RAMSHAMS SEALING INDIA

Ramshams Seals has been a leading supplier of high-quality fluid sealing technologies and engineered sealing solutions. we are able to leverage our expertise in engineering design, superior quality, and advanced manufacturing and production processes to meet your supply needs when and where you need them the most. From high-volume production runs to bespoke sealing solutions, the longevity of our success in meeting the demands of OEMs, and aftermarket specialists can be attributed to doing things the "Ramshams Way."

We bring to market a blend of catalogued and fit-for-purpose, quality products that offer cost- performance. From the last years, we have refined our business approach to provide services to our customers that are searching for both engineered solutions and off-the-shelf products from a single-source supplier.

PTFE PROFILO

PTFE is the most chemical-resistant thermoplastic polymer available. PTFE offers low friction, exceptional chemical resistance, and salability not found in most plastic materials.

The Ramshams PTFE material and product portfolio is a fit-for-purpose solution designed for dynamic and static sealing applications, where high speeds up to 15 m/s (50 ft/s), low friction, temperatures ranging from -200 to 260°C (-328 to 500°F), strong wear performance,

Broad fluid compatibility and high pressure capabilities up to 600 bar (8700 psi) are required. Our material technology, enhanced by the company's deep technical and testing expertise, enables Ramshams to engineer unique, custom sealing solutions. Ramshams engineers can help you select which high-performance compounds made from filler combinations of glass, bronze or other metals, PPS, graphite, MoS2, carbon, mineral, carbon fiber, and other fillers will optimize performance in your application.

SERVICE IS AN OUR MOTIVE

A dedication to getting it done right and on time - the first time. Ensuring products and value added services are delivered on time and to exact specifications

MATERIAL

Proper material selection and compatibility rank high among the factors that contribute to good sealability. In seal design, materials are chosen for the physical attributes, performance properties, and performance characteristics required by the application.

The application environment, including temperature, pressure, and dynamic conditions, as well as design factors such as squeeze and seal geometry and energizer selection, are essential in material selection. The materials used with Ramshams seal profiles perform exceptionally well in applications with variations in temperature, pressure and media. The result is a sealing solution capable of performing in dynamic, hostile environments where standard elastomeric seals fail.

COMMON MATERAIL

PTFE	• Thermal stability across broad temperature range • Low coefficient of friction • Low coefficient of friction • Inherent lubricating properties • Excellent chemical and corrosion capabilities	• Reduced stick-slip • Unlimited shelf life • No swelling due to moisture absorption • Safe for vacuum conditions • Excellent dielectrical properties
PEEK	• High toughness • High abrasion resistance • Self-lubricating	• Low coefficient of friction • Broad chemical resistance
ELASTOMER	• Great sealability • High toughness with unique Properties • Very flexible and thermoplastic	• Broad selection of polymer types • Available in both thermoset

MAJOR INDUSTRIES

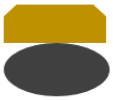
- **Chemical Processing**
- **Construction & Forestry**
- **Food & Beverage**
- **General Industry**
- **Hydro-Power**
- **Injection Molding**
- **Machine Tools**
- **Marine**
- **Material Handling**
- **Mining & Mineral Extraction**
- **Mobile Hydraulics/Off-Highway**
- **Oil & Gas**
- **Steel & Aluminum Processing**
- **Transportation**

FILLED PTFE

In spite of its remarkable properties, pure unmixed PTFE has limited use for applications where high mechanical loading is required, due to its tendency towards cold extrusion (creep). While maintaining its inherent properties and characteristics in material compounds, PTFE can benefit from the improved mechanical strength, stability, and wear resistance provided by an additive. Ramshams uses various fillers to optimize PTFE characteristics such as glass, carbon, graphite, MoS2, bronze, and mineral.
Ramshams experienced team of engineers can help you carefully select fillers based on the application media and seal geometry. We can also custom blend if you need material properties that go beyond the limits of our listed materials. Give us a call and we can partner with you to find the best material choice for your application.

IDEAL FOR	**Filled PTFE has improved mechanical properties and is excellent for dynamic applications and high pressures (up to 6000 psi). Different fillers provide different properties.**	
ADVANTAGES	• **Improved wear resistance** • **Improved heat transfer** • **Increase in mechanical strength**	• **Improved extrusion resistance** • **Decreased friction** • **Increase in thermal conductivity**
DISADVANTAGES	• **Less flexibility in processing (requires machining)**	
COMMON FILLERS	**Glass Fibers** The most common filler. Minor effect on electrical properties. Increased abrasion on mating metal surfaces.	
	Carbon/Carbon Fibers Low abrasion and wear. Good deformation and extrusion resistance.	
	Graphite Non-abrasive. Low friction. Minor effect on deformation properties.	
	MoS2 Lowers break-in wear and starting friction.	
	Bronze Very high wear resistance and load-bearing capability. Poor chemical resistance.	
	Mineral Properties similar to glass, but less abrasive.	
TEMPERATURE RANGE (DRY HEAT)	**-200 to 260°C**	**-328 to 500°F**

Piston Application

		Technical Data						
Type	**Profile**	**Temp. Range**	**Speed**	**Pressure**	**Application**	**Material**	**Standard or Can Fit the Groove**	**Page**
PD		**-45/+200℃**	**≤15m/s**	**≤60MPa**	Mobile Hydraulics Standard Cylinders Machine Tools, Injection Molding Machines, Presses	PTFE NBR/FKM	ISO 7425/1 GB/T15242.3 PG44/PG42/PG4 6 GS55044/42/46 OMK-MR	**8-15**
SP		**-45/+200℃**	**≤15m/s**	**≤60MPa**	Standard Cylinders Ceramic Machine Machine Tools Mobile Hydraulics, Presses	PTFE NBR/FKM	ISO 7425/1 GB/T15242.3 PG44/PG42/PG4 6 GS55044/42/46 OMK-MR	**16-22**
QP		**-45/+200℃**	**≤2m/s**	**≤50MPa**	Standard Cylinders Piston Accumulators Presses	PTFE NBR/FKM	ISO 7425/1 GB/T 15242.3 PQ12/22/32/52 PQ14/24	**23-27**
Q2P		**-45/+200℃**	**≤3m/s**	**≤60MPa**	Mobile Hydraulics Holding Cylinders Piston Accumulators	PTFE NBR/FKM	PQ01/02/ 03/04 AQ5	**28-31**
HDPS		**-45/+200℃**	**≤1.5m/s**	**≤60MPa**	Mobile Hydraulics Holding Cylinders Piston Accumulators	PTFE NBR	PQ01/02/ 03/04 AQ5	**32-35**
DPG		**-45/+200℃**	**≤15m/s**	**≤35MPa**	Valve Stem Machine Tools Mini Hydraulic	PTFE NBR/FKM	ISO 3320 PDD	**36-40**

Rod Application

		Technical Data						
Type	**Profile**	**Temp. Range**	**Speed**	**Pressure**	**Application**	**Material**	**Standard or Can fit the Groove**	**Page**
SR		**-45/+200℃**	**≤15m/s**	**≤60MPa**	Mobile Hydraulics Standard Cylinders Machine Tools, Injection Molding Machines	PTFE NBR/FKM	ISO 7425/2 GB/T 15242.3, RS13/RS11/RS15 GS55013/11/15 OMS-MR	**42-53**
PRS		**-45/+200℃**	**≤15m/s**	**≤60MPa**	Special Cylinders, Pumps and Valves Machine Tools Robotics, Servo Equipment	PTFE NBR/FKM	ISO7425/2 GB/T 15242.3, RG43/RG41/RG45 GS55043/41/45 GSI	**54-62**
DRG		**-45/+200℃**	**≤15m/s**	**≤35MPa**	Valve Stem, Mini Hydraulic	PTFE NBR/FKM	ISO 3320 RDD	**63-67**

Rod Wiper

Technical Data

Type	Profile	Temp. Range	Speed	Pressure	Application	Material	Standard or Can fit the Groove	Page
EW5		**-45/+200°C**	**≤15m/s**	**-**	Ceramic Machine Heavy Duty Cylinders, Injection Molding Machines Presses	PTFE NBR/FKM	WE30/31/32 WE33/34/35 ES56130/31/32 ES56133/34/35 GSZ	**69-74**
EW2		**-45/+200°C**	**≤15m/s**	**-**	Mobile Hydraulics Standard Cylinders Machine Tools, Injection Molding Machines	PTFE NBR/FKM	WE50/51/52 WE53/54/55 ES56150/51/52 ES56153/54/44 GSZ	**75-80**

Rotary Application

Technical Data

Type	Profile	Temp. Range	Speed	Pressure	Application	Material	Standard or Can fit the Groove	Page
RRS		**-45/+200°C**	**≤2m/s**	**≤30MPa**	Rotary Distributors Pivoting Motors: Mobile Hydraulics Machine Tools	PTFE NBR/FKM	ISO 7425/1 TG40/41/42 TG43/44/45	**82-86**
RPS		**-45/+200°C**	**≤2m/s**	**≤30MPa**	Rotary Distributors Pivoting Motors: Mobile Hydraulics Machine Tools	PTFE NBR/FKM	ISO 7425/1 TG40/41/42 TG43/44/45	**87-91**

PISTON SEAL

PD - Piston Seal Double Acting

PD is a double acting, O-ring energized, low friction piston seal that performs well in both high and low pressure systems. High performance PTFE materials, like 40% Bronze filled, provide outstanding wear and extrusion resistance properties as well as large range of temperature and media compatibility.
As a high performance seal used in demanding applications. The standard PD seal face includes pressure notches, which makes the seal very responsive to changes in pressure or direction of travel.
Used successfully for years in performance critical applications in construction equipment, machine tools, material handling, agricultural equipment, and other industries, the PD is a workhorse compact, double acting, and piston sealing solution. Its design fits a variety of housing sizes, including ISO 7425 grooves, and is offered in a wide range of metric and inch (On requested size options)

Advantages

- No stick-slip effect when starting for smooth operation
- Minimum static and dynamic friction coefficient for a minimum energy loss and operating temperature
- Suitable for non-lubricating fluids depending on seal material for optimum design flexibility
- High wear resistance ensures long service life
- Installation grooves acc. to ISO 7425/1
- No adhesive effect to the mating surface during long period of inactivity or storage
- Suitable for most hydraulic fluids in relation with most modern hardware materials and surface finish depending on material selected
- Suitable for new environmentally safe hydraulic fluids

Ordering Code

Example Part NO- PD - M - L - 00080 - BR - N

N/F - NBR/Viton Energizer Material
BR-Bronze Filled
00080- Divided by 10 to Identify the Seal Size
LL/L/R/G/H/HH - Lower/Low/Regular/General/Heavy/Heaviest
M/I - Metric/ Inch
PD-Profile

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

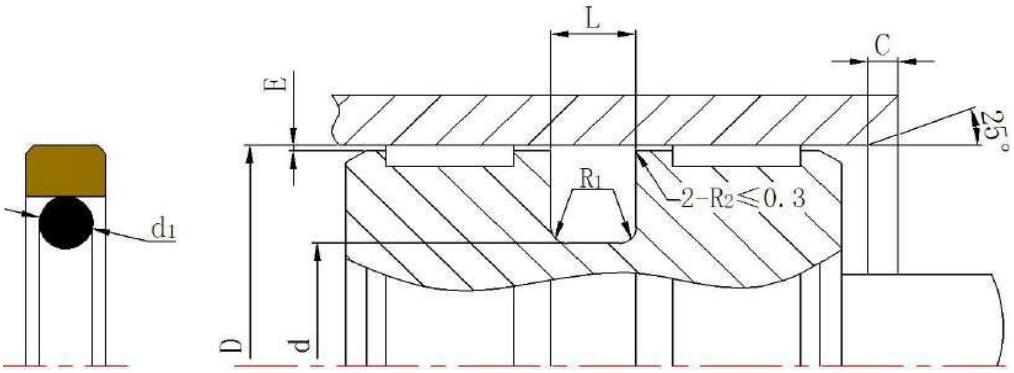
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤60 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

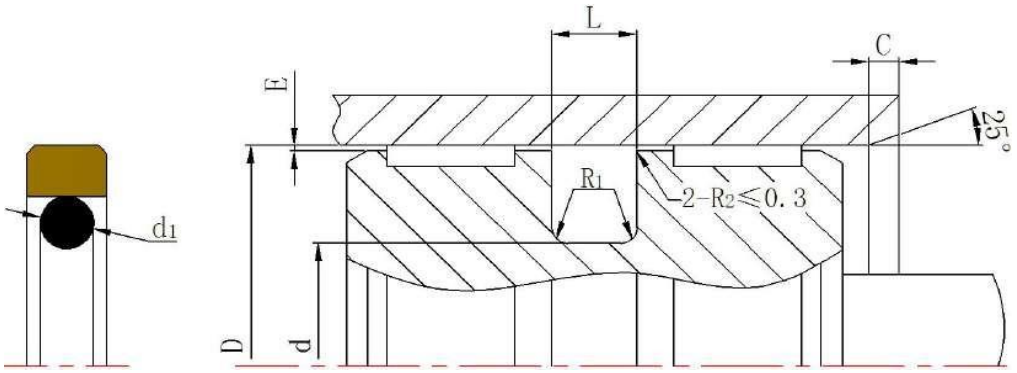
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

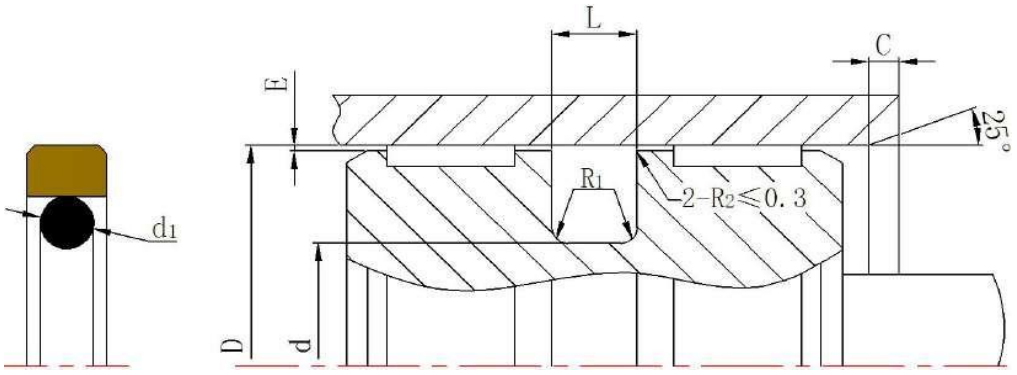
Series No	Bore Diameter D H9			Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section
	Standard Application	Light Application	Heavy Duty Application	d h9	L +0.2	R1 max	10 MPa	20 MPa	40 MPa	D1
PDMLL	8 - 15.9	16 - 39.9	--	D - 4.9	2.2	0.4	0.4	0.3	0.2	1.78
PDML	16 - 39.9	40 - 79.9	--	D - 7.5	3.2	0.6	0.6	0.5	0.3	2.62
PDMR	40 - 79.9	80 - 132.9	16 - 39.9	D - 11.0	4.2	1	0.7	0.5	0.3	3.53
PRMG	80 - 132.9	133 - 329.9	40 - 79.9	D - 15.5	6.3	1.3	0.8	0.6	0.4	5.33
PDMH	133 - 329.9	330 – 400	80 - 132.9	D - 21.0	8.1	1.8	0.8	0.6	0.4	7
PDMHH	330 – 400			D - 24.5	8.1	1.8	0.9	0.7	0.5	7



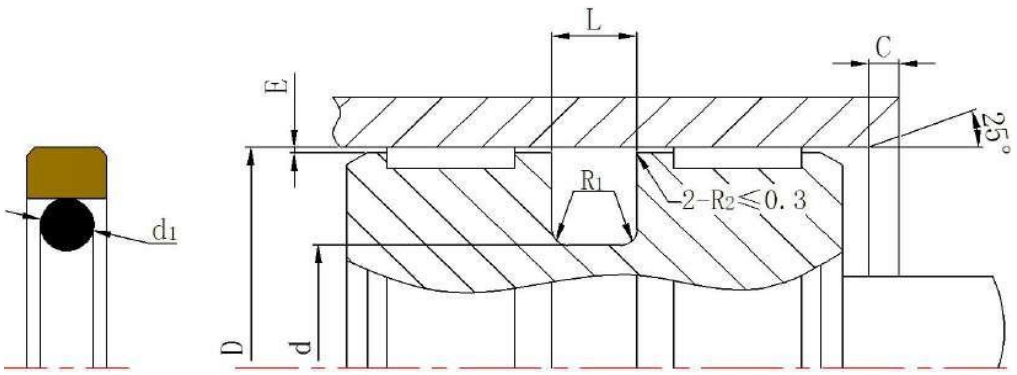
Bore Dia D/H9	Groove Dia d/h9	Groove Width L+0.2	RSS Part NO	O-Ring Size d 1
8	3.1	2.2	PDMLL00080	2.57 x 1.78
10	5.1	2.2	PDMLL00100	4.47 x 1.78
12	7.1	2.2	PDMLL00120	6.70 x 1.80
14	9.1	2.2	PDMLL00140	8.75 x 1.80
15	7.5	3.2	PDML00150	6.98 x 2.62
15.8	10.9	2.2	PDMLL00158	10.60 x 1.80
16	11.1	2.2	PDMLL00160	10.60 x 1.80
16	8.5	3.2	PDML00160	7.59 x 2.62
18	13.1	2.2	PDMLL00180	12.42 x 1.78
18	10.5	3.2	PDML00180	9.19 x 2.62
19	11.5	3.2	PDML00190	10.77 x 2.62
20	15.1	2.2	PDMLL00200	14.00 x 1.78
20	12.5	3.2	PDML00200	12.37 x 2.62
21	13.5	3.2	PDML00210	12.37 x 2.62
22	17.1	2.2	PDMLL00220	17.17 x 1.78
22	14.5	3.2	PDML00220	13.94 x 2.62
24	16.5	3.2	PDML00240	15.54 x 2.62
25	20.1	2.2	PDMLL00250	19.00 x 1.80
25	17.5	3.2	PDML00250	17.12 x 2.62
25	14	4.2	PDMR00250	13.87 x 3.53
25.4	20.5	2.2	PDMLL00254	20.35 x 1.78
28	20.5	3.2	PDML00280	20.29 x 2.62
30	22.5	3.2	PDML00300	21.89 x 2.62



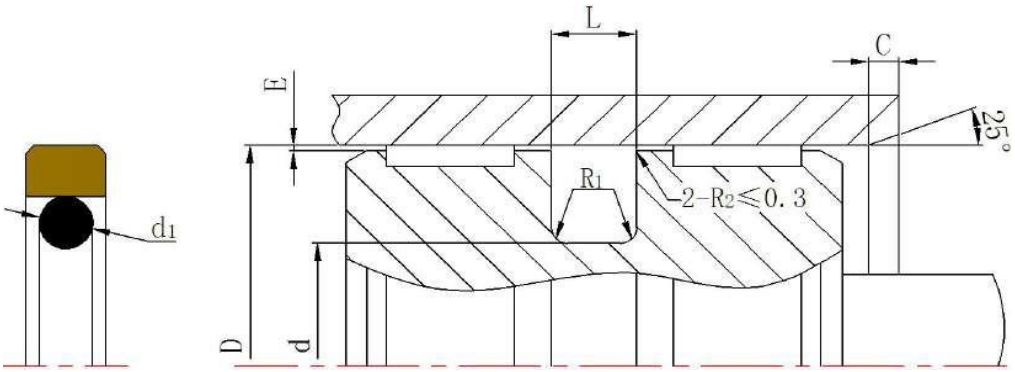
Bore Dia D/H9	Groove Dia d/h9	Groove Width L+0.2	RSS Part NO	O-Ring Size d 1
32	27.1	2.2	PDMLL00320	26.70 x 1.78
32	24.5	3.2	PDML00320	23.47 x 2.62
32	21	4.2	PDMR00320	20.22 x 3.53
35	27.5	3.2	PDML00350	26.64 x 2.62
35	24	4.2	PDMR00350	23.40 x 3.53
36	28.5	3.2	PDML00360	28.24 x 2.62
38	30.5	3.2	PDML00380	29.82 x 2.62
40	32.5	3.2	PDML00400	31.42 x 2.62
40	29	4.2	PDMR00400	28.17 x 3.53
42	31	4.2	PDMR00420	29.75 x 3.53
44.45	36.95	3.2	PDML00444	36.17 x 2.62
45	34	4.2	PDMR00450	32.92 x 3.53
48	37	4.2	PDMR00480	36.09 x 3.53
50	42.5	3.2	PDML00500	40.94 x 2.62
50	39	4.2	PDMR00500	37.69 x 3.53
50	34.5	6.3	PDMG00500	32.69 x 5.33
50.8	43.3	3.2	PDML00508	42.52 x 2.62
50.8	39.8	4.2	PDMR00508	37.69 x 3.53
52	41	4.2	PDMR00520	40.87 x 3.53
53	42	4.2	PDMR00530	40.87 x 3.53
55	44	4.2	PDMR00550	44.04 x 3.53
57	46	4.2	PDMR00570	44.04 x 3.53
58	47	4.2	PDMR00580	47.22 x 3.53



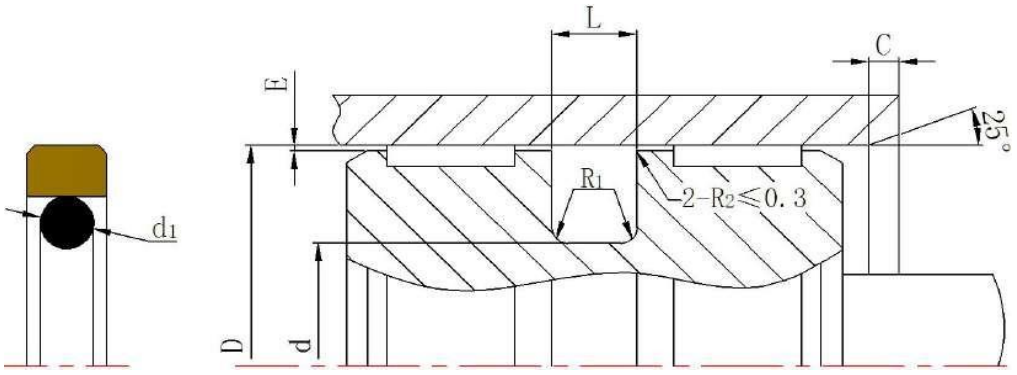
Bore Dia D/H9	Groove Dia d/h9	Groove Width L+0.2	RSS Part NO	O-Ring Size d 1
60	49	4.2	PDMR00600	47.22 x 3.53
62	51	4.2	PDMR00620	50.39 x 3.53
63	52	4.2	PDMR00630	50.39 x 3.53
63	47.5	6.3	PDMG00630	46.99 x 5.33
65	54	4.2	PDMR00650	53.57 x 3.53
68	57	4.2	PDMR00680	56.74 x 3.53
70	59	4.2	PDMR00700	56.74 x 3.53
70	54.5	6.3	PDMG00700	53.34 x 5.33
75	64	4.2	PDMR00750	63.09 x 3.53
75	59.5	6.3	PDMG00750	56.52 x 5.33
80	69	4.2	PDMR00800	66.27 x 3.53
80	64.5	6.3	PDMG00800	62.87 x 5.33
80	59	8.1	PDMH00800	58.00 x 7.00
82.5	67	6.3	PDMG00825	66.04 x 5.33
85	69.5	6.3	PDMG00850	69.22 x 5.33
85	64	8.1	PDMH00850	63.00 x 7.00
90	79	4.2	PDMR00900	78.97 x 3.53
90	74.5	6.3	PDMG00900	72.39 x 5.33
90	69	8.1	PDMH00900	68.00 x 7.00
95	84	4.2	PDMR00950	82.14 x 3.53
95	79.5	6.3	PDMG00950	78.74 x 5.33
95	74	8.1	PDMH00950	73.00 x 7.00
100	89	4.2	PDMR01000	88.49 x 3.53



