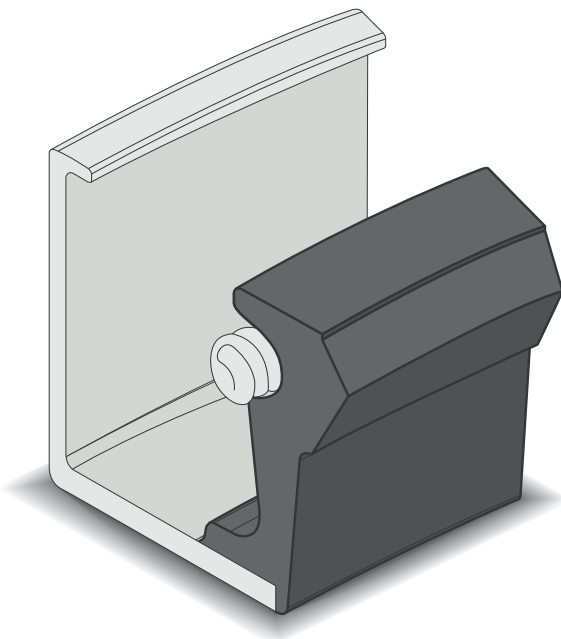




## ROTARY SHAFT OIL SEALS AND CUSTOM MADE ARTICLES IN ELASTOMER AND RUBBER-TO-METAL

Rev. 01 03-11-2016

### OIL SEALS TYPE L



- Oil seals with external metal casing ground according to FP's internal specifications and executed in one single piece without welding points.
- The sealing lip is vulcanized directly onto the metal case.
- The type L1 is particularly indicated when there is limited space between the housing and the shaft.
- Also available with an additional dust lip.

#### Applications

Primary metals industry, Wind mill Industry, General industry

**Dimensions:** Minimum I.D. 25 mm; Maximum O.D. 1.900 mm

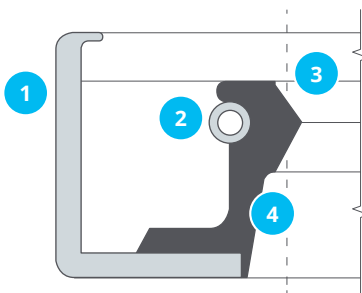
**Working speed:** up to 25 m/s

**Pressure:** up to 0.5 BAR

**Operating temperature range:** - 40°C / + 220°C

**Remarks:** All working parameters vary, considering the different type of materials and elastomer used.

#### L1



#### Technical features

- 1 Metal outer casing with ground surface
- 2 Garter spring
- 3 Mold-made sealing lip

#### Materials

- 1 Metal casing:  
**Fe-DC04; AISI 304**
- 2 Garter Spring:  
**AISI 302; AISI 316; C72 phosphated**
- 4 Elastomer:  
**NBR; FKM; VMQ; HNBR**

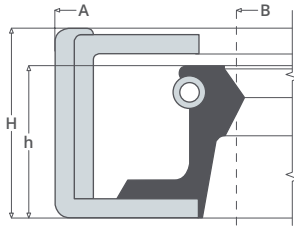
For further information on all our seals, please check our web page or contact our offices.

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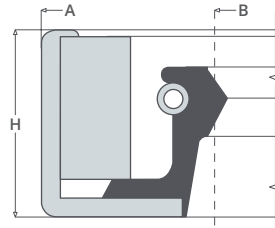
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## L TYPES



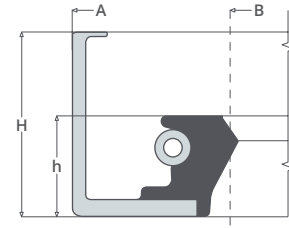
**L2**

Oil seal with ground metal outer casing and sealing lip vulcanized onto the metal body. The reversed L-shaped metal insert protects the sealing lip and strengthens the ring.



**L1A**

Oil seals with a strong body due to a stiffening ring mount in the metal casing. Useful in large cylinders and in heavy-duty applications.



**L1-BP**

Variation of the L1 and L2 type for applications in high-pressure environments.

