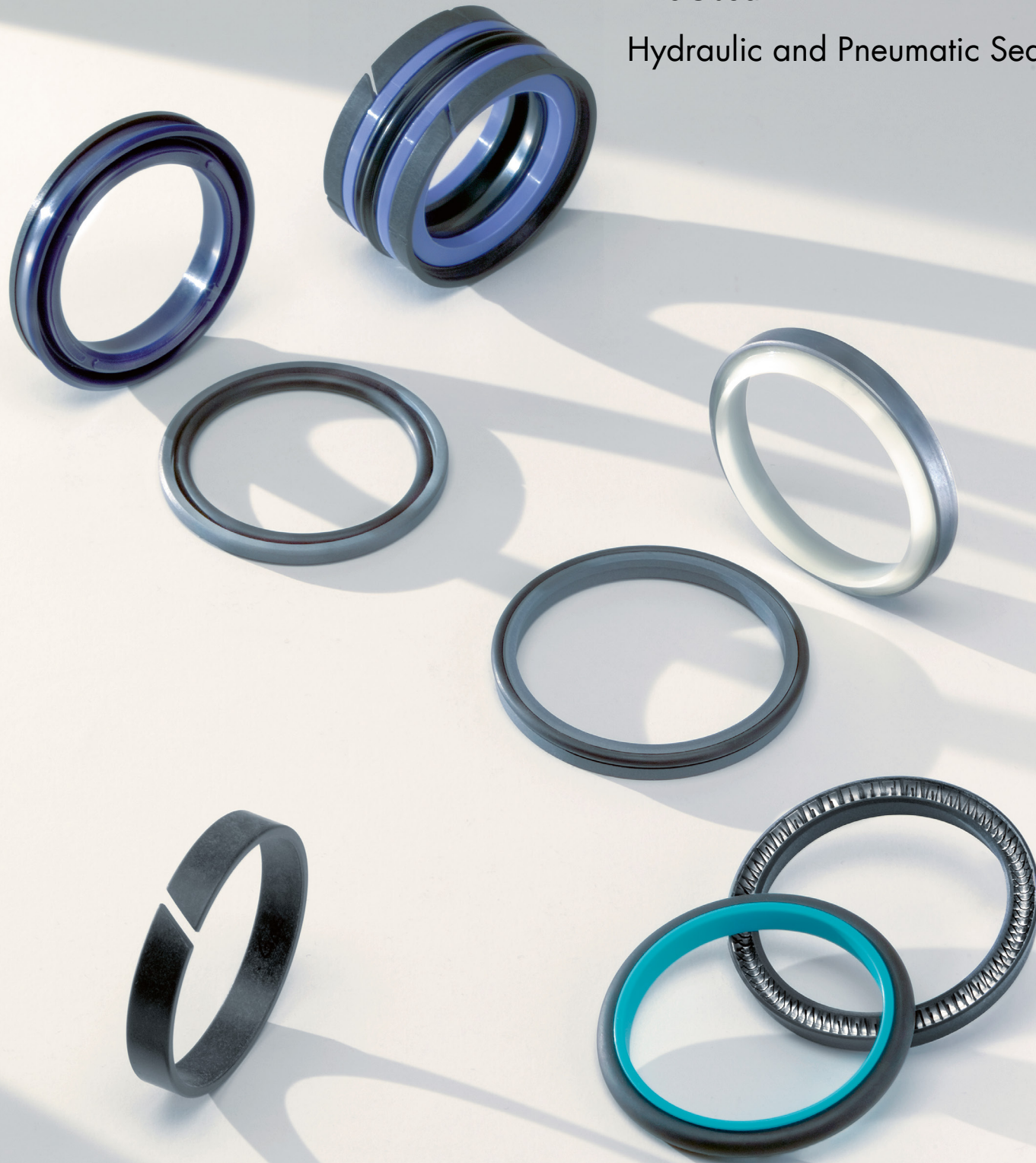


APSOseal®

Hydraulic and Pneumatic Seals



Linear Sealing Systems – A Wide Product Range



Standard compounds overview

A quick summary of the materials most used in hydraulic and pneumatic applications. Angst+Pfister can provide any compound needed per customer request.



APSOseal® – Piston seals

A wide range of piston seals manufactured in thermoplastic and/or in an engineered composite material to cover almost all hydraulic and pneumatic applications.



APSOseal® – Rod seals

We provide a full range of seal designs and materials to ensure a long service life and a leak-free system.



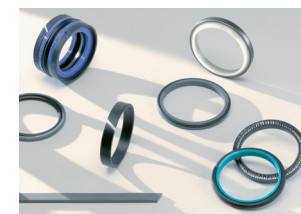
APSOseal® – Wiper seal

Single or double lip design – polyurethane or modified PTFE – Angst+Pfister offers a full range of standard and customized wiper seals.



APSOseal® – Guide tape/ring

Supplied in roll or cut to length, Angst+Pfister has the right guide ring to suit your application.



APSOseal® – Seals static and rotating hydraulic applications

In addition to dynamic linear seals, Angst+Pfister provides standard and special seals for rotating and static applications used within hydraulic systems and components.

From Standard Products to Customer-specific Solutions

The various requirements and operating conditions of hydraulic devices and equipment require a wide range of seal designs. Common operating parameters that affect selection criteria are: speed, temperature, system pressure, service life expectancy, leak-free integrity, low friction and the price/benefit ratio. Another parameter of seals’ profile is its use as a rod or piston seal. Furthermore, the selection of the most appropriate material is important, in order to optimize friction and resistance to pressure.

The Angst+Pfister’s sealing range covers all hydraulic and pneumatic applications. The most common dimensions are supplied from stock.

Engineering services

Angst+Pfister engineers have extensive international experience in optimizing sealing systems. We address our customers’ challenges through the following services:

- Technical consulting on new and existing systems
- Selection of optimal seals and materials
- Calculation and layout of sealing solution
- Optimization of price vs. performance
- Rapid prototyping for customized solutions

We provide the optimal solution through a combination of standard parts, or by developing new, customized parts to meet your specific needs.

The perfect global production platform: High-quality components for the highest requirements

Angst+Pfister has production facilities in 15 countries worldwide. This global orientation provides our customers always with the most cost-effective production environment – even before considering our competitive ability to meet quantity, logistic and quality requirements. Being a company that is certified according to ISO-9001:2000, we make every effort to completely meet the quality requirements of our customers.

Reliable logistics and customer focus worldwide

A comprehensive logistics infrastructure ensures that the right products are getting to their destination when and where they are required. Highly efficient processes, supported by an electronic order processing system, characterize the Angst+Pfister Logistics Center. Thanks to our extraordinary international network, a just-in-time delivery is supplied to all our customers, no matter the location.

Standard Compounds Overview



Here is a list of Angst+Pfister’s standard compounds for linear sealing system. We have a full range of high-performance thermoplastic and polyurethane compounds specially developed for use in linear sealing systems.

Upon request, more standard and special compounds are available. Please contact our engineers for technical advice.

Engineered PTFE Compounds Angst + Pfister/Standard

Angst + Pfister Material code	Compound	Filling rate	Temperature range °C	Mating surface	MPa max.	Purpose
☐ PTFE VG.429-02	PTFE virgin	not filled	–200/+250	steel, steel chrome-plated, cast iron, aluminum, bronze, alloys	20	mainly used for back-up rings; static sealing (excellent); limited resistance to pressure; FDA compliant
☐ PTFE MD.429-01	PTFE modified	low	–200/+280	steel, steel chrome-plated, cast iron, aluminum, bronze, alloys	25	low gas permeability; improved resistance to pressure and wear vs. virgin PTFE (compressive strength)
☒ PTFE MD.429-03	PTFE modified	low	–200/+260	steel, steel chrome-plated, cast iron, aluminum, bronze, alloys	20	lubricating hydraulic fluids; very low friction, excellent sliding and sealing properties; suitable for gas sealing and cryogenics; FDA compliant
☒ PTFE CG.429-01	PTFE carbon/graphite	medium	–200/+260	steel, steel hardened, steel chrome-plated, stainless steel; bronze chrome-plated; anodized aluminium	40	lubricating & non-lubricating hydraulic fluids; guide tape; for dry application; high extrusion resistance
☒ PTFE CF.429-01	PTFE carbon fibers	low	–200/+260	steel hardened, steel chrome-plated; cast iron; anodized aluminium	40	lubricating & non-lubricating hydraulic fluids; water hydraulics, hard mating surfaces; seal with prestressing spring; short strokes/high frequency
☒ PTFE BC.429-01	PTFE modified + bronze	medium	–200/+260	steel hardened, steel chrome-plated; cast iron	50	standard compound for lubricating hydraulics in linear motion; high extrusion resistance; zinc-containing oil
☒ PTFE GM.429-01	PTFE modified + glass fibers + MoS ₂	medium	–200/+260	steel, steel hardened, steel chrome-plated, cast iron	40	for all lubricating & non-lubricating fluids dielectric properties, reduced creep; resistant to organic solvents
☒ PTFE EK.429-02	Ekonol, aromatic polymer	low	–65/+200	soft surface	25	suitable for low pressure rotary applications; high speed; abrasive hydraulic fluids; not for use with water; food application; FDA compliant
☐ PEHD UH.429-01	High-density PE (UHMWPE)	not filled	–50/+80	steel, steel chrome-plated, stainless steel, aluminum, ceramic coating, steel hardened, anodized aluminium, cast iron, premium steel	40	very high abrasion resistance; lubricating & non-lubricating hydraulic fluids; gas, dry air pneumatic, water-based fluids; Limited temperature; strong lips with very good wiping effect; FDA compliant

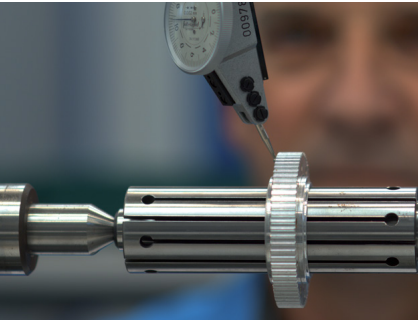
Engineered TPU Compounds Angst + Pfister/Standard

Angst + Pfister Material code	Description	Hardness	Temperature range °C	Mating surface	MPa max.	Purpose
☒ TPU 93.447-01	MDI TPU Polyester	93 Sh.A	–35/+100	steel, steel chrome-plated, stainless steel, premium steel, aluminum	40	standard grade for hydraulics, piston, rod and scrapers
☒ TPU 98.447-01	MDI TPU Polyester	98 Sh.A	–35/+100	steel, steel chrome-plated, stainless steel, premium steel, aluminum	40	standard grade for heavy-duty hydraulics
☒ TPU 90.447-01	MDI TPU Polyether	90 Sh.A	–40/+90	steel, steel chrome-plated, stainless steel, premium steel, aluminum	1.6	standard grade for pneumatics
☒ TPU 92.447-01	PPDI TPU Polycaprolacton	92 Sh.A	–29/+135	steel, steel chrome-plated, stainless steel, premium steel, aluminum	40	special grade for high-temperature applications
☐ TPU 94.447-01	MDI TPU Polyether	94 Sh.A	–50/+90	steel, steel chrome-plated, stainless steel, premium steel, aluminum	40	special grade for low-temperature applications

Elastomeric Compounds Angst + Pfister/Standard

Angst + Pfister Material code	Rubber base	Hardness	Temperature range °C	O-ring Group Angst + Pfister designation	Purpose
☒ NBR 70.00-01 (NT 70.11)	NBR	70 Sh.A	–30/+100	NORMATEC	standard NBR grade for hydraulic applications
☒ NBR 70.10-02 (NBR 70.5/P5F)	NBR	70 Sh.A	–25/+125	HITEC	standard high-quality NBR grade for specific applications where approvals are required such in food & beverage
☒ EPDM 70.10-02 (EPDM 75.5/KW75F)	EPDM	70 Sh.A	–40/+160	HITEC	standard high-quality EPDM grade for specific applications where approvals are required such in food & beverage (FDA, USP class VI, 3A, KTW, etc.)
☒ FKM 75.00-01 (NT 80.7/75)	FKM	75 Sh.A	–20/+200	NORMATEC	standard FKM grade for special hydraulic applications, high-temperature and/or chemical resistant

Many other standard and special compounds are available. Please contact your Angst+Pfister representative!





Piston seals are generally double-acting elements where pressure comes from both sides. An excellent combination of tightness, lubricating behavior, friction and extrusion resistance is the key success factor.

There are different profile designs and materials to choose from, depending on your application. Angst+Pfister offers a wide range of high-quality engineered piston seals, either as standard or as special design.

APSOseal® – Piston seals																	
Product			Application					Standard	Action		Temp. range ¹⁾	Speed ²⁾	Pressure ²⁾	Seal Material Standard			
Profile	Type	Standard	On request		light	medium	heavy	ISO/DIN	single	double	°C	m/s	MPa max.				
	GRP	•		standard cylinders; mobile hydraulics; injection machines; presses	•	•	•	ISO 7425/1		•	–40/+200	15	40	PTFE BC.429-01 + NBR (EPDM or FKM)		pg. 1	
	AQP		•	accumulators; fluid/gas separation; hold cylinders; standard cylinders	•	•		ISO 7425/1		•	–40/+200	2	40	PTFE BC.429-01 + NBR (EPDM or FKM)			
	AQP2		•	accumulators; fluid/gas separation; hold cylinders; standard cylinders		•	•			•	–40/+200	3	50	PTFE BC.429-01 + NBR (EPDM or FKM)			
	LRP	•		standard cylinders; pneumatics; industrial hydraulics; machine tools	•	•				•	–40/+200	15	20	PTFE CG.18-01 + NBR (EPDM or FKM)		pg. 5	
	DDP	•		standard cylinders; pneumatics; industrial hydraulics; machine tools	•			ISO 3601 DIN 3771 AS 4716		•	–30/+200	15	20	PTFE MD.429-03 + NBR (EPDM or FKM)		pg. 8	
	PSO	•		standard cylinders; mobile hydraulics; industrial hydraulics		•	•	ISO 7425/1		•	–35/+110	0.5	25	TPU 93.447-01 + NBR (EPDM or FKM)		pg. 12	
	SSP		•	standard cylinders; mobile hydraulics; injection machines; presses	•	•	•	ISO 7425/1	•		–40/+200	15	40	PTFE BC.429-01 + NBR (EPDM or FKM)			
	VSP100	•		high/low temperatre; aggressive media; foodstuffs; valves; medical technology	•	•	•	AS 4716	•		–200/+260	15	40	PTFE CF.429-01 + stainless steel V spring		pg. 16	
	PSA	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•		ISO 5597/1	•		–35/+110	0.5	40	TPU 93.447-01		pg. 18	
	PAE	•		standard cylinders; mobile hydraulics; industrial hydraulics		•	•	ISO5597/1	•		–35/+110	0.5	50	TPU 93.447-01 / POM		pg. 22	
	RPS	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•		ISO 5597/1	•		–35/+110	0.5	40	TPU 93.447-01		pg. 25	
	UM	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•				•	–30/+100	0.5	10	NBR 90.447-01		pg. 29	
	DEM	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•				•	–30/+100	0.5	10	NBR 75.447-01		pg. 33	
	DMP	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•				•	–30/+120	0.5	40	NBR 65.428-02 NBR 75.428-01		pg. 36	
	KDAE	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•	•			•	–30/+110	0.8	40	TPU 93.447-01/TPE 63.447-01		pg. 39	
	KDSB	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•		ISO 6547		•	–30/+100	0.5	30	TPE 63.447-01/NBR 70.447-02/POM		pg. 42	
	MPP	•		pneumatic cylinders	•					•	–30/+100	1	2	NBR 75.447-02		pg. 46	
	PSP	•		pneumatic cylinders	•					•	–40/+90	1	2	TPU 90.447-01		pg. 48	
	SPS/N	•		pneumatic cylinders	•					•	–20/+100	1	1.2	NBR 80.447-01		pg. 52	

Other types or compounds are available on request.

¹⁾ Temperature range depends on the rubber and media used.

²⁾ These are maximum values and cannot be combined together.

Maximum pressure will depend on temperature and gap dimension.

APSOseal® – Rod Seals



Compared to piston seals, expectations from (and requirements for) rod sealing systems are much higher and more critical. Rod seals must ensure no leakage into the atmosphere at all and thus are impacted by all operating conditions. Furthermore, low friction, high mechanical properties, compact design and ease of installation are some of the key requirements demanded by the market.

Generally speaking, rod seals are single-acting elements. Geometry and materials used depend on several factors. Angst+Pfister offers a wide range of high-quality engineered rod seals, either as standard or as special design.

Contact our engineers for the most appropriate and cost-effective solution.

APSOseal® – Rod seals															
Product			Application				Standard		Action		Temp. range ¹⁾	Speed ²⁾	Pressure ²⁾	Seal Material Standard	
Profile	Type	Standard	On request		light	medium	heavy	ISO/DIN	single	double	°C	m/s	MPa max.		
	SSR	•		standard cylinders; mobile hydraulics; injection machines; presses; machine tools	•	•	•	7425/2	•		–40/+200	15	40	PTFE BC.429-01 + NBR (EPDMor FKM)	 pg.55
	GRR		•	standard cylinders; mobile hydraulics; injection machines; presses; machine tools	•	•	•	7425/2		•	–40/+200	15	40	PTFE BC.429-01 + NBR (EPDMor FKM)	
	LRC	•		standard cylinders; pneumatic; industrial hydraulics; machine tools	•	•				•	–40/+200	15	20	PTFE CG.429-01 + NBR (EPDMor FKM)	 pg.59
	DDR	•		standard cylinders; pneumatic; industrial hydraulics; machine tools	•					•	–40/+200	15	20	PTFE MD.429-03 + NBR (EPDMor FKM)	 pg.62
	VSR100	•		high/low temperature; aggressive media; foodstuffs; valves; medical technology	•	•		AS 4716	•		–200/+200	15	40	PTFE CF.429-01 + stainless steel V spring	 pg.66
	RSA	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•		5597/1	•		–35/+110	0.5	40	TPU 93.447-01	 pg.69
	RSB		•	standard cylinders; mobile hydraulics; industrial hydraulics		•		5597/1	•		–35/+110	0.5	40	TPU 93.447-01	
	RSB2	•		standard cylinders; mobile hydraulics; industrial hydraulics		•	•	5597/1	•		–35/+110	0.5	50	TPU 93.447-01 + POM 118.447-01	 pg.75
	RSC		•	standard cylinders; mobile hydraulics; industrial hydraulics		•		5597/1	•		–35/+110	0.5	40	TPU 93.447-01	
	RSO		•	standard cylinders; mobile hydraulics; industrial hydraulics	•	•		5597/1	•		–35/+110	0.5	25	TPU 93.447-01 + NBR	
	RPS	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•		5597/1	•		–35/+110	0.5	40	TPU 93.447-01	
	DMR	•		standard cylinders; mobile hydraulics; industrial hydraulics		•	•			•	–35/+120	0.5	40	NBR 65.428-02 NBR 75.428-01	 pg.78
	UM	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•				•	–30/+100	0.5	10	NBR 90.447-01	
	DIM	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•				•	–30/+100	0.5	10	NBR 90.447-01	 pg.82
	RSF8	•		standard cylinders; mobile hydraulics; industrial hydraulics	•	•				•	–30/+120	0.3	20	NBR 65.428-02 NBR 75.428-01	 pg.85
	RSP	•		pneumatic cylinders	•					•	–40/+90	1	2	TPU 90.447-01	 pg.90
	SRS/N	•		pneumatic cylinders	•					•	–30/+100	1	1.2	NBR 80.447-01	pg.92

Other types or compounds are available on request.

¹⁾ Temperature range depends on the rubber and media used.
²⁾ These are maximum values and cannot be combined together.
 Maximum pressure will depend on temperature and gap dimension.

APSOseal® – Wiper Seal



Wiper seals are used to prevent internal contamination of the hydraulic system while the rods retract. Single-lip or double-lip types are available. Profile and material to be used will not only depend on your parameters but also from the rod seal system chosen, such as tandem arrangement. Angst+Pfister offers a wide range of high-quality engineered wiper seals, either as standard or special types.

APSOseal® – Wiper seal

Product		Application			Standard			Groove type	Action		Temp. range ¹⁾	Speed ²⁾	Pressure ²⁾	Wiper material
Profile	Type	Standard	On request	light	medium	heavy	ISO/DIN		single	double	°C	m/s	MPa max.	
	WSG	•		•	•			open	•		–35/+110	0.8	0	TPU 94.447-02 + metal insert on OD  pg.94
	WWS	•		•	•			split < 14; closed > 14	•		–35/+110	1	0	> 36 mm = TPU 90.447-01  pg.96 < 36 mm = TPU 93.447-01  pg.96
	WSL	•		•	•	•		closed	•		–35/+110	1	0	TPU 93.447-01  pg.98
	WED	•		•			6195/C	closed		•	–35/+110	1	2	TPU 93.447-01  pg.101
	WES100	•		•	•		6195/D	split < 30; closed > 30	•		–40/+200	15	0	PTFE BC.429-01 + NBR (EPDM or FKM)  pg.104
	WES 500	•		•	•	•	6195/D	split < 30; closed > 30		•	–40/+200	15	0	PTFE BC.429-01 + NBR (EPDM or FKM)  pg.108
	BWA	•		•				closed		•	–40/+90	1	2	TPU 90.447-01  pg.111

Other types or compounds are available on request.

¹⁾ Temperature range depends on the rubber and media used.
²⁾ These are maximum values and cannot be combined together.
 Maximum pressure will depend on temperature and gap dimension.

APSOseal® – Guide Tape/Ring



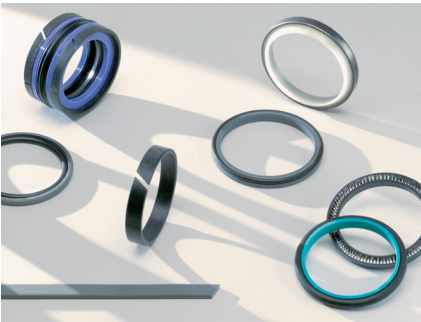
Guide tapes or guide rings guide the piston/rod, protect from metallic contact between the sliding parts and absorb any radial loads which occur. They are available out of roll (cut to the correct length) or available as a pre-formed ring. Material and quantity of wear rings to be used will depend upon your application. Angst+Pfister offers engineered filled PTFE as well as POM, PA and fabric reinforced composite material guide rings.

APSOseal® – Guide tape/ring

Product		Application			Standard			Mating surface	Temp. range	Speed	Load (25°C)	Delivery form	Seal material standard
Profile	Type	Standard	On request	light	medium	heavy	ISO/DIN						
		•		•	•		10766	steel; steel hardened; steel hardchromed; cast iron	–60/+150 (200)	15	15	cut from roll	PTFE BC.429-01  pg.113
		•		•	•		10766	mild steel; steel hardchromed; stainless steel; aluminum	–60/+150 (200)	15	15	cut from roll	PTFE CG.429-01  pg.115
	GT	•		•	•		10766	mild steel; steel hardchromed; stainless steel; aluminum	–50/+80 (100)	2	25	cut from tube	PEHD UH.429-01 
		•		•	•		10766	steel; steel hardchromed; cast iron	–40/+110	0.8	35	pre-formed ring	POM 118.447-01 
		•		•	•	•	10766	steel; steel hardened; steel hardchromed; cast iron	–40/+130	1	100	cut from tube	POLY 100.429-01 

Other types or compounds are available on request.

APSOseal® – Seals Static and Rotating Hydraulic Applications



In addition to the standard APSOseal® stroke seals product range, specially designed for linear sealing systems, Angst + Pfister offers a wide choice of seals custom-designed for static or rotating applications within hydraulic and pneumatic components. Here listed are a few examples of such seals, including our spring energized PTFE jacket seals type VSF for static use and RVSR for rotary applications. Another static seal used in hydraulic cylinders is our type SSA, a single polyurethane element, specially designed to replace the use of an O-ring with its backup rings.

APSOseal® – Special seals

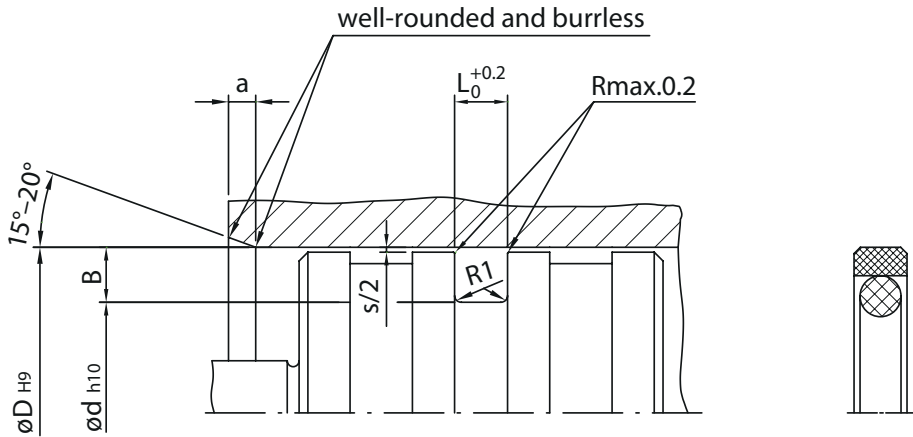
Product		Application		Standard	Action		Temp. range ¹⁾	Speed ²⁾	Pressure ²⁾	Shaft mating surface hardness	Seal material standard
Profile	Type	Standard	On request	ISO/DIN	type	single	double	°C	m/s	MPa max.	
	RGRP	•	rotary distributors; mobile hydraulics; machine tools	7425/1	oscillating rotating	•	–40/+200	2	40	> 55 HRC	PTFE CF.429-01+NBR (EPDM or FKM) 
	RGRR	•	rotary distributors; mobile hydraulics; machine tools	7425/1	oscillating rotating	•	–40/+200	2	40	> 55 HRC	PTFE CF.429-01+NBR (EPDM or FKM) 
	RVSR	•	rotary distributors; machine tools; chemical industry; foodstuffs		oscillating rotating	•	–150/+260	4	10	> 55 HRC	PTFE CF.429-01+stainless steel V spring 
									5	> 170 HB	PTFE EK.429-01 
	R17	•	rotary distributors; industrial hydraulics; machine tools		oscillating	•	–30/+100	0.1	20	n.a.	NBR 65.428-01 NBR 75.428-01 
	VRA	•	pneumatics		oscillating rotating	•	–40/+90	0.1	0	n.a.	TPU 90.447-01 
	VSFOI	•	ball valves; cryogenic; oil & gas; vacuum applications		static (internal)	•	–200/+260	n.a.	80 (static load)	n.a.	PTFE MD.429-03 
	VSFOA	•	ball valves; cryogenic; oil & gas; vacuum applications		static (external)	•	–200/+260	n.a.	80 (static load)	n.a.	PTFE MD.429-03 
	SSA	•	standard cylinders; mobile hydraulics; industrial hydraulics; forklifts		static	•	–35/+100	n.a.	40 (at 60 °C)	n.a.	TPU 93.447-01 

Other types or compounds are available on request.

¹⁾ Temperature range depends on the rubber and media used.
²⁾ These are maximum values and cannot be combined together.
Maximum pressure will depend on temperature and gap dimension.

APSOseals® – Piston Seal GRP

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils)
Product description:	Two-piece seal set consisting of a profile ring with an O-ring as the pre-stressing element
Intended use:	For sealing pistons in hydraulics
Material sealing element:	PTFE BC.429-01 (PTFE/bronze)
Material O-ring:	NBR
Decompression relief groove:	bore Ø from 8 to 80 mm: on the front, 2 relief grooves in each case; positioning on the facing side at an offset of 90°; bore Ø from 85 mm: on the front, 4 relief grooves in each case; positioning on the facing side at an offset of 45°
Hardness O-ring:	70 ±5 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C
Attention:	Order O-ring separately
On request:	Further dimensions available



Surface finish

Surfaces	R _{max}	R _z	R _a
Housing bore D	2,5 µm	1,6 µm	0,4 µm
Groove d	10,0 µm	6,3 µm	1,6 µm
Groove flanks	16,0 µm	10,0 µm	3,2 µm

Recommended Assembly Measurements

Section	O-Ring Corde Ø	Recommended Diameter Standard	Groove Width	Groove Depth	Max. Diameter Clearance		Radius
	mm	D mm	L mm	B mm	0 - 200 bar mm	200 - 400 bar mm	R1 max. mm
A	1,78	8 - 14,9	2,2	2,45	0,6 - 0,3	0,4 - 0,2	0,3
B	2,62	15 - 39,9	3,2	3,75	0,8 - 0,4	0,4 - 0,3	0,5
C	3,53	40 - 79,9	4,2	5,50	1,2 - 0,8	0,8 - 0,4	0,7
D	5,33	80 - 132,9	6,3	7,75	1,4 - 1,0	1,0 - 0,4	1,2
E	7,00	133 - 329,9	8,1	10,50	1,8 - 1,2	1,2 - 0,5	1,5
F	7,00	330 - 669,9	8,1	12,25	2,0 - 1,2	1,2 - 0,5	1,5
G	8,40	670 -	9,5	14,00	2,3 - 1,4	1,3 - 0,6	2,0

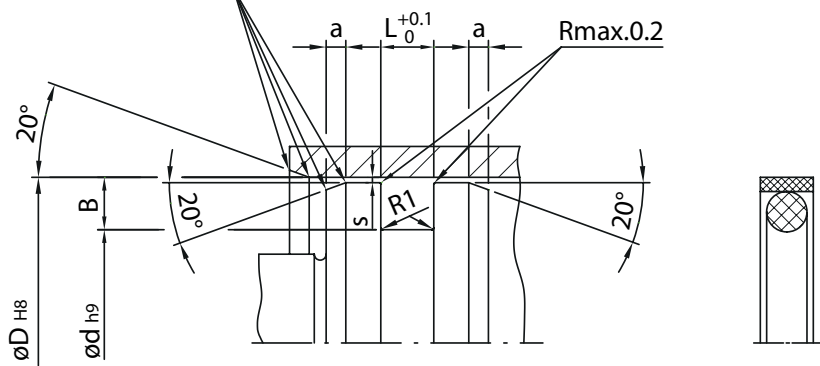
Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{h10}	Groove width L _{±0.2}	Chamfer a	Matching o-ring	Norm
11.6510.0000	8.00 mm	3.10 mm	2.20 mm	3.00 mm	OR 2012	
11.6510.0005	10.00 mm	5.10 mm	2.20 mm	3.00 mm	OR 2018	
11.6510.0010	12.00 mm	7.10 mm	2.20 mm	3.00 mm	OR 106	
11.6510.0015	15.00 mm	7.50 mm	3.20 mm	4.50 mm	OR 3030	
11.6510.0020	16.00 mm	8.50 mm	3.20 mm	4.50 mm	OR 3030	As per DIN ISO 7425
11.6510.0025	18.00 mm	10.50 mm	3.20 mm	4.50 mm	OR 3043	
11.6510.0030	19.00 mm	11.50 mm	3.20 mm	4.50 mm	OR 3043	
11.6510.0035	20.00 mm	12.50 mm	3.20 mm	4.50 mm	OR 3050	As per DIN ISO 7425
11.6510.0040	22.00 mm	14.50 mm	3.20 mm	4.50 mm	OR 3056	
11.6510.0045	24.00 mm	16.50 mm	3.20 mm	4.50 mm	OR 3062	
11.6510.0050	25.00 mm	17.50 mm	3.20 mm	4.50 mm	OR 3068	As per DIN ISO 7425
11.6510.0055	28.00 mm	20.50 mm	3.20 mm	4.50 mm	OR 3081	
11.6510.0060	30.00 mm	22.50 mm	3.20 mm	4.50 mm	OR 3087	
11.6510.0065	32.00 mm	24.50 mm	3.20 mm	4.50 mm	OR 3093	As per DIN ISO 7425
11.6510.0070	35.00 mm	27.50 mm	3.20 mm	4.50 mm	OR 3106	
11.6510.0075	36.00 mm	28.50 mm	3.20 mm	4.50 mm	OR 3112	
11.6510.0080	38.00 mm	30.50 mm	3.20 mm	4.50 mm	OR 3118	
11.6510.0085	40.00 mm	29.00 mm	4.20 mm	6.00 mm	OR 4112	As per DIN ISO 7425
11.6510.0090	42.00 mm	31.00 mm	4.20 mm	6.00 mm	OR 4118	
11.6510.0095	44.00 mm	33.00 mm	4.20 mm	6.00 mm	OR 4125	
11.6510.0100	45.00 mm	34.00 mm	4.20 mm	6.00 mm	OR 4131	
11.6510.0105	47.00 mm	36.00 mm	4.20 mm	6.00 mm	OR 4137	
11.6510.0110	48.00 mm	37.00 mm	4.20 mm	6.00 mm	OR 4143	
11.6510.0115	50.00 mm	39.00 mm	4.20 mm	6.00 mm	OR 4150	As per DIN ISO 7425
11.6510.0120	52.00 mm	41.00 mm	4.20 mm	6.00 mm	OR 4162	
11.6510.0125	54.00 mm	43.00 mm	4.20 mm	6.00 mm	OR 4162	
11.6510.0130	55.00 mm	44.00 mm	4.20 mm	6.00 mm	OR 4175	
11.6510.0135	56.00 mm	45.00 mm	4.20 mm	6.00 mm	OR 4175	
11.6510.0140	60.00 mm	49.00 mm	4.20 mm	6.00 mm	OR 4187	
11.6510.0145	62.00 mm	51.00 mm	4.20 mm	6.00 mm	OR 4200	
11.6510.0150	63.00 mm	52.00 mm	4.20 mm	6.00 mm	OR 4200	As per DIN ISO 7425
11.6510.0155	65.00 mm	54.00 mm	4.20 mm	6.00 mm	OR 4212	
11.6510.0160	70.00 mm	59.00 mm	4.20 mm	6.00 mm	OR 4225	
11.6510.0165	70.00 mm	54.00 mm	6.30 mm	8.00 mm	OR 6212	
11.6510.0170	75.00 mm	64.00 mm	4.20 mm	6.00 mm	OR 4250	
11.6510.0175	75.00 mm	59.50 mm	6.30 mm	8.00 mm	OR 6237	
11.6510.0180	80.00 mm	64.50 mm	6.30 mm	8.00 mm	OR 6250	As per DIN ISO 7425
11.6510.0185	80.00 mm	59.00 mm	8.10 mm	10.50 mm	OR 58.00 x 7.00 mm	As per DIN ISO 7425
11.6510.0190	85.00 mm	69.50 mm	6.30 mm	8.00 mm	OR 6275	
11.6510.0195	86.00 mm	70.50 mm	6.30 mm	8.00 mm	OR 6275	
11.6510.0200	85.00 mm	64.00 mm	8.10 mm	10.50 mm	OR 64.00 x 7.00 mm	
11.6510.0205	90.00 mm	74.50 mm	6.30 mm	8.00 mm	OR 6287	
11.6510.0210	90.00 mm	69.00 mm	8.10 mm	10.50 mm	OR 68.00 x 7.00 mm	
11.6510.0215	95.00 mm	79.50 mm	6.30 mm	8.00 mm	OR 6312	
11.6510.0220	95.00 mm	74.00 mm	8.10 mm	10.50 mm	OR 73.00 x 7.00 mm	
11.6510.0225	100.00 mm	84.50 mm	6.30 mm	8.00 mm	OR 6325	As per DIN ISO 7425
11.6510.0230	100.00 mm	79.00 mm	8.10 mm	10.50 mm	OR 79.00 x 7.00 mm	As per DIN ISO 7425
11.6510.0235	105.00 mm	89.50 mm	6.30 mm	8.00 mm	OR 6350	
11.6510.0240	105.00 mm	84.00 mm	8.10 mm	10.50 mm	OR 83.00 x 7.00 mm	
11.6510.0245	110.00 mm	94.50 mm	6.30 mm	8.00 mm	OR 6375	
11.6510.0250	110.00 mm	89.00 mm	8.10 mm	10.50 mm	OR 89.00 x 7.00 mm	
11.6510.0255	115.00 mm	99.50 mm	6.30 mm	8.00 mm	OR 6387	
11.6510.0260	115.00 mm	94.00 mm	8.10 mm	10.50 mm	OR 94.00 x 7.00 mm	
11.6510.0265	120.00 mm	104.50 mm	6.30 mm	8.00 mm	OR 6412	
11.6510.0270	120.00 mm	99.00 mm	8.10 mm	10.50 mm	OR 99.00 x 7.00 mm	
11.6510.0275	125.00 mm	109.50 mm	6.30 mm	8.00 mm	OR 6425	As per DIN ISO 7425
11.6510.0280	125.00 mm	104.00 mm	8.10 mm	10.50 mm	OR 101.00 x 7.00 mm	As per DIN ISO 7425
11.6510.0285	127.00 mm	111.50 mm	6.30 mm	8.00 mm	OR 6437	
11.6510.0290	130.00 mm	114.50 mm	6.30 mm	8.00 mm	OR 6450	
11.6510.0295	130.00 mm	109.00 mm	8.10 mm	10.50 mm	OR 106.00 x 7.00 mm	
11.6510.0300	140.00 mm	119.00 mm	8.10 mm	10.50 mm	OR 8462	

Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{h10}	Groove width L _{±0.2}	Chamfer a	Matching o-ring	Norm
11.6510.0305	145.00 mm	124.00 mm	8.10 mm	10.50 mm	OR 8487	
11.6510.0310	150.00 mm	129.00 mm	8.10 mm	10.50 mm	OR 8512	
11.6510.0315	155.00 mm	134.00 mm	8.10 mm	10.50 mm	OR 8525	
11.6510.0320	160.00 mm	139.00 mm	8.10 mm	10.50 mm	OR 8550	As per DIN ISO 7425
11.6510.0325	165.00 mm	144.00 mm	8.10 mm	10.50 mm	OR 8562	
11.6510.0330	170.00 mm	149.00 mm	8.10 mm	10.50 mm	OR 8587	
11.6510.0335	175.00 mm	154.00 mm	8.10 mm	10.50 mm	OR 8600	
11.6510.0340	180.00 mm	159.00 mm	8.10 mm	10.50 mm	OR 8625	
11.6510.0345	185.00 mm	164.00 mm	8.10 mm	10.50 mm	OR 8650	
11.6510.0350	190.00 mm	169.00 mm	8.10 mm	10.50 mm	OR 8650	
11.6510.0355	195.00 mm	174.00 mm	8.10 mm	10.50 mm	OR 8675	
11.6510.0360	200.00 mm	179.00 mm	8.10 mm	10.50 mm	OR 8700	As per DIN ISO 7425
11.6510.0365	210.00 mm	189.00 mm	8.10 mm	10.50 mm	OR 8750	
11.6510.0370	220.00 mm	199.00 mm	8.10 mm	10.50 mm	OR 8775	
11.6510.0375	225.00 mm	204.00 mm	8.10 mm	10.50 mm	OR 8800	
11.6510.0380	230.00 mm	209.00 mm	8.10 mm	10.50 mm	OR 8800	
11.6510.0385	240.00 mm	219.00 mm	8.10 mm	10.50 mm	OR 8850	
11.6510.0390	250.00 mm	229.00 mm	8.10 mm	10.50 mm	OR 8900	As per DIN ISO 7425
11.6510.0395	260.00 mm	239.00 mm	8.10 mm	10.50 mm	OR 8925	
11.6510.0400	270.00 mm	249.00 mm	8.10 mm	10.50 mm	OR 8975	
11.6510.0405	280.00 mm	259.00 mm	8.10 mm	10.50 mm	OR 81000	
11.6510.0410	290.00 mm	269.00 mm	8.10 mm	10.50 mm	OR 81050	
11.6510.0415	300.00 mm	279.00 mm	8.10 mm	10.50 mm	OR 81100	
11.6510.0420	320.00 mm	299.00 mm	8.10 mm	10.50 mm	OR 81150	As per DIN ISO 7425
11.6510.0425	330.00 mm	305.50 mm	8.10 mm	10.50 mm	OR 81200	
11.6510.0430	350.00 mm	325.50 mm	8.10 mm	10.50 mm	OR 81250	
11.6510.0435	360.00 mm	335.50 mm	8.10 mm	10.50 mm	OR 81300	
11.6510.0440	380.00 mm	355.50 mm	8.10 mm	10.50 mm	OR 81400	
11.6510.0445	390.00 mm	365.50 mm	8.10 mm	10.50 mm	OR 81400	
11.6510.0450	400.00 mm	375.50 mm	8.10 mm	10.50 mm	OR 81450	As per DIN ISO 7425
11.6510.0455	420.00 mm	395.50 mm	8.10 mm	10.50 mm	OR 81550	
11.6510.0460	430.00 mm	405.50 mm	8.10 mm	10.50 mm	OR 81550	
11.6510.0465	450.00 mm	425.50 mm	8.10 mm	10.50 mm	OR 81650	
11.6510.0470	500.00 mm	475.50 mm	8.10 mm	10.50 mm	OR 81850	As per DIN ISO 7425

APSOseals® – Piston Seal LRP

Medium stability:	for use in mineral oils and greases, water and air
Product description:	Two-piece seal set consisting of a profile ring with an O-ring as the pre-stressing element
Intended use:	Double-acting rod seal, predominantly used in pneumatics or hydraulics
Material sealing element:	PTFE CG.18-01 (PTFE/carbon/graphite)
Material O-ring:	NBR
Hardness O-ring:	70 ±5 Shore A
Pressure PN:	max. 20 MPa
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C
Attention:	Order O-ring separately
On request:	Further dimensions available

well-rounded and burrless



Working temperature:

- hydraulic oils HL, HLP: -30 to +100 °C
- HFA, HFB fluids: +5 to +60 °C
- HFC fluids: -30 to +60 °C
- water: +5 to +100 °C
- HETG (colza): -30 to +80 °C
- HEES (synth. ester): -30 to +80 °C
- HEPG (glycols): -30 to +60 °C
- mineral-based greases: -30 to +100 °C
- air: -20 to +100 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R_a μm	R_t μm	R_z μm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio $t_p > 50\%$ to max. 75 % at 0,25 R_t

Clearance, depending on pressure

Groove width L mm	Profile width B mm	Max. permissible clearance S		
		8 MPa mm	16 MPa mm	25 MPa mm
2	2,25/2,3	0,3	0,2	0,1
3	3,1	0,3	0,2	0,1
4	4	0,4	0,3	0,2
6	5,85/5,75/5,8	0,4	0,3	0,2
6	6,05/6	0,4	0,3	0,2
6	6,25	0,4	0,3	0,2
8	7,75/7,9	0,6	0,5	0,4
8	8,15	0,6	0,5	0,4

Allowance

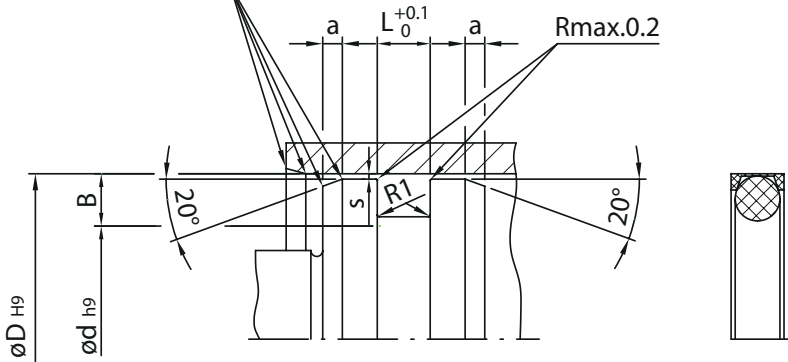
Nominal Ø	Groove base Ø	Tolerance for metal guide
D mm	d	Ø D
8 a/to ≤ 80	h9	H8/f7
> 80 a/to ≤ 300	h9	H7/g6

