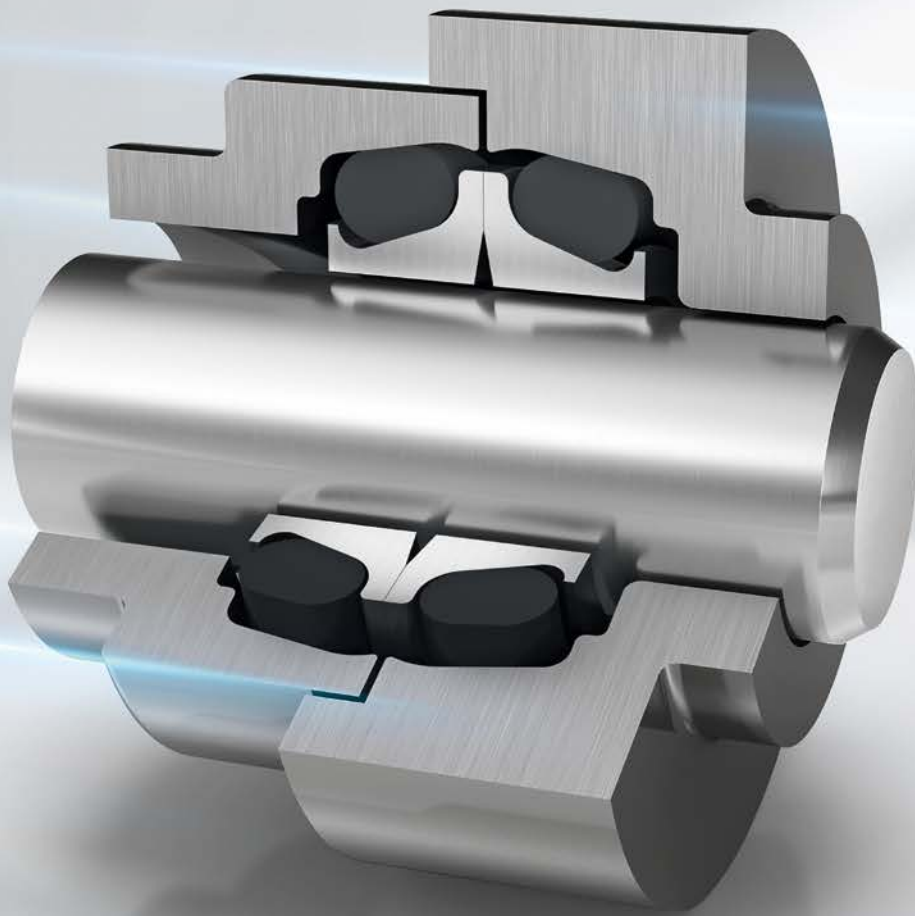


# Mechanical Face Seals





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## ■ Mechanical Face Seals

### ■ General Description

Mechanical Face Seals are a special form of sealing solution for rotating mechanical components. They are also known under other designations, such as lifetime seals, floating seals and heavy-duty seals.

#### TYPES

There are two different types of Mechanical Face Seal. The most common form is Type DO, which is characterized by the use of an O-Ring as the secondary sealing element (see Figure 1).

Type DF, on the other hand, has an elastomer with a diamond-shaped cross-section-Ø as a secondary sealing element instead of the O-Ring (see Figure 2).

Both types consist of two identical metal seal rings which seal against each other on a lapped seal face.

Special designs, like that in Figure 3, are available on request. Seal types can also be divided by the use of different seal materials.

#### DESIGN FEATURES

The seals consist of two metallic seal rings. They are mounted in separate housings face-to-face. The elastomeric elements center the seal in the housing.

#### METHOD OF OPERATION

The elastomeric rings provide three different functions:

- They generate a uniform axial face load. Enough to avoid the opening of the seals but not too high to avoid lapped surface damage.
- Transmit the torque from rotating half (seat) through the lapped surfaces to the static half.
- They guarantee flexibility to the whole system against vibration and misalignment.
- Prevent the sliding of half group assembled inside its seat.

It is important to note that only one half of the seal rotates; the interface between the two precision lapped mating surfaces rotating against the other at an orthogonal angle to the shaft. They form a leak-proof seal. The seal has a wedge

shaped gap from the ID to the seal face allowing for easy access to lubricate the seal face. Lubrication is necessary at all times. The lubricant builds a thin film between the sliding faces by a capillary effect and centrifugal force.

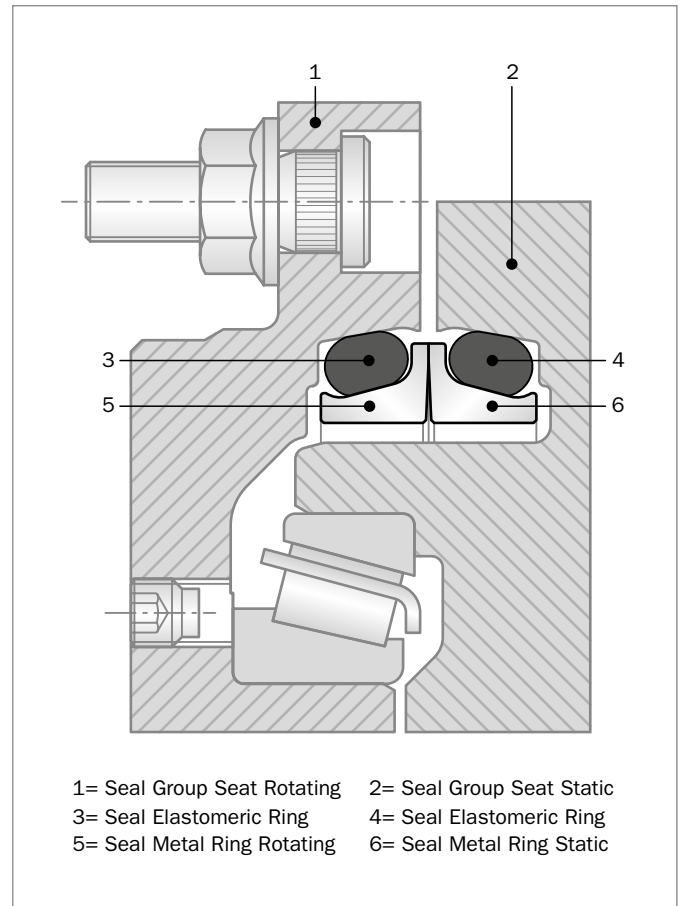


Figure 1: Mechanical Face Seals, Type DO

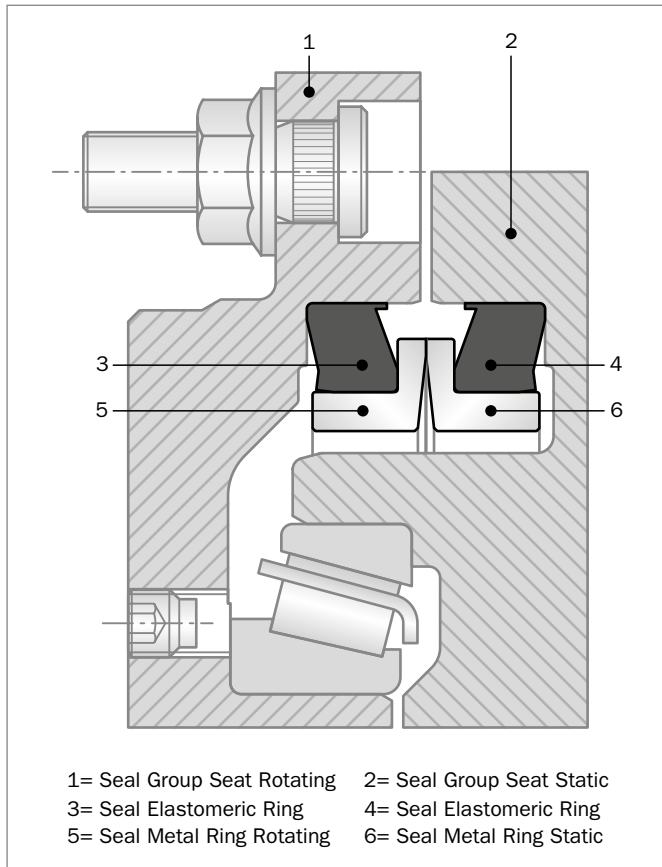


Figure 2: Mechanical Face Seals, Type DF

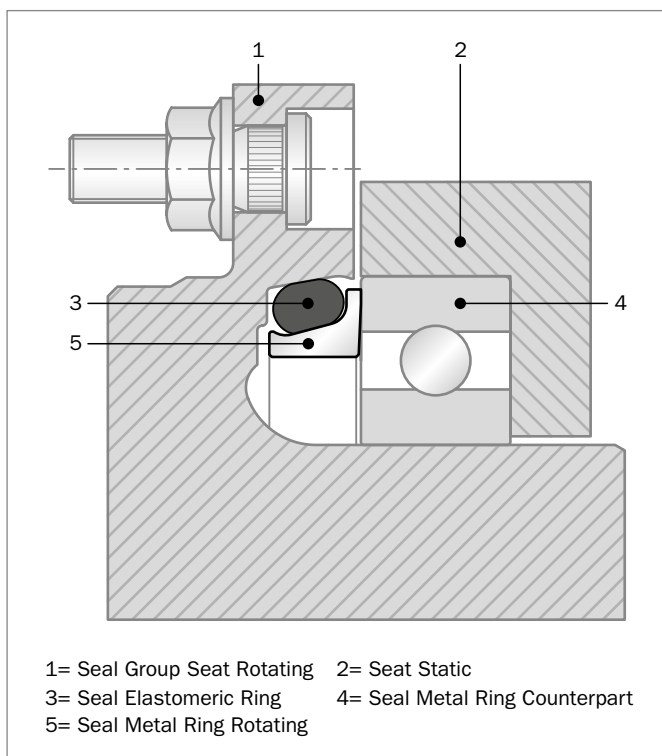


Figure 3: Special Design

## FEATURES AND BENEFITS

- Simple, reliable design
- High sealing effect against dirt, dust, water and abrasive media from the outside and against oil and grease from the inside
- Cost-effective
- Long service life
- Floating, useful against vibration or misalignment
- Maintenance-free
- Easy to assemble

## APPLICATIONS

The Mechanical Face Seal functions to protect the shaft and inner parts against wear from the external environment. At the same time, the seal has to avoid any oil leakage from the inner to the external part.

