320-8917***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	82.94	95.18±0.13	(95.94)	10°	19	72.52	**107-4889***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	82.94	95.18±0.13	(95.94)	10°	19	72.52	**466-5103***

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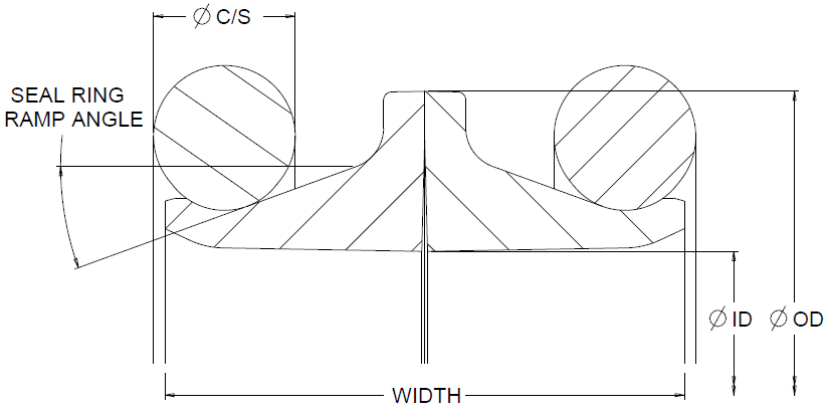

SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
1M-8747*	72.6	92.08	STELLITE	NITRILE (60)	20	9.47	32	94.01	9.6	15.2±0.5	3.5±0.25
171-5882*	72.6	92.08	STELLITE	LT-NBR (70)	20	9.47	32	94.01	9.6	15.2±0.5	3.5±0.25
4S-8984*	72.6	92.08	STELLITE	SILICONE (70)	20	9.47	32	94.01	9.6	15.2±0.5	3.5±0.25
175-7513*	72.6	92.08	C6	NITRILE (60)	20	9.47	32	94.01	9.6	15.2±0.5	3.5±0.25
359-4800	72.6	92.08	C6	LT-NBR (60)	20	9.47	32	94.01	9.6	15.2±0.5	3.5±0.25
422-1454	72.6	92.08	C6	LT-NBR (70)	20	9.47	32	94.01	9.6	15.2±0.5	3.5±0.25
386-1023	73	92	STELLITE	NITRILE (65)	18	9.2	31.8			14.5±0.1	2±0.1
386-1021	73	92	STELLITE	NITRILE (65)	20	9.5	31.8			15±0.1	3±0.1
386-1022	73	92	Ni-HARD	NITRILE (65)	18	9.2	31.8			14.5±0.1	2±0.1
386-1020	73	92	Ni-HARD	NITRILE (65)	20	9.5	31.8			15±0.1	3±0.1
386-1024	74	86.6	STELLITE	NITRILE (65)	20	6.8	22			9.5±0.1	2±0.1
340-8206*	75	94.48	Ni-HARD	LT-NBR (70)	20	9.47	32	96.41	9.6	15.2±0.5	3.5±0.25
386-1026	76	94	STELLITE	NITRILE (65)	20	9.8	29			14.5±0.1	2±0.1
251-3272	77.5	87.6	STELLITE	LT-NBR (70)	20	4.3	13.6	89.5	3.1	7.5±0.2	1.45±0.1
1Z-9354*	77.5	87.6	STELLITE	SILICONE (70)	20	4.3	13.6	89.5	3.1	7.5±0.2	1.45±0.1
386-1028	78	90	STELLITE	NITRILE (65)	20	5.3	17			8±0.1	1.8±0.1
JS0780RD	78	90	NI-HARD	NITRILE (65)	20	5.3	17			8±0.1	1.8±0.1
JS0780UD	78	90	NI-HARD	NITRILE (65)	20	5.3	17			8±0.1	1.8±0.1
JS0800SB	80	100	STELLITE	NITRILE (65)	21	9.3	30			12.5±0.1	2.34±0.1
386-1031	80.5	99.5	STELLITE	NITRILE (65)	20	8.5	29			14.5±0.1	2±0.1
386-1030	80.5	99.5	STELLITE	NITRILE (65)	20	9	29			14.5±0.1	2±0.1
JS0801R	80.5	99.5	NI-HARD	NITRILE (65)	20	8.5	29			14.5±0.1	2±0.1
386-1029	80.5	99.5	NI-HARD	NITRILE (65)	20	9	29			14.5±0.1	2±0.1
386-1032	81	98	STELLITE	NITRILE (65)	20	8	28			12.5±0.1	2.5±0.1
386-1034	82	98	STELLITE	NITRILE (65)	20	7	22			9±0.1	2.8±0.1
162-7863*	82.52	102	STELLITE	LT-NBR (70)	8	9.47	35.6	103.94	9.6	15.2±0.5	3.5±0.25
386-1033*	82.52	102	STELLITE	LT-NBR (70)	8	9.47	35.6	103.94	9.6	15.2±0.5	3.5±0.25
9W-8878*	82.52	102	STELLITE	SILICONE (70)	8	9.47	35.6	103.94	9.6	15.2±0.5	3.5±0.25

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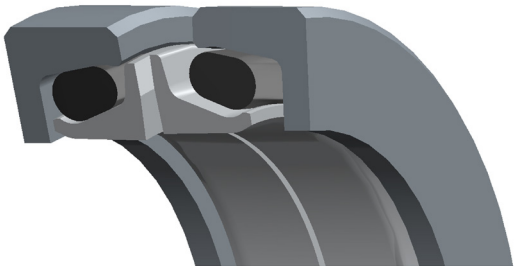

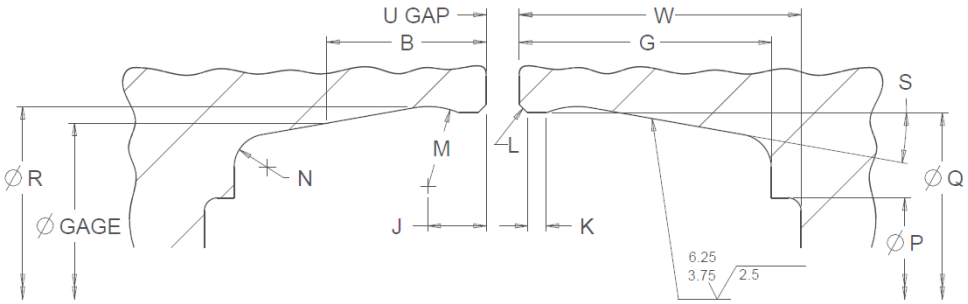

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	83.01	95.25±0.13	(96.01)	10°	17.2	72.6	**1M-8747***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	83.01	95.25±0.13	(96.01)	10°	17.2	72.6	**171-5882***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	83.01	95.25±0.13	(96.01)	10°	17.2	72.6	**4S-8984***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	83.01	95.25±0.13	(96.01)	10°	17.2	72.6	**175-7513***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	83.01	95.25±0.13	(96.01)	10°	17.2	72.6	359-4800
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	83.01	95.25±0.13	(96.01)	10°	17.2	72.6	422-1454
	R0.8	0.8±0.25	0.8	84		96±0.1	12°	16.5	73	386-1023
	0.5±0.2x45°	2.5±0.25	1	84	95.4±0.1	96.2±0.1	10°	17	73	386-1021
	R0.3	2±0.25	0.8	84	95.2±0.1	96±0.1	12°	16.5	73	386-1022
	0.5±0.2x45°	2.5±0.25	0.8	84	95.4±0.1	96.2±0.1	10°	17	73	386-1020
	R0.3	3±0.25	0.8	80	90.3±0.1	91±0.1	10°	11.5	74	386-1024
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	85.41	97.65±0.13	(98.41)	10°	17.2	75	**340-8206***
	R0.5	2.5±0.25	0.8	89	100.8±0.1	101.4±0.1	10°	16.5	76	386-1026
0.15	0.25±0.1	1.5±0.2	3.1±0.2		90.18±0.10	90.68±0.13	15°	9.5	77.5	251-3272
0.15	0.25±0.1	1.5±0.2	3.1±0.2		90.18±0.10	90.68±0.13	15°	9.5	77.5	**1Z-9354***
	R0.4	2.5±0.25	1	87.5	93.3±0.1	93.9±0.1	10°	9	78	386-1028
	R0.4	2.5±0.25	1	87.5	93.3±0.1	93.9±0.1	10°	9	78	JS0780RD
	R0.4	2.5±0.25	1	87.5	93.3±0.1	93.9±0.1	10°	9	78	JS0780UD
	R0.5	4±0.25	3	91	104.6±0.1	105.3±0.1	9.5°	14.5	80	JS0800SB
	R0.8	0.8±0.25	0.8	91		104±0.1	10°	16.5	80.5	386-1031
	R0.3	3±0.25	0.8	92	104.2±0.1	105±0.1	10°	16.5	80.5	386-1030
	R0.3	3±0.25	1	92	103.2±0.1	104±0.1	10°	16.5	80.5	JS0801R
	R0.3	3±0.25	0.8	92	104.2±0.1	105±0.1	10°	16.5	80.5	386-1029
	R0.8	1±0.25	0.8	91		102.3±0.1	10°	14.5	81	386-1032
	R0.8	0.8±0.25	0.8	91		102.3±0.1	10°	11	82	386-1034
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	92.94	105.18±0.13	(105.94)	10°	19	82.52	**162-7863***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	92.94	105.18±0.13	(105.94)	10°	19	82.52	**386-1033***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	92.94	105.18±0.13	(105.94)	10°	19	82.52	**9W-8878***

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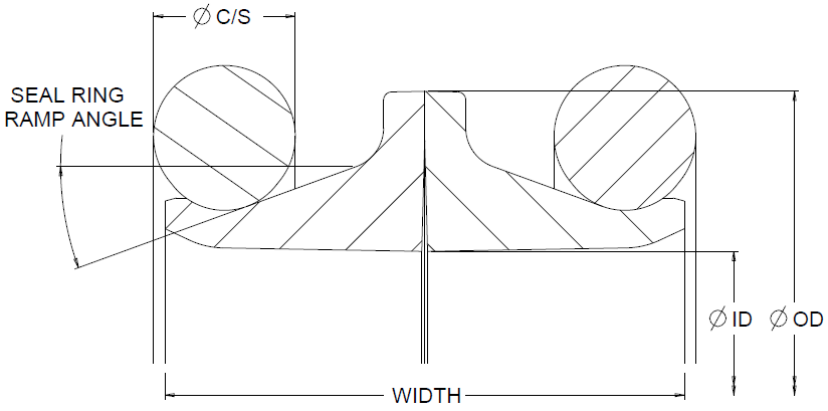
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
485-8830	82.52	102	STELLITE	SILICONE (70)	8	9.47	35.6	103.94	9.6	15.2±0.5	3.5±0.25
482-9627*	85	104.48	Ni-HARD	LT-NBR (70)	20	9.47	32	106.41	9.6	15.2±0.5	3.5±0.25
JS0850R6	85	104.48	NI-HARD	LT-NBR (70)	20	9.47	32	106.41	9.6	15.2±0.5	3.5±0.25
386-1035	85	104.5	STELLITE	NITRILE (65)	20	9.47	32	106.93	8	14.5±0.1	3.7±0.1
386-1036	86	103	STELLITE	NITRILE (65)	20	6.6	22			11.5±0.1	2±0.1
JS0861RD	86	103	NI-HARD	NITRILE (65)	20	6.6	22			11.5±0.1	2±0.1
JS0861UD	86	103	NI-HARD	NITRILE (65)	20	6.6	22			11.5±0.1	2±0.1
386-1037	88	108	STELLITE	NITRILE (65)	20	9.5	29			13.5±0.1	2.4±0.1
216-2957*	90	104.67	STELLITE	NITRILE (60)	15	6.22	26.8	105.8	7.6	11.85±0.5	2.9±0.25
6S-3285*	90	104.67	STELLITE	NITRILE (60)	15	6.22	26.8	105.8	7.6	11.85±0.5	2.9±0.25
5P-0373*	90	104.67	STELLITE	SILICONE (70)	15	6.22	26.8	105.8	7.6	11.85±0.5	2.9±0.25
489-0982	90.04	110	STELLITE	LT-NBR (70)	8	9.47	35.6	111.46	9.6	15.2±0.5	3.5±0.25
162-7864*	90.04	110	STELLITE	LT-NBR (70)	8	9.47	35.6	111.46	9.6	15.2±0.5	3.5±0.25
JS0900SJ	90.04	110	STELLITE	LT-NBR (70)	8	9.47	35.6	111.46	9.6	15.2±0.5	3.5±0.25
107-9621*	90.04	110	STELLITE	SILICONE (70)	8	9.47	35.6	111.46	9.6	15.2±0.5	3.5±0.25
386-1042	90.1	109.5	STELLITE	NITRILE (65)	20	9.5	32			15±0.1	3±0.1
386-1041	90.1	109.5	STELLITE	NITRILE (65)	20	9.7	32			15±0.1	3±0.1
386-1041	90.1	109.5	STELLITE	NITRILE (65)	20	9.7	32			15±0.1	3±0.1
JS0901R	90.1	109.5	NI-HARD	NITRILE (65)	20	9.7	32			15±0.1	3±0.1
386-1040	90.1	109.53	STELLITE	NITRILE (60)	20	9.47	32	111.46	9.6	15.2±0.5	3.5±0.25
386-1039	90.1	109.53	STELLITE	NITRILE (60)	20	9.47	32	111.46	9.6	15±0.5	3.5±0.25
JS0901SCB	90.1	109.53	STELLITE	LT-NBR (70)	20	9.47	31.6	111.46	9.6	15.2±0.5	3.5±0.25
1M-8746*	90.1	109.55	STELLITE	NITRILE (60)	20	9.47	31.6	111.46	9.6	15.2±0.5	3.5±0.25
206-9211*	90.1	109.55	STELLITE	LT-NBR (70)	20	9.47	31.6	111.46	9.6	15.2±0.5	3.5±0.25
8S-5656*	90.1	109.55	STELLITE	SILICONE (70)	20	9.47	31.6	111.46	9.6	15.2±0.5	3.5±0.25
475-8467	90.1	109.55	Ni-HARD	LT-NBR (70)	20	9.47	31.6	111.46	9.6	15.2±0.5	3.5±0.25
434-1920	90.1	109.55	C6	LT-NBR (70)	20	9.47	31.6	111.46	9.6	15.2±0.5	3.5±0.25
386-1038	90.5	109	STELLITE	NITRILE (65)	17.5	9.5	32			15±0.1	3±0.1

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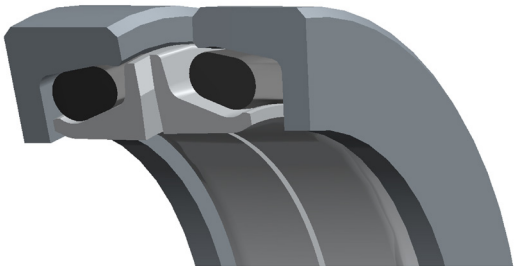

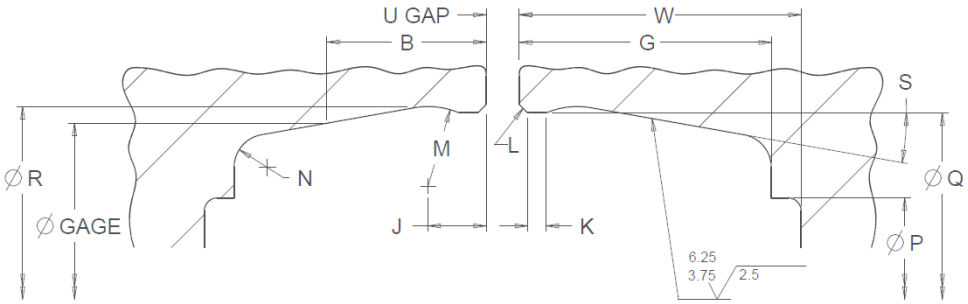

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	92.94	105.18±0.13	(105.94)	10°	19	82.52	485-8830
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	95.41	107.65±0.13	(108.41)	10°	17.2	85	**482-9627***
0.4	0.5±0.2	4.8±0.25	2 MAX	95.41	107.65±0.13	(108.41)	10°	17.2	85	JS0850R6
	0.8±0.2x45°	4.8±0.25	0.8	96	107.6±0.1	(108.3)	10°	17.5	85	386-1035
	R0.3	3±0.25	1	100	106.2±0.1	107±0.1	10°	12.3	86	386-1036
	R0.3	3±0.25	1	100	106.2±0.1	107±0.1	10°	12.3	86	JS0861RD
	R0.3	3±0.25	1	100	106.2±0.1	107±0.1	10°	12.3	86	JS0861UD
	R0.5	4±0.25	2	98	112.4±0.1	113±0.1	10°	15.5	88	386-1037
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	100.4	106.62±0.13	(107.38)	10°	14.5	90	**216-2957***
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	100.4	106.62±0.13	(107.38)	10°	14.5	90	**6S-3285***
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	100.4	106.62±0.13	(107.38)	10°	14.5	90	**5P-0373***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	19	90.04	489-0982
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	19	90.04	**162-7864***
0.4	0.5±0.2	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	19	90.04	JS0900SJ
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	19	90.04	**107-9621***
	0.5±0.2x45°	4±0.25	1	103	112.8±0.1	113.6±0.1	10°	17	90.1	386-1042
	R0.5	4±0.25	1	101	112.8±0.1	113.6±0.1	10°	17	90.1	386-1041
	R0.5	4±0.25	1	101	112.8±0.1	113.6±0.1	10°	17	90.1	386-1041
	R0.5	4±0.25	0.8	101	112.8±0.1	113.6±0.1	10°	17	90.1	JS0901R
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	386-1040
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	386-1039
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	JS0901SCB
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	**1M-8746***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	**206-9211***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	**8S-5656***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	475-8467
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	100.46	112.7±0.13	(113.46)	10°	17.2	90.1	434-1920
	R0.8	0.8±0.25	0.8	101		113.6±0.1	10°	17	90.5	386-1038

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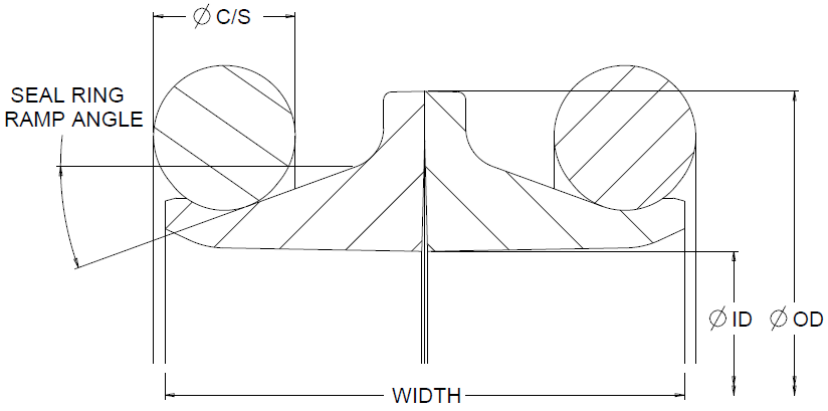

SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
386-1045	90.5	109	STELLITE	NITRILE (65)	17.5	9.2	32			14.5±0.1	3.2±0.1
JS0905SH	90.5	109	STELLITE	NITRILE (65)	17.5	9.2	32			14.5±0.1	3.2±0.1
386-1043	90.5	109	Ni-HARD	NITRILE (65)	17.5	9.2	32			14.5±0.1	3.2±0.1
386-1044	90.5	109	Ni-HARD	NITRILE (65)	17.5	9.2	32			14.5±0.1	3.2±0.1
JS0905RHA	90.5	109	NI-HARD	NITRILE (65)	17.5	9.2	32			13.5±0.1	2.1±0.1
386-1046	92	109	STELLITE	NITRILE (65)	20	7	22			9.5±0.1	1.78±0.1
JS0920S	92	109	STELLITE	NITRILE (65)	20	7	22			9.5±0.1	2±0.1
JS0920RD	92	109	NI-HARD	NITRILE (65)	20	7	22			9.5±0.1	1.78±0.1
JS0920UD	92	109	NI-HARD	NITRILE (65)	20	7	22			9.5±0.1	1.78±0.1
386-1047	94	106.5	STELLITE	NITRILE (65)	20	6.8	22			9.5±0.1	2±0.1
386-1048	95	114	Ni-HARD	NITRILE (65)	18	9.5	31			15±0.1	2.5±0.1
JS0950ST	95	111	STELLITE	NITRILE (65)	20	7.7	24			11±0.1	1.8±0.1
JS0950S	95	114	STELLITE	NITRILE (65)	18	9.5	31			15±0.1	2.5±0.1
251-3279	96.5	106.6	STELLITE	LT-NBR (70)	20	4.3	13.6	108.5	3.1	7.5±0.2	1.45±0.1
252-7909	96.5	106.6	STELLITE	HNBR (70)	20	4.3	13.6	108.5	3.1	7.5±0.2	1.45±0.1
JS0960SB	96.5	106.6	STELLITE	HNBR (60)	20	4.3	13.6	108.5	3.1	7.5±0.1	1.4±0.1
JS0965S	96.5	106.6	STELLITE	NITRILE (60)	20	4.3	13.6			7.5±0.1	1.4±0.1
JS0965ST	96.5	106.6	STELLITE	NITRILE (60)	20	4.3	13.6			7.5±0.1	1.4±0.1
386-1049	98	119	STELLITE	NITRILE (65)	20	9.2	29			13±0.1	2.5±0.1
386-1050	99	120	STELLITE	NITRILE (65)	20	8.8	28			12.5±0.1	2.8±0.1
386-1051	99.6	119.08	STELLITE	NITRILE (60)	20	9.47	32	121.01	9.6	15.2±0.5	3.5±0.25
386-1052	99.6	119.08	STELLITE	LT-NBR (70)	20	9.47	33	121.01	9.6	15.2±0.5	3.5±0.25
171-5811*	99.6	119.08	STELLITE	LT-NBR (70)	20	9.47	32	121.01	9.6	15.2±0.5	3.5±0.25
206-9212*	99.6	119.08	STELLITE	LT-NBR (70)	20	9.47	31.6	121.01	9.6	15.2±0.5	3.5±0.25
JS0996SCA	99.6	119.08	STELLITE	NITRILE (60)	20	9.47	32	121.01	9.6	15.2±0.5	3.5±0.25
1M-8748*	99.6	119.08	STELLITE	NITRILE (60)	20	9.47	31.6	121.01	9.6	15.2±0.5	3.5±0.25
3P-1848*	99.6	119.08	STELLITE	SILICONE (70)	20	9.47	31.6	121.01	9.6	15.2±0.5	3.5±0.25
5P-7143*	99.6	119.08	STELLITE	FKM (60)	8	9.47	32	119.67	9.6	15.2±0.5	3.5±0.25