Item No.	Bore Ø D _{H8}	Ground of the groove Ø d _{h9}	Groove width L _{0.1}	Chamfer α	Radius R ₁	Matching o-ring
11.6511.0000	8.00 mm	3.40 mm	2.00 mm	3.00 mm	0.3 mm	OR 2015
11.6511.0005	9.00 mm	4.40 mm	2.00 mm	3.00 mm	0.3 mm	OR 2018
11.6511.0010	10.00 mm	5.50 mm	2.00 mm	3.00 mm	0.3 mm	OR 2021
11.6511.0015	11.00 mm	6.50 mm	2.00 mm	3.00 mm	0.3 mm	OR 2025
11.6511.0020	12.00 mm	7.40 mm	2.00 mm	3.00 mm	0.3 mm	OR 2031
11.6511.0025	14.00 mm	9.50 mm	2.00 mm	3.00 mm	0.4 mm	OR 2037
11.6511.0030	15.00 mm	10.40 mm	2.00 mm	3.00 mm	0.4 mm	OR 2043
11.6511.0035	16.00 mm	9.80 mm	3.00 mm	3.00 mm	0.4 mm	OR 112
11.6511.0040	17.00 mm	10.80 mm	3.00 mm	3.00 mm	0.4 mm	OR 3043
11.6511.0045	18.00 mm	11.80 mm	3.00 mm	3.00 mm	0.4 mm	OR 115
11.6511.0050	20.00 mm	13.80 mm	3.00 mm	3.00 mm	0.4 mm	OR 3056
11.6511.0055	22.00 mm	15.80 mm	3.00 mm	3.00 mm	0.4 mm	OR 3062
11.6511.0060	25.00 mm	18.80 mm	3.00 mm	3.00 mm	0.4 mm	OR 3075
11.6511.0065	28.00 mm	20.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4081
11.6511.0070	30.00 mm	22.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4087
11.6511.0075	32.00 mm	24.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4093
11.6511.0080	35.00 mm	27.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4106
11.6511.0085	36.00 mm	28.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4112
11.6511.0090	38.00 mm	30.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4118
11.6511.0095	40.00 mm	32.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4125
11.6511.0100	42.00 mm	34.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4131
11.6511.0105	45.00 mm	37.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4143
11.6511.0110	48.00 mm	40.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 144
11.6511.0115	50.00 mm	38.30 mm	6.00 mm	4.00 mm	0.8 mm	OR 6150
11.6511.0120	55.00 mm	43.50 mm	6.00 mm	4.00 mm	0.8 mm	OR 6162
11.6511.0125	56.00 mm	44.30 mm	6.00 mm	4.00 mm	0.8 mm	OR 6175
11.6511.0130	60.00 mm	48.30 mm	6.00 mm	4.00 mm	0.8 mm	OR 6187
11.6511.0135	63.00 mm	51.30 mm	6.00 mm	4.00 mm	0.8 mm	OR 6200
11.6511.0140	65.00 mm	53.30 mm	6.00 mm	4.00 mm	0.8 mm	OR 6212
11.6511.0145	70.00 mm	58.40 mm	6.00 mm	4.00 mm	0.8 mm	OR 6225
11.6511.0150	75.00 mm	62.90 mm	6.00 mm	4.00 mm	0.8 mm	OR 6250
11.6511.0155	80.00 mm	68.00 mm	6.00 mm	4.00 mm	0.8 mm	OR 6262
11.6511.0160	85.00 mm	72.90 mm	6.00 mm	4.00 mm	0.8 mm	OR 6287
11.6511.0165	90.00 mm	78.00 mm	6.00 mm	4.00 mm	0.8 mm	OR 6300
11.6511.0170	95.00 mm	82.90 mm	6.00 mm	4.00 mm	0.8 mm	OR 6325
11.6511.0175	100.00 mm	88.00 mm	6.00 mm	5.00 mm	0.8 mm	OR 6337
11.6511.0180	110.00 mm	97.90 mm	6.00 mm	5.00 mm	0.8 mm	OR 6387
11.6511.0185	120.00 mm	107.90 mm	6.00 mm	5.00 mm	0.8 mm	OR 6425
11.6511.0190	125.00 mm	112.50 mm	6.00 mm	5.00 mm	0.8 mm	OR 6437
11.6511.0195	130.00 mm	117.50 mm	6.00 mm	5.00 mm	0.8 mm	OR 199
11.6511.0200	140.00 mm	124.50 mm	8.00 mm	5.00 mm	1 mm	OR 8487
11.6511.0205	150.00 mm	134.50 mm	8.00 mm	5.00 mm	1 mm	OR 8525
11.6511.0210	160.00 mm	144.20 mm	8.00 mm	5.00 mm	1 mm	OR 8562
11.6511.0215	170.00 mm	153.70 mm	8.00 mm	5.00 mm	1 mm	OR 8600
11.6511.0220	180.00 mm	163.70 mm	8.00 mm	5.00 mm	1 mm	OR 226
11.6511.0225	190.00 mm	173.70 mm	8.00 mm	5.00 mm	1 mm	OR 8675
11.6511.0230	200.00 mm	183.70 mm	8.00 mm	6.00 mm	1 mm	OR 8725
11.6511.0235	250.00 mm	233.70 mm	8.00 mm	6.00 mm	1 mm	OR 8925
11.6511.0240	280.00 mm	263.70 mm	8.00 mm	6.00 mm	1 mm	OR 81025
11.6511.0245	300.00 mm	283.70 mm	8.00 mm	6.00 mm	1 mm	OR 81100

APSOseals® – Piston Seal DDP

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils)
Product description:	Two-piece seal set consisting of a profile ring with an O-ring as the pre-stressing element
Intended use:	Double-acting piston seal, predominantly used in pneumatics or hydraulics
Material sealing element:	PTFE MD.429-03
Material O-ring:	NBR
Colour:	Turquoise
Hardness O-ring:	70 ±5 Shore A
Pressure PN:	max. 20 MPa
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C
Attention:	Order O-ring separately
On request:	Further dimensions available
Approval:	(depending on o-ring material) FDA-compliant

well-rounded and burrless



Working temperature:

- hydraulic oils HL, HLP: -30 to +100 °C
- HFA, HFB fluids: +5 to +60 °C
- HFC fluids: -30 to +60 °C
- water: +5 to +100 °C
- HETG (colza oils): -30 to +80 °C
- HEES (synth. ester): -30 to +80 °C
- HEPG (glycols): -30 to +60 °C
- mineral-based greases: -30 to +100 °C
- air: -20 to +100 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R_a μm	R_l μm	R_z μm	
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$	N4/N5
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio $t_p > 50\%$ to max. 75 % at 0,25 R_l

Clearance, depending on pressure

Groove width	Max. permissible clearance S		
L	7,5 MPa	15 MPa	20 MPa
mm	mm	mm	mm
2,4	0,2	0,15	0,1
3,6	0,2	0,15	0,1
4,8	0,3	0,25	0,2
7,1	0,4	0,35	0,3
9,5	0,5	0,45	0,4

Allowance

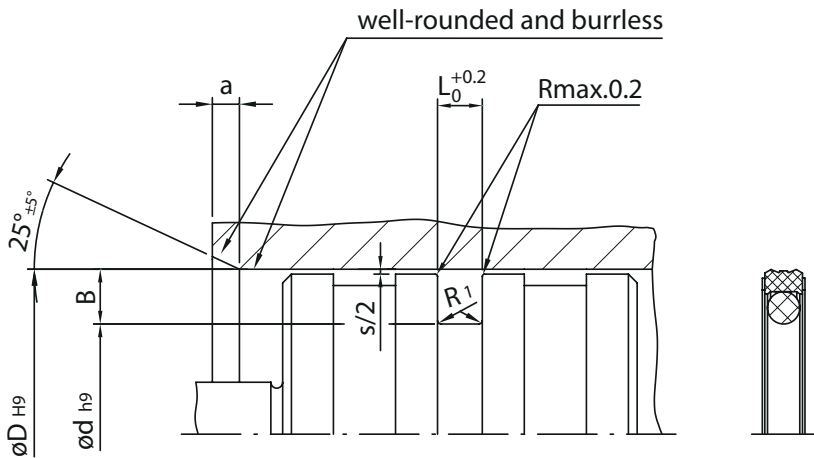
Nominal $\varnothing$	Groove base $\varnothing$	Tolerance for metal guide
d	d	$\varnothing D$
mm		
$6 a/to \leq 80$	h9	H8/f7
$> 80 a/to \leq 410$	h9	H7/g6

Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{h9}	Groove width L _{±0.1}	Chamfer α	Radius R ₁	Matching o-ring
11.6512.0000	6.00 mm	3.10 mm	2.40 mm	3.00 mm	0.3 mm	OR 2010
11.6512.0005	7.00 mm	4.10 mm	2.40 mm	3.00 mm	0.3 mm	OR 2015
11.6512.0010	8.00 mm	5.10 mm	2.40 mm	3.00 mm	0.3 mm	OR 2018
11.6512.0015	9.00 mm	6.10 mm	2.40 mm	3.00 mm	0.3 mm	OR 2021
11.6512.0020	10.00 mm	7.10 mm	2.40 mm	3.00 mm	0.3 mm	OR 2025
11.6512.0025	11.00 mm	8.10 mm	2.40 mm	3.00 mm	0.3 mm	OR 2031
11.6512.0030	13.00 mm	10.10 mm	2.40 mm	3.00 mm	0.3 mm	OR 108
11.6512.0035	15.00 mm	10.50 mm	3.60 mm	3.00 mm	0.3 mm	OR 3037
11.6512.0040	16.00 mm	11.50 mm	3.60 mm	3.00 mm	0.3 mm	OR 3043
11.6512.0045	18.00 mm	13.50 mm	3.60 mm	3.00 mm	0.3 mm	OR 3050
11.6512.0050	20.00 mm	15.50 mm	3.60 mm	3.00 mm	0.3 mm	OR 3056
11.6512.0055	21.00 mm	16.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 121
11.6512.0060	22.00 mm	17.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 3068
11.6512.0065	25.00 mm	20.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 3081
11.6512.0070	26.00 mm	19.80 mm	4.80 mm	3.00 mm	0.4 mm	OR 4075
11.6512.0075	28.00 mm	21.80 mm	4.80 mm	3.00 mm	0.4 mm	OR 4081
11.6512.0080	29.00 mm	22.80 mm	4.80 mm	3.00 mm	0.4 mm	OR 4087
11.6512.0085	30.00 mm	23.80 mm	4.80 mm	3.00 mm	0.4 mm	OR 4093
11.6512.0090	32.00 mm	25.80 mm	4.80 mm	3.00 mm	0.4 mm	OR 4100
11.6512.0095	34.00 mm	27.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4106
11.6512.0100	35.00 mm	28.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4112
11.6512.0105	37.00 mm	30.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4118
11.6512.0110	38.00 mm	31.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4125
11.6512.0115	40.00 mm	33.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4131
11.6512.0120	42.00 mm	35.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4137
11.6512.0125	43.00 mm	36.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4143
11.6512.0130	45.00 mm	38.80 mm	4.80 mm	3.00 mm	0.5 mm	OR 4150
11.6512.0135	50.00 mm	40.60 mm	7.10 mm	4.00 mm	0.5 mm	OR 6162
11.6512.0140	52.00 mm	42.60 mm	7.10 mm	4.00 mm	0.5 mm	OR 6162
11.6512.0145	55.00 mm	45.60 mm	7.10 mm	4.00 mm	0.5 mm	OR 6175
11.6512.0150	58.00 mm	46.60 mm	7.10 mm	4.00 mm	0.5 mm	OR 6187
11.6512.0155	61.00 mm	51.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6200
11.6512.0160	65.00 mm	56.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6212
11.6512.0165	68.00 mm	58.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6225
11.6512.0170	70.00 mm	60.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6237
11.6512.0175	75.00 mm	65.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6250
11.6512.0180	77.00 mm	67.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6262
11.6512.0185	80.00 mm	70.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6275
11.6512.0190	85.00 mm	75.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6287
11.6512.0195	86.00 mm	76.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6300
11.6512.0200	90.00 mm	80.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6312
11.6512.0205	92.00 mm	82.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6325
11.6512.0210	95.00 mm	85.60 mm	7.10 mm	4.00 mm	0.8 mm	OR 6337
11.6512.0215	100.00 mm	90.60 mm	7.10 mm	5.00 mm	0.8 mm	OR 6350
11.6512.0220	102.00 mm	92.60 mm	7.10 mm	5.00 mm	0.8 mm	OR 6362
11.6512.0225	105.00 mm	95.60 mm	7.10 mm	5.00 mm	0.8 mm	OR 6375
11.6512.0230	108.00 mm	98.60 mm	7.10 mm	5.00 mm	0.8 mm	OR 6387
11.6512.0235	111.00 mm	101.60 mm	7.10 mm	5.00 mm	0.8 mm	OR 6400
11.6512.0240	115.00 mm	105.60 mm	7.10 mm	5.00 mm	1 mm	OR 6412
11.6512.0245	118.00 mm	108.60 mm	7.10 mm	5.00 mm	1 mm	OR 6425
11.6512.0250	121.00 mm	111.60 mm	7.10 mm	5.00 mm	1 mm	OR 6437
11.6512.0255	125.00 mm	115.60 mm	7.10 mm	5.00 mm	1 mm	OR 6450
11.6512.0260	127.00 mm	114.80 mm	9.50 mm	5.00 mm	1 mm	OR 8450
11.6512.0265	130.00 mm	117.80 mm	9.50 mm	5.00 mm	1 mm	OR 8462
11.6512.0270	135.00 mm	122.80 mm	9.50 mm	5.00 mm	1 mm	OR 8475
11.6512.0275	137.00 mm	124.80 mm	9.50 mm	5.00 mm	1 mm	OR 8487
11.6512.0280	140.00 mm	127.80 mm	9.50 mm	5.00 mm	1 mm	OR 8500
11.6512.0285	143.00 mm	130.80 mm	9.50 mm	5.00 mm	1 mm	OR 8512
11.6512.0290	146.00 mm	133.80 mm	9.50 mm	5.00 mm	1 mm	OR 8512
11.6512.0295	150.00 mm	137.80 mm	9.50 mm	5.00 mm	1 mm	OR 8537
11.6512.0300	153.00 mm	140.80 mm	9.50 mm	5.00 mm	1 mm	OR 8550

Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{h9}	Groove width L _{±0.1}	Chamfer α	Radius R ₁	Matching o-ring
11.6512.0305	156.00 mm	143.80 mm	9.50 mm	5.00 mm	1 mm	OR 8562
11.6512.0310	160.00 mm	147.80 mm	9.50 mm	5.00 mm	1 mm	OR 8575
11.6512.0315	162.00 mm	149.80 mm	9.50 mm	5.00 mm	1 mm	OR 8587
11.6512.0320	165.00 mm	152.80 mm	9.50 mm	5.00 mm	1 mm	OR 8600
11.6512.0325	172.00 mm	159.80 mm	9.50 mm	5.00 mm	1 mm	OR 8625
11.6512.0330	178.00 mm	165.80 mm	9.50 mm	5.00 mm	1 mm	OR 8650
11.6512.0335	184.00 mm	171.80 mm	9.50 mm	5.00 mm	1 mm	OR 8675
11.6512.0340	191.00 mm	178.80 mm	9.50 mm	5.00 mm	1 mm	OR 8700
11.6512.0345	197.00 mm	184.80 mm	9.50 mm	5.00 mm	1 mm	OR 8725
11.6512.0350	203.00 mm	190.80 mm	9.50 mm	6.00 mm	1 mm	OR 8750
11.6512.0355	210.00 mm	197.80 mm	9.50 mm	6.00 mm	1 mm	OR 8775
11.6512.0360	216.00 mm	208.80 mm	9.50 mm	6.00 mm	1 mm	OR 8800
11.6512.0365	222.00 mm	209.80 mm	9.50 mm	6.00 mm	1 mm	OR 8825
11.6512.0370	230.00 mm	217.80 mm	9.50 mm	6.00 mm	1 mm	OR 8850
11.6512.0375	235.00 mm	222.80 mm	9.50 mm	6.00 mm	1 mm	OR 8875
11.6512.0380	242.00 mm	229.80 mm	9.50 mm	6.00 mm	1 mm	OR 8900
11.6512.0385	250.00 mm	237.80 mm	9.50 mm	6.00 mm	1 mm	OR 8925
11.6512.0390	255.00 mm	242.80 mm	9.50 mm	6.00 mm	1 mm	OR 8950
11.6512.0395	260.00 mm	247.80 mm	9.50 mm	6.00 mm	1 mm	OR 8975
11.6512.0400	270.00 mm	257.80 mm	9.50 mm	6.00 mm	1 mm	OR 81000
11.6512.0405	275.00 mm	262.80 mm	9.50 mm	6.00 mm	1 mm	OR 81025
11.6512.0410	280.00 mm	267.80 mm	9.50 mm	6.00 mm	1 mm	OR 81050
11.6512.0415	286.00 mm	273.80 mm	9.50 mm	6.00 mm	1 mm	OR 81075
11.6512.0420	295.00 mm	282.80 mm	9.50 mm	6.00 mm	1 mm	OR 81100
11.6512.0425	300.00 mm	287.80 mm	9.50 mm	6.00 mm	1 mm	OR 81125
11.6512.0430	305.00 mm	292.80 mm	9.50 mm	6.00 mm	1 mm	OR 81150
11.6512.0435	315.00 mm	302.80 mm	9.50 mm	6.00 mm	1 mm	OR 81175
11.6512.0440	320.00 mm	307.80 mm	9.50 mm	6.00 mm	1 mm	OR 81200
11.6512.0445	330.00 mm	317.80 mm	9.50 mm	6.00 mm	1 mm	OR 81250
11.6512.0450	345.00 mm	332.80 mm	9.50 mm	6.00 mm	1 mm	OR 81300
11.6512.0455	355.00 mm	342.80 mm	9.50 mm	6.00 mm	1 mm	OR 81350
11.6512.0460	370.00 mm	357.80 mm	9.50 mm	6.00 mm	1 mm	OR 81400
11.6512.0465	380.00 mm	367.80 mm	9.50 mm	6.00 mm	1 mm	OR 81450
11.6512.0470	395.00 mm	382.80 mm	9.50 mm	6.00 mm	1 mm	OR 81500
11.6512.0475	410.00 mm	398.80 mm	9.50 mm	6.00 mm	1 mm	OR 81550

APSOseals® – Piston Seal PSO

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Two-piece piston seal consisting of a profile ring with two sealing edges and an O-ring as the pre-stressing element
Intended use:	Sealing of double-acting pistons in hydraulics
Material sealing element:	TPU 93.447-01
Material O-ring:	NBR 70.447-02
Hardness sealing element:	93 ±2 Shore A
Hardness O-ring:	70 ±5 Shore A
Pressure PN:	max. 25 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: -30 to +40 °C
 - water: +5 to +50 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +50 °C
 - mineral-based greases: -30 to +110 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughnessRoughness class		
	R _a µm	R _t µm	R _z µm
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25
Groove base	≤ 1,6	≤ 6,3	≤ 6,3
Groove sides	≤ 3	≤ 15	≤ 10

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_t

Diameter clearance, depending on pressure

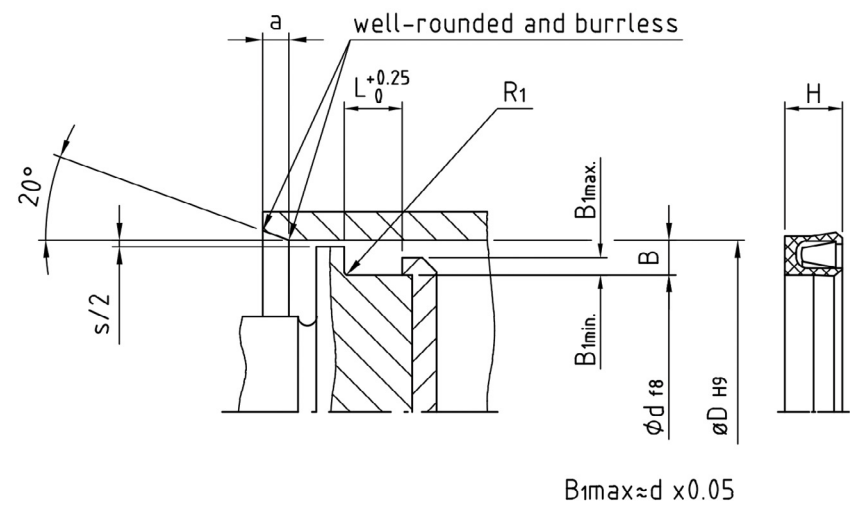
Profile width	Max. permissible clearance S			
B	16 MPa	26 MPa	32 MPa	40 MPa
mm	mm	mm	mm	mm
7,5	0,8	0,7	0,5	0,4
10/12,5/15	1,2	1	0,65	0,55

Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{H9}	Groove width L _{+0.2}	Chamfer α	Radius R ₁	Matching o-ring	Norm
11.6502.0000	12.00 mm	7.10 mm	2.20 mm	2.00 mm	0.2 mm	OR 2062	
11.6502.0005	20.00 mm	12.50 mm	3.20 mm	3.00 mm	0.2 mm	OR 3050	As per ISO 5597
11.6502.0010	22.00 mm	14.50 mm	3.20 mm	3.00 mm	0.2 mm	OR 3056	
11.6502.0015	24.00 mm	16.50 mm	3.20 mm	3.00 mm	0.2 mm	OR 3062	
11.6502.0020	25.00 mm	14.00 mm	4.20 mm	4.00 mm	0.2 mm	OR 4055	As per ISO 5597
11.6502.0025	25.00 mm	17.50 mm	3.20 mm	3.00 mm	0.2 mm	OR 3068	As per ISO 5597
11.6502.0030	28.00 mm	20.50 mm	3.20 mm	3.00 mm	0.4 mm	OR 3081	
11.6502.0035	30.00 mm	22.50 mm	3.20 mm	3.00 mm	0.4 mm	OR 3087	
11.6502.0040	32.00 mm	21.00 mm	4.20 mm	4.00 mm	0.4 mm	OR 4081	
11.6502.0045	32.00 mm	24.50 mm	3.20 mm	3.00 mm	0.4 mm	OR 3093	As per ISO 5597
11.6502.0050	35.00 mm	24.00 mm	4.20 mm	4.00 mm	0.4 mm	OR 4093	
11.6502.0055	35.00 mm	27.50 mm	3.20 mm	3.00 mm	0.4 mm	OR 3106	
11.6502.0060	36.00 mm	25.00 mm	4.20 mm	4.00 mm	0.4 mm	OR 4093	
11.6502.0065	36.00 mm	28.50 mm	3.20 mm	3.00 mm	0.4 mm	OR 3112	
11.6502.0070	38.00 mm	30.50 mm	3.20 mm	3.00 mm	0.4 mm	OR 3118	
11.6502.0075	40.00 mm	24.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6100	
11.6502.0080	40.00 mm	29.00 mm	4.20 mm	4.00 mm	0.4 mm	OR 4112	As per ISO 5597
11.6502.0085	42.00 mm	31.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4118	
11.6502.0090	45.00 mm	29.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6110	
11.6502.0095	45.00 mm	34.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4131	
11.6502.0100	48.00 mm	37.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4143	
11.6502.0105	49.00 mm	38.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4150	
11.6502.0110	50.00 mm	34.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6135	
11.6502.0115	50.00 mm	39.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4150	As per ISO 5597
11.6502.0120	50.80 mm	39.80 mm	4.20 mm	4.00 mm	0.5 mm	OR 4150	
11.6502.0125	52.00 mm	36.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6135	
11.6502.0130	55.00 mm	39.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6150	
11.6502.0135	55.00 mm	44.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4175	
11.6502.0140	57.00 mm	46.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4175	
11.6502.0145	60.00 mm	44.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6175	
11.6502.0150	60.00 mm	49.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4187	
11.6502.0155	63.00 mm	47.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6187	As per ISO 5597
11.6502.0160	63.00 mm	52.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4200	As per ISO 5597
11.6502.0165	63.50 mm	52.50 mm	4.20 mm	4.00 mm	0.5 mm	OR 4200	
11.6502.0170	65.00 mm	49.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6187	
11.6502.0175	65.00 mm	54.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4212	
11.6502.0180	70.00 mm	54.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6212	
11.6502.0185	70.00 mm	59.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4225	
11.6502.0190	72.00 mm	61.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4237	
11.6502.0195	75.00 mm	59.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6225	
11.6502.0200	75.00 mm	64.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 4250	
11.6502.0205	80.00 mm	64.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6250	As per ISO 5597
11.6502.0210	80.00 mm	69.00 mm	4.20 mm	4.00 mm	0.5 mm	OR 171	As per ISO 5597
11.6502.0215	85.00 mm	69.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6275	
11.6502.0220	88.90 mm	73.40 mm	6.30 mm	5.00 mm	0.5 mm	OR 6287	
11.6502.0225	90.00 mm	74.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6287	
11.6502.0230	95.00 mm	79.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6312	
11.6502.0235	100.00 mm	84.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6325	As per ISO 5597
11.6502.0240	105.00 mm	89.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6350	
11.6502.0245	110.00 mm	94.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6375	
11.6502.0250	115.00 mm	94.00 mm	8.10 mm	6.00 mm	0.5 mm	OR 97.00 x 6.99 mm	
11.6502.0255	115.00 mm	99.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6387	
11.6502.0260	118.00 mm	102.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6400	
11.6502.0265	120.00 mm	104.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6412	
11.6502.0270	125.00 mm	104.00 mm	8.10 mm	6.00 mm	0.5 mm	OR 100.00 x 6.99 mm	As per ISO 5597
11.6502.0275	125.00 mm	109.50 mm	6.30 mm	5.00 mm	0.5 mm	OR 6425	As per ISO 5597
11.6502.0280	130.00 mm	109.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 106.00 x 6.99 mm	
11.6502.0285	130.00 mm	114.50 mm	6.30 mm	5.00 mm	0.6 mm	OR 6450	
11.6502.0290	135.00 mm	114.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 4437	
11.6502.0295	135.00 mm	119.50 mm	6.30 mm	5.00 mm	0.6 mm	OR 6460	
11.6502.0300	140.00 mm	119.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8462	

Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{H9}	Groove width L _{+0.2}	Chamfer α	Radius R ₁	Matching o-ring	Norm
11.6502.0305	145.00 mm	124.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8487	
11.6502.0310	150.00 mm	129.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8512	
11.6502.0315	160.00 mm	139.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8550	As per ISO 5597
11.6502.0320	170.00 mm	149.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8587	
11.6502.0325	177.80 mm	156.80 mm	8.10 mm	6.00 mm	0.6 mm	OR 8600	
11.6502.0330	180.00 mm	159.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8625	
11.6502.0335	185.00 mm	164.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 226	
11.6502.0340	190.00 mm	169.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8650	
11.6502.0345	200.00 mm	179.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8700	As per ISO 5597
11.6502.0350	210.00 mm	189.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8750	
11.6502.0355	220.00 mm	199.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8775	
11.6502.0360	230.00 mm	209.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8800	
11.6502.0365	240.00 mm	219.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8850	
11.6502.0370	250.00 mm	229.00 mm	8.10 mm	6.00 mm	0.6 mm	OR 8900	As per ISO 5597

APSOseals® – Piston Seal VSP100

Medium stability:	for use in mineral and synthetic pressurized fluids, water, and aggressive media
Product description:	Grooved-ring-type seal with metallic pre-tension spring
Intended use:	seal can be pressurized on one side
Material sealing element:	PTFE CF.429-01 (PTFE/carbon fibre)
Material V-spring:	Steel mat. no. 1.4310, AISI 301
Pressure PN:	max. 40 MPa
Sliding speed:	max. 15 m/s
Working temperature:	-200 to +260 °C
On request:	Further dimensions available



Surface finish

	Surface roughness			Roughness class
	R_a μm	R_t μm	R_z μm	
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$	N4/N5
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7

Profile bearing length ratio $t_p > 50\%$ to max. 90 % at 0,5 R_t

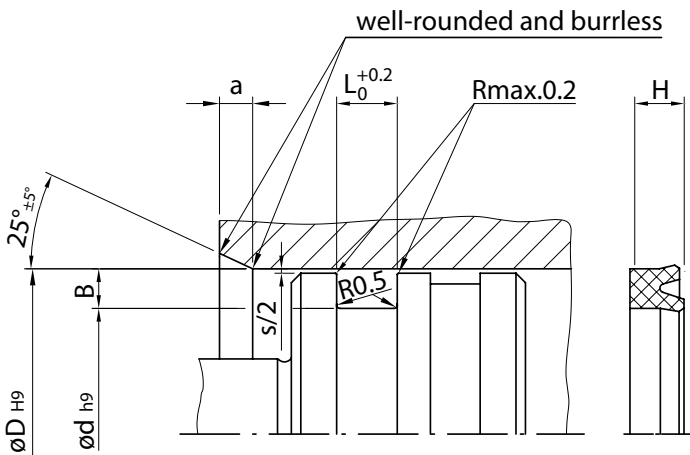
Recomended size range	profil depth	Groove width	Max. permissible clearance S*)			chamfer	
d	B	L +0,25 0	0-10 MPa*)	10-25 MPa*)	25-40 MPa*)	a	R1 max
6-13,9	1,45	2,4	0,4	0,3	0,2	2,0	0,4
14-24,9	2,25	3,6	0,5	0,4	0,3	2,0	0,4
25-45,9	3,1	4,8	0,5	0,4	0,3	2,0	0,6
46-124,9	4,7	7,1	0,6	0,5	0,4	3,0	0,8
125-	6,1	9,5	0,8	0,6	0,5	4,0	0,8

*) If the clearance $s/2$ is $< 0,25\text{ mm}$, a guide ring should not be used

Item No.	Bore $\varnothing$ D_{H9}	Ground of the groove $\varnothing$ d_{f8}	Groove width $L_{+0.25}$	Sealing height H
11.6509.0000	15.00 mm	10.50 mm	3.60 mm	3.10 mm
11.6509.0005	16.00 mm	11.50 mm	3.60 mm	3.10 mm
11.6509.0010	18.00 mm	13.50 mm	3.60 mm	3.10 mm
11.6509.0015	20.00 mm	15.50 mm	3.60 mm	3.10 mm
11.6509.0020	22.00 mm	17.50 mm	3.60 mm	3.10 mm
11.6509.0025	25.00 mm	20.50 mm	3.60 mm	3.10 mm
11.6509.0030	28.00 mm	21.80 mm	4.80 mm	4.30 mm
11.6509.0035	30.00 mm	23.80 mm	4.80 mm	4.30 mm
11.6509.0040	32.00 mm	25.80 mm	4.80 mm	4.30 mm
11.6509.0045	35.00 mm	28.80 mm	4.80 mm	4.30 mm
11.6509.0050	36.00 mm	29.80 mm	4.80 mm	4.30 mm
11.6509.0055	40.00 mm	33.80 mm	4.80 mm	4.30 mm
11.6509.0060	42.00 mm	35.80 mm	4.80 mm	4.30 mm
11.6509.0065	45.00 mm	38.80 mm	4.80 mm	4.30 mm
11.6509.0070	50.00 mm	40.60 mm	7.10 mm	6.50 mm
11.6509.0075	55.00 mm	45.60 mm	7.10 mm	6.50 mm
11.6509.0080	56.00 mm	46.60 mm	7.10 mm	6.50 mm
11.6509.0085	60.00 mm	50.60 mm	7.10 mm	6.50 mm
11.6509.0090	63.00 mm	53.60 mm	7.10 mm	6.50 mm
11.6509.0095	65.00 mm	55.60 mm	7.10 mm	6.50 mm
11.6509.0100	70.00 mm	60.60 mm	7.10 mm	6.50 mm
11.6509.0105	75.00 mm	65.60 mm	7.10 mm	6.50 mm
11.6509.0110	80.00 mm	70.60 mm	7.10 mm	6.50 mm
11.6509.0115	85.00 mm	75.60 mm	7.10 mm	6.50 mm
11.6509.0120	90.00 mm	80.60 mm	7.10 mm	6.50 mm
11.6509.0125	100.00 mm	90.60 mm	7.10 mm	6.50 mm
11.6509.0130	110.00 mm	100.60 mm	7.10 mm	6.50 mm
11.6509.0135	115.00 mm	105.60 mm	7.10 mm	6.50 mm
11.6509.0140	125.00 mm	115.60 mm	7.10 mm	6.50 mm
11.6509.0145	140.00 mm	130.60 mm	7.10 mm	6.50 mm
11.6509.0150	150.00 mm	140.60 mm	7.10 mm	6.50 mm
11.6509.0155	160.00 mm	147.80 mm	9.50 mm	8.50 mm
11.6509.0160	180.00 mm	167.80 mm	9.50 mm	8.50 mm
11.6509.0165	200.00 mm	187.80 mm	9.50 mm	8.50 mm

APSOseals® – Piston Seal PSA

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Grooved ring with asymmetrical profile, sealing lip set back on outer diameter
Intended use:	Wear- and extrusion-proof grooved ring for piston seals
Material:	TPU 93.447-01
Hardness:	93 ±2 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: -30 to +40 °C
 - water: +5 to +40 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +60 °C
 - HEPG (glycols): -30 to +40 °C
 - mineral-based greases: -30 to +110 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R _a µm	R _i µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_i

Diameter clearance, depending on pressure

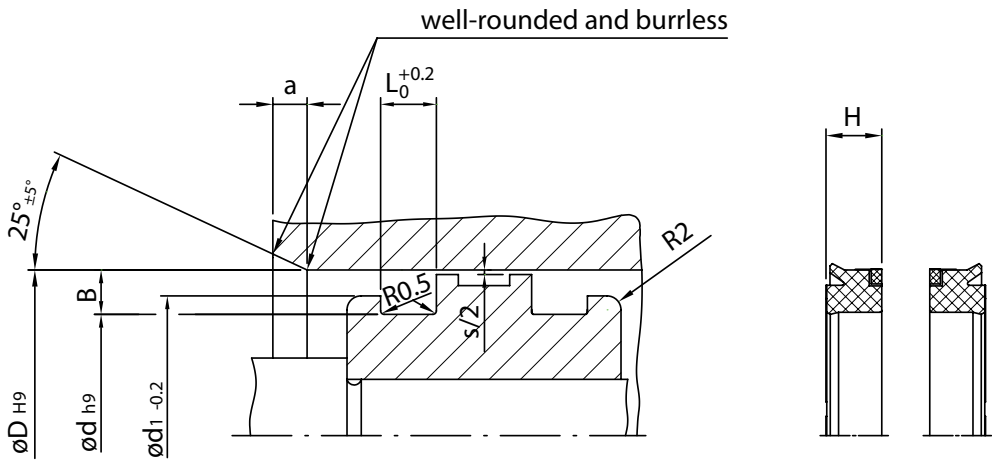
Profile width	Max. permissible clearance S			
B	16 MPa	26 MPa	32 MPa	40 MPa
mm	mm	mm	mm	mm
≤ 5	0,5	0,4	0,35	0,3
> 5 a/to ≤ 7,5	0,55	0,45	0,4	0,35
> 7,5 a/to ≤ 15	0,6	0,5	0,45	0,4

Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{H9}	Groove width L _{0,2}	Sealing height H	Chamfer α
11.6500.0000	20.00 mm	12.00 mm	7.50 mm	6.50 mm	4.00 mm
11.6500.0005	20.00 mm	14.00 mm	6.00 mm	5.50 mm	3.50 mm
11.6500.0010	22.00 mm	12.00 mm	9.00 mm	8.00 mm	5.00 mm
11.6500.0015	25.00 mm	15.00 mm	9.00 mm	8.00 mm	5.00 mm
11.6500.0020	30.00 mm	20.00 mm	9.00 mm	8.00 mm	5.00 mm
11.6500.0025	30.00 mm	22.00 mm	7.00 mm	6.50 mm	5.00 mm
11.6500.0030	32.00 mm	22.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0035	32.00 mm	24.00 mm	6.30 mm	5.70 mm	4.00 mm
11.6500.0040	32.00 mm	26.00 mm	6.00 mm	5.00 mm	3.50 mm
11.6500.0045	35.00 mm	20.00 mm	11.00 mm	10.00 mm	5.50 mm
11.6500.0050	35.00 mm	25.00 mm	9.00 mm	8.00 mm	5.00 mm
11.6500.0055	37.00 mm	21.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0060	40.00 mm	25.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0065	40.00 mm	30.00 mm	7.50 mm	6.50 mm	5.00 mm
11.6500.0070	40.00 mm	30.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0075	40.00 mm	32.00 mm	6.50 mm	5.50 mm	4.00 mm
11.6500.0080	40.00 mm	32.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6500.0085	42.00 mm	32.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0090	45.00 mm	30.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0095	50.00 mm	30.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0100	50.00 mm	32.00 mm	11.00 mm	10.00 mm	6.50 mm
11.6500.0105	50.00 mm	35.00 mm	9.50 mm	8.50 mm	6.00 mm
11.6500.0110	50.00 mm	35.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0115	50.00 mm	40.00 mm	5.50 mm	5.00 mm	5.00 mm
11.6500.0120	50.00 mm	40.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0125	50.00 mm	42.00 mm	6.00 mm	5.50 mm	4.00 mm
11.6500.0130	50.00 mm	42.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6500.0135	55.00 mm	40.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0140	60.00 mm	40.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0145	60.00 mm	45.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0150	60.00 mm	50.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6500.0155	60.00 mm	50.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0160	63.00 mm	43.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0165	63.00 mm	45.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0170	63.00 mm	48.00 mm	7.50 mm	6.50 mm	6.50 mm
11.6500.0175	63.00 mm	48.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0180	63.00 mm	48.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0185	63.00 mm	53.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6500.0190	63.00 mm	53.00 mm	13.00 mm	12.00 mm	5.00 mm
11.6500.0195	65.00 mm	45.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0200	65.00 mm	50.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0205	70.00 mm	50.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0210	70.00 mm	55.00 mm	10.50 mm	9.50 mm	6.00 mm
11.6500.0215	70.00 mm	55.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0220	70.00 mm	60.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6500.0225	70.00 mm	60.00 mm	13.00 mm	12.00 mm	5.00 mm
11.6500.0230	70.00 mm	62.00 mm	8.50 mm	7.50 mm	4.50 mm
11.6500.0235	75.00 mm	55.00 mm	14.50 mm	13.50 mm	7.00 mm
11.6500.0240	75.00 mm	65.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6500.0245	75.00 mm	65.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0250	80.00 mm	60.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0255	80.00 mm	65.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0260	80.00 mm	68.00 mm	9.50 mm	8.50 mm	5.50 mm
11.6500.0265	80.00 mm	70.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6500.0270	80.00 mm	70.00 mm	13.00 mm	12.00 mm	5.00 mm
11.6500.0275	85.00 mm	65.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0280	85.00 mm	65.00 mm	14.50 mm	13.50 mm	7.00 mm
11.6500.0285	85.00 mm	70.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0290	85.00 mm	75.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0295	90.00 mm	70.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0300	90.00 mm	70.00 mm	14.50 mm	13.50 mm	7.00 mm

Item No.	Bore Ø D _{H9}	Ground of the groove Ø d _{H9}	Groove width L _{0,2}	Sealing height H	Chamfer α
11.6500.0305	90.00 mm	75.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0310	90.00 mm	80.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6500.0315	95.00 mm	80.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0320	95.00 mm	85.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6500.0325	100.00 mm	80.00 mm	11.00 mm	10.00 mm	7.00 mm
11.6500.0330	100.00 mm	80.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0335	100.00 mm	85.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0340	100.00 mm	88.00 mm	9.50 mm	8.50 mm	5.50 mm
11.6500.0345	100.00 mm	90.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6500.0350	105.00 mm	90.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0355	110.00 mm	90.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0360	110.00 mm	95.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0365	115.00 mm	95.00 mm	16.00 mm	15.00 mm	7.00 mm
11.6500.0370	115.00 mm	100.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0375	120.00 mm	100.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0380	120.00 mm	105.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6500.0385	125.00 mm	100.00 mm	16.00 mm	15.00 mm	8.00 mm
11.6500.0390	125.00 mm	105.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0395	125.00 mm	105.00 mm	16.00 mm	15.00 mm	7.00 mm
11.6500.0400	125.00 mm	110.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6500.0405	130.00 mm	110.00 mm	16.00 mm	15.00 mm	7.00 mm
11.6500.0410	140.00 mm	120.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6500.0415	150.00 mm	130.00 mm	16.00 mm	15.00 mm	7.00 mm
11.6500.0420	160.00 mm	140.00 mm	12.50 mm	11.50 mm	7.00 mm
11.6500.0425	160.00 mm	140.00 mm	16.00 mm	15.00 mm	7.00 mm
11.6500.0430	180.00 mm	160.00 mm	12.50 mm	11.50 mm	7.00 mm
11.6500.0435	180.00 mm	160.00 mm	16.00 mm	15.00 mm	7.00 mm
11.6500.0440	200.00 mm	170.00 mm	20.00 mm	19.00 mm	8.00 mm
11.6500.0445	250.00 mm	220.00 mm	20.00 mm	19.00 mm	8.00 mm

APSOseals® – Piston Seal PAE

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	grooved ring with asymmetrical profile and integrated backring, sealing lip set back on outer diameter
Intended use:	Wear- and extrusion-proof grooved ring for piston seals in hydraulics
Material:	TPU 93.447-01
Material backup ring:	POM
Hardness:	93 ±2 Shore A
Pressure PN:	max. 50 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: -30 to +40 °C
 - water: +5 to +50 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +50 °C
 - mineral-based greases: -30 to +110 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R_a μm	R_i μm	R_z μm	
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$	N4/N5
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio $t_p > 50\%$ to max. 90 % at 0,5 R_i

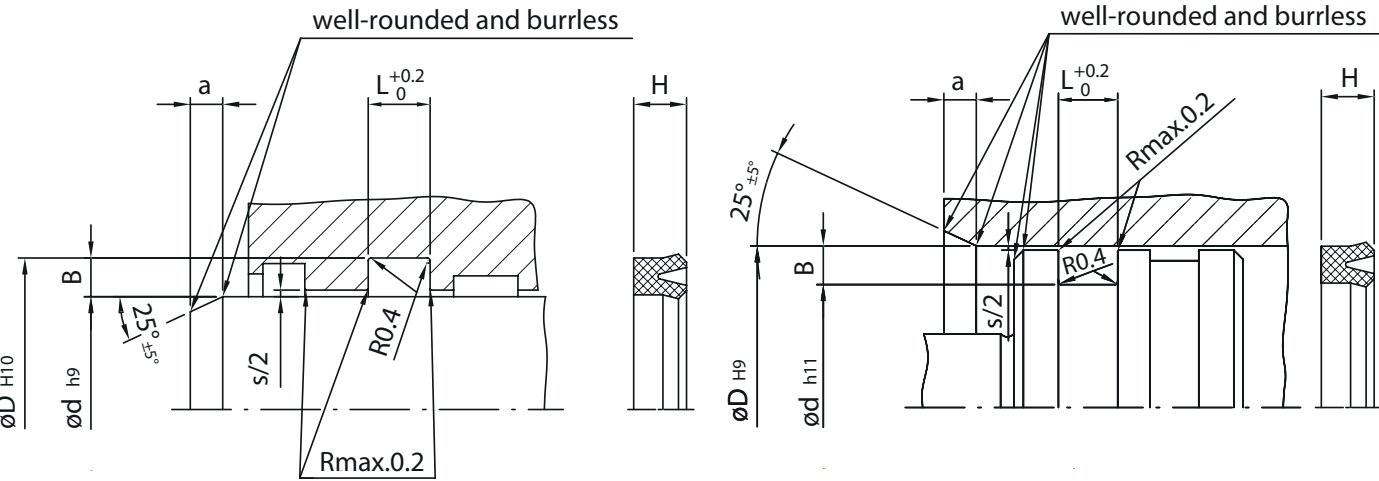
Diameter clearance, depending on pressure

Profile width	Max. permissible clearance S			
B	16 MPa	26 MPa	32 MPa	40 MPa
mm	mm	mm	mm	mm
7,5	0,8	0,7	0,5	0,4
10/12,5/15	1,2	1	0,65	0,55