Bore Dia D/H9	Groove Dia d/h9	Groove Width L+0.2	RSS Part NO	O-Ring Size d 1
100	84.5	6.3	PDMG01000	81.92 x 5.33
100	79	8.1	PDMH01000	78.00 x 7.00
101.6	86.1	6.3	PDMG01016	85.09 x 5.33
105	94	4.2	PDMR01050	91.67 x 3.53
105	89.5	6.3	PDMG01050	88.27 x 5.33
108	92.5	6.3	PDMG01080	91.44 x 5.33
110	99	4.2	PDMR01100	98.02 x 3.53
110	94.5	6.3	PDMG01100	91.44 x 5.33
110	89	8.1	PDMH01100	88.00 x 7.00
115	99.5	6.3	PDMG01150	97.79 x 5.33
120	109	4.2	PDMR01200	107.54 x 3.53
120	104.5	6.3	PDMG01200	100.97 x 5.33
120	99	8.1	PDMH01200	98.00 x 7.00
125	114	4.2	PDMR01250	113.89 x 3.53
125	109.5	6.3	PDMG01250	107.32 x 5.33
125	104	8.1	PDMH01250	103.00 x 7.00
127	111.5	6.3	PDMG01270	110.49 x 5.33
130	114.5	6.3	PDMG01300	113.67 x 5.33
130	109	8.1	PDMH01300	108.00 x 7.00
132	121	4.2	PDMR01320	120.24 x 3.53
135	114	8.1	PDMH01350	113.67 x 7.00
140	124.5	6.3	PDMG01400	123.19 x 5.33



Bore Dia D/H9	Groove Dia d/h9	Groove Width L+0.2	RSS Part NO	O-Ring Size d 1
140	119	8.1	PDMH01400	116.84 x 7.00
145	129.5	6.3	PDMG01450	126.37 x 5.33
145	124	8.1	PDMH01450	123.19 x 7.00
150	134.5	6.3	PDMG01500	132.72 x 5.33
150	129	8.1	PDMH01500	126.37 x 7.00
155	134	8.1	PDMH01550	132.72 x 7.00
160	144.5	6.3	PDMG01600	142.24 x 5.33
160	139	8.1	PDMH01600	135.89 x 7.00
165	144	8.1	PDMH01650	142.24 x 7.00
170	149	8.1	PDMH01700	145.42 x 7.00
175	154	8.1	PDMH01750	151.77 x 7.00
180	164.5	6.3	PDMG01800	164.47 x 5.33
180	159	8.1	PDMH01800	158.12 x 7.00
190	169	8.1	PDMH01900	164.47 x 7.00
194	178.5	6.3	PDMG01940	177.17 x 5.33
200	184.5	6.3	PDMG02000	183.52 x 5.33
200	179	8.1	PDMH02000	177.17 x 7.00
205	184	8.1	PDMH02050	183.52 x 7.00
210	189	8.1	PDMH02100	183.52 x 7.00
215	194	8.1	PDMH02150	189.87 x 7.00
220	199	8.1	PDMH02200	196.22 x 7.00



Bore Dia D/H9	Groove Dia d/h9	Groove Width L+0.2	RSS Part NO	O-Ring Size d 1
230	214.5	6.3	PDMG02300	208.92 x 5.33
230	209	8.1	PDMH02300	202.57 x 7.00
240	219	8.1	PDMH02400	215.27 x 7.00
250	234.5	6.3	PDMG02500	234.32 x 5.33
250	229	8.1	PDMH02500	227.97 x 7.00
250	225.5	8.1	PDMHH02500	215.27 x 7.00
254	233	8.1	PDMH02540	227.97 x 7.00
260	239	8.1	PDMH02600	240.67 x 7.00
265	244	8.1	PDMH02650	240.67 x 7.00
270	249	8.1	PDMH02700	240.67 x 7.00
280	259	8.1	PDMH02800	253.37 x 7.00
290	269	8.1	PDMH02900	266.07 x 7.00
300	279	8.1	PDMH03000	278.77 x 7.00
300	275.5	8.1	PDMHH03000	266.07 x 7.00
304.8	283.8	8.1	PDMH03048	278.77 x 7.00
310	289	8.1	PDMH03100	278.77 x 7.00
320	299	8.1	PDMH03200	291.47 x 7.00
320	295.5	8.1	PDMHH03200	291.47 x 7.00
330	305.5	8.1	PDMHH03300	304.17 x 7.00
340	315.5	8.1	PDMHH03400	316.87 x 7.00
350	325.5	8.1	PDMHH03500	316.87 x 7.00
360	335.5	8.1	PDMHH03600	329.57 x 7.00
370	345.5	8.1	PDMHH03700	342.27 x 7.00
380	355.5	8.1	PDMHH03800	354.97 x 7.00
400	375.5	8.1	PDMHH04000	367.67 x 7.00

SP - Single Acting Piston Step Seal

SP Step Seal Piston is a single-acting seal element consisting of a seal ring of PTFE materials and O-Ring used as energizing element.

Application Area

Piston Step seal is the recommended sealing element for single acting pistons in hydraulic components for: Mobile hydraulics, Presses, Construction Equipment, Injection molding machines, Machine tools, Cranes, Servo hydraulics, Automotive industry,

Advantages

- High static and dynamic sealing effect, Low friction, high efficiency, Stick-slip free operation, High extrusion resistance allowing large hardware clearances.

Ordering Code

Example Part NO-SP- M- L- 00080- BR- N

- **N/F - NBR/Viton Energizer Material**
- **BR-Bronze Filled**
- **00080- Divided by 10 to Identify the Seal Size**
- **LL/L/R/G/H/HH - Lower/Low/Regular/General/Heavy/Heaviest**
- **M/I - Metric/ Inch**
- **SP-Profile**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

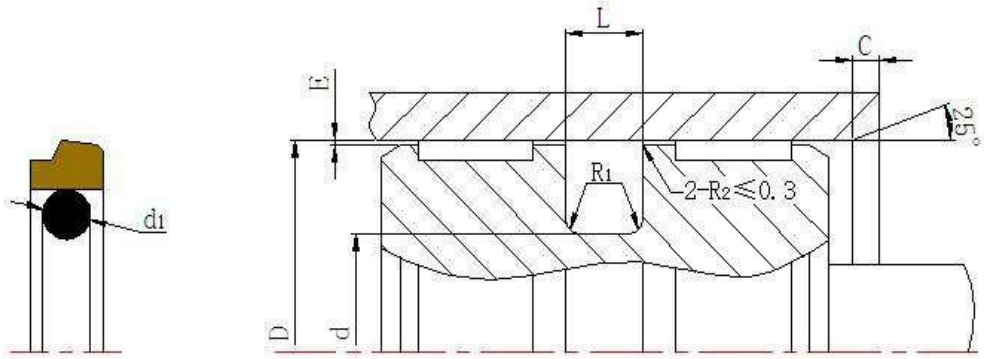
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤60 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

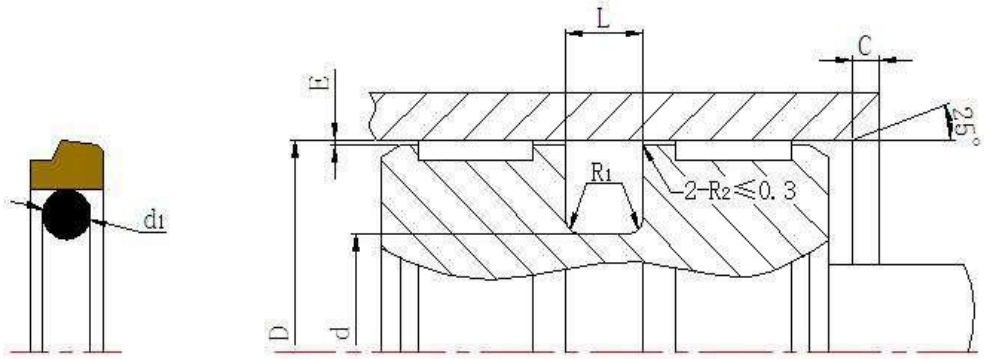
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

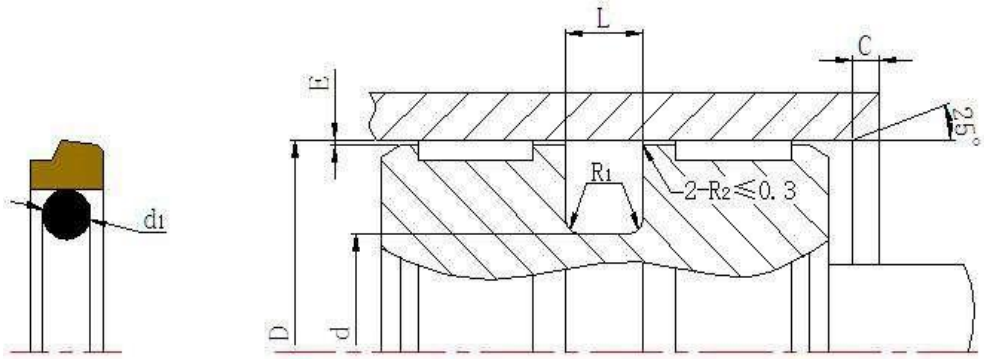
Series No	Bore Diameter D H9			Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section
	Standard Application	Light Application	Heavy-Duty Application	d h9	L +0.2	R1 max	10 MPa	20 MPa	40 MPa	d1
SPMLL	8 - 16.9	17 - 26.9	-	D - 4.9	2.2	0.4	0.3	0.2	0.15	1.78
SPML	17 - 26.9	27 - 59.9	-	D - 7.3	3.2	0.6	0.4	0.25	0.15	2.62
SPMR	27 - 59.9	60 - 199.9	17 - 24.9	D - 10.7	4.2	1	0.5	0.3	0.2	3.53
SPMG	60 - 199.9	200 - 255.9	25 - 59.9	D - 15.1	6.3	1.3	0.7	0.4	0.25	5.33
SPMH	200 - 255.9	256 - 669.9	60 - 199.9	D - 20.5	8.1	1.8	0.8	0.6	0.35	7
SPMHH	256 - 669.9	670 - 999.9	200 - 255.9	D - 24.0	8.1	1.8	0.9	0.7	0.4	7



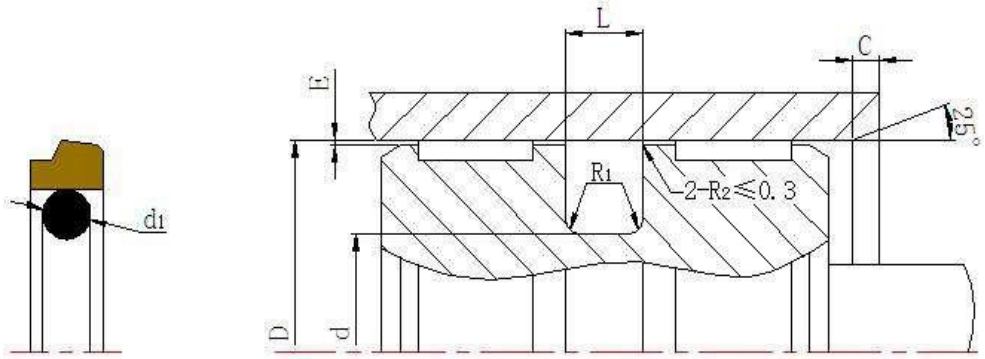
Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
9	4.1	2.2	SPMLL00090	3.68 x 1.78
10	5.1	2.2	SPMLL00100	4.47 x 1.78
12	7.1	2.2	SPMLL00120	6.70 x 1.80
14	9.1	2.2	SPMLL00140	8.75 x 1.80
14.5	9.6	2.2	SPMLL00145	9.25 x 1.78
15	10.1	2.2	SPMLL00150	9.50 x 1.80
15	7.7	3.2	SPML00150	7.03 x 2.62
16	11.1	2.2	SPMLL00160	10.60 x 1.80
18	10.7	3.2	SPML00180	9.19 x 2.62
20	15.1	2.2	SPMLL00200	14.00 x 1.78
20	12.7	3.2	SPML00200	12.37 x 2.62
22	14.7	3.2	SPML00220	13.94 x 2.62
25	17.7	3.2	SPML00250	17.12 x 2.62
25	14.3	4.2	SPMR00250	13.87 x 3.53
28	17.3	4.2	SPMR00280	15.47 x 3.53
30	22.7	3.2	SPML00300	21.89 x 2.62
30	19.3	4.2	SPMR00300	18.66 x 3.53
32	24.7	3.2	SPML00320	23.47 x 2.62
32	21.3	4.2	SPMR00320	20.22 x 3.53
35	24.3	4.2	SPMR00350	23.40 x 3.53
40	32.7	3.2	SPML00400	31.42 x 2.62
40	29.3	4.2	SPMR00400	28.17 x 3.53
42	31.3	4.2	SPMR00420	29.75 x 3.53



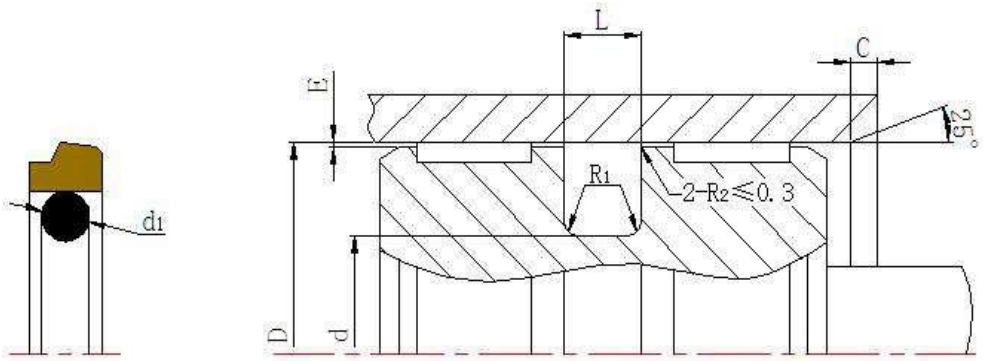
Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
45	34.3	4.2	SPMR00450	32.92 x 3.53
48	37.3	4.2	SPMR00480	36.09 x 3.53
50	39.3	4.2	SPMR00500	37.69 x 3.53
50	34.9	6.3	SPMG00500	32.69 x 5.33
52	41.3	4.2	SPMR00520	40.87 x 3.53
55	44.3	4.2	SPMR00550	44.04 x 3.53
60	44.9	6.3	SPMG00600	43.82 x 5.33
63	52.3	4.2	SPMR00630	50.39 x 3.53
63	47.9	6.3	SPMG00630	46.99 x 5.33
65	49.9	6.3	SPMG00650	46.99 x 5.33
70	59.3	4.2	SPMR00700	56.74 x 3.53
70	54.9	6.3	SPMG00700	53.34 x 5.33
75	59.9	6.3	SPMG00750	56.52 x 5.33
80	64.9	6.3	SPMG00800	62.87 x 5.33
80	59.5	8.1	SPMH00800	58.00 x 7.00
85	69.9	6.3	SPMG00850	69.22 x 5.33
85	64.5	8.1	SPMH00850	63.00 x 7.00
90	74.9	6.3	SPMG00900	72.39 x 5.33
90	69.5	8.1	SPMH00900	68.00 x 7.00
95	79.9	6.3	SPMG00950	78.74 x 5.33
95	74.5	8.1	SPMH00950	73.00 x 7.00
100	84.9	6.3	SPMG01000	81.92 x 5.33



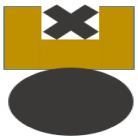
Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
100	79.5	8.1	SPMH01000	78.00 x 7.00
105	89.9	6.3	SPMG01050	88.27 x 5.33
105	84.5	8.1	SPMH01050	83.00 x 7.00
106	90.9	6.3	SPMG01060	88.27 x 5.33
110	94.9	6.3	SPMG01100	91.44 x 5.33
110	89.5	8.1	SPMH01100	88.00 x 7.00
115	99.9	6.3	SPMG01150	97.79 x 5.33
115	94.5	8.1	SPMH01150	93.00 x 7.00
120	104.9	6.3	SPMG01200	104.14 x 5.33
120	99.5	8.1	SPMH01200	98.00 x 7.00
125	109.9	6.3	SPMG01250	107.32 x 5.33
125	104.5	8.1	SPMH01250	103.00 x 7.00
130	114.9	6.3	SPMG01300	113.67 x 5.33
130	109.5	8.1	SPMH01300	108.00 x 7.00
135	114.5	8.1	SPMH01350	113.67 x 7.00
140	119.5	8.1	SPMH01400	116.84 x 7.00
145	124.5	8.1	SPMH01450	123.19 x 7.00
150	129.5	8.1	SPMH01500	126.37 x 7.00
155	139.9	6.3	SPMG01550	135.89 x 5.33
160	144.9	6.3	SPMG01600	142.24 x 5.33
160	139.5	8.1	SPMH01600	135.89 x 7.00
165	149.9	6.3	SPMG01650	148.49 x 5.33
165	144.5	8.1	SPMH01650	142.24 x 7.00



Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
170	149.5	8.1	SPMH01700	145.42 x 7.00
175	159.9	6.3	SPMG01750	158.12 x 5.33
180	164.9	6.3	SPMG01800	164.47 x 5.33
180	159.5	8.1	SPMH01800	158.12 x 7.00
190	174.9	6.3	SPMG01900	170.82 x 5.33
190	169.5	8.1	SPMH01900	164.47 x 7.00
200	184.9	6.3	SPMG02000	183.52 x 5.33
200	179.5	8.1	SPMH02000	177.17 x 7.00
205	184.5	8.1	SPMH02050	183.52 x 7.00
210	189.5	8.1	SPMH02100	183.52 x 7.00
220	204.9	6.3	SPMG02200	202.57 x 5.33
220	199.5	8.1	SPMH02200	196.22 x 7.00
230	209.5	8.1	SPMH02300	208.90 x 7.00
240	219.5	8.1	SPMH02400	215.27 x 7.00
250	229.5	8.1	SPMH02500	227.97 x 7.00
250	226	8.1	SPMHH02500	227.97 x 7.00
260	236	8.1	SPMHH02600	227.97 x 7.00
270	246	8.1	SPMHH02700	240.67 x 7.00
280	256	8.1	SPMHH02800	253.37 x 7.00
300	276	8.1	SPMHH03000	266.07 x 7.00
306	285.5	8.1	SPMH03060	278.77 x 7.00
310	286	8.1	SPMHH03100	278.77 x 7.00
320	299.5	8.1	SPMH03200	291.47 x 7.00



Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
320	296	8.1	SPMHH03200	291.47 x 7.00
330	306	8.1	SPMHH03300	304.17 x 7.00
340	316	8.1	SPMHH03400	316.87 x 7.00
345	324.5	8.1	SPMH03450	316.87 x 7.00
350	326	8.1	SPMHH03500	316.87 x 7.00
360	336	8.1	SPMHH03600	329.57 x 7.00
370	346	8.1	SPMHH03700	342.27 x 7.00
380	356	8.1	SPMHH03800	354.97 x 7.00
400	376	8.1	SPMHH04000	367.67 x 7.00



QP -Double Acting Piston Seal

QP PTFE Seal is a double-acting seal consisting of a seal ring of PTFE material, and Quad-Ring seal and an O-ring as energizing element. The PTFE seal ring and the Quad-Ring seal together create the dynamic sealing function while the O-ring performs the static sealing function.

QP-Seal is supplied as standard with radial notches on bothsides which ensure direct pressurizing of the seal under alloperating conditions.

Application Area

PQ-Seal is the recommended sealing element for doubleacting pistons of positioning and holding cylinders for Mobile hydraulics, Machine tools, Hydro-pneumatic suspensions for heavy vehicles, Presses, Semi-static piston accumulator's Active stabilizers

Advantages

- High sealing effect in applications requiring media separation, e.g. fluid/fluid or fluid/gas
- Double security through the combination of low-friction special materials with elastomer seals. Simple groove design, small installation space interchangeable with PTFE Piston seals.

