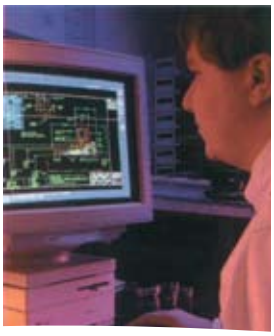
FLOWSERVE

Pac-Seal

Single Spring and Elastomer Bellows Mechanical Seals

Experience In Motion



Seal Excellence Starts with Superior Design

The peak performance of Pac-Seals begins in the design stage. Pac-Seals designs are a result of years of experience with customers varying shaft sealing applications. Today, utilizing the most sophisticated CAD equipment we continue to analyze the most challenging problems and respond with a product line that meets demands for seal solutions.

Principle Advantages of Single Spring Mechanical Seals

Single Spring - gives superior axial and angular flexibility. The seal's design compensates for misalignment and machinery tolerances.

Non-clogging - large single spring, plus free movement of the elastomer shaft seal, combats seal failure caused by build up of solid material.

Self-adjusting - the flexible moving elastomer shaft seals accommodate shaft end float and take up wear.

Minimal Wear - strong static seal to the shaft minimises shaft fretting.

Versatile - Compact in design and simple to fit. Standard designs and sizes for all common imperial, metric and DIN EN 12 756 housings are standard. Extremely cost effective - low capital cost, proven reliability of design, easy to fit and accommodating in use, excellent seal performance and ex-stock service on a complete range of seal types, materials and sizes, make Flowserve single spring seals the choice for the majority of applications.

The power of the Flowserve Flow Solutions Division

As a unit of Flowserve, Pac-Seal can now tap the global resources of the leader in fluid sealing. With an extensive network of direct sales engineers and distribution you are connected to a sealing solution that exactly meets your specifications.

Quality Assurance… Not just a process, a promise

Under no circumstance will the quality of Pac-Seal be compromised. From incoming inspection of raw material, through in-process controls to final assembly, our commitment to quality control is reflected in each of the Pac-Seal lines we manufacture. Flowserve works to established quality assurance procedures, which are approved by Lloyds to ISO 9001.

Product environment testing ensures maximum seal performance

When customers are encountering unusual operating conditions, seal material selection becomes critical to the success of the application. In these situations, Flowserve can provide monitored testing of customer equipment in our laboratory.

By conducting a seal evaluation under simulated operating conditions, we are able to make the appropriate product recommendations that ensure maximum seal performance.

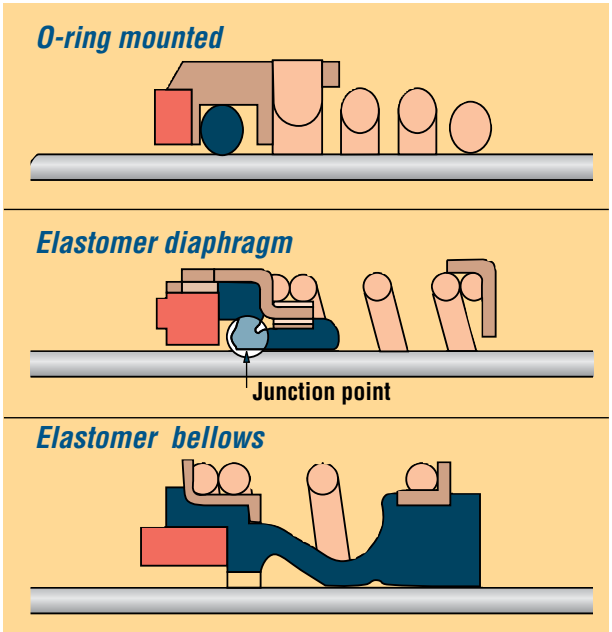


Our delivery keeps you up and running

We know that downtime is not only a frustration, it costs you money. That's why we maintain a large inventory of both complete products and individual components. This enables us to respond quickly to your needs, often with next day delivery.

Special designs

Pac-Seal has built a reputation meeting customers' special requirements with rapid prototype development or modifications to existing designs.
Please contact us for a more cost effective solution for your current special sealing needs.



Typical designs of each of the three product groups.

Product types

The Flowserve single spring seal range is divided into three main product groups, namely; **O-ring mounted seals, elastomer diaphragm seals and elastomer bellow seals.** These single spring mechanical seals have been designed to service the European pump market and are totally inter-changeable, with all other manufacturer's equivalent seals, without any modification to the existing seal housings and gland plates.

O-Ring Mounted Sealing Operation

These conical spring, O-ring mounted, mechanical seals have been designed to have a small cross-section and a complete recessed O-ring housing. A narrow seal head width allows the seals to easily fit confined DIN EN 12 756 housings, whilst also providing the benefits of reduced face surface running speed with increased circulation around the seal faces.

The machined, recessed O-ring groove helps prevent the seal from clogging due to build up of product around the shaft O-ring.
Seal drive is provided by the conical spring tightly gripping the shaft at its base. Stock seals are supplied as **standard with right-hand drive springs** for clockwise shafts. Left-hand springs for anti-clockwise shaft rotation should be specified on order.

Our resilient O-ring mounted seal design is technically efficient (readily accommodating misalignment and vibration) and is highly versatile. Flowserve offers a wide range of face material combinations and spring/seat sizes to suit most applications.

Diaphragm Sealing Operation

The previous drawing shows the standard section of a Flowserve elastomer diaphragm seal.
The shaft seal is provided by the elastomer diaphragm, which is squeezed onto the shaft by the drive ring. Once fitted, the elastomer diaphragm will grip the shaft giving a strong static seal and positive drive via the drive ring to the seal face. As there is no relative movement between the shaft and the elastomer diaphragm, shaft fretting, wear and hang-up hysteresis are eliminated and the seal can immediately accommodate some shaft run-out and misalignment.
Shaft axial movement and the movement required during the working life of the seal is handled by the elastomer flexing at its **junction point**. The spring force and the seal pumping pressure force maintain the faces in full contact whilst the elastomer diaphragm acts as a bellows providing sustained flexibility. Positive drive of the seal face is transmitted via the drive ring and retaining housing and not via the spring, which merely provides some closing force to the seal faces.
These seals can therefore be used to seal shafts rotating in either direction and in vacuum applications.

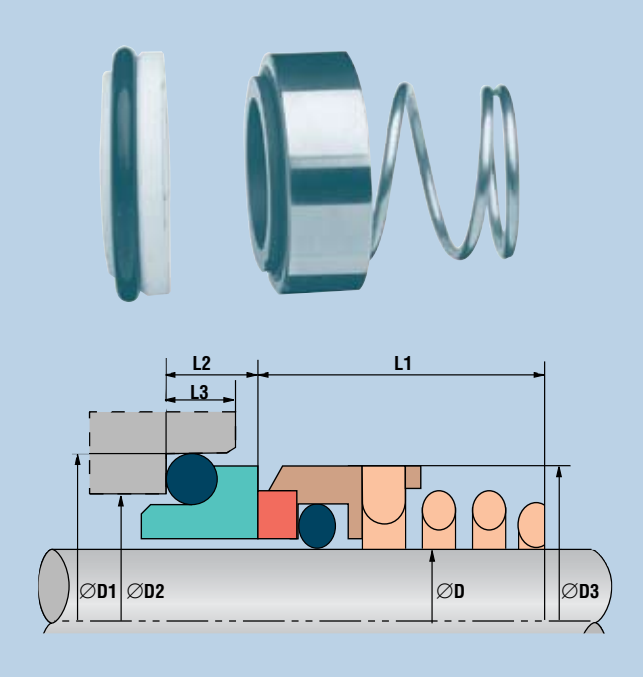
Elastomer Bellows Sealing Operation

Flowserve elastomeric bellows seals are of compact design with a sealing action that provides many benefits. The bellow's high strength and flexibility is the key to the very reliable performance of this type of seal as it readily accommodates misalignment, end-float and seal face wear.
The convoluted bellows profile makes these seals ideal for media prone to clogging or for hygienic applications.
Designed for confined spaces and limited gland depths, Flowserve elastomer bellows seals are bi-directional in operation and provide secure bellows sealing for longer life in a wide range of applications.

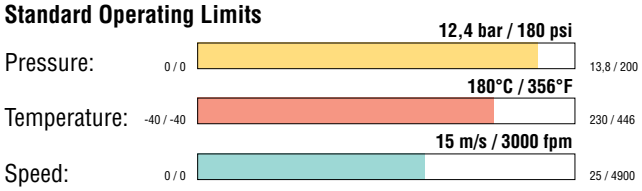
	Type	Page	Dimensions: DIN	Dimensions: Metric	Dimensions: Inch	Rotating Face	Standard seat: O-ring	Standard seat: O-ring + Slot	Standard seat: H-type	Standard seat: Cup	Size Range	Note
O-ring Mounted Seal	Pac-Seal 38	6		●		Shrinkfit	8N				M010 - M080	
	Pac-Seal 38D	7	●	●		Shrinkfit	8L				M010 - M080	As type 38, but with DIN seat
	Pac-Seal 39	8		●		Solid steel	8B				M010 - M080	
	Pac-Seal 42	10		●		Solid steel	2N				M010 - M100	
	Pac-Seal 42D	9	●	●		Solid steel	2D				M010 - M100	As type 42, but with DIN seat
	Pac-Seal 43	11		●		Pressed head	3N				M010 - M040	
	Pac-Seal 43D	12	●	●		Pressed head	3D				M010 - M040	As type 43, but with DIN seat
Elastomer Bellows	Pac-Seal 140	13	●	●		Short version				B9	M010 - M100	According DIN
	Pac-Seal 142	13	●	●		Middle version				B9	M010 - M100	According DIN L1K
	Pac-Seal 143	13	●	●		Long version				B9	M010 - M100	According DIN L1N
	Pac-Seal 190	14	●	●		Standard	8N				M010 - M100	According DIN
	Pac-Seal 192	14	●	●		L1K length	8N				M010 - M100	DIN L1K length
	Pac-Seal 193	14	●	●		L1N length	8N				M010 - M100	DIN L1N length
	Pac-Seal 151	15		●	●	Short version				B1	0500 - 3000 M012 - M075	According common US standards
	Pac-Seal 152	15		●	●	Long version				B1	0500 - 3000 M010 - M075	According common US standards
	Pac-Seal 150	16 / 17		●	●	Working length As type 200				B2	0375 - 4000 M010 - M100	According common international standards
Elastomer Diaphragm	Pac-Seal 100	18 / 19		●	●	Long version				B2	0375 - 4000 M010 - M100	According common international standards
	Pac-Seal 200	18 / 19		●	●	Short version				B2	0375 - 4000 M010 - M100	According common international standards
	Pac-Seal 110	20		●	●	Short version				B1	0500 - 3000 M012 - M075	According common US standards
	Pac-Seal 220	20		●	●	Long version				B1	0500 - 3000 M012 - M075	According common US standards
	Pac-Seal 240	21	●	●						B4	M012 - M100	According DIN L1K
Special	Pac-Seal 118	22		●						B8	M008 - M070	
	Pac-Seal 160	23			●					B6	0375 - 1000	
	Pac-Seal 170	23		●						B7	M013 - M030	
OEM Specific Designs	Pac-Seal FRI	24		●							M022,030,035	Several designs for Fristam pumps
	Pac-Seal APU	24			●						1000, 1500	For APV Puma pumps
	Pac-Seal APR	25		●								For APV Rosista pumps
	Pac-Seal ALC	25			●						M040, M053	For Alfa Laval ALC pumps
	Pac-Seal ALO	25		●							1500, 2000	For Alfa Laval Contherm HE
	Pac-Seal KZN	25		●							M022, 028,038,048	For KSB pumps
	Pac-Seal MAC	25			●						1250, 1750	For Macerator and waste disposal pumps
	Pac-Seal AWS	26		●							M025, M035	For APV World pumps, single
	Pac-Seal AWD	26		●							M025, M035	For APV World pumps, double
	Pac-Seal AWP	26		●							M025, M035	For APV World +pumps
	Pac-Seal 168	26		●								For Johnson and SSP pumps, common food ind
Seats	Pac-Seal 8S	27					●					DIN Short
	Pac-Seal 8L	27						●				DIN Long
	Pac-Seal 1H	27							●			H type face
	Pac-Seal 4S	28					●					DIN Short
	Pac-Seal 4L	28						●				DIN Long

Pac-Seal 38

Conical spring, O-ring mounted seal with a choice of face materials. Suitable for a large variety of general duties and arduous duty applications needing high pV value face combinations.



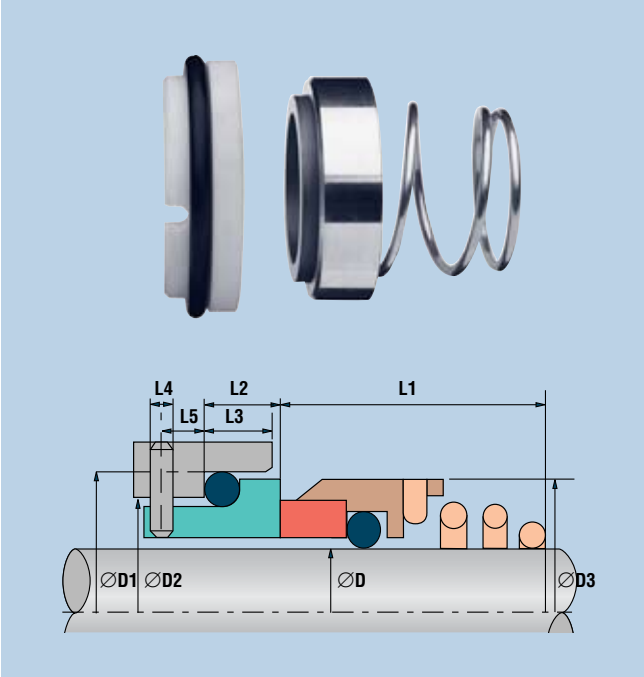
Standard Operating Limits



Standard Sizes [mm]

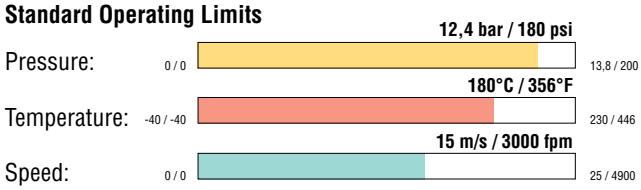
Metric Shaft Size D	D1	D2	D3	L1	L2	L3
10	19.20	15.50	19.00	15.50	6.60	5.00
12	21.60	17.50	21.00	15.50	5.60	5.00
14	24.60	20.50	23.00	15.50	5.60	5.00
15	24.60	20.50	24.00	15.50	6.60	5.00
16	28.00	22.00	26.00	17.50	7.50	6.50
18	30.00	24.00	29.00	18.50	8.00	6.50
19	31.00	25.00	31.00	20.00	7.50	6.50
20	35.00	29.50	31.00	20.00	7.50	6.50
22	35.00	29.50	33.00	21.50	7.50	6.50
24	38.00	32.00	35.00	23.00	7.50	6.50
25	38.00	32.00	36.00	24.50	7.50	6.50
26	40.00	34.00	37.00	24.50	8.00	6.50
28	42.00	36.00	40.00	24.50	9.00	6.50
30	45.00	39.20	43.00	24.50	10.50	6.50
32	48.00	42.20	46.00	28.00	10.50	6.50
35	52.00	46.20	49.00	28.00	11.00	6.50
38	55.00	49.20	53.00	31.00	10.30	6.50
40	58.00	52.20	56.00	34.00	10.80	6.50
42	62.00	53.30	59.00	35.00	12.00	8.00
43	63.00	54.30	59.00	35.00	12.00	8.00
45	64.00	55.30	61.00	36.50	11.60	8.00
48	68.40	59.70	64.00	42.00	11.60	8.00
50	69.30	60.80	66.00	43.00	11.60	8.00
55	75.40	66.50	72.00	47.00	13.30	8.00
58	78.40	69.50	76.00	50.00	13.30	8.00
60	80.40	71.50	78.00	51.00	13.30	8.00
65	85.40	76.50	84.00	52.00	13.00	8.00
68	91.50	82.70	88.00	53.00	13.70	8.00
70	92.00	83.00	90.00	54.00	13.00	8.00
75	99.00	92.20	98.00	55.00	14.00	8.00
80	104.00	95.20	100.00	58.00	15.00	8.00

Pac-Seal 38D



Conical spring, O-ring mounted, seal having a DIN long seat with drive slot. Suitable for a large variety of general and high duty applications through a choice of face material combinations.