Item No.	Bore Ø D_{H9}	Ground of the groove Ø d_{h9}	Groove width $L_{+0.2}$	$\emptyset d_{1-0.2}$	Sealing height H	Chamfer a
11.6501.0000	40.00 mm	25.00 mm	9.50 mm	35.00 mm	9.30 mm	4.00 mm
11.6501.0005	45.00 mm	30.00 mm	9.50 mm	40.00 mm	9.30 mm	4.00 mm
11.6501.0010	50.00 mm	35.00 mm	9.50 mm	45.00 mm	9.30 mm	4.00 mm
11.6501.0015	55.00 mm	40.00 mm	9.50 mm	50.00 mm	9.30 mm	4.00 mm
11.6501.0020	60.00 mm	45.00 mm	9.50 mm	55.00 mm	9.30 mm	4.00 mm
11.6501.0025	63.00 mm	48.00 mm	9.50 mm	58.00 mm	9.30 mm	4.00 mm
11.6501.0030	65.00 mm	50.00 mm	9.50 mm	60.00 mm	9.30 mm	4.00 mm
11.6501.0035	70.00 mm	50.00 mm	12.50 mm	64.00 mm	12.20 mm	5.00 mm
11.6501.0040	75.00 mm	55.00 mm	12.50 mm	69.00 mm	12.20 mm	5.00 mm
11.6501.0045	80.00 mm	60.00 mm	12.50 mm	74.00 mm	12.20 mm	5.00 mm
11.6501.0050	85.00 mm	70.00 mm	9.50 mm	80.00 mm	9.30 mm	4.00 mm
11.6501.0055	90.00 mm	70.00 mm	12.50 mm	84.00 mm	12.20 mm	5.00 mm
11.6501.0060	100.00 mm	80.00 mm	12.50 mm	94.00 mm	12.20 mm	5.00 mm
11.6501.0065	105.00 mm	85.00 mm	12.50 mm	99.00 mm	12.20 mm	5.00 mm
11.6501.0070	110.00 mm	90.00 mm	12.50 mm	104.00 mm	12.20 mm	5.00 mm
11.6501.0075	115.00 mm	95.00 mm	12.50 mm	109.00 mm	12.20 mm	5.00 mm
11.6501.0080	125.00 mm	100.00 mm	16.20 mm	117.00 mm	15.20 mm	6.50 mm
11.6501.0085	125.00 mm	105.00 mm	12.50 mm	119.00 mm	12.20 mm	5.00 mm
11.6501.0090	130.00 mm	110.00 mm	12.50 mm	124.00 mm	12.20 mm	5.00 mm
11.6501.0095	140.00 mm	115.00 mm	16.20 mm	132.00 mm	15.20 mm	6.50 mm
11.6501.0100	140.00 mm	120.00 mm	12.50 mm	134.00 mm	12.20 mm	5.00 mm

APSOseals® – Piston-Rod Seal RPS

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Grooved ring with symmetrical profile
Intended use:	Wear- and extrusion-proof grooved ring for rod and piston seals
Material:	TPU 93.447-01
Hardness:	93 ±2 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: -30 to +40 °C
 - water: +5 to +50 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +50 °C
 - mineral-based greases: -40 to +110 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R_a µm	R_i µm	R_z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio $t_p > 50\%$ to max. 90 % at 0,5 R_i

Diameter clearance, depending on pressure

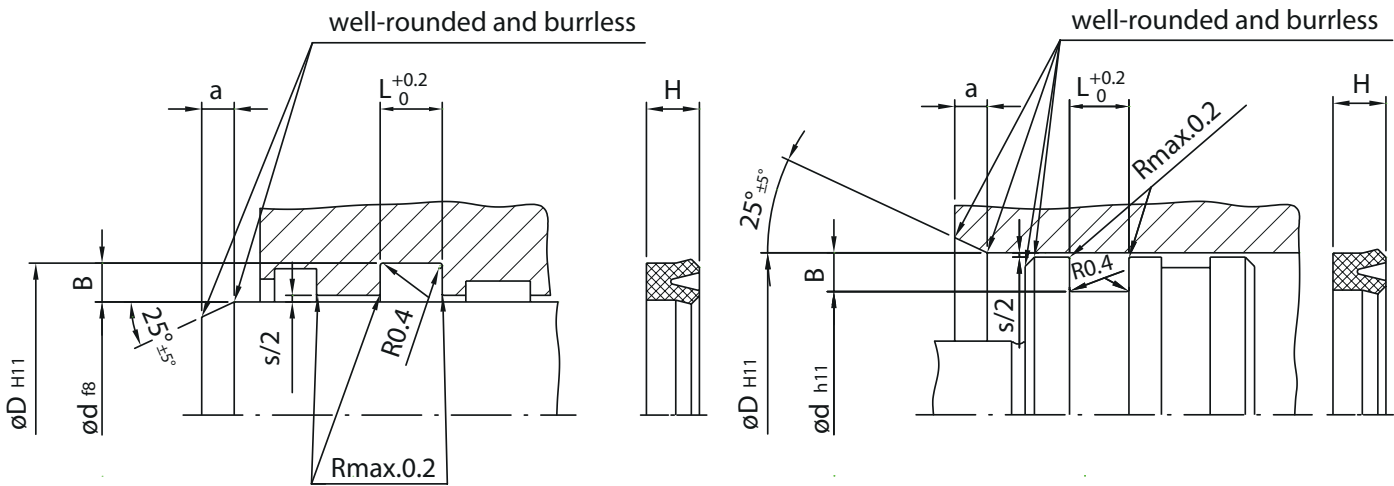
Profile width	Max. permissible clearance S			
B	16 MPa	26 MPa	32 MPa	40 MPa
mm	mm	mm	mm	mm
≤ 5	0,5	0,4	0,35	–
> 5 a/to ≤ 7,5	0,55	0,45	0,4	0,35
> 7,5 a/to ≤ 12,5		0,6	0,5	0,45 0,4
15	0,65	0,55	0,45	0,4

Item No.	Inner Ø _d	Outer Ø _D	Groove width L _{+0,2}	Sealing height H	Chamfer α
11.6560.0000	4.00 mm	8.00 mm	4.00 mm	3.50 mm	2.00 mm
11.6560.0005	4.00 mm	10.00 mm	4.50 mm	4.00 mm	3.00 mm
11.6560.0010	5.00 mm	12.00 mm	5.00 mm	4.50 mm	3.00 mm
11.6560.0015	5.00 mm	12.00 mm	5.50 mm	5.00 mm	3.00 mm
11.6560.0020	6.00 mm	12.00 mm	5.00 mm	4.50 mm	3.00 mm
11.6560.0025	6.00 mm	12.00 mm	6.00 mm	5.50 mm	3.00 mm
11.6560.0030	6.00 mm	12.00 mm	7.00 mm	6.00 mm	3.00 mm
11.6560.0035	7.00 mm	14.00 mm	4.00 mm	3.50 mm	4.00 mm
11.6560.0040	8.00 mm	12.00 mm	5.50 mm	5.00 mm	2.00 mm
11.6560.0045	8.00 mm	14.00 mm	6.00 mm	5.50 mm	3.00 mm
11.6560.0050	8.00 mm	14.00 mm	7.00 mm	6.00 mm	3.00 mm
11.6560.0055	8.00 mm	15.00 mm	6.30 mm	5.70 mm	4.00 mm
11.6560.0060	8.00 mm	16.00 mm	6.00 mm	5.50 mm	4.00 mm
11.6560.0065	8.00 mm	16.00 mm	6.30 mm	5.70 mm	3.50 mm
11.6560.0070	8.00 mm	16.00 mm	8.00 mm	7.00 mm	3.50 mm
11.6560.0075	9.00 mm	19.00 mm	7.00 mm	6.00 mm	4.00 mm
11.6560.0080	10.00 mm	16.00 mm	6.50 mm	6.00 mm	3.00 mm
11.6560.0085	10.00 mm	18.00 mm	6.00 mm	5.50 mm	3.50 mm
11.6560.0090	10.00 mm	18.00 mm	6.30 mm	5.70 mm	3.50 mm
11.6560.0095	10.00 mm	18.00 mm	7.00 mm	6.00 mm	3.50 mm
11.6560.0100	10.00 mm	18.00 mm	9.00 mm	8.00 mm	3.50 mm
11.6560.0105	10.00 mm	19.00 mm	3.50 mm	3.20 mm	4.00 mm
11.6560.0110	10.00 mm	20.00 mm	8.00 mm	7.00 mm	4.00 mm
11.6560.0115	10.00 mm	20.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0120	12.00 mm	18.00 mm	5.50 mm	5.00 mm	3.00 mm
11.6560.0125	12.00 mm	18.00 mm	7.00 mm	6.00 mm	3.00 mm
11.6560.0130	12.00 mm	20.00 mm	4.50 mm	4.00 mm	4.50 mm
11.6560.0135	12.00 mm	20.00 mm	8.00 mm	7.00 mm	3.50 mm
11.6560.0140	12.00 mm	20.00 mm	9.00 mm	8.00 mm	3.50 mm
11.6560.0145	12.00 mm	22.00 mm	6.00 mm	5.00 mm	4.00 mm
11.6560.0150	12.00 mm	22.00 mm	8.00 mm	7.00 mm	4.00 mm
11.6560.0155	12.00 mm	22.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0160	12.00 mm	25.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0165	14.00 mm	20.00 mm	5.30 mm	4.80 mm	3.00 mm
11.6560.0170	14.00 mm	22.00 mm	4.50 mm	4.00 mm	3.50 mm
11.6560.0175	14.00 mm	22.00 mm	7.00 mm	6.00 mm	3.50 mm
11.6560.0180	14.00 mm	22.00 mm	9.00 mm	8.00 mm	3.50 mm
11.6560.0185	14.00 mm	22.00 mm	12.00 mm	11.00 mm	3.50 mm
11.6560.0190	14.00 mm	24.00 mm	8.00 mm	7.00 mm	4.00 mm
11.6560.0195	14.00 mm	24.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0200	15.00 mm	25.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0205	15.00 mm	25.00 mm	11.00 mm	10.00 mm	4.00 mm
11.6560.0210	16.00 mm	22.00 mm	4.50 mm	4.00 mm	3.00 mm
11.6560.0215	16.00 mm	22.00 mm	5.50 mm	5.00 mm	3.00 mm
11.6560.0220	16.00 mm	24.00 mm	6.00 mm	5.00 mm	3.50 mm
11.6560.0225	16.00 mm	24.00 mm	6.30 mm	5.70 mm	3.50 mm
11.6560.0230	16.00 mm	24.00 mm	8.00 mm	7.00 mm	3.50 mm
11.6560.0235	16.00 mm	26.00 mm	6.00 mm	5.00 mm	4.00 mm
11.6560.0240	16.00 mm	26.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0245	16.00 mm	28.00 mm	7.00 mm	6.00 mm	5.00 mm
11.6560.0250	17.00 mm	25.00 mm	11.00 mm	10.00 mm	3.00 mm
11.6560.0255	18.00 mm	25.00 mm	5.50 mm	5.00 mm	3.50 mm
11.6560.0260	18.00 mm	26.00 mm	7.50 mm	6.50 mm	3.50 mm
11.6560.0265	18.00 mm	28.00 mm	7.00 mm	6.00 mm	4.00 mm
11.6560.0270	18.00 mm	28.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0275	18.00 mm	30.00 mm	9.00 mm	8.00 mm	5.00 mm
11.6560.0280	19.00 mm	25.00 mm	7.00 mm	6.00 mm	3.00 mm
11.6560.0285	20.00 mm	28.00 mm	5.00 mm	4.00 mm	3.50 mm
11.6560.0290	20.00 mm	28.00 mm	5.00 mm	4.50 mm	3.50 mm
11.6560.0295	20.00 mm	30.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0300	20.00 mm	30.00 mm	11.00 mm	10.00 mm	4.00 mm

Item No.	Inner Ø _d	Outer Ø _D	Groove width L _{+0,2}	Sealing height H	Chamfer α
11.6560.0305	20.00 mm	32.00 mm	8.50 mm	7.50 mm	5.00 mm
11.6560.0310	20.00 mm	35.00 mm	13.00 mm	12.00 mm	5.00 mm
11.6560.0315	20.00 mm	40.00 mm	11.00 mm	10.00 mm	7.00 mm
11.6560.0320	20.00 mm	40.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6560.0325	22.00 mm	28.00 mm	9.00 mm	8.00 mm	3.00 mm
11.6560.0330	22.00 mm	30.00 mm	7.00 mm	6.00 mm	3.50 mm
11.6560.0335	22.00 mm	30.00 mm	11.00 mm	10.00 mm	3.50 mm
11.6560.0340	22.00 mm	32.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0345	22.00 mm	32.00 mm	11.00 mm	10.00 mm	4.00 mm
11.6560.0350	22.00 mm	35.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0355	22.00 mm	40.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6560.0360	24.00 mm	32.00 mm	8.00 mm	7.00 mm	3.50 mm
11.6560.0365	25.00 mm	35.00 mm	5.50 mm	5.00 mm	4.00 mm
11.6560.0370	25.00 mm	35.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0375	25.00 mm	35.00 mm	11.00 mm	10.00 mm	4.00 mm
11.6560.0380	25.00 mm	38.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0385	25.00 mm	40.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0390	28.00 mm	35.00 mm	5.50 mm	5.00 mm	3.00 mm
11.6560.0395	28.00 mm	36.00 mm	6.30 mm	5.70 mm	4.00 mm
11.6560.0400	28.00 mm	36.00 mm	7.50 mm	6.50 mm	3.50 mm
11.6560.0405	28.00 mm	38.00 mm	6.30 mm	5.70 mm	4.00 mm
11.6560.0410	28.00 mm	38.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0415	28.00 mm	40.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0420	30.00 mm	38.00 mm	6.50 mm	6.00 mm	4.00 mm
11.6560.0425	30.00 mm	40.00 mm	5.50 mm	5.00 mm	5.00 mm
11.6560.0430	30.00 mm	40.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6560.0435	30.00 mm	40.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0440	30.00 mm	42.00 mm	10.00 mm	9.00 mm	5.50 mm
11.6560.0445	30.00 mm	42.00 mm	11.00 mm	10.00 mm	5.50 mm
11.6560.0450	30.00 mm	45.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6560.0455	30.00 mm	50.00 mm	11.00 mm	10.00 mm	7.00 mm
11.6560.0460	30.00 mm	50.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6560.0465	32.00 mm	40.00 mm	6.00 mm	5.50 mm	4.00 mm
11.6560.0470	32.00 mm	40.00 mm	6.30 mm	5.70 mm	4.00 mm
11.6560.0475	32.00 mm	40.00 mm	9.00 mm	8.00 mm	4.00 mm
11.6560.0480	32.00 mm	42.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6560.0485	32.00 mm	42.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0490	32.00 mm	45.00 mm	11.00 mm	10.00 mm	5.50 mm
11.6560.0495	32.00 mm	50.00 mm	13.00 mm	12.00 mm	6.50 mm
11.6560.0500	35.00 mm	45.00 mm	9.00 mm	8.00 mm	5.00 mm
11.6560.0505	35.00 mm	45.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0510	35.00 mm	48.00 mm	11.00 mm	10.00 mm	5.50 mm
11.6560.0515	35.00 mm	50.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6560.0520	35.00 mm	55.00 mm	11.00 mm	10.00 mm	7.00 mm
11.6560.0525	36.00 mm	46.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6560.0530	38.00 mm	45.00 mm	5.50 mm	5.00 mm	3.50 mm
11.6560.0535	38.00 mm	50.00 mm	10.00 mm	9.00 mm	5.50 mm
11.6560.0540	38.00 mm	55.00 mm	11.00 mm	10.00 mm	6.50 mm
11.6560.0545	40.00 mm	50.00 mm	7.00 mm	6.00 mm	5.00 mm
11.6560.0550	40.00 mm	50.00 mm	7.50 mm	6.50 mm	5.00 mm
11.6560.0555	40.00 mm	50.00 mm	8.00 mm	7.00 mm	5.00 mm
11.6560.0560	40.00 mm	50.00 mm	9.00 mm	8.00 mm	5.00 mm
11.6560.0565	40.00 mm	50.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0570	40.00 mm	55.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6560.0575	40.00 mm	56.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6560.0580	40.00 mm	60.00 mm	11.00 mm	10.00 mm	7.00 mm
11.6560.0585	40.00 mm	60.00 mm	11.00 mm	13.00 mm	7.00 mm
11.6560.0590	42.00 mm	52.00 mm	10.00 mm	9.00 mm	5.00 mm
11.6560.0595	45.00 mm	55.00 mm	7.50 mm	6.50 mm	5.00 mm
11.6560.0600	45.00 mm	55.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6560.0605	45.00 mm	60.00 mm	11.00 mm	10.00 mm	6.00 mm
11.6560.0610	45.00 mm	63.00 mm	11.00 mm	10.00 mm	6.50 mm

APSOseals® – Piston-Rod Seal UM

Medium stability:	For use in mineral oils and greases
Product description:	Grooved ring with symmetrical profile
Intended use:	For rod and piston seals in hydraulics and pneumatics
Material:	NBR 90.447-01
Hardness:	90 ±5 Shore A
Pressure PN:	max. 10 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-30 to +100 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +100 °C
 - HFA, HFB fluids: +5 to +60 °C
 - HFC fluids: -30 to +60 °C
 - water: +5 to +90 °C
 - HETG (colza oils): -30 to +80 °C
 - HEPG (glycols): -30 to +60 °C
 - mineral-based greases: -30 to +100 °C

Application is not provided for:

- HFD fluids
- HEES (synth. ester)

Surface finish

	Surface roughness			Roughness class
	R _a µm	R _t µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_t

Diameter clearance, depending on pressure

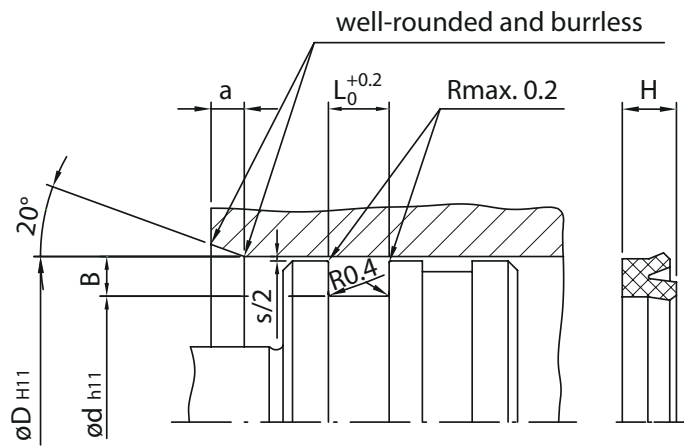
Profile width	Max. permissible clearance S			
B	2,5 MPa	5 MPa	7,5 MPa	10 MPa
mm	mm	mm	mm	mm
≤ 6,5	0,45	0,3	0,25	0,2
> 6,5	0,5	0,35	0,3	0,25

Item No.	Inner Ø d	Outer Ø D	Groove width L _{0,2}	Sealing height H	Chamfer a	Ref.-No.
11.6561.0000	5.00 mm	12.00 mm	6.50 mm	5.00 mm	3.50 mm	UM 125
11.6561.0005	8.00 mm	15.00 mm	7.50 mm	6.00 mm	3.50 mm	UM 158
11.6561.0010	6.00 mm	16.00 mm	7.50 mm	6.00 mm	3.50 mm	UM 1666
11.6561.0015	8.00 mm	16.00 mm	7.50 mm	6.00 mm	3.50 mm	UM 168
11.6561.0020	6.00 mm	17.00 mm	7.50 mm	6.00 mm	3.50 mm	UM 176
11.6561.0025	6.00 mm	18.00 mm	9.50 mm	8.00 mm	3.50 mm	UM 186
11.6561.0030	8.00 mm	18.00 mm	7.50 mm	6.00 mm	3.50 mm	UM 1886
11.6561.0035	6.00 mm	20.00 mm	9.50 mm	8.00 mm	3.50 mm	UM 206
11.6561.0040	10.00 mm	20.00 mm	9.50 mm	8.00 mm	4.00 mm	UM 20108
11.6561.0045	10.00 mm	22.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 2210
11.6561.0050	10.00 mm	22.00 mm	9.50 mm	8.00 mm	4.00 mm	UM 22108
11.6561.0055	12.00 mm	22.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 22126
11.6561.0060	12.00 mm	24.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 2412
11.6561.0065	12.00 mm	24.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 241210
11.6561.0070	14.00 mm	24.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 24146
11.6561.0075	8.00 mm	25.00 mm	7.50 mm	6.00 mm	3.50 mm	UM 258
11.6561.0080	10.00 mm	25.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 251010
11.6561.0085	15.00 mm	25.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 25156
11.6561.0090	10.00 mm	26.00 mm	9.50 mm	8.00 mm	4.00 mm	UM 2610
11.6561.0095	16.00 mm	26.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 26166
11.6561.0100	12.00 mm	28.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 2812
11.6561.0105	14.00 mm	28.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 281410
11.6561.0110	18.00 mm	28.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 28186
11.6561.0115	10.00 mm	30.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 3010
11.6561.0120	13.00 mm	30.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 3013
11.6561.0125	15.00 mm	30.00 mm	9.50 mm	8.00 mm	4.00 mm	UM 3015
11.6561.0130	15.00 mm	30.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 301510
11.6561.0135	18.00 mm	30.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 301810
11.6561.0140	20.00 mm	30.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 30206
11.6561.0145	14.00 mm	32.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 3214
11.6561.0150	16.00 mm	32.00 mm	9.50 mm	8.00 mm	4.00 mm	UM 3216
11.6561.0155	16.00 mm	32.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 321610
11.6561.0160	22.00 mm	32.00 mm	7.50 mm	6.00 mm	4.00 mm	UM 32226
11.6561.0165	18.00 mm	34.00 mm	9.50 mm	8.00 mm	4.00 mm	UM 3418
11.6561.0170	22.00 mm	34.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 342210
11.6561.0175	12.00 mm	35.00 mm	13.50 mm	12.00 mm	4.00 mm	UM 3512
11.6561.0180	15.00 mm	35.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 3515
11.6561.0185	18.00 mm	35.00 mm	13.50 mm	12.00 mm	4.00 mm	UM 351812
11.6561.0190	20.00 mm	35.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 352010
11.6561.0195	16.00 mm	36.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 3616
11.6561.0200	20.00 mm	36.00 mm	9.50 mm	8.00 mm	4.00 mm	UM 3620
11.6561.0205	20.00 mm	36.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 362010
11.6561.0210	17.00 mm	38.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 3817
11.6561.0215	18.00 mm	38.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 3818
11.6561.0220	22.00 mm	38.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 382210
11.6561.0225	18.00 mm	40.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 4018
11.6561.0230	20.00 mm	40.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 4020
11.6561.0235	20.00 mm	40.00 mm	13.50 mm	12.00 mm	4.00 mm	UM 402012
11.6561.0240	24.00 mm	40.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 402410
11.6561.0245	25.00 mm	40.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 402510
11.6561.0250	22.00 mm	42.00 mm	11.50 mm	10.00 mm	4.00 mm	UM 4222
11.6561.0255	25.00 mm	42.00 mm	9.50 mm	8.00 mm	5.00 mm	UM 4225
11.6561.0260	30.00 mm	42.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 423010
11.6561.0265	20.00 mm	43.00 mm	13.50 mm	12.00 mm	4.00 mm	UM 4320
11.6561.0270	28.00 mm	43.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 432810
11.6561.0275	25.00 mm	45.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 4525
11.6561.0280	25.00 mm	45.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 452512
11.6561.0285	30.00 mm	45.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 453010
11.6561.0290	32.00 mm	45.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 453210
11.6561.0295	26.00 mm	46.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 4626
11.6561.0300	32.00 mm	47.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 473210

Item No.	Inner Ø d	Outer Ø D	Groove width L _{0,2}	Sealing height H	Chamfer a	Ref.-No.
11.6561.0305	28.00 mm	48.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 4828
11.6561.0310	28.00 mm	48.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 482812
11.6561.0315	25.00 mm	50.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 5025
11.6561.0320	30.00 mm	50.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 5030
11.6561.0325	30.00 mm	50.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 503012
11.6561.0330	32.00 mm	50.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 503212
11.6561.0335	35.00 mm	50.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 5035
11.6561.0340	36.00 mm	51.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 513610
11.6561.0345	32.00 mm	52.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 5232
11.6561.0350	35.00 mm	52.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 523512
11.6561.0355	38.00 mm	53.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 533810
11.6561.0360	35.00 mm	55.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 553510
11.6561.0365	40.00 mm	55.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 554010
11.6561.0370	40.00 mm	56.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 564010
11.6561.0375	38.00 mm	58.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 5838
11.6561.0380	45.00 mm	58.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 584510
11.6561.0385	30.00 mm	60.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 6030
11.6561.0390	35.00 mm	60.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 6035
11.6561.0395	40.00 mm	60.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 6040
11.6561.0400	40.00 mm	60.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 604012
11.6561.0405	45.00 mm	60.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 604510
11.6561.0410	48.00 mm	63.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 634810
11.6561.0415	40.00 mm	65.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 6540
11.6561.0420	45.00 mm	65.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 6545
11.6561.0425	45.00 mm	65.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 654512
11.6561.0430	50.00 mm	65.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 655010
11.6561.0435	48.00 mm	68.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 6848
11.6561.0440	46.00 mm	70.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 7046
11.6561.0445	50.00 mm	70.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 7050
11.6561.0450	50.00 mm	70.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 705012
11.6561.0455	55.00 mm	75.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 7555
11.6561.0460	55.00 mm	75.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 755512
11.6561.0465	55.00 mm	80.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 8055
11.6561.0470	55.00 mm	80.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 805515
11.6561.0475	60.00 mm	80.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 8060
11.6561.0480	60.00 mm	80.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 806012
11.6561.0485	63.00 mm	83.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 836312
11.6561.0490	55.00 mm	85.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 8555
11.6561.0495	65.00 mm	85.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 8565
11.6561.0500	65.00 mm	85.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 856512
11.6561.0505	60.00 mm	90.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 9060
11.6561.0510	65.00 mm	90.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 9065
11.6561.0515	70.00 mm	90.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 9070
11.6561.0520	70.00 mm	90.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 907012
11.6561.0525	65.00 mm	95.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 9565
11.6561.0530	70.00 mm	95.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 957015
11.6561.0535	75.00 mm	95.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 9575
11.6561.0540	75.00 mm	95.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 957512
11.6561.0545	75.00 mm	100.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 10075
11.6561.0550	80.00 mm	100.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 10080
11.6561.0555	80.00 mm	100.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 1008015
11.6561.0560	75.00 mm	105.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 10575
11.6561.0565	80.00 mm	105.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 10580
11.6561.0570	80.00 mm	105.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 1058015
11.6561.0575	85.00 mm	105.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 10585
11.6561.0580	80.00 mm	110.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 11080
11.6561.0585	85.00 mm	110.00 mm	13.50 mm	12.00 mm	5.00 mm	UM 11085
11.6561.0590	90.00 mm	110.00 mm	11.50 mm	10.00 mm	5.00 mm	UM 11090
11.6561.0595	90.00 mm	110.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 1109015
11.6561.0600	85.00 mm	115.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 11585
11.6561.0605	90.00 mm	115.00 mm	16.50 mm	15.00 mm	5.00 mm	UM 1159015

APSOseals® – Piston Seal DEM

Medium stability:	For use in mineral oils and greases
Product description:	Grooved ring with asymmetrical profile, sealing lip set back on outer diameter
Intended use:	For single-acting pistons in hydraulics and pneumatics
Material:	NBR 75.447-01
Hardness:	75 ±5 Shore A
Pressure PN:	max. 10 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-30 to +100 °C



- Working temperature:**
- hydraulic oils HL, HLP: –30 to +100 °C
 - HFA, HFB fluids: +5 to +60 °C
 - HFC fluids: –30 to +60 °C
 - water: +5 to +90 °C
 - HETG (rapeseed oils): –30 to +80 °C
 - HEPG (glycols): –30 to +60 °C
 - mineral-based greases: –30 to +100 °C
- Application is not provided for:
- HFD fluids
 - HEES (synth. ester)

Surface finish

	Surface roughness			Roughness class
	R_a µm	R_t µm	R_z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_t

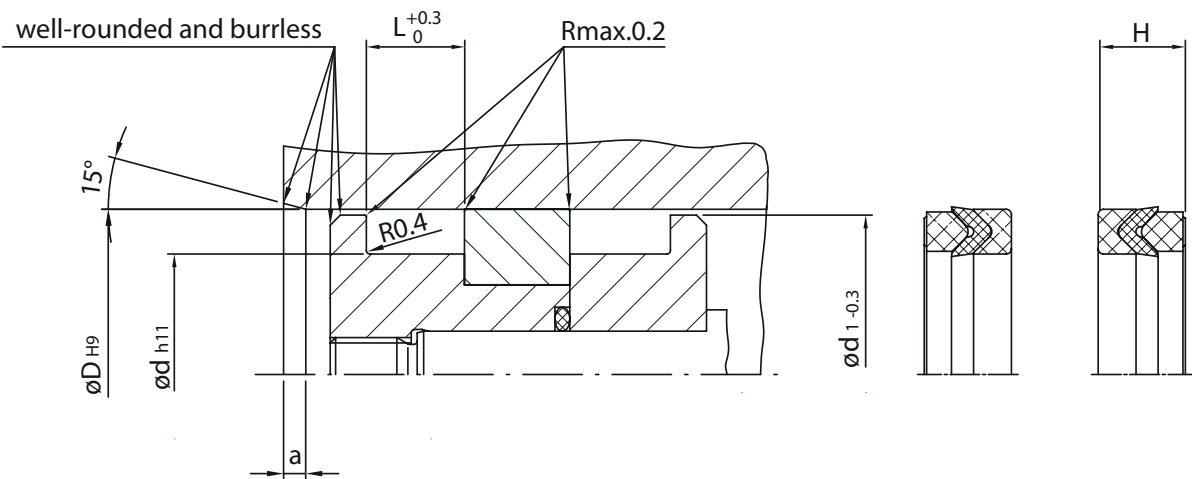
Diameter clearance, depending on pressure

Profile width	Max. permissible clearance S			
	2,5 MPa	5 MPa	7,5 MPa	10 MPa
B				
mm	mm	mm	mm	mm
≤ 5	0,45	0,3	0,25	0,2
> 5	0,5	0,35	0,3	0,25

Item No.	Bore Ø D_{H11}	Ground of the groove Ø d_{h11}	Groove width $L_{+0.2}$	Sealing height H	Chamfer a	Ref.-No.
11.6505.0000	12.00 mm	6.00 mm	4.50 mm	4.00 mm	2.50 mm	DEM 12
11.6505.0005	16.00 mm	10.00 mm	4.50 mm	4.00 mm	2.50 mm	DEM 16
11.6505.0010	18.00 mm	10.00 mm	6.00 mm	5.50 mm	4.00 mm	DEM 18
11.6505.0015	20.00 mm	12.00 mm	6.00 mm	5.50 mm	4.00 mm	DEM 20
11.6505.0020	25.00 mm	17.00 mm	6.00 mm	5.50 mm	4.50 mm	DEM 25
11.6505.0025	30.00 mm	22.00 mm	6.00 mm	5.50 mm	4.50 mm	DEM 30
11.6505.0030	32.00 mm	24.00 mm	6.00 mm	5.50 mm	4.50 mm	DEM 32
11.6505.0035	35.00 mm	25.00 mm	7.50 mm	7.00 mm	4.50 mm	DEM 35
11.6505.0040	40.00 mm	30.00 mm	7.50 mm	7.00 mm	4.50 mm	DEM 40
11.6505.0045	50.00 mm	40.00 mm	7.50 mm	7.00 mm	4.50 mm	DEM 50
11.6505.0050	60.00 mm	50.00 mm	7.50 mm	7.00 mm	4.50 mm	DEM 60
11.6505.0055	63.00 mm	53.00 mm	7.50 mm	7.00 mm	4.50 mm	DEM 63
11.6505.0060	70.00 mm	58.00 mm	9.50 mm	8.50 mm	5.00 mm	DEM 70
11.6505.0065	80.00 mm	68.00 mm	9.50 mm	8.50 mm	5.00 mm	DEM 80
11.6505.0070	100.00 mm	88.00 mm	9.50 mm	8.50 mm	5.00 mm	DEM 100
11.6505.0075	125.00 mm	110.00 mm	11.00 mm	10.00 mm	5.50 mm	DEM 125
11.6505.0080	140.00 mm	125.00 mm	11.00 mm	10.00 mm	5.50 mm	DEM 140
11.6505.0085	160.00 mm	145.00 mm	11.00 mm	10.00 mm	5.50 mm	DEM 160
11.6505.0090	180.00 mm	160.00 mm	15.00 mm	14.00 mm	6.00 mm	DEM 180
11.6505.0095	200.00 mm	180.00 mm	15.00 mm	14.00 mm	6.00 mm	DEM 200

APSOseals® – Piston Seal DMP

Medium stability:	For use in mineral hydraulic oils and water
Product description:	multi-piece seal set consisting of a pressure ring, one or two collars and a supporting ring
Intended use:	used for sealing pistons in mobile and heavy hydraulics and for really high mechanical loads due to its reliability and strength
Material:	NBR/fabric
Hardness:	75 ±5 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-30 to +120 °C



Surface finish

	Surface roughness			Roughness class
	R _a µm	R _i µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_i

Working temperature:

- hydraulic oils HL, HLP:
- NBR 65.428-02/NBR 75.428-01:
- 30 to +100 °C
- HFA, HFB fluids:
- NBR 65.428-02/NBR 75.428-01:
- +5 to +60 °C
- HFC fluids:
- NBR 65.428-02/NBR 75.428-01:
- 30 to +60 °C
- water:
- NBR 65.428-02/NBR 75.428-01:
- +5 to +100 °C
- HETG (colza oils):
- NBR 65.428-02/NBR 75.428-01:
- 30 to +80 °C
- HEES (synth. ester)
- NBR 65.428-02/NBR 75.428-01:
- 30 to +80 °C
- HEPG (glycols):
- NBR 65.428-02/NBR 75.428-01:
- 30 to +60 °C
- mineral-based greases:
- NBR 65.428-02/NBR 75.428-01:
- 30 to +100 °C

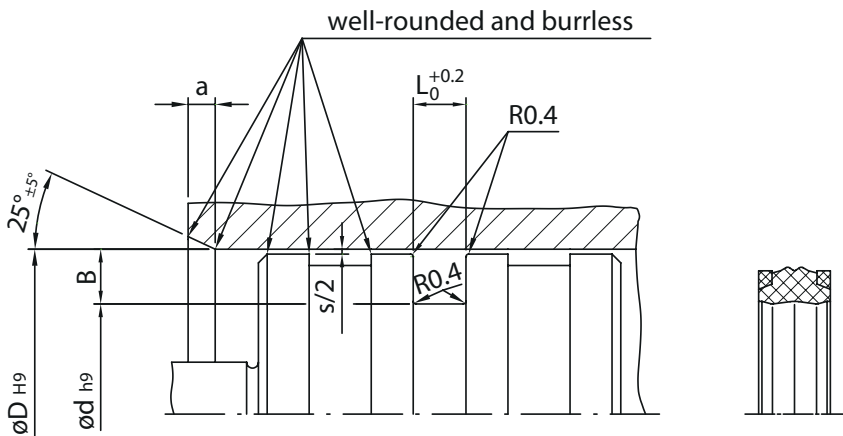
Allowance

Nominal Ø	Groove base Ø	Rod Ø	Tolerance for metal guide
D mm	d	d ₁ mm	Ø D
≤ 80	h11	0/–0,3	H9/f8
> 80 a/to ≤ 120	h11	0/–0,3	H8/f8
> 120 a/to ≤ 500	h11	0/–0,3	H8/f7

Item No.	Bore $\varnothing$ D_{H9}	Ground of the groove $\varnothing$ d_{h11}	Groove width $L_{+0.2}$	$\varnothing d_{1-0.3}$	Sealing height H	Chamfer a
11.6513.0000	20.00 mm	10.00 mm	9.30 mm	19.00 mm	8.90 mm	5.00 mm
11.6513.0005	22.00 mm	12.00 mm	9.30 mm	21.00 mm	8.90 mm	5.00 mm
11.6513.0010	25.00 mm	15.00 mm	9.30 mm	24.00 mm	8.90 mm	5.00 mm
11.6513.0015	28.00 mm	18.00 mm	9.30 mm	27.00 mm	8.90 mm	5.00 mm
11.6513.0020	30.00 mm	20.00 mm	9.30 mm	29.00 mm	8.90 mm	5.00 mm
11.6513.0025	32.00 mm	20.00 mm	10.90 mm	31.00 mm	10.40 mm	5.00 mm
11.6513.0030	36.00 mm	24.00 mm	10.90 mm	35.00 mm	10.40 mm	5.00 mm
11.6513.0035	40.00 mm	25.00 mm	11.50 mm	39.00 mm	11.00 mm	5.00 mm
11.6513.0040	45.00 mm	30.00 mm	11.50 mm	44.00 mm	11.00 mm	5.00 mm
11.6513.0045	50.00 mm	35.00 mm	11.50 mm	49.00 mm	11.00 mm	5.00 mm
11.6513.0050	55.00 mm	40.00 mm	11.50 mm	54.00 mm	11.00 mm	5.00 mm
11.6513.0055	60.00 mm	45.00 mm	11.50 mm	59.00 mm	11.00 mm	5.00 mm
11.6513.0060	63.00 mm	48.00 mm	13.00 mm	62.00 mm	12.50 mm	5.00 mm
11.6513.0065	70.00 mm	50.00 mm	15.20 mm	69.00 mm	14.60 mm	6.00 mm
11.6513.0070	80.00 mm	60.00 mm	15.20 mm	79.00 mm	14.60 mm	6.00 mm
11.6513.0075	90.00 mm	70.00 mm	21.20 mm	89.00 mm	20.60 mm	6.00 mm
11.6513.0080	100.00 mm	80.00 mm	21.20 mm	99.00 mm	20.60 mm	6.00 mm
11.6513.0085	110.00 mm	90.00 mm	21.20 mm	109.00 mm	20.60 mm	6.00 mm
11.6513.0090	115.00 mm	95.00 mm	21.20 mm	114.00 mm	20.60 mm	6.00 mm
11.6513.0095	125.00 mm	100.00 mm	25.80 mm	124.00 mm	25.00 mm	7.50 mm
11.6513.0100	140.00 mm	115.00 mm	25.80 mm	139.00 mm	25.00 mm	7.50 mm
11.6513.0105	150.00 mm	120.00 mm	29.00 mm	148.50 mm	28.00 mm	7.50 mm
11.6513.0110	160.00 mm	130.00 mm	29.00 mm	158.50 mm	28.00 mm	7.50 mm
11.6513.0115	180.00 mm	150.00 mm	31.50 mm	178.50 mm	30.50 mm	7.50 mm
11.6513.0120	200.00 mm	170.00 mm	33.50 mm	198.50 mm	32.50 mm	7.50 mm
11.6513.0125	225.00 mm	195.00 mm	33.50 mm	223.50 mm	32.50 mm	7.50 mm
11.6513.0130	250.00 mm	220.00 mm	33.50 mm	248.50 mm	32.50 mm	7.50 mm

APSOseals® – Piston Seal KDAE

Medium stability:	For use in mineral hydraulic oils
Product description:	Three-piece compact piston seal consisting of a profile ring and two backrings
Intended use:	Sealing of double-acting pistons in hydraulics
Material sealing element:	TPU 93.447-01
Material backup ring:	TPE 63.447-01
Hardness sealing element:	93 ±2 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 0,8 m/s
Working temperature:	-30 to +110 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: -30 to +40 °C
 - water: +5 to +40 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +60 °C
 - HEPG (glycols): -30 to +40 °C
 - mineral-based greases: -30 to +110 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughnessRoughness Class		
	R _a µm	R _t µm	R _z µm
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25
Groove base	≤ 1,6	≤ 6,3	≤ 6,3
Groove sides	≤ 3	≤ 15	≤ 10

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_t

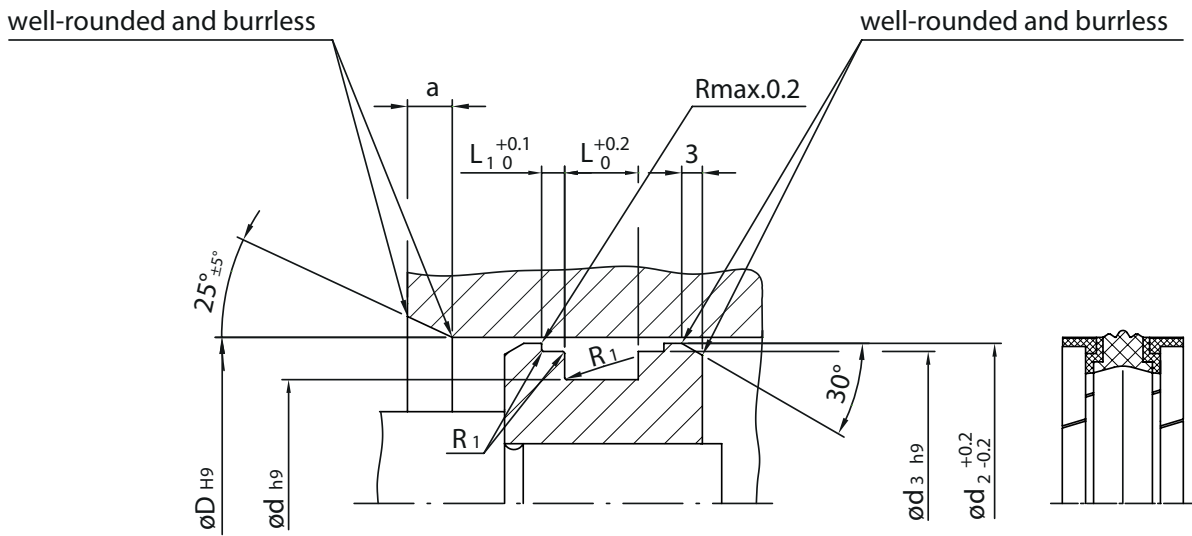
Diameter clearance, depending on pressure

Profile width	Max. permissible clearance S			
B	16 MPa	26 MPa	32 MPa	40 MPa
mm	mm	mm	mm	mm
≤ 5	0,5	0,4	0,35	0,3
> 5 a/to ≤ 7,5	0,55	0,45	0,4	0,35
> 7,5 a/to ≤ 15	0,6	0,5	0,45	0,4

Item No.	Bore Ø D_{H9}	Ground of the groove Ø d_{h9}	Groove width $L_{0.2}$	Chamfer a
11.6503.0000	36.00 mm	50.00 mm	9.00 mm	4.00 mm
11.6503.0005	38.00 mm	50.00 mm	10.00 mm	4.00 mm
11.6503.0010	41.00 mm	55.00 mm	9.00 mm	4.00 mm
11.6503.0015	46.00 mm	60.00 mm	9.00 mm	4.00 mm
11.6503.0020	48.00 mm	63.00 mm	11.00 mm	4.00 mm
11.6503.0025	51.00 mm	63.00 mm	10.00 mm	4.00 mm
11.6503.0030	50.00 mm	65.00 mm	11.00 mm	4.00 mm
11.6503.0035	53.00 mm	70.00 mm	14.00 mm	4.00 mm
11.6503.0040	55.00 mm	70.00 mm	11.00 mm	4.00 mm
11.6503.0045	60.00 mm	75.00 mm	11.00 mm	4.00 mm
11.6503.0050	63.00 mm	80.00 mm	14.00 mm	4.00 mm
11.6503.0055	65.00 mm	80.00 mm	11.00 mm	4.00 mm
11.6503.0060	70.00 mm	85.00 mm	11.00 mm	4.00 mm
11.6503.0065	73.00 mm	90.00 mm	14.00 mm	5.00 mm
11.6503.0070	75.00 mm	90.00 mm	11.00 mm	5.00 mm
11.6503.0075	80.00 mm	95.00 mm	11.00 mm	5.00 mm
11.6503.0080	83.00 mm	100.00 mm	14.00 mm	5.00 mm
11.6503.0085	85.00 mm	100.00 mm	12.50 mm	5.00 mm
11.6503.0090	88.00 mm	105.00 mm	14.00 mm	5.00 mm
11.6503.0095	90.00 mm	105.00 mm	12.50 mm	5.00 mm
11.6503.0100	93.00 mm	110.00 mm	14.00 mm	5.00 mm
11.6503.0105	95.00 mm	110.00 mm	12.50 mm	5.00 mm
11.6503.0110	98.00 mm	115.00 mm	14.00 mm	5.00 mm
11.6503.0115	100.00 mm	115.00 mm	12.50 mm	5.00 mm
11.6503.0120	103.00 mm	120.00 mm	14.00 mm	5.00 mm
11.6503.0125	105.00 mm	120.00 mm	12.50 mm	5.00 mm
11.6503.0130	108.00 mm	125.00 mm	14.00 mm	5.00 mm