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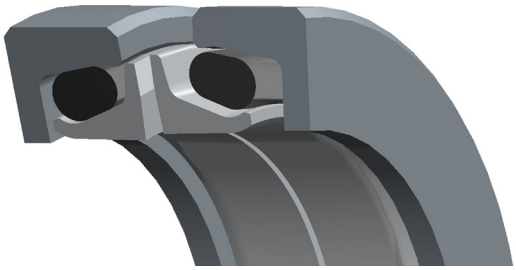

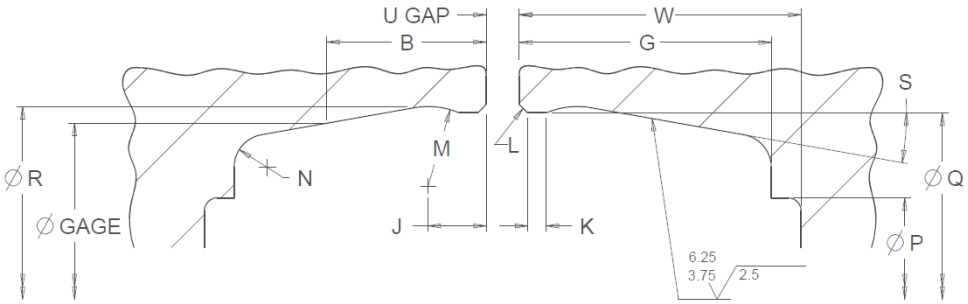

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.8	0.8±0.25	0.8	104		112.5±0.1	12°	16.5	90.5	386-1045
	R0.8	0.8±0.25	0.8	104		112.5±0.1	12°	17	90.5	JS0905SH
	R0.8	0.8±0.25	0.8	104		112.5±0.1	10°	17	90.5	386-1043
	R0.8	0.8±0.25	0.8	104		112.5±0.1	12°	16.5	90.5	386-1044
	R0.3	3±0.25	4	99.4	112±0.1	112.9±0.1	12°	16.5	90.5	JS0905RHA
0.3	0.5±0.2x40°	2.5±0.25	0.8	105	113.4±0.1	113.8±0.1	10°	11.5	92	386-1046
	R0.8	0.8±0.25	0.8	105		113.8±0.1	10°	11.5	92	JS0920S
0.3	0.5±0.2x40°	2.5±0.25	0.8	105	113.4±0.1	113.8±0.1	10°	11.5	92	JS0920RD
0.3	0.5±0.2x40°	2.5±0.25	0.8	105	113.4±0.1	113.8±0.1	10°	11.5	92	JS0920UD
	R0.3	2.5±0.25	0.8	102	110.8±0.1	111.6±0.1	10°	11.5	94	386-1047
	R0.5	3±0.25	0.8	107	119.2±0.1	120±0.1	12°	17	95	386-1048
	R0.5	2±0.25	1	108	114.8±0.1	115.6±0.1	10°	12.5	95	JS0950ST
	R0.8	0.8±0.25	0.8	107		120±0.1	12°	17	95	JS0950S
0.15	0.25±0.1	1.5±0.2	3.1±0.2		109.18±0.10	109.68±0.13	15°	9.5	96.5	251-3279
0.15	0.25±0.1	1.5±0.2	3.1±0.2		109.18±0.10	109.68±0.13	15°	9.5	96.5	252-7909
	0.5±0.2x40°	1.5±0.25	3		109.18±0.1	109.68±0.1	15°		96.5	JS0960SB
	R0.2	1.5±0.25	3.1		109.18±0.1	109.68±0.1	15°		96.5	JS0965S
	R0.5	1.5±0.25	1	105	109.2±0.1	109.7±0.1	15°	8	96.5	JS0965ST
	R0.5	3±0.25	0.8	112	123.2±0.1	124.2±0.1	10°	15	98	386-1049
	R0.8	0.8±0.25	0.8	112		123.5±0.1	10°	14.5	99	386-1050
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	386-1051
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	386-1052
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	**171-5811***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	**206-9212***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	JS0996SCA
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	**1M-8748***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	**3P-1848***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	108.67	120.91±0.13	(121.67)	10°	19	99.6	**5P-7143***

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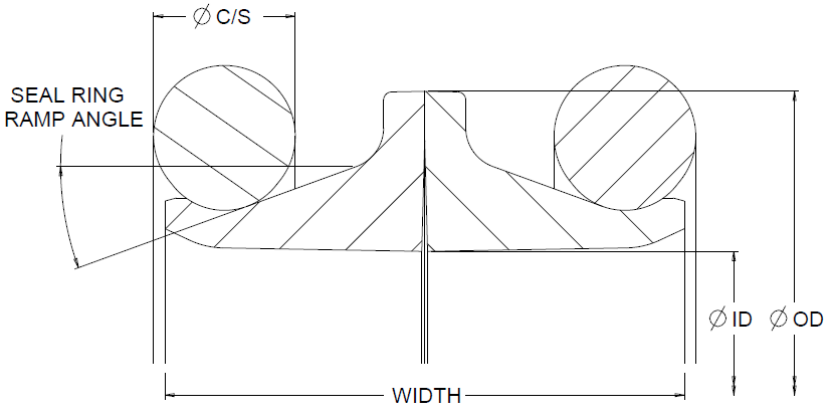
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
475-8471	99.6	119.08	Ni-HARD	LT-NBR (70)	20	9.47	31.6	121.01	9.6	15.2±0.5	3.5±0.25
386-1054	100	119	STELLITE	NITRILE (65)	20	9.5	31.8			14.5±0.1	2.5±0.1
JS1000SB	100	119	STELLITE	NITRILE (65)	20	9.7	31.8	122	7.5	14.5±0.1	2.8±0.1
386-1053	100	120	STELLITE	NITRILE (65)	20	9.2	29.4			14±0.1	2.9±0.1
386-1057	102	122	STELLITE	NITRILE (65)	18	10.3	32			15.5±0.1	2.5±0.1
386-1055	102	122	Ni-HARD	NITRILE (65)	18	10.3	32			15.5±0.1	3.1±0.1
386-1056	102	122	Ni-HARD	NITRILE (65)	18	10.3	32			15.5±0.1	2.5±0.1
JS1020RHA	102	122	NI-HARD	NITRILE (65)	18	10.3	32			14±0.1	2.5±0.1
386-1059	104	121	STELLITE	NITRILE (65)	20	7	22			9.5±0.1	2±0.1
386-1058	104	116.7	STELLITE	NITRILE (65)	18	7	21.2			9.5±0.1	2±0.1
JS1040ST	104	117	STELLITE	NITRILE (60)	20	7	22			9.5±0.1	2±0.1
JS1070SB	107	125	STELLITE	HNBR (60)	20	8.5	25	128.9	7.5	11±0.1	2.8±0.1
386-1061	109	127	Ni-HARD	NITRILE (65)	18	9.7	32			15±0.1	2.5±0.1
386-1060	109	132	STELLITE	NITRILE (65)	20	10.5	32			15.5±0.1	2.5±0.1
386-1062	109	127	STELLITE	NITRILE (65)	18	9.7	32			15±0.1	2.5±0.1
JS1115SB	111.5	131.5	STELLITE	NITRILE (60)	20	9.5	30			15±0.1	4.2±0.1
JS1120SJ	112	130	STELLITE	NITRILE (65)	20	7.2	22			9.5±0.1	2±0.1
386-1063	112.05	131.5	STELLITE	NITRILE (60)	20	9.47	32	133.43	9.6	14.1±0.1	3.5±0.1
148-3533*	112.05	131.5	STELLITE	LT-NBR (70)	20	9.47	32	133.43	9.6	15.2±0.5	3.5±0.25
320-8919*	112.05	131.5	STELLITE	LT-NBR (70)	20	9.47	32	133.43	9.6	15.2±0.5	3.5±0.25
133-0513*	112.05	131.5	STELLITE	SILICONE (70)	20	9.47	32	133.43	9.6	15.2±0.5	3.5±0.25
475-8458	112.05	131.5	Ni-HARD	LT-NBR (70)	20	9.47	32	133.43	9.6	15.2±0.5	3.5±0.25
109-0885*	112.05	131.5	Ni-HARD	NITRILE (60)	20	9.47	32	133.43	9.6	15.2±0.5	3.5±0.25
434-1922	112.05	131.5	C6	LT-NBR (70)	20	9.47	32	133.43	9.6	15.2±0.5	3.5±0.25
386-1066	115	137	Ni-HARD	NITRILE (65)	20	9.5	31			14.5±0.1	5±0.1
155-9879*	114.02	133	STELLITE	LT-NBR (70)	8	9.47	35.6	135.44	9.6	15.2±0.5	3.5±0.25
JS1140S	114.02	133	STELLITE	LT-NBR (70)	8	9.47	35.6			15.2±0.1	3.5±0.1
161-7525*	114.02	133	STELLITE	SILICONE (70)	8	9.47	35.6	135.44	9.6	15.2±0.5	3.5±0.25

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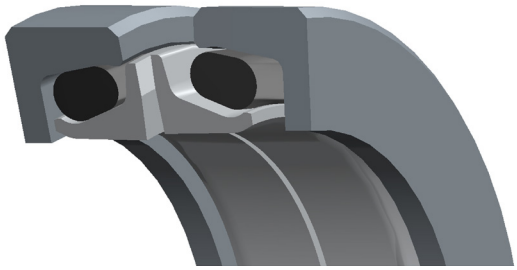

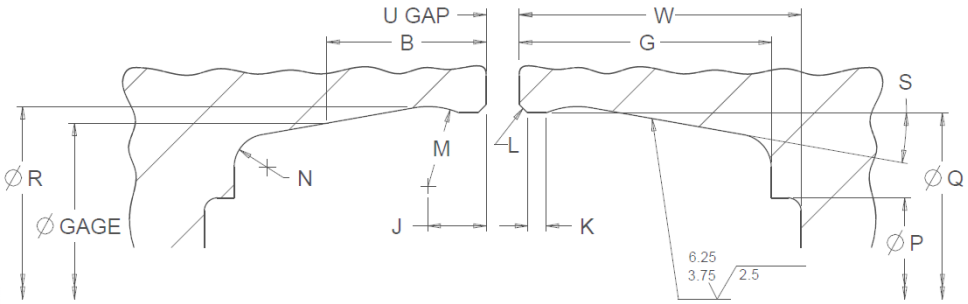

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	110.01	122.25±0.13	(123.01)	10°	17.2	99.6	475-8471
	R0.5	3±0.25	0.8	111	122.4±0.1	123.2±0.1	10°	16.5	100	386-1054
	R0.5	5±0.25	1	111	122.5±0.1	(123.5)	10°	17.5	100	JS1000SB
	R0.5	3±0.25	0.8	111	124±0.1	125±0.1	10°	16	100	386-1053
	R0.8	0.8±0.25	0.8	115		127.2±0.1	12°	17.5	102	386-1057
	R0.5	4±0.25	0.8	115	125.9±0.1	126.9±0.1	10°	17.5	102	386-1055
	R0.8	0.8±0.25	0.8	115		127.2±0.1	12°	17.5	102	386-1056
	R0.4	3±0.25	3.5	114	126.2±0.1	127.2±0.1	12°	17.5	102	JS1020RHA
	R0.3	3±0.25	0.8	117.5	125.2±0.1	125.9±0.1	10°	11.5	104	386-1059
	R0.8	0.8±0.25	0.8	107		121±0.1	10°	11.5	104	386-1058
	R0.5	3±0.25	1	111	120.2±0.1	121±0.1	10°	11.5	104	JS1040ST
	R0.5	5±0.25	1	119.5	129.4±0.1	(130.4)	10°	14	107	JS1070SB
	0.5±0.2x45°	3±0.25	0.8	121	132.2±0.1	133±0.1	10°	17	109	386-1061
	R0.8	0.8±0.25	0.8	124		136.6±0.1	10°	17.5	109	386-1060
	R0.8	3±0.25	0.8	121	132±0.1	133±0.1	12°	17	109	386-1062
	R1	4±0.25	3	123	135.7±0.1	137±0.1	14°	17	111.5	JS1115SB
	R0.3	3±0.25	2	124	133±0.1	133.8±0.1	10°	11	112	JS1120SJ
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	122.4	134.67±0.13	(135.43)	10°	17.2	112.05	386-1063
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	122.43	134.67±0.13	(135.43)	10°	17.2	112.05	**148-3533***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	122.43	134.67±0.13	(135.43)	10°	17.2	112.05	**320-8919***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	122.43	134.67±0.13	(135.43)	10°	17.2	112.05	**133-0513***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	122.43	134.67±0.13	(135.43)	10°	17.2	112.05	475-8458
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	122.43	134.67±0.13	(135.43)	10°	17.2	112.05	**109-0885***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	122.43	134.67±0.13	(135.43)	10°	17.2	112.05	434-1922
	R0.8	0.8±0.25	1.6	130		141.8±0.1	10°	16.5	115	386-1066
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	124.44	136.68±0.13	(137.44)	10°	19	114.02	**155-9879***
	R0.5	4.8±0.25	2	124.43	136.68±0.13	137.44±0.13	10°	18.4	114.02	JS1140S
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	124.44	136.68±0.13	(137.44)	10°	19	114.02	**161-7525***

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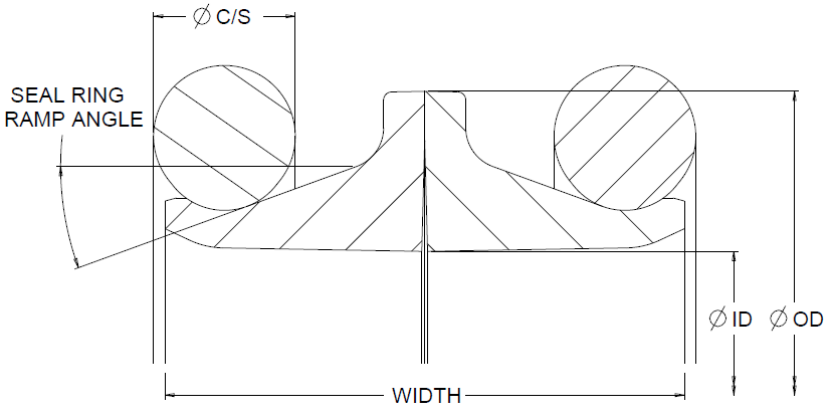

SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
386-1067	115	137	Ni-HARD	NITRILE (65)	15	9.2	31			14.5±0.1	2.5±0.1
JS1150RHA	115	137	NI-HARD	NITRILE (65)	15	9.2	31			14±0.1	2.5±0.1
JS1150S	115	137	STELLITE	NITRILE (65)	20	9.5	31			14.5±0.1	2.5±0.1
386-1068	120	138.5	STELLITE	NITRILE (65)	20	9.7	32			14.5±0.1	2.8±0.1
JS1200R	120	142	NI-HARD	NITRILE (65)	15	11.3	39			17±0.1	2.5±0.1
386-1070	124	141	Ni-HARD	NITRILE (65)	20	7.2	22			10.6±0.1	2.74±0.1
272-1012	124	139.82	STELLITE	LT-NBR (70)	15	6.22	25.4	140.67	7.6	11.85±0.5	2.9±0.25
386-1069	124	141	STELLITE	NITRILE (65)	20	7.2	22			10.6±0.1	2.74±0.1
386-1071	124	141	STELLITE	NITRILE (65)	20	7	22			9.5±0.1	2±0.1
JS1265S	126.5	141	STELLITE	NITRILE (65)	15	8.3	29			13±0.1	3±0.1
3S-0303*	126.5	141.25	STELLITE	NITRILE (60)	15	6.22	25.4	142.38	7.6	11.85±0.5	2.9±0.25
252-7907	126.5	141.25	STELLITE	HNBR (70)	15	6.22	25.4	142.38	7.6	11.85±0.5	2.9±0.25
315-1147	126.5	141.25	STELLITE	HNBR (70)	15	6.22	25.4	142.38	7.6	11.85±0.5	2.9±0.25
8L-5519*	126.5	141.25	STELLITE	SILICONE (70)	15	6.22	25.4	142.38	7.6	11.85±0.5	2.9±0.25
386-1073	126.6	146.05	STELLITE	NITRILE (60)	20	9.47	32	147.98	9.6	15.2±0.5	3.5±0.25
5P-9121*	126.6	146.05	STELLITE	NITRILE (60)	15	9.47	32	147.98	9.6	15.2±0.5	3.5±0.25
176-5331*	126.6	146.05	STELLITE	LT-NBR (70)	20	9.47	32	147.98	9.6	15.2±0.5	3.5±0.25
273-9594	126.6	146.05	STELLITE	SILICONE (70)	20	9.47	32	147.98	9.6	15.2±0.5	3.5±0.25
109-0881*	126.6	146.05	Ni-HARD	NITRILE (60)	20	9.47	32	147.98	9.6	15.2±0.5	3.5±0.25
JS1270RK	127	141	NI-HARD	NITRILE (65)	16	6.4	25			11.5±0.1	2.5±0.1
386-1076	127	141	STELLITE	NITRILE (60)	15	6	29	142.3	7.5	12±0.1	2.3±0.1
JS1270SK	127	141	STELLITE	NITRILE (65)	16	6.4	25			11.5±0.1	2.5±0.1
386-1075	127	146	STELLITE	NITRILE (65)	15	9	31.8			14±0.1	2.5±0.1
386-1074	127	146	Ni-HARD	NITRILE (65)	15	9	31.8			14±0.1	2.5±0.1
6Y-5218*	127.07	146	FORMED	SILICONE (70)	15	9.47	31.6	147.9	9.6	15.2±0.5	3.5±0.25
6Y-5219*	127.07	146	FORMED	NITRILE (60)	15	9.47	31.6	147.9	9.6	15.2±0.5	3.5±0.25
JS1272SB	127.2	140.7	STELLITE	HNBR (60)	15	6	25	142.4	7.5	12.7±0.1	2.7±0.1
386-1077	130	152	Ni-HARD	NITRILE (65)	20	11.3	38			18.5±0.1	2.5±0.1

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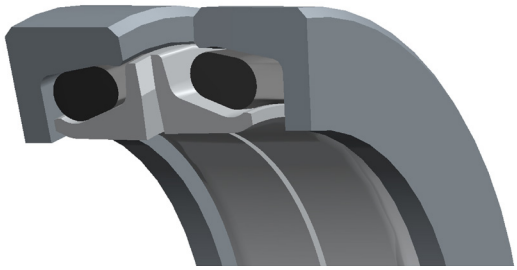