Ordering Code

Example Part NO-QP- M- R- 00480- BR- N

- **N/F - NBR/Viton Energizer Material**
- **BR-Bronze Filled**
- **00480- Divided by 10 to Identify the Seal Size**
- **R/G/H/ HH - Regular/General / Heavy/ Heaviest**
- **M/I - Metric/ Inch**
- **QP-Profile**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

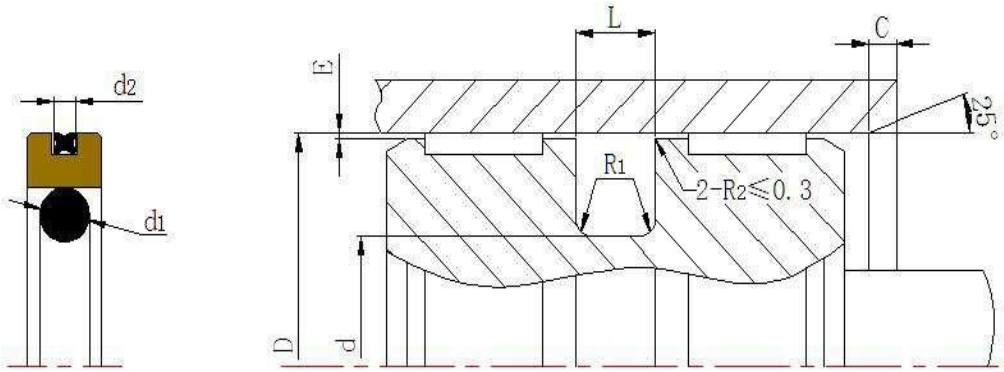
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤50 MPa	-45…+200 °C (Depending on O-Ring and QUAD-RING Seal material)	≤2 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

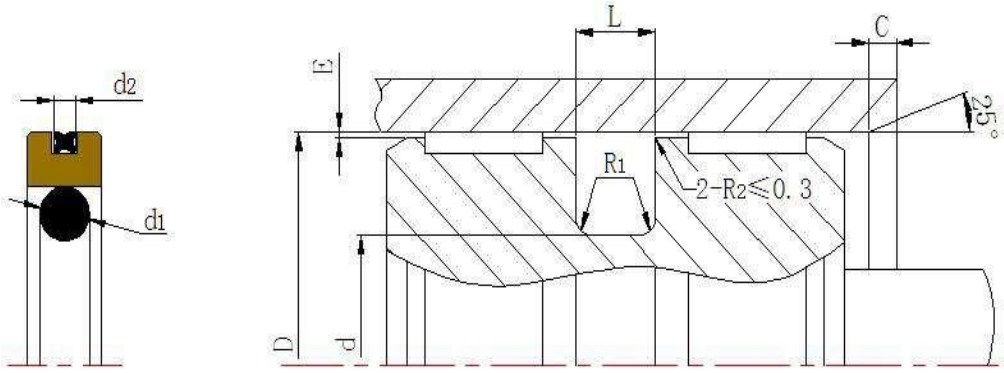
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

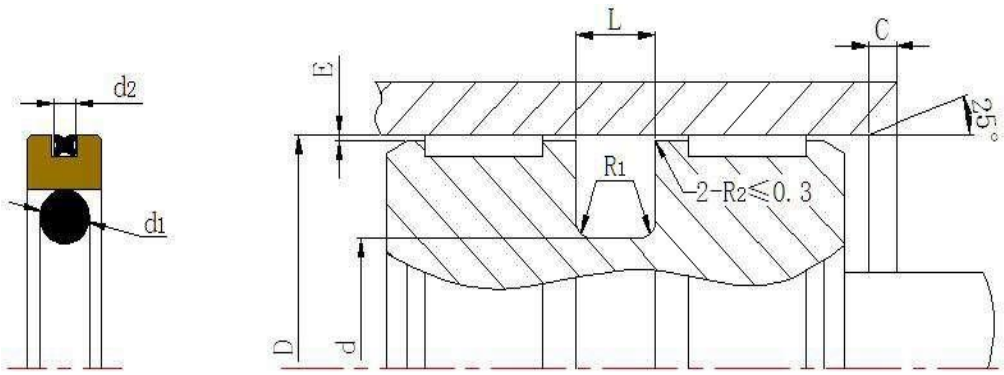
Bore Diameter D H9				Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section	X-Ring Cross Section
Standard Application		Regular Application		d h9	L+0.2	R1 max	10 MPa	20 MPa	40 MPa	d1	d2
Series No	Diameter Range	Series No	Diameter Range								
QPMG	15 - 39.9	QPMR	40 - 79.9	D - 11.0	4.2	1	0.25	0.15	0.1	3.53	1.78
QPMG	40 - 79.9	QPMR	80 - 132.9	D - 15.5	6.3	1.3	0.3	0.2	0.15	5.33	1.78
QPMH	80 - 132.9			D - 21.0	8.1	1.8	0.3	0.2	0.15	7	2.62
QPMHH	133 - 252.9	-	-	D - 24.5	8.1	1.8	0.3	0.2	0.15	7	2.62
QPMH	253 - 400.0	-	-	D - 28.0	9.5	2.5	0.45	0.3	0.25	8.4	3.53



Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1	X-Ring Size d2
16	5	4.2	QPMG00160	4.34 x 3.53	12.42 x 1.78
18	7	4.2	QPMG00180	6.40 x 3.53	14.00 x 1.78
20	9	4.2	QPMG00200	8.40 x 3.53	15.60 x 1.78
22	11	4.2	QPMG00220	10.69 x 3.53	17.17 x 1.78
25	14	4.2	QPMG00250	13.87 x 3.53	20.35 x 1.78
28	17	4.2	QPMG00280	15.47 x 3.53	23.52 x 1.78
30	19	4.2	QPMG00300	18.66 x 3.53	25.12 x 1.78
32	21	4.2	QPMG00320	20.22 x 3.53	26.70 x 1.78
35	24	4.2	QPMG00350	23.40 x 3.53	29.87 x 1.78
40	29	4.2	QPMR00400	28.17 x 3.53	34.65 x 1.78
42	31	4.2	QPMR00420	29.75 x 3.53	37.82 x 1.78
45	34	4.2	QPMR00450	32.92 x 3.53	37.82 x 1.78
48	37	4.2	QPMR00480	36.09 x 3.53	41.00 x 1.78
50	39	4.2	QPMR00500	37.69 x 3.53	44.17 x 1.78
50	34.5	6.3	QPMG00500	32.69 x 5.33	44.17 x 1.78
52	41	4.2	QPMR00520	40.87 x 3.53	47.35 x 1.78
55	44	4.2	QPMR00550	44.04 x 3.53	50.52 x 1.78
60	49	4.2	QPMR00600	47.22 x 3.53	53.70 x 1.78
63	52	4.2	QPMR00630	50.39 x 3.53	56.87 x 1.78
63	47.5	6.3	QPMG00630	46.99 x 5.33	56.87 x 1.78
65	54	4.2	QPMR00650	53.57 x 3.53	60.05 x 1.78
70	59	4.2	QPMR00700	56.74 x 3.53	63.22 x 1.78
70	54.5	6.3	QPMG00700	53.34 x 5.33	63.22 x 1.78



Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1	X-Ring Size d2
75	64	4.2	QPMR00750	63.09 x 3.53	69.57 x 1.78
80	64.5	6.3	QPMR00800	62.87 x 5.33	72.75 x 1.78
80	59	8.1	QPMH00800	58.00 x 7.00	71.12 x 2.62
85	69.5	6.3	QPMR00850	69.22 x 5.33	75.92 x 1.78
85	64	8.1	QPMH00850	63.00 x 7.00	75.87 x 2.62
90	74.5	6.3	QPMR00900	72.39 x 5.33	82.27 x 1.78
90	69	8.1	QPMH00900	68.00 x 7.00	82.22 x 2.62
95	79.5	6.3	QPMR00950	78.74 x 5.33	88.62 x 1.78
95	74	8.1	QPMH00950	73.00 x 7.00	82.22 x 2.62
100	84.5	6.3	QPMR01000	81.92 x 5.33	88.62 x 1.78
100	79	8.1	QPMH01000	78.00 x 7.00	88.57 x 2.62
105	89.5	6.3	QPMR01050	88.27 x 5.33	94.97 x 1.78
105	84	8.1	QPMH01050	83.00 x 7.00	94.92 x 2.62
110	94.5	6.3	QPMR01100	91.44 x 5.33	101.32 x 1.78
110	89	8.1	QPMH01100	88.00 x 7.00	101.27 x 2.62
115	99.5	6.3	QPMR01150	97.79 x 5.33	107.67 x 1.78
115	94	8.1	QPMH01150	93.00 x 7.00	107.62 x 2.62
120	104.5	6.3	QPMR01200	100.97 x 5.33	114.02 x 1.78
120	99	8.1	QPMH01200	98.00 x 7.00	107.62 x 2.62
125	109.5	6.3	QPMR01250	107.32 x 5.33	114.02 x 1.78
125	104	8.1	QPMH01250	103.00 x 7.00	113.97 x 2.62
130	114.5	6.3	QPMR01300	113.67 x 5.33	120.37 x 1.78
130	109	8.1	QPMH01300	108.00 x 7.00	120.32 x 2.62



Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1	X-Ring Size d2
135	114	8.1	QPMHH01350	113.67 x 7.00	126.67 x 2.62
140	119	8.1	QPMHH01400	116.84 x 7.00	126.67 x 2.62
150	129	8.1	QPMHH01500	126.37 x 7.00	139.37 x 2.62
160	139	8.1	QPMHH01600	135.89 x 7.00	145.72 x 2.62
170	149	8.1	QPMHH01700	145.42 x 7.00	158.42 x 2.62
180	159	8.1	QPMHH01800	158.12 x 7.00	171.12 x 2.62
190	169	8.1	QPMHH01900	164.47 x 7.00	177.47 x 2.62
200	179	8.1	QPMHH02000	177.17 x 7.00	190.17 x 2.62
210	189	8.1	QPMHH02100	183.52 x 7.00	196.52 x 2.62
220	199	8.1	QPMHH02200	196.22 x 7.00	202.87 x 2.62
230	209	8.1	QPMHH02300	202.57 x 7.00	215.57 x 2.62
240	219	8.1	QPMHH02400	215.27 x 7.00	221.92 x 2.62
250	225.5	8.1	QPMH02500	227.97 x 7.00	234.62 x 2.62
250	229	8.1	QPMHH02500	227.97 x 7.00	234.62 x 2.62
280	252	9.5	QPMH02800	250.00 x 8.40	266.29 x 3.53
300	272	9.5	QPMH03000	270.00 x 8.40	278.99 x 3.53
310	282	9.5	QPMH03100	280.00 x 8.40	291.69 x 3.53
320	292	9.5	QPMH03200	304.00 x 8.40	304.39 x 3.53
350	322	9.5	QPMH03500	330.00 x 8.40	329.79 x 3.53
400	372	9.5	QPMH04000	370.00 x 8.40	380.59 x 3.53

QP2 - Heavy Duty Double Acting Piston Seals

QP2 the particular characteristics of the seal profile with a defined seal edge and the use of two O-Ringsas energizing elements to optimize the pressure profile and to reduce gas permeability. Combines the benefits of a low-friction PTFE seal with the high sealing characteristics. This optimizes leakagecontrol while minimizing friction.

Application Area

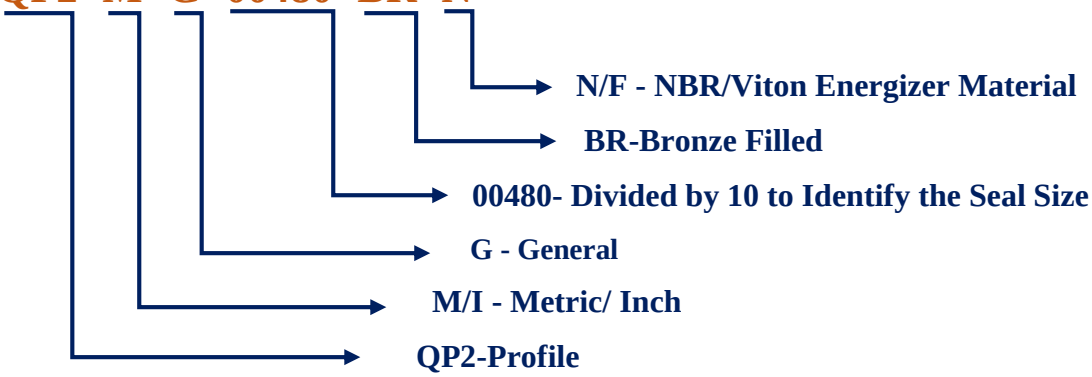
Excellent sealing in application that require separation of two different fluids/Media.
QP2 is mainly designed for heavy duty and largediameter applications and is recommended as double acting Piston seal for hydraulic equipment such as Mobil hydraulics, Cranes Etc.

Advantages

- High sealing effect in applications requiring mediaseparation, e.g. fluid/fluid or fluid/gas,
- Double security through the combination of low-frictionspecial materials with elastomer seals,
- Low gas permeation rate, higher pressure application, higher sliding speed comparedto QP2 Seal.
- Outstanding sliding properties, no stick-slip effect

Ordering Code

Example Part NO-QP2- M- G- 00480- BR- N



Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

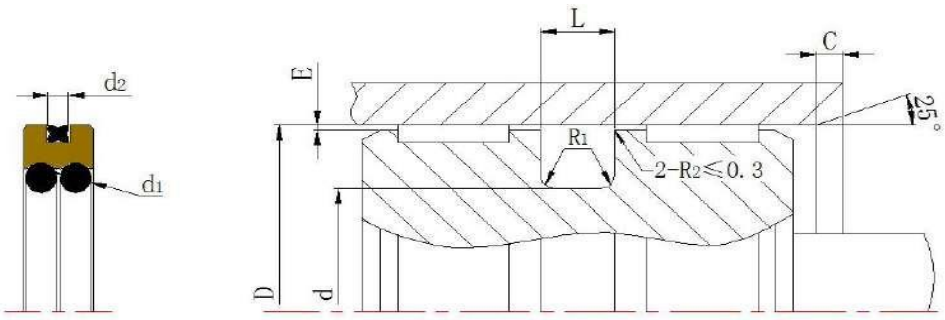
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤60 MPa	-45…+200 °C (Depending on O-Ring and QUAD-RING Seal material)	≤3 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

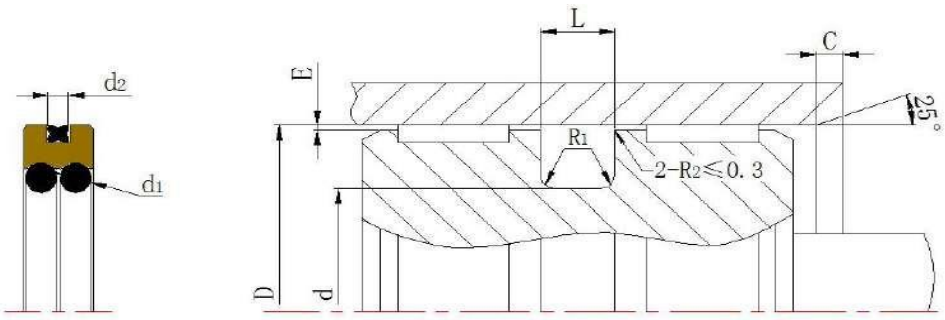
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

Series No	Bore Diameter D H9		Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section	X-Ring Cross Section
	Standard Application	Available Range	d h9	L +0.2	R1 max	10 MPa	20 MPa	30 MPa	d1	d2
Q2PMG	40 - 79.9	25 - 250	D - 10.0	6.3	0.6	0.3	0.2	0.15	2.62	1.78
Q2PMG	80 - 132.9	50 - 275	D - 13.0	8.3	1	0.4	0.3	0.15	3.53	2.62
Q2PMG	133 - 462.9	100 - 480	D - 18.0	12.3	1.3	0.4	0.3	0.2	5.33	3.53



Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1	X-Ring Size d2
40	30	6.3	QP2MG00400	29.82 x 2.62	34.65 x 1.78
42	32	6.3	QP2MG00420	31.42 x 2.62	37.82 x 1.78
45	35	6.3	QP2MG00450	34.59 x 2.62	37.82 x 1.78
48	38	6.3	QP2MG00480	37.77 x 2.62	41.00 x 1.78
50	40	6.3	QP2MG00500	39.34 x 2.62	44.17 x 1.78
52	42	6.3	QP2MG00520	40.94 x 2.62	47.35 x 1.78
55	45	6.3	QP2MG00550	44.12 x 2.62	50.52 x 1.78
60	50	6.3	QP2MG00600	48.90 x 2.62	53.70 x 1.78
63	53	6.3	QP2MG00630	52.07 x 2.62	56.87 x 1.78
65	55	6.3	QP2MG00650	53.64 x 2.62	60.05 x 1.78
70	60	6.3	QP2MG00700	58.42 x 2.62	63.22 x 1.78
75	65	6.3	QP2MG00750	63.17 x 2.62	69.57 x 1.78
80	67	8.3	QP2MG00800	66.27 x 3.53	71.12 x 2.62
85	72	8.3	QP2MG00850	69.44 x 3.53	75.87 x 2.62
90	77	8.3	QP2MG00900	75.79 x 3.53	82.22 x 2.62
95	82	8.3	QP2MG00950	78.97 x 3.53	82.22 x 2.62
100	87	8.3	QP2MG01000	85.32 x 3.53	88.57 x 2.62
105	92	8.3	QP2MG01050	91.67 x 3.53	94.92 x 2.62
110	97	8.3	QP2MG01100	94.84 x 3.53	101.27 x 2.62
115	102	8.3	QP2MG01150	101.19 x 3.53	107.62 x 2.62
120	107	8.3	QP2MG01200	104.37 x 3.53	107.62 x 2.62
125	112	8.3	QP2MG01250	110.72 x 3.53	113.97 x 2.62



Bore Dia D/H9	Groove Dia d/h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1	X-Ring Size d2
130	117	8.3	QP2MG01300	113.89 x 3.53	120.32 x 2.62
135	117	12.3	QP2MG01350	113.67 x 5.33	123.42 x 3.53
140	122	12.3	QP2MG01400	120.02 x 5.33	126.59 x 3.53
150	132	12.3	QP2MG01500	129.54 x 5.33	136.12 x 3.53
160	142	12.3	QP2MG01600	139.07 x 5.33	145.64 x 3.53
170	152	12.3	QP2MG01700	148.49 x 5.33	158.34 x 3.53
180	162	12.3	QP2MG01800	158.12 x 5.33	164.69 x 3.53
190	172	12.3	QP2MG01900	170.82 x 5.33	177.39 x 3.53
200	182	12.3	QP2MG02000	177.17 x 5.33	183.74 x 3.53
210	192	12.3	QP2MG02100	189.87 x 5.33	196.44 x 3.53
220	202	12.3	QP2MG02200	196.22 x 5.33	202.79 x 3.53
230	212	12.3	QP2MG02300	208.92 x 5.33	215.49 x 3.53
240	222	12.3	QP2MG02400	221.62 x 5.33	221.84 x 3.53
250	232	12.3	QP2MG02500	227.97 x 5.33	234.54 x 3.53
280	262	12.3	QP2MG02800	253.37 x 5.33	266.29 x 3.53
300	282	12.3	QP2MG03000	278.77 x 5.33	278.99 x 3.53
320	302	12.3	QP2MG03200	291.47 x 5.33	304.39 x 3.53
350	332	12.3	QP2MG03500	329.57 x 5.33	329.79 x 3.53

HDPS - Heavy Duty Piston Seal

HDPS PTFE seal is a compact, double-acting, high-performance piston seal capable of handling the high pressure and pressure spikes associated with high-performance systems.

Anti-extrusion rings that protect the seal face and energizer from damaging high-pressure shocks well beyond what standard industry designs are capable of. This design, along with our exclusive high-performance PTFE material and high-grade elastomer.

Advantages

- HDPS consists of a filled PTFE cap, high-grade elastomeric energizer, and two precision anti-extrusion rings.
- HDPS is suitable for a wide range of PTFE materials, the most common being bronze.

Ordering Code

Example Part NO- HDP - M - G - 01000 - BR - N

- **N - NBR**
- **BR-Bronze Filled**
- **01000- Divided by 10 to Identify the Seal Size**
- **G - General**
- **M/I - Metric/ Inch**
- **HDP- Profile**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

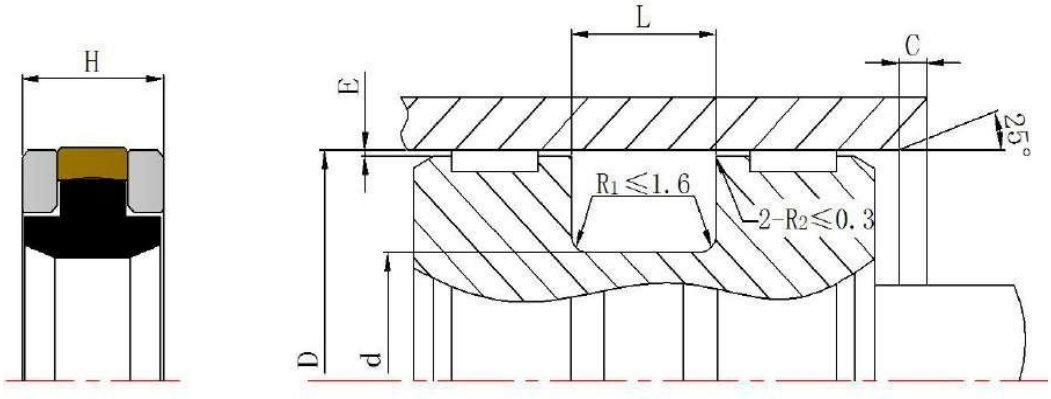
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤60 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤1.5 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

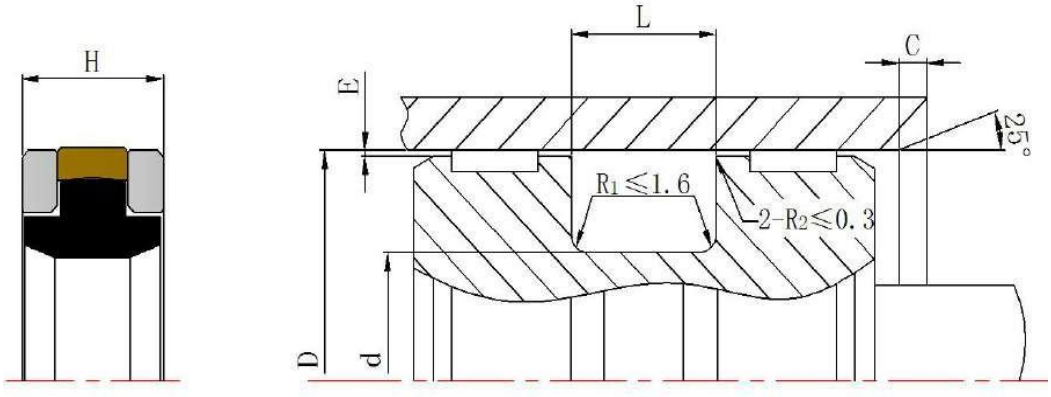
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

Bore Diameter D H9	Groove Width	Radius	Radial Clearance E max	
Standard Application	L +0.2	R1 max	30 MPa	30-60 Mpa
50-60	9	0.3	0.5	0.3
63 – 90	11	0.5	0.5	0.3
100-120	12.5	0.5	0.5	0.3
125 -300	16	0.6	0.5	0.3



Bore Dia D/H9	Groove Dia d/ h9	Groove Width L + 0.2	RSS Part NO
50	36	9	HDPMG00500
60	46	9	HDPMG00600
63	48	11	HDPMG00630
65	50	11	HDPMG00650
70	55	11	HDPMG00700
75	60	11	HDPMG00750
80	65	11	HDPMG00800
85	70	11	HDPMG00850
90	75	11	HDPMG00900
95	80	11	HDPMG00950
100	85	12.5	HDPMG01000
105	90	12.5	HDPMG01050
110	95	12.5	HDPMG01100
115	100	12.5	HDPMG01150
125	102	16	HDPMG01250
120	105	12.5	HDPMG01200
130	107	16	HDPMG01300
135	112	16	HDPMG01350
140	117	16	HDPMG01400
145	122	16	HDPMG01450
150	127	16	HDPMG01500
160	137	16	HDPMG01600
165	142	16	HDPMG01650
170	147	16	HDPMG01700



Bore Dia D/H9	Groove Dia d/ h9	Groove Width L + 0.2	RSS Part NO
175	152	16	HDPMG01750
180	157	16	HDPMG01800
185	162	16	HDPMG01850
190	167	16	HDPMG01900
200	177	16	HDPMG02000
210	187	16	HDPMG02100
215	192	16	HDPMG02150
220	197	16	HDPMG02200
225	202	16	HDPMG02250
230	207	16	HDPMG02300
235	212	16	HDPMG02350
240	217	16	HDPMG02400
250	222	17.5	HDPMG02500
260	232	17.5	HDPMG02600
270	242	17.5	HDPMG02700
275	247	17.5	HDPMG02750
280	252	17.5	HDPMG02800
290	262	17.5	HDPMG02900
300	272	17.5	HDPMG03000

DPG - Delta Piston Seals - General

DPG Delta Piston Seal is rubber energized plastic faced seal, designed to expand and significantly improve the service parameters of O-Rings. Delta can be installed in existing O-Ring grooves.

The double-acting performance of the seal follows from the symmetrical cross section which allows the seal to respond topressure in both directions.

