

△ Component seals



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Conical spring seals

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Types 06/ 8W/ 8X/ 8Y/ 28/ 281/ 121/ 131/ 1688W/ 1688Y/ 1640/ 192K/ 94 & refrigeration seals

Direct replacement seals for food, beverage and dairy industries

Complete range of seals for INOXPA®, ALFA LAVAL®, APV, FRISTAM®, & WAUKESHA® Pumps

Seat types, clamp rings, seal refurbishment, fitting instructions, seal identification, USA seal codes .

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△ Conical Spring Type Seals

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Section 3

Introduction

The Conical Spring Type Seals offered by are an extremely popular seal. These robust, technically proficient, seals are designed to suit DIN and common, standard housing dimensions.

Applications

The proven efficient design and wide choice of 'O'-Ring and face materials enable these seals to be utilised in a large variety of applications. Suited for pumps, mixers, agitators, compressors and other rotary shaft equipment.

Standard Conical Spring Types

Type 8 , Type 8 DIN and Type 82

Inserted rotary faced, 'O'-Ring mounted, conical spring seals, to suit standard common or DIN fitting dimensions. The Type 82 is a balanced version of Type 8 DIN, suitable for stepped shafts.

Type 8B

'O'-Ring mounted, conical spring seals of similar design to the standard Type 8 but with a solid stainless steel head and carbon stationary.

Type 9 and Type 9 L

Conical spring 'O'-Ring mounted seal, with a monolithic seal head and a choice of 8 standard or long DIN seat.

Type 12 and Type 12 DIN

'O'-Ring mounted, conical spring seals, available with solid stainless head as standard, or inserted SIC/TC ring face. Suitable for standard or DIN housings.

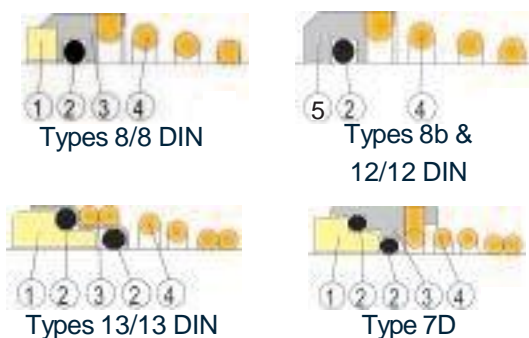
Type 13 and Type 13 DIN

'O'-Ring mounted, conical spring seals with pressed in, 'O'-Ring mounted, rotary face, enabling face material interchangeability, to suit common standard or DIN dimensions.

Type 7 D

As above Type 13 DIN but with a machined, rather than pressed seal head retainer. Designed to suit DIN 24960 (EN12756) standard.

STANDARD COMPONENTS.



No	Description	No	Retainer
1	Face Ring	4	Coil
2	'O'- Ring	5	Monolithic Face

Design Advantages

Positive Drive

Seal is shaft driven, via the coil, providing a positive drive at its base and eliminating common drive pin failures. Standard springs are right hand wound for clockwise shafts. Please specify left- hand coils for anti-clockwise shaft or "back to back" combinations. The spring coil end is turned upwards to protect the shaft from scoring.

Materials

Suitable for a large variety of applications, through a wide choice of 'O'-Ring and face materials.

Design

Single conical spring, stainless steel, head retainer provides a strong and effective seal, suitable for many duties, including clogging media and hygienic applications.

Self- Aligning

The combination of a resilient 'O'-Ring and single spring design results in a technically efficient and versatile design, that accommodates both misalignment and vibrations.

ORing Housing

The ORing is held within a completely recessed groove providing performance benefits, compared to competitor designs that use a separate drive ring.

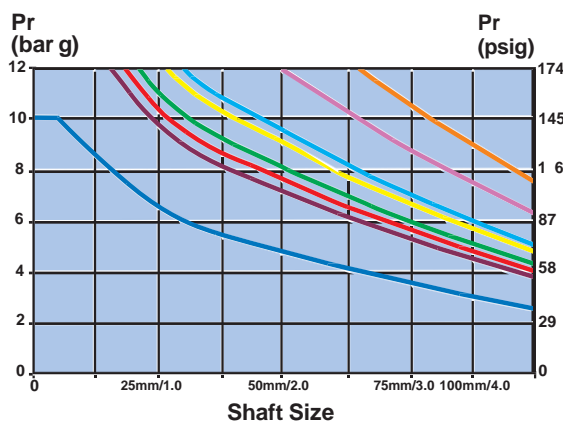
Customisable

Can be specially produced to any working length and seat housing dimensions.

Reliable

Robust, non-clogging, self-adjusting and durable giving highly effective performance.

CONICAL SPRING TYPE SEALS PV CHART

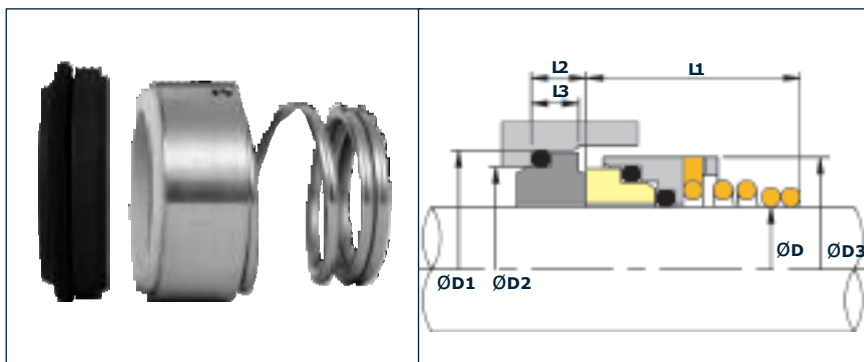


Carbon/Ceramic
Carbon/SiC
Carbon/TC
SC/TC
SC/SC
TC/TC
Carbon/SS (Ni-Resist)
Type 13 (Carbon/Ceramic)

Notes
1.Type 82 multiply by factor 1.4

For information on how to utilise this pV chart please refer to the technical section

TYPE 7D



Resilient, conical spring, 'O'-Ring mounted DIN standard seal. With the advantage of being able to replace the faces. The seal is very versatile and is suitable for a large variety of general and arduous duty applications, through a choice of face material combinations

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.00	17.00	19.00	15.00	7.00	4.00
12	0120	23.00	19.00	21.00	18.00	7.00	4.00
14	0140	25.00	21.00	23.00	22.00	7.00	4.00
16	0160	27.00	23.00	26.00	23.00	7.00	4.00
18	0180	33.00	27.00	29.00	24.00	10.00	5.00
20	0200	35.00	29.00	31.00	25.00	10.00	5.00
22	0220	37.00	31.00	33.00	25.00	10.00	5.00
24	0240	39.00	33.00	35.00	27.00	10.00	5.00
25	0250	40.00	34.00	36.00	27.00	10.00	5.00
28	0280	43.00	37.00	40.00	29.00	10.00	5.00
30	0300	45.00	39.00	43.00	30.00	10.00	5.00
32	0320	48.00	42.00	46.00	30.00	10.00	5.00
33	0330	48.00	42.00	46.00	39.00	10.00	5.00
35	0350	50.00	44.00	49.00	39.00	10.00	5.00
38	0380	56.00	49.00	53.00	42.00	13.00	6.00
40	0400	58.00	51.00	56.00	42.00	13.00	6.00
43	0430	61.00	54.00	59.00	47.00	13.00	6.00
45	0450	63.00	56.00	61.00	47.00	13.00	6.00
48	0480	66.00	59.00	64.00	47.00	13.00	6.00
50	0500	70.00	62.00	66.00	46.00	14.00	6.00
53	0530	73.00	65.00	69.00	56.00	14.00	6.00
55	0550	75.00	67.00	71.00	56.00	14.00	6.00
58	0580	78.00	70.00	76.00	56.00	14.00	6.00
60	0600	80.00	72.00	78.00	56.00	14.00	6.00
63	0630	83.00	75.00	81.00	56.00	14.00	6.00
65	0650	85.00	77.00	84.00	66.00	14.00	6.00
68	0680	90.00	81.00	88.00	64.00	16.00	7.00
70	0700	92.00	83.00	89.60	64.00	16.00	7.00
75	0750	97.00	88.00	98.00	64.00	16.00	7.00
80	0800	105.00	95.00	100.00	72.00	18.00	7.00
85	0850	110.00	100.00	107.50	72.00	18.00	7.00
90	0900	115.00	105.00	111.00	72.00	18.00	7.00
95	0950	120.00	110.00	119.00	72.00	18.00	7.00
100	1000	125.00	115.00	123.80	72.00	18.00	7.00

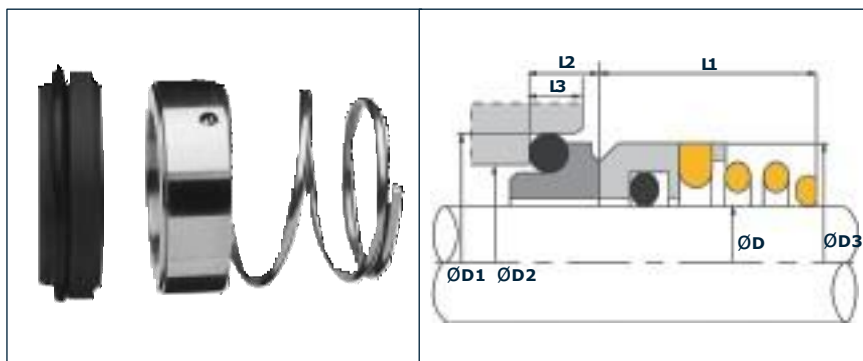
STANDARD FACE MATERIALS
Rotary Face: Ceramic, Silicon Carbide.
Seat: Carbon, Silicon Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 8B



Conical spring, 'O'-Ring mounted seal and seat of similar design to the Type 8 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 SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	19.20	15.50	19.00	15.50	7.10	5.00
12	0120	21.60	17.50	21.00	15.50	7.60	5.00
14	0140	24.60	20.50	23.00	15.50	7.60	5.00
15	0150	24.60	20.50	24.00	15.50	8.60	5.00
16	0160	28.00	22.00	26.00	17.50	9.00	6.50
18	0180	30.00	24.00	29.00	18.50	10.00	6.50
19	0190	31.00	25.00	31.00	20.00	9.00	6.50
20	0200	35.00	29.50	31.00	20.00	9.50	6.50
22	0220	35.00	29.50	33.00	21.50	9.50	6.50
24	0240	38.00	32.00	35.00	23.00	9.50	6.50
25	0250	38.00	32.00	36.00	24.50	9.50	6.50
26	0260	40.00	34.00	37.00	24.50	10.00	6.50
28	0280	42.00	36.00	40.00	24.50	11.00	6.50
30	0300	45.00	39.20	43.00	24.50	11.00	6.50
32	0320	48.00	42.20	46.00	28.00	11.00	6.50
35	0350	52.00	46.20	49.00	28.00	11.50	6.50
38	0380	55.00	49.20	53.00	31.00	11.50	6.50
40	0400	58.00	52.20	56.00	34.00	11.50	6.50
42	0420	62.00	53.30	59.00	35.00	14.30	8.00
43	0430	62.00	54.30	59.00	35.00	14.30	8.00
45	0450	64.00	55.30	61.00	36.50	14.30	8.00
48	0480	68.40	59.70	64.00	42.00	14.30	8.00
50	0500	69.30	60.80	66.00	43.00	14.30	8.00
55	0550	75.40	66.50	71.00	47.00	15.30	8.00
58	0580	78.40	69.50	76.00	50.00	15.30	8.00
60	0600	80.40	71.50	78.00	51.00	15.30	8.00
65	0650	85.40	76.50	84.00	52.00	15.30	8.00
68	0680	91.50	82.70	88.00	53.00	16.00	8.00
70	0700	92.00	83.00	90.00	54.00	15.30	8.00
75	0750	99.00	90.20	98.00	55.00	15.30	8.00
80	0800	104.00	95.20	100.00	58.00	16.30	8.00

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

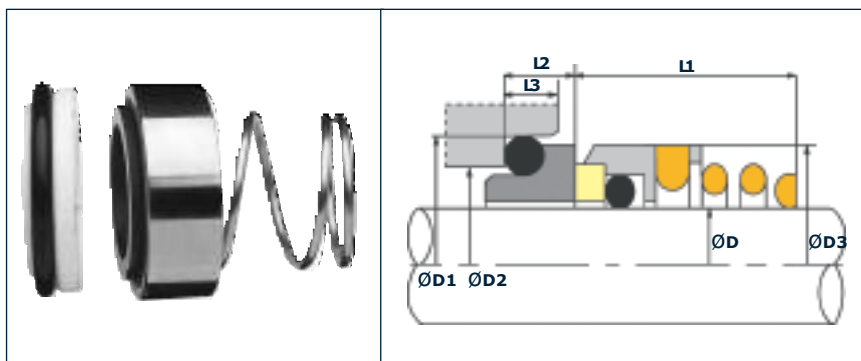
STANDARD FACE MATERIALS

Rotary Face: Stainless Steel.

Stat Ring: Carbon.

OTHER FACE MATERIALS TO ORDER

△ TYPE 8



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

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	19.20	15.50	19.00	15.50	6.60	5.00
12	0120	21.60	17.50	21.00	15.50	5.60	5.00
14	0140	24.60	20.50	23.00	15.50	5.60	5.00
15	0150	24.60	20.50	24.00	15.50	6.60	5.00
16	0160	28.00	22.00	26.00	17.50	7.50	6.50
18	0180	30.00	24.00	29.00	18.50	8.00	6.50
19	0190	31.00	25.00	31.00	20.00	7.50	6.50
20	0200	35.00	29.50	31.00	20.00	7.50	6.50
22	0220	35.00	29.50	33.00	21.50	7.50	6.50
24	0240	38.00	32.00	35.00	23.00	7.50	6.50
25	0250	38.00	32.00	36.00	24.50	7.50	6.50
26	0260	40.00	34.00	37.00	24.50	8.00	6.50
28	0280	42.00	36.00	40.00	24.50	9.00	6.50
30	0300	45.00	39.20	43.00	24.50	10.50	6.50
32	0320	48.00	42.20	46.00	28.00	10.50	6.50
35	0350	52.00	46.20	49.00	28.00	11.00	6.50
38	0380	55.00	49.20	53.00	31.00	10.30	6.50
40	0400	58.00	52.20	56.00	34.00	10.80	6.50
42	0420	62.00	53.30	59.00	35.00	12.00	8.00
43	0430	62.00	54.30	59.00	35.00	12.00	8.00
45	0450	64.00	55.30	61.00	36.50	11.60	8.00
48	0480	68.40	59.70	64.00	42.00	11.60	8.00
50	0500	69.30	60.80	66.00	43.00	11.60	8.00
55	0550	75.40	66.50	71.00	47.00	13.30	8.00
58	0580	78.40	69.50	76.00	50.00	13.30	8.00
60	0600	80.40	71.50	78.00	51.00	13.30	8.00
65	0650	85.40	76.50	84.00	52.00	13.00	8.00
68	0680	91.50	82.70	88.00	53.00	13.70	8.00
70	0700	92.00	83.00	90.00	54.00	13.00	8.00
75	0750	99.00	92.20	98.00	55.00	14.00	8.00
80	0800	104.00	95.20	100.00	58.00	15.00	8.00

STANDARD FACE MATERIALS

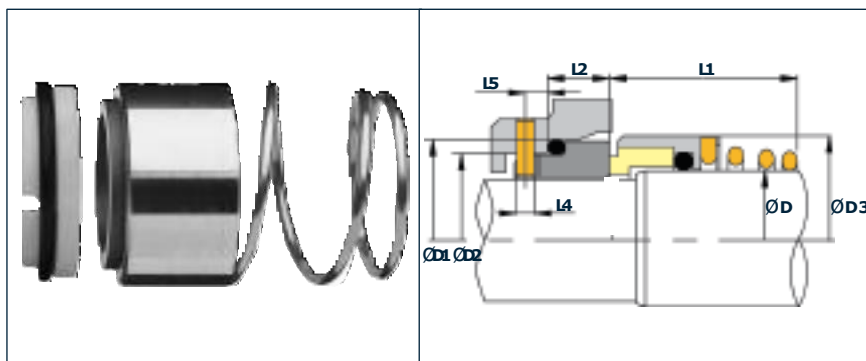
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 82



Conical Spring, 'O'-Ring mounted, balanced DIN Standard seal for stepped shafts, with reduced shaft size Type 8 DIN Long seat. This balanced seal arrangement is suitable for a large variety of general and high duty applications, with a wide choice of face material and elastomer combinations.

STANDARD SIZES

Metric Shaft Size D	Size Code	Seal Size	D1	D2	D3	L1	L2	L4	L5
14	0140	0100	21.00	17.00	23.00	25.50	10.00	3.00	5.00
16	0160	0120	23.00	19.00	26.00	26.50	10.00	3.00	5.00
18	0180	0140	25.00	21.00	29.00	29.50	10.00	3.00	5.00
20	0200	0160	27.00	23.00	31.00	31.00	10.00	3.00	5.00
22	0220	0180	33.00	27.00	33.00	32.50	11.50	3.00	5.00
24	0240	0200	35.00	29.00	35.00	32.50	11.50	3.00	5.00
26	0260	0220	37.00	31.00	36.00	32.50	11.50	3.00	5.00
28	0280	0240	39.00	33.00	40.00	32.50	11.50	3.00	5.00
30	0300	0250	40.00	34.00	43.00	33.50	11.50	3.00	5.00
33	0330	0280	43.00	37.00	46.00	35.50	11.50	3.00	5.00
35	0350	0300	45.00	39.00	49.00	35.50	11.50	3.00	5.00
38	0380	0330	48.00	42.00	53.00	39.50	11.50	3.00	5.00
40	0400	0350	50.00	44.00	56.00	43.50	11.50	3.00	5.00
43	0430	0380	56.00	49.00	59.00	46.00	14.00	4.00	5.00
45	0450	0400	58.00	51.00	61.00	48.00	14.00	4.00	5.00
48	0480	0430	61.00	54.00	64.00	51.00	14.00	4.00	5.00
50	0500	0450	63.00	56.00	66.00	55.00	14.00	4.00	5.00
53	0530	0480	66.00	59.00	69.00	55.00	14.00	4.00	5.00
55	0550	0500	70.00	62.00	71.00	58.00	15.00	4.00	5.00
58	0580	0530	73.00	65.00	76.00	60.00	15.00	4.00	5.00
60	0600	0550	75.00	67.00	78.00	60.00	15.00	4.00	5.00
63	0630	0580	78.00	70.00	81.00	60.00	15.00	4.00	5.00
65	0650	0600	80.00	72.00	84.00	60.00	15.00	4.00	5.00
68	0680	0630	83.00	75.00	88.00	60.00	15.00	4.00	5.00
70	0700	0650	85.00	77.00	90.00	61.00	15.00	4.00	5.00
75	0750	0700	92.00	83.00	98.00	63.00	18.00	4.00	5.00
80	0800	0750	97.00	88.00	100.00	68.00	18.00	4.00	5.00
85	0850	0800	105.00	95.00	107.50	68.00	18.20	4.00	5.00

Suggested Operating Limits

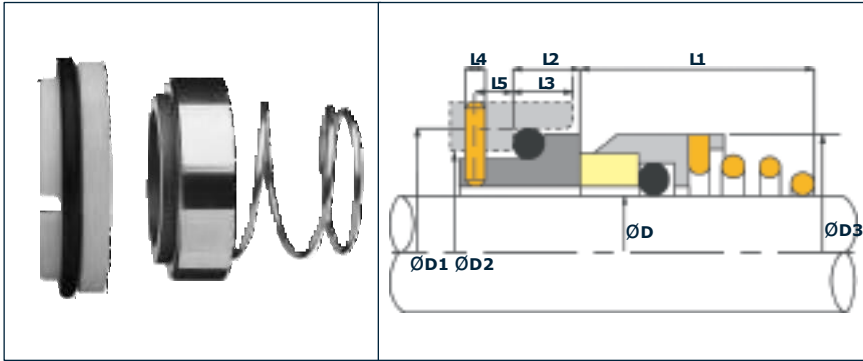
PRESSURE 200psi SPEED 20m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

△ TYPE 8 DIN



Conical spring, 'O'-Ring mounted, DIN standard seal and DIN long seat with drive slot. Suitable for a large variety of general and high duty applications through a ready choice of face material and elastomer materials.

3

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3	L4	L5
10	0100	21.00	17.00	19.00	15.50	10.00	5.50	3.00	5.00
12	0120	23.00	19.00	21.00	16.00	10.00	5.50	3.00	5.00
14	0140	25.00	21.00	23.00	16.50	10.00	5.50	3.00	5.00
16	0160	27.00	23.00	26.00	18.00	10.00	5.50	3.00	5.00
18	0180	33.00	27.00	29.00	19.50	11.50	7.00	3.00	5.00
20	0200	35.00	29.00	31.00	22.00	11.50	7.00	3.00	5.00
22	0220	37.00	31.00	33.00	21.50	11.50	7.00	3.00	5.00
24	0240	39.00	33.00	35.00	23.50	11.50	7.00	3.00	5.00
25	0250	40.00	34.00	36.00	26.50	11.50	7.00	3.00	5.00
28	0280	43.00	37.00	40.00	26.50	11.50	7.00	3.00	5.00
30	0300	45.00	39.00	43.00	26.50	11.50	7.00	3.00	5.00
32	0320	48.00	42.00	46.00	28.50	11.50	7.00	3.00	5.00
35	0350	50.00	44.00	49.00	28.50	11.50	7.00	3.00	5.00
38	0380	56.00	49.00	53.00	33.50	14.00	8.00	4.00	5.00
40	0400	58.00	51.00	56.00	36.00	14.00	8.00	4.00	5.00
43	0430	61.00	54.00	59.00	38.50	14.00	8.00	4.00	5.00
45	0450	63.00	56.00	61.00	39.50	14.00	8.00	4.00	5.00
48	0480	66.00	59.00	64.00	46.00	14.00	8.00	4.00	5.00
50	0500	70.00	62.00	66.00	45.00	15.00	8.50	4.00	5.00
53	0530	73.00	65.00	69.00	47.00	15.00	8.50	4.00	5.00
55	0550	75.00	67.00	71.00	49.00	15.00	8.50	4.00	5.00
58	0580	78.00	70.00	76.00	55.00	15.00	8.50	4.00	5.00
60	0600	80.00	72.00	78.00	55.00	15.00	8.50	4.00	5.00
65	0650	85.00	77.00	84.00	55.00	15.00	8.50	4.00	5.00
68	0680	90.00	81.00	88.00	55.00	18.00	9.50	4.00	5.00
70	0700	92.00	83.00	90.00	57.00	18.00	9.50	4.00	5.00
75	0750	97.00	88.00	98.00	62.00	18.00	9.50	4.00	5.00
80	0800	105.00	95.00	100.00	61.80	18.20	10.00	4.00	5.00

STANDARD STOCK MATERIALS

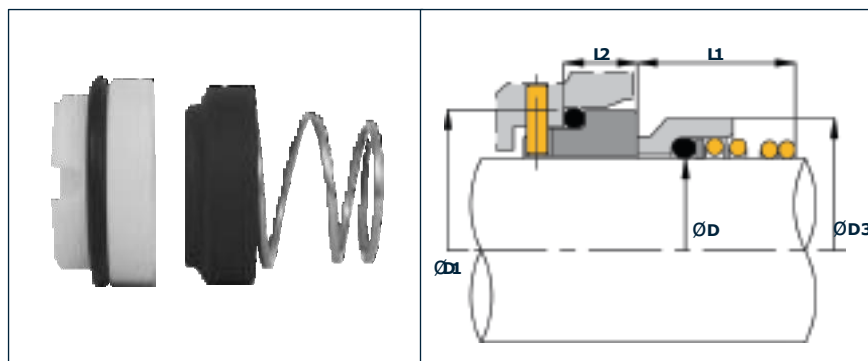
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
 Stat Ring: Ceramic, Carbon, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
 TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 9/9L



Conical spring, 'O'-Ring mounted seal, with a monolithic rotary face, available as Type 9L with Type 8 DIN Long or Type 9 with Type 19/8 'O'-Ring mounted seat. Also available with Type 8 DIN short 'O'-Ring mounted seat (see seat page) as Type 9S

STANDARD SIZES

Metric Shaft Size D	Size Code	D3	Type 9 without Slotted Seat			Type 9L With Slotted Seat		
			D1	L1	L2	D1	L1	L2
10	0100	20.00	19.20	15.90	6.60	21.00	17.50	10.00
12	0120	22.00	21.60	16.00	5.60	23.00	17.50	10.00
14	0140	25.00	24.60	16.00	5.60	25.00	17.50	10.00
15	0150	27.00	24.60	17.40	6.60	27.00	17.40	10.00
16	0160	27.00	28.00	19.00	7.50	27.00	19.50	10.00
18	0180	30.00	30.00	20.50	8.00	33.00	20.50	11.50
20	0200	32.00	35.00	22.00	7.50	35.00	22.00	11.50
22	0220	35.00	35.00	23.50	7.50	37.00	23.50	11.50
24	0240	38.00	38.00	25.00	7.50	39.00	25.00	11.50
25	0250	40.00	38.00	26.50	7.50	40.00	26.50	11.50
28	0280	43.00	42.00	26.50	9.00	43.00	26.50	11.50
30	0300	45.00	45.00	25.00	10.50	45.00	25.00	11.50
32	0320	47.00	48.00	28.50	10.50	48.00	28.50	11.50
35	0350	50.00	52.00	28.50	11.00	50.00	28.50	11.50
38	0380	56.00	55.00	32.00	10.30	56.00	32.00	14.00

Suggested Operating Limits

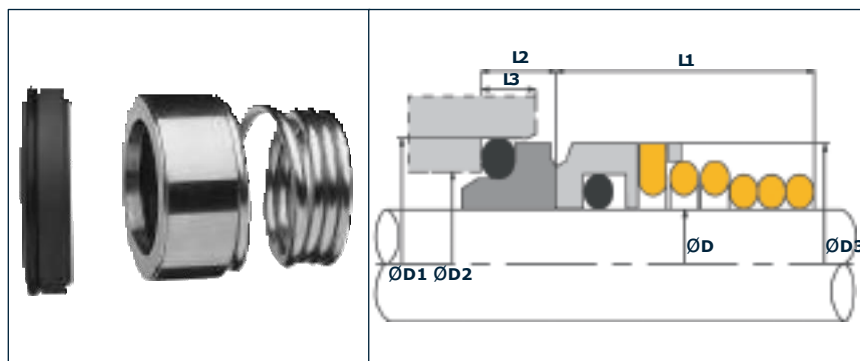
PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide.
Stat Ring: Carbon, Ceramic, Silicon Carbide.
OTHER FACE MATERIALS TO ORDER

TYPE 12 DIN



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 24960 (EN12756) housings. Suitable for a wide variety of general and medium duties.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.00	17.00	19.00	15.00	7.00	4.00
12	0120	23.00	19.00	21.00	18.00	7.00	4.00
14	0140	25.00	21.00	23.00	22.00	7.00	4.00
16	0160	27.00	23.00	26.00	23.00	7.00	4.00
18	0180	33.00	27.00	29.00	24.00	10.00	5.00
20	0200	35.00	29.00	31.00	25.00	10.00	5.00
22	0220	37.00	31.00	33.00	25.00	10.00	5.00
24	0240	39.00	33.00	35.00	27.00	10.00	5.00
25	0250	40.00	34.00	36.00	27.00	10.00	5.00
28	0280	43.00	37.00	40.00	29.00	10.00	5.00
30	0300	45.00	39.00	43.00	30.00	10.00	5.00
32	0320	48.00	42.00	46.00	30.00	10.00	5.00
33	0330	48.00	42.00	46.00	39.00	10.00	5.00
35	0350	50.00	44.00	49.00	39.00	10.00	5.00
38	0380	56.00	49.00	53.00	42.00	13.00	6.00
40	0400	58.00	51.00	56.00	42.00	13.00	6.00
43	0430	61.00	54.00	59.00	47.00	13.00	6.00
45	0450	63.00	56.00	61.00	47.00	13.00	6.00
48	0480	66.00	59.00	64.00	47.00	13.00	6.00
50	0500	70.00	62.00	66.00	46.00	14.00	6.00
53	0530	73.00	65.00	69.00	56.00	14.00	6.00
55	0550	75.00	67.00	71.00	56.00	14.00	6.00
58	0580	78.00	70.00	76.00	56.00	14.00	6.00
60	0600	80.00	72.00	78.00	56.00	14.00	6.00
63	0630	83.00	75.00	81.00	56.00	14.00	6.00
65	0650	85.00	77.00	84.00	66.00	14.00	6.00
68	0680	90.00	81.00	88.00	64.00	16.00	7.00
70	0700	92.00	83.00	89.60	64.00	16.00	7.00
75	0750	97.00	88.00	98.00	64.00	16.00	7.00
80	0800	105.00	95.00	100.00	72.00	18.00	7.00
85	0850	110.00	100.00	107.50	72.00	18.00	7.00
90	0900	115.00	105.00	111.00	72.00	18.00	7.00
95	0950	120.00	110.00	119.00	72.00	18.00	7.00
100	1000	125.00	115.00	123.80	72.00	18.00	7.00

STANDARD FACE MATERIALS
Rotary Face: Stainless Steel, Silicon Carbide. Stat Ring: Carbon, Silicon Carbide.

OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 12

A range of highly proficient, widely utilised, 'O'-Ring mounted, conical spring seals with solid, stainless steel head and carbon seat. To suit standard housings. Suitable for a wide variety of duties. For photo and line drawing see Type 12 DIN page (opposite)

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	18.10	14.00	19.00	15.00	5.50	4.00
11	0110	20.60	16.50	21.00	18.00	5.50	4.00
12	0120	20.60	16.50	21.00	18.00	5.50	4.00
13	0130	23.10	19.00	23.00	22.00	6.00	4.00
14	0140	23.10	19.00	23.00	22.00	6.00	4.00
15	0150	26.90	21.00	24.00	22.00	7.00	5.00
16	0160	26.90	21.00	26.00	23.00	7.00	5.00
17	0170	26.90	21.00	26.00	23.00	7.00	5.00
18	0180	30.90	25.00	29.00	24.00	8.00	5.00
19	0190	30.90	25.00	31.00	25.00	8.00	5.00
20	0200	30.90	25.00	31.00	25.00	8.00	5.00
21	0210	35.40	30.00	33.00	25.00	8.00	5.50
22	0220	35.40	30.00	33.00	25.00	8.00	5.50
23	0230	35.40	30.00	35.00	27.00	8.00	5.50
24	0240	35.40	30.00	35.00	27.00	8.00	5.50
25	0250	38.20	33.00	36.00	27.00	8.50	5.50
26	0260	38.20	33.00	36.00	27.00	8.50	5.50
27	0270	38.20	33.00	36.00	27.00	8.50	5.50
28	0280	43.30	38.00	40.00	29.00	9.00	5.50
29	0290	43.30	38.00	43.00	30.00	9.00	5.50
30	0300	43.30	38.00	43.00	30.00	9.00	5.50
31	0310	43.30	38.00	46.00	30.00	9.00	5.50
32	0320	43.30	38.00	46.00	30.00	9.00	5.50
33	0330	53.50	45.00	46.00	39.00	11.50	7.50
34	0340	53.50	45.00	49.00	39.00	11.50	7.50
35	0350	53.50	45.00	49.00	39.00	11.50	7.50
36	0360	53.50	45.00	49.00	39.00	11.50	7.50
37	0370	53.50	45.00	49.00	39.00	11.50	7.50
38	0380	60.50	52.00	53.00	39.00	11.50	7.50
39	0390	60.50	52.00	56.00	39.00	11.50	7.50
40	0400	60.50	52.00	56.00	39.00	11.50	7.50
41	0410	60.50	52.00	56.00	39.00	11.50	7.50
42	0420	60.50	52.00	59.00	39.00	11.50	7.50
43	0430	60.50	52.00	59.00	39.00	11.50	7.50
44	0440	65.50	57.00	61.00	41.00	11.50	7.50
45	0450	65.50	57.00	61.00	41.00	11.50	7.50
46	0460	65.50	57.00	61.00	41.00	11.50	7.50
47	0470	65.50	57.00	64.00	41.00	11.50	7.50
48	0480	65.50	57.00	64.00	41.00	11.50	7.50
49	0490	65.50	57.00	64.00	41.00	11.50	7.50
50	0500	72.50	64.00	66.00	45.00	11.50	7.50
55	0550	72.50	64.00	71.00	47.00	11.50	7.50
60	0600	79.30	72.00	78.00	49.00	11.50	7.50
65	0650	84.50	77.00	84.00	51.00	11.50	7.50
70	0700	89.50	82.00	89.60	51.00	11.50	7.50
75	0750	94.50	87.00	98.00	57.00	11.50	7.50
80	0800	99.50	92.00	100.00	59.00	11.50	7.50
85	0850	105.50	98.00	107.50	59.00	13.50	8.00
90	0900	111.50	105.00	111.00	62.00	13.50	8.00
95	0950	116.50	110.00	119.00	62.00	13.50	8.00
100	1000	119.50	114.00	123.80	75.00	13.50	8.00

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +180°C

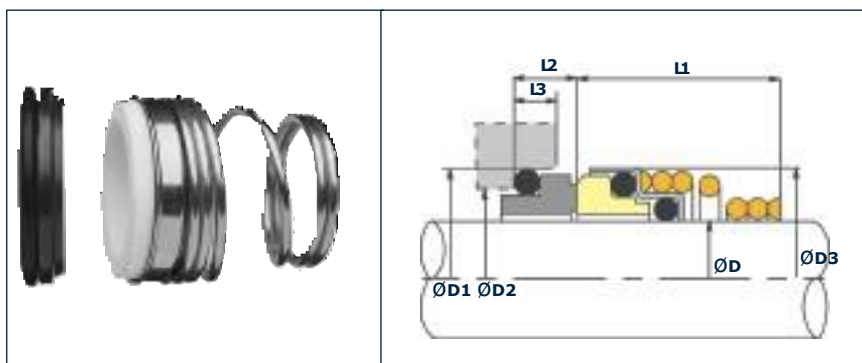
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Stainless Steel, Silicon Carbide. Stat Ring: Carbon, Silicon Carbide.

OTHER FACE MATERIALS TO ORDER

TYPE 13



'O'-Ring mounted, conical spring seal with pressed stainless steel 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 SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	18.10	14.00	19.50	15.00	5.50	4.00
11	0110	20.60	16.50	22.00	18.00	5.50	4.00
12	0120	20.60	16.50	22.00	18.00	5.50	4.00
13	0130	23.10	19.00	24.00	22.00	6.00	4.00
14	0140	23.10	19.00	24.00	22.00	6.00	4.00
15	0150	26.90	21.00	26.00	22.00	7.00	5.00
16	0160	26.90	21.00	26.00	23.00	7.00	5.00
17	0170	26.90	21.00	26.00	23.00	7.00	5.00
18	0180	30.90	25.00	32.00	24.00	8.00	5.00
19	0190	30.90	25.00	32.70	25.00	8.00	5.00
20	0200	30.90	25.00	32.70	25.00	8.00	5.00
21	0210	35.40	30.00	36.00	25.00	8.00	5.50
22	0220	35.40	30.00	36.00	25.00	8.00	5.50
23	0230	35.40	30.00	36.00	27.00	8.00	5.50
24	0240	35.40	30.00	37.40	27.00	8.00	5.50
25	0250	38.20	33.00	38.00	27.00	8.50	5.50
28	0280	43.30	38.00	42.00	29.00	9.00	5.50
29	0290	43.30	38.00	44.00	30.00	9.00	5.50
30	0300	43.30	38.00	44.00	30.00	9.00	5.50
32	0320	43.30	38.00	45.50	30.00	9.00	5.50
33	0330	53.50	45.00	46.50	39.00	11.50	7.50
35	0350	53.50	45.00	49.00	39.00	11.50	7.50
38	0380	60.50	52.00	56.00	39.00	11.50	7.50
40	0400	60.50	52.00	58.00	39.00	11.50	7.50

STANDARD FACE MATERIALS

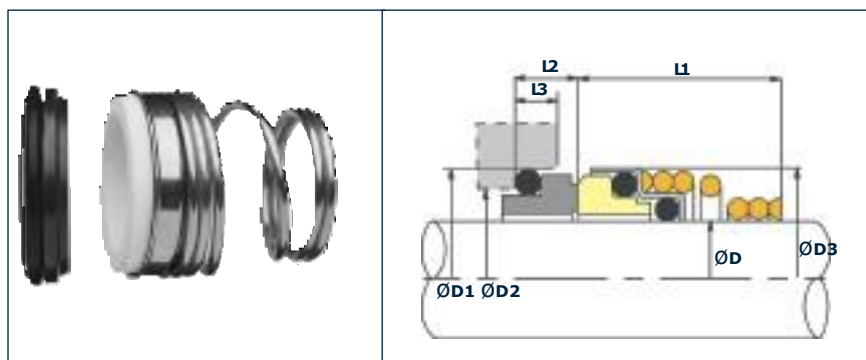
Rotary Face: Ceramic, Silicon Carbide, Tungsten Carbide, Carbon. Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide, Ceramic. OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 13 DIN



'O'-Ring mounted, with pressed seal head and seat, plus conical spring, designed to fit DIN 24960 (EN12756) housings. Cost-effective seal suitable for many duties with the option to replace wear faces and 'O'-Rings during over-hauls.

3

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.00	17.00	19.50	15.00	7.00	5.50
12	0120	23.00	19.00	22.00	18.00	7.00	5.50
14	0140	25.00	21.00	24.00	22.00	7.00	5.50
16	0160	27.00	23.00	26.00	23.00	7.00	5.50
18	0180	33.00	27.00	32.00	24.00	10.00	7.00
20	0200	35.00	29.00	32.70	25.00	10.00	7.00
22	0220	37.00	31.00	36.00	25.00	10.00	7.00
24	0240	39.00	33.00	37.40	27.00	10.00	7.00
25	0250	40.00	34.00	38.00	27.00	10.00	7.00
28	0280	43.00	37.00	42.00	29.00	10.00	7.00
30	0300	45.00	39.00	44.00	30.00	10.00	7.00
32	0320	48.00	42.00	45.50	30.00	10.00	7.00
33	0330	48.00	42.00	46.50	39.00	10.00	7.00
35	0350	50.00	44.00	49.00	39.00	10.00	7.00
38	0380	56.00	49.00	56.00	42.00	13.00	8.00
40	0400	58.00	51.00	58.00	42.00	13.00	8.00

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Ceramic, Silicon Carbide, Tungsten Carbide. Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

△ Elastomeric Bellows Type Seals

4



Section 4

Introduction

offer an extensive range of technically efficient and highly versatile, elastomeric bellows seals, suitable for any application dimensions, via our comprehensive standard range or through special manufacture to individual requirements.

Applications

The bellows seals designs are highly recommended for duties with media containing solids and for hygienic applications, due to their non-clogging, self adjusting and robust design. These very reliable seals are also customisable, as they can be specially produced to any working length and seat housing configuration. Suited for pumps, mixers, agitators, compressors and other rotary shaft equipment.

Standard Bellows Types

Type 14 Series

Universal compact DIN seals to suit three standard DIN working lengths.

Type 19 Series

Compact or extended working lengths, with a non DIN cross-section, for optimum flexibility and durability.

Types 1511 / 1522

Compact DIN profile seal Types to suit American standard working lengths. Types 1511 and 1522 are bellows equivalents to the Parallel Types 11 and 22 as well as Types A4 and A5.

Type 1520

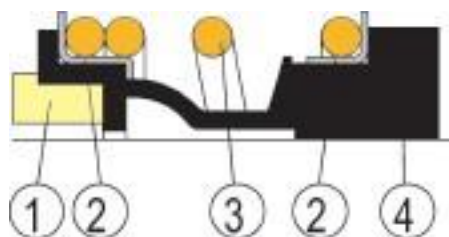
DIN profiled bellows seal to suit common international standard working length. Seal has same working length and seat as the Type 20, and Type A2 Parallel Seals.

Type 1724

Metal encased, rubber bellows seal to fit DIN profiles and DIN L1K. The seal face is retained to avoid the most common cause of seal installation failure on competitor seal manufacture.

STANDARD COMPONENTS.

(All Types except Type 1724)



No	Description	No	Description
1	Face	3	Coil
2	Retaining Plates	4	Bellows

Design Advantages

Range

Widest standard range of Bellows Seals, with more working lengths and seat choices and our compact DIN profile designs, than any other mechanical seal manufacturer.

Material Quality

Wide range of high quality elastomers and seal face materials readily available.

Design

An ingenious robust, non-fretting and non-clogging bellows design, capable of accommodating seal face wear, shaft misalignment and tolerances, due to attention to detail during the design process. The rotary face is resiliently mounted with no bonded joints and therefore will not sustain wear nor damage when in contact with a hard face material, such as Silicon Carbide. The bellows have no moulded joints and are not subjected to torsional stresses. These design features and our proven design face width and loading standards, provide increased seal performance, capability and life.

Retained Components

One sole unit, with no loose parts. The result is an easy fitting, bi-directional seal which is less prone to damage.

Designed for OEM's

The Type 14/15/17 Series have been designed as s OEM range of seals and offer; Better performance, capability and life compared to standard Parallel Spring Seals. Suitable for a wide variety of applications and media.

Customisable to any working length, seat housing dimensions, elastomer colours and name etc. Allowing a unique seal to be marketed by O.E.M's, as their own design, which won't be sold elsewhere.

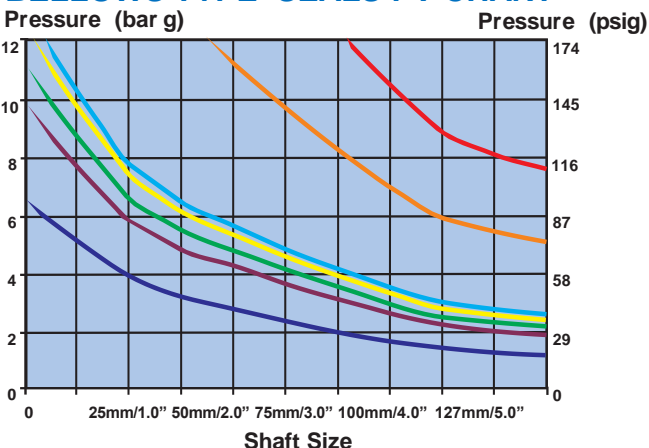
Very cost competitive to produce, especially in larger sizes and hard faces.

Reliability

These are proven very effective designs, highly utilised in many applications. They give extremely reliable performance based upon the bellows' design, high strength and flexibility.

' thorough Quality Control Systems ensure correct and reliable supply.

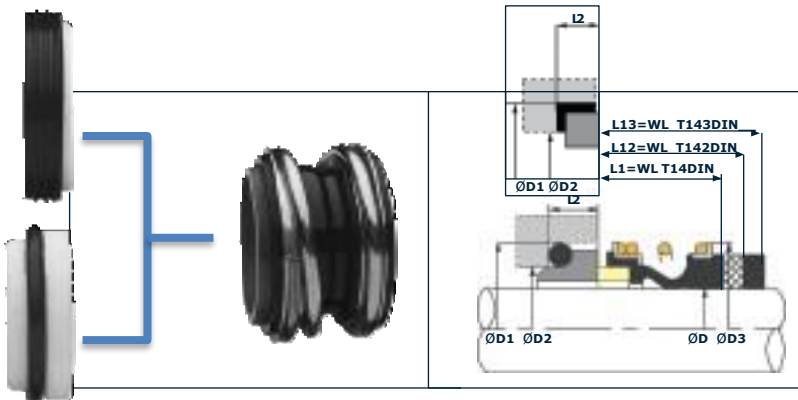
BELLOWS TYPE SEALS PV CHART



—	Carbon/TC
—	Carbon/SiC
—	Carbon/Ceramic
—	SC/TC
—	SC/SC
—	TC/TC
—	Carbon/SS

Notes:
For information on how to utilise this pV chart please refer to the technical section.

△ TYPE 14/TYPE 142/TYPE 143



Universal compact DIN seal and seat with a choice of standard DIN working lengths. The robust, heavy duty bellows design provides excellent flexibility and durability.

