

AUTOMOTIVE | AEROSPACE | FOOD & BEVERAGE | FLUID TECHNOLOGIES | MOBILE MACHINERY

FRANCEJOINT

SEALING SYSTEMS



WIPER
SEALS





FRANCEJOINT

SEALING SYSTEMS

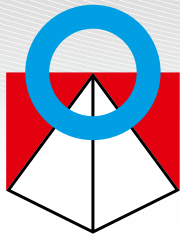
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FRANCEJOINT
SEALING SYSTEMS

Since 1981, FRANCE JOINT – SEALING SYSTEMS has been designing, manufacturing and distributing seals and precision rubber parts for its customers for whom quality is a determining factor.

Faced with tough competition among the big decision-makers of the industrial world, FRANCE JOINT has responded with innovation, research and development, experience in Best-Cost manufacturing, and a consistently high level of quality, thanks to certificates ISO 9001, IATF 16949, EN/AS 9100 and ISO 14001.

Today, FRANCE JOINT is working in close collaboration with its customers, meeting challenges head on with success. Automotive, Aeronautics, Mobile hydraulics, Beverages & Foods, Fluid engineering industries... every solution emerges from a uniquely individual partnership, constantly fostered and renewed.

Our prime objective, based on unrivalled quality, is to find the most suitable solutions for ensuring that

you will stand out in what has become an extremely competitive domain. Our position of excellence has led us since the birth of our company to acquire the tools necessary to anticipate and prevent risks and maximize our service; the ultimate objective being of course to help you keep ahead of developments in this more and more technological market.



AUTOMOTIVE



AERONAUTICS



BEVERAGES & FOODS



FLUID ENGINEERING



MOBILE HYDRAULICS



Compression molding



Injection molding



Machining / Tooling



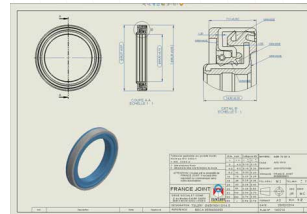
Logistics / Packaging

RESEARCH & DEVELOPMENT

Innovation, reliability, safety, minimization of risk: your expectations are our daily concern. To get from the idea to the finished product demands firm managerial control over a wide range of projects in addition to expertise in manufacturing.

FRANCE JOINT's contributors, who are as much inventors as technicians, get the best of fully automated, state-of-the-art technology that takes them from drawing-board to prototype and finally to assembly line. From writing specifications to putting on a major technical event through designing (3D Solidwrks software) and testing for validation and compliance, FRANCE JOINT engineering works hand in hand with you to find the best solutions guaranteeing the level of expected performance.

More than 1000 compounds integrating elastomers, PTFE materials, Polyurethane, or even thermoplastics, as many solutions vis-a-vis the new most complex requirements which will put you in pole position today so that we can all be winners tomorrow. FRANCE JOINT puts in place qualifications in order to examine the behavior of its seals according to various parameters intervening on frictions, pressures, temperatures, speeds, strokes, leakages...

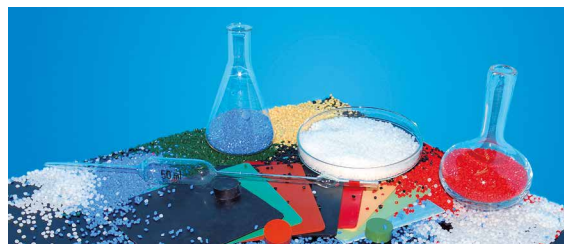


QUALITY IN OUR CONCERNS

Several certificates obtained, ISO 9001, IATF 16949, EN/AS 9100 and ISO 14001, testify to the quality department's commitment to constant progress at every level of the company, at all stages of the realization, particularly where continual improvement is what has made FRANCE JOINT the name it is today.

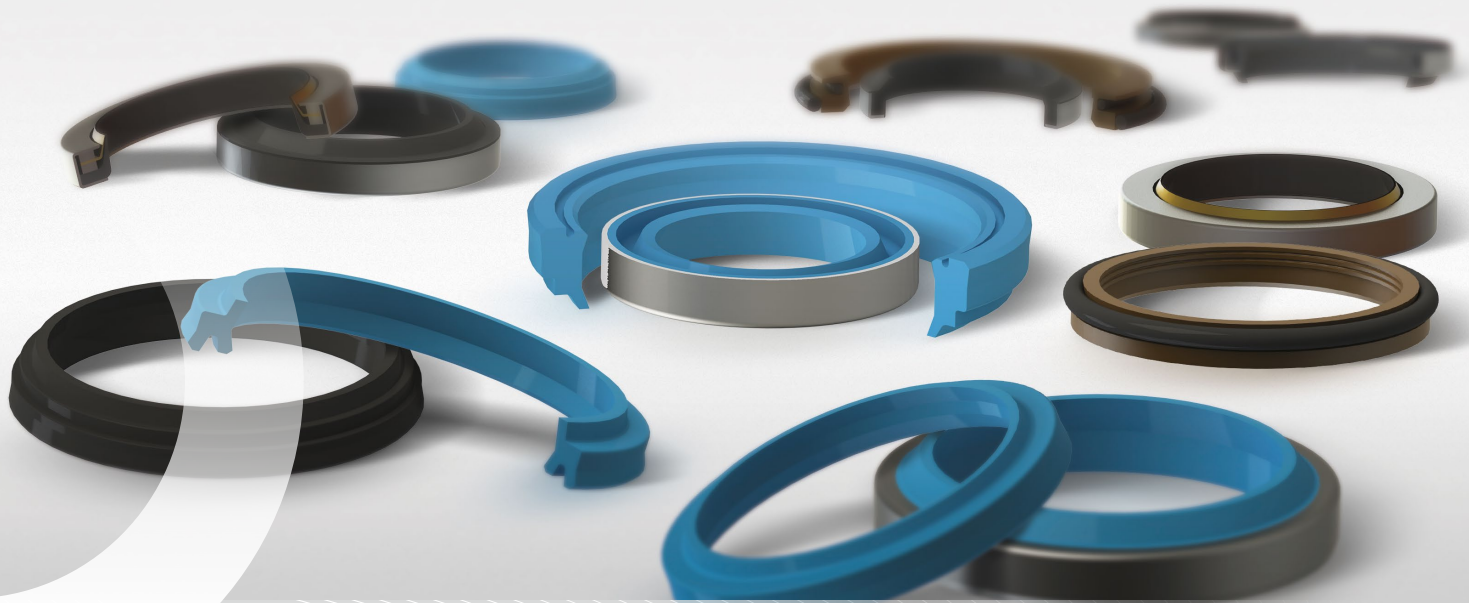
Ambitious with customer satisfaction a priority, FRANCE JOINT has thus obtained the most powerful methods (PPAP, AMDEC, value analysis, Audits, MRP, 8D analysis, SPC, R&R ...) in order to optimize simultaneously the capacity of machines and processes, operational manpower performances, organizational methods, and finally, product and financial results.

FRANCE JOINT guarantees the best technology and pursues its daily objectives of a "Zero defects" production, through physico chemical controls (rheometer, spectrometer, durometer...), through dimensional and final aspects (unit controlling equipment, 3D camera ...). This is because the search for competitiveness is as important as the search for continuous improvement.



3D test device





○ HYDRAULIC SEALS

1. Introduction

There are a number of sealing systems designed for all types of machines, ranging from the simplest to the most complex and depending on field of application. Correctly defining the functional parameters is an essential step in the choice of sealing system and the materials that should be prioritised; each profile and material is designed to meet the specific and varied stresses of different hydraulic systems, including hydraulic cylinders. Working closely with its customers, FRANCE JOINT actively participates in development projects, using its expertise and recommendations to select sealing components.

As critical elements in the correct operation of hydraulic machinery, sealing systems must meet increasingly specialist technical requirements:

- wear resistance
- compatibility with media
- resistance to the effects of temperatures
- resistance to pressure
- resistance to speed
- reduced friction loads

In certain fields of application, typically in heavy-duty mobile machinery where requirements are very important, a single seal is not compatible with all types of stress; that's why FRANCE JOINT offers a wide range of sealing systems. All of these sealing systems are designed for heavy-duty rod applications, and are configured as follows: a buffer seal, secondary seal, wiper seal and guiding components; for the piston part: a piston seal and guiding components.

Hydraulic seals must contain the fluids and maintain the hydraulic pressure (piston seals, rod seals, static seals), to stop the inlet of impurities and to maintain the lubricating film on the rod (wiper seals), and to resist any deformation under a radial load by guiding the piston and rod (wear rings and guide strips).

2. Environment

2.1 FRICTION/LUBRICANT RELATIONSHIP

When hydraulic machinery is in operation, there are different phases of friction until a lubricating film is formed. The thickness of the lubricant film, which is located between the seal and the contact sliding face, greatly influences the nature of the friction. There are different phases of friction as the hydraulic system reaches its operating speed.

The first is a dry friction between the seal and the contact mechanical part, which has a significant force called adhesive friction, and which takes shape during system start-up.

As the system accelerates, a lubricating film forms little by little between the seal and the contact mechanical part, which considerably reduces friction. This is a mixed friction located between the seal and the lubricated mechanical part.

Finally, as the speed continues to increase, so does the force of the friction, transforming it into a viscous friction between two bodies with a hydrodynamic lubrication.

These different phases remain similar for all types of operation, but at different levels for each material used.

The diagram below indicates that PTFE is recommended for lower pressures and speeds, as it reaches the viscous friction phase more quickly.

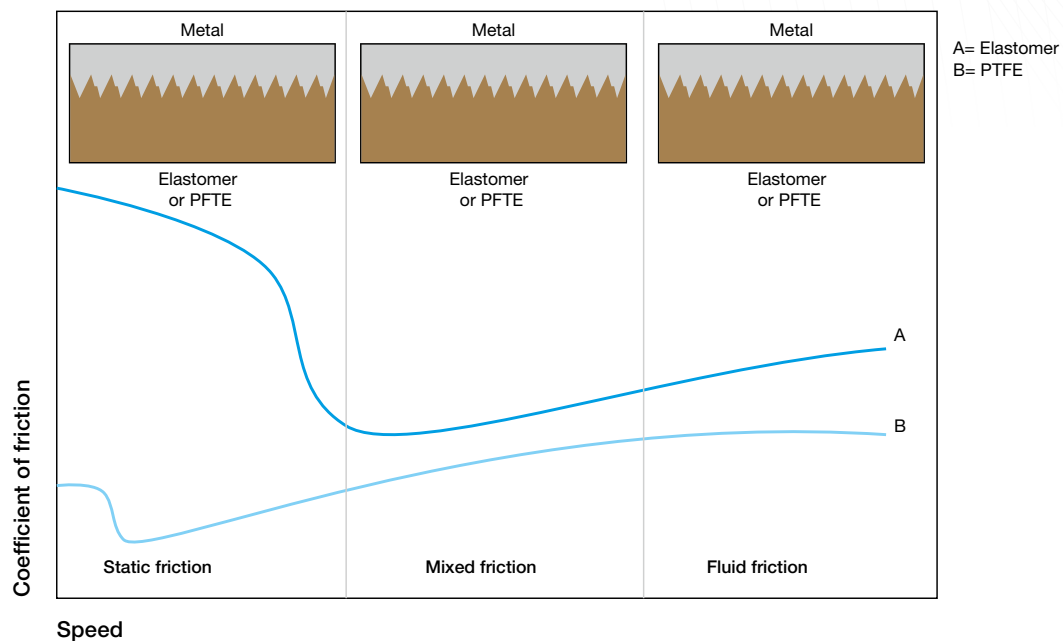


Diagram 2.1-1

2.2 TEMPERATURE

The temperature of the hydraulic fluid as well as the surrounding temperature plays a determining role in the choice of material. The ideal temperature for optimal seal operation is between +30°C and +60°C. However, the choice of material must also be determined, taking into account the heat created at the point of contact on the sealing lip under friction. When using hydraulic cylinders, the temperature usually reached is +80°C and, in extreme cases, +110°C.

When the temperature increases, the seal's material becomes more elastic and its resistance to deformation is reduced. That's why we have developed seal profiles in which the sealing lips are pre-stressed by the inclusion of a metal spring or O'Ring. For temperatures that exceed +100°C, FRANCE JOINT offers special materials, including HNBR – FKM – high-temperature PU – PTFE, among others.

On the other hand, when the temperature is reduced to negative values, the seal's material has a tendency to harden and become less elastic. However, the seal's operational safety is not really influenced by the increase in fluid viscosity. For temperatures that could go lower than -40°C, FRANCE JOINT offers special materials, including NBR – FKM – HNBR – PU – PTFE.

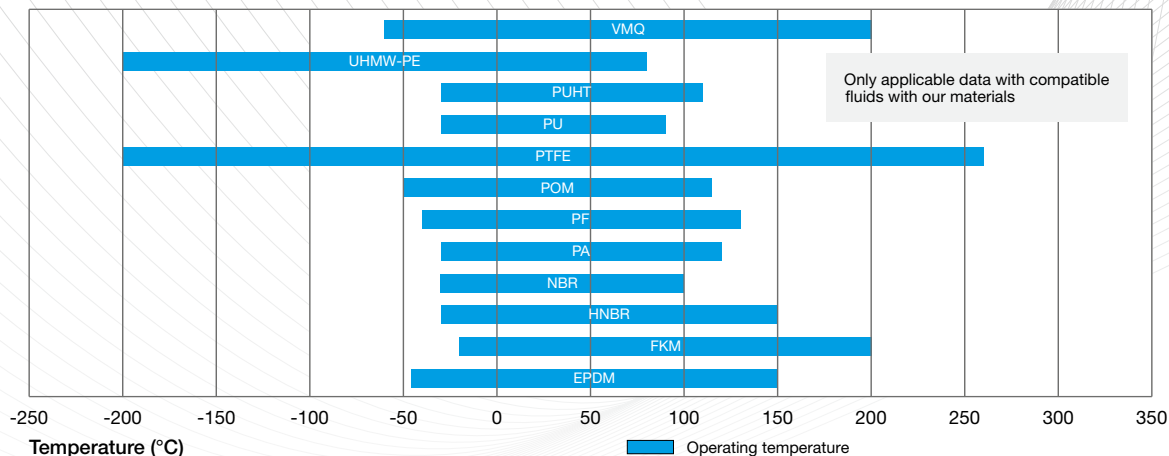


Table 2.2-1

2.3 OPERATING AND DRAG PRESSURE

Pressure is a determining factor to be taken into account when choosing the seal and material hardness. Along with the cylinder size, the pressure of the hydraulic system determines the thrust. From one application to another, we consider the pressure exerted to be defined as:

- **Machine tools:** 8 – 16 MPa
- **Material handling - Lifting:** 16 – 25 MPa
- **Hydraulic presses:** 16 – 28 MPa
- **Construction – Mining – Heavy industry:** 28 – 40 MPa

In certain applications, fluctuations in very high point pressures can appear – mechanical impacts, water hammer – particularly in mobile machinery. FRANCE JOINT offers strong seals designed to efficiently cope with such stresses.

Moreover, when gaps are very tight at the guide in a fitting such as a hydraulic cylinder, hydrodynamic pressures, also called drag pressures, may be generated. With a much smaller gap between the guide and the rod, and a constant flow rate, additional pressures (which can reach up to several dozen MPa) can appear in front of the seal, causing it to deteriorate.

**THIS PRESSURE INCREASE
IS EXPRESSED BY THE FOLLOWING FORMULA:**

$$\Delta P = p_1 - p = \frac{6 \times \eta \times v \times L}{Hs^2}$$

P: pressure
η: dynamic viscosity of the fluid
v: speed
L: length of the guide
Hs: radial extrusion gap

There are ways to prevent the formation of such drag pressures. Helicoidal grooves are provided with a section that is larger than that of the seal; this is in order to prevent the premature destruction of the seal and certain mechanical parts. For BECA 005 – 006 – 007 wear rings, an opening has already been created, preventing the creation of return ducts.

2.4 SPEED

The choice of material is also determined by the system's operation speed. The rubbers and polyurethanes in friction against the moving surface can withstand speeds between 0.1 m/s and 0.5 m/s. For PTFE materials, speeds up to 5 m/s, or even greater, are permitted. For particularly low stresses, the speed can be limited to up to 0.05 m/s, increasing the friction and limiting the formation of lubricating film.

In such conditions, "stick-slip effects" may appear, which are defined as jerking movements caused by a succession of slipping phases followed by sticking phases.

To guard against such effects, FRANCE JOINT has developed a suitable range of seals, where the parts subject to friction are made from PTFE with optimised geometries. Other special materials are also available, such as PE-UHMW.

2.5 HYDRAULIC FLUIDS

a. Introduction to oils

Fluid holds a prominent place in the hydraulics field. It encourages:

- the transmission of power to different working components (transmission of energy as pressure)
- the lubrication of mechanical parts to limit the amount of wear on moving parts
- the protection of the entire hydraulic system
- the removal of heat

The hydraulic fluid most commonly used is mineral oil. Water is the ideal hydraulic fluid (low compressibility, non-flammable, negligible cost) if it does not present serious drawbacks (corrosion, lubrication fault, etc.) to the operation of machinery. A significant number of fluids are used to meet specific requirements. There are:

- mineral oils
- fire-resistant oils
- biodegradable oils

b. Oil classification

Mineral oils

ISO Classification	Properties	Applications
HH	Additive-free mineral oil	This oil only ensures energy transmission and is rarely used today
HL	Oil + additives with antioxidant and anti-corrosion properties to combat ageing	This oil is used for low-stress environments and works very well with water
HM	It has the same features as HL coupled with anti-wear properties to encourage resistance to wear and loads	This oil is heavily used for significant pressures
HLPD	It has the same features as HM coupled with detergent additives	This oil is heavily used for significant pressures with water intake
HR	It has the same features as HL coupled with an improved tolerance to viscosity/temperature	This oil is used during major temperature fluctuations
HV	It has the same features as HM coupled with an improved tolerance to viscosity/temperature	This oil is used during major temperature fluctuations and at low temperatures
HS	Synthetic oil without special fire resistance properties	Special properties
HG	It has the same features as HM coupled with additives to improve its anti-stick-slip properties	This oil is used for machines where lubrication is common to hydraulic parts, rails and joints
HD	Oil + additives for antioxidant, anti-wear and detergent properties	This oil is heavily used in mobile hydraulic systems and in engines

Fire-resistant oils

Group	Temperature	Properties	Applications
Aqueous fluids			
HFAE	+5°C to +60°C	Oil-in-water emulsion with more than 80% water (generally 95 - 98%)	These oils are used in hydraulic presses and in systems where leaks are significant
HFAS		Synthetic oils in aqueous solution with more than 80% water (generally 95 - 98%)	
HFB		Oil-in-water emulsion with more than 40% water	This oil is little used today aside from in the United Kingdom
HFC	-30°C to +60°C	Polymer solution (polyethylene glycol or polypropylene glycol) with more than 35% water (less than 80% water)	This oil is used in industrial environments with a maximum temperature of +60°C and average stresses

Group	Temperature	Properties	Applications
Non-aqueous fluids			
HFDR	-30°C to +150°C	Phosphoric ester base, free from water	This oil is used for significant stresses and for very high temperatures
HFDU		Synthetic fluid with specific composition	
HFDS		Chlorinated hydrocarbon base, free from water	
HFDT		HFDR and HFDS mixture	

Biodegradable oils

ISO Classification	Properties	Applications
HETG	Vegetable oil	This oil is used in the agriculture and forestry sectors
HEPG	Polyglycol	This oil is used in water protection areas
HEEG	Synthetic ester	This oil is mainly used in construction machinery

c. Impurities and air in oil

A fluid's cleanliness is an important factor in optimising the operation of a hydraulic system. Limited hydraulic filtration will lead to a disruption in the mechanism, which is caused by impurities. These impurities have multiple guises, such as metal shavings and other abrasive particles, silica, external dusts, oxidised products (rust), etc. and can lead to premature seal deterioration. It is therefore essential to perform regular checks and reconditioning on filtration systems.

Moreover, the air in the oil can lead to a breakdown of the seal through a phenomenon known as micro explosions. Hydraulic fluids actually contain air particles dissolved in the oil, which will compress and connect as the pressure increases and will tend to relax and escape when the pressure lessens. These particles are always positioned between the seal and the spaces in the groove and closest to the gaps formed by them.

This simultaneous compression and relaxation of air particles in the oil will heat up their epicentre, suddenly increasing the temperature and provoking self-ignition, also known as the "diesel effect".

If this occurs regularly enough, it can lead to the destruction of the back of the seal and even the destruction of mechanical parts and guides as they are blasted and burned. To prevent such risks, it is imperative to bleed the hydraulic systems to limit these micro explosions.

2.6 VISCOSITY

The viscosity determines a hydraulic fluid's capacity to flow. It is, essentially, the resistance that the fluid's molecules encounter, and they move by sliding between each other. The term used today is "fluidity".

Factors that will influence viscosity are essentially temperature and pressure. ISO standard 3448 classes all industrial oils according to their viscosity, expressed in mm²/s at a reference temperature of +40°C.

As the temperature increases, the viscosity has a tendency to decrease. On the other hand, the viscosity can increase when the temperature decreases. A continually increasing pressure can also lead to a continually increased viscosity. Generally speaking, we consider that at a consistent temperature, the viscosity follows a very marginally exponential curve, depending on the pressure.

IT CAN BE EXPRESSED USING THE FOLLOWING FORMULA:

$$\Delta V = 0.003 \times p \times VO$$

p: pressure in MPa

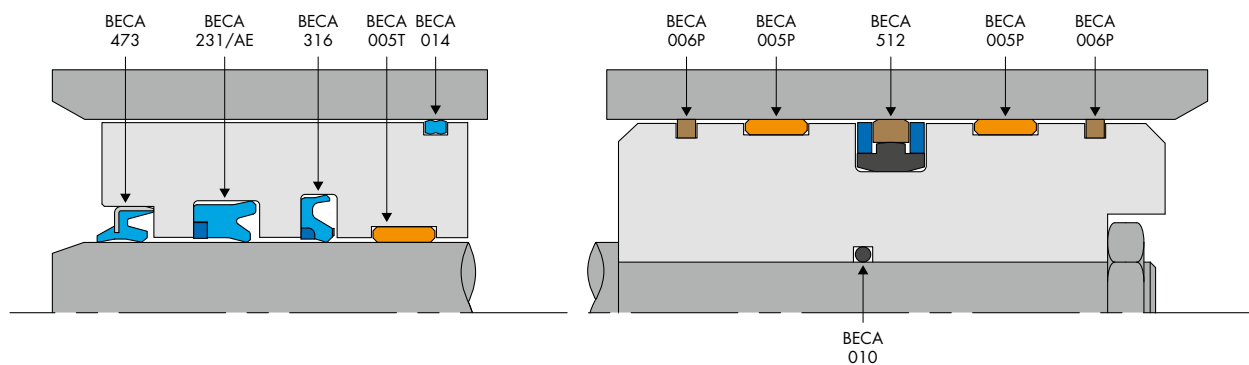
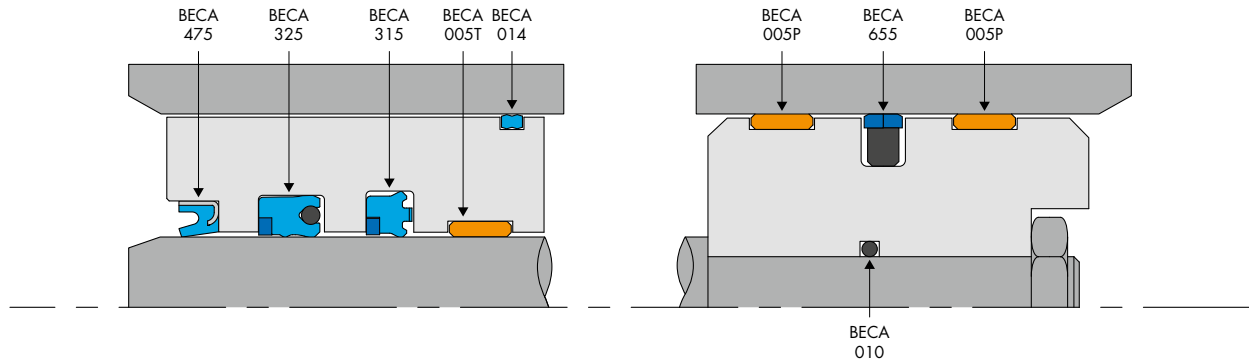
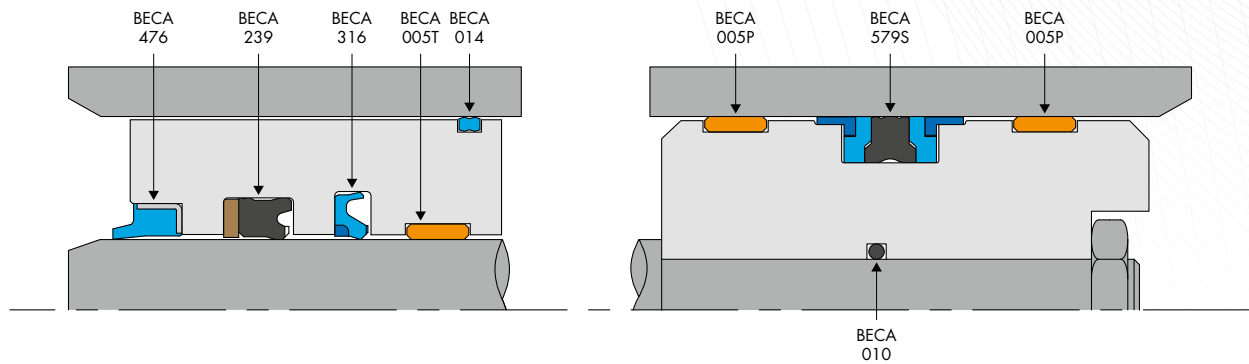
VO: viscosity at atmospheric pressure

The Viscosity Index (VI) measures the viscosity fluctuation with the temperature. Oils with high viscosity indexes are less dependent on temperature.