APSOseals® – Piston Seal KDSB

Medium stability:	For use in mineral hydraulic oils
Product description:	five-piece compact piston seal consisting of a profile ring, two back rings, and two angle sockets
Intended use:	Sealing of double-acting pistons in hydraulics
Material sealing element:	NBR 70.447-02
Material backup ring:	TPE 63.447-01
Material angle sleeve:	POM
Hardness sealing element:	70 ±3 Shore A
Pressure PN:	max. 30 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-30 to +100 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +100 °C
 - HFA, HFB fluids: +5 to +60 °C
 - HFC fluids: +5 to +50 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +50 °C
 - mineral-based greases: -30 to +100 °C

Application is not provided for:

- HFD fluids
- water

Surface finish

	Surface roughnessRoughness class		
	R_a μm	R_t μm	R_z μm
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$
Groove sides	≤ 3	≤ 15	≤ 10

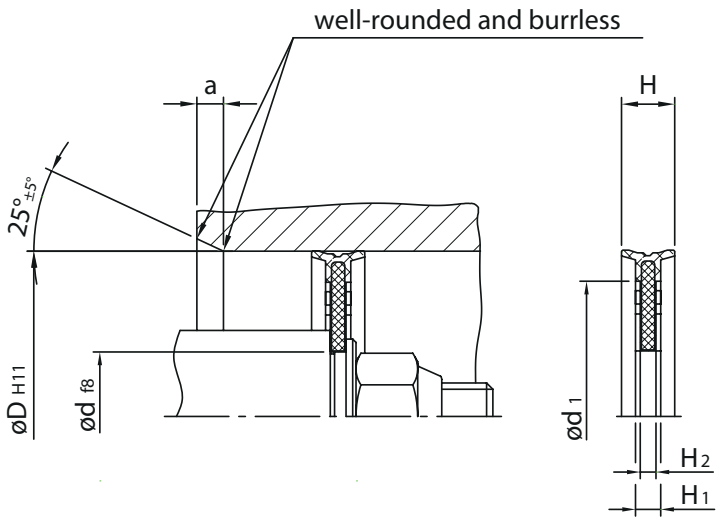
Profile bearing length ratio $t_p > 50\%$ to max. 90 % at 0,5 R_t

Item No.	$\varnothing d_{2 \pm 0.2}$	Bore $\varnothing D_{H9}$	Ground of the groove $\varnothing d_{h9}$	Groove width $L_{\pm 0.2}$	$L_{1 \pm 0.1}$	$\varnothing d_3 h_9$	Chamfer α	Radius R_1
11.6508.0000	19.00 mm	20.00 mm	11.00 mm	13.50 mm	2.10 mm	17.00 mm	3.50 mm	0.4 mm
11.6508.0005	21.00 mm	22.00 mm	13.00 mm	13.50 mm	2.10 mm	19.00 mm	3.50 mm	0.4 mm
11.6508.0010	23.00 mm	25.00 mm	15.00 mm	12.00 mm	4.00 mm	21.00 mm	3.50 mm	0.4 mm
11.6508.0015	24.00 mm	25.00 mm	15.00 mm	12.50 mm	4.00 mm	22.00 mm	3.50 mm	0.4 mm
11.6508.0020	23.50 mm	25.00 mm	15.00 mm	16.40 mm	6.35 mm	21.45 mm	3.50 mm	0.4 mm
11.6508.0025	24.00 mm	25.00 mm	16.00 mm	13.50 mm	2.10 mm	22.00 mm	3.50 mm	0.4 mm
11.6508.0030	27.00 mm	28.00 mm	19.00 mm	13.50 mm	2.10 mm	25.00 mm	3.50 mm	0.4 mm
11.6508.0035	29.00 mm	30.00 mm	21.00 mm	13.50 mm	2.10 mm	27.00 mm	3.50 mm	0.4 mm
11.6508.0040	31.00 mm	32.00 mm	22.00 mm	15.50 mm	2.60 mm	28.00 mm	3.50 mm	0.4 mm
11.6508.0045	30.50 mm	32.00 mm	22.00 mm	16.40 mm	6.35 mm	28.50 mm	3.50 mm	0.4 mm
11.6508.0050	34.00 mm	35.00 mm	25.00 mm	15.50 mm	2.60 mm	31.00 mm	3.50 mm	0.4 mm
11.6508.0055	33.50 mm	35.00 mm	25.00 mm	16.40 mm	6.35 mm	31.40 mm	3.50 mm	0.4 mm
11.6508.0060	38.50 mm	40.00 mm	24.00 mm	18.40 mm	6.35 mm	35.40 mm	4.00 mm	0.4 mm
11.6508.0065	39.00 mm	40.00 mm	26.00 mm	15.50 mm	2.60 mm	36.00 mm	4.00 mm	0.4 mm
11.6508.0070	38.00 mm	40.00 mm	30.00 mm	12.50 mm	4.00 mm	36.00 mm	4.00 mm	0.4 mm
11.6508.0075	38.50 mm	40.00 mm	30.00 mm	16.40 mm	6.35 mm	35.40 mm	4.00 mm	0.4 mm
11.6508.0080	41.00 mm	42.00 mm	28.00 mm	15.50 mm	2.60 mm	38.00 mm	4.00 mm	0.4 mm
11.6508.0085	43.50 mm	45.00 mm	29.00 mm	18.40 mm	6.35 mm	40.40 mm	4.00 mm	0.4 mm
11.6508.0090	44.00 mm	45.00 mm	31.00 mm	15.50 mm	2.60 mm	41.00 mm	4.00 mm	0.4 mm
11.6508.0095	43.50 mm	45.00 mm	35.00 mm	16.40 mm	6.35 mm	40.40 mm	4.00 mm	0.4 mm
11.6508.0100	48.50 mm	50.00 mm	34.00 mm	18.40 mm	6.35 mm	45.40 mm	4.00 mm	0.4 mm
11.6508.0105	49.00 mm	50.00 mm	34.00 mm	20.50 mm	3.10 mm	46.00 mm	4.00 mm	0.4 mm
11.6508.0110	53.50 mm	55.00 mm	39.00 mm	18.40 mm	6.35 mm	50.36 mm	4.00 mm	0.4 mm
11.6508.0115	54.00 mm	55.00 mm	39.00 mm	20.50 mm	3.10 mm	51.00 mm	4.00 mm	0.4 mm
11.6508.0120	55.00 mm	56.00 mm	40.00 mm	20.50 mm	3.10 mm	52.00 mm	4.00 mm	0.4 mm
11.6508.0125	58.50 mm	60.00 mm	44.00 mm	18.40 mm	6.35 mm	55.40 mm	4.50 mm	0.4 mm
11.6508.0130	59.00 mm	60.00 mm	44.00 mm	20.50 mm	3.10 mm	56.00 mm	4.50 mm	0.4 mm
11.6508.0135	61.50 mm	63.00 mm	47.00 mm	18.40 mm	6.35 mm	58.40 mm	4.50 mm	0.4 mm
11.6508.0140	61.50 mm	63.00 mm	47.00 mm	19.40 mm	6.35 mm	58.40 mm	4.50 mm	0.4 mm
11.6508.0145	62.00 mm	63.00 mm	47.00 mm	20.50 mm	3.10 mm	59.00 mm	4.50 mm	0.4 mm
11.6508.0150	64.00 mm	65.00 mm	49.00 mm	20.50 mm	3.10 mm	61.00 mm	4.50 mm	0.4 mm
11.6508.0155	63.50 mm	65.00 mm	50.00 mm	18.40 mm	6.35 mm	60.40 mm	4.50 mm	0.4 mm
11.6508.0160	68.30 mm	70.00 mm	50.00 mm	22.40 mm	6.35 mm	64.20 mm	4.50 mm	0.4 mm
11.6508.0165	69.00 mm	70.00 mm	54.00 mm	20.50 mm	3.10 mm	66.00 mm	4.50 mm	0.4 mm
11.6508.0170	73.30 mm	75.00 mm	55.00 mm	22.40 mm	6.35 mm	69.20 mm	4.50 mm	0.4 mm
11.6508.0175	74.00 mm	75.00 mm	59.00 mm	20.50 mm	3.10 mm	71.00 mm	4.50 mm	0.4 mm
11.6508.0180	78.30 mm	80.00 mm	60.00 mm	22.40 mm	6.35 mm	74.15 mm	4.50 mm	0.4 mm
11.6508.0185	79.00 mm	80.00 mm	62.00 mm	22.50 mm	3.60 mm	76.00 mm	4.50 mm	0.4 mm
11.6508.0190	83.30 mm	85.00 mm	65.00 mm	22.40 mm	6.35 mm	79.15 mm	4.50 mm	0.4 mm
11.6508.0195	88.30 mm	90.00 mm	70.00 mm	22.40 mm	6.35 mm	84.15 mm	4.50 mm	0.4 mm
11.6508.0200	89.00 mm	90.00 mm	72.00 mm	22.50 mm	3.60 mm	86.00 mm	4.50 mm	0.4 mm
11.6508.0205	93.30 mm	95.00 mm	75.00 mm	22.40 mm	6.35 mm	89.15 mm	4.50 mm	0.4 mm
11.6508.0210	98.00 mm	100.00 mm	75.00 mm	22.40 mm	6.35 mm	93.15 mm	5.00 mm	0.4 mm
11.6508.0215	99.00 mm	100.00 mm	82.00 mm	22.50 mm	3.60 mm	96.00 mm	5.00 mm	0.4 mm
11.6508.0220	103.00 mm	105.00 mm	80.00 mm	22.40 mm	6.35 mm	98.10 mm	5.00 mm	0.4 mm
11.6508.0225	108.00 mm	110.00 mm	85.00 mm	22.40 mm	6.35 mm	103.10 mm	5.00 mm	0.4 mm
11.6508.0230	109.00 mm	110.00 mm	92.00 mm	22.50 mm	3.60 mm	106.00 mm	5.00 mm	0.4 mm
11.6508.0235	113.00 mm	115.00 mm	90.00 mm	22.40 mm	6.35 mm	108.10 mm	5.00 mm	0.4 mm
11.6508.0240	114.00 mm	115.00 mm	97.00 mm	22.50 mm	3.60 mm	111.00 mm	5.00 mm	0.4 mm
11.6508.0245	118.10 mm	120.00 mm	95.00 mm	22.40 mm	6.35 mm	113.10 mm	5.00 mm	0.8 mm
11.6508.0250	123.00 mm	125.00 mm	100.00 mm	25.40 mm	6.35 mm	118.10 mm	5.00 mm	0.8 mm
11.6508.0255	124.00 mm	125.00 mm	103.00 mm	26.50 mm	5.10 mm	121.00 mm	5.00 mm	0.8 mm
11.6508.0260	127.50 mm	130.00 mm	105.00 mm	25.40 mm	9.50 mm	122.60 mm	5.00 mm	0.8 mm
11.6508.0265	128.00 mm	130.00 mm	105.00 mm	25.40 mm	6.35 mm	123.10 mm	5.00 mm	0.8 mm
11.6508.0270	132.50 mm	135.00 mm	110.00 mm	25.40 mm	9.50 mm	127.60 mm	5.00 mm	0.8 mm
11.6508.0275	133.00 mm	135.00 mm	110.00 mm	25.40 mm	6.35 mm	128.10 mm	5.00 mm	0.8 mm
11.6508.0280	137.50 mm	140.00 mm	115.00 mm	25.40 mm	9.50 mm	132.60 mm	5.00 mm	0.8 mm
11.6508.0285	138.00 mm	140.00 mm	115.00 mm	25.40 mm	6.35 mm	133.00 mm	5.00 mm	0.8 mm
11.6508.0290	139.00 mm	140.00 mm	118.00 mm	26.50 mm	5.10 mm	136.00 mm	5.00 mm	0.8 mm
11.6508.0295	142.50 mm	145.00 mm	120.00 mm	25.40 mm	9.50 mm	137.60 mm	5.00 mm	0.8 mm
11.6508.0300	143.00 mm	145.00 mm	120.00 mm	25.40 mm	6.35 mm	138.30 mm	5.00 mm	0.8 mm

Item No.	$\varnothing d_{2 \pm 0.2}$	Bore $\varnothing D_{H9}$	Ground of the groove $\varnothing d_{h9}$	Groove width $L_{\pm 0.2}$	$L_{1 \pm 0.1}$	$\varnothing d_3 h_9$	Chamfer α	Radius R_1
11.6508.0305	147.50 mm	150.00 mm	125.00 mm	25.40 mm	9.50 mm	142.60 mm	5.00 mm	0.8 mm
11.6508.0310	148.00 mm	150.00 mm	125.00 mm	25.40 mm	6.35 mm	143.00 mm	5.00 mm	0.8 mm
11.6508.0315	149.00 mm	150.00 mm	128.00 mm	26.50 mm	5.10 mm	146.00 mm	5.00 mm	0.8 mm
11.6508.0320	152.50 mm	155.00 mm	130.00 mm	25.40 mm	9.50 mm	147.60 mm	5.00 mm	0.8 mm
11.6508.0325	1543.00 mm	155.00 mm	130.00 mm	25.40 mm	6.35 mm	148.00 mm	5.00 mm	0.8 mm
11.6508.0330	157.50 mm	160.00 mm	130.00 mm	25.40 mm	6.35 mm	153.00 mm	5.00 mm	0.8 mm
11.6508.0335	157.50 mm	160.00 mm	130.00 mm	25.40 mm	9.50 mm	152.60 mm	5.00 mm	0.8 mm
11.6508.0340	157.50 mm	160.00 mm	135.00 mm	25.40 mm	9.50 mm	152.60 mm	5.00 mm	0.8 mm
11.6508.0345	159.00 mm	160.00 mm	138.00 mm	26.50 mm	5.10 mm	156.00 mm	5.00 mm	0.8 mm
11.6508.0350	162.50 mm	165.00 mm	140.00 mm	25.40 mm	9.50 mm	157.60 mm	5.00 mm	0.8 mm
11.6508.0355	167.10 mm	170.00 mm	145.00 mm	25.40 mm	12.70 mm	161.70 mm	5.00 mm	0.8 mm
11.6508.0360	169.00 mm	170.00 mm	148.00 mm	26.50 mm	5.10 mm	166.00 mm	5.00 mm	0.8 mm
11.6508.0365	172.10 mm	175.00 mm	150.00 mm	25.40 mm	12.70 mm	166.70 mm	5.00 mm	0.8 mm
11.6508.0370	177.90 mm	180.00 mm	150.00 mm	35.40 mm	6.35 mm	172.95 mm	5.00 mm	0.8 mm
11.6508.0375	177.10 mm	180.00 mm	155.00 mm	25.40 mm	12.70 mm	171.70 mm	5.00 mm	0.8 mm
11.6508.0380	182.10 mm	185.00 mm	160.00 mm	25.40 mm	12.70 mm	176.70 mm	5.00 mm	0.8 mm
11.6508.0385	187.00 mm	190.00 mm	165.00 mm	25.40 mm	12.70 mm	181.70 mm	5.00 mm	0.8 mm
11.6508.0390	192.00 mm	195.00 mm	170.00 mm	25.40 mm	12.70 mm	186.70 mm	5.00 mm	0.8 mm
11.6508.0395	197.00 mm	200.00 mm	175.00 mm	25.40 mm	12.70 mm	191.60 mm	6.00 mm	0.8 mm
11.6508.0400	207.00 mm	210.00 mm	185.00 mm	25.40 mm	12.70 mm	201.60 mm	6.00 mm	0.8 mm
11.6508.0405	217.90 mm	220.00 mm	190.00 mm	35.40 mm	6.35 mm	212.70 mm	6.00 mm	0.8 mm
11.6508.0410	217.00 mm	220.00 mm	195.00 mm	25.40 mm	12.70 mm	211.60 mm	6.00 mm	0.8 mm
11.6508.0415	227.00 mm	230.00 mm	205.00 mm	25.40 mm	12.70 mm	221.60 mm	6.00 mm	0.8 mm
11.6508.0420	237.00 mm	240.00 mm	215.00 mm	25.40 mm	12.70 mm	231.60 mm	6.00 mm	0.8 mm
11.6508.0425	247.90 mm	250.00 mm	220.00 mm	35.40 mm	6.35 mm	242.90 mm	6.00 mm	0.8 mm
11.6508.0430	247.00 mm	250.00 mm	225.00 mm	25.40 mm	12.70 mm	241.60 mm	6.00 mm	0.8 mm

APSOseals® – Piston Seal MPP

Medium stability:	For use in processed, dried, or de-oiled compressed air
Product description:	full piston seal with steel body and vulcanized-on sealing lip component
Intended use:	Double-acting piston seal with integrated guide
Material:	NBR 75.447-02
Hardness:	75 ±5 Shore A
Pressure PN:	max. 2 MPa
Sliding speed:	max. 1 m/s
Working temperature:	-30 to +100 °C



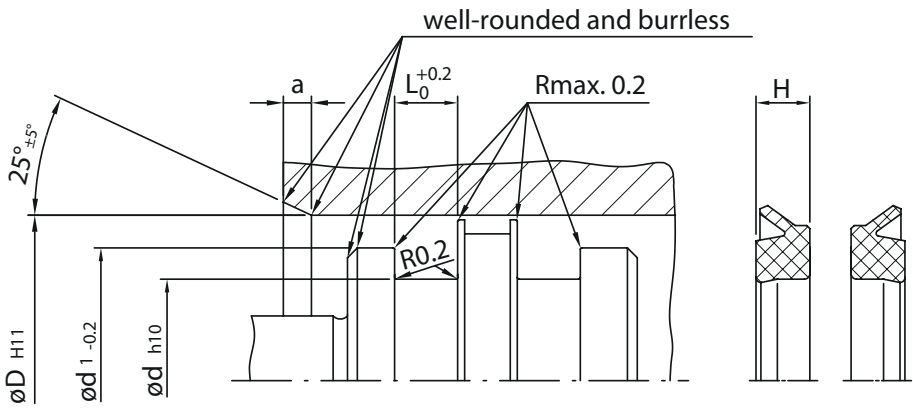
Surface finish

	Surface roughness			Roughness class
	R_a μm	R_t μm	R_z μm	
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$	N4/N5
Profile bearing length ratio $t_p > 50\%$ to max. 75 % at 0,25 R_t				

Item No.	Bore $\varnothing$ D_{H11}	Ground of the groove $\varnothing$ d_{f8}	Installation width H_2	H_1	d_1	Sealing height H	Cham- fer a
11.6506.0000	25.00 mm	8.00 mm	4.00 mm	6.00 mm	14.50 mm	12.00 mm	3.00 mm
11.6506.0005	32.00 mm	8.00 mm	4.00 mm	6.00 mm	16.00 mm	15.00 mm	3.00 mm
11.6506.0010	40.00 mm	10.00 mm	5.00 mm	7.00 mm	23.00 mm	18.00 mm	3.00 mm
11.6506.0015	50.00 mm	10.00 mm	5.00 mm	7.00 mm	29.00 mm	18.00 mm	4.00 mm
11.6506.0020	60.00 mm	12.00 mm	6.00 mm	9.00 mm	37.50 mm	22.00 mm	4.00 mm
11.6506.0025	63.00 mm	12.00 mm	6.00 mm	9.00 mm	40.50 mm	22.00 mm	4.00 mm
11.6506.0030	63.00 mm	14.00 mm	6.00 mm	9.00 mm	40.50 mm	22.00 mm	4.00 mm
11.6506.0035	63.00 mm	16.00 mm	6.00 mm	9.00 mm	40.50 mm	22.00 mm	4.00 mm
11.6506.0040	70.00 mm	12.00 mm	6.00 mm	9.00 mm	47.00 mm	22.00 mm	4.00 mm
11.6506.0045	75.00 mm	12.00 mm	6.00 mm	9.00 mm	49.00 mm	25.00 mm	4.50 mm
11.6506.0050	80.00 mm	12.00 mm	6.00 mm	9.00 mm	55.00 mm	25.00 mm	4.50 mm
11.6506.0055	80.00 mm	14.00 mm	6.00 mm	9.00 mm	55.00 mm	25.00 mm	4.50 mm
11.6506.0060	80.00 mm	16.00 mm	6.00 mm	9.00 mm	55.00 mm	25.00 mm	4.50 mm
11.6506.0065	80.00 mm	18.00 mm	6.00 mm	9.00 mm	60.00 mm	25.00 mm	4.50 mm
11.6506.0070	90.00 mm	12.00 mm	7.00 mm	10.00 mm	65.00 mm	25.00 mm	4.50 mm
11.6506.0075	100.00 mm	18.00 mm	9.00 mm	12.00 mm	75.00 mm	25.00 mm	4.50 mm
11.6506.0080	100.00 mm	20.00 mm	9.00 mm	12.00 mm	75.00 mm	25.00 mm	4.50 mm
11.6506.0085	125.00 mm	18.00 mm	9.00 mm	12.00 mm	90.00 mm	30.00 mm	5.00 mm
11.6506.0090	125.00 mm	20.00 mm	9.00 mm	12.00 mm	90.00 mm	30.00 mm	5.00 mm
11.6506.0095	160.00 mm	24.00 mm	11.00 mm	14.00 mm	115.00 mm	30.00 mm	6.00 mm
11.6506.0100	200.00 mm	24.00 mm	11.00 mm	14.00 mm	150.00 mm	30.00 mm	6.00 mm

APSOseals® – Piston Seal PSP

Medium stability:	For use in processed, dried, or de-oiled compressed air
Product description:	Grooved ring with asymmetrical profile, sealing lip set back on outer diameter
Intended use:	piston seal with especially rounded sealing lip, low friction
Material:	TPU 90.447-01
Hardness:	90 ±5 Shore A
Pressure PN:	max. 2 MPa
Sliding speed:	max. 1 m/s
Working temperature:	-40 to +90 °C



Surface finish

	Surface roughness			Roughness class
	R_a µm	R_t µm	R_z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio $t_p > 50\%$ to max. 75 % at 0,25 R_t

Allowance

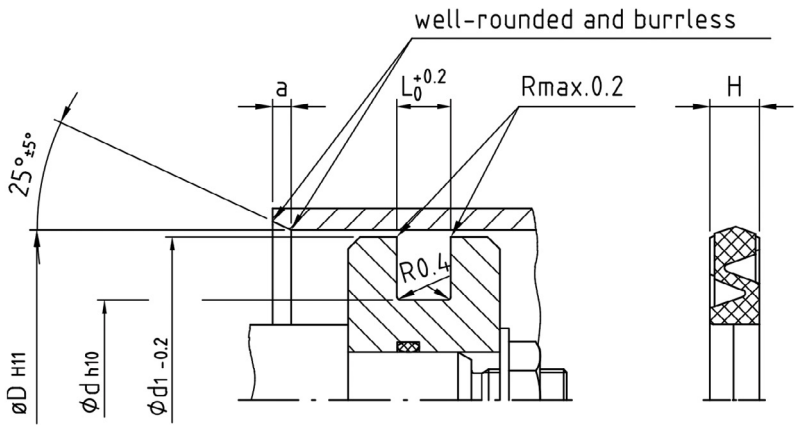
Nominal Ø	Groove base Ø	Tolerance for metal guide
D mm	d	Ø D
8 a/à ≤ 80	h10	H11/e8
> 80 a/à ≤ 200	h10	H8/e8

Item No.	Bore Ø D _{H11}	Ground of the groove Ø d _{h10}	Groove width L _{±0.2}	Sealing height H	Chamfer α
11.6504.0000	6.00 mm	3.00 mm	2.50 mm	5.00 mm	2.00 mm
11.6504.0005	8.00 mm	4.00 mm	3.00 mm	7.00 mm	2.55 mm
11.6504.0010	8.00 mm	4.80 mm	2.70 mm	7.00 mm	2.30 mm
11.6504.0015	8.00 mm	4.80 mm	3.00 mm	7.00 mm	2.55 mm
11.6504.0020	10.00 mm	6.00 mm	3.00 mm	9.00 mm	2.55 mm
11.6504.0025	12.00 mm	7.00 mm	3.00 mm	11.00 mm	2.55 mm
11.6504.0030	13.00 mm	8.00 mm	3.00 mm	12.00 mm	2.55 mm
11.6504.0035	14.00 mm	8.00 mm	3.00 mm	13.00 mm	2.55 mm
11.6504.0040	15.00 mm	9.00 mm	3.00 mm	14.00 mm	2.55 mm
11.6504.0045	16.00 mm	10.00 mm	3.00 mm	15.00 mm	2.55 mm
11.6504.0050	17.00 mm	11.00 mm	3.00 mm	16.00 mm	2.55 mm
11.6504.0055	18.00 mm	12.00 mm	3.00 mm	17.00 mm	2.55 mm
11.6504.0060	20.00 mm	14.00 mm	3.00 mm	19.00 mm	2.55 mm
11.6504.0065	20.00 mm	14.00 mm	4.50 mm	19.00 mm	4.00 mm
11.6504.0070	20.00 mm	15.50 mm	4.50 mm	19.00 mm	4.00 mm
11.6504.0075	22.00 mm	16.00 mm	3.00 mm	21.00 mm	2.55 mm
11.6504.0080	24.00 mm	12.00 mm	7.50 mm	23.00 mm	6.50 mm
11.6504.0085	24.00 mm	18.00 mm	3.00 mm	23.00 mm	2.55 mm
11.6504.0090	25.00 mm	17.00 mm	6.00 mm	24.00 mm	5.50 mm
11.6504.0095	25.00 mm	19.00 mm	3.50 mm	24.00 mm	3.25 mm
11.6504.0100	25.00 mm	19.00 mm	4.50 mm	24.00 mm	4.00 mm
11.6504.0105	27.00 mm	21.00 mm	4.00 mm	26.00 mm	3.25 mm
11.6504.0110	28.00 mm	18.00 mm	7.50 mm	27.00 mm	7.00 mm
11.6504.0115	28.00 mm	22.00 mm	3.50 mm	27.00 mm	3.25 mm
11.6504.0120	30.00 mm	20.00 mm	6.00 mm	29.00 mm	5.00 mm
11.6504.0125	30.00 mm	22.00 mm	3.50 mm	29.00 mm	3.25 mm
11.6504.0130	32.00 mm	24.00 mm	3.50 mm	31.00 mm	3.25 mm
11.6504.0135	32.00 mm	24.00 mm	6.00 mm	31.00 mm	5.50 mm
11.6504.0140	35.00 mm	27.00 mm	3.50 mm	34.00 mm	3.25 mm
11.6504.0145	36.00 mm	28.00 mm	3.50 mm	35.00 mm	3.25 mm
11.6504.0150	38.00 mm	30.00 mm	3.50 mm	37.00 mm	3.25 mm
11.6504.0155	38.00 mm	30.00 mm	6.00 mm	37.00 mm	5.50 mm
11.6504.0160	40.00 mm	27.30 mm	7.50 mm	39.00 mm	6.40 mm
11.6504.0165	40.00 mm	30.00 mm	7.50 mm	39.00 mm	7.00 mm
11.6504.0170	40.00 mm	32.00 mm	3.50 mm	39.00 mm	3.25 mm
11.6504.0175	42.00 mm	30.00 mm	6.50 mm	41.00 mm	6.00 mm
11.6504.0180	42.00 mm	34.00 mm	3.50 mm	41.00 mm	3.25 mm
11.6504.0185	45.00 mm	35.00 mm	11.00 mm	44.00 mm	10.00 mm
11.6504.0190	45.00 mm	37.00 mm	3.50 mm	44.00 mm	3.25 mm
11.6504.0195	50.00 mm	40.00 mm	6.00 mm	49.00 mm	5.00 mm
11.6504.0200	50.00 mm	40.00 mm	7.50 mm	49.00 mm	7.00 mm
11.6504.0205	50.00 mm	42.00 mm	3.50 mm	49.00 mm	3.25 mm
11.6504.0210	52.00 mm	42.00 mm	4.50 mm	51.00 mm	4.25 mm
11.6504.0215	55.00 mm	45.00 mm	7.50 mm	54.00 mm	7.00 mm
11.6504.0220	58.00 mm	48.00 mm	4.50 mm	57.00 mm	4.25 mm
11.6504.0225	60.00 mm	50.00 mm	5.70 mm	59.00 mm	5.00 mm
11.6504.0230	60.00 mm	50.00 mm	7.50 mm	59.00 mm	7.00 mm
11.6504.0235	63.00 mm	53.00 mm	4.50 mm	62.00 mm	4.25 mm
11.6504.0240	63.00 mm	53.00 mm	7.50 mm	62.00 mm	7.00 mm
11.6504.0245	65.00 mm	55.00 mm	6.00 mm	64.00 mm	5.00 mm
11.6504.0250	65.00 mm	55.00 mm	7.50 mm	64.00 mm	7.00 mm
11.6504.0255	68.00 mm	58.00 mm	5.50 mm	67.00 mm	4.70 mm
11.6504.0260	70.00 mm	58.00 mm	9.50 mm	69.00 mm	8.50 mm
11.6504.0265	75.00 mm	63.00 mm	9.50 mm	74.00 mm	8.50 mm
11.6504.0270	80.00 mm	67.30 mm	7.00 mm	79.00 mm	6.35 mm
11.6504.0275	80.00 mm	68.00 mm	9.50 mm	79.00 mm	8.50 mm
11.6504.0280	80.00 mm	70.00 mm	4.50 mm	79.00 mm	4.25 mm
11.6504.0285	85.00 mm	73.00 mm	9.50 mm	84.00 mm	8.50 mm
11.6504.0290	90.00 mm	78.00 mm	9.50 mm	89.00 mm	8.50 mm
11.6504.0295	90.00 mm	80.00 mm	4.50 mm	89.00 mm	4.25 mm
11.6504.0300	100.00 mm	88.00 mm	9.50 mm	99.00 mm	8.50 mm

Item No.	Bore Ø D _{H11}	Ground of the groove Ø d _{h10}	Groove width L _{±0.2}	Sealing height H	Chamfer α
11.6504.0305	100.00 mm	90.00 mm	4.50 mm	99.00 mm	4.25 mm
11.6504.0310	110.00 mm	95.00 mm	11.00 mm	109.00 mm	10.00 mm
11.6504.0315	120.00 mm	105.00 mm	11.00 mm	119.00 mm	10.00 mm
11.6504.0320	125.00 mm	105.00 mm	8.50 mm	124.00 mm	8.25 mm
11.6504.0325	125.00 mm	110.00 mm	11.00 mm	124.00 mm	10.00 mm
11.6504.0330	140.00 mm	120.00 mm	8.50 mm	139.00 mm	8.25 mm
11.6504.0335	160.00 mm	140.00 mm	8.50 mm	159.00 mm	8.25 mm
11.6504.0340	160.00 mm	145.00 mm	11.00 mm	159.00 mm	10.00 mm
11.6504.0345	180.00 mm	160.00 mm	15.00 mm	179.00 mm	14.00 mm
11.6504.0350	200.00 mm	180.00 mm	8.50 mm	199.00 mm	8.25 mm
11.6504.0355	200.00 mm	180.00 mm	15.00 mm	199.00 mm	14.00 mm
11.6504.0360	250.00 mm	230.00 mm	15.00 mm	249.00 mm	14.00 mm

APSOseals® – Piston Seal SPS/N

Medium stability:	For use in processed, dried, or de-oiled compressed air
Product description:	Pneumatic compact seal with Z-shaped design
Intended use:	Double-acting piston seal with grooves on the front for pressure activation, good seal tightness with low friction
Material:	NBR 80.447-01
Hardness:	80 ±5 Shore A
Pressure PN:	max. 1,2 MPa
Sliding speed:	max. 1 m/s
Working temperature:	-20 to +100 °C



Surface finish

	Surface roughness			Roughness class
	R _a µm	R _i µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 75 % at 0,25 R_i

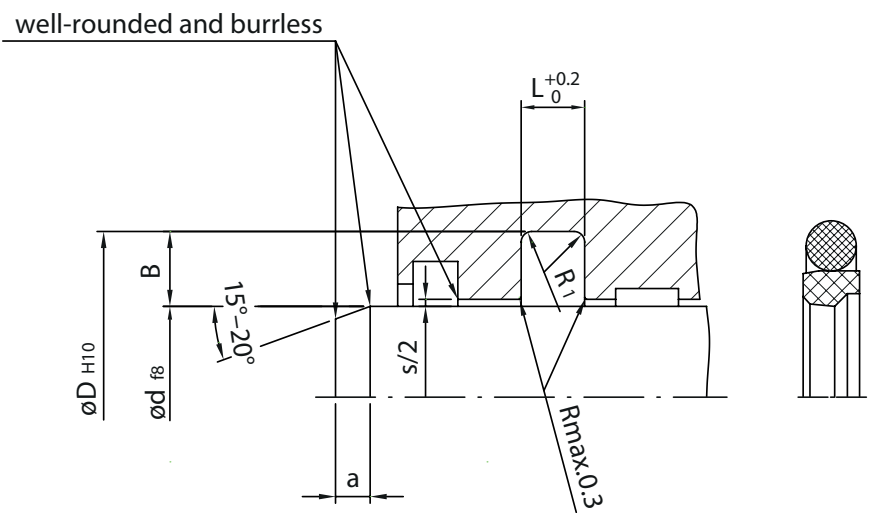
Allowance

Nominal Ø	Groove base Ø	Tolerance for metal guide
D	d	Ø D
mm		
12 bis/to ≤ 80	f9	H11/e8

Item No.	Bore Ø D_{H11}	Ground of the groove Ø d_{h10}	Groove width $L_{\pm 0.2}$	$\emptyset d_{1-0.2}$	Sealing height H	Chamfer a
11.6507.0000	12.00 mm	7.00 mm	2.50 mm	11.50 mm	2.20 mm	1.50 mm
11.6507.0005	16.00 mm	9.00 mm	2.50 mm	15.50 mm	2.40 mm	1.50 mm
11.6507.0010	20.00 mm	13.00 mm	2.50 mm	19.50 mm	2.40 mm	1.50 mm
11.6507.0015	25.00 mm	18.00 mm	2.50 mm	24.50 mm	2.40 mm	1.50 mm
11.6507.0020	28.00 mm	21.00 mm	2.50 mm	27.50 mm	2.40 mm	2.50 mm
11.6507.0025	30.00 mm	21.00 mm	3.00 mm	29.50 mm	2.90 mm	2.50 mm
11.6507.0030	32.00 mm	23.00 mm	3.00 mm	31.50 mm	2.90 mm	2.50 mm
11.6507.0035	35.00 mm	26.00 mm	3.00 mm	34.50 mm	2.90 mm	2.50 mm
11.6507.0040	40.00 mm	31.00 mm	3.00 mm	39.50 mm	2.90 mm	2.50 mm
11.6507.0045	45.00 mm	36.00 mm	3.00 mm	44.50 mm	2.90 mm	2.50 mm
11.6507.0050	50.00 mm	41.00 mm	3.00 mm	49.50 mm	2.90 mm	2.50 mm
11.6507.0055	60.00 mm	48.00 mm	4.00 mm	59.50 mm	3.90 mm	3.50 mm
11.6507.0060	63.00 mm	51.00 mm	4.00 mm	62.50 mm	3.90 mm	3.50 mm
11.6507.0065	70.00 mm	58.00 mm	4.00 mm	69.50 mm	3.90 mm	3.50 mm
11.6507.0070	80.00 mm	68.00 mm	4.00 mm	79.50 mm	3.90 mm	3.50 mm

APSOseals® – Rod Seal SSR

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils)
Product description:	two-piece seal set consisting of a profile with an o-ring as the pre-stressing element
Intended use:	For sealing rods in hydraulics
Material sealing element:	PTFE BC.429-01 (PTFE/bronze)
Material O-ring:	NBR
Hardness O-ring:	70 ±5 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C
Attention:	Order O-ring separately
On request:	Further dimensions available



Surface finish

Surfaces	R _{max}	R _z	R _a
Rod diameter d	2,5 µm	1,6 µm	0,4 µm
Groove diameter	10,0 µm	6,3 µm	1,6 µm
Groove flanks	16,0 µm	10,0 µm	3,2 µm

Recommended Assembly Measurements

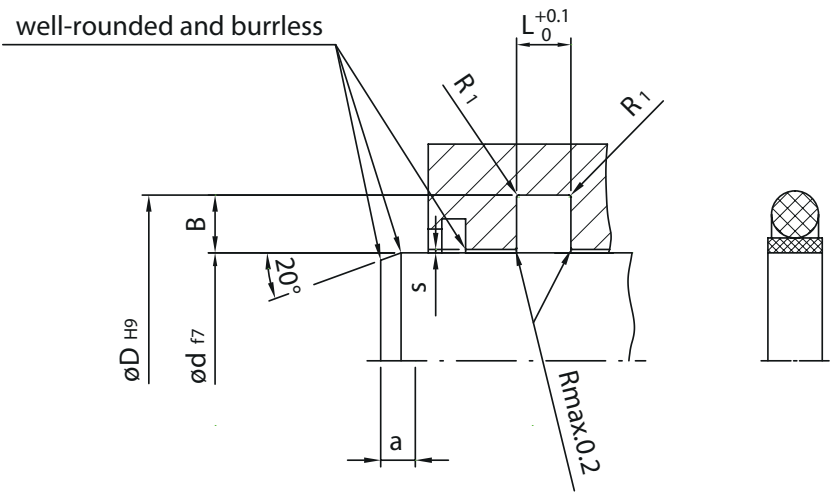
O-Ring Cord Ø	Recommended Diameter Standard	Groove Width	Groove Depth	Max. Diameter Clearance S		Radius
mm	d mm	L mm	B mm	0 - 200 bar mm	200 - 400 bar mm	R1 max. mm
1,78	3 - 7,9	2,2	2,45	0,4 - 0,2	0,3 - 0,1	0,3
2,62	8 - 18,9	3,2	3,65	0,4 - 0,2	0,3 - 0,1	0,5
3,53	19 - 37,9	4,2	5,35	0,6 - 0,3	0,4 - 0,2	0,7
5,33	38 - 199,9	6,3	7,55	0,8 - 0,4	0,4 - 0,2	1,2
7,00	200 - 255,9	8,1	10,25	1,0 - 0,5	0,5 - 0,3	1,5
7,00	256 - 649,9	8,1	12,00	1,0 - 0,5	0,5 - 0,3	1,5
8,40						

Item No.	Rod Ø d _{f8}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Matching o-ring	Chamfer α
11.6536.0000	4.00 mm	8.90 mm	2.20 mm	OR 2025	2.50 mm
11.6536.0005	5.00 mm	9.90 mm	2.20 mm	OR 2025	2.50 mm
11.6536.0010	6.00 mm	10.90 mm	2.20 mm	OR 2031	2.50 mm
11.6536.0015	7.00 mm	11.90 mm	2.20 mm	OR 2031	2.50 mm
11.6536.0020	8.00 mm	12.90 mm	2.20 mm	OR2037	2.50 mm
11.6536.0025	8.00 mm	15.30 mm	3.20 mm	OR 3043	3.00 mm
11.6536.0030	10.00 mm	14.90 mm	2.20 mm	OR 114	2.50 mm
11.6536.0035	10.00 mm	17.30 mm	3.20 mm	OR 3050	3.00 mm
11.6536.0040	12.00 mm	16.90 mm	2.20 mm	OR 2056	2.50 mm
11.6536.0045	12.00 mm	19.30 mm	3.20 mm	OR 119	3.00 mm
11.6536.0050	14.00 mm	18.90 mm	2.20 mm	OR 2062	2.50 mm
11.6536.0055	14.00 mm	21.30 mm	3.20 mm	OR 3068	3.00 mm
11.6536.0060	15.00 mm	19.90 mm	2.20 mm	OR 2062	2.50 mm
11.6536.0065	15.00 mm	22.30 mm	3.20 mm	OR 123	3.00 mm
11.6536.0070	16.00 mm	20.90 mm	2.20 mm	OR 2068	2.50 mm
11.6536.0075	16.00 mm	23.30 mm	3.20 mm	OR 3075	3.00 mm
11.6536.0080	18.00 mm	22.90 mm	2.20 mm	OR 2081	2.50 mm
11.6536.0085	18.00 mm	25.30 mm	3.20 mm	OR 3081	3.00 mm
11.6536.0090	20.00 mm	27.30 mm	3.20 mm	OR 130	3.00 mm
11.6536.0095	20.00 mm	30.70 mm	4.20 mm	OR 4100	3.50 mm
11.6536.0100	22.00 mm	29.30 mm	3.20 mm	OR 3100	3.00 mm
11.6536.0105	22.00 mm	32.70 mm	4.20 mm	OR 4106	3.50 mm
11.6536.0110	24.00 mm	34.70 mm	4.20 mm	OR 4112	3.50 mm
11.6536.0115	25.00 mm	32.30 mm	3.20 mm	OR 3106	3.00 mm
11.6536.0120	25.00 mm	35.70 mm	4.20 mm	OR 4118	3.50 mm
11.6536.0125	28.00 mm	35.30 mm	3.20 mm	OR 3118	3.00 mm
11.6536.0130	28.00 mm	38.70 mm	4.20 mm	OR 4131	3.50 mm
11.6536.0135	30.00 mm	37.30 mm	3.20 mm	OR 3131	3.00 mm
11.6536.0140	30.00 mm	40.70 mm	4.20 mm	OR 4137	3.50 mm
11.6536.0145	32.00 mm	39.30 mm	3.20 mm	OR 3137	3.00 mm
11.6536.0150	32.00 mm	42.70 mm	4.20 mm	OR 4143	3.50 mm
11.6536.0155	35.00 mm	42.30 mm	3.20 mm	OR 3150	3.00 mm
11.6536.0160	35.00 mm	45.70 mm	4.20 mm	OR 144	3.50 mm
11.6536.0165	36.00 mm	43.30 mm	3.20 mm	OR 3150	3.00 mm
11.6536.0170	36.00 mm	46.70 mm	4.20 mm	OR 4162	3.50 mm
11.6536.0175	38.00 mm	48.70 mm	4.20 mm	OR 146	3.50 mm
11.6536.0180	38.00 mm	53.10 mm	6.30 mm	OR 6175	5.50 mm
11.6536.0185	40.00 mm	50.70 mm	4.20 mm	OR 4175	3.50 mm
11.6536.0190	40.00 mm	55.10 mm	6.30 mm	OR 6187	5.50 mm
11.6536.0195	42.00 mm	52.70 mm	4.20 mm	OR 150	3.50 mm
11.6536.0200	42.00 mm	57.10 mm	6.30 mm	OR 6187	5.50 mm
11.6536.0205	45.00 mm	55.70 mm	4.20 mm	OR 153	3.50 mm
11.6536.0210	45.00 mm	60.10 mm	6.30 mm	OR 6200	5.50 mm
11.6536.0215	48.00 mm	63.10 mm	6.30 mm	OR 6212	5.50 mm
11.6536.0220	50.00 mm	60.70 mm	4.20 mm	OR 158	3.50 mm
11.6536.0225	50.00 mm	65.10 mm	6.30 mm	OR 6225	5.50 mm
11.6536.0230	52.00 mm	67.10 mm	6.30 mm	OR 6225	5.50 mm
11.6536.0235	55.00 mm	70.10 mm	6.30 mm	OR 6237	5.50 mm
11.6536.0240	56.00 mm	66.70 mm	4.20 mm	OR 4237	3.50 mm
11.6536.0245	56.00 mm	71.10 mm	6.30 mm	OR 6250	5.50 mm
11.6536.0250	60.00 mm	70.70 mm	4.20 mm	OR 167	3.50 mm
11.6536.0255	60.00 mm	75.10 mm	6.30 mm	OR 6262	5.50 mm
11.6536.0260	63.00 mm	78.10 mm	6.30 mm	OR 6275	5.50 mm
11.6536.0265	65.00 mm	80.10 mm	6.30 mm	OR 6275	5.50 mm
11.6536.0270	70.00 mm	85.10 mm	6.30 mm	OR 6300	5.50 mm
11.6536.0275	75.00 mm	90.10 mm	6.30 mm	OR 6325	5.50 mm
11.6536.0280	80.00 mm	95.10 mm	6.30 mm	OR 6337	5.50 mm
11.6536.0285	85.00 mm	100.10 mm	6.30 mm	OR 6362	6.00 mm
11.6536.0290	90.00 mm	105.10 mm	6.30 mm	OR 6375	6.00 mm
11.6536.0295	95.00 mm	110.10 mm	6.30 mm	OR 6400	6.00 mm
11.6536.0300	100.00 mm	115.10 mm	6.30 mm	OR 6425	6.00 mm

