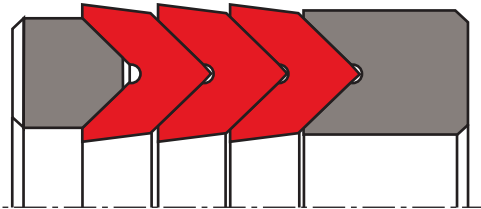


# rod seal S1012-M

## seal spec

### 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.

### application



not bolded symbols; please consult our technical for application limitations

### category of profile

machined or molded/standard/trade product.

### single acting

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

### 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.

**operating parameters & material**

diameter range: up to 600 mm

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

the stated operation conditions represent general indications. it is recommended not to use all maximum values simultaneously.  
surface speed limits apply only to the presence of adequate lubrication film.

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

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

++ ... particularly suitable

o ... conditional suitable

+ ... suitable

- ... not suitable

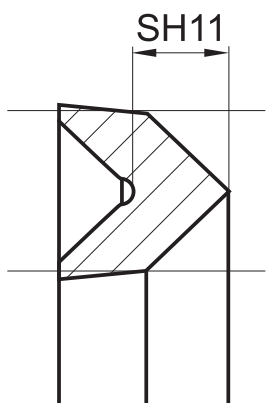
for detailed information regarding chemical resistance please refer to our „list of resistance“. for increased chemical and thermal resistance rubber materials are to be preferred, polyurethane materials increase wear resistance. for higher gliding speeds another sealing system should be used (e.g. PTFE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

**gap dimension**

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

**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)	3.0
7.5	3.5
10	5.0
12.5	6.0
15	7.5
20	10
(25)	12.5
(30)	15

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

**surface quality**

surface roughness	Rtmax [ $\mu\text{m}$ ]	Ra [ $\mu\text{m}$ ]
sliding surface	$\leq 2,5$	$\leq 0,1-0,5$
bottom of groove	$\leq 6,3$	$\leq 1,6$
groove face	$\leq 15$	$\leq 3$

**tolerance recommendation**

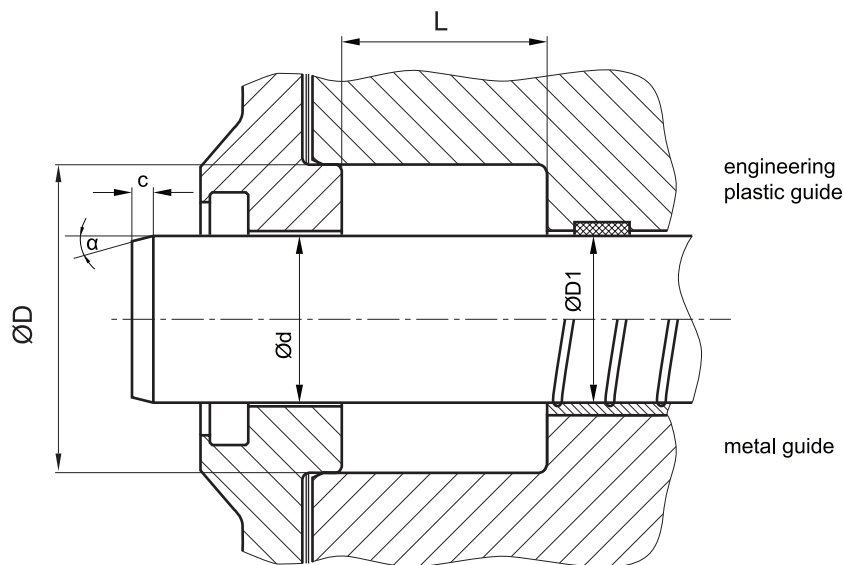
seal housing tolerances	
$\varnothing d$	f8
$\varnothing D$	H10

**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.

$\varnothing d$	type of installation
$\leq 6 \cdot cs$	open mounting space required
$> 6 \cdot cs \dots \dots \leq 10 \cdot cs$	snap mounting with tool
$> 10 \cdot cs$	snap mounting by hand