3. Examples of applications

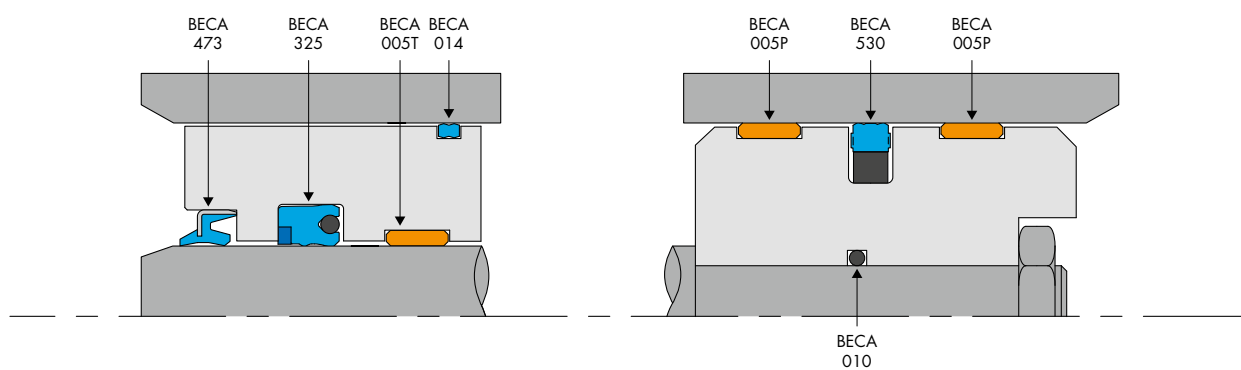
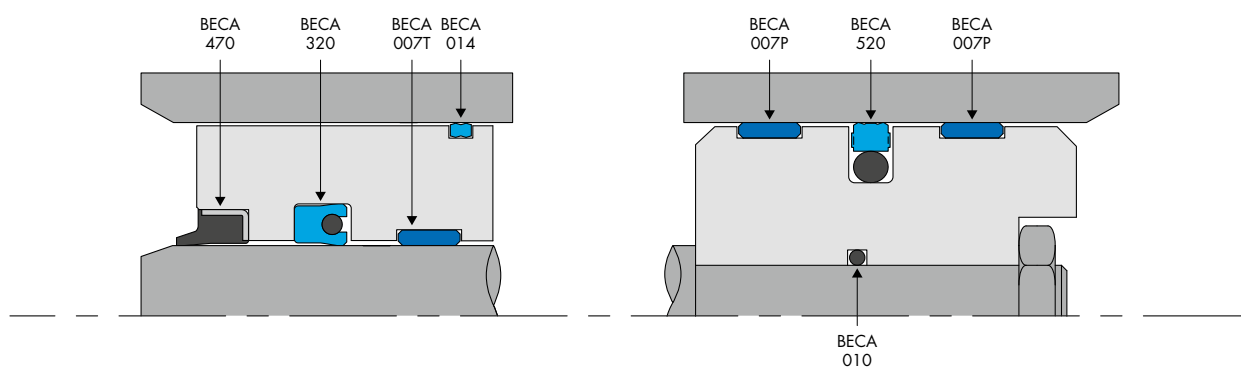
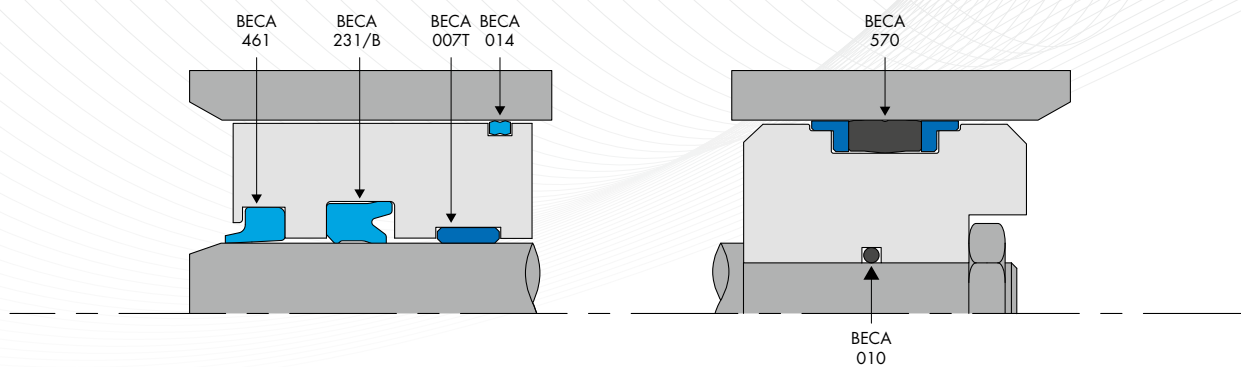


CONSTRUCTION



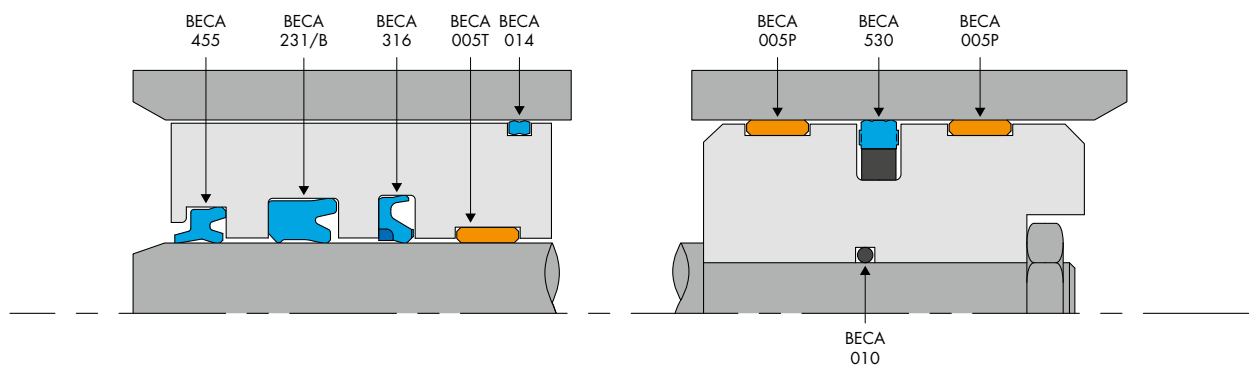
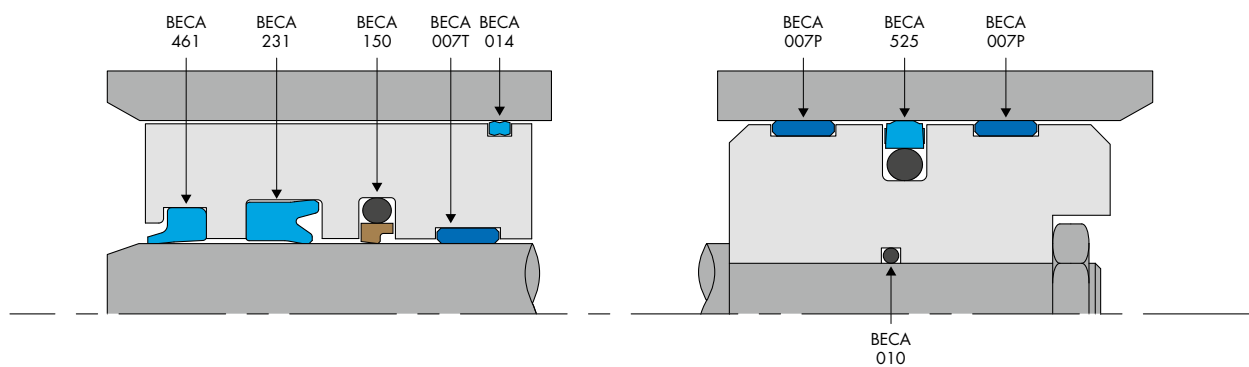
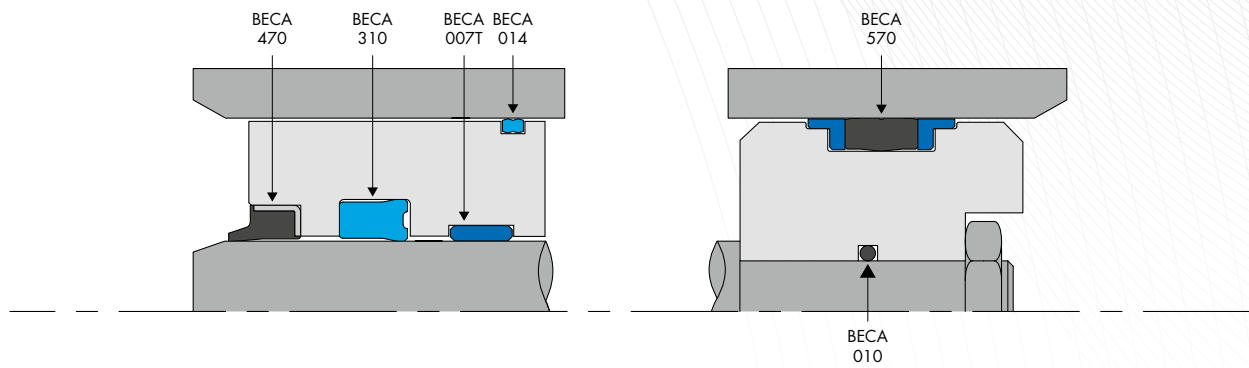


AGRICULTURE



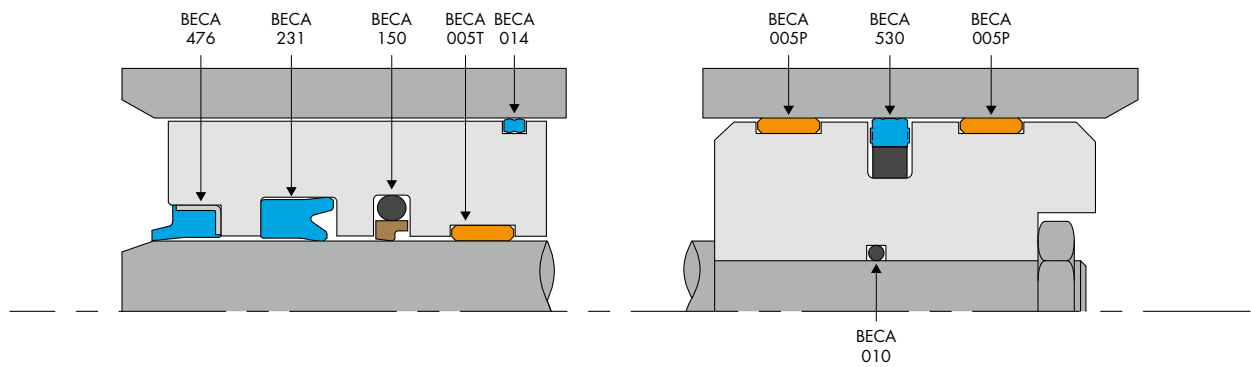
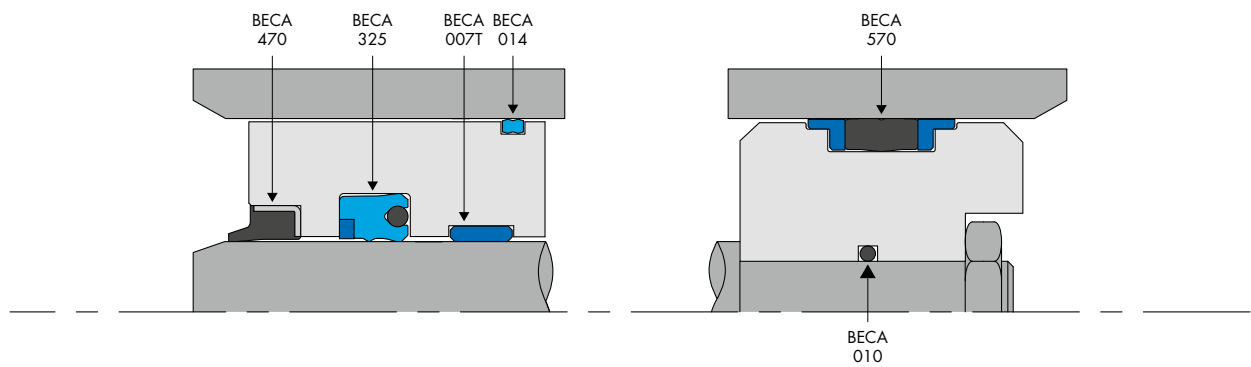
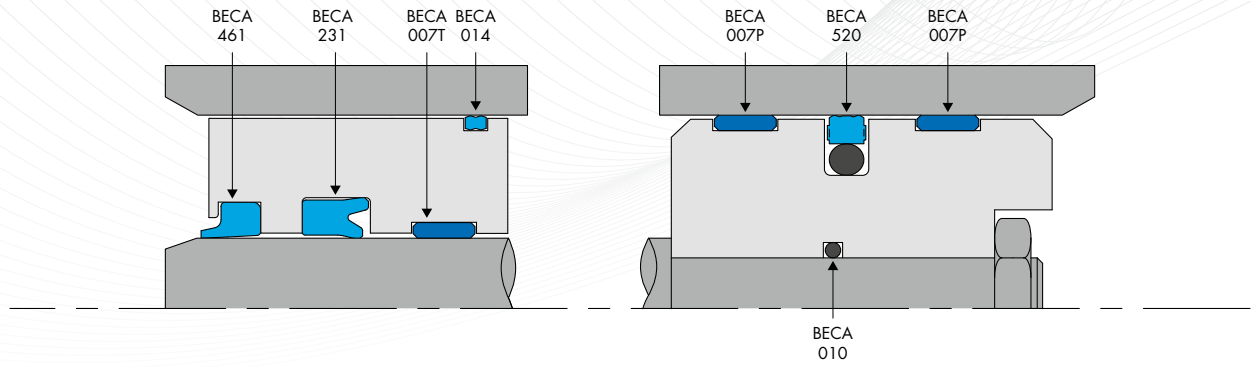


MATERIAL HANDLING



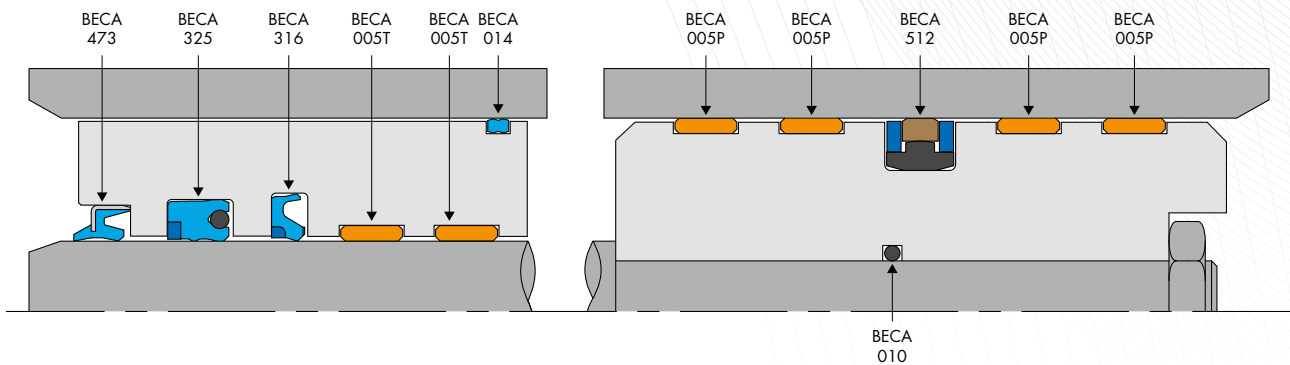


LIFTING

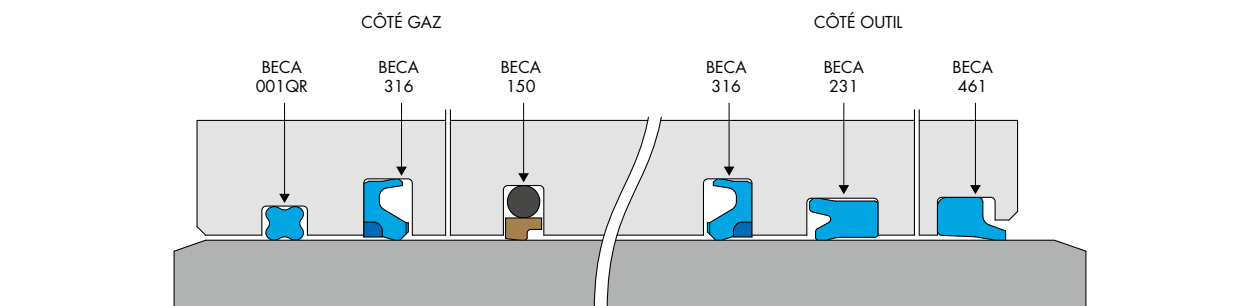
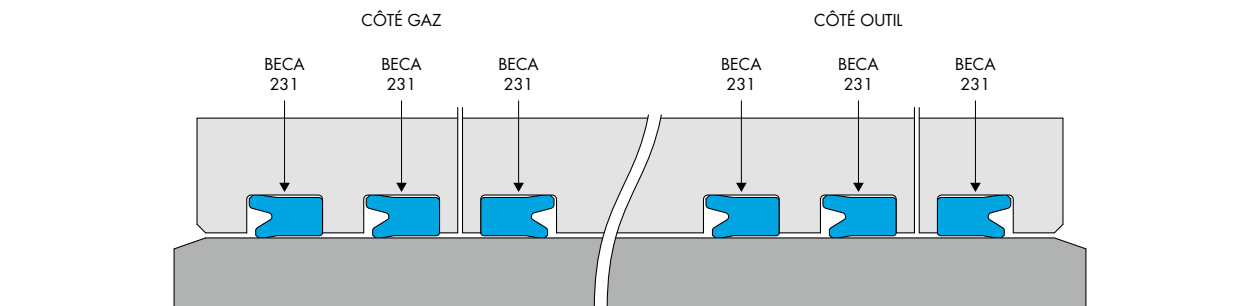




MINING

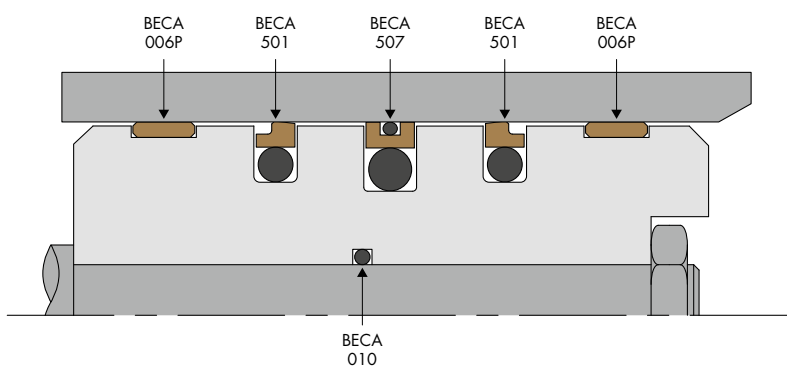
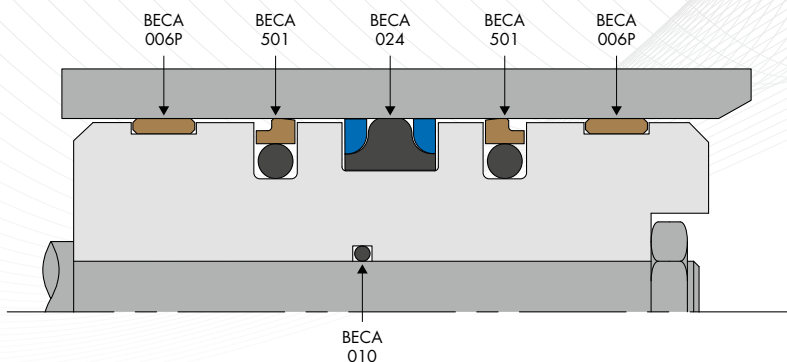


HYDRAULIC BREAKER

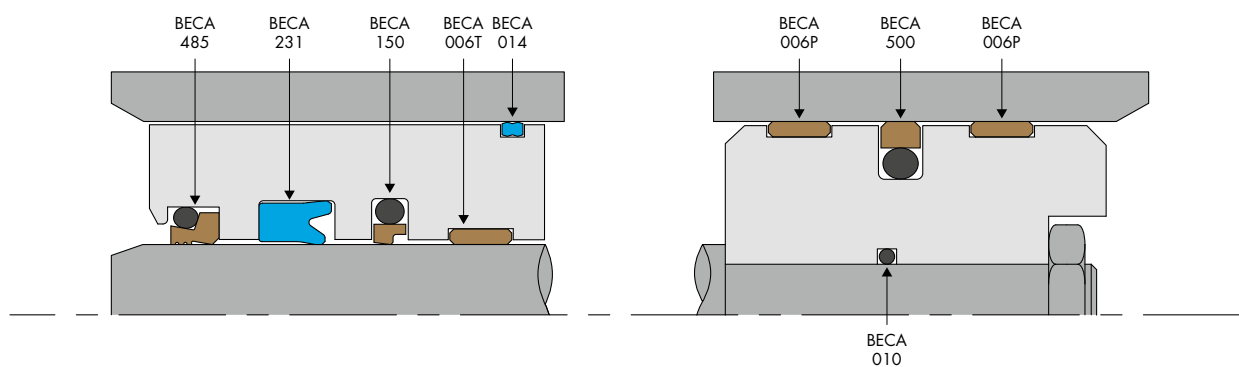




PISTON ACCUMULATORS

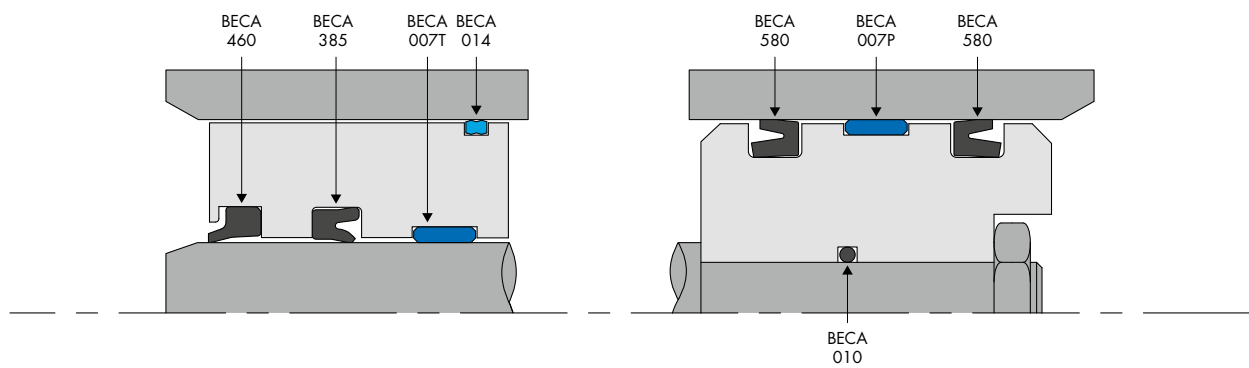
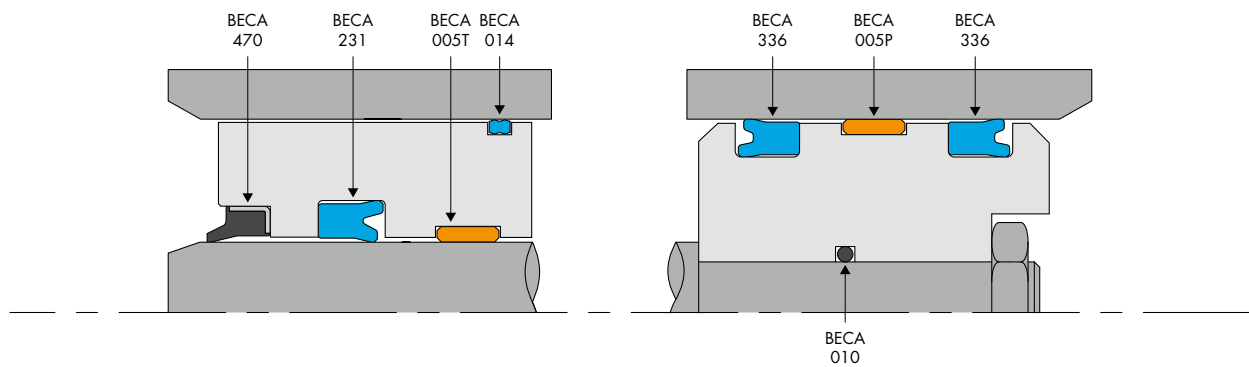
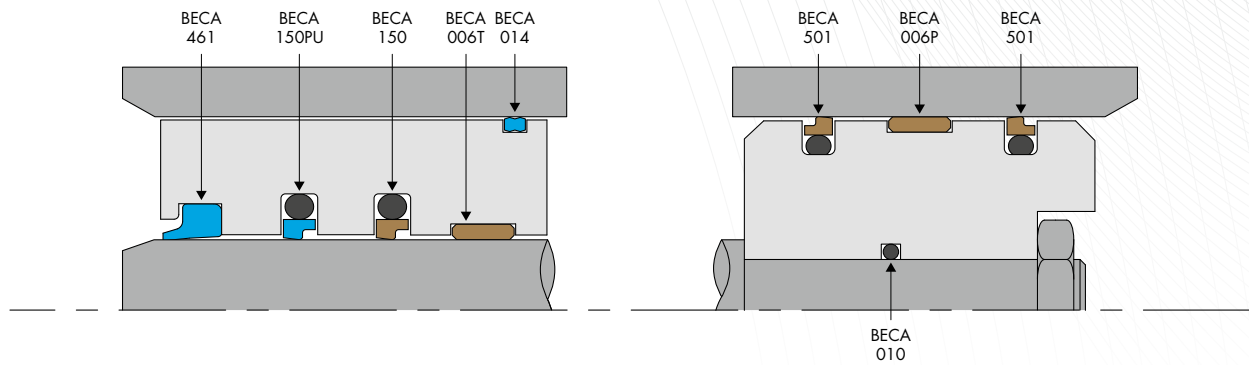


INDUSTRIAL APPLICATIONS





INDUSTRIAL APPLICATIONS (CONT.)



4. Assembly recommendations

Several essential rules must be followed before fitting the seals.

- Check that the mechanical parts (rods and bore parts) have an inlet chamfer. If not, a suitable sleeve must be used.
- Flash and chamfer or round off the sharp edges; cover the threaded parts.
- Remove the machining shavings and all impurities and other foreign bodies. Clean all mechanical parts carefully.
- Grease or oil the seal and mechanical parts to facilitate assembly. To do this, ensure beforehand that the lubricants are compatible with the seal materials. Avoid greases containing solid additives (molybdenum disulphide or zinc sulphide).
- If using installation tools, check that they are clean and do not have sharp edges.
- Soak the seal in oil heated to around +80°C / +100°C (in the water heated for the EPDM) to give the material a greater elasticity. Effective for textile fibre seals and for harder seals.
- Create assembly tools (mandrels, correction tubes, push-in tools, slide tools, plugs, etc.) using a polymer (Polyamide - PA6 or Polyoxymethylene - POM), taking into account characteristics such as sliding, and generally having excellent surface roughness so that the friction ring does not deteriorate.

Fitting methods differ depending on the type of groove (open or closed) as well as the seal's profile. The table below sets out all of the methods used to correctly fit seals from our range.

Type of seal	Wiper seal	
	Closed groove	Open groove
Flexible wiper seal	-	Assembly 3.A
Rigid wiper seal	Assembly 3.B	-
Composite wiper seal	Assembly 3.C	-

4.1 ASSEMBLY 3.A – WIPER SEALS - OPEN GROOVE

Applicable for the following product families: BECA 470, BECA 471, BECA 472, BECA 473, BECA 475, BECA 476, BECA 477, BECA 478

Wiper seals composed of a metal casing are press-fitted into their groove using an assembly tool.

- Position the wiper seal horizontal in relation to the bore
- Insert the seal using a press, ensuring that the thrusting forces are well distributed to prevent the seal from sloping and becoming permanently misshapen (see diagrams 4.7-1 and 4.7-2).

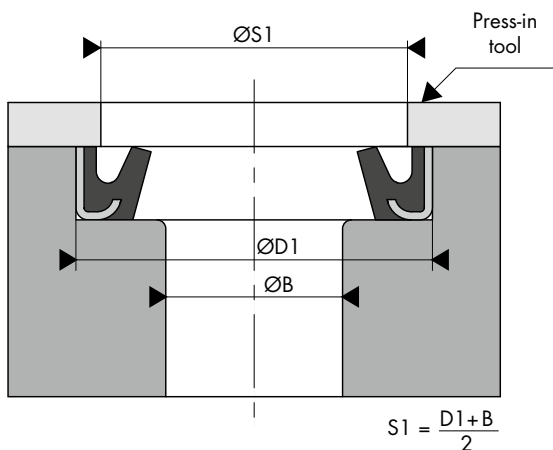


Diagram 4.7-1

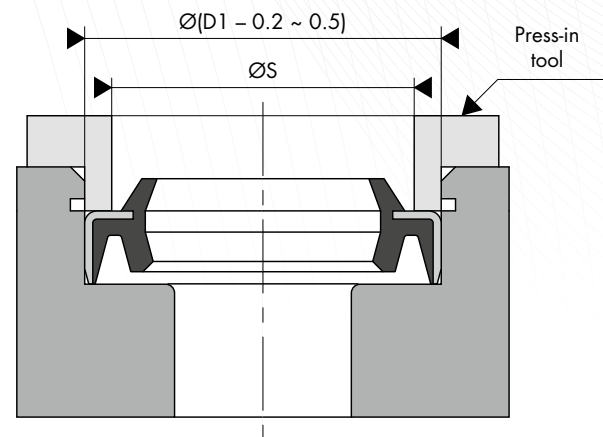


Diagram 4.7-2

4.2 ASSEMBLY 3.B – WIPER SEALS - CLOSED GROOVE

Applicable for the following product families: BECA 382, BECA 417, BECA 455, BECA 460, BECA 461, BECA 464, BECA 465, BECA 466, BECA 468

Flexible rubber or polyurethane wiper seals composed of a metal casing are press-fitted into their groove using an assembly tool.

- Distort the wiper seal by shaping it like a bean without creating a sharp angle.
- Fit the wiper seal into the groove.
- Calibrate the wiper seal using a mandrel

4.3 ASSEMBLY 3.C – WIPER SEALS - CLOSED GROOVE

Applicable for the following product families: BECA 480, BECA 482, BECA 483, BECA 485, BECA 486

- Fit the O'Ring into the groove.
- Distort the friction ring by shaping it like a bean without creating a sharp angle.
- Position the friction ring in the groove and restore its shape by pushing it against the O'Ring.
- Calibrate the friction ring using a mandrel chamfered between 15° and 20° along a length of 30.00 mm.

5. Storage recommendations and lifespan

Seals, which are regularly used as spare parts, can be stored over a long-term period. During storage, rubbers are subject to physical alterations, meaning that they can sometimes become unusable due to deformation, hardening, softening or cracking when they are exposed to oxygen and ozone, light, heat, moisture, oils and solvents.

ISO Standard 2230: 2002 "Rubber Products - Guidelines for Storage" sets out the storage recommendations and length of storage for rubbers depending on material classification, in order to ensure optimal preservation of the physical and chemical features of parts.

Temperature

The temperature in the storage area must preferably be between +5°C and +25°C. If the temperature exceeds +25°C, the rubber seals may undergo physical changes, no longer retaining their original technical features, and may break down prematurely. All heat sources (radiators, lamps, sunlight, etc.) must be controlled so that the temperature does not exceed +25°C.

On the other hand, if the temperature in the storage area is below +5°C, the seals may become more rigid, which will not necessarily alter their chemical and physical features. Returning them to +20°C is advised before putting them into operation.

Humidity

Generally speaking, the relative humidity of the storage area should not exceed 70% for rubber seals (65% for polyurethane seals). Avoid humid areas, as well as areas that are prone to condensation.

Light

Rubber seals must not come into contact with sunlight or artificial light with a high UV ray content. Using normal incandescent lighting is recommended, as is covering windows in the storage area with a protective red or orange paint. Using special anti-UV bags will ensure that seals are better protected.