Mechanical Face Seals are usually designed to work in heavily contaminated environments, with a mixture of wear (abrasion) and chemical compatibility (corrosion).

These include:

Market segments as:

- Agriculture
- Mining
- Construction
- Industrial
- Military Equipment

Applications such as:

- Gearboxes
- Axles
- Undercarriages
- Tunnel Boring Machines
- Conveyor Systems
- Mixers
- Stirrers

and other applications with similar conditions or where maintenance-free lifetime sealing is expected.



## OPERATING CONDITIONS

The seals should not be subjected simultaneously to maximum pressure and maximum speed.

### Operating Pressure:

The shaft seal is pressure-free under normal operating conditions.

The Mechanical Face Seal can hold up to 0.15 MPa of differential pressure from outside to inside and from inside to outside. For higher differential pressures, please contact your local Customer Solution Center, which will analyze suitability for the application.

## SPEED

### Standard:

Cast Iron: 3 m/sec with oil lubrication  
100Cr6: 1 m/sec with oil lubrication

### Customized\*:

Cast Iron: up to 6 m/sec with oil lubrication  
(up to 1.5 m/sec with grease lubricant)  
100Cr6: up to 2.5 m/sec with oil lubrication  
(up to 1 m/sec with grease lubricant)

\* For customized solutions with higher peripheral speeds, please contact your local Customer Solution Center to analyze suitability.

Whether you require a standard or a customized solution, we strongly recommend getting in touch with Trelleborg:

- Whenever you design a new application.
- When an existing application needs to be modified, due to changes in peripheral speed, temperature, pressure, lubrication, or dimension, for example.

## RUN IN

It's strongly suggested during the first 10 hours of rotation to work with peripheral speeds not exceeding 1 m/sec.

## TEMPERATURE

-50 °C to +180 °C (-58 °F to +356 °F), depending on the elastomeric ring material.

## LUBRICATION, MEDIA

The lubrication serves two important functions, and it is needed in all cases. It reduces the friction between the seal face and the mating faces and acts as a cooling agent for the complete shaft and housing.

The best results with regard to wear and service life are achieved with oil lubrication. Grease lubrication is possible but needs special attention, mainly relating to peripheral speed. It's necessary to have a minimum oil level of 1/3 of the seal inside diameter and a full level for grease. Please contact your local Customer Solution Center in other cases or if environmentally compatible bio-oils have to be used.

## Materials

### METAL PARTS

Metal parts of Mechanical Face Seals are available in two different alloy compounds (See Table 1).

The hardness of the two different materials on the sliding contact area are:

- Bearing Steel (100Cr6) = 63 +/- 3 HRC
- Chromium based Alloy = 66 +/- 3 HRC

Contact your local Customer Solution Center to identify suitable material for your application.

**Table 1: Alloy Composition**

Material Chemical Composition %	Bearing Steel Material 100Cr6	Chromium Base Alloy Material
C	0.95 - 1.10	3.4 - 3.8
Cr	1.4 - 1.6	15.00 - 19.00
Fe	Balance	Balance

The analysis range serves to take account of the cross-section. Deviations can be tolerated as far as the microstructure and the mechanical properties are not affected.





## ELASTOMERIC RING

The elastomeric rings for Mechanical Face Seal are available in different compounds, as in Table 2.

**Table 2: Elastomeric Ring Compound**

Type	Temperature Range (min / max) °C		Hardness Available SH A: +/-5			Mechanical Resistance	Oil Suitability
				to			
NBR	-25	+100	50	to	70	Good	Good
NBR LT	-50	+100	60	to	70	Good	Good
HNBR	-30	+150	60	to	65	Very Good	Good
HNBR LT	-40	+150			65	Very Good	Good
FKM	-15	+200			65	Good	Good
FVMQ	-50	+175			65	Quite Good	No EP

Compounds can cover the listed temperature and hardness ranges. Please contact your local Customer Solution Center for more information and to analyze the best elastomeric ring compound suitable for use with the final application.

## Design Instructions

### SEAL HOUSING

The installation dimensions of the seal housing are shown in Table 2.

The axial gap (S) in the housing is such that it meets the demands of the construction machinery industry.

For higher peripheral speeds, please contact your local Customer Solution Center.

It's necessary to avoid any burrs or cutting edges in the seats.

For the surface of the seal installation chamber, we recommend a machining quality of:

$$3.0 \mu < Ra < 6.0 \mu m$$

$$12.5 < Rz < 25$$

### SHAFT

The Mechanical Face Seal does not contact the shaft. For this reason, no particular demands have to be met on the hardness or surface finish.

To ensure correct operation, a minimum gap must be maintained between the shaft and the inside diameter. This gap serves to supply the seal with lubricant.

## Storage Conditions

The parts have to be stored according to several conditions:

- The single carton box and the inner packaging has to be intact 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
- Kept away from contact with light sources.

If the above conditions are respected, the Mechanical Face Seal are protected for approximately 1 year from the shipping date.



## ■ Installation Instructions



To receive detailed and up-to-date video guides and documentation related to assembly and installation, scan the QR code with a mobile device or visit [www.trelleborg.com/seals/mfs](http://www.trelleborg.com/seals/mfs)



The short description of assembly procedure both for DO type and DF type follows.

### PREPARATION FOR INSTALLATION

Mechanical Face Seals must be handled carefully, avoiding damage to the lapped surfaces. The installation area must be kept free from dust and dirt.

The installation should be carried out in the following steps.

### PREPARATION BEFORE INSTALLATION

- Only remove the seal from its packing just before installation.
- Do not stand the seal on the lapped surface.
- The housing must be free of notches or burrs on installation radii and free from any residues of previous working operations e.g. dirt, grease, metal chips, etc.

### INSTALLATION INSTRUCTIONS FOR TYPE DO

- Make sure that the O-Ring is not twisted. A twisted O-Ring may cause a looped effect.
- Check if the O-Ring is properly placed back on the seal. The O-Ring must be seated in the outer radius inside the retaining lip.
- Clean the half seal groups in a volatile solvent or industrial denaturated alcohol and wait for it to evaporate, being sure that no oil film remains on the parts.
- Assemble each half seal into the house using an installation tool (Figure 4). Use a uniform load over the tool to push the half group in to the house until the elastomeric ring reaches the related housing border. The Installation Tool has to only touch the O-Ring and not the metal ring and importantly not the lapped surface. If you have any doubts or require assistance, please contact your local Customer Solution Center.
- When the tool touches the house all around the circumference, the installation phase is complete.
- Remove the tool and visually check the position of the O-Ring and seal. Make sure that everything is seated symmetrically.

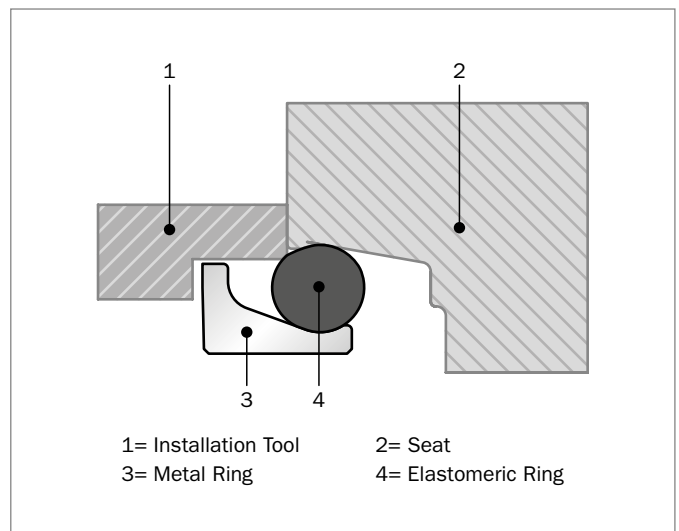


Figure 4: Installation Tool for DO Type





The following picture shows the correct installation of each half seal into the housing:

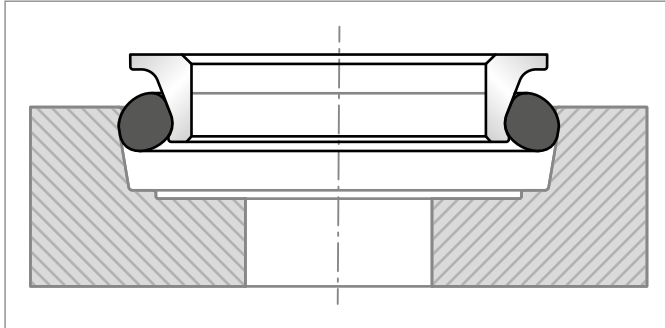


Figure 5: Correct installation of seal

The following pictures show incorrect installation:

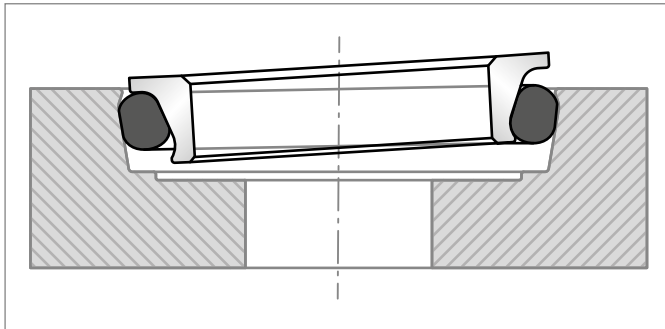


Figure 6: Metal ring slipped against the O-Ring

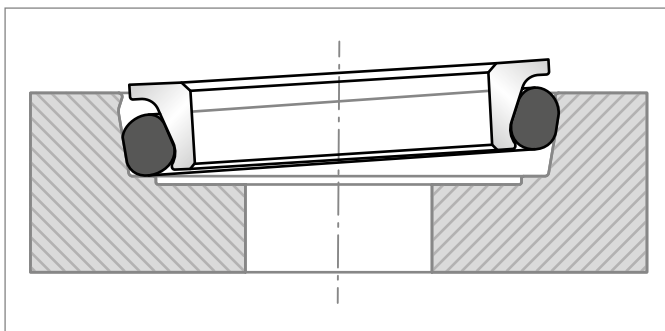


Figure 7: O-Ring slipped against the seat

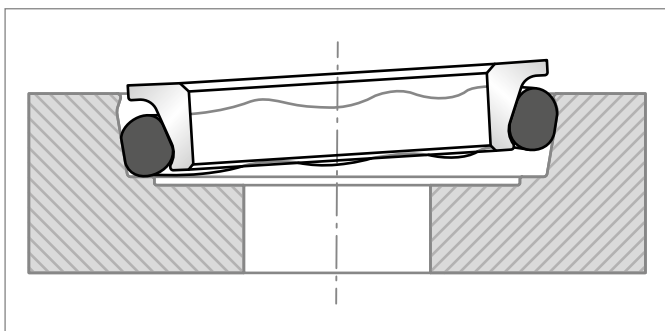


Figure 8: O-Ring slipped against the seat and waved against the metal ring

- Clean both lapped surfaces with a small amount of denatured alcohol and wait for it to evaporate. Apply a thin film of clean oil to the faces.
- Tilt the two parts together, bringing the slide faces carefully into contact.
- Adjust the gap (S) with a slow assembly speed (for example, 2 mm/sec).
- Fill the housing with oil, and bleed if necessary.

The following picture shows correct assembly:

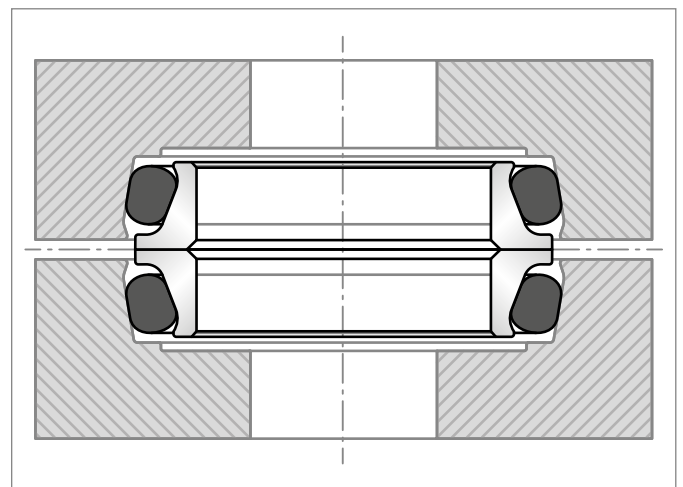


Figure 9: Correct seal assembly

The following pictures show incorrect assemblies:

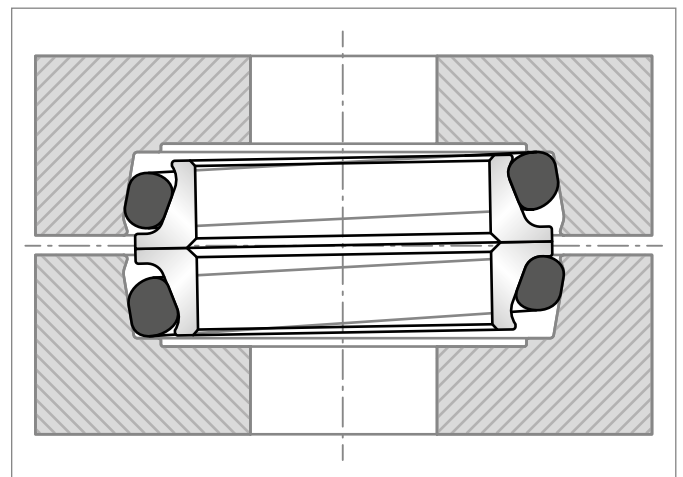


Figure 10: O-Rings slipped against seats and Mechanical Face Seal group is tilted

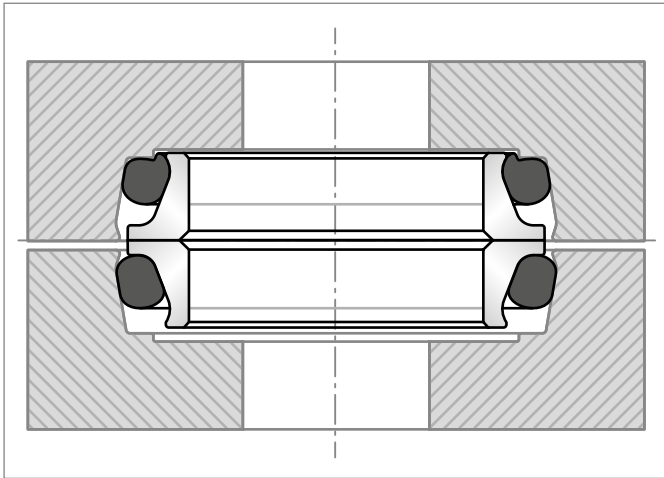


Figure 11: Upper half of the Mechanical Face Seal group has O-Ring slipped against the seat and on the seat bottom

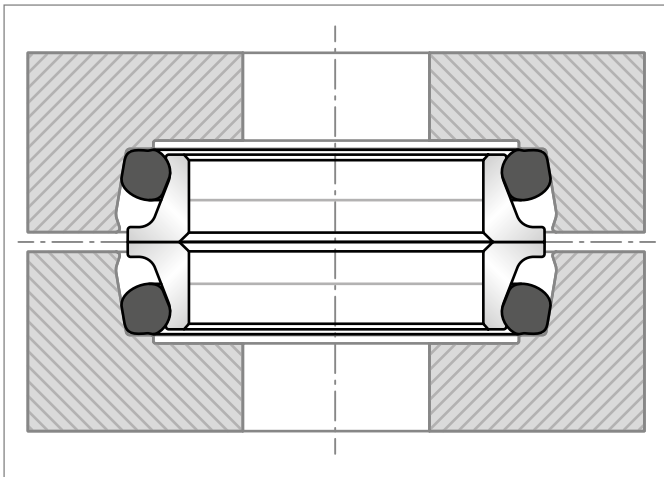


Figure 12: Both halves of the Mechanical Face Seal group have O-Rings slipped against the seat and on the seat bottom

In the event that the installation tool cannot be withdrawn or where the seal is of a special design, an installation O-Ring can be used. The installation O-Ring is placed between the O-Ring of the seal and rear of the ramp on the seal ring. Using an installation tool, apply force to the inner diameter of the metal rings. The installation O-Ring keeps the Mechanical Face Seal elastomeric ring in the correct position. After installation the O-Ring is easily removed (see Figure 13).

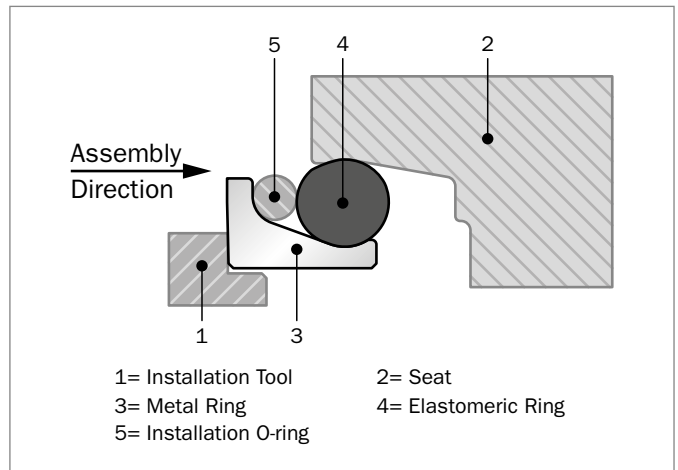


Figure 13: O-Ring as installation aid



## INSTALLATION INSTRUCTIONS FOR TYPE DF

- Make sure that the Diamond-Shaped Elastomeric Ring is well assembled on the metal ring.
- Clean the half seal groups in volatile solvent or industrial denaturated alcohol and wait for it to evaporate, being sure that no oil film remains on the parts.
- Assemble each half on the seal into the house using an installation tool (Figure 14). Use a uniform load over the tool to push the half group in to the housing until the elastomeric ring reaches the house bottom. The installation tool has to only touch the inner part of the metal ring close to the Inner Diameter and far from the lapped surfaces. If you have any doubts or suggestions, please contact your local Customer Solution Center.
- Remove the tool and make a visual check of the position of the seal. Make sure that everything is seated symmetrically.
- Clean both lapped surfaces with a small quantity of denaturated alcohol and wait for it to evaporate. Then apply a thin film of clean oil to the faces.
- Tilt the two parts together, bringing the slide faces carefully into contact.
- Adjust the gap (S) with a slow assembly speed (e.g. 2 mm/sec).