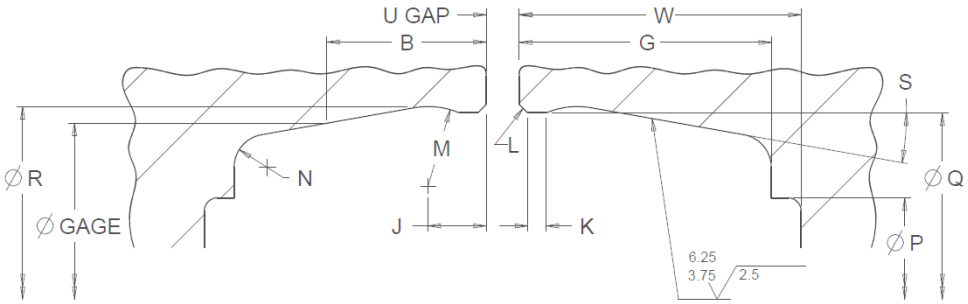

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	0.5±0.2x45°	3±0.25	1.5	130	140.8±0.1	141.8±0.1	10°	16.5	115	386-1067
	0.5±0.2x45°	3±0.25	3.5	128.8	141.3±0.1	142.3±0.1	12°	17	115	JS1150RHA
	R0.5	3±0.25	1.5	130	140.8±0.1	141.8±0.1	10°	16.5	115	JS1150S
	R0.5	5±0.25	1	132	142.6±0.1	143.4±0.1	10°	16.5	120	386-1068
	R0.5	3±0.25	1.5	133	148±0.1	149±0.1	10°	19	120	JS1200R
0.3±0.2	30°	3±0.25	3	137	145.3±0.1	145.75±0.1	9.5°	11.9	124	386-1070
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	135.27	141.49±0.13	(142.25)	10°	14.5	124	272-1012
0.3±0.2	30°	3±0.25	3	137	145.3±0.1	145.75±0.1	9.5°	11.9	124	386-1069
	R0.3	3±0.25	0.8	136	145±0.1	145.8±0.1	10°	11.5	124	386-1071
	R0.8	0.8±0.25	0.8	138		148±0.1	10°	15.5	126.5	JS1265S
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	136.98	143.2±0.13	(143.96)	10°	14.5	126.5	**3S-0303***
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	136.98	143.2±0.13	(143.96)	10°	14.5	126.5	252-7907
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	136.98	143.2±0.13	(143.96)	10°	14.5	126.5	315-1147
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	136.98	143.2±0.13	(143.96)	10°	14.5	126.5	**8L-5519***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	136.98	149.22±0.13	(149.98)	10°	17.2	126.6	386-1073
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	136.98	149.22±0.13	(149.98)	10°	17.2	126.6	**5P-9121***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	136.98	149.22±0.13	(149.98)	10°	17.2	126.6	**176-5331***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	136.98	149.22±0.13	(149.98)	10°	17.2	126.6	273-9594
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	136.98	149.22±0.13	(149.98)	10°	17.2	126.6	**109-0881***
	R0.5	3±0.25	2	136	143.2±0.1	144±0.1	10°	12.5	127	JS1270RK
	R0.5	3±0.25	1	138.5	143±0.1	(144)	10°	14.5	127	386-1076
	R0.5	3±0.25	0.8	136	143.2±0.1	144±0.1	10°	13	127	JS1270SK
	R0.8	0.8±0.25	0.8	138		150.2±0.1	10°	16	127	386-1075
	R0.5	3±0.25	0.8	138	149.4±0.1	150.2±0.1	10°	16	127	386-1074
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	136.9	149.14±0.13	(149.9)	10°	17.2	127.07	**6Y-5218***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	136.9	149.14±0.13	(149.9)	10°	17.2	127.07	**6Y-5219***
	R0.5	2.8±0.25	1	135	143.4±0.1	(144)	10°	15.2	127.2	JS1272SB
	R0.5	3±0.25	0.8	144	158±0.1	159±0.1	10°	20.5	130	386-1077

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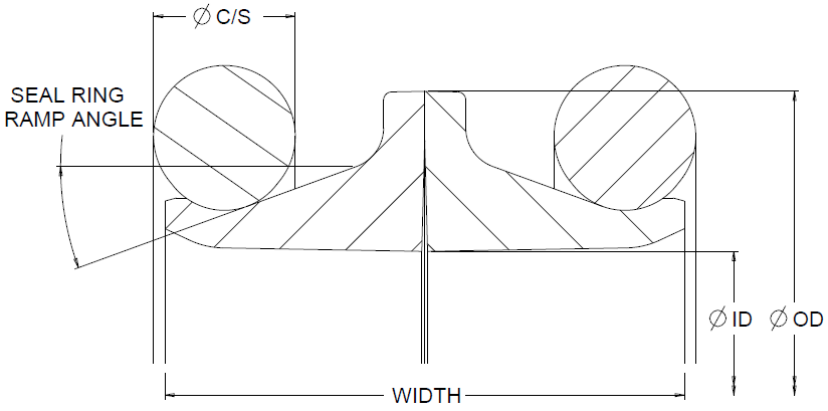

SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
JS1301S	130	150	STELLITE	NITRILE (65)	20	9	32			14.5±0.1	2.5±0.1
386-1078	130	152	STELLITE	NITRILE (65)	17	11.3	38.4			18.5±0.1	2.5±0.1
285-9346	133	148.82	STELLITE	LT-NBR (70)	15	6.22	25.4	149.67	7.6	11.85±0.5	2.9±0.25
252-7912	142.3	157	STELLITE	HNBR (70)	15	6.22	26.8	158.13	7.6	11.85±0.5	2.9±0.25
315-1149	142.3	157	STELLITE	HNBR (70)	15	6.22	26.8	158.13	7.6	11.85±0.5	2.9±0.25
359-4802	142.3	157	STELLITE	LT-NBR (60)	15	6.22	26.8	158.13	7.6	11.85±0.5	2.9±0.25
5K-5288*	142.3	157	STELLITE	NITRILE (60)	15	6.22	26.8	158.13	7.6	11.85±0.5	2.9±0.25
5P-0375*	142.3	157	STELLITE	SILICONE (70)	15	6.22	26.8	158.13	7.6	11.85±0.5	2.9±0.25
JS1430S	143	157	STELLITE	NITRILE (65)	15	6.2	25			11.5±0.1	2.5±0.1
JS1430SB	143	157	STELLITE	HNBR (60)	15	6.22	27	158.2	7.5	12±0.1	2.3±0.1
6T-8440*	143.76	171.7	STELLITE	NITRILE (60)	15	12.7	39	174.54	10.7	22±0.5	3.7±0.25
386-1079	146	168	STELLITE	NITRILE (65)	15	12.7	38			18±0.1	2.5±0.1
386-1082	148	170	STELLITE	NITRILE (65)	15	9.6	34			15±0.1	2.23±0.1
6T-2981*	147.39	171.7	FORMED	SILICONE (70)	15	12.7	38.6	174.49	10.7	22±0.5	3.7±0.25
9G-5311*	147.39	171.7	FORMED	NITRILE (60)	15	12.7	38.6	174.49	10.7	22±0.5	3.7±0.25
386-1081	148	170	Ni-HARD	NITRILE (65)	17.5	9.2	34			14.5±0.1	3.05±0.1
386-1080	148	170	STELLITE	NITRILE (65)	17.5	9.2	34			14.5±0.1	3.05±0.1
386-1084	150	170	Ni-HARD	NITRILE (65)	17.5	9.2	32			14.5±0.1	3.05±0.1
386-1085	150	172	STELLITE	NITRILE (65)	17	11.3	40			18±0.1	3.5±0.1
386-1083	150	170	STELLITE	NITRILE (65)	17.5	9.2	32			14.5±0.1	3.05±0.1
109-0868*	152.05	171.5	Ni-HARD	NITRILE (60)	20	9.47	32	173.43	9.6	15.2±0.5	3.5±0.25
133-0512*	152.05	171.5	Ni-HARD	SILICONE (70)	20	9.47	32	173.43	9.6	15.2±0.5	3.5±0.25
176-5332*	152.05	171.5	STELLITE	LT-NBR (70)	20	9.47	32	173.43	9.6	15.2±0.5	3.5±0.25
JS1530S	153	174	STELLITE	NITRILE (65)	20	9.5	32			12±0.1	2.5±0.1
359-4804	153.6	168.3	STELLITE	LT-NBR (60)	15	6.2	26.8	169.43	7.6	11.85±0.5	2.9±0.25
186-6531*	153.6	168.3	STELLITE	NITRILE (60)	15	6.22	26.8	169.43	7.6	11.85±0.5	2.9±0.25
5K-1078*	153.6	168.3	STELLITE	NITRILE (60)	15	6.22	26.8	169.43	7.6	11.85±0.5	2.9±0.25
8L-5516*	153.6	168.3	STELLITE	SILICONE (70)	15	6.22	26.8	169.43	7.6	11.85±0.5	2.9±0.25

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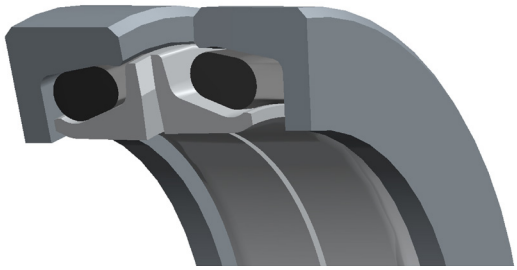

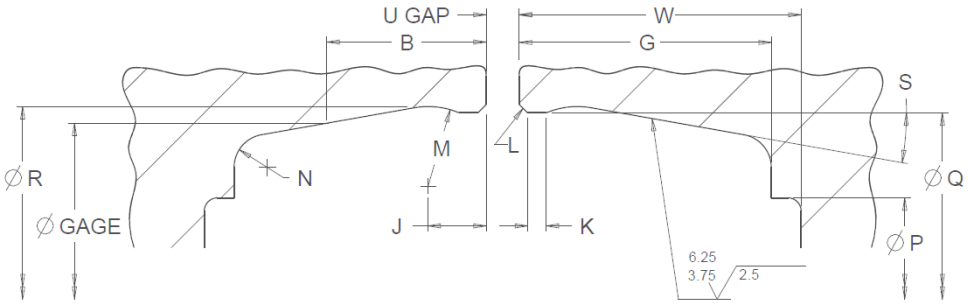

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.8	0.8±0.25	0.8	144.6		155.6±0.1	10°	16.5	130	JS1301S
	R0.5	3±0.25	0.8	144	158±0.1	159±0.1	10°	20.5	130	386-1078
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	144.27	150.49±0.13	(151.25)	10°	14.5	133	285-9346
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	152.73	158.95±0.13	(159.71)	10°	14.5	142.3	252-7912
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	152.73	158.95±0.13	(159.71)	10°	14.5	142.3	315-1149
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	152.73	158.95±0.13	(159.71)	10°	14.5	142.3	359-4802
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	152.73	158.95±0.13	(159.71)	10°	14.5	142.3	**5K-5288***
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	152.73	158.95±0.13	(159.71)	10°	14.5	142.3	**5P-0375***
	R0.8	0.8±0.25	0.8	152		159.7±0.1	10°	13.5	143	JS1430S
	R0.5	3±0.25	1	154.5	159±0.1	(160)	10°	14.5	143	JS1430SB
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	158.94	175.92±0.13	(176.82)	10°	24	143.76	**6T-8440***
	R0.8	0.8±0.25	0.8	159		177±0.1	10°	20	146	386-1079
	R0.5	3±0.25	0.8	164	174.8±0.1	175.6±0.1	10°	17	148	386-1082
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	158.89	175.87±0.13	(176.77)	10°	24	147.39	**6T-2981***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	158.89	175.87±0.13	(176.77)	10°	24	147.39	**9G-5311***
	R0.5	3±0.25	1.5	162	174.5±0.1	175.63±0.1	12°	17.5	148	386-1081
	R0.5	3±0.25	1.5	162	174.5±0.1	175.63±0.1	12°	17.5	148	386-1080
	R0.5	3±0.25	1.5	162	174.5±0.1	175.63±0.1	12°	17.5	150	386-1084
	R0.5	4.5±0.25	0.8	165	177.6±0.1	178.6±0.1	10°	20	150	386-1085
	R0.5	3±0.25	1.5	162	174.5±0.1	175.63±0.1	12°	17.5	150	386-1083
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	162.43	174.67±0.13	(175.43)	10°	17.2	152.05	**109-0868***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	162.43	174.67±0.13	(175.43)	10°	17.2	152.05	**133-0512***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	162.43	174.67±0.13	(175.43)	10°	17.2	152.05	**176-5332***
	R0.5	4±0.25	2	165	178.7±0.1	179.5±0.1	10°	15	153	JS1530S
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	164.03	170.25±0.13	(171.01)	10°	14.5	153.6	359-4804
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	164.03	170.25±0.13	(171.01)	10°	14.5	153.6	**186-6531***
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	164.03	170.25±0.13	(171.01)	10°	14.5	153.6	**5K-1078***
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	164.03	170.25±0.13	(171.01)	10°	14.5	153.6	**8L-5516***

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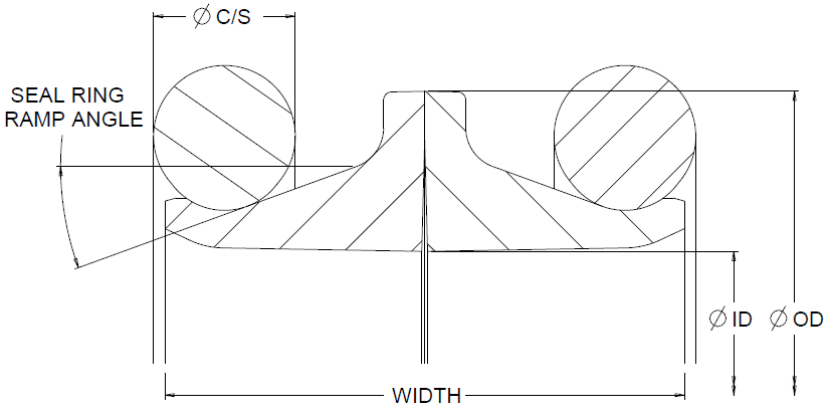
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
386-1086	154	168	Ni-HARD	NITRILE (65)	17.5	6.3	26			11.5±0.1	2.5±0.1
386-1087	154	168	STELLITE	NITRILE (65)	15	6.2	25			11.5±0.1	2.5±0.1
JS1540H	154	168	STELLITE	NITRILE (60)	13.5	6.5	26	169.3	7.5	12±0.1	2.3±0.1
JS1540SJ	154	170	STELLITE	NITRILE (65)	20	7	22	173.8	6	9.2±0.1	2.3±0.1
JS1540SB	154	170	STELLITE	HNBR (60)	20	7	22	173.8	6	9.2±0.1	2.3±0.1
386-1088	154	173.5	STELLITE	NITRILE (65)	20	9.5	32			14.5±0.1	2.5±0.1
272-6133	158	173.82	STELLITE	LT-NBR (70)	15	6.22	25.4	174.67	7.6	11.85±0.5	2.9±0.25
386-1089	160	180	Ni-HARD	NITRILE (60)	17.5	9.1	32			13.5±0.1	2.73±0.1
JS1600F	160	180	STELLITE	NITRILE (60)	17.5	9.1	32			13.5±0.1	2.73±0.1
JS1630SH	163	188	STELLITE	NITRILE (65)	15	13.1	38			18±0.1	2.23±0.1
JS1630SV	163	188	STELLITE	NITRILE (65)	20	12.7	38	194.4	9	18±0.1	3±0.1
JS1630S	163	191	STELLITE	NITRILE (65)	15	12.7	38			18±0.1	3.1±0.1
191-6664	163.32	191.26	C6	NITRILE (60)	15	12.7	43	194.12	10.7	22±0.5	3.7±0.25
210-5536	163.32	191.26	C6	HNBR (70)	15	12.7	43	194.12	10.7	22±0.5	3.7±0.25
4C-1494*	163.32	191.26	C6	SILICONE (70)	15	12.7	43	194.12	10.7	22±0.5	3.7±0.25
6T-8436*	163.32	191.26	STELLITE	NITRILE (60)	15	12.7	39	194.1	10.7	22±0.5	3.7±0.25
9W-7331*	163.32	191.26	STELLITE	NITRILE (60)	8	12.7	46.6	194.1	10.7	22±0.5	3.7±0.25
386-1090	165	183.5	Ni-HARD	NITRILE (65)	20	8.5	28			13.5±0.1	3.5±0.1
386-1091	165	183.5	STELLITE	NITRILE (65)	20	8.5	28			13.5±0.1	3.5±0.1
6T-3377*	166.95	191.26	FORMED	SILICONE (70)	15	12.7	38.6	194.06	10.7	22±0.5	3.7±0.25
9G-5313*	166.95	191.26	FORMED	NITRILE (60)	15	12.7	38.6	194.06	10.7	22±0.5	3.7±0.25
109-0861*	169.05	188.5	Ni-HARD	NITRILE (60)	20	9.47	32	190.43	9.6	15.2±0.5	3.5±0.25
133-0511*	169.05	188.5	Ni-HARD	SILICONE (70)	20	9.47	32	190.43	9.6	15.2±0.5	3.5±0.25
171-5825*	169.05	188.5	STELLITE	LT-NBR (70)	20	9.47	32	190.43	9.6	15.2±0.5	3.5±0.25
272-6134	178	193.82	STELLITE	LT-NBR (70)	15	6.22	25.4	194.67	7.6	11.85±0.5	2.9±0.25
JS1780SJ	178	197.5	STELLITE	NITRILE (65)	15	7.5	24			10.6±0.1	1.2±0.1
386-1092	178	200	STELLITE	NITRILE (65)	16	13.1	38			18±0.1	3±0.1
JS1780SV	178	200	STELLITE	NITRILE (65)	20	12.7	38			19±0.1	3±0.1

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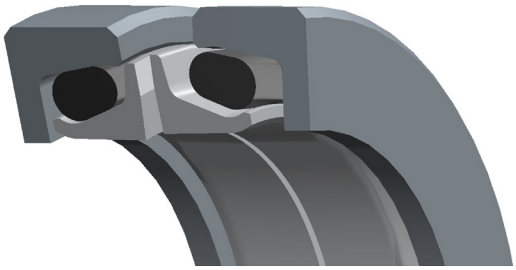

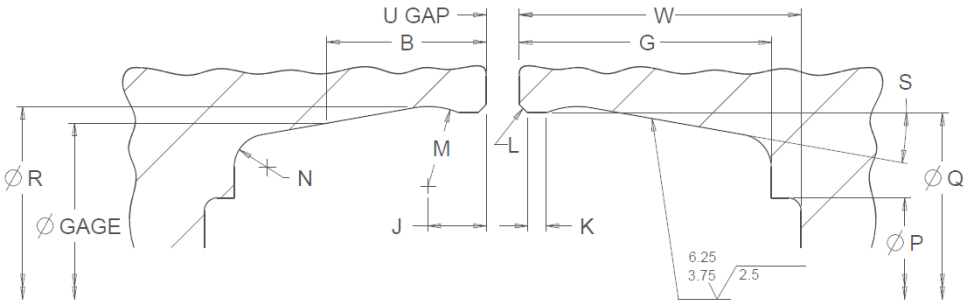

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.5	3±0.25	1	164	170.2±0.1	171±0.1	10°	13.5	154	386-1086
	R0.8	0.8±0.25	0.8	164		171±0.1	10°	13.5	154	386-1087
	R0.5	3±0.25	1	163	170±0.1	(171)	10°	14.5	154	JS1540H
	R0.5	3±0.25	1	167	174.1±0.1	(175.1)	10°	11.2	154	JS1540SJ
	R0.5	3±0.25	1	167	174.1±0.1	(175.1)	10°	11.2	154	JS1540SB
	R0.8	0.8±0.25	0.8	166		178±0.1	10°	17	154	386-1088
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	169.27	175.49±0.13	(176.25)	10°	14.5	158	272-6133
	R0.5	3±0.25	3	174	185.5±0.2	186.16±0.1	12°	17	160	386-1089
	R0.5	3±0.25	3	174	185.5±0.2	186.16±0.1	12°	17	160	JS1600F
	R0.4	3±0.25	0.8	179	195.7±0.1	196.4±0.1	10°	20	163	JS1630SH
	R0.5	4±0.25	1.5	180	195.4±0.1	(196.4)	10°	20	163	JS1630SV
	R0.5	4±0.25	0.8	179	195.4±0.1	196.4±0.1	10°	20	163	JS1630S
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	178.52	195.5±0.13	(196.4)	10°	24	163.32	191-6664
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	178.52	195.5±0.13	(196.4)	10°	24	163.32	210-5536
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	178.52	195.5±0.13	(196.4)	10°	24	163.32	**4C-1494***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	178.5	195.48±0.13	(196.38)	10°	24	163.32	**6T-8436***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	178.5	195.48±0.13	(196.38)	10°	24	163.32	**9W-7331***
	R1	3±0.25	1	176	186.5±0.1	187.5±0.1	10°	16	165	386-1090
	1±0.2x30°	3±0.25	1	176	186.5±0.1	187.5±0.1	10°	16	165	386-1091
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	178.46	195.44±0.13	(196.34)	10°	24	166.95	**6T-3377***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	178.46	195.44±0.13	(196.34)	10°	24	166.95	**9G-5313***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	179.43	191.67±0.13	(192.43)	10°	17.2	169.05	**109-0861***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	179.43	191.67±0.13	(192.43)	10°	17.2	169.05	**133-0511***
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	179.43	191.67±0.13	(192.43)	10°	17.2	169.05	**171-5825***
0.4	0.5±0.2x45°	2.8±0.25	1.5 MAX	189.27	195.49±0.13	(196.25)	10°	14.5	178	272-6134
	0.5±0.2x45°	3±0.25	2	193.2	201.9±0.1	202.2±0.1	10°	11.8	178	JS1780SJ
	R0.5	0.8±0.25	0.8	200		210.6±0.1	10°	20	178	386-1092
	R0.5	3±0.25	1.5	196	209.6±0.1	210.6±0.1	10°	21	178	JS1780SV