Radiation

Precautions must be taken to protect stored parts from all sources of ionising radiation.

Ozone

As ozone is very damaging to rubber seals, the storage area must not contain ozone-producing equipment, such as mercury-vapour lamps, high-voltage electrical equipment, electric motors or other products likely to produce soundless electrical charges or sparks. No combustible gases or organic vapours must be present, as their photochemical processes may lead to ozone production.

Distortion

Seals must preferably be stored where they are not subjected to constraints, pressures or any other force that could cause them to become misshapen. Seals should be kept in their original packaging as far as possible.

Contact with liquids and semi-liquids

Seals must not be stored in contact with liquids (acids, disinfectants, oils, greases, etc.) or other semi-liquid materials, unless packaged in this way by the manufacturer.

Contact with metals

Certain metals, such as manganese, iron, copper, brass and other compounds are damaging to rubbers. Seals must not be stored in contact with such metals unless the rubber parts are affixed to them, in which case a rolled packaging would be preferable.

Contact with other materials

Rubber seals must not be stored in contact with PVC due to the risk of potentially transferring plasticiser or other ingredients. Rubbers with different compositions must be separated from one another.

Cleaning

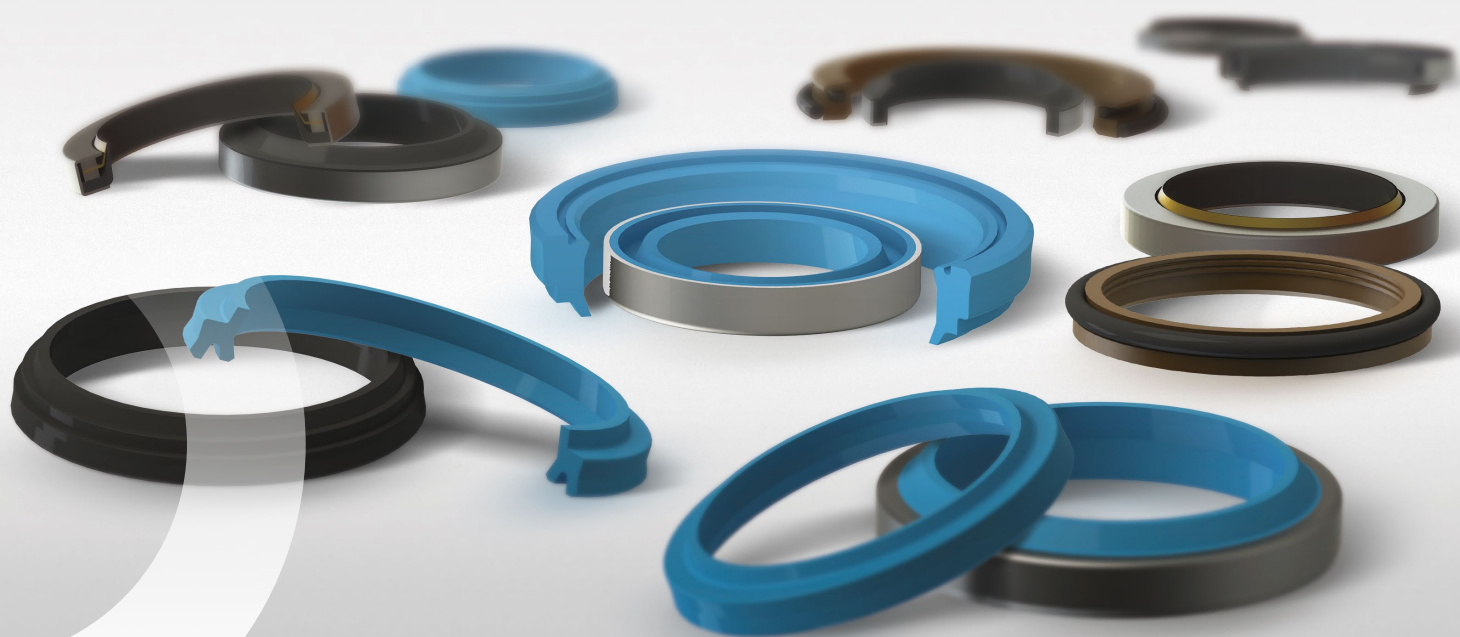
If necessary, clean seals with soap and water, or denatured alcohol. Cleaning with water should particularly be avoided for seals with textile fibre, and steel-rubber (corrosion problems) or polyurethane seals. Parts must be dried at ambient temperature and not near a heat source. Seals must not come into contact with wire brushes or sharp objects.

Storage and control

Storage duration largely depends on the type of material, rubbers being particularly sensitive to storage. The table below sets out the initial storage period.

Type of materials	Initial storage period	Extension period
NR - PU	5 years	2 years
ACM - AEM - CR - HNBR - NBR	7 years	3 years
EPDM - FFKM - FKM - FVMQ - VMQ	10 years	5 years
PTFE - PA6 - POM	Unlimited	-

Quality control is carried out at the end of this period. An extension may be possible, depending on the results.



6. Wiper seals

Mainly used for linear dynamic applications, wiper seals are used to stop the entry of impurities and to preserve the lubricating film on the contact rod.

The causes of premature deterioration in seals, in the rod and other parts, are pollution (or entry of impurities) in the hydraulic system; that's why FRANCE JOINT takes special care in its selection of wiper seals.

IMPORTANT

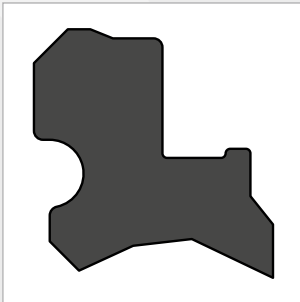
The pressures, speeds and temperatures indicate the maximum values and may not be cumulated. Moreover, they may be developed depending on the materials used.

For specific orders (temperature, pressure, speed, etc.), please contact our technical team so that they can direct you towards the appropriate choice of material and seal profile.

The dimensions shown in the catalogue are usually in stock and can be sent quickly. However, we reserve the right to modify our delivery schedule. Please contact our sales team to find out our availabilities.

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WIPER SEALS

BECA 382



DESCRIPTION

The BECA 382 profile is a U-ring type double acting wiper seal composed of two rubber wiping lips.

ADVANTAGES

Good wiping effect, both internally and externally
Easy assembly by deformation

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

NBR 90 Shore A
FKM 90 Shore A

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

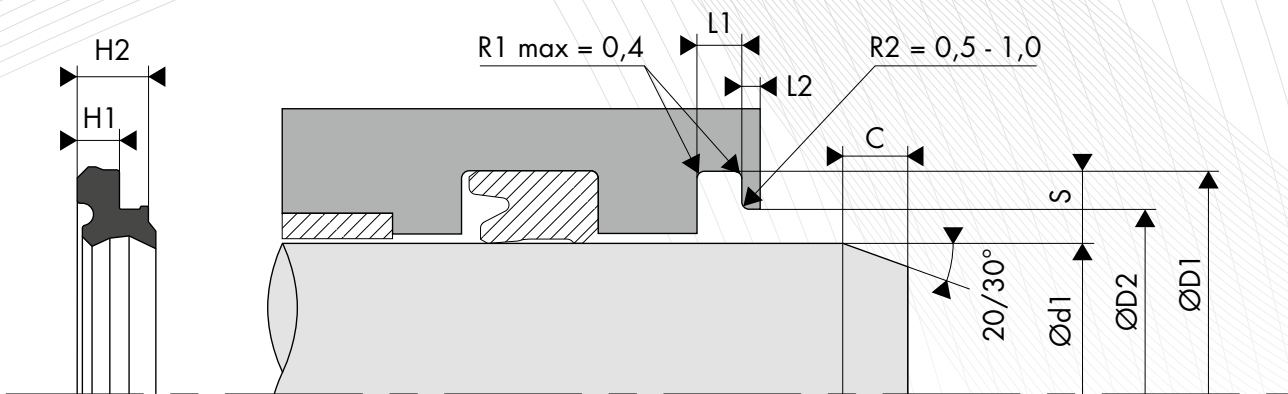
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

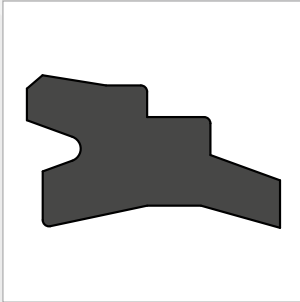
The chamfer length as well as the chamfer angle are determined by the rod seal.



DIMENSIONS

Part number	Rod diameter Ød1 f8	Groove diameter ØD1 H8	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Seal height H2
382.0020028	20.00	28.00	24.00	3.30	3.60
382.0090105	90.00	105.00	98.00	5.10	8.10
382.0110122	110.00	122.00	118.00	5.10	8.10
382.0115130	115.00	130.00	123.00	5.10	8.10
382.0140155	140.00	155.00	148.00	6.00	10.00
382.0145155	145.00	155.00	149.00	6.00	10.00
382.0160175	160.00	175.00	168.00	6.00	10.00
382.0165180	165.00	180.00	173.00	6.00	10.00
382.0175185	175.00	185.00	179.00	6.00	10.00
382.0190209	190.00	209.00	199.00	6.00	10.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 417



DESCRIPTION

The BECA 417 profile is a stepped double acting wiper seal composed of two rubber wiping lips.

ADVANTAGES

Low friction
Good wiping effect, both internally and externally
Easy assembly by deformation

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

NBR 90 Shore A
FKM 90 Shore A

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

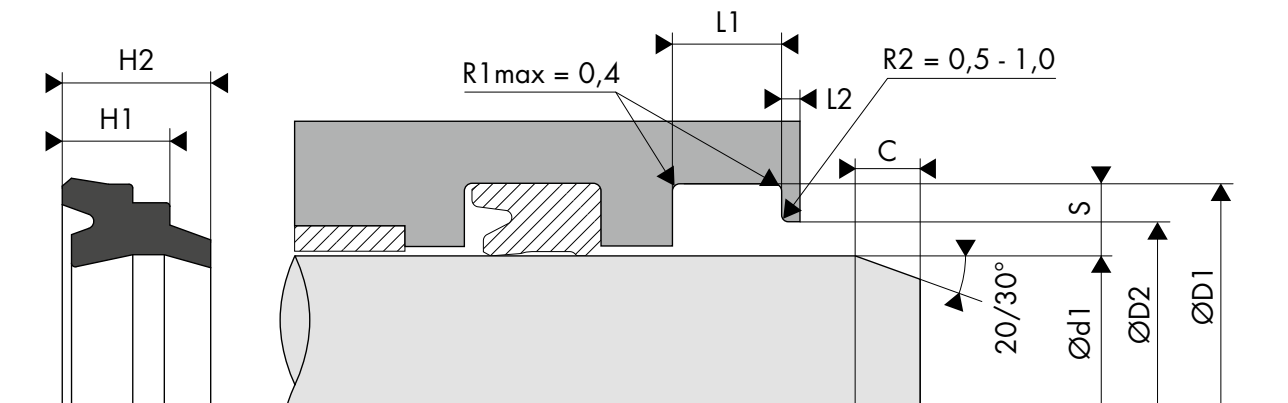
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

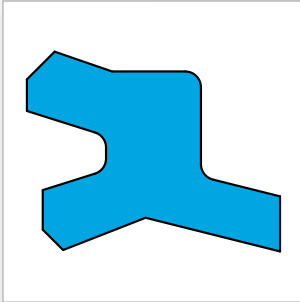
The chamfer length as well as the chamfer angle are determined by the rod seal.



 DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Seal height H2	Groove width L2 0/+0.20
417.0100186	10.00	18.00	13.50	6.00	8.00	2.00
417.0120206	12.00	20.00	15.50	6.00	8.00	2.00
417.0140226	14.00	22.00	17.50	6.00	8.00	2.00
417.0150236	15.00	23.00	18.50	6.00	8.00	2.00
417.0160246	16.00	24.00	19.50	6.00	8.00	2.00
417.0180266	18.00	26.00	21.50	6.00	8.00	2.00
417.0200286	20.00	28.00	23.50	6.00	8.00	2.00
417.0220306	22.00	30.00	25.50	6.00	8.00	2.00
417.0240326	24.00	32.00	27.50	6.00	8.00	2.00
417.0250336	25.00	33.00	28.50	6.00	8.00	2.00
417.0280366	28.00	36.00	31.50	6.00	8.00	2.00
417.0300386	30.00	38.00	33.50	6.00	8.00	2.00
417.0320406	32.00	40.00	35.50	6.00	8.00	2.00
417.0350436	35.00	43.00	38.50	6.00	8.00	2.00
417.0360446	36.00	44.00	39.50	6.00	8.00	2.00
417.0370456	37.00	45.00	40.50	6.00	8.00	2.00
417.0380466	38.00	46.00	41.50	6.00	8.00	2.00
417.0400486	40.00	48.00	43.50	6.00	8.00	2.00
417.0420506	42.00	50.00	45.50	6.00	8.00	2.00
417.0450536	45.00	53.00	48.50	6.00	8.00	2.00
417.0460546	46.00	54.00	49.50	6.00	8.00	2.00
417.0480566	48.00	56.00	51.50	6.00	8.00	2.00
417.0500586	50.00	58.00	53.50	6.00	8.00	2.00
417.0550606	52.00	60.00	55.50	6.00	8.00	2.00
417.0550636	55.00	63.00	58.50	6.00	8.00	2.00
417.0560646	56.00	64.00	59.50	6.00	8.00	2.00
417.0600686	60.00	68.00	63.50	6.00	8.00	2.00
417.0600728	60.00	72.00	65.00	8.20	11.00	3.00
417.0630716	63.00	71.00	66.50	6.00	8.00	2.00
417.0650736	65.00	73.00	68.50	6.00	8.00	2.00
417.0680766	68.00	76.00	71.50	6.00	8.00	2.00
417.0700786	70.00	78.00	73.50	6.00	8.00	2.00
417.0750836	75.00	83.00	78.50	6.00	8.00	2.00
417.0800886	80.00	88.00	83.50	6.00	8.00	2.00
417.0850936	85.00	93.00	88.50	6.00	8.00	2.00
417.0900986	90.00	98.00	93.50	6.00	8.00	2.00
417.0951036	95.00	103.00	98.50	6.00	8.00	2.00
417.1001086	100.00	108.00	103.50	6.00	8.00	2.00
417.1051178	105.00	117.00	110.00	8.20	11.00	3.00
417.1101228	110.00	122.00	115.00	8.20	11.00	3.00
417.1151278	115.00	127.00	120.00	8.20	11.00	3.00
417.1201328	120.00	132.00	125.00	8.20	11.00	3.00
417.1251358	125.00	135.00	130.00	8.20	11.00	3.00
417.1301428	130.00	142.00	135.00	8.20	11.00	3.00
417.1351478	135.00	147.00	140.00	8.20	11.00	3.00
417.1401528	140.00	152.00	145.00	8.20	11.00	3.00
417.1451578	145.00	157.00	150.00	8.20	11.00	3.00
417.1501628	150.00	162.00	155.00	8.20	11.00	3.00
417.1551678	155.00	167.00	160.00	8.20	11.00	3.00
417.1651778	165.00	177.00	170.00	8.20	11.00	3.00
417.1701828	170.00	182.00	175.00	8.20	11.00	3.00
417.1751878	175.00	187.00	180.00	8.20	11.00	3.00
417.1801928	180.00	192.00	185.00	8.20	11.00	3.00
417.1851978	185.00	197.00	190.00	8.20	11.00	3.00
417.1902028	190.00	202.00	195.00	8.20	11.00	3.00
417.1952078	195.00	207.00	200.00	8.20	11.00	3.00
417.2002128	200.00	212.00	205.00	8.20	11.00	3.00
417.2052209	205.00	220.00	212.00	9.50	13.00	3.00
417.2102259	210.00	225.00	217.00	9.50	13.00	3.00
417.2152309	215.00	230.00	222.00	9.50	13.00	3.00
417.2202359	220.00	235.00	227.00	9.50	13.00	3.00
417.2252409	225.00	240.00	232.00	9.50	13.00	3.00
417.2302459	230.00	245.00	237.00	9.50	13.00	3.00
417.2402559	240.00	255.00	247.00	9.50	13.00	3.00
417.2502659	250.00	265.00	257.00	9.50	13.00	3.00
417.2602759	260.00	275.00	267.00	9.50	13.00	3.00
417.2702859	270.00	285.00	277.00	9.50	13.00	3.00
417.2802959	280.00	295.00	287.00	9.50	13.00	3.00
417.2903059	290.00	305.00	297.00	9.50	13.00	3.00
417.3003159	300.00	315.00	307.00	9.50	13.00	3.00
417.3103259	310.00	325.00	317.00	9.50	13.00	3.00
417.3203359	320.00	335.00	327.00	9.50	13.00	3.00
417.3303459	330.00	345.00	337.00	9.50	13.00	3.00
417.3403559	340.00	355.00	347.00	9.50	13.00	3.00
417.3503659	350.00	365.00	357.00	9.50	13.00	3.00
417.3603759	360.00	375.00	367.00	9.50	13.00	3.00
417.3703859	370.00	385.00	377.00	9.50	13.00	3.00
417.3803959	380.00	395.00	387.00	9.50	13.00	3.00
417.3904059	390.00	405.00	397.00	9.50	13.00	3.00
417.4004159	400.00	415.00	407.00	9.50	13.00	3.00
417.4104259	410.00	425.00	417.00	9.50	13.00	3.00
417.4204359	420.00	435.00	427.00	9.50	13.00	3.00
417.4304459	430.00	445.00	437.00	9.50	13.00	3.00
417.4404559	440.00	455.00	447.00	9.50	13.00	3.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 455



DESCRIPTION

The BECA 455 profile is a U-ring type double acting wiper seal composed of two polyurethane wiping lips.

ADVANTAGES

Excellent abrasion and wear resistance
Good wiping effect, both internally and externally
Easy assembly by deformation

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

PU 93 Shore A - Blue
PU 96 Shore A - Blue
High temp. PU 96 Shore A - Beige

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

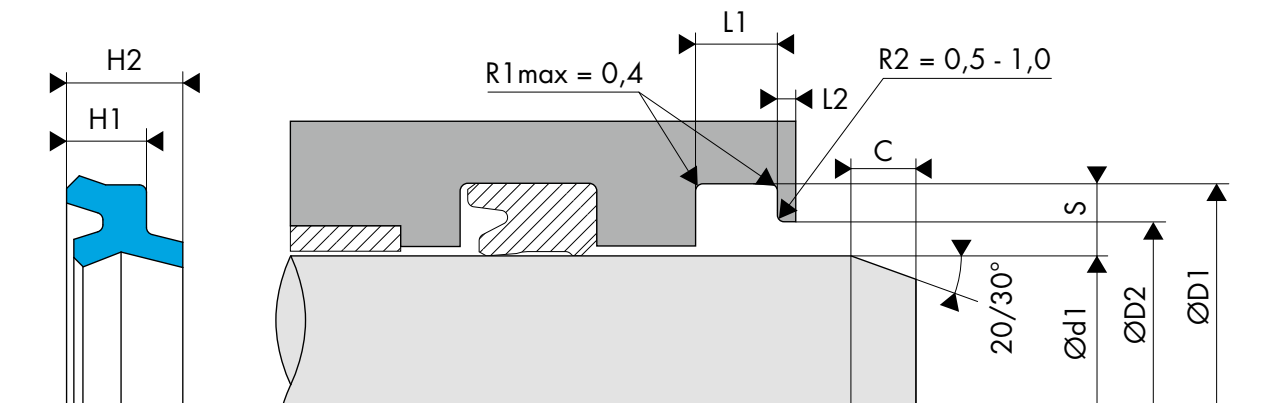
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 μm	$\leq 1.6 \mu\text{m}$	$\leq 3.2 \mu\text{m}$
Rz	0.63 - 2.5 μm	$\leq 6.3 \mu\text{m}$	$\leq 10.0 \mu\text{m}$
Rmax	1.0 - 4.0 μm	$\leq 10.0 \mu\text{m}$	$\leq 16.0 \mu\text{m}$

CHAMFER

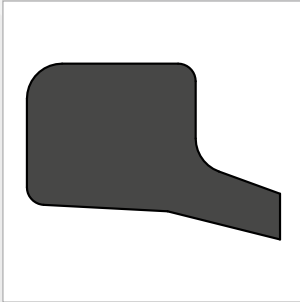
The chamfer length as well as the chamfer angle are determined by the rod seal.



DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Seal height H2	Groove width L2 0/+0.20
455.0120183	12.00	18.00	14.50	3.60	4.80	2.00
455.0140224	14.00	22.00	18.50	4.50	6.00	2.00
455.0180243	18.00	24.00	20.50	3.60	4.80	2.00
455.0180264	18.00	26.00	22.50	4.50	6.00	2.00
455.0190264	19.00	26.00	22.50	4.50	6.00	2.00
455.0200284	20.00	28.00	24.50	4.50	6.00	2.00
455.0200285	20.00	28.00	24.50	5.00	6.80	2.00
455.0200306	20.00	30.00	26.50	6.00	7.50	2.00
455.0220283	22.00	28.00	24.50	3.60	4.80	2.00
455.0250313	25.00	31.00	27.50	3.60	4.80	2.00
455.0250334	25.00	33.00	29.50	4.50	6.00	2.00
455.0280364	28.00	36.00	31.00	4.50	6.00	2.00
455.0300384	30.00	38.00	33.00	4.50	5.80	2.00
455.0300385	30.00	38.00	33.00	5.00	6.50	2.00
455.0320404	32.00	40.00	35.00	4.50	5.80	2.00
455.0320405	32.00	40.00	35.00	5.00	6.50	2.00
455.0350435	35.00	43.00	38.00	5.00	6.50	2.00
455.0360444	36.00	44.00	39.00	4.50	5.80	2.00
455.0360445	36.00	44.00	39.00	5.00	6.80	2.00
455.0400484	40.00	48.00	43.00	4.50	5.80	2.00
455.0400485	40.00	48.00	43.00	5.00	6.50	2.00
455.0400505	40.00	50.00	45.00	5.00	6.50	2.00
455.0420514	42.00	51.00	46.00	4.60	6.00	2.00
455.0450534	45.00	53.00	48.00	4.50	5.80	2.00
455.0450535	45.00	53.00	48.00	5.00	6.50	2.00
455.0450555	45.00	55.00	50.00	5.00	6.80	2.00
455.0500585	50.00	58.00	53.00	5.00	6.50	2.00
455.0500605	50.00	60.00	53.00	5.00	6.80	2.00
455.0530615	53.00	61.00	54.00	5.00	6.50	2.00
455.0550635	55.00	63.00	56.00	5.00	6.50	2.00
455.0550655	55.00	65.00	58.00	5.00	6.80	2.00
455.0560665	56.00	66.00	59.00	5.30	6.80	2.00
455.0600685	60.00	68.00	61.00	5.00	6.50	2.00
455.0600705	60.00	70.00	63.00	5.00	6.80	2.00
455.0630715	63.00	71.00	64.00	5.00	6.50	2.00
455.0650735	65.00	73.00	66.00	5.00	6.50	2.00
455.0650755	65.00	75.00	68.00	5.00	6.80	2.00
455.0700805	70.00	80.00	73.00	5.00	6.80	2.00
455.0700806	70.00	80.00	73.00	6.00	8.00	2.00
455.0750856	75.00	85.00	78.00	6.00	8.00	2.00
455.0750877	75.00	87.00	80.00	7.00	9.00	2.00
455.0800905	80.00	90.00	83.00	5.30	6.80	2.00
455.0800906	80.00	90.00	83.00	6.00	8.00	2.00
455.0800927	80.00	92.00	85.00	7.00	9.00	2.00
455.0850956	85.00	95.00	88.00	6.00	8.00	2.00
455.0850977	85.00	97.00	90.00	7.00	10.00	2.00
455.0901005	90.00	100.00	93.00	5.30	6.80	2.00
455.0901006	90.00	100.00	93.00	6.00	8.00	2.00
455.0901027	90.00	102.00	95.00	7.00	9.00	2.00
455.0951077	95.00	107.00	100.00	7.00	9.00	2.00
455.1001106	100.00	110.00	103.00	6.00	8.00	2.00
455.1101257	110.00	125.00	114.00	7.50	9.50	2.00
455.1151277	115.00	127.00	116.00	7.00	9.00	2.00
455.1251387	125.00	138.00	127.00	7.00	9.50	2.00
455.1351477	135.00	147.00	136.00	7.00	9.00	2.00
455.1401537	140.00	153.00	142.00	7.00	9.50	2.00
455.1401557	140.00	155.00	144.00	7.50	9.50	2.00
455.1451587	145.00	158.00	147.00	7.00	9.50	2.00
455.1551677	155.00	167.00	156.00	7.00	9.50	2.00
455.1601727	160.00	172.00	161.00	7.00	9.50	2.00
455.1601747	160.00	174.00	163.00	7.00	9.50	2.00
455.1651797	165.00	179.00	168.00	7.00	9.50	2.00
455.1801947	180.00	194.00	183.00	7.00	9.50	2.00
455.1851977	185.00	197.00	186.00	7.00	9.50	2.00
455.2152277	215.00	227.00	216.00	7.00	9.50	2.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 460



DESCRIPTION

The BECA 460 profile is a single acting wiper seal composed of a rubber wiping lip.

ADVANTAGES

Economic solution
Easy assembly by deformation
Space saving construction

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

NBR 90 Shore A
FKM 90 Shore A

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

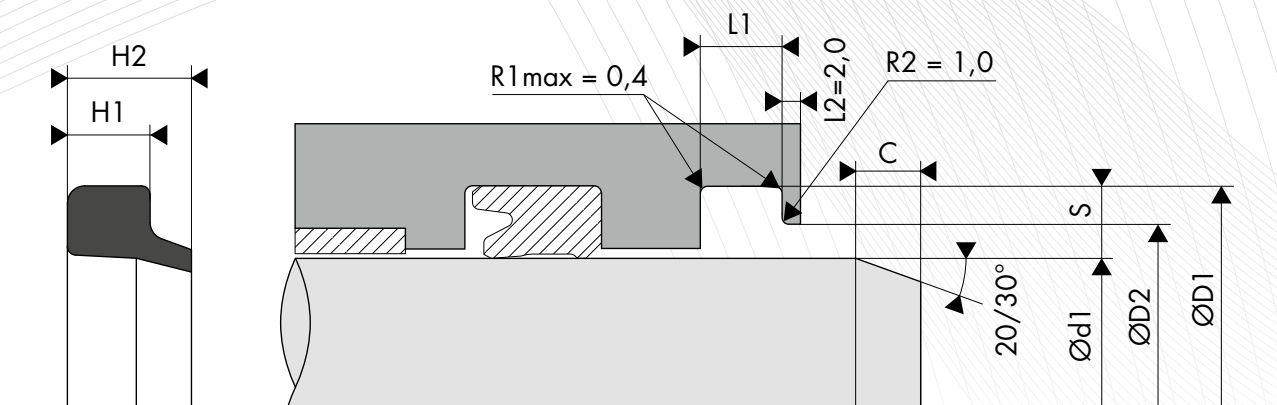
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

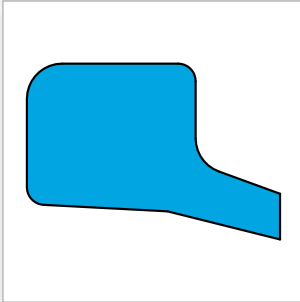


DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 +0/+0.20
460.0050122	5.00	12.00	8.00	2.80
460.0060123	6.00	12.00	9.00	3.00
460.0080143	8.00	14.60	11.00	3.80
460.0100151	10.00	15.00	13.00	1.00
460.0100163	10.00	16.60	13.00	3.80
460.0120183	12.00	18.60	15.00	3.80
460.0130193	13.00	19.60	16.00	3.80
460.0140203	14.00	20.60	17.00	3.80
460.0150213	15.00	21.60	18.00	3.80
460.0160223	16.00	22.60	19.00	3.80
460.0180243	18.00	24.60	21.00	3.80
460.0200285	20.00	28.60	23.00	5.30
460.0220305	22.00	30.60	25.00	5.30
460.0240325	24.00	32.60	27.00	5.30
460.0250335	25.00	33.60	28.00	5.30
460.0260345	26.00	34.60	29.00	5.30
460.0270355	27.00	35.60	30.00	5.30
460.0280365	28.00	36.60	31.00	5.30
460.0300380	30.00	38.00	33.00	5.30
460.0300385	30.00	38.60	33.00	5.30
460.0320405	32.00	40.60	35.00	5.30
460.0330415	33.00	41.60	38.00	5.30
460.0350435	35.00	43.60	38.00	5.30
460.0360445	36.00	44.60	39.00	5.30
460.0380465	38.00	46.60	41.00	5.30
460.0400485	40.00	48.60	43.00	5.30
460.0420505	42.00	50.60	45.00	5.30
460.0450535	45.00	53.60	48.00	5.30
460.0460545	46.00	54.60	49.00	5.30
460.0480565	48.00	56.60	51.00	5.30
460.0490575	49.00	57.60	52.00	5.30
460.0500580	50.00	58.00	53.00	5.30
460.0500585	50.00	58.60	53.00	5.30
460.0530615	53.00	61.60	56.00	5.30
460.0550635	55.00	63.60	58.00	5.30
460.0550655	55.00	65.60	58.00	5.30
460.0560645	56.00	64.60	59.00	5.30
460.0600680	60.00	68.00	63.00	5.30
460.0600685	60.00	68.60	63.00	5.30
460.0600705	60.00	70.00	63.00	5.00
460.0610695	61.00	69.60	64.00	5.30
460.0630715	63.00	71.60	66.00	5.30
460.0650735	65.00	73.60	68.00	5.30
460.0700785	70.00	78.60	73.00	5.30
460.0700805	70.00	80.00	73.00	5.00
460.0700827	70.00	82.60	76.00	7.10

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 +0/+0.20
460.0720805	72.00	80.60	75.00	5.30
460.0730815	73.00	81.60	76.00	5.30
460.0750835	75.00	83.60	78.00	5.30
460.0750877	75.00	87.20	81.00	7.10
460.0760845	76.00	84.60	79.00	5.30
460.0800885	80.00	88.60	83.00	5.30
460.0800907	80.00	90.20	83.00	7.10
460.0800927	80.00	92.60	83.00	7.10
460.0850935	85.00	93.60	88.00	5.30
460.0850977	85.00	97.20	91.00	7.10
460.0901027	90.00	102.20	96.00	7.10
460.0910995	91.00	99.60	94.00	5.30
460.0951077	95.00	107.20	101.00	7.10
460.1001085	100.00	108.60	103.00	5.30
460.1001127	100.00	112.20	106.00	7.10
460.1051135	105.00	113.60	108.00	5.30
460.1051177	105.00	117.20	111.00	7.10
460.1071155	107.00	115.60	110.00	5.30
460.1101185	110.00	118.60	113.00	5.30
460.1101227	110.00	122.20	116.00	7.10
460.1151277	115.00	127.20	121.00	7.10
460.1201327	120.00	132.20	126.00	7.10
460.1251377	125.00	137.20	131.00	7.10
460.1261345	126.00	134.60	129.00	5.30
460.1301427	130.00	142.20	136.00	7.10
460.1351477	135.00	147.20	141.00	7.10
460.1401527	140.00	152.20	146.00	7.10
460.1401559	140.00	155.00	146.50	9.00
460.1451577	145.00	157.20	151.00	7.10
460.1501627	150.00	162.20	156.00	7.10
460.1601727	160.00	172.20	166.00	7.10
460.1601751	160.00	175.20	168.00	10.10
460.1651701	165.00	170.20	173.00	10.10
460.1701851	170.00	185.20	178.00	10.10
460.1751901	175.00	190.20	183.00	10.10
460.1801951	180.00	195.20	188.00	10.10
460.1802001	180.00	200.20	183.00	10.20
460.1902051	190.00	205.20	198.00	10.10
460.2002151	200.00	215.20	208.00	10.10
460.2102251	210.00	225.20	218.00	10.10
460.2202351	220.00	235.20	228.00	10.10
460.2302451	230.00	245.20	238.00	10.10
460.2402551	240.00	255.20	248.00	10.10
460.2502651	250.00	265.20	258.00	10.10

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 461



DESCRIPTION

The BECA 461 profile is a single acting wiper seal composed of a polyurethane wiping lip.