The seal is supplied as standard with the Type 19B seat. Alternatively specify Type 14S, 142S or 143S for this seal to be supplied with a Type 8 DIN Short Seat.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L12	L13	L2
10	0100	21.0	17.0	20.0	13.4	25.9	33.4	6.6
12	0120	23.0	19.0	22.0	14.4	25.9	33.4	6.6
14	0140	25.0	21.0	24.0	14.4	28.4	33.4	6.6
15	0150	27.0	23.0	25.0	14.4	28.4	33.4	6.6
16	0160	27.0	23.0	26.0	14.4	28.4	33.4	6.6
18	0180	33.0	27.0	32.0	18.5	30.0	37.5	7.5
20	0200	35.0	29.0	34.0	18.5	30.0	37.5	7.5
22	0220	37.0	31.0	36.0	18.5	30.0	37.5	7.5
24	0240	39.0	33.0	38.0	18.5	32.5	42.5	7.5
25	0250	40.0	34.0	39.0	18.5	32.5	42.5	7.5
28	0280	43.0	37.0	42.0	24.5	35.0	42.5	7.5
30	0300	45.0	39.0	44.0	25.5	35.0	42.5	7.5
32	0320	48.0	42.0	46.0	25.5	35.0	47.5	7.5
33	0330	48.0	42.0	47.0	25.5	35.0	47.5	7.5
35	0350	50.0	44.0	49.0	26.5	35.0	47.5	7.5
38	0380	56.0	49.0	54.0	29.0	36.0	46.0	9.0
40	0400	58.0	51.0	56.0	29.0	36.0	46.0	9.0
43	0430	61.0	54.0	59.0	29.0	36.0	51.0	9.0
45	0450	63.0	56.0	61.0	29.0	36.0	51.0	9.0
48	0480	66.0	59.0	64.0	31.0	36.0	51.0	9.0
50	0500	70.0	62.0	66.0	30.5	38.0	50.5	9.5
53	0530	73.0	65.0	69.0	29.0	36.5	59.0	11.0
55	0550	75.0	67.0	71.0	29.0	36.5	59.0	11.0
58	0580	78.0	70.0	78.0	32.0	41.5	59.0	11.0
60	0600	80.0	72.0	80.0	34.0	41.5	59.0	11.0
65	0650	85.0	77.0	85.0	34.0	41.5	69.0	11.0
68	0680	90.0	81.0	88.0	33.7	41.2	68.7	11.3
70	0700	92.0	83.0	90.0	33.7	48.7	68.7	11.3
75	0750	97.0	88.0	99.0	40.7	48.7	68.7	11.3
80	0800	105.0	95.0	104.0	40.5	48.0	78.0	12.0
85	0850	110.0	100.0	109.0	38.5	46.0	76.0	14.0
90	0900	115.0	105.0	114.0	38.5	51.0	76.0	14.0
95	0950	120.0	110.0	119.0	38.5	51.0	76.0	14.0
100	1000	125.0	115.0	124.0	38.5	51.0	76.0	14.0

STANDARD FACE MATERIALS

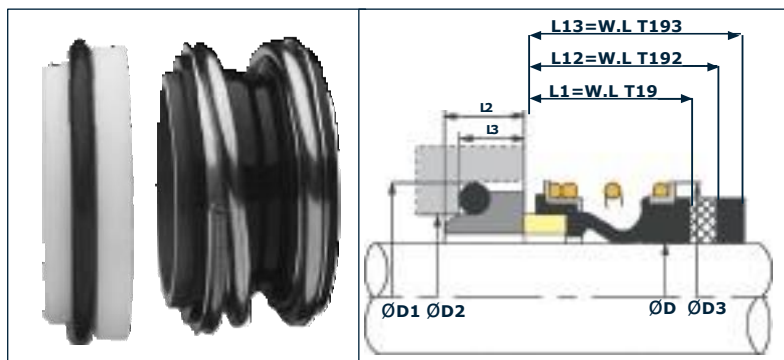
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 19/TYPE 192/ TYPE 193



A robust rubber bellows seal, with a wide non-DIN cross section, for optimum flexibility and durability. Available with a non DIN seat (as shown) or a wide range of 'O'-Ring or Boot Mounted DIN seats (see seats pages). Types 192 and 193 have an extended bellows length to meet DIN L1K and L1N working lengths, when fitted with a Type 8 DIN Short 'O'-Ring or 19B boot mounted Seat.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L12	L13	L2	L3
10	0100	19.2	15.5	20.0	14.5	25.9	33.4	9.0	6.6
12	0120	21.6	17.5	23.2	15.0	25.9	33.4	8.0	5.6
14	0140	24.6	20.5	27.1	17.0	28.4	33.4	8.0	5.6
15	0150	24.6	20.5	28.0	17.0	28.4	33.4	9.0	6.6
16	0160	28.0	22.0	27.1	17.0	28.4	33.4	10.0	7.5
18	0180	30.0	24.0	31.0	19.5	30.0	37.5	10.5	8.0
20	0200	35.0	29.5	36.0	21.5	30.0	37.5	10.0	7.5
22	0220	35.0	29.5	36.0	21.5	30.0	37.5	10.0	7.5
24	0240	38.0	32.0	40.5	22.5	32.5	42.5	10.0	7.5
25	0250	40.0	32.0	41.0	23.0	32.5	42.5	10.0	7.5
28	0280	42.0	36.0	47.0	26.5	35.0	42.5	11.5	9.0
30	0300	45.0	39.2	47.0	26.5	35.0	42.5	13.0	10.5
32	0320	48.0	44.2	51.0	27.5	35.0	47.5	13.0	10.5
33	0330	50.0	42.2	51.0	27.5	35.0	47.5	13.5	11.0
35	0350	52.0	46.2	55.0	28.5	35.0	47.5	13.5	11.0
38	0380	55.0	49.2	57.3	30.0	36.0	46.0	13.0	10.3
40	0400	58.0	52.2	60.0	30.0	36.0	46.0	13.5	10.8
43	0430	62.0	53.3	62.2	30.0	36.0	51.0	14.5	12.0
45	0450	64.0	55.3	64.3	30.0	36.0	51.0	14.5	11.6
48	0480	68.4	59.7	69.0	30.5	36.0	51.0	14.5	11.6
50	0500	69.3	60.8	70.2	30.5	38.0	50.5	14.5	11.6
53	0530	72.3	63.8	76.0	33.0	36.5	59.0	15.0	12.3
55	0550	75.4	66.5	78.0	35.0	36.5	59.0	16.0	13.3
58	0580	78.4	69.5	82.0	37.0	41.5	59.0	16.0	13.3
60	0600	80.4	71.5	85.0	38.0	41.5	59.0	16.0	13.3
65	0650	85.4	76.5	90.0	40.0	41.5	69.0	16.0	13.0
68	0680	91.5	82.7	94.0	40.0	41.5	68.7	16.0	13.7
70	0700	92.0	83.0	97.0	40.0	48.7	68.7	16.0	13.0
75	0750	99.0	90.2	102.0	40.0	48.0	68.7	17.0	14.0
80	0800	104.0	95.2	106.5	40.0	48.0	78.0	18.0	15.0
85	0850	109.0	100.2	117.0	41.0	46.0	76.0	18.0	14.8
90	0900	114.0	105.2	126.0	45.0	51.0	76.0	18.0	14.8
95	0950	120.3	111.6	130.0	46.0	51.0	76.0	19.0	15.8
100	1000	123.3	114.5	130.0	47.0	51.0	76.0	19.0	15.8

Suggested Operating Limits

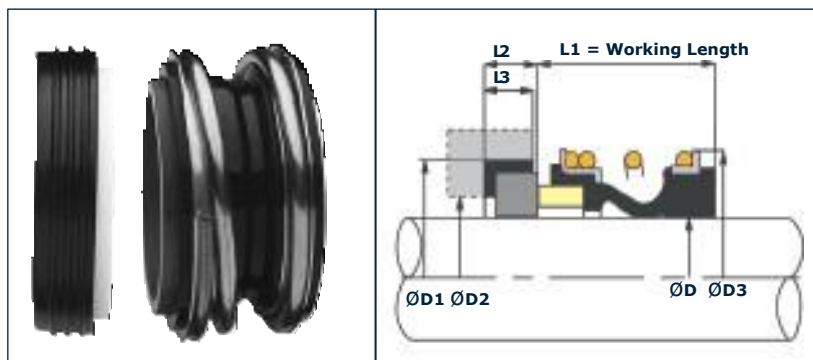
PRESSURE 200psi SPEED 20m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

△ TYPE 1520



Metric DIN profile seal and a standard seat with working length to suit a common International standard. Seal has same working length and the same seat as our Type 20, and is suitable for general duties.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	24.60	16.00	20.00	25.40	8.74	7.47
12	0120	27.79	19.05	22.00	25.40	8.74	7.47
13	0130	27.79	19.05	22.00	25.40	8.74	7.47
14	0140	30.95	22.23	24.00	25.40	10.32	8.97
15	0150	30.95	22.23	25.00	25.40	10.32	8.97
16	0160	30.95	22.23	26.00	25.40	10.32	8.97
18	0180	34.15	25.40	32.00	25.40	10.32	8.97
19	0190	34.15	25.40	32.00	25.40	10.32	8.97
20	0200	35.70	26.99	34.00	25.40	10.32	8.97
22	0220	37.30	28.58	36.00	25.40	10.32	8.97
24	0240	40.50	31.75	38.00	25.40	10.32	8.97
25	0250	40.50	31.75	39.00	25.40	10.32	8.97
28	0280	47.63	35.72	42.00	33.34	11.99	10.46
30	0300	50.80	38.89	44.00	33.34	11.99	10.46
32	0320	50.80	38.89	46.00	33.34	11.99	10.46
33	0330	53.98	42.07	47.00	33.34	11.99	10.46
34	0340	53.98	42.07	49.00	33.34	11.99	10.46
35	0350	53.98	42.07	49.00	33.34	11.99	10.46
38	0381	57.15	45.24	54.00	33.34	11.99	10.46
40	0400	60.35	48.82	56.00	33.34	11.99	10.46
42	0420	63.50	51.59	59.00	40.48	11.99	10.46
43	0430	63.50	51.59	59.00	40.48	11.99	10.46
44	0440	63.50	51.59	61.00	40.48	11.99	10.46
45	0450	63.50	51.59	61.00	40.48	11.99	10.46
48	0480	66.70	54.75	64.00	40.48	11.99	10.46
50	0500	69.85	58.00	66.00	40.48	13.50	11.96
53	0530	73.05	62.00	69.00	41.00	13.50	11.96
55	0550	76.20	65.00	71.00	41.00	13.50	11.96
58	0580	79.40	68.00	78.00	41.00	13.50	11.96
60	0600	79.40	68.00	80.00	41.00	13.50	11.96
63	0630	82.55	71.20	83.00	41.00	13.50	11.96
65	0650	92.10	78.35	85.00	49.00	15.90	14.50
70	0700	95.25	81.10	90.00	49.00	15.90	14.50
73	0730	98.45	84.50	96.00	49.00	15.90	14.50
75	0750	101.65	88.10	99.00	49.00	15.90	14.50
80	0800	114.30	97.00	104.00	56.00	20.00	18.50
85	0850	117.50	100.00	109.00	56.00	20.00	18.50
90	0900	123.85	107.00	114.00	59.00	20.00	18.50
95	0950	127.00	110.00	119.00	59.00	20.00	18.50
100	1000	133.35	116.00	124.00	62.00	20.00	18.50

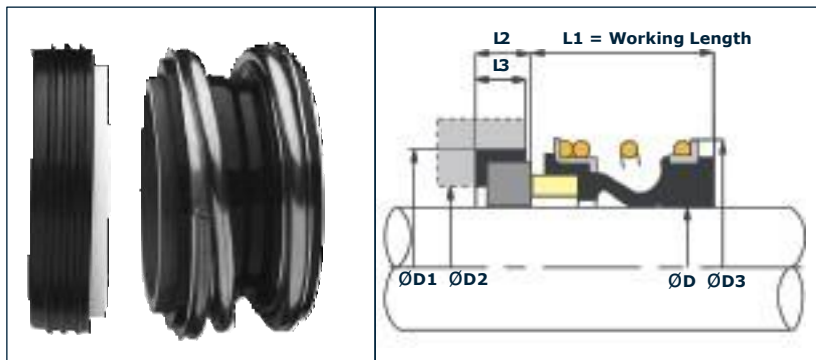
STANDARD FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide,
Tungsten Carbide. Stat Ring: Ceramic,
Silicon Carbide, Tungsten Carbide. OTHER
FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 1520



Imperial DIN profile seal and a standard seat, with working length to suit a common International standard. Seal has same working length and the same seat as our Type 20, and is suitable for general duties.

STANDARD SIZES

Inch Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
0.375	0095	24.60	16.00	20.00	25.40	8.74	7.47
0.500	0127	27.79	19.05	22.00	25.40	8.74	7.47
0.625	0158	30.95	22.23	26.00	25.40	10.32	8.97
0.750	0191	34.15	25.40	32.00	25.40	10.32	8.97
0.875	0222	37.30	28.58	36.00	25.40	10.32	8.97
1.000	0254	40.50	31.75	39.00	25.40	10.32	8.97
1.125	0286	47.63	35.72	42.00	33.34	11.99	10.46
1.250	0317	50.80	38.89	46.00	33.34	11.99	10.46
1.375	0349	53.98	42.07	49.00	33.34	11.99	10.46
1.500	0381	57.15	45.24	54.00	33.34	11.99	10.46
1.625	0412	60.35	48.42	56.00	33.34	11.99	10.46
1.750	0444	63.50	51.59	61.00	40.48	11.99	10.46
1.875	0476	66.70	54.75	64.00	40.48	11.99	10.46
2.000	0508	69.85	58.00	66.00	40.48	13.50	11.96
2.125	0539	73.05	62.00	69.00	41.00	13.50	11.96
2.250	0571	76.20	65.00	78.00	41.00	13.50	11.96
2.375	0603	79.40	68.00	80.00	41.00	13.50	11.96
2.500	0635	82.55	71.20	83.00	41.00	13.50	11.96
2.625	0666	92.10	78.35	85.00	49.00	15.90	14.50
2.750	0698	95.25	81.10	90.00	49.00	15.90	14.50
2.875	0730	98.45	84.50	96.00	49.00	15.90	14.50
3.000	0762	101.65	88.10	99.00	49.00	15.90	14.50
3.125	0794	111.15	93.68	104.00	56.00	20.00	18.50
3.250	0826	114.30	96.85	104.00	56.00	20.00	18.50
3.375	0857	117.50	100.00	109.00	56.00	20.00	18.50
3.500	0889	120.65	103.18	114.00	56.00	20.00	18.50
3.625	0921	123.85	106.35	114.00	59.00	20.00	18.50
3.750	0953	127.00	109.52	119.00	59.00	20.00	18.50
3.875	0984	130.20	112.65	122.00	62.00	20.00	18.50
4.000	1016	133.35	115.88	124.00	62.00	20.00	18.50

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +200°C

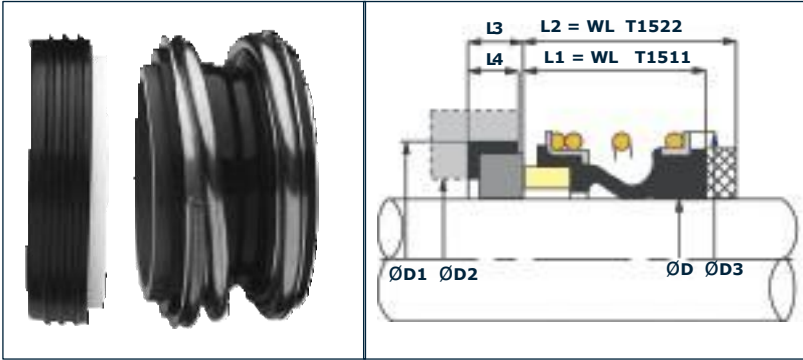
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

△ TYPE 1511/TYPE 1522



DIN profile seal and a standard seat, with a choice of working lengths to suit common American standards. Seal has same working length and the same seat as our Type 11 or Type 22, and is suitable for general duties.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	25.40	1.000	19.05	0.750	22.00	0.866	20.62	0.812	31.75	1.250	7.93	0.312	6.35	0.250
-	-	-	14	0.551	0140	31.75	1.250	23.80	0.937	24.00	0.945	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.625	15.88	0158	16	0.630	0160	31.75	1.250	23.80	0.937	26.00	1.024	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.750	19.05	0191	18	0.709	0180	34.93	1.375	26.98	1.062	32.00	1.260	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
-	-	-	20	0.787	0200	38.10	1.500	30.15	1.187	34.00	1.339	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
0.875	22.23	0222	22	0.866	0220	38.10	1.500	30.15	1.187	36.00	1.417	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
-	-	-	24	0.945	0240	41.28	1.625	33.32	1.312	38.00	1.496	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.000	25.40	0254	25	0.984	0250	41.28	1.625	33.32	1.312	39.00	1.535	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.125	28.58	0286	28	1.102	0280	44.44	1.750	36.50	1.437	42.00	1.654	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	30	1.181	0300	47.63	1.875	37.90	1.492	44.00	1.732	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
1.250	31.75	0317	32	1.260	0320	47.63	1.875	37.90	1.492	46.00	1.811	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	33	1.299	0330	50.80	2.000	42.84	1.687	47.00	1.850	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.375	34.93	0349	35	1.378	0350	50.80	2.000	42.84	1.687	49.00	1.929	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.500	38.10	0381	38	1.496	0380	53.98	2.125	46.05	1.813	54.00	2.126	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.625	41.28	0412	40	1.575	0400	60.33	2.375	50.80	2.000	56.00	2.205	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
-	-	-	43	1.693	0430	63.50	2.500	53.97	2.125	59.00	2.323	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
1.750	44.45	0444	44	1.732	0440	63.50	2.500	53.97	2.125	61.00	2.402	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
1.875	47.63	0476	45	1.772	0450	66.68	2.625	57.15	2.250	61.00	2.402	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
-	-	-	48	1.890	0480	69.85	2.750	60.32	2.375	64.00	2.520	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
2.000	50.80	0508	50	1.969	0500	69.85	2.750	60.32	2.375	66.00	2.598	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
2.125	53.98	0539	53	2.087	0530	76.20	3.000	60.32	2.375	69.00	2.717	42.88	1.688	60.32	2.375	14.28	0.562	12.70	0.500
2.250	57.15	0571	55	2.165	0550	79.38	3.125	61.90	2.437	78.00	3.071	42.88	1.688	60.32	2.375	14.28	0.562	12.70	0.500
-	-	-	58	2.283	0580	82.55	3.250	67.39	2.653	78.00	3.071	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.375	60.33	0603	60	2.362	0600	82.55	3.250	67.39	2.653	80.00	3.150	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.500	63.50	0635	63	2.480	0630	85.73	3.375	68.25	2.687	83.00	3.268	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.625	66.68	0666	65	2.559	0650	85.73	3.375	71.24	2.805	85.00	3.346	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
-	-	-	68	2.677	0680	88.90	3.500	74.60	2.937	88.00	3.465	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
2.750	69.85	0698	70	2.756	0700	88.90	3.500	74.60	2.937	90.00	3.543	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
2.875	73.03	0730	73	2.874	0730	95.25	3.750	77.77	3.062	96.00	3.780	52.37	2.062	73.03	2.875	15.90	0.626	14.50	0.571
3.000	76.20	0762	75	2.953	0750	98.43	3.875	80.95	3.187	99.00	3.898	52.37	2.062	73.03	2.875	15.90	0.626	14.50	0.571

STANDARD FACE MATERIALS

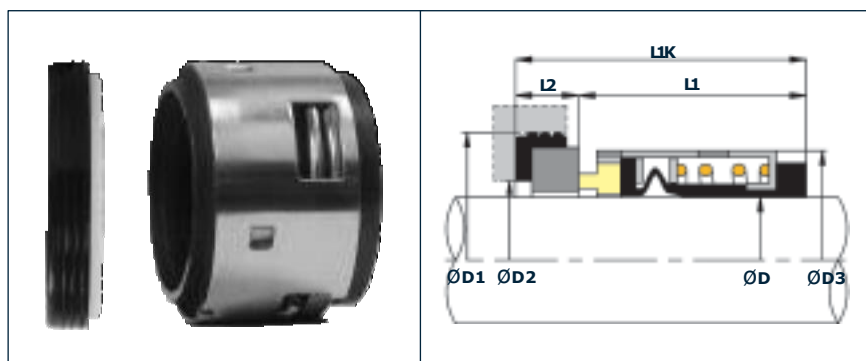
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 1724



High performance, wide duty, full convolution rubber bellows seal inside a stainless steel housing. Type 1724 features a non-clogging spring and self alignment capability, and is offered with a choice of Type 24 boot mounted or 'O'-Ring Short or Long DIN seats

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L1K
14	0140	25.00	21.00	24.00	26.40	8.60	35.00
16	0160	27.00	23.00	26.00	26.40	8.60	35.00
18	0180	33.00	27.00	32.00	27.50	10.00	37.50
20	0200	35.00	29.00	34.00	27.50	10.00	37.50
22	0220	37.00	31.00	36.00	27.50	10.00	37.50
24	0240	39.00	33.00	38.00	30.00	10.00	40.00
25	0250	40.00	34.00	39.00	30.00	10.00	40.00
28	0280	43.00	37.00	42.00	32.50	10.00	42.50
30	0300	45.00	39.00	44.00	32.50	10.00	42.50
32	0320	48.00	42.00	46.00	32.50	10.00	42.50
33	0330	48.00	42.00	47.00	32.50	10.00	42.50
35	0350	50.00	44.00	49.00	32.50	10.00	42.50
38	0380	56.00	49.00	54.00	34.00	11.00	45.00
40	0400	58.00	51.00	56.00	34.00	11.00	45.00
43	0430	61.00	54.00	59.00	34.00	11.00	45.00
45	0450	63.00	56.00	61.00	34.00	11.00	45.00
48	0480	66.00	59.00	64.00	34.00	11.00	45.00
50	0500	70.00	62.00	66.00	34.50	13.00	47.50
53	0530	73.00	65.00	69.00	34.50	13.00	47.50
55	0550	75.00	67.00	71.00	34.50	13.00	47.50
58	0580	78.00	70.00	78.00	39.50	13.00	52.50
60	0600	80.00	72.00	80.00	39.50	13.00	52.50
63	0630	83.00	75.00	83.00	39.50	13.00	52.50
65	0650	85.00	77.00	85.00	39.50	13.00	52.50
68	0680	90.00	81.00	88.00	37.20	15.30	52.50
70	0700	92.00	83.00	89.00	44.70	15.30	60.00
75	0750	97.00	88.00	96.00	44.70	15.30	60.00
80	0800	105.00	95.00	104.00	44.30	15.70	60.00
85	0850	110.00	100.00	108.00	44.30	15.70	60.00
90	0900	115.00	105.00	114.00	49.30	15.70	65.00
95	0950	120.00	110.00	118.00	49.30	15.70	65.00
100	1000	125.00	115.00	124.00	49.30	15.70	65.00

Suggested Operating Limits

PRESSURE 260psi SPEED 18m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

△ Parallel Spring Diaphragm Type Seals



Section 5

Introduction

Parallel Spring Type Seals are highly proficient and widely utilised, covering all standard pump shaft, working length and housing size ranges.

Applications

The parallel spring family range are ideal for a wide spectrum of application conditions, ranging from general water to food processing, petrochemical and other demanding applications. The seals are highly effective and widely utilised in pumps, mixers, agitators, compressors and other rotary shaft equipment.

Standard Parallel Types

Types 10 and 20

Parallel spring, rubber diaphragm seal to common industry standard dimensions. Usually fitted with boot mounted seats, or specify Type 21 'O'-Ring mounted seat.

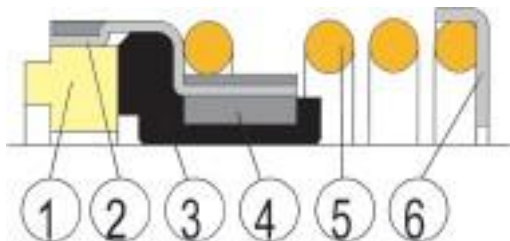
Types 11 and 22

As above, to American standard dimensions, fitted with boot mounted seats or alternatively, specify Type 31 'O'-Ring mounted seat.

Type 24

As above to DIN 24960 (EN12756) dimension, fitted with boot mounted seat, specify Type 24S if a Type 24 DINS seat is required and Type 24L for the seal to be fitted with a Type 24 DINL seat.

STANDARD COMPONENTS



No	Description
1	Seal Face
2	Retainer
3	Diaphragm
4	Drive Ring
5	Spring
6	Base Plate

Design Advantages

Accommodating

The seal head automatically adjusts to accommodate misalignment and seal face wear, through the design and flexibility of the rubber diaphragm.

Improved

'attention to detail and modern in-house design and manufacturing facilities, have enabled to create Parallel Spring Seals, with additional improvements to the original designs, whilst still maintaining the main design features, such as self aligning, non fretting/clogging and vacuum application suitability. These improvements result in a superior Mechanical Seal, to both the original replacement seal and their other direct market copies.

Retained Components

Faces and base plates are retained by adhesive and by mating components, respectively, making handling and fitting easier and more secure.

Customisable

The technically efficient and highly versatile, parallel spring, seal design can be readily customised to suit individual requirements; where a standard seal cannot be utilised.

can assist in the design of special production runs to fully satisfy customer requirements.

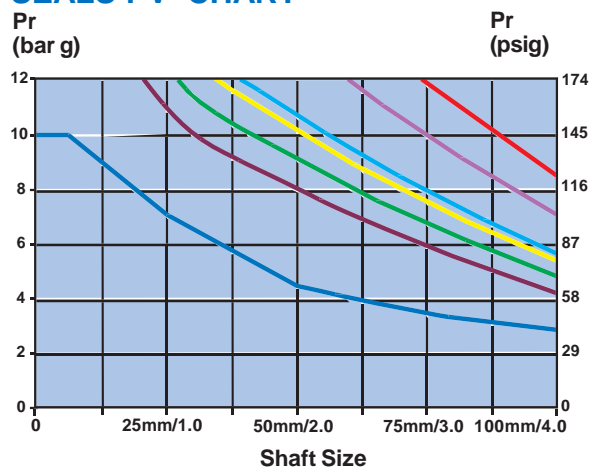
Material Quality

A wide selection of high quality face materials and elastomers are readily available as standard.

Reliability

The resulting Quality Seal and the high strength and flexibility of the diaphragm, provide a very reliable and accommodating mechanical seal design.

PARALLEL SPRING DIAPHRAGM TYPE SEALS PV CHART



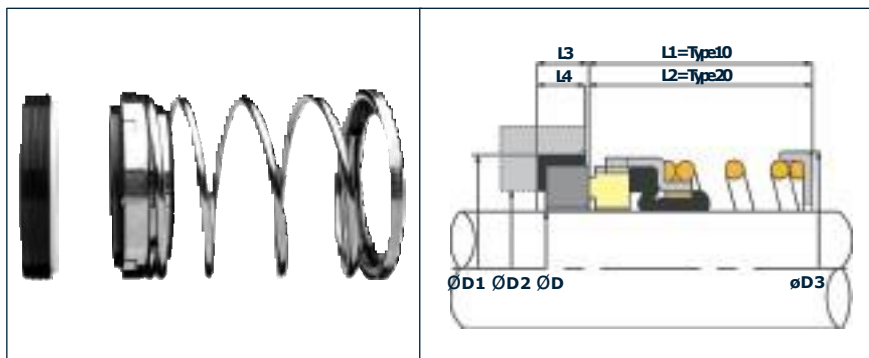
Carbon/Ceramic
Carbon/SIC
Carbon/TC
SC/TC
SC/SC
TC/TC
Carbon/SS (Ni-Resist)

Notes

1. Type A1- A5 multiply by factor 1.1

For information on how to utilise this pV chart please refer to the above advice

TYPE 10/TYPE 20



Metric shaft size resilient, single spring, rubber diaphragm seal with boot mounted seat as standard. A widely specified and utilised seal Type, capable of long service life.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3	L4
10	0100	24.60	16.00	22.95	43.65	25.40	8.74	7.47
12	0120	27.79	19.05	23.90	43.65	25.40	8.74	7.47
13	0130	27.79	19.05	23.90	43.65	25.40	8.74	7.47
14	0140	30.95	22.23	26.70	43.65	25.40	10.32	8.97
15	0150	30.95	22.23	26.70	43.65	25.40	10.32	8.97
16	0160	30.95	22.23	26.70	43.65	25.40	10.32	8.97
18	0180	34.15	25.40	31.10	43.65	25.40	10.32	8.97
19	0190	34.15	25.40	31.10	43.65	25.40	10.32	8.97
20	0200	35.70	26.99	33.40	43.65	25.40	10.32	8.97
22	0220	37.30	28.58	33.40	43.65	25.40	10.32	8.97
24	0240	40.50	31.75	39.20	43.65	25.40	10.32	8.97
25	0250	40.50	31.75	39.20	43.65	25.40	10.32	8.97
28	0280	47.63	35.72	46.30	60.33	33.34	11.99	10.46
30	0300	50.80	38.89	49.40	60.33	33.34	11.99	10.46
32	0320	50.80	38.89	49.40	60.33	33.34	11.99	10.46
33	0330	53.98	42.07	52.60	60.33	33.34	11.99	10.46
34	0340	53.98	42.07	52.60	60.33	33.34	11.99	10.46
35	0350	53.98	42.07	52.60	60.33	33.34	11.99	10.46
38	0381	57.15	45.24	55.80	60.33	33.34	11.99	10.46
40	0400	60.35	48.82	59.20	60.33	33.34	11.99	10.46
42	0420	63.50	51.59	66.00	70.64	40.48	11.99	10.46
43	0430	63.50	51.59	66.00	70.64	40.48	11.99	10.46
44	0440	63.50	51.59	66.00	70.64	40.48	11.99	10.46
45	0450	63.50	51.59	66.00	70.64	40.48	11.99	10.46
48	0480	66.70	54.75	66.60	70.64	40.48	11.99	10.46
50	0500	69.85	58.00	71.65	70.64	40.48	13.50	11.96
53	0530	73.05	62.00	73.30	71.00	41.00	13.50	11.96
55	0550	76.20	65.00	78.40	71.00	41.00	13.50	11.96
58	0580	79.40	68.00	82.00	71.00	41.00	13.50	11.96
60	0600	79.40	68.00	82.00	71.00	41.00	13.50	11.96
63	0630	82.55	71.20	84.90	71.00	41.00	13.50	11.96
65	0650	92.10	78.35	88.40	70.00	49.00	15.90	14.50
70	0700	95.25	81.10	92.60	70.00	49.00	15.90	14.50
73	0730	98.45	84.50	94.85	73.00	49.00	15.90	14.50
75	0750	101.65	88.10	102.70	73.00	49.00	15.90	14.50
80	0800	114.30	97.00	104.00	79.00	56.00	20.00	18.50
85	0850	117.50	100.00	108.00	79.00	56.00	20.00	18.50
90	0900	123.85	107.00	112.00	83.00	59.00	20.00	18.50
95	0950	127.00	110.00	119.00	83.00	59.00	20.00	18.50
100	1000	133.35	116.00	124.00	86.00	62.00	20.00	18.50

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

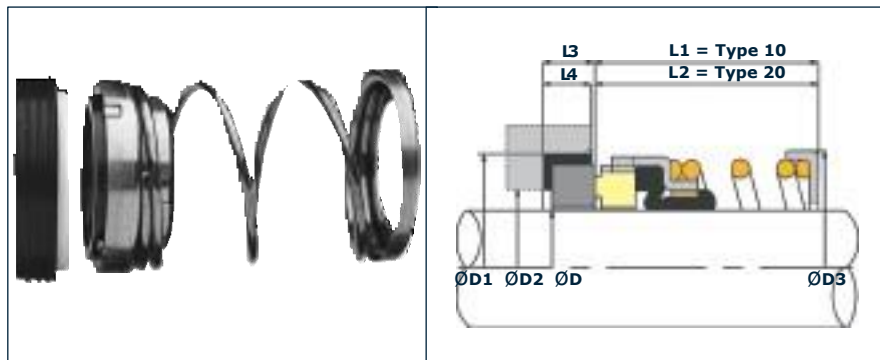
Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

5

△ TYPE 10 / TYPE 20



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

STANDARD SIZES

Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0095	24.60	0.969	16.00	0.630	22.95	0.904	43.65	1.719	25.40	1.000	8.74	0.344	7.47	0.294
0.500	12.70	0127	27.79	1.094	19.05	0.750	23.90	0.941	43.65	1.719	25.40	1.000	8.74	0.344	7.47	0.294
0.625	15.88	0158	30.95	1.219	22.23	0.875	26.70	1.051	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
0.750	19.05	0191	34.15	1.344	25.40	1.000	31.10	1.224	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
0.875	22.23	0222	37.30	1.469	28.58	1.125	33.40	1.315	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
1.000	25.40	0254	40.50	1.594	31.75	1.250	43.20	1.701	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
1.125	28.58	0286	47.63	1.875	35.72	1.406	46.30	1.823	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.250	31.75	0317	50.80	2.000	38.89	1.531	49.40	1.945	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.375	34.93	0349	53.98	2.125	42.07	1.656	52.60	2.071	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.500	38.10	0381	57.15	2.250	45.24	1.781	55.80	2.197	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.625	41.28	0412	60.35	2.376	48.42	1.906	59.20	2.331	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.750	44.45	0444	63.50	2.500	51.59	2.031	66.00	2.598	70.64	2.781	40.48	1.594	11.99	0.472	10.46	0.412
1.875	47.63	0476	66.70	2.626	54.75	2.156	66.60	2.622	70.64	2.781	40.48	1.594	11.99	0.472	10.46	0.412
2.000	50.80	0508	69.85	2.750	58.00	2.283	73.00	2.874	70.64	2.781	40.48	1.594	13.50	0.531	11.96	0.471
2.125	53.98	0539	73.05	2.876	62.00	2.441	73.30	2.886	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.250	57.15	0571	76.20	3.000	65.00	2.559	78.40	3.087	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.375	60.33	0603	79.40	3.126	68.00	2.677	82.00	3.228	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.500	63.50	0635	82.55	3.250	71.20	2.803	84.90	3.343	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.625	66.68	0666	92.10	3.626	78.35	3.085	88.40	3.480	70.00	2.756	49.00	1.929	15.90	0.626	14.50	0.571
2.750	69.85	0698	95.25	3.750	81.10	3.193	92.60	3.646	70.00	2.756	49.00	1.929	15.90	0.626	14.50	0.571
2.875	73.03	0730	98.45	3.876	84.50	3.327	94.85	3.734	73.00	2.874	49.00	1.929	15.90	0.626	14.50	0.571
3.000	76.20	0762	101.65	4.002	88.10	3.469	102.70	4.043	73.00	2.874	49.00	1.929	15.90	0.626	14.50	0.571
3.125	79.38	0794	111.15	4.376	93.68	3.688	104.00	4.094	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.250	82.55	0826	114.30	4.500	96.85	3.813	104.00	4.094	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.375	85.73	0857	117.50	4.626	100.00	3.937	108.00	4.252	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.500	88.90	0889	120.65	4.750	103.18	4.062	112.00	4.409	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.625	92.08	0921	123.85	4.876	106.35	4.187	114.00	4.488	83.00	3.268	59.00	2.323	20.00	0.787	18.50	0.728
3.750	95.25	0953	127.00	5.000	109.52	4.312	119.00	4.685	83.00	3.268	59.00	2.323	20.00	0.787	18.50	0.728
3.875	98.43	0984	130.20	5.126	112.65	4.435	121.00	4.764	86.00	3.386	62.00	2.441	20.00	0.787	18.50	0.728
4.000	101.60	1016	133.35	5.250	115.88	4.562	124.00	4.882	86.00	3.386	62.00	2.441	20.00	0.787	18.50	0.728

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C

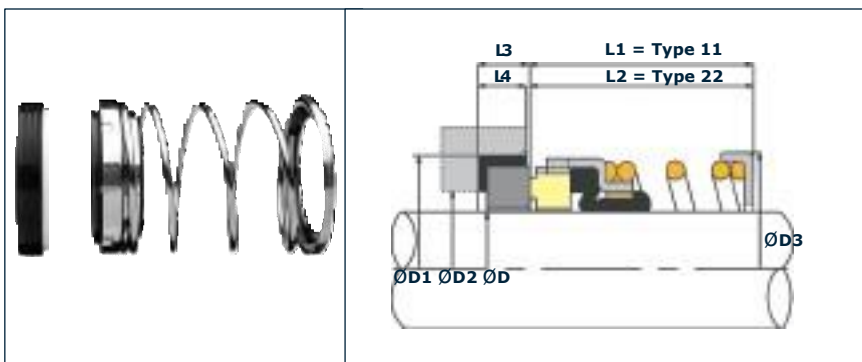
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide

OTHER FACE MATERIALS TO ORDER

TYPE 11/TYPE 22



Single spring, rubber diaphragm seal, designed for different sized seat housings and seal working lengths to the Types 10/20. The imperial sizes are most commonly found on American equipment.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	25.40	1.000	19.05	0.750	22.00	0.866	20.62	0.812	31.75	1.250	7.93	0.312	6.35	0.250
-	-	-	14	0.551	0140	31.75	1.250	23.80	0.937	24.00	0.945	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.625	15.88	0158	16	0.630	0160	31.75	1.250	23.80	0.937	26.00	1.024	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.750	19.05	0191	18	0.709	0180	34.93	1.375	26.98	1.062	32.00	1.260	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
-	-	-	20	0.787	0200	38.10	1.500	30.15	1.187	34.00	1.339	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
0.875	22.23	0222	22	0.866	0220	38.10	1.500	30.15	1.187	36.00	1.417	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
-	-	-	24	0.945	0240	41.28	1.625	33.32	1.312	38.00	1.496	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.000	25.40	0254	25	0.984	0250	41.28	1.625	33.32	1.312	39.00	1.535	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.125	28.58	0286	28	1.102	0280	44.44	1.750	36.50	1.437	42.00	1.654	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	30	1.181	0300	47.63	1.875	37.90	1.492	44.00	1.732	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
1.250	31.75	0317	32	1.260	0320	47.63	1.875	37.90	1.492	46.00	1.811	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	33	1.299	0330	50.80	2.000	42.84	1.687	47.00	1.850	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.375	34.93	0349	35	1.378	0350	50.80	2.000	42.84	1.687	49.00	1.929	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.500	38.10	0381	38	1.496	0380	53.98	2.125	46.05	1.813	54.00	2.126	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.625	41.28	0412	40	1.575	0400	60.33	2.375	50.80	2.000	56.00	2.205	34.93	1.375	50.80	2.000	12.70	0.500	11.1	0.437
-	-	-	43	1.693	0430	63.50	2.500	53.97	2.125	59.00	2.323	34.93	1.375	50.80	2.000	12.70	0.500	11.1	0.437
1.750	44.45	0444	44	1.732	0440	63.50	2.500	53.97	2.125	61.00	2.402	34.93	1.375	50.80	2.000	12.70	0.500	11.1	0.437
1.875	47.63	0476	45	1.772	0450	66.68	2.625	57.15	2.250	61.00	2.402	38.10	1.500	53.98	2.125	12.70	0.500	11.1	0.437
-	-	-	48	1.890	0480	69.85	2.750	60.32	2.375	64.00	2.520	38.10	1.500	53.98	2.125	12.70	0.500	11.1	0.437
2.000	50.80	0508	50	1.969	0500	69.85	2.750	60.32	2.375	66.00	2.598	38.10	1.500	53.98	2.125	12.70	0.500	11.1	0.437
2.125	53.98	0539	53	2.087	0530	76.20	3.000	60.32	2.375	69.00	2.717	42.88	1.688	60.32	2.375	14.28	0.562	12.7	0.500
2.250	57.15	0571	55	2.165	0550	79.38	3.125	61.90	2.437	78.00	3.071	42.88	1.688	60.32	2.375	14.28	0.562	12.7	0.500
-	-	-	58	2.283	0580	82.55	3.250	67.39	2.653	78.00	3.071	46.02	1.812	63.50	2.500	14.28	0.562	12.7	0.500
2.375	60.33	0603	60	2.362	0600	82.55	3.250	67.39	2.653	80.00	3.150	46.02	1.812	63.50	2.500	14.28	0.562	12.7	0.500
2.500	63.50	0635	63	2.480	0630	85.73	3.375	68.25	2.687	83.00	3.268	46.02	1.812	63.50	2.500	14.28	0.562	12.7	0.500
2.625	66.68	0666	65	2.559	0650	85.73	3.375	71.24	2.805	85.00	3.346	49.20	1.937	69.85	2.750	15.90	0.626	14.5	0.571
-	-	-	68	2.677	0680	88.90	3.500	74.60	2.937	88.00	3.465	49.20	1.937	69.85	2.750	15.90	0.626	14.5	0.571
2.750	69.85	0698	70	2.756	0700	88.90	3.500	74.60	2.937	90.00	3.543	49.20	1.937	69.85	2.750	15.90	0.626	14.5	0.571
2.875	73.03	0730	73	2.874	0730	95.25	3.750	77.77	3.062	96.00	3.780	52.37	2.062	73.03	2.875	15.90	0.626	14.5	0.571
3.000	76.20	0762	75	2.953	0750	98.43	3.875	80.95	3.187	99.00	3.898	52.37	2.062	73.03	2.875	15.90	0.626	14.5	0.571

STANDARD FACE MATERIALS

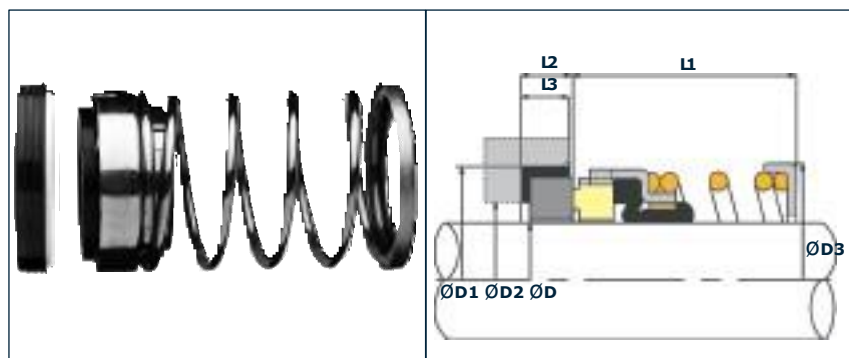
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 24



Compact single spring, rubber diaphragm seal specifically designed to comply with DIN 24960 (EN12756) housings. Shown with boot mounted seat, but is also often specified with a Type 24 'O'-Ring mounted DIN Long or Short seat (Types 24L or 24S respectively)

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
12	0120	23.00	19.00	21.70	23.90	8.60	5.50
14	0140	25.00	21.00	23.90	26.40	8.60	5.50
16	0160	27.00	23.00	26.70	26.40	8.60	5.50
18	0180	33.00	27.00	30.40	27.50	10.00	7.00
20	0200	35.00	29.00	33.40	27.50	10.00	7.00
22	0220	37.00	31.00	33.40	27.50	10.00	7.00
24	0240	39.00	33.00	38.00	30.00	10.00	7.00
25	0250	40.00	34.00	39.30	30.00	10.00	7.00
28	0280	43.00	37.00	42.00	32.50	10.00	7.00
30	0300	45.00	39.00	43.95	32.50	10.00	7.00
32	0320	48.00	42.00	45.80	32.50	10.00	7.00
33	0330	48.00	42.00	45.80	32.50	10.00	7.00
35	0350	50.00	44.00	49.00	32.50	10.00	7.00
38	0380	56.00	49.00	52.80	34.00	11.00	8.00
40	0400	58.00	51.00	55.80	34.00	11.00	8.00
43	0430	61.00	54.00	58.80	34.00	11.00	8.00
45	0450	63.00	56.00	61.00	34.00	11.00	8.00
48	0480	66.00	59.00	64.00	34.00	11.00	8.00
50	0500	70.00	62.00	66.00	34.50	13.00	8.50
53	0530	73.00	65.00	70.65	34.50	13.00	8.50
55	0550	75.00	67.00	71.65	34.50	13.00	8.50
58	0580	78.00	70.00	78.40	39.50	13.00	8.50
60	0600	80.00	72.00	78.40	39.50	13.00	8.50
63	0630	83.00	75.00	81.50	39.50	13.00	8.50
65	0650	85.00	77.00	84.30	39.50	13.00	8.50
68	0680	90.00	81.00	89.65	37.20	15.30	9.50
70	0700	92.00	83.00	89.65	37.20	15.30	9.50
75	0750	97.00	88.00	96.80	44.70	15.30	9.50
80	0800	105.00	95.00	104.00	44.30	15.70	10.00
85	0850	110.00	100.00	107.95	44.30	15.70	10.00
90	0900	115.00	105.00	111.10	49.30	15.70	10.00
95	0950	120.00	110.00	119.00	49.30	15.70	10.00
100	1000	125.00	115.00	124.00	49.30	15.70	10.00

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

△ Balanced Diaphragm Type Seals



Introduction

The A1 to A5 range are elastomeric bellows, bi-directional, parallel spring mechanical seals, offering superior design and performance compared to market alternatives. This has been achieved by superior face materials and innovative (patent pending) design features. These seals are supplied with a boot mounted seat as standard and can also be supplied with an 'O'-Ring mounted alternative, if required.

Applications

These seals are suitable for pumps, mixers, compressors and other rotary equipment. They are often used for a diverse range of applications including; water, petrochemical, chemical, food processing, refrigeration and other arduous duties.

STANDARD PARALLEL TYPES

Type A 1

The A1 is a flexible seal, suitable for the narrower seal housing, due to the compact radial cross-sectional design and suits common European seal housing standards. The Type A1 has a long working length and is fitted with a seal head retainer backing plate

Type A 2

The A2 Type coil fits over the seal head, reducing the overall working length, making this seal suitable for short gland depth applications, to common European seal housing standards.

Type A 3

A thin, radial, cross sectioned, Type A4 variant designed to suit common American seal housing standards.

Type A 4

As per the Type A2 seal but designed to suit common American standards, working length and seat housing dimensions.

Type A 5

Spring profile as per the Type A1 seal but designed to suit common American standards and supplied without the seal head retainer backing plate, utilized on the Type A1.

Section 6

DESIGN ADVANTAGES

Mechanical Drive

The mechanical drive mechanism of the AX range incorporates a patent pending design. This innovative solution eliminates the problem of seal failure, due to excessive wear by the thin metal drive components cutting a groove into the retainer, common to competitors' seals.



The drive area has been increased by over 250%, to greatly reduce the contact pressure and consequent wear. The unique seal head design also retains the drive ring by a locking mechanism. This results in security and ease of assembly, due to the unitised design of the cartridge rotary unit.

Balanced

The AX range seals are specially balanced to a recognised industry standard, to reduce heat and friction at the seal interface. This allows for higher operating parameters to be achieved and prolongs seal life.

Many competitor's seals are not truly balanced throughout the range and therefore do not offer the full benefits of a balanced seal.

Bellows Disk

The AX seal family includes a bellows disk, as a standard design feature. This component provides radial support to the bellows, ensuring no bellows/shaft contact, which could result in seal wear and possible hang-up. This component is routinely omitted in the Crane® USA designs but is included on UK/European Type 1A and 2. Without the disk, the bellows ID's are very close to the shaft and can be problematic, due to bellows extrusion and shaft contact/stiction.

Bellows Design

The flexible bellows compensates for primary seal face wear and machinery misalignment, such as shaft end float.

The AX bellows contains an additional drive ring supporting lip, to ensure that the drive ring is held in a positive position, away from the bellows. This feature is not included in many alternative designs, which can result in possible bellows interference, affecting seal performance.