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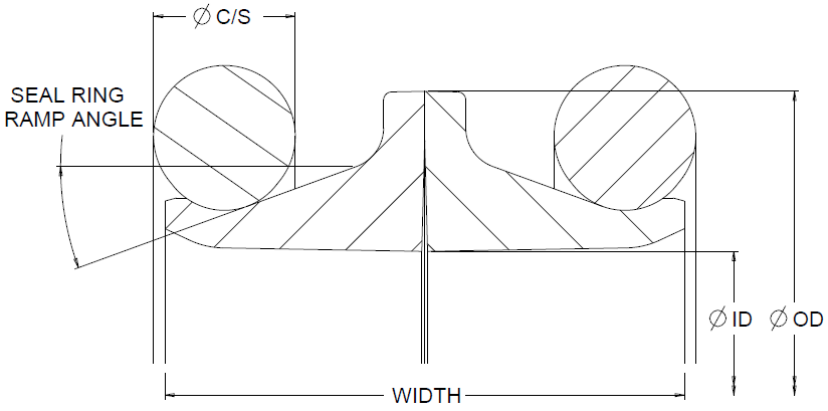

SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
8E-5322	179.55	199	STELLITE	SILICONE (70)	15	9.47	32	200.93	9.6	15.2±0.5	3.5±0.25
386-1093	182	210	STELLITE	NITRILE (65)	15	12.7	38			18±0.1	3±0.1
519-1899	182.37	210.31	STELLITE	LT-NBR (70)	15	12.7	39	213.15	10.7	22±0.5	3.7±0.25
460-5369*	182.37	210.31	NI-HARD	SILICONE (70)	15	12.7	39	213.15	10.7	22±0.5	3.7±0.25
6T-8438*	182.37	210.31	STELLITE	NITRILE (60)	15	12.7	39	213.15	10.7	22±0.5	3.7±0.25
6T-8439*	182.37	210.31	STELLITE	NITRILE (60)	8	12.7	46.6	213.15	10.7	22±0.5	3.7±0.25
6T-9986*	182.37	210.31	STELLITE	SILICONE (70)	15	12.7	39	213.15	10.7	22±0.5	3.7±0.25
3T-6541*	186	210.31	FORMED	SILICONE (70)	15	12.7	38.6	213.12	10.7	22±0.5	3.7±0.25
9G-5315*	186	210.31	FORMED	NITRILE (60)	15	12.7	38.6	213.12	10.7	22±0.5	3.7±0.25
386-1094	191	210	STELLITE	NITRILE (65)	20	8.2	28			12.5±0.1	2.8±0.1
JS1910SB	191	210	STELLITE	NITRILE (60)	17.5	8.5	28	212.5	7.5	12.5±0.1	2.8±0.1
386-1095	192	215	Ni-HARD	NITRILE (65)	20	10.5	33			16.5±0.1	3±0.1
386-1096	192	215	STELLITE	NITRILE (65)	20	10.5	33			16.5±0.1	3±0.1
386-1097	200	228.5	STELLITE	NITRILE (60)	15	13	38			18±0.1	3±0.1
JS2050S	205	227	STELLITE	NITRILE (60)	15	9.5	30	230	7.5	14.5±0.1	2.8±0.1
JS2050SJ	205	227	STELLITE	NITRILE (65)	15	9.5	30	230	7.5	14.5±0.1	2.8±0.1
JS2070S	207	227.5	STELLITE	NITRILE (65)	20	8.5	32			14.5±0.1	3±0.1
JS2070SF	207	227.5	STELLITE	NITRILE (65)	20	8.5	32			14.5±0.1	3±0.1
JS2070SF2	207	227.5	STELLITE	HNBR (60)	20	8.5	32			14.5±0.1	3±0.1
JS2070R	207	227.5	NI-HARD	NITRILE (65)	20	8.5	32			14.5±0.1	3±0.1
JS2070RF	207	227.5	NI-HARD	NITRILE (65)	20	8.5	32			14.5±0.1	3±0.1
JS2070RF2	207	227.5	NI-HARD	HNBR (60)	20	8.5	32			14.5±0.1	3±0.1
386-1099	209	234	STELLITE	NITRILE (60)	14	13	42	240.25	10	19.5±0.1	3±0.1
386-1098	209	234	STELLITE	NITRILE (60)	14	13	42			17.5±0.1	2.5±0.1
JS2090S	209	234	STELLITE	NITRILE (65)	20	13	42			19.5±0.1	3±0.1
JS2090SHA	209	234	STELLITE	NITRILE (65)	14	13.1	42			17.5±0.1	2.5±0.1
JS2090RF	209	234	NI-HARD	NITRILE (65)	14	13	42			19.5±0.1	3±0.1
386-1100	220	239.5	STELLITE	NITRILE (65)	20	9	31.8			14.5±0.1	2.8±0.1

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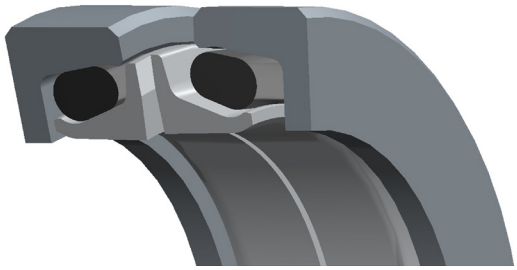

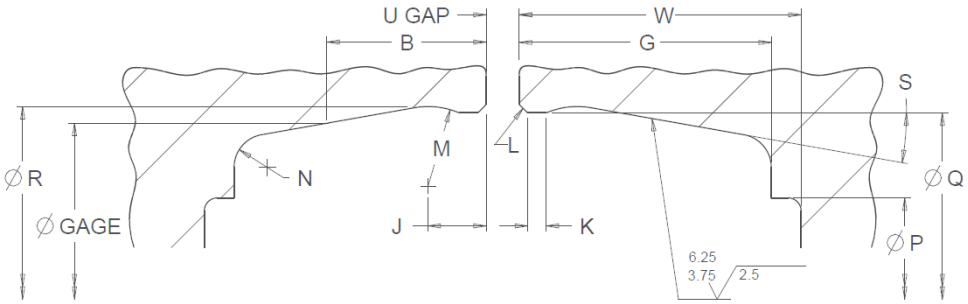

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	4.8±0.25	2 MAX	189.93	202.17±0.13	(202.93)	10°	17.2	179.55	8E-5322
	R0.5	4±0.25	0.8	198	214.4±0.1	215.4±0.1	10°	20	182	386-1093
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	197.55	214.53±0.13	(215.43)	10°	24	182.37	519-1899
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	197.55	214.53±0.13	(215.43)	10°	24	182.37	**460-5369***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	197.55	214.53±0.13	(215.43)	10°	24	182.37	**6T-8438***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	197.55	214.53±0.13	(215.43)	10°	24	182.37	**6T-8439***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	197.55	214.53±0.13	(215.43)	10°	24	182.37	**6T-9986***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	197.52	214.5±0.13	(215.4)	10°	24	186	**3T-6541***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	197.52	214.5±0.13	(215.4)	10°	24	186	**9G-5315***
	R0.5	5±0.25	2	203	213±0.1	214±0.1	10°	14.5	191	386-1094
	R0.5	5±0.25	2	203	213±0.1	(214)	10°	14.5	191	JS1910SB
	R0.5	4±0.25	0.8	207	219.8±0.1	220.8±0.1	10°	18.5	192	386-1095
	R0.5	4±0.25	0.8	207	219.8±0.1	220.8±0.1	10°	18.5	192	386-1096
	R0.5	6.3±0.25	1	216	232..5±0.1	233..5±0.1	10°	21	200	386-1097
	R0.5	5±0.25	1	219	230.5±0.1	(231.5)	10°	17	205	JS2050S
	R0.5	5±0.25	1	219	230.5±0.1	(231.5)	10°	17	205	JS2050SJ
	R0.5	4±0.25	0.8	219	230.5±0.1	231.5±0.1	10°	17	207	JS2070S
	R0.5	4±0.25	0.8	219	230.5±0.1	231.5±0.1	10°	17	207	JS2070SF
	R0.5	4±0.25	0.8	219	230.5±0.1	231.5±0.1	10°	17	207	JS2070SF2
	R0.5	4±0.25	0.8	219	230.5±0.1	231.5±0.1	10°	17	207	JS2070R
	R0.5	4±0.25	0.8	219	230.5±0.1	231.5±0.1	10°	17	207	JS2070RF
	R0.5	4±0.25	0.8	219	230.5±0.1	231.5±0.1	10°	17	207	JS2070RF2
	R0.6	4±0.25	2	224	241.8±0.1	(242.6)	10°	21.5	209	386-1099
	R0.5	4±0.25	5	224	241.8±0.1	242.6±0.1	10°	21.5	209	386-1098
	R0.8	0.8±0.25	0.8	224		242.6±0.1	10°	21.5	209	JS2090S
	R0.5	4±0.25	5	224	241.8±0.1	242.6±0.1	10°	21.5	209	JS2090SHA
	R0.5	4±0.25	2	224	241.8±0.1	242.6±0.1	10°	21.5	209	JS2090RF
	R0.5	4±0.25	0.8	232	243.2±0.1	244±0.1	10°	16.5	220	386-1100

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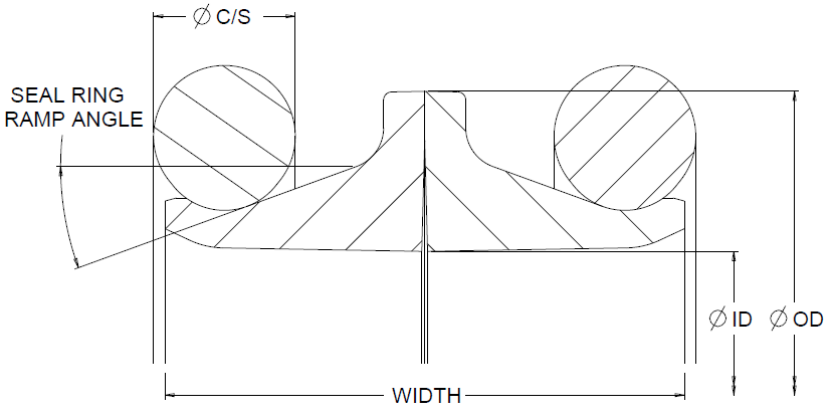
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
386-1102	220	239.5	STELLITE	NITRILE (65)	20	9	31.8			14.5±0.1	2.8±0.1
JS2200SK	220	239.5	STELLITE	NITRILE (65)	17.5	9	31.8			14±0.1	3.3±0.1
JS2200SKA	220	239.5	STELLITE	NITRILE (65)	17.5	9	31.8			14±0.1	3.3±0.1
JS2200U	220	239.5	NI-HARD	NITRILE (65)	20	9	31.8			14.5±0.1	2.8±0.1
JS2200R	220	239.5	NI-HARD	NITRILE (65)	20	9	31.8			14.5±0.1	2.8±0.1
386-1101	220	241.4	STELLITE	NITRILE (60)	15	7.7	25	243.3	6.5	11±0.1	2.2±0.1
JS2200RBA	220	241.4	NI-HARD	NITRILE (60)	15	7.7	25	243.3	6.5	11±0.1	2.2±0.1
JS2200RH	220	246	NI-HARD	NITRILE (65)	15	13	41			21±0.1	3.5±0.1
JS2215SB	221.5	239.5	STELLITE	NITRILE (65)	17.5	9.5	31.8	242.5	7.5	14.5±0.1	2.8±0.1
386-1103	223.5	252	STELLITE	NITRILE (65)	15	12.7	38			18±0.1	3.1±0.1
6Y-0859*	223.52	251.46	STELLITE	NITRILE (60)	8	12.7	46.6	254.3	10.7	22±0.5	3.7±0.25
440-4292	223.52	251.46	STELLITE	NITRILE (60)	8	12.7	46.6	254.3	10.7	22±0.5	3.7±0.25
6Y-6277*	223.52	251.46	STELLITE	SILICONE (70)	8	12.7	46.6	254.3	10.7	22±0.5	3.7±0.25
6T-8435*	223.52	251.46	STELLITE	NITRILE (60)	15	12.7	39	254.3	10.7	22±0.5	3.7±0.25
171-5897*	223.52	251.46	STELLITE	LT-NBR (70)	15	12.7	39	254.3	10.7	22±0.5	3.7±0.25
498-2701*	223.52	251.46	STELLITE	LT-NBR (60)	15	12.7	39	254.3	10.7	22±0.5	3.7±0.25
9W-4650*	223.52	251.46	STELLITE	SILICONE (70)	15	12.7	39	254.3	10.7	22±0.5	3.7±0.25
469-9174*	223.52	251.46	Ni-HARD	SILICONE (65)	8	12.7	46.6	254.3	10.7	22±0.5	3.7±0.25
213-7509*	223.52	251.46	Ni-HARD	NITRILE (60)	15	12.7	39	254.3	10.7	22±0.5	3.7±0.25
195-3070*	223.52	251.46	C6	NITRILE (60)	8	12.7	46.6	254.3	10.7	22±0.5	3.7±0.25
210-5535	223.52	251.46	C6	HNBR (70)	8	12.7	46.6	254.3	10.7	22±0.5	3.7±0.25
445-0455*	223.52	251.46	C6	SILICONE (65)	8	12.7	46.6	254.3	10.7	22±0.5	3.7±0.25
386-1105	225	252	STELLITE	NITRILE (65)	21	12	37			19±0.1	3±0.1
386-1104	225	252	STELLITE	NITRILE (65)	15	12.7	38			19±0.1	3±0.1
9G-5343*	227.15	251.46	FORMED	NITRILE (60)	8	12.7	46.18	254.3	10.7	22±0.5	3.7±0.25
9W-5977*	227.15	251.46	FORMED	SILICONE (70)	8	12.7	46.18	254.3	10.7	22±0.5	3.7±0.25
383-4232	227.15	251.46	FORMED	SILICONE (65)	8	12.7	46.18	254.3	10.7	22±0.5	3.7±0.25
9G-5317*	227.15	251.46	FORMED	NITRILE (60)	15	12.7	38.6	254.3	10.7	22±0.5	3.7±0.25

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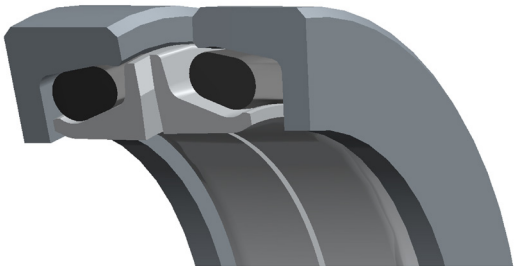

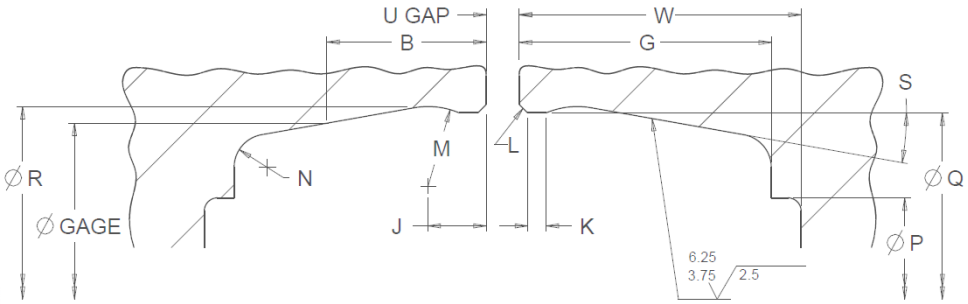

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.4	4±0.25	0.8	232	243.2±0.1	244±0.1	10°	16.5	220	386-1102
	1±0.2x45°	4±0.25	3	232	243.2±0.1	244±0.1	10°	16.5	220	JS2200SK
	1±0.2x45°	4±0.25	3	232	243.2±0.1	244±0.1	10°	16.5	220	JS2200SKA
	R0.4	4±0.25	0.8	232	243.2±0.1	244±0.1	10°	16.5	220	JS2200U
	R0.4	4±0.25	0.8	232	243.2±0.1	244±0.1	10°	16.5	220	JS2200R
	R0.5	4±0.25	1	233.5	244±0.1	(244.7)	10°	13.5	220	386-1101
	R0.5	4±0.25	1	233.5	244±0.1	(244.7)	10°	13.5	220	JS2200RBA
	R0.5	4±0.25	0.8	238	253.4±0.1	254.6±0.1	10°	24	220	JS2200RH
	R0.5	5±0.25	1	232	243±0.1	(244)	10°	16.5	221.5	JS2215SB
	R0.8	0.8±0.25	0.8	238		256.6±0.1	10°	20	223.5	386-1103
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**6Y-0859***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	440-4292
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**6Y-6277***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**6T-8435***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**171-5897***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**498-2701***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**9W-4650***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**469-9174***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**213-7509***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**195-3070***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	210-5535
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	223.52	**445-0455***
	R0.5	4±0.25	2	241	257±0.1	258±0.1	10°	21	225	386-1105
	R0.5	4±0.25	2	240	257±0.1	258±0.1	10°	21	225	386-1104
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	227.15	**9G-5343***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	227.15	**9W-5977***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	227.15	383-4232
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	227.15	**9G-5317***

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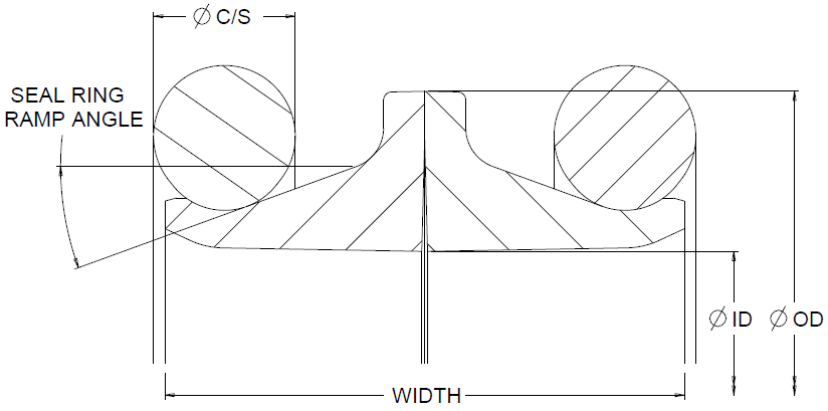

SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
6T-2815*	227.15	251.46	FORMED	SILICONE (70)	15	12.7	38.6	254.3	10.7	22±0.5	3.7±0.25
195-4446	231.65	259.59	STELLITE	NITRILE (60)	15	12.7	39	262.43	10.7	22±0.5	3.7±0.25
9W-4098*	231.65	259.59	STELLITE	NITRILE (60)	15	12.7	39	262.43	10.7	22±0.5	3.7±0.25
9W-6617*	231.65	259.59	STELLITE	SILICONE (70)	15	12.7	39	262.43	10.7	22±0.5	3.7±0.25
314-4124*	235.28	259.59	FORMED	SILICONE (65)	15	12.7	38.6	262.44	10.7	22±0.5	3.7±0.25
6Y-0520*	235.28	259.59	FORMED	SILICONE (70)	15	12.7	38.6	262.44	10.7	22±0.5	3.7±0.25
202-3206*	236.5	259.59	FORMED	NITRILE (60)	15	12.7	38.6	262.44	10.7	22±0.5	3.7±0.25
309-7664*	236.77	264.71	C6	SILICONE (70)	15	12.7	39	271.93	10.7	22±0.5	3.7±0.25
386-1106	240	268	STELLITE	NITRILE (65)	15	12.7	38			19±0.1	3±0.1
386-1107	240	262.8	STELLITE	NITRILE (65)	15	12.4	38			19±0.1	3±0.1
JS2400RO	240	262.8	NI-HARD	NITRILE (60)	15	12.7	38			19±0.1	3±0.1
JS2400ROA	240	262.8	NI-HARD	NITRILE (60)	15	12.7	36.6			19±0.1	3±0.1
JS2400UD	240	262.8	NI-HARD	NITRILE (65)	15	12.4	38			19±0.1	3±0.1
386-1108	250	276	STELLITE	NITRILE (60)	15	13	41			20.5±0.1	3±0.1
386-1109	250	276	Ni-HARD	NITRILE (65)	15	13	41			20.5±0.1	3±0.1
JS2500R	250	276	NI-HARD	NITRILE (65)	15	13	41			20.5±0.1	3±0.1
386-1110	265	293	Ni-HARD	NITRILE (65)	15	12.7	38			19±0.1	3±0.1
9W-3732*	264.82	292.86	STELLITE	NITRILE (60)	8	12.7	46.6	295.6	10.7	22±0.5	3.7±0.25
190-0270	264.82	292.86	STELLITE	FKM (60)	8	12.55	46.6	295.6	10.7	22±0.5	3.7±0.25
381-0705*	264.82	292.86	STELLITE	SILICONE (70)	8	12.7	46.6	295.6	10.7	22±0.5	3.7±0.25
6T-8437*	264.82	292.86	STELLITE	NITRILE (60)	15	12.7	39	295.6	10.7	22±0.5	3.7±0.25
171-5898*	264.82	292.86	STELLITE	LT-NBR (70)	15	12.7	39	295.6	10.7	22±0.5	3.7±0.25
9W-4651*	264.82	292.86	STELLITE	SILICONE (70)	15	12.7	39	295.6	10.7	22±0.5	3.7±0.25
137-2429*	264.82	292.86	Ni-HARD	NITRILE (60)	15	12.7	39	295.6	10.7	22±0.5	3.7±0.25
204-6452	264.82	292.86	Ni-HARD	FKM (60)	15	12.55	39	295.6	10.7	22±0.5	3.7±0.25
145-8032*	264.82	292.86	Ni-HARD	SILICONE (70)	15	12.7	39	295.6	10.7	22±0.5	3.7±0.25
386-1111	265	293	STELLITE	NITRILE (65)	15	12.7	38			19±0.1	3±0.1
386-1112	265	293	STELLITE	NITRILE (65)	15	12.7	38	295.55	10	19±0.1	3±0.1