ADVANTAGES

Good external wiping effect
Excellent abrasion and wear resistance
Easy assembly by deformation

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

PU 93 Shore A - Blue
PU 96 Shore A - Blue
High temp. PU 96 Shore A - Beige

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

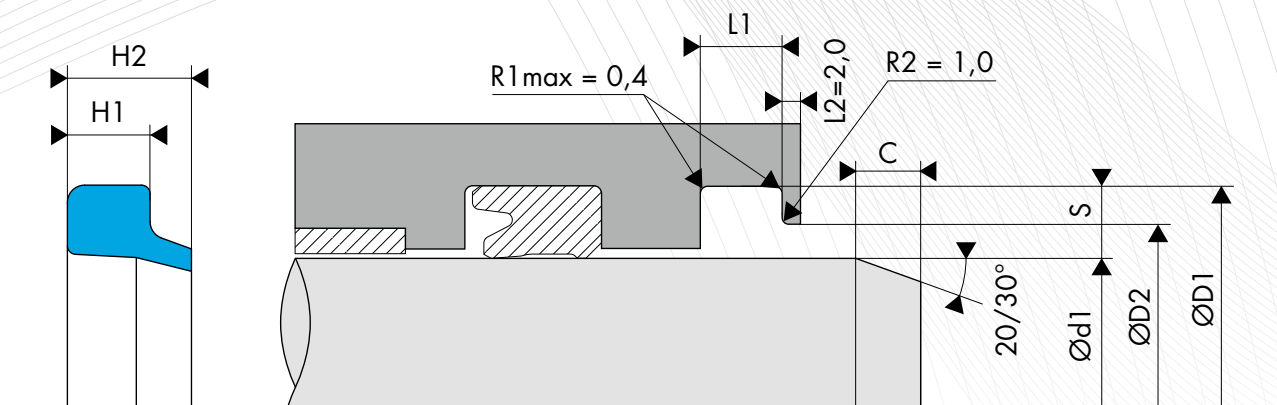
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

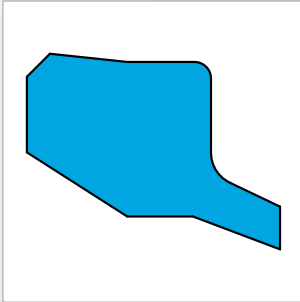


DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20
461.0050122	5.00	12.00	8.00	2.80
461.0060123	6.00	12.00	9.00	3.00
461.0080143	8.00	14.60	11.00	3.80
461.0100151	10.00	15.00	13.00	1.00
461.0100163	10.00	16.60	13.00	3.80
461.0120183	12.00	18.60	15.00	3.80
461.0130193	13.00	19.60	16.00	3.80
461.0140203	14.00	20.60	17.00	3.80
461.0150213	15.00	21.60	18.00	3.80
461.0160223	16.00	22.60	19.00	3.80
461.0180243	18.00	24.60	21.00	3.80
461.0200285	20.00	28.60	23.00	5.30
461.0220305	22.00	30.60	25.00	5.30
461.0240325	24.00	32.60	27.00	5.30
461.0250335	25.00	33.60	28.00	5.30
461.0260345	26.00	34.60	29.00	5.30
461.0270355	27.00	35.60	30.00	5.30
461.0280365	28.00	36.60	31.00	5.30
461.0300380	30.00	38.00	33.00	5.30
461.0300385	30.00	38.60	33.00	5.30
461.0320405	32.00	40.60	35.00	5.30
461.0330415	33.00	41.60	38.00	5.30
461.0350435	35.00	43.60	38.00	5.30
461.0360445	36.00	44.60	39.00	5.30
461.0380465	38.00	46.60	41.00	5.30
461.0400485	40.00	48.60	43.00	5.30
461.0420505	42.00	50.60	45.00	5.30
461.0450535	45.00	53.60	48.00	5.30
461.0460545	46.00	54.60	49.00	5.30
461.0480565	48.00	56.60	51.00	5.30
461.0490575	49.00	57.60	52.00	5.30
461.0500580	50.00	58.00	53.00	5.30
461.0500585	50.00	58.60	53.00	5.30
461.0530615	53.00	61.60	56.00	5.30
461.0550635	55.00	63.60	58.00	5.30
461.0550655	55.00	65.60	58.00	5.30
461.0560645	56.00	64.60	59.00	5.30
461.0600680	60.00	68.00	63.00	5.30
461.0600685	60.00	68.60	63.00	5.30
461.0600705	60.00	70.00	63.00	5.00
461.0610695	61.00	69.60	64.00	5.30
461.0630715	63.00	71.60	66.00	5.30
461.0650735	65.00	73.60	68.00	5.30
461.0700785	70.00	78.60	73.00	5.30
461.0700805	70.00	80.00	73.00	5.00
461.0700827	70.00	82.60	76.00	7.10

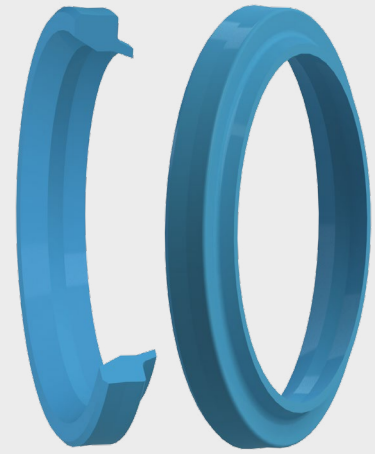
Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20
461.0720805	72.00	80.60	75.00	5.30
461.0730815	73.00	81.60	76.00	5.30
461.0750835	75.00	83.60	78.00	5.30
461.0750877	75.00	87.20	81.00	7.10
461.0760845	76.00	84.60	79.00	5.30
461.0800885	80.00	88.60	83.00	5.30
461.0800907	80.00	90.20	83.00	7.10
461.0800927	80.00	92.60	83.00	7.10
461.0850935	85.00	93.60	88.00	5.30
461.0850977	85.00	97.20	91.00	7.10
461.0901027	90.00	102.20	96.00	7.10
461.0910995	91.00	99.60	94.00	5.30
461.0951077	95.00	107.20	101.00	7.10
461.1001085	100.00	108.60	103.00	5.30
461.1001127	100.00	112.20	106.00	7.10
461.1051135	105.00	113.60	108.00	5.30
461.1051177	105.00	117.20	111.00	7.10
461.1071155	107.00	115.60	110.00	5.30
461.1101185	110.00	118.60	113.00	5.30
461.1101227	110.00	122.20	116.00	7.10
461.1151277	115.00	127.20	121.00	7.10
461.1201327	120.00	132.20	126.00	7.10
461.1251377	125.00	137.20	131.00	7.10
461.1261345	126.00	134.60	129.00	5.30
461.1301427	130.00	142.20	136.00	7.10
461.1351477	135.00	147.20	141.00	7.10
461.1401527	140.00	152.20	146.00	7.10
461.1401559	140.00	155.00	146.50	9.00
461.1451577	145.00	157.20	151.00	7.10
461.1501627	150.00	162.20	156.00	7.10
461.1601727	160.00	172.20	166.00	7.10
461.1601751	160.00	175.20	168.00	10.10
461.1651701	165.00	170.20	173.00	10.10
461.1701851	170.00	185.20	178.00	10.10
461.1751901	175.00	190.20	183.00	10.10
461.1801951	180.00	195.20	188.00	10.10
461.1802001	180.00	200.20	183.00	10.20
461.1902051	190.00	205.20	198.00	10.10
461.2002151	200.00	215.20	208.00	10.10
461.2102251	210.00	225.20	218.00	10.10
461.2202351	220.00	235.20	228.00	10.10
461.2302451	230.00	245.20	238.00	10.10
461.2402551	240.00	255.20	248.00	10.10
461.2502651	250.00	265.20	258.00	10.10

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 464



DESCRIPTION

The BECA 464 profile is a single acting wiper seal composed of a polyurethane wiping lip and a diagonally cut back.

ADVANTAGES

Good external wiping effect
Excellent abrasion and wear resistance
Easy assembly by deformation

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

PU 93 Shore A - Blue
PU 96 Shore A - Blue
High temp. PU 96 Shore A - Beige

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

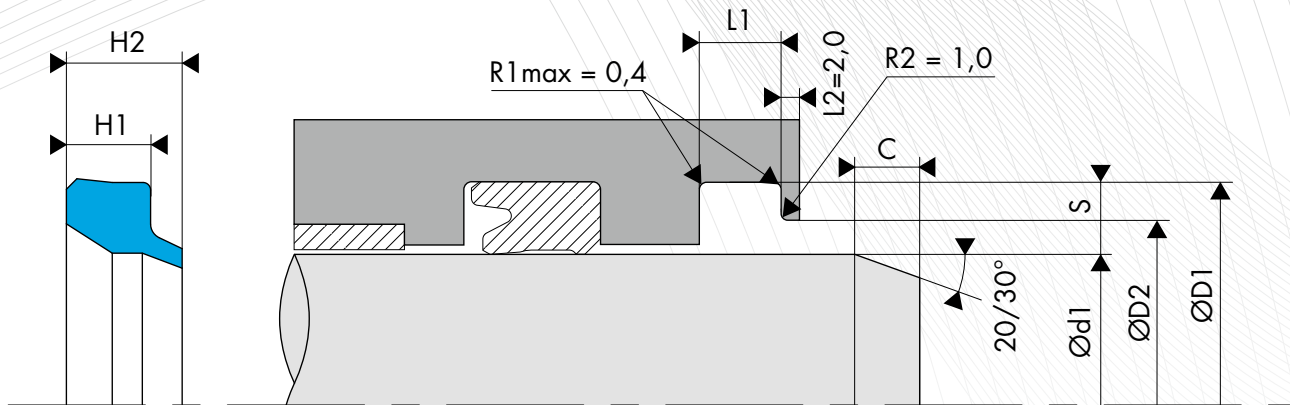
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

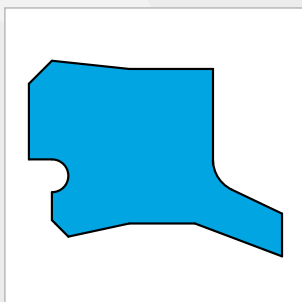
The chamfer length as well as the chamfer angle are determined by the rod seal.



DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Seal height H2
464.3016022	16.00	22.00	18.50	4.00	5.30
464.3018024	18.00	24.00	20.50	4.00	5.30
464.3020026	20.00	26.00	22.50	4.00	5.30
464.3022028	22.00	28.00	24.50	4.00	5.30
464.3025033	25.00	33.00	28.00	5.00	6.40
464.3028036	28.00	36.00	31.00	5.00	6.40
464.0300404	30.00	40.00	35.00	4.00	8.00
464.3032040	32.00	40.00	35.00	5.00	6.40
464.3036044	36.00	44.00	39.00	5.00	6.40
464.3040048	40.00	48.00	43.00	5.00	6.40
464.3045053	45.00	53.00	48.00	5.00	6.40
464.3050058	50.00	58.00	53.00	5.00	6.40
464.3056066	56.00	66.00	59.00	6.00	7.30
464.3060068	60.00	68.00	63.00	5.00	6.70
464.3063073	63.00	73.00	66.00	6.00	7.30
464.3070080	70.00	80.00	73.00	6.00	7.30
464.3075083	75.00	83.00	78.00	5.00	6.70
464.3080090	80.00	90.00	83.00	6.00	7.30
464.3090098	90.00	98.00	93.00	5.00	6.70
464.3090100	90.00	100.00	93.00	6.00	7.30
464.3100115	100.00	115.00	104.00	8.50	10.30
464.3105113	105.00	113.00	102.00	5.00	6.70
464.3110125	110.00	125.00	114.00	8.50	10.30

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 465



DESCRIPTION

The BECA 465 profile is a compact double acting wiper seal composed of two polyurethane wiping lips. It can be assembled in a groove in line with standard ISO 6195 type C.

ADVANTAGES

Excellent abrasion and wear resistance

Good wiping effect, both internally and externally

Easy assembly by deformation

APPLICATIONS

Agriculture

Mobile machinery

Material handling - Lifting

Hydraulic cylinders

MATERIALS

PU 93 Shore A - Blue

PU 96 Shore A - Blue

High temp. PU 96 Shore A - Beige

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

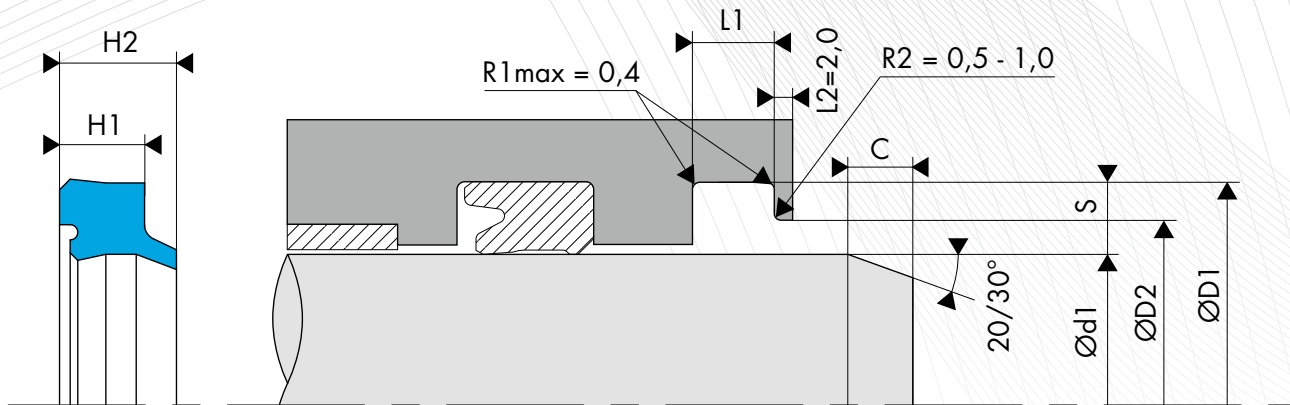
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

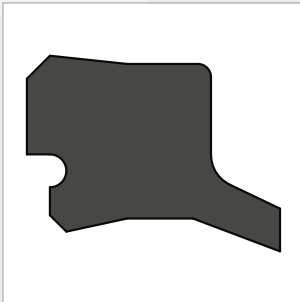
The chamfer length as well as the chamfer angle are determined by the rod seal.



DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Seal height H2
465.3016022	16.00	22.00	18.50	4.00	5.30
465.3018024	18.00	24.00	20.50	4.00	5.30
465.3020026	20.00	26.00	22.50	4.00	5.30
465.3022028	22.00	28.00	24.50	4.00	5.30
465.3025033	25.00	33.00	28.00	5.00	6.40
465.3028036	28.00	36.00	31.00	5.00	6.40
465.3032040	32.00	40.00	35.00	5.00	6.40
465.3036044	36.00	44.00	39.00	5.00	6.40
465.3040048	40.00	48.00	43.00	5.00	6.40
465.3045053	45.00	53.00	48.00	5.00	6.40
465.3050058	50.00	58.00	53.00	5.00	6.40
465.3056066	56.00	66.00	59.00	6.00	7.30
465.3061069	61.00	69.00	64.00	5.00	6.40
465.3063073	63.00	73.00	66.00	6.00	7.30
465.3068076	68.00	76.00	71.00	5.00	6.40
465.3070080	70.00	80.00	73.00	6.00	7.30
465.3076084	76.00	84.00	79.00	5.00	6.40
465.3080090	80.00	90.00	83.00	6.00	7.30
465.3088096	88.00	96.00	91.00	5.00	6.40
465.3090100	90.00	100.00	93.00	6.00	7.30
465.3091099	91.00	99.00	94.00	5.00	6.40
465.3100115	100.00	115.00	104.00	8.50	10.30
465.3107115	107.00	115.00	110.00	5.00	6.40
465.3110125	110.00	125.00	114.00	8.50	10.30
465.3125140	125.00	140.00	129.00	8.50	10.30
465.3126134	126.00	134.00	129.00	5.00	6.40
465.3147155	147.00	155.00	150.00	5.00	6.40
465.3170178	170.00	178.00	173.00	5.00	6.40

The figures highlighted in bold correspond to the dimensions for standard ISO 6195 Type C, with the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 466



DESCRIPTION

The BECA 466 profile is a compact double acting wiper seal composed of two rubber wiping lips. It can be assembled in a groove in line with standard ISO 6195 type C.

ADVANTAGES

Wide temperature range, depending on the material chosen

Good wiping effect, both internally and externally

Easy assembly by deformation

APPLICATIONS

Agriculture

Mobile machinery

Material handling - Lifting

Hydraulic cylinders

MATERIALS

NBR 90 Shore A

FKM 90 Shore A

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

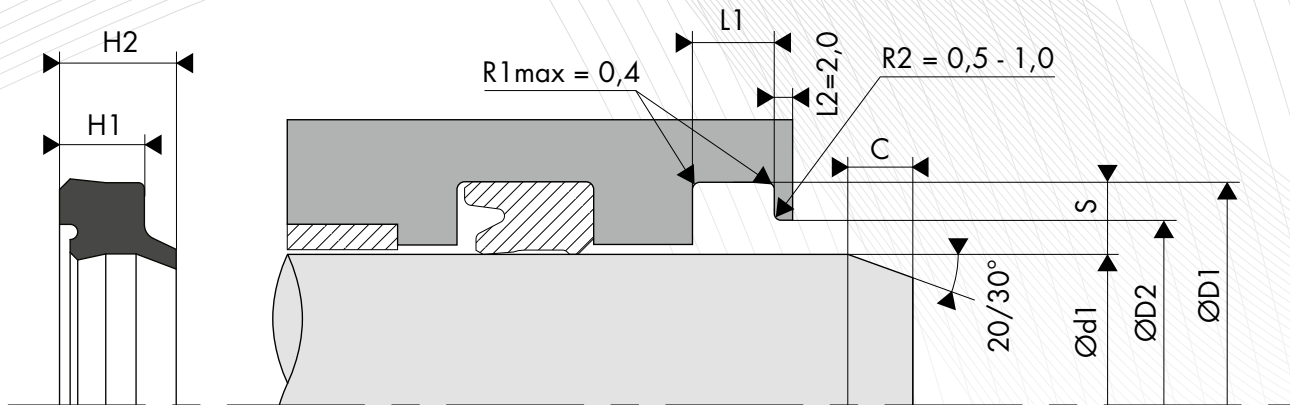
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

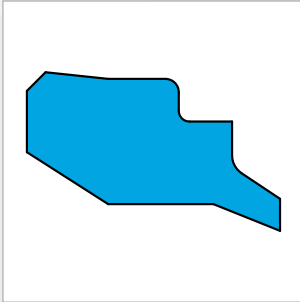
The chamfer length as well as the chamfer angle are determined by the rod seal.



DIMENSIONS

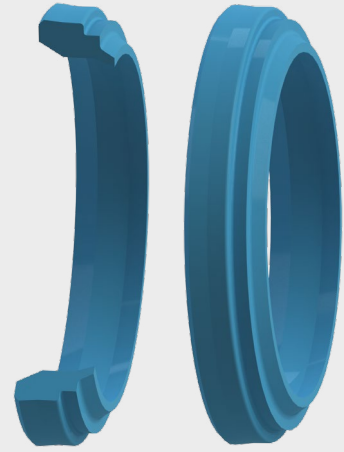
Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Seal height H2
466.0160224	16.00	22.00	18.50	4.00	5.30
466.0180244	18.00	24.00	20.50	4.00	5.30
466.0220284	22.00	28.00	24.50	4.00	5.30
466.0280365	28.00	36.00	31.00	5.00	6.40
466.0360445	36.00	44.00	39.00	5.00	6.40
466.0450535	45.00	53.00	48.00	5.00	6.40
466.0560666	56.00	66.00	59.00	6.00	7.30
466.0700806	70.00	80.00	73.00	6.00	7.30
466.0901006	90.00	100.00	93.00	6.00	7.30
466.1101258	110.00	125.00	114.00	8.50	10.30
466.1251408	125.00	140.00	129.00	8.50	10.30
466.1401558	140.00	155.00	144.00	8.50	10.30
466.2002158	200.00	215.00	204.00	8.50	10.30

The figures highlighted in bold correspond to the dimensions for standard ISO 6195 Type C, with the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 467



DESCRIPTION

The BECA 467 profile is a stepped compact single acting wiper seal composed of a polyurethane wiping lip and a diagonally cut back. It can be assembled in a groove in line with standard ISO 6195 type A.

ADVANTAGES

Excellent abrasion and wear resistance
Good external wiping effect
Easy assembly by deformation

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

PU 93 Shore A - Blue
PU 96 Shore A - Blue
High temp. PU 93 Shore A - Beige

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

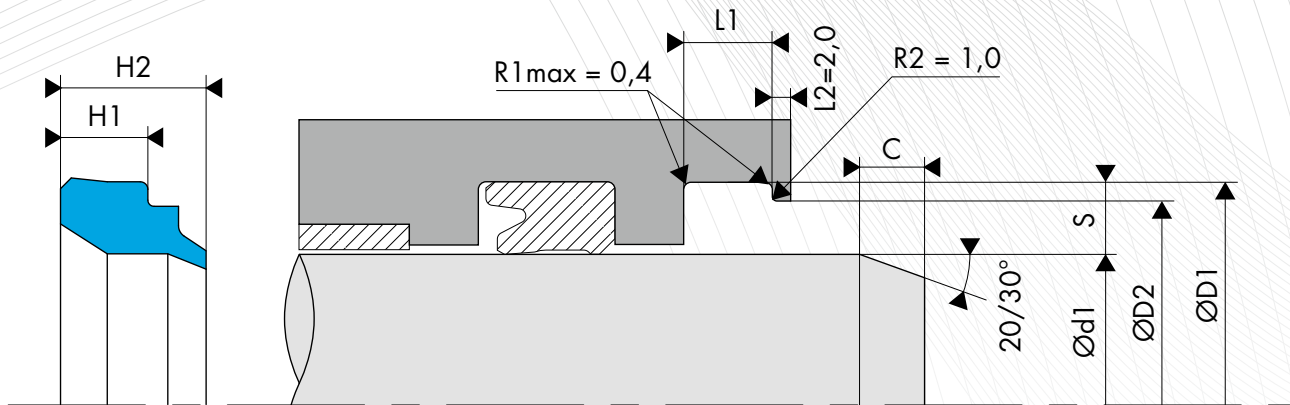
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

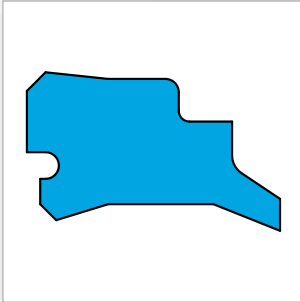
The chamfer length as well as the chamfer angle are determined by the rod seal.



DIMENSIONS

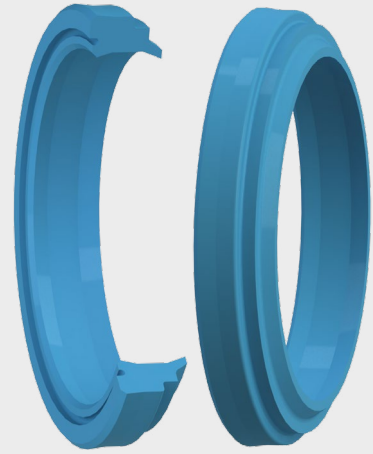
Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Seal height H2
467.3020028	20.00	28.00	25.50	5.00	8.00
467.3022030	22.00	30.00	27.50	5.00	8.00
467.3025033	25.00	33.00	30.50	5.00	8.00
467.3028036	28.00	36.00	33.50	5.00	8.00
467.3032040	32.00	40.00	37.50	5.00	8.00
467.3036044	36.00	44.00	41.50	5.00	8.00
467.3040048	40.00	48.00	45.50	5.00	8.00
467.3045053	45.00	53.00	50.50	5.00	8.00
467.3050058	50.00	58.00	55.50	5.00	8.00
467.3056066	56.00	66.00	63.00	6.30	10.00
467.3063073	63.00	73.00	70.00	6.30	10.00
467.3070080	70.00	80.00	77.00	6.30	10.00
467.3080090	80.00	90.00	87.00	6.30	10.00
467.3090100	90.00	100.00	97.00	6.30	10.00
467.3100115	100.00	115.00	110.00	9.50	14.00
467.3110125	110.00	125.00	120.00	9.50	14.00

The figures highlighted in bold correspond to the dimensions for standard ISO 6195 Type A, with the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 468



DESCRIPTION

The BECA 468 profile is a stepped compact double acting wiper seal composed of two polyurethane wiping lips. It can be assembled in a groove in line with standard ISO 6195 type A.

ADVANTAGES

Excellent abrasion and wear resistance
Good wiping effect, both internally and externally
Easy assembly by deformation

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

PU 93 Shore A - Blue
PU 96 Shore A - Blue
High temp. PU 96 Shore A - Beige

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

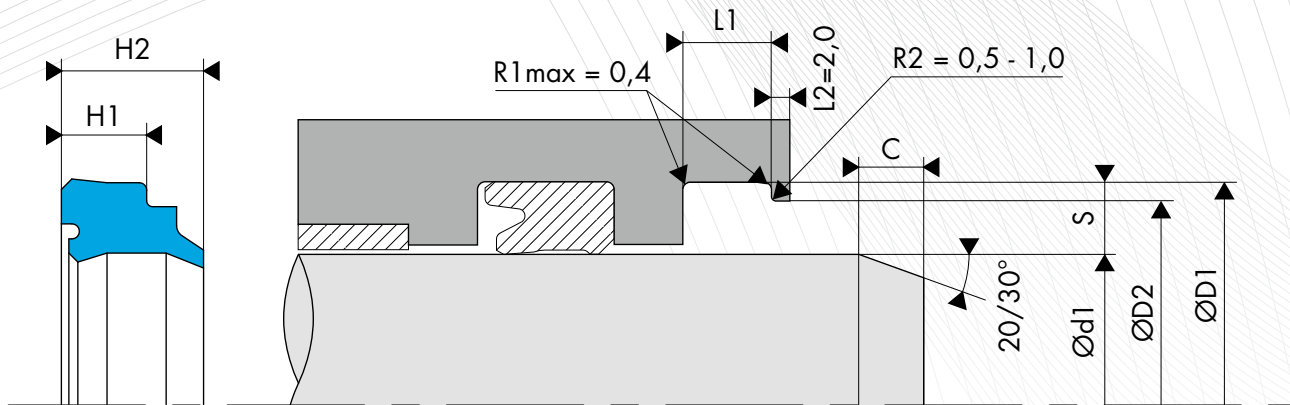
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

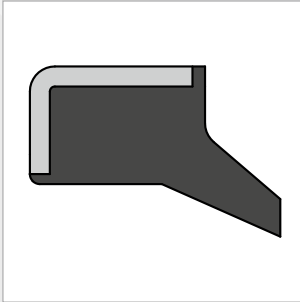
The chamfer length as well as the chamfer angle are determined by the rod seal.



○ DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/-0.20	Seal height H2
468.0200284	20.00	28.00	25.50	4.00	7.00
468.3020028	20.00	28.00	25.50	5.00	8.00
468.3022030	22.00	30.00	27.50	5.00	8.00
468.3025033	25.00	33.00	30.50	5.00	8.00
468.3028036	28.00	36.00	33.50	5.00	8.00
468.3032040	32.00	40.00	37.50	5.00	8.00
468.3036044	36.00	44.00	41.50	5.00	8.00
468.3040048	40.00	48.00	45.50	5.00	8.00
468.3045053	45.00	53.00	50.50	5.00	8.00
468.3050058	50.00	58.00	55.50	5.00	8.00
468.3056066	56.00	66.00	63.00	6.30	10.00
468.3063073	63.00	73.00	70.00	6.30	10.00
468.3070080	70.00	80.00	77.00	6.30	10.00
468.3080090	80.00	90.00	87.00	6.30	10.00
468.3090100	90.00	100.00	97.00	6.30	10.00
468.3100115	100.00	115.00	110.00	9.50	14.00
468.3110125	110.00	125.00	120.00	9.50	14.00

The figures highlighted in bold correspond to the dimensions for standard ISO 6195 Type A, with the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 470



DESCRIPTION

The BECA 470 profile is a vulcanised NBR single acting wiper seal on a metal cage.

ADVANTAGES

Economic solution
Tight and precise fitting in the housing
Good external wiping effect

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

Profiled seal

NBR 90 Shore A

Metal cage

Steel

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +100°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

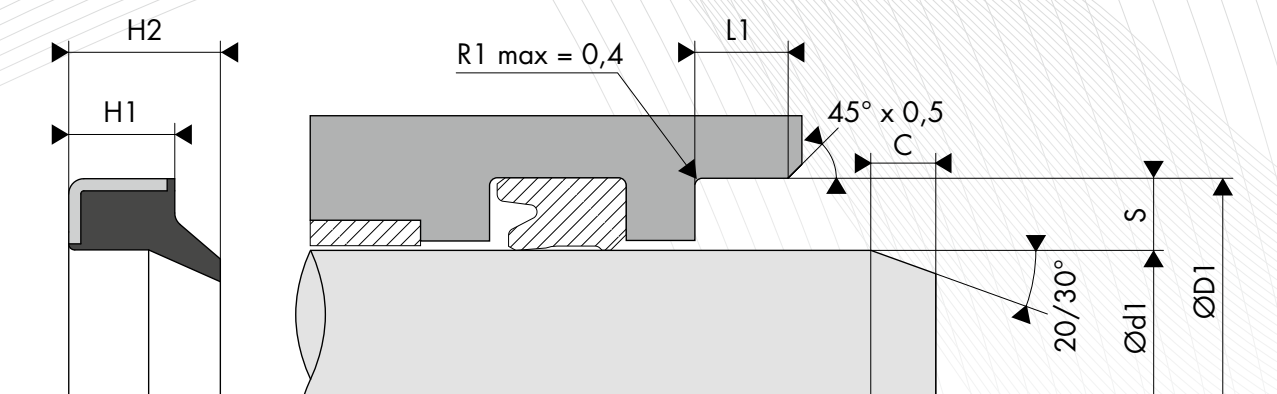
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.



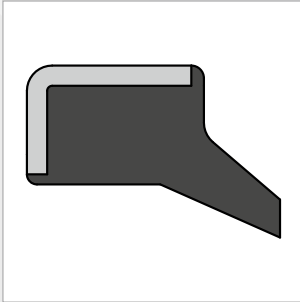
DIMENSIONS

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
470.0060133	6.00	13.00	3.00	4.50
470.0080154	8.00	15.00	4.50	7.00
470.0080165	8.00	16.00	5.00	8.00
470.0100162	10.00	16.00	2.00	3.15
470.0100163	10.00	16.00	3.00	4.50
470.0100185	10.00	18.00	5.00	8.00
470.0100205	10.00	20.00	5.00	8.00
470.0120183	12.00	18.00	3.00	4.50
470.0120184	12.00	18.00	4.00	6.00
470.0120185	12.00	18.00	5.00	7.00
470.0120204	12.00	20.00	4.00	6.00
470.0120225	12.00	22.00	5.00	8.00
470.0120227	12.00	22.00	7.00	10.00
470.0130204	13.00	20.00	4.00	6.00
470.0140203	14.00	20.00	3.50	5.00
470.0140204	14.00	20.00	4.00	5.00
470.0140223	14.00	22.00	3.00	4.00
470.0140247	14.00	24.00	7.00	10.00
470.0140255	14.00	25.00	5.00	8.00
470.0140257	14.00	25.00	7.00	10.00
470.0150255	15.00	25.00	5.00	8.00
470.0150257	15.00	25.00	7.00	10.00
470.0160223	16.00	22.00	3.00	4.00
470.0160224	16.00	22.00	4.00	6.00
470.0160243	16.00	24.00	3.00	4.00
470.0160265	16.00	26.00	5.00	8.00
470.0160267	16.00	26.00	7.00	10.00
470.0180265	18.00	26.00	5.00	8.00
470.0180285	18.00	28.00	5.00	7.00
470.0180287	18.00	28.00	7.00	10.00
470.0180355	18.00	35.00	5.00	8.00
470.0200264	20.00	26.00	4.00	6.00
470.0200265	20.00	26.00	5.00	8.00
470.0200274	20.00	27.00	4.00	6.00
470.0200283	20.00	28.00	3.00	5.00
470.0200285	20.00	28.00	5.00	8.00
470.0200304	20.00	30.00	4.00	6.00
470.0200305	20.00	30.00	5.00	8.00
470.0200307	20.00	30.00	7.00	10.00
470.0200327	20.00	32.00	7.00	10.00
470.0200357	20.00	35.00	7.00	10.00
470.0210283	21.00	28.00	3.50	5.00
470.0220285	22.00	28.00	5.00	8.00
470.0220305	22.00	30.00	5.00	8.00
470.0220325	22.00	32.00	5.00	7.00
470.0220327	22.00	32.00	7.00	10.00
470.0220355	22.00	35.00	5.00	8.00
470.0220357	22.00	35.00	7.00	10.00
470.0220385	22.00	38.00	5.00	8.00
470.0240325	24.00	32.00	5.00	7.00

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
470.0240357	24.00	35.00	7.00	10.00
470.0240377	24.00	37.00	7.00	10.00
470.0250315	25.00	31.00	5.00	7.00
470.0250355	25.00	35.00	5.00	8.00
470.0250357	25.00	35.00	7.00	10.00
470.0250376	25.00	37.00	6.00	9.00
470.0260345	26.00	34.00	5.00	8.00
470.0280365	28.00	36.00	5.00	8.00
470.0280385	28.00	38.00	5.00	8.00
470.0280387	28.00	38.00	7.00	10.00
470.0280407	28.00	40.00	7.00	10.00
470.0300405	30.00	40.00	5.00	8.00
470.0300407	30.00	40.00	7.00	10.00
470.0300427	30.00	42.00	7.00	10.00
470.0300455	30.00	45.00	5.00	8.00
470.0300457	30.00	45.00	7.00	10.00
470.0320404	32.00	40.00	4.00	7.00
470.0320405	32.00	40.00	5.00	8.00
470.0320407	32.00	40.00	7.00	10.00
470.0320425	32.00	42.00	5.00	7.00
470.0320427	32.00	42.00	7.00	10.00
470.0320454	32.00	45.00	4.00	8.00
470.0320455	32.00	45.00	5.00	7.00
470.0320457	32.00	45.00	7.00	10.00
470.0330437	33.00	43.00	7.00	10.00
470.0350415	35.00	41.00	5.00	7.00
470.0350455	35.00	45.00	5.00	8.00
470.0350457	35.00	45.00	7.00	10.00
470.0350477	35.00	47.00	7.00	10.00
470.0350527	35.00	52.00	7.00	10.00
470.0360455	36.00	45.00	5.00	7.00
470.0360457	36.00	45.00	7.00	10.00
470.0360465	36.00	46.00	5.00	8.00
470.0360467	36.00	46.00	7.00	10.00
470.0370475	37.00	47.00	5.00	8.00
470.0380453	38.00	45.00	3.00	4.00
470.0380487	38.00	48.00	7.00	10.00
470.0380535	38.00	53.00	5.00	8.00
470.0400503	40.00	50.00	3.50	5.00
470.0400505	40.00	50.00	5.00	8.00
470.0400507	40.00	50.00	7.00	10.00
470.0400525	40.00	52.00	5.00	8.00
470.0400527	40.00	52.00	7.00	10.00
470.0400535	40.00	53.00	5.00	8.00
470.0420527	42.00	52.00	7.00	10.00
470.0440555	44.00	55.00	5.00	7.00
470.0450535	45.00	53.00	5.00	8.00
470.0450555	45.00	55.00	5.00	7.00
470.0450557	45.00	55.00	7.00	10.00
470.0450577	45.00	57.00	7.00	10.00
470.0450607	45.00	60.00	7.00	10.00
470.0480607	48.00	60.00	7.00	10.00
470.0500565	50.00	56.00	5.00	7.00
470.0500605	50.00	60.00	5.00	7.00
470.0500607	50.00	60.00	7.00	10.00
470.0500655	50.00	65.00	5.00	8.00
470.0500657	50.00	65.00	7.00	10.00
470.0520627	52.00	62.00	7.00	10.00
470.0550637	55.00	63.00	7.00	10.00
470.0550655	55.00	65.00	5.00	8.00
470.0550657	55.00	65.00	7.00	10.00
470.0550687	55.00	68.00	7.00	10.00
470.0550707	55.00	70.00	7.00	10.00
470.0560655	56.00	65.00	5.00	7.00
470.0560657	56.00	65.00	7.00	10.00
470.0560665	56.00	66.00	5.00	8.00
470.0560667	56.00	66.00	7.00	10.00
470.0600685	60.00	68.00	5.00	7.00
470.0600705	60.00	70.00	5.00	7.00
470.0600707	60.00	70.00	7.00	10.00
470.0600745	60.00	74.00	5.00	8.00
470.0600757	60.00	75.00	7.00	10.00
470.0610727	61.00	72.00	7.00	10.00

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
470.0620727	62.00	72.00	7.00	10.00
470.0630727	63.00	72.00	7.00	10.00
470.0630736	63.00	73.00	6.00	9.00
470.0630737	63.00	73.00	7.00	10.00
470.0630757	63.00	75.00	7.00	10.00
470.0650757	65.00	75.00	7.00	10.00
470.0700805	70.00	80.00	5.00	8.00
470.0700806	70.00	80.00	6.00	7.00
470.0700807	70.00	80.00	7.00	10.00
470.0720827	72.00	82.00	7.00	10.00
470.0750857	75.00	85.00	7.00	10.00
470.0750875	75.00	87.00	5.00	7.00
470.0750877	75.00	87.00	7.00	10.00
470.0780887	78.00	88.00	7.00	10.00
470.0800887	80.00	88.00	7.00	10.00
470.0800907	80.00	90.00	7.00	10.00
470.0800947	80.00	94.00	7.00	10.00
470.0820927	82.00	92.00	7.00	10.00
470.0850957	85.00	95.00	7.00	10.00
470.0901007	90.00	100.00	7.00	10.00
470.0951057	95.00	105.00	7.00	10.00
470.1001107	100.00	110.00	7.00	10.00
470.1001159	100.00	115.00	9.00	12.00
470.1051157	105.00	115.00	7.00	10.00
470.1081207	108.00	120.00	7.00	10.00
470.1101207	110.00	120.00	7.00	10.00
470.1101259	110.00	125.00	9.00	12.00
470.1151257	115.00	125.00	7.00	10.00
470.1201307	120.00	130.00	7.00	10.00
470.1251357	125.00	135.00	7.00	10.00
470.1251409	125.00	140.00	9.00	12.00
470.1251419	125.00	141.00	9.00	12.00
470.1301407	130.00	140.00	7.00	10.00
470.1301457	130.00	145.00	7.00	10.00
470.1301459	130.00	145.00	9.00	12.00
470.1351507	135.00	150.00	7.00	10.00
470.1351509	135.00	150.00	9.00	12.00
470.1401507	140.00	150.00	7.00	10.00
470.1401559	140.00	155.00	9.00	12.00
470.1451609	145.00	160.00	9.00	12.00
470.1451650	145.00	165.00	10.00	15.00
470.1451709	145.00	170.00	9.00	12.00
470.1501659	150.00	165.00	9.00	12.00
470.1601759	160.00	175.00	9.00	12.00
470.1651809	165.00	180.00	9.00	12.00
470.1701859	170.00	185.00	9.00	12.00
470.1701850	170.00	185.00	10.00	14.00
470.1751900	175.00	190.00	10.00	14.00
470.1801950	180.00	195.00	10.00	14.00
470.1852000	185.00	200.00	10.00	14.00
470.2002159	200.00	215.00	9.00	13.00
470.2002200	200.00	220.00	10.00	14.00
470.2002202	200.00	220.00	12.00	16.00
470.2102300	210.00	230.00	10.00	15.00
470.2102302	210.00	230.00	12.00	16.00
470.2202402	220.00	240.00	12.00	16.00
470.2502702	250.00	270.00	12.00	16.00
470.2753002	275.00	300.00	12.00	16.00
470.2803002	280.00	300.00	12.00	16.00
470.3103406	310.00	340.00	16.00	22.00
470.3203402	320.00	340.00	12.00	16.00
470.3603802	360.00	380.00	12.00	16.00
470.3904206	390.00	420.00	16.00	22.00
470.4004202	400.00	420.00	12.00	16.00
470.4905206	490.00	520.00	16.00	22.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 471



DESCRIPTION

The BECA 471 profile is a vulcanised FKM single acting wiper seal on a metal cage.

ADVANTAGES

Excellent chemical compatibility and wide temperature range

Tight and precise fitting in the housing

Good external wiping effect

APPLICATIONS

Agriculture

Mobile machinery

Material handling - Lifting

Hydraulic cylinders

MATERIALS

Profiled seal

FKM 90 Shore A

Metal cage

Steel

TECHNICAL DATA

Temperature	-20°C / +200°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

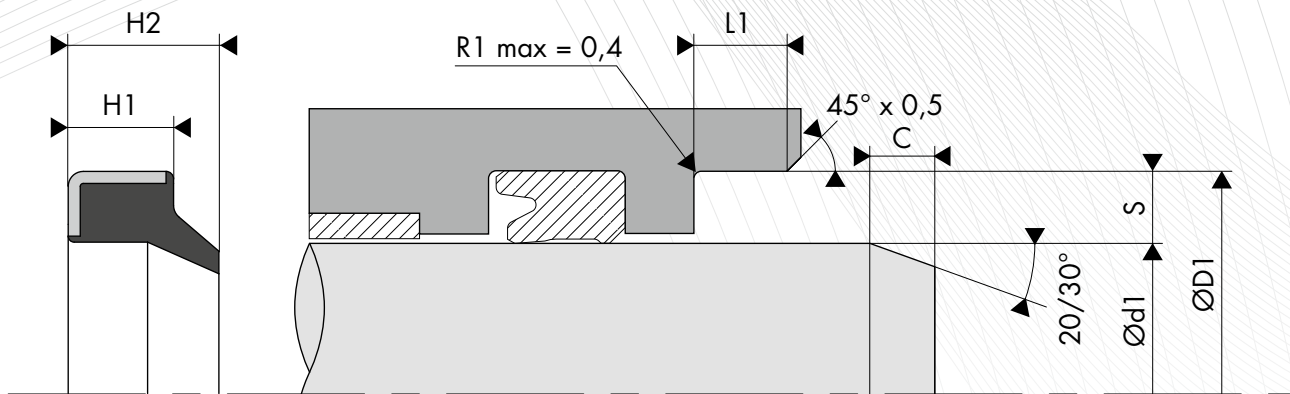
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

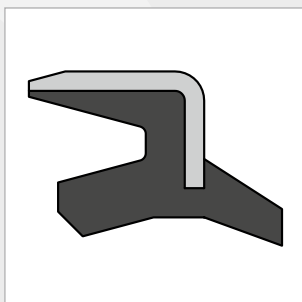


DIMENSIONS

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
471.0613345	6.00	13.00	3.00	4.50
471.0100163	10.00	16.00	3.00	4.50
471.0120204	12.00	20.00	4.00	6.00
471.0160265	16.00	26.00	5.00	8.00
471.0180287	18.00	28.00	7.00	10.00
471.0200284	20.00	28.00	4.00	7.00
471.0200285	20.00	28.00	5.00	8.00
471.0200307	20.00	30.00	7.00	10.00
471.0220285	22.00	28.00	5.00	8.00
471.0250355	25.00	35.00	5.00	8.00
471.0250357	25.00	35.00	7.00	10.00
471.0280385	28.00	38.00	5.00	8.00
471.0280407	28.00	40.00	7.00	10.00
471.0300405	30.00	40.00	5.00	8.00
471.0300407	30.00	40.00	7.00	10.00
471.0320427	32.00	42.00	7.00	10.00
471.0350457	35.00	45.00	7.00	10.00
471.0400505	40.00	50.00	5.00	8.00
471.0400507	40.00	50.00	7.00	10.00
471.0450557	45.00	55.00	7.00	10.00
471.0450607	45.00	60.00	7.00	10.00

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
471.0500565	50.00	56.00	5.00	8.00
471.0500605	50.00	60.00	5.00	7.00
471.0500607	50.00	60.00	7.00	10.00
471.0500657	50.00	65.00	7.00	10.00
471.0550657	55.00	65.00	7.00	10.00
471.0560657	56.00	65.00	7.00	10.00
471.0560667	56.00	66.00	7.00	10.00
471.0650757	65.00	75.00	7.00	10.00
471.0700807	70.00	80.00	7.00	10.00
471.0750857	75.00	85.00	7.00	10.00
471.0800907	80.00	90.00	7.00	10.00
471.0850957	85.00	95.00	7.00	10.00
471.0901007	90.00	100.00	7.00	10.00
471.1001107	100.00	110.00	7.00	10.00
471.1051157	105.00	115.00	7.00	10.00
471.1101207	110.00	120.00	7.00	10.00
471.1251409	125.00	140.00	9.00	12.00
471.1351457	135.00	145.00	7.00	10.00
471.1801950	180.00	195.00	10.00	14.00
471.2202402	220.00	240.00	12.00	16.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 472



DESCRIPTION

The BECA 472 profile is a rubber double acting wiper seal on a metal cage.

ADVANTAGES

Tight and precise fitting in the housing
Good wiping effect, both internally and externally

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

Profiled seal

NBR 90 Shore A
FKM 90 Shore A

Metal cage

Steel

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	1 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

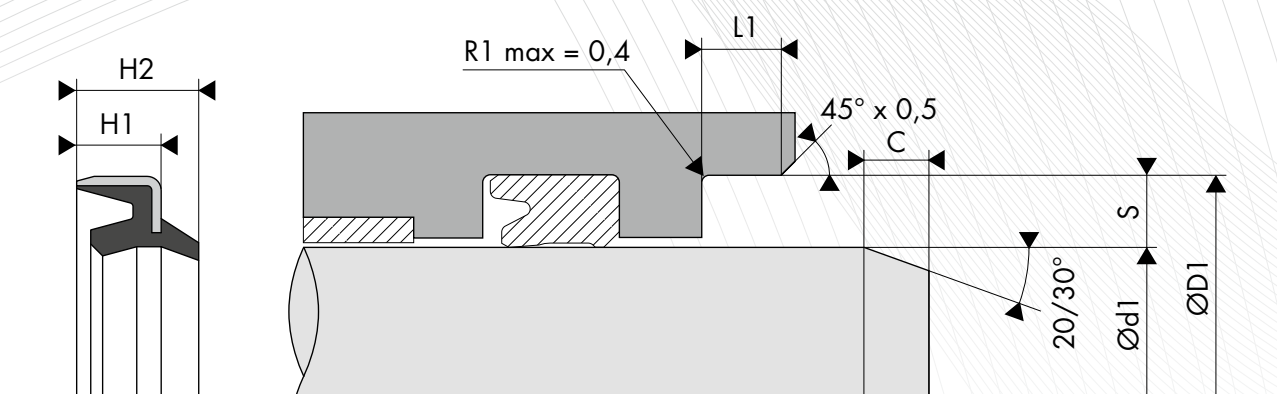
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

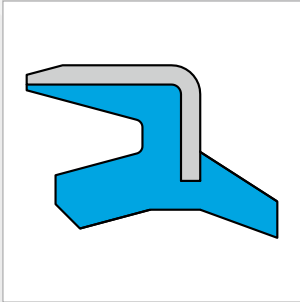


DIMENSIONS

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
472.0120183	12.00	18.00	3.50	5.00
472.1250193	12.50	19.00	3.00	5.00
472.0130193	13.00	19.00	3.50	5.00
472.0140213	14.00	21.00	3.50	5.00
472.0140224	14.00	22.00	4.00	5.50
472.0140245	14.00	24.00	5.00	7.00
472.0150213	15.00	21.00	3.50	5.00
472.0160223	16.00	22.00	3.50	5.00
472.0170233	17.00	23.00	3.50	5.00
472.0180243	18.00	24.00	3.50	5.00
472.0180306	18.00	30.00	6.00	9.00
472.0190274	19.00	27.00	4.00	6.00
472.0190285	19.00	28.00	5.00	7.00
472.0190316	19.00	31.00	6.00	9.00
472.0200274	20.00	27.00	4.00	6.00
472.0200285	20.00	28.00	5.00	7.00
472.0200326	20.00	32.00	6.00	9.00
472.0220305	22.00	30.00	5.00	7.00
472.0220326	22.00	32.00	6.00	9.00
472.0220346	22.00	34.00	6.00	9.00
472.0240325	24.00	32.00	5.00	7.00
472.0250335	25.00	33.00	5.00	7.00
472.0250376	25.00	37.00	6.00	9.00
472.0260322	26.00	32.00	2.50	4.00
472.0270355	27.00	35.00	5.00	7.00
472.0280354	28.00	35.00	4.00	5.50
472.0280365	28.00	36.00	5.00	7.00
472.0280385	28.00	38.00	5.00	7.00
472.0280406	28.00	40.00	6.00	9.00
472.285395	28.58	39.12	5.80	8.10
472.0300385	30.00	38.00	5.00	7.00
472.0300426	30.00	42.00	6.00	9.00
472.0300456	30.00	45.00	6.00	9.00
472.0300477	30.00	47.00	7.00	10.00
472.0320405	32.00	40.00	5.00	7.00
472.0320447	32.00	44.00	7.00	10.00
472.0320528	32.00	52.00	8.00	11.00
472.0330415	33.00	41.00	5.00	7.00
472.0340467	34.00	46.00	7.00	10.00
472.0350435	35.00	43.00	5.00	7.00
472.0350477	35.00	47.00	7.00	10.00
472.0360445	36.00	44.00	5.00	7.00
472.0380465	38.00	46.00	5.00	7.00
472.0380507	38.00	50.00	7.00	10.00
472.0400485	40.00	48.00	5.00	7.00
472.0400527	40.00	52.00	7.00	10.00
472.0420505	42.00	50.00	5.00	7.00
472.0450535	45.00	53.00	5.00	7.00
472.0450555	45.00	55.00	5.00	7.00
472.0450577	45.00	57.00	7.00	10.00
472.0500585	50.00	58.00	5.00	7.00
472.0500605	50.00	60.00	5.00	7.00
472.0500627	50.00	62.00	7.00	10.00
472.0500728	50.00	72.00	8.00	11.00
472.0550635	55.00	63.00	5.00	7.00
472.0550655	55.00	65.00	5.00	7.00
472.0550698	55.00	69.00	8.00	11.00

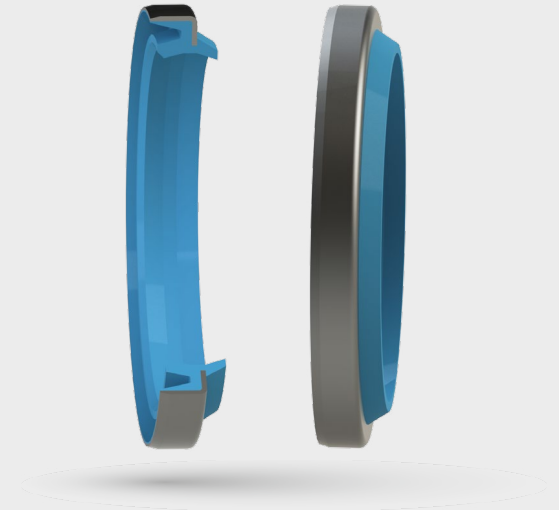
Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
472.0560665	56.00	66.00	5.00	7.00
472.0560687	56.00	68.00	7.00	10.00
472.0600685	60.00	68.00	5.00	7.00
472.0600705	60.00	70.00	5.00	7.00
472.0600748	60.00	74.00	8.00	11.00
472.0600828	60.00	82.00	8.00	11.00
472.0630715	63.00	71.00	5.00	7.00
472.0630735	63.00	73.00	5.00	7.00
472.0650735	65.00	73.00	5.00	7.00
472.0650755	65.00	75.00	5.00	7.00
472.0650798	65.00	79.00	8.00	11.00
472.0700785	70.00	78.00	5.00	7.00
472.0700805	70.00	80.00	5.00	7.00
472.0700848	70.00	84.00	8.00	11.00
472.0700901	70.00	90.00	10.00	14.00
472.0730815	73.00	81.00	5.00	7.00
472.0750835	75.00	83.00	5.00	7.00
472.0750877	75.00	87.00	7.00	12.00
472.0750898	75.00	89.00	8.00	11.00
472.0800927	80.00	92.00	7.00	12.00
472.0800948	80.00	94.00	8.00	11.00
472.0850935	85.00	93.00	5.00	7.00
472.0850998	85.00	99.00	8.00	11.00
472.0901027	90.00	102.00	7.00	12.00
472.0901048	90.00	104.00	8.00	11.00
472.0901077	90.00	107.00	7.00	12.00
472.0951098	95.00	109.00	8.00	11.00
472.1001127	100.00	112.00	7.00	12.00
472.1001148	100.00	114.00	8.00	11.00
472.1051177	105.00	117.00	7.00	12.00
472.1051218	105.00	121.00	8.00	11.00
472.1051219	105.00	121.00	9.00	12.00
472.1101269	110.00	126.00	9.00	12.00
472.1151319	115.00	131.00	9.00	12.00
472.1201369	120.00	136.00	9.00	12.00
472.1251419	125.00	141.00	9.00	11.00
472.1301469	130.00	146.00	9.00	12.00
472.1351477	135.00	147.00	7.00	12.50
472.1351509	135.00	150.00	9.00	12.00
472.1351551	135.00	155.00	10.00	14.00
472.1401609	140.00	160.00	9.00	12.00
472.1401601	140.00	160.00	10.00	14.00
472.1451651	145.00	165.00	10.00	14.00
472.1501701	150.00	170.00	10.00	14.00
472.1551751	155.00	175.00	10.00	14.00
472.1601801	160.00	180.00	10.00	14.00
472.1701901	170.00	190.00	10.00	14.00
472.1802001	180.00	200.00	10.00	14.00
472.1802051	180.00	205.00	12.00	17.00
472.1902151	190.00	215.00	12.00	17.00
472.2002251	200.00	225.00	12.00	17.00
472.2102351	210.00	235.00	12.00	17.00
472.2202451	220.00	245.00	12.00	17.00
472.2252387	225.00	238.00	7.00	9.50
472.2302551	230.00	255.00	12.00	17.00
472.2402651	240.00	265.00	12.00	17.00
472.2502751	250.00	275.00	12.00	17.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 473



DESCRIPTION

The BECA 473 profile is a double acting wiper seal with a polyurethane metal insert.