Seal Face Retaining

The seal face is retained by inert grease and NOT glue. Some seal suppliers chose to utilise glue which can create a leakage path, and on chemical attack, the glue can migrate into seal components and product.

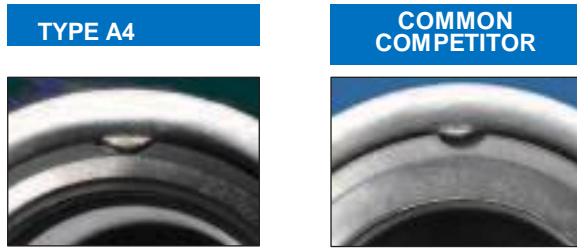
Seal Type	Crane® Equivalent
A1	1A (UK / EUROPEAN)
A2	Type 2 (UK / EUROPEAN)
A3	N/A
A4	Type 2 (US DIMENSIONS)
A5	Type 1 (US DIMENSIONS)

Base Plate Retaining

A1 to A5 seal types retain the base plates on the coil as standard, providing support during seal fitting.

Seal Face Drive

designs include improved seal face/retainer engagement. The seal face slot is designed to achieve a positive drive from the retainer crimps and to eliminate chipping of the face. It can be demonstrated, from the seal comparison diagram below, that the seal has a superior drive location area and doesn't drive at the weakest point, as per the standard competitors design; which will be prone to chipping.



Mechanical Face Loading

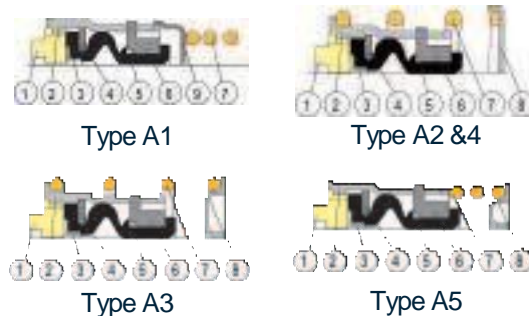
Face loading on the Ax seal ranges has been designed to enhance seal life, whilst not affecting performance capabilities.

The linear progressive, design, utilises proven values within the seal industry, which will result in less heat generation, less power consumption, less wear and therefore, increased seal performance, capability and life. Common competitor designs have wide variances in face loading, between shaft sizes.

Material Quality and Reliability

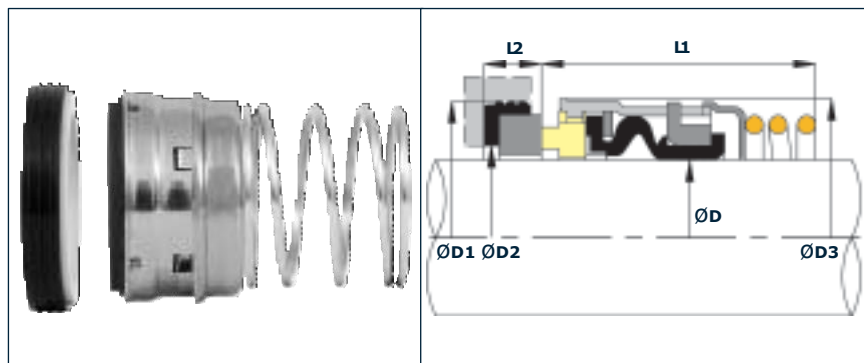
A wide selection of first-class face materials and elastomers are readily available as standard. These ensure excellent performance and have been verified through extensive testing.

Standard Components



No	Description
1	Face
2	Retainer
3	Bellows Disk
4	Plate
5	Bellows
6	Drive Ring
7	Coil
8	Backing Plate
9	Sleeve

TYPE A1



Robust, long working length, highly accommodating and reliable, rubber diaphragm balanced seal, which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common UK and Euro housing dimensions.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2	
Inch	Metric	Code	Metric	Inch	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	27.79	1.094	19.05	0.750	23.80	0.937	44.00	1.732	8.74	0.344
-	-	-	14	0.551	0140	30.95	1.219	22.23	0.875	27.76	1.093	44.00	1.732	10.32	0.406
0.625	15.88	0158	16	0.630	0160	30.95	1.219	22.23	0.875	27.76	1.093	44.00	1.732	10.32	0.406
0.750	19.05	0191	18	0.709	0180	34.15	1.344	25.40	1.000	30.94	1.218	44.00	1.732	10.32	0.406
-	-	-	20	0.787	0200	35.70	1.406	26.99	1.063	33.00	1.299	44.00	1.732	10.32	0.406
0.875	22.23	0222	22	0.866	0220	37.30	1.469	28.58	1.125	34.11	1.343	44.00	1.732	10.32	0.406
-	-	-	24	0.945	0240	40.50	1.594	31.75	1.250	38.10	1.500	44.00	1.732	10.32	0.406
1.000	25.40	0254	25	0.984	0250	40.50	1.594	31.75	1.250	38.10	1.500	44.00	1.732	10.32	0.406
1.125	28.58	0286	28	1.102	0280	47.63	1.875	35.72	1.406	41.28	1.625	60.00	2.362	11.99	0.472
-	-	-	30	1.181	0300	50.80	2.000	38.89	1.531	46.02	1.812	60.00	2.362	11.99	0.472
1.250	31.75	0317	32	1.260	0320	50.80	2.000	38.89	1.531	46.02	1.812	60.00	2.362	11.99	0.472
-	-	-	33	1.299	0330	53.98	2.125	42.07	1.656	47.63	1.875	60.00	2.362	11.99	0.472
1.375	34.93	0349	35	1.378	0350	53.98	2.125	42.07	1.656	47.63	1.875	60.00	2.362	11.99	0.472
1.500	38.10	0381	38	1.496	0380	57.15	2.250	45.24	1.781	50.80	2.000	60.00	2.362	11.99	0.472
1.625	41.28	0412	40	1.575	0400	60.35	2.376	48.82	1.922	57.15	2.250	60.00	2.362	11.99	0.472
-	-	-	43	1.693	0430	63.50	2.500	51.59	2.031	62.50	2.461	71.00	2.795	11.99	0.472
1.750	44.45	0444	45	1.772	0450	63.50	2.500	51.59	2.031	62.50	2.461	71.00	2.795	11.99	0.472
1.875	47.63	0476	48	1.890	0480	66.70	2.626	54.75	2.156	65.50	2.579	71.00	2.795	11.99	0.472
2.000	50.80	0508	50	1.969	0500	69.85	2.750	58.00	2.283	66.68	2.626	71.00	2.795	13.50	0.531
2.125	53.98	0539	53	2.087	0530	73.05	2.876	62.00	2.441	71.42	2.812	71.00	2.795	13.50	0.531
2.250	57.15	0571	55	2.165	0550	76.20	3.000	65.00	2.559	74.60	2.937	71.00	2.795	13.50	0.531
2.375	60.33	0603	60	2.362	0600	79.40	3.126	68.00	2.677	77.77	3.062	71.00	2.795	13.50	0.531
2.500	63.50	0635	63	2.480	0630	82.55	3.250	71.20	2.803	80.95	3.187	71.00	2.795	13.50	0.531
2.625	66.68	0666	65	2.559	0650	92.10	3.626	78.35	3.085	85.73	3.375	71.00	2.795	15.90	0.626
2.750	69.85	0698	70	2.756	0700	95.25	3.750	81.10	3.193	88.90	3.500	70.00	2.756	15.90	0.626
2.875	73.03	0730	73	2.874	0730	98.45	3.876	84.50	3.327	92.08	3.625	73.00	2.874	15.90	0.626
3.000	76.20	0762	75	2.953	0750	101.65	4.002	88.10	3.469	95.25	3.750	73.00	2.874	15.90	0.626

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

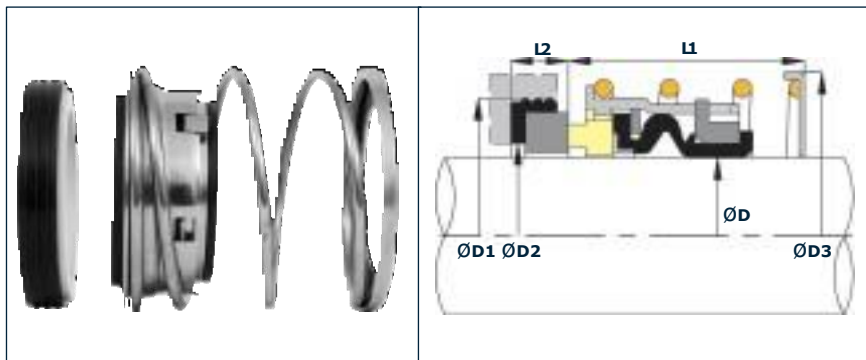
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE A2



Robust, short working length highly accommodating and reliable, rubber diaphragm balanced seal which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common UK and Euro housing and working length dimensions.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2	
Inch	Metric	Code	Metric	Inch	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
-	-	-	12	0.472	0120	27.79	1.094	19.05	0.750	31.50	1.240	25.00	0.984	8.74	0.344
0.500	12.70	0127	13	0.512	0130	27.79	1.094	19.05	0.750	31.50	1.240	25.00	0.984	8.74	0.344
-	-	-	14	0.551	0140	30.95	1.219	22.23	0.875	35.00	1.378	25.00	0.984	10.32	0.406
-	-	-	15	0.591	0150	30.95	1.219	22.23	0.875	35.00	1.378	25.00	0.984	10.32	0.406
0.625	15.88	0158	16	0.630	0160	30.95	1.219	22.23	0.875	35.00	1.378	25.00	0.984	10.32	0.406
0.750	19.05	0191	18	0.709	0180	34.15	1.344	25.40	1.000	38.00	1.496	25.00	0.984	10.32	0.406
-	-	-	20	0.787	0200	35.70	1.406	26.99	1.063	42.50	1.673	25.00	0.984	10.32	0.406
0.875	22.23	0222	22	0.866	0220	37.30	1.469	28.58	1.125	41.00	1.614	25.00	0.984	10.32	0.406
-	-	-	24	0.945	0240	40.50	1.594	31.75	1.250	47.00	1.850	25.00	0.984	10.32	0.406
1.000	25.40	0254	25	0.984	0250	40.50	1.594	31.75	1.250	47.00	1.850	25.00	0.984	10.32	0.406
1.125	28.58	0286	28	1.102	0280	47.63	1.875	35.72	1.406	50.50	1.988	33.00	1.299	11.99	0.472
-	-	-	30	1.181	0300	50.80	2.000	38.89	1.531	54.50	2.146	33.00	1.299	11.99	0.472
1.250	31.75	0317	32	1.260	0320	50.80	2.000	38.89	1.531	54.50	2.146	33.00	1.299	11.99	0.472
-	-	-	33	1.299	0330	53.98	2.125	42.07	1.656	59.00	2.323	33.00	1.299	11.99	0.472
1.375	34.93	0349	35	1.378	0350	53.98	2.125	42.07	1.656	59.00	2.323	33.00	1.299	11.99	0.472
1.500	38.10	0381	38	1.496	0380	57.15	2.250	45.24	1.781	63.00	2.480	33.00	1.299	11.99	0.472
1.625	41.28	0412	40	1.575	0400	60.35	2.376	48.82	1.922	70.00	2.756	33.00	1.299	11.99	0.472
-	-	-	43	1.693	0430	63.50	2.500	51.59	2.031	73.50	2.894	41.00	1.614	11.99	0.472
1.750	44.45	0444	45	1.772	0450	63.50	2.500	51.59	2.031	73.50	2.894	41.00	1.614	11.99	0.472
1.875	47.63	0476	48	1.890	0480	66.70	2.626	54.75	2.156	76.50	3.012	41.00	1.614	11.99	0.472
2.000	50.80	0508	50	1.969	0500	69.85	2.750	58.00	2.283	79.50	3.130	41.00	1.614	13.50	0.531
2.125	53.98	0539	53	2.087	0530	73.05	2.876	62.00	2.441	84.00	3.307	41.00	1.614	13.50	0.531
2.250	57.15	0571	55	2.165	0550	76.20	3.000	65.00	2.559	88.00	3.465	41.00	1.614	13.50	0.531
2.375	60.33	0603	60	2.362	0600	79.40	3.126	68.00	2.677	91.00	3.583	41.00	1.614	13.50	0.531
2.500	63.50	0635	63	2.480	0630	82.55	3.250	71.20	2.803	94.50	3.720	41.00	1.614	13.50	0.531
2.625	66.68	0666	65	2.559	0650	92.10	3.626	78.35	3.085	99.50	3.917	49.00	1.929	15.90	0.626
2.750	69.85	0698	70	2.756	0700	95.25	3.750	81.10	3.193	102.50	4.035	49.00	1.929	15.90	0.626
2.875	73.03	0730	73	2.874	0730	98.45	3.876	84.50	3.327	106.50	4.193	52.00	2.047	15.90	0.626
3.000	76.20	0762	75	2.953	0750	101.65	4.002	88.10	3.469	110.00	4.331	52.00	2.047	15.90	0.626

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s
TEMPERATURE -40 +200°C

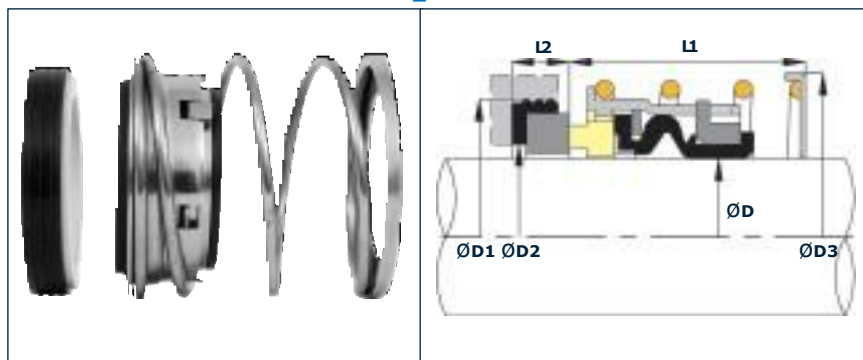
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

△ TYPE A3/ TYPE A4



Robust, short working length highly accommodating and reliable rubber diaphragm balanced seal, which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common US standard housing and working length dimensions.

6

STANDARD SIZES

Shaft Size DØ Inch Metric Code	Shaft Size DØ Metric Inch Code	D1		D2		Type A4 D3		A3 Thin Profile D3		L1		L2	
		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500 12.70 0127	12 0.472 0120	25.40	1.000	19.05	0.750	30.14	1.187	28.58	1.125	20.64	0.813	7.93	0.312
- - -	14 0.551 0140	31.75	1.250	23.80	0.937	33.32	1.312	30.30	1.193	22.23	0.875	10.28	0.405
0.625 15.88 0158	16 0.630 0160	31.75	1.250	23.80	0.937	33.32	1.312	31.75	1.250	22.23	0.875	10.28	0.405
0.750 19.05 0191	18 0.709 0180	34.93	1.375	26.98	1.062	36.50	1.437	34.93	1.375	22.23	0.875	10.28	0.405
- - -	20 0.787 0200	38.10	1.500	30.15	1.187	39.67	1.562	36.95	1.455	23.80	0.937	10.28	0.405
0.875 22.23 0222	22 0.866 0222	38.10	1.500	30.15	1.187	39.67	1.562	38.10	1.500	23.80	0.937	10.28	0.405
- - -	24 0.945 0240	41.28	1.625	33.32	1.312	45.50	1.791	42.65	1.679	25.40	1.000	11.10	0.437
1.000 25.40 0254	25 0.984 0250	41.28	1.625	33.32	1.312	45.50	1.791	43.69	1.720	25.40	1.000	11.10	0.437
1.125 28.58 0286	28 1.102 0280	44.44	1.750	36.50	1.437	48.50	1.909	46.86	1.845	26.97	1.062	11.10	0.437
- - -	30 1.181 0300	47.63	1.875	37.90	1.492	52.37	2.062	48.80	1.921	26.97	1.062	11.10	0.437
1.250 31.75 0317	32 1.260 0320	47.63	1.875	37.90	1.492	52.37	2.062	51.21	2.016	26.97	1.062	11.10	0.437
- - -	33 1.299 0330	50.80	2.000	42.84	1.687	56.00	2.205	52.50	2.067	28.58	1.125	11.10	0.437
1.375 34.93 0349	35 1.378 0350	50.80	2.000	42.84	1.687	56.00	2.205	54.38	2.141	28.58	1.125	11.10	0.437
1.500 38.10 0381	38 1.496 0380	53.98	2.125	46.05	1.813	59.20	2.331	57.55	2.266	28.58	1.125	11.10	0.437
1.625 41.28 0412	40 1.575 0400	60.33	2.375	50.80	2.000	67.00	2.638	64.95	2.557	34.93	1.375	12.70	0.500
- - -	43 1.693 0430	63.50	2.500	53.97	2.125	69.85	2.750	66.30	2.610	34.93	1.375	12.70	0.500
1.750 44.45 0444	45 1.772 0450	63.50	2.500	53.97	2.125	69.85	2.750	68.12	2.682	34.93	1.375	12.70	0.500
1.875 47.63 0476	- - -	66.68	2.625	57.15	2.250	73.03	2.875	71.17	2.802	38.10	1.500	12.70	0.500
- - -	48 1.890 0480	69.85	2.750	57.15	2.250	73.03	2.875	71.17	2.802	38.10	1.500	12.70	0.500
2.000 50.80 0508	50 1.969 0500	69.85	2.750	60.32	2.375	76.20	3.000	74.47	2.932	38.10	1.500	12.70	0.500
2.125 53.98 0539	53 2.087 0530	76.20	3.000	60.32	2.375	82.55	3.250	80.72	3.178	42.85	1.687	14.28	0.562
2.250 57.15 0571	55 2.165 0550	79.38	3.125	61.90	2.437	85.73	3.375	83.90	3.303	42.85	1.687	14.28	0.562
2.375 60.33 0603	60 2.362 0600	82.55	3.250	67.39	2.653	88.90	3.500	87.07	3.428	46.02	1.812	14.28	0.562
2.500 63.50 0635	63 2.480 0630	85.73	3.375	68.25	2.687	92.08	3.625	90.25	3.553	46.02	1.812	14.28	0.562
2.625 66.68 0666	65 2.559 0650	85.73	3.375	71.24	2.805	98.43	3.875	96.42	3.796	49.20	1.937	15.90	0.626
2.750 69.85 0698	70 2.756 0700	88.90	3.500	74.60	2.937	101.60	4.000	99.60	3.921	49.20	1.937	15.90	0.626
2.875 73.03 0730	73 2.874 0730	95.25	3.750	77.77	3.062	104.78	4.125	102.77	4.046	52.37	2.062	15.90	0.626
3.000 76.20 0762	75 2.953 0750	98.43	3.875	80.95	3.187	107.95	4.250	105.94	4.171	52.37	2.062	15.90	0.626

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

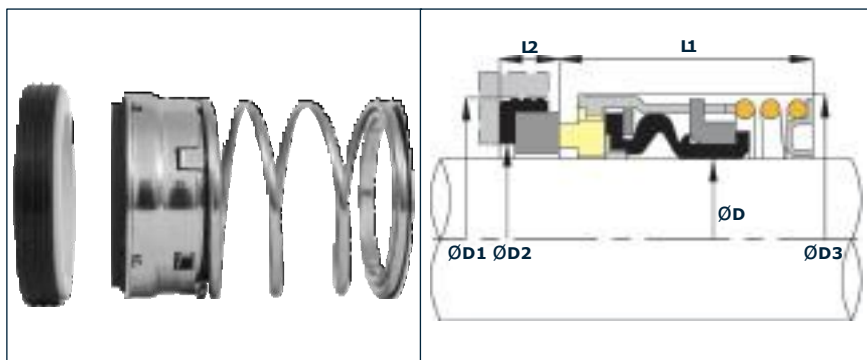
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE A5



Robust, long working length highly accommodating and reliable rubber diaphragm balanced seal, which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common US standard housing and working length dimensions.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2	
Inch	Metric	Code	Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	25.40	1.000	19.05	0.750	23.80	0.937	30.16	1.187	7.93	0.312
-	-	-	14	0.551	0140	31.75	1.250	23.80	0.937	27.76	1.093	33.32	1.312	10.28	0.405
0.625	15.88	0158	16	0.630	0160	31.75	1.250	23.80	0.937	27.76	1.093	33.32	1.312	10.28	0.405
0.750	19.05	0191	18	0.709	0180	34.93	1.375	26.98	1.062	30.94	1.218	33.32	1.312	10.28	0.405
-	-	-	20	0.787	0200	38.10	1.500	30.15	1.187	34.11	1.343	34.93	1.375	10.28	0.405
0.875	22.23	0222	22	0.866	0220	38.10	1.500	30.15	1.187	34.11	1.343	34.93	1.375	10.28	0.405
-	-	-	24	0.945	0240	41.28	1.625	33.32	1.312	38.10	1.500	39.67	1.562	11.10	0.437
1.000	25.40	0254	25	0.984	0250	41.28	1.625	33.32	1.312	38.10	1.500	39.67	1.562	11.10	0.437
1.125	28.58	0286	28	1.102	0280	44.44	1.750	36.50	1.437	41.28	1.625	41.28	1.625	11.10	0.437
-	-	-	30	1.181	0300	47.63	1.875	37.90	1.492	46.02	1.812	41.28	1.625	11.10	0.437
1.250	31.75	0317	32	1.260	0320	47.63	1.875	37.90	1.492	46.02	1.812	41.28	1.625	11.10	0.437
-	-	-	33	1.299	0330	50.80	2.000	42.84	1.687	48.68	1.917	42.85	1.687	11.10	0.437
1.375	34.93	0349	35	1.378	0350	50.80	2.000	42.84	1.687	48.68	1.917	42.85	1.687	11.10	0.437
1.500	38.10	0381	38	1.496	0380	53.98	2.125	46.05	1.813	51.85	2.041	42.85	1.687	11.10	0.437
1.625	41.28	0412	40	1.575	0400	60.38	2.377	50.80	2.000	58.10	2.287	50.80	2.000	12.70	0.500
-	-	-	43	1.693	0430	63.50	2.500	53.97	2.125	61.27	2.412	50.80	2.000	12.70	0.500
1.750	44.45	0444	45	1.772	0450	63.50	2.500	53.97	2.125	61.27	2.412	50.80	2.000	12.70	0.500
1.875	47.63	0476	-	-	-	66.68	2.625	57.15	2.250	64.44	2.537	53.98	2.125	12.70	0.500
-	-	-	48	1.890	0480	69.85	2.750	60.32	2.375	67.21	2.646	53.98	2.125	12.70	0.500
2.000	50.80	0508	50	1.969	0500	69.85	2.750	60.32	2.375	67.21	2.646	53.98	2.125	12.70	0.500
2.125	53.98	0539	53	2.087	0530	76.20	3.000	60.32	2.375	72.02	2.835	60.33	2.375	14.28	0.562
2.250	57.15	0571	55	2.165	0550	79.38	3.125	61.90	2.437	75.30	2.965	60.33	2.375	14.28	0.562
2.375	60.33	0603	60	2.362	0600	82.55	3.250	67.39	2.653	78.30	3.083	63.50	2.500	14.28	0.562
2.500	63.50	0635	63	2.480	0630	85.73	3.375	68.25	2.687	81.54	3.210	63.50	2.500	14.28	0.562
2.625	66.68	0666	65	2.559	0650	85.73	3.375	71.24	2.805	86.22	3.394	69.85	2.750	15.90	0.626
2.750	69.85	0698	70	2.756	0700	88.90	3.500	74.60	2.937	89.40	3.520	73.03	2.875	15.90	0.626
2.875	73.03	0730	73	2.874	0730	95.25	3.750	77.77	3.062	92.57	3.644	73.03	2.875	15.90	0.626
3.000	76.20	0762	75	2.953	0750	98.43	3.875	80.95	3.187	95.75	3.770	73.03	2.875	15.90	0.626

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

△ Parallel Spring 'O'-Ring Mounted Seals



Section

7

Introduction

The Type 9X mechanical seals are robust, general purpose, parallel spring, pusher type seals, designed to suit standard metric and imperial housing dimensions, that are commonly found mainly in the marine and textile industries.

These are a direct replacement for John Crane® Flexibox® Types R00, R10, R20 and R30 series, together with Pillar® US1, US2 and US3 series (CGU).

Applications

The Type 9X seal ranges are mainly used in marine pump applications, but are designed to satisfy the sealing requirements of rotating shaft equipment for a wide variety of applications, including; marine, textile, pulp and paper, refrigeration compressors, waste treatment etc.

Standard Types Types 95 , 96 and 97

These are the standard series 9x range, supplied with either solid or inserted rotary face, in a wide variety of face and elastomer materials. All types provide a positive drive to the rotary face, by a heavy duty spring, which is supplied either with left or right-hand wound springs, depending on whether clockwise or anti-clockwise shaft direction.

Three versions are available and vary only by the method of providing the drive to the rotary seal face.

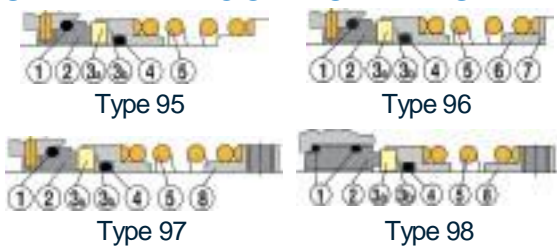
- Type 95 - Drives directly from shaft.
- Type 96 - Type 95 components with the addition of a split ring and washer for simple shaft abutment.
- Type 97 - Type 95 components with addition of a grub screwed drive collar.

Type 98

Heavy duty, single spring, pusher type seal, supplied with either solid or inserted rotary face, in a wide variety of face and elastomer materials. Seal is driven by a grubbed screwed collar, similar to the Type 97.

The Type 98 design is unique compared to Type 95, 96 and 97, as it designed to suit different housing sizes and is supplied with a double 'O'-Ring stationary seat, as standard.

STANDARD COMPONENTS



NO	Description	4	Rotary 'O'-Ring
1	Stationary 'O'-Ring	5	Coil
2	Stationary Seat	6	Split Ring
3a	Rotary Face	7	Washer
3b	Seal Head Retainer	8	Drive Collar with Grub screws

Design Advantages

Material Quality

All 9x Types are available from stock, with a wide range of face and stationary materials, including Tungsten Carbide, Silicon Carbide or Ceramic inserted rotary faces, Chrome Dioxide coated Stainless Steel rotary faces, and Carbon, Tungsten Carbide or Silicon Carbide stationaries.

Design

The 9X seal ranges can either be supplied with solid rotary faces or inserted hard faces, with improved tracking capabilities to many competitors' equivalents.

Seal face loading has been designed to ensure optimum seal performance and therefore longer seal life.

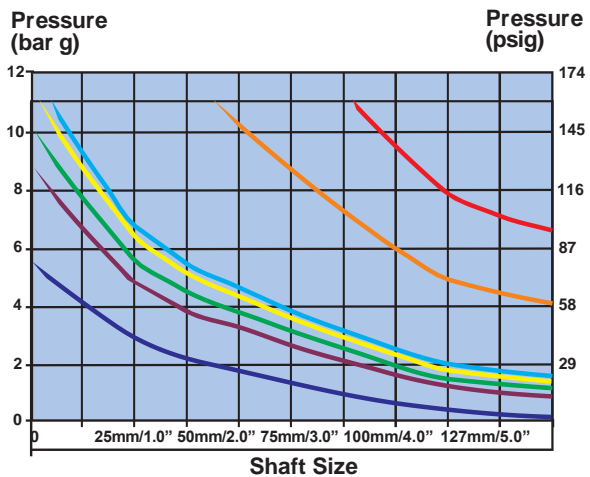
Some main competitors seals do not have a linear progression of increasing spring force with shaft size nor optimum closing forces.

Superior Face Combinations

As is evidenced from the pV Chart below and from any Seal Technical literature, the competitor norms of Stainless Steel vs Carbon or Ceramic vs Carbon faces, as standard on their seals, have, substantially lower capability, performance and life in comparison to preferred face combination of Carbon vs Silicon Carbide.

This Carbon vs SIC face combination is offered as the standard by, at no extra price, to give the very best quality and performance. Why compromise on quality or accept a higher price for the best seal face combination, for standard, common Marine and Textile duties?

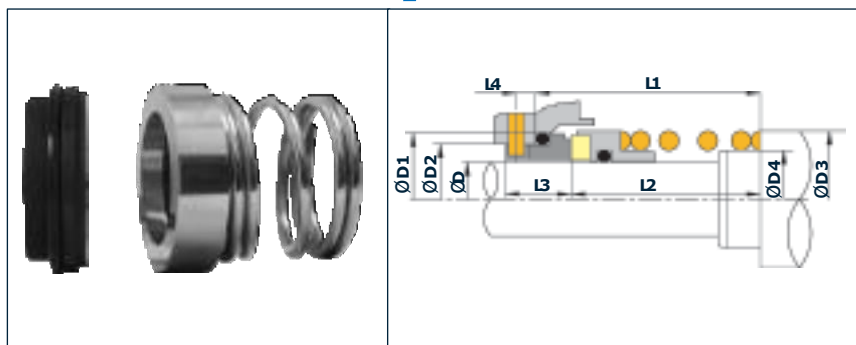
PARALLEL SPRING O-RING MOUNTED TYPE SEALS PV CHART



- Carbon/TC
- Carbon/SIC
- Carbon/Ceramic
- SC/TC
- SC/SC
- TC/TC
- Carbon/SS

Notes:
For information on how to utilise this pV chart please refer to the technical section.

TYPE 95/95N



Robust, general purpose, unbalanced pusher Type seal capable of many shaft-sealing duties. The Type 95 drives directly from the shaft, and is also available with a short, non-pinned seat as Type 95N, see column L31 for revised seat length. Seal illustrated shows a Stainless Steel rotary face.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		D4		L1	L2	L3	L31	L4					
Inch	Metric	Code	Metric	Inch	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch				
0.625	15.88	0158	-	-	-	28.57	1.125	24.31	0.957	29.00	1.142	19.05	0.750	33.50	1.319	24.50	0.965	15.00	0.591	11.50	0.453	4.00	0.157
0.750	19.05	0191	-	-	-	31.75	1.250	27.48	1.082	32.50	1.280	22.22	0.875	33.50	1.319	24.50	0.965	15.00	0.591	11.50	0.453	4.00	0.157
-	-	-	20	0.787	0200	33.32	1.312	29.06	1.144	34.50	1.358	24.00	0.945	36.50	1.437	27.50	1.083	15.00	0.591	11.50	0.453	4.00	0.157
0.875	22.23	0222	-	-	-	34.93	1.375	30.66	1.207	34.93	1.375	25.40	1.000	35.00	1.378	26.00	1.024	15.00	0.591	11.50	0.453	4.00	0.157
-	-	-	25	0.984	0250	39.85	1.569	33.84	1.332	38.10	1.500	28.57	1.125	40.00	1.575	30.00	1.181	16.00	0.630	11.50	0.453	4.00	0.157
1.000	25.40	0254	-	-	-	39.85	1.569	33.84	1.332	38.10	1.500	28.57	1.125	40.00	1.575	30.00	1.181	16.00	0.630	11.50	0.453	4.00	0.157
1.125	28.58	0286	28	1.102	0286	43.05	1.695	37.01	1.457	42.60	1.677	31.75	1.250	41.50	1.634	31.50	1.240	16.00	0.630	11.50	0.453	4.00	0.157
-	-	-	30	1.181	0300	44.63	1.757	38.61	1.520	45.50	1.791	33.32	1.312	41.50	1.634	31.50	1.240	16.00	0.630	11.50	0.453	4.00	0.157
1.250	31.75	0317	32	1.260	0317	46.32	1.824	40.28	1.586	46.20	1.819	34.92	1.375	44.50	1.752	34.50	1.358	16.00	0.630	11.50	0.453	4.00	0.157
1.375	34.93	0349	35	1.378	0349	49.48	1.948	43.46	1.711	49.50	1.949	38.10	1.500	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.500	38.10	0381	38	1.496	0381	52.56	2.069	46.63	1.836	52.50	2.067	42.88	1.688	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
-	-	-	40	1.575	0400	54.25	2.136	48.13	1.895	55.00	2.165	44.45	1.750	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.625	41.28	0412	42	1.654	0412	55.83	2.198	49.81	1.961	55.50	2.185	46.02	1.812	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.750	44.45	0444	45	1.772	0444	59.02	2.324	52.98	2.086	59.20	2.331	49.20	1.937	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.875	47.63	0476	48	1.890	0476	63.68	2.507	57.66	2.270	61.91	2.437	52.37	2.062	52.50	2.067	42.50	1.673	18.00	0.709	11.50	0.453	5.00	0.197
-	-	-	50	1.969	0500	65.37	2.574	59.33	2.336	66.00	2.598	53.97	2.125	55.50	2.185	45.50	1.791	18.00	0.709	11.50	0.453	5.00	0.197
2.000	50.80	0508	-	-	-	66.85	2.632	60.83	2.395	66.68	2.625	55.57	2.188	55.50	2.185	45.50	1.791	18.00	0.709	11.50	0.453	5.00	0.197
2.125	53.98	0539	55	2.165	0539	70.03	2.757	64.01	2.520	70.20	2.764	58.72	2.312	57.00	2.244	47.00	1.850	18.00	0.709	n/a	n/a	5.00	0.197
2.250	57.15	0571	-	-	-	73.20	2.882	67.18	2.645	73.02	2.875	61.90	2.437	57.00	2.244	47.00	1.850	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	58	2.283	0580	79.50	3.129	68.86	2.711	74.00	2.913	63.50	2.500	57.00	2.244	47.00	1.850	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	60	2.362	0600	76.38	3.007	70.36	2.770	77.00	3.031	65.07	2.562	60.50	2.382	50.50	1.988	18.00	0.709	n/a	n/a	5.00	0.197
2.375	60.33	0603	-	-	-	76.38	3.007	70.36	2.770	76.20	3.000	65.07	2.562	60.50	2.382	50.50	1.988	18.00	0.709	n/a	n/a	5.00	0.197
2.500	63.50	0635	-	-	-	79.56	3.132	73.53	2.895	79.38	3.125	68.28	2.688	60.50	2.382	50.50	1.988	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	65	2.559	0650	81.23	3.198	75.21	2.961	82.00	3.228	69.85	2.750	63.50	2.500	53.50	2.106	18.00	0.709	n/a	n/a	5.00	0.197
2.625	66.68	0666	-	-	-	82.73	3.257	76.71	3.020	82.55	3.250	71.42	2.812	63.50	2.500	53.50	2.106	18.00	0.709	n/a	n/a	5.00	0.197
2.750	69.85	0698	70	2.756	0698	85.90	3.382	79.88	3.145	86.20	3.394	74.60	2.937	63.50	2.500	53.50	2.106	18.00	0.709	n/a	n/a	5.00	0.197
2.875	73.03	0730	73	2.874	0730	89.08	3.507	83.06	3.270	90.00	3.543	77.77	3.062	66.50	2.618	56.50	2.224	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	75	2.953	0750	90.77	3.574	84.73	3.336	91.50	3.602	79.37	3.125	66.50	2.618	56.60	2.228	18.00	0.709	n/a	n/a	5.00	0.197
3.000	76.20	0762	-	-	-	95.43	3.757	89.41	3.520	95.25	3.750	80.97	3.188	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	80	3.150	0800	100.29	3.948	94.26	3.711	99.50	3.917	85.73	3.375	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
3.250	82.55	0825	-	-	-	101.78	4.007	95.76	3.770	101.60	4.000	87.30	3.437	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	85	3.346	0850	104.77	4.125	98.93	3.895	105.50	4.154	90.00	3.543	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
3.500	88.90	0889	-	-	-	108.13	4.257	102.11	4.020	107.95	4.250	93.67	3.688	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	90	3.543	0900	109.82	4.324	103.78	4.086	110.50	4.350	95.25	3.750	78.00	3.071	68.00	2.677	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	95	3.740	0950	114.30	4.500	108.46	4.270	115.50	4.547	100.00	3.937	78.00	3.071	68.00	2.677	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	100	3.937	1000	119.33	4.698	113.31	4.461	120.00	4.724	104.77	4.125	78.00	3.071	68.00	2.677	18.00	0.709	n/a	n/a	5.00	0.197
4.000	101.60	1016	-	-	-	124.00	4.882	117.98	4.645	124.50	4.902	107.95	4.250	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
4.125	104.78	1047	105	4.134	1047	127.00	5.000	121.16	4.770	128.00	5.039	111.00	4.370	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	110	4.331	1100	131.77	5.188	126.01	4.961	133.00	5.236	116.00	4.567	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
4.500	114.30	1143	115	4.528	1143	136.52	5.375	130.68	5.145	137.50	5.413	121.00	4.764	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	120	4.724	1200	142.87	5.625	137.03	5.395	144.00	5.669	126.00	4.961	89.00	3.504	79.00	3.110	18.00	0.709	n/a	n/a	5.00	0.197

STANDARD FACE MATERIALS

Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel. Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.

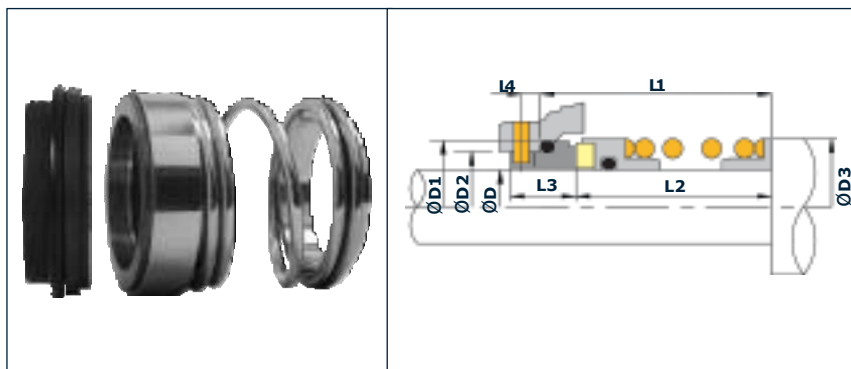
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 20m/s
TEMPERATURE -50 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 96



Robust, general purpose, unbalanced pusher Type seal capable of many shaft-sealing duties. The Type 96 drives from the shaft via the split ring, inserted in the coil tail. Also available with a short, non-pinned seat as Type 96N, see column L31 on the Type 95 page for revised seat length. Seal illustrated shows a Silicon Carbide rotary face.

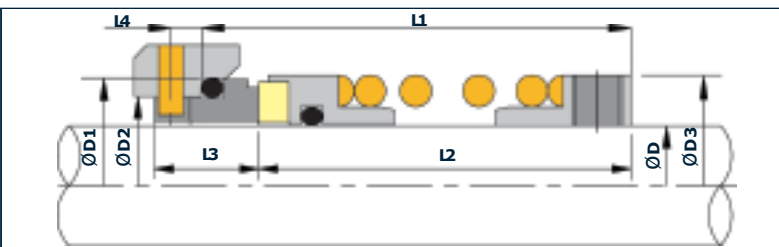
STANDARD SIZES

Shaft Size DØ		Shaft Size DØ		D1		D2		D3		L1		L2		L3		L4			
Inch	Metric	Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric		
0.625	15.88	0158	16	0.630	0160	28.57	1.125	24.31	0.957	29.00	1.142	35.00	1.378	26.00	1.024	15.00	0.591	4.00	0.157
0.750	19.05	0191	18	0.709	0180	31.75	1.250	27.48	1.082	32.50	1.280	35.00	1.378	26.00	1.024	15.00	0.591	4.00	0.157
-	-	-	20	0.787	0200	33.32	1.312	29.06	1.144	34.50	1.358	38.00	1.496	29.00	1.142	15.00	0.591	4.00	0.157
0.875	22.23	0222	22	0.866	0220	34.93	1.375	30.66	1.207	34.93	1.375	36.50	1.437	27.50	1.083	15.00	0.591	4.00	0.157
1.000	25.40	0254	25	0.984	0250	39.85	1.569	33.84	1.332	38.10	1.500	41.50	1.634	31.50	1.240	16.00	0.630	4.00	0.157
1.125	28.58	0286	28	1.102	0280	43.05	1.695	37.01	1.457	42.86	1.687	43.00	1.693	33.00	1.299	16.00	0.630	4.00	0.157
-	-	-	30	1.181	0300	44.63	1.757	38.61	1.520	43.50	1.713	43.00	1.693	33.00	1.299	16.00	0.630	4.00	0.157
1.250	31.75	0317	32	1.260	0320	46.32	1.824	40.28	1.586	47.00	1.850	46.00	1.811	36.00	1.417	16.00	0.630	4.00	0.157
1.375	34.93	0349	35	1.378	0350	49.48	1.948	43.46	1.711	50.00	1.969	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.500	38.10	0381	38	1.496	0380	52.56	2.069	46.63	1.836	53.00	2.087	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
-	-	-	40	1.575	0400	54.25	2.136	48.13	1.895	55.00	2.165	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.625	41.28	0412	42	1.654	0420	55.83	2.198	49.81	1.961	55.50	2.185	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.750	44.45	0444	45	1.772	0450	59.02	2.324	52.98	2.086	60.00	2.362	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.875	47.63	0476	48	1.890	0480	63.68	2.507	57.66	2.270	61.91	2.437	54.00	2.126	44.00	1.732	18.00	0.709	5.00	0.197
-	-	-	50	1.969	0500	65.37	2.574	59.33	2.336	66.00	2.598	57.00	2.244	47.00	1.850	18.00	0.709	5.00	0.197
2.000	50.80	0508	-	-	-	66.85	2.632	60.83	2.395	66.68	2.625	57.00	2.244	47.00	1.850	18.00	0.709	5.00	0.197
2.125	53.98	0539	55	2.165	0550	70.03	2.757	64.01	2.520	71.00	2.795	58.50	2.303	48.50	1.909	18.00	0.709	5.00	0.197
2.250	57.15	0571	-	-	-	73.20	2.882	67.18	2.645	73.02	2.875	58.50	2.303	48.50	1.909	18.00	0.709	5.00	0.197
2.375	60.33	0603	60	2.362	0600	76.38	3.007	70.36	2.770	77.00	3.031	62.00	2.441	52.00	2.047	18.00	0.709	5.00	0.197
2.500	63.50	0635	-	-	-	79.56	3.132	73.53	2.895	79.38	3.125	62.00	2.441	52.00	2.047	18.00	0.709	5.00	0.197
-	-	-	65	2.559	0650	81.23	3.198	75.21	2.961	82.00	3.228	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
2.625	66.68	0666	-	-	-	82.73	3.257	76.71	3.020	82.55	3.250	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
2.750	69.85	0698	70	2.756	0700	85.90	3.382	79.88	3.145	87.00	3.425	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
2.875	73.03	0730	73	2.874	0730	89.08	3.507	83.06	3.270	90.00	3.543	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
-	-	-	75	2.953	0750	90.77	3.574	84.73	3.336	91.50	3.602	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
3.000	76.20	0762	-	-	-	95.43	3.757	89.41	3.520	95.25	3.750	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
-	-	-	80	3.150	0800	100.29	3.948	94.26	3.711	99.50	3.917	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
3.250	82.55	0826	-	-	-	101.78	4.007	95.76	3.770	101.60	4.000	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
-	-	-	85	3.346	0850	104.77	4.125	98.93	3.895	105.50	4.154	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
3.500	88.90	0889	-	-	-	108.13	4.257	102.11	4.020	107.95	4.250	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
-	-	-	90	3.543	0900	109.82	4.324	103.78	4.086	110.50	4.350	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
-	-	-	95	3.740	0950	114.30	4.500	108.46	4.270	115.50	4.547	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
-	-	-	100	3.937	1000	119.33	4.698	113.31	4.461	120.00	4.724	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
4.000	101.60	1016	-	-	-	124.00	4.882	117.98	4.645	124.50	4.902	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
4.125	104.78	1047	105	4.134	1050	127.00	5.000	121.16	4.770	128.00	5.039	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
-	-	-	110	4.331	1100	131.77	5.188	126.01	4.961	133.00	5.236	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
4.500	114.30	1143	115	4.528	1150	136.52	5.375	130.68	5.145	137.50	5.413	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
-	-	-	120	4.724	1200	142.87	5.625	137.03	5.395	144.00	5.669	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197

STANDARD STOCK FACE MATERIALS
 Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel.
 Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits	
PRESSURE 170psi	SPEED 20m/s
TEMPERATURE -50 +180°C	
Dependent upon shaft diameter and speed + Temperature and media to be sealed	

TYPE 97



Robust, general purpose, unbalanced pusher Type seal, capable of many shaft-sealing duties. The Type 97 drives from the shaft via the drive collar with grub screws inserted in the coil tail. Type 97 is also available with a short, non-pinned seat as Type 97N, see column L31 on the Type 95 page for revised seat length.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Size	Metric	Inch	Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.625	15.80	0158	16	0.630	0160	28.57	1.125	24.31	0.957	29.00	1.142	41.50	1.634	32.50	1.280	15.00	0.591	4.00	0.157
0.750	19.10	0191	18	0.709	0180	31.75	1.250	27.48	1.082	32.50	1.280	41.50	1.634	32.50	1.280	15.00	0.591	4.00	0.157
-	-	-	20	0.787	0200	33.32	1.312	29.06	1.144	34.50	1.358	44.50	1.752	35.50	1.398	15.00	0.591	4.00	0.157
0.875	22.20	0222	22	0.866	0220	34.93	1.375	30.66	1.207	34.93	1.375	44.50	1.752	35.50	1.398	15.00	0.591	4.00	0.157
1.000	25.40	0254	25	0.984	0250	39.85	1.569	33.84	1.332	38.10	1.500	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.125	28.60	0286	28	1.102	0280	43.05	1.695	37.01	1.457	42.86	1.687	51.00	2.008	41.00	1.614	16.00	0.630	4.00	0.157
-	-	-	30	1.181	0300	44.63	1.757	38.61	1.520	45.50	1.791	51.00	2.008	41.00	1.614	16.00	0.630	4.00	0.157
1.250	31.70	0317	32	1.260	0320	46.32	1.824	40.28	1.586	47.00	1.850	54.00	2.126	44.00	1.732	16.00	0.630	4.00	0.157
1.375	34.90	0349	35	1.378	0350	49.48	1.948	43.46	1.711	50.00	1.969	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.500	38.10	0381	38	1.496	0380	52.56	2.069	46.63	1.836	53.00	2.087	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
-	-	-	40	1.575	0400	54.25	2.136	48.13	1.895	55.00	2.165	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.625	41.20	0412	42	1.654	0420	55.83	2.198	49.81	1.961	55.50	2.185	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.750	44.40	0444	45	1.772	0450	59.02	2.324	52.98	2.086	60.00	2.362	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.875	47.60	0476	48	1.890	0480	63.68	2.507	57.66	2.270	61.91	2.437	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
-	-	-	50	1.969	0500	65.37	2.574	59.33	2.336	66.00	2.598	68.50	2.697	58.50	2.303	18.00	0.709	5.00	0.197
2.000	50.80	0508	-	-	-	66.85	2.632	60.83	2.395	66.68	2.625	68.50	2.697	58.50	2.303	18.00	0.709	5.00	0.197
2.125	53.90	0539	55	2.165	0550	70.03	2.757	64.01	2.520	71.00	2.795	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
2.250	57.10	0571	-	-	-	73.20	2.882	67.18	2.645	73.02	2.875	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
2.375	60.30	0603	60	2.362	0600	76.38	3.007	70.36	2.770	77.00	3.031	73.00	2.874	63.00	2.480	18.00	0.709	5.00	0.197
2.500	63.50	0635	-	-	-	79.56	3.132	73.56	2.896	79.38	3.125	73.00	2.874	63.00	2.480	18.00	0.709	5.00	0.197
-	-	-	65	2.559	0650	81.23	3.198	75.21	2.961	82.00	3.228	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
2.625	66.60	0666	-	-	-	82.73	3.257	76.71	3.020	82.55	3.250	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
2.750	69.80	0698	70	2.756	0700	85.90	3.382	79.88	3.145	87.00	3.425	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
2.875	73.00	0730	73	2.874	0730	89.08	3.507	83.06	3.270	90.00	3.543	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
-	-	-	75	2.953	0750	90.77	3.574	84.73	3.336	91.50	3.602	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
3.000	76.20	0762	-	-	-	95.43	3.757	89.41	3.520	95.25	3.750	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
-	-	-	80	3.150	0800	100.29	3.948	94.26	3.711	99.50	3.917	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
3.250	82.60	0826	-	-	-	101.78	4.007	95.76	3.770	101.60	4.000	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
-	-	-	85	3.346	0850	104.77	4.125	98.93	3.895	105.50	4.154	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
3.500	88.90	0889	-	-	-	108.13	4.257	102.11	4.020	107.95	4.250	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
-	-	-	90	3.543	0900	109.82	4.324	103.78	4.086	110.50	4.350	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197
-	-	-	95	3.740	0950	114.30	4.500	108.46	4.270	115.50	4.547	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197
-	-	-	100	3.937	1000	119.33	4.698	113.31	4.461	120.00	4.724	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197
4.000	101.60	1016	-	-	-	124.00	4.882	117.98	4.645	124.50	4.902	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
4.125	104.70	1047	105	4.134	1050	127.00	5.000	121.16	4.770	128.00	5.039	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
-	-	-	110	4.331	1100	131.77	5.188	126.01	4.961	133.00	5.236	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
4.500	114.30	1143	115	4.528	1150	136.52	5.375	130.68	5.145	137.50	5.413	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
-	-	-	120	4.724	1200	142.87	5.625	137.03	5.395	144.00	5.669	105.00	4.134	95.00	3.740	18.00	0.709	5.00	0.197

Suggested Operating Limits

PRESSURE 170psi SPEED 20m/s
TEMPERATURE -50 +180°C

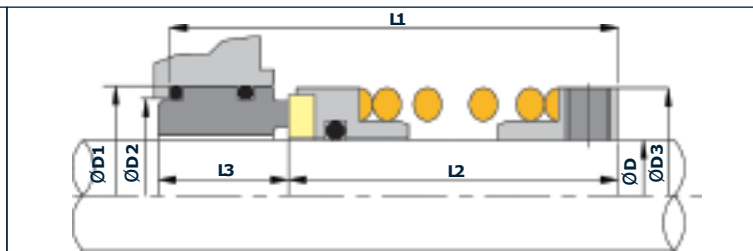
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel.

Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

△ TYPE 98



Robust, 'O'-Ring mounted, unbalanced, metric shaft, parallel spring seal, as per Type 97, but with the addition of a double 'O'-Ring mounted Stationary Seat.

Most commonly found in marine and textile dyeing applications.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
20	0200	37.00	31.00	34.50	61.00	38.00	24.00
22	0220	39.00	33.00	34.93	61.00	38.00	24.00
25	0250	40.00	34.00	38.10	61.00	38.00	24.00
28	0280	44.00	38.00	42.00	63.00	40.00	24.00
30	0300	47.00	41.00	43.50	64.00	40.00	26.00
32	0320	48.00	42.00	47.00	64.00	40.00	26.00
35	0350	51.00	45.00	50.00	64.00	40.00	26.00
38	0380	54.00	48.00	53.00	69.00	45.00	26.00
40	0400	57.00	51.00	55.00	69.00	45.00	26.00
42	0420	60.50	54.50	55.50	74.00	50.00	26.00
45	0450	61.00	55.00	60.00	74.00	50.00	26.00
48	0480	64.00	58.00	62.00	79.00	55.00	26.00
50	0500	67.00	61.00	66.00	79.00	55.00	26.00
52	0520	70.00	64.00	68.00	82.00	58.00	26.00
55	0550	73.00	67.00	71.00	82.00	58.00	26.00
58	0580	76.00	70.00	74.00	82.00	58.00	26.00
60	0600	80.00	74.00	77.00	86.00	60.00	28.00
62	0620	83.00	77.00	78.00	86.00	60.00	28.00
65	0650	86.00	80.00	82.00	88.00	62.00	28.00
68	0680	89.00	83.00	84.00	88.00	62.00	28.00
70	0700	89.00	83.00	87.00	91.00	65.00	28.00
75	0750	95.00	89.00	91.50	91.00	65.00	28.00
80	0800	99.00	93.00	99.50	96.00	70.00	28.00
85	0850	105.00	99.00	105.50	96.00	70.00	28.00
90	0900	111.00	105.00	110.50	96.00	70.00	28.00
95	0950	114.00	108.00	115.50	101.00	75.00	28.00
100	1000	118.00	112.00	120.00	101.00	75.00	28.00
105	1050	132.00	126.00	128.00	103.00	75.00	30.00
110	1100	137.00	131.00	133.00	108.00	80.00	30.00
115	1150	140.00	134.00	137.50	108.00	80.00	30.00
120	1200	147.00	141.00	144.00	113.00	85.00	30.00
130	1300	156.00	150.00	154.00	113.00	85.00	30.00

Suggested Operating Limits

PRESSURE 170psi SPEED 20m/s
TEMPERATURE -50 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel.

Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

△ P.T.F.E. Wedge
Type Seals



Section 8

Introduction

extensive 16XX range of Multi-Sprung Seals are commonly specified for arduous applications, such as corrosive process fluids or demanding operating parameters.

The standard designs are available with a chemically resistant PTFE wedge component, which is spring loaded to force the flexible angular lip of the wedge into tight contact with the shaft. The same spring force impacts a sufficient load to the rotary face to create a suitable seal interface with a varied choice of standard stationary seats, most commonly our Type 25 V Seat.

Balanced face designs are also available for higher duty applications. 'O'-Ring variants, of both balanced and non-balanced Types, are available as standard.

All the seal faces and wedges interchange with most common competitor designs by fitting into their retainers.

Applications

The 16XX family range are ideally suited for corrosive duties and are commonly utilised in the chemical industry, due to the inertness and sealing nature of the wedge design.

These seals are also very suitable for a wide spectrum of application conditions. Their operating suitability range is enhanced by the 'O'-Ring alternative design and the wide range of available elastomers.

Standard 16 XX Types 1609

Series

Standard multi-sprung, grub screwed seal, available in a wide variety of face and secondary seal, materials and designs.

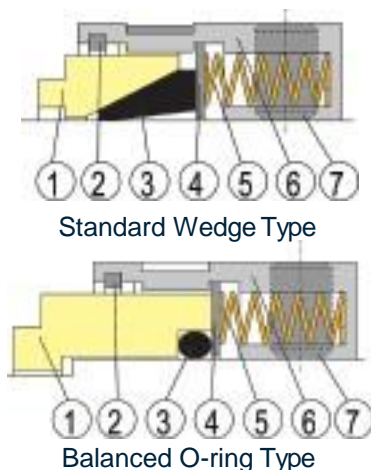
1659 Series

As above, but compact design complies to DIN 24960 (EN12756) and ISO 3069 standards.

1645 Series

Thin profiled, multi-sprung, grub screwed seal, conforming to ANSI B73 for American standard equipment.

STANDARD COMPONENTS



No	Description	4	Plate
1	Face	5	Coils
2	Circlip	6	Retainer
3	Wedge/O-ring	7	Grub Screws

Design Advantages

Range

A comprehensive range of these common chemical industry seals are available, from as standard.

Materials

Grade M825 Triple Phenolic Resin Impregnated Carbon has been adopted by, as our standard for the 16XX range, in order to offer direct face material equivalence, as well as the ability to swap faces into our most common competitors seals.

316 stainless steel is standard throughout all metal components in the 16XX seal ranges, improving chemical resistance capabilities. Please refer to our data-sheets for all materials alternatives, such as; Hastelloy® Metal parts, Glass Filled P.T.F.E. Wedges or faces and 'O'- Ring material options.

Improved Design

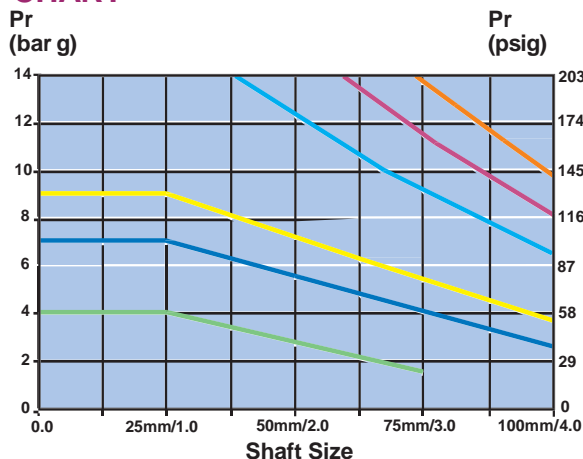
The 16XX range are superior performance seals, specifically designed to incorporate a number of improvements, compared to the original seal design and other direct copies.

- No awkward setting pieces - The 16XX designs have eliminated the setting clips, making the seals easier and more reliable to fit.
- Improved face loading values - 16XX proven face loading designs are superior to competitor designs with higher loading values, which are detrimental to seal performance and life.

Reliability

These are proven, very effective designs, highly utilised in many applications. They give extremely reliable performance based upon design improvements and the quality materials utilised.

PTFE WEDGE TYPE SEALS PV CHART

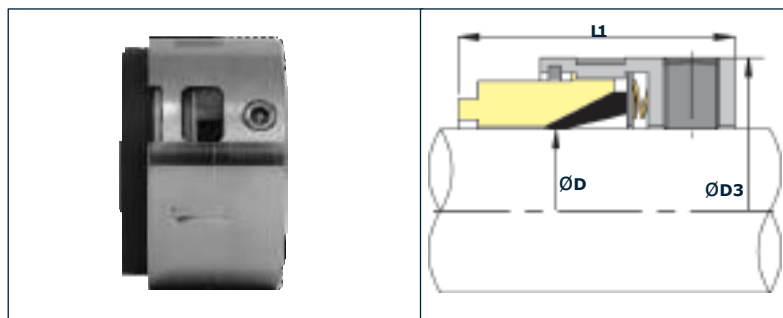


Carbon/Ceram
Carbon/SiC
Carbon/TC
25% G F PTFE/Ceramic at 50 C
25% G F PTFE/Ceramic at 100 C
25% G F PTFE/Ceramic at 150 C

Notes
 1. Type 1609B/1609BS/1659B/1659BS/1645B/1645BS multiply by factor 1.4
 For information on how to utilise this pV chart please refer to the technical section

Seal Type	Metric Sizes	Imperial Sizes	DIN/ISO Standard	ANSI Standard	Balanced	Wedge Type	O-Ring	Crane® Equivalent Type No.
1609	✓	✓	-	-	-	✓	-	109/9/909
1609B	✓	✓	-	-	✓	✓	-	109B/9B
1609S	✓	✓	-	-	-	-	✓	8-1/8
1609BS	✓	✓	-	-	✓	-	✓	8B1/8B
1659	✓	-	✓	-	-	✓	-	59U
1659B	✓	-	✓	-	✓	✓	-	59B
1659S	✓	-	✓	-	-	-	✓	58U
1659BS	✓	-	✓	-	✓	-	✓	58B
1645	-	✓	-	✓	-	✓	-	9T
1645B	-	✓	-	✓	✓	✓	-	9BT
1645S	-	✓	-	✓	-	-	✓	8-1T
1645BS	-	✓	-	✓	✓	-	✓	8B1T

TYPE 1609/1609S



Multiple Spring seal with a highly effective design, commonly used in chemical and petro-chemical duties. These seals are frequently fitted with the Type 25 seat. Standard Type 1609 incorporates a PTFE Wedge secondary seal, with the alternative 'O'-Ring Type as 1609S.

8

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		L1		Shaft Size DØ			Shaft Size DØ			D1		L1	
Inch	Metric	Code	Metric	Inch	Code	Metric	Inch	Metric	Inch	Inch	Metric	Code	Metric	Inch	Code	Metric	Inch	Metric	Inch
0.625	15.88	0158	-	-	-	30.70	1.209	19.00	0.748	-	-	-	55	2.165	0550	78.00	3.071	43.00	1.693
0.750	19.05	0191	-	-	-	34.70	1.366	22.20	0.874	2.250	57.10	0571	-	-	-	79.90	3.146	43.00	1.693
-	-	-	20	0.787	0200	35.70	1.406	24.00	0.945	2.375	60.30	0603	60	2.362	0600	83.10	3.272	43.00	1.693
-	-	-	22	0.866	0220	37.00	1.457	24.00	0.945	2.500	63.50	0635	-	-	-	86.60	3.409	43.00	1.693
0.875	22.23	0222	-	-	-	38.00	1.496	23.80	0.937	-	-	-	65	2.559	0650	88.20	3.472	43.00	1.693
-	-	-	24	0.945	0240	39.50	1.555	25.00	0.984	2.625	66.60	0666	-	-	-	89.60	3.528	43.00	1.693
-	-	-	25	0.984	0250	40.50	1.594	25.00	0.984	2.750	69.80	0698	-	-	-	92.80	3.654	43.00	1.693
1.000	25.40	0254	-	-	-	40.50	1.594	25.40	1.000	-	-	-	70	2.756	0700	92.80	3.654	43.00	1.693
-	-	-	28	1.102	0280	44.00	1.732	27.00	1.063	2.875	73.00	0730	73	2.874	0730	95.50	3.760	43.00	1.693
1.125	28.58	0286	-	-	-	43.50	1.713	27.00	1.063	-	-	-	75	2.953	0750	96.20	3.787	43.00	1.693
-	-	-	30	1.181	0300	47.00	1.850	27.00	1.063	3.000	76.20	0762	-	-	-	97.70	3.846	43.00	1.693
1.250	31.75	0317	-	-	-	48.30	1.902	27.00	1.063	3.125	79.40	0794	-	-	-	100.50	3.957	43.00	1.693
-	-	-	32	1.260	0320	50.20	1.976	29.00	1.142	-	-	-	80	3.150	0800	101.00	3.976	43.00	1.693
1.375	34.93	0349	-	-	-	52.00	2.047	28.60	1.126	3.250	82.50	0825	-	-	-	105.30	4.146	43.00	1.693
-	-	-	35	1.378	0350	52.00	2.047	29.00	1.142	-	-	-	85	3.346	0850	107.50	4.232	43.00	1.693
-	-	-	38	1.496	0380	55.60	2.189	29.00	1.142	3.375	85.70	0857	-	-	-	108.30	4.264	43.00	1.693
1.500	38.10	0381	-	-	-	55.60	2.189	28.60	1.126	3.500	88.90	0889	-	-	-	111.50	4.390	43.00	1.693
-	-	-	40	1.575	0400	59.70	2.350	35.00	1.378	-	90.00	0900	90	3.543	0900	112.50	4.429	43.00	1.693
1.625	41.28	0412	-	-	-	61.00	2.402	35.00	1.378	3.625	92.10	0921	-	-	-	114.90	4.524	43.00	1.693
1.750	44.45	0444	-	-	-	64.30	2.531	35.00	1.378	-	-	-	95	3.740	0950	117.50	4.626	43.00	1.693
-	-	-	45	1.772	0450	64.90	2.555	35.00	1.378	3.750	95.30	0953	-	-	-	118.00	4.646	43.00	1.693
1.875	47.63	0476	-	-	-	65.10	2.563	35.00	1.378	3.875	98.40	0984	-	-	-	121.20	4.772	43.00	1.693
-	-	-	48	1.890	0480	65.10	2.563	35.00	1.378	-	-	-	100	3.937	1000	122.50	4.823	43.00	1.693
-	-	-	50	1.969	0500	69.70	2.744	35.00	1.378	4.000	101.60	1016	-	-	-	124.60	4.906	43.00	1.693
2.000	50.80	0508	-	-	-	70.70	2.783	35.00	1.378	5.000	127.00	1270	-	-	-	159.00	6.260	51.00	2.008
2.125	53.98	0539	-	-	-	77.00	3.031	43.00	1.693	5.500	139.70	1397	-	-	-	172.00	6.772	51.00	2.008

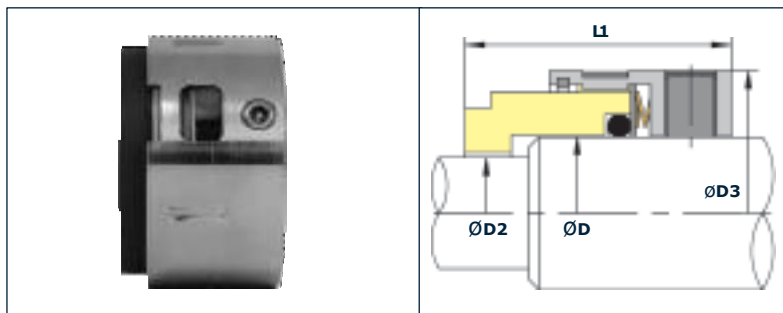
STANDARD FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 240psi SPEED 25m/s
TEMPERATURE -100 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 1609B/1609BS



Multiple Spring, stepped shaft, balanced seal, alternative to the Type 1609/1609S. Standard Type 1609B utilises a PTFE wedge shaft seal, or specify Type 1609BS for the 'O'-Ring version. Commonly fitted with the next shaft size down Type 25 seat.

STANDARD SIZES

Shaft Size DØ			D2		D3		L1	
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch
0.625	15.88	0158	12.70	0.500	30.70	1.209	27.00	1.063
0.750	19.05	0191	15.80	0.622	34.70	1.366	30.00	1.181
0.875	22.23	0222	19.10	0.752	38.00	1.496	32.00	1.260
1.000	25.40	0254	22.20	0.874	40.50	1.594	33.00	1.299
1.125	28.58	0286	25.40	1.000	43.50	1.713	35.00	1.378
1.250	31.75	0317	28.60	1.126	48.30	1.902	35.00	1.378
1.375	34.93	0349	28.60	1.126	52.00	2.047	37.00	1.457
1.500	38.10	0381	31.80	1.252	55.60	2.189	37.00	1.457
1.625	41.28	0412	34.90	1.374	61.00	2.402	45.00	1.772
1.750	44.45	0444	38.10	1.500	64.30	2.531	45.00	1.772
1.875	47.63	0476	41.30	1.626	65.10	2.563	45.00	1.772
2.000	50.80	0508	44.50	1.752	70.70	2.783	45.00	1.772
2.125	53.98	0539	47.60	1.874	77.00	3.031	52.00	2.047
2.250	57.15	0571	50.80	2.000	79.90	3.146	52.00	2.047
2.375	60.33	0603	54.00	2.126	83.10	3.272	52.00	2.047
2.500	63.50	0635	57.20	2.252	86.60	3.409	52.00	2.047
2.625	66.68	0666	60.30	2.374	89.60	3.528	52.00	2.047
2.750	69.85	0698	63.50	2.500	92.80	3.654	52.00	2.047
2.875	73.03	0730	66.70	2.626	95.50	3.760	52.00	2.047
3.000	76.20	0762	69.90	2.752	97.70	3.846	52.00	2.047
3.125	79.38	0794	73.00	2.874	100.50	3.957	52.00	2.047
3.250	82.55	0825	76.20	3.000	105.30	4.146	52.00	2.047
3.375	85.73	0857	79.40	3.126	108.30	4.264	52.00	2.047
3.500	88.90	0889	82.60	3.252	111.50	4.390	52.00	2.047
3.625	92.08	0921	85.70	3.374	114.90	4.524	52.00	2.047
3.750	95.25	0953	88.90	3.500	118.00	4.646	52.00	2.047
3.875	98.43	0984	92.10	3.626	121.20	4.772	52.00	2.047
4.000	101.60	1016	95.30	3.752	124.60	4.906	52.00	2.047

Suggested Operating Limits

PRESSURE 320psi SPEED 25m/s
TEMPERATURE -100 +200°C

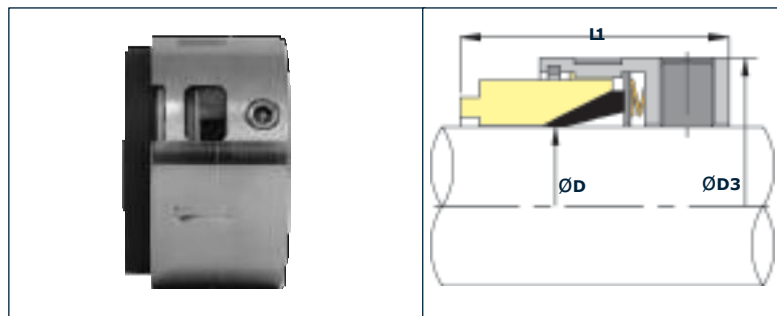
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon.

OTHER FACE MATERIALS TO ORDER

TYPE 1645/1645S



Narrow profile, multiple-spring seal, designed for common American installation dimensions, in chemical process industry equipment. Complies with ANSI B73-1974 centrifugal pump standard. Standard Type 1645 utilises a PTFE Wedge secondary seal and Type 1645S uses an 'O'-Ring. Commonly fitted with Type 25 seat.

STANDARD SIZES

Shaft Size DØ			D3		L1	
Inch	Metric	Code	Metric	Inch	Metric	Inch
0.500	12.70	0127	23.80	0.937	23.80	0.937
0.625	15.88	0158	27.00	1.063	23.80	0.937
0.750	19.05	0191	30.20	1.189	23.80	0.937
0.875	22.23	0222	33.40	1.315	23.80	0.937
1.000	25.40	0254	36.50	1.437	25.40	1.000
1.125	28.58	0286	39.70	1.563	25.40	1.000
1.250	31.75	0317	42.90	1.689	25.40	1.000
1.375	34.93	0349	49.30	1.941	34.90	1.374
1.437	36.50	0365	49.30	1.941	28.60	1.126
1.500	38.10	0381	49.30	1.941	28.60	1.126
1.625	41.28	0412	57.20	2.252	29.40	1.157
1.750	44.45	0444	58.80	2.315	34.90	1.374
1.875	47.63	0476	63.50	2.500	34.90	1.374
2.000	50.80	0508	66.70	2.626	34.90	1.374
2.125	53.98	0539	71.50	2.815	42.80	1.685
2.250	57.15	0571	72.30	2.846	34.90	1.374
2.375	60.33	0603	76.20	3.000	42.80	1.685
2.500	63.50	0635	79.40	3.126	34.90	1.374
2.625	66.68	0666	82.60	3.252	42.80	1.685
2.750	69.85	0698	85.70	3.374	42.80	1.685
2.875	73.03	0730	88.90	3.500	42.80	1.685
3.000	76.20	0762	92.10	3.626	42.80	1.685
3.125	79.38	0794	95.30	3.752	42.80	1.685
3.250	82.55	0826	98.40	3.874	42.80	1.685
3.375	85.73	0857	101.60	4.000	42.80	1.685
3.500	88.90	0889	104.80	4.126	42.80	1.685
3.625	92.08	0921	108.00	4.252	42.80	1.685
3.750	95.25	0953	111.10	4.374	42.80	1.685
3.875	98.43	0984	114.30	4.500	42.80	1.685
4.000	101.60	1016	117.50	4.626	42.80	1.685

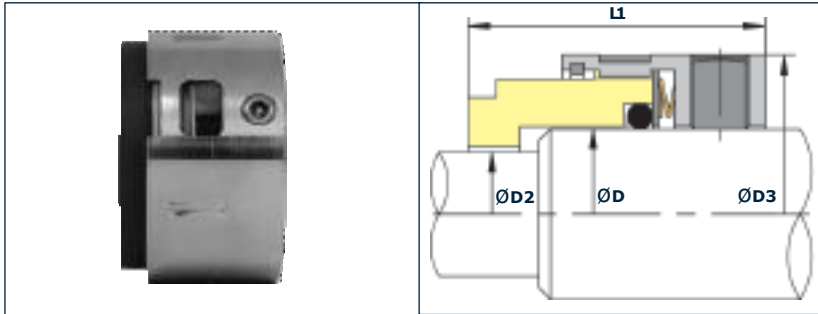
STANDARD FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 240psi SPEED 25m/s
TEMPERATURE -100 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1645B/1645BS



Multiple-Spring, stepped shaft, balanced seal to common American Installation dimensions. Standard Type 1645B incorporates a PTFE Wedge secondary seal with Type 1645BS being the 'O'-Ring variant. Commonly fitted with the next shaft size down Type 25 seat.

STANDARD SIZES

Shaft Size	DØ		D2		D3		L1	
	Inch	Metric	Metric	Inch	Metric	Inch	Metric	Inch
0.750	19.05	0191	15.80	0.622	30.20	1.189	31.70	1.248
0.875	22.23	0222	19.10	0.752	33.40	1.315	31.70	1.248
1.000	25.40	0254	22.20	0.874	37.50	1.476	33.30	1.311
1.125	28.58	0286	25.40	1.000	40.70	1.602	34.90	1.374
1.250	31.75	0317	28.60	1.126	43.90	1.728	34.90	1.374
1.375	34.93	0349	28.60	1.126	49.30	1.941	42.80	1.685
1.500	38.10	0381	31.70	1.248	49.30	1.941	36.40	1.433
1.625	41.28	0412	34.90	1.374	57.20	2.252	40.40	1.591
1.750	44.45	0444	38.10	1.500	58.80	2.315	44.40	1.748
1.875	47.63	0476	41.20	1.622	63.50	2.500	44.40	1.748
2.000	50.80	0508	44.40	1.748	66.70	2.626	44.40	1.748
2.125	53.98	0539	47.60	1.874	71.50	2.815	52.30	2.059
2.250	57.15	0571	50.80	2.000	72.30	2.846	44.40	1.748
2.375	60.33	0603	53.90	2.122	76.20	3.000	52.30	2.059
2.500	63.50	0635	57.10	2.248	79.40	3.126	44.40	1.748
2.625	66.68	0666	60.30	2.374	82.60	3.252	52.30	2.059
2.750	69.85	0698	63.50	2.500	85.70	3.374	52.30	2.059
2.875	73.03	0730	66.60	2.622	88.90	3.500	52.30	2.059
3.000	76.20	0762	69.80	2.748	92.10	3.626	52.30	2.059
3.125	79.38	0794	73.00	2.874	95.30	3.752	52.30	2.059
3.250	82.55	0826	76.20	3.000	98.40	3.874	52.30	2.059
3.375	85.73	0857	79.30	3.122	101.60	4.000	52.30	2.059
3.500	88.90	0889	82.50	3.248	104.80	4.126	52.30	2.059
3.625	92.08	0921	85.70	3.374	108.00	4.252	52.30	2.059
3.750	95.25	0953	88.90	3.500	111.10	4.374	52.30	2.059
3.875	98.43	0984	92.00	3.622	114.30	4.500	52.30	2.059
4.000	101.60	1016	95.20	3.748	117.50	4.626	52.30	2.059

Suggested Operating Limits

PRESSURE 320psi SPEED 25m/s
TEMPERATURE -100 +200°C

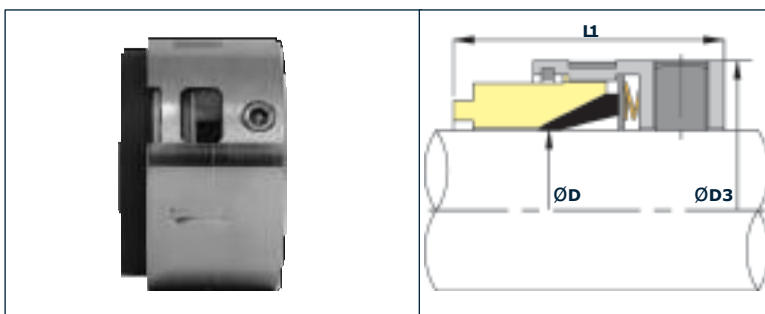
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon.

OTHER FACE MATERIALS TO ORDER

△ TYPE 1659/1659S



Narrow profile, multiple spring seal with a highly efficient design, frequently specified in chemical process industry pumps. Use Type 1659 with a PTFE Wedge or Type 1659S for 'O'-Ring variant.

Commonly fitted with Type 24 DIN Long or Type 24 DIN Short Stats.

STANDARD SIZES

Metric Shaft Size D	Size Code	Dimensions	
		D3	L1
16	0160	26.00	23.00
18	0180	32.20	24.00
20	0200	34.20	24.00
22	0220	36.50	24.00
24	0240	38.60	26.70
25	0250	40.00	27.00
28	0280	43.00	30.00
30	0300	45.00	30.50
32	0320	47.10	30.50
33	0330	48.20	30.50
35	0350	50.00	30.50
38	0380	54.00	32.00
40	0400	56.00	32.00
43	0430	59.00	32.00
45	0450	61.00	32.00
48	0480	64.00	32.00
50	0500	66.30	34.00
53	0530	68.70	34.00
55	0550	70.80	34.00
58	0580	78.00	39.00
60	0600	79.80	39.00
63	0630	82.80	39.00
65	0650	85.50	39.00
68	0680	87.80	39.00
70	0700	90.00	45.50
75	0750	95.20	45.50
80	0800	103.80	45.00
85	0850	109.10	45.00
90	0900	113.80	50.00
95	0950	118.50	50.00
100	1000	123.50	50.00

STANDARD FACE MATERIALS

Rotary Face: Carbon.

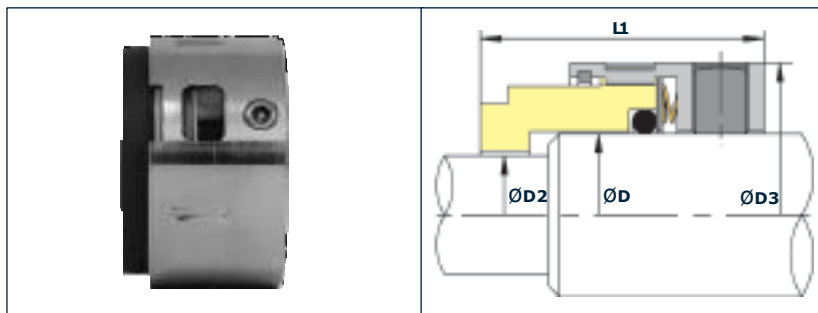
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 240psi SPEED 25m/s
TEMPERATURE -100 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 1659B/1659BS



Multiple-Spring, stepped shaft, balanced seal. Standard Type 1659B incorporates a PTFE Wedge shaft seal, or specify Type 1659BS for the 'O'-Ring version.

Commonly supplied with a suitable smaller shaft size Type 24 DIN Long or Type 24 DIN Short Seat.

STANDARD SIZES

Metric Shaft Size D	Size Code	D2	D3	L1
18	0180	14.00	32.20	30.50
20	0200	16.00	34.20	30.50
22	0220	18.00	36.50	31.50
24	0240	20.00	38.60	31.50
28	0280	24.00	43.00	34.20
30	0300	25.00	45.00	34.50
33	0330	28.00	48.20	37.50
35	0350	30.00	50.00	38.00
38	0380	33.00	54.00	38.00
40	0400	35.00	56.00	38.00
43	0430	38.00	59.00	39.50
45	0450	40.00	61.00	39.50
48	0480	43.00	64.00	39.50
50	0500	45.00	66.30	39.50
53	0530	48.00	68.70	39.50
55	0550	50.00	70.80	44.00
58	0580	53.00	78.00	44.00
60	0600	55.00	79.80	44.00
63	0630	58.00	82.80	49.00
65	0650	60.00	85.50	49.00
68	0680	63.00	87.80	49.00
70	0700	65.00	90.00	49.00
75	0750	70.00	95.50	55.50
80	0800	75.00	103.80	55.50
85	0850	80.00	109.10	55.00
90	0900	85.00	113.80	60.00
95	0950	90.00	118.50	60.00
100	1000	95.00	123.50	60.00

Suggested Operating Limits

PRESSURE 320psi SPEED 25m/s
TEMPERATURE -100 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon.

OTHER FACE MATERIALS TO ORDER

△ Wave Spring Type Seals



Section 9

Introduction

The Wave Spring Range of Bi-Directional mechanical seals offer proven design and wave spring technology, in a multitude of material combinations, with superior designs but at very competitive pricing.

Applications

The 1688 and 1682 ranges were specifically designed for rotary lobe pumps, whose principle application is normally for liquids of high viscosity. These are commonly found in the food, dairy, brewery and pharmaceutical industries. Their compact design makes these seals an excellent choice for confined stuffing boxes areas or even external mounted applications

The 1677 Seal Type is designed as a high quality, general purpose seal, suitable for many sealing application requirements, including chemical duties.

Standard Wave Spring

Types

Types 1688

The robust wave spring seal is ideally suited for standard, rotary lobe pump, stuffing boxes, of compact design. The seal is positively driven by grub screws and supplied from with monolithic hard face materials as our standard.

Type 1688 L

As above but supplied with a Type 24 DINL pinned stat, to suit DIN standard housing dimensions.

Type 1682

A wave spring seal to suit standard rotary lobe pumps. The Type 1682 is similar in design to the Type 1688 but is driven directly from the grub screws.

Type 1677

The Type 1677 is a positively, bi-direction driven wave spring seal, utilising crest to crest wave spring technology, offering excellent axial movement capabilities. The seal is radially compacted and designed to suit DIN 24960 (EN12756).

The design of this seal head, enables easy replacement of a wide range of high quality materials and elastomers, supplied as standard.

Type 1678

Designed as per the Type 1677 but with a stepped face, to provide a balanced seal for stepped shafts.

STANDARD COMPONENTS



Type 1688 series

Type 1682

Type 1677

No	Description	No	Description
1	Face	4	Wave Spring
2	O-Ring	5	Grub Screw
3	Sleeve/Retainer	6	Backing Plate

Design Advantages

Type 168 X Superior Design

Types 1688, 1688L and 1682 are supplied with monolithic rotary heads, in both standard and hard face alternatives, to improve the seal operating performance in viscous fluids. This is achieved by eliminating the possibility of spinning and damage common to inserted face designs. Competitors inserted T.C/Sic seal face rings are prone to spinning, particularly in the viscous or coagulating fluids, which are common to rotary lobe pump applications.

Common, popular sizes of Type 168x seals are fitted with our special, split Sinusoidal Wave-Springs. These split wave-springs offer a more consistent and accurate spring rate than traditional wave-springs.

The Sinusoidal waves offer a larger and more even contact and the split over-lap minimises the working stresses which frequently result in fracture, buckling or hang-up with a stamped, non-split, wave-spring.

Type 167 X Superior Design

These seals utilise a double wave-spring. If the seal manufacturer's design solution is to use two wave-springs welded together, then this creates a weak spot, prone to both mechanical failure and corrosive attack.

Type 167X seals incorporate a one-piece designed, crest to crest wave spring, removing the possibility of corrosion to weld spots. This removes the most common seal failure mode on such seals.

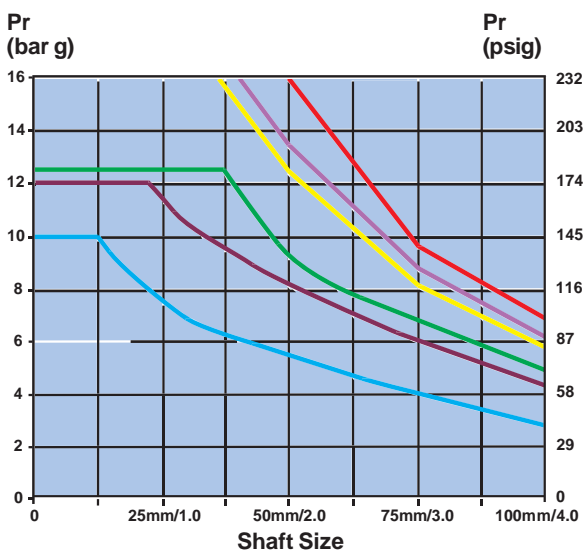
The seals contain an energised rotary 'O'-Ring, reducing shaft fretting and ensuring positive shaft sealing. Our design has a chamfer at the front wall of the 'O'-Ring groove and a dynamic ring backing plate constantly energising and pressing the 'O'-Ring forward and down onto the shaft. This overcomes 'O'-Ring hang-up on the shaft, the second common ultimate seal failure mode found on other manufacturer's designs.

Compact Seal

The uniform wave spring forces, provide excellent axial movement capabilities, compared to conventional mechanical seals.

Use of a wave-spring allows the seal design to be very compact, giving an assured seal for short, confined glands.

WAVE SPRING TYPE SEALS PV CHART

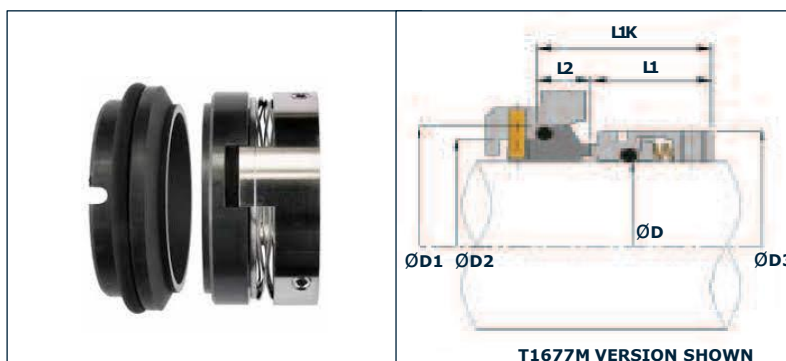


—	Carbon/TC
—	SC/SC
—	TC/TC
—	Carbon/SS
—	Type 1677-Carbon/SIC
—	Type 1677-SIC/SIC

Notes

1. Type 1678 multiply 1677 charts by factor 1.2.2 Do not use Type 1688 series seals above 12 bar
For information on how to utilise this pV chart please refer to the technical section

△ TYPE 1677/1677M



Wave-spring , 'O'-Ring mounted seal commonly utilised in the European chemical process industries.

Manufactured to suit DIN 24960 (EN12756) dimensions. Supplied as Type 1677 with an inserted face or increasingly as Type 1677M, with a Monolithic face design for exceptional performance. Type 8 Din Long Seat shown is standard, with other variants available.

Note: As standard stocks this seal as the type 1677M. If inserted face are required, please ask for Type 1677 Specifically.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L1K
14	0140	25.00	21.00	24.00	25.00	10.00	35.00
16	0160	27.00	23.00	26.00	25.00	10.00	35.00
18	0180	33.00	27.00	32.00	26.00	11.50	37.50
20	0200	35.00	29.00	34.00	26.00	11.50	37.50
22	0220	37.00	31.00	36.00	26.00	11.50	37.50
24	0240	39.00	33.00	38.00	28.50	11.50	40.00
25	0250	40.00	34.00	39.00	28.50	11.50	40.00
28	0280	43.00	37.00	42.00	31.00	11.50	42.50
30	0300	45.00	39.00	44.00	31.00	11.50	42.50
32	0320	48.00	42.00	46.00	31.00	11.50	42.50
33	0330	48.00	42.00	47.00	31.00	11.50	42.50
35	0350	50.00	44.00	49.00	31.00	11.50	42.50
38	0380	56.00	49.00	54.00	31.00	14.00	45.00
40	0400	58.00	51.00	56.00	31.00	14.00	45.00
43	0430	61.00	54.00	59.00	31.00	14.00	45.00
45	0450	63.00	56.00	61.00	31.00	14.00	45.00
48	0480	66.00	59.00	64.00	31.00	14.00	45.00
50	0500	70.00	62.00	66.00	32.50	15.00	47.50
53	0530	73.00	65.00	69.00	32.50	15.00	47.50
55	0550	75.00	67.00	71.00	32.50	15.00	47.50
58	0580	78.00	70.00	78.00	37.50	15.00	52.50
60	0600	80.00	72.00	80.00	37.50	15.00	52.50
63	0630	83.00	75.00	83.00	37.50	15.00	52.50
65	0650	85.00	77.00	85.00	37.50	15.00	52.50
68	0680	90.00	81.00	88.00	34.50	18.00	52.50
70	0700	92.00	83.00	90.00	42.00	18.00	60.00
75	0750	97.00	88.00	99.00	42.00	18.00	60.00
80	0800	105.00	95.00	104.00	41.80	18.20	60.00
85	0850	110.00	100.00	109.00	41.80	18.20	60.00
90	0900	115.00	105.00	114.00	46.80	18.20	65.00
95	0950	120.00	110.00	119.00	47.80	17.20	65.00
100	1000	125.00	115.00	124.00	47.80	17.20	65.00

STANDARD FACE MATERIALS

Rotary Face: Sintered Silicon Carbide.

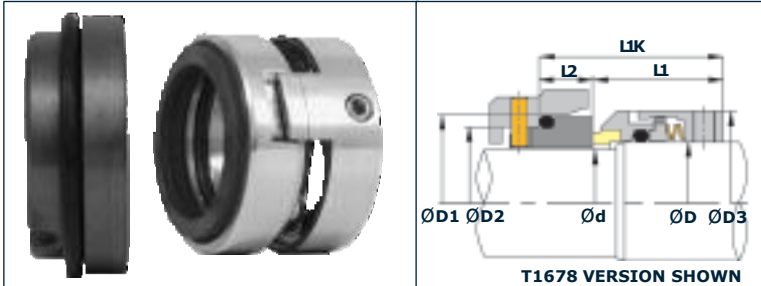
Stat Ring: Sintered Silicon Carbide, Carbon. OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 250psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 1678/1678M



Stepped shaft balanced seal, otherwise similar to our Types 1677M/1677. All our 1677/8 versions are energised by a special continuous wave spring with no weld spots. Supplied as Monolithic version 1678M, as standard. The inserted version is also available to production order.

STANDARD SIZES

Metric Shaft Size D	Size Code	Stat Size d	D1	D2	D3	L1	L2	L1K
18	0180	14	25.0	21.0	32.0	32.5	10.0	42.5
20	0200	16	27.0	23.0	34.0	32.5	10.0	42.5
22	0220	18	33.0	27.0	36.0	33.5	11.5	45.0
24	0240	20	35.0	29.0	38.0	33.5	11.5	45.0
28	0280	24	39.0	33.0	42.0	36.0	11.5	47.5
30	0300	25	40.0	34.0	44.0	36.0	11.5	47.5
33	0330	28	43.0	37.0	47.0	38.5	11.5	50.0
35	0350	30	45.0	39.0	49.0	38.5	11.5	50.0
38	0380	33	48.0	42.0	54.0	38.5	11.5	50.0
40	0400	35	50.0	44.0	56.0	38.5	11.5	50.0
43	0430	38	56.0	49.0	59.0	38.5	14.0	52.5
45	0450	40	58.0	51.0	61.0	38.5	14.0	52.5
50	0500	45	63.0	56.0	66.0	38.5	14.0	52.5
53	0530	48	66.0	59.0	69.0	38.5	14.0	52.5
55	0550	50	70.0	62.0	71.0	42.5	15.0	57.5
60	0600	55	75.0	67.0	80.0	42.5	15.0	57.5

Suggested Operating Limits

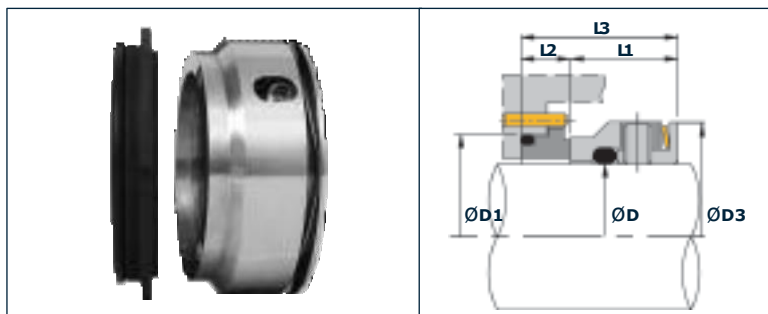
PRESSURE 280psi SPEED 20m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Sintered Silicon Carbide.
Stat Ring: Sintered Silicon Carbide,
Carbon. OTHER FACE MATERIALS TO
ORDER

△ TYPE 1682



Rotary based, bi-directional, wave- spring seal to suit standard rotary lobe SSP® pumps. The Type 1682 is driven directly from the grub-screws. Most commonly found in the food, brewing and dairy industries.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D3	L1	L2	L3
20	0200	30.00	32.40	20.00	10.50	30.50
30	0300	41.30	44.00	21.40	11.10	32.50
35	0350	46.95	50.80	22.00	12.00	34.00
45	0450	58.26	62.40	22.90	12.60	35.50
55	0550	69.55	76.00	29.30	13.20	42.50
75	0750	92.15	99.20	31.10	14.40	45.50

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C

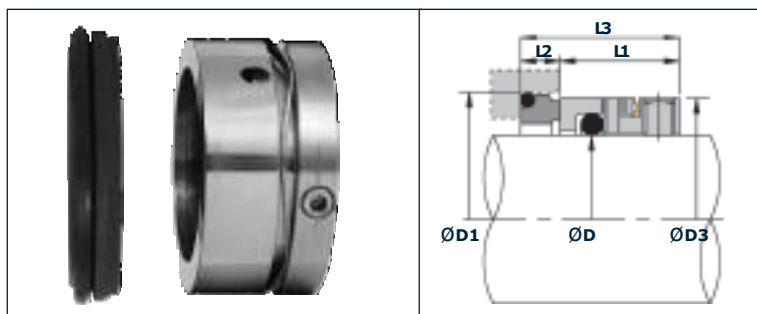
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Stainless Steel, Tungsten Carbide. Stat Ring: Carbon, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

△ TYPE 1688



Wave spring mechanical seal with thin cross section and short working length. Most commonly used on rotary lobe pumps, found extensively in the food, process, dairy and brewery industries. Popular, common sizes are fitted with Sinusoidal Split Wave-Springs.