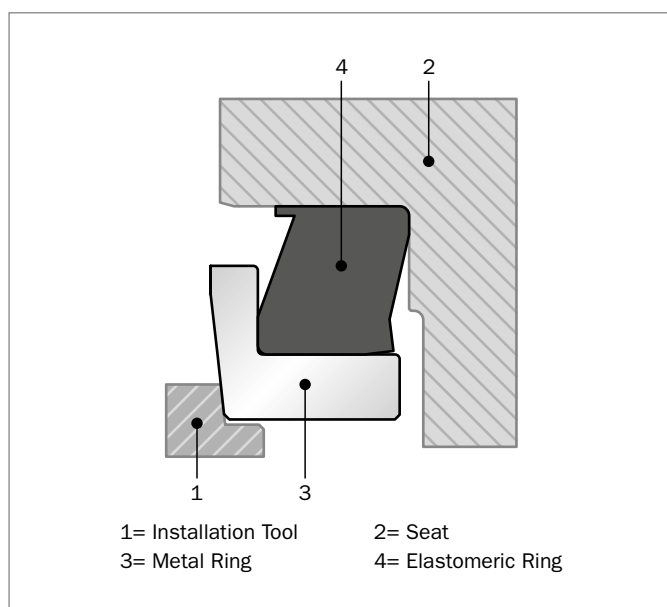


Figure 14: Installation Tool for DF Type



## ■ Installation Recommendations for Type DO in Bearing and Cast Iron Steel

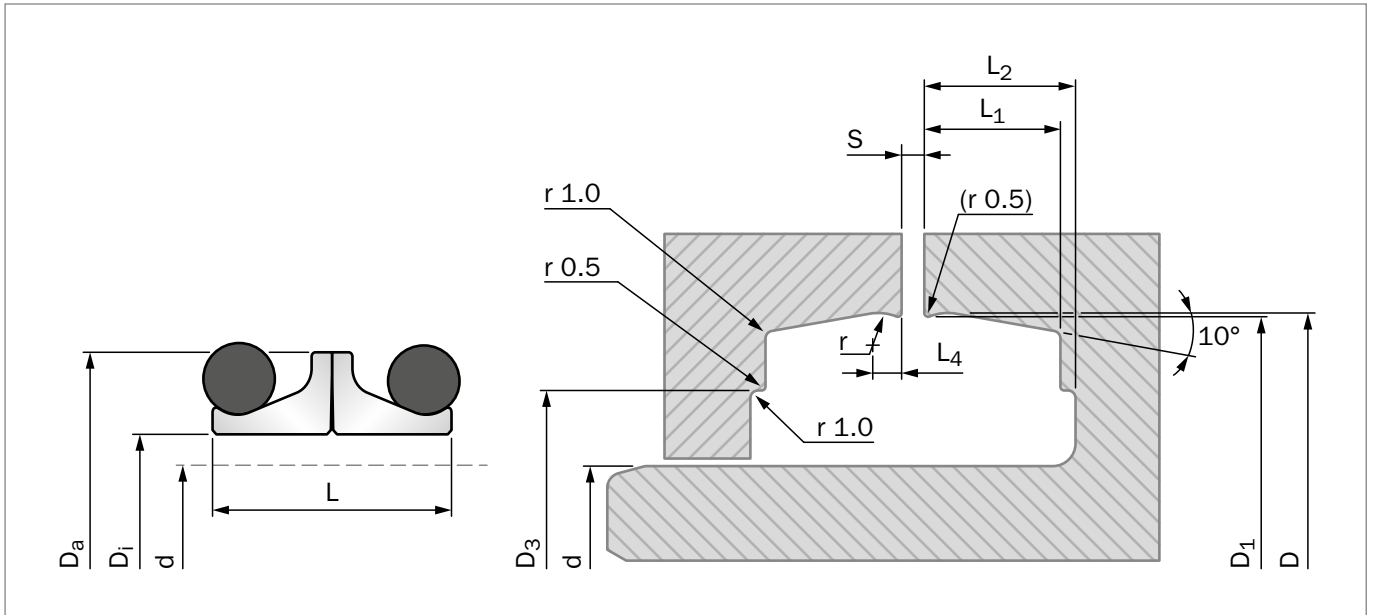


Figure 15: Installation Drawing

**Table 3: Standard Installation Dimensions / TSS Part Number**

TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	D <sub>3</sub>	L <sub>1</sub>	L <sub>2min.</sub>	L <sub>4</sub>	r	S	BS	CI
TLDOA0340	34.00	45.00	14.00	30.00	47.00	46.50	42.00	6.50	8.00	1.00	1.00	1.50	●	
TLDOC0380	38.00	51.00	20.40	35.00	53.70	53.00	46.00	9.00	11.00	1.80	2.00	3.00	●	
TLDOA0380	38.00	51.00	20.00	35.00	53.70	53.00	46.00	9.00	11.00	1.60	2.00	3.00		●
TLDOA0390	39.00	50.00	14.00	35.00	52.00	51.50	46.00	6.50	8.00	1.00	1.00	1.50	●	
TLDOA0400 1)	40.00	52.00	20.00	36.00	55.00	54.20	46.00	9.00	11.00	1.00	1.00	3.00	●	
TLDOA0430	43.00	58.00	24.00	39.00	61.60	60.80	53.40	10.00	12.00	1.80	2.50	3.00	●	
TLDOA0430	43.00	58.00	24.00	40.00	62.00	61.30	51.00	10.50	12.50	2.00	2.00	3.00		●
TLDOB0450	45.00	58.00	21.60	41.00	61.60	61.00	54.00	10.50	12.50	1.80	2.50	3.00	●	
TLDOA0450	45.00	58.00	21.00	42.00	61.60	60.80	53.40	10.00	12.00	1.80	2.50	3.00		●
TLDOA0460 2)	46.00	59.00	20.00	42.00	61.60	61.20	53.00	9.00	11.00	2.00	2.50	3.00	●	
TLDOB0480	48.00	58.00	14.40	44.00	59.90	59.40	55.00	6.30	8.00	1.50	1.70	1.50	●	
TLDOC0480	48.00	62.00	26.00	45.00	68.00	67.20	58.00	12.00	14.00	2.00	3.00	3.00	●	
TLDOA0480	48.00	62.00	25.00	45.00	68.00	67.20	58.00	12.00	14.00	2.00	3.00	3.00		●
TLDOA0555	55.50	70.00	22.00	52.00	73.80	73.10	65.50	10.00	11.50	2.40	5.00	3.00	●	
TLDOA0555	55.50	70.00	22.00	52.50	73.80	73.10	55.50	10.00	11.50	2.40	5.00	3.00		●
TLDOB0560	56.00	70.00	26.00	53.00	76.00	75.20	66.00	12.00	14.00	2.00	2.50	3.00	●	
TLDOA0560	56.00	70.00	25.00	53.00	76.00	75.20	66.00	12.00	14.00	2.00	3.00	3.00		●
TLDOA0570	57.00	77.50	35.60	54.00	81.40	80.70	68.50	15.20	20.90	3.50	4.80	3.00	●	
TLDOC0580	58.00	74.00	27.00	55.00	79.40	78.60	67.00	13.50	15.50	2.00	3.00	3.00		●
TLDOB0580 3)	58.00	75.00	27.00	53.00	79.20	78.60	66.00	12.00	14.00	2.00	2.50	3.00	●	
TLDOA0600 2)	60.00	74.00	20.60	57.00	78.40	77.40	70.00	9.00	11.00	1.90	2.50	3.00	●	
TLDOA0600 2)	60.00	74.00	20.60	57.00	78.40	77.40	70.00	9.00	11.00	1.90	2.50	3.00		●

Seat Ramp Angle is 10°, except for a few exceptions shown in the notes at the bottom of the page.

1) 15°    2) 12°    3) 12°30'    4) 9°30'

All sizes in Bearing Steel (BS) could also be requested in Cast Iron (CI)



TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	D <sub>3</sub>	L <sub>1</sub>	L <sub>2min.</sub>	L <sub>4</sub>	r	S	BS	CI
TLDOB0610	61.00	73.00	17.60	58.00	75.80	75.50	66.80	6.50	7.50	1.00	1.40	3.00	●	
TLDOA0610	61.00	73.00	17.60	58.00	75.80	75.50	68.50	8.00	9.50	1.40	1.50	2.00		●
TLDOB0635	63.50	82.50	31.80	60.50	86.50	85.70	73.50	15.20	16.80	3.50	4.80	3.20	●	
TLDOA0635	63.50	82.50	31.80	60.50	86.80	85.90	74.00	15.00	17.00	3.00	2.50	3.00		●
TLDOA0640 2)	64.00	78.00	25.00	61.00	84.60	83.80	74.00	12.50	14.50	2.00	3.00	3.00	●	
TLDOA0640	64.00	78.00	25.00	61.00	84.60	83.60	74.00	12.50	14.50	2.00	3.00	3.00		●
TLDOA0660	66.00	85.00	28.00	63.00	90.00	89.20	78.00	14.00	16.00	2.00	3.00	3.00		●
TLDOA0675	67.50	86.50	31.80	64.00	91.00	90.00	78.00	14.50	17.00	2.80	5.00	3.00	●	
TLDOB0690	69.00	89.00	24.00	66.00	92.50	91.50	83.00	11.00	13.50	2.80	5.00	3.00	●	
TLDOA0690 2)	69.00	84.00	24.00	66.00	89.60	88.60	78.50	11.00	13.00	1.90	3.00	3.00	●	
TLDOA0690 2)	69.00	84.00	24.00	66.00	89.60	88.60	78.50	11.00	13.00	1.90	3.00	3.00		●
TLDOA0700	70.00	84.00	20.00	66.00	87.00	86.20	80.00	9.10	11.00	2.00	1.00	3.00	●	
TLDOB0700 2)	70.00	90.00	29.00	65.00	95.50	94.70	84.00	13.50	15.50	2.00	3.00	3.00	●	
TLDOB0710	71.00	84.00	20.00	68.00	87.40	86.70	80.80	8.50	10.00	1.80	2.00	3.00	●	
TLDOA0710 2)	71.00	90.00	29.00	68.00	95.50	94.70	84.00	13.50	15.50	2.00	3.00	3.00		●
TLDOA0725	72.50	92.00	35.60	70.10	96.00	95.20	83.00	15.20	20.90	3.50	4.80	3.00	●	
TLDOA0731	73.10	92.00	31.80	70.10	96.00	95.20	83.00	15.20	16.80	3.50	4.80	3.20	●	
TLDOB0730	73.00	92.00	31.80	70.00	96.20	95.40	84.00	15.00	17.00	3.00	4.00	3.00	●	
TLDOA0730	73.00	92.00	31.80	70.00	96.20	95.40	84.00	15.00	17.00	3.00	2.50	3.00		●
TLDOA0735	73.50	88.50	20.40	70.00	90.20	89.40	82.00	12.70	14.30	2.20	2.80	3.20	●	
TLDOB0740	74.00	86.50	22.50	70.00	91.40	90.70	80.00	9.50	11.50	2.00	3.00	3.00	●	
TLDOA0740	74.00	86.60	22.00	71.00	91.40	90.70	80.00	9.50	11.50	2.00	3.00	3.00		●
TLDOA0750	75.00	94.00	29.00	73.00	101.40	100.60	89.00	14.50	16.50	2.00	3.00	3.00	●	
TLDOA0775 1)	77.50	87.60	13.60	75.90	90.70	90.20	85.20	7.50	8.00	1.40	1.50	3.00	●	
TLDOA0795	79.50	92.50	20.00	76.00	96.00	95.30	88.00	8.50	10.50	1.80	2.00	3.00	●	
TLDOB0800	80.00	100.00	30.00	76.00	104.10	103.30	93.00	15.00	18.00	2.30	2.50	3.00	●	
TLDOA0800	80.50	99.50	29.00	77.00	105.00	104.20	92.00	14.50	16.50	2.00	3.00	3.00		●
TLDOA0810	81.00	98.00	28.00	78.00	102.30	101.30	91.00	12.50	14.50	2.80	5.00	3.00	●	
TLDOA0810	81.00	98.00	28.00	78.00	102.30	101.30	91.00	12.50	14.50	2.80	5.00	3.00		●
TLDOA0820	82.00	98.00	22.00	79.00	102.30	101.30	91.00	9.00	11.00	2.80	5.00	3.00		●
TLDOA0825	82.50	102.00	35.60	80.50	107.30	106.50	94.30	15.20	20.90	3.50	4.80	3.20	●	
TLDOA0860	86.00	99.00	20.00	81.00	102.00	101.20	94.00	9.00	11.50	2.00	3.00	3.00	●	
TLDOC0900 2)	90.00	109.00	32.00	86.00	112.50	111.70	104.00	14.50	17.00	3.20	3.00	3.00	●	
TLDOA0904	90.40	109.50	31.80	87.40	113.40	112.70	100.40	15.20	16.80	3.50	4.80	3.20	●	
TLDOC0900	90.50	109.00	32.00	87.00	112.50	111.70	104.00	14.50	17.00	3.20	3.00	3.00		●
TLDOB0900	90.00	104.60	26.00	87.40	107.30	106.70	100.40	11.80	14.20	2.90	2.80	3.20	●	
TLDOB0904	90.40	109.50	35.60	88.50	113.40	112.70	100.40	15.20	20.90	3.50	4.80	3.20	●	
TLDOA0920	92.00	109.00	22.00	89.00	113.80	113.40	105.00	9.50	11.50	1.80	2.50	3.00		●
TLDOB0920	92.00	109.50	22.00	88.00	113.80	113.00	105.00	9.50	11.50	2.00	3.00	3.00	●	
TLDOB0940	94.00	106.50	23.00	90.00	111.60	110.80	102.00	9.50	11.50	2.00	3.00	3.00	●	
TLDOA0940	94.00	106.50	22.00	91.00	111.60	110.80	102.00	9.50	11.50	2.00	2.50	3.00		●
TLDOC0950 2)	95.00	114.00	32.00	91.00	120.00	119.20	107.00	15.00	17.00	2.50	3.00	3.00	●	
TLDOA0950	95.00	111.00	24.00	92.00	115.60	114.80	108.00	11.00	12.50	1.80	2.00	3.00	●	

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1) 15°      2) 12°      3) 12°30'      4) 9°30'

All sizes in Bearing Steel (BS) could also be requested in Cast Iron (CI)



TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	D <sub>3</sub>	L <sub>1</sub>	L <sub>2min.</sub>	L <sub>4</sub>	r	S	BS	CI
TLDOB0950	95.00	114.00	31.00	92.00	120.00	119.20	107.00	15.00	17.00	2.50	3.00	3.00		●
TLDOA0965 1)	96.50	106.80	13.60	94.90	109.70	109.20	105.00	7.50	8.00	1.40	1.50	3.00	●	
TLDOA1000	100.00	119.00	31.60	97.00	123.00	122.20	110.00	15.20	16.80	3.50	4.80	3.20	●	
TLDOA1000	100.00	119.00	31.80	97.00	123.20	122.40	111.00	14.50	16.50	2.50	2.50	3.00		●
TLDOB1000	100.00	120.00	29.40	97.00	125.00	124.20	111.00	14.00	16.00	2.90	3.00	3.00		●
TLDOA1015	101.50	119.00	29.00	95.00	125.30	124.30	112.30	13.80	16.60	2.50	3.00	3.00	●	
TLDOA1020 2)	102.00	122.00	32.00	99.00	127.20	126.20	115.00	15.50	17.50	2.50	3.00	3.00		●
TLDOA1030 2)	103.00	122.00	32.00	99.00	127.20	126.20	115.00	15.50	17.50	2.50	3.00	3.00	●	
TLDOC1040	104.00	121.00	22.00	101.00	125.50	125.10	117.50	9.50	11.50	2.00	3.00	3.00		●
TLDOE1040	104.00	122.50	22.50	100.00	125.50	125.10	117.50	9.50	11.50	2.00	3.00	3.00	●	
TLDOD1040	104.00	117.00	22.00	100.00	121.00	120.20	107.00	9.50	11.50	2.00	3.00	3.00	●	
TLDOF1040	104.00	125.00	28.00	100.00	128.50	127.50	117.00	12.50	14.00	2.80	5.00	3.00	●	
TLDOA1070	107.00	125.00	24.00	103.00	130.40	129.40	119.50	11.00	13.50	2.80	5.00	3.00	●	
TLDOB1100 2)	109.00	127.00	32.00	106.00	133.00	132.00	121.00	15.00	17.00	2.50	3.00	3.00		●
TLDOA1090	112.00	132.00	32.00	104.00	136.50	135.50	124.00	15.50	17.50	2.50	3.00	3.00	●	
TLDOA1090	109.00	132.00	32.00	106.00	136.60	135.60	124.00	15.50	17.50	2.50	3.00	3.00		●
TLDOB1100	110.00	128.00	32.00	106.00	133.00	132.00	121.00	14.50	17.00	2.50	3.00	3.00	●	
TLDOB1110 2)	111.00	128.00	22.00	108.00	132.50	132.00	123.00	10.60	12.30	2.80	3.00	3.00	●	
TLDOA1145	114.50	129.00	23.50	107.50	134.10	133.10	126.00	10.40	11.90	2.80	5.00	3.00	●	
TLDOA1150	115.00	137.00	31.00	110.00	141.80	140.80	130.00	14.50	16.50	2.50	3.00	3.00	●	
TLDOA1150	115.00	137.00	31.00	112.00	141.80	140.80	130.00	14.50	16.50	2.50	3.00	3.00		●
TLDOB1170	117.00	140.00	28.00	113.00	142.50	141.50	132.00	12.50	14.00	2.80	5.00	3.00	●	
TLDOA1170	117.00	138.00	31.80	114.00	142.50	141.50	132.00	14.50	17.00	2.80	5.00	3.00	●	
TLDOA1190	119.00	140.00	28.00	115.00	142.50	141.50	132.00	12.50	14.00	2.80	5.00	3.00	●	
TLDOC1200	120.00	141.00	31.80	116.00	144.00	143.00	138.00	14.50	17.50	2.80	5.00	3.00	●	
TLDOD1200	120.00	142.00	38.00	116.00	149.00	148.00	133.00	17.00	19.00	2.50	3.00	4.00	●	
TLDOA1200	120.00	139.00	31.80	116.00	143.00	142.00	129.30	14.30	17.40	3.00	5.40	3.00	●	
TLDOA1240 4)	124.00	141.00	22.00	120.00	146.40	145.30	136.00	10.60	12.30	2.80	3.00	3.00	●	
TLDOA1240	124.00	141.00	22.00	121.00	145.80	145.00	136.00	9.50	11.50	2.00	3.00	3.00		●
TLDOB1250	125.00	144.10	31.80	120.00	148.50	147.50	136.00	14.30	17.40	3.00	5.00	3.00	●	
TLDOA1260	126.00	146.00	31.80	123.00	150.00	149.20	137.00	15.20	16.80	3.50	4.80	3.20	●	
TLDOA1265	126.50	139.00	26.80	123.50	143.80	143.10	136.90	11.80	14.20	2.90	2.80	3.20	●	
TLDOA1270	127.00	146.00	31.80	124.00	150.00	149.20	138.00	15.20	16.80	3.50	4.80	3.20	●	
TLDOA1270	127.00	146.00	31.80	123.00	150.20	149.40	138.00	14.00	16.00	2.50	2.50	4.00		●
TLDOD1270	127.00	141.20	25.40	124.00	143.80	143.10	136.90	11.80	14.20	2.90	2.80	3.20	●	
TLDOC1270	127.00	141.00	29.00	124.00	144.00	143.00	136.00	12.00	14.50	2.30	3.00	3.00	●	
TLDOD1300	130.00	152.00	38.50	125.00	159.00	158.00	144.00	18.50	20.50	2.50	3.00	3.00	●	
TLDOB1300	130.00	150.50	32.00	125.00	155.60	154.60	144.00	14.50	16.50	2.50	5.00	3.00	●	
TLDOD1300	130.00	152.00	38.00	127.00	159.00	158.00	144.00	18.50	20.50	2.50	3.00	3.00		●
TLDOA1427	142.70	156.90	25.40	139.70	159.70	158.90	152.10	11.80	14.20	2.90	2.80	3.20	●	
TLDOC1430	143.00	157.00	25.00	140.00	159.70	158.90	152.00	11.50	13.50	2.50	2.80	4.00		●
TLDOB1430	143.00	160.00	27.00	138.00	164.00	163.00	154.00	12.00	14.50	2.80	5.00	4.00	●	
TLDOA1440	144.00	157.50	26.00	139.00	160.00	159.00	154.50	12.00	14.50	2.80	5.00	3.00	●	