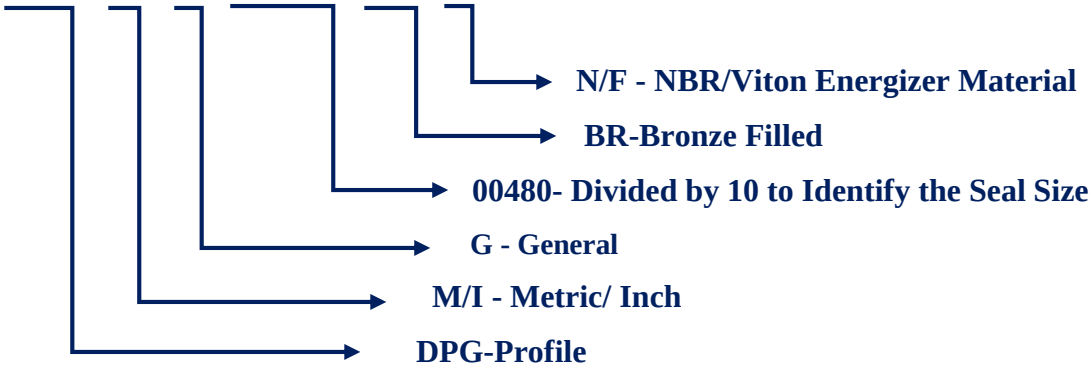
Delta combines the flexibility and responsivenessof O-Rings with the wear and friction characteristics of thePTFE materials in dynamic applications.

Advantages

- PTFE Delta is used as double acting piston seal forhydraulic and pneumatic cylinders in applications such as Machine tools, Handling devices and valves.
- Fits Groove dimensions MIL-G-5514F
- Can be used in standard AS-568 dynamic O-ring Groove.

Ordering Code

Example Part NO-DPG- M- G- 00480- BR- N



Important Note:
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In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

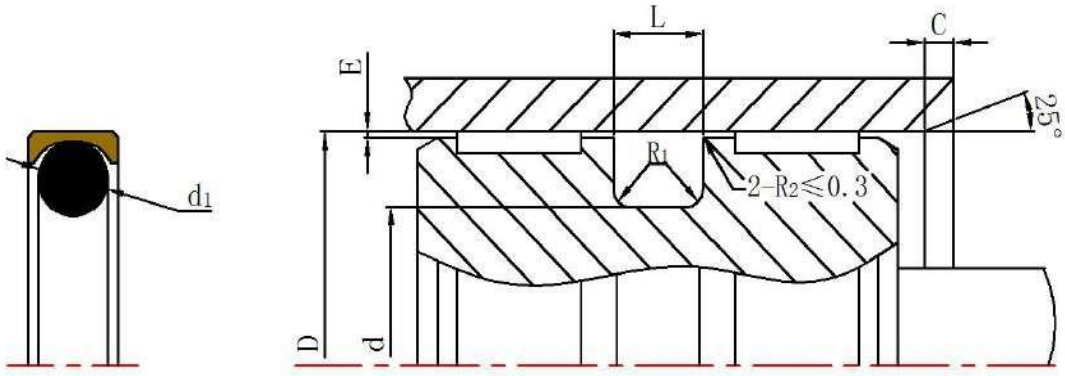
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤35 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

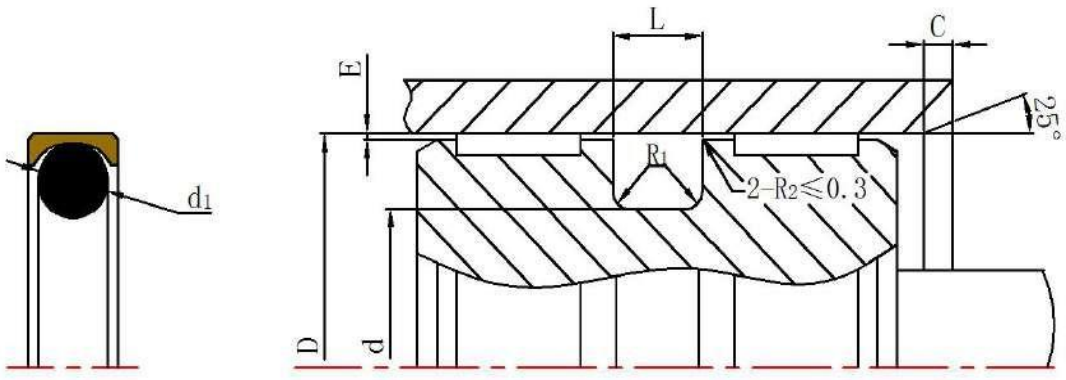
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

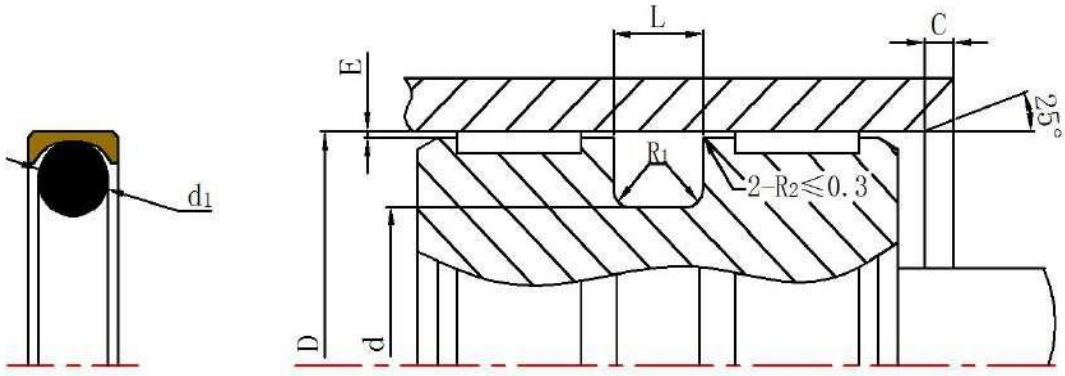
Series No	Bore Diameter D H9		Groove Dia	Groove Width	Radius	Radial Clearance E max				O-Ring Cross Section
	Standard Application	Available Range	d h9	L +0.2	R1 max	2 Mpa	10 Mpa	20 Mpa	35 Mpa	d1
DPGMG	5 - 13.9	5 - 139.9	D - 2.9	2.4	0.4	0.1	0.1	0.08	0.05	1.78
DPGMG	14 - 24.9	8 - 259.9	D - 4.5	3.6	0.4	0.15	0.15	0.1	0.07	2.62
DPGMG	25 - 45.9	12 - 469.9	D - 6.2	4.8	0.6	0.25	0.2	0.15	0.08	3.53
DPGMG	46 - 124.9	20 - 669.9	D - 9.4	7.1	0.8	0.35	0.25	0.2	0.1	5.33
DPGMG	125 - 400.00	80 - 400.00	D - 12.2	9.5	0.8	0.5	0.3	0.25	0.15	7



Bore Dia D/H9	Groove Dia d/ h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
6	3.1	2.4	DPGMG00060	2.57 x 1.78
8	5.1	2.4	DPGMG00080	4.47 x 1.78
9	6.1	2.4	DPGMG00090	5.60 x 1.80
10	7.1	2.4	DPGMG00100	6.70 x 1.80
11	8.1	2.4	DPGMG00110	7.65 x 1.78
12	9.1	2.4	DPGMG00120	8.75 x 1.80
12.7	9.8	2.4	DPGMG00127	9.25 x 1.78
14	9.5	3.6	DPGMG00140	9.19 x 2.62
15	10.5	3.6	DPGMG00150	9.19 x 2.62
16	11.5	3.6	DPGMG00160	10.77 x 2.62
18	13.5	3.6	DPGMG00180	12.37 x 2.62
20	15.5	3.6	DPGMG00200	14.50 x 2.65
22	17.5	3.6	DPGMG00220	17.12 x 2.62
24	19.5	3.6	DPGMG00240	18.72 x 2.62
25	18.8	4.8	DPGMG00250	17.04 x 3.53
25.4	19.2	4.8	DPGMG00254	18.66 x 3.53
27	20.8	4.8	DPGMG00270	20.22 x 3.53
28	21.8	4.8	DPGMG00280	20.22 x 3.53
30	23.8	4.8	DPGMG00300	23.40 x 3.53
32	25.8	4.8	DPGMG00320	25.00 x 3.53



Bore Dia D/H9	Groove Dia d/ h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
35	28.8	4.8	DPGMG00350	28.17 x 3.53
40	33.8	4.8	DPGMG00400	32.92 x 3.53
42	35.8	4.8	DPGMG00420	34.52 x 3.53
45	38.8	4.8	DPGMG00450	37.69 x 3.53
48	38.6	7.1	DPGMG00480	37.47 x 5.33
50	40.6	7.1	DPGMG00500	37.47 x 5.33
50.8	41.4	7.1	DPGMG00508	40.64 x 5.33
52	42.6	7.1	DPGMG00520	40.64 x 5.33
55	45.6	7.1	DPGMG00550	43.82 x 5.33
56	46.6	7.1	DPGMG00560	43.82 x 5.33
60	50.6	7.1	DPGMG00600	50.17 x 5.33
63	53.6	7.1	DPGMG00630	53.34 x 5.33
65	55.6	7.1	DPGMG00650	53.34 x 5.33
70	60.6	7.1	DPGMG00700	59.69 x 5.33
75	65.6	7.1	DPGMG00750	62.87 x 5.33
80	70.6	7.1	DPGMG00800	69.22 x 5.33
85	75.6	7.1	DPGMG00850	72.39 x 5.33
90	80.6	7.1	DPGMG00900	78.74 x 5.33
95	85.6	7.1	DPGMG00950	81.92 x 5.33
100	90.6	7.1	DPGMG01000	88.27 x 5.33
110	100.6	7.1	DPGMG01100	97.79 x 5.33
115	105.6	7.1	DPGMG01150	104.14 x 5.33



Bore Dia D/H9	Groove Dia d/ h9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
120	110.6	7.1	DPGMG01200	107.32 x 5.33
125	112.8	9.5	DPGMG01250	113.67 x 7.00
130	117.8	9.5	DPGMG01300	116.84 x 7.00
135	122.8	9.5	DPGMG01350	120.02 x 7.00
140	127.8	9.5	DPGMG01400	126.37 x 7.00
150	137.8	9.5	DPGMG01500	135.89 x 7.00
160	147.8	9.5	DPGMG01600	145.42 x 7.00
170	157.8	9.5	DPGMG01700	151.77 x 7.00
180	167.8	9.5	DPGMG01800	164.47 x 7.00
190	177.8	9.5	DPGMG01900	177.17 x 7.00
200	187.8	9.5	DPGMG02000	183.52 x 7.00
210	197.8	9.5	DPGMG02100	196.22 x 7.00
220	207.8	9.5	DPGMG02200	202.57 x 7.00
230	217.8	9.5	DPGMG02300	215.27 x 7.00
240	227.8	9.5	DPGMG02400	227.97 x 7.00
250	237.8	9.5	DPGMG02500	227.97 x 7.00
280	267.8	9.5	DPGMG02800	266.07 x 7.00
300	287.8	9.5	DPGMG03000	278.77 x 7.00
320	307.8	9.5	DPGMG03200	304.17 x 7.00
350	337.8	9.5	DPGMG03500	329.57 x 7.00
400	387.8	9.5	DPGMG04000	380.37 x 7.00

ROD SEAL

SR - Step Rod Seal

SR sealing of piston rods places the highest demands on operational safety and environmental protection in hydraulic engineering. Rod seals must exhibit no dynamic leakage to the atmosphere side under all operating conditions and must be statically completely leak tight when the machine is at a standstill.

Furthermore, they should achieve a high degree of mechanical efficiency through low friction and be easy to install in small grooves. Costs and service life must meet the high expectations of the operator.

The single-acting seal element is made of high-grade PTFE materials with outstanding sliding and wear resistance properties. It is installed according to ISO 7425/2 and standard grooves, using an O-ring as energizing element.

Advantages

- High static and dynamic sealing effect
- High extrusion resistance, meets high hardware clearances.
- Low friction, high efficiency
- Stick-slip free starting, no sticking
- High abrasion resistance, high operational reliability
- Simple installation without seal edge deformation
- Wide range of application temperatures and high resistance to chemicals, depending on the choice of O-Ring material

Ordering Code

Example Part NO-SR- M- R- 00080- BR- N

N/F - NBR/Viton Energizer Material

BR-Bronze Filled

00080- Divided by 10 to Identify the Seal Size

R/G/H - Regular/General/Heavy

M/I - Metric/ Inch

SR-Profile

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

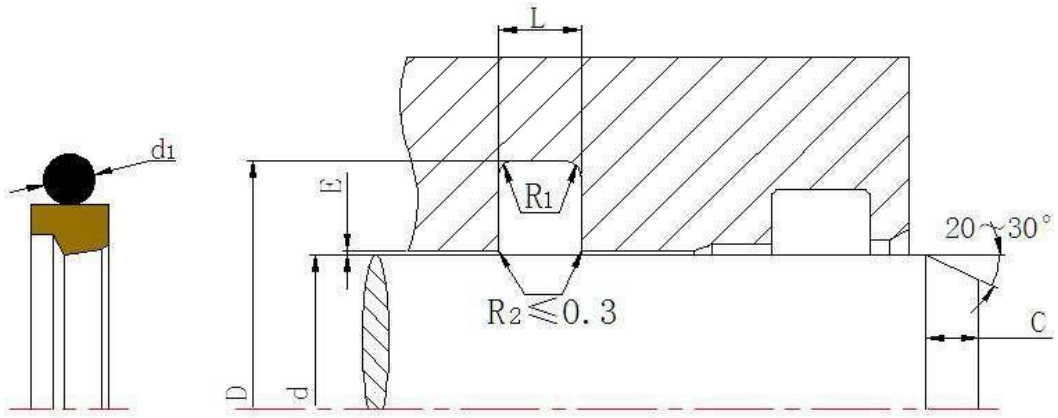
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤60 MPa	-45…+200 °C (Depending on O-Ring and QUAD-RING Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

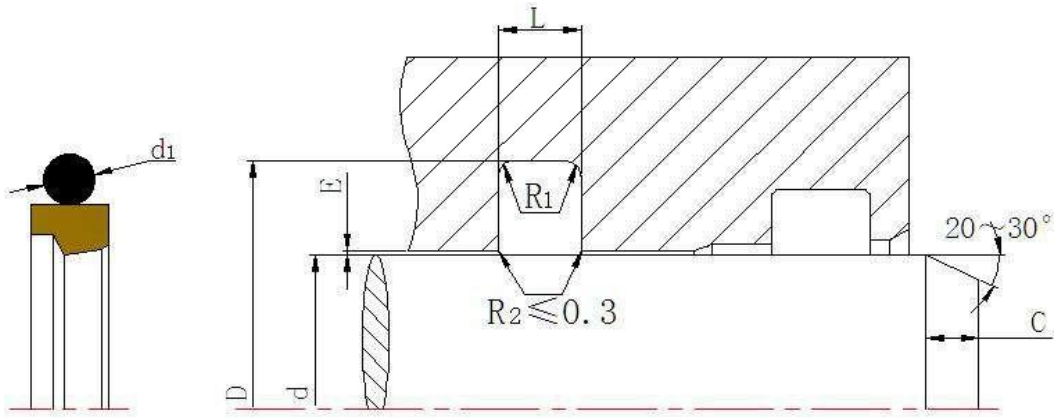
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

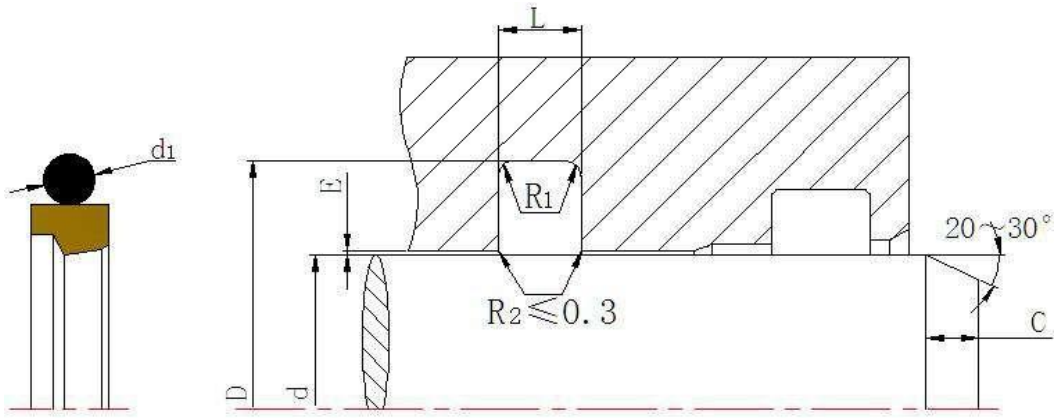
Series No	Rod Diameter d f8/h9			Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section
	Standard Application G	Light Application R	Heavy Duty Application	D H9	L +0.2	R1 max	10 MPa	20 MPa	40 MPa	d 1
SRMG	3 - 7.9	8 - 18.9	-	d + 4.9	2.2	0.4	0.3	0.2	0.15	1.78
SRMG	8 - 18.9	19 - 37.9	-	d + 7.3	3.2	0.6	0.4	0.25	0.15	2.62
SRMG	19 - 37.9	38 - 199.9	8 - 18.9	d + 10.7	4.2	1	0.5	0.3	0.2	3.53
SRMG	38 - 199.9	200 - 255.9	19 - 37.9	d + 15.1	6.3	1.3	0.7	0.4	0.25	5.33
SRMG	200 - 255.9	256 - 649.9	38 - 199.9	d + 20.5	8.1	1.8	0.8	0.6	0.35	7
SRMG	256 - 649.9	650 - 999.9	200 - 255.9	d + 24.0	8.1	1.8	0.9	0.7	0.4	7



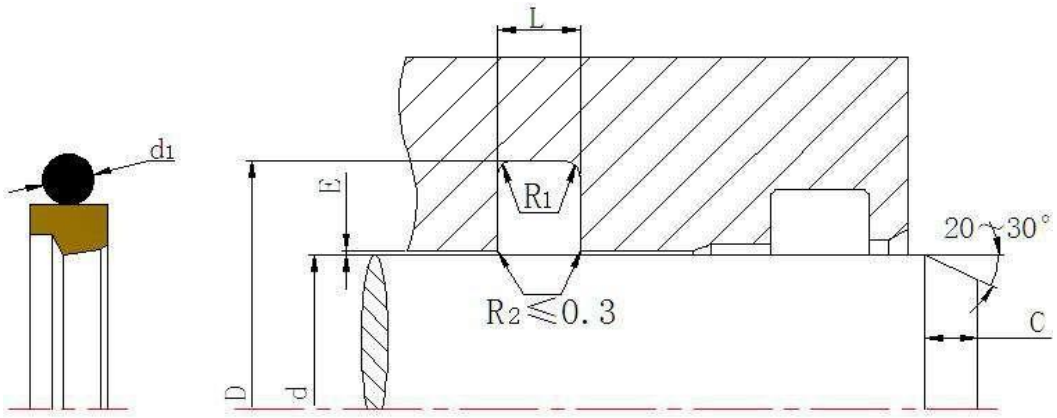
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
4,0	8,9	2,2	SRMG00040	5.6 x 1.8
5,0	9,9	2,2	SRMG00050	6.7 x 1.8
6,0	10,9	2,2	SRMG00060	7.65 x 1.78
7,0	11,9	2,2	SRMG00070	8.75 x 1.8
8,0	12,9	2,2	SRMR00080	9.5 x 1.8
8,0	15,3	3,2	SRMG00080	10.77 x 2.62
9,0	13,9	2,2	SRMR00090	10.82 x 1.78
9,0	16,3	3,2	SRMG00090	10.77 x 2.62
10,0	14,9	2,2	SRMR00100	11.8 x 1.8
10,0	17,3	3,2	SRMG00100	12.37 x 2.62
12,0	16,9	2,2	SRMR00120	14.00 x 1.78
12,0	19,3	3,2	SRMG00120	13.94 x 2.62
12,7	17,6	2,2	SRMR00127	14.00 x 1.78
12,7	20,0	3,2	SRMG00127	15.54 x 2.62
14,0	18,9	2,2	SRMR00140	15.60 x 1.78
14,0	21,3	3,2	SRMG00140	17.12 x 2.62
15,0	19,9	2,2	SRMR00150	17.17 x 1.78
15,0	22,3	3,2	SRMG00150	17.12 x 2.62
16,0	20,9	2,2	SRMR00160	17.17 x 1.78
16,0	23,3	3,2	SRMG00160	18.72 x 2.62



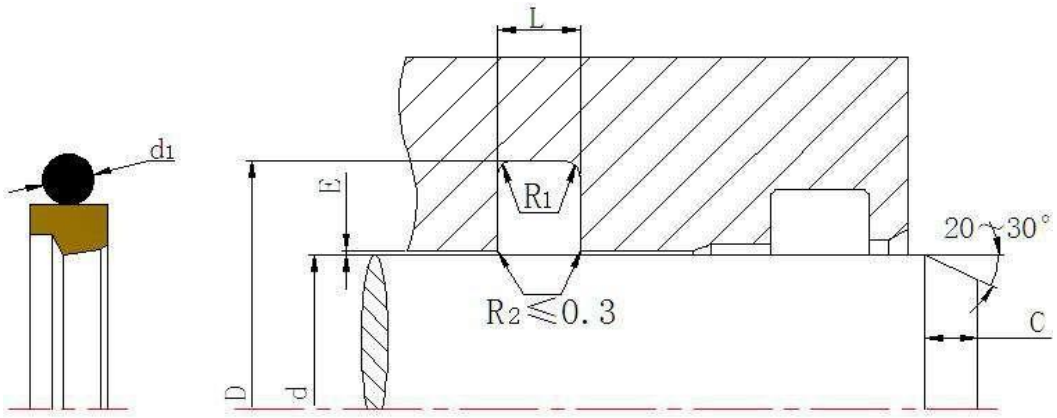
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
17,0	21,9	2,2	SRMR00170	18.77 x 1.78
18,0	22,9	2,2	SRMR00180	18.77 x 1.78
18,0	25,3	3,2	SRMG00180	20.29 x 2.62
19,0	29,7	4,2	SRMG00190	23.40 x 3.53
20,0	27,3	3,2	SRMR00200	21.89 x 2.62
20,0	30,7	4,2	SRMG00200	23.40 x 3.53
22,0	29,3	3,2	SRMR00220	25.07 x 2.62
22,0	32,7	4,2	SRMG00220	26.58 x 3.53
24,0	31,3	3,2	SRMR00240	26.64 x 2.62
25,0	32,3	3,2	SRMR00250	28.24 x 2.62
25,0	35,7	4,2	SRMG00250	29.75 x 3.53
25,4	32,7	3,2	SRMR00254	28.24 x 2.62
25,4	36,1	4,2	SRMG00254	29.75 x 3.53
26,0	33,3	3,2	SRMR00260	28.24 x 2.62
26,0	36,7	4,2	SRMG00260	29.75 x 3.53
28,0	35,3	3,2	SRMR00280	29.82 x 2.62
28,0	38,7	4,2	SRMG00280	32.92 x 3.53
28,575	35,875	3,2	SRMR00286	31.42 x 2.62
30,0	37,3	3,2	SRMR00300	32.99 x 2.62
30,0	40,7	4,2	SRMG00300	34.52 x 3.53