STANDARD SIZES

Inch Shaft Size D	Size Code	Metric Shaft Size D	Size Code	D1	D3	L1	L2	L3
0.625	0158	16	0160	28.50	27.00	19.10	6.30	25.40
0.750	0191			31.70	30.00	19.10	6.30	25.40
		24	0240	35.40	34.10	19.10	7.60	26.70
		28	0280	42.00	39.00	19.10	7.60	26.70
1.125	0286			41.20	39.50	19.10	7.60	26.70
		30	0300	42.70	41.00	19.10	7.60	26.70
1.250	0317			44.40	42.40	19.10	7.60	26.70
		32	0320	44.40	42.40	19.10	7.60	26.70
1.375	0349	35	0350	47.60	45.50	19.10	7.60	26.70
1.500	0381	38	0380	53.90	51.80	21.10	8.10	29.20
1.750	0444			60.30	58.20	21.10	8.10	29.20
1.875	0476			63.50	61.40	21.10	8.10	29.20
		50	0500	63.90	61.90	21.10	8.10	29.20
2.000	0508			66.60	64.60	22.10	9.60	31.70
2.125	0539			73.00	71.00	22.10	9.60	31.70
		54	0540	73.90	71.00	22.10	9.60	31.70
2.150	0546	55	0550	75.00	72.00	22.10	9.60	31.70
		63	0630	83.00	79.30	25.80	9.10	34.90
2.500	0635			88.90	79.30	25.80	9.10	34.90
2.750	0698			95.20	90.80	25.80	9.10	34.90
2.875	0730	73	0730	98.40	94.00	25.80	9.10	34.90
		75	0750	100.40	96.00	25.80	9.10	34.90
3.000	0762			101.60	96.90	25.80	9.10	34.90
		80	0800	104.00	101.00	25.80	9.10	34.90
		95	0950	125.00	116.00	25.80	9.10	34.90
		100	1000	130.00	121.00	25.80	9.10	34.90

STANDARD FACE MATERIALS

Rotary Face: Stainless Steel or Tungsten Carbide.

Stat Ring: Carbon, Silicon Carbide or Tungsten Carbide. OTHER FACE

MATERIALS TO ORDER

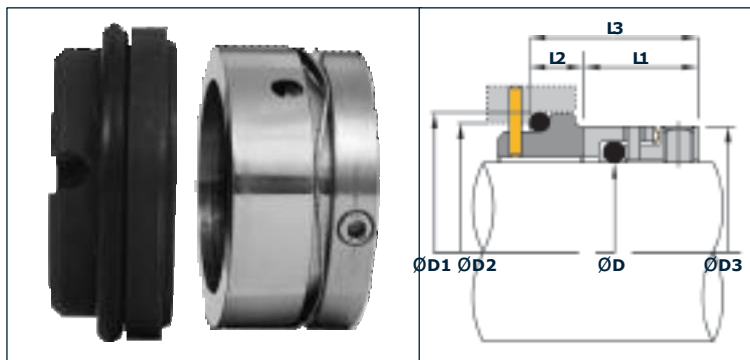
Suggested Operating Limits

PRESSURE 150psi SPEED 15m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 1688L



Rotary based wave sprung mechanical seal with thin cross section and short working length, supplied as standard with Type 24 DIN Long seat. Most commonly used on rotary lobe pumps found extensively in the food, process, dairy and brewery industries. Popular, common sizes are fitted with Sinusoidal Split Wave-Springs.

STANDARD SIZES

Inch Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3	Slot width	Slot Depth
16	0160	27.00	23.00	27.00	19.10	8.60	27.70	4.00	5.00
20	0200	35.00	29.00	31.20	19.10	10.00	29.10	5.00	5.50
22	0220	37.00	31.00	33.00	19.10	10.00	29.10	5.00	5.50
24	0240	39.00	33.00	34.10	19.10	10.00	29.10	5.00	5.50
25	0250	40.00	34.00	36.00	19.10	10.00	29.10	5.00	5.50
28	0280	43.00	37.00	39.00	19.10	10.00	29.10	5.00	5.50
30	0300	45.00	39.00	41.00	19.10	10.00	29.10	5.00	5.50
32	0320	48.00	42.00	42.40	19.10	10.00	29.10	5.00	5.50
33	0330	48.00	42.00	44.00	19.10	10.00	29.10	5.00	5.50
35	0350	50.00	44.00	45.50	19.10	10.00	29.10	5.00	5.50
38	0380	56.00	49.00	51.80	21.10	11.00	32.10	5.00	5.50
40	0400	58.00	51.00	53.80	21.10	11.00	32.10	5.00	5.50
43	0430	61.00	54.00	56.80	21.10	11.00	32.10	5.00	5.50
45	0450	63.00	56.00	58.20	21.10	11.00	32.10	5.00	5.50
48	0480	66.00	59.00	61.40	21.10	11.00	32.10	5.00	5.50
50	0500	70.00	62.00	61.90	21.10	13.00	34.10	5.00	5.50
55	0550	75.00	67.00	72.00	22.10	13.00	35.10	5.00	5.50
60	0600	80.00	72.00	77.00	25.80	13.00	38.80	5.00	5.50
63	0630	83.00	75.00	79.30	25.80	13.00	38.80	5.00	5.50
65	0650	85.00	77.00	82.30	25.80	13.00	38.80	5.00	5.50
70	0700	92.00	83.00	87.00	25.80	15.30	41.10	5.00	5.50
75	0750	97.00	88.00	96.00	25.80	15.30	41.10	5.00	5.50
80	0800	105.00	95.00	101.00	25.80	15.70	41.50	5.00	5.50
85	0850	110.00	100.00	106.00	25.80	15.70	41.50	5.00	5.50
90	0900	115.00	105.00	111.00	25.80	15.70	41.50	5.00	5.50
95	0950	120.00	110.00	116.00	25.80	15.70	41.50	5.00	5.50
100	1000	125.00	115.00	121.00	25.80	15.70	41.50	5.00	5.50

Suggested Operating Limits

PRESSURE 150psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Stainless Steel or Tungsten Carbide.

Stat Ring: Carbon, Silicon Carbide or Tungsten Carbide. OTHER FACE MATERIALS TO ORDER

△ Water Pump Type Seals



Section 10

Introduction

supply a substantial range of cost effective and reliable water pump seals, that are commonly utilised in high volume commercial, domestic and industrial water systems.

These seal types generally serve applications such as swimming pools, spa pools, shower pumps, central heating systems, irrigation and light fluid duties.

Standard Water Type Seals

Types 60 and 65

Sleeve mounted, rubber bellows seals of compact unitised design. Suitable for small shaft diameter, general low pressure applications.

These rubber driven, rotary seal types are easily fitted and mass produced, under stringent quality procedures.

Type 70 and 75

Stationary based, unitised rubber bellows seals, utilised in high volume, small shaft diameter applications. These seals are successfully used in engine coolant pumps, as well as many other general water applications, proving the reliability of the seal design and construction.

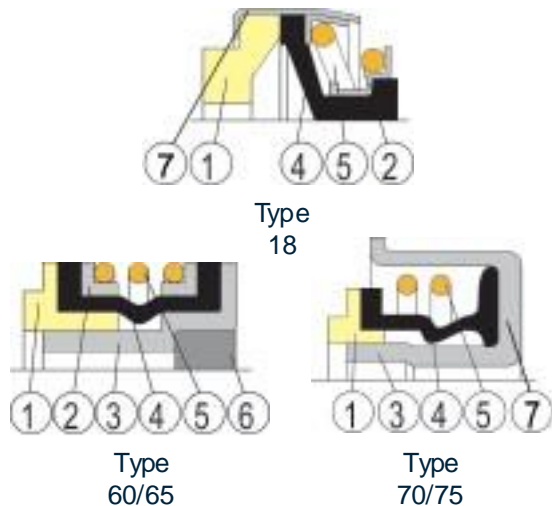
The adequate shaft clearance enables one size to be used on a number of shaft sizes, whilst being stationary seal based increases rotational speed capabilities.

Type 18

Enclosed rubber bellows seal, with short axial fitting length, ideal for equipment where space is restricted.

In addition to the standard carbon face, also offer hard face alternatives for the more demanding applications. The seal is also fitted with an internal plug as standard to aid assembly.

STANDARD COMPONENTS



No	Description	4	Bellows
1	Face	5	Coil
2	Retaining Plates	6	Drive Ring
3	Sleeve	7	Ret ainer

Swimming Pool Seals

With over fifteen years extensive specific experience, are leading manufacturers of seals for the International Swimming Pool Industry. We have a comprehensive range of seal assemblies and designs, backed by an ex-stock service.

Seal and seat face materials, as standard, are superior to industry norms. Exact designs, excellent materials, a wide stock range and the ability to manufacture to any industry design or requirement, complement the swimming Pool Seal Range.

Design Advantages

Material Quality

Wide range of high quality elastomers and seal face materials readily available. Superior seal material selection especially Ceramic purity and Carbon quality increases reliability, capability, performance and life.

Design

The Water Pump seals are high quality, bi-directional, seal designs containing positively designed, material benefits and features.

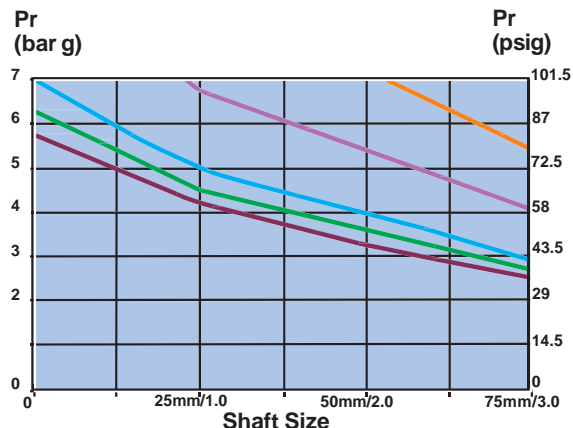
For instance, Type 18;

- The Type 18 is supplied with a fitting plug, as standard, which provides support when fitting these seals.
- The Type 18 is of robust bellows design, compared to some competitors' equivalents, which are prone to falling apart on assembly.
- Type 18 is designed to eliminate bellows wear during operation, which can be a fault in competitors designs.
- The Type 18 is fitted with our M106K + Carbon and 99.5 Pure Ceramic.

Cost Effective

These proven, mass produced seals, with their additional benefits and superior material quality, result in an exceptional, cost effective choice of seal.

WATER PUMP TYPE SEALS PV CHART



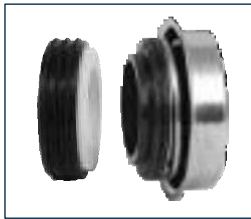
Carbon/Ceram
SIC/S C
Carbon/S C
Carbon/TC
TC/TC

Notes
For information on how to utilize this pv chart please refer to the technical section

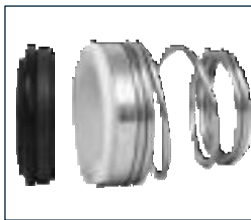


SEALS TO SUIT SWIMMING POOL AND SPA PUMP APPLICATIONS

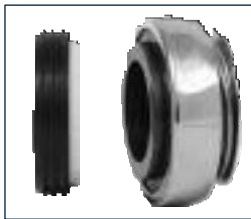
With over fifteen years specific experience, are leading manufacturers of seals for the International Swimming Pools Industry. We have a comprehensive range of seal assemblies and designs, backed by an ex-stock service. Water is a poor lubricant and this in combination with frequent high shaft speeds, possible dry running and the chemicals utilised in pool systems, creates demanding environments for mechanical seal faces. Seal and seat face materials, as standard, are superior to industry norms. Please see our Face Material Section. In addition, we have specialist Carbon Grades available to exceed the requirements of particularly difficult applications and duties. Exact designs, excellent materials, a wide stock range and the ability to manufacture to any industry design or requirement further enhance the Swimming Pool range.



For American products® 397102, G. G. Industries 1000®, Premier® 31-813 & P19-0, Swim-Rite®, Waterway® & Wet Institute® Models.



For Calpeda® pumps



For Doll®, Hydronaut® 100, Kripsol® Ondina, Polaris® XNF7M & Structural® 100



For Hayward® Cup Mount, Jacuzzi® 10.486.10.487, Showertux® 0755L, Vico® & Premier®



For Sta-Rite® 5P2R

STANDARD SEALS OFFERED FOR OEM PUMP REFERENCES

American Products® 395005
American Products® 397102
Ampro® 304
Aqua Flo® RS1000SS
Aqua Flo® 92500150
Arneson® Poolsweep
A-8 Astral® Flipper (pre 1986)

Astral® Flipper (post 1986) Astral® Sprint
Astral® 4HP

Badu® (Speck®)

20mm Calpeda®

M203.04.05

Calpeda® 50-12H

12D Calpeda® 65-

16F Calpeda® 65-

16E Calpeda® 65-

16C

Certikin® Mini pump 0.5-

1.0hp Certikin® FD pumps

SPBP002 seal Challenger®

5/8"

Doll® Models 15mm Shaft

Doughboy® 306-1002 & 306-

1005

Doughboy® 1128-1006 & 306-

1007

Espa® Models, 3/4"

Shaft Espa® Squipper

80 Eurostar®

Fluvo® 21147

G. G. Industries®

1000 Hayward®

(Cup Mount)

Hayward® SP1250

XZ2

Hayward® SP16007 ('O'-Ring

Mount) Hydra-Bath® Models

Hydronaut® (Structural®)

100 ITT® Gemini

ITT® Marlow 25353

ITT® Marlow / Argonaut 38592

STANDARD SEALS OFFERED FOR OEM PUMP REFERENCES

Jacuzzi® 10.1203

Jacuzzi® 10.478.10.506

Jacuzzi®

10.486.10.487

Kripsol® Ondina 0.5-

1.0hp Kripsol® 4.5-

5.5hp

Lee Howl® 4270 3-

5.5hp Lee Howl®

4277/4778

Lee Howl® 4275 0.5-10.0hp

Lowara® CEA 70/3-5

Lowara® CEA 70/3-5

AV Lowara® CM70

Pool Sweep Modern®

1.5-4.0

Modern® 10-12.5

Modern® 5.5

Modern® 7.5

Pacific Fabrications® 35-002-

354894 Polaris® XNF7M

Premier® 31-812

Premier® 31-813 &

P19-0 Purex

Aquatron® P28322

Showertux® 0755L

Sta-Rite® 5P2R U109-93 &

U109-6A

Sta-Rite® 5P4R 9372 SS

Sta-Rite® U109-136 SS (old

type) Sta-Rite® U109-170

Sta-Rite® U109-

47 Sta-Rite®

U109-220 Sta-

Rite® U9358-SS

Swim-Quip® 37407-0009

Swim-Rite® 60-828-813

Structural® (Hydronaut®)

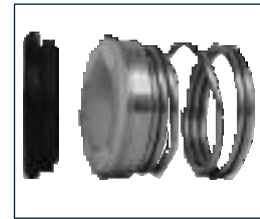
100 Stuart Turner® XB90

Vico® Models, 3/4" Shaft

Waterway® Models 5/8"

Shaft Wet Institute®

1000



For Astral Flipper® (post 1986) & Sprint®



For Lee Howl® 4277/78



For Modern®



For Showertux® 0755L

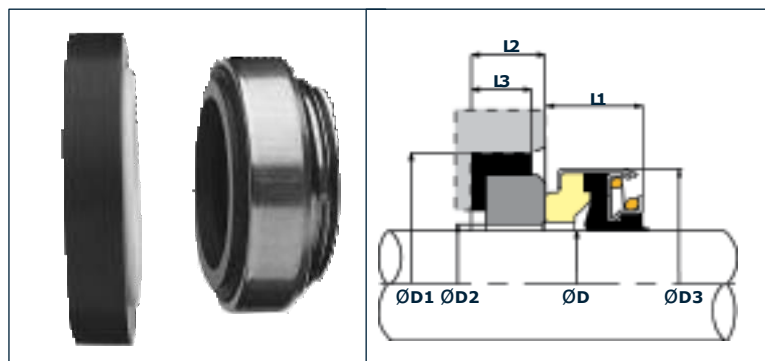


For Sta-Rite® U109-136 SS



For Sta-Rite® U109-220

△ TYPE 18



Compact, enclosed rubber bellows seal with a wide stationary seat. Very short working length makes the Type 18 ideal for equipment where space for a seal is restricted. Seal is supplied with a top hat retainer (remove upon installation)

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
8	0080	26.00	12.00	24.00	11.00	8.00	6.00
10	0100	26.00	12.00	24.00	11.00	8.00	6.00
11	0110	26.00	13.00	24.00	11.00	8.00	6.00
12	0120	26.00	14.00	24.00	11.00	8.00	6.00
12	0120.B	26.00	13.00	24.00	13.00	8.00	6.00
12	0120.C	35.00	16.00	32.00	13.00	8.00	6.00
13	0130	26.00	14.00	24.00	13.00	8.00	6.00
14	0140	35.00	17.00	32.00	13.00	8.00	6.00
15	0150	38.00	18.00	35.00	13.00	8.00	6.00
16	0160	38.00	18.00	35.00	13.00	8.00	6.00
16	0160.B	42.00	21.00	39.00	13.00	8.00	6.00
17	0170	42.00	21.00	39.00	13.00	8.00	6.00
18	0180	42.00	21.00	39.00	13.00	8.00	6.00
19	0190	42.00	21.00	39.00	13.00	8.00	6.00
20	0200	42.00	21.00	39.00	13.00	8.00	6.00
20	0200.B	45.00	23.00	42.00	13.00	10.00	8.00
22	0220	45.00	23.00	42.00	13.00	10.00	8.00
23	0230	50.00	27.00	47.00	14.00	10.00	8.00
24	0240	50.00	27.00	47.00	14.00	10.00	8.00
25	0250	50.00	27.00	47.00	14.00	10.00	8.00
28	0280	57.00	31.00	54.00	15.00	10.00	8.00
30	0300	57.00	31.00	54.00	15.00	10.00	8.00
32	0320	57.00	34.00	54.00	15.00	10.00	8.00
35	0350	63.00	37.00	60.00	16.00	10.00	8.00
38	0380	68.00	42.00	65.00	17.00	12.00	9.00
40	0400	68.00	42.00	65.00	17.00	12.00	9.00
45	0450	73.00	47.00	70.00	20.00	12.00	9.00
50	0500	88.00	52.00	85.00	23.00	15.00	12.00
60	0600	110.00	67.00	105.00	30.00	15.00	12.00
65	0650	110.00	67.00	105.00	30.00	15.00	12.00
70	0700	110.00	72.00	105.00	32.00	15.00	12.00

Suggested Operating Limits

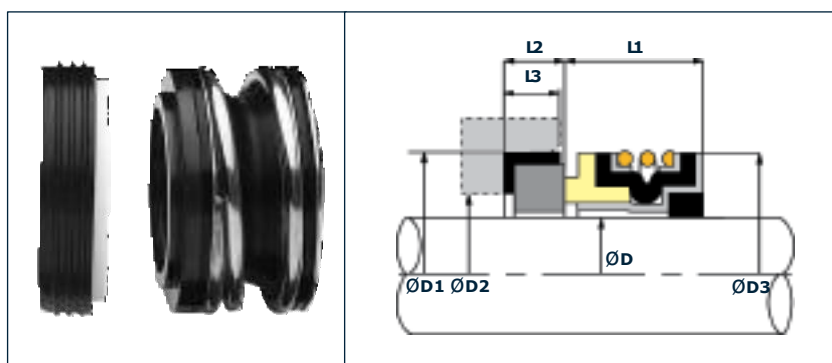
PRESSURE 120psi SPEED 10m/s
TEMPERATURE -20 +160°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide. Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. N.B. Sic or T.C. stocked in certain common sizes only. OTHER FACE MATERIALS TO ORDER

△ TYPE 60



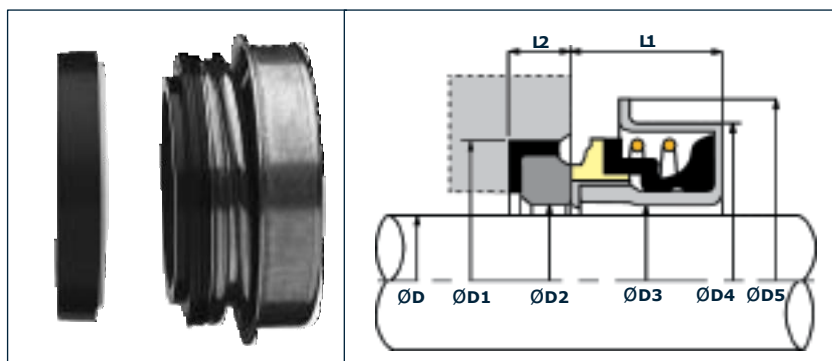
Sleeve mounted, rubber bellows seal with shaft drive ring.

Mass produced and easily fitted for low pressure, general applications on small diameter shafts.

STANDARD SIZES

Shaft Size DØ			D1		D2		D3		L1		L2		L3	
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0095	22.22	0.875	14.30	0.563	23.80	0.937	16.02	0.631	6.20	0.244	4.76	0.187
0.500	12.70	0127	25.40	1.000	17.45	0.687	26.97	1.062	16.60	0.654	6.20	0.244	4.76	0.187
0.625	15.88	0158	31.75	1.250	20.63	0.812	30.94	1.218	18.71	0.737	10.29	0.405	8.71	0.343
0.750	19.05	0191	34.93	1.375	23.80	0.937	34.11	1.343	18.71	0.737	10.29	0.405	8.71	0.343
1.000	25.40	0254	41.28	1.625	30.15	1.187	42.85	1.687	20.63	0.812	11.10	0.437	9.53	0.375

△ TYPE 70



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 SIZES

Shaft Size DØ			D1		D2		D3		D4		D5		L1		L2	
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.512	13.00	0127	25.00	0.984	14.00	0.551	14.20	0.559	28.55	1.124	31.70	1.248	13.20	0.520	5.00	0.197
0.669	17.00	0158	31.00	1.220	18.00	0.709	18.20	0.717	36.45	1.435	41.30	1.626	14.80	0.583	5.00	0.197
0.787	20.00	0191	35.00	1.378	21.00	0.827	21.40	0.843	40.00	1.575	43.70	1.720	15.50	0.610	5.00	0.197
1.181	30.00	0286	48.00	1.890	32.00	1.260	31.00	1.220	52.00	2.047	57.00	2.244	19.00	0.748	8.00	0.315

STANDARD FACE MATERIALS

Rotary Face: Carbon.

Stat Ring: Ceramic (Silicon Carbide, Tungsten Carbide also available).

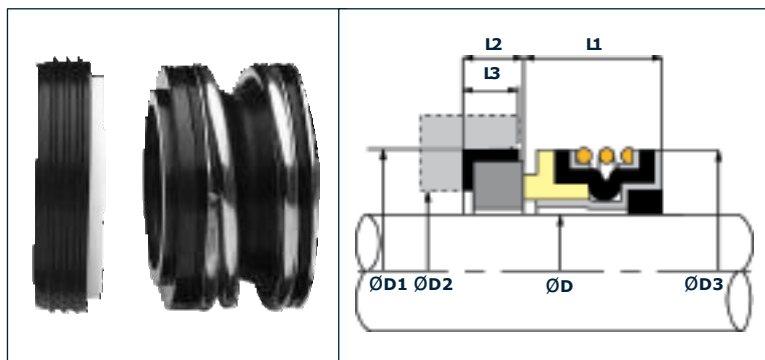
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 120psi SPEED 10m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

△ TYPE 65

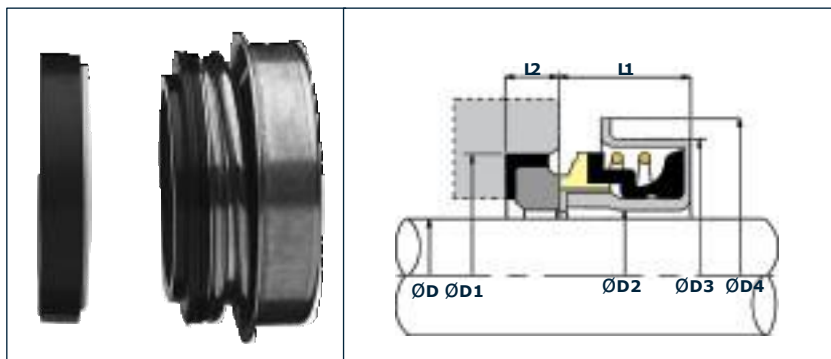


Sleeve mounted, rubber bellows seal, with dimensions to equate to the common American seal standard. Mass produced and easily fitted for low pressure, general applications on small shaft diameters.

STANDARD SIZES

Shaft Size DØ			D1		D2		D3		L1		L2		L3	
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0095	25.40	1.000	14.30	0.563	26.97	1.062	16.66	0.656	7.92	0.312	6.35	0.250
0.500	12.70	0127	25.40	1.000	17.45	0.687	26.97	1.062	16.66	0.656	7.92	0.312	6.35	0.250
0.625	15.88	0158	31.75	1.250	20.63	0.812	30.94	1.218	18.24	0.718	10.31	0.406	8.71	0.343
0.750	19.05	0191	34.93	1.375	23.80	0.937	34.11	1.343	18.24	0.718	10.31	0.406	8.71	0.343
1.000	25.40	0254	41.28	1.625	30.15	1.187	42.85	1.687	20.62	0.812	11.10	0.437	9.53	0.375

△ TYPE 75



Coolant pump seal primarily utilised in combustion engine water pumps, with dimensions to equate to the common American seal standard.

STANDARD SIZES

Shaft Size DØ			D1		D2		D3		D4		L1		L2	
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	25.40	1.000	14.20	0.559	28.55	1.124	31.70	1.248	13.79	0.543	7.93	0.312
0.625	15.88	0158	31.75	1.250	18.20	0.717	36.45	1.435	41.30	1.626	15.36	0.605	10.31	0.406
0.750	19.05	0191	34.93	1.375	21.40	0.843	40.00	1.575	43.70	1.720	15.36	0.605	10.31	0.406

Suggested Operating Limits

PRESSURE 120psi SPEED 10m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon.
Stat Ring: Ceramic (Silicon Carbide, Tungsten Carbide also available).

OTHER FACE MATERIALS TO ORDER

△ **Direct Replacement
Seals For Common O.E.M Pumps**



Section 11 a

11a

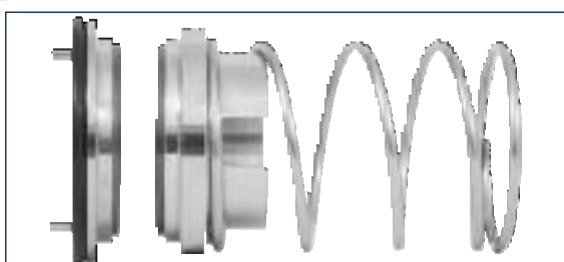
In addition to our standard range of stock seal types, also manufacture and stock many thousands of individual seal designs for specific pumps and applications.

We are leading providers of seals for O.E.M. Equipment due to the following principal advantages;

- Ability to design and manufacture, almost any, seal to customer requirements.
 - In-house production of practically all materials, components and the tools/moulds for the same.
 - Vertically integrated, in-house design, production and quality control, allows small runs and fast turn-round. A Can-Do Philosophy linked to a commercial readiness to produce specials.
 - Agreements to produce a specific design/detail, that are not made available for sale to anybody else.
- The best Range, Quality, Service and Price available from any one manufacturer.

Selected examples of pump marques that have stock seals for are listed below. Some of the most common, stocked, special designs are illustrated, in further detail, in this and the next section.

A.B.S.®	D.A.B.®	Hamworthy.®	I.T.T. Marlow.®	Pacific Fabrications.®	Thune-Eureka.®
A.P.V.®	Doughboy.®	Holden & Brooke.®	Ibex.®	Pullen.®	Tri-Clover.®
Alfa Laval.®	Duveljarr.®	Hydra Bath.®	Inoxpa.®	S.S.P.®	Tuchenhagen.®
Allweiler.®	E.M.U.®	Hidrostal.®	Iron.®	Scanpump.®	Tuthill.®
Armstrong.®	Ebara.®	I.T.T. Bell & Gossett.®	Jacuzzi.®	Sihi.®	Varley.®
Beresford.®	Flygt.®	I.T.T. Gemini.®	Johnson.®	Silverstone.®	Viking.®
Biral.®	Fristam.®	I.T.T. Goulds.®	K.S.B.®	Sta-Rite Industries.®	Wade.®
Calpeda.®	Girdlestone.®	I.T.T. Jabsco.®	Lee Howl.®	Svanehoj.®	Weir.®
Crane.®	Grindex.®	I.T.T. Lowara.®	Mission.®	Swimmey.®	Worthington-Deepwell.®



STANDARD SIZES

Shaft Size DØ Inch Metric	Size Code	Rotary O.D.		Seat O.D.		Pin P.C.D.		Seat W/L	
		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
1.125 28.58	0286	47.20	1.858	50.30	1.980	34.87	1.373	9.40	0.370
1.437 36.50	0365	56.50	2.224	58.00	2.283	43.73	1.722	9.40	0.370

produce and stock a range of seals to suit several Viking® pumps, including the Positive Displacement and Rotary Lobe pumps. The Type 89 is a specific design to replace the original seals found in the popular Viking® 4225 pump range, and has the double-pinned seat required for the housings on this pump type. Seals are available from stock with inserted silicon carbide faces on both the rotary and stationary. Fitted with Viton® 'O'-Rings. Other 'O'-Ring and face materials are available, if specified at time of order.

CODES

Where XXXX is stated in the code, replace with appropriate shaft size code. Available with Viton® 'O'-Rings as standard, if E.P. or Nitrile is required, replace the V character in the code with E or N.

XXXX.89.V.S. Type 89 complete seal, with inserted silicon carbide rotary face vs. silicon carbide inserted stationary face, Viton® 'O'-Rings.

XXXX.89.V.H. Type 89 complete seal, with inserted tungsten carbide rotary face vs. tungsten carbide inserted stationary face, Viton® 'O'-Rings.



TYPE 06 RANGE TO SUIT FLYGT® PUMP APPLICATIONS

The range of Type 06 seals are designed as superior replacement seals for Flygt® and Grindex® submersible pumps and mixers, with no pump modifications necessary. The Type 06 designs require no additional fitting tool and most types have pre-set working lengths, operated by removable setting clips for easy installation.

All Type 06 seals are supplied fitted with Nitrile elastomers and Carbon vs. T.C or SIC faces for Upper Seals as well as Viton® elastomers and T.C vs. T.C or SIC vs. SIC faces for Lower Seals. The Stock Codes listed below are for a complete seal and seat.

also stock complete kits of sealing parts for Flygt® pumps. These repair kits include the relevant Type 06 seals, 'O'-rings, bearings, lip seals, cable seals and other consumable items required during pump refurbishment. The contents of each kit is dependent on pump model; the code is constructed from the shaft size of the Upper seal, and the Flygt® pump model preceded by a "V", and the suffix ".KIT". e.g. To order repair kit for pump model "2102-40", use code "0220.V2102-040.KIT".



XXXX.06.LIP



0220.06C.U.N.E



0200.06G.U.N.E

Flygt® Pump Model	Shaft Size Code	Lip Wear Ring Code (If Fitted)	Upper Seal Code	Lower Seal Code
600	60mm	0600.06.LIP	0600.06Q.U.N.E.	0600.06Q.L.V.H.
605, 615, 665, 670, 680	90-80mm		0900.06S.U.N.H.	0800.06S.L.V.H.
705, 715, 720, 721, 735, 745, 760, 765, 770, 775	90-80mm or 90-120mm		0900.06S.U.N.H.	0800.06S.L.V.H. or 1200.06T.L.V.H.
820, 840, 841, 860, 880, 881, 900	90-80mm or 90-120mm		0900.06S.U.N.H.	0800.06S.L.V.H. or 1200.06T.L.V.H.
2004, 2008, 2012, 2016	15mm		0150.06D.N.Z.	No Lower Seal fitted.
2024	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2050, 2052	15mm		0150.06D.N.Z.	No Lower Seal fitted.
2060	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
2066	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2070	22mm		0220.06E.U.N.E.	0220.06E.L.V.H.
2071	22mm		0220.06E.U.N.E.	0220.06F.L.V.H.
2075	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2082, 2090, 2125, 2140	28mm		0280.06I.U.N.E.	0280.06I.L.V.H.
2084, 2135	35mm		0350.06K.U.N.E.	0350.06L.L.V.H.
2101	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2102-40	22mm		0220.06E.U.N.E.	0220.06E.L.V.H.
2151-10	35mm	0350.06.LIP	0350.06K.U.N.E.	0350.06K.L.V.H.
2151-11, 2151-50	35mm		0350.06K.U.N.E.	0350.06L.L.V.H.
2201-10	45-35mm		0450.06O.U.N.E.	0350.06K.L.V.H.
2201-320, 2201-430, 2201-480, 2201-590, 2201-690	45mm		0450.06N.U.N.E.	0350.06N.L.V.H.
2201-11HT or MT	45mm	0450.06.LIP	0450.06O.U.N.E.	0350.06N.L.V.H.
2201-11LT	45mm		0450.06O.U.N.E.	0450.06O.L.V.H.
2250, 2290	60mm		0600.06P.U.N.E.	0600.06P.L.V.H.
2400	60mm	0600.06.LIP	0600.06R.U.N.E.	0600.06R.L.V.H.
3041-281	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3057	20mm		0200.06G.U.N.E.	0200.06H.L.V.H.
3057-180, 3060	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3065	20mm		0200.06A.L.V.E.	0200.06A.L.V.H.
3067-170, 3067-250, 3068	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3080	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
3082	22mm		0220.06E.U.N.E.	0220.06E.L.V.H.

Where pumps are fitted with stepped shafts, the first size is always the shaft size at the upper seal point.

11a

TYPE 06 RANGE TO SUIT FLYGT® PUMP APPLICATIONS

Robust, superior mechanical seal designs, with stainless steel parts and monolithic carbide faces, provide higher seal capability, performance, reliability and life.

No plastic working seal parts, brazed nor inserted faces, wave-springs etc; all of which are prone to wear and failure, particularly in such arduous applications.

Highly successful, proven designs, with over a decade of service, have now been even further developed with the enhancements of improved setting clips, change to cup-ended grub-screws mounted at 90 degrees to the shaft and with the option of SIC faces.

The Type 06 Flygt Seal® improvements reduces costs of purchase and installation and most especially, by increased reliability and service life.



0200.06H.L.V.H



0250.06J.L.V.H

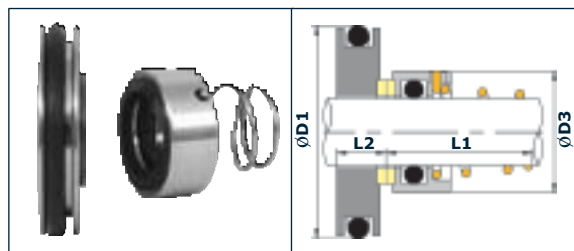


0350.06L.L.V.H

Flygt® Pump Model	Shaft Size Code	Lip Wear Ring Code (If Fitted)	Upper Seal Code	Lower Seal Code
3085-91, 3085-120, 3085-170, 3085-171, 3085-181, 3085-280, 3082-290, 3085-890	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3101	28mm		0280.06B.U.N.E.	0280.06B.L.V.H.
3102	25mm		0250.06J.U.N.E.	0250.06J.L.V.H.
3126-90, 3126-180	35mm	0350.06.LIP	0350.06K.U.N.E.	0350.06K.L.V.H.
3126-91, 3126-280, 3126-290	35mm		0350.06K.U.N.E.	0350.06M.L.V.H.
3126-181, 3127	35mm		0350.06M.U.N.E.	0350.06M.L.V.H.
3140, 3152	45mm	0450.06.LIP	0450.06O.U.N.E.	0450.06O.L.V.H.
3170, 3201	60mm	0600.06.LIP	0600.06Q.U.N.E.	0600.06Q.L.V.H.
3200	60mm		0600.06P.U.N.E.	0600.06P.L.V.H.
3230, 3300-91, 3300-181, 3300-280, 3300-980, 3305	90mm		0900.06S.U.N.H.	0800.06S.L.V.H.
3310, 3311, 3312, 3350, 3351	90-120mm		0900.06S.U.N.H.	1200.06T.L.V.H.
3355, 3356, 3357	90mm		0900.06S.U.N.H.	0800.06S.L.V.H.
3500, 3501, 3530, 3531, 3600, 3601, 3602	90-120mm		0900.06S.U.N.H.	1200.06T.L.V.H.
4351, 4352, 4400	20mm		0200.06G.U.N.E.	0200.06H.L.V.H.
4410, 4430	60mm	0600.06.LIP	No Upper Seal	0600.06Q.L.V.H.
4440, 5530	35mm		0350.06M.U.N.E.	0350.06M.L.V.H.
4650, 4660	45mm	0450.06.LIP	0450.06O.U.N.E.	0450.06O.L.V.H.
4670, 4680, 7045	60mm	0600.06.LIP	0600.06Q.U.N.E.	0600.06Q.L.V.H.
7050, 7051, 7055, 7060, 7061, 7076, 7556	90mm		0900.06S.U.N.H.	0800.06S.L.V.H.
7080, 7115	90-80mm or 90-120mm		0900.06S.U.N.H.	0800.06S.L.V.H. or 1200.06T.L.V.H.
7570, 7585	90-120mm		0900.06S.U.N.H.	1200.06T.L.V.H.
Grindex® Major, Master, Matador, Midi, Minette, Salvador	25-24mm		0250.06Z.U.N.E.	0240.06Z.L.V.H.
Grindex® Maxi	45mm		0450.06O.U.N.E.	0450.06N.L.V.H.
Ready® models 4, 8, 12, & 16	15mm		0150.06D.N.Z.	No Lower Seal fitted.
Ready® 24	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
Ready® 90	28mm		0280.06I.U.N.E.	0280.06I.L.V.H.
Steady® 7	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.

Where pumps are fitted with stepped shafts, the first size is always the shaft size at the upper seal point.

TYPE 8W TO SUIT ALLWEILER® SPF10 AND SPF20 PUMPS.



produce and stock seals to suit the Allweiler® SPF10 and SPF20 pumps. Seals have tapered right-hand springs with inserted carbon or tungsten carbide faces vs. inserted silicon or tungsten carbide stationaries. Viton® 'O'-Rings are supplied as standard, if you require another elastomer please specify at time of order.

CODES

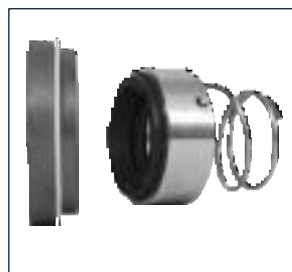
If E.P. or Nitrile is required, replace the V character in the code with an E or N. Where xxxx appears in the code, please replace with 0150 for SPF10, and 0200 for SPF20 pumps.

xxxx.8W.V.D. Type 8W, with carbon faced rotary and inserted silicon seat
 xxxx.8W.V.H. Type 8W, with tungsten carbide faces to rotary and seat

STANDARD SIZES

Shaft Size	D1	D3	L1	L2
15	38.00	24.00	15.00	8.00
20	45.00	31.00	19.50	8.50

TYPE 95 AND 8X TO SUIT HAMWORTHY® PUMPS.

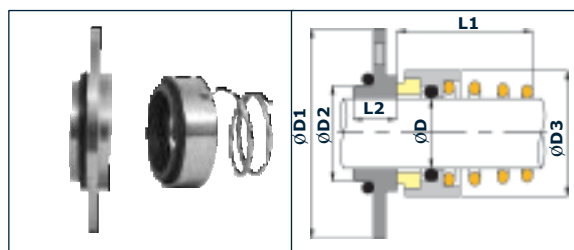


manufacture a complete range of standard and special Type 95 and Type 97 seals to suit Hamworthy® pumps; please contact us with the pump or seal part number. also produce a special seal to suit the Hamworthy® JOB 22 pump. Seals have tapered right-hand springs, with inserted carbon faces vs. monolithic silicon carbide, gasket mounted, seat. Viton® 'O'-Rings and P.T.F.E. gasket are supplied as standard, if you require another elastomer please specify at time of order.

CODES

If E.P. or nitrile is required, replace the V character in the code with an E or N
 0220.8X.V.D. Type 8X, with inserted carbon faced rotary, and monolithic silicon seat

TYPE 8Y TO SUIT ANEMA® PUMPS.



produce and stock seals to suit Anema® pumps. Available in 30mm and 35mm sizes, seals have tapered right-hand springs with inserted carbon faces vs. monolithic stainless steel plate seats. Nitrile 'O'-Rings are supplied as standard, if you require another elastomer please specify at time of order.

CODES

If E.P. or Viton® is required, replace the N character in the code with an E or V. Where xxxx appears in the code, please replace with 0300 or 0350 for 30 or 35mm shaft size.

xxxx.8Y.N.Q. Type 8Y, with inserted carbon faced rotary and stainless steel seat

STANDARD SIZES

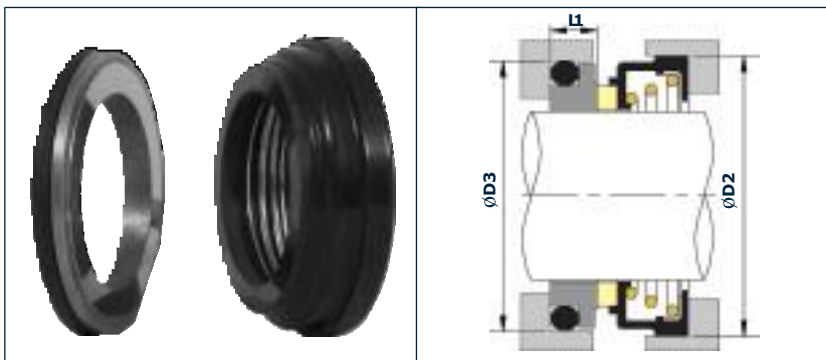
Shaft Size D	D1	D2	D3	L1	L2
30	77.50	38.70	43.00	24.50	15.00
35	77.50	45.80	49.00	28.00	15.00

11a

TYPES 8, 8B AND 12 TO SUIT HILGE® PUMPS.

produce a full range of seals to suit all common Hilge® pumps. Please contact us with your specific requirement, quoting the Hilge® code reference or ask for our code and price list. All Hilge® codes consist of a group of four digits beginning with 123x, followed by two digits which designate the shaft size, followed by three letters for the material code, and a final two digits for the coil style. An example code would be 1232-28-KIE-F3®.

TYPE 28 SEALS TO SUIT HAIGH® MACERATORS.



produce and stock 1.1/4" rotaries, and 1.3/4" complete seals, to suit Haigh® macerators. Rotaries have carbon faces with Nitrile elastomers, complete seals have a Ni-Resist steel seat with Nitrile 'O'-Ring.

TYPE 28 STANDARD SIZES

Shaft Size D	D2	D3	L1
31.7	57.50	-	-
44.4	70.00	67.00	7.50



Type 281

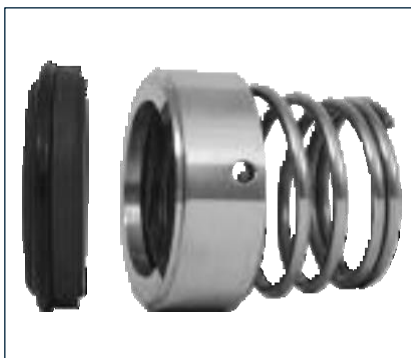
CODES

- 0317.28.N.C.SEAL 1.1/4" Rotary seal only, with carbon face and Nitrile rubber bellows.
- 0444.28.N.C.SEAL 1.3/4" Rotary seal only, with carbon face and Nitrile rubber bellows.
- 0444.28.N.F. 1.3/4" Complete seal, with carbon face rotary vs. Ni-Resist seat

TYPE 281 SEALS

also offer a complete 53mm shaft seal to suit Imperial Machine Company® waste-disposal units, model numbers 1204 and 1604. Seals have stainless steel rotary faces vs. carbon seats, with Viton® elastomers. Please contact us for details.

TYPE 121 TO SUIT SIHI® PUMPS.



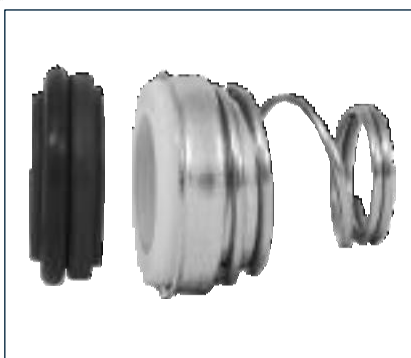
produce and stock a modified 38mm Type 12 seal to suit the reduced housing size found on Sihi® pumps. Available from stock in the usual face and elastomer combinations for Type 12.

