

# SEAL SPEC

## S1012-M

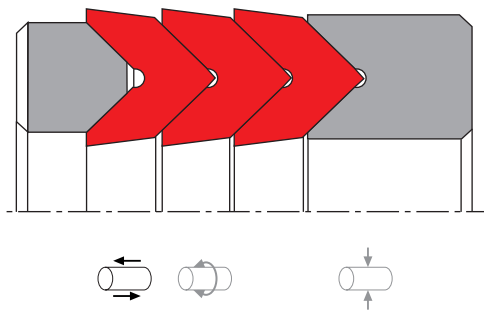


### category of profile

machined or molded/standard/trade product.

### single acting

the S1012-M seal is designed for use as a rod seal.



### description

chevron sealing set, parting surface design for heavy industry hydraulics.

- + symmetric single-acting rod sealing set consisting of several chevrons, combined with pressure ring and support ring to form a set.
- + various materials are available for different purposes.
- + good sealing in all pressure ranges, particularly in the low pressure range.
- + for pressures up to 500 bar as a seal between pressurised space and atmosphere.
- + excellent static and dynamic sealing.
- + suitable for short and long travel.
- + very sturdy and wear-resistant.
- + insensitive to thermal damage caused by air in the oil.
- + open, preferably adjustable, mounting space required (see mode of installation).
- + the seal packing can be used both as a rod seal and single-acting piston seal.
- + by combining various materials, the packing can be adjusted to the operating conditions.
- + by varying the number of packings, friction as well as leakage behaviour can be influenced.
- + for easier installation, seals can be split (see mode of installation).
- + mainly used for repair purposes. use more modern systems for new designs.

### area of application; hydraulics

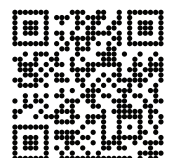
- reciprocating rods on hydraulic cylinders; small swivelling motion also permissible.
- especially for heavy hydraulic applications or heavy-duty operating conditions.
- for repairs of heavy machinery and for normal wear, when re-tightening is possible.

### note

- expensive and complex design.
- high degree of friction and thus little mechanical efficiency.
- for large numbers. for small amounts, the S1012-T profile is preferred.
- too many chevrons or too high clamping torque at installation can lead to increased friction, and wear (for standard applications use maximum 3-4 chevrons).
- if a split version is used, the packings must be made slightly larger (approx. 1% in the diameter). the packing as well as the pressure and male ring are cut straight. at least 3 packings should be provided, preferably 5.

### function

S1012-M profiles are single-acting chevron seal sets designed to seal pressurised space against the atmosphere; mainly for reciprocating movements. the design is based on application in standard hydraulic systems with conventional hydraulic oils. the operating parameters are as defined in the sealing data sheet and material data. requirements deviating from these parameters can be met to a certain degree by changing the geometry in the software program.



# SEAL SPEC S1012-M

## operating parameter & material

sealing element	material		temperature	max surface speed	max pressure <sup>1</sup>	hydrolysis	dry running	wear resistance
	header ring	back-up ring						
S11-M	S10-A	S12-M						
PU	POM / PA <sup>2</sup>	POM / PA <sup>2</sup>	-30 °C ... +100 °C	0,5 m/s	500 bar (50 MPa)	-	+	+
HPU	POM / PA <sup>2</sup>	POM / PA <sup>2</sup>	-20 °C ... +100 °C	0,5 m/s	500 bar (50 MPa)	+	+	+
LTPU	POM / PA <sup>2</sup>	POM / PA <sup>2</sup>	-40 °C ... +100 °C	0,5 m/s	500 bar (50 MPa)	-	+	+
SPU	POM / PA <sup>2</sup>	POM / PA <sup>2</sup>	-20 °C ... +100 °C	0,7 m/s	500 bar (50 MPa)	+	+	+
GPU	POM / PA <sup>2</sup>	POM / PA <sup>2</sup>	-30 °C ... +100 °C	0,5 m/s	500 bar (50 MPa)	+	+	+
NBR	PTFE glass	PTFE glass	-30 °C ... +100 °C	0,5 m/s	250 bar (25 MPa)	-	-	o
FKM	PTFE glass	PTFE glass	-20 °C ... +200 °C	0,5 m/s	250 bar (25 MPa)	-	-	o
EPDM	PTFE glass	PTFE glass	-50 °C ... +150 °C	0,5 m/s	250 bar (25 MPa)	++	-	o
HNBR	PTFE glass	PTFE glass	-25 °C ... +150 °C	0,5 m/s	250 bar (25 MPa)	+	o	+

<sup>1</sup> pressure ratings are dependent on the size of the extrusion gap.

++ particularly suitable

+ suitable

o conditional suitable

- not suitable

<sup>2</sup> POM up to ø260 mm, PA above ø260 mm

for detailed information regarding chemical resistance please refer to our „list of resistance“. for increased chemical and thermal resistance rubber materials are to be preferred, polyurethane materials increase wear resistance. for higher gliding speeds another sealing system should be used (e.g. PTFE materials).

## gap dimension

when using a pressure ring, the extrusion gap is already integrated in the seal. the gap between piston and housing should not exceed  $cs \cdot 0.05$ .