**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 $\leq$ 100 [bar]	100 < p $\leq$ 200 [bar]	p > 200 [bar]
$\leq 100$	H10	H8	H8
$> 100 \leq 200$	H10	H8	H7
$> 200$	H9	H8	H7

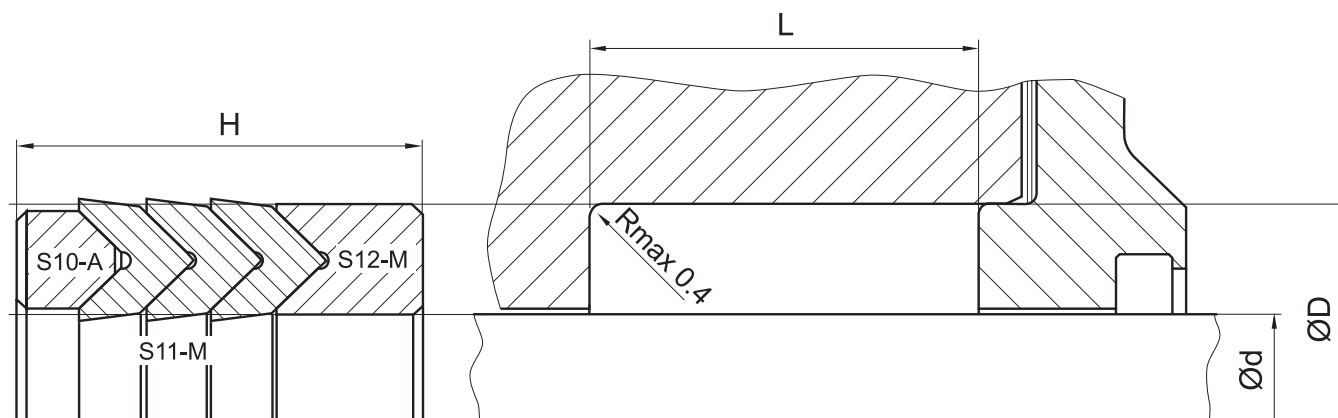
**insertion chamfer:**

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)	
	$\alpha = 15^\circ \dots 20^\circ$	$\alpha = 20^\circ \dots 30^\circ$
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 & 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...

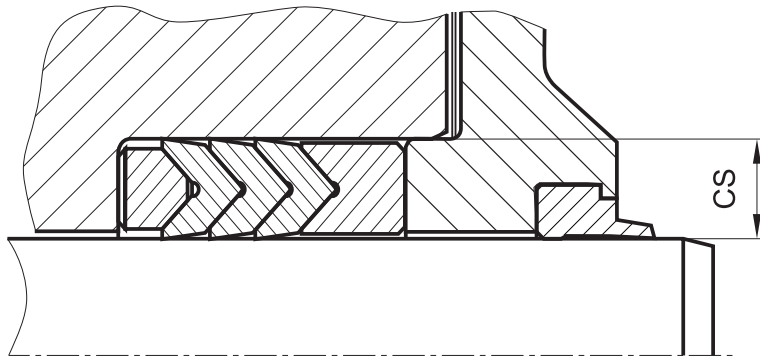


the ratio between nominal width and seal height should be in accordance with following recommendations (see also manufacturing notes)

$\varnothing d$ [mm]	$\varnothing D$ [mm]	L [mm]	$cs = (\varnothing D - \varnothing d)/2$ [mm]
10 - 39,9	$\varnothing d + 10$	16	5
40 - 74,9	$\varnothing d + 15$	25	7,5
75 - 149,9	$\varnothing d + 20$	32	10
150 - 199,9	$\varnothing d + 25$	40	12,5
200 - 300	$\varnothing d + 30$	50	15
> 300	$\varnothing d + 40$	63	20



**fitted:**



*don't hesitate to contact our technical department for further information or for special requirements (temperature, speed etc.), so that suitable materials and/or designs can be recommended.*