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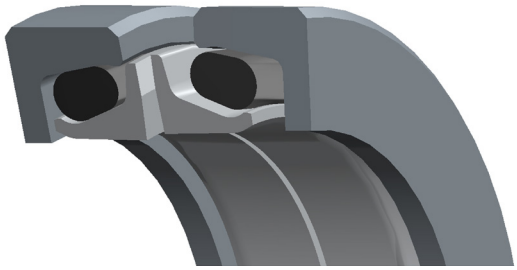

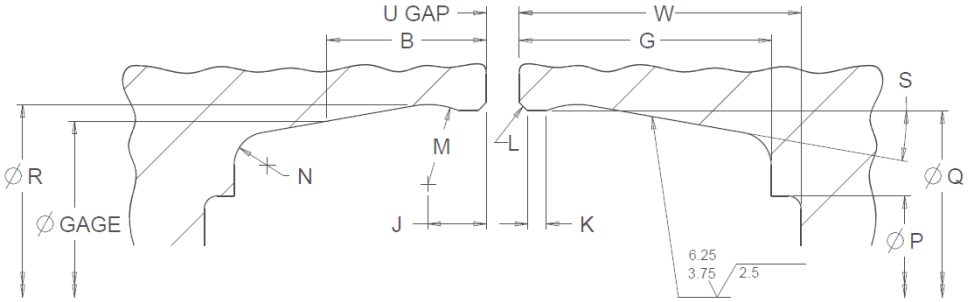

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	238.7	255.68±0.13	(256.58)	10°	24	227.15	**6T-2815***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	246.83	263.81±0.13	(264.71)	10°	24	231.65	195-4446
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	246.83	263.81±0.13	(264.71)	10°	24	231.65	**9W-4098***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	246.83	263.81±0.13	(264.71)	10°	24	231.65	**9W-6617***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	246.84	263.82±0.13	(264.72)	10°	24	235.28	**314-4124***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	246.84	263.82±0.13	(264.72)	10°	24	235.28	**6Y-0520***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	246.84	263.82±0.13	(264.72)	10°	24	236.5	**202-3206***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	256.33	273.31±0.13	(274.21)	10°	24	236.77	**309-7664***
	R0.8	0.8±0.25	0.8	257		274.2±0.1	10°	21	240	386-1106
	R0.5	4±0.25	0.5	257	272.5±0.1	273.5±0.1	10°	21	240	386-1107
	R0.5	4±0.25	2	260	273.2±0.1	274.2±0.1	10°	21	240	JS2400RO
	R0.5	4±0.25	2	260	273.2±0.1	274.2±0.1	10°	21	240	JS2400ROA
	R0.4	4±0.25	0.8	257	272.5±0.1	273.5±0.1	10°	21	240	JS2400UD
	R0.5	4±0.25	0.8	266	283.6±0.1	284.6±0.1	10°	22.5	250	386-1108
	R0.4	4±0.25	0.8	266	283.6±0.1	284.6±0.1	10°	22.5	250	386-1109
	R0.4	4±0.25	0.8	266	283.6±0.1	284.6±0.1	10°	22.5	250	JS2500R
	R0.4	4±0.25	0.8	280	296.9±0.1	297.9±0.1	10°	21	265	386-1110
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	**9W-3732***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	190-0270
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	**381-0705***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	**6T-8437***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	**171-5898***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	**9W-4651***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	**137-2429***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.1	(297.88)	10°	24	264.82	204-6452
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	264.82	**145-8032***
	R0.5	4±0.25	0.8	280	296.9±0.1	297.9±0.1	10°	21	265	386-1111
	R0.5	4±0.25	0.8	277	297.1±0.1	(297.9)	10°	21	265	386-1112

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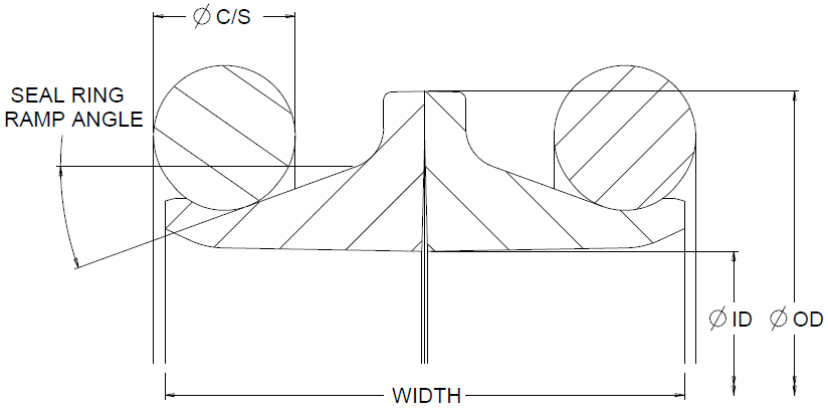
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
JS2650S	265	293	STELLITE	NITRILE (60)	15	12.7	38			19±0.1	3±0.1
JS2650RD	265	293	NI-HARD	HNBR (60)	15	12.7	38			18.9±0.1	4.2±0.1
JS2650RI	265	293	NI-HARD	NITRILE (65)	15	12.7	38	295.9	9	17.5±0.1	3±0.1
JS2650RS	265	293	NI-HARD	NITRILE (70)	15	12.7	38			19±0.1	3±0.1
JS2650UD	265	293	NI-HARD	NITRILE (60)	15	12.7	38			19±0.1	3±0.1
9G-5319*	268.45	292.86	FORMED	NITRILE (60)	15	12.7	38.6	295.6	10.7	22±0.5	3.7±0.25
174-4873	268.45	292.86	FORMED	LT-NBR (70)	15	12.7	38.6	295.6	10.7	22±0.5	3.7±0.25
3T-9117*	268.45	292.86	FORMED	SILICONE (70)	15	12.7	38.6	295.6	10.7	22±0.5	3.7±0.25
JS2720SD	272	295	STELLITE	NITRILE (60)	15	9	30			14.2±0.1	3.5±0.1
386-1113	275	303	STELLITE	NITRILE (65)	15	12.7	38	305.77	10	18±0.1	3.1±0.1
JS2750SBA	275	303	STELLITE	NITRILE (60)	15	12.7	38			18±0.1	3.1±0.1
JS2750RV	275	303	NI-HARD	NITRILE (65)	15	12.7	39			18±0.1	3.1±0.1
386-1114	282	314	STELLITE	NITRILE (65)	15	12.7	40			18±0.1	3±0.1
JS2820R	282	314	NI-HARD	NITRILE (65)	15	12.7	40			18±0.1	3±0.1
7T-2459*	282.92	310.88	STELLITE	NITRILE (60)	15	12.7	37.6	313.69	10.7	22±0.5	3.7±0.25
JS2940RK	294	327	NI-HARD	NITRILE (65)	15	12.8	42			18.5±0.1	3±0.1
386-1116	300	325	STELLITE	NITRILE (65)	15	12.7	38			17.5±0.1	3.1±0.1
JS3000SB	300	324.65	STELLITE	NITRILE (60)	15	12.7	38	333.3	10	17.5±0.1	3.1±0.1
386-1115	300	328	STELLITE	NITRILE (65)	20	12.7	39			19.5±0.1	3±0.1
JS3000SS	300	328	STELLITE	NITRILE (65)	20	12.7	39			19.5±0.1	3±0.1
446-1424*	302	328	Ni-HARD	LT-NBR (60)	15	12.7	38.8	330.72	10.7	22±0.5	3.7±0.25
174-4874*	303.57	328	FORMED	LT-NBR (70)	15	12.7	38.6	330.72	10.7	22±0.5	3.7±0.25
386-1117	318	345	STELLITE	NITRILE (65)	15	12.7	39	349.33	10	19±0.1	3±0.1
JS3180SK	318	345	STELLITE	NITRILE (60)	15	12.7	39			19.6±0.1	4.94±0.1
JS3180RK	318	341.5	NI-HARD	NITRILE (60)	15	12.7	38			19.6±0.1	4.94±0.1
JS3180R	318	345	NI-HARD	NITRILE (65)	15	12.7	39			19±0.1	3±0.1
JS3180U	318	345	NI-HARD	NITRILE (65)	15	12.7	39	349.33	10	19±0.1	3±0.1
JS3185SBB	318.5	341	STELLITE	HNBR (60)	15	12.7	38			19±0.1	3±0.1

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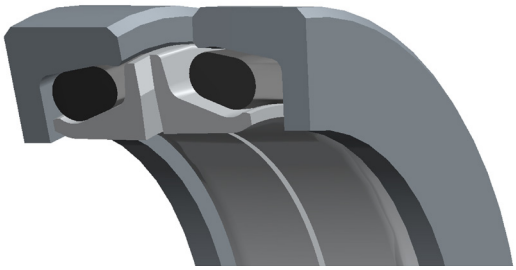
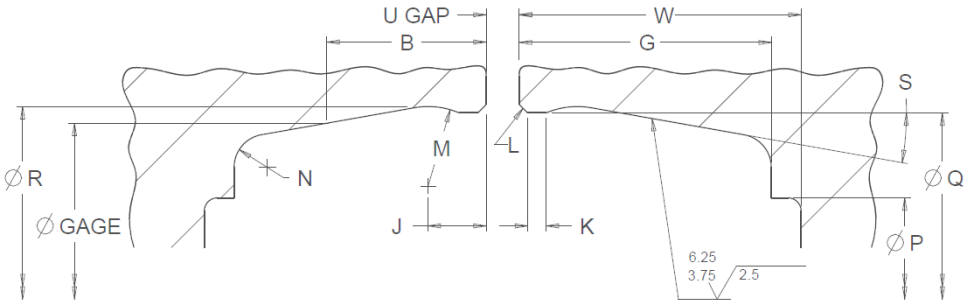
CAT Duo-Cone™ SEALS





K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.5	4±0.25	0.8	280	296.9±0.1	297.9±0.1	10°	21	265	JS2650S
	R1	6.3±0.25	2	280	297±0.1	297.8±0.1	10°	21.5	265	JS2650RD
	0.2±0.2x45°	6±0.25	2.5	280	296.8±0.1	(297.8)	10°	20	265	JS2650RI
	R0.4	4±0.25	0.8	280	296.9±0.1	297.9±0.1	10°	21	265	JS2650RS
	R0.4	4±0.25	0.8	280	296.9±0.1	297.9±0.1	10°	21	265	JS2650UD
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	268.45	**9G-5319***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	268.45	174-4873
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	280	296.98±0.13	(297.88)	10°	24	268.45	**3T-9117***
0.4	0.5±0.2x45°	4±0.25	2	286	298.2±0.1	299.2±0.1	10°	16	272	JS2720SD
	R0.5	6.5±0.25	0.8	290	307.2±0.1	(308)	10°	20.5	275	386-1113
	R0.5	6.5±0.25	1	290	307±0.1	308±0.1	10°	20.5	275	JS2750SBA
	R0.5	4±0.25	0.8	290	307±0.1	308±0.1	10°	19.5	275	JS2750RV
	R0.5	4±0.25	0.8	300	319±0.1	320±0.1	10°	21	282	386-1114
	R0.5	4±0.25	0.8	300	319±0.1	320±0.1	10°	21	282	JS2820R
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	298.09	315.07±0.13	(315.97)	10°	24	282.92	**7T-2459***
	R0.5	4±0.25	2	315	332±0.1	333±0.1	10°	22	294	JS2940RK
	R0.8	0.8±0.25	0.8	318		335.5±0.1	10°	20.5	300	386-1116
	R0.5	6.5±0.25	1	318	334.5±0.1	(335.5)	10°	21.5	300	JS3000SB
	R0.5	4±0.25	0.8	315	332±0.1	333±0.1	10°	22	300	386-1115
	R0.5	4±0.25	0.8	315	332±0.1	333±0.1	10°	22	300	JS3000SS
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	315.12	332.1±0.13	(333)	10°	24	302	**446-1424***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	315.12	332.1±0.13	(333)	10°	24	303.57	**174-4874***
	R0.5	6.5±0.25	0.8	331	350.6±0.1	(351.6)	10°	21.5	318	386-1117
	R1.5	6.3±0.25	1	334	350±0.1	351.6±0.1	10°	21.7	318	JS3180SK
	R1.5	6.3±0.25	1	334	350±0.1	351.6±0.1	10°	21.7	318	JS3180RK
	R0.5	6.5±0.25	0.8	331	350.6±0.1	351.6±0.1	10°	21.5	318	JS3180R
	R0.5	6.5±0.25	0.8	331	350.6±0.1	(351.6)	10°	21.5	318	JS3180U
	R0.5	6.5±0.25	0.8	331	350.6±0.1	351.6±0.1	10°	21.5	318.5	JS3185SBB

Contact Caterpillar for additional dimensions and custom options at catseals@cat.com

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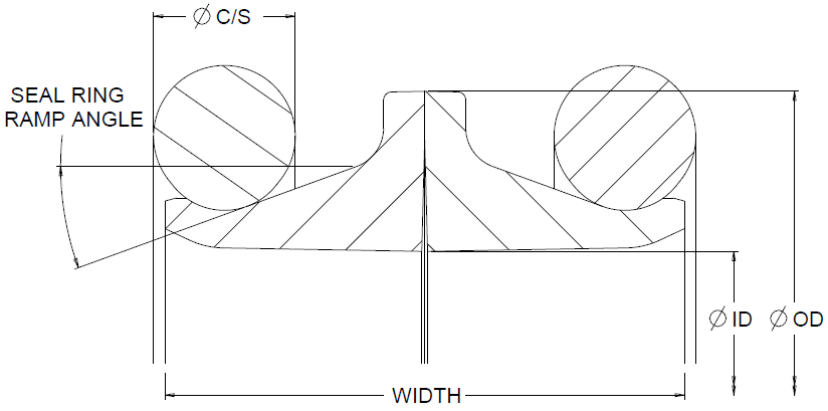

SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
386-1118	318.5	341	STELLITE	NITRILE (65)	15	12.7	38			19±0.1	3±0.1
JS3185SV	318.5	341.5	STELLITE	NITRILE (65)	15	12.7	38			19±0.1	3±0.1
JS3185S	318.5	346.5	STELLITE	NITRILE (65)	15	12.7	38			19±0.1	3.1±0.1
6Y-0857*	318.52	346.46	STELLITE	NITRILE (60)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
383-1597*	318.52	346.46	STELLITE	LT-NBR (70)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
6Y-6275*	318.52	346.46	STELLITE	SILICONE (70)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
190-0271	318.52	346.46	STELLITE	FKM (60)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
6T-8434*	318.52	346.46	STELLITE	NITRILE (60)	15	12.7	39	349.3	10.7	22±0.5	3.7±0.25
175-6294	318.52	346.46	STELLITE	FKM (60)	15	12.7	39	349.3	10.7	22±0.5	3.7±0.25
9W-4652*	318.52	346.46	STELLITE	SILICONE (70)	15	12.7	39	349.3	10.7	22±0.5	3.7±0.25
186-3277*	318.52	346.46	Ni-HARD	SILICONE (70)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
417-7857	318.52	346.46	C6	NITRILE (60)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
373-1647	318.52	346.46	C6	SILICONE (65)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
118-2900*	318.52	346.46	C6	SILICONE (70)	8	12.7	46.6	349.3	10.7	22±0.5	3.7±0.25
166-8815*	318.52	347.5	Ni-HARD	NITRILE (60)	15	12.7	39	349.3	10.7	22±0.5	3.7±0.25
462-6304*	318.52	347.5	Ni-HARD	SILICONE (65)	15	12.7	39	349.3	10.7	22±0.5	3.7±0.25
9G-5347*	322.14	346.46	FORMED	NITRILE (60)	8	12.7	46.18	349.3	10.7	22±0.5	3.7±0.25
163-7368*	322.14	346.46	FORMED	LT-NBR (60)	8	12.7	46.18	349.3	10.7	22±0.5	3.7±0.25
314-4122*	322.14	346.46	FORMED	SILICONE (65)	8	12.7	46.18	349.3	10.7	22±0.5	3.7±0.25
9W-5978*	322.14	346.46	FORMED	SILICONE (70)	8	12.7	46.18	349.3	10.7	22±0.5	3.7±0.25
9G-5321*	322.14	346.46	FORMED	NITRILE (60)	15	12.7	38.6	349.3	10.7	22±0.5	3.7±0.25
207-1571*	322.14	346.46	FORMED	LT-NBR (70)	15	12.7	38.6	349.3	10.7	22±0.5	3.7±0.25
3T-8500*	322.14	346.46	FORMED	SILICONE (70)	15	12.7	38.6	349.3	10.7	22±0.5	3.7±0.25
JS3360RT	336	368	NI-HARD	NITRILE (65)	15	12	40.8			18.6±0.1	4.46±0.1
JS3370S	337	368	STELLITE	NITRILE (65)	15	12.7	40.8		10	19.6±0.1	4.64±0.1
386-1119	338	368	STELLITE	NITRILE (65)	15	12	40.8	373.64	10	19.6±0.1	4.64±0.1
386-1120	340	368	STELLITE	NITRILE (65)	15	12.9	39	373.64	10	19.6±0.2	4.64±0.1
386-1122	340	368	STELLITE	NITRILE (61)	15	12	39	373.2	9	18.6±0.2	3.93±0.1

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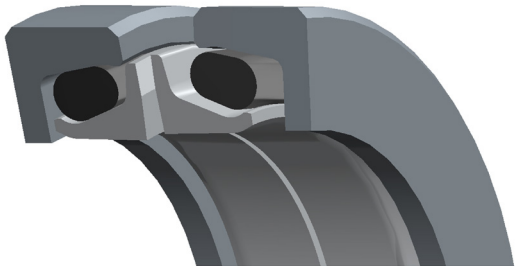

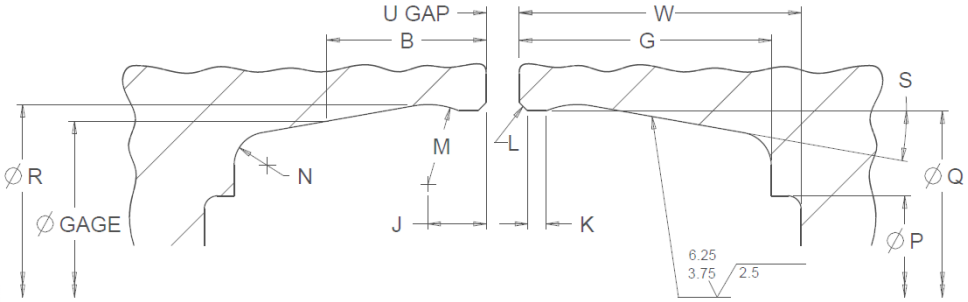

K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.5	6.5±0.25	0.8	335	350.6±0.1	351.6±0.1	10°	21.5	318.5	386-1118
	R0.5	6.5±0.25	0.8	331	350.6±0.1	351.6±0.1	10°	21.5	318.5	JS3185SV
	R0.5	6.5±0.25	0.8	335	350.6±0.1	351.6±0.1	10°	21.5	318.5	JS3185S
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**6Y-0857***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**383-1597***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**6Y-6275***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	190-0271
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**6T-8434***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	175-6294
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**9W-4652***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**186-3277***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	417-7857
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	373-1647
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**118-2900***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**166-8815***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	318.52	**462-6304***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	322.14	**9G-5347***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	322.14	**163-7368***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	322.14	**314-4122***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	322.14	**9W-5978***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	322.14	**9G-5321***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	322.14	**207-1571***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	333.7	350.68±0.13	(351.58)	10°	24	322.14	**3T-8500***
	2±0.2x45°	3±0.25	3	360	373.5±0.1	374.65±0.1	9.5°	21.1	336	JS3360RT
	2.11±0.2x45°	4±0.25	3	355	374.8±0.1	375.41±0.1	10°	22.6	337	JS3370S
	2.11±0.2x45°	4±0.25	3	358.5	374.8±0.1	(375.41)	10°	22.6	338	386-1119
0.9±0.2	2.21±0.2x45°	4±0.25	1	358.5	374.8±0.1	(375.41)	10°	22.1	340	386-1120
0.9±0.2	2.2±0.2x45°	1±0.25	3	358.5	374±0.1	(374.87)	9.5°	21.6	340	386-1122