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TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	D <sub>3</sub>	L <sub>1</sub>	L <sub>2min.</sub>	L <sub>4</sub>	r	S	BS	CI
TLDOC1460	146.00	175.00	38.00	142.00	180.50	179.50	162.00	17.70	20.50	3.00	6.30	6.30	●	
TLD0B1460	146.00	168.00	38.00	143.00	176.80	175.90	159.00	18.00	20.50	3.00	6.50	4.00	●	
TLDOA1460	146.00	168.00	38.00	143.00	177.00	176.00	159.00	18.00	20.00	2.50	3.00	4.00		●
TLDOA1463	146.30	171.70	38.00	142.30	176.80	175.90	158.90	18.40	20.30	3.70	6.30	6.30	●	
TLDOA1470	147.00	167.00	28.00	142.00	171.00	170.00	160.00	13.00	15.50	2.80	5.00	3.00	●	
TLDOA1480	148.00	170.00	31.00	142.00	175.60	174.60	164.00	15.00	17.00	2.50	3.00	4.00	●	
TLDOC1500	150.00	172.00	40.00	147.00	179.00	178.00	165.00	18.00	20.00	2.50	2.00	4.00	●	
TLDOC1500	150.00	172.00	40.00	147.00	179.00	178.00	165.00	18.00	20.00	2.50	3.00	4.00		●
TLDOA1530	153.00	171.50	28.00	149.00	176.30	175.30	164.50	12.50	14.50	2.80	5.00	3.00	●	
TLDOA1539	153.90	168.10	25.40	150.90	171.00	170.20	164.00	11.80	14.20	2.90	2.80	3.20	●	
TLD0B1530	154.00	168.00	25.00	151.00	171.00	170.20	164.00	11.50	13.50	2.50	2.80	4.00		●
TLDOA1540	154.00	168.10	27.00	151.00	171.00	170.00	162.50	12.00	14.50	2.30	3.00	3.00	●	
TLDOF1540	154.00	168.10	27.00	151.00	171.00	170.00	162.50	12.00	14.50	2.30	3.00	3.00	●	
TLDOC1540	154.00	173.50	31.80	151.00	178.00	177.00	166.00	14.50	17.00	2.80	5.00	3.00	●	
TLD0D1540	154.00	169.00	22.00	151.10	174.50	173.50	166.00	9.20	11.00	2.30	3.00	3.00	●	
TLDOE1540	154.00	170.00	21.00	151.00	175.10	174.10	167.00	9.20	10.00	2.30	3.00	3.00	●	
TLD0B1633	163.30	191.30	46.00	160.30	196.80	195.90	178.90	18.40	24.10	3.70	6.30	6.30	●	
TLD0B1630	163.00	191.00	38.00	160.00	196.40	195.50	179.00	18.00	20.00	3.10	6.40	4.00		●
TLDOA1633	163.30	191.20	38.00	160.30	196.80	195.90	178.90	18.40	20.30	3.70	6.30	6.30	●	
TLDOA1640	164.00	189.00	30.00	160.00	193.50	192.50	179.00	14.50	17.00	2.80	5.00	3.00	●	
TLDOA1650	165.00	181.00	27.00	161.00	185.00	184.00	176.50	12.00	14.50	2.70	4.00	3.00	●	
TLDOA1725	172.50	190.00	25.40	168.00	192.70	191.80	188.00	12.70	14.30	2.30	2.80	3.20	●	
TLDOA1740	174.00	190.00	25.40	170.00	192.70	191.80	188.00	12.70	14.30	2.30	2.80	3.20	●	
TLDOA1770	177.00	200.00	31.00	173.00	204.50	203.40	191.00	14.50	17.00	3.10	5.00	3.00	●	
TLDOA1780	178.00	199.00	32.00	175.00	203.60	202.40	190.00	14.50	16.00	3.00	5.00	3.00	●	
TLDOC1780	178.00	199.00	32.00	175.00	203.60	202.40	190.00	14.50	16.00	3.00	5.00	3.00	●	
TLD0B1780	178.00	200.00	38.00	175.00	210.60	209.60	192.00	19.00	21.00	3.00	4.00	4.00	●	
TLDOA1800	180.00	197.40	21.40	177.00	202.20	201.90	196.00	9.40	10.60	1.20	3.00	3.00	●	
TLDOA1823	182.30	210.30	38.00	179.30	215.40	214.40	197.50	18.40	20.30	3.70	6.30	6.30	●	
TLDOA1824	182.40	210.30	46.00	179.40	215.40	214.40	197.50	18.40	24.10	3.70	6.30	6.30	●	
TLD0B1830	183.00	202.00	28.00	179.00	206.00	205.00	195.00	12.50	14.50	2.80	5.00	3.00	●	
TLDOA1860	186.00	203.00	25.40	182.00	205.70	204.90	190.50	14.50	16.00	2.30	2.80	3.20	●	
TLD0D1910	191.00	210.00	28.00	187.00	214.00	213.00	203.00	12.50	14.50	2.80	5.00	3.00	●	
TLDOA1910	191.00	210.00	28.00	187.00	214.00	213.00	203.00	12.50	14.50	2.80	5.00	3.00	●	
TLDOA1910	191.00	210.00	28.00	187.00	214.00	213.00	203.00	12.50	14.50	2.80	5.00	3.00		●
TLDOA1920	192.00	215.00	33.00	189.00	220.80	219.80	207.00	16.50	18.50	3.00	4.00	4.00	●	
TLDOA1920	192.00	215.00	33.00	189.00	220.80	219.80	207.00	16.50	18.50	3.00	4.00	4.00		●
TLDOA1950	195.00	216.50	32.00	191.00	221.00	220.00	207.00	14.50	17.00	2.80	5.00	3.00	●	
TLDOA2000	200.00	228.50	38.00	196.00	233.50	232.50	215.50	18.00	20.50	3.00	6.30	6.30	●	
TLDOA2020	202.00	222.30	26.50	197.00	224.90	224.10	217.90	11.80	14.20	2.90	2.80	3.00	●	
TLDOA2050	205.00	227.00	30.00	201.00	231.50	230.50	219.00	14.50	17.00	2.80	5.00	3.00	●	
TLD0B2050	205.00	227.00	31.60	201.00	231.50	230.50	219.00	14.50	17.00	2.80	5.00	3.00	●	
TLDOA2087	208.70	222.80	26.00	205.00	225.40	224.40	217.00	11.50	13.50	2.20	2.50	3.00	●	

