

Metal face seals

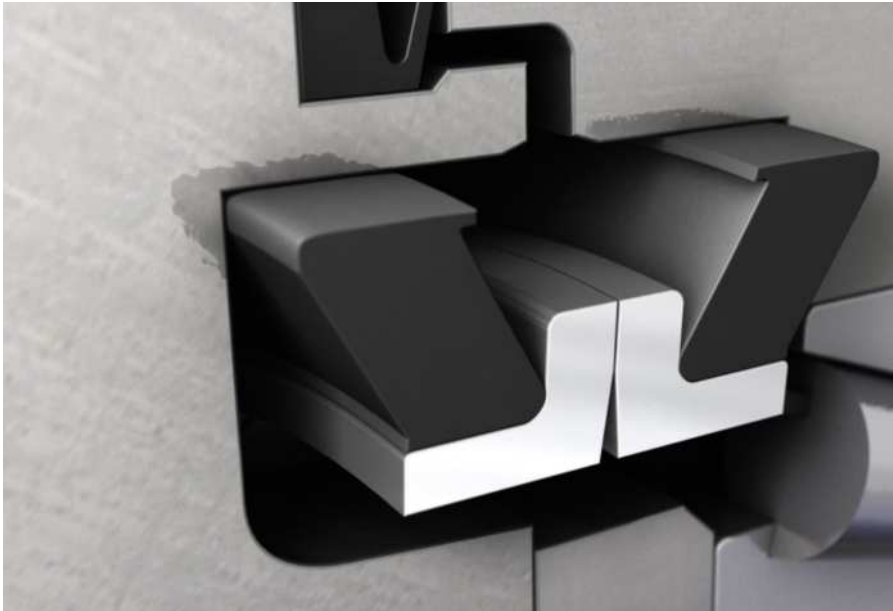
High resistance to wear, corrosion and chemicals



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Introduction to metal face seals



Applications:

- Mixers
- Sand treatment equipment
- Conveyors
- Agricultural machinery
- Washing equipment
- Grinding mills and other pulverizing equipment
- Ore dressing equipment
- Mining equipment (TBM)
- Dump and haul trucks
- Other off-highway and construction equipment

Metal face seals are designed for use under severe service conditions at relatively low circumferential speeds. They offer reliable protection against solid and liquid contaminants as well as leak-proof retention of lubricants. The seals were originally developed for off-road and tracked vehicles but have been found equally suitable for a range of other applications requiring protection against contaminants such as sand, soil, mud, and water.

Metal face seals are often used in heavily contaminated environments, where mud packing in the cavity between the housing, sealing rings and O-rings or Belleville washers can occur. This mud packing can push the elastomeric energizers out of position, resulting in improper face loads or mud bypassing the seal.

Contaminants can also cause abrasion, leading to deterioration of the elastomer. To minimize the risk of seal failure due to such deterioration, it is essential to select appropriate materials for the application.

Design features

Metal face seals from SKF consist of two identical metal sealing rings and two identical elastomeric energizers.

The sealing rings are made of wear-resistant cast alloy and have finely finished sliding and sealing surfaces. Sealing rings made of forged steel are also available on request.

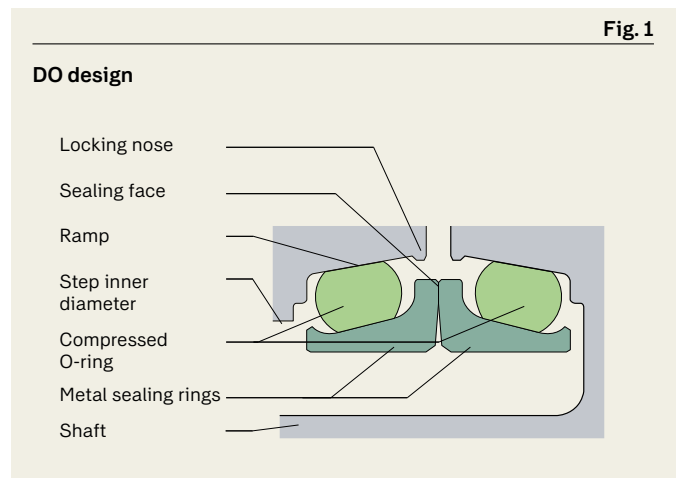
The energizers are made of different materials depending on the application working conditions.

It is critical that the bore diameter and depth align with the dimensions listed in the product tables. Adequate tolerances between the seal assembly and its mating components are necessary to ensure proper sealing performance.



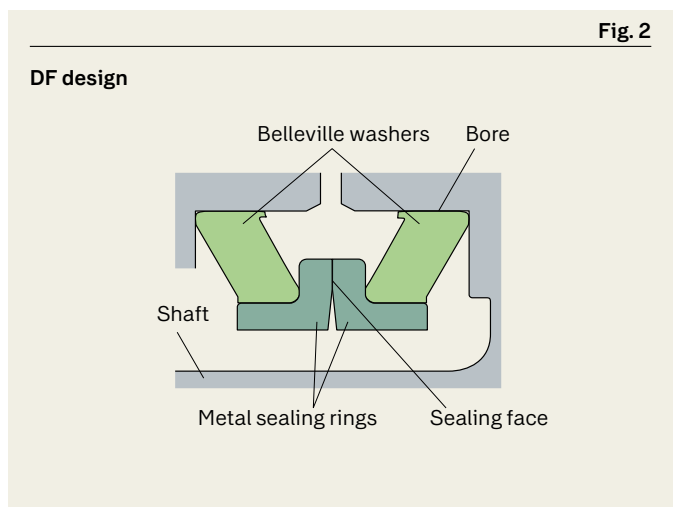
DO metal face seals

DO metal face seals use two O-rings, which are responsible for keeping the metal sealing rings in constant contact, compensating for small movements in the application.



DF metal face seals

DF metal face seals use Belleville washers to provide uniform face loading and effective sealing at both the bore and outside diameters. The washers' outside diameter adapts to the bore's shape for optimal installation.



Permissible operating conditions

Depending on their design, metal face seals can withstand different values of internal pressure. It should, however, generally be maintained below 0,3 MPa. Other recommendations regarding operating conditions for the metal face seals, like temperature and speed, are provided in **tables 1** and **3**.

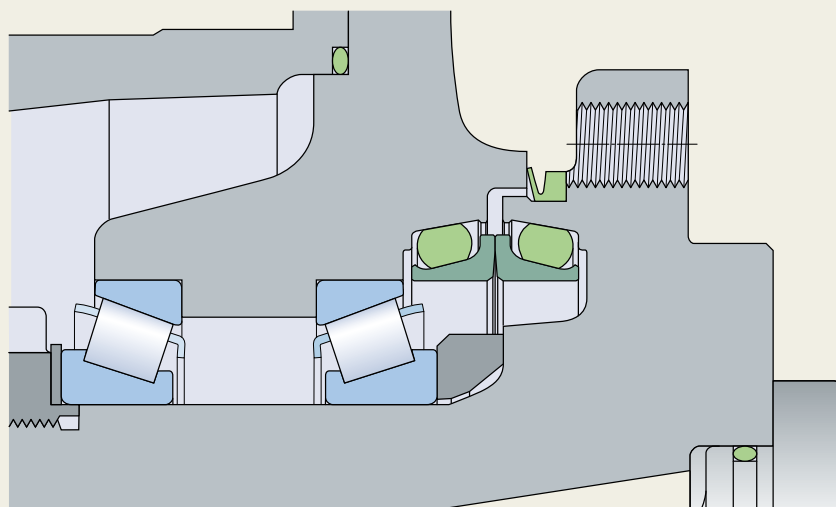
Table 1

	DO type	DF type
Temperature limits	See table 3	See table 3
Circumferential speed	5 m/s oil lubrication 1 m/s grease lubrication	1 m/s oil lubrication 0,5 m/s grease lubrication
Pressure differential	0.30 MPa	0.35 MPa

Note: Not all maximum values are allowed at the same time. For higher values, contact SKF.

Fig. 3

DO application example



Materials

Sealing ring materials

Standard sealing rings are made of a Ni-hard cast alloy with high abrasion and wear resistance. Other materials, such as forged steel, are available on request.

Table 2

Chemical composition	Forged steel SAE 52100	Ni- Hard cast iron
C	0.93-1.05	3.0-3.6
Si	0.15-0.35	0.4-0.7
Ni	0.25 max	3.5-4.3
Cr	1.35-1.60	1.2-1.7
Mo	0.10 max	0.4 max
V	–	0.3-0.6
Hardness	59-65 HRC	64-75 HRC

Elastomeric energizer materials

O-rings and Belleville washers are available in various materials to suit specific application demands.

Table 3

Material	Material code	Temperature limits (°C)	Permissible temperature short period (°C)	Hardness (Shore A)	Chemical compatibility
NBR	R	-35 to 110	120	60	+
NBR LT	RL	-50 to 100	110	60	+
HNBR	H	-25 to 150	150	60	+
HNBR LT	HL	-40 to 130	140	60	+
Silicone	S	-60 to 200	200	60	+
FKM	V	-10 to 200	220	60	++

Lubrication requirements

During seal assembly, apply lubricant on the dynamic sealing surfaces of metal face seals to prevent scoring. Cover at least 30% of the sealing surface to lubricate and cool the sealing rings properly. The lubricant can be mineral-based oil ranging from 10 WT to 90 WT, depending on the ambient temperature.

Note that some oils contain additives that make them incompatible with elastomers, which can cause degradation of the rubber energizers, especially when exposed to elevated temperatures.

Mineral oils are always the recommended lubricant, but a grease lubricant can also be used in some slowly rotating or oscillating applications, where the seal face surface speed does not exceed 0.5 m/s. At higher speeds, an oil lubricant is required, not only to provide lubrication to the sealing faces, but also to cool the sealing rings.

Best results are achieved with oil lubrication. Grease lubrication is possible but needs attention as the faces need lubrication. For optimum operation, the oil level should be 1/3 and grease must at full level.

Storage conditions

The parts have to be stored in the following way:

- The single carton box and the inner packaging has to be stored intact, in horizontal position, without any opening until assembly.
- Parts must be stored in a dry environment with temperature between 0 °C and +30 °C, stocked far from sources of heat and kept away from contact with light sources.

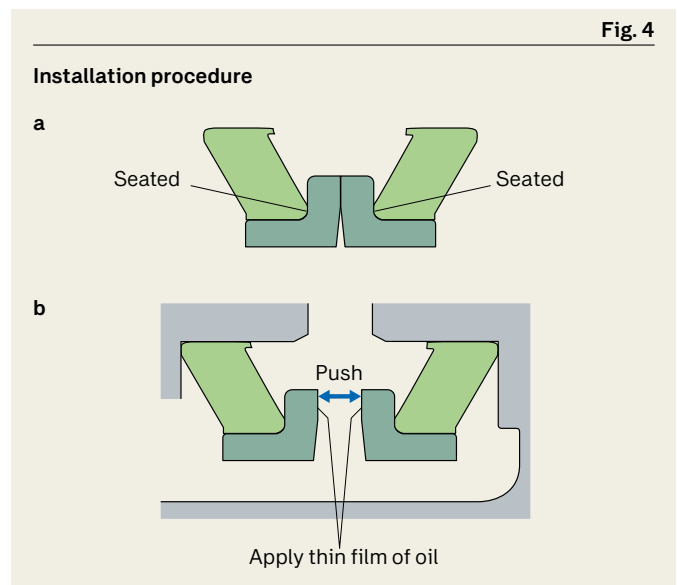
Installing DF seals

General

Careful handling and installation of a metal face seal is crucial to avoid cutting or tearing of the elastomeric Belleville washers or breaking the metal sealing rings, both which can cause premature seal failure and immediate leakage. It is also vital to keep the sealing faces free of contaminants like dirt or lint.

Installation procedure.

- 1 Check the housing for any damage or imperfections (**Fig. 5**).
- 2 Clean the housing surface from any foreign materials or residue. Use a lint-free cloth with a volatile solvent or industrial degreasing alcohol. Ensure any cleaning agent used evaporates quickly and does not leave any residual oil film (**Fig. 6**).
- 3 Check the tools. Individually degrease the metal rings, paying particular attention to their surfaces. (**Fig. 7**).
- 4 Install the Belleville washers seated against the inside shoulder of the metal sealing rings (**Fig. 4a**).
- 5 Carefully push each seal half (Belleville washer and metal sealing ring) into the housing until it is fully seated. Make sure that the seal is not cocked and that the washers are seated evenly at the bottom of the housing bore. Improper seal installation can result in uneven face loads around the circumference of the seal faces, causing scoring or the sealing rings to separate and allow oil to leak.
- 6 Clean both metal sealing ring faces with a lint-free wipe and apply a thin film of oil. Ensure that no oil is applied to any surface but the sealing ring faces (**Fig. 4b**).
- 7 Check that both housings are concentric and in correct alignment. The Belleville washers must not unseat from the bottom of the housing.
- 8 Carefully bring the two housings together, avoiding high impact that can scratch or break the seal components.
- 9 Once the two halves have been assembled within the application, check that the gap width is within the seal specification.
- 10 Finally, hold one half of the assembly stationary while rotating the other half at least ten complete revolutions.



NOTE

This procedure enables the installer to check that the housing and the Belleville washers are aligned. If the seal assembly wobbles, it is necessary to disassemble it and make sure that the Belleville washers are properly seated in the housing.

Installing DO seals

General

Always carefully observe installation instructions. Each seal dimension needs a specific installation tool. Make sure that the appropriate tool part number is available. Careful handling and installation of a metal face seal is crucial to avoid cutting or tearing the O-rings or breaking the metal sealing rings, both which can cause premature seal failure and immediate leakage. It is also vital to keep the sealing faces free of contaminants like dirt or lint.

Installation procedure

- 1 Check the housing for any damage or imperfections (**Fig. 5**).
- 2 Clean the housing surface from any foreign materials or residue. Use a lint-free cloth with a volatile solvent or industrial degreasing alcohol. Ensure any cleaning agent used evaporates quickly and does not leave any residual oil film (**Fig. 6**).
- 3 Check the assembly tools. Individually degrease the metal rings, paying particular attention to their surfaces. (**Fig. 7**).
- 4 Clean the o-rings using a lint-free cloth with a volatile solvent or industrial degreasing alcohol (**Fig. 8**).
- 5 Install the o-rings on the metal sealing rings at the bottom of the ramp. Check that there is no skewing or twisting of the o-rings. Make sure that the center line of the o-ring is parallel to the seal face (**Fig. 9**).
- 6 Hold the o-ring on the seal ramp and engage the end of the tool between the gap of the o-ring and seal face inside the circular guideway groove of the tool (**Fig. 10**).