Standard Operating Limits

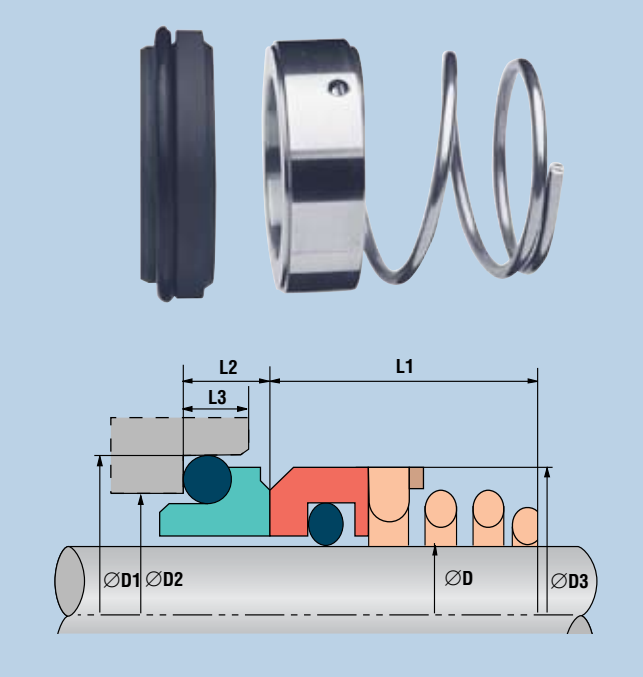


Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L2	L3	L4	L5
10	21.00	17.00	19.00	15.50	10.00	5.50	3.00	5.00
12	23.00	19.00	21.00	16.00	10.00	5.50	3.00	5.00
14	25.00	21.00	23.00	16.50	10.00	5.50	3.00	5.00
16	27.00	23.00	26.00	18.00	10.00	5.50	3.00	5.00
18	33.00	27.00	29.00	19.50	11.50	7.00	3.00	5.00
20	35.00	29.00	31.00	22.00	11.50	7.00	3.00	5.00
20	37.00	31.00	33.00	21.50	11.50	7.00	3.00	5.00
24	39.00	33.00	35.00	23.50	11.50	7.00	3.00	5.00
25	40.00	34.00	36.00	26.50	11.50	7.00	3.00	5.00
28	43.00	37.00	40.00	26.50	11.50	7.00	3.00	5.00
30	45.00	39.00	43.00	26.50	11.50	7.00	3.00	5.00
32	48.00	42.00	46.00	28.50	11.50	7.00	3.00	5.00
35	50.00	44.00	49.00	28.50	11.50	7.00	3.00	5.00
38	56.00	49.00	53.00	33.50	14.00	8.00	4.00	5.00
40	58.00	51.00	56.00	36.00	14.00	8.00	4.00	5.00
43	61.00	54.00	59.00	38.50	14.00	8.00	4.00	5.00
45	63.00	56.00	61.00	39.50	14.00	8.00	4.00	5.00
48	66.00	59.00	64.00	46.00	14.00	8.00	4.00	5.00
50	70.00	62.00	66.00	45.00	15.00	8.50	4.00	5.00
53	73.00	65.00	69.00	47.00	15.00	8.50	4.00	5.00
55	75.00	67.00	72.00	49.00	15.00	8.50	4.00	5.00
58	78.00	70.00	76.00	55.00	15.00	8.50	4.00	5.00
60	80.00	72.00	78.00	55.00	15.00	8.50	4.00	5.00
65	85.00	77.00	84.00	55.00	15.00	8.50	4.00	5.00
68	90.00	81.00	88.00	55.00	18.00	9.50	4.00	5.00
70	92.00	83.00	90.00	57.00	18.00	9.50	4.00	5.00
75	97.00	88.00	98.00	62.00	18.00	9.50	4.00	5.00
80	105.00	95.00	100.00	61.80	18.20	10.00	4.00	5.00

Pac-Seal 39

Conical spring, O-ring mounted seal and seat of similar design to the Pac-Seal 38 but with a solid stainless seal head and O-ring mounted carbon seat. This standard face combination is suitable for general and medium duty applications.

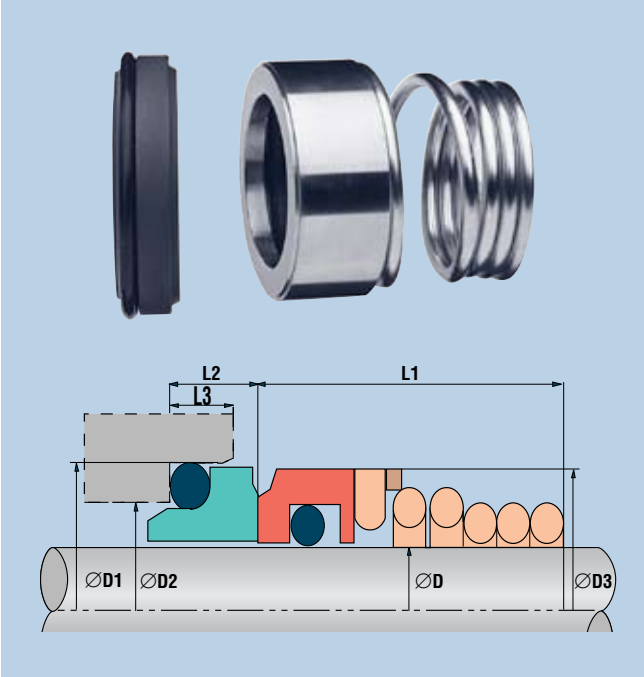


Standard Operating Limits

Pressure:	0 / 0	11,0 bar / 160 psi	13,8 / 200
Temperature:	-40 / -40	180°C / 356°F	230 / 446
Speed:	0 / 0	15 m/s / 3000 fpm	25 / 4900

Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L2	L3
10	19.20	15.50	19.00	15.50	7.10	5.00
12	21.60	17.50	21.00	15.50	7.60	5.00
14	24.60	20.50	23.00	15.50	7.60	5.00
15	24.60	20.50	24.00	15.50	8.60	5.00
16	28.00	22.00	26.00	17.50	9.00	6.50
18	30.00	24.00	29.00	18.50	10.00	6.50
19	31.00	25.00	31.00	20.00	9.00	6.50
20	35.00	29.50	31.00	20.00	9.50	6.50
22	35.00	29.50	33.00	21.50	9.50	6.50
24	38.00	32.00	35.00	23.00	9.50	6.50
25	38.00	32.00	36.00	24.50	9.50	6.50
26	40.00	34.00	37.00	24.50	10.00	6.50
28	42.00	36.00	40.00	24.50	11.00	6.50
30	45.00	39.20	43.00	24.50	11.00	6.50
32	48.00	42.20	46.00	28.00	11.00	6.50
35	52.00	46.20	49.00	28.00	11.50	6.50
38	55.00	49.20	53.00	31.00	11.50	6.50
40	58.00	52.20	56.00	34.00	11.50	6.50
42	62.00	53.30	59.00	35.00	14.30	8.00
43	63.00	54.30	59.00	35.00	14.30	8.00
45	64.00	55.30	61.00	36.50	14.30	8.00
48	68.40	59.70	64.00	42.00	14.30	8.00
50	69.30	60.80	66.00	43.00	14.30	8.00
55	75.40	66.50	71.00	47.00	15.30	8.00
58	78.40	69.50	76.00	50.00	15.30	8.00
60	80.40	71.50	78.00	51.00	15.30	8.00
65	85.40	76.50	84.00	52.00	15.30	8.00
68	91.50	82.70	88.00	53.00	16.00	8.00
70	92.00	83.00	90.00	54.00	15.30	8.00
75	99.00	90.20	98.00	55.00	15.30	8.00
80	104.00	95.20	100.00	58.00	16.30	8.00



Pac-Seal 42D

A range of highly proficient, widely utilised, O-ring mounted, conical spring seals with solid, stainless steel head and carbon seat. Available to suit DIN EN 12 756 housings (Pac-Seal 42D) and for standard housings (Pac-Seal 42, next page). Suitable for a wide variety of duties.

Standard Operating Limits

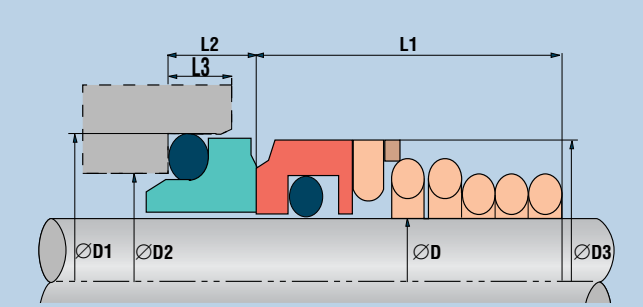
Pressure:	0 / 0	11,0 bar / 160 psi	13,8 / 200
Temperature:	-40 / -40	180°C / 356°F	230 / 446
Speed:	0 / 0	15 m/s / 3000 fpm	25 / 4900

Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L2	L3
10	21.00	17.00	19.00	15.00	7.00	4.00
12	23.00	19.00	21.00	18.00	7.00	4.00
14	25.00	21.00	23.00	22.00	7.00	4.00
16	27.00	23.00	26.00	23.00	7.00	4.00
18	33.00	27.00	29.00	24.00	10.00	5.00
20	35.00	29.00	31.00	25.00	10.00	5.00
22	37.00	31.00	33.00	25.00	10.00	5.00
24	39.00	33.00	35.00	27.00	10.00	5.00
25	40.00	34.00	36.00	27.00	10.00	5.00
28	43.00	37.00	40.00	29.00	10.00	5.00
30	45.00	39.00	43.00	30.00	10.00	5.00
32	48.00	42.00	46.00	30.00	10.00	5.00
33	48.00	42.00	46.00	39.00	10.00	5.00
35	50.00	44.00	49.00	39.00	10.00	5.00
38	56.00	49.00	53.00	42.00	13.00	6.00
40	58.00	51.00	56.00	42.00	13.00	6.00
43	61.00	54.00	59.00	47.00	13.00	6.00
45	63.00	56.00	61.00	47.00	13.00	6.00
48	66.00	59.00	64.00	47.00	13.00	6.00
50	70.00	62.00	66.00	46.00	14.00	6.00
53	73.00	65.00	69.00	56.00	14.00	6.00
55	75.00	67.00	71.00	56.00	14.00	6.00
58	78.00	70.00	76.00	56.00	14.00	6.00
60	80.00	72.00	78.00	56.00	14.00	6.00
63	83.00	75.00	81.00	56.00	14.00	6.00
65	85.00	77.00	84.00	66.00	14.00	6.00
68	90.00	81.00	88.00	64.00	16.00	7.00
70	92.00	83.00	89.60	64.00	16.00	7.00
75	97.00	88.00	98.00	64.00	16.00	7.00
80	105.00	95.00	100.00	72.00	18.00	7.00
85	110.00	100.00	107.50	72.00	18.00	7.00
90	115.00	105.00	111.00	72.00	18.00	7.00
95	120.00	110.00	119.00	72.00	18.00	7.00
100	125.00	115.00	123.80	72.00	18.00	7.00

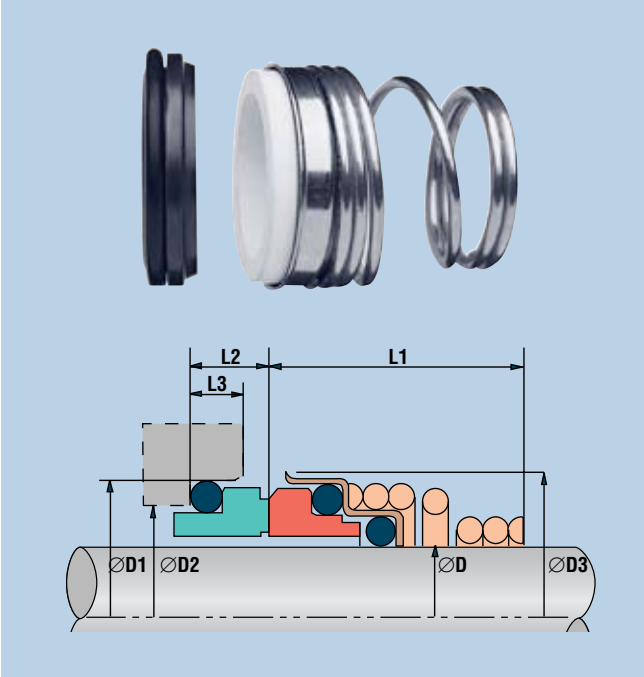
Pac-Seal 42

A range of highly proficient, widely utilized, O-ring mounted, conical spring seals with solid, stainless steel head and carbon seat. Suitable for a wide variety of duties.