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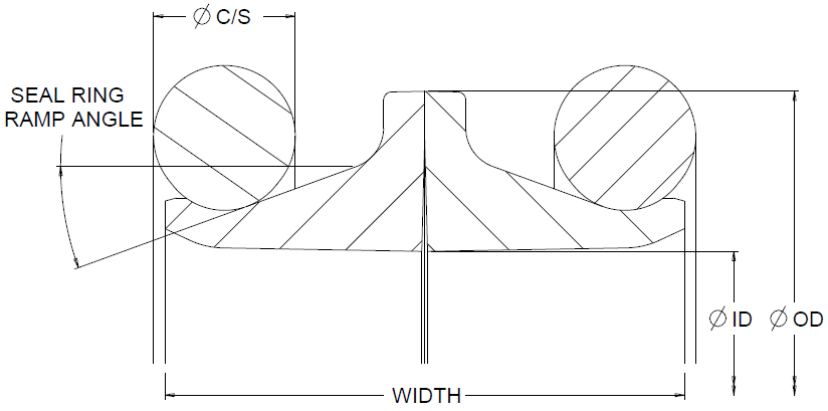
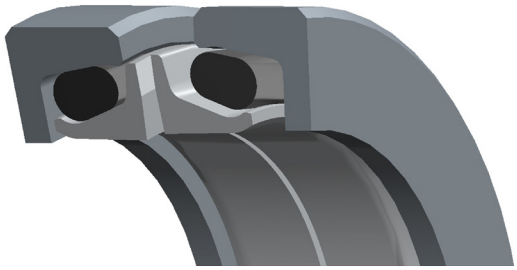
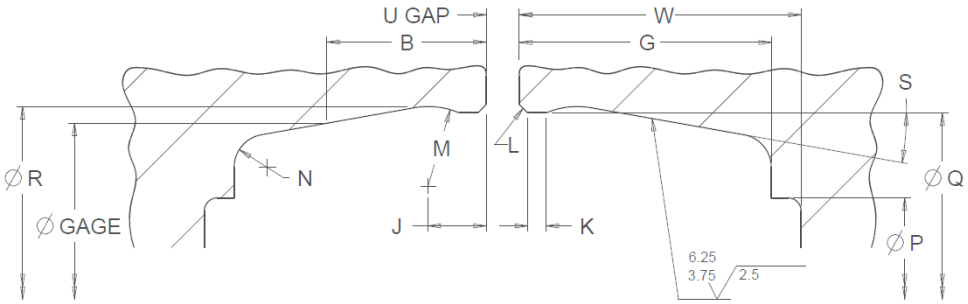


SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
JS3400S	340	368	STELLITE	NITRILE (65)	15	12.7	38			19±0.1	3±0.1
386-1121	340	368	STELLITE	NITRILE (61)	21	12	40.8	373.2	9	18.6±0.2	3.93±0.1
JS3400U	340	368	NI-HARD	NITRILE (60)	15	12.9	39	373.64	10	19.6±0.1	4.64±0.1
305-7976*	341.75	368.75	C6	NITRILE (60)	20	12	40.3	374.76	10.7	22±0.5	3.7±0.25
JS3420R	342	368	NI-HARD	NITRILE (65)	15	12	40.8			18.6±0.1	3.1±0.1
386-1123	350	375	STELLITE	NITRILE (65)	15	12.7	38			17.5±0.1	3.1±0.1
386-1124	356	381	STELLITE	NITRILE (65)	15	12.7	38	387.15	10	18.5±0.1	3±0.1
JS3560SV	356	381	STELLITE	NITRILE (65)	15	12.7	38	387.15	10	18.5±0.1	3±0.1
JS3560U	356	381	NI-HARD	NITRILE (65)	15	12.7	38	387.15	10	18.5±0.1	3±0.1
386-1126	366.5	391	STELLITE	NITRILE (65)	15	13	38			18.5±0.1	3±0.1
JS3660SH	366.5	391	STELLITE	NITRILE (65)	15	13	38			18.5±0.1	3±0.1
386-1125	366.5	394.5	STELLITE	NITRILE (65)	15	12.7	37			18.5±0.1	3±0.1
JS3660SBA	366.5	394.5	STELLITE	NITRILE (65)	15	13	37			18.5±0.1	3±0.1
6Y-0855*	366.52	394.46	STELLITE	NITRILE (60)	8	12.7	46.6	397.3	10.7	22±0.5	3.7±0.25
6Y-6273*	366.52	394.46	STELLITE	SILICONE (70)	8	12.7	46.6	397.3	10.7	22±0.5	3.7±0.25
6T-8433*	366.52	394.46	STELLITE	NITRILE (60)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
213-4737*	366.52	394.46	STELLITE	LT-NBR (70)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
137-2428*	366.52	394.46	Ni-HARD	NITRILE (60)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
155-1388	366.52	394.46	Ni-HARD	SILICONE (70)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
314-4119*	366.52	394.46	Ni-HARD	SILICONE (65)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
6T-4316*	366.52	394.46	C6	NITRILE (60)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
133-0441*	366.52	394.46	C6	HNBR (70)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
149-8434*	366.52	394.46	C6	SILICONE (70)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
341-8543*	366.52	394.46	C6	SILICONE (65)	15	12.7	39	397.3	10.7	22±0.5	3.7±0.25
9G-5323*	369.77	394.1	FORMED	NITRILE (60)	15	12.7	38.6	397.3	10.7	22±0.5	3.7±0.25
255-2272*	369.77	394.1	FORMED	LT-NBR (70)	15	12.7	38.6	397.3	10.7	22±0.5	3.7±0.25
314-4120*	369.77	394.1	FORMED	SILICONE (65)	15	12.7	38.6	397.3	10.7	22±0.5	3.7±0.25
9G-5349*	370.05	394.46	FORMED	NITRILE (60)	8	12.7	46.18	397.3	10.7	22±0.5	3.7±0.25

**** Denotes Part Number is available within the Cat Dealer Network***

CAT Duo-Cone™ SEALS





K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
	R0.8	0.8±0.25	0.8	358		374.8±0.1	10°	21.5	340	JS3400S
0.9±0.2	2.2±0.2x45°	1±0.25	3	358.5	374±0.1	(374.87)	9.5°	21.6	340	386-1121
	2.21±0.2x45°	4±0.25	1	358	374.8±0.1	(375.41)	10°	21.6	340	JS3400U
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	359.16	376.14±0.13	(377.04)	10°	24	341.75	**305-7976***
	2.2±0.2x45°	1±0.25	3	358	374±0.1	374.88±0.1	9.5°	21.1	342	JS3420R
	R0.5	6.5±0.25	1	368	384.5±0.1	385.5±0.1	10°	20.5	350	386-1123
	R0.5	4±0.25	2	370	388.5±0.1	389.5±0.1	10°	21	356	386-1124
	R0.5	4±0.25	2	370	388.5±0.1	(389.5)	10°	21	356	JS3560SV
	R0.5	4±0.25	2	370	388.5±0.1	(389.5)	10°	21	356	JS3560U
	R0.5	4±0.25	0.8	381.8	398.5±0.1	399.5±0.1	10°	21	366.5	386-1126
	R0.5	4±0.25	0.8	381.8	398.5±0.1	399.5±0.1	10°	21	366.5	JS3660SH
	R0.5	6.4±0.25	2	382	398.8±0.1	399.5±0.1	10°	21	366.5	386-1125
	R0.5	4±0.25	2	381.8	398.5±0.1	399.5±0.1	10°	21	366.5	JS3660SBA
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**6Y-0855***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**6Y-6273***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**6T-8433***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**213-4737***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**137-2428***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	155-1388
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**314-4119***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**6T-4316***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**133-0441***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**149-8434***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	366.52	**341-8543***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	369.77	**9G-5323***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	369.77	**255-2272***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	369.77	**314-4120***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	370.05	**9G-5349***

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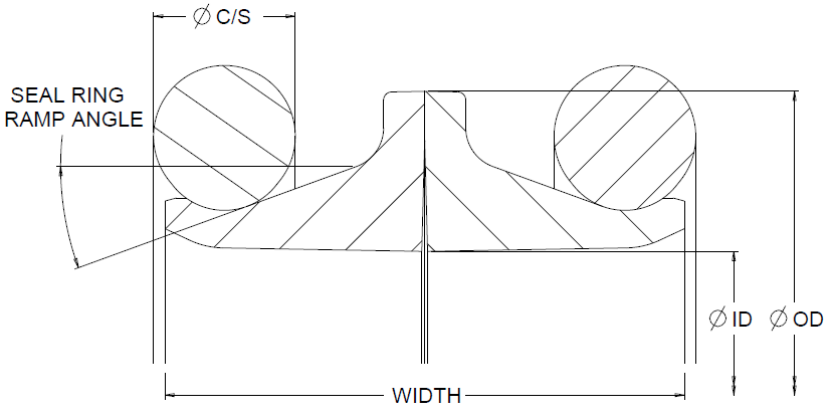
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
9W-5979*	370.05	394.46	FORMED	SILICONE (70)	8	12.7	46.18	397.3	10.7	22±0.5	3.7±0.25
JS3760ST	376	405	STELLITE	NITRILE (65)	15	12	40			17±0.1	3.83±0.1
386-1127	384	413.5	STELLITE	NITRILE (65)	15	12.2	39	417.23	10	18±0.1	3±0.1
386-1128	387	415	STELLITE	NITRILE (65)	15	12.2	38	417.23	10	18±0.1	3±0.1
JS3870SI	387	415	STELLITE	NITRILE (65)	15	12.7	38	418.2	9.5	17.5±0.1	3±0.1
314-4128*	400.2	427.2	C6	SILICONE (65)	15	12.7	39	430.04	10.7	22±0.5	3.7±0.25
JS4290SH	429	454	STELLITE	NITRILE (65)	15	12.7	37			18.5±0.1	3±0.1
JS4290SW	429	454	STELLITE	NITRILE (65)	15	12.7	37			18.5±0.1	3±0.1
386-1130	429	454	STELLITE	NITRILE (65)	15	13	37			18±0.1	2.5±0.1
386-1131	429	454	STELLITE	FKM (65)	15	13	37			18±0.1	2.5±0.1
386-1129	429	457	STELLITE	NITRILE (65)	15	13	38			18±0.1	3±0.1
JS4290SI	429	457	STELLITE	NITRILE (65)	15	12.7	38			17.5±0.1	3±0.1
JS4290SBA	429	457	STELLITE	SILICONE (60)	15	12.7	38			17.5±0.1	3±0.1
JS4290ST	429	457	STELLITE	NITRILE (65)	15	13	38			18±0.1	3±0.1
4D-8960*	429.26	457.2	STELLITE	NITRILE (60)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
186-6493	429.26	457.2	STELLITE	NITRILE (60)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
205-9025*	429.26	457.2	STELLITE	LT-NBR (70)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
175-6297	429.26	457.2	STELLITE	FKM (60)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
195-3495*	429.26	458.36	C6	NITRILE (60)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
137-4343*	429.26	458.36	C6	HNBR (70)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
175-6299	429.26	458.36	C6	FKM (60)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
195-9706*	429.26	458.36	C6	SILICONE (70)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
314-4126*	429.26	458.36	C6	SILICONE (65)	15	12.7	39	460.04	10.7	22±0.5	3.7±0.25
212-2784*	430.35	457.2	C6	NITRILE (60)	8	12.7	46.6	460.04	10.7	22±0.5	3.7±0.25
201-5468	430.35	457.2	C6	FKM (60)	8	12.7	46.6	460.04	10.7	22±0.5	3.7±0.25
JS4500SB	450	480	STELLITE	NITRILE (60)	13	16	50	489.2	13	23.5±0.1	4±0.1
JS4500RB	450	480	NI-HARD	NITRILE (60)	13	16	50	489.2	13	23.5±0.1	4±0.1
365-4924*	454.66	482.6	C6	SILICONE (65)	15	12.7	39	485.44	10.7	22±0.5	3.7±0.25

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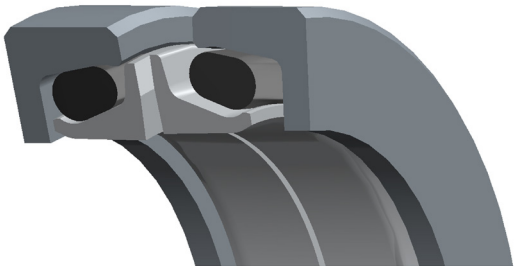
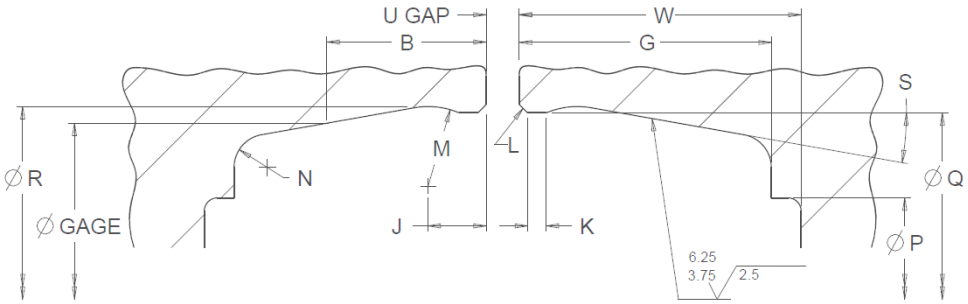
CAT Duo-Cone™ SEALS





K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	381.7	398.68±0.13	(399.58)	10°	24	370.05	**9W-5979***
	1±0.2x45°	4.5±0.25	3 MAX	395	411.2±0.1	412.5±0.1	10°	20.5	376	JS3760ST
	R0.5	6.5±0.25	0.8	400	418.7±0.1	(419.5)	10°	20.5	384	386-1127
	R0.5	6.5±0.25	0.8	400	418.7±0.1	(419.5)	10°	20.5	387	386-1128
	R0.2	6.5±0.25	1	402	419.4±0.1	(420.3)	10°	20.5	387	JS3870SI
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	414.44	431.42±0.13	(432.32)	10°	24	400.2	**314-4128***
	R0.5	4±0.25	0.8	444.6		462.3±0.1	10°	21	429	JS4290SH
	R0.2	4±0.25	2	444.6	461.3±0.3	462.3±0.1	10°	21	429	JS4290SW
	R0.5	4±0.25	0.8	444	462.5±0.1	463.5±0.1	10°	20.5	429	386-1130
	R0.5	4±0.25	0.8	444	462.5±0.1	463.5±0.1	10°	20.5	429	386-1131
	R0.8	0.8±0.25	0.8	444		463.5±0.1	10°	20.5	429	386-1129
	R0.2	6.5±0.25	1	444	461.3±0.1	462.3±0.1	10°	20.5	429	JS4290SI
	R0.2	6.5±0.25	1	444	461.3±0.1	462.3±0.1	10°	20.5	429	JS4290SBA
	R0.5	4±0.25	0.8	444	462.5±0.1	463.5±0.1	10°	20.5	429	JS4290ST
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	**4D-8960***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	186-6493
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	**205-9025***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	175-6297
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	**195-3495***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	**137-4343***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	175-6299
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	**195-9706***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	429.26	**314-4126***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	430.35	**212-2784***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	444.44	461.42±0.13	(462.32)	10°	24	430.35	201-5468
	R0.5	6±0.25	1	470	490.2±0.4	(492.2)	10°	25.5	450	JS4500SB
	R0.5	6±0.25	1	470	490.2±0.4	(492.2)	10°	25.5	450	JS4500RB
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	469.84	486.82±0.13	(487.72)	10°	24	454.66	**365-4924***

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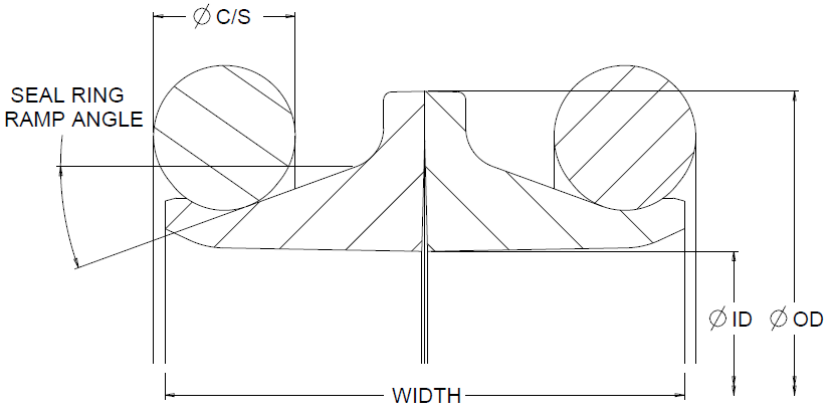
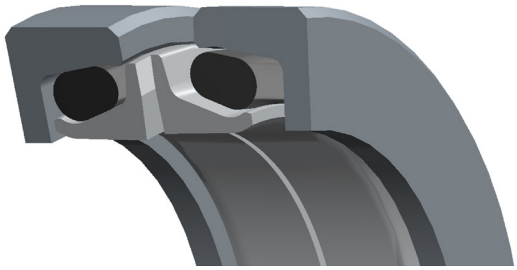
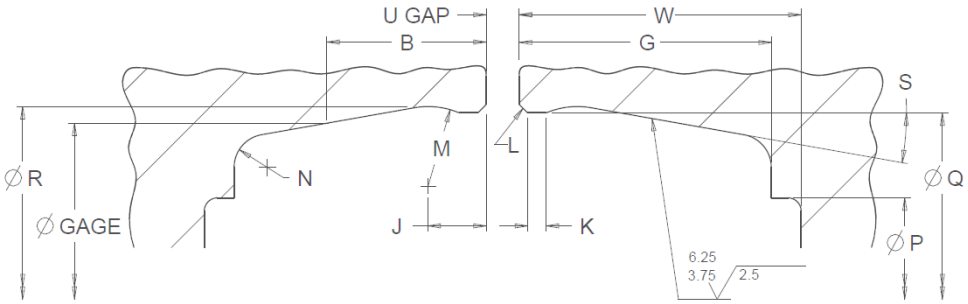
CAT Duo-Cone™ SEALS



SEAL GROUP	ID	OD	SEAL RING MATERIAL	TORIC MATERIAL	SEAL RING RAMP ANGLE	C/S	WIDTH	GAGE Ø ±0.13	B	G	J
319-3887*	454.66	482.6	C6	SILICONE (65)	15	12.7	39	485.44	10.7	22±0.5	3.7±0.25
386-1132	505	533.4	STELLITE	NITRILE (65)	15	12.7	43.6			19.7±0.1	4±0.1
214-7880*	505.46	533.4	C6	LT-NBR (60)	15	12.7	39.8	536.24	10.7	22±0.5	3.7±0.25
6T-6802*	505.8	534	C6	NITRILE (60)	15	12.7	45	536.24	10.7	22±0.5	3.7±0.25
175-6298	505.8	534	C6	FKM (60)	15	12.7	45	536.24	10.7	22±0.5	3.7±0.25
190-4136	505.8	534	C6	SILICONE (70)	15	13	45	536.24	10.7	22±0.5	3.7±0.25
147-5509*	505.8	534	C6	SILICONE (70)	15	12.7	45	536.24	10.7	22±0.5	3.7±0.25
297-9546*	505.8	534	C6	SILICONE (65)	15	12.7	45	536.24	10.7	22±0.5	3.7±0.25
386-1133	530	560	STELLITE	NITRILE (60)	15	16	50	569.21	13	23.5±0.1	4±0.1
JS5300SB	530	560	STELLITE	NITRILE (60)	13	16	50	569.2	13	23.5±0.1	4±0.1
172-5284*	540	567.94	C6	NITRILE (60)	15	12.7	39	570.78	10.7	22±0.5	3.7±0.25
365-4920*	540	567.94	C6	SILICONE (65)	15	12.7	39	570.78	10.7	22±0.5	3.7±0.25
8E-6327*	540	567.94	C6	SILICONE (70)	15	12.7	39	570.78	10.7	22±0.5	3.7±0.25
1C-9748*	667.58	700	C6	NITRILE (60)	15	12.75	43.68	703.28	10.7	22±0.5	3.7±0.25
433-1348*	667.58	700	C6	NITRILE (60)	15	12.7	43.68	703.28	10.7	22±0.5	3.7±0.25
147-5510*	667.58	700	C6	SILICONE (70)	15	12.7	43.68	703.28	10.7	22±0.5	3.7±0.25
314-4130*	667.58	700	C6	SILICONE (65)	15	12.7	43.68	703.28	10.7	22±0.5	3.7±0.25
378-0592*	773.72	806.72	C6	SILICONE (65)	15	12.7	43.46	810	10.7	22±0.5	3.7±0.25
110-9718	832	865	C6	NITRILE (60)	16	12.65	43.68	868.28	10.7	22±0.5	3.7±0.25
152-9157	832	865	C6	HNBR (70)	16	12.8	43.68	868.28	10.7	22±0.5	3.7±0.25
453-5929*	832	865.44	C6	SILICONE (65)	16	12.7	45.4	869.37	10.7	22±0.5	3.7±0.25
148-6633	898.22	939.8	C6	HNBR (70)	16	16	55.04	943.44	13.48	23.18±0.5	4.66±0.25