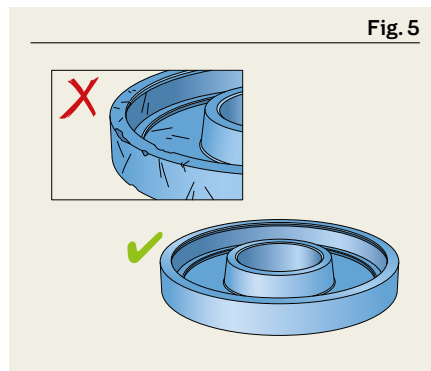


Fig. 5

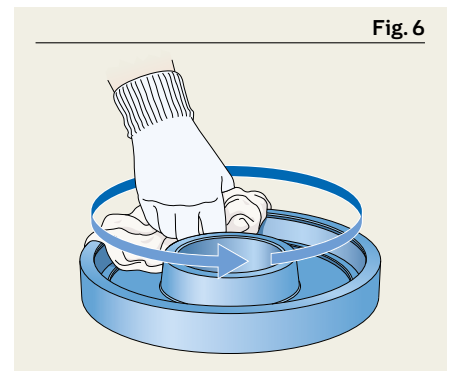


Fig. 6

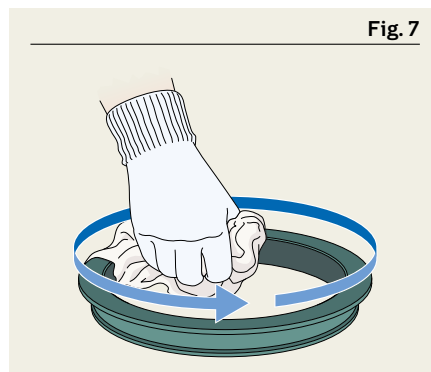


Fig. 7

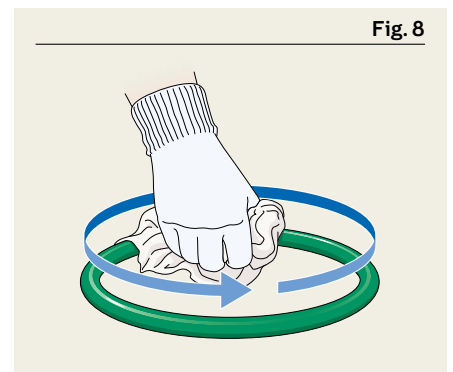


Fig. 8

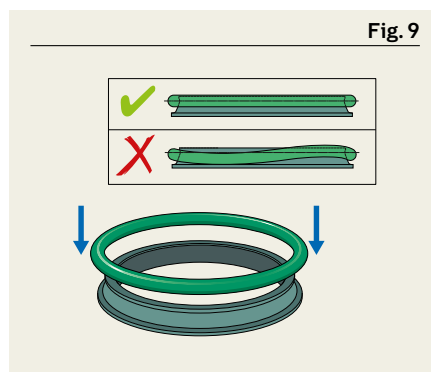


Fig. 9

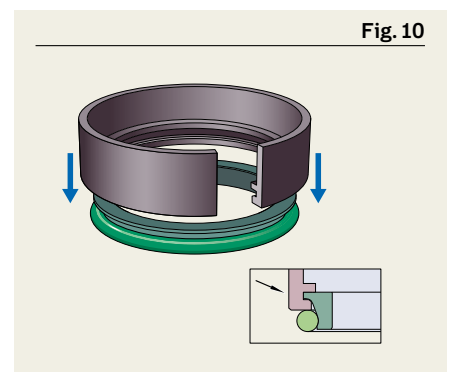


Fig. 10

7 Bring the edges of the tool bracket close to each other and hold the seal firmly in the clamp formed. It guides the seal in the installation tool (Fig. 11).

8 Apply even pressure with the installation tool on the o-ring, and feel the o-ring snap into place inside the housing (Fig. 12).

Small rings can be manually installed; for big rings, apply even and gentle pressure around the rim of the guide plate using a wooden mallet.

9 Check that the o-rings are in the right position without any twisting. (Fig. 13)

10 Check the assembly height as shown at 4 diagonally opposite positions. Make sure that each position is seated symmetrically (Fig. 14). The maximum height difference allowed is:

0.5 mm for seals with $d_4 < 300$ mm
1 mm for seals with $d_4 > 300$ mm

11 After installing the first half-seal in the housing, clean both metallic surfaces with a volatile solvent or industrial degreasing alcohol (Fig. 15).

12 Apply a thin film of oil of the same type used in the application on the sealing surfaces, taking care to lubricate only these areas (Fig. 16).

13 Carefully bring the two housings together, avoiding high impact that can scratch or break the seal components.

14 Once the two halves have been assembled within the application, check that the gap width " B_1 " is within the seal specification (Fig. 17).

15 Finally, hold one half of the assembly stationary while rotating the other half at least ten complete revolutions.

Fig. 11

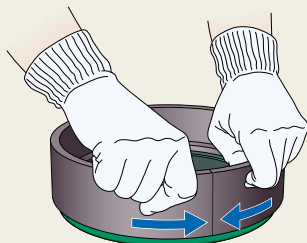


Fig. 12

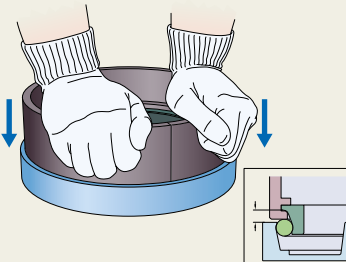


Fig. 13

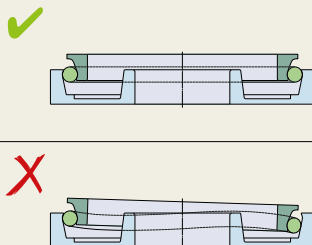


Fig. 14

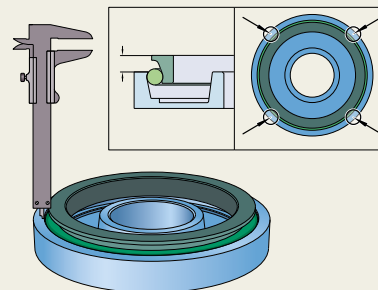


Fig. 15

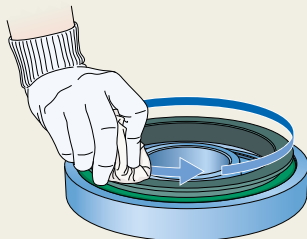


Fig. 16

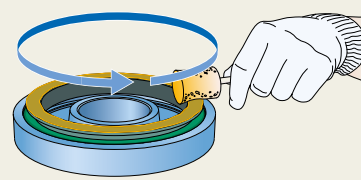
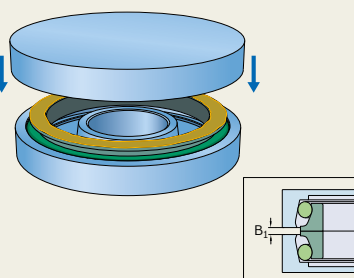


Fig. 17



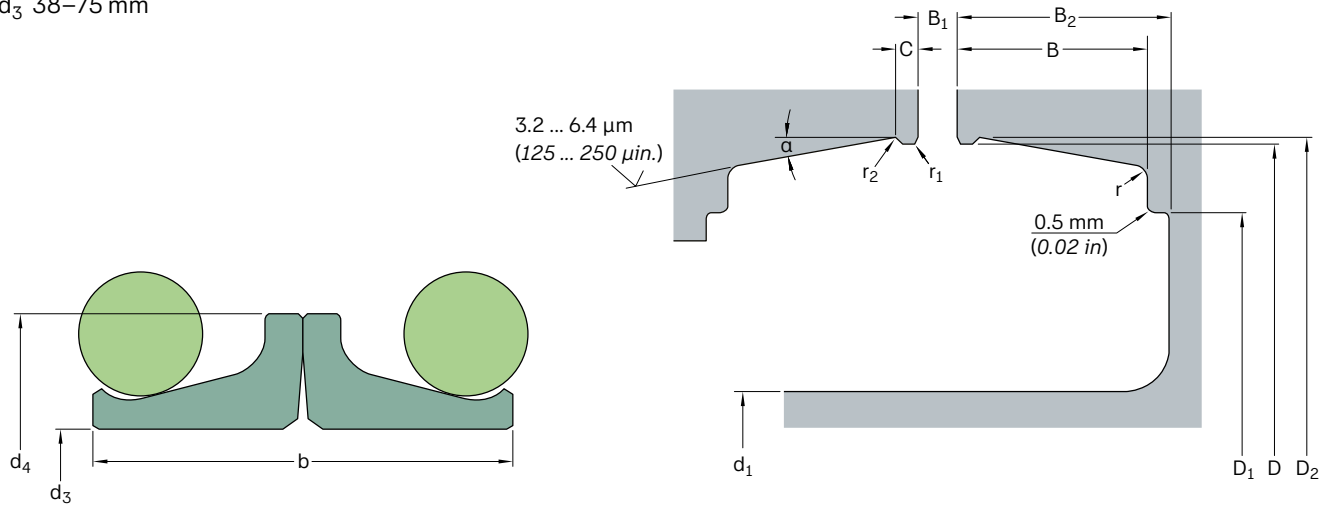
Designation system

Table 4

Designation system for metal face seals

Example: 45X58X21 DO CR60

		45X58X21	DO	C	R	60
Dimensions						
45	Inside seal diameter					
58	Outside seal diameter					
21	Inner rings width					
Seal design						
DO	DO or DF seal design					
Rings material code						
C	C – Cast iron (standard) F – Forged steel (on request)					
Elastomeric material code						
R	R – Nitrile rubber RL – Nitrile rubber low temperature H – Hydrogenated nitrile rubber HL – Hydrogenated nitrile rubber low temperature S – Silicone V – Fluoro rubber					
Elastomeric material hardness						
60	60 Shore A (other available on request)					

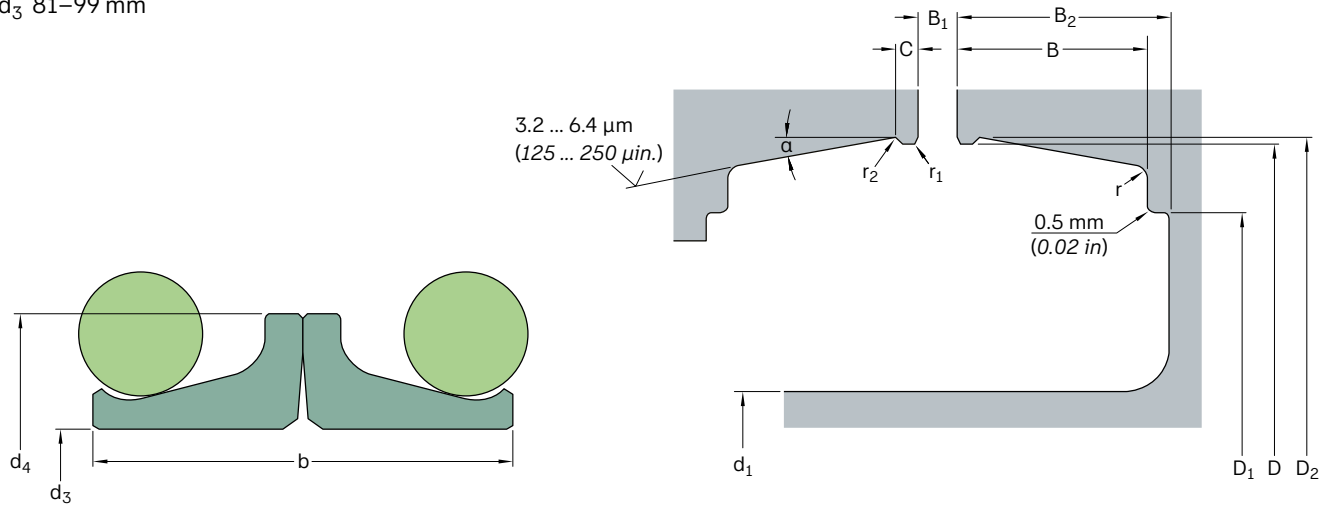


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
38X51X21 DO CR60	R	38	51	21	53±0.2	46	53.7±0.2	10°
43.5X58X24 DO CR60	R	43.5	58	24	61.5±0.1	51	62±0.2	10°
45X58X21 DO CR60	R	45	58	21	60.8±0.2	53.4	61.6±0.2	10°
46X59X20 DO CR60	R	46	59	20	61.8±0.2	56	62.5±0.2	10°
46X59X20 DO CV60	V	46	59	20	61.8±0.2	56	62.5±0.2	10°
48X62.15X25 DO CR60	R	48	62.15	25	67.2±0.2	58	68±0.2	10°
51X65.67X26.8 DO CR60	R	51	65.67	26.8	67.62±0.2	61.4	68.38±0.2	10°
55.5X70X22 DO CR60	R	55.5	70	22	73.1±0.2	65.5	73.8±0.2	10°
55.5X70X22 DO CV60	V	55.5	70	22	73.1±0.2	65.5	73.8±0.2	10°
56X70X25 DO CR60	R	56	70	25	75.2±0.2	66	76±0.2	10°
58X74X24.8 DO CR60	R	58	74	24.8	78.2±0.2	67	79.28±0.2	17°
60.2X73X20 DO CR60	R	60.2	73	20	75.8±0.2	69	76.5±0.2	10°
60.2X73X20 DO CV60	V	60.2	73	20	75.8±0.2	69	76.5±0.2	10°
61.5X73X17.4 DO CR60	R	61.5	73	17.4	75.5±0.2	68.5	75.8±0.2	10°
64X76X17.6 DO CR60	R	64	76	17.6	78.5±0.2	72	78.8±0.2	10°
64X78X25 DO CR60	R	64	78	25	83.8±0.2	74	84.6±0.2	10°
67X80X20 DO CR60	R	67	80	20	82.7±0.2	76.8	83.4±0.2	10°
67X80X20 DO CS60	S	67	80	20	82.7±0.2	76.8	83.4±0.2	10°
63X80.5X26 DO CR60	R	63	80.5	26	83.2±0.2	72	84±0.2	10°
63.5X82.5X32 DO CR60	R	63.5	82.5	32	86±0.25	74.5	87±0.25	10°
63.5X82.5X32 DO CS60	S	63.5	82.5	32	86±0.25	74.5	87±0.25	10°
71X84X20 DO CR60	R	71	84	20	86.7±0.2	80.8	87.4±0.2	10°
71X84X20 DO CV60	V	71	84	20	86.7±0.2	80.8	87.4±0.2	10°
67.5X86.5X32 DO CR60	R	67.5	86.5	32	90±0.25	78	91±0.25	10°
77.5X87.6X13.5 DO CH60	H	67.5	86.5	32	90±0.25	78	91±0.25	10°
77.5X87.6X13.5 DO CS60	S	67.5	86.5	32	90±0.25	78	91±0.25	10°
77.5X87.6X13.5 DO CR60	R	77.5	87.6	13.5	90.2±0.2	85	90.7±0.2	15°
68.5X89X24 DO CR60	R	68.5	89	24	91.5±0.2	83	92.5±0.2	10°
68.5X89X24 DO CV60	V	68.5	89	24	91.5±0.2	83	92.5±0.2	10°
78X90X17 DO CR60	R	78	90	17	93.3±0.2	87.5	93.9±0.2	10°
73X92X32 DO CR60	R	73	92	32	95.5±0.25	84	96.5±0.25	10°
73X92X32 DO CS60	S	73	92	32	95.5±0.25	84	96.5±0.25	10°
79.5X92.5X20 DO CR60	R	79.5	92.5	20	95.3±0.2	88	96±0.2	10°
75X94.48X32 DO CR60	R	75	94.48	32	97.65±0.25	85.41	98.41±0.25	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
—	mm						
38X51X21 DO CR60	9	3±0.5	11	1.8	1	0.5	2
43.5X58X24 DO CR60	10.5	4±0.5	12.5	2	0.8	0.8	0.8
45X58X21 DO CR60	10	3±0.5	12	1.8	1	0.3	2.5
46X59X20 DO CR60	8.5	3±0.5	10.5	1.8	1	0.5	2
46X59X20 DO CV60	8.5	3±0.5	10.5	1.8	1	0.5	2
48X62.15X25 DO CR60	12	3±0.5	14	2	1	0.4	3
51X65.67X26.8 DO CR60	11.85	4±0.5	14.5	2.9	1.5	0.5	2.8
55.5X70X22 DO CR60	10	3±0.5	11.5	2.4	1	0.5	5
55.5X70X22 DO CV60	10	3±0.5	11.5	2.4	1	0.5	5
56X70X25 DO CR60	12	4±0.5	14	2	0.8	0.3	3
58X74X24.8 DO CR60	12.4	4±0.5	15	3.82	3	0.5	3
60.2X73X20 DO CR60	8.5	3±0.5	10.5	1.8	1	0.5	2
60.2X73X20 DO CV60	8.5	3±0.5	10.5	1.8	1	0.5	2
61.5X73X17.4 DO CR60	8	2±0.5	9.5	1.4	1	0.5	1.5
64X76X17.6 DO CR60	8	2±0.5	10	1.37	1	0.5	1.5
64X78X25 DO CR60	12.5	3±0.5	14.5	2	1	0.4	3
67X80X20 DO CR60	8.5	3±0.5	10.5	1.8	1	0.5	2
67X80X20 DO CS60	8.5	3±0.5	10.5	1.8	1	0.5	2
63X80.5X26 DO CR60	11.5	3±0.5	13	2.5	1	0.5	5
63.5X82.5X32 DO CR60	14.5	3±0.5	17.5	2.8	1	0.5	5
63.5X82.5X32 DO CS60	14.5	3±0.5	17.5	2.8	1	0.5	5
71X84X20 DO CR60	8.5	3±0.5	10.5	1.8	1	0.5	2
71X84X20 DO CV60	8.5	3±0.5	10.5	1.8	1	0.5	2
67.5X86.5X32 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
77.5X87.6X13.5 DO CH60	14.5	3±0.5	17	2.8	1	0.5	5
77.5X87.6X13.5 DO CS60	14.5	3±0.5	17	2.8	1	0.5	5
77.5X87.6X13.5 DO CR60	7.5	3±0.5	8.5	1.4	1.5	0.5	1.5
68.5X89X24 DO CR60	11	3±0.5	13.5	2.8	1	0.5	5
68.5X89X24 DO CV60	11	3±0.5	13.5	2.8	1	0.5	5
78X90X17 DO CR60	8	4±0.5	9	1.8	1	0.4	2.5
73X92X32 DO CR60	14.5	3±0.5	17.5	2.8	1	0.5	5
73X92X32 DO CS60	14.5	3±0.5	17.5	2.8	1	0.5	5
79.5X92.5X20 DO CR60	8.5	3±0.5	10.5	1.8	1	0.5	2
75X94.48X32 DO CR60	15.2	4±0.5	17.2	3.5	2	0.5	4.8