Standard Sizes [mm]

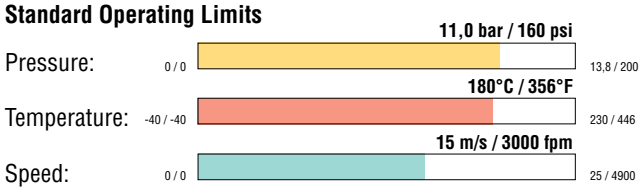
Metric Shaft Size D	D1	D2	D3	L1	L2	L3
10	18.10	14.00	19.00	15.00	5.50	4.00
11	20.60	16.50	21.00	18.00	5.50	4.00
12	20.60	16.50	21.00	18.00	5.50	4.00
13	23.10	19.00	23.00	22.00	6.00	4.00
14	23.10	19.00	23.00	22.00	6.00	4.00
15	26.90	21.00	24.00	22.00	7.00	5.00
16	26.90	21.00	26.00	23.00	7.00	5.00
17	26.90	21.00	26.00	23.00	7.00	5.00
18	30.90	25.00	29.00	24.00	8.00	5.00
19	30.90	25.00	31.00	25.00	8.00	5.00
20	30.90	25.00	31.00	25.00	8.00	5.00
21	35.40	30.00	33.00	25.00	8.00	5.50
22	35.40	30.00	33.00	25.00	8.00	5.50
23	35.40	30.00	35.00	27.00	8.00	5.50
24	35.40	30.00	35.00	27.00	8.00	5.50
25	38.20	33.00	36.00	27.00	8.50	5.50
26	38.20	33.00	36.00	27.00	8.50	5.50
27	38.20	33.00	36.00	27.00	8.50	5.50
28	43.30	38.00	40.00	29.00	9.00	5.50
29	43.30	38.00	43.00	30.00	9.00	5.50
30	43.30	38.00	43.00	30.00	9.00	5.50
31	43.30	38.00	46.00	30.00	9.00	5.50
32	43.30	38.00	46.00	30.00	9.00	5.50
33	53.50	45.00	46.00	39.00	11.50	7.50
34	53.50	45.00	49.00	39.00	11.50	7.50
35	53.50	45.00	49.00	39.00	11.50	7.50
36	53.50	45.00	49.00	39.00	11.50	7.50
37	53.50	45.00	49.00	39.00	11.50	7.50
38	60.50	52.00	53.00	39.00	11.50	7.50
39	60.50	52.00	56.00	39.00	11.50	7.50
40	60.50	52.00	56.00	39.00	11.50	7.50
41	60.50	52.00	56.00	39.00	11.50	7.50
42	60.50	52.00	59.00	39.00	11.50	7.50
43	60.50	52.00	59.00	39.00	11.50	7.50
44	65.50	57.00	61.00	41.00	11.50	7.50
45	65.50	57.00	61.00	41.00	11.50	7.50
46	65.50	57.00	61.00	41.00	11.50	7.50
47	65.50	57.00	64.00	41.00	11.50	7.50
48	65.50	57.00	64.00	41.00	11.50	7.50
49	65.50	57.00	64.00	41.00	11.50	7.50
50	72.50	64.00	66.00	45.00	11.50	7.50
55	72.50	64.00	71.00	47.00	11.50	7.50
60	79.30	72.00	78.00	49.00	11.50	7.50
65	84.50	77.00	84.00	51.00	11.50	7.50
70	89.50	82.00	89.60	51.00	11.50	7.50
75	94.50	87.00	98.00	57.00	11.50	7.50
80	99.50	92.00	100.00	59.00	11.50	7.50
85	105.50	98.00	107.50	59.00	13.50	8.00
90	111.50	105.00	111.00	62.00	13.50	8.00
95	116.50	110.00	119.00	62.00	13.50	8.00
100	119.50	114.00	123.80	75.00	13.50	8.00



Pac-Seal 43

O-ring mounted, conical spring seal with pressed stainless seal head retainer and pressed carbon seat. Highly productionised seal capable of wide ranging service. Seal and seat faces can be inter-changed with each other and can be easily replaced.

Standard Operating Limits

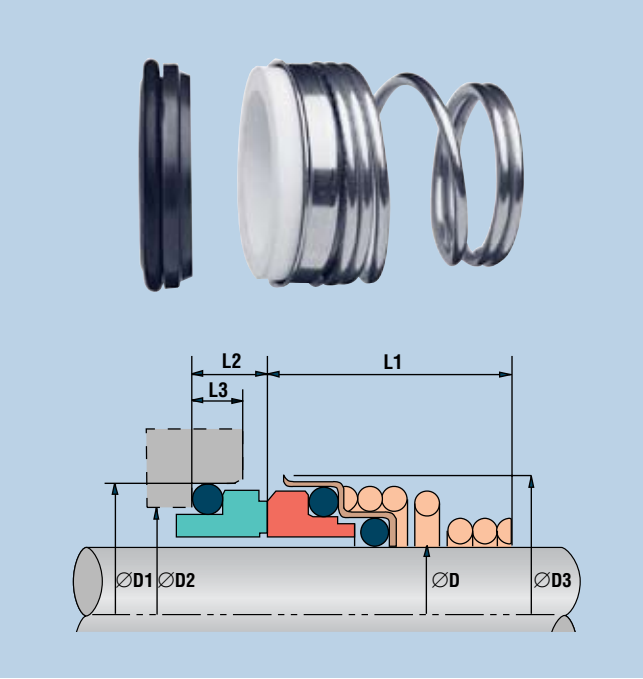


Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L2	L3
10	18.10	14.00	19.50	15.00	5.50	4.00
11	20.60	16.50	22.00	18.00	5.50	4.00
12	20.60	16.50	22.80	18.00	5.50	4.00
13	23.10	19.00	25.00	22.00	6.00	4.00
14	23.10	19.00	25.00	22.00	6.00	4.00
15	26.90	21.00	28.60	22.00	7.00	5.00
16	26.90	21.00	28.60	23.00	7.00	5.00
17	26.90	21.00	28.60	23.00	7.00	5.00
18	30.90	25.00	32.70	24.00	8.00	5.00
19	30.90	25.00	32.70	25.00	8.00	5.00
20	30.90	25.00	32.70	25.00	8.00	5.00
21	35.40	30.00	37.40	25.00	8.00	5.50
22	35.40	30.00	37.40	25.00	8.00	5.50
23	35.40	30.00	37.40	27.00	8.00	5.50
24	35.40	30.00	37.40	27.00	8.00	5.50
25	38.20	33.00	40.00	27.00	8.50	5.50
28	43.30	38.00	45.50	29.00	9.00	5.50
29	43.30	38.00	45.50	30.00	9.00	5.50
30	43.30	38.00	45.50	30.00	9.00	5.50
32	43.30	38.00	45.50	30.00	9.00	5.50
33	53.50	45.00	48.00	39.00	11.50	7.50
35	53.50	45.00	50.00	39.00	11.50	7.50
38	60.50	52.00	56.00	39.00	11.50	7.50
40	60.50	52.00	58.00	39.00	11.50	7.50

Pac-Seal 43D

O-ring mounted, with pressed seal head and seat, plus conical spring, designed to fit DIN EN 12 756 housings. Cost-effective seal suitable for many duties with the option to replace worn faces and O-rings during over-hauls.

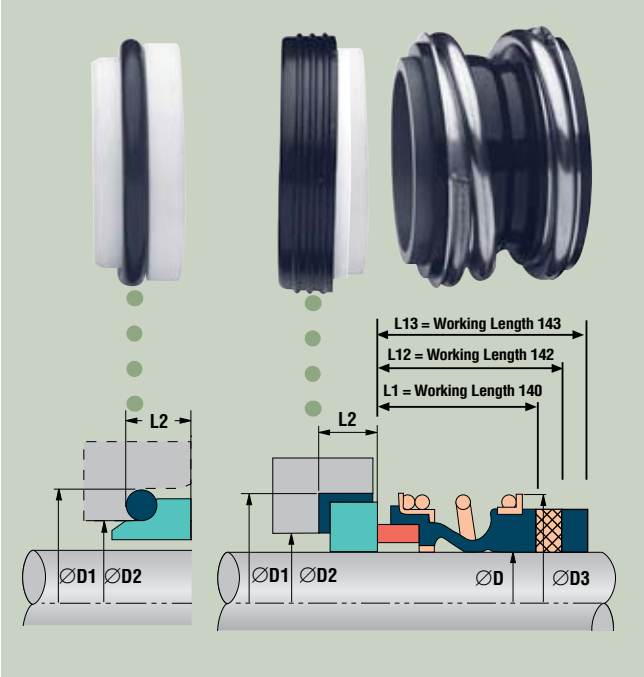


Standard Operating Limits

Pressure:	0 / 0	11,0 bar / 160 psi	13,8 / 200
Temperature:	-40 / -40	180°C / 356°F	230 / 446
Speed:	0 / 0	15 m/s / 3000 fpm	25 / 4900

Standard Sizes [mm]

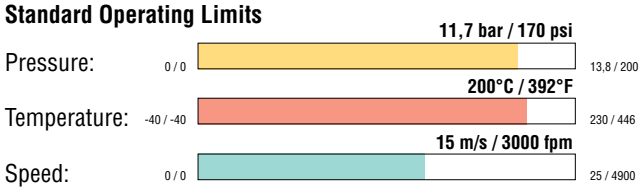
Metric Shaft Size D	D1	D2	D3	L1	L2	L3
10	21.00	17.00	20.00	15.00	7.00	5.50
12	23.00	19.00	22.00	18.00	7.00	5.50
14	25.00	21.00	24.00	22.00	7.00	5.50
16	27.00	23.00	26.00	23.00	7.00	5.50
18	33.00	27.00	32.00	24.00	10.00	7.00
20	35.00	29.00	33.00	25.00	10.00	7.00
22	37.00	31.00	36.00	25.00	10.00	7.00
24	39.00	33.00	37.40	27.00	10.00	7.00
25	40.00	34.00	38.00	27.00	10.00	7.00
28	43.00	37.00	42.00	29.00	10.00	7.00
30	45.00	39.00	44.00	30.00	10.00	7.00
32	48.00	42.00	45.50	30.00	10.00	7.00
33	48.00	42.00	46.50	39.00	10.00	7.00
35	50.00	44.00	49.00	39.00	10.00	7.00
38	56.00	49.00	56.00	42.00	13.00	8.00
40	58.00	51.00	58.00	42.00	13.00	8.00



Pac-Seal 140
Pac-Seal 142
Pac-Seal 143

Universal compact DIN seal with a choice of working lengths to suit common International standards. The robust, heavy duty bellows design provides excellent flexibility and durability. The seal is supplied with the B9 seat as standard, or alternatively the 8S seat if O-ring mounting is required.

Standard Operating Limits

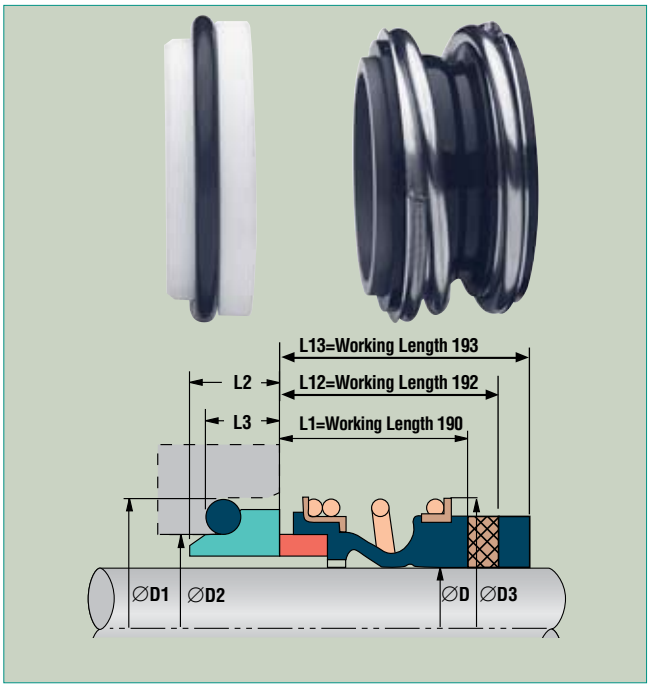


Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L12	L13	L2
10	21.0	17.0	20.0	13.4	25.9	33.4	6.6
12	23.0	19.0	22.0	14.4	25.9	33.4	6.6
14	25.0	21.0	24.0	14.4	28.4	33.4	6.6
15	27.0	23.0	25.0	14.4	28.4	33.4	6.6
16	27.0	23.0	26.0	14.4	28.4	33.4	6.6
18	33.0	27.0	32.0	18.5	30.0	37.5	7.5
20	35.0	29.0	34.0	18.5	30.0	37.5	7.5
22	37.0	31.0	36.0	18.5	30.0	37.5	7.5
24	39.0	33.0	38.0	18.5	32.5	42.5	7.5
25	40.0	34.0	39.0	18.5	32.5	42.5	7.5
28	43.0	37.0	42.0	24.5	35.0	42.5	7.5
30	45.0	39.0	44.0	25.5	35.0	42.5	7.5
32	48.0	42.0	46.0	25.5	35.0	47.5	7.5
33	48.0	42.0	47.0	25.5	35.0	47.5	7.5
35	50.0	44.0	49.0	26.5	35.0	47.5	7.5
38	56.0	49.0	54.0	29.0	36.0	46.0	9.0
40	58.0	51.0	56.0	29.0	36.0	46.0	9.0
43	61.0	54.0	59.0	29.0	36.0	51.0	9.0
45	63.0	56.0	61.0	29.0	36.0	51.0	9.0
48	66.0	59.0	64.0	31.0	36.0	51.0	9.0
50	70.0	62.0	66.0	30.5	38.0	50.5	9.5
53	73.0	65.0	69.0	29.0	36.5	59.0	11.0
55	75.0	67.0	71.0	29.0	36.5	59.0	11.0
58	78.0	70.0	78.0	32.0	41.5	59.0	11.0
60	80.0	72.0	80.0	34.0	41.5	59.0	11.0
65	85.0	77.0	85.0	34.0	41.5	69.0	11.0
68	90.0	81.0	88.0	33.7	41.2	68.7	11.3
70	92.0	83.0	90.0	33.7	48.7	68.7	11.3
75	97.0	88.0	99.0	40.7	48.7	68.7	11.3
80	105.0	95.0	104.0	40.5	48.0	78.0	12.0
85	110.0	100.0	109.0	38.5	46.0	76.0	14.0
90	115.0	105.0	114.0	38.5	51.0	76.0	14.0
95	120.0	110.0	119.0	38.5	51.0	76.0	14.0
100	125.0	115.0	124.0	38.5	51.0	76.0	14.0

Pac-Seal 190
Pac-Seal 192
Pac-Seal 193

Robust, rubber bellows seals, with a wide non-DIN cross-section, for optimum flexibility and durability. Types Pac-Seal 192 and 193 have an extended bellows tail to meet DIN L1K and L1N working lengths, when fitted with types 8S or B9 seats.