**** Denotes Part Number is available within the Cat Dealer Network***





K (MIN)	L	M	N	ØP (±0.5)	ØQ	ØR	S (±0.5°)	W (MIN)	ID	SEAL GROUP
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	469.84	486.82±0.13	(487.72)	10°	24	454.66	**319-3887***
	R0.5	6.5±0.25	3	521	536.4±0.1	538.3±0.1	10°	21.7	505	386-1132
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	520.64	537.62±0.13	(538.52)	10°	24	505.46	**214-7880***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	520.64	537.62±0.13	(538.52)	10°	24	505.8	**6T-6802***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	520.64	537.62±0.13	(538.52)	10°	24	505.8	175-6298
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	520.64	537.62±0.13	(538.52)	10°	24	505.8	190-4136
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	520.64	537.62±0.13	(538.52)	10°	24	505.8	**147-5509***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	520.64	537.62±0.13	(538.52)	10°	24	505.8	**297-9546***
	R0.5	6±0.25	1	545	570.2±0.1	(572.2)	10°	25.5	530	386-1133
	R0.5	6±0.25	1	545	570.2±0.4	(572.2)	10°	25.5	530	JS5300SB
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	555.18	572.16±0.13	(573.06)	10°	24	540	**172-5284***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	555.18	572.16±0.13	(573.06)	10°	24	540	**365-4920***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	555.18	572.16±0.13	(573.06)	10°	24	540	**8E-6327***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	687.68	704.66±0.13	(705.56)	10°	24	667.58	**1C-9748***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	687.68	704.66±0.13	(705.56)	10°	24	667.58	**433-1348***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	687.68	704.66±0.13	(705.56)	10°	24	667.58	**147-5510***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	687.68	704.66±0.13	(705.56)	10°	24	667.58	**314-4130***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	794.4	811.38±0.13	(812.28)	10°	24	773.72	**378-0592***
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	852.68	869.66±0.13	(870.56)	10°	24	832	110-9718
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	852.68	869.66±0.13	(870.56)	10°	24	832	152-9157
0.4	0.5±0.2x45°	6.3±0.25	3 MAX	853.77	870.75±0.13	(871.65)	10°	24	832	**453-5929***
0.4	0.5±0.2x45°	7.94±0.25	3.78 MAX	923.84	945.18±0.13	(946.3)	10°	25.18	898.22	148-6633

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CAT DUO-CONE™ SEAL TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (°)			Nominal	+/- Variation
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
5K-6191	82.55	20	9.47	224-9466	9.3	1.5
107-4889	92	8	9.47	224-9467	10.6	1.5
162-7862	92	8	9.47	224-9467	10.6	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
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
162-7863	102	8	9.47	227-4755	10.6	1.5
9W-8878	102	8	9.47	227-4755	10.6	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
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
171-5811	119.08	20	9.47	1U-8842	8.9	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
3P-1848	119.08	20	9.47	1U-8842	8.7	1.5
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
434-1922	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

CAT DUO-CONE™ SEAL TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (°)			Nominal	+/- Variation
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
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
176-5331	146.05	20	9.47	1U-8849	8.88	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
186-6531	168.3	15	6.22	1U-8697	7.6	1.5
359-4804	168.3	15	6.22	1U-8697	7.6	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
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
176-5332	171.5	20	9.47	4C-6206	8.88	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
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
195-3070	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

CAT DUO-CONE™ SEAL TOOLS

Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (°)			Nominal	+/- Variation
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
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
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	292.86	15	12.7	1U-6434	11.77	1.5
7T-2459	310.86	15	12.7	220-5726	11.55	1.5
174-4874	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

CAT DUO-CONE™ SEAL TOOLS

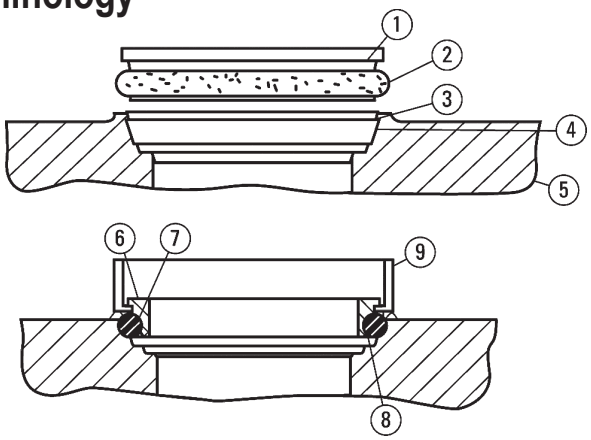
Seal Groups	Seal Ring		Toric Cross-Section (mm)	Installation Tool	Assembled Height	
	OD (mm)	Angle (°)			Nominal	+/- Variation
9G-5321	346.46	15	12.7	1U-5933	11.88	1.5
9W-4652	346.46	15	12.7	1U-5933	11.55	1
166-8815	347.5	15	12.7	1U-5933	11.55	1.5
305-7976	368.75	20	12.7	317-3806	11.4	1.5
255-2272	394.1	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
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
378-0592	806.72	15	12.7	264-5067	13.78	1.5

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 Ret. Lip
9. Installation Tool

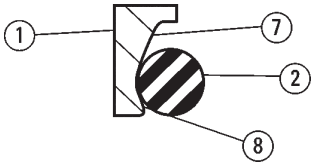
Handling the Seals

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

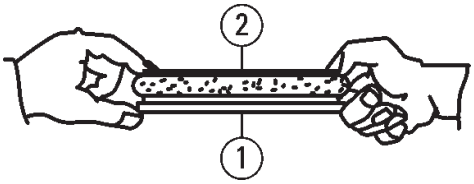
Housing Preparation

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.



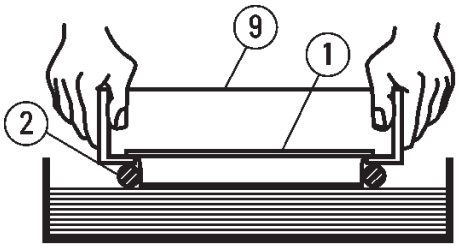
Place the rubber torics on the metal seal ring at the bottom of the seal ring ramp and against the retaining lip.



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

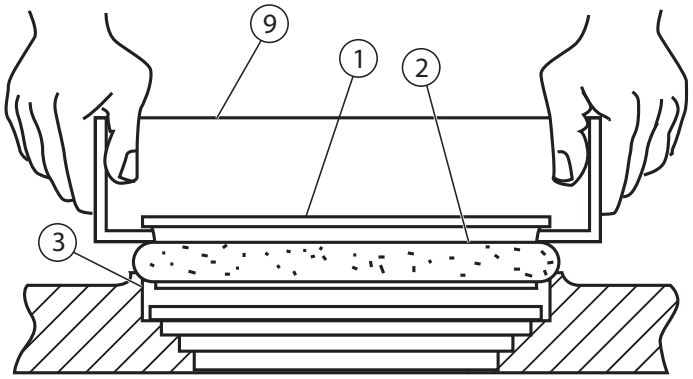
- Isopropyl Alcohol*
- Houghto-Grind 60 CT
- Quaker® Solvo Clean 68-RAH

(*) 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).



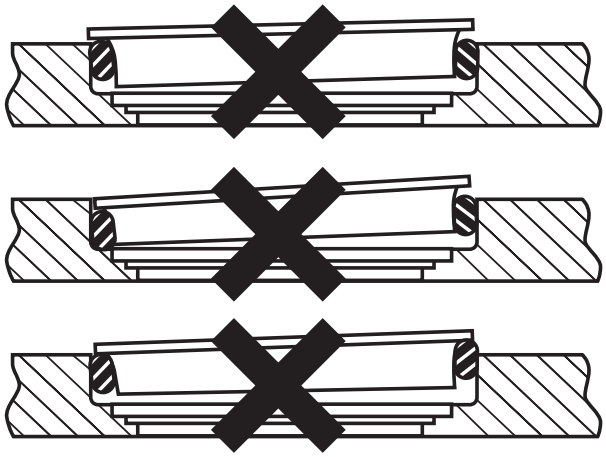
For smaller diameter seals, use sudden and even pressure to push the rubber toric under the retaining lip of the housing. For larger diameter seals, which will not press in with sudden and even pressure, it is acceptable to work the toric past the retaining lip by starting one side and tapping the opposite 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 at least four places, 90° apart, use a caliper, toolmakers' ruler or any other calibrated measuring device.

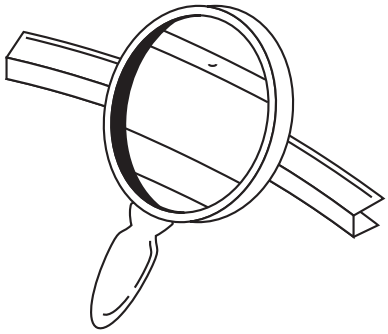
The difference in height around the ring must not be more than 1.00 mm. If small adjustments are necessary, do not push or pull directly on the seal ring. Use the installation tool to push down and your fingers to pull up uniformly on the rubber toric and seal ring.

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)

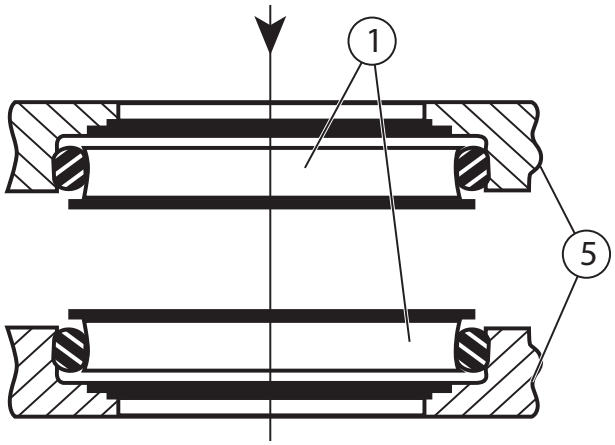


Apply a thin film of oil on the entire seal face of one or both seals using a lint-free applicator. Oil must not contact surfaces other than the sealing face.

Final Assembly

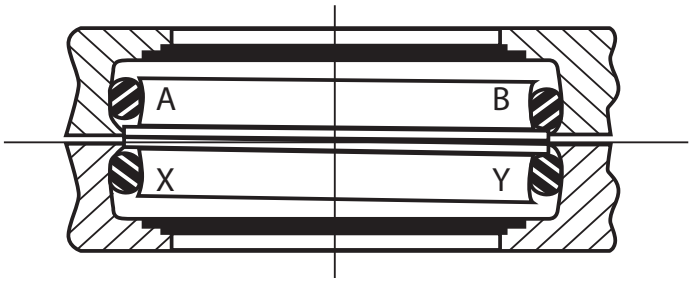
While completing the final assembly of the unit, make sure that both housings are in correct alignment and are concentric. Slowly bring the two housings together. High impact can scratch or break the seal components.

CAT DUO-CONE SEALS INSTALLATION

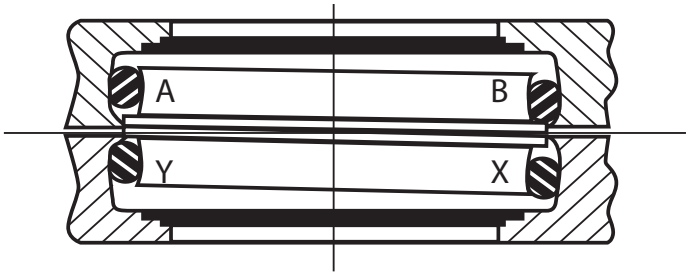


If the rubber toric slips at any location, it will twist, causing the seal rings to cock. Any wobbling motion of the seal is an indication of cocked seals and can cause dirt to enter by pumping mud past the torics.

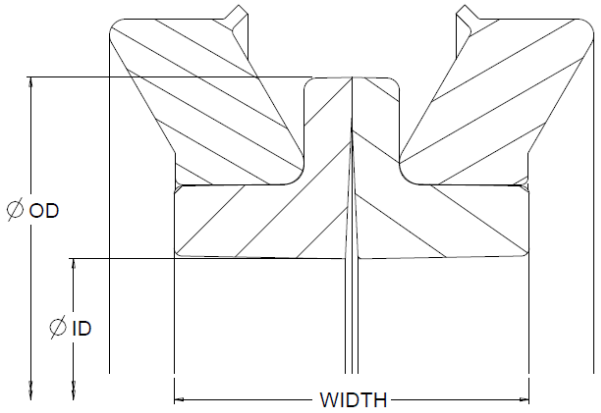
The following examples show the effects of a cocked seal group.



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°.



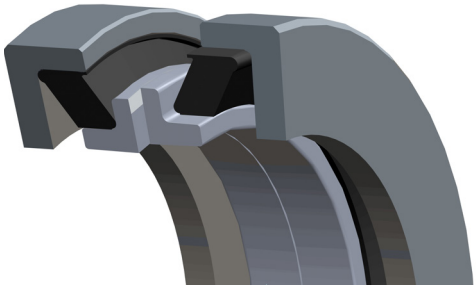
CAT HEAVY DUTY DUAL FACED SEALS

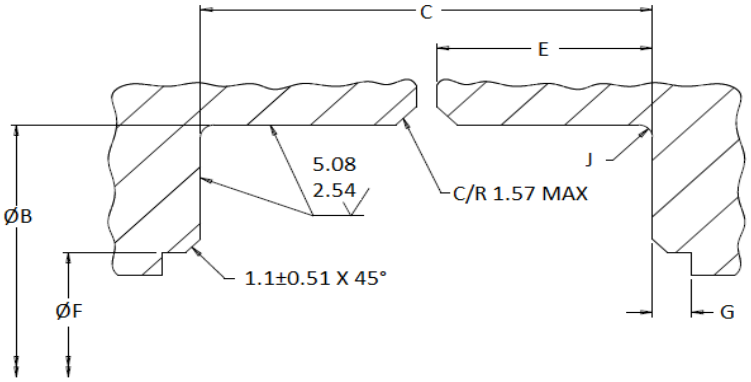


GROUP	ID	OD	SEAL RING MATERIAL	BELLEVILLE WASHER MATERIAL	SHAFT DIAMETER (MAX)	WIDTH
132-0356	46.86	61.6	Stellite	Nitrile	42.88	20.56
132-0362	46.86	61.6	Stellite	LT-NBR	42.88	20.56
192-0052	50.6	65.08	C6	Nitrile	46.02	18.56
132-0368	50.86	65.08	Stellite	Nitrile	46.02	18.56
215-6276	50.86	65.08	Stellite	LT-NBR	46.02	18.56
132-0377	58.27	73	Stellite	Nitrile	53.98	19.56
132-0383	67.46	86.36	Stellite	Nitrile	63.5	19.82
132-0389	67.46	86.36	Stellite	LT-NBR	63.5	19.82
132-0400	73.81	92.48	Stellite	Nitrile	69.85	18.8
132-0404	73.81	92.48	Stellite	LT-NBR	66.68	18.8
192-0061	73.81	92.48	C6	Nitrile	60.33	18.8
269-3358	76	90	C6	FKM	73.92	17
132-0422	82.55	100.33	Stellite	Nitrile	77.8	22.16
245-4631	82.55	100.33	C6	FKM	77.8	22.16
458-6657	82.55	100.33	Ni-Hard	FKM	77.8	22.16
444-1244	82.55	100.33	C6	LT-NBR	77.8	22.16
253-1727	88	104	Stellite	FKM	83.5	16.4
377-2188	88	104	Stellite	LT-NBR	83.5	16.4
132-0433	90.25	106.55	Stellite	Nitrile	86.36	27.22
132-0447	94.06	119.46	Stellite	Nitrile	88.9	25.2
140-9881	94.06	119.46	Stellite	FKM	88.9	25.2
215-6288	94.06	119.46	Stellite	LT-NBR	88.9	25.2
132-0438	94.64	112.06	Stellite	Nitrile	88.9	22.8
132-0442	94.64	112.06	Stellite	LT-NBR	88.9	22.8
250-4366	94.64	112.06	Stellite	FKM	88.9	22.8
132-0460	104.78	123.83	Stellite	Nitrile	98.42	24.44
132-0466	104.78	123.83	Stellite	Nitrile	98.42	26.52
185-8643	104.78	123.83	C6	Nitrile	98.42	24

**** Denotes Part Number is available within the Cat Dealer Network***

CAT HEAVY DUTY DUAL FACED SEALS





B	C	E	J	F	G (MIN)	GROUP
70.09±0.06	24.74±0.97	11.51±0.25	R0.94	57.96 MAX	-	132-0356
70.09±0.06	24.74±0.97	11.51±0.25	R0.94	57.96 MAX	-	132-0362
76.26±0.06	22.66±0.79	10.57±0.25	R1.07	62.86 MAX	-	192-0052
76.26±0.06	22.66±0.79	10.57±0.25	R1.07	62.86 MAX	-	132-0368
76.26±0.06	22.66±0.79	10.57±0.25	R1.07	62.86 MAX	-	215-6276
82.55±0.06	22.86±0.84	10.62±0.25	R1.14	70.08 MAX	-	132-0377
95.54±0.06	23.04±0.84	10.72±0.25	R1.07	80.98 MAX	-	132-0383
95.54±0.06	23.04±0.84	10.72±0.25	R1.07	80.98 MAX	-	132-0389
102.35±0.06	23.32±0.89	10.82±0.25	R1.07	88.39 MAX	-	132-0400
102.35±0.06	23.32±0.89	10.13±0.25	R1.07	88.39 MAX	-	132-0404
101.54±0.06	25.4±1.14	11.73±0.25	R1.02	92.07 MAX	-	192-0061
94.2±0.06	19±0.3	8.07±0.25	R1.07	83 MAX	-	269-3358
114.3±0.06	25.81±0.89	12.06±0.25	R1.07	97.36 MAX	-	132-0422
113.7±0.06	28.6±0.5	12.06±0.25	R1.07	97.36 MAX	-	245-4631
113.7±0.06	28.6±0.5	12.06±0.25	R1.07	97.36 MAX	-	458-6657
113.7±0.06	28.6±0.5	12.06±0.25	R1.07	97.36 MAX	-	444-1244
113±0.05	19.3±0.3	8.66±0.25	R1.57	98 MAX	-	253-1727
113±0.05	19.3±0.3	8.66±0.25	R1.57	98 MAX	-	377-2188
117.48±0.05	30.38±1.14	14.22±0.25	R1.57	100.98 MAX	-	132-0433
125.81±0.06	27.84±1.09	10.84±0.25	R0.89	109.12 MAX	-	132-0447
125.81±0.06	27.84±1.09	12.98±0.25	R0.89	109.12 MAX	-	140-9881
125.81±0.06	27.84±1.09	12.98±0.25	R0.89	109.12 MAX	-	215-6288
125.81±0.06	27.84±1.09	12.98±0.25	R0.89	109.12 MAX	-	132-0438
125.81±0.06	27.84±1.09	12.98±0.25	R0.89	109.12 MAX	-	132-0442
125.2±0.06	32.2±0.5	12.98±0.25	R0.89	109.12 MAX	-	250-4366
134.92±0.08	28±0.61	13.3±0.25	R1.07	120.65 MAX	-	132-0460
141.27±0.08	32.18±1.27	15.09±0.25	R1.3	121.69 MAX	-	132-0466
141.27±0.08	32.94±0.76	15.09±0.25	R1.3	121.69 MAX	-	185-8643

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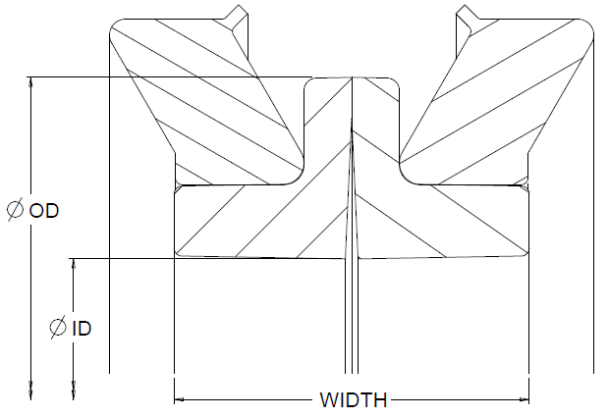
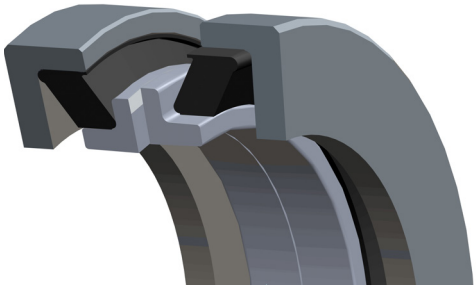
CAT HEAVY DUTY DUAL FACED SEALS

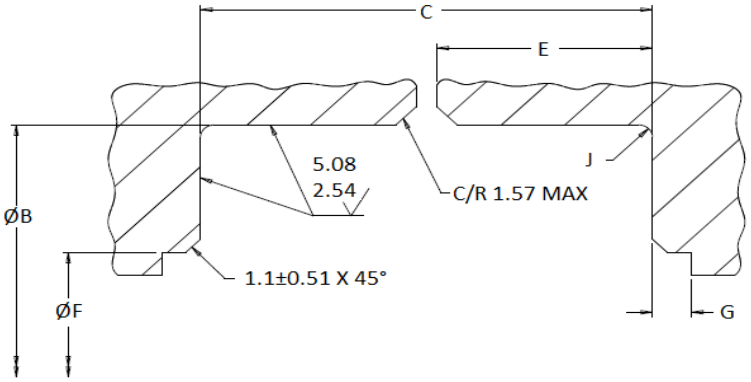


GROUP	ID	OD	SEAL RING MATERIAL	BELLEVILLE WASHER MATERIAL	SHAFT DIAMETER (MAX)	WIDTH
199-7214	104.78	123.83	Stellite	LT-NBR	98.42	26.52
132-0471	114.3	132.84	Stellite	Nitrile	110	24.68
132-0475	114.3	132.84	Stellite	Nitrile	109.52	27.18
132-0476	114.3	132.84	Stellite	LT-NBR	109.52	27.18
209-4514	114.3	132.84	C6	Nitrile	110	24.68
132-0483	114.3	142.24	Stellite	Nitrile	109.52	26.42
133-0445	114.3	142.24	C6	Nitrile	109.52	26.42
425-1284	114.3	142.24	C6	LT-NBR	109.52	26.42
132-0484	117.86	138.91	Stellite	Nitrile	114.13	21.5
132-0488	124.33	144.15	Stellite	Nitrile	117.48	31.46
132-0505	133.35	155.07	Stellite	Nitrile	128.57	27.68
205-8684	133.35	155.07	Stellite	LT-NBR	128.57	27.68
132-0506	134.37	155.58	Stellite	Nitrile	130.81	19.56
205-9682	134.37	155.58	C6	FKM	130.81	19.56
132-0510	142.88	165.1	Stellite	Nitrile	137.16	28.76
132-0513	144.17	162.91	C6	Nitrile	140.2	22.96
132-0524	147.32	167.49	Stellite	Nitrile	144.02	19.54
132-0516	149.4	168.3	Stellite	Nitrile	142.88	31.24
132-0521	149.4	168.3	Stellite	Nitrile	143.71	31.24
132-0529	154.46	179.86	Stellite	Nitrile	149.22	35.3
132-0534	162.86	184.15	Stellite	Nitrile	158.75	28
132-0535	168.91	195.07	Stellite	Nitrile	161.92	32.26
132-0537	168.91	195.07	Stellite	FKM	161.92	32.26
132-0538	168.91	195.07	Stellite	LT-NBR	161.93	32.26
132-0546*	174.24	196.85	Stellite	Nitrile	169.06	22.1
132-0551	179	207.16	Stellite	Nitrile	171.45	29.98
132-0554	194.18	214.55	Stellite	Nitrile	188.93	32.54
132-0555	194.18	214.55	Stellite	FKM	188.93	32.54