ADVANTAGES

Tight and precise fitting in the housing
Very good wiping effect, both internally and externally
Excellent abrasion and wear resistance

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

Profiled seal

PU 94 Shore A - White

Metal cage

Steel

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

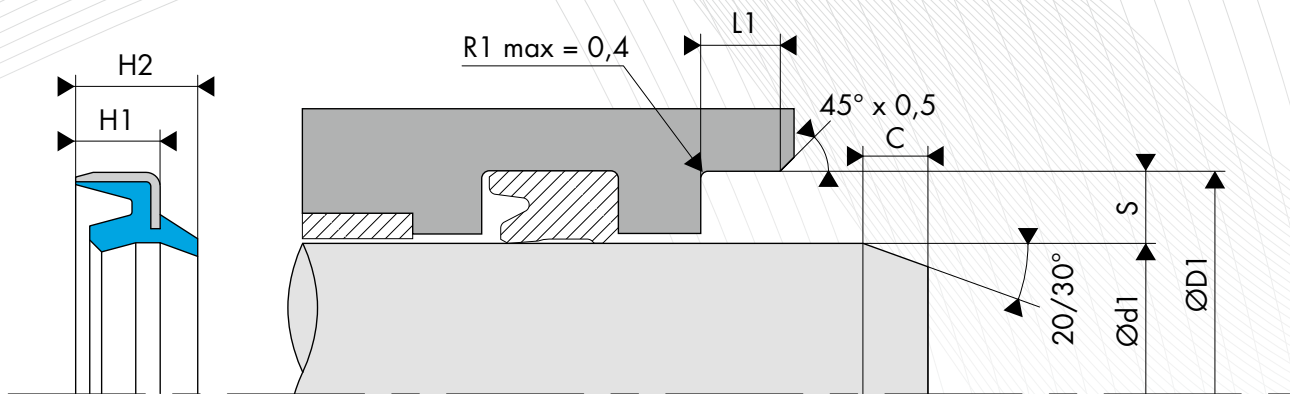
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

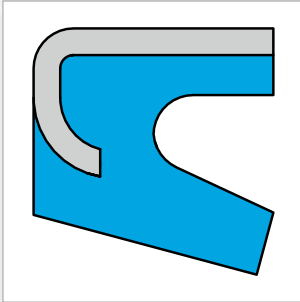


DIMENSIONS

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
473.0200326	20.00	32.00	6.00	9.00
473.0250376	25.00	37.00	6.00	9.00
473.0280406	28.00	40.00	6.00	9.00
473.0300426	30.00	42.00	6.00	9.00
473.0320447	32.00	44.00	7.00	10.00
473.0340467	34.00	46.00	7.00	10.00
473.0350477	35.00	47.00	7.00	10.00
473.0360487	36.00	48.00	7.00	10.00
473.0380507	38.00	50.00	7.00	10.00
473.0400527	40.00	52.00	7.00	10.00
473.0450577	45.00	57.00	7.00	10.00
473.0500627	50.00	62.00	7.00	10.00
473.0550698	55.00	69.00	8.00	12.00
473.0560708	56.00	70.00	8.00	12.00
473.0600748	60.00	74.00	8.00	12.00
473.0630778	63.00	77.00	8.00	12.00
473.0650798	65.00	79.00	8.00	12.00

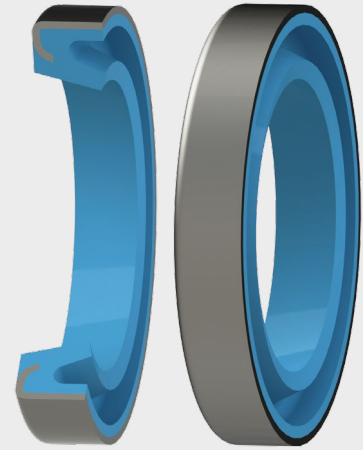
Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
473.0700848	70.00	84.00	8.00	12.00
473.0750898	75.00	89.00	8.00	12.00
473.0800948	80.00	94.00	8.00	12.00
473.0850998	85.00	99.00	8.00	12.00
473.0901048	90.00	104.00	8.00	12.00
473.0951098	95.00	109.00	8.00	12.00
473.1001148	100.00	114.00	8.00	12.00
473.1051219	105.00	121.00	9.00	12.00
473.1101269	110.00	126.00	9.00	12.00
473.1151319	115.00	131.00	9.00	12.00
473.1201369	120.00	136.00	9.00	12.00
473.1251419	125.00	141.00	9.00	12.00
473.1301469	130.00	146.00	9.00	12.00
473.1351508	135.00	150.00	8.00	11.00
473.1401601	140.00	160.00	10.00	14.00
473.2002168	200.00	216.00	8.00	11.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 475



DESCRIPTION

The BECA 475 profile is a single acting wiper seal with a polyurethane metal insert.

ADVANTAGES

Tight and precise fitting in the housing
Very good external wiping effect
Excellent abrasion and wear resistance

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

Profiled seal

PU 94 Shore A - White

Metal cage

Steel

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

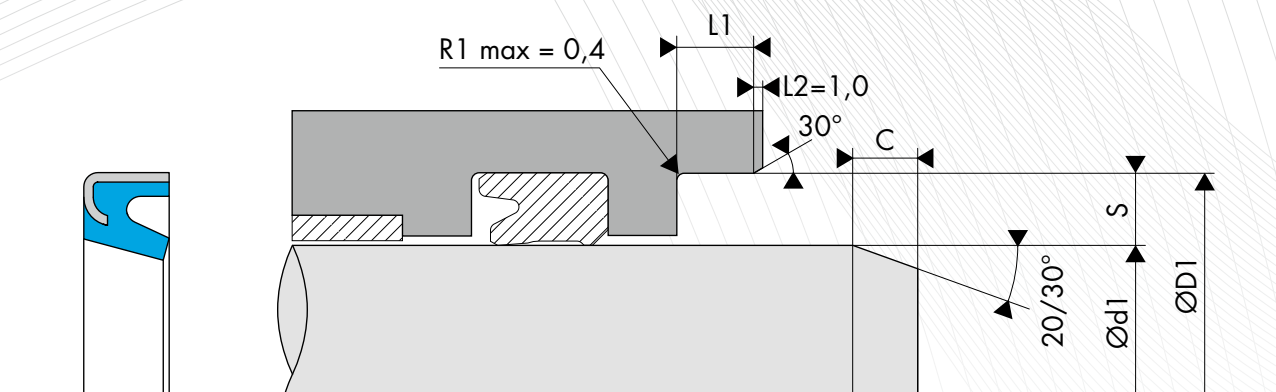
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

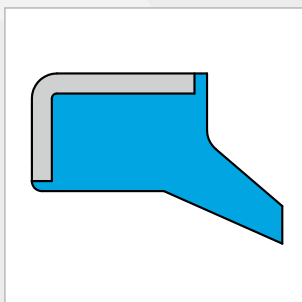


DIMENSIONS

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.10
475.0300404	30.00	40.00	4.00
475.0300406	30.00	40.00	6.00
475.0350454	35.00	45.00	4.00
475.0350456	35.00	45.00	6.00
475.0350509	35.00	50.00	9.00
475.0360467	36.00	46.00	7.00
475.0400504	40.00	50.00	4.00
475.0400505	40.00	50.00	5.00
475.0400508	40.00	50.00	8.00
475.0400526	40.00	52.00	6.00
475.0400559	40.00	55.00	9.00
475.0450553	45.00	55.00	3.20
475.0450554	45.00	55.00	4.00
475.0450555	45.00	55.00	5.00
475.0450607	45.00	60.00	7.50
475.0500603	50.00	60.00	3.20
475.0500605	50.00	60.00	5.00
475.0500634	50.00	63.00	4.00
475.0500655	50.00	65.00	5.00
475.0500657	50.00	65.00	7.50
475.0500659	50.00	65.00	9.00
475.0550653	55.00	65.00	3.20
475.0550655	55.00	65.00	5.00
475.0550705	55.00	70.00	5.00
475.0550707	55.00	70.00	7.50
475.0560719	56.00	71.00	9.00
475.0600705	60.00	70.00	5.00
475.0600748	60.00	74.00	8.00
475.0600754	60.00	75.00	4.20
475.0600755	60.00	75.00	5.00
475.0600757	60.00	75.00	7.50
475.0600758	60.00	75.00	8.00
475.0600751	60.00	75.00	10.00
475.0630789	63.00	78.00	9.00
475.0650755	65.00	75.00	5.00

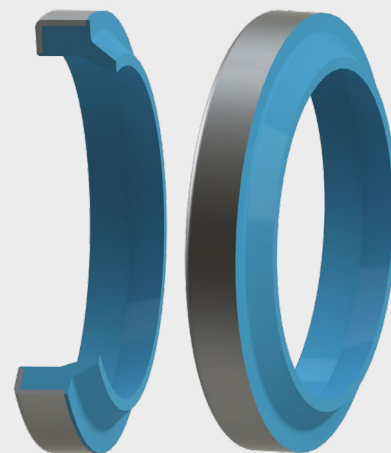
Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.10
475.0650798	65.00	79.00	8.00
475.0650805	65.00	80.00	5.00
475.0700805	70.00	80.00	5.00
475.0700807	70.00	80.00	7.00
475.0700848	70.00	84.00	8.00
475.0700855	70.00	85.00	5.00
475.0700857	70.00	85.00	7.00
475.0700858	70.00	85.00	8.00
475.0700851	70.00	85.00	10.00
475.0710865	71.00	86.00	5.00
475.0750855	75.00	85.00	5.00
475.0750898	75.00	89.00	8.00
475.0750908	75.00	90.00	8.00
475.0800903	80.00	90.00	3.20
475.0800948	80.00	94.00	8.00
475.0800954	80.00	95.00	4.00
475.0800955	80.00	95.00	5.00
475.0800958	80.00	95.00	8.00
475.0850954	85.00	95.00	4.50
475.0850998	85.00	99.00	8.00
475.0901007	90.00	100.00	7.00
475.0901048	90.00	104.00	8.00
475.0901056	90.00	105.00	6.00
475.0901058	90.00	105.00	8.00
475.0951056	95.00	105.00	6.00
475.0951098	95.00	109.00	8.00
475.0951106	95.00	110.00	6.50
475.1001148	100.00	114.00	8.00
475.1001157	100.00	115.00	7.00
475.1001158	100.00	115.00	8.00
475.1101258	110.00	125.00	8.00
475.1101304	110.00	130.00	4.50
475.1201358	120.00	135.00	8.00
475.1251408	125.00	140.00	8.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 476



DESCRIPTION

The BECA 476 profile is a single acting wiper seal with a polyurethane metal insert.

ADVANTAGES

Tight and precise fitting in the housing
Very good external wiping effect
Excellent abrasion and wear resistance

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

Profiled seal

PU 94 Shore A - White

Metal cage

Steel

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

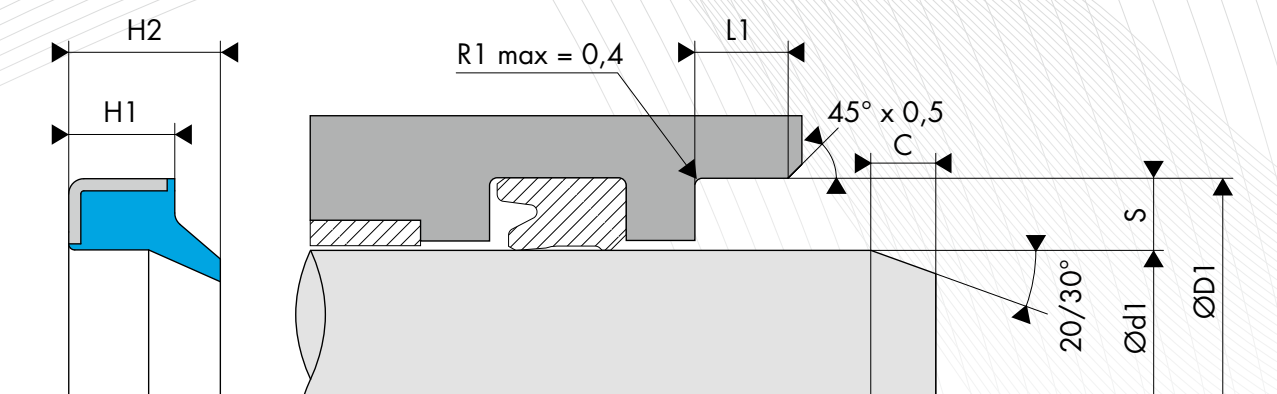
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

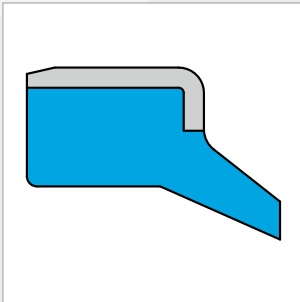


DIMENSIONS

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
476.0130194	13.00	19.00	4.00	5.00
476.0140255	14.00	25.00	5.00	8.00
476.0200307	20.00	30.00	7.00	10.00
476.0250357	25.00	35.00	7.00	10.00
476.0280387	28.00	38.00	7.00	10.00
476.0300407	30.00	40.00	7.00	10.00
476.0350457	35.00	45.00	7.00	10.00
476.0400505	40.00	50.00	5.00	7.00
476.0400507	40.00	50.00	7.00	10.00
476.0450557	45.00	55.00	7.00	10.00
476.0500607	50.00	60.00	7.00	10.00
476.0550657	55.00	65.00	7.00	10.00
476.0550698	55.00	69.00	8.00	11.00
476.0560667	56.00	66.00	7.00	10.00
476.0570667	57.00	66.00	7.00	9.20
476.0600707	60.00	70.00	7.00	10.00
476.0600748	60.00	74.00	8.00	11.00
476.0630757	63.00	75.00	7.00	10.00

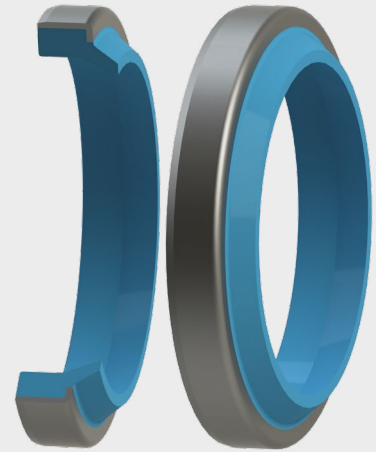
Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
476.0630778	63.00	77.00	8.00	11.00
476.0650757	65.00	75.00	7.00	10.00
476.0650798	65.00	79.00	8.00	11.00
476.0670767	67.00	76.00	7.00	9.20
476.0700807	70.00	80.00	7.00	10.00
476.0700848	70.00	84.00	8.00	11.00
476.0750898	75.00	89.00	8.00	11.00
476.0800907	80.00	90.00	7.00	10.00
476.0800948	80.00	94.00	8.00	11.00
476.0850998	85.00	99.00	8.00	11.00
476.0901007	90.00	100.00	7.00	10.00
476.0901048	90.00	104.00	8.00	11.00
476.0951098	95.00	109.00	8.00	11.00
476.1001107	100.00	110.00	7.00	10.00
476.1251409	125.00	140.00	9.00	12.00
476.1601759	160.00	175.00	9.00	12.00
476.1801951	180.00	195.00	10.00	14.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 477



DESCRIPTION

The BECA 477 profile is a single acting wiper seal with a polyurethane metal insert.

ADVANTAGES

Tight and precise fitting in the housing
Very good external wiping effect
Excellent abrasion and wear resistance

APPLICATIONS

Agriculture
Mobile machinery
Material handling - Lifting
Hydraulic cylinders

MATERIALS

Profiled seal

PU 94 Shore A - White

Metal cage

Steel

Other grades of materials are available.
Please contact our experts.

TECHNICAL DATA

Temperature	-30°C / +110°C
Speed	1 m/s
Media	Mineral hydraulic oils

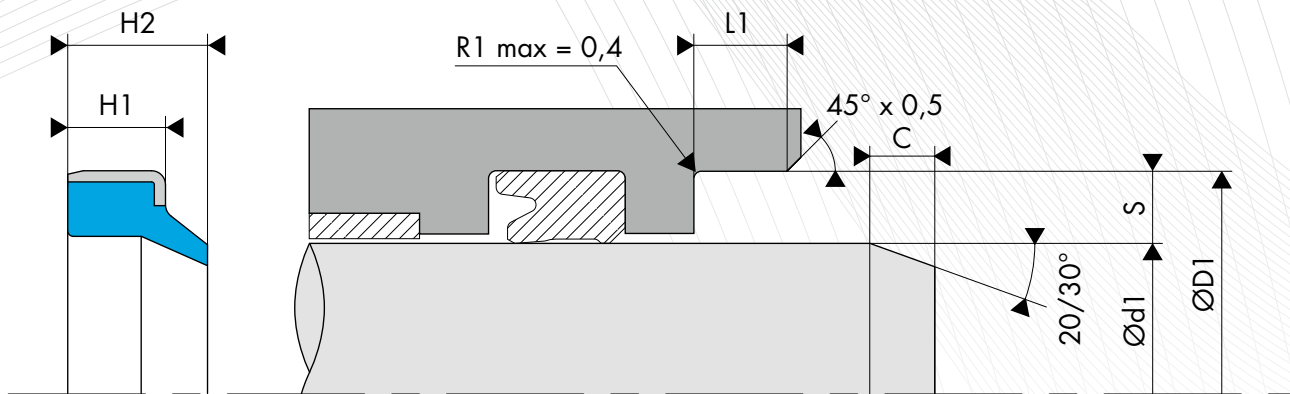
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

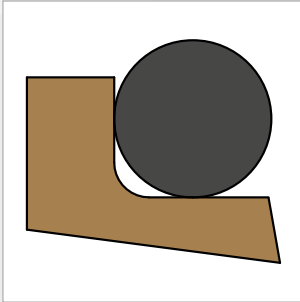


DIMENSIONS

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
477.0100205	10.00	20.00	5.00	8.00
477.0120204	12.00	20.00	4.00	6.00
477.0150255	15.00	25.00	5.00	7.00
477.0160223	16.00	22.00	3.00	4.00
477.0160265	16.00	26.00	5.00	8.00
477.0170243	17.00	24.00	3.50	5.00
477.0180285	18.00	28.00	5.00	7.00
477.0180306	18.00	30.00	6.00	9.00
477.0200283	20.00	28.00	3.50	5.00
477.0200304	20.00	30.00	4.00	6.00
477.0200305	20.00	30.00	5.00	8.00
477.0250355	25.00	35.00	5.00	8.00
477.0250376	25.00	37.00	6.00	9.00
477.0280385	28.00	38.00	5.00	8.00
477.0280387	28.00	38.00	7.00	10.00
477.0300405	30.00	40.00	5.00	8.00
477.0300426	30.00	42.00	6.00	9.00
477.0300455	30.00	45.00	5.00	8.00
477.0320425	32.00	42.00	5.00	8.00
477.0320426	32.00	42.00	6.00	9.00
477.0320457	32.00	45.00	7.00	10.00
477.0320528	32.00	52.00	8.00	11.00
477.0350457	35.00	45.00	7.00	10.00
477.0350477	35.00	47.00	7.00	10.00
477.0400505	40.00	50.00	5.00	8.00
477.0400507	40.00	50.00	7.00	10.00
477.0400527	40.00	52.00	7.00	10.00
477.0400607	40.00	60.00	7.00	10.00
477.0450557	45.00	55.00	7.00	10.00
477.0450577	45.00	57.00	7.00	10.00
477.0450607	45.00	60.00	7.00	10.00
477.0500607	50.00	60.00	7.00	10.00
477.0500627	50.00	62.00	7.00	10.00

Part number	Rod diameter Ød1 h9	Groove diameter ØD1 H8	Groove width L1 0/+0.20	Seal height H2
477.0550655	55.00	65.00	5.00	8.00
477.0550657	55.00	65.00	7.00	10.00
477.0550698	55.00	69.00	8.00	11.00
477.0600707	60.00	70.00	7.00	10.00
477.0600745	60.00	74.00	5.00	8.00
477.0600748	60.00	74.00	8.00	11.00
477.0630757	63.00	75.00	7.00	10.00
477.0650757	65.00	75.00	7.00	10.00
477.0650798	65.00	79.00	8.00	11.00
477.0700807	70.00	80.00	7.00	10.00
477.0700848	70.00	84.00	8.00	11.00
477.0750857	75.00	85.00	7.00	10.00
477.0750898	75.00	89.00	8.00	11.00
477.0800907	80.00	90.00	7.00	10.00
477.0800948	80.00	94.00	8.00	11.00
477.0850957	85.00	95.00	7.00	10.00
477.0850998	85.00	99.00	8.00	11.00
477.0901007	90.00	100.00	7.00	10.00
477.0901048	90.00	104.00	8.00	11.00
477.0951057	95.00	105.00	7.00	10.00
477.0951098	95.00	109.00	8.00	11.00
477.1001107	100.00	110.00	7.00	10.00
477.1001148	100.00	114.00	8.00	11.00
477.1051219	105.00	121.00	9.00	12.00
477.1101207	110.00	120.00	7.00	10.00
477.1101269	110.00	126.00	9.00	12.00
477.1151319	115.00	131.00	9.00	12.00
477.1201307	120.00	130.00	7.00	10.00
477.1201369	120.00	136.00	9.00	12.00
477.1301469	130.00	146.00	9.00	12.00
477.1401601	140.00	160.00	10.00	14.00
477.1501701	150.00	170.00	10.00	14.00
477.1601801	160.00	180.00	10.00	14.00

The figures highlighted in bold correspond to the rod diameters that are recommended by standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 480



DESCRIPTION

The BECA 480 profile is a composite wiper seal composed of a filled PTFE friction ring and a pre-tightened rubber O'Ring.

ADVANTAGES

Low friction coefficient;
no stick-slip effect

Wide temperature range and excellent chemical resistance, depending on the materials selected

Excellent abrasion and wear resistance

Very good wiping effect against external pollutions

APPLICATIONS

Agro-food

Machine tools

Hydraulic cylinders

Fluid technologies

MATERIALS

Friction ring

Bronze-filled PTFE

Carbon-filled PTFE

Blue GL PTFE

O'Ring

NBR 70 Shore A

FKM 70 Shore A

Other grades of materials are available. Please refer to the materials table on the next page.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	5 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.05 - 0.2 µm	≤1.6 µm	≤3.2 µm
Rz	0.4 - 1.6 µm	≤6.3 µm	≤10.0 µm
Rmax	0.63 - 2.5 µm	≤10.0 µm	≤16.0 µm

RADIUS

Radial section S	Radius R1	Radius R2
2.40	0.20	0.40
3.40	0.20	0.80
4.40	0.20	1.00
6.10	0.20	1.50
8.00	0.20	1.50

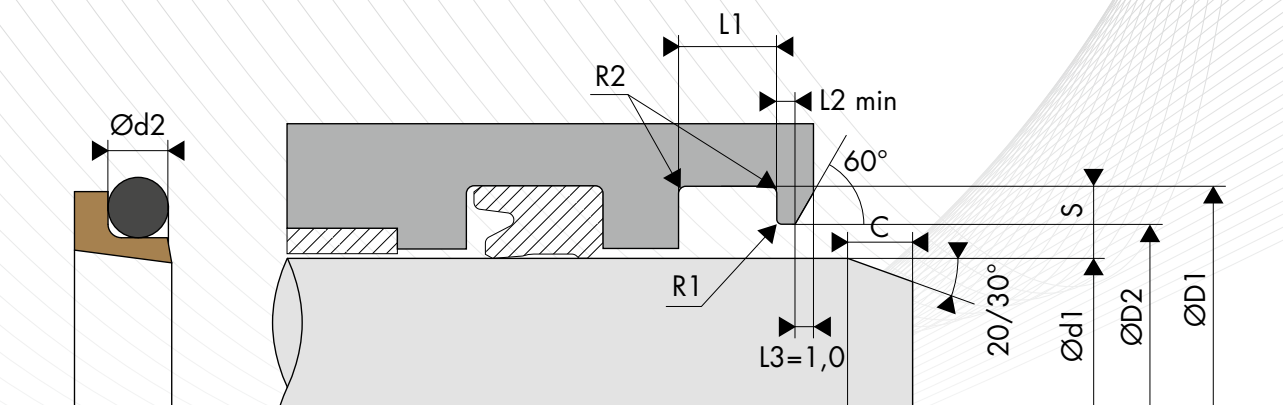
CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

TABLE MATERIALS

Friction ring					O'Ring			Mating surface material
Standard code	ISO code	Material	Colour	Characteristics	Code	Type of material	Service temperature	
DP	P	Virgin PTFE	White	Resistance to chemical products Impermeability Dielectric Non-stick Low friction coefficient Food industry	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
					F6	VMQ 70 Shore A	-60°C/+200°C	
DC	C	PTFE + 25% Carbon	Grey	Improvements • Wear properties • Compression set Good resistance to chemical products Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
CG	C	PTFE + 23% Carbon + 2% Graphite	Black		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DV	V	PTFE + 25 % Glass	Blue	Improvements • Wear properties • Mechanical strength Slightly more abrasive, however, this is corrected by adding MOS2 Maintains its chemical and dielectric properties Well-suited to applications with rotational and simultaneous alternating movements	K6	NBR 70 Shore A	-30°C/+100°C	Steel Chrome steel Cast iron
					G6	FKM 70 Shore A	-20°C/+200°C	
VM	M	PTFE + 15 % Glass + 5% MOS2	Grey		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
DX	X	PTFE GL Blue + Glass + Metal oxides	Turquoise blue	Resistance to compression Resistance to wear Excellent chemical stability Good thermal conductivity	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
DG	G	PTFE + 15% Graphite	Black	Improvements • Wear properties Reduced wear on metal parts Self-lubricating Thermal and electrical conductivity Low permeability Good friction coefficient Anti-static High performing in dynamic self-lubricating applications	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
K1	K	PTFE + 10% Ekonol	Light brown	Improvements • Better abrasion resistance • Better dimensional stability at high temperatures Use up to +300°C Good friction coefficient and low permeability	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
K2	K	PTFE + 20% Ekonol	Light brown		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DB	B	PTFE + 60% Bronze	Dark brown	Improvements • Wear properties • Warping resistance and creep strength • Compression resistance Self-lubricating Electrical and thermal conductivity Does not alter the metal parts Reduced hold with certain chemical products Used for high-compression dynamic seals and has a low level of wear	K6	NBR 70 Shore A	-30°C/+100°C	Steel Chrome steel Cast iron
					G6	FKM 70 Shore A	-20°C/+200°C	
B4	B	PTFE + 40% Bronze	Dark brown		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	

Other grades of materials are available depending on your specificities.



○ INSTALLATION DIMENSIONS

Rod diameter Ød1 f8/h9		Groove diameter	Bore diameter	Groove width	Step width	O'Ring cross-section
Standard range	Extended range	ØD1 H9	ØD2 H11	L1 0/+0.20	L2 min	Ød2
4.0 - 11.9	4.0 - 130.0	d1 + 4.80	d1 + 2.70	3.70	2.00	1.78
12.0 - 64.9	10.0 - 245.0	d1 + 6.80	d1 + 3.50	5.00	2.00	2.62
65.0 - 250.9	25.0 - 400.0	d1 + 8.80	d1 + 4.00	6.00	3.00	3.53
251.0 - 420.9	40.0 - 655.0	d1 + 12.20	d1 + 4.50	8.40	4.00	5.33
421.0 - 650.9	110.0 - 655.0	d1 + 16.00	d1 + 5.20	11.00	4.00	6.99

○ EXAMPLE OF CODIFICATION

STANDARD CODIFICATION

Materials _____ : Friction ring, PTFE + 60% Bronze - Code DB
 _____ : NBR 70 Shore A O'Ring - Code K6

Rod diameter _____ : Ød1 = 50.00 mm

Groove diameter _____ : ØD1 = 58.80 mm

Part number _____ : 480. 050DBK6

Part number -

480. 050 DB K6

Family

Rod diameter

Friction ring material*

O'Ring material*

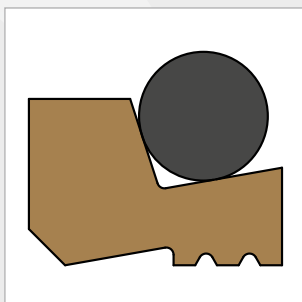
* The codes that define the materials are set out in the materials table on the previous page.

DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Shoulder width L2 min
480.004	4.00	8.80	6.70	3.70	2.00
480.005	5.00	9.80	7.70	3.70	2.00
480.006	6.00	10.80	8.70	3.70	2.00
480.008	8.00	12.80	10.70	3.70	2.00
480.009	9.00	13.80	11.70	3.70	2.00
480.010	10.00	14.80	12.70	3.70	2.00
480.012	12.00	18.80	15.50	5.00	2.00
480.014	14.00	20.80	17.50	5.00	2.00
480.015	15.00	21.80	18.50	5.00	2.00
480.016	16.00	22.80	19.50	5.00	2.00
480.018	18.00	24.80	21.50	5.00	2.00
480.020	20.00	26.80	23.50	5.00	2.00
480.022	22.00	28.80	25.50	5.00	2.00
480.025	25.00	31.80	28.50	5.00	2.00
480.028	28.00	34.80	31.50	5.00	2.00
480.030	30.00	36.80	33.50	5.00	2.00
480.032	32.00	38.80	35.50	5.00	2.00
480.035	35.00	41.80	38.50	5.00	2.00
480.036	36.00	42.80	39.50	5.00	2.00
480.037	37.00	43.80	40.50	5.00	2.00
480.038	38.00	44.80	41.50	5.00	2.00
480.040	40.00	46.80	43.50	5.00	2.00
480.042	42.00	48.80	45.50	5.00	2.00
480.045	45.00	51.80	48.50	5.00	2.00
480.048	48.00	54.80	51.50	5.00	2.00
480.049	49.00	55.80	52.50	5.00	2.00
480.050	50.00	56.80	53.50	5.00	2.00
480.052	52.00	58.80	55.50	5.00	2.00
480.054	54.00	60.80	57.50	5.00	2.00
480.055	55.00	61.80	58.50	5.00	2.00
480.056	56.00	62.80	59.50	5.00	2.00
480.058	58.00	64.80	61.50	5.00	2.00
480.060	60.00	66.80	63.50	5.00	2.00
480.062	62.00	68.80	65.50	5.00	2.00
480.063	63.00	69.80	66.50	5.00	2.00
480.065	65.00	73.80	69.00	6.00	3.00
480.068	68.00	76.80	72.00	6.00	3.00
480.070	70.00	78.80	74.00	6.00	3.00
480.075	75.00	83.80	79.00	6.00	3.00
480.080	80.00	88.80	84.00	6.00	3.00
480.085	85.00	93.80	89.00	6.00	3.00
480.090	90.00	98.80	94.00	6.00	3.00
480.095	95.00	103.80	99.00	6.00	3.00
480.100	100.00	108.80	104.00	6.00	3.00

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Shoulder width L2 min
480.105	105.00	113.80	109.00	6.00	3.00
480.110	110.00	118.80	114.00	6.00	3.00
480.115	115.00	123.80	119.00	6.00	3.00
480.120	120.00	128.80	124.00	6.00	3.00
480.125	125.00	133.80	129.00	6.00	3.00
480.130	130.00	138.80	134.00	6.00	3.00
480.135	135.00	143.80	139.00	6.00	3.00
480.140	140.00	148.80	144.00	6.00	3.00
480.145	145.00	153.80	149.00	6.00	3.00
480.150	150.00	158.80	154.00	6.00	3.00
480.155	155.00	163.80	159.00	6.00	3.00
480.160	160.00	168.80	164.00	6.00	3.00
480.165	165.00	173.80	169.00	6.00	3.00
480.170	170.00	178.80	174.00	6.00	3.00
480.175	175.00	183.80	179.00	6.00	3.00
480.180	180.00	188.80	184.00	6.00	3.00
480.185	185.00	193.80	189.00	6.00	3.00
480.190	190.00	198.80	194.00	6.00	3.00
480.195	195.00	203.80	199.00	6.00	3.00
480.200	200.00	208.80	204.00	6.00	3.00
480.205	205.00	213.80	209.00	6.00	3.00
480.210	210.00	218.80	214.00	6.00	3.00
480.215	215.00	223.80	219.00	6.00	3.00
480.220	220.00	228.80	224.00	6.00	3.00
480.230	230.00	238.80	234.00	6.00	3.00
480.240	240.00	248.80	244.00	6.00	3.00
480.250	250.00	258.80	254.00	6.00	3.00
480.260	260.00	272.20	264.50	8.40	4.00
480.270	270.00	282.20	274.50	8.40	4.00
480.280	280.00	292.20	284.50	8.40	4.00
480.290	290.00	302.20	294.50	8.40	4.00
480.300	300.00	312.20	304.50	8.40	4.00
480.310	310.00	322.20	314.50	8.40	4.00
480.320	320.00	332.20	324.50	8.40	4.00
480.330	330.00	342.20	334.50	8.40	4.00
480.340	340.00	352.20	344.50	8.40	4.00
480.350	350.00	362.20	354.50	8.40	4.00
480.360	360.00	372.20	364.50	8.40	4.00
480.370	370.00	382.20	374.50	8.40	4.00
480.380	380.00	392.20	384.50	8.40	4.00
480.390	390.00	402.20	394.50	8.40	4.00
480.400	400.00	412.20	404.50	8.40	4.00
480.450	450.00	466.00	455.20	11.00	4.00
480.500	500.00	516.00	505.20	11.00	4.00

The figures highlighted in bold correspond to the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 482



DESCRIPTION

The BECA 482 profile is a double acting composite wiper seal composed of a filled PTFE friction ring and a pre-tightened rubber O'Ring.

ADVANTAGES

Low friction coefficient;
no stick-slip effect

Wide temperature range and excellent chemical resistance, depending on the materials selected

Excellent abrasion and wear resistance

Very good wiping effect against external pollutions

APPLICATIONS

Agro-food

Machine tools

Hydraulic cylinders

Fluid technologies

MATERIALS

Friction ring

Bronze-filled PTFE

Carbon-filled PTFE

O'Ring

NBR 70 Shore A

FKM 70 Shore A

Other grades of materials are available. Please refer to the materials table on the next page.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	5 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.05 - 0.2 µm	≤1.6 µm	≤3.2 µm
Rz	0.4 - 1.6 µm	≤6.3 µm	≤10.0 µm
Rmax	0.63 - 2.5 µm	≤10.0 µm	≤16.0 µm

RADIUS

Radial section S	Radius R1	Radius R2
2.40	0.20	0.40
3.40	0.20	0.80
4.40	0.20	1.00
6.10	0.20	1.50
8.00	0.20	1.50
10.00	0.20	2.00

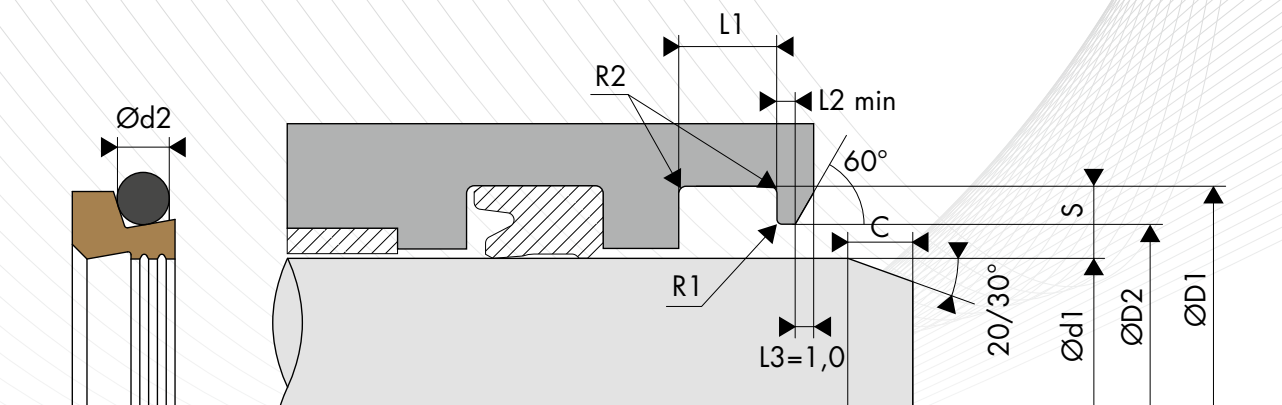
CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

TABLE MATERIALS

Friction ring					O'Ring			Mating surface material	
Standard code	ISO code	Material	Colour	Characteristics	Code	Type of material	Service temperature		
DP	P	Virgin PTFE	White	Resistance to chemical products Impermeability Dielectric Non-stick Low friction coefficient Food industry	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface	
					G6	FKM 70 Shore A	-20°C/+200°C		
					C6	EPDM 70 Shore A	-45°C/+150°C		
					F6	VMQ 70 Shore A	-60°C/+200°C		
DC	C	PTFE + 25% Carbon	Grey	Improvements • Wear properties • Compression set Good resistance to chemical products Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C		
					G6	FKM 70 Shore A	-20°C/+200°C		
					C6	EPDM 70 Shore A	-45°C/+150°C		
CG	C	PTFE + 23% Carbon + 2% Graphite	Black	Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C		
					G6	FKM 70 Shore A	-20°C/+200°C		
					C6	EPDM 70 Shore A	-45°C/+150°C		
DV	V	PTFE + 25 % Glass	Blue	Improvements • Wear properties • Mechanical strength Slightly more abrasive, however, this is corrected by adding MOS2 Maintains its chemical and dielectric properties Well-suited to applications with rotational and simultaneous alternating movements	K6	NBR 70 Shore A	-30°C/+100°C		Steel Chrome steel Cast iron
					G6	FKM 70 Shore A	-20°C/+200°C		
VM	M	PTFE + 15 % Glass + 5% MOS2	Grey		K6	NBR 70 Shore A	-30°C/+100°C		
					G6	FKM 70 Shore A	-20°C/+200°C		
DX	X	PTFE GL Blue + Glass + Metal oxides	Turquoise blue	Resistance to compression Resistance to wear Excellent chemical stability Good thermal conductivity	K6	NBR 70 Shore A	-30°C/+100°C		
					G6	FKM 70 Shore A	-20°C/+200°C		
DG	G	PTFE + 15% Graphite	Black	Improvements • Wear properties Reduced wear on metal parts Self-lubricating Thermal and electrical conductivity Low permeability Good friction coefficient Anti-static High performing in dynamic self-lubricating applications	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface	
					G6	FKM 70 Shore A	-20°C/+200°C		
					C6	EPDM 70 Shore A	-45°C/+150°C		
K1	K	PTFE + 10% Ekonol	Light brown	Improvements • Better abrasion resistance • Better dimensional stability at high temperatures Use up to +300°C Good friction coefficient and low permeability	K6	NBR 70 Shore A	-30°C/+100°C		
					G6	FKM 70 Shore A	-20°C/+200°C		
					C6	EPDM 70 Shore A	-45°C/+150°C		
K2	K	PTFE + 20% Ekonol	Light brown		K6	NBR 70 Shore A	-30°C/+100°C		
					G6	FKM 70 Shore A	-20°C/+200°C		
					C6	EPDM 70 Shore A	-45°C/+150°C		
DB	B	PTFE + 60% Bronze	Dark brown	Improvements • Wear properties • Warping resistance and creep strength • Compression resistance Self-lubricating Electrical and thermal conductivity Does not alter the metal parts Reduced hold with certain chemical products Used for high-compression dynamic seals and has a low level of wear	K6	NBR 70 Shore A	-30°C/+100°C	Steel Chrome steel Cast iron	
					G6	FKM 70 Shore A	-20°C/+200°C		
B4	B	PTFE + 40% Bronze	Dark brown		K6	NBR 70 Shore A	-30°C/+100°C		
					G6	FKM 70 Shore A	-20°C/+200°C		

Other grades of materials are available depending on your specificities.



○ INSTALLATION DIMENSIONS

Rod diameter Ød1 f8/h9		Groove diameter	Bore diameter	Groove width	Step width	O'Ring cross-section
Standard range	Extended range	ØD1 H9	ØD2 H11	L1 0/+0.20	L2 min	Ød2
4.0 - 11.9	4.0 - 130.0	d1 + 4.80	d1 + 1.50	3.70	2.00	1.78
12.0 - 64.9	10.0 - 245.0	d1 + 6.80	d1 + 1.50	5.00	2.00	2.62
65.0 - 250.9	25.0 - 400.0	d1 + 8.80	d1 + 1.50	6.00	3.00	3.53
251.0 - 420.9	40.0 - 655.0	d1 + 12.20	d1 + 2.00	8.40	4.00	5.33
421.0 - 650.9	110.0 - 655.0	d1 + 16.00	d1 + 2.00	11.00	4.00	6.99
651.0 - 999.9	140.0 - 999.9	d1 + 20.00	d1 + 2.50	14.00	5.00	8.40

○ EXAMPLE OF CODIFICATION

STANDARD CODIFICATION

Materials _____ : Friction ring, PTFE + 60% Bronze - Code DB
 _____ : NBR 70 Shore A O'Ring - Code K6

Rod diameter _____ : Ød1 = 50.00 mm

Groove diameter _____ : ØD1 = 56.80 mm

Part number _____ : 482. 050DBK6

Part number -	482.	050	DB	K6
Family				
Rod diameter				
Friction ring material*				
O'Ring material*				

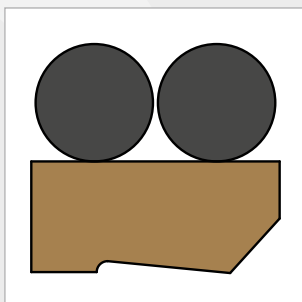
* The codes that define the materials are set out in the materials table on the previous page.

DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Groove diameter ØD2 H11	Groove width L1 0/+0.20	Shoulder width L2 min
482.004	4.00	8.80	5.50	3.70	2.00
482.005	5.00	9.80	6.50	3.70	2.00
482.006	6.00	10.80	7.50	3.70	2.00
482.008	8.00	12.80	9.50	3.70	2.00
482.009	9.00	13.80	10.50	3.70	2.00
482.010	10.00	14.80	11.50	3.70	2.00
482.012	12.00	18.80	13.50	5.00	2.00
482.014	14.00	20.80	15.50	5.00	2.00
482.015	15.00	21.80	16.50	5.00	2.00
482.016	16.00	22.80	17.50	5.00	2.00
482.018	18.00	24.80	19.50	5.00	2.00
482.020	20.00	26.80	21.50	5.00	2.00
482.022	22.00	28.80	23.50	5.00	2.00
482.025	25.00	31.80	26.50	5.00	2.00
482.028	28.00	34.80	29.50	5.00	2.00
482.030	30.00	36.80	31.50	5.00	2.00
482.032	32.00	38.80	33.50	5.00	2.00
482.035	35.00	41.80	36.50	5.00	2.00
482.036	36.00	42.80	37.50	5.00	2.00
482.037	37.00	43.80	38.50	5.00	2.00
482.038	38.00	44.80	39.50	5.00	2.00
482.040	40.00	46.80	41.50	5.00	2.00
482.042	42.00	48.80	43.50	5.00	2.00
482.045	45.00	51.80	46.50	5.00	2.00
482.048	48.00	54.80	49.50	5.00	2.00
482.049	49.00	55.80	50.50	5.00	2.00
482.050	50.00	56.80	51.50	5.00	2.00
482.052	52.00	58.80	53.50	5.00	2.00
482.054	54.00	60.80	55.50	5.00	2.00
482.055	55.00	61.80	56.50	5.00	2.00
482.056	56.00	62.80	57.50	5.00	2.00
482.058	58.00	64.80	59.50	5.00	2.00
482.060	60.00	66.80	61.50	5.00	2.00
482.062	62.00	68.80	63.50	5.00	2.00
482.063	63.00	69.80	64.50	5.00	2.00
482.065	65.00	73.80	66.50	6.00	3.00
482.068	68.00	76.80	69.50	6.00	3.00
482.070	70.00	78.80	71.50	6.00	3.00
482.075	75.00	83.80	76.50	6.00	3.00
482.080	80.00	88.80	81.50	6.00	3.00
482.085	85.00	93.80	86.50	6.00	3.00
482.090	90.00	98.80	91.50	6.00	3.00
482.095	95.00	103.80	96.50	6.00	3.00
482.100	100.00	108.80	101.50	6.00	3.00

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Groove diameter ØD2 H11	Groove width L1 0/+0.20	Shoulder width L2 min
482.105	105.00	113.80	106.50	6.00	3.00
482.110	110.00	118.80	111.50	6.00	3.00
482.115	115.00	123.80	116.50	6.00	3.00
482.120	120.00	128.80	121.50	6.00	3.00
482.125	125.00	133.80	126.50	6.00	3.00
482.130	130.00	138.80	131.50	6.00	3.00
482.135	135.00	143.80	136.50	6.00	3.00
482.140	140.00	148.80	141.50	6.00	3.00
482.145	145.00	153.80	146.50	6.00	3.00
482.150	150.00	158.80	151.50	6.00	3.00
482.155	155.00	163.80	156.50	6.00	3.00
482.160	160.00	168.80	161.50	6.00	3.00
482.165	165.00	173.80	166.50	6.00	3.00
482.170	170.00	178.80	171.50	6.00	3.00
482.175	175.00	183.80	176.50	6.00	3.00
482.180	180.00	188.80	181.50	6.00	3.00
482.185	185.00	193.80	186.50	6.00	3.00
482.190	190.00	198.80	191.50	6.00	3.00
482.195	195.00	203.80	196.50	6.00	3.00
482.200	200.00	208.80	201.50	6.00	3.00
482.205	205.00	213.80	206.50	6.00	3.00
482.210	210.00	218.80	211.50	6.00	3.00
482.215	215.00	223.80	216.50	6.00	3.00
482.220	220.00	228.80	221.50	6.00	3.00
482.230	230.00	238.80	231.50	6.00	3.00
482.240	240.00	248.80	241.50	6.00	3.00
482.250	250.00	258.80	251.50	6.00	3.00
482.260	260.00	272.20	262.00	8.40	4.00
482.270	270.00	282.20	272.00	8.40	4.00
482.280	280.00	292.20	282.00	8.40	4.00
482.290	290.00	302.20	292.00	8.40	4.00
482.300	300.00	312.20	302.00	8.40	4.00
482.310	310.00	322.20	312.00	8.40	4.00
482.320	320.00	332.20	322.00	8.40	4.00
482.330	330.00	342.20	332.00	8.40	4.00
482.340	340.00	352.20	342.00	8.40	4.00
482.350	350.00	362.20	352.00	8.40	4.00
482.360	360.00	372.20	362.00	8.40	4.00
482.370	370.00	382.20	372.00	8.40	4.00
482.380	380.00	392.20	382.00	8.40	4.00
482.390	390.00	402.20	392.00	8.40	4.00
482.400	400.00	412.20	402.00	8.40	4.00
482.450	450.00	466.00	452.00	11.00	4.00
482.500	500.00	516.00	502.00	11.00	4.00

The figures highlighted in bold correspond to the dimensions for standard ISO 6195 Type D, with the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 483



DESCRIPTION

The BECA 483 profile is a double acting composite wiper seal composed of a filled PTFE friction ring and two pre-tightened rubber O'Rings.

ADVANTAGES

Low friction coefficient;
no stick-slip effect

Wide temperature range and excellent chemical resistance, depending on the materials selected

Excellent abrasion and wear resistance

Very good wiping effect against external pollutions

APPLICATIONS

Agro-food

Machine tools

Hydraulic cylinders

Fluid technologies

MATERIALS

Friction ring

Bronze-filled PTFE

Glass-filled PTFE

O'Rings

NBR 70 Shore A

FKM 70 Shore A

Other grades of materials are available. Please refer to the materials table on the next page.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	5 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.05 - 0.2 µm	≤1.6 µm	≤3.2 µm
Rz	0.4 - 1.6 µm	≤6.3 µm	≤10.0 µm
Rmax	0.63 - 2.5 µm	≤10.0 µm	≤16.0 µm

RADIUS

Radial section S	Radius R1	Radius R2
3.80	0.30	0.40
4.40	0.30	1.00
6.10	0.30	1.20
8.00	0.30	2.00
12.00	0.30	2.50
13.65	0.30	2.50

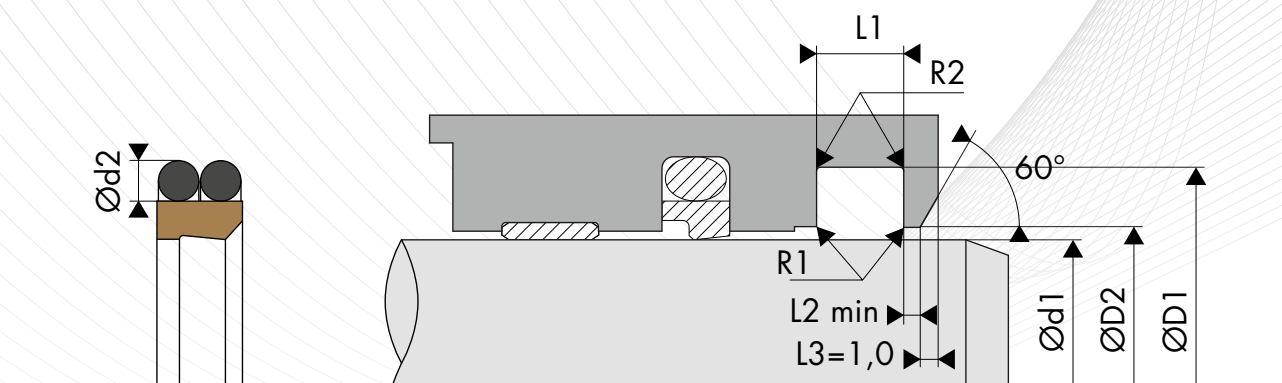
CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

TABLE MATERIALS

Friction ring					O'Rings			Mating surface material
Standard code	ISO code	Material	Colour	Characteristics	Code	Type of material	Service temperature	
DP	P	Virgin PTFE	White	Resistance to chemical products Impermeability Dielectric Non-stick Low friction coefficient Food industry	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
					F6	VMQ 70 Shore A	-60°C/+200°C	
DC	C	PTFE + 25% Carbon	Grey	Improvements • Wear properties • Compression set Good resistance to chemical products Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
CG	C	PTFE + 23% Carbon + 2% Graphite	Black	Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DV	V	PTFE + 25 % Glass	Blue	Improvements • Wear properties • Mechanical strength Slightly more abrasive, however, this is corrected by adding MOS2 Maintains its chemical and dielectric properties Well-suited to applications with rotational and simultaneous alternating movements	K6	NBR 70 Shore A	-30°C/+100°C	Steel Chrome steel Cast iron
					G6	FKM 70 Shore A	-20°C/+200°C	
VM	M	PTFE + 15 % Glass + 5% MOS2	Grey		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
DX	X	PTFE GL Blue + Glass + Metal oxides	Turquoise blue	Resistance to compression Resistance to wear Excellent chemical stability Good thermal conductivity	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
DG	G	PTFE + 15% Graphite	Black	Improvements • Wear properties Reduced wear on metal parts Self-lubricating Thermal and electrical conductivity Low permeability Good friction coefficient Anti-static High performing in dynamic self-lubricating applications	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
K1	K	PTFE + 10% Ekonol	Light brown	Improvements • Better abrasion resistance • Better dimensional stability at high temperatures Use up to +300°C Good friction coefficient and low permeability	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
K2	K	PTFE + 20% Ekonol	Light brown		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DB	B	PTFE + 60% Bronze	Dark brown	Improvements • Wear properties • Warping resistance and creep strength • Compression resistance Self-lubricating Electrical and thermal conductivity Does not alter the metal parts Reduced hold with certain chemical products Used for high-compression dynamic seals and has a low level of wear	K6	NBR 70 Shore A	-30°C/+100°C	Steel Chrome steel Cast iron
					G6	FKM 70 Shore A	-20°C/+200°C	
B4	B	PTFE + 40% Bronze	Dark brown		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	

Other grades of materials are available depending on your specificities.



○ INSTALLATION DIMENSIONS

Rod diameter Ød1 f8/h9		Groove diameter	Bore diameter	Seal height	Groove width	Step width	O'Ring cross-section
Standard range	Extended range	ØD1 H9	ØD2 H11	H1	L1 0/+0.20	L2 min	Ød2
19.0 - 39.9	19.0 - 130.0	d1 + 7.60	d1 + 1.00	4.00	4.20	3.00	1.78
40.0 - 69.9	30.0 - 250.0	d1 + 8.80	d1 + 1.50	6.00	6.30	3.00	2.62
70.0 - 139.9	50.0 - 450.0	d1 + 12.20	d1 + 2.00	7.70	8.10	4.00	3.53
140.0 - 399.9	80.0 - 650.0	d1 + 16.00	d1 + 2.00	11.00	11.50	5.00	5.33
400.0 - 649.9	180.0 - 650.0	d1 + 24.00	d1 + 2.50	14.80	15.50	8.00	6.99
650.0 - 999.9	300.0 - 999.9	d1 + 27.30	d1 + 2.50	17.20	18.00	10.00	8.40

○ EXAMPLE OF CODIFICATION

STANDARD CODIFICATION

Materials _____ : Friction ring, PTFE + 60% Bronze - Code DB

_____ : NBR 70 Shore A O'Rings - Code K6

Rod diameter _____ : Ød1 = 50.00 mm

Groove diameter _____ : ØD1 = 58.80 mm

Part number _____ : 483. 050DBK6

Part number -

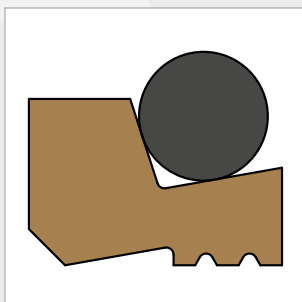
	483.	050	DB	K6
Family				
Rod diameter				
Friction ring material*				
O'Ring materials*				

* The codes that define the materials are set out in the materials table on the previous page.

DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Bore diameter ØD2 H11	Groove width L1 0/+0.20	Dimensions O'Ring
483.019	19.00	26.60	20.00	4.20	23.52 x 1.78
483.020	20.00	27.60	21.00	4.20	23.52 x 1.78
483.025	25.00	32.60	26.00	4.20	29.87 x 1.78
483.028	28.00	35.60	29.00	4.20	33.05 x 1.78
483.030	30.00	37.60	31.00	4.20	34.65 x 1.78
483.032	32.00	39.60	33.00	4.20	36.27 x 1.78
483.035	35.00	42.60	36.00	4.20	39.45 x 1.78
483.036	36.00	43.60	37.00	4.20	41.00 x 1.78
483.038	38.00	45.60	39.00	4.20	41.00 x 1.78
483.040	40.00	48.80	41.50	6.30	44.12 x 2.62
483.042	42.00	50.80	43.50	6.30	45.69 x 2.62
483.045	45.00	53.80	46.50	6.30	48.90 x 2.62
483.050	50.00	58.80	51.50	6.30	53.64 x 2.62
483.055	55.00	63.80	56.50	6.30	58.42 x 2.62
483.056	56.00	64.80	57.50	6.30	59.99 x 2.62
483.060	60.00	68.80	61.50	6.30	63.17 x 2.62
483.063	63.00	71.80	64.50	6.30	66.34 x 2.62
483.065	65.00	73.80	66.50	6.30	67.95 x 2.62
483.070	70.00	82.20	72.00	8.10	75.79 x 3.53
483.075	75.00	87.20	77.00	8.10	78.97 x 3.53
483.080	80.00	92.20	82.00	8.10	85.32 x 3.53
483.085	85.00	97.20	87.00	8.10	88.49 x 3.53
483.090	90.00	102.20	92.00	8.10	94.84 x 3.53
483.095	95.00	107.20	97.00	8.10	101.19 x 3.53
483.100	100.00	112.20	102.00	8.10	104.37 x 3.53
483.105	105.00	117.20	107.00	8.10	110.72 x 3.53
483.110	110.00	122.20	112.00	8.10	113.89 x 3.53
483.115	115.00	127.20	117.00	8.10	120.24 x 3.53
483.120	120.00	132.20	122.00	8.10	123.42 x 3.53
483.125	125.00	137.20	127.00	8.10	129.77 x 3.53
483.130	130.00	142.20	132.00	8.10	136.12 x 3.53
483.135	135.00	147.20	137.00	8.10	139.29 x 3.53
483.140	140.00	156.00	142.00	11.50	145.42 x 5.33
483.145	145.00	161.00	147.00	11.50	148.49 x 5.33
483.150	150.00	166.00	152.00	11.50	155.00 x 5.30
483.155	155.00	171.00	157.00	11.50	158.12 x 5.33
483.160	160.00	176.00	162.00	11.50	164.47 x 5.33
483.165	165.00	181.00	167.00	11.50	170.82 x 5.33
483.170	170.00	186.00	172.00	11.50	175.00 x 5.30
483.175	175.00	191.00	177.00	11.50	180.00 x 5.30
483.180	180.00	196.00	182.00	11.50	183.52 x 5.33
483.185	185.00	201.00	187.00	11.50	189.87 x 5.33
483.190	190.00	206.00	192.00	11.50	196.22 x 5.33
483.195	195.00	211.00	197.00	11.50	196.22 x 5.33
483.200	200.00	216.00	202.00	11.50	202.57 x 5.33
483.210	210.00	226.00	212.00	11.50	215.27 x 5.33
483.220	220.00	236.00	222.00	11.50	227.97 x 5.33
483.230	230.00	246.00	232.00	11.50	234.32 x 5.33
483.240	240.00	256.00	242.00	11.50	247.02 x 5.33
483.250	250.00	266.00	252.00	11.50	253.37 x 5.33
483.260	260.00	276.00	262.00	11.50	266.07 x 5.33
483.270	270.00	286.00	272.00	11.50	278.77 x 5.33
483.280	280.00	296.00	282.00	11.50	290.00 x 5.30
483.290	290.00	306.00	292.00	11.50	291.47 x 5.33
483.300	300.00	316.00	302.00	11.50	304.17 x 5.33
483.310	310.00	326.00	312.00	11.50	315.00 x 5.30
483.320	320.00	336.00	322.00	11.50	329.57 x 5.33
483.330	330.00	346.00	332.00	11.50	329.57 x 5.33
483.340	340.00	356.00	342.00	11.50	345.00 x 5.30
483.350	350.00	366.00	352.00	11.50	354.97 x 5.33
483.360	360.00	376.00	362.00	11.50	365.00 x 5.30
483.370	370.00	386.00	372.00	11.50	365.00 x 5.30
483.380	380.00	396.00	382.00	11.50	387.00 x 5.30
483.390	390.00	406.00	392.00	11.50	380.37 x 5.33
483.400	400.00	424.00	402.50	15.50	412.00 x 7.00
483.420	420.00	444.00	422.50	15.50	430.66 x 7.00
483.440	440.00	464.00	442.50	15.50	450.00 x 7.00
483.460	460.00	484.00	462.50	15.50	468.76 x 7.00
483.480	480.00	504.00	482.50	15.50	494.16 x 7.00
483.500	500.00	524.00	502.50	15.50	506.86 x 7.00

The figures highlighted in bold correspond to the dimensions for standard ISO 6195 Type D, with the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 485



DESCRIPTION

The BECA 485 profile is a double acting composite wiper seal composed of a filled PTFE friction ring and a pre-tightened rubber O'Ring.