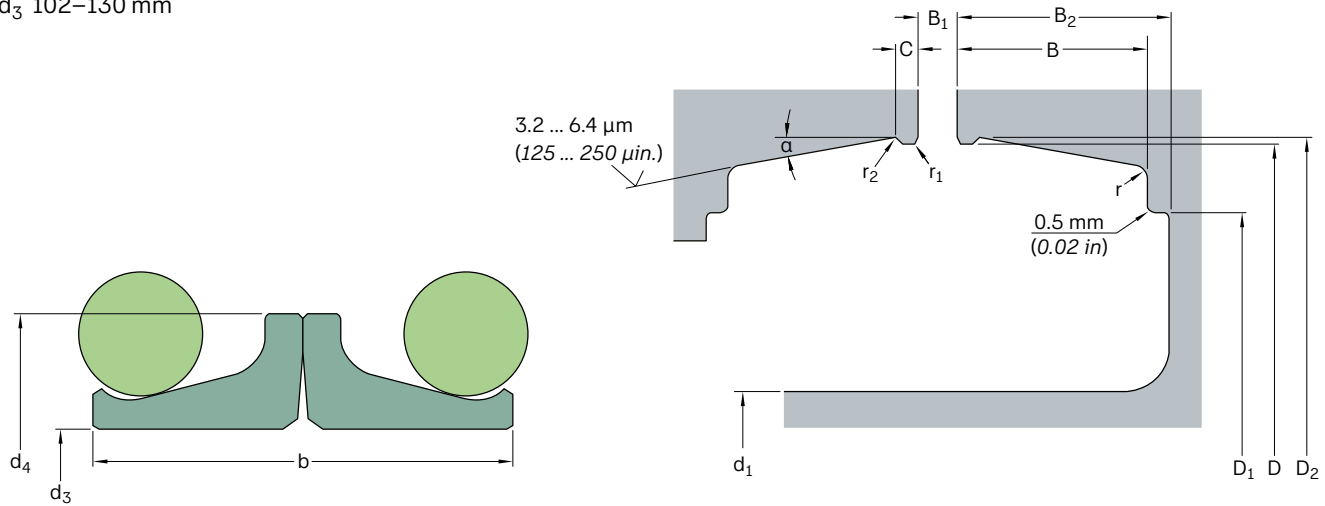


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
81X98X28 DO CR60	R	81	98	28	101.3±0.2	91	102.3±0.2	10°
81X98X28 DO CV60	V	81	98	28	101.3±0.2	91	102.3±0.2	10°
79X100X30 DO CR60	R	79	100	30	104.2±0.25	92	105.2±0.25	10°
80X100X29 DO CR60	R	80	100	29	103.2±0.2	92	104±0.2	10°
83X102X28 DO CR60	R	83	102	28	104.5±0.2	94	105.5±0.2	10°
86X103X22 DO CR60	R	86	103	22	106.2±0.2	100	107±0.2	10°
85X104.48X32 DO CR60	R	85	104.48	32	107.65±0.25	95.41	108.41±0.25	10°
90.5X104.5X26 DO CR60	R	90.5	104.5	26	106.6±0.2	100.4	107.4±0.2	10°
90.5X104.5X26 DO CH60	H	90.5	104.5	26	106.6±0.2	100.4	107.4±0.2	10°
90.5X104.5X26 DO CS60	S	90.5	104.5	26	106.6±0.2	100.4	107.4±0.2	10°
96.5X106.6X13.6 DO CR60	R	96.5	106.6	13.6	109.18±0.2	104.4	109.68±0.2	15°
88X108X24 DO CR60	R	88	108	24	110.5±0.2	102	111.5±0.2	10°
88X108X24 DO CH60	H	88	108	24	110.5±0.2	102	111.5±0.2	10°
92X109X22 DO CR60	R	92	109	22	113±0.2	105	113.8±0.2	10°
90.5X109.5X32 DO CR60	R	90.5	109.5	32	113±0.25	101.5	114±0.25	10°
90.5X109.5X32 DO CH60	H	90.5	109.5	32	113±0.25	101.5	114±0.25	10°
90.5X109.5X32 DO CS60	S	90.5	109.5	32	113±0.25	101.5	114±0.25	10°
90.5X109.5X32 DO CV60	V	90.5	109.5	32	113±0.25	101.5	114±0.25	10°
95X111X24 DO CR60	R	95	111	24	114.8±0.2	108	115.6±0.2	10°
95X111X24 DO CH60	H	95	111	24	114.8±0.2	108	115.6±0.2	10°
95X111X24 DO CS60	S	95	111	24	114.8±0.2	108	115.6±0.2	10°
95X111X24 DO CV60	V	95	111	24	114.8±0.2	108	115.6±0.2	10°
95X114X32 DO CR60	R	95	114	32	119.2±0.25	107	120±0.25	12°
97X116X32 DO CR60	R	97	116	32	119.5±0.25	108	120.5±0.25	10°
97X116X32 DO CH60	H	97	116	32	119.5±0.25	108	120.5±0.25	10°
103X117X20 DO CR60	R	103	117	20	119±0.2	112.5	119.8±0.2	10°
100X119X32 DO CR60	R	100	119	32	122.5±0.25	111	123.5±0.25	10°
100X119X32 DO CH60	H	100	119	32	122.5±0.25	111	123.5±0.25	10°
100X119X32 DO CS60	S	100	119	32	122.5±0.25	111	123.5±0.25	10°
100X119X32 DO CV60	V	100	119	32	122.5±0.25	111	123.5±0.25	10°
99X120X28 DO CR60	R	99	120	28	122.5±0.2	112	123.5±0.2	10°
99X120X28 DO CH60	H	99	120	28	122.5±0.2	112	123.5±0.2	10°
99X120X28 DO CS60	S	99	120	28	122.5±0.2	112	123.5±0.2	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
–	mm						
81X98X28 DO CR60	12.5	3±0.5	14.5	2.8	1	0.5	5
81X98X28 DO CV60	12.5	3±0.5	14.5	2.8	1	0.5	5
79X100X30 DO CR60	15	3±0.5	17	2.5	1	0.7	3
80X100X29 DO CR60	14.5	3±0.5	16.5	2	1	0.4	3
83X102X28 DO CR60	12.5	3±0.5	15	2.8	1	0.5	5
86X103X22 DO CR60	11.5	4±0.5	12.3	2	1	0.3	3
85X104.48X32 DO CR60	15.2	4±0.5	17.2	3.5	2	0.5	4.8
90.5X104.5X26 DO CR60	11.8	3±0.5	14.2	2.9	1	1.2	2.8
90.5X104.5X26 DO CH60	11.8	3±0.5	14.2	2.9	1	1.2	2.8
90.5X104.5X26 DO CS60	11.8	3±0.5	14.2	2.9	1	1.2	2.8
96.5X106.6X13.6 DO CR60	7.5	2±0.5	8	1.4	1	0.2	1.5
88X108X24 DO CR60	11	3±0.5	13.5	2.8	1	0.5	5
88X108X24 DO CH60	11	3±0.5	13.5	2.8	1	0.5	5
92X109X22 DO CR60	9.5	3±0.5	11.5	2	1	0.5	3
90.5X109.5X32 DO CR60	14.5	3±0.5	17.5	2.8	1	0.5	5
90.5X109.5X32 DO CH60	14.5	3±0.5	17.5	2.8	1	0.5	5
90.5X109.5X32 DO CS60	14.5	3±0.5	17.5	2.8	1	0.5	5
90.5X109.5X32 DO CV60	14.5	3±0.5	17.5	2.8	1	0.5	5
95X111X24 DO CR60	11	3±0.5	12.5	1.8	1	0.5	2
95X111X24 DO CH60	11	3±0.5	12.5	1.8	1	0.5	2
95X111X24 DO CS60	11	3±0.5	12.5	1.8	1	0.5	2
95X111X24 DO CV60	11	3±0.5	12.5	1.8	1	0.5	2
95X114X32 DO CR60	15	3±0.5	17	2.5	1	0.5	3
97X116X32 DO CR60	14.5	3±0.5	17.5	2.8	1	0.5	5
97X116X32 DO CH60	14.5	3±0.5	17.5	2.8	1	0.5	5
103X117X20 DO CR60	9	3±0.5	11	1.8	1	0.5	2
100X119X32 DO CR60	14.5	3±0.5	17.5	2.8	1	0.5	5
100X119X32 DO CH60	14.5	3±0.5	17.5	2.8	1	0.5	5
100X119X32 DO CS60	14.5	3±0.5	17.5	2.8	1	0.5	5
100X119X32 DO CV60	14.5	3±0.5	17.5	2.8	1	0.5	5
99X120X28 DO CR60	12.5	3±0.5	14.5	2.8	1	0.5	5
99X120X28 DO CH60	12.5	3±0.5	14.5	2.8	1	0.5	5
99X120X28 DO CS60	12.5	3±0.5	14.5	2.8	1	0.5	5