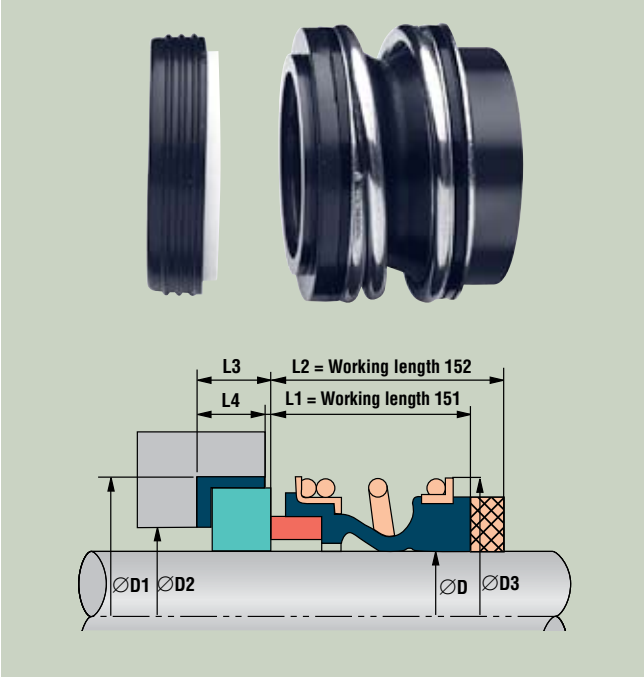


Standard Operating Limits

Pressure:	0 / 0	13,8 bar / 200 psi	13,8 / 200
Temperature:	-40 / -40	200°C / 392°F	230 / 446
Speed:	0 / 0	20 m/s / 3920 fpm	25 / 4900

Standard Sizes [mm]

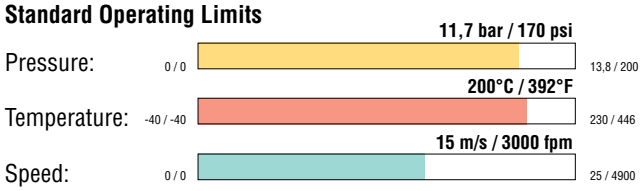
Shaft Size D	D1	D2	D3	L1	L12	L13	L2	L3
10	19.2	15.5	24.0	14.5	25.9	33.4	9.0	6.6
12	21.6	17.5	24.0	15.0	25.9	33.4	8.0	5.6
14	24.6	20.5	28.0	17.0	28.4	33.4	8.0	5.6
15	24.6	20.5	28.0	17.0	28.4	33.4	9.0	6.6
16	28.0	22.0	28.0	17.0	28.4	33.4	10.0	7.5
18	30.0	24.0	31.0	19.5	30.0	37.5	10.5	8.0
20	35.0	29.5	36.0	21.5	30.0	37.5	10.0	7.5
22	35.0	29.5	36.0	21.5	30.0	37.5	10.0	7.5
24	38.0	32.0	40.5	22.5	32.5	42.5	10.0	7.5
25	38.0	32.0	41.0	23.0	32.5	42.5	10.0	7.5
28	42.0	36.0	47.0	26.5	35.0	42.5	11.5	9.0
30	45.0	39.2	47.0	26.5	35.0	42.5	13.0	10.5
32	48.0	42.2	51.0	27.5	35.0	47.5	13.0	10.5
33	50.0	42.2	51.0	27.5	35.0	47.5	13.5	11.0
35	52.0	46.2	55.0	28.5	35.0	47.5	13.5	11.0
38	55.0	49.2	58.0	30.0	36.0	46.0	13.0	10.3
40	58.0	52.2	60.0	30.0	36.0	46.0	13.5	10.8
43	62.0	53.3	63.0	30.0	36.0	51.0	14.5	12.0
45	64.0	53.3	65.0	30.0	36.0	51.0	14.5	11.6
48	68.4	59.7	69.0	30.5	36.0	51.0	14.5	11.6
50	69.3	60.8	71.0	30.5	38.0	50.5	14.5	11.6
53	72.3	63.8	76.0	33.0	36.5	59.0	15.0	12.3
55	75.4	66.5	78.0	35.0	36.5	59.0	16.0	13.3
58	78.4	69.5	82.0	37.0	41.5	59.0	16.0	13.3
60	80.4	71.5	85.0	38.0	41.5	59.0	16.0	13.3
65	85.4	76.5	90.0	40.0	41.5	69.0	16.0	13.0
68	91.5	82.7	94.0	40.0	48.7	68.7	16.0	13.7
70	92.0	83.0	97.0	40.0	48.7	68.7	16.0	13.0
75	99.0	90.2	102.0	40.0	48.0	68.7	17.0	14.0
80	104.0	95.2	108.0	40.0	48.0	78.0	18.0	15.0
85	109.0	100.2	117.0	41.0	46.0	76.0	18.0	14.8
90	114.0	105.2	126.0	45.0	51.0	76.0	18.0	14.8
95	120.3	111.6	131.0	46.0	51.0	76.0	19.0	15.8
100	123.3	114.5	136.0	47.0	51.0	76.0	19.0	15.8



Pac-Seal 151
Pac-Seal 152

Elastomer bellows seal with a choice of working lengths to suit common American standards. Seal has same working length and the same seat as our Pac-Seal 110 or Pac-Seal 220. The robust, heavy duty bellows design provides optimum flexibility, durability and performance.

Standard Operating Limits

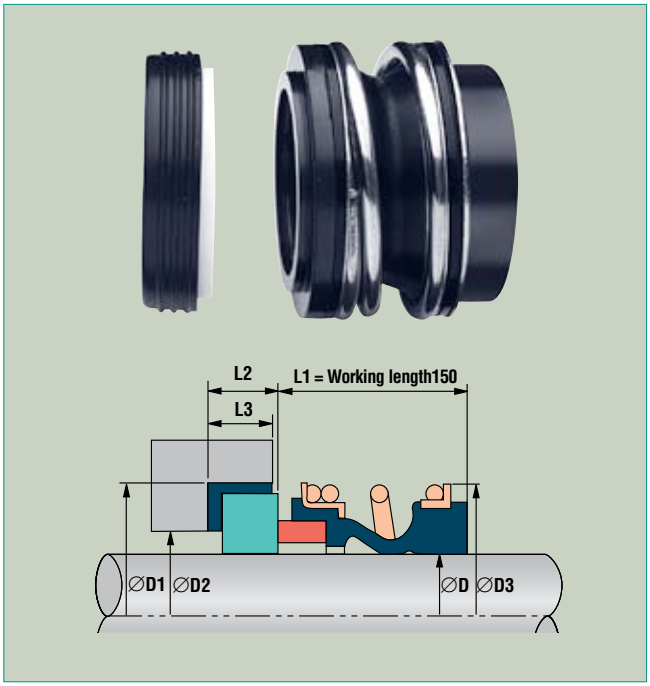


Standard Sizes [mm]

Inch Shaft Size D	Metric Shaft Size D	D1	D2	D3	L1	L2	L3	L4
0.500	12	25.40	19.05	22.00	20.62	31.75	7.93	6.35
-	14	31.75	23.80	24.00	22.22	34.93	10.28	8.71
0.625	16	31.75	23.80	26.00	22.22	34.93	10.28	8.71
0.750	18	34.93	26.98	32.00	22.22	34.93	10.28	8.71
-	20	38.10	30.15	34.00	23.80	36.50	10.28	8.71
0.875	22	38.10	30.15	36.00	23.80	36.50	10.28	8.71
1.000	25	41.28	33.32	39.00	25.40	41.28	11.10	9.53
1.125	28	44.44	36.50	42.00	26.97	42.85	11.10	9.53
-	30	47.63	37.90	44.00	26.97	42.85	11.10	9.53
1.250	32	47.63	37.90	46.00	26.97	42.85	11.10	9.53
-	33	50.80	42.84	47.00	28.58	42.85	11.10	9.53
1.375	35	50.80	42.84	49.00	28.58	42.85	11.10	9.53
1.500	38	53.98	46.05	54.00	28.58	42.85	11.10	9.53
1.625	40	60.33	50.80	56.00	34.93	50.80	12.70	11.10
-	43	63.50	53.97	59.00	34.93	50.80	12.70	11.10
1.750	44	63.50	53.97	59.00	34.93	50.80	12.70	11.10
1.875	45	66.68	57.15	61.00	38.10	53.98	12.70	11.10
-	48	69.85	60.32	64.00	38.10	53.98	12.70	11.10
2.000	50	69.85	60.32	66.00	38.10	53.98	12.70	11.10
2.125	53	76.20	60.32	69.00	42.88	60.32	14.28	12.70
2.250	55	79.38	61.90	71.00	42.88	60.32	14.28	12.70
-	58	82.55	67.39	78.00	46.02	63.50	14.28	12.70
2.375	60	82.55	67.39	80.00	46.02	63.50	14.28	12.70
2.500	63	85.73	68.25	83.00	46.02	63.50	14.28	12.70
2.625	65	85.73	71.24	85.00	49.20	69.85	15.90	14.50
-	68	88.90	74.60	88.00	49.20	69.85	15.90	14.50
2.750	70	88.90	74.60	90.00	49.20	69.85	15.90	14.50
2.875	73	95.25	77.77	96.00	52.37	73.03	15.90	14.50
3.000	75	98.43	80.95	99.00	52.37	73.03	15.90	14.50

Pac-Seal 150

Elastomer bellow seal with working length to suit common international standards. Seal has same working length and the same seat as our Pac-Seal 200. The robust, heavy duty bellows design provides optimum flexibility, durability and performance.

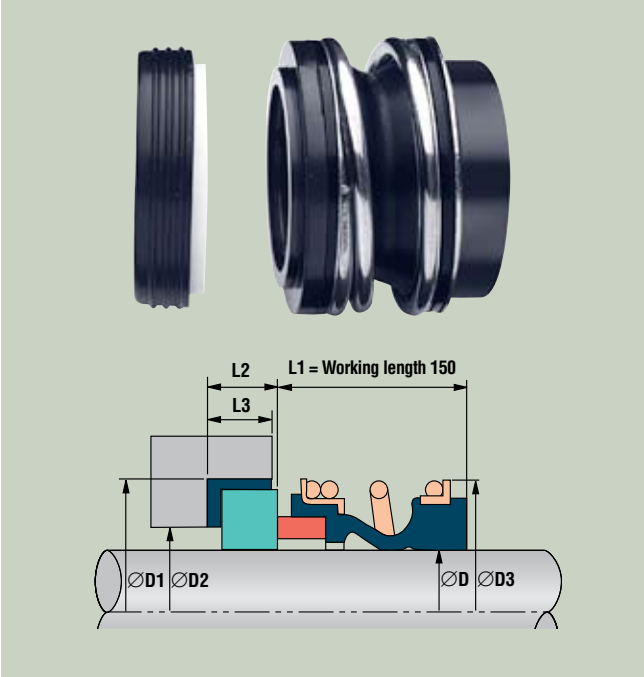


Standard Operating Limits

Pressure:	0 / 0	11,7 bar / 170 psi	13,8 / 200
Temperature:	-40 / -40	200°C / 392°F	230 / 446
Speed:	0 / 0	15 m/s / 3000 fpm	25 / 4900

Standard Sizes [mm]

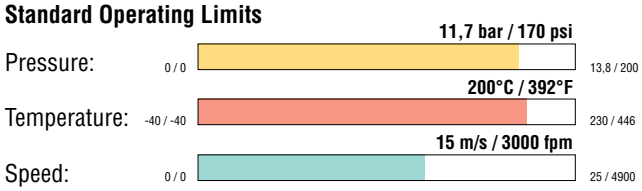
Metric Shaft Size D	D1	D2	D3	L1	L2	L3
10	24.60	16.00	20.00	25.40	08.74	07.47
12	27.79	19.05	22.00	25.40	08.74	07.47
13	27.79	19.05	22.00	25.40	08.74	07.47
14	30.95	22.23	24.00	25.40	10.32	08.97
15	30.95	22.23	25.00	25.40	10.32	08.97
16	30.95	22.23	26.00	25.40	10.32	08.97
18	34.15	25.40	32.00	25.40	10.32	08.97
19	34.15	25.40	32.00	25.40	10.32	08.97
20	35.70	26.99	34.00	25.40	10.32	08.97
22	37.30	28.58	36.00	25.40	10.32	08.97
24	40.50	31.75	38.00	25.40	10.32	08.97
25	40.50	31.75	39.00	25.40	10.32	08.97
28	47.62	35.72	42.00	33.34	11.99	10.46
30	50.80	38.89	44.00	33.34	11.99	10.46
32	50.80	38.89	46.00	33.34	11.99	10.46
33	53.98	42.07	47.00	33.34	11.99	10.46
34	53.98	42.07	49.00	33.34	11.99	10.46
35	53.98	42.07	49.00	33.34	11.99	10.46
38	57.15	45.24	54.00	33.34	11.99	10.46
40	60.35	48.82	56.00	33.34	11.99	10.46
42	63.50	51.59	59.00	40.48	11.99	10.46
43	63.50	51.59	59.00	40.48	11.99	10.46
44	63.50	51.59	59.00	40.48	11.99	10.46
45	63.50	51.59	61.00	40.48	11.99	10.46
48	66.70	54.75	64.00	40.48	11.99	10.46
50	69.85	58.00	66.00	40.48	11.99	10.46
53	73.05	62.00	69.00	41.00	13.50	11.96
55	76.20	65.00	71.00	41.00	13.50	11.96
58	79.40	68.00	78.00	41.00	13.50	11.96
60	79.40	68.00	80.00	41.00	13.50	11.96
63	82.55	71.20	83.00	41.00	13.50	11.96
65	92.10	78.35	85.00	49.00	15.90	14.50
70	95.25	81.10	90.00	49.00	15.90	14.50
73	98.45	84.50	96.00	46.00	15.90	14.50
75	101.65	88.10	99.00	49.00	15.90	14.50
80	114.30	97.00	104.00	56.00	20.00	18.50
85	117.50	100.00	109.00	56.00	20.00	18.50
90	123.85	107.00	114.00	59.00	20.00	18.50
95	127.00	110.00	119.00	59.00	20.00	18.50
100	133.35	116.00	124.00	62.00	20.00	18.50



Pac-Seal 150

Elastomer bellow seal with working length to suit common international standards. Seal has same working length and the same seat as our Pac-Seal 200. The robust, heavy duty bellows design provides optimum flexibility, durability and performance.