Item No.	Rod Ø d _{f8}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Matching o-ring	Chamfer α
11.6536.0305	105.00 mm	120.10 mm	6.30 mm	OR 6437	6.00 mm
11.6536.0310	110.00 mm	125.10 mm	6.30 mm	OR 199	6.00 mm
11.6536.0315	115.00 mm	130.10 mm	6.30 mm	OR 201	6.00 mm
11.6536.0320	120.00 mm	135.10 mm	6.30 mm	OR 206	6.00 mm
11.6536.0325	125.00 mm	140.10 mm	6.30 mm	OR 208	6.00 mm
11.6536.0330	130.00 mm	145.10 mm	6.30 mm	OR 213	6.00 mm
11.6536.0335	135.00 mm	150.10 mm	6.30 mm	OR 215	6.00 mm
11.6536.0340	140.00 mm	155.10 mm	6.30 mm	OR 219	6.00 mm
11.6536.0345	145.00 mm	160.10 mm	6.30 mm	OR 6600	6.00 mm
11.6536.0350	150.00 mm	165.10 mm	6.30 mm	OR 6625	6.00 mm
11.6536.0355	155.00 mm	170.10 mm	6.30 mm	OR 6623	6.00 mm
11.6536.0360	160.00 mm	175.10 mm	6.30 mm	OR 6650	6.00 mm
11.6536.0365	165.00 mm	180.10 mm	6.30 mm	OR 6670	6.00 mm
11.6536.0370	170.00 mm	185.10 mm	6.30 mm	OR 6700	6.00 mm
11.6536.0375	175.00 mm	190.10 mm	6.30 mm	OR 6720	6.00 mm
11.6536.0380	180.00 mm	195.10 mm	6.30 mm	OR 6745	6.00 mm
11.6536.0385	185.00 mm	200.10 mm	6.30 mm	OR 6745	6.00 mm
11.6536.0390	190.00 mm	205.10 mm	6.30 mm	OR 6775	6.00 mm
11.6536.0395	195.00 mm	210.10 mm	6.30 mm	OR 6795	6.00 mm
11.6536.0400	200.00 mm	220.50 mm	8.10 mm	OR 8825	7.50 mm
11.6536.0405	210.00 mm	230.50 mm	8.10 mm	OR 8850	7.50 mm
11.6536.0410	220.00 mm	240.50 mm	8.10 mm	OR 8900	7.50 mm
11.6536.0415	230.00 mm	250.50 mm	8.10 mm	OR 8950	7.50 mm
11.6536.0420	240.00 mm	260.50 mm	8.10 mm	OR 8975	7.50 mm
11.6536.0425	250.00 mm	270.50 mm	8.10 mm	OR 81025	7.50 mm
11.6536.0430	260.00 mm	284.00 mm	8.10 mm	OR 81075	7.50 mm
11.6536.0435	270.00 mm	294.00 mm	8.10 mm	OR 81100	7.50 mm
11.6536.0440	280.00 mm	304.00 mm	8.10 mm	OR 81150	7.50 mm
11.6536.0445	290.00 mm	314.00 mm	8.10 mm	OR 81200	7.50 mm
11.6536.0450	300.00 mm	324.00 mm	8.10 mm	OR 81250	7.50 mm
11.6536.0455	320.00 mm	344.00 mm	8.10 mm	OR 81300	7.50 mm
11.6536.0460	340.00 mm	364.00 mm	8.10 mm	OR 81400	7.50 mm
11.6536.0465	360.00 mm	384.00 mm	8.10 mm	OR 81450	7.50 mm
11.6536.0470	380.00 mm	404.00 mm	8.10 mm	OR 81550	7.50 mm
11.6536.0475	400.00 mm	424.00 mm	8.10 mm	OR 81600	7.50 mm
11.6536.0480	420.00 mm	444.00 mm	8.10 mm	OR 81700	7.50 mm
11.6536.0485	440.00 mm	464.00 mm	8.10 mm	OR 81750	7.50 mm
11.6536.0490	460.00 mm	484.00 mm	8.10 mm	OR 81850	7.50 mm
11.6536.0495	480.00 mm	504.00 mm	8.10 mm	OR 81950	7.50 mm
11.6536.0500	500.00 mm	524.00 mm	8.10 mm	OR 82000	7.50 mm

APSOseals® – Rod Seal LRC

Medium stability:	for use in mineral oils and greases, water and air
Product description:	Two-piece seal set consisting of a profile ring with an O-ring as the pre-stressing element
Intended use:	Double-acting rod seal, predominantly used in pneumatics or hydraulics
Material sealing element:	PTFE CG.18-01 (PTFE/carbon/graphite)
Material O-ring:	NBR
Hardness O-ring:	70 ±5 Shore A
Pressure PN:	max. 20 MPa
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C
Attention:	Order O-ring separately
On request:	Further dimensions available



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +100 °C
 - HFA, HFB fluids: +5 to +60 °C
 - HFC fluids: -30 to +60 °C
 - water: +5 to +100 °C
 - HETG (colza oils): -30 to +80 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +60 °C
 - mineral-based greases: -30 to +100 °C
 - air: -20 to +100 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughnessRoughness class		
	R _a µm	R _t µm	R _z µm
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25
Groove base	≤ 1,6	≤ 6,3	≤ 6,3
Groove sides	≤ 3	≤ 15	≤ 10

Profile bearing length ratio t_p > 50 % to max. 75 % at 0,25 R_t

Clearance, depending on pressure

Groove width L mm	Profile width B mm	Max. permissible clearance S		
		8 MPa mm	16 MPa mm	25 MPa mm
2	2,25	0,3	0,2	0,1
3	3,1/3,05	0,3	0,2	0,1
4	4/3,95	0,4	0,3	0,2
6	5,85/5,8	0,4	0,3	0,2
6	6,05/6	0,4	0,3	0,2
8	7,75	0,6	0,5	0,4
8	8,15	0,6	0,5	0,4

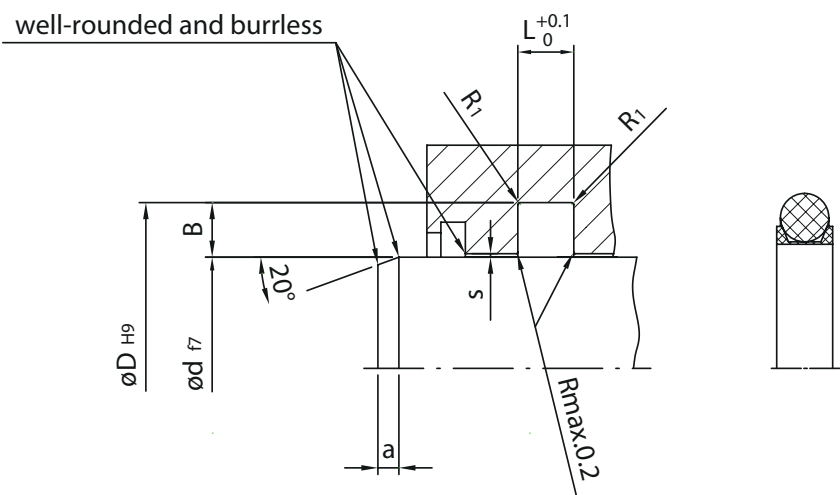
Allowance

Nominal Ø	Groove base Ø	Tolerance for metal guide
d mm	D	Ø d
4 a/to ≤ 80	H9	H8/f7
> 80 a/to ≤ 300	H9	H7/g6

Item No.	Rod Ø d_{17}	Ground of the groove Ø D_{H9}	Groove width $L_{+0.1}$	Chamfer α	Radius R_1	Matching o-ring
11.6537.0000	4.00 mm	8.50 mm	2.00 mm	3.00 mm	0.3 mm	OR 2021
11.6537.0005	5.00 mm	9.50 mm	2.00 mm	3.00 mm	0.3 mm	OR 106
11.6537.0010	6.00 mm	10.50 mm	2.00 mm	3.00 mm	0.3 mm	OR 2031
11.6537.0015	8.00 mm	12.50 mm	2.00 mm	3.00 mm	0.3 mm	OR 2037
11.6537.0020	10.00 mm	16.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 115
11.6537.0025	12.00 mm	18.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 3056
11.6537.0030	14.00 mm	20.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 3062
11.6537.0035	15.00 mm	21.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 121
11.6537.0040	16.00 mm	22.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 123
11.6537.0045	18.00 mm	24.10 mm	3.00 mm	3.00 mm	0.4 mm	OR 3075
11.6537.0050	20.00 mm	26.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 3087
11.6537.0055	22.00 mm	28.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 3093
11.6537.0060	25.00 mm	31.20 mm	3.00 mm	3.00 mm	0.4 mm	OR 3106
11.6537.0065	28.00 mm	36.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4118
11.6537.0070	30.00 mm	38.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4125
11.6537.0075	32.00 mm	39.90 mm	4.00 mm	3.00 mm	0.5 mm	OR 4131
11.6537.0080	35.00 mm	42.90 mm	4.00 mm	3.00 mm	0.5 mm	OR 4143
11.6537.0085	38.00 mm	46.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 144
11.6537.0090	40.00 mm	48.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 146
11.6537.0095	42.00 mm	50.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4175
11.6537.0100	45.00 mm	53.00 mm	4.00 mm	3.00 mm	0.5 mm	OR 4187
11.6537.0105	50.00 mm	61.60 mm	6.00 mm	4.00 mm	0.8 mm	OR 6200
11.6537.0110	55.00 mm	66.70 mm	6.00 mm	4.00 mm	0.8 mm	OR 6225
11.6537.0115	56.00 mm	67.70 mm	6.00 mm	4.00 mm	0.8 mm	OR 6225
11.6537.0120	60.00 mm	71.70 mm	6.00 mm	4.00 mm	0.8 mm	OR 6250
11.6537.0125	63.00 mm	74.70 mm	6.00 mm	4.00 mm	0.8 mm	OR 6262
11.6537.0130	65.00 mm	76.60 mm	6.00 mm	4.00 mm	0.8 mm	OR 6262
11.6537.0135	70.00 mm	81.70 mm	6.00 mm	4.00 mm	0.8 mm	OR 6287
11.6537.0140	75.00 mm	87.10 mm	6.00 mm	4.00 mm	0.8 mm	OR 6312
11.6537.0145	80.00 mm	92.10 mm	6.00 mm	4.00 mm	0.8 mm	OR 6325
11.6537.0150	85.00 mm	97.10 mm	6.00 mm	4.00 mm	0.8 mm	OR 6350
11.6537.0155	90.00 mm	102.10 mm	6.00 mm	4.00 mm	0.8 mm	OR 6362
11.6537.0160	95.00 mm	107.10 mm	6.00 mm	4.00 mm	0.8 mm	OR 6387
11.6537.0165	100.00 mm	112.10 mm	6.00 mm	5.00 mm	0.8 mm	OR 6400
11.6537.0170	110.00 mm	122.00 mm	6.00 mm	5.00 mm	0.8 mm	OR 6437
11.6537.0175	120.00 mm	135.50 mm	8.00 mm	5.00 mm	1 mm	OR 8487
11.6537.0180	125.00 mm	140.50 mm	8.00 mm	5.00 mm	1 mm	OR 8500
11.6537.0185	130.00 mm	145.50 mm	8.00 mm	5.00 mm	1 mm	OR 8525
11.6537.0190	140.00 mm	155.50 mm	8.00 mm	5.00 mm	1 mm	OR 8562
11.6537.0195	150.00 mm	165.50 mm	8.00 mm	5.00 mm	1 mm	OR 8600
11.6537.0200	160.00 mm	175.50 mm	8.00 mm	5.00 mm	1 mm	OR 8650
11.6537.0205	170.00 mm	186.30 mm	8.00 mm	5.00 mm	1 mm	OR 231
11.6537.0210	180.00 mm	196.30 mm	8.00 mm	5.00 mm	1 mm	OR 8725
11.6537.0215	190.00 mm	206.30 mm	8.00 mm	5.00 mm	1 mm	OR 237
11.6537.0220	200.00 mm	216.30 mm	8.00 mm	6.00 mm	1 mm	OR 8800
11.6537.0225	250.00 mm	266.30 mm	8.00 mm	6.00 mm	1 mm	OR 81000
11.6537.0230	280.00 mm	296.30 mm	8.00 mm	6.00 mm	1 mm	OR 81125
11.6537.0235	300.00 mm	316.30 mm	8.00 mm	6.00 mm	1 mm	OR 81200

APSOseals® – Rod Seal DDR

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils)
Product description:	Two-piece seal set consisting of a profile ring with an O-ring as the pre-stressing element
Intended use:	Double-acting rod seal, predominantly used in pneumatics or hydraulics
Material sealing element:	PTFE MD.429-03
Material O-ring:	NBR
Colour:	Turquoise
Hardness O-ring:	70 ±5 Shore A
Pressure PN:	max. 20 MPa
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C
Attention:	Order O-ring separately
On request:	Further dimensions available
Approval:	(depending on o-ring material) FDA-compliant



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +100 °C
 - HFA, HFB fluids: +5 to +60 °C
 - HFC fluids: -30 to +60 °C
 - water: +5 to +100 °C
 - HETG (colza oils): -30 to +80 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +60 °C
 - mineral-based greases: -30 to +100 °C
 - air: -20 to +100 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R_a μm	R_t μm	R_z μm	
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$	N4/N5
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio $t_p > 50\%$ to max. 75 % at 0,25 R_t

Clearance, depending on pressure

Groove width	Profile width	Max. permissible clearance S		
L	B	7,5 MPa	15 MPa	20 MPa
mm	mm	mm	mm	mm
2,5	1,75	0,2	0,15	0,1
3,5	2,75	0,2	0,15	0,1
4,5	3,55	0,3	0,25	0,2
7	5,20	0,4	0,35	0,3
9,5	6,85	0,5	0,45	0,4

Allowance

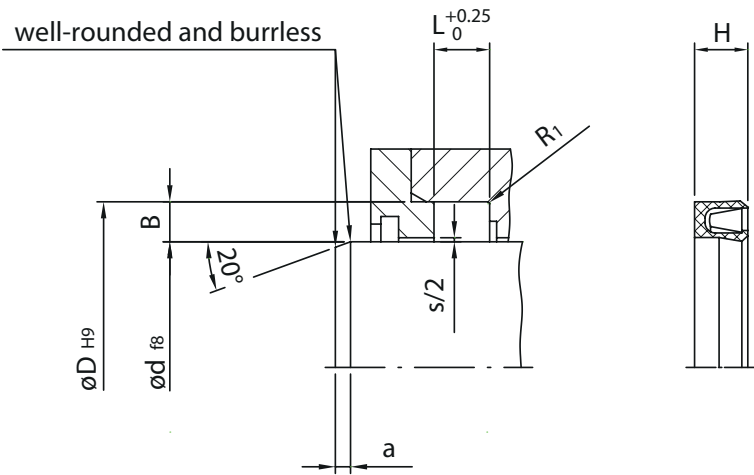
Nominal $\varnothing$	Groove base $\varnothing$	Tolerance for metal guide
d	D	$\varnothing d$
mm		
≥ 3 a/to ≤ 80	H9	H8/f7
> 80 a/to ≤ 393	H9	H7/g6

Item No.	Rod Ø d ₁₇	Ground of the groove Ø D _{H9}	Groove width L _{+0,-1}	Chamfer α	Radius R ₁	Matching o-ring
11.6538.0000	3.00 mm	5.90 mm	2.40 mm	2.50 mm	0.3 mm	OR 2012
11.6538.0005	4.00 mm	6.90 mm	2.40 mm	2.50 mm	0.3 mm	OR 2015
11.6538.0010	5.00 mm	7.90 mm	2.40 mm	2.50 mm	0.3 mm	OR 2018
11.6538.0015	6.00 mm	8.90 mm	2.40 mm	2.50 mm	0.3 mm	OR 2025
11.6538.0020	8.00 mm	10.90 mm	2.40 mm	2.50 mm	0.3 mm	OR 2031
11.6538.0025	9.00 mm	13.50 mm	3.60 mm	3.00 mm	0.3 mm	OR 3037
11.6538.0030	10.00 mm	12.90 mm	2.40 mm	2.50 mm	0.4 mm	OR 2043
11.6538.0035	11.00 mm	15.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 115
11.6538.0040	12.00 mm	16.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 3050
11.6538.0045	14.00 mm	18.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 3056
11.6538.0050	15.00 mm	19.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 119
11.6538.0055	17.00 mm	21.50 mm	3.60 mm	3.00 mm	0.4 mm	OR 123
11.6538.0060	19.00 mm	25.20 mm	4.80 mm	3.00 mm	0.4 mm	OR 4075
11.6538.0065	20.00 mm	26.20 mm	4.80 mm	3.00 mm	0.4 mm	OR 4081
11.6538.0070	22.00 mm	28.20 mm	4.80 mm	3.00 mm	0.4 mm	OR 4087
11.6538.0075	23.00 mm	29.20 mm	4.80 mm	3.00 mm	0.4 mm	OR 4093
11.6538.0080	25.00 mm	31.20 mm	4.80 mm	3.00 mm	0.4 mm	OR 4100
11.6538.0085	27.00 mm	33.20 mm	4.80 mm	3.00 mm	0.5 mm	OR 4106
11.6538.0090	28.00 mm	34.20 mm	4.80 mm	3.00 mm	0.5 mm	OR 4112
11.6538.0095	30.00 mm	36.20 mm	4.80 mm	3.00 mm	0.5 mm	OR 4125
11.6538.0100	31.00 mm	37.20 mm	4.80 mm	3.00 mm	0.5 mm	OR 4125
11.6538.0105	33.00 mm	39.20 mm	4.80 mm	3.00 mm	0.5 mm	OR 4131
11.6538.0110	35.00 mm	41.20 mm	4.80 mm	3.00 mm	0.5 mm	OR 4143
11.6538.0115	36.00 mm	42.20 mm	4.80 mm	3.00 mm	0.5 mm	OR 4143
11.6538.0120	38.00 mm	45.40 mm	7.10 mm	3.00 mm	0.5 mm	OR 6150
11.6538.0125	40.00 mm	49.40 mm	7.10 mm	3.00 mm	0.5 mm	OR 6162
11.6538.0130	45.00 mm	54.40 mm	7.10 mm	3.00 mm	0.5 mm	OR 6187
11.6538.0135	47.00 mm	56.40 mm	7.10 mm	3.00 mm	0.8 mm	OR 6187
11.6538.0140	50.00 mm	59.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6200
11.6538.0145	53.00 mm	62.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6215
11.6538.0150	57.00 mm	66.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6225
11.6538.0155	60.00 mm	69.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6237
11.6538.0160	63.00 mm	72.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6250
11.6538.0165	66.00 mm	75.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6262
11.6538.0170	70.00 mm	79.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6287
11.6538.0175	73.00 mm	82.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 178
11.6538.0180	75.00 mm	84.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6300
11.6538.0185	80.00 mm	89.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6325
11.6538.0190	82.00 mm	91.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6326
11.6538.0195	85.00 mm	94.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6337
11.6538.0200	90.00 mm	99.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6362
11.6538.0205	90.00 mm	102.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6362
11.6538.0210	95.00 mm	104.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 6387
11.6538.0215	98.00 mm	107.40 mm	7.10 mm	4.00 mm	0.8 mm	OR 189
11.6538.0220	100.00 mm	109.40 mm	7.10 mm	5.00 mm	0.8 mm	OR 6400
11.6538.0225	104.00 mm	113.40 mm	7.10 mm	5.00 mm	0.8 mm	OR 6412
11.6538.0230	107.00 mm	116.40 mm	7.10 mm	5.00 mm	0.8 mm	OR 193
11.6538.0235	111.00 mm	120.40 mm	7.10 mm	5.00 mm	0.8 mm	OR 6450
11.6538.0240	114.00 mm	126.20 mm	9.50 mm	5.00 mm	1 mm	OR 197
11.6538.0245	117.00 mm	129.20 mm	9.50 mm	5.00 mm	1 mm	OR 8462
11.6538.0250	120.00 mm	132.20 mm	9.50 mm	5.00 mm	1 mm	OR 8475
11.6538.0255	123.00 mm	135.20 mm	9.50 mm	5.00 mm	1 mm	OR 204
11.6538.0260	126.00 mm	138.20 mm	9.50 mm	5.00 mm	1 mm	OR 8512
11.6538.0265	130.00 mm	142.20 mm	9.50 mm	5.00 mm	1 mm	OR 8525
11.6538.0270	133.00 mm	145.20 mm	9.50 mm	5.00 mm	1 mm	OR 211
11.6538.0275	136.00 mm	148.20 mm	9.50 mm	5.00 mm	1 mm	OR 8550
11.6538.0280	139.00 mm	151.20 mm	9.50 mm	5.00 mm	1 mm	OR 8562
11.6538.0285	142.00 mm	154.20 mm	9.50 mm	5.00 mm	1 mm	OR 8575
11.6538.0290	145.00 mm	157.20 mm	9.50 mm	5.00 mm	1 mm	OR 8587
11.6538.0295	149.00 mm	161.20 mm	9.50 mm	5.00 mm	1 mm	OR 8600
11.6538.0300	152.00 mm	164.20 mm	9.50 mm	5.00 mm	1 mm	OR 223

Item No.	Rod Ø d ₁₇	Ground of the groove Ø D _{H9}	Groove width L _{+0,-1}	Chamfer α	Radius R ₁	Matching o-ring
11.6538.0305	158.00 mm	170.20 mm	9.50 mm	5.00 mm	1 mm	OR 225
11.6538.0310	165.00 mm	177.20 mm	9.50 mm	5.00 mm	1 mm	OR 228
11.6538.0315	170.00 mm	182.20 mm	9.50 mm	5.00 mm	1 mm	OR 8675
11.6538.0320	178.00 mm	190.20 mm	9.50 mm	5.00 mm	1 mm	OR 8700
11.6538.0325	184.00 mm	196.20 mm	9.50 mm	5.00 mm	1 mm	OR 8725
11.6538.0330	190.00 mm	202.20 mm	9.50 mm	6.00 mm	1 mm	OR 8750
11.6538.0335	196.00 mm	208.20 mm	9.50 mm	6.00 mm	1 mm	OR 8775
11.6538.0340	203.00 mm	215.20 mm	9.50 mm	6.00 mm	1 mm	OR 8800
11.6538.0345	210.00 mm	222.20 mm	9.50 mm	6.00 mm	1 mm	OR 8850
11.6538.0350	215.00 mm	227.20 mm	9.50 mm	6.00 mm	1 mm	OR 8850
11.6538.0355	222.00 mm	234.20 mm	9.50 mm	6.00 mm	1 mm	OR 8875
11.6538.0360	230.00 mm	242.20 mm	9.50 mm	6.00 mm	1 mm	OR 8900
11.6538.0365	235.00 mm	247.20 mm	9.50 mm	6.00 mm	1 mm	OR 8925
11.6538.0370	240.00 mm	252.20 mm	9.50 mm	6.00 mm	1 mm	OR 8950
11.6538.0375	248.00 mm	260.20 mm	9.50 mm	6.00 mm	1 mm	OR 8975
11.6538.0380	255.00 mm	267.20 mm	9.50 mm	6.00 mm	1 mm	OR 81000
11.6538.0385	260.00 mm	272.20 mm	9.50 mm	6.00 mm	1 mm	OR 81025
11.6538.0390	265.00 mm	277.20 mm	9.50 mm	6.00 mm	1 mm	OR 81050
11.6538.0395	273.00 mm	285.20 mm	9.50 mm	6.00 mm	1 mm	OR 81075
11.6538.0400	280.00 mm	292.20 mm	9.50 mm	6.00 mm	1 mm	OR 81100
11.6538.0405	285.00 mm	297.20 mm	9.50 mm	6.00 mm	1 mm	OR 81125
11.6538.0410	292.00 mm	304.20 mm	9.50 mm	6.00 mm	1 mm	OR 81150
11.6538.0415	293.00 mm	305.20 mm	9.50 mm	6.00 mm	1 mm	OR 81150
11.6538.0420	300.00 mm	312.20 mm	9.50 mm	6.00 mm	1 mm	OR 81200
11.6538.0425	305.00 mm	317.20 mm	9.50 mm	6.00 mm	1 mm	OR 81200
11.6538.0430	318.00 mm	330.20 mm	9.50 mm	6.00 mm	1 mm	OR 81250
11.6538.0435	330.00 mm	342.20 mm	9.50 mm	6.00 mm	1 mm	OR 81300
11.6538.0440	342.00 mm	354.20 mm	9.50 mm	6.00 mm	1 mm	OR 81350
11.6538.0445	355.00 mm	367.20 mm	9.50 mm	6.00 mm	1 mm	OR 81400
11.6538.0450	370.00 mm	382.20 mm	9.50 mm	6.00 mm	1 mm	OR 81450
11.6538.0455	380.00 mm	392.20 mm	9.50 mm	6.00 mm	1 mm	OR 81500

APSOseals® – Rod Seal VSR100

Medium stability:	for use in mineral and synthetic pressurized fluids, water, and aggressive media
Product description:	Grooved-ring-type seal with metallic pre-tension spring
Intended use:	seal can be pressurized on one side
Material sealing element:	PTFE CF.429-01 (PTFE/carbon fibre)
Material V-spring:	Steel mat. no. 1.4310, AISI 301
Pressure PN:	max. 40 MPa
Sliding speed:	max. 15 m/s
Working temperature:	-200 to +260 °C
On request:	Further dimensions available



Surface finish

	Surface roughness			Roughness class
	R_a μm	R_t μm	R_z μm	
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$	N4/N5
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7

Profile bearing length ratio $t_p > 50\%$ to max. 90 % at 0,5 R_t

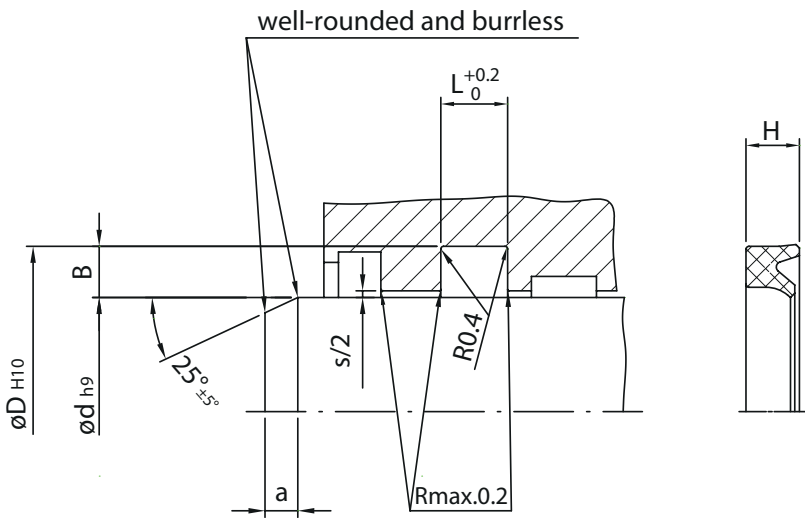
Recomended size range	profil depth	Groove width	Max. permissible clearance S*)			chamfer	
d	B	L +0,25 0	0-10 MPa*)	10-25 MPa*)	25-40 MPa*)	a	R1 max
6-13,9	1,45	2,4	0,4	0,3	0,2	2,0	0,4
14-24,9	2,25	3,6	0,5	0,4	0,3	2,0	0,4
25-45,9	3,1	4,8	0,5	0,4	0,3	2,0	0,6
46-124,9	4,7	7,1	0,6	0,5	0,4	3,0	0,8
125-	6,1	9,5	0,8	0,6	0,5	4,0	0,8

*) If the clearance $s/2$ is $< 0,25$ mm, a guide ring should not be used

Item No.	Rod Ø d_{f8}	Ground of the groove Ø D_{H9}	Groove width $L_{0.25}$	Sealing height H
11.6535.0000	10.00 mm	14.50 mm	3.60 mm	3.10 mm
11.6535.0005	12.00 mm	16.50 mm	3.60 mm	3.10 mm
11.6535.0010	14.00 mm	18.50 mm	3.60 mm	3.10 mm
11.6535.0015	15.00 mm	19.50 mm	3.60 mm	3.10 mm
11.6535.0020	16.00 mm	20.50 mm	3.60 mm	3.10 mm
11.6535.0025	18.00 mm	22.50 mm	3.60 mm	3.10 mm
11.6535.0030	20.00 mm	24.50 mm	3.60 mm	3.10 mm
11.6535.0035	22.00 mm	28.20 mm	4.80 mm	4.30 mm
11.6535.0040	25.00 mm	31.20 mm	4.80 mm	4.30 mm
11.6535.0045	28.00 mm	34.20 mm	4.80 mm	4.30 mm
11.6535.0050	30.00 mm	36.20 mm	4.80 mm	4.30 mm
11.6535.0055	32.00 mm	38.20 mm	4.80 mm	4.30 mm
11.6535.0060	35.00 mm	41.20 mm	4.80 mm	4.30 mm
11.6535.0065	36.00 mm	42.20 mm	4.80 mm	4.30 mm
11.6535.0070	40.00 mm	46.20 mm	4.80 mm	4.30 mm
11.6535.0075	42.00 mm	51.40 mm	7.10 mm	6.50 mm
11.6535.0080	45.00 mm	54.40 mm	7.10 mm	6.50 mm
11.6535.0085	50.00 mm	59.40 mm	7.10 mm	6.50 mm
11.6535.0090	55.00 mm	64.40 mm	7.10 mm	6.50 mm
11.6535.0095	56.00 mm	65.40 mm	7.10 mm	6.50 mm
11.6535.0100	60.00 mm	69.40 mm	7.10 mm	6.50 mm
11.6535.0105	63.00 mm	72.40 mm	7.10 mm	6.50 mm
11.6535.0110	65.00 mm	74.40 mm	7.10 mm	6.50 mm
11.6535.0115	70.00 mm	79.40 mm	7.10 mm	6.50 mm
11.6535.0120	75.00 mm	84.40 mm	7.10 mm	6.50 mm
11.6535.0125	80.00 mm	89.40 mm	7.10 mm	6.50 mm
11.6535.0130	85.00 mm	94.40 mm	7.10 mm	6.50 mm
11.6535.0135	90.00 mm	99.40 mm	7.10 mm	6.50 mm
11.6535.0140	100.00 mm	109.40 mm	7.10 mm	6.50 mm
11.6535.0145	110.00 mm	119.40 mm	7.10 mm	6.50 mm
11.6535.0150	115.00 mm	124.40 mm	7.10 mm	6.50 mm
11.6535.0155	125.00 mm	134.40 mm	7.10 mm	6.50 mm
11.6535.0160	140.00 mm	149.40 mm	7.10 mm	6.50 mm
11.6535.0165	150.00 mm	159.40 mm	7.10 mm	6.50 mm
11.6535.0170	160.00 mm	172.20 mm	9.50 mm	8.50 mm
11.6535.0175	180.00 mm	192.20 mm	9.50 mm	8.50 mm
11.6535.0180	200.00 mm	212.20 mm	9.50 mm	8.50 mm

APSOseals® – Rod Seal RSA

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Grooved ring with asymmetrical profile, sealing lip set back on inner diameter
Intended use:	Wear- and extrusion-proof grooved ring for rod seals
Material:	TPU 93.447-01
Hardness:	93 ±2 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: -30 to +40 °C
 - water: +5 to +50 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +50 °C
 - mineral-based greases: -40 to +110 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R _a µm	R _t µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_t

Diameter clearance, depending on pressure

Profile width	Max. permissible clearance S			
	16 MPa	26 MPa	32 MPa	40 MPa
B	mm	mm	mm	mm
≤ 5	0,5	0,4	0,35	–
> 5 a/to ≤ 7,5	0,55	0,45	0,4	0,35
> 7,5 a/to ≤ 12,5	0,6	0,5	0,45	0,4
> 12,5	0,65	0,55	0,45	0,4

Item No.	Rod Ø d _{h9}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Sealing height H	Chamfer a	Norm
11.6530.0000	6.00 mm	14.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0005	8.00 mm	16.00 mm	5.30 mm	4.70 mm	3.50 mm	
11.6530.0010	8.00 mm	16.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0015	8.00 mm	18.00 mm	9.00 mm	8.00 mm	3.50 mm	
11.6530.0020	10.00 mm	18.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0025	10.00 mm	20.00 mm	8.00 mm	7.20 mm	4.50 mm	
11.6530.0030	12.00 mm	20.00 mm	5.50 mm	5.00 mm	3.50 mm	As per ISO 5597
11.6530.0035	12.00 mm	20.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0040	12.00 mm	22.00 mm	5.30 mm	4.70 mm	4.50 mm	
11.6530.0045	12.00 mm	22.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0050	14.00 mm	22.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0055	14.00 mm	24.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0060	15.00 mm	23.00 mm	6.30 mm	5.70 mm	3.50 mm	
11.6530.0065	15.00 mm	25.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0070	16.00 mm	20.60 mm	3.60 mm	3.30 mm	3.50 mm	
11.6530.0075	16.00 mm	24.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0080	16.00 mm	26.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0085	18.00 mm	24.00 mm	5.30 mm	4.70 mm	3.50 mm	
11.6530.0090	18.00 mm	26.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0095	18.00 mm	26.00 mm	9.00 mm	8.00 mm	3.50 mm	
11.6530.0100	18.00 mm	28.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0105	18.00 mm	28.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0110	20.00 mm	26.00 mm	5.50 mm	5.00 mm	3.50 mm	
11.6530.0115	20.00 mm	28.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0120	20.00 mm	28.00 mm	7.00 mm	6.20 mm	3.50 mm	
11.6530.0125	20.00 mm	28.00 mm	8.00 mm	7.20 mm	3.50 mm	
11.6530.0130	20.00 mm	30.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0135	20.00 mm	30.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0140	20.00 mm	35.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0145	22.00 mm	30.00 mm	6.30 mm	5.70 mm	3.50 mm	As per ISO 5597
11.6530.0150	22.00 mm	30.00 mm	9.00 mm	8.00 mm	3.50 mm	
11.6530.0155	22.00 mm	32.00 mm	8.00 mm	7.20 mm	4.50 mm	
11.6530.0160	22.00 mm	32.00 mm	10.00 mm	9.00 mm	4.50 mm	As per ISO 5597
11.6530.0165	24.00 mm	34.00 mm	8.00 mm	7.20 mm	4.50 mm	
11.6530.0170	25.00 mm	33.00 mm	6.30 mm	5.70 mm	3.50 mm	
11.6530.0175	25.00 mm	33.00 mm	7.00 mm	6.30 mm	3.50 mm	As per ISO 5597
11.6530.0180	25.00 mm	33.00 mm	8.00 mm	7.20 mm	3.50 mm	
11.6530.0185	25.00 mm	33.00 mm	11.00 mm	10.00 mm	3.50 mm	
11.6530.0190	25.00 mm	35.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0195	25.00 mm	38.00 mm	10.00 mm	9.00 mm	5.00 mm	
11.6530.0200	25.00 mm	40.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0205	28.00 mm	36.00 mm	6.30 mm	5.70 mm	3.50 mm	
11.6530.0210	28.00 mm	38.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0215	28.00 mm	38.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0220	28.00 mm	38.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0225	28.00 mm	40.00 mm	9.50 mm	8.50 mm	4.50 mm	
11.6530.0230	28.00 mm	43.00 mm	12.50 mm	11.50 mm	5.50 mm	As per ISO 5597
11.6530.0235	30.00 mm	38.00 mm	6.30 mm	5.70 mm	3.50 mm	
11.6530.0240	30.00 mm	38.00 mm	9.00 mm	8.00 mm	3.50 mm	
11.6530.0245	30.00 mm	40.00 mm	6.30 mm	5.70 mm	4.50 mm	
11.6530.0250	30.00 mm	40.00 mm	8.00 mm	7.20 mm	4.50 mm	
11.6530.0255	30.00 mm	40.00 mm	10.50 mm	9.50 mm	4.50 mm	
11.6530.0260	30.00 mm	40.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0265	30.00 mm	43.00 mm	10.00 mm	9.00 mm	4.50 mm	
11.6530.0270	30.00 mm	45.00 mm	9.00 mm	8.00 mm	5.50 mm	
11.6530.0275	32.00 mm	40.00 mm	6.30 mm	5.70 mm	3.50 mm	
11.6530.0280	32.00 mm	40.00 mm	9.00 mm	8.00 mm	3.50 mm	
11.6530.0285	32.00 mm	42.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0290	32.00 mm	42.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0295	32.00 mm	45.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0300	32.00 mm	47.00 mm	11.00 mm	10.00 mm	5.50 mm	

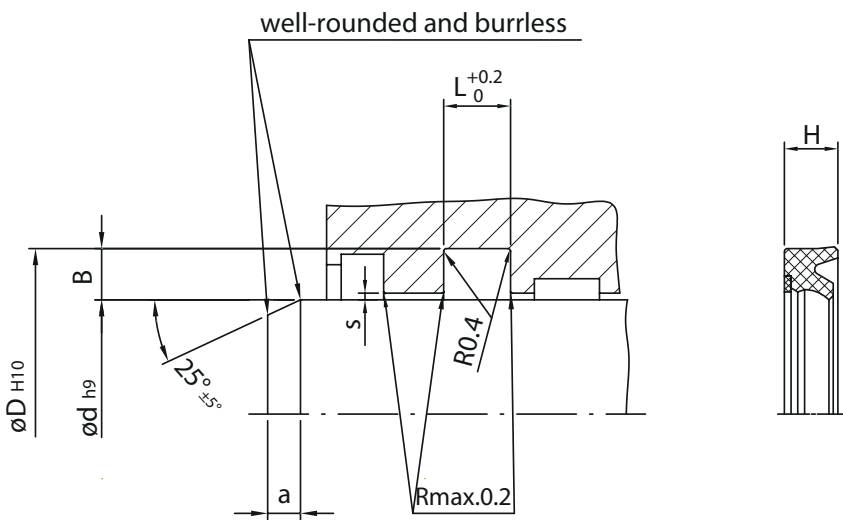
Item No.	Rod Ø d _{h9}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Sealing height H	Chamfer a	Norm
11.6530.0305	33.00 mm	43.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0310	35.00 mm	43.00 mm	6.30 mm	5.70 mm	3.50 mm	
11.6530.0315	35.00 mm	43.00 mm	9.00 mm	8.00 mm	3.50 mm	
11.6530.0320	35.00 mm	45.00 mm	8.00 mm	7.20 mm	4.50 mm	
11.6530.0325	35.00 mm	45.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0330	35.00 mm	46.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0335	35.00 mm	47.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0340	35.00 mm	50.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0345	36.00 mm	44.00 mm	5.50 mm	5.00 mm	3.50 mm	
11.6530.0350	36.00 mm	44.00 mm	6.30 mm	5.70 mm	3.50 mm	
11.6530.0355	36.00 mm	44.00 mm	9.00 mm	8.00 mm	3.50 mm	
11.6530.0360	36.00 mm	46.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0365	36.00 mm	46.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0370	36.00 mm	48.00 mm	8.00 mm	7.00 mm	4.50 mm	
11.6530.0375	36.00 mm	48.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0380	36.00 mm	51.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0385	36.00 mm	51.00 mm	12.50 mm	11.50 mm	5.50 mm	As per ISO 5597
11.6530.0390	38.00 mm	44.50 mm	5.30 mm	4.70 mm	3.50 mm	
11.6530.0395	38.00 mm	45.00 mm	7.00 mm	6.20 mm	3.50 mm	
11.6530.0400	40.00 mm	48.00 mm	6.30 mm	5.70 mm	4.00 mm	
11.6530.0405	40.00 mm	48.00 mm	9.00 mm	8.00 mm	4.00 mm	
11.6530.0410	40.00 mm	50.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0415	40.00 mm	50.00 mm	10.00 mm	9.00 mm	4.50 mm	
11.6530.0420	40.00 mm	50.00 mm	11.00 mm	10.00 mm	4.50 mm	As per ISO 5597
11.6530.0425	40.00 mm	52.00 mm	9.00 mm	8.00 mm	4.50 mm	
11.6530.0430	40.00 mm	55.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0435	40.00 mm	55.00 mm	12.50 mm	11.50 mm	5.50 mm	As per ISO 5597
11.6530.0440	40.00 mm	60.00 mm	13.00 mm	12.00 mm	6.00 mm	
11.6530.0445	45.00 mm	53.00 mm	6.30 mm	5.70 mm	4.00 mm	
11.6530.0450	45.00 mm	53.00 mm	11.00 mm	10.00 mm	4.00 mm	
11.6530.0455	45.00 mm	55.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0460	45.00 mm	55.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0465	45.00 mm	58.00 mm	10.00 mm	9.00 mm	5.00 mm	
11.6530.0470	45.00 mm	60.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0475	45.00 mm	60.00 mm	12.50 mm	11.50 mm	5.50 mm	As per ISO 5597
11.6530.0480	45.00 mm	65.00 mm	13.00 mm	12.00 mm	5.50 mm	
11.6530.0485	50.00 mm	60.00 mm	8.00 mm	7.20 mm	4.50 mm	As per ISO 5597
11.6530.0490	50.00 mm	60.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0495	50.00 mm	60.00 mm	13.00 mm	12.00 mm	4.50 mm	
11.6530.0500	50.00 mm	62.00 mm	10.00 mm	9.00 mm	5.00 mm	
11.6530.0505	50.00 mm	63.00 mm	11.00 mm	10.00 mm	5.00 mm	
11.6530.0510	50.00 mm	65.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0515	50.00 mm	65.00 mm	12.50 mm	11.50 mm	5.50 mm	As per ISO 5597
11.6530.0520	50.00 mm	70.00 mm	13.00 mm	12.00 mm	6.50 mm	
11.6530.0525	52.00 mm	62.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0530	55.00 mm	63.00 mm	13.00 mm	12.00 mm	3.50 mm	
11.6530.0535	55.00 mm	65.00 mm	8.00 mm	7.20 mm	4.50 mm	
11.6530.0540	55.00 mm	65.00 mm	11.00 mm	10.00 mm	4.50 mm	
11.6530.0545	55.00 mm	68.00 mm	11.00 mm	10.00 mm	5.00 mm	
11.6530.0550	55.00 mm	70.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0555	55.00 mm	75.00 mm	13.00 mm	12.00 mm	6.50 mm	
11.6530.0560	56.00 mm	66.00 mm	11.00 mm	10.00 mm	5.00 mm	
11.6530.0565	56.00 mm	71.00 mm	11.00 mm	10.00 mm	6.00 mm	
11.6530.0570	56.00 mm	71.00 mm	12.50 mm	11.50 mm	6.00 mm	As per ISO 5597
11.6530.0575	56.00 mm	71.00 mm	13.50 mm	12.50 mm	6.00 mm	
11.6530.0580	56.00 mm	76.00 mm	13.00 mm	12.00 mm	6.50 mm	
11.6530.0585	56.00 mm	76.00 mm	16.00 mm	15.00 mm	6.50 mm	
11.6530.0590	60.00 mm	68.00 mm	13.50 mm	12.50 mm	4.50 mm	
11.6530.0595	60.00 mm	70.00 mm	8.00 mm	7.20 mm	5.00 mm	
11.6530.0600	60.00 mm	70.00 mm	11.00 mm	10.00 mm	5.00 mm	
11.6530.0605	60.00 mm	72.00 mm	9.00 mm	8.00 mm	5.50 mm	