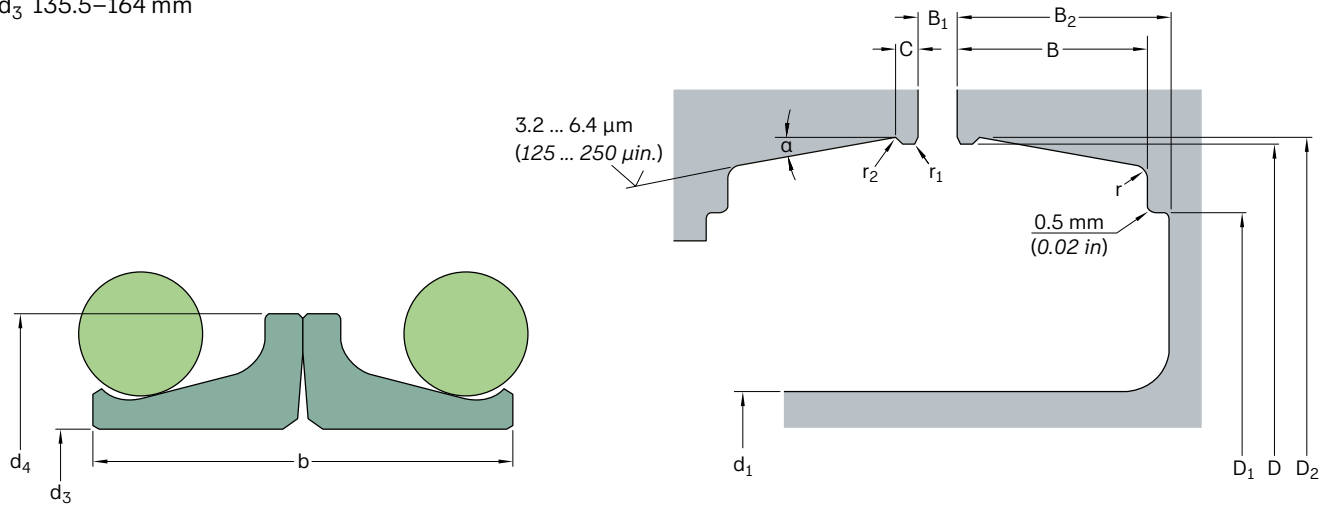
Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
102X122X32 DO CR60	R	102	122	32	125.9±0.25	115	126.9±0.25	10°
107X123X23 DO CR60	R	107	123	23	125.1±0.2	117.5	125.5±0.2	10°
104X125X28 DO CR60	R	104	125	28	127.5±0.2	117	128.5±0.2	10°
107X125X24 DO CR60	R	107	125	24	129.4±0.2	119.5	130.4±0.2	10°
107X125X24 DO CH60	H	107	125	24	129.4±0.3	119.5	130.4±0.3	10°
107X125X24 DO CS60	S	107	125	24	129.4±0.4	119.5	130.4±0.4	10°
107X125X24 DO CV60	V	107	125	24	129.4±0.5	119.5	130.4±0.5	10°
109X127X32 DO CR60	R	109	127	32	132.2±0.25	121	133±0.25	10°
110X128X32 DO CR60	R	110	128	32	132±0.25	121	133±0.25	12°
114.5X129X21 DO CR60	R	114.5	129	21	133.1±0.2	126	134.1±0.2	10°
114.5X129X21 DO CH60	H	114.5	129	21	133.1±0.3	126	134.1±0.3	10°
114.5X129X21 DO CS60	S	114.5	129	21	133.1±0.4	126	134.1±0.4	10°
111.5X131.5X30 DO CR60	R	111.5	131.5	30	135.7±0.25	123	137±0.25	14°
109X132X32 DO CR60	R	109	132	32	135.6±0.25	124	136.6±0.25	10°
114X133X35.6 DO CR60	R	114	133	35.6	136.68±0.25	124.44	137.44±0.25	10°
113X133.5X31.8 DO CR60	R	113	133.5	31.8	136.7±0.25	124.4	137.4±0.25	10°
115X137.5X31 DO CR60	R	115	137.5	31	140.8±0.25	130	141.8±0.25	10°
120X138X32 DO CR60	R	120	138	32	142±0.25	132	143±0.25	10°
120X139X31.8 DO CR60	R	120	139	31.8	142.8±0.25	132	143.8±0.25	10°
118.5X139.5X28 DO CR60	R	118.5	139.5	28	142±0.2	131.5	143±0.2	10°
118.5X139.5X28 DO CH60	H	118.5	139.5	28	142±0.3	131.5	143±0.3	10°
118.5X139.5X28 DO CS60	S	118.5	139.5	28	142±0.4	131.5	143±0.4	10°
117X140X29 DO CR60	R	117	140	29	141.5±0.2	132	142.5±0.2	10°
127X140.7X25 DO CR60	R	127	140.7	25	143.2±0.2	135	144±0.2	10°
124X141X22 DO CR60	R	124	141	22	145.3±0.2	136	146.4±0.2	10°
127X141X25 DO CR60	R	127	141	25	143.2±0.2	136	144±0.2	10°
127X141X29 DO CR60	R	127	141	29	143±0.2	136	144±0.2	10°
120X142X38 DO CR60	R	120	142	38	148±0.25	133	149±0.25	10°
125X144X31.8 DO CR60	R	125	144	31.8	147.5±0.25	136	148.5±0.25	10°
127X146X32 DO CR60	R	127	146	32	149.5±0.25	138	150.5±0.25	10°
126.6X146.05X32 DO CR60	R	126.6	146.05	32	149.22±0.25	136.98	149.98±0.25	10°
130X150.5X32 DO CR60	R	130	150.5	32	154.6±0.25	144	155.6±0.25	10°
130X152X38 DO CR60	R	130	152	38	158±0.25	144	159±0.25	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
—	mm						
102X122X32 DO CR60	15.5	4±0.5	17.5	3.1	0.8	R0.5	4
107X123X23 DO CR60	9.5	3±0.5	11.5	1.8	1	0.7	3
104X125X28 DO CR60	12.5	3±0.5	14	2.8	1	0.5	5
107X125X24 DO CR60	11	3±0.5	13.5	2.8	1	0.5	5
107X125X24 DO CH60	11	3±0.6	13.5	2.8	1	0.5	5
107X125X24 DO CS60	11	3±0.7	13.5	2.8	1	0.5	5
107X125X24 DO CV60	11	3±0.8	13.5	2.8	1	0.5	5
109X127X32 DO CR60	15	4±0.5	17	2.5	0.8	0.5	3
110X128X32 DO CR60	15	3±0.5	17	2.5	1	0.7	3
114.5X129X21 DO CR60	9.2	3±0.5	10	2.3	1	0.5	3
114.5X129X21 DO CH60	9.2	3±0.6	10	2.3	1	0.5	3
114.5X129X21 DO CS60	9.2	3±0.7	10	2.3	1	0.5	3
111.5X131.5X30 DO CR60	15	3±0.5	17	4.2	3	1	4
109X132X32 DO CR60	15.5	3±0.5	17.5	2.5	1	0.5	3
114X133X35.6 DO CR60	15.2	3±0.5	19	3.5	2	0.5	4.8
113X133.5X31.8 DO CR60	15.2	3±0.5	17	3.5	1	0.5	4.8
115X137.5X31 DO CR60	14.5	3±0.5	16.5	2.5	1	0.5	3
120X138X32 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
120X139X31.8 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
118.5X139.5X28 DO CR60	12.5	3±0.5	15	2.8	1	0.5	5
118.5X139.5X28 DO CH60	12.5	3±0.6	15	2.8	1	0.5	5
118.5X139.5X28 DO CS60	12.5	3±0.7	15	2.8	1	0.5	5
117X140X29 DO CR60	13	3±0.5	14	2.8	1	0.5	5
127X140.7X25 DO CR60	12.7	3±0.5	15.2	2.7	1	1	2.8
124X141X22 DO CR60	10.6	3±0.5	12.3	2.8	1	0.5	3
127X141X25 DO CR60	11.5	4±0.5	12.5	2.5	2	R0.5	3
127X141X29 DO CR60	12	3±0.5	14.5	2.3	1	0.5	3
120X142X38 DO CR60	17	4±0.5	19	2.5	1	0.7	3
125X144X31.8 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
127X146X32 DO CR60	14.5	3±0.5	17.5	2.8	1	0.5	5
126.6X146.05X32 DO CR60	15.2	4±0.5	17.2	3.5	2	0.5	4.8
130X150.5X32 DO CR60	14.5	3±0.5	16.5	2.5	1	0.5	5
130X152X38 DO CR60	18.5	4±0.5	20.5	2.5	0.8	0.5	3

d₃ 135.5–164 mm

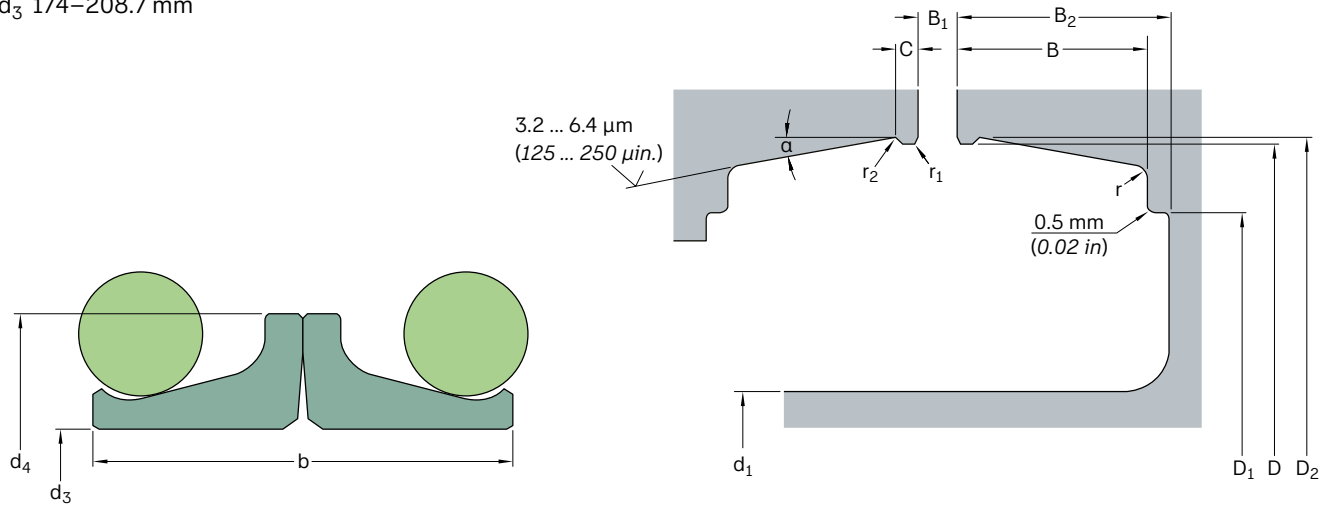


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
135.5X154.5X28 DO CR60	R	135.5	154.5	28	157.3±0.2	146.5	158.3±0.2	10°
135.5X154.5X28 DO CH60	H	135.5	154.5	28	157.3±0.3	146.5	158.3±0.3	10°
135.5X154.5X28 DO CS60	S	135.5	154.5	28	157.3±0.4	146.5	158.3±0.4	10°
141.3X157X25.4 DO CR60	R	141.3	157	25.4	158.9±0.2	152.1	159.7±0.2	10°
143X157X27 DO CR60	R	143	157	27	159±0.2	152	160±0.2	10°
143X160X27 DO CR60	R	143	160	27	163±0.2	154	164±0.2	10°
150X167X28 DO CR60	R	150	167	28	170±0.2	160	171±0.2	10°
150X167X28 DO CH60	H	150	167	28	170±0.3	160	171±0.3	10°
150X167X28 DO CS60	S	150	167	28	170±0.4	160	171±0.4	10°
154X168X27 DO CR60	R	154	168	27	170±0.2	162.5	171±0.2	10°
154X168X27 DO CH60	H	154	168	27	170±0.3	162.5	171±0.3	10°
154X168X27 DO CS60	S	154	168	27	170±0.4	162.5	171±0.4	10°
154X169X22 DO CR60	R	154	169	22	173.5±0.2	166	174.5±0.2	10°
148X170X34 DO CR60	R	148	170	34	174.5±0.25	162	175.63±0.25	12°
150X170X32 DO CR60	R	150	170	32	174.5±0.25	162	175.63±0.25	12°
154X170X21 DO CR60	R	154	170	21	174.1±0.2	167	175.1±0.2	10°
152.05X171.5X32 DO CR60	R	152.05	171.5	32	174.67±0.25	162.43	175.43±0.25	10°
153X171.5X28 DO CR60	R	153	171.5	28	175.3±0.2	164.5	176.3±0.2	10°
146.5X171.7X38 DO CR60	R	146.5	171.7	38	175.9±0.25	158.9	176.8±0.25	10°
146X172X38 DO CR60	R	146	172	38	176±0.2	159	177±0.2	10°
146X172X38 DO CH60	H	146	172	38	176±0.3	159	177±0.3	10°
146X172X38 DO CS60	S	146	172	38	176±0.4	159	177±0.4	10°
150X172X40 DO CR60	R	150	172	40	178±0.2	165	179±0.2	10°
154X173.5X32 DO CR60	R	154	173.5	32	177±0.25	166	178±0.25	10°
154X173.5X32 DO CH60	H	154	173.5	32	177±0.26	166	178±0.26	10°
154X173.5X32 DO CS60	S	154	173.5	32	177±0.27	166	178±0.27	10°
160X180X32 DO CR60	R	160	180	32	185.5±0.25	174	186.16±0.25	12°
154X180X38 DO CR60	R	154	180	38	184±0.2	167	185±0.2	10°
165X180.5X27 DO CR60	R	165	180.5	27	184±0.2	176.5	185±0.2	10°
165X183.5X28 DO CR60	R	165	183.5	28	186.5±0.2	176	187.5±0.2	10°
169.05X188.5X32 DO CR60	R	169.05	188.5	32	191.67±0.25	179.43	192.43±0.25	10°
173X188.5X25 DO CR60	R	173	188.5	25	191.8±0.2	182	192.7±0.2	10°
164X189X30 DO CR60	R	164	189	30	192.5±0.25	179	193.5±0.25	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
–	mm						
135.5X154.5X28 DO CR60	12.5	3±0.5	14	2.8	1	0.5	5
135.5X154.5X28 DO CH60	12.5	3±0.6	14	2.8	1	0.5	5
135.5X154.5X28 DO CS60	12.5	3±0.7	14	2.8	1	0.5	5
141.3X157X25.4 DO CR60	11.8	3±0.5	14.2	2.9	1.5	0.5	2.8
143X157X27 DO CR60	12	3±0.5	14.5	2.3	1	0.5	3
143X160X27 DO CR60	12	3±0.5	14.5	2.8	1	0.5	5
150X167X28 DO CR60	13	3±0.5	15.5	2.8	1	0.5	5
150X167X28 DO CH60	13	3±0.6	15.5	2.8	1	0.5	5
150X167X28 DO CS60	13	3±0.7	15.5	2.8	1	0.5	5
154X168X27 DO CR60	12	3±0.5	14.5	2.3	1	0.5	3
154X168X27 DO CH60	12	3±0.6	14.5	2.3	1	0.5	3
154X168X27 DO CS60	12	3±0.7	14.5	2.3	1	0.5	3
154X169X22 DO CR60	9.5	3±0.5	11	2.3	1	0.5	3
148X170X34 DO CR60	14.5	4±0.5	17.5	3.05	1.5	0.5	3
150X170X32 DO CR60	14.5	4±0.5	17.5	3.05	1.5	0.5	3
154X170X21 DO CR60	10	3±0.5	11	2.3	1	0.5	3
152.05X171.5X32 DO CR60	15.2	4±0.5	17.2	3.5	2	0.5	4.8
153X171.5X28 DO CR60	12.5	3±0.5	14.5	2.8	1	0.5	5
146.5X171.7X38 DO CR60	18.4	3±0.5	20.3	3.7	1	0.5	6.3
146X172X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
146X172X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
146X172X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
150X172X40 DO CR60	18	4±0.5	20	2.5	1	0.7	3
154X173.5X32 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
154X173.5X32 DO CH60	14.5	3±0.6	17	2.8	1	0.5	5
154X173.5X32 DO CS60	14.5	3±0.7	17	2.8	1	0.5	5
160X180X32 DO CR60	13.5	4±0.5	17	2.73	3	0.5	3
154X180X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
165X180.5X27 DO CR60	12	3±0.5	14.5	2.3	1	0.5	3
165X183.5X28 DO CR60	13.5	4±0.5	16	3.5	1	1	3
169.05X188.5X32 DO CR60	15.2	4±0.5	17.2	3.5	2	0	4.8
173X188.5X25 DO CR60	11	3±0.5	13	2.3	1	0.6	2.8
164X189X30 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5