All the profiles are also available with dust lip "P"

## TECHNICAL SPECIFICATIONS

Outside diameter (mm)	Tolerances (mm)	Maximum ovalization (mm)
<= 50	+0.10 +0.20	0.18
50 ÷ 80	+0.13 +0.23	0.25
80 ÷ 120	+0.15 +0.25	0.30
120 ÷ 180	+0.18 +0.28	0.40
180 ÷ 300	+0.20 +0.30	0.8
300 ÷ 400	+0.23 +0.35	1
400 ÷ 500	+0.23 +0.35	1
500 ÷ 630	+0.25 +0.35	1.3
630 ÷ 800	+0.30 +0.40	1.6
800 ÷ 1000	+0.30 +0.40	1.9
1000 ÷ 1250	+0.30 +0.45	2.2
1250 ÷ 1500	+0.40 +0.55	2.5

<b>Thickness or Height (mm)</b>	<= 10	± 0.30
	> 10	± 0.40

# TECHNICAL FEATURES FOR L

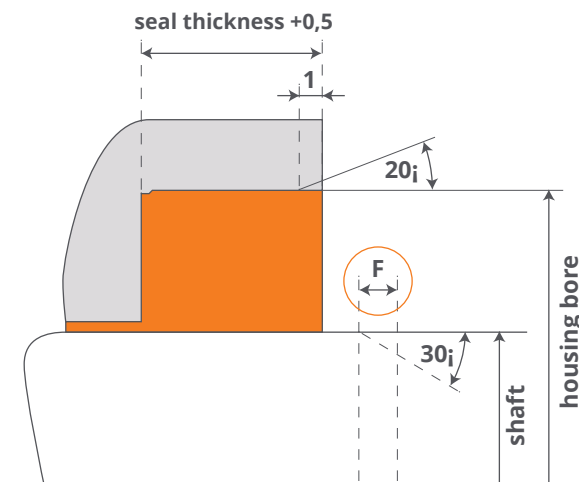


## Tolerances on shaft and housing for metric (mm) and imperial (inch.)

<b>Shaft size</b>	$\leq 100$	$\pm 0.080$
<b>Ø (mm)</b>	101 ÷ 150	$\pm 0.100$
	151 ÷ 250	$\pm 0.130$
	$\geq 250$	$\pm 0.250$
	<b>Housing</b>	$\leq 76$
<b>Ø (mm)</b>	77 ÷ 150	$\pm 0.040$
	151 ÷ 255	$\pm 0.050$
	256 ÷ 510	+ 0.05 / -0.10
	511 ÷ 1015	+ 0.05 / -0.15
	$\geq 1015$	+ 0.05 / -0.15

Maximum misalignment allowed 2,5 mm

Shaft Ø (mm)	Chamfer "F" (mm)
$\leq 250$	7.00
$> 250$	12.00



"We recommend the use of a conical mounting tool for the installation of the seal"

## Finishing of the shaft

A surface finishing of the cylinders done with chromium carbide has shown excellent results. Finishes made with chromium oxides have the disadvantage of reducing the heat dissipation capacity through the cylinder and should not be used with high-speed installations ( $<10$  m/s). It is recommended to apply sleeves on the cylinders in the sealing areas of the ring and finished with hardness 58-62 HRC.

## Shaft hardness and surface finishing

Speed (m/s)	Maximum roughness		Hardness
	Ra (mm)	Rmax (mm)	HRC
$\leq 10$	0.5-0.6	2.0-3.0	30
11 ÷ 16	0.3-0.5	1.0-2.0	40
$> 16$	0.2-0.3	0.8-1.0	50

## Selecting the sealing elastomers

Elastomers	Applications
<b>Nitrile NBR</b>	Lubricating oils, hydraulic oils and mineral fats, water, HFA and HFB fluids, caustic cleaners.
<b>Hydrogenated Nitrile HNBR</b>	Lubricating oils, hydraulic oils and mineral fats, water, HFA and HFB fluids, caustic cleaners. It guarantees an excellent resistance to abrasion and a good thermal behavior.
<b>Fluoroelastomer FKM</b>	Mineral based liquids and fats, HFA, HFB, HFC and HFD fluids, water, chemicals and solutions. Not applicable with highly flammable liquids based on phosphoric acid. Recommended for use with flammable oils.
<b>Silicon VQM</b>	Organic oils and oils with high aniline content. Engine and gearbox oil. Excellent characteristics for mineral oils and fats. It can be used with aliphatic and aromatic hydrocarbons. This material is resistant to high and low temperatures.

Description		NBR	FKM	VQM	HNBR
<b>Working temperature</b>	C ( $\pm 2$ )	-20 ÷ +100	-20 ÷ +220	-60 ÷ +180	-40+150
<b>Standard Hardness</b>	Shore A ( $\pm 5$ )	70	70	70	70
<b>Maximum working speed</b>	m/s	12	25 ÷ 35	25	15

The above data has been obtained through tests that •FP• considers to be reliable. •FP• does not guarantee that the same results will be replicated in other laboratories with different preparation conditions and laboratory sample evaluation. For more details, please contact our technical office.

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