CODES

If E.P. or Viton® is required, replace the N character in the code with an E or V.

- 0380.121.L.N.P. 38mm Type 121, left-hand coil with stainless rotary face, carbon seat
- 0380.121.R.N.P. 38mm Type 121, right-hand coil with stainless rotary face, carbon seat

TYPE 13 SERIES TO SUIT LOWARA® PUMPS



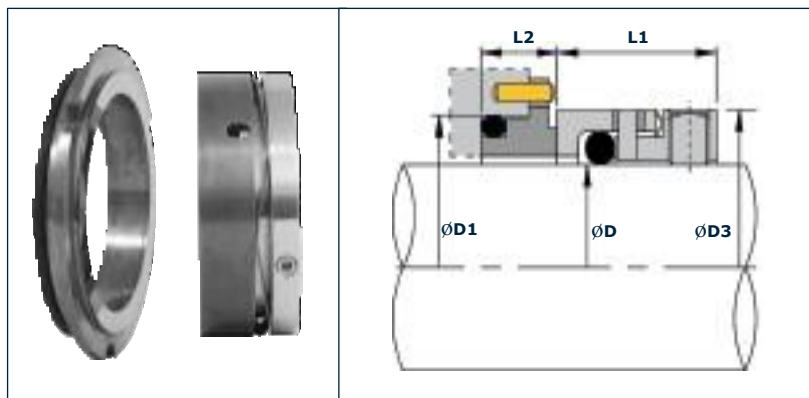
also produce and stock Type 131 seals to suit Lowara® CEA/A, BG/A, CO/A and HM/A pumps fitted with the new SM motor. They are modified Type 13 tapered right-hand spring seals, with Silicon or Tungsten Carbide faces vs. Silicon or Tungsten Carbide stationaries supplied with the usual choice of 'O'-Rings, please specify at time of order. Other face material combinations available to order. Practically all common Lowara® pumps can be fitted with a direct replacement Type 13/13DIN seal or similar. Please contact us with the pump model number or sample seal.

CODES

If E.P. or Nitrile is required, replace the V character in the code with an E or N.

- 0140.131.R.V.H. Tungsten Carbide faced rotary vs. Tungsten Carbide seat
- 0140.131.R.V.I. Silicon Carbide faced rotary vs. Tungsten Carbide seat
- 0140.131.R.V.B. Ceramic faced rotary vs. carbon seat

△ TYPE 1688W



manufacture seals to suit SR® Series Pumps from SSP®. Type 1688W seal and seat assemblies are designed to fit the most popular rotary lobe pumps, without any modification. The monolithic Tungsten Carbide or Stainless Steel seal head avoids face spinning problems, associated with competitor designs in common lobe pump duties.

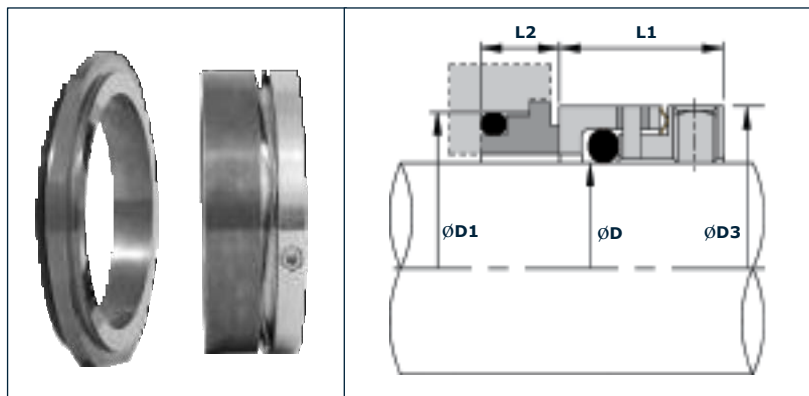
We also make seals to suit the SSP® AP(GP),SRU, ND and NDM Pumps.

Common, popular sizes of Type 1688x seals are fitted with our special, split Sinusoidal Wave-Springs.

STANDARD SIZES

OEM Pump Model	Metric Shaft Size D	Size Code	D1	D3	L1	L2
SR1	20	0200	30.00	31.00	19.10	10.70
SR2	30	0300	41.00	41.00	19.10	10.90
SR3	35	0350	47.00	45.50	19.10	12.20
SR4	45	0450	58.00	58.20	21.10	11.60
SR5	55	0550	70.00	72.00	22.10	13.00
SR6	75	0750	92.00	96.00	25.80	14.50

△ TYPE 1688Y



seals to suit Johnson® Positive Displacement Pumps Type 1688Y seal and seat suit Johnson® positive displacement pumps, in all standard shaft sizes. Again the monolithic seal head provides seal capability, performance and increased life benefits.

We also produce the Type 1650 seal to suit OL1,2 and 3 pumps, in 24, 38 and 53mm sizes respectively, as well as other Johnson pumps.

STANDARD SIZES

OEM Pump Model	Metric Shaft Size D	Size Code	D1	D3	L1	L2
PD10	30	0300	40.00	41.00	19.10	9.30
PD20	35	0350	44.50	45.50	21.10	9.20
PD30	50	0500	62.00	61.90	21.10	10.40
PD40	70	0700	85.00	88.90	25.80	14.10
PD50	80	0800	95.00	101.00	25.80	16.20

Suggested Operating Limits

PRESSURE 150psi SPEED 15m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

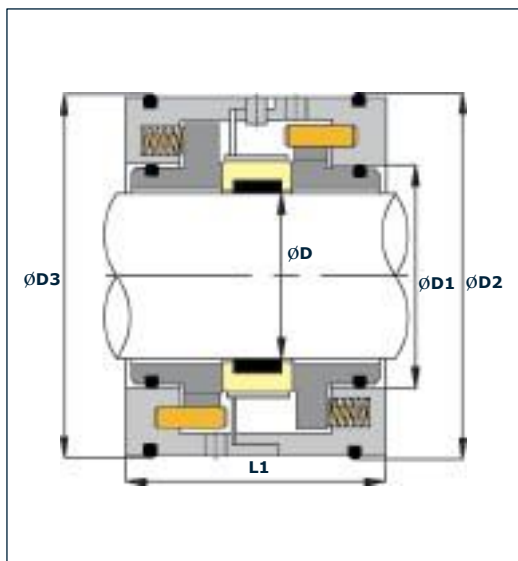
Rotary Face: Stainless Steel, Tungsten Carbide. Stat Ring: Carbon, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

SEALS TO SUIT E.M.U.® PUMPS AND MIXERS.

offer a range of seals to suit both EMU® Pump and Mixers applications, including the enclosed block seals.

TYPE 1640



Available in either repair kit form, or as a complete mechanical seal assembly, fitted within the stainless steel outer collet. The Type 1640 is a direct replacement for the E.B.S. Seal fitted to the most common EMU® Pumps. Repair kits comprise of all wear parts being; two stationaries with 'O'-Rings, central rotary with elastomer diaphragm, anti-rotation pins and springs for stationaries and retaining pins for the collets.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1
35.00	0350	47.00	72.00	72.00	47.00
50.00	0500	63.00	90.00	92.00	52.00
75.00	0750	95.00	128.00	130.00	75.00



REPAIR KIT



COMPLETE TYPE 1640

CODES

All Type 1640 seals are supplied as standard with Viton® Elastomers. Where xxxx is stated in the code add the appropriate shaft size code.

- xxxx.1640.V.ZS. Complete Type 1640 with Silicon Carbide Faces.
- xxxx.1640.V.ZH. Complete Type 1640 with Tungsten Carbide Faces
- xxxx.1640.V.ZS.KIT Repair kit with Silicon Carbide Faces.
- xxxx.1640.V.ZH.KIT Repair kit with Tungsten Carbide Faces.

STANDARD FACE MATERIALS
Rotary Face: Silicon Carbide, Tungsten Carbide. Stat Ring: Silicon Carbide, Tungsten Carbide.

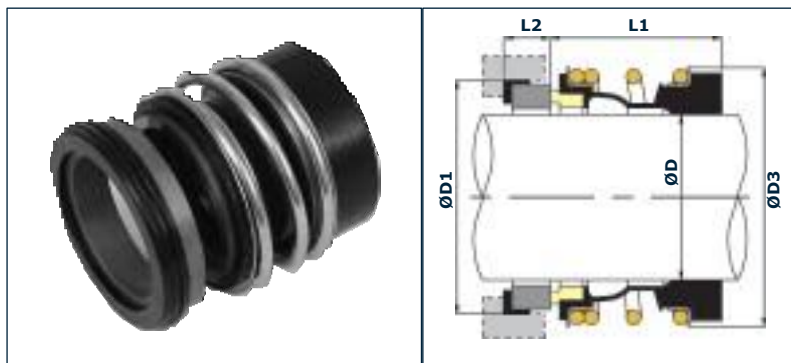
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 20m/s
TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 192K SEALS TO SUIT KSB® PUMPS



produce and stock a range of elastomer bellows seals to suit the most common types of standard KSB® pumps. Available from stock with carbon or silicon carbide rotary faces with silicon carbide seats, in the three standard elastomers.

STANDARD SIZES

Size Code	Metric Shaft Size D	D1	D3	L1	L2
0100	10	19.60	20.00	26.00	6.60
0150	15	25.00	25.00	28.40	6.60
0160	16	27.00	26.00	22.20	8.60
0220	22	37.00	36.00	25.50	12.10
0280	28	43.00	47.00	36.50	14.40
0380	38	56.00	58.00	42.00	13.20
0480	48	66.00	69.00	50.50	9.60

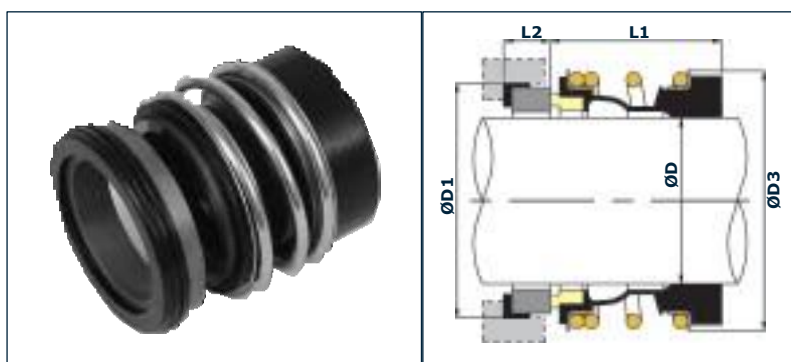
CODING

Where XXXX is stated in the code, add the appropriate size code. If E.P. or Viton® is required, replace the N character in the code with an E or V.

If carbon vs. silicon carbide faces are required, replace the S character in the code with a D.

XXXX.192K.N.S. Complete seal, with silicon carbide rotary face vs. silicon carbide boot seat.

197 SEALS TO SUIT KSB® PUMPS



produce a range of elastomer bellows seals to replace the "SU" range of KSB® seals. Available to order with carbon or silicon carbide rotary faces with silicon carbide seats, in the three standard elastomers.

STANDARD SIZES

Shaft Size DØ	Size Code	D1	D2	L1	L2	OEM Seal Code
10mm	0100	21.00	22.00	14.40	6.60	SU 010
15mm	0150	24.00	28.00	17.00	7.00	SU 015
28mm	0280	35.50	47.00	26.50	9.00	SU 028
30mm	0300	37.00	48.00	26.50	10.50	SU 030
33mm	0330	38.50	51.00	27.50	11.00	SU 033
43mm	0430	42.00	63.00	30.00	12.00	SU 043
48mm	0480	42.00	69.00	30.50	11.50	SU 048
75mm	0750	54.00	102.00	40.00	14.00	SU 075
90mm	0900	60.00	123.00	45.00	15.00	SU 090

CODING

Where XXXX is stated in the code, add the appropriate size code. If Nitrile or E.P. is required, replace the V character in the code with an N or E.

If carbon vs. silicon carbide faces are required, replace the S character in the code with a D.

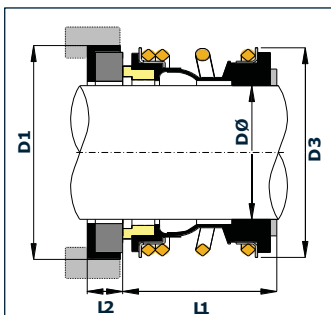
XXXX.197.V.S.

TYPE 195 SEALS FOR ABS® PUMPS



produce a range of elastomer bellows seals to replace the bellows lower seals found in common ABS® submersible pumps. Available from stock in silicon carbide rotary faces with silicon carbide seats, in the same style as the OEM seals. Unless stated, all sizes are supplied complete with the necessary back washer to separate the bellows from shaft circlip.

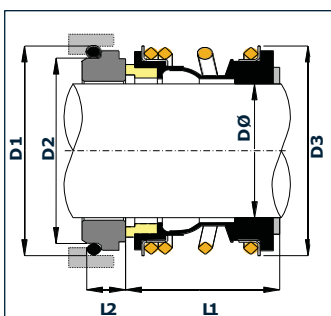
STYLE A - WITH BOOT MOUNTED SEATS - SILICON CARBIDE VS SILICON CARBIDE



Shaft Size DØ	Size Code	D1	D3	L1	L2	OEM Part No.
20mm*	0200	35.00	29.50	21.50	7.50	11110001
25mm	0250	40.50	41.00	22.50	8.50	11110095
30mm	0300	50.80	47.00	23.50	9.10	11110096
40mm*	0400	58.00	60.00	30.00	9.00	11110144
45mm	0450	65.50	65.00	32.00	12.00	11110093, 11110109
55mm	0550	76.20	78.00	35.00	15.50	11110135, 11110136
80mm	0800	104.00	108.00	40.00	15.00	11110051

NB* = 20mm & 40mm SIZES ARE CODED AS STANDARD TYPE 19B. NOT SUPPLIED WITH WASHER AS IT IS NOT REQUIRED.

STYLE B - WITH O-RING MOUNTED BEZEL SEATS - SILICON CARBIDE vs. SILICON CARBIDE



Shaft Size DØ	Size Code	D1	D2	D3	L1	L2	OEM Part No.
40mm	0400	58.00	52.00	60.00	27.50	10.50	11110055
48mm	0480	67.00	59.00	69.00	31.50	13.00	11110003
65mm	0650	86.00	77.00	90.00	39.00	12.00	11110050
90mm	0900	114.00	105.20	126.00	45.00	13.30	11110052
100mm	1000	123.30	114.50	131.00	45.70	14.00	11110053

NB - OLDER PART NUMBERS CAN ALSO HAVE ONLY 7 DIGITS, WITH A MIDDLE ZERO MISSING.

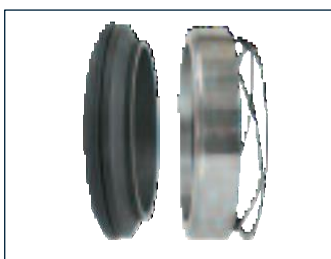
CODING

Where XXXX is stated in the code, add the appropriate size code.

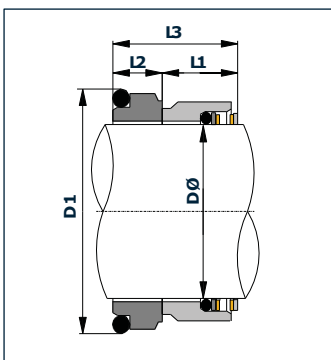
If Viton® is required, replace the N character in the code with a V. If carbon vs. silicon carbide faces are required, replace the S character in the code with a D.

XXXX.195.N.S. Complete seal, with silicon carbide rotary face vs. silicon carbide.

TYPE 1632 SEALS FOR ABS® PUMPS



Produce a range of 'O'-ring mounted wave-spring seals to replace the upper seals found in common ABS® submersible pumps. Common sizes available from stock with stainless steel rotary faces with carbon seats, in the same style as the OEM seals.



Shaft Size DØ	Size Code	D1	L1	L2	L3	OEM Part No.
20mm	USE SEAL CODE 0200.A18.N.Q.					11100066
45mm	0450	65.00	15.60	14.50	30.10	-
48mm	0480	67.00	15.60	14.50	30.10	11100048, 11100058
65mm	0650	86.00	17.80	15.30	33.10	11100059
80mm	0800	104.00	19.50	16.30	35.80	11100053
90mm	0900	114.00	19.50	16.30	35.80	11100055

NB - OLDER PART NUMBERS CAN ALSO HAVE ONLY 7 DIGITS, WITH A MIDDLE ZERO MISSING.

CODING

Where XXXX is stated in the code, add the appropriate size code.

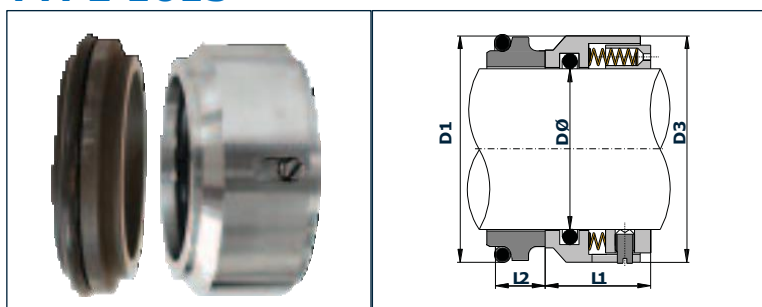
If Viton® is required, replace the N character in the code with a V.

XXXX.1632.N.P. Complete seal, with stainless steel rotary face vs. carbon 'O'-ring seat.

SEALS TO SUIT SARLIN® (GRUNDFOS®) PUMPS

manufacture and stock a range of replacements seals to suit all seal types found in common Sarlin® designed pumps.

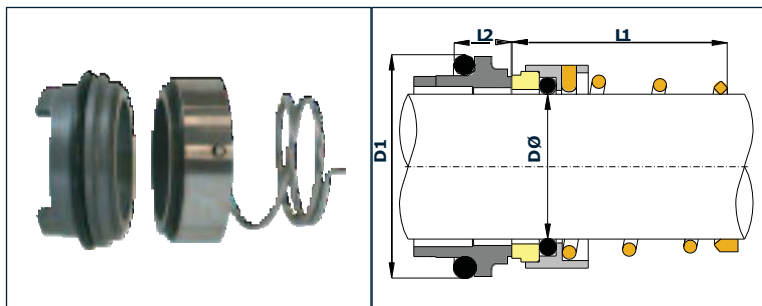
TYPE 1615



The Type 1615 is an 'O'-ring mounted multi-spring seal to replace the upper seals found in older models of Sarlin® pumps. Available from stock with stainless steel rotary faces vs. antimony carbon seats, with Viton® 'O'-rings.

Shaft Size DØ	Size Code	D1	D2	L1	L2
30mm	0300	45.00	45.50	28.00	10.50
38mm	0380	56.00	55.00	31.00	14.00
50mm	0580	70.00	70.50	32.50	15.00

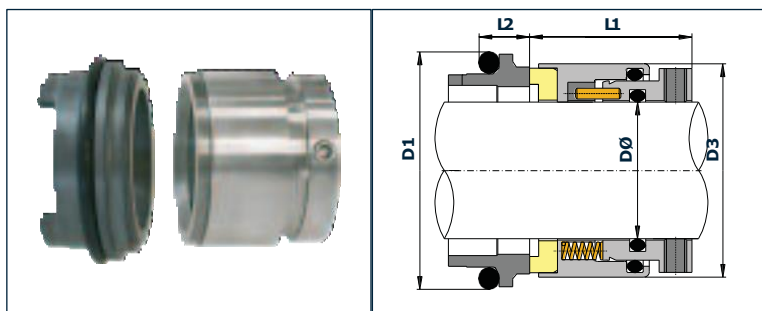
TYPE 81



The Type 81 is an 'O'-ring mounted tapered-spring seal to replace the lower seals with the distinctive design seats. Available from stock with silicon carbide rotary faces vs. silicon carbide seats, with Viton® 'O'-rings.

Shaft Size DØ	Size Code	D1	L1	L2
25mm	0250	38	26.5	10
32mm	0320	48	28.5	11
38mm	0380	55	33.5	11.5

TYPE 40S and 42



The Types 40S and 42 are 'O'-ring mounted, hydraulically-balanced multi-spring seals to replace the upper and lower seals found in more recent designs of Sarlin® pumps.

Shaft Size DØ	Size Code	D1	D2	L1	L2	Seal Style
32.00	0320	48.0	46.0	38.0	11.0	42 LOWER SEAL
38.00	0380	56.0	52.8	38.0	11.5	42 LOWER SEAL
38.00	0380	56.0	52.8	34.0	11.0	40S UPPER SEAL
50.00	0500	70.0	65.6	34.5	9.5	40S UPPER SEAL
65.00	0650	85.0	84.2	36.0	11.0	40S UPPER SEAL
65.00	0650	85.0	84.2	65.5	11.5	42 LOWER SEAL

CODING

Where XXXX is stated in the code, add the appropriate size code. If nitrile is required, replace the V character in the code with an N.

XXXX.1615.V.AP. Complete seal, with stainless steel rotary face vs. antimony carbon seat.

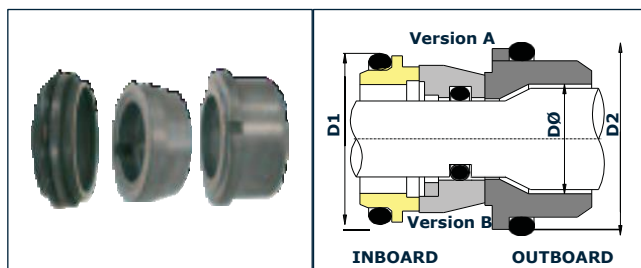
XXXX.81.R.V.S. Complete seal, with silicon carbide rotary face vs. silicon carbide seat.

XXXX.81.R.V.S.STAT Stationary seat only, silicon carbide with Viton® 'O'-ring

XXXX.40S.V.D. Complete upper seal, with carbon rotary face vs. silicon carbide seat.

XXXX.42.V.S. Complete upper seal, with silicon carbide rotary face vs. silicon carbide seat

TYPE 86 Seals to suit Sarlin® (Grundfos®) Pumps



Shaft DØ	Code	D1	D2	Version
16mm	0160	35.00	28.00	A
24mm	0240	45.00	48.00	A
30mm	0300	45.00	48.00	B
38mm	0380	56.00	53.50	A

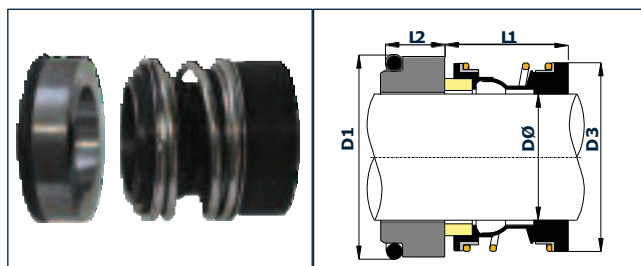
The Type 86 is an 'O'-ring mounted seal face kit to suit Sarlin® pumps fitted with single seals with three-faces. Available from stock with silicon carbide inboard seat, carbon outboard seat, and silicon carbide central rotary faces, with Viton® 'O'-rings.

CODING

Where XXXX is stated in the code, add the appropriate size code. If nitrile is required, replace the V character in the code with an N.

XXXX.86.V.ZS. Complete seal, with silicon carbide inboard seat, silicon carbide central rotary face vs. carbon outboard seat.

TYPE 192G Seals to suit Grundfos® Pumps



Shaft DØ	Code	D1	D3	L1	L2
12mm	0120	23.00	24.00	25.90	15.00
16mm	0160	27.00	28.00	28.40	12.30
22mm	0220	37.00	36.50	30.00	11.10
33mm	0330	48.00	51.00	35.00	7.50

manufacture and stock an elastomer bellows seal that is designed to replace the Grundfos seal styles "A-", "B-" & "C-" with a single superior performing and easier to instal seal design.

Available from stock in carbon vs. tungsten carbide, or tungsten carbide vs. tungsten carbide, in E.P. or Viton® elastomers.

CODING

Where XXXX is stated in the code, add the appropriate size code. If E.P. is required, replace the V character in the code with an E.

XXXX.192G.V.E. Complete seal, with carbon rotary face vs. tungsten carbide 'O'- ring seat.

XXXX.192G.V.H. Complete seal, with tungsten carbide rotary face vs. tungsten carbide 'O'-ring seat.

Offers a range of further seal types to suit Grundfos® pumps. The Type 953 and 954 replace the "H- Type" and "E-Type" respectively. To replace the "D-Type" the Type 40L can be utilised, and the Type 19 series will replace the "G-Type". Please enquire for more detailed information regarding replacement seals for Grundfos® pumps, seal part number or repair kit numbers.

TYPE 191 Seals to suit Wilo® Pumps



manufactures and stocks two sizes of Type 191 elastomer bellows seals to suit common Wilo® heating pumps. Available from stock in carbon vs. silicon carbide with E.P. elastomers. Seals are also available with brass shaft sleeves. Other shaft sizes such as 14mm, 17mm and 22mm are available, please enquire for details.

CODING

Where XXXX is stated in the code, add the appropriate size code.

Shaft DØ	Code	D1	D3	L1	L2
32mm	0320	50.80	51.00	33.34	12.00
55mm	0550	76.20	78.00	41.00	12.00

XXX.191.E.D.

Complete seal, with carbon rotary face vs. silicon carbide boot seat.

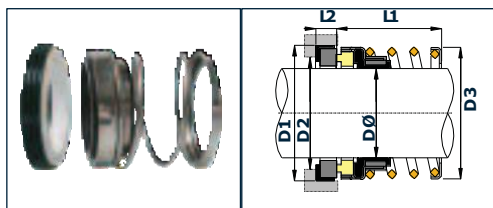
XXXX.191.E.D.KIT

Complete seal and gasket kit, including brass sleeve.

XXXX.191.SLEE

Brass shaft sleeve and shaft 'O'-ring only.

TYPE 11, 1511, 194 and 41 Seals for Hidrostral® Pumps

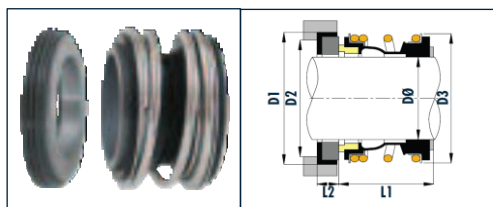


Standard Type 11 diaphragm seals and 1511 elastomer bellows seals to replace the "C-" & "V-" seals in Hidrostral® pumps. Available from stock with carbon or silicon carbide rotary faces and ceramic or silicon carbide seats.

Shaft Size DØ Inch Metric	Size Code	D1		D2		D3		L1		L2		OEM SEAL CODE
		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	
0.875 22.23	0222	38.10	1.500	30.15	1.187	33.40	1.315	23.80	0.937	10.28	0.405	C 0.6 , V 0.6
1.125 28.58	0286	44.44	1.750	36.50	1.437	46.30	1.823	26.97	1.062	11.10	0.437	C 1.1 , V 1.1
1.375 34.93	0349	50.80	2.000	42.84	1.687	52.60	2.071	28.58	1.125	11.10	0.437	C 1.3
1.500 38.10	0381	53.98	2.125	46.05	1.813	55.80	2.197	28.58	1.125	11.10	0.437	C 1.5
2.000 50.80	0508	69.85	2.750	60.32	2.375	73.00	2.874	38.10	1.500	12.70	0.500	C 2.0
2.500 63.50	0635	85.73	3.375	68.25	2.687	84.90	3.343	46.02	1.812	14.28	0.562	C 2.5
3.000 76.20	0762	98.43	3.875	80.95	3.187	102.70	4.043	52.37	2.062	15.90	0.626	C 3.0

Working dimensions for Type 11 and 1511 are identical and the seals are thus interchangeable.

THE TYPE 194 is a robust elastomer bellows seal to replace the "G-" seals found in Hidrostral® pumps

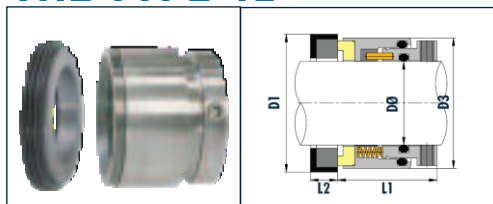


Available with silicon carbide rotary faces and silicon carbide boot seats. Size codes marked with "*" are supplied complete with the necessary back washer to separate the bellows from shaft circlip.

Shaft Size DØ Inch Metric	Size Code	D1		D2		D3		L1		L2		OEM SEAL CODE
		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	
0.625 15.88	0158*	30.14	1.187	22.23	0.875	28.00	1.102	22.22	0.875	10.28	0.405	G 016 , M 0.6
0.787 20.00	0200	38.10	1.500	26.90	1.059	36.00	1.417	30.00	1.181	10.00	0.394	G 020
0.787 20.00	M0200	38.10	1.500	26.90	1.059	36.00	1.417	21.50	0.846	10.00	0.394	M 020, G 020KZ
1.125 28.58	0286	44.44	1.750	36.50	1.437	47.00	1.850	26.97	1.062	11.10	0.437	G 1.1
1.500 38.10	0381	53.98	2.125	46.05	1.813	58.00	2.283	28.58	1.125	11.10	0.437	G 1.5
2.000 50.80	0508	69.85	2.750	60.32	2.375	71.00	2.795	38.10	1.500	12.70	0.500	G 2.0
2.500 63.50	0635	85.73	3.375	68.25	2.687	90.00	3.543	46.02	1.812	14.28	0.562	G 2.5
3.000 76.20	0762	98.43	3.875	80.95	3.187	102.00	4.016	52.37	2.062	15.90	0.626	G 3.0
3.740 95.00	0950	123.85	4.876	106.00	4.173	131.00	5.157	60.30	2.374	19.10	0.752	G 095
3.937 100.00	1000	123.85	4.876	106.00	4.173	131.00	5.157	60.30	2.374	19.10	0.752	G 100

NB: OEM SEAL CODE G 020K can be replaced by standard code 0200.19B.V.S.

THE TYPE 41



The Type 41 is a unitised, highly robust, balanced multi-spring design seal, to provide an alternative lower seal. With the springs protected from the media, to prevent seal damage and clogging, that often leads to premature seal failure.

Shaft Size DØ Inch Metric	Size Code	D1		D3		L1		L2		OEM SEAL CODE
		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	
1.125 28.58	0286	44.44	1.750	44.00	1.732	30.00	1.181	8.10	0.319	G 1.1
1.500 38.10	0381	53.98	2.125	54.80	2.157	31.60	1.244	8.10	0.319	G 1.5
2.000 50.80	0508	69.85	2.750	67.60	2.661	38.10	1.500	12.70	0.500	G 2.0 , X 2.0T
2.500 63.50	0635	85.73	3.375	78.30	3.082	46.20	1.812	14.28	0.562	G 2.5 , X 2.5
3.000 76.20	0762	98.43	3.875	93.70	3.689	52.40	2.063	15.90	0.626	G 3.0 , X 3.0
3.740 95.00	0950	123.85	4.876	128.00	5.039	62.90	2.477	16.50	0.649	G 095 , X 095
3.937 100.00	1000	123.85	4.876	128.00	5.039	62.90	2.477	16.50	0.649	G 100 , X 100
4.528 115.00	1150	142.88	5.625	144.50	5.689	48.30	1.902	12.50	0.492	X 115 , N 115
4.724 120.00	1200	142.88	5.625	144.50	5.689	48.30	1.902	12.50	0.492	X 120 , N 120

Seal sizes upto and including 3.000" utilise boot-mounted seats. Sizes over 3.000" utilise 'O'-ring mounted seats.

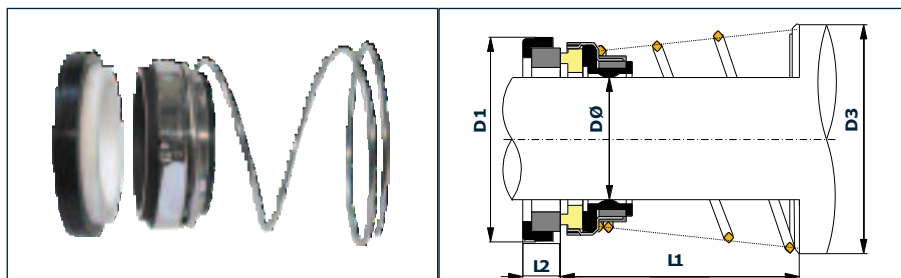
CODING

Where XXXX is stated in the code, add the appropriate size code. If nitrile is required, replace the V character in the code with an N

XXXX.11.N.C.	Complete Seal, carbon rotary face vs. ceramic boot seat
XXXX.1511.N.C.	Complete Seal, carbon rotary face vs. ceramic boot seat
XXXX.194.V.S.	Complete Seal, silicon carbide rotary face vs. silicon carbide boot seat
XXXX.41.V.S.	Complete Seal, silicon carbide rotary face vs. silicon carbide boot seat

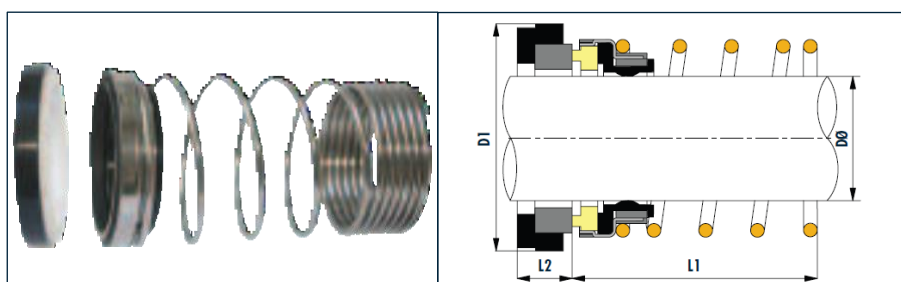
TYPE 277 & 278 MECHANICAL SEALS FOR THUNE-EUREKA® PUMPS

manufacture and stock the Type 277 and 278 diaphragm bellows seal ranges to suit the unique dimensions required in the "CG-series" range of pumps. The Type 277 has reverse-tapered coils, while the Type 278 has distinctive lengthened parallel coils.



Common sizes are available from stock in carbon vs. ceramic, with nitrile elastomers. Other material combinations available to order.

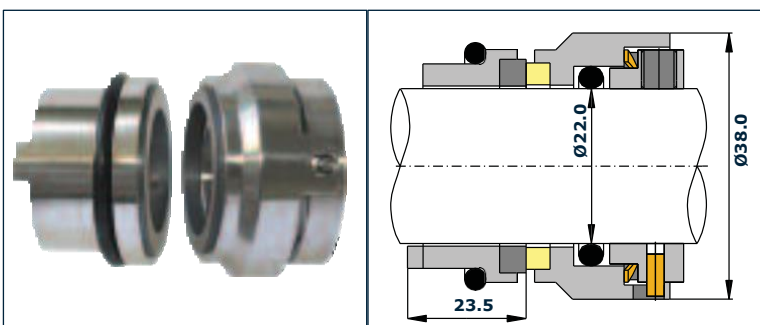
Shaft Size DØ	Size Code	D1	D2	L1	L2	OEM Pump Code
29.00	0290	47.63	46.00	32.00	11.99	CGA
35.00	0350	53.98	53.00	31.50	11.99	CGB
41.00	0410	60.35	59.30	32.50	11.99	CGC
48.00	0480	66.70	66.00	38.50	11.99	CGD
54.00	0540	73.05	70.00	41.00	13.50	CGE



Shaft DØ		Size Code	D1		D3		D4	
Inch	Metric		Metric	Inch	Metric	Inch	Metric	Inch
1.875	47.60	0476	66.70	2.626	79.40	3.126	11.99	0.472
2.375	60.33	0603	79.40	3.126	82.60	3.252	13.50	0.531

SEALS TO SUIT IMO® PUMPS

manufacture and stock a complete range of standard seals to suit IMO® pumps; please contact us with the complete pump model reference or seal part number. have also designed a special Type 1689 & 1690 seal to suit the ACE025, ACE032 and ACE038 generation three pumps fitted with the three-part seals.



The seal fits in exactly the same space as the original seal, but follows standard design practice and offers a superior performing, easier to install mechanical seal.

CODING

If nitrile is required, replace the V character in the code with an N

XXXX.277.N.C. Complete seal, with carbon rotary face vs. ceramic boot seat.

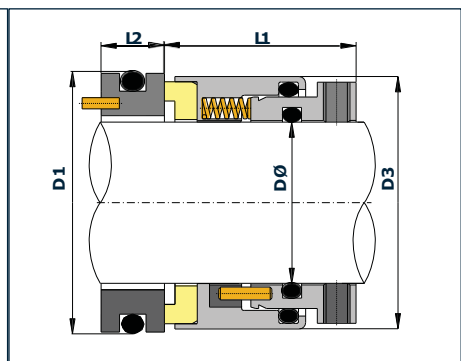
XXXX.278.N.C. Complete seal, with carbon rotary face vs. ceramic boot seat.

0220.1689.V.S. Complete seal, with silicon carbide rotary face vs. silicon carbide 'O'-ring seat.

0220.1690.V.S. Complete seal, with silicon carbide rotary face vs. silicon carbide 'O'-ring seat.

Photo illustrates Type 1690, Type 1689 has straight outer rotary profile.

TYPE 40 BALANCED INTERNAL SEALS



Type 40 is a multiple-spring, 'O'-ring mounted, set-screw driven, non-clogging, balanced mechanical seal. The balanced design, protected springs and dynamic 'O'-ring enable use in demanding applications. Available with a wide variety of seats, Types 40H (UK) & 40J (USA housing dimensions) are illustrated here.

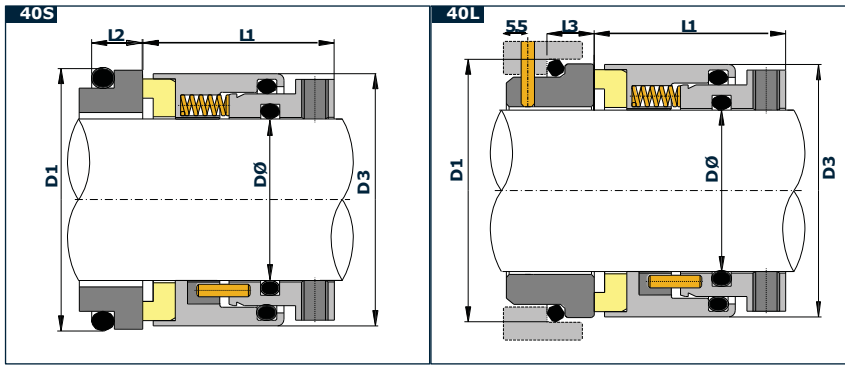
STANDARD SIZES: IMPERIAL SHAFTS

Shaft DØ		Size Code	D3		D4		L1		D1 40H Seat		L2 40H Seat		D1 40J Seat		L2 40J Seat	
Metric	Inch		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
19.05	0.750	0191	33.50	1.319	35.00	1.378	30.00	1.181	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
22.23	0.875	0222	36.50	1.437	38.00	1.496	30.00	1.181	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
25.40	1.000	0254	39.60	1.559	41.30	1.626	30.00	1.181	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
28.58	1.125	0286	43.00	1.693	44.50	1.752	32.50	1.280	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
31.75	1.250	0317	46.10	1.815	48.00	1.890	32.50	1.280	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
34.93	1.375	0349	49.00	1.929	51.00	2.008	32.50	1.280	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
38.10	1.500	0381	53.00	2.087	54.00	2.126	34.00	1.339	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
41.28	1.625	0412	56.00	2.205	58.00	2.283	34.00	1.339	60.35	2.376	11.90	0.469	60.33	2.375	12.70	0.500
44.45	1.750	0444	59.20	2.331	62.50	2.461	34.00	1.339	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
47.63	1.875	0476	62.40	2.457	63.50	2.500	34.00	1.339	66.70	2.626	11.90	0.469	66.68	2.625	12.70	0.500
50.80	2.000	0508	65.60	2.583	67.60	2.661	34.50	1.358	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
53.98	2.125	0539	68.80	2.709	70.80	2.787	34.50	1.358	73.05	2.876	13.50	0.531	76.20	3.000	14.30	0.563
57.15	2.250	0571	71.90	2.831	73.90	2.909	34.50	1.358	76.20	3.000	13.50	0.531	79.30	3.122	14.30	0.563
60.33	2.375	0603	75.20	2.961	77.20	3.039	34.50	1.358	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
63.50	2.500	0635	78.30	3.083	80.30	3.161	34.50	1.358	82.55	3.250	13.50	0.531	85.73	3.375	14.30	0.563
66.68	2.625	0666	84.20	3.315	88.20	3.472	36.00	1.417	92.10	3.626	15.90	0.626	85.73	3.375	15.90	0.626
69.85	2.750	0698	87.40	3.441	91.40	3.598	36.00	1.417	95.25	3.750	15.90	0.626	88.90	3.500	15.90	0.626
73.03	2.875	0730	90.60	3.567	94.60	3.724	36.00	1.417	98.45	3.876	15.90	0.626	95.25	3.750	15.90	0.626
76.20	3.000	0762	93.70	3.689	95.50	3.760	36.00	1.417	101.65	4.002	15.90	0.626	98.43	3.875	15.90	0.626
79.38	3.125	0793	97.00	3.819	99.00	3.898	36.00	1.417	111.15	4.376	19.90	0.783	101.60	4.000	19.88	0.783
82.55	3.250	0825	100.00	3.937	102.00	4.016	36.00	1.417	114.30	4.500	19.90	0.783	104.78	4.125	19.88	0.783
85.73	3.375	0857	103.30	4.067	105.30	4.146	36.00	1.417	117.50	4.626	19.90	0.783	107.95	4.250	19.88	0.783
88.90	3.500	0889	106.40	4.189	108.50	4.272	36.00	1.417	120.65	4.750	19.90	0.783	111.13	4.375	19.88	0.783
92.08	3.625	0920	109.60	4.315	111.50	4.390	36.00	1.417	123.85	4.876	19.90	0.783	114.30	4.500	19.88	0.783
95.30	3.750	0953	112.80	4.441	115.00	4.528	36.50	1.437	127.00	5.000	19.90	0.783	117.48	4.625	19.88	0.783
98.00	3.875	0984	116.00	4.567	118.00	4.646	36.50	1.437	130.20	5.126	19.90	0.783	120.65	4.750	19.88	0.783
101.60	4.000	1016	119.20	4.693	121.50	4.783	36.50	1.437	133.35	5.250	19.90	0.783	123.83	4.875	19.88	0.783

11a

STANDARD FACE MATERIALS
 Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide
 Static Face: Stainless Steel, Ni-resist, Ceramic, Silicon Carbide, Tungsten Carbide
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits
 PRESSURE 350psi SPEED 25m/s
 TEMPERATURE -30 +200°C
 Dependent upon shaft diameter and speed + Temperature and media to be sealed



Type 40 is a multiple-spring, 'O'-ring mounted, set-screw driven, non-clogging, balanced mechanical seal. The balanced design, protected springs and dynamic 'O'-ring enable use in demanding applications. Available with a wide variety of seats, Types 40S & 40L are illustrated here.

STANDARD SIZES: METRIC SHAFTS

Shaft Size DØ		Size Code	D1		D3		D4		L1		L2		L3		Slot Width	
Metric	Inch		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
18.00	0.709	0180	33.00	1.299	32.50	1.280	34.00	1.339	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
19.00	0.748	0190	35.00	1.378	33.50	1.319	35.00	1.378	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
20.00	0.787	0200	35.00	1.378	34.50	1.358	36.00	1.417	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
22.00	0.866	0220	37.00	1.457	36.50	1.437	38.00	1.496	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
24.00	0.945	0240	39.00	1.535	38.50	1.516	40.00	1.575	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
25.00	0.984	0250	40.00	1.575	39.50	1.555	41.00	1.614	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
28.00	1.102	0280	43.00	1.693	42.50	1.673	44.00	1.732	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
30.00	1.181	0300	45.00	1.772	44.50	1.752	46.00	1.811	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
32.00	1.260	0320	48.00	1.890	46.00	1.811	48.00	1.890	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
33.00	1.299	0330	48.00	1.890	47.00	1.850	49.00	1.929	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
35.00	1.378	0350	50.00	1.969	49.30	1.941	51.00	2.008	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
38.00	1.496	0380	56.00	2.205	52.80	2.079	54.80	2.157	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
40.00	1.575	0400	58.00	2.283	56.00	2.205	58.00	2.283	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
42.00	1.654	0420	61.00	2.402	56.00	2.205	58.00	2.283	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
43.00	1.693	0430	61.00	2.402	59.00	2.323	61.00	2.402	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
44.00	1.732	0440	63.00	2.480	59.00	2.323	61.00	2.402	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
45.00	1.772	0450	63.00	2.480	59.00	2.323	61.00	2.402	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
48.00	1.890	0480	66.00	2.598	62.40	2.457	64.40	2.535	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
50.00	1.969	0500	70.00	2.756	65.60	2.583	67.60	2.661	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
53.00	2.087	0530	73.00	2.874	68.80	2.709	70.80	2.787	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
55.00	2.165	0550	75.00	2.953	70.80	2.787	73.00	2.874	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
58.00	2.283	0580	78.00	3.071	75.20	2.961	77.20	3.039	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
60.00	2.362	0600	80.00	3.150	75.20	2.961	77.20	3.039	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
63.00	2.480	0630	83.00	3.268	78.30	3.083	80.30	3.161	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
65.00	2.559	0650	85.00	3.346	84.20	3.315	88.20	3.472	36.50	1.437	14.50	0.571	13.00	0.512	5.00	0.197
68.00	2.677	0680	90.00	3.543	85.50	3.366	88.20	3.472	36.50	1.437	16.50	0.650	15.30	0.602	5.00	0.197
70.00	2.756	0700	92.00	3.622	87.50	3.445	91.40	3.598	36.50	1.437	16.50	0.650	15.30	0.602	5.00	0.197
75.00	2.953	0750	97.00	3.819	92.70	3.650	97.70	3.846	36.50	1.437	16.50	0.650	15.30	0.602	5.00	0.197
80.00	3.150	0800	105.00	4.134	100.00	3.937	104.00	4.094	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
85.00	3.346	0850	110.00	4.331	103.00	4.055	107.30	4.224	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
90.00	3.543	0900	115.00	4.528	109.60	4.315	113.60	4.472	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
95.00	3.740	0950	120.00	4.724	112.80	4.441	114.00	4.488	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
100.00	3.937	1000	125.00	4.921	117.50	4.626	119.00	4.685	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197

Suggested Operating Limits

PRESSURE 350psi SPEED 25m/s
TEMPERATURE -30 +200°C

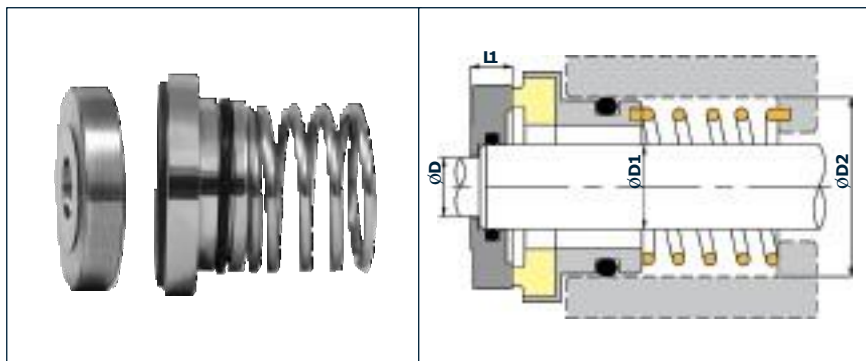
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide
Static Face: Ceramic, Silicon carbide, Tungsten Carbide

OTHER FACE MATERIALS TO ORDER

TYPE 94 STATIONARY SEALS TO SUIT TUCHENHAGEN® PUMPS



produce and stock a complete range of balanced seals to suit the Tuchenhagen® A and Z series pumps, seal types F1 to F5. Available with inserted carbon face seal heads, and inserted silicon carbide, or chrome dioxide coated stainless steel rotary counterfaces. E.P. 'O'-Rings are fitted as standard. If Nitrile or Viton® is required, please specify this at time of order.