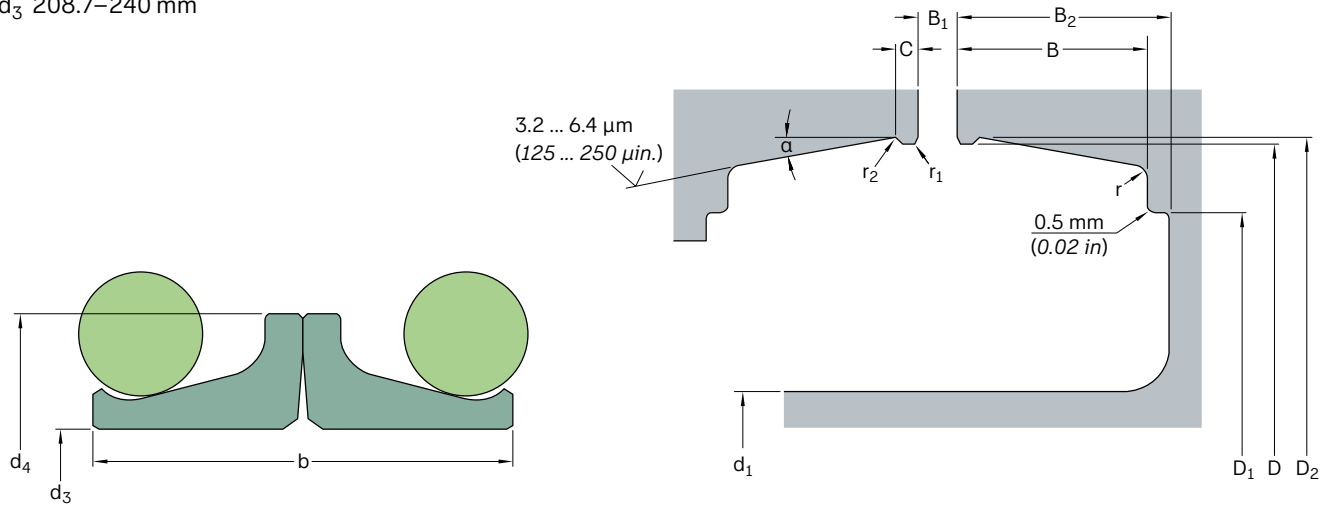


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
174X190X25.4 DO CR60	R	174	190	25.4	191.8±0.2	188	192.7±0.2	10°
174X190X25.4 DO CH60	H	174	190	25.4	191.8±0.3	188	192.7±0.3	10°
174X190X25.4 DO CS60	S	174	190	25.4	191.8±0.4	188	192.7±0.4	10°
163X191X38 DO CR60	R	163	191	38	195.5±0.2	178.5	196.5±0.2	10°
163X191X38 DO CH60	H	163	191	38	195.5±0.3	178.5	196.5±0.3	10°
163X191X38 DO CS60	S	163	191	38	195.5±0.4	178.5	196.5±0.4	10°
163X191X38 DO CV60	V	163	191	38	195.5±0.5	178.5	196.5±0.5	10°
172X194.4X31.8 DO CR60	R	172	194.4	31.8	197.9±0.25	186	198.9±0.25	10°
176X195X28 DO CR60	R	176	195	28	198.8±0.2	188	199.8±0.2	10°
180X197.4X21.4 DO CR60	R	180	197.4	21.4	201.9±0.2	196	202.2±0.2	10°
178X199X32 DO CR60	R	178	199	32	202.6±0.25	190	203.6±0.25	10°
178X199X32 DO CH60	H	178	199	32	202.6±0.26	190	203.6±0.26	10°
178X199X32 DO CS60	S	178	199	32	202.6±0.27	190	203.6±0.27	10°
177X200X30 DO CR60	R	177	200	30	203.5±0.25	191	204.5±0.25	10°
177X200X30 DO CH60	H	177	200	30	203.5±0.26	191	204.5±0.26	10°
177X200X30 DO CS60	S	177	200	30	203.5±0.27	191	204.5±0.27	10°
178X200X38 DO CR60	R	178	200	38	209.6±0.2	192	210.6±0.2	10°
180X200X29.4 DO CR60	R	180	200	29.4	203.3±0.25	192	203.84±0.25	12°
183X202X28 DO CR60	R	183	202	28	205±0.2	195	206±0.2	10°
186X203X25.4 DO CR60	R	186	203	25.4	204.9±0.2	190.5	205.7±0.2	10°
186X203X25.4 DO CH60	H	186	203	25.4	204.9±0.3	190.5	205.7±0.3	10°
186X203X25.4 DO CS60	S	186	203	25.4	204.9±0.4	190.5	205.7±0.4	10°
178X205X38 DO CR60	R	178	205	38	209.6±0.2	192	210.6±0.2	10°
192X209X30 DO CR60	R	192	209	30	212.5±0.25	200	213.5±0.25	10°
182X210X46 DO CR60	R	182	210	46	214.4±0.2	197.5	215.4±0.2	10°
191X210X28 DO CR60	R	191	210	28	213±0.2	203	214±0.2	10°
191X210X28 DO CH60	H	191	210	28	213±0.3	203	214±0.3	10°
191X210X28 DO CS60	S	191	210	28	213±0.4	203	214±0.4	10°
182.3X210.3X38 DO CR60	R	182.3	210.3	38	214.5±0.2	197.5	215.5±0.2	10°
182.3X210.3X38 DO CS60	S	182.3	210.3	38	214.5±0.3	197.5	215.5±0.3	10°
192X215X34 DO CR60	R	192	215	34	219.8±0.25	207	220.8±0.25	10°
195X216.5X31.8 DO CR60	R	195	216.5	31.8	220±0.25	207	221±0.25	10°
208.7X222.8X26 DO CR60	R	208.7	222.8	26	224.4±0.2	217	225.4±0.2	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
—	mm						
174X190X25.4 DO CR60	12.7	3±0.5	14.3	2.3	1	0.5	2.8
174X190X25.4 DO CH60	12.7	3±0.6	14.3	2.3	1	0.5	2.8
174X190X25.4 DO CS60	12.7	3±0.7	14.3	2.3	1	0.5	2.8
163X191X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
163X191X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
163X191X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
163X191X38 DO CV60	18	3±0.8	20.5	3.1	1	0.5	6.5
172X194.4X31.8 DO CR60	14.5	3±0.5	16.5	2.8	1	0.5	5
176X195X28 DO CR60	12.5	3±0.5	14.5	2.8	1	0.5	5
180X197.4X21.4 DO CR60	9.4	3±0.5	10.6	1.2	1	0.5	3
178X199X32 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
178X199X32 DO CH60	14.5	3±0.6	17	2.8	1	0.5	5
178X199X32 DO CS60	14.5	3±0.7	17	2.8	1	0.5	5
177X200X30 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
177X200X30 DO CH60	14.5	3±0.6	17	2.8	1	0.5	5
177X200X30 DO CS60	14.5	3±0.7	17	2.8	1	0.5	5
178X200X38 DO CR60	19	4±0.5	21	3	1	0.5	4
180X200X29.4 DO CR60	13.1	3±0.5	17.1	2.94	3	1	3
183X202X28 DO CR60	12.5	3±0.5	14.5	2.8	1	0.5	5
186X203X25.4 DO CR60	14.5	3±0.5	16	2.3	1	0.5	2.8
186X203X25.4 DO CH60	14.5	3±0.6	16	2.3	1	0.5	2.8
186X203X25.4 DO CS60	14.5	3±0.7	16	2.3	1	0.5	2.8
178X205X38 DO CR60	19	4±0.5	21	3	1	0.8	4
192X209X30 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
182X210X46 DO CR60	18.4	6.3±0.5	24.1	3.7	1	0.5	6.3
191X210X28 DO CR60	12.5	3±0.5	14.5	2.8	1	0.5	5
191X210X28 DO CH60	12.5	3±0.6	14.5	2.8	1	0.5	5
191X210X28 DO CS60	12.5	3±0.7	14.5	2.8	1	0.5	5
182.3X210.3X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
182.3X210.3X38 DO CS60	18	3±0.6	20.5	3.1	1	0.5	6.5
192X215X34 DO CR60	16.5	4±0.5	18.5	3	1	0.5	4
195X216.5X31.8 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
208.7X222.8X26 DO CR60	11.5	3±0.5	13.5	2.2	1	0.5	2.5

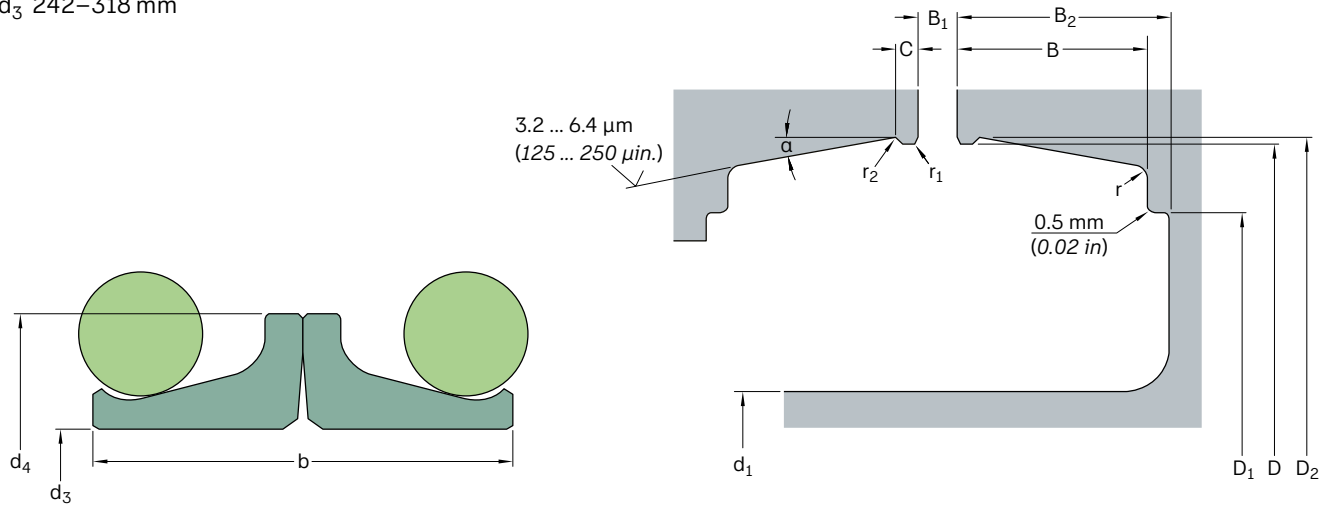


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
208.7X222.8X26 DO CS60	S	208.7	222.8	26	224.4±0.3	217	225.4±0.3	10°
205X227X30 DO CR60	R	205	227	30	230.5±0.25	219	231.5±0.25	10°
205X227X30 DO CH60	H	205	227	30	230.5±0.26	219	231.5±0.26	10°
205X227X30 DO CS60	S	205	227	30	230.5±0.27	219	231.5±0.27	10°
205X227X30 DO CV60	V	205	227	30	230.5±0.28	219	231.5±0.28	10°
200X228.5X38 DO CR60	R	200	228.5	38	232.5±0.2	215.5	233.5±0.2	10°
200X228.5X38 DO CH60	H	200	228.5	38	232.5±0.3	215.5	233.5±0.3	10°
200X228.5X38 DO CS60	S	200	228.5	38	232.5±0.4	215.5	233.5±0.4	10°
208X229.6X35.4 DO CR60	R	208	229.6	35.4	234.6±0.2	224	236±0.2	10°
209X234X42 DO CR60	R	209	234	42	241.6±0.2	224	242.6±0.2	10°
216X237X30 DO CR60	R	216	237	30	240.5±0.25	229	241.5±0.25	10°
220X239.5X31.8 DO CR60	R	220	239.5	31.8	243±0.25	232	244±0.25	10°
220X239.5X31.8 DO CS60	S	220	239.5	31.8	243±0.26	232	244±0.26	10°
220X241.4X25 DO CR60	R	220	241.4	25	244±0.2	233.5	244.7±0.2	10°
220X246X41 DO CR60	R	220	246	41	253.4±0.2	238	254.6±0.2	10°
226X250X41 DO CR60	R	226	250	41	257.23±0.2	242	258±0.2	10°
223X251.5X38 DO CR60	R	223	251.5	38	255.5±0.2	238.5	256.5±0.2	10°
223X251.5X38 DO CH60	H	223	251.5	38	255.5±0.3	238.5	256.5±0.3	10°
223X251.5X38 DO CS60	S	223	251.5	38	255.5±0.4	238.5	256.5±0.4	10°
223.5X251.5X46.6 DO CR60	R	223.5	251.5	46.6	255.68±0.2	238.7	256.58±0.2	10°
223.5X251.5X46.6 DO CH60	H	223.5	251.5	46.6	255.68±0.3	238.7	256.58±0.3	10°
223.5X251.5X46.6 DO CS60	S	223.5	251.5	46.6	255.68±0.4	238.7	256.58±0.4	10°
225.5X252X38 DO CR60	R	225.5	252	38	257.7±0.2	-	259.3±0.2	15°
231X259.7X38 DO CR60	R	231	259.7	38	263.7±0.2	247	264.7±0.2	10°
231X259.7X38 DO CV60	V	231	259.7	38	263.7±0.3	247	264.7±0.3	10°
235X259.7X38 DO CR60	R	235	259.7	38	263.7±0.2	247	264.7±0.2	10°
235X259.7X38 DO CH60	H	235	259.7	38	263.7±0.3	247	264.7±0.3	10°
235X259.7X38 DO CS60	S	235	259.7	38	263.7±0.4	247	264.7±0.4	10°
238X261X31.8 DO CR60	R	238	261	31.8	264.5±0.25	254	265.5±0.25	10°
240X262.8X36.6 DO CR60	R	240	262.8	36.6	273.2±0.2	260	274.2±0.2	10°
240X262.8X38 DO CR60	R	240	262.8	38	272.5±0.2	255.5	273.5±0.2	10°
240X262.8X38 DO CH60	H	240	262.8	38	272.5±0.3	255.5	273.5±0.3	10°
240X262.8X38 DO CS60	S	240	262.8	38	272.5±0.4	255.5	273.5±0.4	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
—	mm						
208.7X222.8X26 DO CS60	11.5	3±0.6	13.5	2.2	1	0.5	2.5
205X227X30 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
205X227X30 DO CH60	14.5	3±0.6	17	2.8	1	0.5	5
205X227X30 DO CS60	14.5	3±0.7	17	2.8	1	0.5	5
205X227X30 DO CV60	14.5	3±0.8	17	2.8	1	0.5	5
200X228.5X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
200X228.5X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
200X228.5X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
208X229.6X35.4 DO CR60	17	1.5±0.5	17.8	3.3	1	1	3
209X234X42 DO CR60	19.5	4±0.5	22.5	3	1	0.5	4
216X237X30 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
220X239.5X31.8 DO CR60	14.5	3±0.5	16.5	2.8	1	0.5	5
220X239.5X31.8 DO CS60	14.5	3±0.6	16.5	2.8	1	0.5	5
220X241.4X25 DO CR60	11	3±0.5	13.5	2.2	1	0.5	4
220X246X41 DO CR60	21	4±0.5	24	3.5	0.8	0.5	4
226X250X41 DO CR60	20	4±0.5	22	3.5	1	0.5	6
223X251.5X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
223X251.5X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
223X251.5X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
223.5X251.5X46.6 DO CR60	22	3±0.5	24	3.7	3	0.5	6.3
223.5X251.5X46.6 DO CH60	22	3±0.6	24	3.7	3	0.5	6.3
223.5X251.5X46.6 DO CS60	22	3±0.7	24	3.7	3	0.5	6.3
225.5X252X38 DO CR60	18	3±0.5	-	4	3	1	3
231X259.7X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
231X259.7X38 DO CV60	18	3±0.6	20.5	3.1	1	0.5	6.5
235X259.7X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
235X259.7X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
235X259.7X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
238X261X31.8 DO CR60	14.5	3±0.5	17	2.8	1	0.5	5
240X262.8X36.6 DO CR60	19	4±0.5	21	3	2	0.5	4
240X262.8X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
240X262.8X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
240X262.8X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5