ADVANTAGES

Low friction coefficient;
no stick-slip effect

Wide temperature range and excellent chemical resistance, depending on the materials selected

Excellent abrasion and wear resistance

Very good wiping effect against external pollutions

APPLICATIONS

Agro-food

Machine tools

Hydraulic cylinders

Fluid technologies

MATERIALS

Friction ring

Bronze-filled PTFE

Carbon-filled PTFE

Blue GL PTFE

O'Ring

NBR 70 Shore A

FKM 70 Shore A

Other grades of materials are available. Please refer to the materials table on the next page.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	5 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.05 - 0.2 µm	≤1.6 µm	≤3.2 µm
Rz	0.4 - 1.6 µm	≤6.3 µm	≤10.0 µm
Rmax	0.63 - 2.5 µm	≤10.0 µm	≤16.0 µm

RADIUS

Radial section S	Radius R1	Radius R2
3.80	0.20	0.80
4.40	0.20	0.80
6.10	0.20	1.00
8.00	0.20	1.50
12.00	0.20	1.50
13.65	0.20	2.00

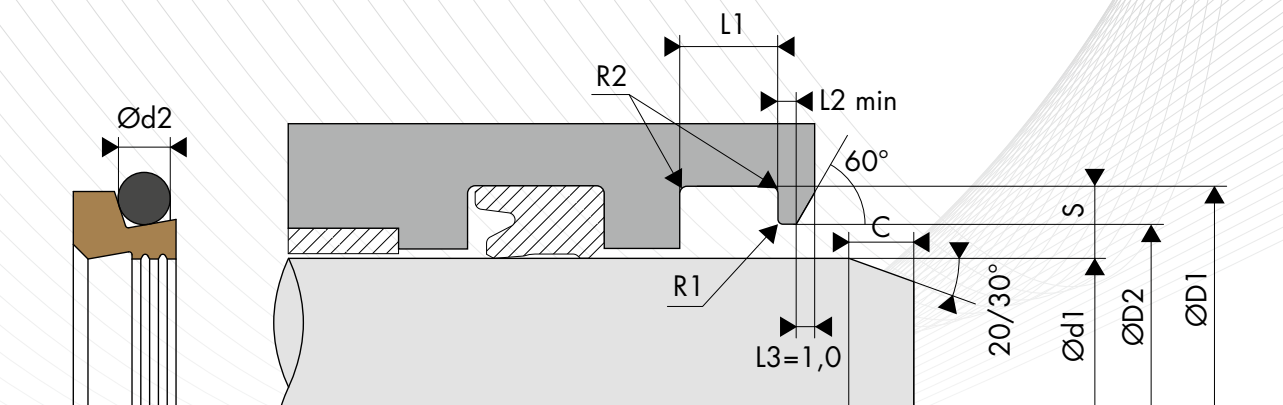
CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

TABLE MATERIALS

Friction ring					O'Ring			Mating surface material
Standard code	ISO code	Material	Colour	Characteristics	Code	Type of material	Service temperature	
DP	P	Virgin PTFE	White	Resistance to chemical products Impermeability Dielectric Non-stick Low friction coefficient Food industry	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
					F6	VMQ 70 Shore A	-60°C/+200°C	
DC	C	PTFE + 25% Carbon	Grey	Improvements • Wear properties • Compression set Good resistance to chemical products Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
CG	C	PTFE + 23% Carbon + 2% Graphite	Black		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DV	V	PTFE + 25 % Glass	Blue		Improvements • Wear properties • Mechanical strength Slightly more abrasive, however, this is corrected by adding MOS2 Maintains its chemical and dielectric properties Well-suited to applications with rotational and simultaneous alternating movements	K6	NBR 70 Shore A	-30°C/+100°C
						G6	FKM 70 Shore A	-20°C/+200°C
VM	M	PTFE + 15 % Glass + 5% MOS2	Grey			K6	NBR 70 Shore A	-30°C/+100°C
						G6	FKM 70 Shore A	-20°C/+200°C
DX	X	PTFE GL Blue + Glass + Metal oxides	Turquoise blue	K6		NBR 70 Shore A	-30°C/+100°C	
				G6		FKM 70 Shore A	-20°C/+200°C	
DG	G	PTFE + 15% Graphite	Black	Improvements • Wear properties Reduced wear on metal parts Self-lubricating Thermal and electrical conductivity Low permeability Good friction coefficient Anti-static High performing in dynamic self-lubricating applications		K6	NBR 70 Shore A	-30°C/+100°C
						G6	FKM 70 Shore A	-20°C/+200°C
						C6	EPDM 70 Shore A	-45°C/+150°C
K1	K	PTFE + 10% Ekonol	Light brown			K6	NBR 70 Shore A	-30°C/+100°C
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
K2	K	PTFE + 20% Ekonol	Light brown		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DB	B	PTFE + 60% Bronze	Dark brown		Improvements • Wear properties • Warping resistance and creep strength • Compression resistance Self-lubricating Electrical and thermal conductivity Does not alter the metal parts Reduced hold with certain chemical products Used for high-compression dynamic seals and has a low level of wear	K6	NBR 70 Shore A	-30°C/+100°C
				G6		FKM 70 Shore A	-20°C/+200°C	
B4	B	PTFE + 40% Bronze	Dark brown	K6		NBR 70 Shore A	-30°C/+100°C	
				G6		FKM 70 Shore A	-20°C/+200°C	

Other grades of materials are available depending on your specificities.



○ INSTALLATION DIMENSIONS

Rod diameter Ød1 f8/h9		Groove diameter	Bore diameter	Groove width	Step width	O'Ring cross-section
Standard range	Extended range	ØD1 H9	ØD2 H11	L1 0/+0.20	L2 min	Ød2
19.0 - 39.9	19.0 - 100.0	d1 + 7.60	d1 + 1.50	4.20	3.00	2.62
40.0 - 69.9	30.0 - 200.0	d1 + 8.80	d1 + 1.50	6.30	3.00	2.62
70.0 - 139.9	70.0 - 360.0	d1 + 12.20	d1 + 2.00	8.10	4.00	3.53
140.0 - 399.9	100.0 - 650.0	d1 + 16.00	d1 + 2.50	9.50	5.00	5.33
400.0 - 649.9	200.0 - 650.0	d1 + 24.00	d1 + 2.50	14.00	8.00	6.99
650.0 - 999.9	400.0 - 999.9	d1 + 27.30	d1 + 2.50	16.00	10.00	8.40

○ EXAMPLE OF CODIFICATION

STANDARD CODIFICATION

Materials _____ : Friction ring, PTFE + 60% Bronze - Code DB

_____ : NBR 70 Shore A O'Ring - Code K6

Rod diameter _____ : Ød1 = 50.00 mm

Groove diameter _____ : ØD1 = 58.80 mm

Part number _____ : 485. 050DBK6

Part number -

485.

050

DB

K6

Family

Rod diameter

Friction ring material*

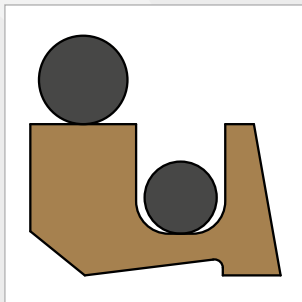
O'Ring material*

* The codes that define the materials are set out in the materials table on the previous page.

DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H9	Groove diameter ØD2 H11	Groove width L1 0/+0.20	Shoulder width L2 min
485.019	19.00	26.60	20.50	4.20	3.00
485.020	20.00	27.60	21.50	4.20	3.00
485.022	22.00	29.60	23.50	4.20	3.00
485.025	25.00	32.60	26.50	4.20	3.00
485.028	28.00	35.60	29.50	4.20	3.00
485.030	30.00	37.60	31.50	4.20	3.00
485.032	32.00	39.60	33.50	4.20	3.00
485.035	35.00	42.60	36.50	4.20	3.00
485.036	36.00	43.60	37.50	4.20	3.00
485.037	37.00	44.60	38.50	4.20	3.00
485.038	38.00	45.60	39.50	4.20	3.00
485.040	40.00	48.80	41.50	6.30	3.00
485.042	42.00	50.80	43.50	6.30	3.00
485.045	45.00	53.80	46.50	6.30	3.00
485.048	48.00	56.80	49.50	6.30	3.00
485.049	49.00	57.80	50.50	6.30	3.00
485.050	50.00	58.80	51.50	6.30	3.00
485.052	52.00	60.80	53.50	6.30	3.00
485.054	54.00	62.80	55.50	6.30	3.00
485.055	55.00	63.80	56.50	6.30	3.00
485.056	56.00	64.80	57.50	6.30	3.00
485.058	58.00	66.80	59.50	6.30	3.00
485.060	60.00	68.80	61.50	6.30	3.00
485.062	62.00	70.80	63.50	6.30	3.00
485.063	63.00	71.80	64.50	6.30	3.00
485.065	65.00	73.80	66.50	6.30	3.00
485.068	68.00	76.80	69.50	6.30	3.00
485.070	70.00	82.20	72.00	8.10	4.00
485.075	75.00	87.20	77.00	8.10	4.00
485.080	80.00	92.20	82.00	8.10	4.00
485.085	85.00	97.20	87.00	8.10	4.00
485.090	90.00	102.20	92.00	8.10	4.00
485.095	95.00	107.20	97.00	8.10	4.00
485.100	100.00	112.20	102.00	8.10	4.00
485.105	105.00	117.20	107.00	8.10	4.00
485.110	110.00	122.20	112.00	8.10	4.00
485.115	115.00	127.20	117.00	8.10	4.00
485.120	120.00	132.20	122.00	8.10	4.00
485.125	125.00	137.20	127.00	8.10	4.00
485.130	130.00	142.20	132.00	8.10	4.00
485.135	135.00	147.20	137.00	8.10	4.00
485.140	140.00	156.00	142.50	9.50	5.00
485.145	145.00	161.00	147.50	9.50	5.00
485.150	150.00	166.00	152.50	9.50	5.00
485.155	155.00	171.00	157.50	9.50	5.00
485.160	160.00	176.00	162.50	9.50	5.00
485.165	165.00	181.00	167.50	9.50	5.00
485.170	170.00	186.00	172.50	9.50	5.00
485.175	175.00	191.00	177.50	9.50	5.00
485.180	180.00	196.00	182.50	9.50	5.00
485.185	185.00	201.00	187.50	9.50	5.00
485.190	190.00	206.00	192.50	9.50	5.00
485.195	195.00	211.00	197.50	9.50	5.00
485.200	200.00	216.00	202.50	9.50	5.00
485.205	205.00	221.00	207.50	9.50	5.00
485.210	210.00	226.00	212.50	9.50	5.00
485.215	215.00	231.00	217.50	9.50	5.00
485.220	220.00	236.00	222.50	9.50	5.00
485.230	230.00	246.00	232.50	9.50	5.00
485.240	240.00	256.00	242.50	9.50	5.00
485.250	250.00	266.00	252.50	9.50	5.00
485.260	260.00	276.00	262.50	9.50	5.00
485.270	270.00	286.00	272.50	9.50	5.00
485.280	280.00	296.00	282.50	9.50	5.00
485.290	290.00	306.00	292.50	9.50	5.00
485.300	300.00	316.00	302.50	9.50	5.00
485.310	310.00	326.00	312.50	9.50	5.00
485.320	320.00	336.00	322.50	9.50	5.00
485.330	330.00	346.00	332.50	9.50	5.00
485.340	340.00	356.00	342.50	9.50	5.00
485.350	350.00	366.00	352.50	9.50	5.00
485.360	360.00	376.00	362.50	9.50	5.00
485.370	370.00	386.00	372.50	9.50	5.00
485.380	380.00	396.00	382.50	9.50	5.00
485.390	390.00	406.00	392.50	9.50	5.00
485.400	400.00	424.00	402.50	14.00	8.00
485.450	450.00	474.00	452.50	14.00	8.00
485.500	500.00	524.00	502.50	14.00	8.00

The figures highlighted in bold correspond to the dimensions for standard ISO 6195 Type D, with the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.



WIPER SEALS

BECA 486



DESCRIPTION

The BECA 486 profile is a double acting composite wiper seal composed of a filled PTFE friction ring and two pre-tightened rubber O'Rings.

ADVANTAGES

Low friction coefficient;
no stick-slip effect

Wide temperature range and excellent chemical resistance, depending on the materials selected

Excellent abrasion and wear resistance

Very good wiping effect against external pollutions

Suitable for large dimensions

APPLICATIONS

Steelworks

Offshore

Mine

Hydraulic presses

Water treatment

MATERIALS

Friction ring

Bronze-filled PTFE

Carbon-filled PTFE

O'Rings

NBR 70 Shore A

FKM 70 Shore A

Other grades of materials are available. Please refer to the materials table on the next page.

TECHNICAL DATA

Temperature	-30°C / +200°C
Speed	5 m/s
Media	Mineral hydraulic oils Fire-resistant liquids Biocompatible fluids Water Others (contact our experts)

The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.05 - 0.2 µm	≤1.6 µm	≤3.2 µm
Rz	0.4 - 1.6 µm	≤6.3 µm	≤10.0 µm
Rmax	0.63 - 2.5 µm	≤10.0 µm	≤16.0 µm

RADIUS

Radial section S	Radius R1	Radius R2
11.10	0.30	1.20
12.10	0.30	1.20
16.50	0.30	1.20
18.25	0.30	2.00

CHAMFER

The chamfer length as well as the chamfer angle are determined by the rod seal.

DETERMINATION OF O-RING INSIDE DIAMETERS

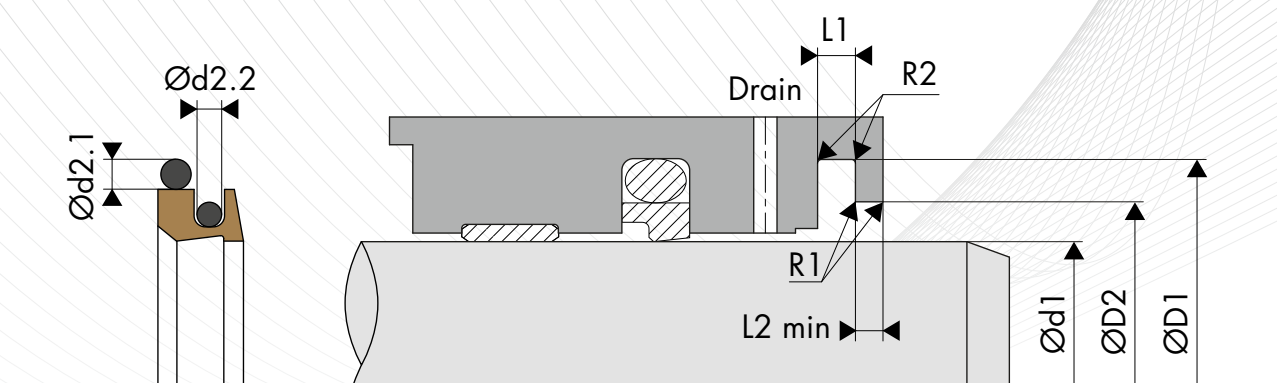
Radial section S	Ød1 O'Rings	
	Ød1.1	Ød1.2
11.10	Ød1 + 12.00	Ød1 + 5.00
12.10	Ød1 + 14.00	Ød1 + 5.00
16.50	Ød1 + 20.00	Ød1 + 6.00
18.25	Ød1 + 21.00	Ød1 + 6.00

We recommend consulting the dimensions in standard ISO 3601-1 that are closest to the value calculated.

TABLE MATERIALS

Friction ring					O'Rings			Mating surface material
Standard code	ISO code	Material	Colour	Characteristics	Code	Type of material	Service temperature	
DP	P	Virgin PTFE	White	Resistance to chemical products Impermeability Dielectric Non-stick Low friction coefficient Food industry	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
					F6	VMQ 70 Shore A	-60°C/+200°C	
DC	C	PTFE + 25% Carbon	Grey	Improvements • Wear properties • Compression set Good resistance to chemical products Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
CG	C	PTFE + 23% Carbon + 2% Graphite	Black	Thermal and electrical conductivity Anti-static High-performing in compression-based dynamic applications	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DV	V	PTFE + 25 % Glass	Blue	Improvements • Wear properties • Mechanical strength Slightly more abrasive, however, this is corrected by adding MOS2 Maintains its chemical and dielectric properties Well-suited to applications with rotational and simultaneous alternating movements	K6	NBR 70 Shore A	-30°C/+100°C	Steel Chrome steel Cast iron
					G6	FKM 70 Shore A	-20°C/+200°C	
VM	M	PTFE + 15 % Glass + 5% MOS2	Grey		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
DX	X	PTFE GL Blue + Glass + Metal oxides	Turquoise blue	Resistance to compression Resistance to wear Excellent chemical stability Good thermal conductivity	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
DG	G	PTFE + 15% Graphite	Black	Improvements • Wear properties Reduced wear on metal parts Self-lubricating Thermal and electrical conductivity Low permeability Good friction coefficient Anti-static High performing in dynamic self-lubricating applications	K6	NBR 70 Shore A	-30°C/+100°C	Steel Stainless steel Chrome steel Aluminium Bronze Cast iron Treated surface
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
K1	K	PTFE + 10% Ekonol	Light brown	Improvements • Better abrasion resistance • Better dimensional stability at high temperatures Use up to +300°C Good friction coefficient and low permeability	K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
K2	K	PTFE + 20% Ekonol	Light brown		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	
					C6	EPDM 70 Shore A	-45°C/+150°C	
DB	B	PTFE + 60% Bronze	Dark brown	Improvements • Wear properties • Warping resistance and creep strength • Compression resistance Self-lubricating Electrical and thermal conductivity Does not alter the metal parts Reduced hold with certain chemical products Used for high-compression dynamic seals and has a low level of wear	K6	NBR 70 Shore A	-30°C/+100°C	Steel Chrome steel Cast iron
					G6	FKM 70 Shore A	-20°C/+200°C	
B4	B	PTFE + 40% Bronze	Dark brown		K6	NBR 70 Shore A	-30°C/+100°C	
					G6	FKM 70 Shore A	-20°C/+200°C	

Other grades of materials are available depending on your specificities.



○ INSTALLATION DIMENSIONS

Rod diameter Ød1 f8/h9		Groove diameter	Bore diameter	Groove width	Step width	O'Ring cross-section	O'Ring cross-section
Standard range	Extended range	ØD1 H8	ØD2 H8	L1 0/+0.20	L2 +0/-0.10	Ød2.1	Ød2.2
140.0 - 229.9	100.0 - 450.0	d1 + 22.20	d1 + 10.70	6.30	4.20	5.33	3.53
230.0 - 299.9	220.0 - 450.0	d1 + 24.20	d1 + 10.70	6.30	4.20	5.33	3.53
300.0 - 629.9	250.0 - 650.0	d1 + 33.00	d1 + 15.10	8.10	6.30	6.99	5.33
630.0 - 999.9	550.0 - 999.9	d1 + 36.50	d1 + 15.10	9.50	6.30	8.40	5.33

○ EXAMPLE OF CODIFICATION

STANDARD CODIFICATION

Materials _____ : Friction ring, PTFE + 60% Bronze - Code DB
 _____ : NBR 70 Shore A O'Rings - Code K6
Rod diameter _____ : Ød1 = 150.00 mm
Groove diameter _____ : ØD1 = 172.20 mm
Part number _____ : 486.150DBK6

Part number - 486. 150 DB K6
 Family _____
 Rod diameter _____
 Friction ring material* _____
 O'Ring materials* _____

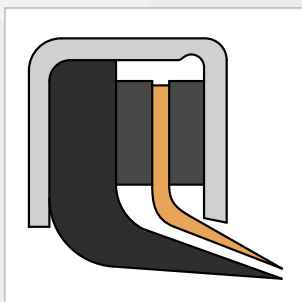
* The codes that define the materials are set out in the materials table on the previous page.

DIMENSIONS

Part number	Rod diameter Ød1 f8/h9	Groove diameter ØD1 H8	Bore diameter ØD2 H8	Seal height H1	Groove width L1 0/+0.20	Shoulder width L2 +0/-0.10	O'Ring Ød1.1 x Ød2.1	O'Ring Ød1.2 x Ød2.2
486.100	100.00	122.20	110.70	13.50	6.30	4.20	110.49 x 5.33	104.37 x 3.53
486.110	110.00	132.20	120.70	13.50	6.30	4.20	123.19 x 5.33	117.07 x 3.53
486.120	120.00	142.20	130.70	13.50	6.30	4.20	132.72 x 5.33	126.59 x 3.53
486.130	130.00	152.20	140.70	13.50	6.30	4.20	142.24 x 5.33	136.12 x 3.53
486.140	140.00	162.20	150.70	13.50	6.30	4.20	151.77 x 5.33	142.47 x 3.53
486.150	150.00	172.20	160.70	13.50	6.30	4.20	164.47 x 5.33	151.99 x 3.53
486.160	160.00	182.20	170.70	13.50	6.30	4.20	170.82 x 5.33	164.69 x 3.53
486.170	170.00	192.20	180.70	13.50	6.30	4.20	183.52 x 5.33	171.04 x 3.53
486.180	180.00	202.20	190.70	13.50	6.30	4.20	189.87 x 5.33	183.74 x 3.53
486.190	190.00	212.20	200.70	13.50	6.30	4.20	202.57 x 5.33	190.09 x 3.53
486.200	200.00	222.20	210.70	13.50	6.30	4.20	215.27 x 5.33	202.79 x 3.53
486.210	210.00	232.20	220.70	13.50	6.30	4.20	221.62 x 5.33	215.49 x 3.53
486.220	220.00	242.20	230.70	13.50	6.30	4.20	234.32 x 5.33	221.84 x 3.53
486.230	230.00	254.20	240.70	13.50	6.30	4.20	247.02 x 5.33	234.54 x 3.53
486.240	240.00	264.20	250.70	13.50	6.30	4.20	253.37 x 5.33	247.24 x 3.53
486.250	250.00	274.20	260.70	13.50	6.30	4.20	266.07 x 5.33	253.59 x 3.53
486.260	260.00	284.20	270.70	13.50	6.30	4.20	278.77 x 5.33	266.29 x 3.53
486.270	270.00	294.20	280.70	13.50	6.30	4.20	278.77 x 5.33	278.99 x 3.53
486.280	280.00	304.20	290.70	13.50	6.30	4.20	291.47 x 5.33	291.69 x 3.53
486.290	290.00	314.20	300.70	13.50	6.30	4.20	304.17 x 5.33	291.69 x 3.53
486.300	300.00	333.00	315.10	18.40	8.10	6.30	316.87 x 6.99	304.17 x 5.33
486.310	310.00	343.00	325.10	18.40	8.10	6.30	329.57 x 6.99	304.17 x 5.33
486.320	320.00	353.00	335.10	18.40	8.10	6.30	342.47 x 6.99	329.57 x 5.33
486.330	330.00	363.00	345.10	18.40	8.10	6.30	354.97 x 6.99	329.57 x 5.33
486.340	340.00	373.00	355.10	18.40	8.10	6.30	354.97 x 6.99	354.97 x 5.33
486.350	350.00	383.00	365.10	18.40	8.10	6.30	367.67 x 6.99	354.97 x 5.33
486.360	360.00	393.00	375.10	18.40	8.10	6.30	380.37 x 6.99	354.97 x 5.33
486.370	370.00	403.00	385.10	18.40	8.10	6.30	393.07 x 6.99	380.37 x 5.33
486.380	380.00	413.00	395.10	18.40	8.10	6.30	405.26 x 6.99	380.37 x 5.33
486.390	390.00	423.00	405.10	18.40	8.10	6.30	417.96 x 6.99	405.26 x 5.33
486.400	400.00	433.00	415.10	18.40	8.10	6.30	417.96 x 6.99	405.26 x 5.33
486.410	410.00	443.00	425.10	18.40	8.10	6.30	430.66 x 6.99	405.26 x 5.33
486.420	420.00	453.00	435.10	18.40	8.10	6.30	443.36 x 6.99	430.66 x 5.33
486.430	430.00	463.00	445.10	18.40	8.10	6.30	456.06 x 6.99	430.66 x 5.33
486.440	440.00	473.00	455.10	18.40	8.10	6.30	468.76 x 6.99	456.06 x 5.33
486.450	450.00	483.00	465.10	18.40	8.10	6.30	468.76 x 6.99	456.06 x 5.33
486.460	460.00	493.00	475.10	18.40	8.10	6.30	481.46 x 6.99	456.06 x 5.33
486.470	470.00	503.00	485.10	18.40	8.10	6.30	494.16 x 6.99	481.38 x 5.33
486.480	480.00	513.00	495.10	18.40	8.10	6.30	506.86 x 6.99	481.38 x 5.33
486.500	500.00	533.00	515.10	18.40	8.10	6.30	532.26 x 6.99	506.78 x 5.33

The figures highlighted in bold correspond to the rod diameters in line with standard ISO 3320. Other intermediate sizes can be provided.

Other profiles



WIPER SEALS

BECA 478



Description

The BECA 478 profile is a wiper seal composed of a thin brass wiping lip assembled in tandem with a second rubber wiping lip in a metal shell. This seal is designed to efficiently remove the solid particles (ice, mud) and all other impurities that stick to the rod.

Advantages

Very good external wiping effect even for stubborn soiling (ice, mud)
 Very good abrasion resistance
 Assembly in open groove

APPLICATIONS

Cold and heavily contaminated environments
 Agriculture
 Mobile machinery
 Material handling - Lifting
 Hydraulic cylinders

MATERIALS

Primary sealing lip

Brass

Secondary sealing lip

NBR 70 Shore A

Metal cage

Steel

TECHNICAL DATA

Temperature	-40°C / +100°C
Speed	1 m/s
Media	Mineral oils Fire-resistant hydraulic fluids (HFA, HFB and HFC) Water Air

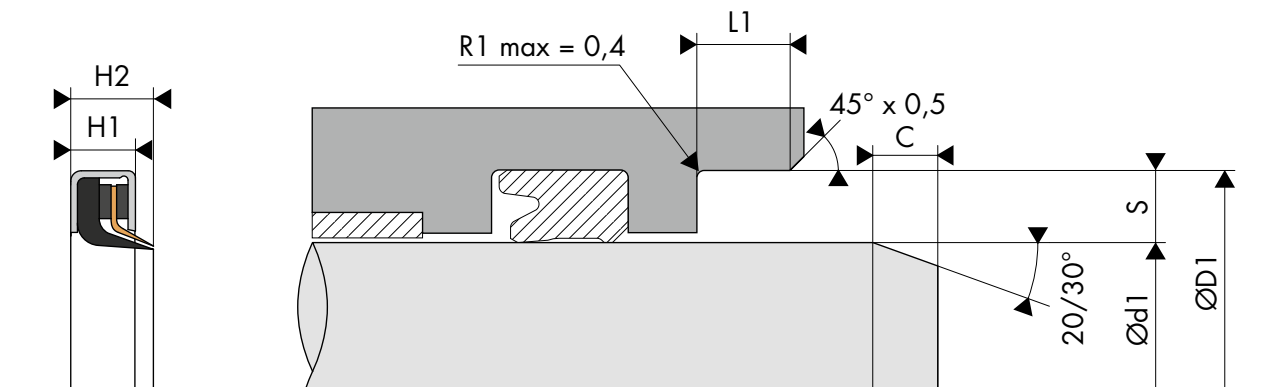
The figures above indicate the maximum values and may not be cumulated. They may be developed, depending on the materials used.

SURFACE ROUGHNESS

Roughness	Dynamic surface area	Static surface area	Groove flanks
Ra	0.1 - 0.4 µm	≤1.6 µm	≤3.2 µm
Rz	0.63 - 2.5 µm	≤6.3 µm	≤10.0 µm
Rmax	1.0 - 4.0 µm	≤10.0 µm	≤16.0 µm

CHAMFER

The length as well as the chamfer angle are determined by the rod seal.



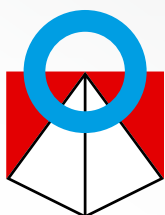


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