Standard Operating Limits

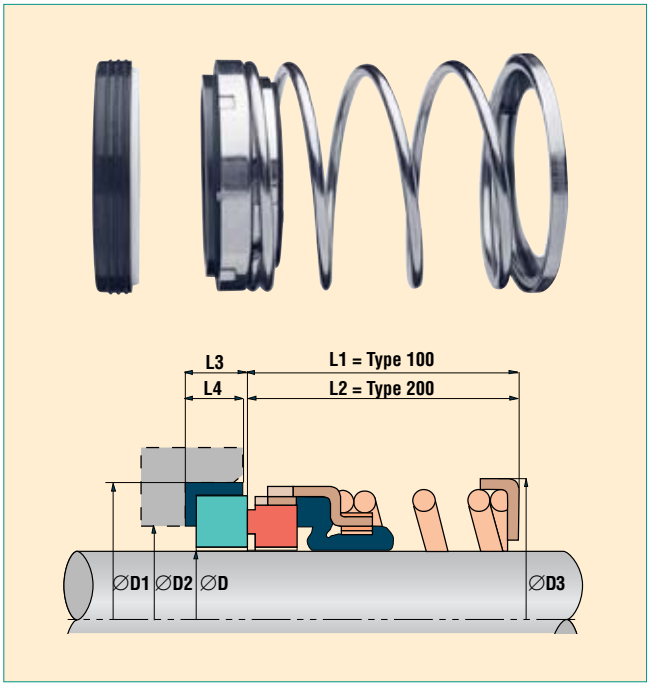


Standard Sizes [mm]

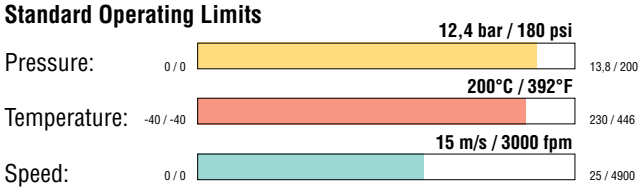
Inch Shaft Size D	D1	D2	D3	L1	L2	L3
0.375	24.60	16.00	20.00	25.40	08.74	07.47
0.500	27.79	19.05	22.00	25.40	08.74	07.47
0.625	30.95	22.23	26.00	25.40	10.32	08.97
0.750	34.15	25.40	32.00	25.40	10.32	08.97
0.875	37.30	28.58	36.00	25.40	10.32	08.97
1.000	40.50	31.75	39.00	25.40	10.32	08.97
1.125	47.63	35.72	42.00	33.34	11.99	10.46
1.250	50.80	38.89	46.00	33.34	11.99	10.46
1.375	53.98	42.07	49.00	33.34	11.99	10.46
1.500	57.15	45.24	54.24	33.34	11.99	10.46
1.625	60.35	48.42	56.00	33.34	11.99	10.46
1.750	63.50	51.59	61.00	40.48	11.99	10.46
1.875	66.70	54.75	64.00	40.48	11.99	10.46
2.000	69.85	58.00	66.00	40.48	11.99	10.46
2.125	73.05	62.00	69.00	41.00	13.50	11.96
2.250	76.20	65.00	71.00	41.00	13.50	11.96
2.375	79.40	68.00	80.00	41.00	13.50	11.96
2.500	82.55	71.20	83.00	41.00	13.50	11.96
2.625	92.10	78.35	85.00	49.00	15.90	14.50
2.750	95.25	81.10	90.00	49.00	15.90	14.50
2.875	98.45	84.50	96.00	49.00	15.90	14.50
3.000	101.65	88.10	99.00	49.00	15.90	14.50
3.125	111.15	93.68	104.00	56.00	20.00	18.50
3.250	114.30	96.85	104.00	56.00	20.00	18.50
3.375	117.50	100.00	109.00	56.00	20.00	18.50
3.500	120.65	103.18	114.00	56.00	20.00	18.50
3.625	123.85	106.35	106.35	59.00	20.00	18.50
3.750	127.00	109.52	119.00	59.00	20.00	18.50
3.875	130.20	112.65	122.00	62.00	20.00	18.50
4.000	133.35	115.88	124.00	62.00	20.00	18.50

Pac-Seal 100
Pac-Seal 200

Resilient, single spring, elastomer diaphragm seal with rubber cup mounted seat as standard. A widely specified and utilised seal type, capable of long service life.

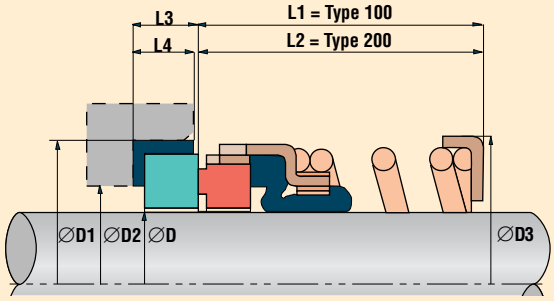


Standard Operating Limits



Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L2	L3	L4
10	24.60	16.00	22.95	43.65	25.40	08.74	07.47
12	27.79	19.05	23.90	43.65	25.40	08.74	07.47
13	27.79	19.05	23.90	43.65	25.40	08.74	07.47
14	30.95	22.23	26.70	43.65	25.40	10.32	08.97
15	30.95	22.23	26.70	43.65	25.40	10.32	08.97
16	30.95	22.23	26.70	43.65	25.40	10.32	08.97
18	34.15	25.40	31.10	43.65	25.40	10.32	08.97
19	34.15	25.40	31.10	43.65	25.40	10.32	08.97
20	35.70	26.99	33.40	43.65	25.40	10.32	08.97
22	37.30	28.58	33.40	43.65	25.40	10.32	08.97
24	40.50	31.75	39.20	43.65	25.40	10.32	08.97
25	40.50	31.75	39.20	43.65	25.40	10.32	08.97
28	47.63	35.72	46.30	60.33	33.34	11.99	10.46
30	50.80	38.89	49.40	60.33	33.34	11.99	10.46
32	50.80	38.89	49.40	60.33	33.34	11.99	10.46
33	53.98	42.07	52.60	60.33	33.34	11.99	10.46
34	53.98	42.07	52.60	60.33	33.34	11.99	10.46
35	53.98	42.07	52.60	60.33	33.34	11.99	10.46
38	57.15	45.24	55.80	60.33	33.34	11.99	10.46
40	60.35	48.82	59.20	60.33	33.34	11.99	10.46
42	63.50	51.59	66.00	70.64	40.48	11.99	10.46
43	63.50	51.59	66.00	70.64	40.48	11.99	10.46
44	63.50	51.59	66.00	70.64	40.48	11.99	10.46
45	63.50	51.59	66.00	70.64	40.48	11.99	10.46
48	66.70	54.75	66.60	70.64	40.48	11.99	10.46
50	69.85	58.00	71.65	70.64	40.48	11.99	10.46
53	73.05	62.00	73.30	71.00	41.00	13.50	11.96
55	76.20	65.00	78.40	71.00	41.00	13.50	11.96
58	79.40	68.00	82.00	71.00	41.00	13.50	11.96
60	79.40	68.00	82.00	71.00	41.00	13.50	11.96
63	82.55	71.20	84.90	71.00	41.00	13.50	11.96
65	92.10	78.35	88.40	70.00	49.00	15.90	14.50
70	95.25	81.10	92.60	70.00	49.00	15.90	14.50
73	98.45	84.50	94.85	73.00	49.00	15.90	14.50
75	101.65	88.10	102.70	73.00	49.00	15.90	14.50
80	114.30	97.00	104.00	79.00	56.00	20.00	18.50
85	117.50	100.00	108.00	79.00	56.00	20.00	18.50
90	123.85	107.00	112.00	83.00	59.00	20.00	18.50
95	127.00	110.00	119.00	83.00	59.00	20.00	18.50
100	133.35	116.00	124.00	86.00	62.00	20.00	18.50



Pac-Seal 100
Pac-Seal 200

Elastomer diaphragm seal with parallel single spring and rubber cup mounted seat as standard. The most common imperial shaft single spring design, suitable for use in many applications.

Standard Operating Limits

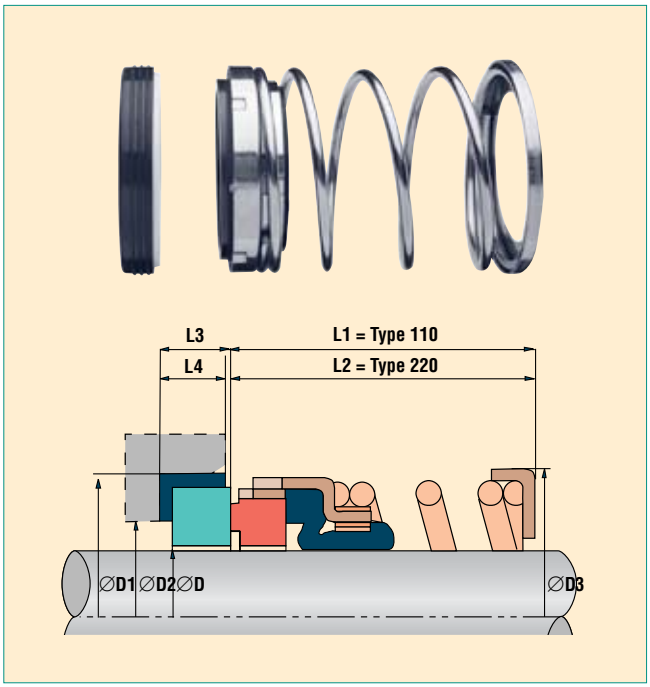
Pressure:	0 / 0	12,4 bar / 180 psi	13,8 / 200
Temperature:	-40 / -40	200°C / 392°F	230 / 446
Speed:	0 / 0	15 m/s / 3000 fpm	25 / 4900

Standard Sizes [mm]

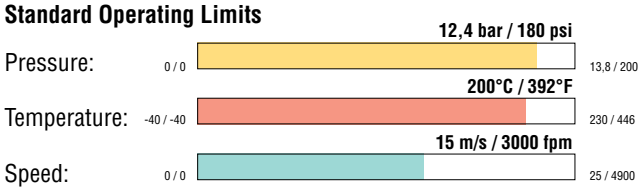
Inch Shaft Size D	D1	D2	D3	L1	L2	L3	L4
0.375	24.60	16.00	22.95	43.65	25.40	08.74	07.47
0.500	27.79	19.05	23.90	43.65	25.40	08.74	07.47
0.625	30.95	22.23	26.70	43.65	25.40	10.32	08.97
0.750	34.15	25.40	31.10	43.65	25.40	10.32	08.97
0.875	37.30	28.58	33.40	43.65	25.40	10.32	08.97
1.000	40.50	31.75	43.20	43.65	25.40	10.32	08.97
1.125	47.63	35.72	46.30	60.33	33.34	11.99	10.46
1.250	50.80	38.89	49.40	60.33	33.34	11.99	10.46
1.375	53.98	42.07	52.60	60.33	33.34	11.99	10.46
1.500	57.15	45.24	55.80	60.33	33.34	11.99	10.46
1.625	60.35	48.42	59.20	60.33	33.34	11.99	10.46
1.750	63.50	51.59	66.00	70.64	40.48	11.99	10.46
1.875	66.70	54.75	66.60	70.64	40.48	11.99	10.46
2.000	69.85	58.00	73.00	70.64	40.48	11.99	10.46
2.125	73.05	62.00	73.30	71.00	41.00	13.50	11.96
2.250	76.20	65.00	78.40	71.00	41.00	13.50	11.96
2.375	79.40	68.00	82.00	71.00	41.00	13.50	11.96
2.500	82.55	71.20	84.90	71.00	41.00	13.50	11.96
2.625	92.10	78.35	88.40	70.00	49.00	15.90	14.50
2.750	95.25	81.10	92.60	70.00	49.00	15.90	14.50
2.875	98.45	84.50	94.85	73.00	49.00	15.90	14.50
3.000	101.65	88.10	102.70	73.00	49.00	15.90	14.50
3.125	111.15	93.68	104.00	79.00	56.00	20.00	18.50
3.250	114.30	96.85	104.00	79.00	56.00	20.00	18.50
3.375	117.50	100.00	108.00	79.00	56.00	20.00	18.50
3.500	120.65	103.18	112.00	79.00	56.00	20.00	18.50
3.625	123.85	106.35	114.00	83.00	59.00	20.00	18.50
3.750	127.00	109.52	119.00	83.00	59.00	20.00	18.50
3.875	130.20	112.65	121.00	86.00	62.00	20.00	18.50
4.000	133.35	115.88	124.00	86.00	62.00	20.00	18.50

Pac-Seal 110
Pac-Seal 220

Single spring, elastomer diaphragm seal designed for different sized seat housings and seal working lengths to the Pac-Seals 100/200. The imperial sizes are most commonly found on American equipment.



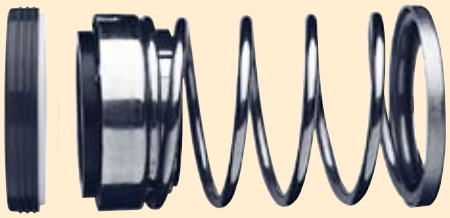
Standard Operating Limits

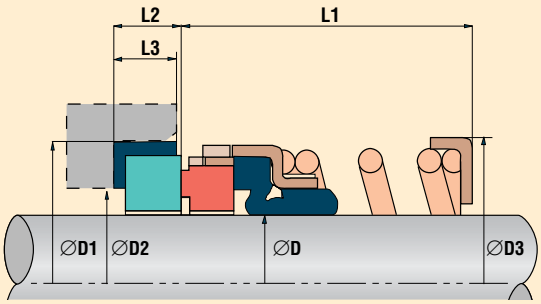


Standard Sizes [mm]

Inch Shaft Size D	Metric Shaft Size D	D1	D2	D3	L1	L2	L3	L4
0.500	12	25.40	19.05	23.90	20.62	31.75	7.93	6.35
0.625	14	31.75	23.80	26.70	22.22	34.93	10.28	8.71
	16	31.75	23.80	26.70	22.22	34.93	10.28	8.71
0.750	18	34.93	26.98	31.10	22.22	34.93	10.28	8.71
0.875	20	38.10	30.15	33.40	23.80	36.50	10.28	8.71
	22	38.10	30.15	33.40	23.80	36.50	10.28	8.71
1.000	24	41.28	33.32	43.20	25.40	41.28	11.10	9.53
	25	41.28	33.32	43.20	25.40	41.28	11.10	9.53
1.125	28	44.44	36.50	46.30	26.97	42.85	11.10	9.53
1.250	30	47.63	37.90	49.40	26.97	42.85	11.10	9.53
	32	47.63	37.90	49.40	26.97	42.85	11.10	9.53
1.375	33	50.80	42.84	52.60	28.58	42.85	11.10	9.53
	35	50.80	42.84	52.60	28.58	42.85	11.10	9.53
1.500	38	53.98	46.05	55.80	28.58	42;85	11.10	9.53
1.625	40	60.33	50.80	62.20	34.93	50.80	12.70	11.10
1.750	43	63.50	53.97	66.00	34.93	50.80	12.70	11.10
	44	63.50	53.97	66.00	34.93	50.80	12.70	11.10
1.875	45	66.68	57.15	66.60	38.10	53.98	12.70	11.10
2.000	48	69.85	60.32	73.00	38.10	53.98	12.70	11.10
	50	69.85	60.32	73.00	38.10	53.98	12.70	11.10
2.125	53	76.20	60.32	73.30	42.88	60.32	14.28	12.70
2.250	55	79.38	61.90	78.40	42.88	60.32	14.28	12.70
2.375	58	82.55	67.39	82.00	46.02	63.50	14.28	12.70
	60	82.55	67.39	82.00	46.02	63.50	14.28	12.70
2.500	63	85.73	68.25	84.90	46.02	63.50	14.28	12.70
2.625	65	85.73	71.24	88.40	49.20	69.85	15.90	14.50
2.750	68	88.90	74.60	92.60	49.20	69.85	15.90	14.50
	70	88.90	74.60	92.60	49.20	69.85	15.90	14.50
2.875	73	95.25	77.77	94.85	52.37	73.03	15.90	14.50
3.000	75	98.43	80.95	102.70	52.37	73.03	15.90	14.50

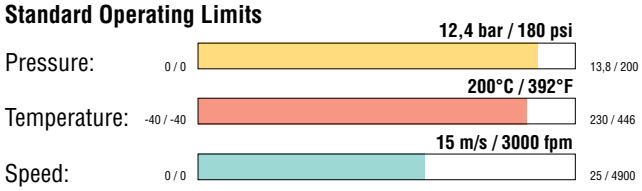
Pac-Seal 240





Compact single spring, elastomer diaphragm seal specifically designed to comply with DIN EN 12 756 housings. Available with a choice of three DIN seat types in a variety of materials.