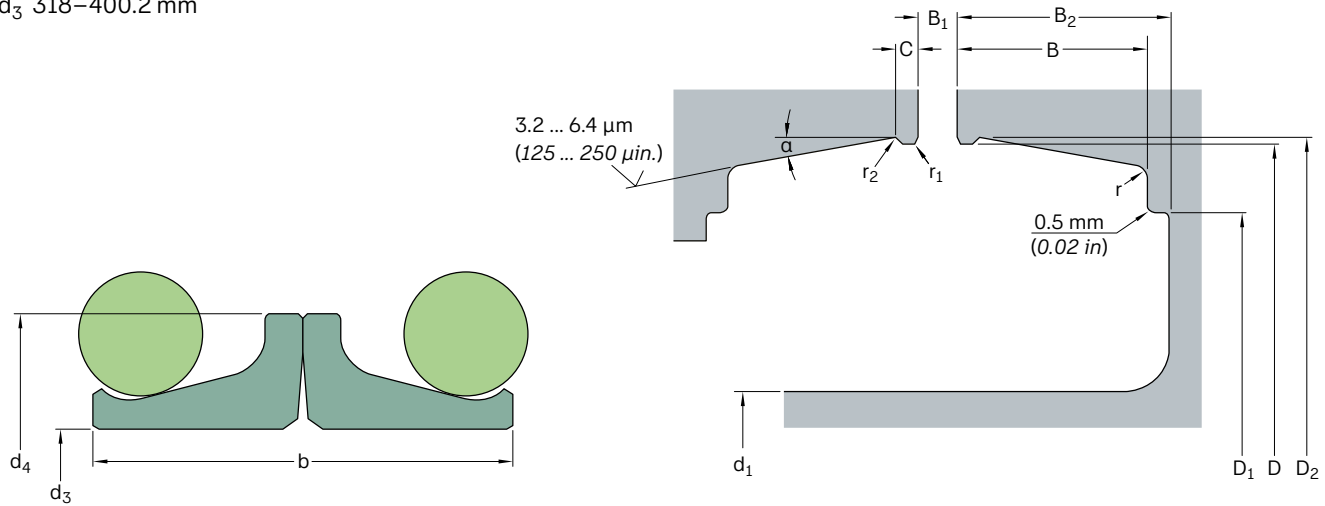


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
242X262.8X40 DO CR60	R	242	262.8	40	272.5±0.2	255.5	273.5±0.2	10°
250X270X30 DO CR60	R	250	270	30	273.7±0.25	262	274.7±0.25	10°
250X270X30 DO CV60	V	250	270	30	273.7±0.26	262	274.7±0.26	10°
236X274X42 DO CR60	R	236	274	42	277.3±0.2	260	278.2±0.2	10°
250X276X44 DO CR60	R	250	276	44	283.6±0.2	266	284.6±0.2	10°
252X280.5X38 DO CR60	R	252	280.5	38	284.5±0.2	267.5	285.5±0.2	10°
252X280.5X38 DO CH60	H	252	280.5	38	284.5±0.3	267.5	285.5±0.3	10°
252X280.5X38 DO CS60	S	252	280.5	38	284.5±0.4	267.5	285.5±0.4	10°
262X288X40 DO CR60	R	262	288	40	293±0.2	276	294±0.2	10°
262X288X40 DO CH60	H	262	288	40	293±0.3	276	294±0.3	10°
262X288X40 DO CS60	S	262	288	40	293±0.4	276	294±0.4	10°
265X293X38 DO CR60	R	265	293	38	297±0.2	280	298±0.2	10°
265X293X38 DO CH60	H	265	293	38	297±0.3	280	298±0.3	10°
265X293X38 DO CS60	S	265	293	38	297±0.4	280	298±0.4	10°
265X293X38 DO CV60	V	265	293	38	297±0.5	280	298±0.5	10°
265X293X46 DO CR60	R	265	293	46	297±0.2	280	298±0.2	10°
275X303X38 DO CR60	R	275	303	38	307±0.2	290	308±0.2	10°
275X303X38 DO CS60	S	275	303	38	307±0.3	290	308±0.3	10°
282.5X311X38 DO CR60	R	282.5	311	38	315.4±0.2	298	316.3±0.2	10°
282.5X311X38 DO CH60	H	282.5	311	38	315.4±0.3	298	316.3±0.3	10°
282.5X311X38 DO CS60	S	282.5	311	38	315.4±0.4	298	316.3±0.4	10°
282X314X40 DO CR60	R	282	314	40	319±0.2	300	320±0.2	10°
300X325X38 DO CR60	R	300	325	38	334.5±0.2	318	335.5±0.2	10°
300X325X38 DO CS60	S	300	325	38	334.5±0.3	318	335.5±0.3	10°
303X325X38 DO CR60	R	303	325	38	334.5±0.2	318	335.5±0.2	10°
303.5X327X38 DO CR60	R	303.5	327	38	332.1±0.2	315.12	333±0.2	10°
300X328X38 DO CR60	R	300	328	38	332±0.2	315	333±0.2	10°
300X328X40 DO CR60	R	300	328	40	332±0.2	315	333±0.2	10°
318X341X38 DO CR60	R	318	341	38	350.5±0.2	334	351.5±0.2	10°
318X341X38 DO CH60	H	318	341	38	350.5±0.3	334	351.5±0.3	10°
318X341X38 DO CS60	S	318	341	38	350.5±0.4	334	351.5±0.4	10°
318X343X38 DO CR60	R	318	343	38	350.5±0.2	334	351.5±0.2	10°
318X346X38 DO CR60	R	318	346	38	350.5±0.2	334	351.5±0.2	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
–	mm						
242X262.8X40 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
250X270X30 DO CR60	14	3±0.5	15.5	2.8	1	0.5	5
250X270X30 DO CV60	14	3±0.6	15.5	2.8	1	0.5	5
236X274X42 DO CR60	18.8	3±0.5	22	5.1	3	1	10
250X276X44 DO CR60	20.5	4±0.5	24	3	1	0.5	4
252X280.5X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
252X280.5X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
252X280.5X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
262X288X40 DO CR60	17	7±0.5	20	3.8	3	1.2	6
262X288X40 DO CH60	17	7±0.6	20	3.8	3	1.2	6
262X288X40 DO CS60	17	7±0.7	20	3.8	3	1.2	6
265X293X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
265X293X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
265X293X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
265X293X38 DO CV60	18	3±0.8	20.5	3.1	1	0.5	6.5
265X293X46 DO CR60	18.4	3±0.5	24.1	3.7	3	0.5	6.3
275X303X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
275X303X38 DO CS60	18	3±0.6	20.5	3.1	1	0.5	6.5
282.5X311X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
282.5X311X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
282.5X311X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
282X314X40 DO CR60	18	4±0.5	21	3	0.8	0.5	4
300X325X38 DO CR60	17.5	3±0.5	20.5	3.1	1	0.5	6.5
300X325X38 DO CS60	17.5	3±0.6	20.5	3.1	1	0.5	6.5
303X325X38 DO CR60	17.5	3±0.5	20.5	3.1	1	0.5	6.5
303.5X327X38 DO CR60	18.4	3±0.5	20.3	3.7	1	0.5	6.3
300X328X38 DO CR60	19.5	4±0.5	22	3	1	0.8	4
300X328X40 DO CR60	18.5	4±0.5	21	3	1	0.5	4
318X341X38 DO CR60	17.5	3±0.5	20.5	3.1	1	0.5	6.5
318X341X38 DO CH60	17.5	3±0.6	20.5	3.1	1	0.5	6.5
318X341X38 DO CS60	17.5	3±0.7	20.5	3.1	1	0.5	6.5
318X343X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5
318X346X38 DO CR60	18	3±0.5	20.5	3.1	1	0.5	6.5

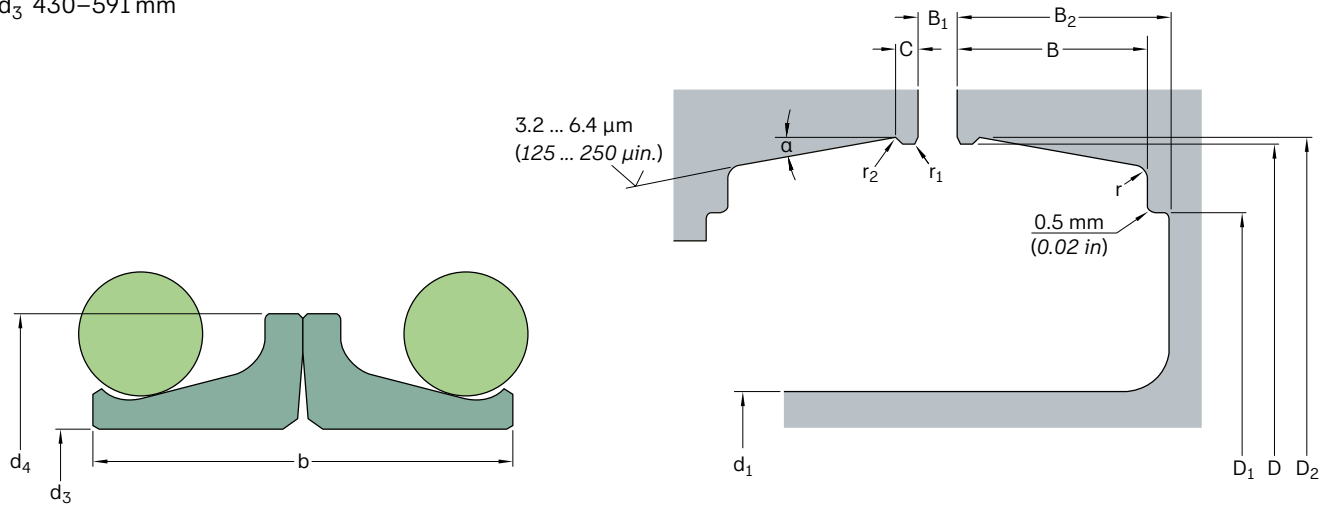


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
318X346X38 DO CH60	H	318	346	38	350.5±0.3	334	351.5±0.3	10°
318X346X38 DO CS60	S	318	346	38	350.5±0.4	334	351.5±0.4	10°
318X346X46 DO CR60	R	318	346	46	350.68±0.2	333.7	351.58±0.2	10°
318X346X46 DO CS60	S	318	346	46	350.68±0.3	333.7	351.58±0.3	10°
326X354X30 DO CR60	R	326	354	30	357.7±0.25	346	358.7±0.25	10°
340X368X40 DO CR60	R	340	368	40	373.8±0.2	358	374.8±0.2	10°
340X368.5X38 DO CR60	R	340	368.5	38	373.2±0.2	358	374.8±0.2	10°
340X368.5X38 DO CH60	H	340	368.5	38	373.2±0.3	358	374.8±0.3	10°
340X368.5X38 DO CS60	S	340	368.5	38	373.2±0.4	358	374.8±0.4	10°
340X370X40 DO CR60	R	340	370	40	374±0.2	358	374.6±0.2	9°30'
350X375X38 DO CR60	R	350	375	38	384.5±0.2	368	385.5±0.2	10°
350X375X38 DO CH60	H	350	375	38	384.5±0.3	368	385.5±0.3	10°
350X375X38 DO CS60	S	350	375	38	384.5±0.4	368	385.5±0.4	10°
350X375X38 DO CV60	V	350	375	38	384.5±0.5	368	385.5±0.5	10°
355X375X38 DO CR60	R	355	375	38	384.5±0.2	368	385.5±0.2	10°
355X375X38 DO CS60	S	355	375	38	384.5±0.3	368	385.5±0.3	10°
356X381X38 DO CR60	R	356	381	38	388.5±0.2	370	389.5±0.2	10°
367X394X38 DO CR60	R	367	394	38	398.6±0.2	381	399.5±0.2	10°
369X394X38 DO CR60	R	369	394	38	398.6±0.2	381	399.5±0.2	10°
366X394X38 DO CR60	R	366	394	38	398.6±0.2	381	399.5±0.2	10°
366X394X38 DO CH60	H	366	394	38	398.6±0.3	381	399.5±0.3	10°
366X394X38 DO CS60	S	366	394	38	398.6±0.4	381	399.5±0.4	10°
366X394X38 DO CV60	V	366	394	38	398.6±0.5	381	399.5±0.5	10°
366X394X46.6 DO CR60	R	366	394	46.6	398.68±0.2	381.7	399.58±0.2	10°
370X398X38 DO CR60	R	370	398	38	402.6±0.2	385	403.5±0.2	10°
382X405X40 DO CR60	R	382	405	40	411±0.2	395	412±0.2	10°
382X405X40 DO CS60	S	382	405	40	411±0.3	395	412±0.3	10°
388X410X38 DO CR60	R	388	410	38	418.7±0.2	400	419.5±0.2	10°
385X413X46 DO CR60	R	385	413	46	423.3±0.2	402	424.5±0.2	10°
388X415X38 DO CR60	R	388	415	38	419.4±0.2	402	420.3±0.2	10°
388X415X38 DO CV60	V	388	415	38	419.4±0.3	402	420.3±0.3	10°
388X416.2X38 DO CR60	R	388	416.2	38	420.7±0.2	402	421.6±0.2	10°
400.2X427.2X38 DO CR60	R	400.2	427.2	38	431.42±0.2	413	432.32±0.2	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
–	mm						
318X346X38 DO CH60	18	3±0.6	20.5	3.1	1	0.5	6.5
318X346X38 DO CS60	18	3±0.7	20.5	3.1	1	0.5	6.5
318X346X46 DO CR60	22	3±0.5	24	3.7	3	0.5	6.3
318X346X46 DO CS60	22	3±0.6	24	3.7	3	0.5	6.3
326X354X30 DO CR60	15	3±0.5	16.5	2.8	1	0.5	5
340X368X40 DO CR60	19	3±0.5	21.5	3	1	0.5	4
340X368.5X38 DO CR60	19	3±0.5	21.5	3	1	0.5	4
340X368.5X38 DO CH60	19	3±0.6	21.5	3	1	0.5	4
340X368.5X38 DO CS60	19	3±0.7	21.5	3	1	0.5	4
340X370X40 DO CR60	17	3±0.5	21.5	3	3	1	3
350X375X38 DO CR60	17.5	3±0.5	20.5	3.1	1	0.5	6.5
350X375X38 DO CH60	17.5	3±0.6	20.5	3.1	1	0.5	6.5
350X375X38 DO CS60	17.5	3±0.7	20.5	3.1	1	0.5	6.5
350X375X38 DO CV60	17.5	3±0.8	20.5	3.1	1	0.5	6.5
355X375X38 DO CR60	17.5	3±0.5	20.5	3.1	1	0.5	6.5
355X375X38 DO CS60	17.5	3±0.6	20.5	3.1	1	0.5	6.5
356X381X38 DO CR60	18.5	4±0.5	21	3	2	R0.5	4
367X394X38 DO CR60	17.5	3±0.5	20.5	3.7	1	0.5	6.5
369X394X38 DO CR60	17.5	3±0.5	20.5	3	1	0.5	6.5
366X394X38 DO CR60	17.5	4.77±0.5	20.5	3	1	0.5	6.5
366X394X38 DO CH60	17.5	4.77±0.6	20.5	3	1	0.5	6.5
366X394X38 DO CS60	17.5	4.77±0.7	20.5	3	1	0.5	6.5
366X394X38 DO CV60	17.5	4.77±0.8	20.5	3	1	0.5	6.5
366X394X46.6 DO CR60	22	4±0.5	24	3.7	3	0.5	6.3
370X398X38 DO CR60	17.5	3±0.5	20.5	3	1	0.5	6.5
382X405X40 DO CR60	17	6±0.5	22	3.8	3	1.1	6
382X405X40 DO CS60	17	6±0.6	22	3.8	3	1.1	6
388X410X38 DO CR60	18	3±0.5	20.5	3	0.8	0.5	6.5
385X413X46 DO CR60	22	8±0.5	30	3.5	3	0.5	6
388X415X38 DO CR60	17.5	3±0.5	20.5	3	1	0.5	6.5
388X415X38 DO CV60	17.5	3±0.6	20.5	3	1	0.5	6.5
388X416.2X38 DO CR60	17.5	3±0.5	20.5	3	1	0.5	6.5
400.2X427.2X38 DO CR60	22	3±0.5	24	3.7	3	0.5	6.3