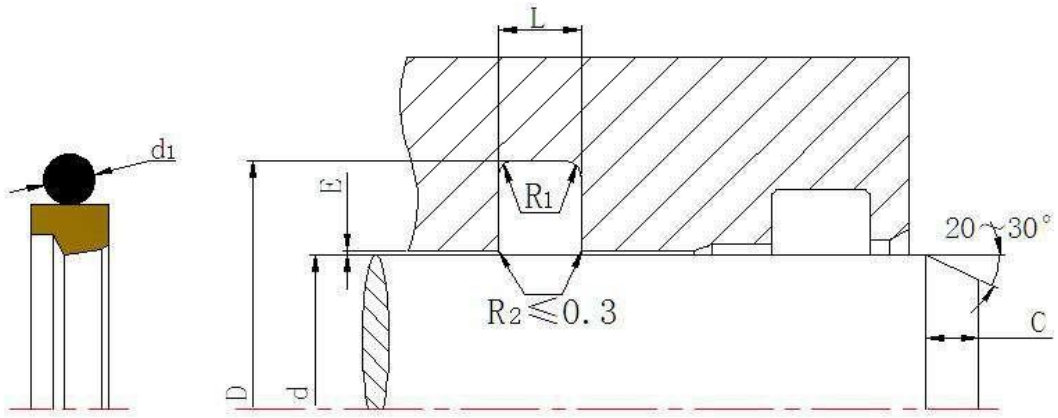
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
32,0	39,3	3,2	SRMR00320	34.59 x 2.62
32,0	42,7	4,2	SRMG00320	36.09 x 3.53
35,0	42,3	3,2	SRMR00350	37.77 x 2.62
35,0	45,7	4,2	SRMG00350	37.69 x 3.53
36,0	43,3	3,2	SRMR00360	39.34 x 2.62
36,0	46,7	4,2	SRMG00360	40.87 x 3.53
37,0	44,3	3,2	SRMR00370	39.34 2.62
37,0	47,7	4,2	SRMG00370	40.87 x 3.53
38,0	48,7	4,2	SRMR00380	40.87 x 3.53
38,0	53,1	6,3	SRMG00380	43.82 x 5.33
40,0	50,7	4,2	SRMR00400	44.04 x 3.53
40,0	55,1	6,3	SRMG00400	43.82 x 5.33
42,0	52,7	4,2	SRMR00420	47.22 x 3.53
42,0	57,1	6,3	SRMG00420	46.99 x 5.33
43,0	53,7	4,2	SRMR00430	47.22 x 3.53
44,45	59,55	6,3	SRMG00444	50.17 x 5.33
45,0	55,7	4,2	SRMR00450	50.39 x 3.53
45,0	60,1	6,3	SRMG00450	50.17 x 5.33
48,0	58,7	4,2	SRMR00480	51.5 x 3.55
48,0	63,1	6,3	SRMG00480	53.34 x 5.33



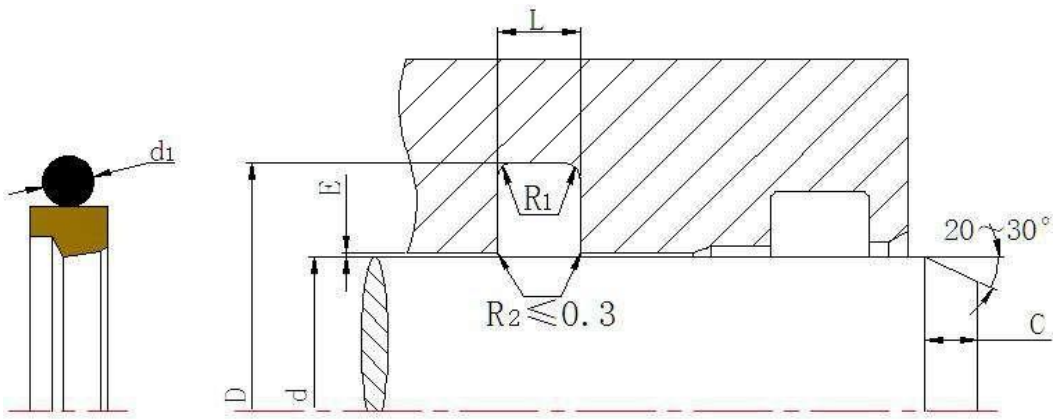
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
50,0	60,7	4,2	SRMR00500	53.57 x 3.53
50,0	65,1	6,3	SRMG00500	56.52 x 5.33
50,8	61,5	4,2	SRMR00508	53.57 x 3.53
50,8	65,9	6,3	SRMG00508	56.52 x 5.33
52,0	62,7	4,2	SRMR00520	56.74 x 3.53
52,0	67,1	6,3	SRMG00520	56.52 x 5.33
54,0	69,1	6,3	SRMG00540	59.69 x 5.33
55,0	65,7	4,2	SRMR00550	59.92 x 3.53
55,0	70,1	6,3	SRMG00550	59.69 x 5.33
56,0	66,7	4,2	SRMR00560	59.92 x 3.53
56,0	71,1	6,3	SRMG00560	62.87 x 5.33
56,0	76,5	8,1	SRMH00560	63 x 7.0
57,0	72,1	6,3	SRMG00570	62.87 x 5.33
59,0	69,7	4,2	SRMR00590	63.09 x 3.53
60,0	70,7	4,2	SRMR00600	63.09 x 3.53
60,0	75,1	6,3	SRMG00600	66.04 x 5.33
63,0	73,7	4,2	SRMR00630	66.27 x 3.53
63,0	78,1	6,3	SRMG00630	69.22 x 5.33
63,5	78,6	6,3	SRMG00635	69.22 x 5.33
65,0	75,7	4,2	SRMR00650	69.44 x 3.53



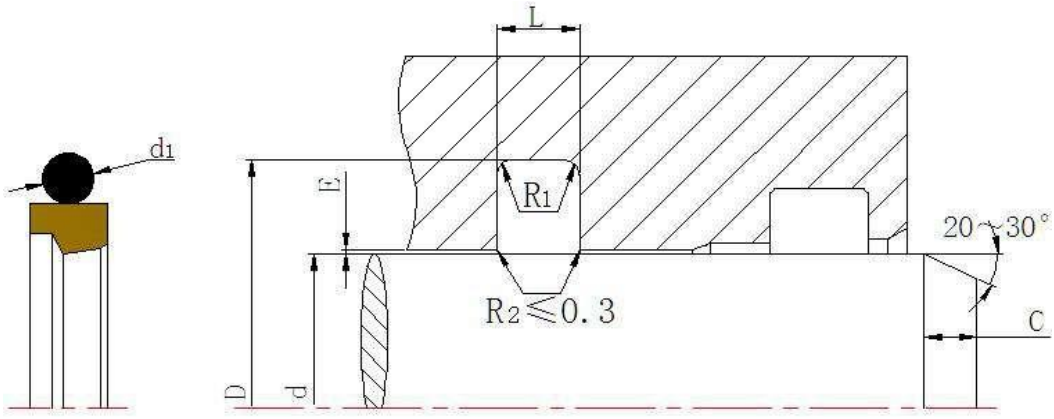
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
65,0	80,1	6,3	SRMG00650	69.22 x 5.33
67,0	77,7	4,2	SRMR00670	72.62 x 3.53
69,0	84,1	6,3	SRMG00690	75.57 x 5.33
70,0	80,7	4,2	SRMR00700	75.79 x 3.53
70,0	85,1	6,3	SRMG00700	75.57 x 5.33
70,0	90,5	8,1	SRMH00700	78 x 7.0
72,0	82,7	4,2	SRMR00720	75.79 x 3.53
73,0	88,1	6,3	SRMG00730	78.74 x 5.33
75,0	85,7	4,2	SRMR00750	78.97 x 3.53
75,0	90,1	6,3	SRMG00750	81.92 x 5.33
76,2	91,3	6,3	SRMG00762	81.92 x 5.33
78,0	93,1	6,3	SRMG00780	85.09 x 5.33
80,0	90,7	4,2	SRMR00800	85.32 x 3.53
80,0	95,1	6,3	SRMG00800	85.09 x 5.33
80,0	100,5	8,1	SRMH00800	88 x 7.0
82,5	97,6	6,3	SRMG00825	88.27 x 5.33
83,0	93,7	4,2	SRMR00830	88.49 x 3.53
85,0	95,7	4,2	SRMR00850	88.49 x 3.53
85,0	100,1	6,3	SRMG00850	91.44 x 5.33
85,0	105,5	8,1	SRMH00850	93 x 7.0



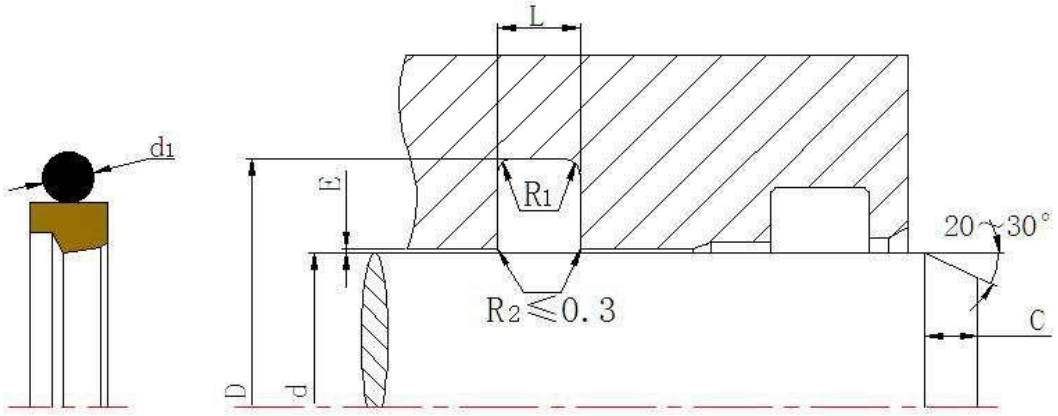
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
89,0	104,1	6,3	SRMG00890	94.62 x 5.33
90,0	100,7	4,2	SRMR00900	94.84 x 3.53
90,0	105,1	6,3	SRMG00900	94.62 x 5.33
90,0	110,5	8,1	SRMH00900	98 x 7.0
92,0	102,7	4,2	SRMR00920	98.02 x 3.53
92,0	107,1	6,3	SRMG00920	97.79 x 5.33
95,0	105,7	4,2	SRMR00950	101.19 x 3.53
95,0	110,1	6,3	SRMG00950	100.97 x 5.33
100,0	110,7	4,2	SRMR01000	104.37 x 3.53
100,0	115,1	6,3	SRMG01000	107.32 x 5.33
100,0	120,5	8,1	SRMH01000	108 x 7.0
101,6	116,7	6,3	SRMG01016	107.32 x 5.33
104,7	119,8	6,3	SRMG01047	110.49 x 5.33
105,0	120,1	6,3	SRMG01050	110.49 x 5.33
105,0	125,5	8,1	SRMH01050	113.67 x 7.0
110,0	120,7	4,2	SRMR01100	113.89 x 3.53
110,0	125,1	6,3	SRMG01100	116.84 x 5.33
110,0	130,5	8,1	SRMH01100	116.84 x 7.0
115,0	130,1	6,3	SRMG01150	120.02 x 5.33
120,0	135,1	6,3	SRMG01200	126.37 x 5.33



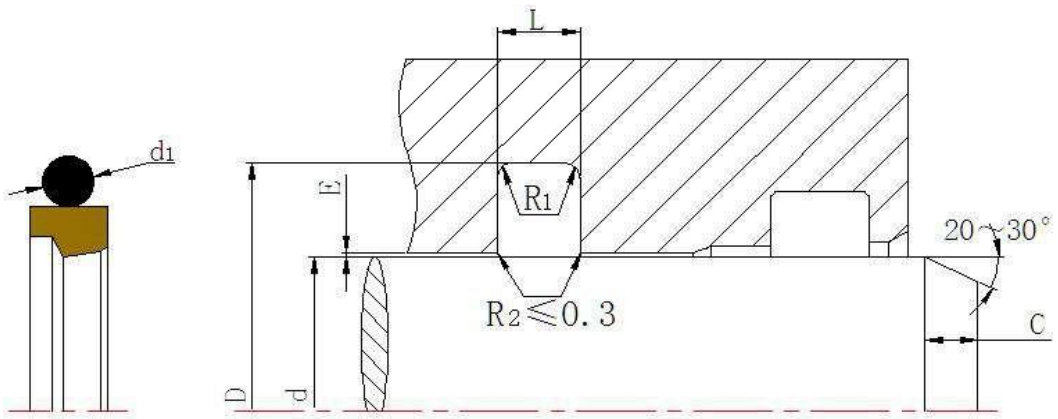
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
120,0	145,5	8,1	SRMH01200	129.54 x 7.0
125,0	140,1	6,3	SRMG01250	129.54 x 5.33
125,0	145,5	8,1	SRMH01250	132.72 x 7.0
125,4	140,5	6,3	SRMG01254	132.72 x 5.33
127,0	142,1	6,3	SRMG01270	132.72 x 5.33
130,0	145,1	6,3	SRMG01300	135.89 x 5.33
130,0	150,5	8,1	SRMH01300	139.07 x 7.0
132,0	147,1	6,3	SRMG01320	139.07 x 5.33
135,0	145,7	4,2	SRMR01350	139.29 x 3.53
135,0	150,1	6,3	SRMG01350	142.24 x 5.33
137,0	152,1	6,3	SRMG01370	142.24 x 5.33
138,0	153,1	6,3	SRMG01380	142.24 x 5.33
140,0	150,7	4,2	SRMR01400	145.64 x 3.53
140,0	155,1	6,3	SRMG01400	145.42 x 5.33
140,0	160,5	8,1	SRMH01400	148.59 x 7.0
140,5	155,6	6,3	SRMG01405	145.42 x 5.33
145,0	160,1	6,3	SRMG01450	151.77 x 5.33
145,0	165,5	8,1	SRMH01450	151.77 x 7.0
150,0	165,1	6,3	SRMG01500	158.12 x 5.33
150,0	170,5	8,1	SRMH01500	158.12 x 7.0



Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
153,0	168,1	6,3	SRMG01530	158.12 x 5.33
155,0	170,1	6,3	SRMG01550	158.12 x 5.33
160,0	175,1	6,3	SRMG01600	164.47 x 5.33
160,0	180,5	8,1	SRMH01600	170.82 x 7.0
165,0	180,1	6,3	SRMG01650	170.82 x 5.33
170,0	185,1	6,3	SRMG01700	177.17 x 5.33
170,0	190,5	8,1	SRMH01700	177.17 x 7.0
173,0	188,1	6,3	SRMG01730	177.17 x 5.33
175,0	190,1	6,3	SRMG01750	183.52 x 5.33
180,0	195,1	6,3	SRMG01800	183.52 x 5.33
180,0	200,5	8,1	SRMH01800	189.87 x 7.0
185,0	200,1	6,3	SRMG01850	189.87 x 5.33
185,0	205,5	8,1	SRMH01850	196.22 x 7.0
190,0	205,1	6,3	SRMG01900	196.22 x 5.33
190,0	210,5	8,1	SRMH01900	196.22 x 7.0
195,0	210,1	6,3	SRMG01950	202.57 x 5.33
200,0	215,1	6,3	SRMR02000	208.92 x 5.33
200,0	220,5	8,1	SRMG02000	215.27 x 7.0
205,0	225,5	8,1	SRMG02050	215.27 x 7.0
210,0	230,5	8,1	SRMG02100	215.27 x 7.0



Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
211,0	231,5	8,1	SRMG02110	215.27 x 7.0
212,0	232,5	8,1	SRMG02120	227.97 x 7.0
215,0	235,5	8,1	SRMG02150	227.97 x 7.0
220,0	240,5	8,1	SRMG02200	227.97 x 7.0
225,0	245,5	8,1	SRMG02250	240.67 x 7.0
230,0	245,1	6,3	SRMR02300	234.32 x 5.33
230,0	250,5	8,1	SRMG02300	240.67 x 7.0
235,0	255,5	8,1	SRMG02350	240.67 x 7.0
240,0	260,5	8,1	SRMG02400	253.37 x 7.0
245,0	265,5	8,1	SRMG02450	253.37 x 7.0
250,0	270,5	8,1	SRMG02500	266.07 x 7.0
265,0	289,0	8,1	SRMG02650	278.77 x 7.0
270,0	290,5	8,1	SRMR02700	278.77 x 7.0
270,0	294,0	8,1	SRMG02700	278.77 x 7.0
275,0	299,0	8,1	SRMG02750	291.47 x 7.0
280,0	304,0	8,1	SRMG02800	291.47 x 7.0
285,0	309,0	8,1	SRMG02850	291.47 x 7.0
290,0	314,0	8,1	SRMG02900	304.17 x 7.0
295,0	319,0	8,1	SRMG02950	304.17 x 7.0
300,0	320,5	8,1	SRMR03000	304.17 x 7.0



Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
300,0	324,0	8,1	SRMG03000	316.87 x 7.0
310,0	334,0	8,1	SRMG03100	316.87 x 7.0
320,0	344,0	8,1	SRMG03200	329.57 x 7.0
330,0	354,0	8,1	SRMG03300	342.27 x 7.0
340,0	364,0	8,1	SRMG03400	354.97 x 7.0
350,0	370,5	8,1	SRMR03500	354.97 x 7.0
350,0	374,0	8,1	SRMG03500	367.67 x 7.0
360,0	384,0	8,1	SRMG03600	367.67 x 7.0
365,0	389,0	8,1	SRMG03650	380.37 x 7.0
370,0	394,0	8,1	SRMG03700	380.37 x 7.0
375,0	399,0	8,1	SRMG03750	393.07 x 7.0
380,0	404,0	8,1	SRMG03800	393.07 x 7.0
390,0	414,0	8,1	SRMG03900	405.26 x 7.0
400,0	424,0	8,1	SRMG04000	417.96 x 7.0

PRS – Piston Rod seals

PRS PTFE Rod seal is s a very effective and reliable low friction seal. It is particularly suitable as a rodseal in both high and low pressure systems.

The double-acting Piston seal is a combination of a PTFE based slipper seal and an energizing O-Ring. It is having Good static sealing effect.

Application Area

PRS seal has been used successfully for years in machine tool, injection molding, and many other industrial applications in both single- and double-acting systems. This design also fits standard ISO 7425-2 grooves and is offered in a wide range of metric and inch options.

Advantages

- Compact Design to save metal spacing Area.
- Use full in High Speed application.
- High extrusion resistance and service temperature. Long wear.

Ordering Code

Example Part NO- PRS - M- R - 00080 - BR- N

- **PRS-Profile**
- **M/I - Metric/ Inch**
- **R/G/H - Regular/General/Heavy**
- **00080- Divided by 10 to Identify the Seal Size**
- **BR-Bronze Filled**
- **N/F - NBR/Viton Energizer Material**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

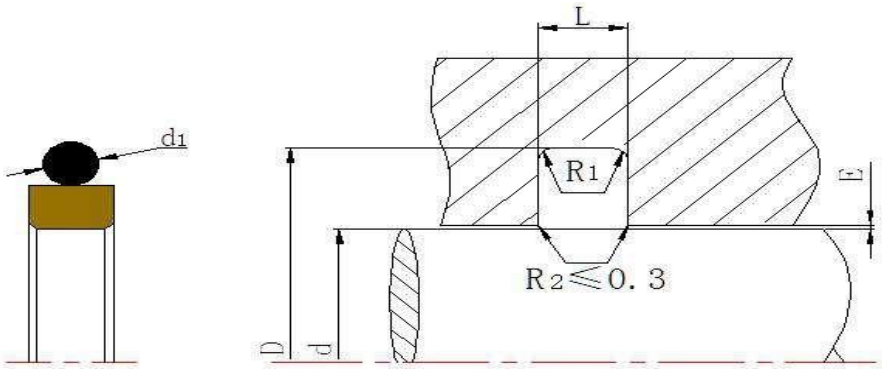
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤60 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

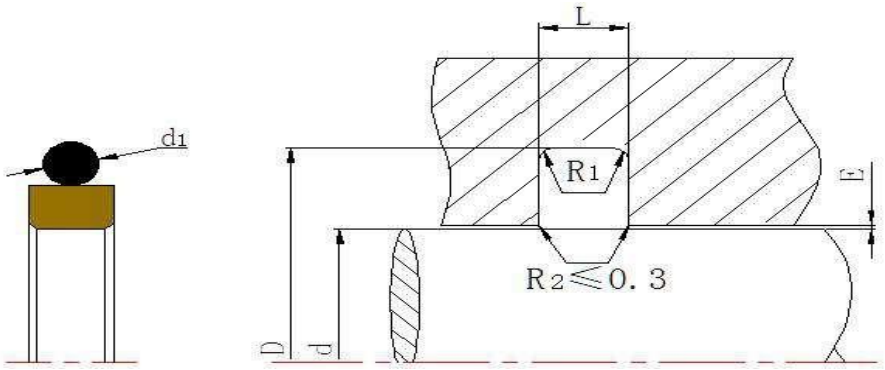
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

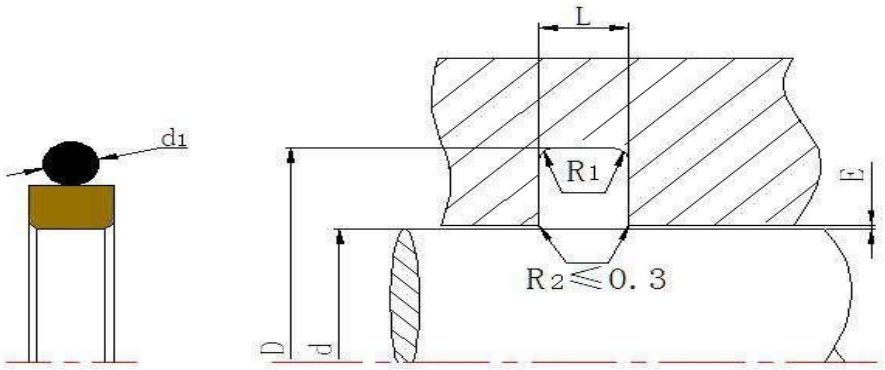
Series No	Rod Dia d f8/h9			Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section
	General Application G	Light Application R	Heavy Duty Application	D H9	L +0.2	R1 max	10 MPa	20 MPa	40 MPa	d1
PRSMG	3 - 7.9	8 - 18.9	-	d + 4.9	2.2	0.4	0.3	0.2	0.15	1.78
PRSMG	8 - 18.9	19 - 37.9	3 - 7.9	d + 7.3	3.2	0.6	0.4	0.25	0.15	2.62
PRSMG	19 - 37.9	38 - 199.9	8 - 18.9	d + 10.7	4.2	1	0.4	0.25	0.2	3.53
PRSMG	38 - 199.9	200 - 255.9	19 - 37.9	d + 15.1	6.3	1.3	0.5	0.3	0.2	5.33
PRSMG	200 - 255.9	256 - 400	38 - 199.9	d + 20.5	8.1	1.8	0.6	0.35	0.25	7