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TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	D <sub>3</sub>	L <sub>1</sub>	L <sub>2min.</sub>	L <sub>4</sub>	r	S	BS	CI
TLDOA2090	209.00	234.00	42.00	206.00	242.60	241.60	224.00	19.50	22.50	3.00	4.00	4.00	●	
TLDOA2090	209.00	234.00	42.00	206.00	242.60	241.80	224.00	19.50	21.50	3.00	4.00	4.25		●
TLDOA2200	220.00	239.50	31.80	215.00	244.00	243.00	232.00	14.50	16.50	2.80	5.00	3.00	●	
TLDOA2200	220.00	239.00	31.80	217.00	244.00	243.00	232.00	14.50	16.50	2.80	5.00	3.00		●
TLDOC2200	220.00	239.50	31.80	215.00	244.00	243.00	232.00	14.50	16.50	2.80	5.00	3.00	●	
TLDOB2200	220.00	241.40	25.00	215.00	244.70	244.00	232.00	11.00	13.50	2.20	4.00	3.00	●	
TLDOA2235	223.50	251.40	38.00	220.50	256.50	255.70	238.70	18.40	20.30	3.70	6.30	6.30	●	
TLDOC2235	223.50	251.50	46.00	220.50	256.60	255.70	238.70	18.40	24.10	3.70	6.30	6.30	●	
TLDOA2240	223.50	252.00	38.00	220.00	256.60	255.70	238.00	18.00	20.00	3.10	6.40	3.00		●
TLDOA2250	225.00	252.00	38.00	221.00	258.00	257.00	241.00	19.00	21.00	3.00	4.00	4.00	●	
TLDOA2316	231.60	259.60	38.00	227.00	264.70	263.80	247.00	18.40	20.50	3.70	6.30	6.30	●	
TLDOA2350	235.00	259.60	38.00	231.00	264.70	263.80	247.00	18.40	20.50	3.70	6.30	6.30	●	
TLDOA2380	238.00	261.00	32.00	234.00	265.50	264.50	254.00	14.50	17.00	2.80	5.00	3.00	●	
TLDOA2390	239.00	268.00	40.00	235.00	274.20	273.20	257.00	20.50	22.50	3.00	4.00	4.00	●	
TLDOC2400	240.00	262.80	38.00	236.00	273.50	272.50	255.50	18.00	20.50	3.10	6.50	3.00	●	
TLDOA2400	240.00	262.80	38.00	237.00	273.50	272.50	257.00	19.00	21.00	3.00	4.00	4.00		●
TLDOA2450	245.00	264.50	32.00	241.00	268.90	267.90	255.00	14.50	17.00	2.80	5.00	3.00	●	
TLDOB2500	250.00	276.00	44.00	247.00	284.60	283.60	266.00	20.50	24.00	3.00	4.00	4.00	●	
TLDOA2500	250.00	276.00	41.00	247.00	284.60	283.60	266.00	20.50	22.50	3.00	4.00	4.00		●
TLDOA2520	252.00	280.00	38.00	248.00	285.50	284.50	265.00	18.00	20.00	3.10	6.50	3.00	●	
TLDOA2650	265.00	292.80	38.00	261.00	297.80	297.00	280.00	18.00	20.50	3.70	6.30	6.30	●	
TLDOB2650	265.00	292.80	46.00	261.00	297.80	297.00	280.00	18.40	24.10	3.70	6.30	6.30	●	
TLDOA2650	265.00	293.00	38.00	262.00	298.00	297.00	280.00	19.00	21.00	3.00	6.40	4.00		●
TLDOA2750	275.00	303.00	38.00	271.00	308.00	307.00	290.00	18.00	20.50	3.10	6.50	3.00	●	
TLDOA2750	275.00	303.00	38.00	271.00	308.00	307.00	290.00	18.00	20.50	3.10	6.4	4.00		●
TLDOA2829	282.90	310.80	38.00	280.00	316.30	315.40	298.40	18.40	20.30	3.70	6.30	6.30	●	
TLDOA3000	300.00	325.00	38.00	296.00	335.50	334.50	318.00	17.50	20.50	3.10	6.50	3.00	●	
TLDOB3000	300.00	328.00	40.00	296.00	333.00	332.00	315.00	18.50	21.00	3.00	4.00	4.00	●	
TLDOB3000	300.00	328.00	39.00	297.00	333.00	332.00	315.00	19.50	22.00	3.00	4.00	4.00		●
TLDOA3010	301.00	328.00	38.00	297.00	333.00	332.10	315.10	18.40	20.30	3.70	6.30	6.30	●	
TLDOA3190	319.00	346.50	46.00	315.00	351.60	350.70	333.70	18.40	24.10	3.70	6.30	6.30	●	
TLDOA3185	318.50	346.50	38.00	315.50	351.60	350.70	333.70	18.40	20.30	3.70	6.30	6.30	●	
TLDOA3180	318.50	341.00	38.00	315.00	351.60	350.70	335.00	19.00	21.50	3.00	6.40	4.00		●
TLDOA3180	318.00	341.40	38.00	315.00	351.50	350.50	334.00	18.00	20.50	3.10	6.50	3.00	●	
TLDOA3395	339.50	369.00	40.00	335.00	374.80	373.80	358.00	19.00	21.50	3.00	4.00	4.00	●	
TLDOA3400	340.00	369.00	40.00	337.00	374.80	373.80	358.00	19.00	21.50	3.00	4.00	3.00	●	
TLDOA3400	340.00	368.00	38.00	333.00	375.70	374.80	358.00	19.60	22.10	3.10	4.00	2.00		●
TLDOA3500	350.00	375.00	38.00	345.00	385.50	384.50	368.00	17.50	20.50	3.10	6.50	3.00	●	
TLDOD3665	366.50	394.50	48.00	363.50	399.50	398.60	381.70	18.40	24.10	3.70	6.30	6.30	●	
TLDOA3665	366.50	394.50	37.00	363.00	399.50	398.60	382.00	18.50	21.00	3.00	6.40	4.00		●
TLDOB3665	366.50	391.00	38.00	363.00	399.50	398.50	381.80	18.50	21.00	3.00	4.00	4.00		●
TLDOC3665	366.50	394.40	38.00	363.50	399.50	398.60	381.70	18.40	20.30	3.70	6.30	6.30	●	
TLDOA3700	370.00	398.00	38.00	365.00	403.50	402.60	385.00	17.50	20.50	3.00	6.50	3.00	●	

Seat Ramp Angle is 10°, except for a few exceptions shown in the notes at the bottom of the page.

1) 15°      2) 12°      3) 12°30'      4) 9°30'

All sizes in Bearing Steel (BS) could also be requested in Cast Iron (CI)



TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	D <sub>3</sub>	L <sub>1</sub>	L <sub>2min.</sub>	L <sub>4</sub>	r	S	BS	CI
TLDOA3805	380.50	405.00	40.00	375.00	412.20	410.50	395.00	17.00	22.00	3.00	4.00	4.00	●	
TLDOA3850	385.00	413.00	46.00	381.00	424.50	423.30	402.00	22.00	30.00	3.50	6.00	8.00	●	
TLDOA3870	387.00	415.00	38.00	382.00	420.30	419.30	402.00	17.50	20.50	3.00	6.50	3.00	●	
TLDOA3870	387.00	415.00	38.00	384.00	419.50	418.50	400.00	18.00	20.50	3.00	4.00	3.00		●
TLDOA4285	428.50	454.00	37.00	425.00	462.30	461.30	444.60	18.50	21.00	3.00	4.00	4.00	●	
TLDOA4290	429.00	457.00	38.00	426.00	463.50	462.50	444.00	18.00	20.50	3.00	4.00	3.00		●
TLDOA4292	429.20	457.20	38.00	426.20	462.30	461.40	444.40	18.40	20.30	3.70	6.30	6.30	●	
TLDOB4292	429.20	457.20	38.00	426.20	463.50	462.50	444.00	18.00	20.50	3.10	6.50	3.00	●	
TLDOA4500	450.00	480.00	50.00	445.00	492.20	490.20	470.00	23.50	25.50	4.00	6.00	3.00	●	
TLDOA4700	470.00	500.00	50.00	465.00	512.20	510.20	490.00	23.50	25.50	4.00	6.00	3.00	●	
TLDOA5054	505.40	533.40	44.00	502.40	538.50	537.60	520.60	21.30	26.20	3.70	6.30	6.30	●	
TLDOA5300	530.00	560.00	50.00	524.00	572.20	570.20	545.00	23.50	25.50	4.00	6.00	3.00	●	
TLDOA5800	580.00	608.00	43.60	575.50	613.00	611.00	596.00	19.70	21.70	4.00	6.50	6.00	●	
TLDOA5910	591.00	623.00	50.00	585.00	635.20	632.10	613.00	23.50	25.50	4.00	6.00	5.20	●	
TLDOA6670	667.00	700.00	44.00	660.00	705.60	704.60	687.60	18.40	23.40	3.70	6.30	6.30	●	
TLDOA7100	710.00	750.00	50.00	700.00	762.20	760.20	740.00	23.50	25.50	4.00	6.00	3.00	●	
TLDOA8300	830.00	886.00	80.00	815.00	891.60	890.60	860.00	34.50	39.50	4.40	10.00	17.00	●	

Seat Ramp Angle is 10°, except for a few exceptions shown in the notes at the bottom of the page.

- 1) 15°      2) 12°      3) 12°30'      4) 9°30'

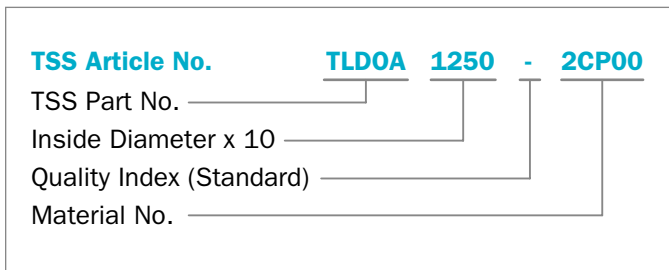
All sizes in Bearing Steel (BS) could also be requested in Cast Iron (CI)

### ORDERING EXAMPLE

Mechanical Face Seal Type D0

**Inside diameter:** Di = 125.0 mm

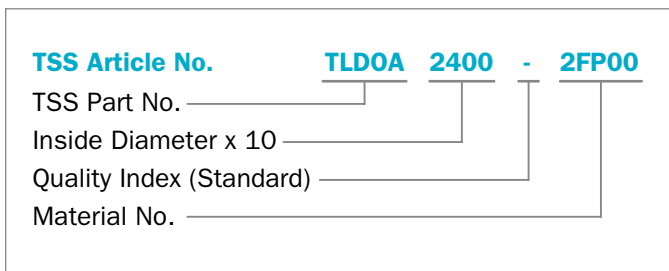
**Materials:** Seal Rings of Bearing Steel (1.3505)  
O-Rings of NBR