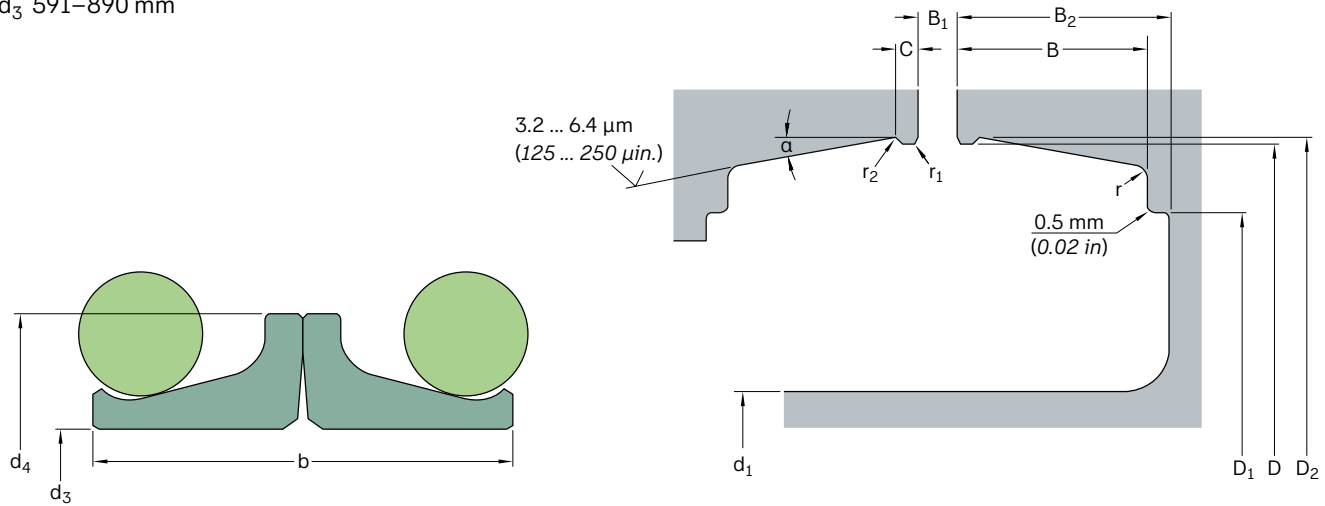


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
430X457X38 DO CR60	R	430	457	38	461.3±0.2	444	462.3±0.2	10°
430X457X38 DO CS60	S	430	457	38	461.3±0.3	444	462.3±0.3	10°
430X457X38 DO CV60	V	430	457	38	461.3±0.4	444	462.3±0.4	10°
430.35X457.2X46.6 DO CR60	R	430.35	457.2	46.6	461.42±0.2	444.44	462.32±0.2	10°
429.3X458.4X38 DO CR60	R	429.3	458.4	38	461.3±0.2	444	462.3±0.2	10°
429.3X458.4X38 DO CH60	H	429.3	458.4	38	461.3±0.3	444	462.3±0.3	10°
429.3X458.4X38 DO CS60	S	429.3	458.4	38	461.3±0.4	444	462.3±0.4	10°
429.3X458.4X38 DO CV60	V	429.3	458.4	38	461.3±0.5	444	462.3±0.5	10°
450X480X50 DO CR60	R	450	480	50	490.2±0.2	470	492.2±0.2	10°
454.6X482.6X40 DO CR60	R	454.6	482.6	40	486.82±0.2	469.84	487.72±0.2	10°
454.6X482.6X40 DO CS60	S	454.6	482.6	40	486.82±0.3	469.84	487.72±0.3	10°
465X495X43.6 DO CR60	R	465	495	43.6	498.5±0.2	482.9	500.7±0.2	10°
465X497.2X43.6 DO CR60	R	465	497.2	43.6	500.9±0.2	482.9	503.1±0.2	10°
470X500X50 DO CR60	R	470	500	50	510.2±0.2	490	512.2±0.2	10°
505X533.4X43.6 DO CR60	R	505	533.4	43.6	537.5±0.2	521	538.5±0.2	10°
505X533.4X43.6 DO CH60	H	505	533.4	43.6	537.5±0.3	521	538.5±0.3	10°
505X533.4X43.6 DO CS60	S	505	533.4	43.6	537.5±0.4	521	538.5±0.4	10°
505X533.4X43.6 DO CV60	V	505	533.4	43.6	537.5±0.5	521	538.5±0.5	10°
505X535.8X43.6 DO CR60	R	505	535.8	43.6	539.7±0.2	521	541.8±0.2	10°
508X548X60 DO CR60	R	508	548	60	551.5±0.4	528	553±0.4	10°
508X548X60 DO CH60	H	508	548	60	551.5±0.5	528	553±0.5	10°
508X548X60 DO CS60	S	508	548	60	551.5±0.6	528	553±0.6	10°
530X560X50 DO CR60	R	530	560	50	570±0.2	545	571.5±0.2	10°
530X560X50 DO CH60	H	530	560	50	570±0.3	545	571.5±0.3	10°
530X560X50 DO CS60	S	530	560	50	570±0.4	545	571.5±0.4	10°
538X566.8X43.6 DO CR60	R	538	566.8	43.6	571.2±0.2	554	572.2±0.2	10°
540X567.9X39 DO CR60	R	540	567.9	39	572.16±0.2	555.18	573.06±0.2	10°
540X567.9X39 DO CS60	S	540	567.9	39	572.16±0.3	555.18	573.06±0.3	10°
559X590X50 DO CR60	R	559	590	50	599.9±0.2	575	601.5±0.2	10°
576X608X43.6 DO CR60	R	576	608	43.6	612±0.2	596	613±0.2	10°
576X608X43.6 DO CV60	V	576	608	43.6	612±0.3	596	613±0.3	10°
591X623X50 DO CR60	R	591	623	50	633.2±0.2	613	634.7±0.2	10°
591X623X50 DO CH60	H	591	623	50	633.2±0.3	613	634.7±0.3	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
–	mm						
430X457X38 DO CR60	17.5	3±0.5	20.5	3	1	0.5	6.5
430X457X38 DO CS60	17.5	3±0.6	20.5	3	1	0.5	6.5
430X457X38 DO CV60	17.5	3±0.7	20.5	3	1	0.5	6.5
430.35X457.2X46.6 DO CR60	22	3±0.5	24	3.7	3	0.5	6.3
429.3X458.4X38 DO CR60	17.5	3±0.5	20.5	3	1	0.5	6.5
429.3X458.4X38 DO CH60	17.5	3±0.6	20.5	3	1	0.5	6.5
429.3X458.4X38 DO CS60	17.5	3±0.7	20.5	3	1	0.5	6.5
429.3X458.4X38 DO CV60	17.5	3±0.8	20.5	3	1	0.5	6.5
450X480X50 DO CR60	23.5	3±0.5	25.5	4	1	0.5	6
454.6X482.6X40 DO CR60	22	4±0.5	24	3.7	3	3	6.3
454.6X482.6X40 DO CS60	22	4±0.6	24	3.7	3	3	6.3
465X495X43.6 DO CR60	21.2	3±0.5	22.9	4.7	1	0.7	7
465X497.2X43.6 DO CR60	21.2	3±0.5	23	4.7	1	0.7	7
470X500X50 DO CR60	23.5	3±0.5	25.5	4	1	0.5	6
505X533.4X43.6 DO CR60	19.7	6±0.5	21.7	3.8	1	1.3	6.35
505X533.4X43.6 DO CH60	19.7	6±0.6	21.7	3.8	1	1.3	6.35
505X533.4X43.6 DO CS60	19.7	6±0.7	21.7	3.8	1	1.3	6.35
505X533.4X43.6 DO CV60	19.7	6±0.8	21.7	3.8	1	1.3	6.35
505X535.8X43.6 DO CR60	19.7	3±0.5	21.7	4.2	1	0.5	6.5
508X548X60 DO CR60	22	15±0.5	26	5	3	1.1	9
508X548X60 DO CH60	22	15±0.6	26	5	3	1.1	9
508X548X60 DO CS60	22	15±0.7	26	5	3	1.1	9
530X560X50 DO CR60	23.5	6±0.5	25.5	4	1	0.8	6
530X560X50 DO CH60	23.5	6±0.6	25.5	4	1	0.8	6
530X560X50 DO CS60	23.5	6±0.7	25.5	4	1	0.8	6
538X566.8X43.6 DO CR60	19.7	6±0.5	21.7	4	1	1.3	6.5
540X567.9X39 DO CR60	18.4	3±0.5	23.3	3.7	3.7	0.5	6.3
540X567.9X39 DO CS60	18.4	3±0.6	23.3	3.7	3.7	0.5	6.3
559X590X50 DO CR60	23.5	6±0.5	25.5	4	1	0.8	6
576X608X43.6 DO CR60	19.7	6±0.5	21.7	4	1	1.3	6.5
576X608X43.6 DO CV60	19.7	6±0.6	21.7	4	1	1.3	6.5
591X623X50 DO CR60	23.5	6±0.5	25.5	4	1	0.8	6
591X623X50 DO CH60	23.5	6±0.6	25.5	4	1	0.8	6

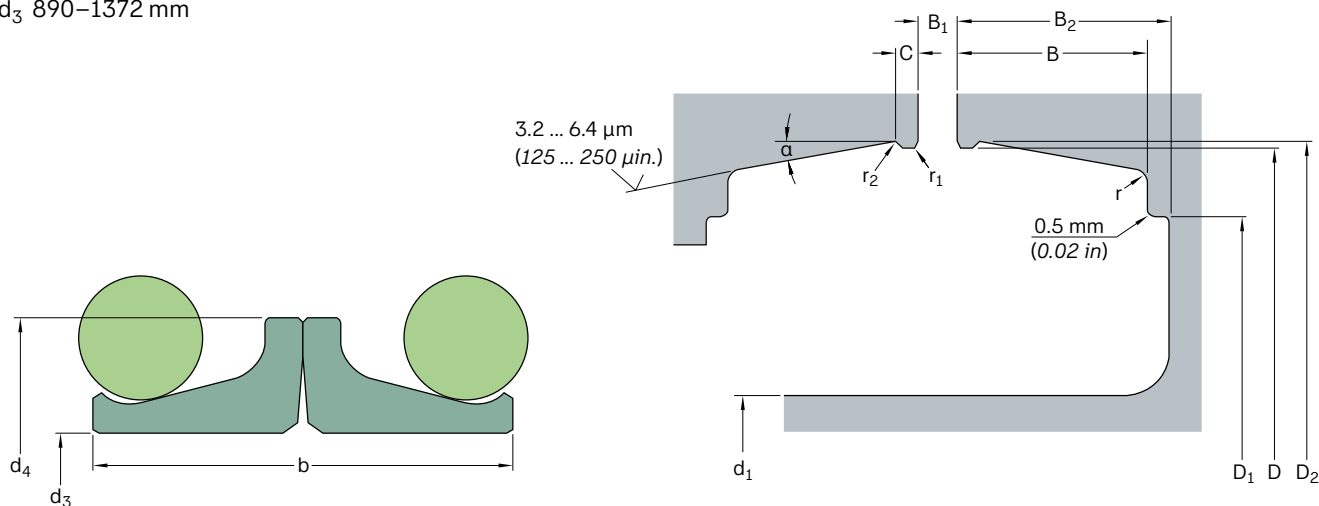


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
591X623X50 DO CS60	S	591	623	50	633.2±0.4	613	634.7±0.4	10°
591X626X50 DO CR60	R	591	626	50	633.7±0.2	610	634.7±0.2	10°
596X628X50 DO CR60	R	596	628	50	638.2±0.2	618	640.2±0.2	10°
596X628X50 DO CH60	H	596	628	50	638.2±0.3	618	640.2±0.3	10°
596X628X50 DO CS60	S	596	628	50	638.2±0.4	618	640.2±0.4	10°
660X695X53 DO CR60	R	660	695	53	703.8±0.4	680	705.3±0.4	10°
660X695X53 DO CV60	V	660	695	53	703.8±0.5	680	705.3±0.5	10°
667X700X43.6 DO CR60	R	667	700	43.6	704.3±0.2	687	705.6±0.2	10°
667X700X43.6 DO CH60	H	667	700	43.6	704.3±0.3	687	705.6±0.3	10°
667X700X43.6 DO CS60	S	667	700	43.6	704.3±0.4	687	705.6±0.4	10°
667X700X43.6 DO CV60	V	667	700	43.6	704.3±0.5	687	705.6±0.5	10°
667X700X50 DO CR60	R	667	700	50	704.7±0.2	687.7	705.6±0.2	10°
667X700X50 DO CH60	H	667	700	50	704.7±0.3	687.7	705.6±0.3	10°
667X700X50 DO CS60	S	667	700	50	704.7±0.4	687.7	705.6±0.4	10°
718X750X50 DO CR60	R	718	750	50	760.2±0.2	740	761.7±0.2	10°
718X750X50 DO CH60	H	718	750	50	760.2±0.3	740	761.7±0.3	10°
718X750X50 DO CS60	S	718	750	50	760.2±0.4	740	761.7±0.4	10°
740X801X80 DO CR60	R	740	801	80	815.9±0.5	784	816.9±0.5	10°
773.7X806.7X44 DO CR60	R	773.7	806.7	44	811.38±0.2	794.4	812.28±0.2	10°
773.7X806.7X44 DO CS60	S	773.7	806.7	44	811.38±0.3	794.4	812.28±0.3	10°
770X826X80 DO CR60	R	770	826	80	830.9±0.5	800	831.9±0.5	10°
780X836X80 DO CR60	R	780	836	80	840.9±0.5	810	841.9±0.5	10°
819X862X50 DO CR60	R	819	862	50	868.7±0.2	845	869.7±0.2	10°
817X865X46.6 DO CR60	R	817	865	46.6	869.7±0.2	852.7	870.6±0.2	10°
817X865X46.6 DO CS60	S	817	865	46.6	869.7±0.3	852.7	870.6±0.3	10°
825X865X48 DO CR60	R	825	865	48	869.7±0.2	852.7	870.6±0.2	10°
825X865X48 DO CH60	H	825	865	48	869.7±0.3	852.7	870.6±0.3	10°
825X865X48 DO CS60	S	825	865	48	869.7±0.4	852.7	870.6±0.4	10°
834X886X80 DO CR60	R	834	886	80	890.9±0.5	860	891.9±0.5	10°
834X886X80 DO CV60	V	834	886	80	890.9±0.6	860	891.9±0.6	10°
902X937X60 DO CR60	R	902	937	60	945.1±0.4	922.4	946.3±0.4	10°
902X941X60 DO CR60	R	902	941	60	945.2±0.4	922.4	946.3±0.4	10°
890X951X80 DO CR60	R	890	951	80	955.9±0.5	924	956.9±0.5	10°