Standard Operating Limits

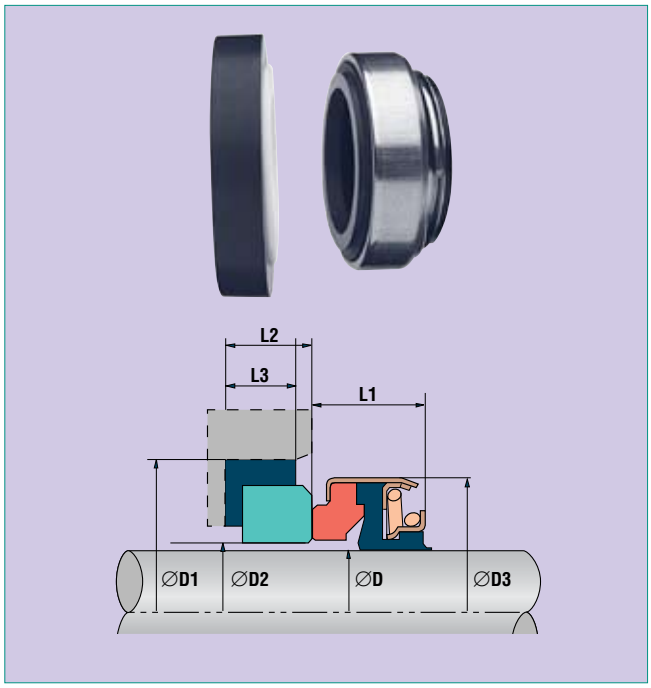


Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L2	L3
12	23.00	19.00	21.70	23.90	8.60	5.50
14	25.00	21.00	23.90	26.40	8.60	5.50
16	27.00	23.00	26.70	26.40	8.60	5.50
18	33.00	27.00	30.40	27.50	10.00	7.00
20	35.00	29.00	33.40	27.50	10.00	7.00
22	37.00	31.00	33.40	27.50	10.00	7.00
24	39.00	33.00	38.00	30.00	10.00	7.00
25	40.00	34.00	39.30	30.00	10.00	7.00
28	43.00	37.00	42.00	32.50	10.00	7.00
30	45.00	39.00	43.95	32.50	10.00	7.00
32	48.00	42.00	45.80	32.50	10.00	7.00
33	48.00	42.00	45.80	32.50	10.00	7.00
35	50.00	44.00	49.00	32.50	10.00	7.00
38	56.00	49.00	52.80	34.00	11.00	8.00
40	58.00	51.00	55.80	34.00	11.00	8.00
43	61.00	54.00	58.80	34.00	11.00	8.00
45	63.00	56.00	61.00	34.00	11.00	8.00
48	66.00	59.00	64.00	34.00	11.00	8.00
50	70.00	62.00	66.00	34.50	13.00	8.50
53	73.00	65.00	70.65	34.50	13.00	8.50
55	75.00	67.00	71.65	34.50	13.00	8.50
58	78.00	70.00	78.40	39.50	13.00	8.50
60	80.00	72.00	78.40	39.50	13.00	8.50
63	83.00	75.00	81.50	39.50	13.00	8.50
65	85.00	77.00	84.30	39.50	13.00	8.50
68	90.00	81.00	89.65	37.20	15.30	9.50
70	92.00	83.00	89.65	37.20	15.30	9.50
75	97.00	88.00	96.80	44.70	15.30	9.50
80	105.00	95.00	104.00	44.30	15.70	10.00
85	110.00	100.00	107.95	44.30	15.70	10.00
90	115.00	105.00	111.10	49.30	15.70	10.00
95	120.00	110.00	119.00	49.30	15.70	10.00
100	125.00	115.00	124.00	49.30	15.70	10.00

Pac-Seal 118

Compact, enclosed rubber bellows seal with a wide stationary seat. Very short working length makes the Pac-Seal 118 ideal for equipment where space for a seal is restricted.

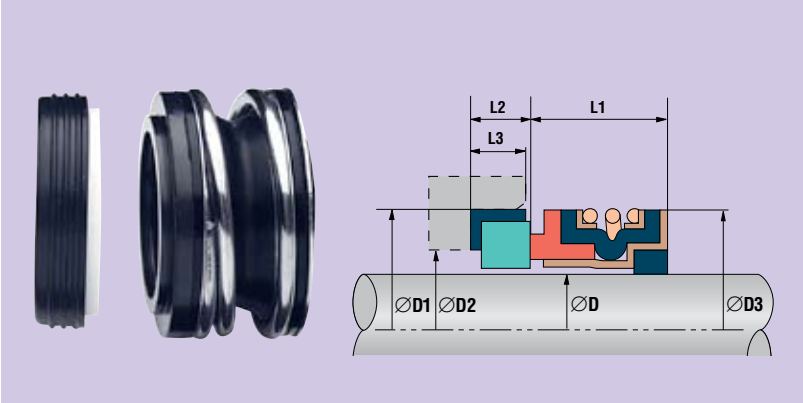


Standard Operating Limits

Pressure:	0 / 0	8,3 bar / 120 psi	13,8 / 200
Temperature:	-40 / -40	160°C / 320°F	230 / 446
Speed:	0 / 0	10 m/s / 1960 fpm	25 / 4900

Standard Sizes [mm]

Metric Shaft Size D	D1	D2	D3	L1	L2	L3
8	26	11	24	11	8	6
10	26	11	24	11	8	6
11	26	13	24	11	8	6
12	26	14	24	11	8	6
12	26	13	24	13	8	6
12	35	16	32	13	8	6
13	26	14	24	13	8	6
14	35	16	32	13	8	6
15	38	18	35	13	8	6
16	38	18	35	13	8	6
16	42	21	39	13	8	6
17	42	21	39	13	8	6
18	42	21	39	13	8	6
19	42	21	39	13	8	6
20	42	21	39	13	8	6
20	45	23	42	13	10	8
22	45	23	42	13	10	8
23	50	27	47	14	10	8
24	50	27	47	14	10	8
25	50	27	47	14	10	8
28	57	34	54	15	10	8
30	57	34	54	15	10	8
32	57	34	54	15	10	8
35	63	37	60	16	10	8
38	68	42	65	17	12	9
40	68	42	65	17	12	9
45	73	47	70	20	12	9
50	88	52	85	20	15	12
60	110	67	110	30	15	12
65	110	67	110	30	15	12
70	110	72	105	32	15	12



Pac-Seal 160

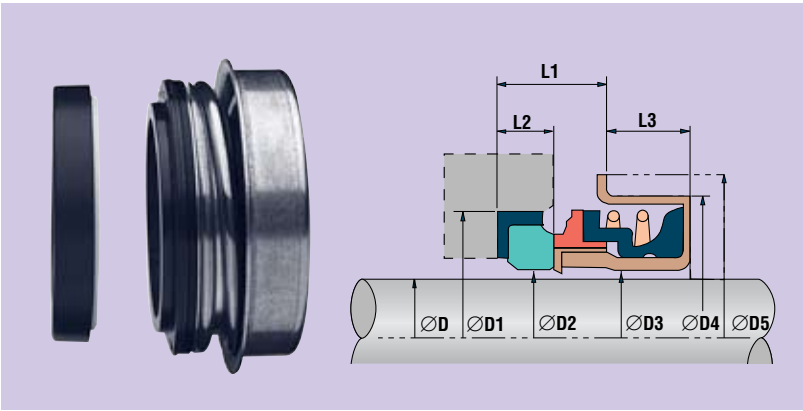
Sleeve mounted, rubber bellows seal with shaft drive ring. Mass produced and easily fitted for low pressure, general applications on small diameter shafts.

Standard Operating Limits

Pressure:	0 / 0	8,3 bar / 120 psi	13,8 / 200
Temperature:	-40 / -40	200°C / 392°F	230 / 446
Speed:	0 / 0	10 m/s / 1960 fpm	25 / 4900

Standard Sizes [mm]

Inch Shaft Size D	D1	D2	D3	L1	L2	L3
0.375	22.22	14.30	23.80	16.02	6.20	4.76
0.500	25.40	17.45	26.97	16.60	6.20	4.76
0.625	31.75	20.63	30.94	18.71	10.29	8.71
0.750	34.93	23.80	34.11	18.71	10.29	8.71
1.000	41.28	30.15	42.85	20.63	11.10	9.53



Pac-Seal 170

Coolant pump seal primarily utilised in combustion engine water pumps. The clearance of the seal and seat above the shaft allows one size to be used on several shaft diameters.

Standard Operating Limits

Pressure:	0 / 0	8,3 bar / 120 psi	13,8 / 200
Temperature:	-40 / -40	200°C / 392°F	230 / 446
Speed:	0 / 0	10 m/s / 1960 fpm	25 / 4900

Standard Sizes [mm]

Shaft Dia. Max. D	D1	D2	D3	D4	D5	L1	L2	L3
13	25	14	14.2	28.55	31.7	10.2	5	8
17	31	18	18.2	36.45	41.3	11.8	5	8
20	35	21	21.4	40.00	43.7	11.0	5	9.5
30	48	32	31.0	52.00	57.0	16.0	8	11

OEM Specific Designs

Flowserve stocks a large range of single spring mechanical seals that will directly replace common pump manufacturers' seals. We are continually extending this range and can offer seals to directly replace virtually any single spring seal you require. Flowserve can design and make OEM specific designs on request.

Pac-Seal FRI

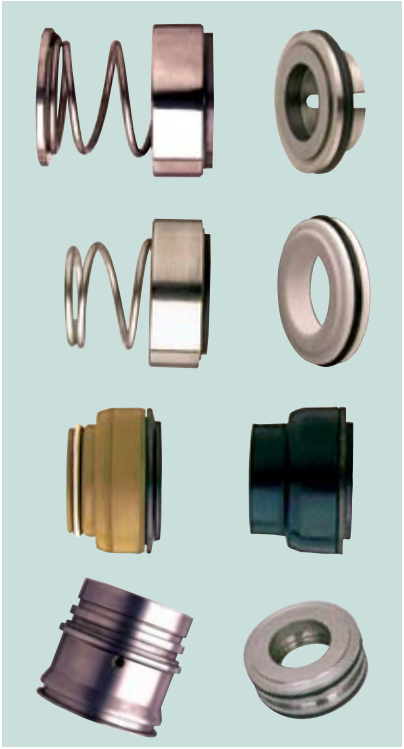
A complete range of mechanical seals to suit Fristam™ Pumps which are frequently utilised in the Food and Beverage Process Industries. Stock sizes: All components for the 22mm, 30mm and 35mm centrifugal pump seal systems.

Complete internal rotary mechanical seal with spring with drive base.
Stock seal face materials: Carbon, Tungsten Carbide, Silicon Carbide.
O-ring mounted long internal stationary.
Stock seal face materials: Stainless Steel, Tungsten Carbide, Silicon Carbide.
Elastomers: EPDM fitted as standard. Nitrile and Viton available from stock.

Complete external rotary mechanical seal with spiral spring.
Stock seal face materials: Carbon, Tungsten Carbide, Silicon Carbide.
O-ring mounted short external stationary.
Stock seal face materials: Stainless Steel, Silicon Carbide, Ceramic.
Elastomers: EPDM fitted as standard. Nitrile and Viton available from stock.

22mm Carbon face, EPDM rubber encased seals.
Three designs are available:
(i) internal rotary seal with drive base.
(ii) external rotary seal with garter spring.
(iii) plain external rotary seal.

Stainless Steel spool bodies/collets.
A full range of spool bodies for the 22mm, 30mm and 35mm seal systems are available from stock.
Elastomers: EPDM fitted as standard. Nitrile and Viton available from stock.



Pac-Seal APU

A range of mechancial seals designed to suit APV™ 'Puma' Pumps which are frequently utilised in the Food and Beverage Process Industries.

Internal rotary seal.
Shaft sizes: 1" and 1 1/2"
Stock seal face materials: Carbon, Silicon Carbide
Elastomers: Nitrile, EPDM, Viton, FEP

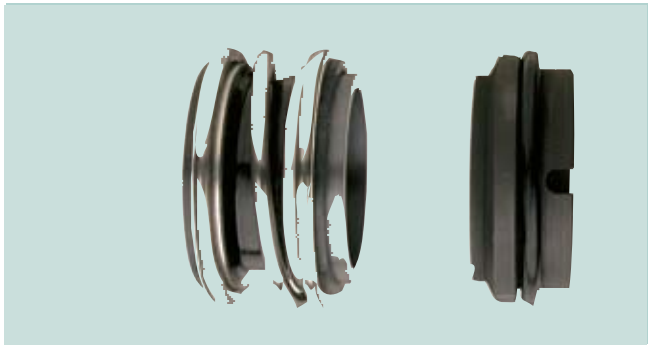
Plain Stainless Steel stationary plate or Stainless Steel seal face holder.
Shaft sizes 1" and 1 1/2 "
Stock seal face materials: Stainless Steel, Ceramic, Silicon Carbide

External seals to suit water cooled pumps.
Shaft sizes: 1" and 1 1/2"
Stock seal face materials: Carbon vs Stainless Steel Plate
Elastomers: Nitrile, EPDM, Viton

Pac-Seal APR

Mechanical seals to suit APV™ 'Rosista' Pump types ZMA, ZMH and ZMK.

Stock seal face materials:	Carbon or Silicon Carbide rotary. Stainless Steel or Silicon Carbide Stationary.
Elastomers:	Nitrile



Pac-Seal ALC & Pac-Seal ALO

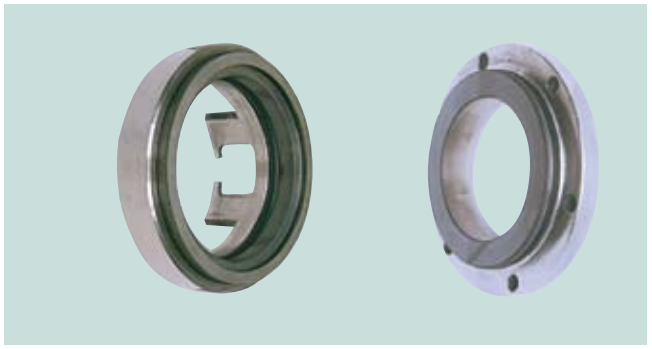
Seals to suit Alfa Laval™ equipment ALC Series Centrifugal Pumps

Mechanical seals to suit the ALC series pumps widely utilised in the Food and Beverage Process Industries.

Shaft sizes:	40 mm, 53 mm
Stock seal face materials:	Silicon Carbide rotary vs Carbon Stationary as standard

Other seal face combinations available from stock.

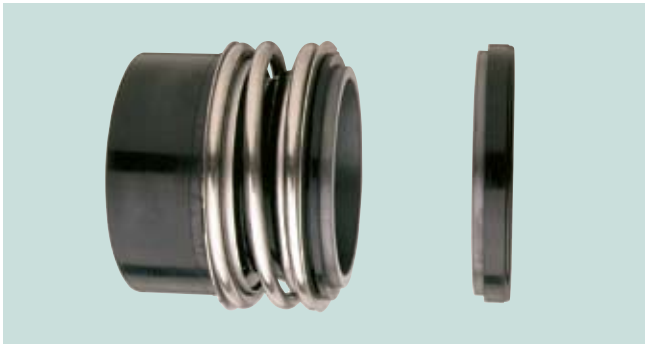
Elastomers:	Nitrile, EPDM, Viton



CONTHERM® scraped surface heat exchangers

'Flush Bushings', 'Shell-Ends' and Springs to suit the Contherm® seal system.