## surface quality

surface roughness	Rtmax (µm)	Ra (µm)
sliding surface	≤2,5	≤0,1-0,5
bottom of groove	≤6,3	≤1,6
groove face	≤15	≤3

## tolerance recommendation

seal housing tolerance	
ød	f8
ØD	H10

## mode of installation

insert the male ring first, then the packing and finally the pressure ring (well greased) into the installation space. insert the metal insert without load, complete mounting of the system, tighten metal inserts slightly, let run in (10 to 20 idle strokes); re-tighten depending on leakage. in the case of wear, re-tightening is also possible.

if split rings are used, the packing should be fitted by separating the split ends axially (twisting). joints to be staggered 90 to 120 degrees relative to each other. the split ends are to be inserted first then the remaining seal ring is pressed in.

## mode of installation

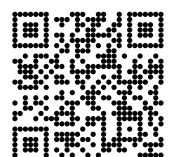
ød	type of installation
≤ 6·cs	open mounting space required
> 6·cs ..... ≤ 10·cs	snap mounting with tool
> 10·cs	snap mounting by hand

for inside diameters of 25mm or more, and dependant on radial cross section (cs), seals may be snapped into closed housings.

## insertion chamfer

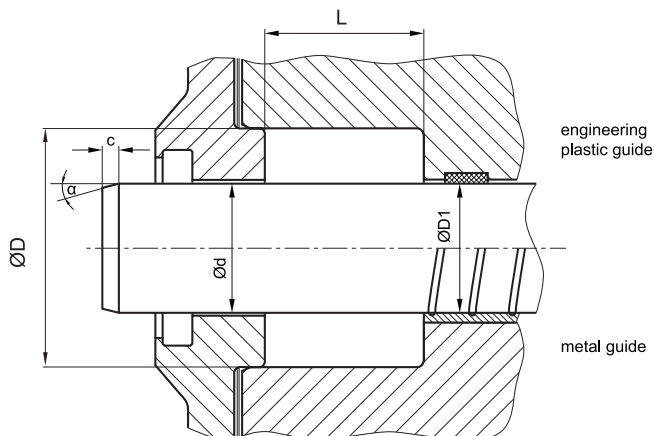
in order to avoid damage to the rod seal during installation, the piston rod is to be chamfered and rounded as shown in the "recommended mounting space" drawing. the size of chamfer depends on the seal type and profile width.

cs (mm)	c (mm)	
	α = 15° ... 20°	α = 20° ... 30°
4	3,5	2
5	4	2,5
6	4,5	3
7,5	5	4
10	6	5
12,5	8,5	6,5
15	10	7,5
20	13	10



# SEAL SPEC S1012-M

## recommended mounting space

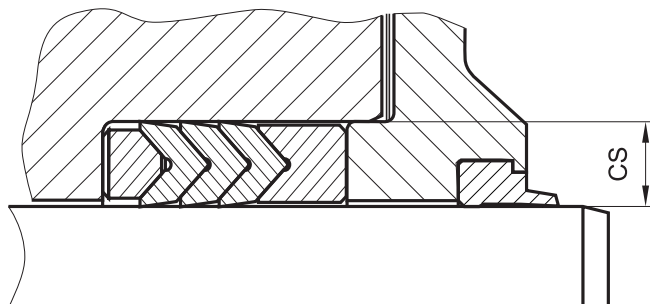


the adjustment range of the mounting space height (L) should correspond to approx. 10% of the theoretical mounting length. a guideline for the height of the spacer should be approx. 30% of the cross section.

## recommended guide tolerance D1

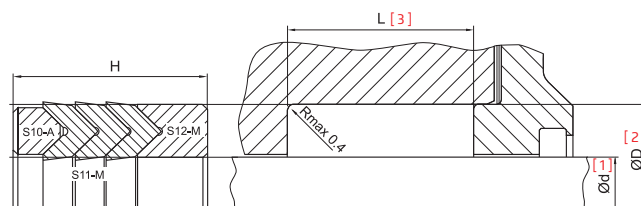
d f8 [mm]	p ≤ 100 [bar]	100 < p ≤ 200 [bar]	p > 200 [bar]
≤ 100	H10	H8	H8
> 100 ≤ 200	H10	H8	H7
> 200	H9	H8	H7

## fitted



## seal & housing recommendations

please note that we are able to produce those profiles to your specific need or any non standard housing. for detail measurements, please see seal-mart catalog...

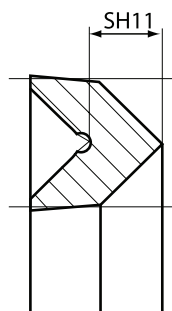


Ød [mm] [1]	ØD [mm] [2]	L [mm] [3]	cs = (ØD - Ød)/2 [mm]
10 - 39,9	ød + 10	16	5
40 ~ 74,9	ød + 15	25	7,5
75 ~ 149,9	ød + 20	32	10
150 ~ 199,9	ød + 25	40	12,5
200 ~ 300	ød + 30	50	15
> 300	ød + 40	63	20

the ratio between nominal width and seal height should be in accordance with following recommendations (see also manufacturing notes)

## manufacturing notes

the following nominal widths are preferred. the theoretical packing height SH11 should be designed in accordance with the recommended values:



cs	SH11
(4)	2,2
5	2,5
(6)	3
7,5	3,5
10	5
12,5	6
15	7,5
20	10
(25)	12,5
(30)	15

in order to be able to maintain the required height irrespective of the accumulated packing height 'h', the pressure ring is individually adjusted during the production of the V-packing set.