**** Denotes Part Number is available within the Cat Dealer Network***

CAT HEAVY DUTY DUAL FACED SEALS





B	C	E	J	F	G (MIN)	GROUP
141.27±0.08	32.18±1.27	15.09±0.25	R1.3	121.69 MAX	-	199-7214
148+0-0.2	28±0.6	12±0.25	R1	128 MAX	-	132-0471
152.4±0.08	33.53±1.02	15.88±0.25	R1.3	131.39 MAX	-	132-0475
152.4±0.08	33.53±1.02	15.88±0.25	R1.3	131.39 MAX	-	132-0476
148+0-0.2	28±0.6	12±0.25	R1	128 MAX	-	209-4514
152.4±0.08	33.53±1.02	15.88±0.25	R1.3	131.39 MAX	-	132-0483
152.4±0.08	33.53±1.02	15.88±0.25	R1.3	131.39 MAX	-	133-0445
152.4±0.08	34.53±0.5	15.88±0.25	R1.3	131.39 MAX	-	425-1284
146.05±0.08	25.91±0.76	12.19±0.25	R0.89	131.78 MAX	-	132-0484
162.56±0.08	38.74±1.27	18.34±0.25	R1.19	141.81 MAX	-	132-0488
171.45±0.08	32.51±1.02	15.37±0.25	R1.45	151.76 MAX	-	132-0505
171.45±0.08	32.51±1.02	15.37±0.25	R1.45	151.76 MAX	-	205-8684
162.56±0.08	22.86±0.76	10.67±0.25	R0.64	152.73 MAX	-	132-0506
162.56±0.08	24.38±0.76	10.67±0.25	R0.64	152.73 MAX	-	205-9682
177.55±0.08	33.27±0.76	15.88±0.25	R1.44	168.28 MAX	-	132-0510
173.02±0.13	27.74±1.02	12.98±0.25	R1.44	168.35 MAX	-	132-0513
174.63±0.08	22.86±0.76	10.67±0.25	R0.64	160.32 MAX	-	132-0524
184.15±0.08	34.7±0.79	16.51±0.25	R1.45	160.78±3.96	0.81	132-0516
188.93±0.13	35.71±0.79	16.38±0.38	R1.40	182.58 MAX	-	132-0521
194.08±0.08	38.35±0.79	18.39±0.25	R1.85	174.45 MAX	1.42	132-0529
190.5±0.08	31.75±0.46	14.88±0.25	R1.07	175.5	-	132-0534
206.25±0.08	32.13±1.02	15.19±0.25	R1.07	191.26±0.64	3.18	132-0535
206.25±0.08	32.13±1.02	15.19±0.25	R1.07	191.27±0.64	3.18	132-0537
206.25±0.08	32.13±1.02	15.19±0.25	R1.07	191.26±0.64	3.18	132-0538
204.77±0.13	22.86±0.76	10.67±0.25	R1.07	190.50±0.76	2.29	**132-0546***
218.95±0.1	34.93±0.76	16.66±0.25	R1.07	196.85 MAX	-	132-0551
238.76±0.1	42.06±1.02	20.14±0.25	R1.85	214.15 MAX	-	132-0554
238.76±0.1	42.06±1.02	20.14±0.25	R1.85	214.15 MAX	-	132-0555

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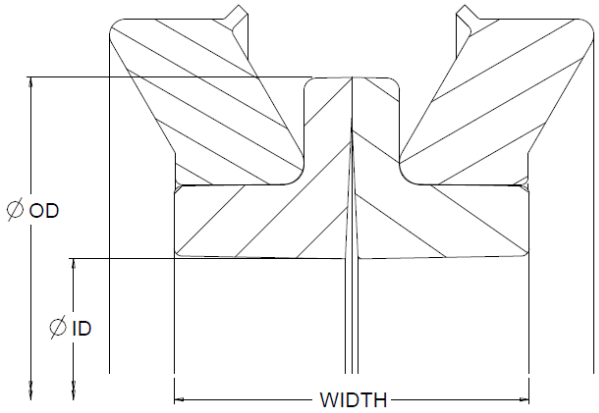
CAT HEAVY DUTY DUAL FACED SEALS



GROUP	ID	OD	SEAL RING MATERIAL	BELLEVILLE WASHER MATERIAL	SHAFT DIAMETER (MAX)	WIDTH
358-0793	194.18	214.55	C6	Nitrile	188.93	32.54
132-0565	198.12	220.68	Stellite	Nitrile	192.07	22.86
132-0572	203.84	229.49	Stellite	Nitrile	198.12	37.34
161-4343	203.84	229.49	Stellite	FKM	198.12	37.34
132-0582	215	242.09	Stellite	Nitrile	209.55	37.62
132-0584	215	242.09	Stellite	Nitrile	209.55	37.62
132-0587	225.43	245.75	Stellite	Nitrile	220.68	39.76
133-0433	225.43	245.75	Stellite	Nitrile	220.47	39.76
423-6536	225.43	245.75	Stellite	LT-NBR	220.68	39.76
132-0591*	227.33	260.35	Stellite	Nitrile	220.68	39.82
155-8358	238.5	261.93	C6	Nitrile	236.2	20.82
132-0595	241.3	273.05	Stellite	Nitrile	236.52	35.42
132-0601	241.3	273.05	Stellite	Nitrile	236.52	35.42
197-9203	241.3	273.05	Stellite	FKM	236.52	35.42
344-3837	241.31	273.05	Stellite	Nitrile	236.52	35.42
172-1619*	244.55	261.93	Formed	LT-NBR	240.15	26
132-0604	247.65	270.51	Stellite	Nitrile	242.87	41.42
132-0610*	257.18	285.75	Stellite	Nitrile	250.82	30.02
132-0611	283.21	304.8	Stellite	Nitrile	276.22	40.8
132-0617	283.21	322.58	Stellite	Nitrile	276.22	41.2
422-0069	283.21	322.58	Stellite	LT-NBR	276.22	41.2
132-0615	301.63	329.31	Stellite	Nitrile	295.28	29.32
148-9594	320.05	352.43	C6	Nitrile	314.96	39.16
161-4456	321	352.43	Stellite	Nitrile	314.96	39.16
132-0625	355.6	391.16	Stellite	Nitrile	349.25	40.38
132-0626	355.6	391.16	C6	FKM	349.25	40.64
132-0632	355.6	391.16	C6	Nitrile	349.25	40.64
132-0634	355.6	391.16	Ni-Hard	Nitrile	349.25	40.64

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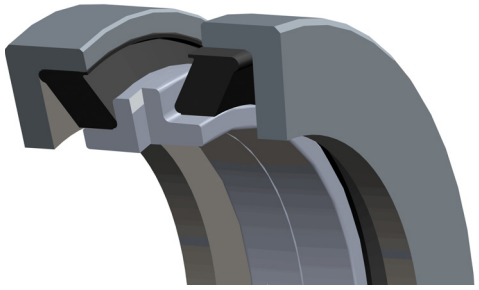
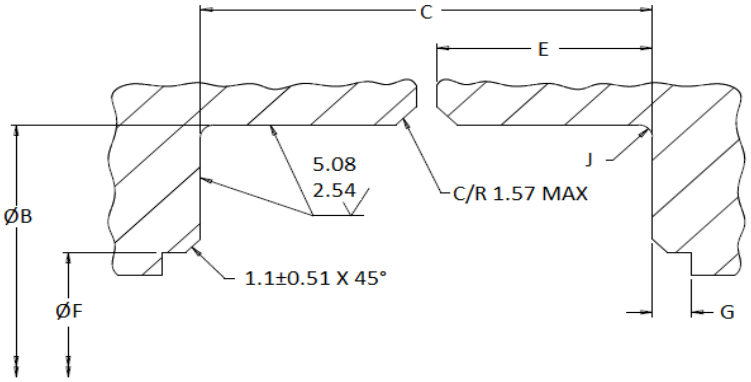
CAT HEAVY DUTY DUAL FACED SEALS





B	C	E	J	F	G (MIN)	GROUP
238.76±0.1	42.06±1.02	20.14±0.25	R1.85	214.15 MAX	-	358-0793
228.6±0.13	22.86±1.02	10.54±0.25	R1.07	212.73±0.76	2.29	132-0565
254±0.1	44.45±1.27	21.21±0.25	R1.47	226.31 MAX	-	132-0572
254±0.1	44.45±1.27	21.21±0.25	R1.47	226.31 MAX	-	161-4343
255.57±0.1	39.62±1.02	18.92±0.25	R1.47	234.95±0.76	1.8	132-0582
255.57±0.1	39.62±1.02	18.92±0.25	R1.47	234.95±0.76	1.8	132-0584
277.14±0.13	48.87±0.76	23.67±0.25	R1.47	247.75 MAX	-	132-0587
266.78±0.1	38.1±1.02	18.16±0.25	R1.47	246.15±0.76	13.56	133-0433
277.14±0.13	48.87±0.76	23.67±0.25	R1.47	247.75 MAX	-	423-6536
277.14±0.13	48.87±0.76	23.67±0.25	R1.47	247.75 MAX	-	**132-0591***
269.88±0.08	24.76±0.76	10.67±0.13	R1.19	253.03±2.69	1.3	155-8358
279.4±0.13	36.5±0.81	17.45±0.25	R1.27	261.87±1.27	2.29	132-0595
295.28±0.13	44.55±1.27	21.26±0.25	R2.26	273.05 MAX	-	132-0601
279.4±0.13	36.5±0.81	17.45±0.25	R1.27	261.87±1.27	2.29	197-9203
279.4±0.13	36.5±0.81	17.45±0.25	R1.27	261.87±1.27	2.29	344-3837
269.88±0.08	22.1±0.8	10.67±0.13	R1.19	253.03±2.69	3.1	**172-1619***
301.22±0.13	49.50±1.75	23.50±0.25	R1.88	271.86 MAX	-	132-0604
292.1±0.13	32.77±0.76	15.62±0.25	R1.14	276.23 MAX	-	**132-0610***
329.41±0.13	39.12±1.27	18.54±0.25	R1.09	306.07±1.27	3.63	132-0611
329.41±0.13	39.12±1.27	18.54±0.25	R1.09	306.07±1.27	3.63	132-0617
329.41±0.13	39.12±1.27	18.54±0.25	R1.09	306.07±1.27	3.63	422-0069
336.55±0.13	32.77±0.76	15.62±0.25	R1.14	324.6 MAX	-	132-0615
365.12±0.13	42.06±1.27	20.02±0.25	R1.45	342.90±0.76	1.52	148-9594
365.12±0.13	42.06±1.27	20.02±0.25	R1.45	342.90±0.76	1.52	161-4456
401.75±0.13	47.62±0.81	23.01±0.25	R2.26	380.62 MAX	-	132-0625
401.75±0.13	47.62±0.81	23.01±0.25	R2.26	380.62 MAX	-	132-0626
401.75±0.13	47.62±0.81	23.01±0.25	R2.26	380.62 MAX	-	132-0632
401.75±0.13	47.62±0.81	23.01±0.25	R2.26	380.62 MAX	-	132-0634

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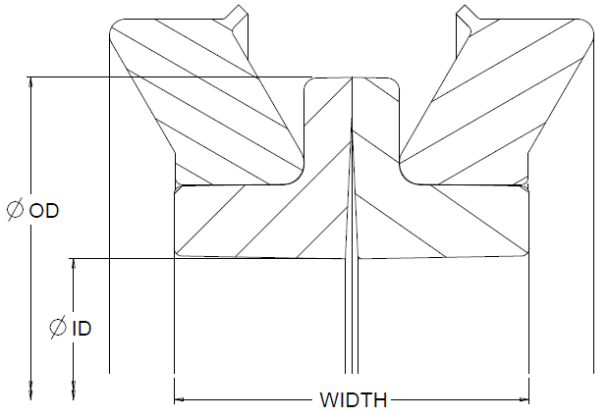
CAT HEAVY DUTY DUAL FACED SEALS



GROUP	ID	OD	SEAL RING MATERIAL	BELLEVILLE WASHER MATERIAL	SHAFT DIAMETER (MAX)	WIDTH
203-0340	355.6	391.16	Stellite	FKM	349.25	40.38
132-0636	379.73	413.46	Stellite	Nitrile	374.65	40.64
132-0637	379.73	413.46	Stellite	FKM	374.65	40.64
149-3957	429.64	458.22	Stellite	Rubber	426.72	40.28
139-5949	441.33	481.33	C6	Nitrile	434.97	40.54
488-7658	441.33	481.33	C6	FKM	434.97	40.54
132-0642	441.86	469.9	Stellite	Nitrile	434.98	40.04
132-0643	441.86	469.9	Stellite	FKM	434.98	40.04
132-0649*	491.8	529.5	Stellite	Nitrile	485.78	42.52
133-0510	491.8	529.5	Stellite	LT-NBR	485.78	42.52
132-0650	492.9	531	Ni-Hard	Nitrile	485.78	43.18
205-9683	492.9	531	Ni-Hard	FKM	485.78	43.18
176-1164	497.9	531	Ni-Hard	Nitrile	490.78	43.18
132-0651*	620	651.24	Stellite	Nitrile	606.42	45.52
132-0654	620	651.24	Stellite	FKM	606.42	45.52
132-0652	749.4	782.3	C6	Nitrile	736.6	45.52
132-0653	749.4	782.3	C6	FKM	736.6	45.52

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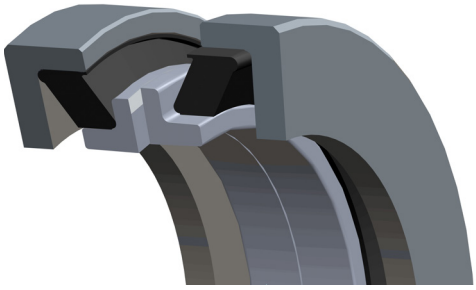
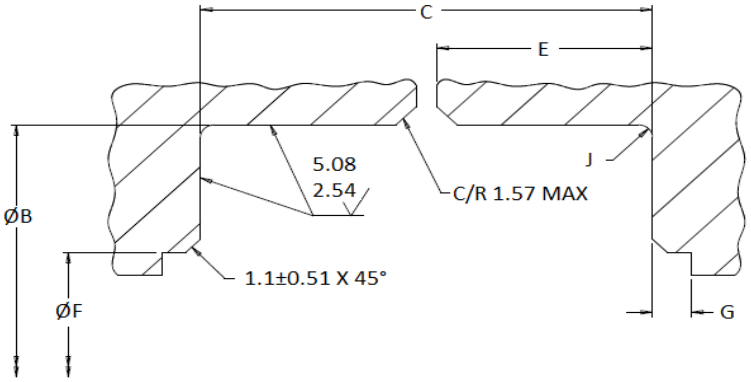
CAT HEAVY DUTY DUAL FACED SEALS





B	C	E	J	F	G (MIN)	GROUP
401.75±0.13	47.62±0.81	23.01±0.25	R2.26	380.62 MAX	-	203-0340
424.05±0.13	47.62±0.81	23.01±0.25	R2.26	402.92 MAX	-	132-0636
424.05±0.13	47.62±0.81	23.01±0.25	R2.26	402.92 MAX	-	132-0637
477.01±0.15	38.89±1.35	18.39±0.25	R1.09	454.41±1.27	-	149-3957
488.7±0.13	38.89±1.35	18.39±0.25	R1.09	466.09±1.27	3.56±0.25	139-5949
488.7±0.13	38.89±1.35	18.39±0.25	R1.09	466.09±1.27	3.56±0.25	488-7658
488.7±0.15	38.89±1.35	18.39±0.25	R1.09	466.09±1.27	3.56	132-0642
488.7±0.15	38.89±1.35	18.39±0.25	R1.09	466.09±1.27	3.56	132-0643
546.1±0.15	41.66±1.07	19.91±0.25	R1.45	530.86±1.27	4.44	**132-0649***
546.1±0.15	41.66±1.07	19.91±0.25	R1.45	530.86±1.27	4.44	133-0510
546.1±0.15	41.66±1.07	19.91±0.25	R1.45	530.86±1.27	4.44	132-0650
546.1±0.15	41.66±1.07	19.91±0.25	R1.45	530.86±1.27	4.44	205-9683
546.1±0.15	41.66±1.07	19.91±0.25	R1.45	530.86±1.27	4.44	176-1164
682.62±0.15	53.98±1.02	26.11±0.25	R2.26	647.70±1.27	-	**132-0651***
682.62±0.15	52.96±1.02	25.60±0.25	R2.26	647.70±1.27	-	132-0654
812.8±0.15	53.98±1.02	26.11±0.25	R2.26	779.07 MAX	-	132-0652
812.8±0.15	53.98±1.02	26.11±0.25	R2.26	779.07 MAX	-	132-0653

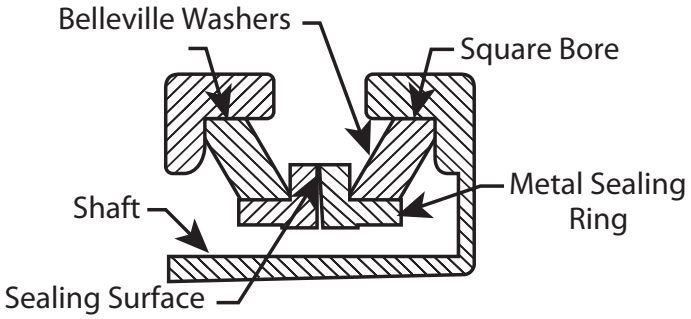
Contact Caterpillar for additional dimensions and custom options at catseals@cat.com

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

Terminology



Handling the Seals

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

Housing Preparation

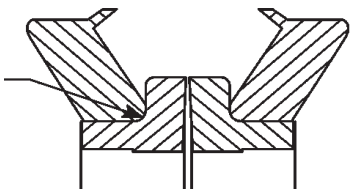
The housing components that contact the Belleville Washers must be free from foreign material (oil, grease, dirt, metal chips, dust or lint particles, etc.) before installing the seal. The housings should be cleaned using a lint-free wipe and a non-petroleum base solvent. Dry with a clean wipe.

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

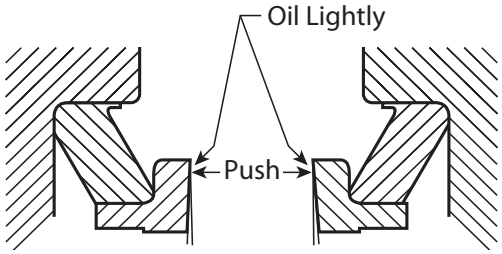
The Belleville washer should be installed with the inside diameter radius in contact with the neck to flange radius of the seal ring.

Neck to Flange Radius



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!

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? _____

Radial tolerance stack _____ mm Axial tolerance stack _____ mm

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

Minimum operating temperature _____°C Maximum operating temperature _____ °C

Operating Environment

Prolonged muddy conditions? _____ Description _____

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

Minimum ambient temperature _____°C Maximum ambient temperature _____ °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, and exposure to and protection from outside environment

Anticipated Annual Volume

Units of seals: Year 1:_____, Year 2:_____, Year 3:_____

Send data sheet to Caterpillar at catseals@cat.com

SEAL AREA DATA:

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? _____

Radial tolerance stack _____ mm Axial tolerance stack _____ mm

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

Minimum operating temperature _____°C Maximum operating temperature _____ °C

Operating Environment

Prolonged muddy conditions? _____ Description _____

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

Minimum ambient temperature _____°C Maximum ambient temperature _____ °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, and exposure to and protection from outside environment

Anticipated Annual Volume

Units of seals: Year 1:_____, Year 2:_____, Year 3:_____

Send data sheet to Caterpillar at catseals@cat.com

SEAL AREA DATA:

For more information on Cat Seals

www.cat.com/cat-seals

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WEGQ1000 (12/17)