Item No.	Rod Ø d _{h9}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Sealing height H	Chamfer a	Norm
11.6530.0610	60.00 mm	72.00 mm	10.00 mm	9.00 mm	5.50 mm	
11.6530.0615	60.00 mm	73.00 mm	11.00 mm	10.00 mm	5.50 mm	
11.6530.0620	60.00 mm	75.00 mm	11.00 mm	10.00 mm	6.00 mm	
11.6530.0625	60.00 mm	75.00 mm	12.50 mm	11.50 mm	6.00 mm	
11.6530.0630	60.00 mm	80.00 mm	13.00 mm	12.00 mm	6.50 mm	
11.6530.0635	63.00 mm	73.00 mm	13.00 mm	12.00 mm	5.00 mm	
11.6530.0640	63.00 mm	75.00 mm	9.60 mm	8.60 mm	5.50 mm	
11.6530.0645	63.00 mm	78.00 mm	11.00 mm	10.00 mm	6.00 mm	
11.6530.0650	63.00 mm	78.00 mm	12.50 mm	11.50 mm	6.00 mm	As per ISO 5597
11.6530.0655	63.00 mm	83.00 mm	16.00 mm	15.00 mm	6.50 mm	
11.6530.0660	65.00 mm	75.00 mm	11.00 mm	10.00 mm	5.00 mm	
11.6530.0665	65.00 mm	77.00 mm	9.60 mm	8.60 mm	5.50 mm	
11.6530.0670	65.00 mm	77.00 mm	10.00 mm	9.00 mm	5.50 mm	
11.6530.0675	65.00 mm	80.00 mm	11.00 mm	10.00 mm	6.00 mm	
11.6530.0680	65.00 mm	85.00 mm	13.00 mm	12.00 mm	6.50 mm	
11.6530.0685	70.00 mm	80.00 mm	8.00 mm	7.20 mm	5.00 mm	As per ISO 5597
11.6530.0690	70.00 mm	80.00 mm	13.00 mm	12.00 mm	5.00 mm	
11.6530.0695	70.00 mm	82.00 mm	9.60 mm	8.60 mm	6.00 mm	
11.6530.0700	70.00 mm	85.00 mm	11.00 mm	10.00 mm	6.00 mm	
11.6530.0705	70.00 mm	85.00 mm	12.50 mm	11.50 mm	6.00 mm	As per ISO 5597
11.6530.0710	70.00 mm	85.00 mm	13.00 mm	12.00 mm	6.00 mm	As per ISO 5597
11.6530.0715	70.00 mm	90.00 mm	16.00 mm	15.00 mm	7.00 mm	As per ISO 5597
11.6530.0720	75.00 mm	85.00 mm	8.00 mm	7.20 mm	7.00 mm	
11.6530.0725	75.00 mm	87.00 mm	9.60 mm	8.60 mm	6.00 mm	
11.6530.0730	75.00 mm	90.00 mm	13.00 mm	12.00 mm	6.00 mm	
11.6530.0735	75.00 mm	95.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0740	80.00 mm	90.00 mm	8.00 mm	7.20 mm	5.00 mm	
11.6530.0745	80.00 mm	90.00 mm	11.00 mm	10.00 mm	5.00 mm	
11.6530.0750	80.00 mm	90.00 mm	13.00 mm	12.00 mm	5.00 mm	
11.6530.0755	80.00 mm	92.00 mm	9.60 mm	8.60 mm	5.50 mm	
11.6530.0760	80.00 mm	95.00 mm	11.00 mm	10.00 mm	6.00 mm	
11.6530.0765	80.00 mm	95.00 mm	12.50 mm	11.50 mm	6.00 mm	As per ISO 5597
11.6530.0770	80.00 mm	95.00 mm	13.00 mm	12.00 mm	6.00 mm	
11.6530.0775	80.00 mm	100.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0780	80.00 mm	100.00 mm	13.50 mm	12.50 mm	7.00 mm	
11.6530.0785	80.00 mm	100.00 mm	16.00 mm	15.00 mm	7.00 mm	As per ISO 5597
11.6530.0790	85.00 mm	100.00 mm	12.00 mm	11.00 mm	6.00 mm	
11.6530.0795	85.00 mm	100.00 mm	13.00 mm	12.00 mm	6.00 mm	
11.6530.0800	85.00 mm	105.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0805	90.00 mm	100.00 mm	12.50 mm	11.50 mm	5.50 mm	
11.6530.0810	90.00 mm	105.00 mm	9.50 mm	8.50 mm	6.00 mm	As per ISO 5597
11.6530.0815	90.00 mm	105.00 mm	12.50 mm	11.50 mm	6.00 mm	As per ISO 5597
11.6530.0820	90.00 mm	105.00 mm	13.00 mm	12.00 mm	6.00 mm	As per ISO 5597
11.6530.0825	90.00 mm	110.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0830	90.00 mm	110.00 mm	16.00 mm	15.00 mm	7.00 mm	As per ISO 5597
11.6530.0835	95.00 mm	110.00 mm	13.00 mm	12.00 mm	6.00 mm	
11.6530.0840	95.00 mm	115.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0845	100.00 mm	115.00 mm	13.00 mm	12.00 mm	6.00 mm	
11.6530.0850	100.00 mm	120.00 mm	13.00 mm	12.00 mm	7.00 mm	As per ISO 5597
11.6530.0855	100.00 mm	120.00 mm	16.00 mm	15.00 mm	7.00 mm	As per ISO 5597
11.6530.0860	100.00 mm	125.00 mm	20.00 mm	19.00 mm	8.00 mm	As per ISO 5597
11.6530.0865	105.00 mm	120.00 mm	12.50 mm	11.50 mm	6.00 mm	
11.6530.0870	105.00 mm	125.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0875	105.00 mm	125.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0880	110.00 mm	125.00 mm	12.00 mm	11.00 mm	6.00 mm	
11.6530.0885	110.00 mm	130.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0890	110.00 mm	130.00 mm	16.00 mm	15.00 mm	7.00 mm	As per ISO 5597
11.6530.0892	115.00 mm	130.00 mm	12.00 mm	11.00 mm	7.00 mm	
11.6530.0895	115.00 mm	135.00 mm	13.00 mm	12.00 mm	6.00 mm	
11.6530.0900	120.00 mm	135.00 mm	12.50 mm	11.50 mm	7.00 mm	
11.6530.0905	120.00 mm	140.00 mm	13.00 mm	12.00 mm	7.00 mm	

Item No.	Rod Ø d _{h9}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Sealing height H	Chamfer a	Norm
11.6530.0910	120.00 mm	140.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0915	125.00 mm	145.00 mm	16.00 mm	15.00 mm	7.00 mm	As per ISO 5597
11.6530.0920	130.00 mm	150.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0925	130.00 mm	150.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0930	140.00 mm	160.00 mm	16.00 mm	15.00 mm	7.00 mm	As per ISO 5597
11.6530.0935	150.00 mm	170.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0940	160.00 mm	180.00 mm	13.00 mm	12.00 mm	7.00 mm	
11.6530.0945	160.00 mm	180.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0950	170.00 mm	190.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0955	180.00 mm	200.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0960	190.00 mm	210.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0965	200.00 mm	220.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0970	200.00 mm	225.00 mm	17.00 mm	16.00 mm	8.00 mm	
11.6530.0975	210.00 mm	230.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0980	220.00 mm	240.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0985	230.00 mm	250.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0990	240.00 mm	260.00 mm	16.00 mm	15.00 mm	7.00 mm	
11.6530.0995	250.00 mm	270.00 mm	16.00 mm	15.00 mm	7.00 mm	

APSOseals® – Rod Seal RSB2

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Grooved ring with asymmetrical profile and integrated backing, sealing lip set back on inner diameter
Intended use:	Wear- and extrusion-proof grooved ring for rod seals in hydraulics
Material:	TPU 93.447-01
Material backup ring:	POM 118.447-01
Hardness:	93 ±2 Shore A
Pressure PN:	max. 50 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: -30 to +40 °C
 - water: +5 to +50 °C
 - HETG (colza oils): -30 to +60 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +50 °C
 - mineral-based greases: -40 to +110 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R _a µm	R _i µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_i

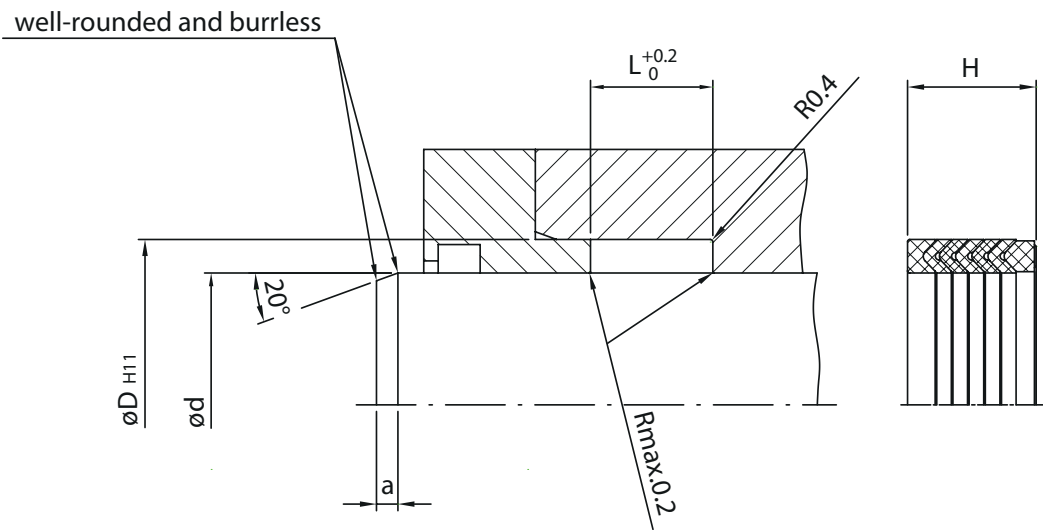
Diameter clearance, depending on pressure

Profile width	Max. permissible clearance S			
B	16 MPa	26 MPa	32 MPa	40 MPa
mm	mm	mm	mm	mm
≤ 5	0,5	0,4	0,35	–
> 5 a/to ≤ 7,5	0,55	0,45	0,4	0,35
> 7,5 a/to ≤ 12,5	0,6	0,5	0,45	0,4
> 12,5	0,65	0,55	0,45	0,4

Item No.	Rod Ø d_{H9}	Ground of the groove Ø D_{H10}	Groove width $L_{+0.2}$	Sealing height H	Chamfer a
11.6531.0000	40.00 mm	55.00 mm	11.00 mm	10.00 mm	5.50 mm
11.6531.0005	42.00 mm	51.00 mm	11.00 mm	10.00 mm	4.50 mm
11.6531.0010	45.00 mm	60.00 mm	11.00 mm	10.00 mm	5.50 mm
11.6531.0015	50.00 mm	59.00 mm	11.00 mm	10.00 mm	4.50 mm
11.6531.0020	50.00 mm	60.00 mm	8.00 mm	7.30 mm	5.00 mm
11.6531.0025	50.00 mm	65.00 mm	11.00 mm	10.00 mm	5.50 mm
11.6531.0030	50.00 mm	70.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6531.0035	56.00 mm	71.00 mm	12.50 mm	11.50 mm	5.50 mm
11.6531.0040	60.00 mm	69.00 mm	11.00 mm	10.00 mm	4.50 mm
11.6531.0045	60.00 mm	75.00 mm	12.50 mm	11.50 mm	5.50 mm
11.6531.0050	60.00 mm	80.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6531.0055	63.00 mm	78.00 mm	12.50 mm	11.50 mm	5.50 mm
11.6531.0060	63.00 mm	83.00 mm	13.00 mm	12.00 mm	6.00 mm
11.6531.0065	65.00 mm	80.00 mm	12.50 mm	11.50 mm	5.50 mm
11.6531.0070	70.00 mm	80.00 mm	8.00 mm	7.30 mm	5.00 mm
11.6531.0075	70.00 mm	85.00 mm	12.50 mm	11.50 mm	5.50 mm
11.6531.0080	75.00 mm	95.00 mm	14.50 mm	13.50 mm	6.00 mm
11.6531.0085	80.00 mm	95.00 mm	12.50 mm	11.50 mm	5.50 mm
11.6531.0090	80.00 mm	100.00 mm	14.50 mm	13.50 mm	7.00 mm
11.6531.0095	85.00 mm	105.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6531.0100	85.00 mm	105.00 mm	14.50 mm	13.50 mm	7.00 mm
11.6531.0105	90.00 mm	105.00 mm	12.50 mm	11.50 mm	6.00 mm
11.6531.0110	95.00 mm	115.00 mm	14.50 mm	13.50 mm	7.00 mm
11.6531.0115	100.00 mm	120.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6531.0120	100.00 mm	120.00 mm	14.50 mm	13.50 mm	7.00 mm
11.6531.0125	105.00 mm	125.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6531.0130	110.00 mm	130.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6531.0135	120.00 mm	140.00 mm	13.00 mm	12.00 mm	7.00 mm
11.6531.0140	125.00 mm	145.00 mm	13.00 mm	12.00 mm	7.00 mm

APSOseals® – Rod Seal DMR

Medium stability:	For use in mineral hydraulic oils and water
Product description:	Multi-piece seal set consisting of a pressure ring, at least three collars, and a supporting ring
Intended use:	Used for sealing rods in mobile and heavy hydraulics and for really high mechanical loads due to its reliability and strength
Material:	NBR/fabric
Hardness:	75 ±5 Shore A
Pressure PN:	max. 40 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-30 to +120 °C



Surface finish

	Surface roughness			Roughness class
	R_a µm	R_i µm	R_z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_i

Allowance

Nominal Ø	Groove base Ø	Rod Ø	Tolerance for metal guide
d mm	D	d	Ø d
≤ 80	H11	f8	H9/f8
> 80 a/to ≤ 120	H11	f8	H8/f8
> 120 a/to ≤ 500	H11	f7	H8/f7

Working temperature:

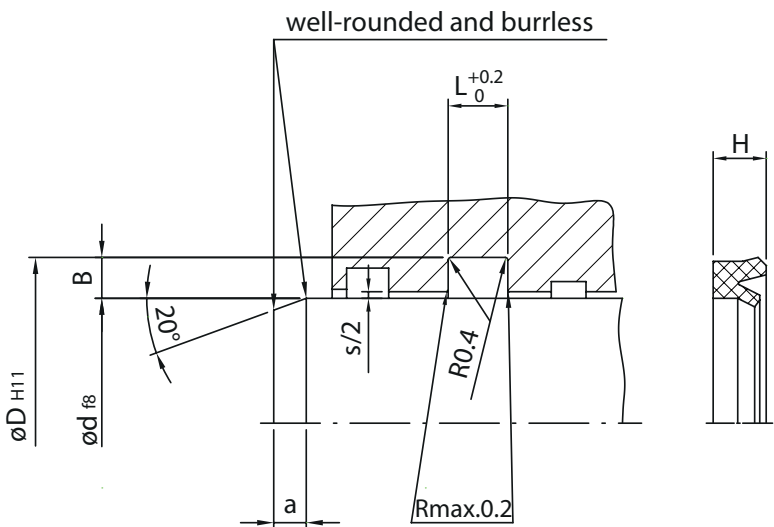
- hydraulic oils HL, HLP:
NBR 65.428-02/NBR 75.428-01:
–30 to +100 °C
- HFA, HFB fluids:
NBR 65.428-02/NBR 75.428-01:
+5 to +60 °C
- HFC fluids:
NBR 65.428-02/NBR 75.428-01:
–30 to +60 °C
- water:
NBR 65.428-02/NBR 75.428-01:
+5 to +100 °C
- HETG (colza oils):
NBR 65.428-02/NBR 75.428-01:
–30 to +80 °C
- HEES (synth. ester):
NBR 65.428-02/NBR 75.428-01:
–30 to +80 °C
- HEPG (glycols):
NBR 65.428-02/NBR 75.428-01:
–30 to +60 °C
- mineral-based greases:
NBR 65.428-02/NBR 75.428-01:
–30 to +100 °C

Item No.	Rod Ø d	Ground of the groove Ø D _{H11}	Groove width L _{0,2}	Sealing height H	Chamfer α
11.6539.0000	8.00 mm	18.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0005	10.00 mm	18.00 mm	20.70 mm	19.70 mm	3.00 mm
11.6539.0010	10.00 mm	20.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0015	10.00 mm	22.00 mm	23.00 mm	22.00 mm	3.00 mm
11.6539.0020	12.00 mm	22.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0025	12.00 mm	24.00 mm	28.00 mm	27.00 mm	3.00 mm
11.6539.0030	12.00 mm	25.00 mm	20.00 mm	19.00 mm	3.00 mm
11.6539.0035	14.00 mm	24.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0040	15.00 mm	25.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0045	16.00 mm	26.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0050	18.00 mm	28.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0055	20.00 mm	30.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0060	20.00 mm	32.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0065	22.00 mm	32.00 mm	19.50 mm	18.50 mm	3.00 mm
11.6539.0070	22.00 mm	34.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0075	25.00 mm	37.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0080	25.00 mm	40.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0085	25.00 mm	42.00 mm	33.00 mm	32.00 mm	3.00 mm
11.6539.0090	28.00 mm	40.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0095	28.00 mm	43.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0100	30.00 mm	42.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0105	30.00 mm	45.00 mm	23.70 mm	22.50 mm	3.00 mm
11.6539.0110	32.00 mm	44.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0115	32.00 mm	47.00 mm	23.70 mm	22.50 mm	3.00 mm
11.6539.0120	35.00 mm	47.00 mm	23.70 mm	22.50 mm	3.00 mm
11.6539.0125	35.00 mm	50.00 mm	23.70 mm	22.50 mm	3.00 mm
11.6539.0130	36.00 mm	48.00 mm	23.70 mm	22.50 mm	3.00 mm
11.6539.0135	36.00 mm	51.00 mm	23.70 mm	22.50 mm	3.00 mm
11.6539.0140	40.00 mm	52.00 mm	23.50 mm	22.50 mm	3.00 mm
11.6539.0145	40.00 mm	55.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0150	40.00 mm	60.00 mm	41.20 mm	40.00 mm	5.00 mm
11.6539.0155	42.00 mm	54.00 mm	23.50 mm	22.50 mm	5.00 mm
11.6539.0160	42.00 mm	57.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0165	45.00 mm	60.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0170	45.00 mm	65.00 mm	28.70 mm	27.50 mm	5.00 mm
11.6539.0175	50.00 mm	65.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0180	50.00 mm	70.00 mm	31.20 mm	30.00 mm	5.00 mm
11.6539.0185	50.80 mm	63.50 mm	26.00 mm	25.00 mm	5.00 mm
11.6539.0190	55.00 mm	70.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0195	55.00 mm	75.00 mm	31.20 mm	30.00 mm	5.00 mm
11.6539.0200	56.00 mm	71.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0205	56.00 mm	76.00 mm	38.20 mm	37.00 mm	5.00 mm
11.6539.0210	60.00 mm	75.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0215	60.00 mm	80.00 mm	38.20 mm	37.00 mm	5.00 mm
11.6539.0220	63.00 mm	78.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0225	63.00 mm	83.00 mm	38.20 mm	37.00 mm	5.00 mm
11.6539.0230	63.50 mm	82.60 mm	35.70 mm	34.50 mm	5.00 mm
11.6539.0235	65.00 mm	80.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0240	65.00 mm	85.00 mm	41.20 mm	40.00 mm	5.00 mm
11.6539.0245	70.00 mm	85.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0250	70.00 mm	89.00 mm	32.00 mm	31.00 mm	5.00 mm
11.6539.0255	70.00 mm	90.00 mm	41.20 mm	40.00 mm	5.00 mm
11.6539.0260	75.00 mm	90.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0265	75.00 mm	95.00 mm	41.20 mm	40.00 mm	5.00 mm
11.6539.0270	76.20 mm	95.20 mm	40.20 mm	39.00 mm	5.00 mm
11.6539.0275	80.00 mm	95.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0280	80.00 mm	100.00 mm	41.20 mm	40.00 mm	5.00 mm
11.6539.0285	85.00 mm	100.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0290	85.00 mm	105.00 mm	41.20 mm	40.00 mm	5.00 mm
11.6539.0295	90.00 mm	105.00 mm	23.70 mm	22.50 mm	5.00 mm
11.6539.0300	90.00 mm	115.00 mm	46.90 mm	45.50 mm	5.00 mm

Item No.	Rod Ø d	Ground of the groove Ø D _{H11}	Groove width L _{0,2}	Sealing height H	Chamfer α
11.6539.0305	100.00 mm	115.00 mm	31.20 mm	30.00 mm	5.00 mm
11.6539.0310	105.00 mm	120.00 mm	33.20 mm	32.00 mm	5.00 mm
11.6539.0315	105.00 mm	125.00 mm	40.90 mm	39.50 mm	7.50 mm
11.6539.0320	110.00 mm	125.00 mm	31.20 mm	30.00 mm	7.50 mm
11.6539.0325	110.00 mm	132.00 mm	49.20 mm	48.00 mm	7.50 mm
11.6539.0330	115.00 mm	130.00 mm	31.20 mm	30.00 mm	7.50 mm
11.6539.0335	120.00 mm	140.00 mm	41.20 mm	40.00 mm	7.50 mm
11.6539.0340	125.00 mm	140.00 mm	35.20 mm	34.00 mm	7.50 mm
11.6539.0345	125.00 mm	150.00 mm	47.40 mm	46.00 mm	7.50 mm
11.6539.0350	130.00 mm	150.00 mm	40.90 mm	39.50 mm	7.50 mm
11.6539.0355	140.00 mm	155.00 mm	35.20 mm	34.00 mm	7.50 mm
11.6539.0360	140.00 mm	160.00 mm	39.20 mm	38.00 mm	7.50 mm
11.6539.0365	145.00 mm	165.00 mm	41.40 mm	40.00 mm	7.50 mm
11.6539.0370	150.00 mm	170.00 mm	41.20 mm	40.00 mm	7.50 mm
11.6539.0375	150.00 mm	180.00 mm	61.40 mm	60.00 mm	7.50 mm
11.6539.0380	160.00 mm	180.00 mm	41.20 mm	40.00 mm	7.50 mm
11.6539.0385	160.00 mm	190.00 mm	61.40 mm	60.00 mm	7.50 mm
11.6539.0390	170.00 mm	190.00 mm	41.20 mm	40.00 mm	7.50 mm
11.6539.0395	180.00 mm	200.00 mm	41.20 mm	40.00 mm	7.50 mm
11.6539.0400	180.00 mm	210.00 mm	61.40 mm	60.00 mm	7.50 mm
11.6539.0405	195.00 mm	215.00 mm	46.20 mm	45.00 mm	7.50 mm
11.6539.0410	200.00 mm	220.00 mm	41.20 mm	40.00 mm	7.50 mm
11.6539.0415	200.00 mm	225.00 mm	48.40 mm	47.00 mm	7.50 mm
11.6539.0420	200.00 mm	230.00 mm	61.40 mm	60.00 mm	7.50 mm
11.6539.0425	250.00 mm	270.00 mm	41.20 mm	40.00 mm	7.50 mm
11.6539.0430	310.00 mm	330.00 mm	44.20 mm	43.00 mm	7.50 mm
11.6539.0435	440.00 mm	470.00 mm	67.00 mm	65.50 mm	7.50 mm

APSOseals® – Rod Seal DIM

Medium stability:	For use in mineral oils and greases
Product description:	Grooved ring with asymmetrical profile, sealing lip set back on inner diameter
Intended use:	For sealing rods in hydraulics and pneumatics
Material:	NBR 90.447-01
Hardness:	90 ±5 Shore A
Pressure PN:	max. 10 MPa
Sliding speed:	max. 0,5 m/s
Working temperature:	-30 to +100 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +100 °C
 - HFA, HFB fluids: +5 to +60 °C
 - HFC fluids: -30 to +60 °C
 - water: +5 to +90 °C
 - HETG (colza oils): -30 to +80 °C
 - HEPG (glycols): -30 to +60 °C
 - mineral greases: -30 to +100 °C
- Application is not provided for:
- HFD fluids
 - HEES (synth. ester)

Surface finish

	Surface roughness			Roughness class
	R _a µm	R _i µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_i

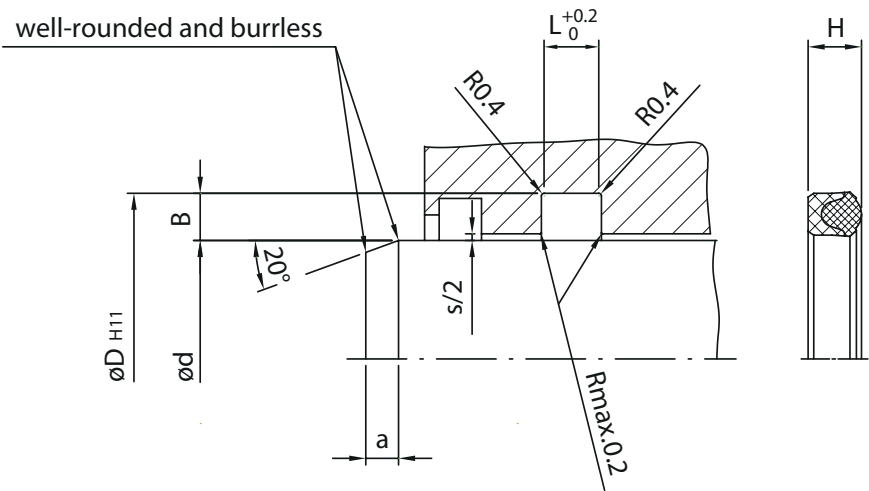
Diameter clearance, depending on pressure

Profile width	Max. permissible clearance S			
B	2,5 MPa	5 MPa	7,5 MPa	10 MPa
mm	mm	mm	mm	mm
≤ 5	0,45	0,3	0,25	0,2
> 5	0,5	0,35	0,3	0,25

Item No.	Rod Ø d_{fg}	Ground of the groove Ø D_{H11}	Groove width $L_{+0.2}$	Sealing height H	Chamfer a	Ref.-No.
11.6533.0000	8.00 mm	16.00 mm	6.00 mm	5.50 mm	3.50 mm	DIM 8
11.6533.0005	10.00 mm	18.00 mm	6.00 mm	5.50 mm	3.50 mm	DIM 10
11.6533.0010	12.00 mm	20.00 mm	6.00 mm	5.50 mm	3.50 mm	DIM 12
11.6533.0015	14.00 mm	22.00 mm	6.00 mm	5.50 mm	3.50 mm	DIM 14
11.6533.0020	16.00 mm	24.00 mm	6.00 mm	5.50 mm	4.00 mm	DIM 16
11.6533.0025	18.00 mm	26.00 mm	6.00 mm	5.50 mm	4.00 mm	DIM 18
11.6533.0030	20.00 mm	28.00 mm	6.00 mm	5.50 mm	4.00 mm	DIM 20
11.6533.0035	22.00 mm	30.00 mm	6.00 mm	5.50 mm	4.00 mm	DIM 22
11.6533.0040	25.00 mm	35.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 25
11.6533.0045	28.00 mm	38.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 28
11.6533.0050	30.00 mm	40.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 30
11.6533.0055	32.00 mm	42.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 32
11.6533.0060	35.00 mm	45.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 35
11.6533.0065	36.00 mm	46.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 36
11.6533.0070	40.00 mm	50.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 40
11.6533.0075	45.00 mm	55.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 45
11.6533.0080	50.00 mm	60.00 mm	7.50 mm	7.00 mm	4.50 mm	DIM 50
11.6533.0085	56.00 mm	68.00 mm	7.50 mm	7.00 mm	5.00 mm	DIM 56
11.6533.0090	60.00 mm	72.00 mm	9.50 mm	8.50 mm	5.00 mm	DIM 60
11.6533.0095	63.00 mm	75.00 mm	9.50 mm	8.50 mm	5.00 mm	DIM 63
11.6533.0100	70.00 mm	82.00 mm	9.50 mm	8.50 mm	5.00 mm	DIM 70
11.6533.0105	80.00 mm	92.00 mm	9.50 mm	8.50 mm	5.00 mm	DIM 80
11.6533.0110	90.00 mm	102.00 mm	9.50 mm	8.50 mm	5.00 mm	DIM 90

APSOseals® – Rod Seal RSF8

Medium stability:	For use in mineral hydraulic oils
Product description:	One-piece rod seal with elastomer component enclosed in fabric component
Intended use:	Single-acting rod seal, suitable for use in low- and high-pressure areas
Material:	NBR/fabric
Hardness:	75 ±5 Shore A
Pressure PN:	max. 20 MPa
Sliding speed:	max. 0,3 m/s
Working temperature:	-30 to +120 °C



- Working temperature:**
- hydraulic oils HL, HLP: -30 to +100 °C
 - HFA, HFB fluids: +5 to +60 °C
 - HFC fluids: -30 to +60 °C
 - water: +5 to +100 °C
 - HETG (colza oils): -30 to +80 °C
 - HEES (synth. ester): -30 to +80 °C
 - HEPG (glycols): -30 to +60 °C
 - mineral-based greases: -30 to +100 °C

Application is not provided for:

- HFD fluids

Surface finish

	Surface roughness			Roughness class
	R _a µm	R _t µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 90 % at 0,5 R_t

Diameter clearance, depending on pressure

Profile width	Max. permissible clearance S	
B	16 MPa	25 MPa
mm	mm	mm
≤ 6	0,2	0,1
> 6 a/to ≤ 10	0,2	0,1
> 10 a/to ≤ 15	0,2	0,1

Allowance

Nominal Ø	Groove base Ø	Rod Ø	Tolerance for metal guide
d	D	d	Ø d
mm			
≤ 80	H11	f8	H9/f8
> 80 a/to ≤ 120	H11	f8	H8/f8
> 120 a/to ≤ 240	H11	f7	H8/f7

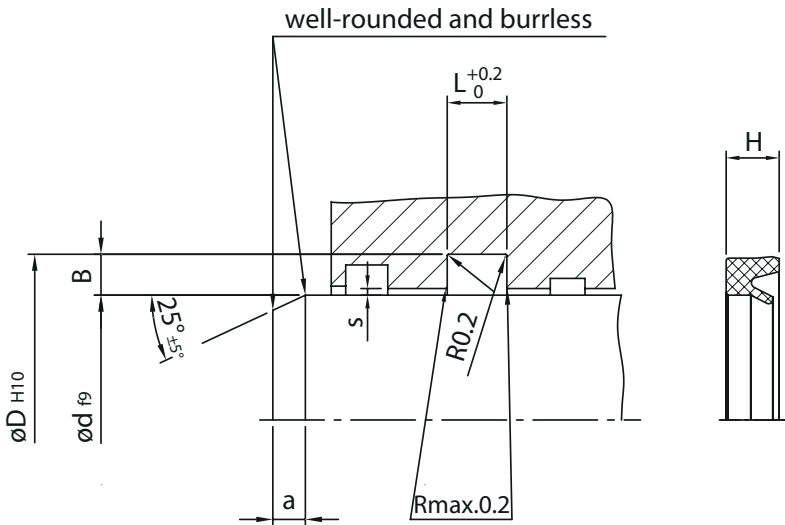
Item No.	Rod Ø d	Ground of the groove Ø D _{H11}	Groove width L _{0,2}	Sealing height H	Chamfer α
11.6540.0000	5.00 mm	12.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0005	6.00 mm	13.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0010	8.00 mm	15.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0015	8.00 mm	16.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0020	8.00 mm	16.00 mm	10.50 mm	10.00 mm	2.50 mm
11.6540.0025	10.00 mm	17.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0030	10.00 mm	18.00 mm	8.40 mm	8.00 mm	2.50 mm
11.6540.0035	12.00 mm	19.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0040	14.00 mm	22.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0045	15.00 mm	23.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0050	16.00 mm	24.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0055	18.00 mm	25.00 mm	6.00 mm	5.60 mm	2.50 mm
11.6540.0060	18.00 mm	26.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0065	20.00 mm	26.00 mm	5.40 mm	5.00 mm	2.50 mm
11.6540.0070	20.00 mm	28.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0075	20.00 mm	32.00 mm	7.50 mm	7.00 mm	2.50 mm
11.6540.0080	22.00 mm	30.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0085	25.00 mm	32.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0090	25.00 mm	33.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0095	25.00 mm	35.00 mm	7.50 mm	7.00 mm	2.50 mm
11.6540.0100	25.40 mm	38.10 mm	10.20 mm	9.50 mm	2.50 mm
11.6540.0105	28.00 mm	36.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0110	28.00 mm	36.00 mm	7.40 mm	7.00 mm	2.50 mm
11.6540.0115	28.00 mm	40.00 mm	10.60 mm	10.00 mm	2.50 mm
11.6540.0120	29.60 mm	45.00 mm	11.50 mm	10.50 mm	2.50 mm
11.6540.0125	30.00 mm	38.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0130	30.00 mm	45.00 mm	9.00 mm	8.50 mm	2.50 mm
11.6540.0135	31.80 mm	44.50 mm	10.20 mm	9.50 mm	2.50 mm
11.6540.0140	31.80 mm	47.60 mm	11.80 mm	11.00 mm	2.50 mm
11.6540.0145	32.00 mm	40.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0150	32.00 mm	40.00 mm	8.00 mm	7.50 mm	2.50 mm
11.6540.0155	33.00 mm	45.00 mm	10.60 mm	10.00 mm	2.50 mm
11.6540.0160	34.90 mm	44.40 mm	7.60 mm	6.90 mm	2.50 mm
11.6540.0165	35.00 mm	42.00 mm	7.40 mm	7.00 mm	2.50 mm
11.6540.0170	35.00 mm	43.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0175	35.00 mm	43.00 mm	8.50 mm	8.00 mm	2.50 mm
11.6540.0180	35.00 mm	44.00 mm	8.00 mm	7.50 mm	2.50 mm
11.6540.0185	35.00 mm	45.00 mm	8.00 mm	7.50 mm	2.50 mm
11.6540.0190	35.00 mm	55.00 mm	13.00 mm	12.00 mm	2.50 mm
11.6540.0195	36.00 mm	44.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0200	38.00 mm	55.00 mm	13.00 mm	12.00 mm	2.50 mm
11.6540.0205	38.10 mm	50.80 mm	10.20 mm	9.50 mm	2.50 mm
11.6540.0210	40.00 mm	48.00 mm	4.30 mm	4.00 mm	2.50 mm
11.6540.0215	40.00 mm	48.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0220	40.00 mm	50.00 mm	8.00 mm	7.50 mm	2.50 mm
11.6540.0225	40.00 mm	50.00 mm	9.50 mm	9.00 mm	2.50 mm
11.6540.0230	40.00 mm	52.00 mm	9.60 mm	9.00 mm	2.50 mm
11.6540.0235	40.00 mm	60.00 mm	14.50 mm	13.50 mm	2.50 mm
11.6540.0240	42.00 mm	50.00 mm	6.40 mm	6.00 mm	2.50 mm
11.6540.0245	44.50 mm	60.30 mm	10.30 mm	9.50 mm	3.00 mm
11.6540.0250	45.00 mm	53.00 mm	8.50 mm	8.00 mm	3.00 mm
11.6540.0255	45.00 mm	55.00 mm	8.00 mm	7.50 mm	3.00 mm
11.6540.0260	45.00 mm	65.00 mm	14.50 mm	13.50 mm	3.00 mm
11.6540.0265	46.00 mm	54.00 mm	8.50 mm	8.00 mm	3.00 mm
11.6540.0270	47.00 mm	57.00 mm	9.50 mm	9.00 mm	3.00 mm
11.6540.0275	48.00 mm	60.00 mm	10.60 mm	10.00 mm	3.00 mm
11.6540.0280	50.00 mm	58.00 mm	12.80 mm	12.00 mm	3.00 mm
11.6540.0285	50.00 mm	60.00 mm	8.00 mm	7.50 mm	3.00 mm
11.6540.0290	50.00 mm	62.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0295	50.00 mm	62.00 mm	10.60 mm	10.00 mm	3.00 mm
11.6540.0300	50.00 mm	62.00 mm	12.60 mm	12.00 mm	3.00 mm

Item No.	Rod Ø d	Ground of the groove Ø D _{H11}	Groove width L _{0,2}	Sealing height H	Chamfer α
11.6540.0305	50.00 mm	65.00 mm	12.80 mm	12.00 mm	3.00 mm
11.6540.0310	50.80 mm	63.50 mm	10.20 mm	9.50 mm	3.00 mm
11.6540.0315	50.80 mm	66.60 mm	11.80 mm	11.00 mm	3.00 mm
11.6540.0320	50.80 mm	76.20 mm	22.50 mm	21.50 mm	3.00 mm
11.6540.0325	55.00 mm	63.00 mm	6.40 mm	6.00 mm	3.00 mm
11.6540.0330	55.00 mm	65.00 mm	8.00 mm	7.50 mm	3.00 mm
11.6540.0335	55.00 mm	65.00 mm	12.50 mm	12.00 mm	3.00 mm
11.6540.0340	55.00 mm	67.00 mm	14.00 mm	13.00 mm	3.00 mm
11.6540.0345	55.00 mm	70.00 mm	12.00 mm	11.30 mm	3.00 mm
11.6540.0350	56.00 mm	66.00 mm	8.00 mm	7.50 mm	3.00 mm
11.6540.0355	60.00 mm	70.00 mm	8.00 mm	7.50 mm	3.00 mm
11.6540.0360	60.00 mm	72.00 mm	10.00 mm	9.50 mm	3.00 mm
11.6540.0365	60.00 mm	75.00 mm	12.80 mm	12.00 mm	3.00 mm
11.6540.0370	60.00 mm	80.00 mm	14.50 mm	13.70 mm	3.00 mm
11.6540.0375	61.00 mm	69.00 mm	8.50 mm	8.00 mm	3.00 mm
11.6540.0380	63.00 mm	75.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0385	63.50 mm	76.20 mm	8.70 mm	8.00 mm	3.00 mm
11.6540.0390	65.00 mm	77.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0395	65.00 mm	80.00 mm	8.00 mm	7.50 mm	3.00 mm
11.6540.0400	65.00 mm	80.00 mm	12.70 mm	12.00 mm	3.00 mm
11.6540.0405	68.00 mm	80.00 mm	10.60 mm	10.00 mm	3.00 mm
11.6540.0410	70.00 mm	78.00 mm	8.40 mm	8.00 mm	3.00 mm
11.6540.0415	70.00 mm	82.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0420	70.00 mm	85.00 mm	12.20 mm	11.50 mm	3.00 mm
11.6540.0425	73.00 mm	85.00 mm	11.20 mm	10.50 mm	3.00 mm
11.6540.0430	75.00 mm	87.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0435	75.00 mm	90.00 mm	12.20 mm	11.50 mm	3.00 mm
11.6540.0440	75.00 mm	95.00 mm	14.50 mm	13.70 mm	3.00 mm
11.6540.0445	76.00 mm	84.00 mm	8.50 mm	8.00 mm	3.00 mm
11.6540.0450	78.00 mm	90.00 mm	12.70 mm	12.00 mm	3.00 mm
11.6540.0455	80.00 mm	92.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0460	80.00 mm	95.00 mm	12.00 mm	11.30 mm	3.00 mm
11.6540.0465	80.00 mm	100.00 mm	16.50 mm	15.50 mm	3.00 mm
11.6540.0470	85.00 mm	97.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0475	85.00 mm	100.00 mm	12.70 mm	12.00 mm	3.00 mm
11.6540.0480	85.00 mm	105.00 mm	16.00 mm	15.00 mm	3.00 mm
11.6540.0485	85.00 mm	110.00 mm	21.20 mm	20.00 mm	3.00 mm
11.6540.0490	86.00 mm	98.00 mm	10.60 mm	10.00 mm	3.00 mm
11.6540.0495	90.00 mm	100.00 mm	7.20 mm	6.80 mm	3.00 mm
11.6540.0500	90.00 mm	102.00 mm	9.60 mm	9.00 mm	3.00 mm
11.6540.0505	90.00 mm	105.00 mm	12.70 mm	12.00 mm	5.00 mm
11.6540.0510	90.00 mm	110.00 mm	15.00 mm	14.00 mm	5.00 mm
11.6540.0515	92.00 mm	108.00 mm	12.20 mm	11.50 mm	5.00 mm
11.6540.0520	95.00 mm	110.00 mm	12.00 mm	11.30 mm	5.00 mm
11.6540.0525	97.00 mm	105.00 mm	13.90 mm	13.50 mm	5.00 mm
11.6540.0530	100.00 mm	115.00 mm	12.00 mm	11.30 mm	5.00 mm
11.6540.0535	100.00 mm	120.00 mm	15.20 mm	14.20 mm	5.00 mm
11.6540.0540	100.00 mm	125.00 mm	20.00 mm	18.80 mm	5.00 mm
11.6540.0545	106.00 mm	118.00 mm	10.60 mm	10.00 mm	5.00 mm
11.6540.0550	110.00 mm	125.00 mm	12.00 mm	11.30 mm	5.00 mm
11.6540.0555	110.00 mm	130.00 mm	14.50 mm	13.70 mm	5.00 mm
11.6540.0560	110.00 mm	130.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0565	112.00 mm	120.00 mm	14.00 mm	13.50 mm	5.00 mm
11.6540.0570	114.30 mm	133.30 mm	13.00 mm	12.00 mm	5.00 mm
11.6540.0575	115.00 mm	130.00 mm	12.00 mm	11.30 mm	5.00 mm
11.6540.0580	118.00 mm	126.00 mm	8.50 mm	8.00 mm	5.00 mm
11.6540.0585	120.00 mm	135.00 mm	12.00 mm	11.30 mm	5.00 mm
11.6540.0590	125.00 mm	135.00 mm	7.20 mm	6.80 mm	5.00 mm
11.6540.0595	125.00 mm	140.00 mm	12.00 mm	11.30 mm	5.00 mm
11.6540.0600	125.00 mm	145.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0605	127.00 mm	142.00 mm	12.00 mm	11.30 mm	5.00 mm

Item No.	Rod Ø d	Ground of the groove Ø D _{H11}	Groove width L _{±0.2}	Sealing height H	Chamfer a
11.6540.0610	128.00 mm	140.00 mm	10.60 mm	10.00 mm	5.00 mm
11.6540.0615	130.00 mm	145.00 mm	10.70 mm	10.00 mm	5.00 mm
11.6540.0620	135.00 mm	143.00 mm	14.00 mm	13.50 mm	5.00 mm
11.6540.0625	135.00 mm	150.00 mm	11.00 mm	10.00 mm	5.00 mm
11.6540.0630	135.00 mm	150.00 mm	12.50 mm	11.50 mm	5.00 mm
11.6540.0635	140.00 mm	150.00 mm	8.00 mm	7.50 mm	5.00 mm
11.6540.0640	140.00 mm	160.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0645	150.00 mm	170.00 mm	13.00 mm	12.00 mm	5.00 mm
11.6540.0650	150.00 mm	170.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0655	152.00 mm	167.00 mm	10.70 mm	10.00 mm	5.00 mm
11.6540.0660	160.00 mm	180.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0665	165.00 mm	185.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0670	170.00 mm	190.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0675	180.00 mm	200.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0680	185.00 mm	210.00 mm	20.00 mm	18.80 mm	5.00 mm
11.6540.0685	190.00 mm	210.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0690	200.00 mm	220.00 mm	16.00 mm	15.00 mm	5.00 mm
11.6540.0695	200.00 mm	225.00 mm	16.00 mm	15.00 mm	7.50 mm
11.6540.0700	210.00 mm	237.00 mm	19.70 mm	18.50 mm	7.50 mm
11.6540.0705	215.00 mm	240.00 mm	20.00 mm	18.80 mm	7.50 mm
11.6540.0710	220.00 mm	250.00 mm	25.50 mm	24.00 mm	7.50 mm
11.6540.0715	240.00 mm	270.00 mm	24.00 mm	22.50 mm	7.50 mm
11.6540.0720	245.00 mm	270.00 mm	19.70 mm	18.50 mm	7.50 mm
11.6540.0725	260.00 mm	280.00 mm	16.00 mm	15.00 mm	7.50 mm
11.6540.0730	265.00 mm	290.00 mm	20.00 mm	18.80 mm	7.50 mm
11.6540.0735	270.00 mm	295.00 mm	21.20 mm	20.00 mm	7.50 mm
11.6540.0740	295.00 mm	315.00 mm	17.00 mm	16.00 mm	7.50 mm
11.6540.0745	300.00 mm	320.00 mm	16.00 mm	15.00 mm	7.50 mm