Mechanical Face Seal Type D0

**Inside diameter:** Di = 240.0 mm

**Materials:** Cast Iron  
O-Rings of NBR





## ■ Installation Recommendations for Type DF Bearing Steel

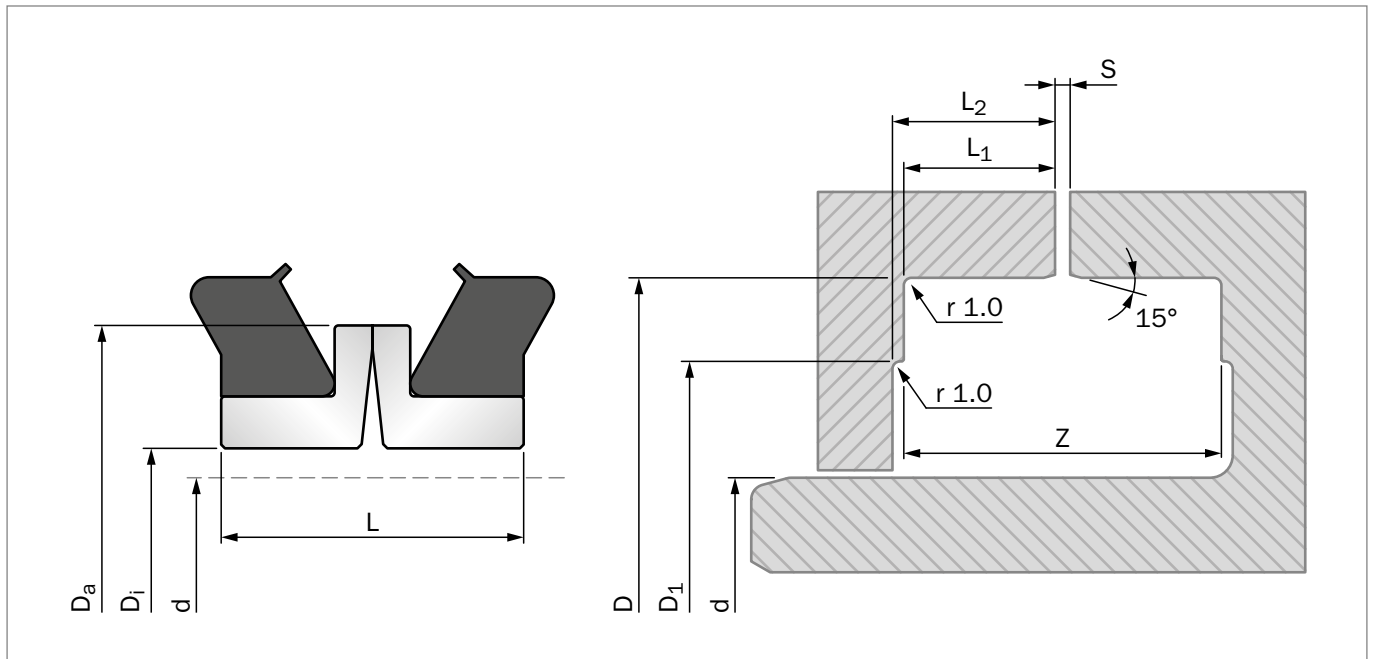


Figure 16: Installation Drawing

**Table 4: Standard Installation Dimensions / TSS Part Number**

TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	S	Z	BS	CI
TL DFA0420	42.0	59.0	20.0	38.0	65.0	53.0	10.0	10.5	3.0	23.0	●	
TL DFA0470	47.0	62.0	20.0	44.0	70.0	58.0	10.0	11.0	3.0	23.0	●	
TL DFA0505	50.5	65.0	19.0	46.0	76.2	63.0	10.0	11.0	2.5	22.5	●	
TL DFA0540	54.0	73.0	22.0	50.0	80.0	67.0	11.5	12.0	3.0	26.0	●	
TL DFA0585	58.5	73.0	19.0	54.0	82.5	65.0	10.0	11.0	3.0	23.0	●	
TL DFA0586	58.6	80.0	19.6	57.0	84.0	71.0	9.0	9.5	3.0	21.0	●	
TL DFA0635	63.5	81.0	19.0	59.5	87.8	71.0	9.0	9.5	3.0	21.0	●	
TL DFA0670	67.0	86.2	20.0	64.0	95.4	82.0	10.0	11.0	3.0	23.0	●	
TL DFB0670	67.0	87.0	25.0	64.0	95.0	81.0	12.5	13.0	4.0	29.0	●	
TL DFC0670	67.0	91.7	20.0	64.0	95.4	82.0	10.0	11.0	3.0	23.0	●	
TL DFA0680	68.0	86.2	20.0	64.0	95.6	82.0	10.0	11.0	3.5	23.5	●	
TL DFA0738	73.8	92.8	20.0	70.0	102.2	88.0	10.0	11.0	3.0	23.0	●	
TL DFA0740	74.0	99.0	20.0	70.0	102.2	88.0	10.0	11.0	3.0	23.0	●	
TL DFA0770	77.0	97.0	25.0	74.0	105.0	87.0	12.5	13.5	4.0	29.0	●	
TL DFA0817	81.7	101.5	20.0	70.0	110.2	96.0	10.0	11.0	3.0	23.0	●	
TL DFA0825	82.5	100.0	22.0	78.0	114.3	97.0	11.0	12.0	3.5	25.5	●	
TL DFA0875	87.5	109.0	17.5	83.0	113.0	100.0	8.5	9.5	3.0	20.0	●	
TL DFB0875	87.5	111.5	19.0	85.0	115.8	102.0	10.0	11.0	3.0	23.0	●	
TL DFA0920	92.0	113.0	24.0	88.0	125.8	109.0	12.5	13.0	3.0	28.0	●	
TL DFA0940	94.0	112.5	24.0	90.0	125.8	109.0	12.5	13.0	3.0	28.0	●	
TL DFA0990	99.0	120.0	17.5	95.0	124.0	110.0	8.5	9.5	3.0	20.0	●	



TSS Part No.	D <sub>i</sub>	D <sub>a</sub>	L	d <sub>max.</sub>	D	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	S	Z	BS	CI
TLDFB0990	99.0	123.0	19.0	95.0	127.3	113.0	10.0	11.0	3.0	23.0	●	
TL DFA1040	104.0	126.0	24.0	100.0	135.0	114.0	12.0	13.0	4.0	28.0	●	
TLDFB1050	105.0	124.0	24.4	101.0	134.9	125.0	13.3	14.5	3.0	29.6	●	
TLDFB1140	114.0	138.0	26.0	110.0	148.0	126.0	12.0	13.0	4.0	28.0	●	
TL DFA1180	118.0	142.0	29.0	114.0	152.4	131.4	16.3	16.3	2.0	34.6		●
TL DFA1240	124.0	144.0	32.0	119.0	162.5	141.5	18.5	20.5	3.0	40.0	●	
TL DFA1330	133.0	156.0	28.0	128.0	171.5	151.0	13.0	14.0	6.5	32.5	●	
TL DFA1485	148.5	168.0	32.4	143.0	184.1	164.0	16.5	17.5	5.0	38.0	●	
TL DFA1500	150.0	175.0	30.0	145.0	190.0	170.0	15.0	15.5	5.0	35.0	●	
TL DFA1540	154.0	180.0	36.0	149.0	194.0	174.0	18.4	20.0	4.5	41.3	●	
TL DFA1580	158.0	180.0	18.0	153.0	190.0	174.0	8.0	10.0	6.0	22.0	●	
TL DFA1690	169.0	195.0	33.0	164.0	206.2	191.5	15.1	18.4	5.0	35.2	●	
TL DFA1777	177.7	207.0	29.0	173.0	218.9	197.0	16.6	17.5	3.0	36.2	●	
TL DFA1795	179.5	207.0	29.0	173.0	218.9	197.0	16.6	17.5	3.0	36.2	●	
TL DFA1930	193.0	214.3	31.0	187.0	238.9	215.0	19.4	20.4	3.0	41.8	●	
TL DFA1940	194.0	214.5	31.0	188.0	238.8	214.0	20.1	21.0	3.0	43.2	●	
TL DFA1980	198.0	224.0	35.0	195.0	245.0	223.0	17.0	17.5	6.0	40.0	●	
TL DFA2280	228.0	260.5	41.0	221.0	277.1	247.5	23.5	24.5	4.0	51.0	●	
TL DFA2330	233.0	259.0	35.0	229.0	280.0	250.0	17.0	18.0	6.0	40.0	●	
TL DFA2415	241.5	273.5	36.0	235.0	279.4	260.6	17.5	20.0	2.0	37.0	●	
TLDFB2415	241.5	273.5	33.0	235.0	279.4	260.6	17.5	20.0	2.0	36.5	●	
TL DFA2750	275.0	303.0	36.0	270.0	309.4	290.0	17.5	20.0	2.0	37.0	●	
TL DFA2750	275.0	303.0	36.0	270.0	309.4	290.0	17.5	20.0	2.0	37.0		●
TL DFA2830	283.0	305.0	42.0	278.0	329.4	307.0	18.5	22.1	3.0	40.0	●	
TL DFA3200	320.0	352.5	40.0	312.0	365.1	343.0	20.0	21.5	2.0	42.0	●	
TL DFA3550	355.5	392.0	39.6	345.0	401.7	380.0	23.0	24.0	1.8	47.8	●	
TL DFA4420	442.0	470.0	41.0	435.0	488.7	467.0	18.4	22.0	2.5	39.3	●	
TL DFA4920	492.0	530.0	43.0	480.0	546.1	532.0	19.9	24.4	2.0	41.8	●	

All sizes in Bearing Steel (BS) could also be requested in Cast Iron (CI).

## ORDERING EXAMPLE

Mechanical Face Seal Type DF in Bearing Steel

**Inside diameter:** Di = 150 mm

**Materials:** Sealing Ring of Bearing Steel  
Square Ring of NBR

**TSS Article No.** TL DFA 1500 - 2CP00

TSS Part No. \_\_\_\_\_  
 Inside Diameter x 10 \_\_\_\_\_  
 Quality Index (Standard) \_\_\_\_\_  
 Material No. \_\_\_\_\_

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

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