STANDARD SIZES

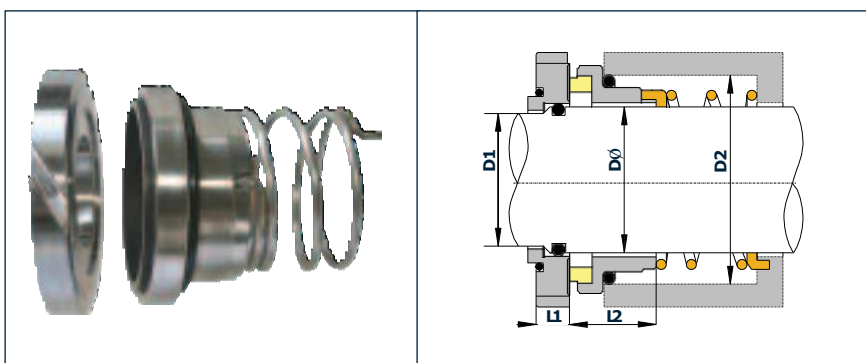
Metric Shaft size D	Size Code	D1	D2	L1
12	0120	16.0	30.0	7.0
18	0180	24.0	50.0	11.0
21	0210	25.0	50.0	11.0
28	0280	35.0	50.0	11.0
40	0400	50.0	64.0	14.0

CODING.

NB:- Shaft size is measured from the minimum ID of the rotary counterface. If Nitrile or Viton® is required, replace the E character in the code with an N or V. Where xxxx is stated in the code, add the relevant size code according to the dimension table.

- xxxx.94.E.D. Type 94 seal, with carbon faced head, and inserted silicon carbide counterface
- xxxx.94.E.O. Type 94 seal, with carbon faced head, and chrome dioxide coated counterface

TYPE B94 STATIONARY SEALS TO SUIT TUCHENHAGEN® PUMPS



Modified type 94 seals with turning vanes cut into the OD of the Rotary faces to agitate pumping media. Standard materials are solid steel rotary rings with inserted carbon faced Sprung statics. E.P. 'O'-Rings are fitted as standard. If Nitrile or Viton® is required, please specify this at time of order. All sizes are supplied complete with both running faces and stationary coil.

STANDARD SIZES

Metric Shaft size D	Size Code	D1	D2	L1	L2	OEM Pump Code
21.00	0210	18.00	40.00	10.00	28.00	VP 7.5
30.00	0300	22.00	55.00	11.00	30.00	VP 15
35.00	0350	30.00	55.00	11.00	30.00	VP 37

CODING.

Where XXXX is stated in the code, add the appropriate size code. If Viton® is required, replace the E character in the code with a V.

- XXXX.B94.E.P. Complete seal, with Stainless steel rotary face vs. inserted carbon face sprung stationary.



MECHANICAL SEALS TO SUIT REFRIGERATION OEM APPLICATIONS

Have extensive sealing experience within the refrigeration industry, and have developed a comprehensive range of seals, fitted with the specific elastomers required to suit the exacting, cryogenic duties and refrigerants commonly found. As there are a wide range of compressor models, and generally each compressor has model specific seal arrangements, have developed many seal designs to suit these compressor applications.

Furthermore these seals can be fitted without amendment to the existing housings. Our exact designs, excellent materials, wide stock range and the ability to manufacture to any industry design or requirement, complement the Refrigeration Seal range.

SEALS OFFERED FOR OEM COMPRESSOR MODELS

Bitzer® 4H, 6F & 6G Bock
AM & BFO Ranges Bock F,
FK & FX Ranges
Carrier® 05K
Carrier® 05G
Carrier® 05H
Copeland® 2CC, 4CC & 6CC
Copeland® 8CC
Dunham Bush® Big 4
Frick® RWB-11-100
Frick® RWB-11-222E
Frick® RWB-11-222H
Gram® HC & HL Ranges
Grasso® RC9, non-bellows
Grasso® RC11, non-bellows
J & E Hall® 3/6CP
J & E Hall® HS18-20 screw J
& E Hall® HS20-20 screw J
& E Hall® HS20-31 screw J
& E Hall® HS21-20 screw
J & E Hall® V54 6-cyl (1.1/2" Shaft)
J & E Hall® V54 8-cyl (1.3/4" Shaft)
J & E Hall® V92 and variants
J & E Hall® V127 Mk 1-5 J
& E Hall® V127 Mk 6
J & E Hall® V178
Howden® WGRB204
Howden® WRV163 & XRV163
Howden® WRV204 Mk4
Howden® WRV204 Mk5
Howden® WRV204 Mk6
Howden® XRV204

SEALS OFFERED FOR OEM COMPRESSOR MODELS

Howden® WRV205
Howden® WRV255 Mk1 to
4F Howden® WRV255 Mk5
Howden® WRV321
Lightfoot® VQ8
Lightfoot® VT5
Lightfoot® VT6
Lightfoot® A.F36 Mk 3A
Lightfoot® A.F50 & A.F54
Sabroe® 128, non-
bellows
Sabroe® 163, non-
bellows Sabroe® PKO
Sabroe® VMY Ranges
Sabroe® TSMC108 to 165
Sabroe® CM018
Sabroe® TCM024, 026 &
028 Sabroe® SMC100 to
104 Sabroe® TSMC108 to
165 Sabroe® HPC
Stal® S50 series
Stal® S70 series
Stal® P24 Stal®
P28 Stal® U
series
Thermo King® D214
Thermo King® 426 & 430
Thermo King® X426
Thermo King® X430
Thermo King® 426, X426 for
R134A and R404A refrigerant
gases
Witt® GP42 refrigeration
pump Witt® GP51
refrigeration pump



J & E Hall® V92



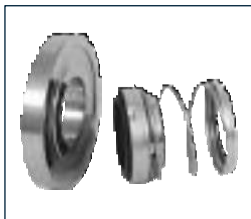
Howden® WRV205



Howden® WRV255 Mk 1



Sabroe® TCM028



Stal® P24



J & E Hall® HS18-20



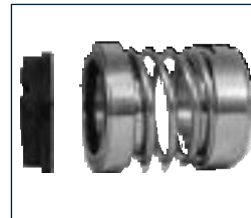
Grasso® RC9



Copeland® 4CC



Carrier® 05G



J & E Hall® V54



Sabroe® CM018



Sabroe® TSMC108

△ Direct Replacement Seals For Food, Beverage And Dairy Industries

offer the widest range of direct replacement seals to suit the most common and widely utilised pumps in the food process, beverage and dairy industries. All seals are manufactured to the highest standards using the highest quality materials and can be fitted to pumps without modification.

Within this range, now manufacture a range of seals specified to be compliant with FDA and European Regulations. For more information, please refer to our 'Technical and Material Standards' in Section 2 of this catalogue.



Section 11b

TYPE 50/1683 SEALS TO SUIT INOXPA®

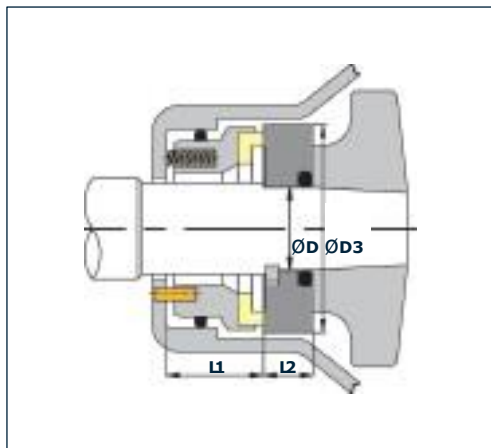
PROLAC AND SLR PUMPS

offer a range of seals to suit both single and double seal arrangements for Inoxpa Prolac® and SLR® Pumps.

Both single and double types of seal are of a unique design to directly replace the original seals, without any modifications to these pumps.



TYPE 50



A unique design of multi-spring seal, where the sprung component behaves as the stationary. Suits all Inoxpa Prolac® applications where the single, uncooled mechanical seal is required. This seal is also utilised as the internal seal in double, cooled seal arrangements.

CODES

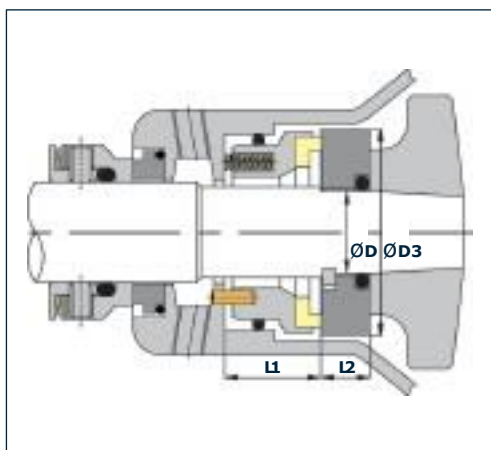
All Type 50 and 1683 seals are supplied as standard with Viton® 'O'-rings, if other materials are required please advise at the time of order.

Where xxxx is stated in the code, add the appropriate shaft size. If EP or Nitrile is required, replace the V in the code with an E or N respectively.

xxxx.50.V.P. Type 50, with stainless steel rotary and inserted Carbon faced multi-spring stationary.

xxxx.50.V.S. Type 50, with monolithic Silicon Carbide rotary and inserted Silicon Carbide multi-spring faced stationary.

xxxx.1683.V.P. Type 1683, with stainless-steel rotary and carbon seat. xxxx.1688.V.P. Type 1688, with stainless-steel rotary and carbon seat.



STANDARD SIZES

Inch Shaft Size D	Size Code	L1	L2	D3
0.625	0158	26.00	10.50	44.50
1.000	0254	26.00	10.00	53.50
1.500	0381	31.00	15.50	74.00

offer the Type 1683 range of seals to suit the Inoxpa® SLR pump, utilising a stainless-steel wave spring rotary with a unique, double 'O'-Ring mounted carbon stationary. The Type 1683 seal is available in four shaft sizes to suit the common SLR pumps.

Seals to suit Inoxpa Prolac® Pumps.		
PUMP MODEL	SEAL TYPE	EQUIVALENT
S-15, -20, -26, -28 & -35	5/8" Single-internal	0158.50.V.P.
S-15, -20, -26, -28 & -35	28mm Double-external seal	0280.1688.V.P.
S-38, -70 & -80 with 160kW motor	1.0" Single-internal	0254.50.V.P.
S-38, -70 & -80	35mm Double-external seal	0350.1688.V.P.
S-38, -70 & -80 with 180 or 200kW motor	1.1/2" Single-internal	0381.50.V.P.
S-38, -70 & -80	50mm Double-external seal	0500.1688.V.P.
S-38, -70 & -80, MR200-250 version	1.1/2" Single-internal	0381.50.V.P.
S-38, -70 & -80	65mm External seal	0650.1688.V.P.

Can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.



TYPE 9x SEALS TO SUIT

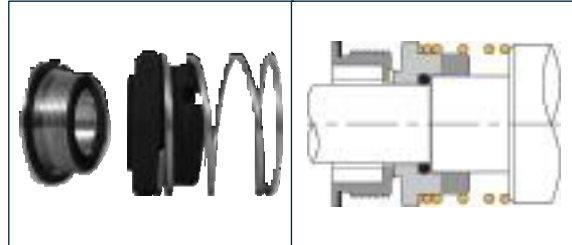
VARIOUS ALFA LAVAL®

PUMPS.

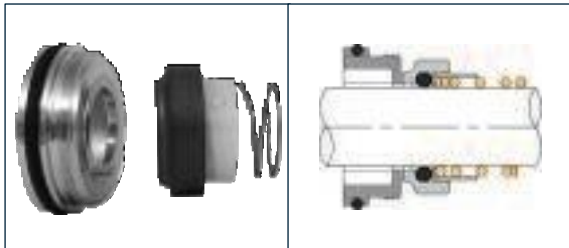
manufacture and stock a complete range to suit CMx, EMx, FMx, and GMx series pumps, as well as MR and LKH series pumps. Seals are available from stock with carbon or silicon carbide rotary heads vs. stainless steel or inserted silicon carbide faced left-hand threaded seats. E.P. 'O'-rings are fitted as standard, if another elastomer is required please advise at time of order.



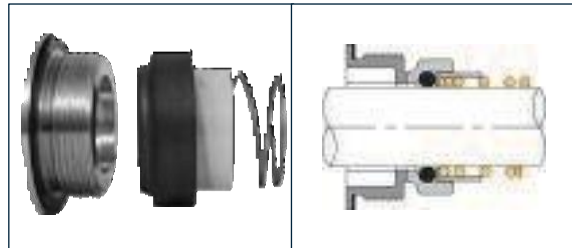
Type 91 22mm complete seal, designed to suit pump models CM1A, CM1B, CM1C, CM1D, EM1C and EM1D.



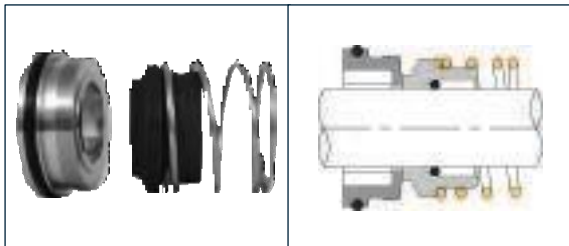
Type 91B 22mm complete seal, designed to suit pump models FM0, FM0S, FM1A, FM1AE, FM2A, FM3A and FM4A.



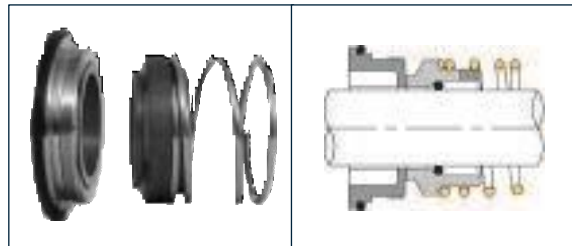
Type 93 22mm complete seal, designed to suit pump models MR166A, MR166B and MR166E.



Type 93B 22mm complete seal, designed to suit pump model ME155AE, GM1, GM1A, GM2 and GM2A.



Type 92 27mm complete seal, designed to suit pump models MR185A to MR200A.



Type 92 32mm complete seal, designed to suit pump models LKH5 through to LKH60 with single or flushed seals fitted. Type 92D 32mm complete double seal also available. Type 92 42mm complete seal, designed to suit pump models LKH70 through to LKH80 with single seals fitted.

CODING

If Nitrile or Viton® is required, replace the E character in the code with an N or V.
Where yyyy is stated in code, insert relevant shaft size, where xx is stated in code, insert relevant seal type

yyyy.xx.E.Q.	Complete seals, with carbon rotary head and stainless steel seat.
yyyy.xx.E.D.	Complete seals, with carbon rotary head and inserted silicon carbide seat.
yyyy.xx.E.S.	Complete seals, with silicon carbide head and inserted silicon carbide seat.
0320.92D.E.YC.	Complete double seals, carbon vs. inserted silicon carbide seat inboard and outboard.
yyyy.xx.E.C.SEAL	Rotary unit only, with carbon head.
yyyy.xx.E.S.SEAL	Rotary unit only, with silicon carbide head.

yyyy.xx.E.Q.STAT	Threaded seat unit, in solid stainless steel.
yyyy.xx.E.S.STAT	Threaded seat unit, in stainless steel with inserted silicon carbide face.

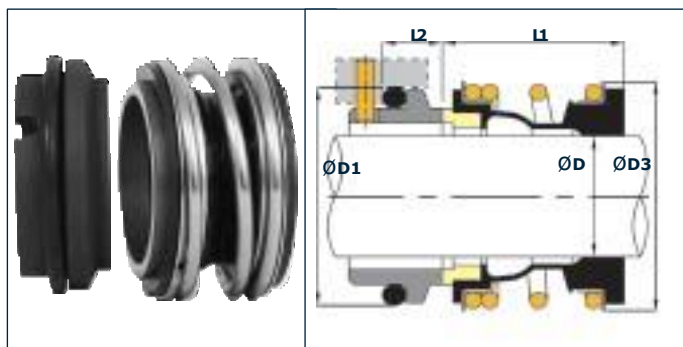
Also produce seals to suit other Alfa Laval® MR series pumps, models MR260A to MR300A, as well seals to suit Alfa Laval® Tri-Clover® pumps and face kits for LKH multi-stage pump models. Please ask for details.

Can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

SEALS TO SUIT ALFA LAVAL® EQUIPMENT

manufacture seals to suit the Alfa Laval® ALC, ALP and other Alfa Laval® pump and equipment ranges.

TYPE 19C

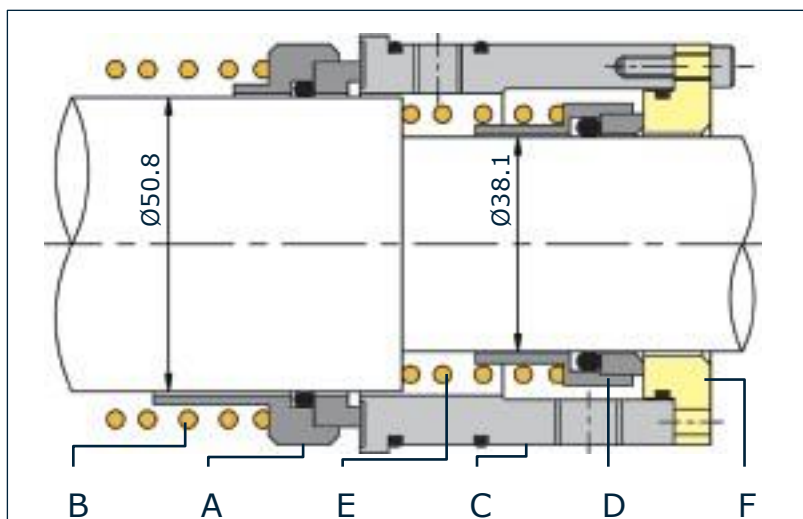


produce a special Type 19 seal to suit Alfa Laval ALC® series pumps, motor sizes from 1.5kW to 22kW. Available from stock with silicon carbide vs. carbon seat as standard, in all common elastomers.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D3	L1	L2
40	0400	58.00	60.00	30.00	14.00
53	0530	73.00	76.00	33.00	15.00
60	0600	80.00	85.00	38.00	15.00

SEALS TO SUIT ALFA LAVAL CONTHERM® DRYER SEAL SYSTEM



SHELLEND



2" FLUSH SINGLE



1.1/2" FLUSH SINGLE



2" NONFLUSH SINGLE

CODING.

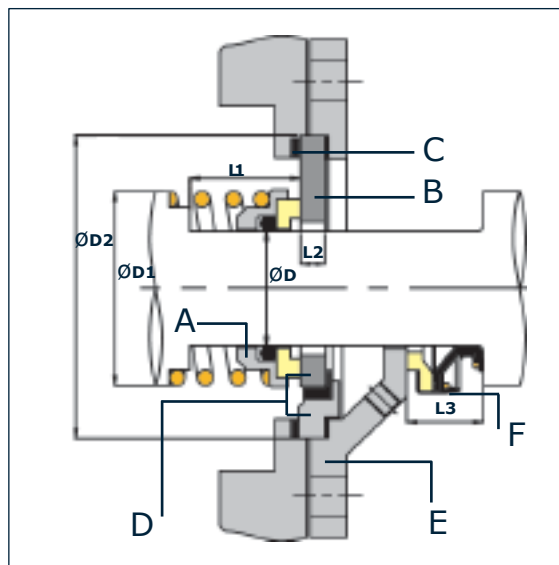
All components are supplied as standard with Nitrile 'O'-rings, if other materials are required please advise at time of order.

- A. SHELLEND SHELLEND.CARB 2.000" Outer shaft rotary head, with inserted tungsten carbide face.
- B. SHELLEND.COIL 2.000" Outer shaft rotary head, with inserted carbon face.
- C. 2" FLUSH SINGLE Spring to suit 2.000" outer shaft rotary head.
- D. 1.1/2" SHELLEND 2.000" Outer shaft collet, with chrome dioxide coated running face.
- E. 1.1/2" SHELLEND.COIL 1.1/2" Inner shaft rotary head, with inserted carbon face.
- F. 1.1/2" FLUSH SINGLE Spring to suit 1.1/2" inner shaft rotary head.
- G. 1.1/2" NONFLUSH SINGLE 1.1/2" Inner shaft bush, with chrome dioxide coated running face.

We also produce and stock an alternative component C, with a reduced length and no flush ports.

- C 2" NONFLUSH SINGLE 2.000" Outer shaft collet, with chrome dioxide coated running face.

△ TYPE 26 SEALS TO SUIT APV PUMA® PUMPS



Have been successfully supplying the dairy and beverage industries with seals to suit APV Puma® pumps for over 15 years. produce and stock all the seals and associated components commonly used on the 1.000" and 1.500" shaft Puma® pumps.

Every seal, seat and gasket component, used on the range of these pumps, is available ex-stock, in all common face and elastomer materials.

STANDARD SIZES

Shaft Size D	Size Code	D1	D2	L1	L2	L3
1.000	0254	41.20	68.20	25.40	7.80	14.00
1.500	0381	55.70	80.10	33.30	9.00	17.00

STOCK CODES.

Where XXXX is stated in the code, add 0254 for 1.000" or 0381 for 1.500" shaft size as required. If E.P. or Viton® is required, replace the N with an E or V respectively.

INTERNAL SEAL =A

- XXXX.26.N.C.SEAL Type 26 'O'-Ring mounted rotary with inserted carbon face.
- XXXX.26.N.S.SEAL Type 26 'O'-Ring mounted rotary with inserted silicon carbide face.
- XXXX.26.N.H.SEAL Type 26 'O'-Ring mounted rotary with inserted tungsten carbide face.

SEAT ARRANGEMENT ONE =B and C

- XXXX.26.S.S. Type 26 monolithic stainless steel stationary plate, lapped one side.
- XXXX.26.S.S.D. Type 26 monolithic stainless steel stationary plate, lapped both sides.
- XXXX.26.C.C.D. Type 26 monolithic ceramic stationary plate, lapped both sides.
- XXXX.26.N.C.GASK Gasket set, with flat and L-shaped gasket, for above plate seat.

SEAT ARRANGEMENT TWO =D and C

- XXXX.26.N.C.SEAT Type 26 boot mounted ceramic seat, inserted in stainless adaptor.
- XXXX.26.N.S.SEAT Type 26 boot mounted silicon carbide seat, inserted in stainless adaptor.
- XXXX.26.N.C.GASK Gasket set, with flat and L-shaped gasket, for above plate seat.

ADDITIONAL DOUBLE SEAL COMPONENTS,

FOR WATER JACKETED PUMPS, WITH EXTERNAL SEAL =E and F

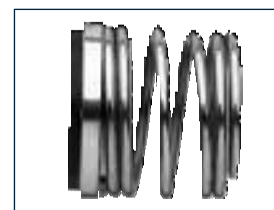
- XXXX.26.S.S.PLAT Type 26 stainless steel backing plate with flush connection holes.
- XXXX.18.N.C.SEAL Type 18 inboard rotary, Nitrile bellows and carbon face.

ANCILLARY INFORMATION.

All parts are fitted with Nitrile elastomers as standard. If E.P. or Viton® are required, please specify this at the time of order.

also manufacture and stock the following square-section replacement gaskets to suit the body of the APV Puma® pump.

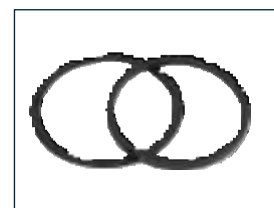
- P.7"BODYSEAL Square section Nitrile gasket, with 7.0" ID
- P.9"BODYSEAL Square section Nitrile gasket, with 9.0" ID
- P.11"BODYSEAL Square section Nitrile gasket, with 11.0" ID



XXXX.26.N.C.SEAL



XXXX.26.S.S.(D)



XXXX.26.GASK

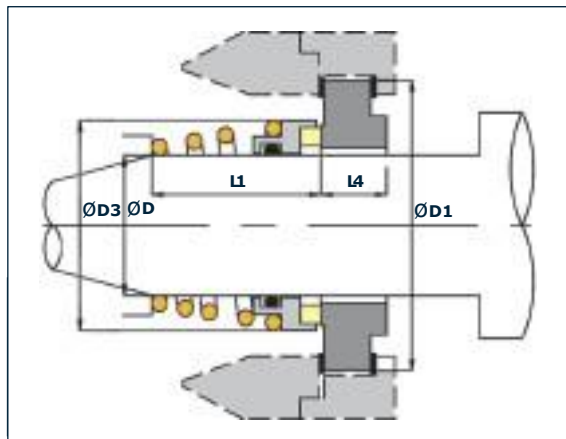


XXXX.26.S.S.PLAT

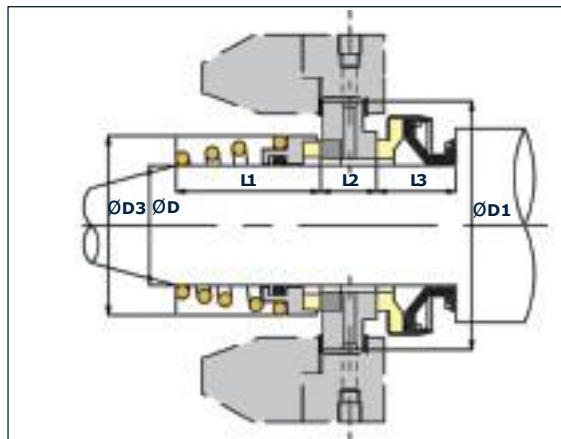
TYPE 16 SEALS TO SUIT APV W® AND APV W+® PUMPS

The APV W® and APV W+® pumps have been introduced to replace the APV Puma® pumps. manufacture and stock a complete range of mechanical seals designed to suit APV W® and APV W+® pumps, in single and double configuration.

SINGLE SEAL ARRANGEMENT AND STANDARD DIMENSIONS

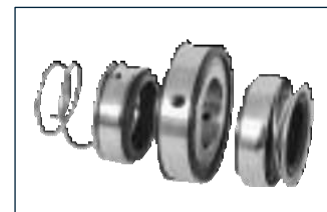


DOUBLE SEAL ARRANGEMENT AND STANDARD DIMENSIONS



STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D3	L1	L2	L3	L4
25	0250	52.00	38.20	25.40	17.00	14.00	16.00
35	0350	62.50	49.50	33.30	20.00	16.00	16.00



XXXX.16.DOUB.V.X

STOCK CODES.

Where XXXX is stated in the code, add 0250 or 0350 for 25mm or 35mm shaft size as appropriate. If E.P. is required, replace the N character in the code with an E.

SINGLE SEAL ARRANGEMENTS

- XXXX.16.N.D. Type 16 with carbon rotary face and monolithic silicon carbide seat
- XXXX.16.N.S. Type 16 with silicon carbide rotary face and monolithic SIC seat
- XXXX.16.N.H. Type 16 with tungsten carbide rotary face and monolithic TC seat
- XXXX.16.N.C.GASK Two-part gasket set for the Type 16 stationary



XXXX.16.N.X

DOUBLE SEAL ARRANGEMENTS

- XXXX.16.DOUB.N.W. Carbon vs silicon carbide inboard, stainless vs carbon outboard
- XXXX.16.DOUB.N.Y. Carbon vs silicon carbide inboard, silicon carbide vs carbon outboard
- XXXX.16.DOUB.N.WS. Silicon carbide vs silicon carbide inboard, stainless vs carbon outboard
- XXXX.16.DOUB.N.Z. Silicon carbide vs silicon carbide inboard, silicon vs carbon outboard
- XXXX.16.DOUB.N.ZS. Silicon carbide vs silicon carbide inboard, silicon vs silicon outboard
- XXXX.16.DOUB.N.ZH. Tungsten carbide vs tungsten inboard, tungsten vs tungsten outboard
- XXXX.16.D.NWSTATMON Central seat only, monolithic silicon carbide



XXXX.16.D.XX.STATMON

ANCILLARY INFORMATION.

Manufacture and stock replacement face kits for APV W+® pumps, available in carbon vs silicon carbide, or silicon carbide vs silicon carbide, with E.P., Nitrile or Viton® 'O'-rings. The kits include rotary and stationary faces, with two 'O'-rings to suit, and a replacement face pin.

- XXXX.16.PLUS.N.D. Type 16 PLUS face kit, silicon long face, carbon short face
- XXXX.16.PLUS.N.T. Type 16 PLUS face kit, with carbon long face, silicon carbide short face
- XXXX.16.PLUS.N.S. Type 16 PLUS face kit, with silicon carbide long face, silicon carbide short face

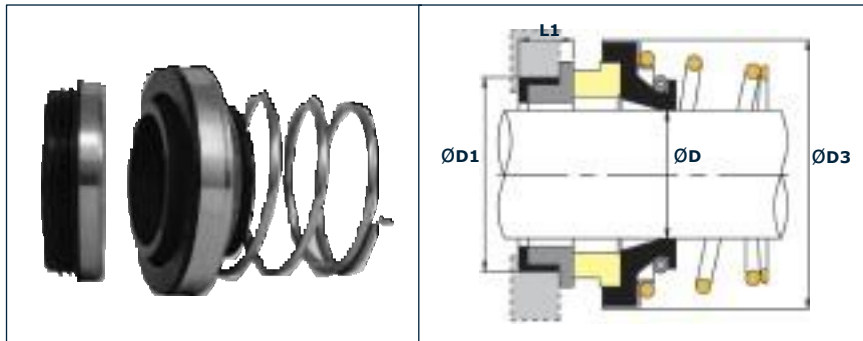


XXXX.16.PLUS.N.X

TYPE 29 SERIES SEALS TO SUIT APV® PUMPS

Produce and stock a wide range of mechanical seals designed to directly replace all other common APV® pump seals. We are continually extending this range, if what you require is not shown in this brochure, then please ask.

TYPE 29



Type 29, suitable for APV® ZMA, ZMB, ZMD, ZMS, ZMH & ZMK "Rosista®" and "Pasilac®" pumps. Available with carbon rotary face vs. stainless boot mounted seat as standard, or with hard silicon carbide faces, in all standard elastomers.

STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D3	L1	Pump Type
20	0200	30.00	40.60	9.80	ZMA, ZMB, ZMH-1, ZMH-2, ZMK-1 & ZMK-2 ZMS-3 & ZMS-4 ZMH-4, ZMK-3 & ZMD
25	0250	35.00	45.40	9.80	
30	0300	42.00	57.00	13.00	

CODING.

Where XXXX is stated in the code, add 0200, 0250 or 0300 for 20, 25 or 30mm as required. If E.P. or Viton® is required, replace the N character in the code with an E or V respectively.

XXXX.29.N.Q. Type 29 with carbon rotary face and monolithic stainless steel seat
 XXXX.29.N.S. Type 29 with silicon carbide rotary face and monolithic silicon seat.

TYPE 295

Wave-spring seal available in two sizes, 48mm for APV® ZMS-5 and 54mm for APV® ZMS-6 pumps. Rotary unit has a carbon inserted face, with a monolithic stainless steel pinned-seat. Inserted carbide faces are also available. Where XXXX is stated in the code, add 0480 or 0540 for required shaft size.

If Nitrile or Viton® is required, replace the E character in the code with an N or V respectively.



0480.295.V.Q

CODING.

XXXX.295.E.Q. Type 295 carbon rotary face vs. stainless steel seat, E.P. 'O'-rings
 XXXX.295.E.H. Type 295 Tungsten Carbide rotary face vs. Tungsten Carbide seat, E.P. 'O'-rings.



0286.292.X.C

TYPE 292

Bearing face kits, for 1.1/8" shaft size, suitable for APV, Osborne Craig® mixers. The bearing seat is monolithic carbon, with the bearing being monolithic ceramic.

CODING.

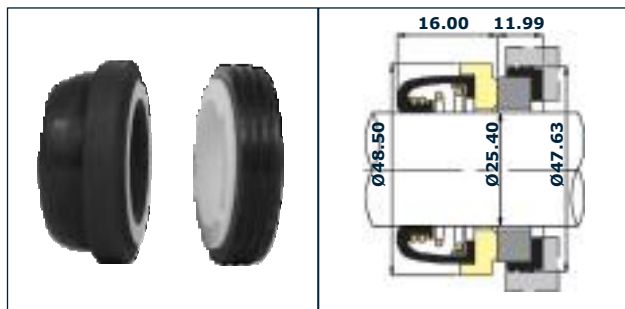
0286.292.X.C. 1.1/8" Type 292 complete bearing; ceramic bearing vs. carbon seat

FURTHER TYPES FOR APV® PUMPS.

Also produce mechanical seals to suit APV®, ZMS410 and ZM8-610 pumps. Type 294 repair kits for APV Howard® Cleanline R900® wave-spring seals, in single or double arrangement, consisting of rotary face with 'O'-Ring, stationary face with elastomer boot, and a wave-spring, are available usually from stock.

Can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

TYPE 66 RUBBER-ENCASED SEAL.



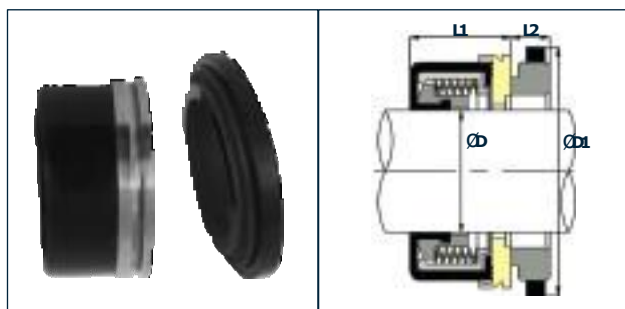
Produce a simple, 1.0" shaft size rubber encased, single-spring seal for use in several common food and dairy equipment applications.

CODING.

Available in Nitrile as standard, if E.P. is required, replace the N character in the code with an E.

- 0254.66.N.C. Type 66 seal, with carbon face rotary vs. ceramic boot mounted seat.
0254.66.N.C.SEAL Type 66, carbon-faced, rotary unit only.

TYPE 1644 RUBBER-ENCASED SEAL.



Type 1644 rubber-encased multi-spring seal, for use in the food, beverage and dairy industries applications. Available with Ni-Resist seal face and carbon seat-ring, Nitrile elastomers, other material combinations available to special order.

CODING.

Where XXXX is stated in the code, replace with 0381 or 0444 for 1.1/2" or 1.3/4" shaft sizes.

- XXXX.1644.N.K. Type 1644 seal, with Ni-Resist seal face vs. carbon seat, Nitrile elastomers

Shaft Size D	Size Code	D1	L1	L2
1.500	0381	75.70	33.00	16.00
1.750	0444	82.05	33.00	16.00

TYPE 1655 WAVE-SPRING SEALS TO SUIT IBEX® MOG PUMPS



manufacture and stock a range of face repair kits and barrels to suit MOG® and ALP® pumps.

Available with inserted carbon or silicon carbide faced rotary heads, and monolithic stainless steel, or inserted silicon carbide pinned seats as standard, with inserted tungsten carbide faces available to order. Repair kits comprise of rotary head with 'O'-Ring and wave-spring, with seat and 'O'-Ring. The barrels to complete the rotary unit are available as separate items. Other shaft sizes are available to suit APV® Howard CL® pumps.

CODING.

If Nitrile or Viton® is required, replace the E character in the code with an N or V. Where XXXX appears in the code, replace with relevant size code, according to the dimension table.

- XXXX.1655.E.Q. Face repair kit, with inserted carbon rotary face and stainless steel seat
XXXX.1655.E.S. Face repair kit, with inserted silicon carbide faces to rotary and seat
XXXX.1655.BARR Replacement rotary barrel, complete with grub screws.

Shaft Size DØ		Seal O.D.		Seat O.D.		Working Length	
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric
1.188	30.16	0300	40.75	1.604	42.70	1.681	10.00
1.375	34.90	0349	46.75	1.841	47.60	1.874	15.80
2.000	50.80	0508	65.40	2.575	66.60	2.622	11.50
3.000	76.20	0762	98.60	3.882	101.60	4.000	11.50

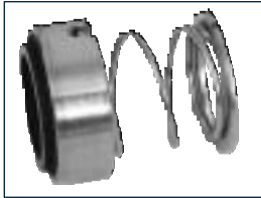
Further Types for the Food and Dairy Industries

As can be seen from this section of this brochure, offer an exceptional range of mechanical seals specifically for the Food and Dairy Industries, and this range is constantly under further expansion. For example, have recently developed repair kits to suit Maso-Sine® SPS pumps, consisting of ceramic rotary face with 'O'-Ring, pressure ring and double-wave spring, together with carbon, 'O'-Ring mounted seat. If you require details of these, or any other application not illustrated here, please ask. With our excellent design and production facilities, we are sure to be able to help.

MECHANICAL SEALS TO SUIT FRISTAM® PUMP APPLICATIONS

Fristam® seal, seat and collet arrangements are widely utilised in the Dairy and Whey industries. offer a complete range of components and collets which can be fitted directly into Fristam® pump applications without any need for amendment to the pump housing. These components are available either as individual components (see below) or as complete collet arrangements (see following pages) to suit your requirements. Only the most common components are shown, therefore If you require anything else, please contact us.

Individual Rotary Components;



XX08/12

Inboard Rotaries

Coding

Where XX is stated in the code, apply 22, 30 or 35 as appropriate to shaft size required.

XX08/12

Description

Inboard rotary, with base plate, with inserted carbon face

XX08/12.S.C.

Inboard rotary, with base plate, with inserted silicon carbide face

XX08/12.T.C.

Inboard rotary, with base plate, with inserted tungsten carbide face

Note: 35mm has a right hand coil with No base plate

Outboard Rotaries

These do not have a base plate and have left hand springs.

XX08/12B

Outboard rotary (no base plate), with inserted carbon face

XX08/12B.S.C

Outboard rotary (no base plate), with inserted silicon carbide face

XX08/12B.T.C.

Outboard rotary (no base plate), with inserted tungsten carbide face

Alternative Rubber Encased Rotaries.

2209/1

22mm Outboard encased rotary, with carbon face

2209/2

22mm Inboard encased rotary, with carbon face

2209/3

22mm Outboard encased rotary, with carbon face and garter spring

3009/1

30mm Outboard encased rotary, with carbon face

3009/2

30mm Inboard encased rotary, with carbon face

3009/3

30mm Outboard encased rotary, with carbon face and garter spring



2209/1



XX08/12B



2209/2 & 3009/2

Individual Rotary Components;

'O'-Ring Mounted Stationaries.

Where XX is stated in the code, apply 22, 30 or 35 as appropriate to shaft size required.

XX06/61

Inboard pinned-seat, monolithic stainless steel

XX06/61.S.C.

Inboard pinned-seat, with inserted silicon carbide face

XX06/61.S.C.MON

Inboard pinned-seat, monolithic silicon carbide

XX06/61.T.C.

Inboard pinned-seat, with inserted tungsten carbide face

XX06/61.T.C.MON

Inboard pinned-seat, monolithic tungsten carbide

3006/8

Inboard double 'O'-Ring seat, monolithic stainless steel, 30mm

XX05/6

Outboard seat, monolithic stainless steel

XX05/6.S.C.

Outboard seat, with inserted silicon carbide face

XX05/6.S.C.MON

Outboard seat, monolithic silicon carbide

XX05/6.T.C.

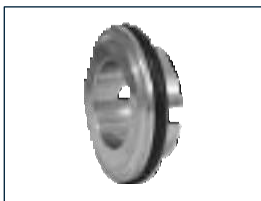
Outboard seat, with inserted tungsten carbide face

XX05/6.T.C.MON

Outboard seat, monolithic tungsten carbide

2207/1

Outboard seat, monolithic ceramic (22mm only)



XX06/61



2209/3 & 3009/3



XX05/6



2204/9

Individual Rotary Components;

Coding

2201/1

Description

Outer collet, without internal carbon bush

2201/2

Outer collet, with internal carbon bush

2201/3

Outer collet, with internal carbon bush and reduced ID dimension at internal flush port.

2204/9

Replacement carbon bush for the above collets.

2201/4

Collet for single seal arrangement.



2201/1



XX01/1



2201/2 OR 2201/3

Where XX is stated in the following codes, apply

30 or 35 as appropriate to shaft size required. Not Available in 22mm

XX01/1

Centre collet, to accept inboard and outboard seats

XX01/2

Centre seat with lapped faces, monolithic stainless steel

XX01/2.CER

Centre seat with lapped faces, monolithic ceramic

XX01/2.S.C.MON

Centre seat with lapped faces, monolithic silicon carbide



XX01/2

11b

Can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

MECHANICAL SEALS TO SUIT FRISTAM® PUMP APPLICATIONS



2201/5 & 2201/51

ADDITIONAL COLLET COMPONENTS;

For line diagrams please see following pages.

CODING	DESCRIPTION
2201/5	Outer collet, with internal carbon bush
2201/51	Outer collet, with internal carbon bush
3001/6	Outer collet, with internal carbon bush
3501/7	Outer collet, with internal carbon bush and external gland plate.
3501/7.GLAN	Gland plate for above collet
2201/8	Outer collet, with internal carbon bush
2201/91	Outer collet, without internal carbon bush
2204/6	Replacement carbon bush for 2201/5 collet
2204/9	Replacement carbon bush for 2201/51 collet
3004/6	Replacement carbon bush for 3001/6 collet
3004/7	Replacement carbon bush for 3501/7 collet
2204/3	Replacement carbon bush for 2201/8 collet



3501/7 with gland fitted



2201/8

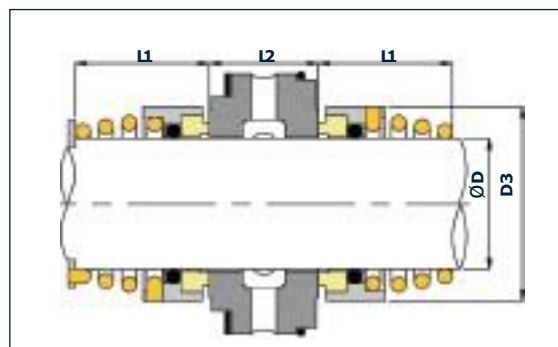


3006/8

GASKET-MOUNTED CENTRAL STATIONARY COMPONENTS;

Where XX is started please add relevant size code.

2205/1 & XX05/2 Arrangement



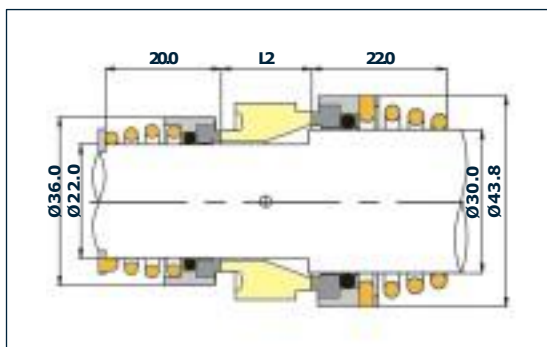
XX08/12

INBOARD
ROTARY

XX08/12B

OUTBOARD
ROTARY

2205/3 Arrangement



2208/12

INBOARD
ROTARY

3008/12B

OUTBOARD
ROTARY



2205/1 & XX05/2

Metric Shaft Size D	D1	D3	L1	L2
22	50.0	36.0	20.0	22.5
22	44.7	36.0	20.0	31.0
30	60.0	43.8	22.0	28.0
35	64.0	48.9	26.0	30.0
22/30	45.0	See Above Diagram		29.7



2205/2.CARB

CODING	DESCRIPTION
2205/1	Central Gasket Seat in Stainless Steel
2205/2	Central Gasket Seat in Stainless Steel
2205/2.CARB	Central Gasket Seat in Carbon

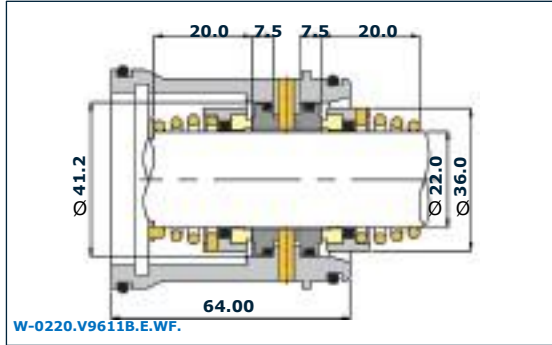
CODING	DESCRIPTION
3005/2	Central Gasket Seat in Stainless Steel
3505/2	Central Gasket Seat in Stainless Steel
2205/3.CARB	Central Gasket Seat for Stepped Shaft, in Carbon

EQUIVALENTS TO REPLACE FRISTAM® COLLET ARRANGEMENTS

supply from stock complete seal units for Fristam® pumps, based on the extensive range of components. These complete seal units directly replace the Fristam® original collet assembly while giving the benefits of quality and reliability.