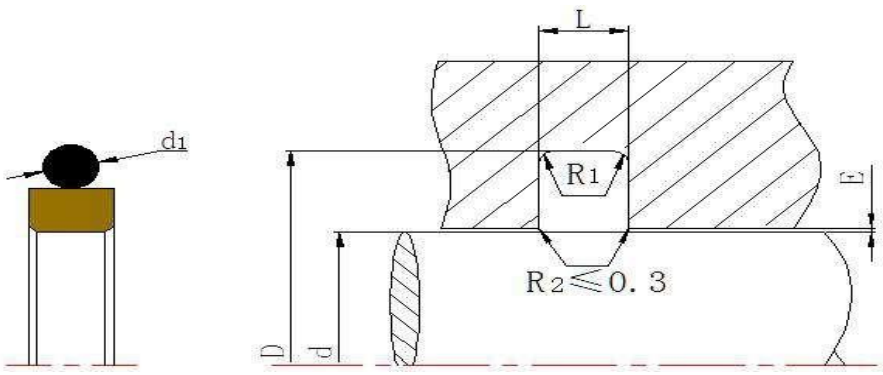
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
4	8.9	2.2	PRSMG00040	5.60 x 1.80
5	9.9	2.2	PRSMG00050	6.70 x 1.80
6	10.9	2.2	PRSMG00060	7.65 x 1.78
7	11.9	2.2	PRSMG00070	8.75 x 1.80
8	12.9	2.2	PRSMR00080	9.50 x 1.80
8	15.3	3.2	PRSMG00080	10.77 x 2.62
10	14.9	2.2	PRSMR00100	11.80 x 1.80
10	17.3	3.2	PRSMG00100	12.37 x 2.62
12	16.9	2.2	PRSMR00120	13.20 x 1.80
12	19.3	3.2	PRSMG00120	14.50 x 2.65
14	18.9	2.2	PRSMR00140	15.60 x 1.78
14	21.3	3.2	PRSMG00140	17.12 x 2.62
15	19.9	2.2	PRSMR00150	17.17 x 1.78
15	22.3	3.2	PRSMG00150	18.00 x 2.65
16	20.9	2.2	PRSMR00160	17.17 x 1.78
16	23.3	3.2	PRSMG00160	18.72 x 2.62
18	22.9	2.2	PRSMR00180	19.00 x 1.80
18	25.3	3.2	PRSMG00180	20.29 x 2.62
19	29.7	4.2	PRSMG00190	23.40 x 3.53
20	27.3	3.2	PRSMR00200	21.89 x 2.62
20	30.7	4.2	PRSMG00200	23.40 x 3.53
22	29.3	3.2	PRSMR00220	25.07 x 2.62



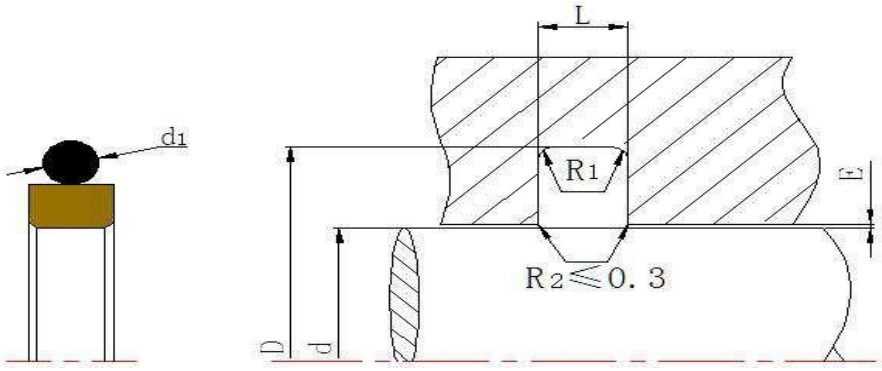
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
22	32.7	4.2	PRSMG00220	26.58 x 3.53
24	31.3	3.2	PRSMR00240	26.64 x 2.62
25	32.3	3.2	PRSMR00250	28.24 x 2.62
25	35.7	4.2	PRSMG00250	29.75 x 3.53
26	33.3	3.2	PRSMR00260	28.24 x 2.62
26	36.7	4.2	PRSMG00260	29.75 x 3.53
27	34.3	3.2	PRSMR00270	29.82 x 2.62
28	35.3	3.2	PRSMR00280	29.82 x 2.62
28	38.7	4.2	PRSMG00280	32.92 x 3.53
29	36.3	3.2	PRSMR00290	31.42 x 2.62
30	37.3	3.2	PRSMR00300	32.99 x 2.62
30	40.7	4.2	PRSMG00300	34.52 x 3.53
32	39.3	3.2	PRSMR00320	34.59 x 2.62
32	42.7	4.2	PRSMG00320	36.09 x 3.53
35	42.3	3.2	PRSMR00350	37.77 x 2.62
35	45.7	4.2	PRSMG00350	37.69 x 3.53
36	43.3	3.2	PRSMR00360	39.34 x 2.62
36	46.7	4.2	PRSMG00360	40.87 x 3.53
38	48.7	4.2	PRSMR00380	40.87 x 3.53
38	53.1	6.3	PRSMG00380	43.82 x 5.33
39	49.7	4.2	PRSMR00390	44.04 x 3.53
40	50.7	4.2	PRSMR00400	44.04 x 3.53



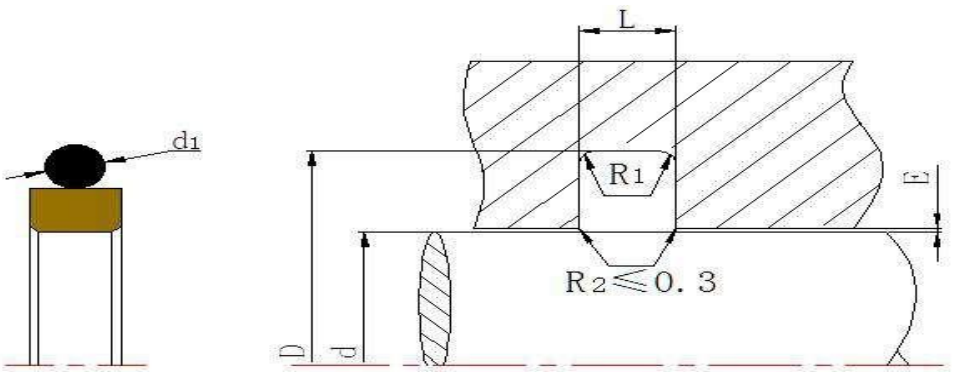
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
40	55.1	6.3	PRSMG00400	43.82 x 5.33
42	52.7	4.2	PRSMR00420	47.22 x 3.53
42	57.1	6.3	PRSMG00420	46.99 x 5.33
44	54.7	4.2	PRSMR00440	47.22 x 3.53
45	55.7	4.2	PRSMR00450	50.39 x 3.53
45	60.1	6.3	PRSMG00450	50.17 x 5.33
48	58.7	4.2	PRSMR00480	51.50 x 3.55
48	63.1	6.3	PRSMG00480	53.34 x 5.33
50	60.7	4.2	PRSMR00500	53.57 x 3.53
50	65.1	6.3	PRSMG00500	56.52 x 5.33
52	62.7	4.2	PRSMR00520	56.74 x 3.53
52	67.1	6.3	PRSMG00520	56.52 x 5.33
54	69.1	6.3	PRSMG00540	59.69 x 5.33
55	65.7	4.2	PRSMR00550	59.92 x 3.53
55	70.1	6.3	PRSMG00550	59.69 x 5.33
56	66.7	4.2	PRSMR00560	59.92 x 3.53
56	71.1	6.3	PRSMG00560	62.87 x 5.33
58	73.1	6.3	PRSMG00580	62.87 x 5.33
60	70.7	4.2	PRSMR00600	63.09 x 3.53
60	75.1	6.3	PRSMG00600	66.04 x 5.33
63	73.7	4.2	PRSMR00630	66.27 x 3.53
63	78.1	6.3	PRSMG00630	69.22 x 5.33



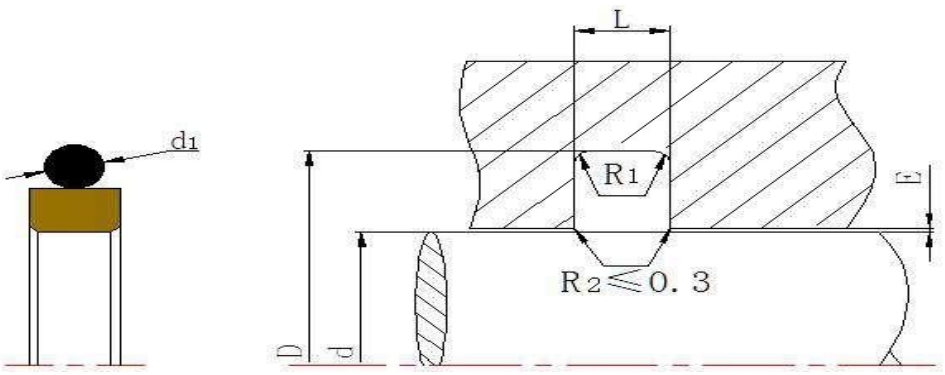
Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
65	80.1	6.3	PRSMG00650	69.22 x 5.33
67	77.7	4.2	PRSMR00670	72.62 x 3.53
70	80.7	4.2	PRSMR00700	75.79 x 3.53
70	85.1	6.3	PRSMG00700	75.57 x 5.33
72	82.7	4.2	PRSMR00720	75.79 x 3.53
75	85.7	4.2	PRSMR00750	78.97 x 3.53
75	90.1	6.3	PRSMG00750	81.92 x 5.33
80	90.7	4.2	PRSMR00800	85.32 x 3.53
80	95.1	6.3	PRSMG00800	85.09 x 5.33
83	93.7	4.2	PRSMR00830	88.49 x 3.53
85	100.1	6.3	PRSMG00850	91.44 x 5.33
86	96.7	4.2	PRSMR00860	91.67 x 3.53
90	100.7	4.2	PRSMR00900	94.84 x 3.53
90	105.1	6.3	PRSMG00900	94.62 x 5.33
92	102.7	4.2	PRSMR00920	98.02 x 3.53
95	105.7	4.2	PRSMR00950	101.19 x 3.53
95	110.1	6.3	PRSMG00950	100.97 x 5.33
100	110.7	4.2	PRSMR01000	104.37 x 3.53
100	115.1	6.3	PRSMG01000	107.32 x 5.33
105	115.7	4.2	PRSMR01050	110.72 x 3.53
105	120.1	6.3	PRSMG01050	110.49 x 5.33
110	120.7	4.2	PRSMR01100	113.89 x 3.53



Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
110	125.1	6.3	PRSMG01100	116.84 x 5.33
110	130.5	8.1	PRSMH01100	116.84 x 7.00
112	127.1	6.3	PRSMG01120	116.84 x 5.33
115	125.7	4.2	PRSMR01150	120.24 x 3.53
115	130.1	6.3	PRSMG01150	120.02 x 5.33
118	133.1	6.3	PRSMG01180	123.19 x 5.33
120	130.7	4.2	PRSMR01200	123.42 x 3.53
120	135.1	6.3	PRSMG01200	126.37 x 5.33
125	135.7	4.2	PRSMR01250	129.77 x 3.53
125	140.1	6.3	PRSMG01250	129.54 x 5.33
129	139.7	4.2	PRSMR01290	132.94 x 3.53
130	140.7	4.2	PRSMR01300	136.12 x 3.53
130	145.1	6.3	PRSMG01300	135.89 x 5.33
135	145.7	4.2	PRSMR01350	139.29 x 3.53
135	150.1	6.3	PRSMG01350	142.24 x 5.33
140	150.7	4.2	PRSMR01400	145.64 x 3.53
140	155.1	6.3	PRSMG01400	145.42 x 5.33
145	155.7	4.2	PRSMR01450	148.82 x 3.53
145	160.1	6.3	PRSMG01450	151.77 x 5.33
150	165.1	6.3	PRSMG01500	158.12 x 5.33
160	175.1	6.3	PRSMG01600	164.47 x 5.33
160	180.5	8.1	PRSMH01600	170.82 x 7.00
165	180.1	6.3	PRSMG01650	170.82 x 5.33



Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
170	180.7	4.2	PRSMR01700	177.39 x 3.53
170	185.1	6.3	PRSMG01700	177.17 x 5.33
175	190.1	6.3	PRSMG01750	183.52 x 5.33
180	190.7	4.2	PRSMR01800	183.74 x 3.53
180	195.1	6.3	PRSMG01800	183.52 x 5.33
180	200.5	8.1	PRSMH01800	189.87 x 7.00
190	200.7	4.2	PRSMR01900	196.44 x 3.53
190	205.1	6.3	PRSMG01900	196.22 x 5.33
200	215.1	6.3	PRSMR02000	208.92 x 5.33
200	220.5	8.1	PRSMG02000	208.90 x 7.00
205	220.1	6.3	PRSMR02050	208.92 x 5.33
210	225.1	6.3	PRSMR02100	215.27 x 5.33
220	235.1	6.3	PRSMR02200	227.97 x 5.33
220	240.5	8.1	PRSMG02200	227.97 x 7.00
230	245.1	6.3	PRSMR02300	234.32 x 5.33
230	250.5	8.1	PRSMG02300	240.67 x 7.00
240	255.1	6.3	PRSMR02400	247.02 x 5.33
260	284	8.1	PRSMG02600	266.07 x 7.00
270	294	8.1	PRSMG02700	278.77 x 7.00
270	290.5	8.1	PRSMR02700	278.77 x 7.00
275	299	8.1	PRSMG02750	291.47 x 7.00
280	304	8.1	PRSMG02800	291.47 x 7.00
290	314	8.1	PRSMG02900	304.17 x 7.00



Rod Dia d f8/h9	Groove Dia D/ H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
300	324	8.1	PRSMG03000	316.87 x 7.00
310	334	8.1	PRSMG03100	316.87 x 7.00
310	330.5	8.1	PRSMR03100	316.87 x 7.00
320	344	8.1	PRSMG03200	329.57 x 7.00
330	354	8.1	PRSMG03300	342.27 x 7.00
340	364	8.1	PRSMG03400	354.97 x 7.00
350	374	8.1	PRSMG03500	367.67 x 7.00
360	384	8.1	PRSMG03600	367.67 x 7.00
370	394	8.1	PRSMG03700	380.37 x 7.00
380	404	8.1	PRSMG03800	393.07 x 7.00
390	414	8.1	PRSMG03900	405.26 x 7.00
400	424	8.1	PRSMG04000	417.96 x 7.00

DRG - Delta Rod Seal -General

DRG PTFE Delta is a rubber energized faced seal, designed to expand and significantly improve the service parameters of O-Rings. Delta can be installed in existing O-Ring grooves.

Delta combines the flexibility and responsiveness of O-Rings with the wear and friction characteristics of the PTFE materials in dynamic applications.

The double-acting performance of the seal follows from the symmetrical cross section which allows the seal to respond to pressure in both directions.

Advantages

- Compact groove dimensions and simple installation, Low friction without stick-slip
- Resistance against wear and extrusion Rod seals available for all diameters from 4 to 400 Standard cross sections cover ISO 6194 and AS 4716 and important metric O-Rings, other cross sections available on request.

Ordering Code

Example Part NO- DRG - M- R - 00080 - BR- N

- **N/F - NBR/Viton Energizer Material**
- **BR-Bronze Filled**
- **00080- Divided by 10 to Identify the Seal Size**
- **R/G/H - Regular/General/Heavy**
- **M/I - Metric/ Inch**
- **DRG-Profile**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

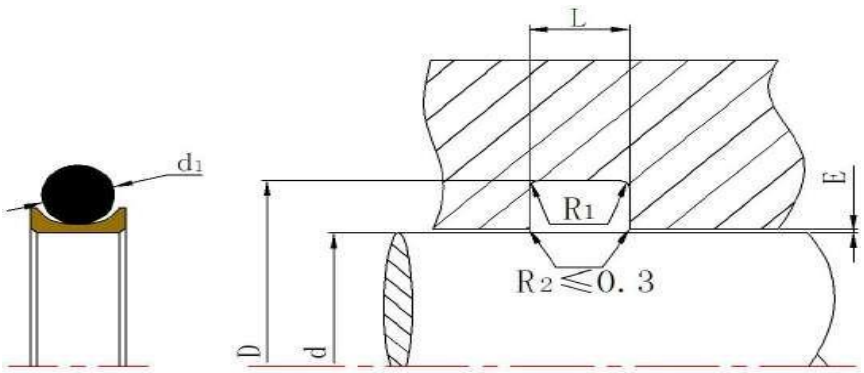
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤35 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

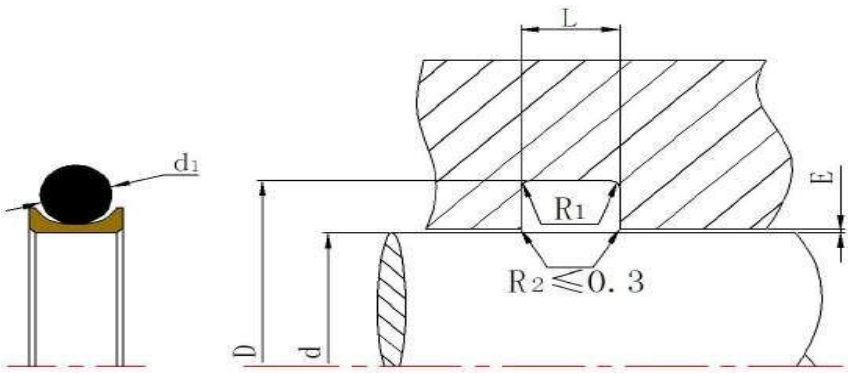
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

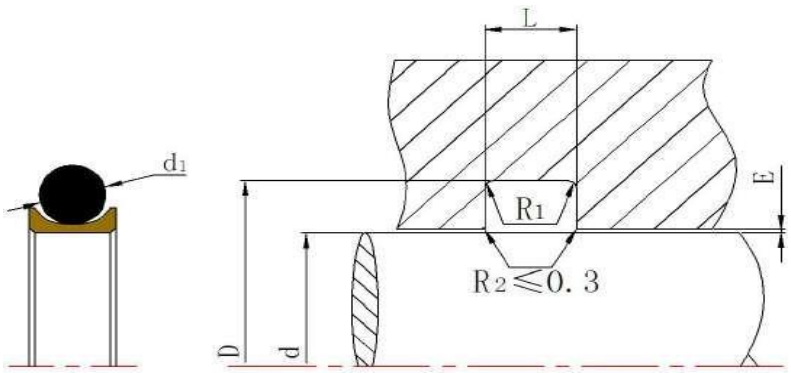
Series No	Rod Diameter d f8/h9		Groove Dia	Groove Width	Radius	Radial Clearance E max				O-Ring Cross Section
	Standard Application	Available Range	D H9	L +0.2	R1 max	2 MPa	10 MPa	20 MPa	35 MPa	d1
DRGMG	4 - 9.9	2 - 129.9	d + 2.9	2.4	0.4	0.1	0.1	0.08	0.05	1.78
DRGMG	10 - 19.9	5 - 249.9	d + 4.5	3.6	0.4	0.15	0.15	0.1	0.07	2.62
DRGMG	20 - 39.9	5 - 449.9	d + 6.2	4.8	0.6	0.25	0.2	0.15	0.08	3.53
DRGMG	40 - 119.9	12 - 649.9	d + 9.4	7.1	0.8	0.35	0.25	0.2	0.1	5.33
DRGMG	120 - 649.9		d + 12.2	9.5	0.8	0.5	0.3	0.25	0.15	7



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
6	8.9	2.4	DRGMG00060	5.60 x 1.80
8	10.9	2.4	DRGMG00080	7.65 x 1.78
9.9	12.8	2.4	DRGMG00099	9.50 x 1.80
10	14.5	3.6	DRGMG00100	10.77 x 2.62
12	16.5	3.6	DRGMG00120	12.37 x 2.62
14	18.5	3.6	DRGMG00140	13.94 x 2.62
15	19.5	3.6	DRGMG00150	14.50 x 2.65
16	20.5	3.6	DRGMG00160	15.54 x 2.62
18	22.5	3.6	DRGMG00180	18.00 x 2.65
20	26.2	4.8	DRGMG00200	20.22 x 3.53
22	28.2	4.8	DRGMG00220	21.82 x 3.53
25	31.2	4.8	DRGMG00250	25.00 x 3.53
28	34.2	4.8	DRGMG00280	28.17 x 3.53
30	36.2	4.8	DRGMG00300	29.75 x 3.53
32	38.2	4.8	DRGMG00320	31.35 x 3.53
35	41.2	4.8	DRGMG00350	34.52 x 3.53
36	42.2	4.8	DRGMG00360	36.09 x 3.53
40	49.4	7.1	DRGMG00400	40.64 x 5.33
42	51.4	7.1	DRGMG00420	43.82 x 5.33
45	54.4	7.1	DRGMG00450	43.82 x 5.33
48	57.4	7.1	DRGMG00480	46.99 x 5.33
50	59.4	7.1	DRGMG00500	50.17 x 5.33
52	61.4	7.1	DRGMG00520	53.34 x 5.33
55	64.4	7.1	DRGMG00550	56.52 x 5.33
56	65.4	7.1	DRGMG00560	56.52 x 5.33



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
60	69.4	7.1	DRGMG00600	59.69 x 5.33
63	72.4	7.1	DRGMG00630	62.87 x 5.33
65	74.4	7.1	DRGMG00650	66.04 x 5.33
70	79.4	7.1	DRGMG00700	69.22 x 5.33
80	89.4	7.1	DRGMG00800	78.74 x 5.33
85	94.4	7.1	DRGMG00850	85.09 x 5.33
90	99.4	7.1	DRGMG00900	91.44 x 5.33
95	104.4	7.1	DRGMG00950	94.62 x 5.33
100	109.4	7.1	DRGMG01000	100.97 x 5.33
105	114.4	7.1	DRGMG01050	104.14 x 5.33
110	119.4	7.1	DRGMG01100	110.49 x 5.33
115	124.4	7.1	DRGMG01150	116.84 x 5.33
120	132.2	9.5	DRGMG01200	120.02 x 7.00
125	137.2	9.5	DRGMG01250	126.37 x 7.00
130	142.2	9.5	DRGMG01300	129.54 x 7.00
135	147.2	9.5	DRGMG01350	135.89 x 7.00
140	152.2	9.5	DRGMG01400	139.07 x 7.00
150	162.2	9.5	DRGMG01500	148.59 x 7.00
160	172.2	9.5	DRGMG01600	164.47 x 7.00
170	182.2	9.5	DRGMG01700	170.82 x 7.00
180	192.2	9.5	DRGMG01800	183.52 x 7.00
190	202.2	9.5	DRGMG01900	189.87 x 7.00
200	212.2	9.5	DRGMG02000	202.57 x 7.00
210	222.2	9.5	DRGMG02100	208.90 x 7.00
220	232.2	9.5	DRGMG02200	227.97 x 7.00



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L + 0.2	RSS Part NO	O-Ring Size d1
230	242.2	9.5	DRGMG02300	240.67 x 7.00
240	252.2	9.5	DRGMG02400	240.67 x 7.00
250	262.2	9.5	DRGMG02500	253.37 x 7.00
280	292.2	9.5	DRGMG02800	278.77 x 7.00
300	312.2	9.5	DRGMG03000	304.17 x 7.00
320	332.2	9.5	DRGMG03200	329.57 x 7.00
350	362.2	9.5	DRGMG03500	354.97 x 7.00
360	372.2	9.5	DRGMG03600	367.67 x 7.00
400	412.2	9.5	DRGMG04000	405.26 x 7.00

WIPERS

EW5 – Wiper

EW5 PTFE Excluder wiper is a double-acting, O-ring energized, rod wiper/excluder designed to include two different unique wiping lip geometries. The two lips combine to scrape debris from the rod and contain residual oil on rod extension, as well as allowing oil to pump back into the cylinder. The O-ring energizer provides the force necessary to maintain the engagement of the wiping lips against the sliding surface and allow the wiper to adjust for deflection.

Materials, like PTFE, provide outstanding wear and scraping capability as well as large range of temperature and media compatibility.