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Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
—	mm						
591X623X50 DO CS60	23.5	6±0.7	25.5	4	1	0.8	6
591X626X50 DO CR60	22	8±0.5	24	4	5	1.3	6
596X628X50 DO CR60	23.5	3±0.5	25.5	5.12	1	0.5	6
596X628X50 DO CH60	23.5	3±0.6	25.5	5.12	1	0.5	6
596X628X50 DO CS60	23.5	3±0.7	25.5	5.12	1	0.5	6
660X695X53 DO CR60	23.5	6±0.5	25.5	4	1	0.8	6
660X695X53 DO CV60	23.5	6±0.6	25.5	4	1	0.8	6
667X700X43.6 DO CR60	21.3	9±0.5	24	3.7	1	0.7	6.3
667X700X43.6 DO CH60	21.3	9±0.6	24	3.7	1	0.7	6.3
667X700X43.6 DO CS60	21.3	9±0.7	24	3.7	1	0.7	6.3
667X700X43.6 DO CV60	21.3	9±0.8	24	3.7	1	0.7	6.3
667X700X50 DO CR60	21.3	12±0.5	26.2	3.7	1	1.2	6.3
667X700X50 DO CH60	21.3	12±0.6	26.2	3.7	1	1.2	6.3
667X700X50 DO CS60	21.3	12±0.7	26.2	3.7	1	1.2	6.3
718X750X50 DO CR60	23.5	6±0.5	25.5	4	1	0.5	6
718X750X50 DO CH60	23.5	6±0.6	25.5	4	1	0.5	6
718X750X50 DO CS60	23.5	6±0.7	25.5	4	1	0.5	6
740X801X80 DO CR60	34.5	17±0.5	39.5	4.4	1	1.1	10
773.7X806.7X44 DO CR60	22	10±0.5	24	3.7	3	0.5	6.3
773.7X806.7X44 DO CS60	22	10±0.6	24	3.7	3	0.5	6.3
770X826X80 DO CR60	34.5	17±0.5	39.5	4.4	1	1.1	10
780X836X80 DO CR60	34.5	17±0.5	39.5	4.4	1	1.1	10
819X862X50 DO CR60	22	10±0.5	24	4	5	1.3	6
817X865X46.6 DO CR60	21.3	12±0.5	26.2	3.8	1	1.2	6.3
817X865X46.6 DO CS60	21.3	12±0.6	26.2	3.8	1	1.2	6.3
825X865X48 DO CR60	18.4	11±0.5	23.3	3.7	1	1.2	6.3
825X865X48 DO CH60	18.4	11±0.6	23.3	3.7	1	1.2	6.3
825X865X48 DO CS60	18.4	11±0.7	23.3	3.7	1	1.2	6.3
834X886X80 DO CR60	34.5	17±0.5	39.5	4.5	1	1.1	10
834X886X80 DO CV60	34.5	17±0.6	39.5	4.5	1	1.1	10
902X937X60 DO CR60	23.8	12±0.5	29	4.65	1	1.4	8
902X941X60 DO CR60	23.8	16±0.5	25.2	4.65	1	1.4	8
890X951X80 DO CR60	30	17±0.5	34	4.4	5	1.1	10

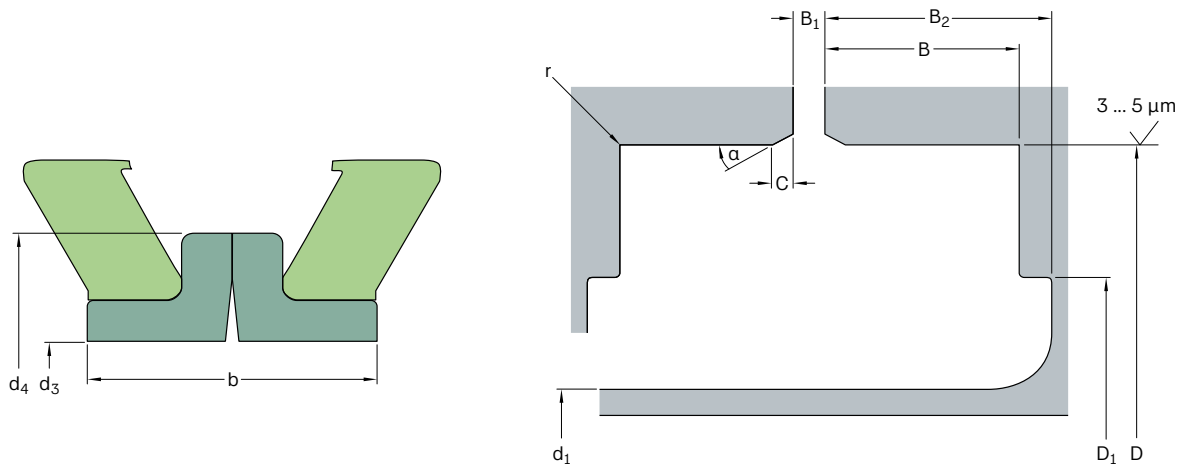


Designation	O-ring material	Dimensions seal rings			Dimensions housing			
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Locking nose diameter D	Shoulder diameter D ₁	Ramp diameter D ₂	Ramp angle α
–	–	mm						°
890X951X80 DO CH60	H	890	951	80	955.9±0.6	924	956.9±0.6	10°
890X951X80 DO CS60	S	890	951	80	955.9±0.7	924	956.9±0.7	10°
920X976X80 DO CR60	R	920	976	80	980.9±0.5	950	981.9±0.5	10°
1030X1085X80 DO CR60	R	1030	1085	80	1089.9±0.5	1058	1090.9±0.5	10°
1047X1105X80 DO CR60	R	1047	1105	80	1109.9±0.5	1078	1110.9±0.5	10°
1175X1236X80 DO CR60	R	1175	1236	80	1240.4±0.5	1209	1241.9±0.5	10°
1372X1425X80 DO CR60	R	1372	1425	80	1429.9±0.5	1398	1430.9±0.5	10°

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or click [here](#).

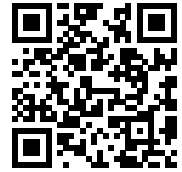


Designation	Dimensions housing						
	Bore depth B	Gap width B ₁	Undercut B ₂	Locking nose width C	Housing corner radius r	r ₁	Locking nose radius r ₂
–	mm						
890X951X80 DO CH60	30	17±0.6	34	4.4	5	1.1	10
890X951X80 DO CS60	30	17±0.7	34	4.4	5	1.1	10
920X976X80 DO CR60	34.5	17±0.5	39.5	4.4	1	1.1	10
1030X1085X80 DO CR60	34.5	17±0.5	39.5	4.4	1	1.1	10
1047X1105X80 DO CR60	34.5	17±0.5	39.5	4.4	1	1.1	10
1175X1236X80 DO CR60	32.5	26±0.5	37.5	4.4	1	0.5	10
1372X1425X80 DO CR60	32.5	26±0.5	37.5	4.4	1	1.1	10



Designation	Belleville washer material	Dimensions										
		Seal inside diameter d_3	Seal outside diameter d_4	Sealing ring width b	Bore diameter D	Shoulder diameter D_1	Bore depth B	Gap width B_1	Under-cut B_2	Radius r	Chamfer length c	Chamfer angle α
–	–	mm										°
42X59X20 DF CR60	R	42	59	20	65±0.16	53	10	3±0.5	10.5	1	2	15°
48.5X62.5X25.6 DF CR60	R	48.5	62.5	25.6	76.3±0.16	62.9	10.6	1.5±0.5	14	1	1.6	30°
45X65X22 DF CR60	R	45	65	22	70.1±0.16	58	11.5	1.7±0.5	12.1	1	1.5	30°
56X76X21 DF CR60	R	56	76	21	82.55±0.16	70.1	10.6	1.7±0.5	11.7	1	1	30°
60X80X24 DF CR60	R	60	80	24	85±0.16	70	10.5	7±0.5	10.5	1	1	30°
76X90X17 DF CR60	R	76	90	17	95±0.16	83	8	2±0.5	9.5	1	1	30°
73.8X92.8X20 DF CR60	R	73.8	92.8	20	102.2±0.16	88	10	3±0.5	11	1	2	15°
88X104X19 DF CR60	R	88	104	19	113±0.16	98	8	4±0.5	9.5	1	1	20°
88X104X19 DF CV60	V	88	104	19	113±0.17	98	8	4±0.6	9.5	1	1	20°
88X105X23 DF CR60	R	88	105	23	115.8±0.16	102	10	3±0.5	11	1	1.5	15°
94X112X22.8 DF CR60	R	94	112	22.8	125.8±0.16	109	12.5	3±0.5	13	1	2.5	15°
94X120X25 DF CR60	R	94	120	25	125.8±0.16	109.1	13	1.8±0.5	13.6	1	1.5	30°
94X120X25 DF CV60	V	94	120	25	125.8±0.17	109.1	13	1.8±0.6	13.6	1	1.5	30°
99X123X19 DF CR60	R	99	123	19	127.3±0.18	113	10	3±0.5	11	1	3	15°
115X141X28 DF CR60	R	115	141	28	152.4±0.18	131.4	15.9	1.7±0.5	17.9	1	1.5	30°
124X143X34 DF CR60	R	124	143	34	162.6±0.18	149.9	17.8	3.1±0.5	17.8	1.5	4	30°
132X158X31 DF CR60	R	132	158	31	171.5±0.18	151.8	15.4	3.2±0.5	15.9	1.5	1.5	30°
142.5X161X24 DF CR60	R	142.5	161	24	173±0.18	139.7	11.1	5.5±0.5	11.3	1	1.5	30°
147.32X167.49X20 DF CR60	R	147.32	167.49	20	174.63±0.18	160.32	10.67	1.52±0.5	10.67	1	1.57	45°
148X172X29 DF CR60	R	148	172	29	184.5±0.18	164.7	16.5	1.7±0.5	17.5	1.5	1.5	30°
150X175X30 DF CR60	R	150	175	30	190±0.18	170	13	5±0.5	15	1	0.5	15°
169X195X33 DF CR60	R	169	195	33	206.2±0.18	191.5	15.1	1.8±0.5	18.4	1	1.1	15°
192X218X32 DF CR60	R	192	218	32	231±0.2	206	15.2	1.8±0.5	17.1	1.5	1	30°
194X222X34 DF CR60	R	194	222	34	238.8±0.2	214.2	20.14	3±0.5	21	1	1.5	30°
201X238X36 DF CR60	R	201	238	36	254±0.2	235.5	21.2	2.1±0.5	20.2	1.5	1	30°
213.5X238X27.4 DF CR60	R	213.5	238	27.4	254±0.2	240	13.7	4.6±0.5	13.7	1	1.5	30°
215X249X36 DF CR60	R	215	249	36	255.57±0.2	234.95	18.59	2.44±0.5	20.39	1.5	0.62	45°
228X260.5X41 DF CR60	R	228	260.5	41	277.1±0.23	247.5	23.5	4±0.5	24.5	1	1.5	15°
239X264X38 DF CR60	R	239	264	38	279.4±0.23	261.9	17.5	1.5±0.5	20.2	1	1.57	30°
235.7X265X30 DF CR60	R	235.7	265	30	273.1±0.23	230	15.6	2.6±0.5	15.7	1	1.5	30°
239X273X33 DF CR60	R	239	273	33	279.4±0.23	261.9	17.5	1.5±0.5	20.2	1	1.5	30°
256X282X30 DF CR60	R	256	282	30	292.1±0.23	276.2	15.6	1.6±0.5	16.2	1	1.5	30°
283X305X42 DF CR60	R	283	305	42	329.4±0.23	307.3	18.5	3±0.5	22.1	1	1.5	15°

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Designation	Belleville washer material	Dimensions										
		Seal inside diameter d ₃	Seal outside diameter d ₄	Sealing ring width b	Bore diameter D	Shoulder diameter D ₁	Bore depth B	Gap width B ₁	Under- cut B ₂	Radius r	Chamfer length c	Chamfer angle α
–	–	mm										°
300.5X325X30 DF CR60	R	300.5	325	30	336.4±0.23	324.6	15.6	1.6±0.5	17.6	1.5	1.5	30°
303X325X23 DF CR60	R	303	325	23	331±0.23	318	10	3±0.5	12	1	1.5	30°
320X352.5X36 DF CR60	R	320	352.5	36	365.1±0.23	343.7	18.4	2.1±0.5	20	1.5	1.6	30°
319X353X36 DF CR60	R	319	353	36	365.1±0.23	342.1	20	4.7±0.5	21.5	1.5	0.65	45°
354.5X392X38 DF CR60	R	354.5	392	38	401.8±0.23	380.6	23	1.6±0.5	24	2	1.5	30°
378.25X414X42 DF CR60	R	378.25	414	42	424.1±0.23	402.9	23	1.6±0.5	23	2	1.5	30°
378.25X414X42 DF CV60	V	378.25	414	42	424.1±0.24	402.9	23	1.6±0.6	23	2	1.5	30°
428X457X40.4 DF CR60	R	428	457	40.4	478±0.25	460	20.5	4.5±0.5	22	1	1.5	30°
428X457X40.4 DF CH60	H	428	457	40.4	478±0.26	460	20.5	4.5±0.6	22	1	1.5	30°
752X800X56 DF CR60	R	752	800	56	812.8±0.25	779	26.1	5.8±0.5	27.1	2	1.5	30°
752X800X56 DF CH60	H	752	800	56	812.8±0.26	779	26.1	5.8±0.6	27.1	2	1.5	30°

Proposal data sheet (PDS)

Customer Information

Company name:

Address:

City:

State/Province:

Zip / Postal code:

Country:

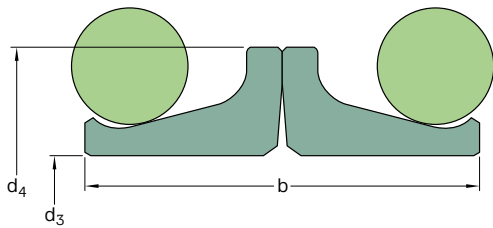
Contact name:

Telephone:

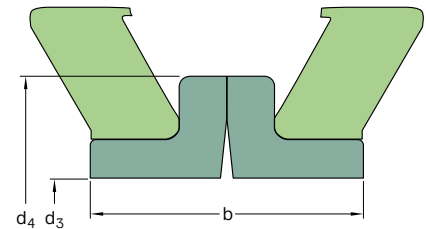
Email:

Requested seal design type

DO / DF:



DO design



DF design

d₃: mm

d₄: mm

b:

Dynamic information

Application description (e.g. track roller, carrier, idler, gearbox etc.):

Customer information

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/minutes

Duration of motion: seconds

Pressure

Is oil compartment vented? _____

If no, what is operating pressure (MPa)? _____

Maximum (MPa)? _____

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

Temperature

Minimum operating temperature: _____ °C

Maximum operating temperature: _____ °C

Typical operating temperature: _____ °C

Sealing hardware information

Shaft size or internal component diameter: _____ mm

Is seal exposed to the environment? _____

Radial tolerance stack: _____ mm

Axial tolerance stack: _____ mm

Housing roughness: _____ μm

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 centreline? _____ mm

Operating environment

Prolonged muddy conditions? _____

Description _____

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

Description _____

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

Customer information

Seal life expectations in hours: _____

Anticipated annual volume

Quantity (pcs) Year 1: _____ Year 2: _____ Year 3: _____

Additional information



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