Shaft sizes:	1 1/2", 2"
Stock seal face materials:	'Flush Bushings' - Chrome Oxide coated Stainless Steel, 'Shell-Ends' - Tungsten Carbide, Carbon



Pac-Seal KZN

A range of seals to suit the most common types of standard KSB™ pumps.

Shaft sizes:	22 mm, 28 mm, 38 mm, 48 mm
Stock seal face materials:	Carbon or Silicon Carbide rotary. Ceramic or Silicon Carbide Stationary
Elastomers:	Nitrile, Viton

Pac-Seal MAC

Seals to suit Macerator and waste disposal pumps

(i) **Seals to directly suit Haigh™ macerator pumps.**

Shaft sizes:	$1^1/_4$", $1^3/_4$"
Stock seal face materials:	Carbon rotary vs Ni-Resist stationary
Elastomer:	Nitrile

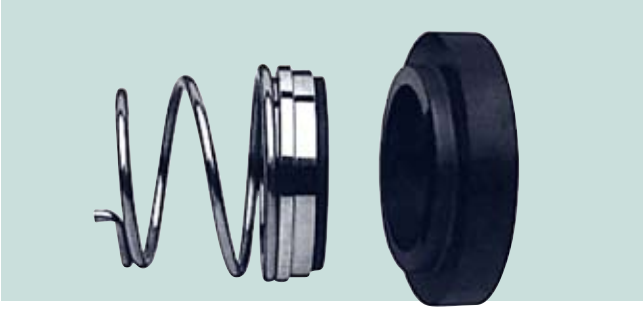
(ii) **Seal to suit Imperial Machine Company waste diposal pump models 1204 and 1604.**

Stock seal face materials:	Stainless Steel rotary vs Carbon stationary.
Elastomer:	Viton

Pac-Seal AWS

Flowserve mechanical seals to suit APV™ 'World' Pumps in single configuration.

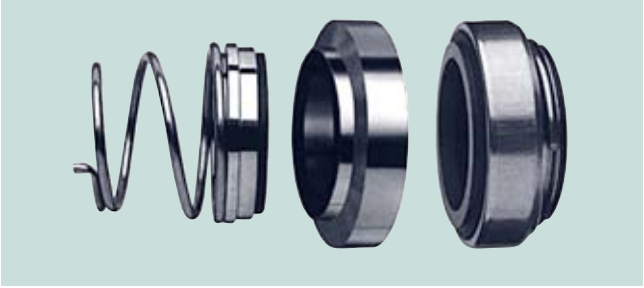
Stock seal face materials:	Carbon or Silicon Carbide rotary Silicon Carbide Stationary
Shaft sizes:	25 mm and 35 mm



Pac-Seal AWD

Flowserve mechanical seals to suit APV™ 'World' Pumps in double configuration.

Stock seal face materials:	Carbon inboard/out board Rotary Stainless Steel/Silicon Carbide (or Silicon Carbide/Silicon Carbide) Inboard/Outboard Stationary
Shaft sizes:	25 mm and 35 mm



Pac-Seal AWD

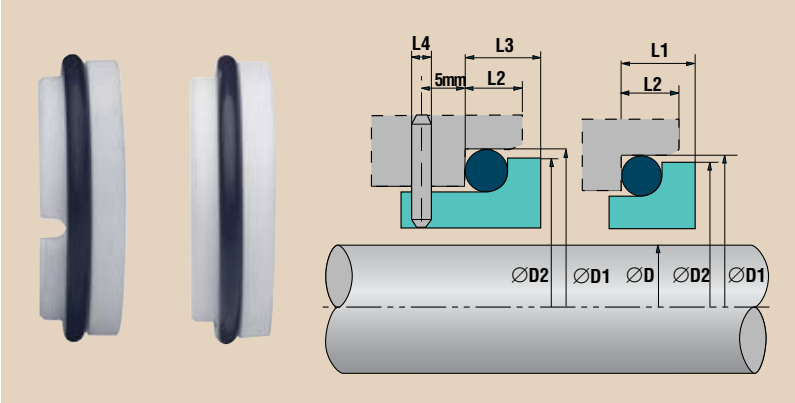
Flowserve face kit to suit APV™-'World' + Pumps.

Stock materials	Carbon vs Silicon Carbide
Shaft sizes:	25 mm and 35 mm
Note:	Face Fixing Kits are also available

Pac-Seal 168 Wave Spring Seal

Flowserve mechanical seals to replace common food industry wave-spring

Stock materials	Stainless Steel, Resin Impregnated Carbon



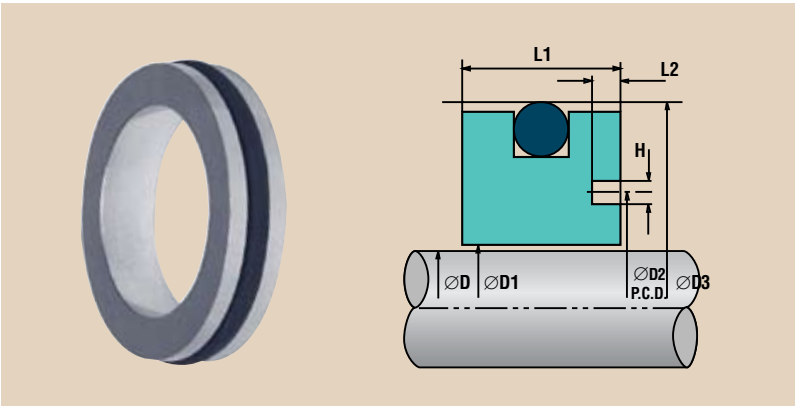
Pac-Seal 8S
Pac-Seal 8L

O-ring mounted DIN short seat and DIN long seat with drive slot. They offer different axial dimensions and can be utilized with most seals particularly the Pac-Seal 140 DIN and Pac-Seal 190 designs.

Standard Sizes [mm]

Metric Shaft Size D	D1	D2	L1	L2	L3	L4
10	21.0	20.6	6.6	5.5	10.0	3.0
12	23.0	22.6	6.6	5.5	10.0	3.0
14	25.0	24.6	6.6	5.5	10.0	3.0
15	27.0	26.6	6.6	5.5	10.0	3.0
16	27.0	26.6	6.6	5.5	10.0	3.0
18	33.0	32.6	7.5	7.0	11.5	3.0
20	35.0	34.6	7.5	7.0	11.5	3.0
22	37.0	36.6	7.5	7.0	11.5	3.0
24	39.0	38.6	7.5	7.0	11.5	3.0
25	40.0	39.6	7.5	7.0	11.5	3.0
28	43.0	42.6	7.5	7.0	11.5	3.0
30	45.0	44.6	7.5	7.0	11.5	3.0
32	48.0	47.6	7.5	7.0	11.5	3.0
33	48.0	47.6	7.5	7.0	11.5	3.0
35	50.0	49.6	7.5	7.0	11.5	3.0
38	56.0	55.6	9.0	8.0	14.0	4.0
40	58.0	57.4	9.0	8.0	14.0	4.0

Metric Shaft Size D	D1	D2	L1	L2	L3	L4
43	61.0	60.6	9.0	8.0	14.0	4.0
45	63.0	62.6	9.0	8.0	14.0	4.0
48	66.0	65.6	9.0	8.0	14.0	4.0
50	70.0	69.6	9.5	8.5	15.0	4.0
53	73.0	72.6	11.0	8.5	15.0	4.0
55	75.0	74.4	11.0	8.5	15.0	4.0
58	78.0	77.5	11.0	8.5	15.0	4.0
60	80.0	79.5	11.0	8.5	15.0	4.0
65	85.0	84.5	11.0	8.5	15.0	4.0
68	90.0	89.5	11.3	9.5	18.0	4.0
70	92.0	91.4	11.3	9.5	18.0	4.0
75	97.0	96.4	11.3	9.5	18.0	4.0
80	105.0	104.2	12.0	10.0	18.2	4.0
85	110.0	109.2	14.0	10.0	18.2	4.0
90	115.0	114.2	14.0	10.0	18.2	4.0
95	120.0	119.2	14.0	10.0	17.2	4.0
100	125.0	124.2	14.0	10.0	17.2	4.0



Pac-Seal 1H

O-ring mounted, H configuration, stationary seat. Normally specified as an alternative to the cup mounted B2 seat.

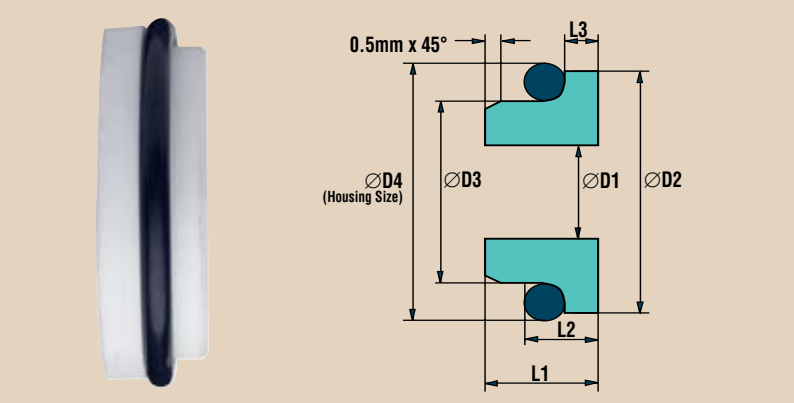
Standard Sizes [mm]

Shaft Size D Inch / .002"	Shaft Size D Metric / 0.05	D1	D2	D3	L1	L2	H
0.375	10	10.60	16.50	24.60	8.70	1.50	4.00
0.500	12,13	13.80	19.00	27.79	8.70	1.50	4.00
0.625	14,15,16	17.00	22.00	30.95	10.30	1.50	4.00
0.750	18,19	20.20	26.00	34.15	10.30	1.50	4.00
0.812	20	21.70	28.00	35.70	10.30	1.50	4.00
0.875	22	23.30	29.50	37.30	10.30	1.50	4.00
0.937	24	26.80	32.50	40.50	10.30	1.50	4.00
1.000	25,26	26.80	32.50	40.50	10.30	1.50	4.00
1.125	28	30.00	38.00	47.63	11.90	2.00	4.50
1.250	30,32	33.10	41.50	50.80	11.90	2.00	4.50
1.375	33,34,35	36.30	44.50	53.98	11.90	2.00	4.50
1.500	38	39.50	47.50	57.15	11.90	2.00	4.50

Shaft Size D Inch / .002"	Shaft Size D Metric / 0.05	D1	D2	D3	L1	L2	H
1.625	40	42.60	51.00	60.35	11.90	2.00	4.50
1.750	42,43,44,45	45.80	54.00	63.50	11.90	2.00	4.50
1.875	48	49.00	57.00	66.70	11.90	2.00	4.50
2.000	50	52.20	60.50	69.85	13.50	2.00	4.50
2.125	53	55.40	63.50	73.05	13.50	2.00	4.50
2.250	55	58.50	66.50	76.20	13.50	2.00	4.50
2.375	58,60	61.70	70.00	79.40	13.50	2.00	4.50
2.500	63	65.10	73.00	82.55	13.50	2.00	4.50
2.625	65	68.20	79.50	92.10	15.90	2.50	5.50
2.750	68,70	71.40	82.50	95.25	15.90	2.50	5.50
2.875	73	74.60	85.50	98.45	15.90	2.50	5.50
3.000	75	77.60	89.00	101.65	15.90	2.50	5.50

Pac-Seal 4S

O-ring mounted stationary seat to DIN EN 12 756 Standard with short tail. Available in a variety of seat and O-ring materials.



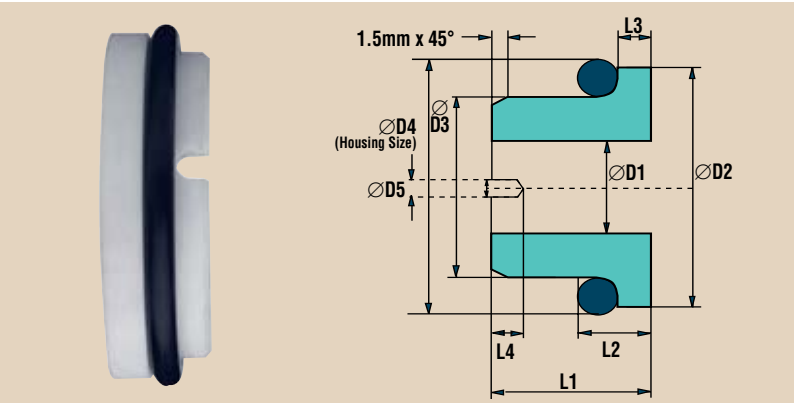
DIN SHORT STANDARD SIZES [mm]

Metric Shaft Size D	D1	D2	D3	D4	L1	L2	L3
10	11.0	20.6	16.4	21.0	10.0	8.6	6.0
12	13.0	22.6	18.4	23.0	10.0	8.6	6.0
14	15.0	24.6	20.4	25.0	10.0	8.6	6.0
16	17.0	26.6	22.4	27.0	10.0	8.6	6.0
18	19.0	32.6	26.6	33.0	11.5	10.0	6.5
20	21.0	34.6	28.6	35.0	11.5	10.0	6.5
22	23.0	36.6	30.6	37.0	11.5	10.0	6.5
24	25.0	38.6	32.6	39.0	11.5	10.0	6.5
25	26.0	39.6	33.6	40.0	11.5	10.0	6.5
28	29.0	42.6	36.6	43.0	11.5	10.0	6.5
30	31.0	44.6	38.6	45.0	11.5	10.0	6.5
32	33.0	47.6	41.6	48.0	11.5	10.0	6.5
33	34.0	47.6	41.6	48.0	11.5	10.0	6.5
35	36.0	49.6	43.8	50.0	11.5	10.0	6.5
38	39.0	55.6	48.8	56.0	12.5	11.0	7.0
40	41.0	57.6	50.8	58.0	12.5	11.0	7.0
43	44.0	60.6	53.8	61.0	12.5	11.0	7.0

Metric Shaft Size D	D1	D2	D3	D4	L1	L2	L3
45	46.0	62.6	55.8	63.0	12.5	11.0	7.0
48	49.0	65.6	58.8	66.0	12.5	11.0	7.0
50	51.0	69.6	61.3	70.0	14.5	13.0	8.5
53	54.0	72.6	64.3	73.0	14.5	13.0	8.5
55	56.0	74.6	66.3	75.0	14.5	13.0	8.5
58	59.0	77.5	69.3	78.0	14.5	13.0	8.5
60	61.0	79.5	71.3	80.0	14.5	13.0	8.5
63	64.0	82.5	74.3	83.0	14.5	13.0	8.5
65	66.0	84.5	76.3	85.0	14.5	13.0	8.5
68	69.0	89.5	80.5	90.0	16.5	15.3	10.0
70	71.2	91.4	82.6	92.0	16.5	15.3	10.0
75	76.2	96.4	87.6	97.0	16.5	15.3	10.0
80	81.2	104.2	94.7	105.0	17.5	15.7	10.0
85	86.2	109.2	99.7	110.0	17.5	15.7	10.0
90	91.2	114.2	104.7	115.0	17.5	15.7	10.0
95	96.2	119.2	109.7	120.0	17.5	15.7	10.0
100	101.2	124.2	114.7	125.0	17.5	15.7	10.0

Pac-Seal 4L

O-ring mounted stationary seat to DIN EN 12 756 Standard with long tail and drive slot. Available in a variety of seat and O-ring materials.