Advantages

- Outstanding sliding properties
- Stick-slip-free, no sticking
- Very good scraping effect against outside contaminants, even with firmly adhered dirt, etc
- Can compensate for deflections of the piston rod or plunger.
- Very good scraping effect from the inside against the residual oil film adhering to the surface of the piston rod - Very high resistance to hydraulic media.

Ordering Code

Example Part NO- EW5 - M - L - 00080 - BR - N

- **N/F - NBR/Viton Energizer Material**
- **BR-Bronze Filled**
- **00080- Divided by 10 to Identify the Seal Size**
- **L/R/G/H - Low/Regular/General/Heavy**
- **M/I - Metric/ Inch**
- **EW5-Profile**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

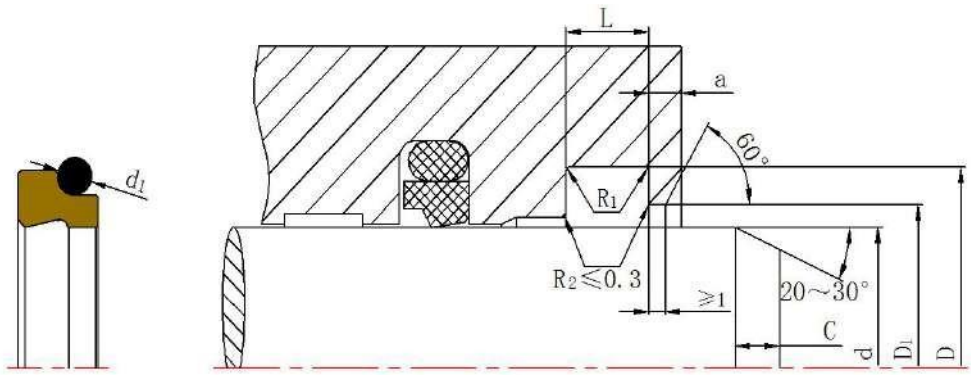
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions		-45…+200 °C (Depending on O-Ring and QUAD-RING Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

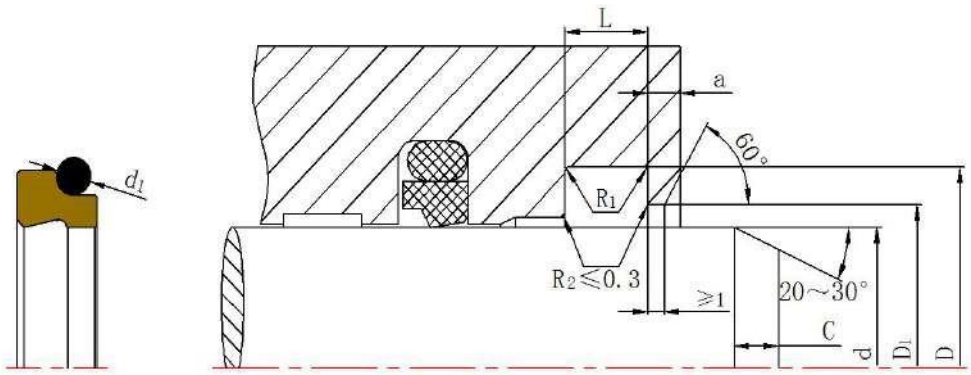
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

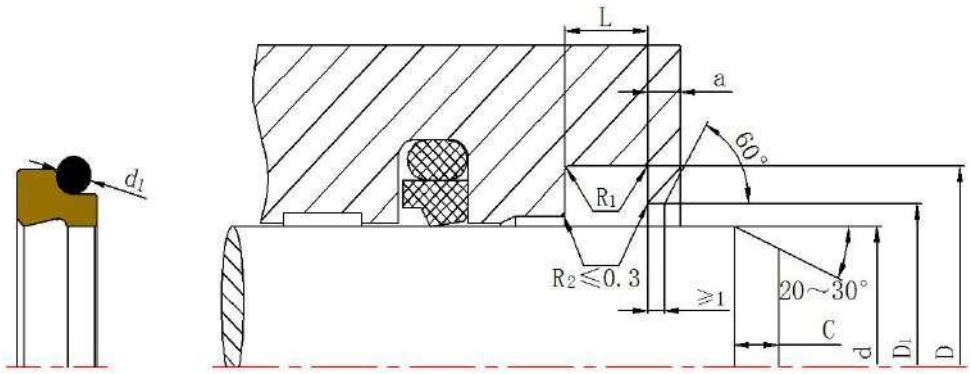
Series No	Rod Diameter d f8/h9		Groove Dia	Groove Width	Bore Dia	Step Width	O-Ring Cross Section
	Recommended Range	Extended Range	D H9	L +0.2	D1 H11	a min.	d1
EW5ML	19.0 - 39.9	19.0 - 100	d + 7.6	4.2	d + 1.5	3	2.62
EW5MR	40.0 - 69.9	30.0 - 200	d + 8.8	6.3	d + 1.5	3	2.62
EW5MG	70.0 - 139.9	70.0 - 360	d + 12.2	8.1	d + 2.0	4	3.53
EW5MH	140.0 - 399.9	100.0 -	d + 16.0	9.5	d + 2.5	5	5.33



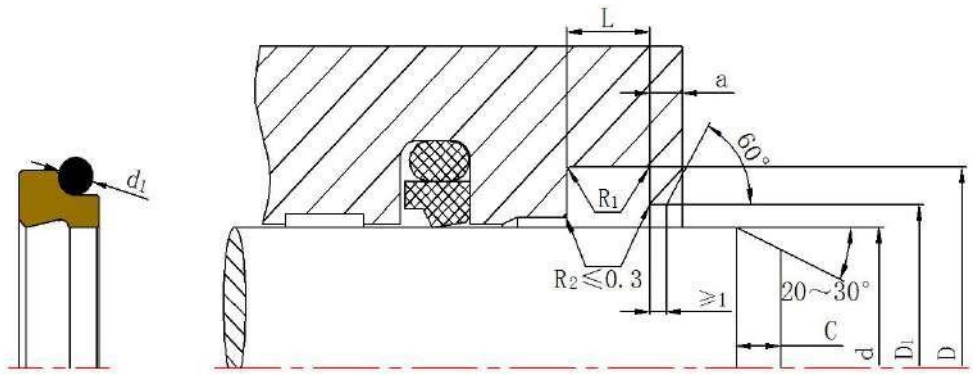
Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
20	27.6	4.2	21.5	0.8	3	EW5ML00200	21.89 x 2.62
25	32.6	4.2	26.5	0.8	3	EW5ML00250	28.24 x 2.62
28	35.6	4.2	29.5	0.8	3	EW5ML00280	29.82 x 2.62
30	37.6	4.2	31.5	0.8	3	EW5ML00300	32.99 x 2.62
32	39.6	4.2	33.5	0.8	3	EW5ML00320	34.59 x 2.62
36	43.6	4.2	37.5	0.8	3	EW5ML00360	37.77 x 2.62
40	48.8	6.3	41.5	0.8	3	EW5MR00400	44.12 x 2.62
42	50.8	6.3	43.5	0.8	3	EW5MR00420	45.69 x 2.62
45	53.8	6.3	46.5	0.8	3	EW5MR00450	48.90 x 2.62
50	58.8	6.3	51.5	0.8	3	EW5MR00500	53.64 x 2.62
55	63.8	6.3	56.5	0.8	3	EW5MR00550	58.42 x 2.62
56	64.8	6.3	57.5	0.8	3	EW5MR00560	59.99 x 2.62
60	68.8	6.3	61.5	0.8	3	EW5MR00600	63.17 x 2.62
63	71.8	6.3	64.5	0.8	3	EW5MR00630	66.34 x 2.62
65	73.8	6.3	66.5	0.8	3	EW5MR00650	67.95 x 2.62
70	78.8	6.3	71.5	0.8	3	EW5MR00700	72.69 x 2.62
70	82.2	8.1	72	1	4	EW5MG00700	75.79 x 3.53
75	87.2	8.1	77	1	4	EW5MG00750	78.97 x 3.53
80	88.8	6.3	81.5	1	3	EW5MR00800	82.22 x 2.62
80	92.2	8.1	82	1	4	EW5MG00800	85.32 x 3.53
85	97.2	8.1	87	1	4	EW5MG00850	88.49 x 3.53
90	98.8	6.3	91.5	1	3	EW5MR00900	94.92 x 2.62
90	102.2	8.1	92	1	4	EW5MG00900	94.84 x 3.53



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
97	109.2	8.1	99	1	4	EW5MG00970	101.19 x 3.53
99	111.2	8.1	101	1	4	EW5MG00990	104.37 x 3.53
100	108.8	6.3	101.5	1	3	EW5MR01000	101.27 x 2.62
100	112.2	8.1	102	1	4	EW5MG01000	104.37 x 3.53
105	117.2	8.1	107	1	4	EW5MG01050	110.72 x 3.53
110	118.8	6.3	111.5	1	3	EW5MR01100	113.97 x 2.62
110	122.2	8.1	112	1	4	EW5MG01100	113.89 x 3.53
115	127.2	8.1	117	1	4	EW5MG01150	120.24 x 3.53
120	132.2	8.1	122	1	4	EW5MG01200	123.42 x 3.53
125	133.8	6.3	126.5	1	3	EW5MR01250	126.67 x 2.62
125	137.2	8.1	127	1	4	EW5MG01250	129.77 x 3.53
125.4	137.6	8.1	127.4	1	4	EW5MG01254	129.77 x 3.53
130	142.2	8.1	132	1	4	EW5MG01300	136.12 x 3.53
135	147.2	8.1	137	1	4	EW5MG01350	139.29 x 3.53
140	152.2	8.1	142	1	4	EW5MG01400	145.64 x 3.53
140	156	9.5	142.5	1.5	5	EW5MH01400	145.42 x 5.33
140.5	156.5	9.5	143	1.5	5	EW5MH01405	145.42 x 5.33
150	166	9.5	152.5	1.5	5	EW5MH01500	151.77 x 5.33
153	169	9.5	155.5	1.5	5	EW5MH01530	158.12 x 5.33
155	171	9.5	157.5	1.5	5	EW5MH01550	158.12 x 5.33
160	172.2	8.1	162	1	4	EW5MG01600	164.69 x 3.53
160	176	9.5	162.5	1.5	5	EW5MH01600	164.47 x 5.33



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
165	181	9.5	167.5	1.5	5	EW5MH01650	170.82 x 5.33
170	186	9.5	172.5	1.5	5	EW5MH01700	177.17 x 5.33
175	191	9.5	177.5	1.5	5	EW5MH01750	177.17 x 5.33
180	192.2	8.1	182	1	4	EW5MG01800	183.74 x 3.53
180	196	9.5	182.5	1.5	5	EW5MH01800	183.52 x 5.33
188.2	204.2	9.5	190.7	1.5	5	EW5MH01882	189.87 x 5.33
190	206	9.5	192.5	1.5	5	EW5MH01900	196.22 x 5.33
192	208	9.5	194.5	1.5	5	EW5MH01920	196.22 x 5.33
200	212.2	8.1	202	1	4	EW5MG02000	202.79 x 3.53
200	216	9.5	202.5	1.5	5	EW5MH02000	202.57 x 5.33
211	227	9.5	213.5	1.5	5	EW5MH02110	215.27 x 5.33
220	232.2	8.1	222	1	4	EW5MG02200	221.84 x 3.53
220	236	9.5	222.5	1.5	5	EW5MH02200	221.62 x 5.33
240	256	9.5	242.5	1.5	5	EW5MH02400	247.02 x 5.33
250	262.2	8.1	252	1	4	EW5MG02500	253.59 x 3.53
250	266	9.5	252.5	1.5	5	EW5MH02500	253.37 x 5.33
260	276	9.5	262.5	1.5	5	EW5MH02600	266.07 x 5.33
270	286	9.5	272.5	1.5	5	EW5MH02700	278.77 x 5.33
280	292.2	8.1	282	1.5	4	EW5MG02800	278.99 x 3.53
280	296	9.5	282.5	1.5	5	EW5MH02800	278.77 x 5.33
300	316	9.5	302.5	1.5	5	EW5MH03000	304.17 x 5.33
320	332.2	8.1	322	1.5	4	EW5MG03200	329.79 x 3.53



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
320	336	9.5	322.5	1.5	5	EW5MH03200	329.57 x 5.33
330	346	9.5	332.5	1.5	5	EW5MH03300	329.57 x 5.33
350	366	9.5	352.5	1.5	5	EW5MH03500	354.97 x 5.33
360	372.2	8.1	362	1.5	4	EW5MG03600	355.19 x 3.53
360	376	9.5	362.5	1.5	5	EW5MH03600	365.00 x 5.30
380	396	9.5	382.5	1.5	5	EW5MH03800	380.37 x 5.33
400	424	14	402.5	1.5	8	EW5MH04000	405.26 x 7.00

EW2 – Wiper

EW2 PTFE Excluder wiper is a double-acting, O-ring energized, scraper/excluder designed to include two different unique scraper lip geometries, geometrically with sliding surface and can compensate any deflection of the piston rod.
Materials, like PTFE, provide outstanding wear and scraping capability as well as large range of temperature and media compatibility.

Advantages

- Scrape contaminants from the retracting piston rod and thus to protect the system from soiling
- Hold back the residual oil film on the extending piston rod on the medium side.
- Wiper are used in conjunction with the rod seal i.e. seals with hydrodynamic back pumping function.
- Can compensate for deflections of the piston rod or plunger.
- Very good scraping effect from the inside against the residual oil film adhering to the surface of the piston rod - Very high resistance to hydraulic media.

Ordering Code

Example Part NO- EW5 - M - L - 00080 - BR - N

- **N/F - NBR/Viton Energizer Material**
- **BR-Bronze Filled**
- **00080- Divided by 10 to Identify the Seal Size**
- **L/R/G/H - Low/Regular/General/Heavy**
- **M/I - Metric/ Inch**
- **EW5-Profile**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

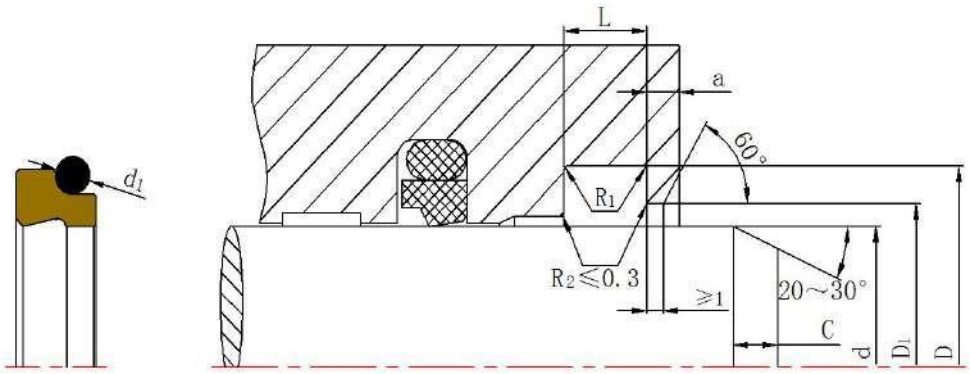
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions		-45…+200 °C (Depending on O-Ring and QUAD-RING Seal material)	≤15 m/s	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

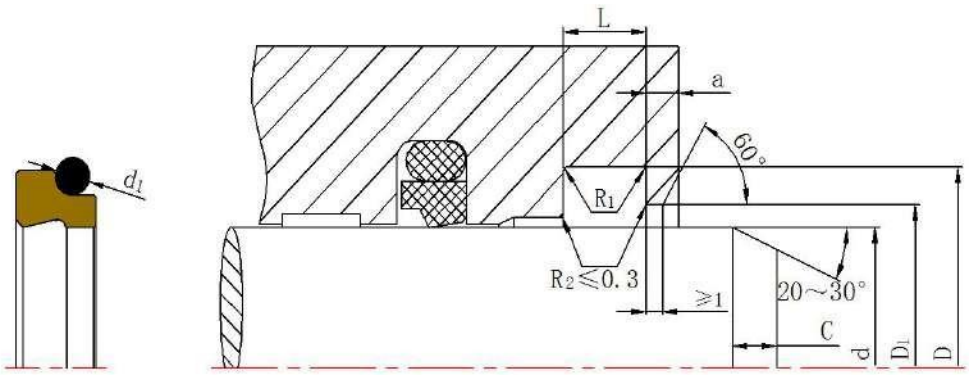
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

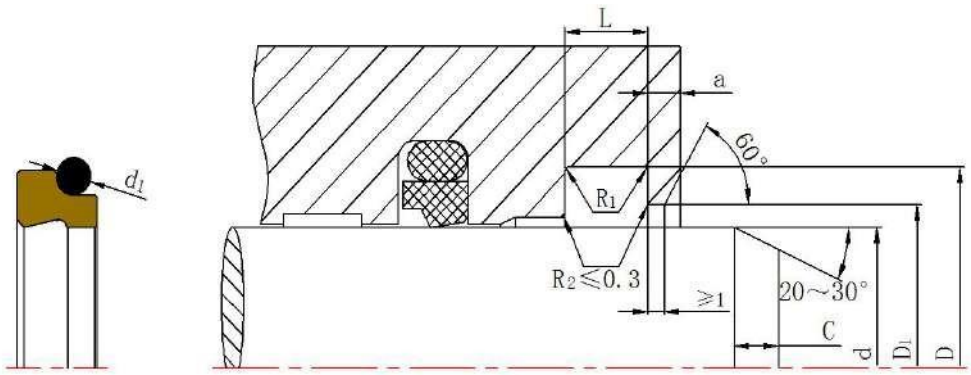
Series No	Rod Diameter d f8/h9		Groove Dia	Groove Width	Bore Dia	Step Width	O-Ring Cross Section
	Recommended Range	Extended Range	D H9	L +0.2	D1 H11	a min.	d1
EW2ML	4.0 - 11.9	4.0 - 130.0	d + 4.8	3.7	d + 1.5	2	1.78
EW2MR	12.0 - 64.9	10.0 - 245.0	d + 6.8	5	d + 1.5	2	2.62
EW2MG	65.0 - 250.9	25.0 - 400.0	d + 8.8	6	d + 1.5	3	3.53
EW2MH	251.0 - 420.9	40.0 - 655.0	d + 12.2	8.4	d + 2.0	4	5.33



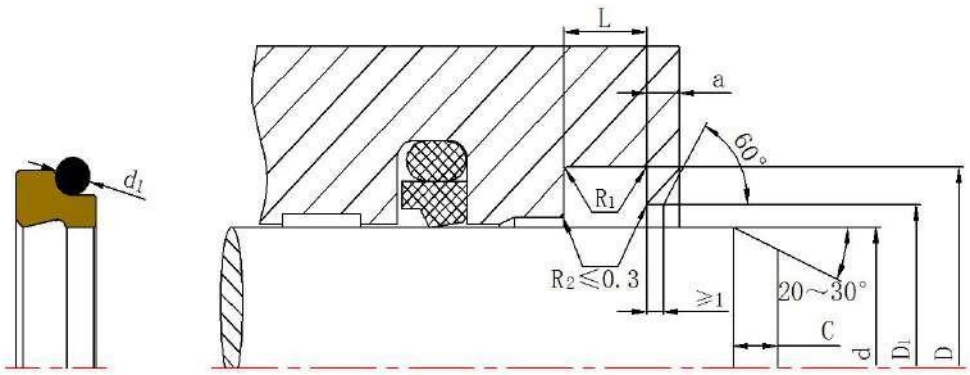
Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
8	12.8	3.7	9.5	0.4	2	EW2ML00080	9.50 x 1.80
10	14.8	3.7	11.5	0.4	2	EW2ML00100	11.80 x 1.80
12	18.8	5	13.5	0.8	2	EW2MR00120	13.94 x 2.62
14	20.8	5	15.5	0.8	2	EW2MR00140	15.54 x 2.62
15	21.8	5	16.5	0.8	2	EW2MR00150	17.12 x 2.62
16	20.8	3.7	17.5	0.4	2	EW2ML00160	17.17 x 1.78
16	22.8	5	17.5	0.8	2	EW2MR00160	18.00 x 2.65
18	22.8	3.7	19.5	0.4	2	EW2ML00180	19.00 x 1.80
18	24.8	5	19.5	0.8	2	EW2MR00180	20.29 x 2.62
20	26.8	5	21.5	0.8	2	EW2MR00200	21.89 x 2.62
22	28.8	5	23.5	0.8	2	EW2MR00220	23.47 x 2.62
25	31.8	5	26.5	0.8	2	EW2MR00250	26.64 x 2.62
28	34.8	5	29.5	0.8	2	EW2MR00280	29.82 x 2.62
30	34.8	3.7	31.5	0.4	2	EW2ML00300	31.47 x 1.78
30	36.8	5	31.5	0.8	2	EW2MR00300	31.42 x 2.62
32	38.8	5	33.5	0.8	2	EW2MR00320	34.59 x 2.62
35	41.8	5	36.5	0.8	2	EW2MR00350	36.17 x 2.62
36	42.8	5	37.5	0.8	2	EW2MR00360	37.77 x 2.62
37	43.8	5	38.5	0.8	2	EW2MR00370	39.34 x 2.62
40	46.8	5	41.5	0.8	2	EW2MR00400	42.52 x 2.62
42	48.8	5	43.5	0.8	2	EW2MR00420	44.12 x 2.62



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
45	51.8	5	46.5	0.8	2	EW2MR00450	47.29 x 2.62
49	55.8	5	50.5	0.8	2	EW2MR00490	50.47 x 2.62
50	56.8	5	51.5	0.8	2	EW2MR00500	52.07 x 2.62
50.8	57.6	5	52.3	0.8	2	EW2MR00508	52.07 x 2.62
54	60.8	5	55.5	0.8	2	EW2MR00540	55.25 x 2.62
55	61.8	5	56.5	0.8	2	EW2MR00550	56.82 x 2.62
56	62.8	5	57.5	0.8	2	EW2MR00560	58.42 x 2.62
60	66.8	5	61.5	0.8	2	EW2MR00600	61.60 x 2.62
63	69.8	5	64.5	0.8	2	EW2MR00630	64.77 x 2.62
65	73.8	6	66.5	1	3	EW2MG00650	66.27 x 3.53
70	78.8	6	71.5	1	3	EW2MG00700	72.62 x 3.53
75	83.8	6	76.5	1	3	EW2MG00750	75.79 x 3.53
80	88.8	6	81.5	1	3	EW2MG00800	82.14 x 3.53
85	93.8	6	86.5	1	3	EW2MG00850	83.52 x 3.53
90	98.8	6	91.5	1	3	EW2MG00900	91.67 x 3.53
95	103.8	6	96.5	1	3	EW2MG00950	98.02 x 3.53
100	108.8	6	101.5	1	3	EW2MG01000	101.19 x 3.53
105	113.8	6	106.5	1	3	EW2MG01050	107.54 x 3.53
110	118.8	6	111.5	1	3	EW2MG01100	110.72 x 3.53
115	123.8	6	116.5	1	3	EW2MG01150	117.07 x 3.53
120	128.8	6	121.5	1	3	EW2MG01200	120.24 x 3.53



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
125	133.8	6	126.5	1	3	EW2MG01250	126.59 x 3.53
130	138.8	6	131.5	1	3	EW2MG01300	132.94 x 3.53
135	143.8	6	136.5	1	3	EW2MG01350	136.12 x 3.53
137	145.8	6	138.5	1	3	EW2MG01370	139.29 x 3.53
140	148.8	6	141.5	1	3	EW2MG01400	142.47 x 3.53
145	153.8	6	146.5	1	3	EW2MG01450	145.64 x 3.53
150	158.8	6	151.5	1	3	EW2MG01500	151.99 x 3.53
160	168.8	6	161.5	1	3	EW2MG01600	158,34 x 3.53
170	178.8	6	171.5	1	3	EW2MG01700	171.04 x 3.53
180	188.8	6	181.5	1	3	EW2MG01800	177.39 x 3.53
190	198.8	6	191.5	1	3	EW2MG01900	190.09 x 3.53
200	208.8	6	201.5	1	3	EW2MG02000	202.79 x 3.53
210	218.8	6	211.5	1	3	EW2MG02100	209.14 x 3.53
220	228.8	6	221.5	1	3	EW2MG02200	221.84 x 3.53
230	238.8	6	231.5	1	3	EW2MG02300	228.19 x 3.53
240	248.8	6	241.5	1	3	EW2MG02400	240.89 x 3.53
250	258.8	6	251.5	1	3	EW2MG02500	253.59 x 3.53
260	272.2	8.4	262	1.5	4	EW2MH02600	253.59 x 5.33
280	292.2	8.4	282	1.5	4	EW2MH02800	278.77 x 5.33
300	312.2	8.4	302	1.5	4	EW2MH03000	304.17 x 5.33



Rod Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	Bore Dia D1 H11	Radius R1 max	Step Width a min	RSS Part NO	O-Ring Size d1
320	332.2	8.4	322	1.5	4	EW2MH03200	329.57 x 5.33
350	362.2	8 .4	352	1.5	4	EW2MH03500	354.97 x 5.33
360	372.2	8.4	362	1.5	4	EW2MH03600	354.97 x 5.33
370	382.2	8.4	372	1.5	4	EW2MH03700	365.00 x 5.30
400	412.2	8.4	402	1.5	4	EW2MH04000	405.26 x 5.33

Rotary Seals

RRS - Double Acting Rotary Rod Seals

RRS Double-acting PTFE rotary Rod seals are used to seal shafts, axles, cylinder bores, rotary manifolds, and swivels with rotary,helical or oscillating movement.