APSOseals® – Rod Seal RSP

Medium stability:	For use in processed, dried, or de-oiled compressed air
Product description:	Grooved ring with asymmetrical profile, sealing lip set back on inner diameter
Intended use:	rod seal with especially rounded sealing lip, low friction
Material:	TPU 90.447-01
Hardness:	90 ±5 Shore A
Pressure PN:	max. 2 MPa
Sliding speed:	max. 1 m/s
Working temperature:	-30 to +90 °C



Surface finish

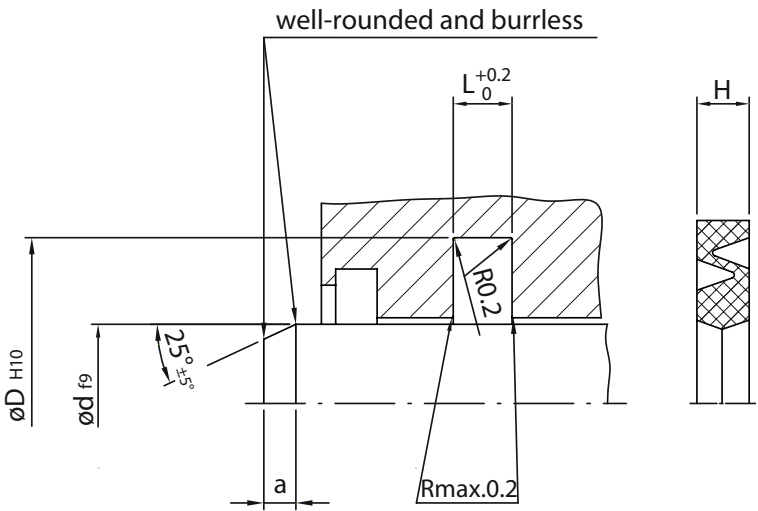
	Surface roughnessRoughness class			
	R _a µm	R _t µm	R _z µm	
Sliding surface	≤ 0,3	≤ 2,5	≤ 1,25	N4/N5
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio t_p > 50 % to max. 75 % at 0,25 R_t

Item No.	Rod Ø d _{f9}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Sealing height H	Chamfer a
11.6532.0000	3.00 mm	6.00 mm	3.00 mm	2.50 mm	2.50 mm
11.6532.0005	4.00 mm	8.00 mm	3.50 mm	3.00 mm	2.50 mm
11.6532.0010	5.00 mm	9.00 mm	3.00 mm	2.50 mm	2.50 mm
11.6532.0015	6.00 mm	10.00 mm	3.50 mm	3.00 mm	2.50 mm
11.6532.0020	6.00 mm	11.00 mm	3.50 mm	3.00 mm	2.50 mm
11.6532.0025	6.00 mm	12.00 mm	4.50 mm	4.00 mm	2.50 mm
11.6532.0030	7.00 mm	13.00 mm	4.50 mm	4.00 mm	2.50 mm
11.6532.0035	7.00 mm	14.00 mm	4.00 mm	3.50 mm	2.50 mm
11.6532.0040	8.00 mm	14.00 mm	4.50 mm	4.00 mm	2.50 mm
11.6532.0045	8.00 mm	14.00 mm	5.00 mm	4.50 mm	2.50 mm
11.6532.0050	8.00 mm	16.00 mm	5.00 mm	4.50 mm	2.50 mm
11.6532.0055	10.00 mm	16.00 mm	5.00 mm	4.50 mm	2.50 mm
11.6532.0060	10.00 mm	18.00 mm	6.00 mm	5.50 mm	2.50 mm
11.6532.0065	11.00 mm	19.00 mm	4.50 mm	4.00 mm	2.50 mm
11.6532.0070	12.00 mm	20.00 mm	6.00 mm	5.50 mm	2.50 mm
11.6532.0075	12.00 mm	24.00 mm	6.50 mm	6.00 mm	2.50 mm
11.6532.0080	14.00 mm	22.00 mm	6.00 mm	5.50 mm	2.50 mm
11.6532.0085	16.00 mm	22.00 mm	3.50 mm	3.00 mm	2.50 mm
11.6532.0090	16.00 mm	24.00 mm	6.00 mm	5.50 mm	2.50 mm
11.6532.0095	18.00 mm	26.00 mm	6.00 mm	5.50 mm	2.50 mm
11.6532.0100	20.00 mm	28.00 mm	6.00 mm	5.50 mm	2.50 mm
11.6532.0105	22.00 mm	28.00 mm	5.00 mm	4.50 mm	2.50 mm
11.6532.0110	22.00 mm	30.00 mm	6.00 mm	5.50 mm	2.50 mm
11.6532.0115	25.00 mm	33.00 mm	6.00 mm	5.50 mm	3.00 mm
11.6532.0120	28.00 mm	36.00 mm	6.00 mm	5.50 mm	3.00 mm
11.6532.0125	28.00 mm	38.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0130	30.00 mm	38.00 mm	6.00 mm	5.50 mm	3.00 mm
11.6532.0135	30.00 mm	40.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0140	32.00 mm	40.00 mm	6.00 mm	5.50 mm	3.00 mm
11.6532.0145	35.00 mm	43.00 mm	8.50 mm	8.00 mm	3.00 mm
11.6532.0150	35.00 mm	45.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0155	35.00 mm	45.00 mm	10.50 mm	10.00 mm	3.00 mm
11.6532.0160	36.00 mm	46.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0165	40.00 mm	48.00 mm	6.00 mm	5.50 mm	3.00 mm
11.6532.0170	40.00 mm	50.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0175	45.00 mm	55.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0180	50.00 mm	60.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0185	55.00 mm	65.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0190	56.00 mm	66.00 mm	7.50 mm	7.00 mm	3.00 mm
11.6532.0195	60.00 mm	72.00 mm	9.50 mm	8.50 mm	3.00 mm
11.6532.0200	63.00 mm	73.00 mm	7.50 mm	7.00 mm	4.00 mm
11.6532.0205	63.00 mm	75.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0210	65.00 mm	77.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0215	70.00 mm	82.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0220	75.00 mm	87.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0225	80.00 mm	92.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0230	85.00 mm	97.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0235	90.00 mm	102.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0240	95.00 mm	107.00 mm	9.50 mm	8.50 mm	4.00 mm
11.6532.0245	100.00 mm	115.00 mm	11.00 mm	10.00 mm	4.00 mm

APSOseals® – Rod Seal SRS/N

Medium stability:	For use in processed, dried, or de-oiled compressed air
Product description:	Pneumatic compact seal with Z-shaped design
Intended use:	Double-acting rod seal, good seal tightness with low friction
Material:	NBR 80.447-01
Hardness:	80 ±5 Shore A
Pressure PN:	max. 1,2 MPa
Sliding speed:	max. 1 m/s
Working temperature:	-30 to +100 °C



Surface finish

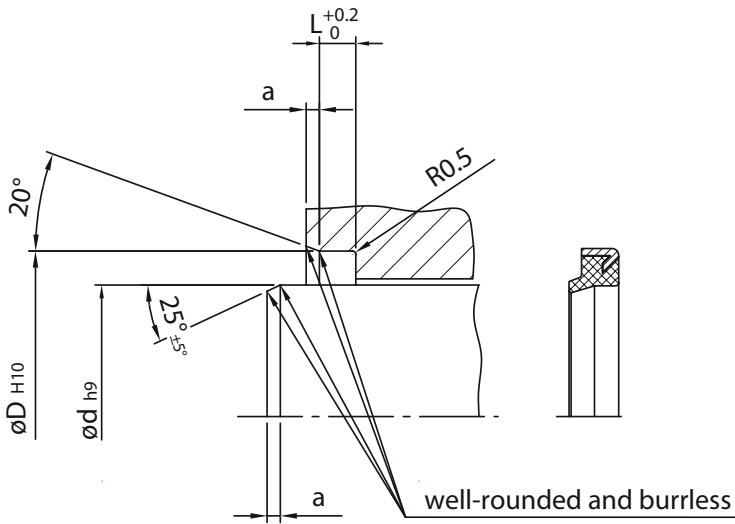
	Surface roughnessRoughness class			
	R_a μm	R_t μm	R_z μm	
Sliding surface	$\leq 0,3$	$\leq 2,5$	$\leq 1,25$	N4/N5
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

Profile bearing length ratio $t_p > 50\%$ to max. 75 % at 0,25 R_t

Item No.	Rod $\varnothing$ d_{f9}	Ground of the groove $\varnothing$ D_{H10}	Groove width $L_{+0.2}$	Sealing height H	Chamfer a
11.6534.0000	6.00 mm	13.00 mm	2.50 mm	2.30 mm	1.50 mm
11.6534.0005	8.00 mm	15.00 mm	2.50 mm	2.30 mm	1.50 mm
11.6534.0010	10.00 mm	17.00 mm	2.50 mm	2.30 mm	1.50 mm
11.6534.0015	12.00 mm	19.00 mm	2.50 mm	2.30 mm	1.50 mm
11.6534.0020	14.00 mm	21.00 mm	2.50 mm	2.30 mm	1.50 mm
11.6534.0025	15.00 mm	22.00 mm	2.50 mm	2.30 mm	1.50 mm
11.6534.0030	16.00 mm	25.00 mm	3.00 mm	2.80 mm	1.50 mm
11.6534.0035	20.00 mm	29.00 mm	3.00 mm	2.80 mm	2.50 mm
11.6534.0040	25.00 mm	34.00 mm	3.00 mm	2.80 mm	2.50 mm
11.6534.0045	30.00 mm	39.00 mm	3.00 mm	2.80 mm	2.50 mm
11.6534.0050	40.00 mm	49.00 mm	3.00 mm	2.80 mm	2.50 mm
11.6534.0055	42.00 mm	51.00 mm	3.00 mm	2.80 mm	2.50 mm
11.6534.0060	50.00 mm	59.00 mm	3.00 mm	2.80 mm	2.50 mm

APSOseals® – Wiper Seal WSG

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	dirt scraper with external metal cage and fixed seat installation space (press fit)
Intended use:	single-acting scraper for recessed grooves
Execution:	With metal cage
Material:	TPU 94.447-02
Hardness:	94 ±2 Shore A
Sliding speed:	max. 0,8 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



Surface finish

	Surface roughnessRoughness class			
	R _a µm	R _t µm	R _z µm	
Sliding surface	*	*	*	*
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

* The surface roughness and carrying component of the sliding surface must be assigned to the rod seal used.

Working temperature:

- hydraulic oils HL, HLP: –30 to +110 °C
- HFA, HFB fluids: +5 to +50 °C
- HFC fluids: –30 to +40 °C
- water: +5 to +50 °C
- HETG (colza oils): –30 to +60 °C
- HEES (synth. ester): –30 to +80 °C
- HEPG (glycols): –30 to +50 °C
- mineral-based greases: –30 to +110 °C

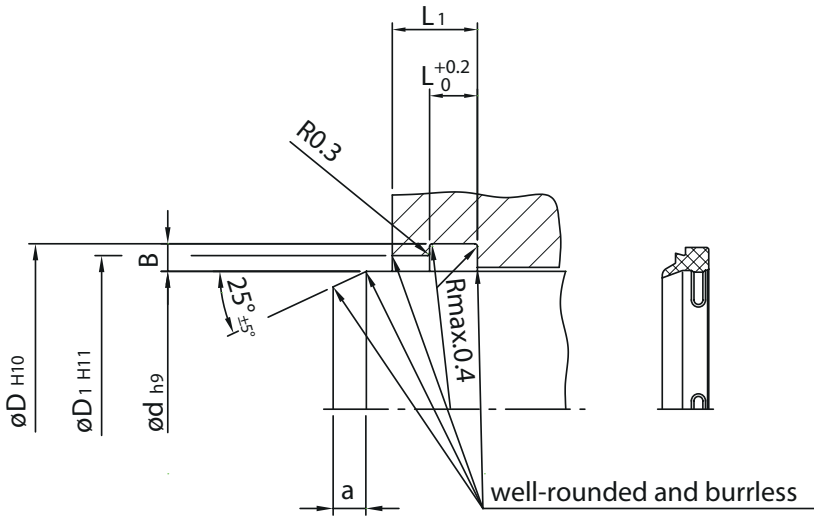
Application is not provided for:

- HFD fluids

Item No.	Rod Ø d _{h9}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Chamfer a	Norm
11.6572.0000	20.00 mm	30.00 mm	4.00 mm	0.80 mm	
11.6572.0005	20.00 mm	30.00 mm	5.00 mm	1.00 mm	
11.6572.0010	20.00 mm	30.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0015	22.00 mm	30.00 mm	4.00 mm	0.80 mm	
11.6572.0020	22.00 mm	32.00 mm	5.00 mm	1.00 mm	
11.6572.0025	22.00 mm	32.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0030	25.00 mm	35.00 mm	5.00 mm	1.50 mm	
11.6572.0035	25.00 mm	35.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0040	28.00 mm	38.00 mm	5.00 mm	1.00 mm	
11.6572.0045	28.00 mm	38.00 mm	7.00 mm	1.50 mm	
11.6572.0050	30.00 mm	40.00 mm	5.00 mm	1.00 mm	
11.6572.0055	30.00 mm	40.00 mm	7.00 mm	1.50 mm	
11.6572.0060	32.00 mm	42.00 mm	5.00 mm	1.00 mm	
11.6572.0065	32.00 mm	42.00 mm	7.00 mm	1.50 mm	
11.6572.0070	35.00 mm	45.00 mm	5.00 mm	1.00 mm	
11.6572.0075	35.00 mm	45.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0080	36.00 mm	46.00 mm	5.00 mm	1.00 mm	
11.6572.0085	38.00 mm	48.00 mm	7.00 mm	1.00 mm	
11.6572.0090	40.00 mm	50.00 mm	5.00 mm	1.00 mm	
11.6572.0095	40.00 mm	50.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0100	42.00 mm	52.00 mm	7.00 mm	1.50 mm	
11.6572.0105	45.00 mm	55.00 mm	7.00 mm	1.50 mm	
11.6572.0110	50.00 mm	60.00 mm	5.00 mm	1.00 mm	
11.6572.0115	50.00 mm	60.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0120	55.00 mm	65.00 mm	7.00 mm	1.50 mm	
11.6572.0125	56.00 mm	66.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0130	60.00 mm	70.00 mm	5.00 mm	1.00 mm	
11.6572.0135	60.00 mm	70.00 mm	7.00 mm	1.50 mm	
11.6572.0140	65.00 mm	75.00 mm	7.00 mm	1.50 mm	
11.6572.0145	70.00 mm	80.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0150	75.00 mm	85.00 mm	7.00 mm	1.50 mm	
11.6572.0155	80.00 mm	90.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0160	85.00 mm	95.00 mm	7.00 mm	1.50 mm	
11.6572.0165	90.00 mm	100.00 mm	7.00 mm	1.50 mm	As per ISO 3320
11.6572.0170	95.00 mm	105.00 mm	7.00 mm	1.50 mm	
11.6572.0175	100.00 mm	110.00 mm	7.00 mm	1.50 mm	
11.6572.0180	110.00 mm	120.00 mm	7.00 mm	1.50 mm	
11.6572.0185	120.00 mm	130.00 mm	7.00 mm	1.50 mm	

APSOseals® – Wiper Seal WWS

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Dirt scraper with static sealing edge on outer diameter and support segments
Intended use:	Single-acting scraper for recessed grooves
Material:	rod-Ø 6 to 35 mm: TPU 90.447-01; rod-Ø from 36 mm: TPU 93.447-01
Colour:	rod-Ø 6 to 35 mm: grey; rod-Ø from 36 mm: violet
Hardness:	rod-Ø 6 to 35 mm: 90 ±5 Shore A; rod-Ø from 36 mm: 93 ±5 Shore A
Sliding speed:	max. 1 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



Surface finish

	Surface roughnessRoughness class			
	R_a μm	R_t μm	R_z μm	
Sliding surface	*	*	*	*
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

*The surface roughness and carrying component of the sliding surface must be assigned to the rod seal used.

Working temperature:

- hydraulic oils HL, HLP: –30 to +110 °C
- HFA, HFB fluids: +5 to +50 °C
- HFC fluids: –30 to +40 °C
- water: +5 to +50 °C
- HETG (colza oils): –30 to +60 °C
- HEES (synth. ester): –30 to +80 °C
- HEPG (glycols): –30 to +50 °C
- mineral-based greases: –30 to +110 °C

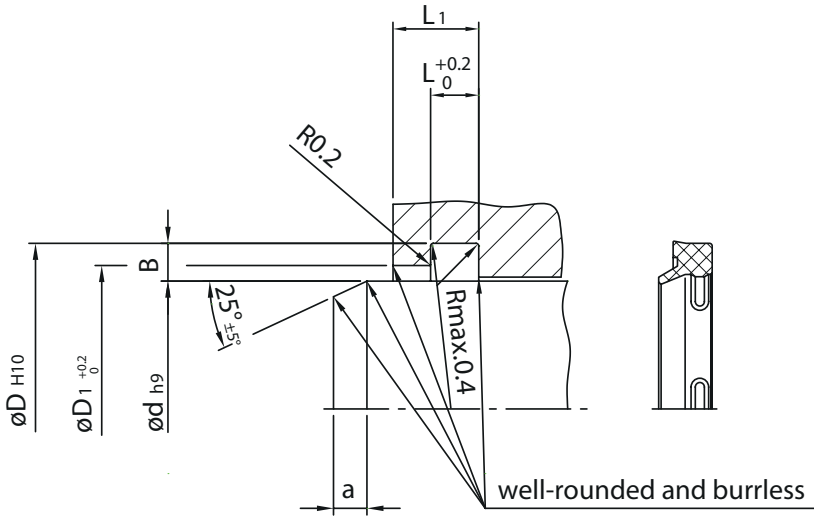
Application is not provided for:

- HFD fluids

Item No.	Rod $\varnothing$ d_{H9}	Ground of the groove $\varnothing$ D_{H10}	Groove width $L_{+0.2}$	$\varnothing D_{1H11}$	L1	Chamfer a	Norm
11.6570.0000	6.00 mm	10.00 mm	2.00 mm	9.00 mm	3.00 mm	2.50 mm	As per ISO 3320
11.6570.0005	8.00 mm	14.00 mm	2.60 mm	12.00 mm	4.00 mm	2.50 mm	As per ISO 3320
11.6570.0010	10.00 mm	16.00 mm	2.60 mm	14.00 mm	4.00 mm	2.50 mm	As per ISO 3320
11.6570.0015	10.00 mm	18.00 mm	4.00 mm	16.00 mm	5.00 mm	2.50 mm	As per ISO 3320
11.6570.0020	12.00 mm	18.00 mm	2.60 mm	16.00 mm	4.00 mm	2.50 mm	As per ISO 3320
11.6570.0025	12.00 mm	20.00 mm	4.00 mm	18.00 mm	5.00 mm	2.50 mm	As per ISO 3320
11.6570.0030	14.00 mm	20.00 mm	2.60 mm	18.00 mm	4.00 mm	2.50 mm	As per ISO 3320
11.6570.0035	14.00 mm	22.00 mm	4.00 mm	20.00 mm	5.00 mm	2.50 mm	As per ISO 3320
11.6570.0040	15.00 mm	23.00 mm	4.00 mm	21.00 mm	5.00 mm	2.50 mm	
11.6570.0045	16.00 mm	24.00 mm	4.00 mm	22.00 mm	5.00 mm	2.50 mm	As per ISO 3320
11.6570.0050	18.00 mm	26.00 mm	4.00 mm	24.00 mm	5.00 mm	2.50 mm	As per ISO 3320
11.6570.0055	20.00 mm	28.00 mm	4.00 mm	26.00 mm	5.00 mm	2.50 mm	As per ISO 3320
11.6570.0060	22.00 mm	30.00 mm	4.00 mm	28.00 mm	5.00 mm	2.50 mm	As per ISO 3320
11.6570.0065	24.00 mm	32.00 mm	4.00 mm	30.00 mm	5.00 mm	2.50 mm	
11.6570.0070	25.00 mm	33.00 mm	4.00 mm	31.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0075	28.00 mm	36.00 mm	4.00 mm	34.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0080	30.00 mm	38.00 mm	4.00 mm	36.00 mm	5.00 mm	3.00 mm	
11.6570.0085	32.00 mm	40.00 mm	4.00 mm	38.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0090	34.00 mm	42.00 mm	4.00 mm	40.00 mm	5.00 mm	3.00 mm	
11.6570.0095	35.00 mm	43.00 mm	4.00 mm	41.00 mm	5.00 mm	3.00 mm	
11.6570.0100	36.00 mm	44.00 mm	4.00 mm	42.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0105	38.00 mm	46.00 mm	4.00 mm	44.00 mm	5.00 mm	3.00 mm	
11.6570.0110	40.00 mm	48.00 mm	4.00 mm	46.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0115	42.00 mm	50.00 mm	4.00 mm	48.00 mm	5.00 mm	3.00 mm	
11.6570.0120	45.00 mm	53.00 mm	4.00 mm	51.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0125	50.00 mm	58.00 mm	4.00 mm	56.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0130	52.00 mm	60.00 mm	4.00 mm	58.00 mm	5.00 mm	3.00 mm	
11.6570.0135	55.00 mm	63.00 mm	4.00 mm	61.00 mm	5.00 mm	3.00 mm	
11.6570.0140	56.00 mm	64.00 mm	4.00 mm	62.00 mm	5.00 mm	3.00 mm	As per ISO 3320
11.6570.0145	60.00 mm	68.00 mm	4.00 mm	66.00 mm	5.00 mm	3.00 mm	
11.6570.0150	63.00 mm	71.00 mm	4.00 mm	69.00 mm	5.00 mm	4.00 mm	As per ISO 3320
11.6570.0155	63.50 mm	71.50 mm	4.00 mm	69.50 mm	5.00 mm	4.00 mm	
11.6570.0160	65.00 mm	73.00 mm	4.00 mm	71.00 mm	5.00 mm	4.00 mm	
11.6570.0165	70.00 mm	78.00 mm	4.00 mm	76.00 mm	5.00 mm	4.00 mm	As per ISO 3320
11.6570.0170	75.00 mm	83.00 mm	4.00 mm	81.00 mm	5.00 mm	4.00 mm	
11.6570.0175	80.00 mm	88.00 mm	4.00 mm	86.00 mm	5.00 mm	4.00 mm	As per ISO 3320
11.6570.0180	85.00 mm	93.00 mm	4.00 mm	91.00 mm	5.00 mm	4.00 mm	
11.6570.0185	90.00 mm	98.00 mm	4.00 mm	96.00 mm	5.00 mm	4.00 mm	As per ISO 3320
11.6570.0190	100.00 mm	108.00 mm	4.00 mm	106.00 mm	5.00 mm	4.00 mm	As per ISO 3320
11.6570.0195	110.00 mm	122.00 mm	5.50 mm	119.00 mm	7.00 mm	5.00 mm	
11.6570.0200	120.00 mm	132.00 mm	5.50 mm	129.00 mm	7.00 mm	5.00 mm	
11.6570.0205	125.00 mm	137.00 mm	5.50 mm	134.00 mm	7.00 mm	5.00 mm	As per ISO 3320
11.6570.0210	140.00 mm	152.00 mm	5.50 mm	149.00 mm	7.00 mm	5.00 mm	As per ISO 3320
11.6570.0215	150.00 mm	162.00 mm	5.50 mm	159.00 mm	7.00 mm	5.00 mm	
11.6570.0220	160.00 mm	172.00 mm	5.50 mm	169.00 mm	7.00 mm	5.00 mm	As per ISO 3320
11.6570.0225	180.00 mm	192.00 mm	5.50 mm	189.00 mm	7.00 mm	5.00 mm	As per ISO 3320

APSOseals® – Wiper Seal WSL

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Dirt scraper with static sealing edge on outer diameter and support segments
Intended use:	Single-acting scraper for recessed grooves
Material:	TPU 93.447-01
Hardness:	93 ±2 Shore A
Sliding speed:	max. 1 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



	Surface roughnessRoughness class			
	R_a μm	R_t μm	R_z μm	
Sliding surface	*	*	*	
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove edges	≤ 3	≤ 15	≤ 10	N8

*The surface roughness and carrying component of the sliding surface must be assigned to the rod seal used.

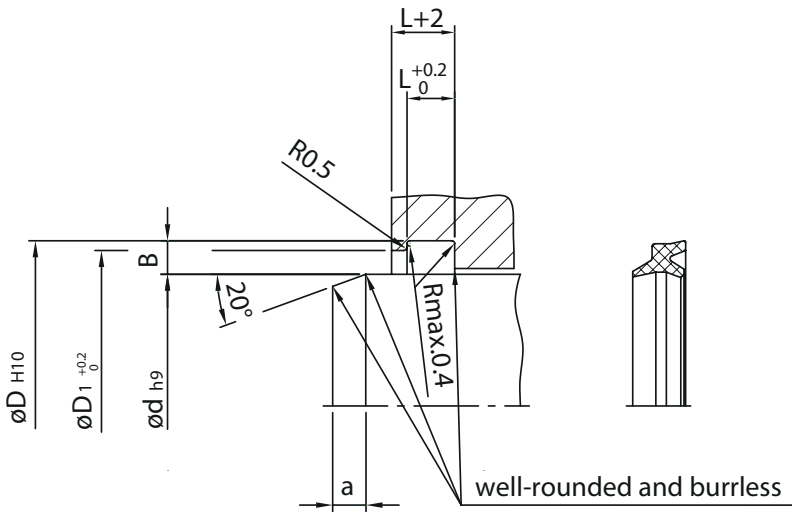
- Working temperature:**
- hydraulic oils HL, HLP: –30 to +110 °C
 - HFA, HFB fluids: +5 to +50 °C
 - HFC fluids: –30 to +40 °C
 - water: +5 to +50 °C
 - HETG (colza oils): –30 to +60 °C
 - HEES (synth. ester): –30 to +80 °C
 - HEPG (glycols): –30 to +50 °C
 - mineral-based greases: –30 to +110 °C
- Application is not provided for:
- HFD fluids

Item No.	Rod $\varnothing$ d_{h9}	Ground of the groove $\varnothing$ D_{H10}	Groove width $L_{+0.2}$	L_1	$\varnothing D_{1+0.2}$	Chamfer a
11.6571.0000	5.00 mm	12.00 mm	2.80 mm	4.00 mm	8.00 mm	2.50 mm
11.6571.0005	6.00 mm	12.00 mm	3.00 mm	4.00 mm	9.00 mm	2.50 mm
11.6571.0010	8.00 mm	14.60 mm	3.80 mm	5.00 mm	11.00 mm	2.50 mm
11.6571.0015	10.00 mm	15.00 mm	1.00 mm	3.00 mm	13.00 mm	2.50 mm
11.6571.0020	10.00 mm	16.60 mm	3.80 mm	5.00 mm	13.00 mm	2.50 mm
11.6571.0025	12.00 mm	18.60 mm	3.80 mm	5.00 mm	15.00 mm	2.50 mm
11.6571.0030	13.00 mm	19.60 mm	3.80 mm	5.00 mm	16.00 mm	2.50 mm
11.6571.0035	14.00 mm	20.60 mm	3.80 mm	5.00 mm	17.00 mm	2.50 mm
11.6571.0040	15.00 mm	21.60 mm	3.80 mm	5.00 mm	18.00 mm	2.50 mm
11.6571.0045	16.00 mm	22.60 mm	3.80 mm	5.00 mm	19.00 mm	2.50 mm
11.6571.0050	18.00 mm	24.60 mm	3.80 mm	5.00 mm	21.00 mm	2.50 mm
11.6571.0055	20.00 mm	28.60 mm	5.30 mm	7.00 mm	23.00 mm	2.50 mm
11.6571.0060	22.00 mm	30.60 mm	5.30 mm	7.00 mm	25.00 mm	2.50 mm
11.6571.0065	24.00 mm	32.60 mm	5.30 mm	7.00 mm	27.00 mm	2.50 mm
11.6571.0070	25.00 mm	33.60 mm	5.30 mm	7.00 mm	28.00 mm	3.00 mm
11.6571.0075	28.00 mm	36.60 mm	5.30 mm	7.00 mm	31.00 mm	3.00 mm
11.6571.0080	30.00 mm	38.00 mm	5.30 mm	7.00 mm	33.00 mm	3.00 mm
11.6571.0085	30.00 mm	38.60 mm	5.30 mm	7.00 mm	33.00 mm	3.00 mm
11.6571.0090	32.00 mm	40.60 mm	5.30 mm	7.00 mm	35.00 mm	3.00 mm
11.6571.0095	35.00 mm	43.60 mm	5.30 mm	7.00 mm	38.00 mm	3.00 mm
11.6571.0100	36.00 mm	44.60 mm	5.30 mm	7.00 mm	39.00 mm	3.00 mm
11.6571.0105	38.00 mm	46.60 mm	5.30 mm	7.00 mm	41.00 mm	3.00 mm
11.6571.0110	40.00 mm	48.60 mm	5.30 mm	7.00 mm	43.00 mm	3.00 mm
11.6571.0115	45.00 mm	53.60 mm	5.30 mm	7.00 mm	48.00 mm	3.00 mm
11.6571.0120	46.00 mm	54.60 mm	5.30 mm	7.00 mm	49.00 mm	3.00 mm
11.6571.0125	50.00 mm	58.00 mm	5.30 mm	7.00 mm	53.00 mm	3.00 mm
11.6571.0130	50.00 mm	58.60 mm	5.30 mm	7.00 mm	53.00 mm	3.00 mm
11.6571.0135	55.00 mm	63.60 mm	5.30 mm	7.00 mm	58.00 mm	3.00 mm
11.6571.0140	55.00 mm	65.60 mm	5.30 mm	7.00 mm	58.00 mm	3.00 mm
11.6571.0145	56.00 mm	64.60 mm	5.30 mm	7.00 mm	59.00 mm	3.00 mm
11.6571.0150	60.00 mm	68.00 mm	5.30 mm	7.00 mm	63.00 mm	3.00 mm
11.6571.0155	60.00 mm	68.60 mm	5.30 mm	7.00 mm	63.00 mm	4.00 mm
11.6571.0160	60.00 mm	70.00 mm	5.00 mm	7.00 mm	63.00 mm	4.00 mm
11.6571.0165	61.00 mm	69.60 mm	5.30 mm	7.00 mm	64.00 mm	4.00 mm
11.6571.0170	63.00 mm	71.60 mm	5.30 mm	7.00 mm	66.00 mm	4.00 mm
11.6571.0175	65.00 mm	73.60 mm	5.30 mm	7.00 mm	68.00 mm	4.00 mm
11.6571.0180	70.00 mm	78.60 mm	5.30 mm	7.00 mm	73.00 mm	4.00 mm
11.6571.0185	70.00 mm	80.00 mm	5.00 mm	7.00 mm	73.00 mm	4.00 mm
11.6571.0190	70.00 mm	82.20 mm	7.10 mm	8.50 mm	76.00 mm	4.00 mm
11.6571.0195	70.00 mm	82.60 mm	7.10 mm	8.50 mm	76.00 mm	4.00 mm
11.6571.0200	75.00 mm	83.60 mm	5.30 mm	7.00 mm	78.00 mm	4.00 mm
11.6571.0205	75.00 mm	87.20 mm	7.10 mm	8.50 mm	81.00 mm	4.00 mm
11.6571.0210	76.00 mm	84.60 mm	5.30 mm	7.00 mm	79.00 mm	4.00 mm
11.6571.0215	80.00 mm	88.60 mm	5.30 mm	7.00 mm	83.00 mm	4.00 mm
11.6571.0220	80.00 mm	90.20 mm	7.10 mm	8.50 mm	83.00 mm	4.00 mm
11.6571.0225	80.00 mm	92.60 mm	7.10 mm	8.50 mm	83.00 mm	4.00 mm
11.6571.0230	85.00 mm	93.60 mm	5.30 mm	7.00 mm	88.00 mm	4.00 mm
11.6571.0235	85.00 mm	97.20 mm	7.10 mm	8.50 mm	91.00 mm	4.00 mm
11.6571.0240	90.00 mm	102.20 mm	7.10 mm	8.50 mm	96.00 mm	4.00 mm
11.6571.0245	91.00 mm	99.60 mm	5.30 mm	7.00 mm	94.00 mm	4.00 mm
11.6571.0250	95.00 mm	107.20 mm	7.10 mm	8.50 mm	101.00 mm	4.00 mm
11.6571.0255	100.00 mm	108.60 mm	5.30 mm	7.00 mm	103.00 mm	4.00 mm
11.6571.0260	100.00 mm	112.20 mm	7.10 mm	8.50 mm	106.00 mm	5.00 mm
11.6571.0265	105.00 mm	113.60 mm	5.30 mm	7.00 mm	108.00 mm	5.00 mm
11.6571.0270	105.00 mm	117.20 mm	7.10 mm	8.50 mm	111.00 mm	5.00 mm
11.6571.0275	107.00 mm	115.60 mm	5.30 mm	7.00 mm	110.00 mm	5.00 mm
11.6571.0280	110.00 mm	118.60 mm	5.30 mm	7.00 mm	113.00 mm	5.00 mm
11.6571.0285	110.00 mm	122.20 mm	7.10 mm	8.50 mm	116.00 mm	5.00 mm
11.6571.0290	115.00 mm	127.20 mm	7.10 mm	8.50 mm	121.00 mm	5.00 mm
11.6571.0295	120.00 mm	132.20 mm	7.10 mm	8.50 mm	126.00 mm	5.00 mm
11.6571.0300	125.00 mm	137.20 mm	7.10 mm	8.50 mm	131.00 mm	5.00 mm

Item No.	Rod Ø d_{h9}	Ground of the groove Ø D_{H10}	Groove width $L_{+0.2}$	L_1	Ø $D_{1+0.2}$	Chamfer a
11.6571.0305	126.00 mm	134.60 mm	5.30 mm	7.00 mm	129.00 mm	5.00 mm
11.6571.0310	130.00 mm	142.20 mm	7.10 mm	8.50 mm	136.00 mm	5.00 mm
11.6571.0315	135.00 mm	147.20 mm	7.10 mm	8.50 mm	141.00 mm	5.00 mm
11.6571.0320	140.00 mm	152.20 mm	7.10 mm	8.50 mm	146.00 mm	5.00 mm
11.6571.0325	140.00 mm	155.00 mm	9.00 mm	14.00 mm	146.50 mm	5.00 mm
11.6571.0330	145.00 mm	157.20 mm	7.10 mm	8.50 mm	151.00 mm	5.00 mm
11.6571.0335	150.00 mm	162.20 mm	7.10 mm	8.50 mm	156.00 mm	5.00 mm
11.6571.0340	160.00 mm	172.20 mm	7.10 mm	8.50 mm	166.00 mm	5.00 mm
11.6571.0345	160.00 mm	175.20 mm	10.10 mm	11.50 mm	168.00 mm	5.00 mm
11.6571.0350	170.00 mm	185.20 mm	10.10 mm	11.50 mm	178.00 mm	5.00 mm
11.6571.0355	180.00 mm	195.20 mm	10.10 mm	11.50 mm	188.00 mm	5.00 mm
11.6571.0360	180.00 mm	200.20 mm	10.20 mm	11.50 mm	183.00 mm	6.00 mm
11.6571.0365	190.00 mm	205.20 mm	10.10 mm	11.50 mm	198.00 mm	6.00 mm
11.6571.0370	200.00 mm	215.20 mm	10.10 mm	11.50 mm	208.00 mm	6.00 mm
11.6571.0375	210.00 mm	225.20 mm	10.10 mm	11.50 mm	218.00 mm	6.00 mm
11.6571.0380	220.00 mm	235.20 mm	10.10 mm	11.50 mm	228.00 mm	6.00 mm
11.6571.0385	230.00 mm	245.20 mm	10.10 mm	11.50 mm	238.00 mm	6.00 mm
11.6571.0390	240.00 mm	255.20 mm	10.10 mm	11.50 mm	248.00 mm	6.00 mm
11.6571.0395	250.00 mm	265.20 mm	10.10 mm	11.50 mm	258.00 mm	6.00 mm

APSOseals® – Wiper Seal WED

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB)
Product description:	Double scraper for sealing and scraping lip
Intended use:	Double-acting scraper for recessed grooves
Material:	TPU 93.447-01
Hardness:	93 ±2 Shore A
Pressure PN:	max. 2 MPa
Sliding speed:	max. 1,0 m/s
Working temperature:	-35 to +110 °C; HFA-, HFB-fluids +5 to +50 °C



Surface finish

	Surface roughnessRoughness class			
	R _a µm	R _t µm	R _z µm	
Sliding surface	*	*	*	*
Groove base	≤ 1,6	≤ 6,3	≤ 6,3	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

* The surface roughness and carrying component of the sliding surface must be assigned to the rod seal used.