DIN LONG STANDARD SIZES [mm]

Metric Shaft Size D	D1	D2	D3	D4	D5	L1	L2	L3	L4
10	11.2	20.6	16.4	21.0	4.0	15.0	8.6	6.0	5.0
12	13.2	22.6	18.4	23.0	4.0	15.0	8.6	6.0	5.0
14	15.2	24.6	20.4	25.0	4.0	15.0	8.6	6.0	5.0
16	17.2	26.6	22.4	27.0	4.0	15.0	8.6	6.0	5.0
18	19.2	32.6	26.6	33.0	5.0	17.0	10.0	6.5	5.5
20	21.2	34.6	28.6	35.0	5.0	17.0	10.0	6.5	5.5
22	23.2	36.6	30.6	37.0	5.0	17.0	10.0	6.5	5.5
24	25.2	38.6	32.6	39.0	5.0	17.0	10.0	6.5	5.5
25	26.2	39.6	33.6	40.0	5.0	17.0	10.0	6.5	5.5
28	29.2	42.6	36.6	43.0	5.0	17.0	10.0	6.5	5.5
30	31.2	44.6	38.6	45.0	5.0	17.0	10.0	6.5	5.5
32	33.2	47.6	41.6	48.0	5.0	17.0	10.0	6.5	5.5
33	34.2	47.6	41.6	48.0	5.0	17.0	10.0	6.5	5.5
35	36.2	49.6	43.8	50.0	5.0	17.0	10.0	6.5	5.5
38	39.2	55.6	48.8	56.0	5.0	18.0	11.0	7.0	5.5
40	41.2	57.6	50.8	58.0	5.0	18.0	11.0	7.0	5.5
43	44.2	60.6	53.8	61.0	5.0	18.0	11.0	7.0	5.5

Metric Shaft Size D	D1	D2	D3	D4	D5	L1	L2	L3	L4
45	46.2	62.6	55.8	63.0	5.0	18.0	11.0	7.0	5.5
48	49.2	65.6	58.8	66.0	5.0	18.0	11.0	7.0	5.5
50	51.2	69.6	61.3	70.0	5.0	20.0	13.0	8.5	5.5
53	54.2	72.6	64.3	73.0	5.0	20.0	13.0	8.5	5.5
55	56.3	74.6	66.3	75.0	5.0	20.0	13.0	8.5	5.5
58	59.2	77.5	69.3	78.0	5.0	20.0	13.0	8.5	5.5
60	61.2	79.5	71.3	80.0	5.0	20.0	13.0	8.5	5.5
63	64.2	82.5	74.3	83.0	5.0	20.0	13.0	8.5	5.5
65	66.2	84.5	76.3	85.0	5.0	20.0	13.0	8.5	5.5
68	69.2	89.5	80.5	90.0	5.0	22.0	15.3	10.0	5.5
70	71.2	91.4	82.6	92.0	5.0	22.0	15.3	10.0	5.5
75	76.2	96.4	87.6	97.0	5.0	22.0	15.3	10.0	5.5
80	81.2	104.2	94.7	105.0	5.0	23.0	15.7	10.0	5.5
85	86.2	109.2	99.7	110.0	5.0	23.0	15.7	10.0	5.5
90	91.2	114.2	104.7	115.0	5.0	23.0	15.7	10.0	5.5
95	96.2	119.2	109.7	120.0	5.0	23.0	15.7	10.0	5.5
100	101.2	124.2	114.7	125.0	5.0	23.0	15.7	10.0	5.5

Materials

The limits of pressure, temperature and speed depend on the materials specified for the rotary seals and seats, as well as the nature of the media to be sealed. The maximum capabilities of each seal type are shown on the individual data sheets. Changes in single spring seal operating capabilities are partially a factor of each seal design but are mainly influenced by selection of elastomer type and seal face materials.

Elastomer selection primarily sets temperature and chemical resistance. Differing face material combinations affect seal capability, performance and life. Their pV (pressure x velocity) value largely determines the suitability of material combinations of seal faces and specifically the amount of heat generated at the faces. The ability of the face material to resist wear increases the life of the seal particularly in abrasive applications.

Flowserve offers face combinations, from carbon, solid ceramic and stainless steel materials, as standard. We recommend fine-grained, reaction-bonded silicon carbide as the superior "hard face" material, to be used for both faces for maximum wear resistance, or to run against carbon for ultimate pV capability.

		Seal (R) & Seat (S) faces									Diaphragms, Bellows & Cups			O-rings							Metal body components
		B	A	V	Q2	Q1	U2	U1	G	R	P	E	V	P	E	V	Y	N	M	K	G
	Type	Resin carbon	Special carbons	Solid Alumina Ceramic	SiC (reaction bonded)	SSiC (self sintered)	Tungsten carbide (nickel binder)	Tungsten carbide (Cobalt binder)	Stainless steel	Ni-Resist	Nitrile	Etheyle Propylene	Fluoroelastomer	Nitrile	Etheyle Propylene	Fluoroelastomer	Aflas™	Neoprene	FEP or FPA encapsulated	Perfluoroelastomer	304 SS / 316 SS
O-Ring mounted	Pac-Seal 38, 38D	◐	○	◐	◑	○	○	○						●	●	●			○		●
	Pac-Seal 39, 42, 42D	◐	○	◐	○	○			◐					●	●	●			○		●
	Pac-Seal 43, 43D	◐	○	◐	◑	○	○	○						●	●	●			○		●
Elastomer bellows	Pac-Seal 140-143	◐	○	◐	◑	○	○	○			●	●	●	●	●	●					●
	Pac-Seal 190-193	◐	○	◐	◑	○	○	○			●	●	●	●	●	●					●
	Pac-Seal 150-152	◐	○	◐	◑	○	○	○			●	●	●	●	●	●					●
Elastomer diaphragm	Pac-Seal 100-220	◐	○	◐	◑	○	○	○			●	●	●	●	●	●					●
	Pac-Seal 240	◐	○	◐	◑	○	○	○			●	●	●	●	●	●					●
Special	Pac-Seal 118	◐	○	◐	○	○	○	○			●	●	●								●
	Pac-Seal 160	◐	○	◐							●	●	●								●
	Pac-Seal 170	◐	○	◐							●	●	●								●
OEM specific designs	Pac-Seal FRI	◐	○	◐	◐	○	○	◐	◐			●			●	●					●
	Pac-Seal APU	◐	○	◐					◐		●		●	●		●					●
	Pac-Seal APR	◐	○		◐	○			◐		●		●								●
	Pac-Seal ALC	◐	○		◐	○					●	●	●	●	●	●					●
	Pac-Seal ALO	◑	○				○	◑	◐												●
	Pac-Seal KZN				◑	○					●		●								●
	Pac-Seal MAC	◐	○						◐		●			●							●
	Pac-Seal AWS	◐	○		◑	○					●	●	●								●
	Pac-Seal AWD	◐	○		◑	○			◐		●	●	●								●
	Pac-Seal AWP	◐	○		◑	○								●	●	●					●
Standard seats	Pac-Seal 8N/S/L	○	○	●	●	○	○	●													
	Pac-Seal 8B	●	○		○	○															
	Pac-Seal 2N,D	●	○	○	○	○															
	Pac-Seal 3N,D	●	○	○	●	○															
	Pac-Seal 1H			●	●	○	○	●	●	○											
	Pac-Seal 4S,L	○	○	●	●	○	○	●													
	Pac-Seal B2			●	●	○	○	●	○												
	Pac-Seal B1			●	●	○	○	●	○												
	Pac-Seal B9			●	●	○	○	●													
	Pac-Seal B8			●	○	○	○	○													
	Pac-Seal B4			●	●	○	○	○													
	Pac-Seal B6			●																	
	Pac-Seal B7			●																	

" ○" indicates available to special order, delivery dependant.
Combinations of O-ring materials on O-ring seals are all possible (eg Aflas & perfluor-elastomer), but not ex-stock.

◐ = Rotary face
◐ =-Stationary face
◑ = Stationary and Rotary face
● = Standard
○ = Special

Elastomers		*min* *Temperature limits* *max*	*Application*
Ethylene Propylene (EPDM)	E	**-40°C / -40°F** **149°C / 300°F**	For general duties, especially hot water
Neoprene	N	**-40°C / -40°F** **149°C / 300°F**	For refrigeration applications
Nitrile Butadiene (Buna N)	P	**-40°C / -40°F** **121°C / 250°F**	For general duties
Perfluoroelastomer (e.g. Kalrez 4079)	K	**-7°C / 20°F** **316°C / 600°F**	For very high chemical and temperature capability
Fluoroelastomer/PTFE coated	M	**-18°C / 0°F** **204°C / 400°F**	Near universal chemical resistance
Fluoroelastomer (e.g. Viton)	V	**-18°C / 0°F** **204°C / 400°F**	For general chemical applications
Aflas	X	**-10°C / 15°F** **204°C / 400°F**	For general chemical applications
FEP/FPA	T	**-60°C / -76°F** **205–260°C / 400–500°F**	Near universal chemical resistance
Other non-elastomers	Y		

Nomenclature

The seal nomenclature is a 15 to 19 digit code, consisting of seal type, seal size and material combination. The first character is a P for Pac-Seal products, followed imediately by 2 to 4 characters defining the rotating seal type and two characters defining the stationary face type.
For O-ring mounted seals specify R for right hand and L for optional left hand drive spring.

Metric size seals are identified with the letter M followed by three numbers. A seal size of 40 mm would read M040. Imperial (inch) size seals are identified by four numbers. A seal size of 1.750" would read 1750.
The next 4 characters define the shaft size, either metric or imperial followed by the next five to seven characters which define the materials.

Example 1

A type 38 DIN with short DIN stationary face for a 40mm shaft with **epdm/carbon/ceramic:**

P 3 8 D 8 S L M 0 4 0 B V E G G

- P: Type — Pac-Seal
- 38: Type
- D: Type
- 8: Seat
- S: Seat
- L: Seat — L = Left hand spring (optional), R = Right hand spring (standard)
- M040: Size (M040 = metric) (1750=inch)
- B: Material
- V: Material
- E: Material
- G: Material
- G: Material

Example 2

A type 192 with boot mounted stationary for a 65mm shaft **nitrile/SiC/SiC:**

P 1 9 2 B 9 M 0 6 5 Q 2 Q 2 P G G

- P: Type — Pac-Seal
- 192: Type
- B: Seat
- 9: Seat
- M065: Size (M065 = metric) (1750=inch)
- Q: Material
- 2: Material
- Q: Material
- 2: Material
- P: Material
- G: Material
- G: Material

Installation guidelines Pac-Seal

Note: protect precision lapped faces of new seal seat and seal ring from damage, dirt and finger marks.

A. Disassemble pump housing to expose defective seal: note how old seal is assembled to be sure replacement seal is installed in identical manner.

B. Carefully remove old seal head and seat, taking care not to scratch shaft or seal counterbore.

C. Clean shaft and counterbore surfaces using fine emery cloth or equivalent. Remove rust, burrs and wipe clean. Avoid making flat spots or otherwise changing original dimensions of the shaft or bore.

- ***Shaft runout*** should not exceed 0,05 mm (0.002") TIR (Total Indicator Reading) at any point along the shaft, for roller or ball type bearings.
- ***Shaft end play*** should not ex-ceed 0,10 mm (0.004") TIR on ball type thrust bearings.
- Ensure seal chamber face is sufficiently smooth to make a good gasket joint.
- Ensure that seal chamber face is ***square*** to the shaft centerline within 0,025 mm per 25 mm shaft diameter (0.001" per 1" shaft diameter) to a maximum of 0,125 mm (0.005") TIR.
- Ensure that the shaft is ***concentric*** to the seal chamber bore within 0,025 mm per 25 mm shaft diameter (0.001" per 1" shaft diameter) to a maximum of 0,125 mm (0.005") TIR

D. ***For O-ring and diaphragm seals (38-43, 100-240):***
Lubricate the shaft, rubber inner diameter of the rotating seal head and rubber outer diameter of the stationary seal seat with a light multipurpose oil. Do not lubricate seal faces. Note: never use grease or heavy oil as installation lubricant. Do not use petroleum based lubricants with EPDM.
For elastomer bellows seals (140, 190 and 150):
As above, but use water instead of oil.
Press against the last spring convolution and avoid pressing on the face.

E. Press seal firmly into counterbore to be sure it is bottomed square and at right angles to the shaft. This can be hand pressed into place taking care to protect the sealing face from a direct blow with any metal object. Use a piece of plastic between the face and any driving force.

F. Check both seal surfaces to assure they are free of any foreign matter. Slide rotating seal head by hand pressure along the shaft to a completely parallel contact with the stationary seat. Avoid extreme installation pressure or hammering of the seal. Make sure spring correctly engages the shoulder of seal head and impeller shoulder or shaft spring retainer.

G. Re-assemble impeller and/or pump housing.

H. ***DO NOT RUN PUMP DRY.*** Always prime the pump before starting. In the case of self-priming models the pump casing must be filled.

These instructions are intended for use by trained, experienced technicians who are familiar with the installation and service of mechanical seals.

Seat Selection

Correct seat selection lays the foundation for maximising seal performance. Preferred seat types are shown with each seal. However, Flowserve offers any seat design to be used with any seal, thereby giving a maximum range of possible combinations.
Seat housings, for all Flowserve seats, are recommended to have a machined lead in of 1.5 to 2.0 mm at 20 to 30 degrees angle.

● = Standard
○ = Optional

	Type	8N standard 38	8S DIN short	8L DIN long	8B carbon standard	2N standard 42	2D DIN short	3N standard 43	3D DIN short	1H H type face	4S DIN short	4L DIN long	B2 boot mounted	B1 boot mounted	B9 boot mounted	B8 boot mounted	B4 boot mounted	B6 boot mounted	B7 boot mounted
O-ring mounted	38	●																	
	38D			●															
	39				●														
	42					●													
	42D						●												
	43							●											
	43D								●										
Full elastomer bellows	140-143	○	○	○							○	○			●		○		
	190-193	●	○	○							○	○			○		○		
	150	○	○	○							○	○	●	○	○		○		
	151-152													●					
Elastomer diaphragm	100-200									○			●						
	110-220									○				●					
	240										○	○			○		●		
Special	118															●			
	160																	●	
	170																		●

USA and Canada
Kalamazoo, Michigan USA
Telephone: +1 269 381 2650
Telefax: +1 269 382 8726

Europe, Middle East, Africa
Roosendaal, the Netherlands
Telephone: +31 165 581400
Telefax: +31 165 554590

Asia Pacific
Singapore
Telephone: +65 6544 6800
Telefax: +65 6214 0541

Latin America
Mexico City
Telephone: +52 55 5567 7170
Telefax: +52 55 5567 4224

FSD132eng EMA REV 11/11 Printed in Europe

To find your local Flowserve representative:

For more information about Flowserve Corporation, visit www.flowserve.com

ISO 9000
Certified