It consists of a seal ring in high-grade PTFE material activated by an elastomeric O-Ring, the contact surface profile of the seal ring is specially designed for use at high-pressure and low sliding speeds

The double-acting performance of the seal follows from the symmetrical cross section which allows the seal to respond topressure in both directions. Initial contact pressure is provided by radial compression of the O-Ring.

When the system pressure is increased the O-Ringtransforms this into additional contact pressure, the contact pressure of the seal is thereby automatically adjusted so sealing is ensured under all service conditions

Notch

To assure rapid activation of the seal at sudden changes of pressure and direction of motion, radial notches are added onboth sides of the seal ring.

Advantages

- Compact grove design suitable for narrow spacing
- Excellent Anti extrusion resistance

Ordering Code

Example Part NO- RRS - M - L - 00080 - BR - N

N/F - NBR/Viton Energizer Material

BR-Bronze Filled

00080- Divided by 10 to Identify the Seal Size

L/R/G/H/HH - Low/Regular/General/Heavy/Heaviest

M/I - Metric/ Inch

RRS-Profile

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

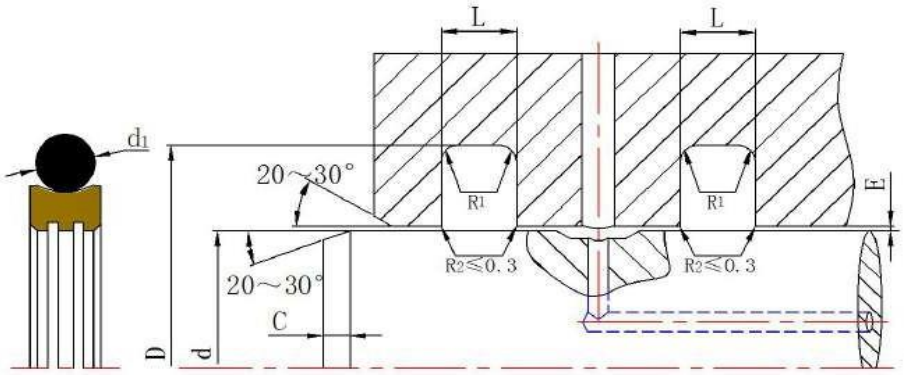
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤30 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤2 m/s Max	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

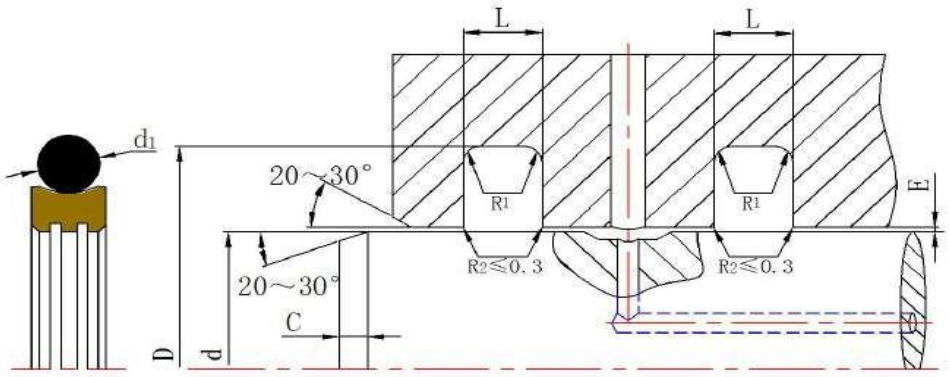
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

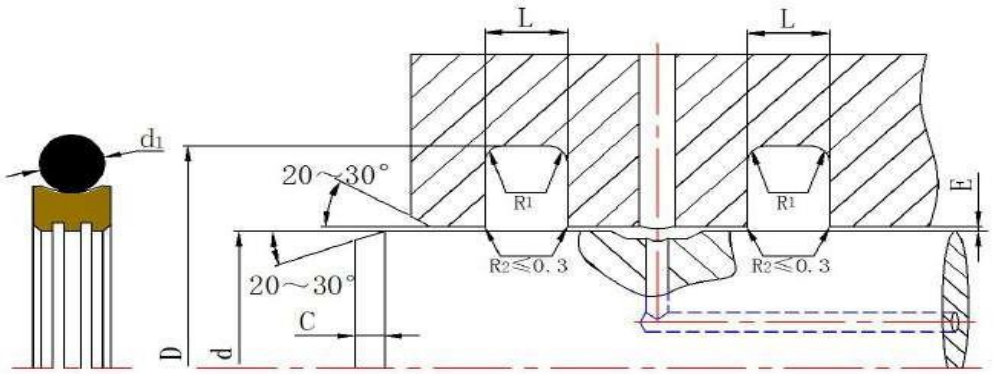
Series No	Bore Diameter d f8/h9		Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section
	Recommended Range	Available Range	D H9	L +0.2	R1 max	10 MPa	20 MPa	40 MPa	d1
RRSML	6-18.9	6-130	d+4.9	2.2	0.4	0.2	0.15	-	1,78
RRSMR	19-37.9	10-245	d+7.5	3.2	0.6	0.25	0.2	0.15	2.62
RRSMG	19-37.9	19-455	d+11.0	4.2	1	0.3	0.25	0.2	3.53
RRSMH	200-255		d+15.5	6.3	1.3	0.35	0.3	0.25	5.33
RRSMHH	250-400		d+21.0	8.1	1.8	0.4	0.35	0.3	7



Shaft Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	RSS Part NO	O-Ring Size d1
6	10.9	2.2	RRSML00060	7.65 x 1.78
10	14.9	2.2	RRSML00100	11.80 x 1.80
12	16.9	2.2	RRSML00120	13.20 x 1.80
14	18.9	2.2	RRSML00140	15.60 x 1.78
15	19	2.2	RRSML00150	17.17 x 1.78
16	20.9	2.2	RRSML00160	17.17 x 1.78
18	22.9	2.2	RRSML00180	19.00 x 1.80
20	24.9	3.2	RRSML00200	21.95 x 1.78
20	27.5	3.2	RRSMR00200	21.89 x 2.62
22	29.5	3.2	RRSMR00220	25.07 x 2.62
25	29.5	2.2	RRSML00250	26.70 x 1.78
25	32.5	3.2	RRSMR00250	28.24 x 2.62
28	35.5	3.2	RRSMR00280	31.42 x 2.62
30	37.5	3.2	RRSMR00300	32.99 x 2.62
32	39.5	3.2	RRSMR00320	34.59 x 2.62
35	42.5	3.2	RRSMR00350	37.77 x 2.62
36	43.5	3.2	RRSMR00360	39.34 x 2.62
40	47.5	3.2	RRSMR00400	42.52 x 2.62
40	51	4.2	RRSMG00400	44.04 x 3.53
45	56	4.2	RRSMG00450	50.39 x 3.53



Shaft Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	RSS Part NO	O-Ring Size d1
50	61	4.2	RRSMG00500	53.57 x 3.53
55	66	4.2	RRSMG00550	59.92 x 3.53
56	67	4.2	RRSMG00560	59.92 x 3.53
60	67.5	3.2	RRSMR00600	63.17 x 2.62
60	71	4.2	RRSMG00600	63.09 x 3.53
63	74	4.2	RRSMG00630	66.27 x 3.53
70	81	4.2	RRSMG00700	75.79 x 3.53
75	86	4.2	RRSMG00750	78.97 x 3.53
80	91	4.2	RRSMG00800	85.32 x 3.53
85	96	4.2	RRSMG00850	88.49 x 3.53
90	101	4.2	RRSMG00900	94.84 x 3.53
95	106	4.2	RRSMG00950	101.19 x 3.53
100	111	4.2	RRSMG01000	104.37 x 3.53
105	116	4.2	RRSMG01050	110.72 x 3.53
110	121	4.2	RRSMG01100	113.89 x 3.53
120	131	4.2	RRSMG01200	123.42 x 3.53
125	136	4.2	RRSMG01250	129.77 x 3.53
130	137.5	3.2	RRSMR01300	133.02 x 2.62
130	141	4.2	RRSMG01300	136.12 x 3.53
135	146	4.2	RRSMG01350	139.29 x 3.53



Shaft Dia d f8/h9	Groove Dia D H9	Groove Width L +0.2	RSS Part NO	O-Ring Size d1
140	151	4.2	RRSMG01400	145.64 x 3.53
140	155.5	6.3	RRSMH01400	145.42 x 5.33
150	161	4.2	RRSMG01500	158.34 x 3.53
150	165.5	6.3	RRSMH01500	158.12 x 5.33
150	171	8.1	RRSMHH01500	158.12 x 7.00
160	171	4.2	RRSMG01600	164.69 x 3.53
170	181	4.2	RRSMG01700	177.39 x 3.53
180	191	4.2	RRSMG01800	183.74 x 3.53
190	201	4.2	RRSMG01900	196.44 x 3.53
200	215.5	6.3	RRSMH02000	208.92 x 5.33
210	225.5	6.3	RRSMH02100	215.27 x 5.33
220	235.5	6.3	RRSMH02200	227.97 x 5.33
230	245.5	6.3	RRSMH02300	234.32 x 5.33
250	271	8.1	RRSMHH02500	266.07 x 7.00
280	301	8.1	RRSMHH02800	291.47 x 7.00
300	321	8.1	RRSMHH03000	304.17 x 7.00
320	341	8.1	RRSMHH03200	329.57 x 7.00
350	365.5	6.3	RRSMH03500	354.97 x 5.33
350	371	8.1	RRSMHH03500	354.97 x 7.00
360	381	8.1	RRSMHH03600	367.67 x 7.00
400	421	8.1	RRSMHH04000	405.26 x 7.00

RPS – Rotary Piston Seals

RPS Double-acting PTFE rotary Piston seals are used to seal shafts, axles, cylinder bores, rotary manifolds, and swivels with rotary,helical or oscillating movement.

It consists of a seal ring in high-grade PTFE material activated by an elastomeric O-Ring, the contact surface profile of the seal ring is specially designed for use at high-pressure and low sliding speeds

The double-acting performance of the seal follows from the symmetrical cross section which allows the seal to respond topressure in both directions. Initial contact pressure is provided by radial compression of the O-Ring.

When the system pressure is increased the O-Ringtransforms this into additional contact pressure, the contact pressure of the seal is thereby automatically adjusted so sealing is ensured under all service conditions

Notch

To assure rapid activation of the seal at sudden changes of pressure and direction of motion, radial notches are added onboth sides of the seal ring.

Advantages

- Compact grove design suitable for narrow spacing
- Excellent Anti extrusion resistance

Ordering Code

Example Part NO- RPS - M - L - 00150 - BR - N

- **RPS-Profile**
- **M/I - Metric/ Inch**
- **L/R/G/H - Low/Regular/General/Heavy**
- **00150- Divided by 10 to Identify the Seal Size**
- **BR-Bronze Filled**
- **N/F - NBR/Viton Energizer Material**

Important Note:
The above data are maximum values and cannot be used at the same time. e.g. the maximum operating speed depends on material type, pressure, temperature and gap value. Temperature range also dependent on medium.
In the case of unpressurized applications in temperatures below 0°C please contact our application engineers for assistance

Materials Table

PTFE With Filler Details	Friction	Wear Resistant	Thermal Conductivity	Mating Metal Wear
Bronze filled (BR)	XX	XXX	XXX	X
Carbon (C)	X	XXX	XX	X
Glass Filled (GS)	XX	-	X	XXX
MOS2 (MO)	-	X	X	-
Carbon Fiber (CF)	X	XXX	XX	X
Mineral filled (MF)	XX	XXX	XX	XX

X	Good	XXX	Excellent
XX	Very Good	-	No Effect

Technical Data

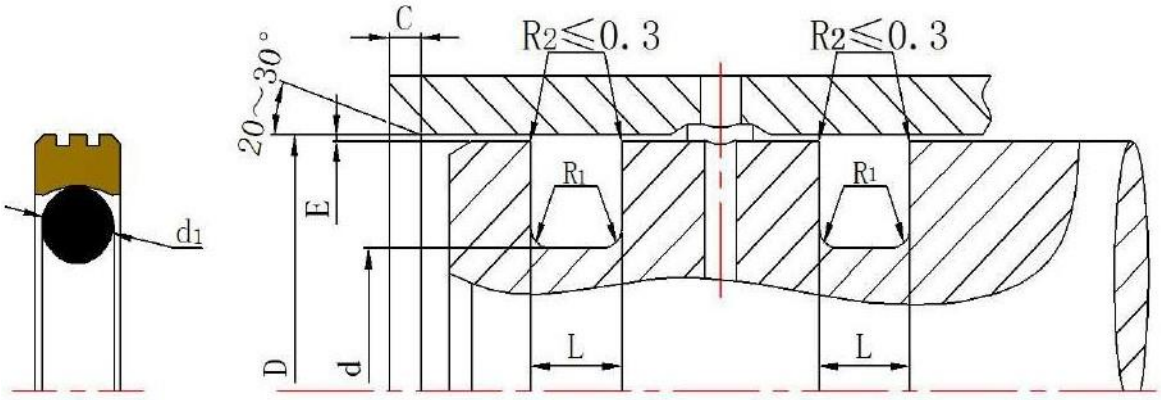
	Max. Dynamic Pressure	Temperature	Speed	Medium	Clearance
Operating Conditions	≤30 MPa	-45…+200 °C (Depending on O-Ring Seal material)	≤2 m/s Max	Mineral oil based hydraulic fluids, barely flammable hydraulic fluids, water, air and others.	The maximum permissible radial clearance E max is shown in Table as a function of the operating pressure and functional diameter.

Energizer Material

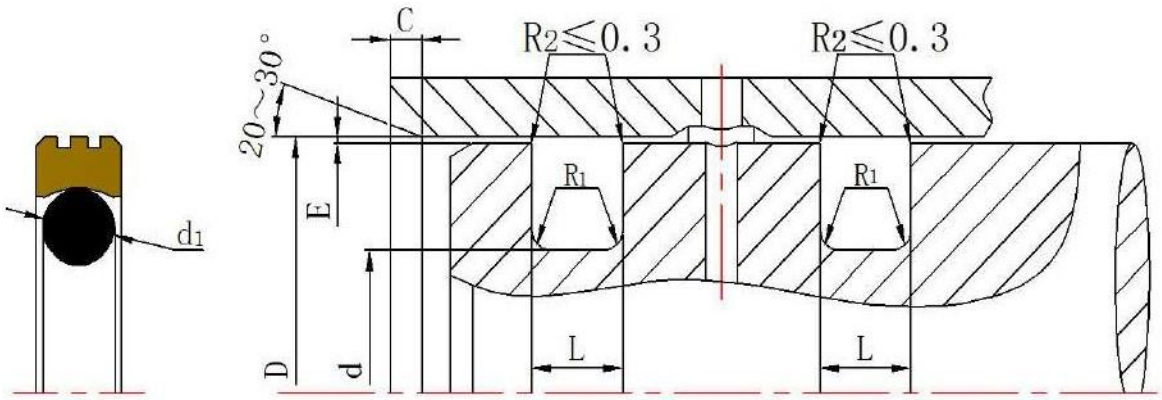
O-Ring	Code	O-Ring Operating Temp. Deg C	Standard Material
NBR - 70 Shore A	N	-30 to +100	PTFE-Bronze, MoS2, PTFE-Carbon
FKM - 70 Shore A	F	-10 to +200	PTFE-Bronze, MoS2, PTFE-Carbon
EPDM-70 Shore A	E	-45 to +145	PTFE-Bronze, MoS2, PTFE-Carbon

Installation Dimension Table Based on Metric Size

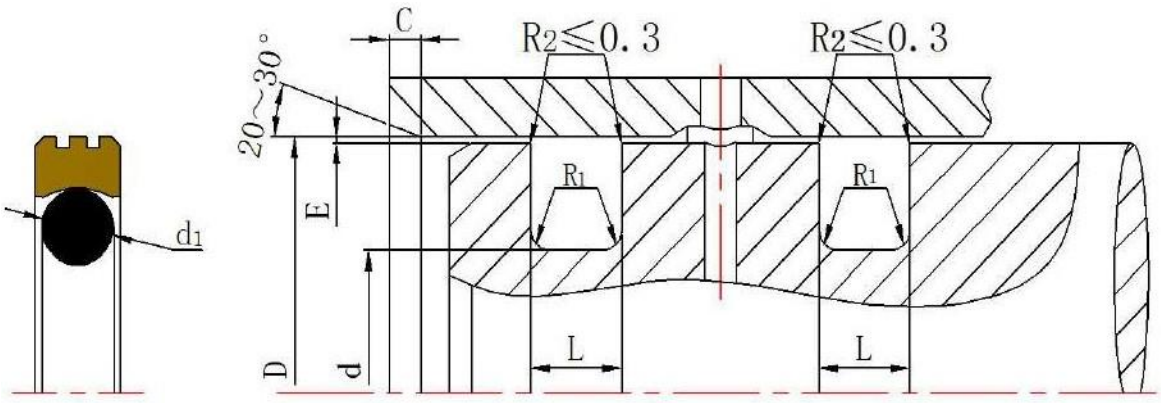
Series No	Bore Diameter D H9		Groove Dia	Groove Width	Radius	Radial Clearance E max			O-Ring Cross Section
	Recommended range	Available range	D H9	L +0.2	R1 max	10 MPa	20 MPa	40 MPa	d1
RPSML	8-39.9	8-135	D-4.9	2.2	0.4	0.2	0.15	-	1,78
RPSMR	40-79.9	14-250	D-7.5	3.2	0.6	0.25	0.2	0.15	2.62
RPSMG	80-132.9	22-400	D-11.0	4.2	1	0.3	0.25	0.2	3.53
RPSMH	133-329	40-400	D-15.5	6.3	1.3	0.35	0.3	0.25	5.33
RPSMHH	330-400	133-400	D-21.0	8.1	1.8	0.4	0.35	0.3	7



Bore Dia D H9	Groove Dia d f8/h9	Groove Width L +0.2	RSS Part NO	O-Ring Size d1
12	7.1	2.2	RPSML00120	6.70 x 1.80
14	9.1	2.2	RPSML00140	8.75 x 1.80
15	10.1	2.2	RPSML00150	9.50 x 1.80
16	11.1	2.2	RPSML00160	10.60 x 1.80
18	13.1	2.2	RPSML00180	12.42 x 1.78
20	15.1	2.2	RPSML00200	14.00 x 1.78
23	18.1	2.2	RPSML00230	17.17 x 1.78
25	20.1	2.2	RPSML00250	19.00 x 1.80
28	20.5	3.2	RPSMR00280	20.29 x 2.62
30	25.1	2.2	RPSML00300	25.12 x 1.78
32	27.1	2.2	RPSML00320	26.70 x 1.78
35	30.1	2.2	RPSML00350	29.87 x 1.78
40	32.5	3.2	RPSMR00400	31.42 x 2.62
45	37.5	3.2	RPSMR00450	36.17 x 2.62
50	42.5	3.2	RPSMR00500	40.94 x 2.62
54	46.5	3.2	RPSMR00540	45.69 x 2.62
55	47.5	3.2	RPSMR00550	45.69 x 2.62
60	52.5	3.2	RPSMR00600	52.07 x 2.62
63	55.5	3.2	RPSMR00630	53.64 x 2.62
65	57.5	3.2	RPSMR00650	56.82 x 2.62



Bore Dia D H9	Groove Dia d f8/h9	Groove Width L +0.2	RSS Part NO	O-Ring Size d1
70	62.5	3.2	RPSMR00700	61.60 x 2.62
75	67.5	3.2	RPSMR00750	66.34 x 2.62
80	69	4.2	RPSMG00800	66.27 x 3.53
85	72	4.2	RPSMG00850	72.62 x 3.53
90	79	4.2	RPSMG00900	78.97 x 3.53
95	84	4.2	RPSMG00950	82.14 x 3.53
100	89	4.2	RPSMG01000	88.49 x 3.53
110	99	4.2	RPSMG01100	98.02 x 3.53
120	109	4.2	RPSMG01200	107.54 x 3.53
125	114	4.2	RPSMG01250	113.89 x 3.53
130	119	4.2	RPSMG01300	117.07 x 3.53
140	124.5	6.3	RPSMH01400	123.19 x 5.33
150	134.5	6.3	RPSMH01500	132.72 x 5.33
150	134.5	6.3	RPSMH01500	132.72 x 5.33
160	144.5	6.3	RPSMH01600	142.24 x 5.33
170	154.5	6.3	RPSMH01700	151.77 x 5.33
180	164.5	6.3	RPSMH01800	164.47 x 5.33
190	174.5	6.3	RPSMH01900	170.82 x 5.33
200	184.5	6.3	RPSMH02000	183.52 x 5.33



Bore Dia D H9	Groove Dia d f8/h9	Groove Width L +0.2	RSS Part NO	O-Ring Size d1
210	194.5	6.3	RPSMH02100	189.87 x 5.33
220	204.5	6.3	RPSMH02200	202.57 x 5.33
230	214.5	6.3	RPSMH02300	208.92 x 5.33
240	224.5	6.3	RPSMH02400	221.62 x 5.33
250	234.5	6.3	RPSMH02500	234.32 x 5.33
280	264.5	6.3	RPSMH02800	266.07 x 5.33
300	284.5	6.3	RPSMH03000	278.77 x 5.33
320	304.5	6.3	RPSMH0320	304.17 x 5.33

THE END