Working temperature:

- hydraulic oils HL, HLP: –30 to +100 °C
- HFA, HFB fluids: +5 to +60 °C
- HFC fluids: –30 to +60 °C
- water: +5 to +100 °C
- HETG (colza oils): –30 to +80 °C
- HEES (synth. ester): –30 to +80 °C
- HEPG (glycols): –30 to +60 °C
- mineral-based greases: –30 to +100 °C

Application is not provided for:

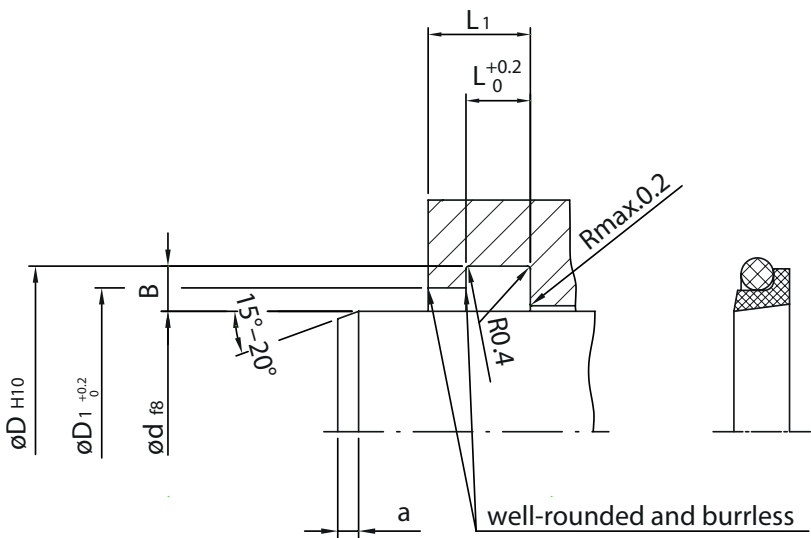
- HFD fluids

Item No.	Rod Ø d _{h9}	Ground of the groove Ø D _{H10}	Groove width L _{+0.2}	Ø D _{1+0.2}	Chamfer a	Norm
11.6573.0000	6.00 mm	11.00 mm	3.50 mm	8.50 mm	3.50 mm	
11.6573.0005	8.00 mm	13.00 mm	3.50 mm	10.50 mm	3.50 mm	
11.6573.0010	10.00 mm	16.00 mm	4.00 mm	13.00 mm	3.50 mm	
11.6573.0015	12.00 mm	18.00 mm	4.00 mm	14.50 mm	3.50 mm	As per ISO 6195
11.6573.0020	12.00 mm	18.60 mm	3.80 mm	15.00 mm	3.50 mm	
11.6573.0025	14.00 mm	20.00 mm	4.00 mm	16.50 mm	3.50 mm	As per ISO 6195
11.6573.0030	14.00 mm	20.60 mm	3.80 mm	17.00 mm	3.50 mm	
11.6573.0035	16.00 mm	22.00 mm	4.00 mm	18.50 mm	3.50 mm	
11.6573.0040	18.00 mm	24.00 mm	4.00 mm	20.50 mm	3.50 mm	As per ISO 6195
11.6573.0045	18.00 mm	24.60 mm	3.80 mm	21.00 mm	3.50 mm	
11.6573.0050	20.00 mm	26.00 mm	4.00 mm	22.50 mm	3.50 mm	
11.6573.0055	20.00 mm	28.60 mm	5.30 mm	23.00 mm	3.50 mm	
11.6573.0060	22.00 mm	28.00 mm	4.00 mm	24.50 mm	3.50 mm	As per ISO 6195
11.6573.0065	22.00 mm	30.60 mm	5.30 mm	25.00 mm	3.50 mm	
11.6573.0070	24.00 mm	32.60 mm	5.30 mm	27.00 mm	3.50 mm	
11.6573.0075	25.00 mm	31.00 mm	4.00 mm	27.50 mm	3.50 mm	
11.6573.0080	25.00 mm	33.60 mm	5.30 mm	28.00 mm	3.50 mm	
11.6573.0085	28.00 mm	36.00 mm	5.00 mm	31.00 mm	3.50 mm	As per ISO 6195
11.6573.0090	28.00 mm	36.60 mm	5.30 mm	31.00 mm	3.50 mm	
11.6573.0095	30.00 mm	38.00 mm	5.00 mm	33.00 mm	3.50 mm	
11.6573.0100	30.00 mm	38.60 mm	5.30 mm	33.00 mm	3.50 mm	
11.6573.0105	32.00 mm	40.00 mm	5.00 mm	35.00 mm	3.50 mm	
11.6573.0110	32.00 mm	40.60 mm	5.30 mm	35.00 mm	3.50 mm	
11.6573.0115	35.00 mm	43.00 mm	5.00 mm	38.00 mm	3.50 mm	
11.6573.0120	35.00 mm	43.60 mm	5.30 mm	38.00 mm	3.50 mm	
11.6573.0125	35.00 mm	45.00 mm	5.00 mm	38.00 mm	4.00 mm	
11.6573.0130	36.00 mm	44.00 mm	5.00 mm	39.00 mm	3.50 mm	As per ISO 6195
11.6573.0135	36.00 mm	44.60 mm	5.30 mm	39.00 mm	3.50 mm	
11.6573.0140	38.00 mm	46.00 mm	5.00 mm	41.00 mm	3.50 mm	
11.6573.0145	40.00 mm	48.00 mm	5.00 mm	43.00 mm	4.00 mm	
11.6573.0150	40.00 mm	48.60 mm	5.30 mm	43.00 mm	4.00 mm	
11.6573.0155	42.00 mm	50.00 mm	5.00 mm	45.00 mm	3.50 mm	
11.6573.0160	42.00 mm	50.00 mm	6.00 mm	45.00 mm	3.50 mm	
11.6573.0165	45.00 mm	53.00 mm	5.00 mm	48.00 mm	4.00 mm	As per ISO 6195
11.6573.0170	45.00 mm	53.60 mm	5.30 mm	48.00 mm	4.00 mm	
11.6573.0175	50.00 mm	58.00 mm	5.00 mm	53.00 mm	4.00 mm	
11.6573.0180	50.00 mm	58.60 mm	5.30 mm	53.00 mm	4.00 mm	
11.6573.0185	50.00 mm	60.00 mm	6.00 mm	53.00 mm	4.00 mm	
11.6573.0190	55.00 mm	63.60 mm	5.30 mm	58.00 mm	4.00 mm	
11.6573.0195	55.00 mm	65.00 mm	6.00 mm	58.00 mm	4.00 mm	
11.6573.0200	56.00 mm	64.60 mm	5.30 mm	59.00 mm	4.00 mm	
11.6573.0205	56.00 mm	66.00 mm	6.00 mm	59.00 mm	4.00 mm	As per ISO 6195
11.6573.0210	58.00 mm	68.00 mm	6.00 mm	61.00 mm	4.00 mm	
11.6573.0215	60.00 mm	68.60 mm	5.30 mm	63.00 mm	4.00 mm	
11.6573.0220	60.00 mm	70.00 mm	6.00 mm	63.00 mm	4.00 mm	
11.6573.0225	63.00 mm	71.60 mm	5.30 mm	66.00 mm	4.00 mm	
11.6573.0230	63.00 mm	73.00 mm	6.00 mm	66.00 mm	4.00 mm	
11.6573.0235	65.00 mm	73.60 mm	5.30 mm	68.00 mm	4.00 mm	
11.6573.0240	65.00 mm	75.00 mm	6.00 mm	68.00 mm	4.00 mm	
11.6573.0245	67.00 mm	77.00 mm	6.00 mm	70.00 mm	4.00 mm	
11.6573.0250	70.00 mm	78.60 mm	5.30 mm	73.00 mm	4.00 mm	
11.6573.0255	70.00 mm	80.00 mm	6.00 mm	73.00 mm	4.00 mm	As per ISO 6195
11.6573.0260	75.00 mm	83.60 mm	5.30 mm	78.00 mm	4.00 mm	
11.6573.0265	75.00 mm	85.00 mm	6.00 mm	78.00 mm	4.00 mm	
11.6573.0270	78.00 mm	88.00 mm	6.00 mm	81.00 mm	4.00 mm	
11.6573.0275	80.00 mm	88.60 mm	5.30 mm	83.00 mm	4.00 mm	
11.6573.0280	80.00 mm	90.00 mm	6.00 mm	83.00 mm	4.00 mm	
11.6573.0285	85.00 mm	93.60 mm	5.30 mm	88.00 mm	3.50 mm	
11.6573.0290	85.00 mm	95.00 mm	6.00 mm	88.00 mm	4.00 mm	

Item No.	Rod $\varnothing$ d_{h9}	Ground of the groove $\varnothing$ D_{H10}	Groove width $L_{+0,2}$	$\varnothing D_{1+0,2}$	Chamfer α	Norm
11.6573.0295	85.00 mm	97.20 mm	7.10 mm	91.00 mm	4.00 mm	
11.6573.0300	90.00 mm	100.00 mm	6.00 mm	93.00 mm	4.00 mm	As per ISO 6195
11.6573.0305	90.00 mm	102.20 mm	7.10 mm	96.00 mm	4.00 mm	
11.6573.0310	100.00 mm	110.00 mm	6.00 mm	103.00 mm	5.00 mm	
11.6573.0315	100.00 mm	112.20 mm	7.10 mm	106.00 mm	5.00 mm	
11.6573.0320	110.00 mm	122.20 mm	7.10 mm	116.60 mm	5.00 mm	
11.6573.0325	110.00 mm	125.00 mm	8.50 mm	114.00 mm	5.00 mm	As per ISO 6195
11.6573.0330	120.00 mm	135.00 mm	8.50 mm	124.00 mm	5.00 mm	
11.6573.0335	125.00 mm	140.00 mm	8.50 mm	129.00 mm	5.00 mm	
11.6573.0340	140.00 mm	155.00 mm	8.50 mm	144.00 mm	5.00 mm	As per ISO 6195
11.6573.0345	150.00 mm	165.00 mm	8.50 mm	154.00 mm	5.00 mm	
11.6573.0350	160.00 mm	175.00 mm	8.50 mm	164.00 mm	5.00 mm	
11.6573.0355	180.00 mm	195.00 mm	8.50 mm	184.00 mm	5.00 mm	

APSOseals® – Wiper Seal WES100

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils)
Product description:	Scraper consisting of a profile ring with an O-ring as the pre-stressing element
Intended use:	Single-acting scraper for recessed grooves
Material sealing element:	PTFE BC.429-01 (PTFE/bronze)
Material O-ring:	NBR
Hardness O-ring:	70 ±5 Shore A
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C °C
Attention:	Order O-ring separately
On request:	Further dimensions available



Surface finish

Surfaces	R_{max}	R_z	R_a
Rod diameter d	2,5 μm	1,6 μm	0,4 μm
Groove diameter D	10,0 μm	6,3 μm	1,6 μm
Groove flanks	16,0 μm	10,0 μm	3,2 μm

Recommended sizes for Installation

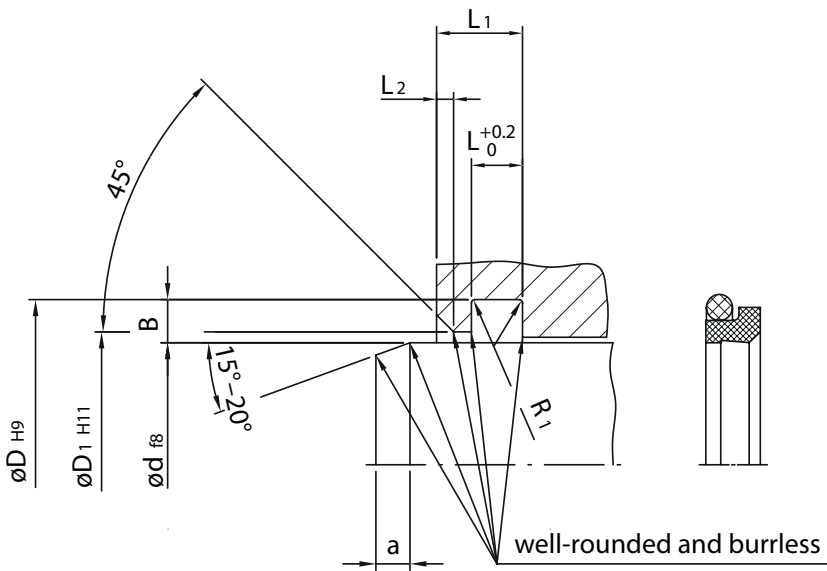
O-Ring Cord $\varnothing$	Recommended Diameter Standard	Groove Width	Groove Depth	chamfer	Housing Width
mm	d mm	L mm	B mm	a mm	L_1 mm
1,78	6 - 11,9	3,7	2,4	2,5	5,7
2,62	12 - 64,9	5,0	3,4	3,0	7,0
3,53	65 - 250,9	6,0	4,4	4,0	9,0
5,33	251 - 420,9	8,4	6,1	6,0	11,4
7,00	421 - 650,9	11,0	8,0	7,5	15,0
8,40	651 -	14,0	10,0	9,5	19,0

Item No.	Rod Ø d _{f8}	Ground of the groove Ø D _{H10}	Groove width L _{+0,2}	Ø D _{1+0,2}	Matching o-ring	Norm
11.6575.0000	4.00 mm	8.80 mm	3.70 mm	6.70 mm	OR 2025	
11.6575.0005	6.00 mm	10.80 mm	3.70 mm	8.70 mm	OR 2031	Rod Ø as per DIN ISO 3320
11.6575.0010	8.00 mm	12.80 mm	3.70 mm	10.70 mm	OR 2037	Rod Ø as per DIN ISO 3320
11.6575.0015	10.00 mm	14.80 mm	3.70 mm	12.70 mm	OR 2043	Rod Ø as per DIN ISO 3320
11.6575.0020	12.00 mm	18.80 mm	5.00 mm	15.50 mm	OR 3056	Rod Ø as per DIN ISO 3320
11.6575.0025	14.00 mm	20.80 mm	5.00 mm	17.50 mm	OR 3062	Rod Ø as per DIN ISO 3320
11.6575.0030	15.00 mm	21.80 mm	5.00 mm	18.50 mm	OR 3068	
11.6575.0035	16.00 mm	22.80 mm	5.00 mm	19.50 mm	OR 3075	Rod Ø as per DIN ISO 3320
11.6575.0040	18.00 mm	24.80 mm	5.00 mm	21.50 mm	OR 3081	Rod Ø as per DIN ISO 3320
11.6575.0045	20.00 mm	26.80 mm	5.00 mm	23.50 mm	OR 3087	Rod Ø as per DIN ISO 3320
11.6575.0050	22.00 mm	28.80 mm	5.00 mm	25.50 mm	OR 3093	Rod Ø as per DIN ISO 3320
11.6575.0055	24.00 mm	30.80 mm	5.00 mm	27.50 mm	OR 3100	
11.6575.0060	25.00 mm	31.80 mm	5.00 mm	28.50 mm	OR 3106	Rod Ø as per DIN ISO 3320
11.6575.0065	28.00 mm	34.80 mm	5.00 mm	31.50 mm	OR 3118	Rod Ø as per DIN ISO 3320
11.6575.0070	30.00 mm	36.80 mm	5.00 mm	33.50 mm	OR 3125	
11.6575.0075	32.00 mm	38.80 mm	5.00 mm	35.50 mm	OR 3131	Rod Ø as per DIN ISO 3320
11.6575.0080	35.00 mm	41.80 mm	5.00 mm	38.50 mm	OR 3143	
11.6575.0085	36.00 mm	42.80 mm	5.00 mm	39.50 mm	OR 3150	Rod Ø as per DIN ISO 3320
11.6575.0090	38.00 mm	44.80 mm	5.00 mm	41.50 mm	OR 3156	
11.6575.0095	40.00 mm	46.80 mm	5.00 mm	43.50 mm	OR 3162	Rod Ø as per DIN ISO 3320
11.6575.0100	45.00 mm	51.80 mm	5.00 mm	48.50 mm	OR 3187	Rod Ø as per DIN ISO 3320
11.6575.0105	48.00 mm	54.80 mm	5.00 mm	51.50 mm	OR 3200	
11.6575.0110	50.00 mm	56.80 mm	5.00 mm	53.50 mm	OR 3206	Rod Ø as per DIN ISO 3320
11.6575.0115	52.00 mm	58.80 mm	5.00 mm	55.50 mm	OR 3212	
11.6575.0120	55.00 mm	61.80 mm	5.00 mm	58.50 mm	OR 3225	
11.6575.0125	56.00 mm	62.80 mm	5.00 mm	59.50 mm	OR 3231	Rod Ø as per DIN ISO 3320
11.6575.0130	60.00 mm	66.80 mm	5.00 mm	63.50 mm	OR 3243	
11.6575.0135	63.00 mm	69.80 mm	5.00 mm	66.50 mm	OR 3256	Rod Ø as per DIN ISO 3320
11.6575.0140	65.00 mm	73.80 mm	6.00 mm	69.00 mm	OR 4262	
11.6575.0145	70.00 mm	78.80 mm	6.00 mm	74.00 mm	OR 4287	Rod Ø as per DIN ISO 3320
11.6575.0150	75.00 mm	83.80 mm	6.00 mm	79.00 mm	OR 4312	
11.6575.0155	80.00 mm	88.80 mm	6.00 mm	84.00 mm	OR 4325	Rod Ø as per DIN ISO 3320
11.6575.0160	85.00 mm	93.80 mm	6.00 mm	89.00 mm	OR 4350	
11.6575.0165	90.00 mm	98.80 mm	6.00 mm	94.00 mm	OR 4362	Rod Ø as per DIN ISO 3320
11.6575.0170	95.00 mm	103.80 mm	6.00 mm	99.00 mm	OR 4387	
11.6575.0175	100.00 mm	108.80 mm	6.00 mm	104.00 mm	OR 4400	Rod Ø as per DIN ISO 3320
11.6575.0180	105.00 mm	113.80 mm	6.00 mm	109.00 mm	OR 4425	
11.6575.0185	110.00 mm	118.80 mm	6.00 mm	114.00 mm	OR 4450	Rod Ø as per DIN ISO 3320
11.6575.0190	115.00 mm	123.80 mm	6.00 mm	119.00 mm	OR 4462	
11.6575.0195	120.00 mm	128.80 mm	6.00 mm	124.00 mm	OR 4487	
11.6575.0200	125.00 mm	133.80 mm	6.00 mm	129.00 mm	OR 4500	Rod Ø as per DIN ISO 3320
11.6575.0205	130.00 mm	138.80 mm	6.00 mm	134.00 mm	OR 4525	
11.6575.0210	135.00 mm	143.80 mm	6.00 mm	139.00 mm	OR 4537	
11.6575.0215	140.00 mm	148.80 mm	6.00 mm	144.00 mm	OR 4562	Rod Ø as per DIN ISO 3320
11.6575.0220	145.00 mm	153.80 mm	6.00 mm	149.00 mm	OR 4587	
11.6575.0225	150.00 mm	158.80 mm	6.00 mm	154.00 mm	OR 4600	
11.6575.0230	155.00 mm	163.80 mm	6.00 mm	159.00 mm	OR 4625	
11.6575.0235	160.00 mm	168.80 mm	6.00 mm	164.00 mm	OR 4650	Rod Ø as per DIN ISO 3320
11.6575.0240	165.00 mm	173.80 mm	6.00 mm	169.00 mm	OR 4650	
11.6575.0245	170.00 mm	178.80 mm	6.00 mm	174.00 mm	OR 4675	
11.6575.0250	175.00 mm	183.80 mm	6.00 mm	179.00 mm	OR 4700	
11.6575.0255	180.00 mm	188.80 mm	6.00 mm	184.00 mm	OR 4725	Rod Ø as per DIN ISO 3320
11.6575.0260	185.00 mm	193.80 mm	6.00 mm	189.00 mm	OR 4750	
11.6575.0265	190.00 mm	198.80 mm	6.00 mm	194.00 mm	OR 4750	
11.6575.0270	195.00 mm	203.80 mm	6.00 mm	199.00 mm	OR 4775	
11.6575.0275	200.00 mm	208.80 mm	6.00 mm	204.00 mm	OR 4800	Rod Ø as per DIN ISO 3320
11.6575.0280	210.00 mm	218.80 mm	6.00 mm	214.00 mm	OR 4825	
11.6575.0285	220.00 mm	228.80 mm	6.00 mm	224.00 mm	OR 4875	Rod Ø as per DIN ISO 3320
11.6575.0290	230.00 mm	238.80 mm	6.00 mm	234.00 mm	OR 4925	
11.6575.0295	240.00 mm	248.80 mm	6.00 mm	244.00 mm	OR 4950	

Item No.	Rod Ø d _{f8}	Ground of the groove Ø D _{H10}	Groove width L _{+0,2}	Ø D _{1+0,2}	Matching o-ring	Norm
11.6575.0300	250.00 mm	258.80 mm	6.00 mm	254.00 mm	OR 41000	Rod Ø as per DIN ISO 3320
11.6575.0305	260.00 mm	272.20 mm	8.40 mm	264.50 mm	OR 61050	
11.6575.0310	270.00 mm	282.20 mm	8.40 mm	274.50 mm	OR 61100	
11.6575.0315	280.00 mm	292.20 mm	8.40 mm	284.50 mm	OR 61100	Rod Ø as per DIN ISO 3320
11.6575.0320	290.00 mm	302.20 mm	8.40 mm	294.50 mm	OR 61150	
11.6575.0325	300.00 mm	312.20 mm	8.40 mm	304.50 mm	OR 61200	
11.6575.0330	320.00 mm	332.20 mm	8.40 mm	324.50 mm	OR 61300	Rod Ø as per DIN ISO 3320
11.6575.0335	340.00 mm	352.20 mm	8.40 mm	344.50 mm	OR 61400	
11.6575.0340	360.00 mm	372.20 mm	8.40 mm	364.50 mm	OR 61400	Rod Ø as per DIN ISO 3320
11.6575.0345	380.00 mm	392.20 mm	8.40 mm	384.50 mm	OR 61500	
11.6575.0350	400.00 mm	412.20 mm	8.40 mm	404.50 mm	OR 61600	
11.6575.0355	420.00 mm	432.20 mm	8.40 mm	424.50 mm	OR 61700	
11.6575.0360	440.00 mm	456.00 mm	11.00 mm	445.20 mm	OR 81750	
11.6575.0365	460.00 mm	476.00 mm	11.00 mm	465.20 mm	OR 81850	
11.6575.0370	480.00 mm	496.00 mm	11.00 mm	185.20 mm	OR 81900	
11.6575.0375	500.00 mm	516.00 mm	11.00 mm	505.20 mm	OR 82000	

APSOseals® – Wiper Seal WES500

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils)
Product description:	Double scraper consisting of a profile ring with one sealing edge and one scraping edge and an O-ring as the pre-stressing element
Intended use:	Double-acting scraper for recessed grooves
Material sealing element:	PTFE BC.429-01 (PTFE/bronze)
Material O-ring:	NBR
Hardness O-ring:	70 ±5 Shore A
Sliding speed:	max. 15 m/s
Working temperature:	(depending on o-ring material) -40 to +200 °C
Attention:	Order O-ring separately
On request:	Further dimensions available



- Media for use:**
- mineral oil based pressure fluids
 - flame resistant fluids (HFA, HFB, HFC)
 - non-polluting pressure fluids (Bio Oils)
 - water
 - air
 - other media (depending on O-Ring-material)

Surface finish

Surfaces	R _{max}	R _z	R _a
Rod diameter d	2,5 µm	1,6 µm	0,4 µm
Groove diameter D	10,0 µm	6,3 µm	1,6 µm
Groove flanks	16,0 µm	10,0 µm	3,2 µm

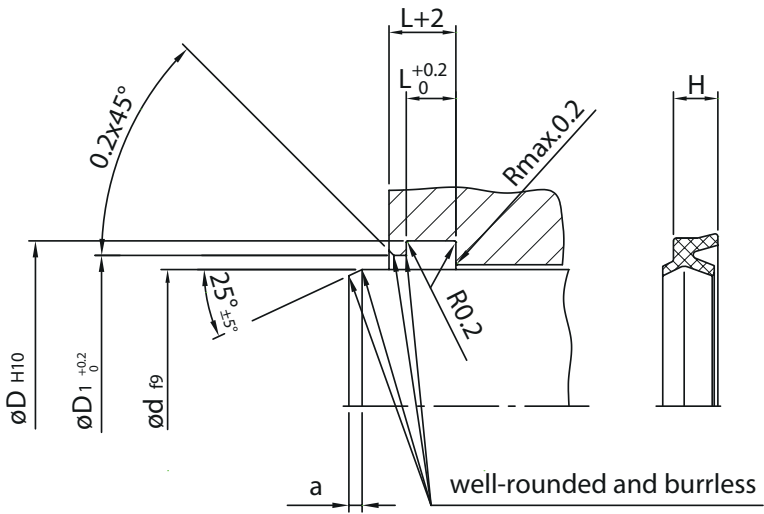
Recommended sizes for Installation

L ₂	O-Ring Cord Ø	Recommended Diameter Standard	Groove Width	Groove Depth	Radius	Housing Width
mm	mm	d mm	L mm	B mm	R1 max. mm	L ₁ mm
2,00	2,62	19 - 39,9	4,2	3,8	0,8	7,2
2,00	2,62	40 - 69,9	6,3	4,4	0,8	9,3
3,00	3,53	70 - 139,9	8,1	6,1	1,5	12,1
3,50	5,33	140 - 399,9	9,5	8,0	1,5	14,5
5,00	7,00	400 - 649,9	14,0	12,0	1,5	22,0
7,00	8,40	650 -	16,0	13,6	2,0	26,0

Item No.	Rod Ø d_{f8}	Ground of the groove Ø D_{H9}	Groove width $L_{+0.2}$	Ø D_{1H11}	Chamfer a	Matching o-ring	Norm
11.6576.0000	25.00 mm	32.60 mm	4.20 mm	26.50 mm	3.00 mm	OR 3112	Rod Ø as per DIN ISO 3320
11.6576.0005	28.00 mm	35.60 mm	4.20 mm	29.50 mm	3.00 mm	OR 3118	Rod Ø as per DIN ISO 3320
11.6576.0010	30.00 mm	37.60 mm	4.20 mm	31.50 mm	3.00 mm	OR 3131	
11.6576.0015	32.00 mm	39.60 mm	4.20 mm	33.50 mm	3.00 mm	OR 3137	Rod Ø as per DIN ISO 3320
11.6576.0020	35.00 mm	42.60 mm	4.20 mm	36.50 mm	3.00 mm	OR 3150	
11.6576.0025	36.00 mm	43.60 mm	4.20 mm	37.50 mm	3.00 mm	OR 3156	Rod Ø as per DIN ISO 3320
11.6576.0030	38.00 mm	45.60 mm	4.20 mm	39.50 mm	3.00 mm	OR 3162	
11.6576.0035	40.00 mm	48.80 mm	6.30 mm	41.50 mm	3.00 mm	OR 3175	Rod Ø as per DIN ISO 3320
11.6576.0040	42.00 mm	50.80 mm	6.30 mm	43.50 mm	3.00 mm	OR 3181	
11.6576.0045	45.00 mm	53.80 mm	6.30 mm	46.50 mm	3.00 mm	OR 3193	Rod Ø as per DIN ISO 3320
11.6576.0050	50.00 mm	58.80 mm	6.30 mm	51.50 mm	3.00 mm	OR 3212	Rod Ø as per DIN ISO 3320
11.6576.0055	55.00 mm	63.80 mm	6.30 mm	56.50 mm	3.00 mm	OR 3231	
11.6576.0060	56.00 mm	64.80 mm	6.30 mm	57.50 mm	3.00 mm	OR 3237	Rod Ø as per DIN ISO 3320
11.6576.0065	60.00 mm	68.80 mm	6.30 mm	61.50 mm	3.00 mm	OR 3250	
11.6576.0070	63.00 mm	71.80 mm	6.30 mm	64.50 mm	4.00 mm	OR 3262	Rod Ø as per DIN ISO 3320
11.6576.0075	65.00 mm	73.80 mm	6.30 mm	66.50 mm	4.00 mm	OR 3268	
11.6576.0080	70.00 mm	82.20 mm	8.10 mm	72.00 mm	4.00 mm	OR 4300	Rod Ø as per DIN ISO 3320
11.6576.0085	75.00 mm	87.20 mm	8.10 mm	77.00 mm	4.00 mm	OR 4312	
11.6576.0090	80.00 mm	92.20 mm	8.10 mm	82.00 mm	4.00 mm	OR 4337	Rod Ø as per DIN ISO 3320
11.6576.0095	85.00 mm	97.20 mm	8.10 mm	87.00 mm	4.00 mm	OR 4362	
11.6576.0100	90.00 mm	102.20 mm	8.10 mm	92.00 mm	4.00 mm	OR 4375	Rod Ø as per DIN ISO 3320
11.6576.0105	95.00 mm	107.20 mm	8.10 mm	97.00 mm	4.00 mm	OR 4400	
11.6576.0110	100.00 mm	112.20 mm	8.10 mm	102.00 mm	4.00 mm	OR 4412	Rod Ø as per DIN ISO 3320
11.6576.0115	105.00 mm	117.20 mm	8.10 mm	107.00 mm	4.00 mm	OR 4437	
11.6576.0120	110.00 mm	122.20 mm	8.10 mm	112.00 mm	4.00 mm	OR 4450	Rod Ø as per DIN ISO 3320
11.6576.0125	115.00 mm	127.20 mm	8.10 mm	117.00 mm	4.00 mm	OR 4475	
11.6576.0130	120.00 mm	132.20 mm	8.10 mm	122.00 mm	4.00 mm	OR 4487	
11.6576.0135	125.00 mm	137.20 mm	8.10 mm	127.00 mm	4.00 mm	OR 4512	Rod Ø as per DIN ISO 3320
11.6576.0140	130.00 mm	142.20 mm	8.10 mm	132.00 mm	6.00 mm	OR 4537	
11.6576.0145	135.00 mm	147.20 mm	8.10 mm	137.00 mm	6.00 mm	OR 4550	
11.6576.0150	140.00 mm	156.20 mm	9.50 mm	142.00 mm	6.00 mm	OR 6573	Rod Ø as per DIN ISO 3320
11.6576.0155	150.00 mm	166.00 mm	9.50 mm	152.50 mm	6.00 mm	OR 6600	
11.6576.0160	160.00 mm	176.00 mm	9.50 mm	162.50 mm	6.00 mm	OR 6650	Rod Ø as per DIN ISO 3320
11.6576.0165	170.00 mm	186.00 mm	9.50 mm	172.50 mm	6.00 mm	OR 6700	
11.6576.0170	180.00 mm	196.00 mm	9.50 mm	182.50 mm	6.00 mm	OR 6725	Rod Ø as per DIN ISO 3320
11.6576.0175	190.00 mm	206.00 mm	9.50 mm	192.50 mm	6.00 mm	OR 6775	
11.6576.0180	200.00 mm	216.00 mm	9.50 mm	202.50 mm	6.00 mm	OR 6800	Rod Ø as per DIN ISO 3320
11.6576.0185	220.00 mm	236.00 mm	9.50 mm	222.50 mm	6.00 mm	OR 6900	Rod Ø as per DIN ISO 3320
11.6576.0190	230.00 mm	246.00 mm	9.50 mm	232.50 mm	6.00 mm	OR 6925	
11.6576.0195	240.00 mm	256.00 mm	9.50 mm	242.50 mm	6.00 mm	OR 6975	
11.6576.0200	250.00 mm	266.00 mm	9.50 mm	252.50 mm	6.00 mm	OR 61000	Rod Ø as per DIN ISO 3320
11.6576.0205	260.00 mm	276.00 mm	9.50 mm	262.50 mm	6.00 mm	OR 61050	
11.6576.0210	280.00 mm	296.00 mm	9.50 mm	282.50 mm	6.00 mm	OR 61100	Rod Ø as per DIN ISO 3320
11.6576.0215	300.00 mm	316.00 mm	9.50 mm	302.50 mm	6.00 mm	OR 61200	
11.6576.0220	320.00 mm	336.00 mm	9.50 mm	322.50 mm	6.00 mm	OR 61300	Rod Ø as per DIN ISO 3320
11.6576.0225	340.00 mm	356.00 mm	9.50 mm	342.50 mm	6.00 mm	OR 61400	
11.6576.0230	360.00 mm	376.00 mm	9.50 mm	362.50 mm	6.00 mm	OR 61400	Rod Ø as per DIN ISO 3320
11.6576.0235	400.00 mm	416.00 mm	9.50 mm	402.50 mm	7.50 mm	OR 61600	

APSOseals® – Wiper Seal BWA

Medium stability:	For use in processed, dried, or de-oiled compressed air
Product description:	Pneumatic combination seal, combining a grooved ring and scraper in a single element
Intended use:	Single-acting rod seal with good seal tightness and low friction
Material:	TPU 90.447-01
Hardness:	90 ±5 Shore A
Pressure PN:	max. 2 MPa
Sliding speed:	max. 1 m/s
Working temperature:	-30 to +90 °C



Surface finish

	Surface roughnessRoughness class			
	R_a μm	R_l μm	R_z μm	
Sliding surface	*	*	*	*
Groove base	$\leq 1,6$	$\leq 6,3$	$\leq 6,3$	N7
Groove sides	≤ 3	≤ 15	≤ 10	N8

* The surface roughness and carrying component of the sliding surface must be assigned to the rod seal used.

Working temperature:

- hydraulic oils HL, HLP: –30 to +100 °C
- HFA, HFB fluids: +5 to +60 °C
- HFC fluids: –30 to +60 °C
- water: +5 to +100 °C
- HETG (colza oils): –30 to +80 °C
- HEES (synth. ester): –30 to +80 °C
- HEPG (glycols): –30 to +60 °C
- mineral-based greases: –30 to +100 °C

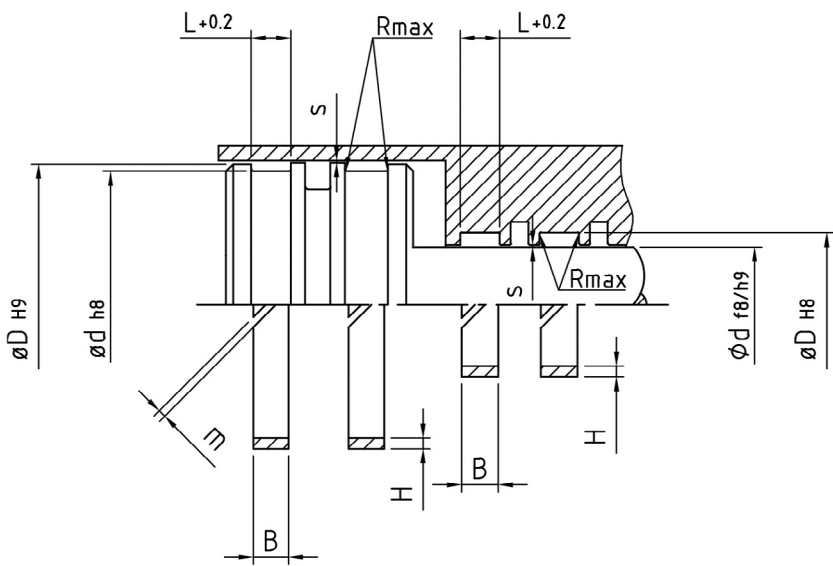
Application is not provided for:

- HFD fluids

Item No.	Rod Ø d_{f9}	Ground of the groove Ø D_{H10}	Groove width $L_{+0.2}$	Sealing height H	Chamfer a
11.6574.0000	3.00 mm	8.80 mm	4.50 mm	5.00 mm	4.00 mm
11.6574.0005	4.00 mm	7.00 mm	2.70 mm	6.00 mm	2.20 mm
11.6574.0010	4.00 mm	8.80 mm	4.50 mm	5.40 mm	4.00 mm
11.6574.0015	5.00 mm	8.00 mm	2.70 mm	6.20 mm	2.20 mm
11.6574.0020	6.00 mm	9.00 mm	2.70 mm	7.20 mm	2.20 mm
11.6574.0025	6.00 mm	10.80 mm	4.50 mm	8.00 mm	4.00 mm
11.6574.0030	8.00 mm	11.50 mm	3.00 mm	9.20 mm	2.50 mm
11.6574.0035	8.00 mm	12.80 mm	4.50 mm	10.00 mm	4.00 mm
11.6574.0040	8.00 mm	14.00 mm	4.50 mm	11.00 mm	4.00 mm
11.6574.0045	10.00 mm	14.00 mm	3.20 mm	11.40 mm	2.80 mm
11.6574.0050	10.00 mm	16.00 mm	4.00 mm	12.50 mm	3.60 mm
11.6574.0055	10.00 mm	16.80 mm	4.50 mm	13.00 mm	4.00 mm
11.6574.0060	10.00 mm	18.00 mm	5.00 mm	14.00 mm	4.50 mm
11.6574.0065	12.00 mm	16.50 mm	3.70 mm	13.70 mm	3.20 mm
11.6574.0070	12.00 mm	18.00 mm	4.00 mm	14.50 mm	3.60 mm
11.6574.0075	12.00 mm	20.00 mm	3.70 mm	16.00 mm	3.20 mm
11.6574.0080	12.00 mm	20.00 mm	5.00 mm	16.00 mm	4.50 mm
11.6574.0085	12.00 mm	20.00 mm	5.50 mm	16.00 mm	5.00 mm
11.6574.0090	12.00 mm	22.00 mm	6.00 mm	16.00 mm	5.00 mm
11.6574.0095	14.00 mm	18.50 mm	3.70 mm	15.70 mm	3.20 mm
11.6574.0100	14.00 mm	20.00 mm	4.00 mm	16.50 mm	3.60 mm
11.6574.0105	14.00 mm	22.00 mm	5.00 mm	18.00 mm	4.50 mm
11.6574.0110	14.00 mm	24.00 mm	6.00 mm	18.00 mm	5.00 mm
11.6574.0115	16.00 mm	20.50 mm	3.70 mm	17.70 mm	3.20 mm
11.6574.0120	16.00 mm	22.00 mm	4.00 mm	18.50 mm	3.60 mm
11.6574.0125	16.00 mm	24.00 mm	5.00 mm	18.50 mm	4.50 mm
11.6574.0130	16.00 mm	26.00 mm	6.00 mm	20.00 mm	5.00 mm
11.6574.0135	18.00 mm	22.50 mm	3.70 mm	19.70 mm	3.20 mm
11.6574.0140	18.00 mm	24.00 mm	4.00 mm	20.50 mm	3.60 mm
11.6574.0145	18.00 mm	26.00 mm	5.00 mm	21.00 mm	4.50 mm
11.6574.0150	18.00 mm	28.00 mm	6.00 mm	22.00 mm	5.00 mm
11.6574.0155	20.00 mm	25.00 mm	4.00 mm	21.90 mm	3.60 mm
11.6574.0160	20.00 mm	26.00 mm	4.00 mm	22.50 mm	3.60 mm
11.6574.0165	20.00 mm	30.00 mm	7.00 mm	24.00 mm	6.00 mm
11.6574.0170	22.00 mm	27.00 mm	4.00 mm	23.90 mm	3.60 mm
11.6574.0175	22.00 mm	28.00 mm	4.00 mm	24.50 mm	3.60 mm
11.6574.0180	22.00 mm	32.00 mm	7.00 mm	26.00 mm	6.00 mm
11.6574.0185	25.00 mm	30.00 mm	4.00 mm	26.90 mm	3.60 mm
11.6574.0190	25.00 mm	31.00 mm	4.00 mm	27.50 mm	3.60 mm
11.6574.0195	25.00 mm	35.00 mm	7.00 mm	29.00 mm	6.00 mm
11.6574.0200	28.00 mm	38.00 mm	7.00 mm	32.00 mm	6.00 mm
11.6574.0205	30.00 mm	35.50 mm	4.50 mm	32.10 mm	3.90 mm
11.6574.0210	30.00 mm	38.00 mm	5.00 mm	33.00 mm	4.50 mm
11.6574.0215	30.00 mm	40.00 mm	7.00 mm	34.00 mm	6.00 mm
11.6574.0220	32.00 mm	37.50 mm	4.50 mm	34.10 mm	3.90 mm
11.6574.0225	32.00 mm	40.00 mm	5.00 mm	35.00 mm	4.50 mm
11.6574.0230	32.00 mm	42.00 mm	7.00 mm	36.00 mm	6.00 mm
11.6574.0235	35.00 mm	45.00 mm	7.00 mm	39.00 mm	6.00 mm
11.6574.0240	36.00 mm	44.00 mm	5.00 mm	39.00 mm	4.50 mm
11.6574.0245	36.00 mm	46.00 mm	7.00 mm	40.00 mm	6.00 mm
11.6574.0250	40.00 mm	46.00 mm	4.80 mm	43.00 mm	4.30 mm
11.6574.0255	40.00 mm	50.00 mm	7.00 mm	44.00 mm	6.00 mm
11.6574.0260	45.00 mm	53.00 mm	5.00 mm	48.00 mm	4.50 mm
11.6574.0265	45.00 mm	55.00 mm	7.00 mm	49.00 mm	6.00 mm
11.6574.0270	50.00 mm	62.00 mm	8.50 mm	55.00 mm	7.50 mm

APSOseals® – Guide Tape GT

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils)
Product description:	Guide band as intermediate element for non-metallic guides
Intended use:	For play-free guidance of pistons and piston rods in hydraulics
Material:	PTFE BC.429-01 (PTFE/bronze)
Sliding speed:	max. 15 m/s
Working temperature:	-60 to +200 °C
On request:	Further dimensions available, cut ready to length of circumference, also with oblique cut



Rmax = 0,2 for D < 250
Rmax = 0,4 for D > 250

Split Sizes

Radial clearance “s” depends on the included seal type.
Recommended ring split “m” as per the following table.

Bore diameter	Rod diameter	Ring split
mm	mm	m mm
≤ - 24,9	≤ - 19,9	1,0 - 1,5
25 - 44,9	20 - 39,9	1,5 - 2,0
45 - 79,9	40 - 74,9	2,0 - 4,0
80 - 129,9	75 - 124,9	3,0 - 5,0
130 - 349,9	125 - 299,9	4,0 - 6,0
350 - 1000,0	300 - 1000,0	5,0 - 8,0

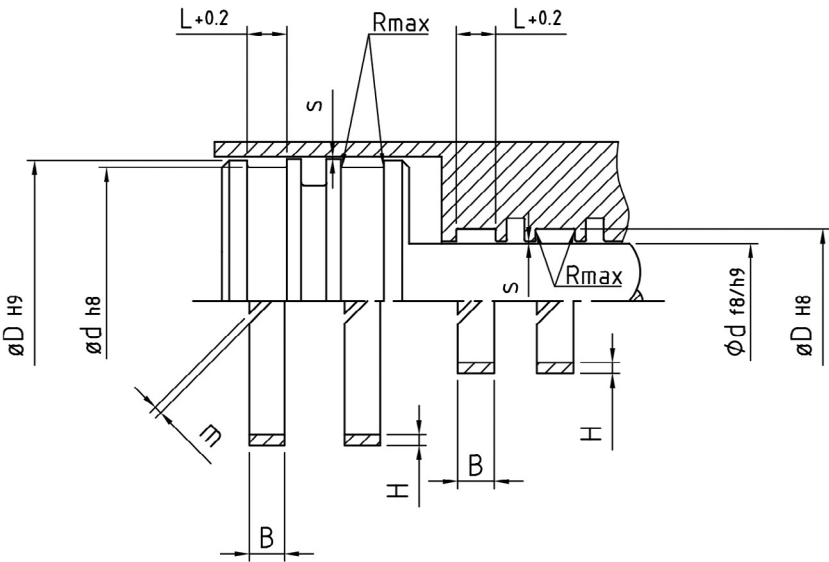
Item No.	Groove width L _{+0.2}	Band width B _{-0.2}	Band gauge H _{-0.05}	Roll length
11.6590.0000	5.60 mm	5.50 mm	1.50 mm	21.00 m
11.6590.0005	6.00 mm	5.80 mm	1.50 mm	21.00 m
11.6590.0010	8.00 mm	7.80 mm	1.50 mm	21.00 m
11.6590.0015	10.00 mm	9.80 mm	1.50 mm	21.00 m
11.6590.0020	12.00 mm	11.80 mm	1.50 mm	21.00 m
11.6590.0025	8.00 mm	7.80 mm	2.00 mm	15.75 m
11.6590.0030	10.00 mm	9.80 mm	2.00 mm	15.75 m
11.6590.0035	12.00 mm	11.80 mm	2.00 mm	15.75 m
11.6590.0040	15.00 mm	14.80 mm	2.00 mm	15.75 m
11.6590.0046	5.60 mm	5.50 mm	2.50 mm	12.50 m
11.6590.0050	6.00 mm	5.80 mm	2.50 mm	12.50 m
11.6590.0055	8.00 mm	7.80 mm	2.50 mm	12.50 m
11.6590.0060	9.70 mm	9.50 mm	2.50 mm	12.50 m
11.6590.0065	10.00 mm	9.80 mm	2.50 mm	12.50 m
11.6590.0070	12.00 mm	11.80 mm	2.50 mm	12.50 m
11.6590.0075	15.00 mm	14.80 mm	2.50 mm	12.50 m
11.6590.0080	20.00 mm	19.50 mm	2.50 mm	12.50 m
11.6590.0085	25.00 mm	24.50 mm	2.50 mm	12.50 m

Limitations on use:

- velocity: reciprocating to 15 m/s
- temperature: –60 to +200 °C
- compr. strength, dyn.:
comp. 55 max. 15 N/mm²
comp. 30 max. 8 N/mm²

APSOseals® – Guide Tape GT

Medium stability:	for use in mineral hydraulic oils, flame-retardant pressurized fluids (HFA, HFB, HFC), environmentally friendly pressurized fluids (bio-oils), water, air
Product description:	Guide band as intermediate element for non-metallic guides
Intended use:	for play-free guidance of pistons and piston rods in hydraulics
Material:	PTFE CG.429-01 (PTFE/carbon/graphite)
Sliding speed:	max. 15 m/s
Working temperature:	-60 to +200 °C
Attention:	Black carbon abrasion in running-in phase
On request:	Further dimensions available, cut ready to length of circumference, also with oblique cut



$$R_{max} = 0,2 \text{ for } D < 250$$

$$R_{max} = 0,4 \text{ for } D > 250$$

Split Sizes

Radial clearance “s” depends on the included seal type.
 Recommended ring split “m” as per the following table.

Bore diameter	Rod diameter	Ring split
mm	mm	m mm
≤ - 24,9	≤ - 19,9	1,0 - 1,5
25 - 44,9	20 - 39,9	1,5 - 2,0
45 - 79,9	40 - 74,9	2,0 - 4,0
80 - 129,9	75 - 124,9	3,0 - 5,0
130 - 349,9	125 - 299,9	4,0 - 6,0
350 - 1000,0	300 - 1000,0	5,0 - 8,0

Limitations on use:

- velocity: reciprocating to 15 m/s
- temperature: –60 to +200 °C
- compr. strength, dyn.:
 comp. 55 max. 15 N/mm²
 comp. 30 max. 8 N/mm²

Item No.	Groove width L _{+0.2}	Band width B _{-0.2}	Band gauge H _{-0.05}	Roll length
11.6591.0000	5.60 mm	5.50 mm	1.50 mm	21.00 m
11.6591.0005	6.00 mm	5.80 mm	1.50 mm	21.00 m
11.6591.0010	8.00 mm	7.80 mm	1.50 mm	21.00 m
11.6591.0015	10.00 mm	9.80 mm	1.50 mm	21.00 m
11.6591.0020	12.00 mm	11.80 mm	1.50 mm	21.00 m
11.6591.0025	8.00 mm	7.80 mm	2.00 mm	15.75 m
11.6591.0030	10.00 mm	9.80 mm	2.00 mm	15.75 m
11.6591.0035	12.00 mm	11.80 mm	2.00 mm	15.75 m
11.6591.0040	15.00 mm	14.80 mm	2.00 mm	15.75 m
11.6591.0045	5.60 mm	5.50 mm	2.50 mm	12.50 m
11.6591.0050	6.00 mm	5.80 mm	2.50 mm	12.50 m
11.6591.0055	8.00 mm	7.80 mm	2.50 mm	12.50 m
11.6591.0060	9.70 mm	9.50 mm	2.50 mm	12.50 m
11.6591.0065	10.00 mm	9.80 mm	2.50 mm	12.50 m
11.6591.0070	12.00 mm	11.80 mm	2.50 mm	12.50 m
11.6591.0075	15.00 mm	14.80 mm	2.50 mm	12.50 m
11.6591.0080	20.00 mm	19.50 mm	2.50 mm	12.50 m
11.6591.0085	25.00 mm	24.50 mm	2.50 mm	12.50 m
11.6591.0090	20.00 mm	19.70 mm	3.00 mm	10.00 m
11.6591.0095	30.00 mm	29.80 mm	3.00 mm	10.00 m
11.6591.0100	40.00 mm	39.50 mm	3.00 mm	10.00 m

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The Angst + Pfister Group is a leading international technical manufacturer and service provider for high-end industrial components. As a supply and solutions partner for engineering plastics, sealing, fluid handling, drive, and antivibration technology as well as

sensors, Angst + Pfister combines efficient logistics concept with comprehensive product application engineering services. Besides providing customer-specific parts, the Group offers a product range consisting of approximately 100,000 standard items.

Our core product divisions



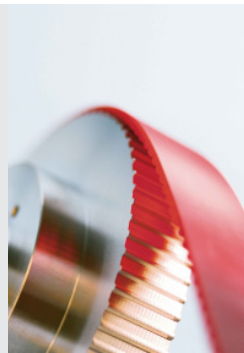
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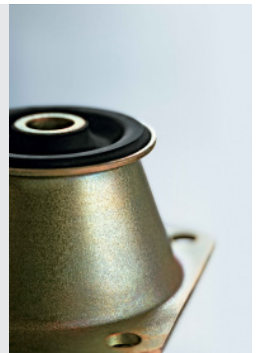
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