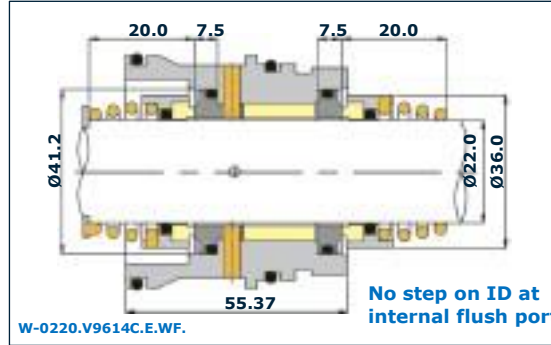
The following illustrations only show the most common arrangements for each collet style, please ask for alternatives, we have a huge range of variations available to suit your requirements.

2201/1 Collet Arrangement



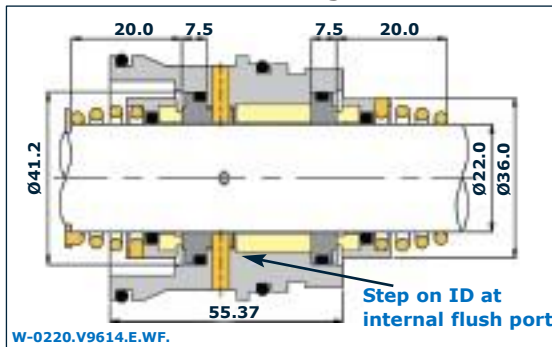
2208/12 INBOARD ROTARY
2206/61 INBOARD STAT
2205/6 OUTBOARD STAT
XX08/12B OUTBOARD ROTARY

2201/2 Collet Arrangement



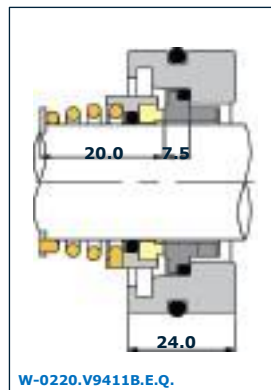
2208/12 INBOARD ROTARY
2206/61 INBOARD STAT
2204/9 CARBON BUSH
2205/6 OUTBOARD STAT
2208/12B OUTBOARD ROTARY

2201/3 Collet Arrangement



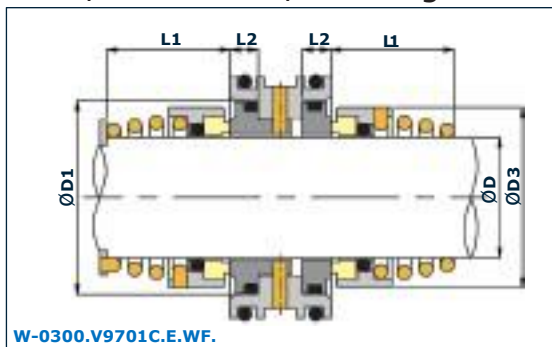
2208/12 INBOARD ROTARY
2206/61 INBOARD STAT
2204/9 CARBON BUSH
2205/6 OUTBOARD STAT
2208/12B OUTBOARD ROTARY

2201/4 Collet Arrangement



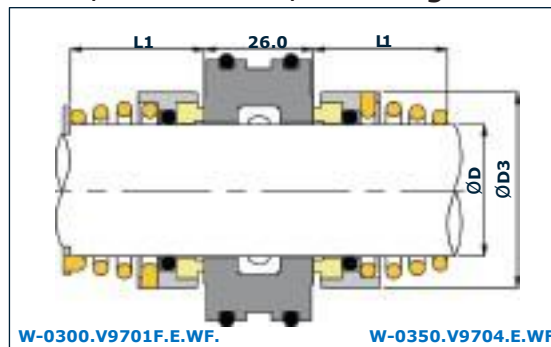
2201/4

3001/1 and 3501/1 Arrangement



XX08/12 INBOARD ROTARY
XX06/61 INBOARD STAT
XX05/6 OUTBOARD STAT
XX08/12B OUTBOARD ROTARY

3001/2 and 3501/2 Arrangement



XX08/12 INBOARD ROTARY
XX08/12B OUTBOARD ROTARY

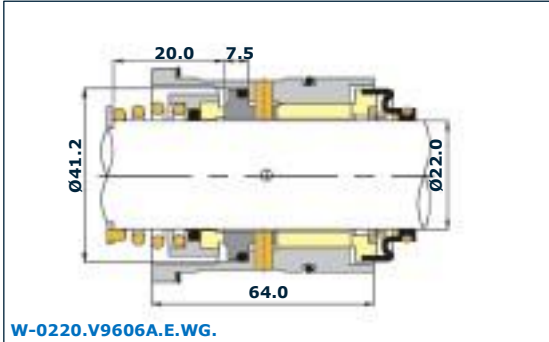
30/35mm Collet Assembly Dimensions	Metric Shaft Size D	Size Code	D1	D3	L1	L2
	30	0300	48.0	43.8	22.0	7.6
	35	0350	55.5	48.9	26.0	8.6

EQUIVALENTS TO REPLACE FRISTAM® COLLET ARRANGEMENTS

To aid the identification of the correct seat unit, the code is derived from the original seal code, with a "W-V" prefix, and a standard material code suffix. For example, a seal to replace code "9.611b" would be W-V9611B.E.WF., where the E denotes E.P. elastomers, and WF denotes a double seal, with carbon vs 316 stainless steel running faces inboard and outboard.

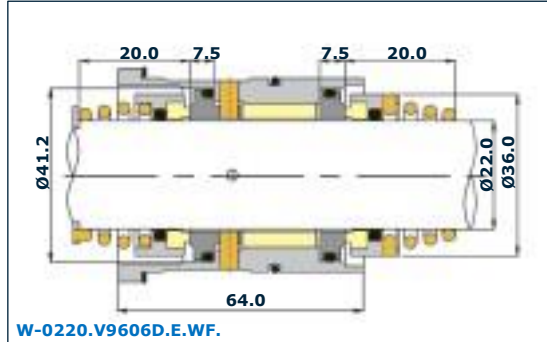
The following illustrations only show the most common arrangements for each collet style, please ask for alternatives, we have a huge range of variations available to suit your requirements.

2201/5 Collet Arrangement



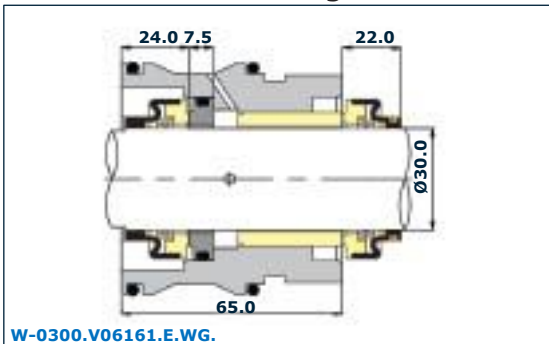
2208/12	2206/61	2204/6	2209/3
INBOARD	INBOARD	CARBON	OUTBOARD
ROTARY	STAT	BUSH	ROTARY

2201/51 Collet Arrangement



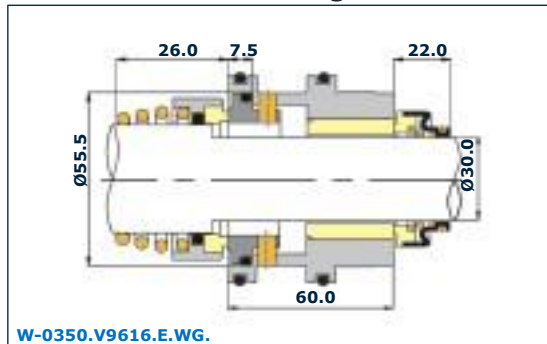
2208/12	2206/61	2204/9	2205/6	2208/12B
INBOARD	INBOARD	CARBON	OUTBOARD	OUTBOARD
ROTARY	STAT	BUSH	STAT	ROTARY

3001/6 Collet Arrangement



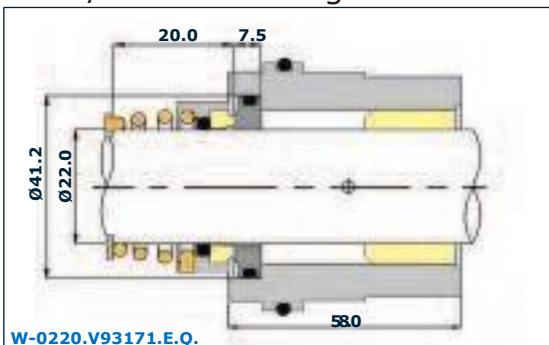
3009/2	3005/6	3004/6	3009/3
INBOARD	INBOARD	CARBON	OUTBOARD
ROTARY	STAT	BUSH	ROTARY

3501/7 Collet Arrangement



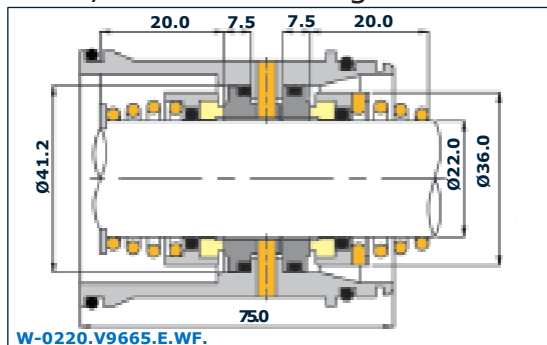
3508/12	3506/61	3004/7	3009/3
INBOARD	INBOARD	CARBON	OUTBOARD
ROTARY	STAT	BUSH	ROTARY

2201/8 Collet Arrangement



2208/12	2205/6	2204/3
INBOARD	INBOARD	CARBON
ROTARY	STAT	BUSH

2201/91 Collet Arrangement

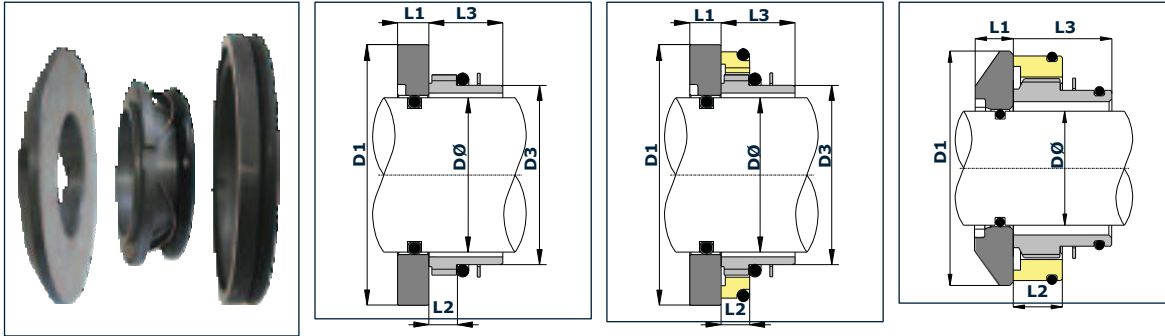


2208/12	2206/61	2205/6	2208/12B
INBOARD	INBOARD	OUTBOARD	OUTBOARD
ROTARY	STAT	STAT	ROTARY

MECHANICAL SEALS TO SUIT WAUKESHA® UNIVERSAL SERIES PUMPS

Can now offer replacement seals for the common models of Waukesha® Universal-series pumps. These seals comprise complete seals with rotary and inner and outer static faces, 'O'-rings and wave-springs as required. The Type 87 is designed for the Universal I®-series of pumps, Type 88 is designed for Universal II®-series of pumps. Rotary with inner face is Type 87 or 88. Rotary with inner and outer statics is Type 87A or 88A. The profile of the reverse of the rotary face can be flat or sloped depending on shaft size. Details are included in the data table below.

Rotaries faces are ceramic or monolithic silicon carbide as standard. Inner statics will be carbon or silicon carbide, outer statics are always carbon. 'O'-rings are normally E.P. but Viton® or nitrile can be supplied to order.



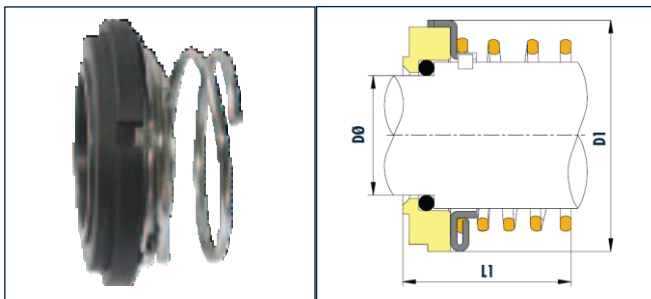
Type 87 Table for the Universal I®-series of pumps

Shaft Size DØ		Size Code	D1		D3		L1		L2		L3		OEM SEAL CODE	Face Profile
Inch	Metric		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch		
1.125	28.60	0286	63.90	2.516	37.50	1.476	8.00	0.315	10.50	0.413	19.10	0.752	U6, U14, U15, U18, U24	SLOPE
1.500	38.10	0381	80.50	3.169	43.80	1.724	8.50	0.335	11.50	0.453	17.00	0.669	U30, U34	SLOPE
1.875	47.60	0476	94.20	3.709	56.60	2.228	13.80	0.543	13.50	0.531	32.50	1.280	U60, U64, U130, U134	FLAT
2.750	69.80	0698	114.50	4.508	79.00	3.110	13.80	0.543	13.50	0.531	32.50	1.280	U220, U224	FLAT

Type 88 Table for the Universal II®-series of pumps

Shaft Size DØ		Size Code	D1		D3		L1		L2		L3		OEM SEAL CODE	Face Profile
Inch	Metric		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch		
1.250	31.70	0317	63.50	2.500	39.20	1.543	10.30	0.406	11.60	0.457	10.60	0.417	006U2, 015U2, 018U2	SLOPE
1.625	41.20	0412	80.10	3.154	50.00	1.969	10.30	0.406	9.00	0.354	18.30	0.720	030U2	SLOPE
2.000	50.80	0508	98.40	3.874	63.20	2.488	13.80	0.543	12.00	0.472	25.40	1.000	045U2, 060U2, 130U2	FLAT
2.750	69.80	0698	116.00	4.567	112.80	4.440	13.80	0.543	12.00	0.472	25.40	1.000	180U2, 220U2	FLAT

MECHANICAL SEALS TO SUIT TRI-CLOVER® C-SERIES PUMPS



Manufacture direct replacement rotary parts for the Common models of Tri-Clover® Tri-Flo® pumps. The Type 293 is an 'O'-ring, external mounted, hydraulically-balanced seal to replace the Tri-Clover® "Type-D" seal. Clamped seats with PTFE gaskets are also available to combine with the Type 293 rotary to replace the "Type-DG" seal, details available on request.

Rotary faces are carbon as standard, with silicon carbide available to order.

'O'-ring material is normally E.P. or Viton®.

Shaft Size DØ		Size Code	D1		L1		OEM SEAL CODE
Inch	Metric		Metric	Inch	Metric	Inch	
0.750	19.10	0191*	47.00	1.850	39.50	1.555	C114, SP114
1.125	28.60	0286	54.00	2.125	39.00	1.535	C216, SP216
1.250	31.70	0317	54.40	2.141	60.00	2.362	-
1.500	38.10	0381	66.60	2.612	33.50	1.319	C218, C328, SP218, SP328

* Size 0.750" (19.10mm) is supplied complete with set-screw sleeve.

SEALS TO SUIT APV® HOWARD & CREPACO PUMPS

produce and stock a range of seals to directly replace the two common seals types found fitted to these pumps. The most common seal Types are illustrated. If what you require is not shown in this section, then please ask.

TYPE 1655 WAVE-SPRING SEALS.

manufacture and stock a range of complete wave-spring seals to suit the common sizes of Howard® and Crepaco® Cleanline (CL) pumps. Available with inserted carbon faced rotaries running with monolithic stainless steel pinned 'O'-ring mounted seats.



CODING

Where XXXX is stated in the code, add required shaft size, code.

If Nitrile or Viton® is required, replace the E character in the code with an N or V respectively.

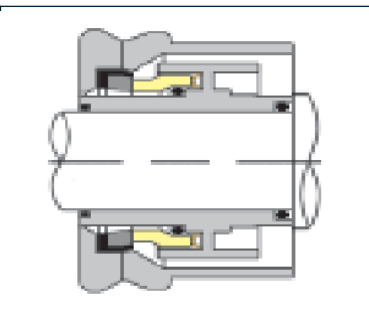
XXXX.1655.E.Q. Type 1655 complete seal, with carbon rotary face vs. stainless steel seat, E.P. 'O'-rings

Shaft Size	Size Code	Suits Pump Models
1.1/8	0286	CL 0S & CL 1
1.7/8	0476	CL 2
2.1/8	0539	CL 3

This table applies to both Type 1655 and Type 294 seals

TYPE 294 WAVE-SPRING SEAL KITS.

Manufacture and stock a range of complete wave-spring seal kits to suit the common sizes of Howard® and Crepaco® Cleanline (CL) pumps fitted with the R900® seal. Available with carbon or silicon carbide rotary faces running with silicon carbide boot-mounted seats. Kits include rotary face with 'O'-ring and wave spring, and stationary ring fitted with boot.



CODING

Where XXXX is stated in the code, add required shaft size according to the Type 1655 table above.

If Viton® is required, replace the E character in the code with a V.

XXXX.294.E.D. Type 294 complete seal kit, with carbon rotary face vs. silicon carbide seat, E.P. elastomers.

XXXX.294.E.S. Type 294 complete seal kit, with silicon carbide rotary and stationary faces, E.P. elastomers.

TYPE 1650 WAVE-SPRING SEAL KITS.

Manufacture and stock a range of complete wave-spring seal kits to suit the common sizes of Johnson® OL pumps. Available with inserted carbon or silicon carbide rotary faces running with monolithic stainless steel or inserted silicon carbide stationary faces. Kits include rotary face with 'O'-ring and wave spring, and stationary ring with 'O'-ring.



CODING

Where XXXX is stated in the code, add required shaft size, code. If Viton® is required, replace the E character in the code with a V.

XXXX.1650.E.Q. Type 1650 seal kit, with carbon rotary face vs. stainless steel stationary, E.P. elastomers.

XXXX.1650.E.S. Type 1650 seal kit, with silicon carbide rotary and stationary faces, E.P. elastomers.

XXXX.1650.E.T. Type 1650 seal kit, with silicon carbide rotary and carbon stationary faces, E.P. elastomers.

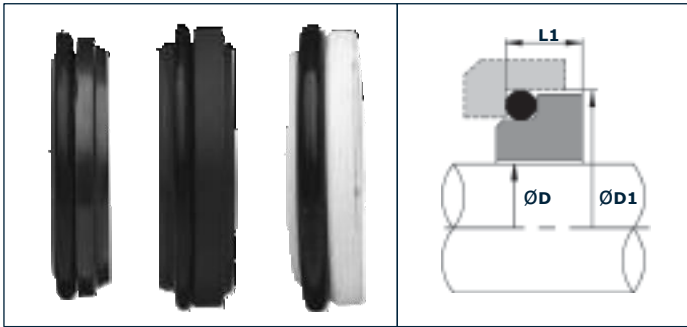
Size Code	Suits Pump Models
0240	OL1
0400	OL2
0530	OL3
0750	OL4

△ **Stationary Seat Types,
Clamp Rings. Seal Repair,
Fitting, Identification**



Section 12

COMMON O'-RING MOUNTED SEATS



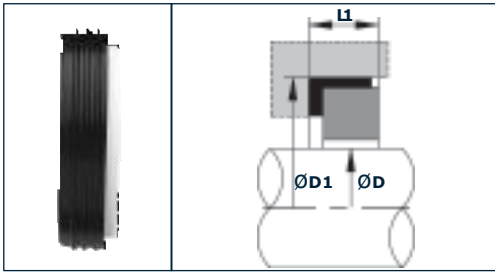
Common O'-Ring Mounted Short Stationary designs to suit DIN and other standard housings. These short 'O'-Ring Mounted Seats are not pinned and rely upon compression on the 'O'-Ring for retention. Consideration should be given to Long Pinned Seats or Boot Mounted Seats where conditions necessitate.

STANDARD SIZES

Metric Shaft Size D	Size Code	Type 8/19 STD		Type 8B		Type 12		Type 12 DIN		Type 13		Type 13 DIN	
		D1	L1	D1	L1	D1	L1	D1	L1	D1	L1	D1	L1
10	0100	19.2	6.6	19.2	7.1	18.1	5.5	21.0	7.0	18.1	5.5	21.0	7.0
11	0110	-	-	-	-	20.6	5.5	-	-	20.6	5.5	-	-
12	0120	21.6	5.6	21.6	7.6	20.6	5.5	23.0	7.0	20.6	5.5	23.0	7.0
13	0130	-	-	-	-	23.1	6.0	-	-	23.1	6.0	-	-
14	0140	24.6	5.6	24.6	7.6	23.1	6.0	25.0	7.0	23.1	6.0	25.0	7.0
15	0150	24.6	6.6	24.6	8.6	26.9	7.0	-	-	26.9	7.0	-	-
16	0160	28.0	7.5	28.0	9.0	26.9	7.0	27.0	7.0	26.9	7.0	27.0	7.0
17	0170	-	-	-	-	26.9	7.0	-	-	26.9	7.0	-	-
18	0180	30.0	8.0	30.0	10.0	30.9	8.0	33.0	10.0	30.9	8.0	33.0	10.0
19	0190	31.0	7.5	31.0	9.0	30.9	8.0	-	-	30.9	8.0	-	-
20	0200	35.0	7.5	35.0	9.5	30.9	8.0	35.0	10.0	30.9	8.0	35.0	10.0
21	0210	-	-	-	-	35.4	8.0	-	-	35.4	8.0	-	-
22	0220	35.0	7.5	35.0	9.5	35.4	8.0	37.0	10.0	35.4	8.0	37.0	10.0
23	0230	-	-	-	-	35.4	8.0	-	-	35.4	8.0	-	-
24	0240	38.0	7.5	38.0	9.5	35.4	8.0	39.0	10.0	35.4	8.0	39.0	10.0
25	0250	38.0	7.5	38.0	9.5	38.2	8.5	40.0	10.0	38.2	8.5	40.0	10.0
26	0260	40.0	8.0	40.0	10.0	38.2	8.5	-	-	-	-	-	-
28	0280	42.0	9.0	42.0	11.0	43.3	9.0	43.0	10.0	43.3	9.0	43.0	10.0
29	0290	-	-	-	-	43.3	9.0	-	-	43.3	9.0	-	-
30	0300	45.0	10.5	45.0	11.0	43.3	9.0	45.0	10.0	43.3	9.0	45.0	10.0
32	0320	48.0	10.5	48.0	11.0	43.3	9.0	48.0	10.0	43.3	9.0	48.0	10.0
33	0330	-	-	-	-	53.5	11.5	48.0	10.0	53.5	11.5	48.0	10.0
35	0350	52.0	11.0	52.0	11.5	53.5	11.5	50.0	10.0	53.5	11.5	50.0	10.0
38	0380	55.0	10.3	55.0	11.5	60.5	11.5	56.0	13.0	60.5	11.5	56.0	13.0
40	0400	58.0	10.8	58.0	11.5	60.5	11.5	58.0	13.0	60.5	11.5	58.0	13.0
42	0420	62.0	12.0	62.0	14.3	60.5	11.5	-	-	-	-	-	-
43	0430	62.0	12.0	62.0	14.3	60.5	11.5	61.0	13.0	-	-	-	-
44	0440	-	-	-	-	65.5	11.5	-	-	-	-	-	-
45	0450	64.0	11.6	64.0	14.3	65.5	11.5	63.0	13.0	-	-	-	-
48	0480	68.4	11.6	68.4	14.3	65.5	11.5	66.0	13.0	-	-	-	-
50	0500	69.3	11.6	69.3	14.3	72.5	11.5	70.0	14.0	-	-	-	-
53	0530	-	-	-	-	-	-	73.0	14.0	-	-	-	-
55	0550	75.4	13.3	75.4	15.3	72.5	11.5	75.0	14.0	-	-	-	-
58	0580	78.4	13.3	78.4	15.3	-	-	78.0	14.0	-	-	-	-
60	0600	80.4	13.3	80.4	15.3	79.3	11.5	80.0	14.0	-	-	-	-
63	0630	-	-	-	-	-	-	83.0	14.0	-	-	-	-
65	0650	85.4	13.0	85.4	15.3	84.5	11.5	85.0	14.0	-	-	-	-
68	0680	91.5	13.7	91.5	16.0	-	-	90.0	16.0	-	-	-	-
70	0700	92.0	13.0	92.0	15.3	89.5	11.5	92.0	16.0	-	-	-	-
75	0750	99.0	14.0	99.0	15.3	94.5	11.5	97.0	16.0	-	-	-	-
80	0800	104.0	15.0	104.0	16.3	99.5	11.5	105.0	18.0	-	-	-	-
85	0850	109.0	14.8	-	-	105.5	13.5	110.0	18.0	-	-	-	-
90	0900	114.0	14.8	-	-	111.5	13.5	115.0	18.0	-	-	-	-
95	0950	120.3	15.8	-	-	116.5	13.5	120.0	18.0	-	-	-	-
100	1000	123.3	15.8	-	-	119.5	13.5	125.0	18.0	-	-	-	-

STANDARD SEAT MATERIALS Carbon,
Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER SEAT MATERIALS TO ORDER

BOOT MOUNTED SEATS



offer a wide variety of stock Boot Mounted Seats, to suit a variety of different housings and working length standards, as well as different ring I.D.'s to track against all Seal faces. Boot Mounted Seats offer optimum cost and performance benefits and are widely utilised. Please specify your shaft size because each seat size shown has a unique I.D.

TYPES 11 & 1511 STANDARD SIZES

Shaft Size DØ		D1		L1	
Inch	Metric	Metric	Inch	Metric	Inch
0.500	12,13	25.40	1.000	7.93	0.312
0.625	14,15,16	31.75	1.250	10.28	0.405
0.750	18,19	34.93	1.375	10.26	0.404
0.875	20,22	38.10	1.500	10.28	0.405
1.000	24,25	41.28	1.625	11.10	0.437
1.125	28	44.44	1.750	11.10	0.437
1.250	30,32	47.63	1.875	11.10	0.437
1.375	33,34,35	50.80	2.000	11.10	0.437
1.500	38	53.98	2.125	11.10	0.437
1.625	40	60.33	2.375	12.70	0.500
1.750	43,44,45	63.50	2.500	12.70	0.500
1.875	48	69.85	2.750	12.70	0.500
2.000	50	69.85	2.750	12.70	0.500
2.125	53	76.20	3.000	14.28	0.562
2.250	55	79.38	3.125	14.28	0.562
2.375	58,60	82.55	3.250	14.28	0.562
2.500	63	85.73	3.375	14.28	0.562
2.625	65	85.73	3.375	15.90	0.626
2.750	68,70	88.90	3.500	15.90	0.626
2.875	73	95.25	3.750	15.90	0.626
3.000	75	98.43	3.875	15.90	0.626

TYPES 20 & 1520 STANDARD SIZES

Shaft Size DØ		D1		L1	
Inch	Metric	Metric	Inch	Metric	Inch
0.375	10	24.60	0.969	8.74	0.344
0.500	12,13	27.79	1.094	8.74	0.344
0.625	14,15,16	30.95	1.219	10.32	0.406
0.750	18,19	34.15	1.344	10.32	0.406
0.875	20,22	37.30	1.469	10.32	0.406
1.000	24,25	40.50	1.594	10.32	0.406
1.125	28	47.63	1.875	11.99	0.472
1.250	30,32	50.80	2.000	11.99	0.472
1.375	33,34,35	53.98	2.125	11.99	0.472
1.500	38	57.15	2.250	11.99	0.472
1.625	40	60.35	2.376	11.99	0.472
1.750	43,44,45	63.50	2.500	11.99	0.472
1.875	48	66.70	2.626	11.99	0.472
2.000	50	69.85	2.750	13.50	0.531
2.125	53	73.05	2.876	13.50	0.531
2.250	55	76.20	3.000	13.50	0.531
2.375	58,60	79.40	3.126	13.50	0.531
2.500	63	82.55	3.250	13.50	0.531
2.625	65	92.10	3.626	15.90	0.626
2.750	68,70	95.25	3.750	15.90	0.626
2.875	73	98.45	3.876	15.90	0.626
3.000	75	101.65	4.002	15.90	0.626
3.125	-	111.15	4.376	20.00	0.787
3.250	80	114.30	4.500	20.00	0.787
3.375	85	117.50	4.626	20.00	0.787
3.500	-	120.65	4.750	20.00	0.787
3.625	90	123.85	4.876	20.00	0.787
3.750	95	127.00	5.000	20.00	0.787
3.875	-	130.20	5.126	20.00	0.787
4.000	100	133.35	5.250	20.00	0.787

TYPES 19B/24 STANDARD SIZES

Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
12	0120	23.00	6.60	8.60
14	0140	25.00	6.60	8.60
15	0150	27.00	6.60	8.60
16	0160	27.00	6.60	10.00
18	0180	33.00	7.50	10.00
20	0200	35.00	7.50	10.00
22	0220	37.00	7.50	10.00
24	0240	39.00	7.50	10.00
25	0250	40.00	7.50	10.00
28	0280	43.00	7.50	10.00
30	0300	45.00	7.50	10.00

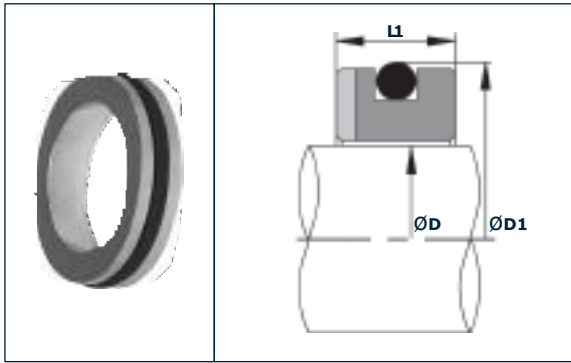
Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
32	0320	48.00	7.50	10.00
35	0350	50.00	7.50	10.00
38	0380	56.00	9.00	11.00
40	0400	58.00	9.00	11.00
43	0430	61.00	9.00	11.00
45	0450	63.00	9.00	11.00
48	0480	66.00	9.00	11.00
50	0500	70.00	9.50	13.00
53	0530	73.00	11.0	13.00
55	0550	75.00	11.0	13.00
58	0580	71.00	11.0	13.00

Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
60	0600	80.00	11.0	13.00
65	0650	85.00	11.0	13.00
68	0680	90.00	11.3	13.00
70	0700	92.00	11.3	15.30
75	0750	97.00	11.3	15.30
80	0800	105.0	12.0	15.30
85	0850	110.0	14.0	15.70
90	0900	115.0	14.0	15.70
95	0950	120.0	14.0	15.70
100	1000	125.0	14.0	15.70

STANDARD SEAT MATERIALS

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide. OTHER SEAT MATERIALS TO ORDER

NON-DIN 'O'-RING MOUNTED SEATS



TYPE 21/31 SEATS

'O'-Ring mounted 'H' configuration stationary seat, to suit both standard European (Type 21) or American (Type 31) housing dimensions. These seats provide the benefit of being able to be pinned through-out the size range.

STANDARD SIZES

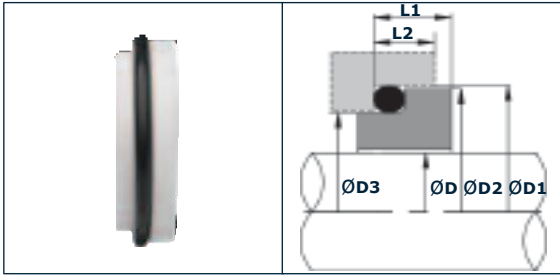
Shaft Size DØ			Shaft Size DØ			Type 21				Type 31			
Inch	Metric	Code	Metric	Inch	Code	D1		L1		D1		L1	
						Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0950	-	-	-	24.60	0.969	8.70	0.343	22.22	0.875	7.95	0.313
-	-	-	10	0.394	0100	24.60	0.969	8.70	0.343	22.22	0.875	7.95	0.313
-	-	-	12	0.472	0120	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
0.500	12.70	0127	-	-	-	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
-	-	-	13	0.512	0130	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
-	-	-	14	0.551	0140	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
-	-	-	15	0.591	0150	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
0.625	15.88	0158	-	-	-	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
-	-	-	16	0.630	0160	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
-	-	-	18	0.709	0180	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
0.750	19.05	0191	-	-	-	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
-	-	-	20	0.787	0200	35.70	1.406	10.30	0.406	38.10	1.500	10.30	0.406
-	-	-	22	0.866	0220	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
0.875	22.23	0222	-	-	-	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
-	-	-	24	0.945	0240	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
-	-	-	25	0.984	0250	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
1.000	25.40	0254	-	-	-	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
-	-	-	28	1.102	0280	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
1.125	28.58	0286	-	-	-	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
-	-	-	30	1.181	0300	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
1.250	31.75	0317	-	-	-	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
-	-	-	32	1.260	0320	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
-	-	-	33	1.299	0330	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
1.375	34.93	0349	-	-	-	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
-	-	-	35	1.378	0350	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
-	-	-	38	1.496	0380	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
1.500	38.10	0381	-	-	-	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
-	-	-	40	1.575	0400	60.35	2.376	11.90	0.469	60.35	2.376	12.70	0.500
1.625	41.28	0412	-	-	-	60.35	2.376	11.90	0.469	60.35	2.376	12.70	0.500
-	-	-	42	1.654	0420	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
-	-	-	43	1.693	0430	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
1.750	44.45	0444	-	-	-	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
-	-	-	45	1.772	0450	63.50	2.500	11.90	0.469	66.68	2.625	12.70	0.500
1.875	47.63	0475	-	-	-	66.70	2.626	11.90	0.469	66.68	2.625	12.70	0.500
-	-	-	48	1.890	0480	66.70	2.626	11.90	0.469	69.85	2.750	12.70	0.500
-	-	-	50	1.969	0500	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
2.000	50.80	0508	-	-	-	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
-	-	-	53	2.087	0530	73.05	2.876	13.50	0.531	76.20	3.000	14.30	0.563
2.125	53.98	0539	-	-	-	73.05	2.876	13.50	0.531	76.20	3.000	14.30	0.563
-	-	-	55	2.165	0550	76.20	3.000	13.50	0.531	79.38	3.125	14.30	0.563
2.250	57.15	0571	-	-	-	76.20	3.000	13.50	0.531	79.30	3.122	14.30	0.563
-	-	-	58	2.283	0580	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
-	-	-	60	2.362	0600	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
2.375	60.33	0603	-	-	-	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
-	-	-	63	2.480	0630	82.55	3.250	13.50	0.531	85.73	3.375	14.30	0.563
2.500	63.50	0635	-	-	-	82.55	3.250	13.50	0.531	85.73	3.375	14.30	0.563
-	-	-	65	2.559	0650	92.10	3.626	15.90	0.626	85.73	3.375	15.90	0.626
2.625	66.68	0666	-	-	-	92.10	3.626	15.90	0.626	85.73	3.375	15.90	0.626
2.750	69.85	0698	-	-	-	95.25	3.750	15.90	0.626	88.90	3.500	15.90	0.626
-	-	-	70	2.756	0700	95.25	3.750	15.90	0.626	88.90	3.500	15.90	0.626
2.875	73.03	0730	-	-	-	98.45	3.876	15.90	0.626	95.25	3.750	15.90	0.626
-	-	-	75	2.953	0750	101.65	4.002	15.90	0.626	98.43	3.875	15.90	0.626
3.000	76.20	0762	-	-	-	101.65	4.002	15.90	0.626	98.43	3.875	15.90	0.626
-	-	-	80	3.150	0800	111.15	4.376	19.90	0.783	101.60	4.000	19.88	0.783
-	-	-	90	3.543	0900	120.65	4.750	19.90	0.783	111.13	4.375	19.88	0.783
-	-	-	100	3.937	1000	133.35	5.250	19.90	0.783	123.83	4.875	19.88	0.783

STANDARD SEAT MATERIALS

Stat Ring: Ceramic, Stainless Steel, Silicon Carbide, Tungsten Carbide, Ni-Resist.

OTHER SEAT MATERIALS TO ORDER

TYPE 8 DIN SHORT



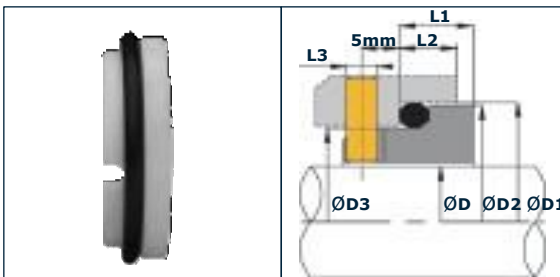
Common 'O'-Ring mounted DIN Short seat. DIN Short seats are normally only best recommended for smaller shaft sizes or for non-arduous duties.

DIN SHORT STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2
10	0100	21.0	20.6	16.4	6.6	5.5
12	0120	23.0	22.6	18.4	6.6	5.5
14	0140	25.0	24.6	20.4	6.6	5.5
15	0150	27.0	26.6	22.4	6.6	5.5
16	0160	27.0	26.6	22.4	6.6	5.5
18	0180	33.0	32.6	26.6	7.5	7.0
20	0200	35.0	34.6	28.6	7.5	7.0
22	0220	37.0	36.6	30.6	7.5	7.0
24	0240	39.0	38.6	32.6	7.5	7.0
25	0250	40.0	39.6	33.6	7.5	7.0
28	0280	43.0	42.6	36.6	7.5	7.0
30	0300	45.0	44.6	38.6	7.5	7.0
32	0320	48.0	47.6	41.6	7.5	7.0
33	0330	48.0	47.6	41.6	7.5	7.0
35	0350	50.0	49.6	43.8	7.5	7.0
38	0380	56.0	55.6	48.8	9.0	8.0
40	0400	58.0	57.4	50.8	9.0	8.0
43	0430	61.0	60.6	53.8	9.0	8.0

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2
45	0450	63.0	62.6	55.8	9.0	8.0
48	0480	66.0	65.6	58.8	9.0	8.0
50	0500	70.0	69.6	61.25	9.5	8.5
53	0530	73.0	72.6	64.25	11.0	8.5
55	0550	75.0	74.4	66.25	11.0	8.5
58	0580	78.0	77.5	69.25	11.0	8.5
60	0600	80.0	79.5	71.25	11.0	8.5
65	0650	85.0	84.5	76.25	11.0	8.5
68	0680	90.0	89.5	80.50	11.3	9.5
70	0700	92.0	91.4	82.60	11.3	9.5
75	0750	97.0	96.4	87.60	11.3	9.5
80	0800	105.0	104.2	94.70	12.0	10.0
85	0850	110.0	109.2	99.70	14.0	10.0
90	0900	115.0	114.2	104.70	14.0	10.0
95	0950	120.0	119.2	109.70	14.0	10.0
100	1000	125.0	124.2	114.70	14.0	10.0

TYPE 8 DIN LONG



DIN Long Type seats, with anti-rotation slot, are preferred for higher shaft size/speeds/pressures or sticky, co-agulating etc. media.

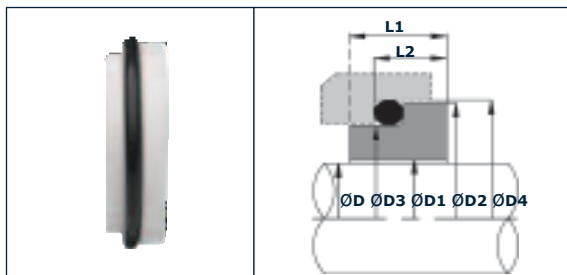
DIN LONG STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.0	20.6	16.4	10.0	5.5	3.0
12	0120	23.0	22.6	18.4	10.0	5.5	3.0
14	0140	25.0	24.6	20.4	10.0	5.5	3.0
15	0150	27.0	26.6	22.4	10.0	5.5	3.0
16	0160	27.0	26.6	22.4	10.0	5.5	3.0
18	0180	33.0	32.6	26.6	11.5	7.0	3.0
20	0200	35.0	34.6	28.6	11.5	7.0	3.0
22	0220	37.0	36.6	30.6	11.5	7.0	3.0
24	0240	39.0	38.6	32.6	11.5	7.0	3.0
25	0250	40.0	39.6	33.6	11.5	7.0	3.0
28	0280	43.0	42.6	36.6	11.5	7.0	3.0
30	0300	45.0	44.6	38.6	11.5	7.0	3.0
32	0320	48.0	47.6	41.6	11.5	7.0	3.0
33	0330	48.0	47.6	41.6	11.5	7.0	3.0
35	0350	50.0	49.6	43.8	11.5	7.0	3.0
38	0380	56.0	55.6	48.8	14.0	8.0	4.0
40	0400	58.0	57.4	50.3	14.0	8.0	4.0

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
43	0430	61.0	60.6	53.8	14.0	8.0	4.0
45	0450	63.0	62.6	55.8	14.0	8.0	4.0
48	0480	66.0	65.6	58.8	14.0	8.0	4.0
50	0500	70.0	69.6	61.25	15.0	8.5	4.0
53	0530	73.0	72.6	64.25	15.0	8.5	4.0
55	0550	75.0	74.4	66.25	15.0	8.5	4.0
58	0580	78.0	77.5	69.25	15.0	8.5	4.0
60	0600	80.0	79.5	71.25	15.0	8.5	4.0
65	0650	85.0	84.5	76.25	15.0	8.5	4.0
68	0680	90.0	89.5	80.50	18.0	9.5	4.0
70	0700	92.0	91.4	88.60	18.0	9.5	4.0
75	0750	97.0	96.4	87.60	18.0	9.5	4.0
80	0800	105.0	104.2	94.70	18.2	10.0	4.0
85	0850	110.0	109.2	99.70	18.2	10.0	4.0
90	0900	115.0	114.2	104.70	18.2	10.0	4.0
95	0950	120.0	119.2	109.70	17.2	10.0	4.0
100	1000	125.0	124.2	114.70	17.2	10.0	4.0

STANDARD SEAT MATERIALS

Ceramic, Silicon Carbide, Tungsten Carbide, Carbon. OTHER SEAT MATERIALS TO ORDER

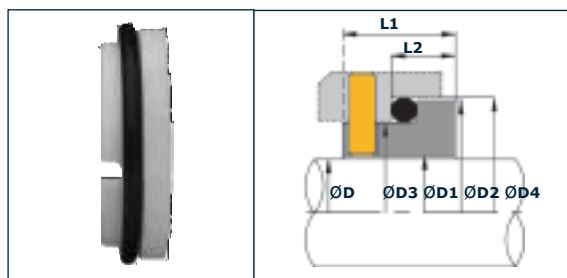


'O'-Ring mounted stationary seat to DIN 24960 (EN12756) Standard with short tail. The seat offers different axial dimensions to the Type 8 DIN short seat and can be utilised with most seals particularly the Type 24 and 1724 designs.

DIN SHORT STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2
10	0100	11.0	20.6	16.4	21.0	10.0	8.6
12	0120	13.0	22.6	18.4	23.0	10.0	8.6
14	0140	15.0	24.6	20.4	25.0	10.0	8.6
16	0160	17.0	26.6	22.4	27.0	10.0	8.6
18	0180	19.0	32.6	26.6	33.0	11.5	10.0
20	0200	21.0	34.6	28.6	35.0	11.5	10.0
22	0220	23.0	36.6	30.6	37.0	11.5	10.0
24	0240	25.0	38.6	32.6	39.0	11.5	10.0
25	0250	26.0	39.6	33.6	40.0	11.5	10.0
28	0280	29.0	42.6	36.6	43.0	11.5	10.0
30	0300	31.0	44.6	38.6	45.0	11.5	10.0
32	0320	33.0	47.6	41.6	48.0	11.5	10.0
33	0330	34.0	47.6	41.6	48.0	11.5	10.0
35	0350	36.0	49.6	43.8	50.0	11.5	10.0
38	0380	39.0	55.6	48.8	56.0	12.5	11.0
40	0400	41.0	57.6	50.8	58.0	12.5	11.0
43	0430	44.0	60.6	53.8	61.0	12.5	11.0

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2
45	0450	46.0	62.6	55.8	63.0	12.5	11.0
48	0480	49.0	65.6	58.8	66.0	12.5	11.0
50	0500	51.0	69.6	61.3	70.0	14.5	13.0
53	0530	54.0	72.6	64.3	73.0	14.5	13.0
55	0550	56.0	74.6	66.3	75.0	14.5	13.0
58	0580	59.0	77.5	69.3	78.0	14.5	13.0
60	0600	61.0	79.5	71.3	80.0	14.5	13.0
63	0630	64.0	82.5	74.3	83.0	14.5	13.0
65	0650	66.0	84.5	76.3	85.0	14.5	13.0
68	0680	69.0	89.5	80.5	90.0	16.5	15.3
70	0700	71.2	91.4	82.6	92.0	16.5	15.3
75	0750	76.2	96.4	87.6	97.0	16.5	15.3
80	0800	81.2	104.2	94.7	105.0	17.5	15.7
85	0850	86.2	109.2	99.7	110.0	17.5	15.7
90	0900	91.2	114.2	104.7	115.0	17.5	15.7
95	0950	96.2	119.2	109.7	120.0	17.5	15.7
100	1000	101.2	124.2	114.7	125.0	17.5	15.7



'O'-Ring mounted stationary seat to DIN 24960 (EN12756) Standard with long tail and drive slot. The seat offers different axial dimensions to the Type 8 DIN long seat and can be utilised with most seals particularly the Type 24 and 1724 designs.

DIN LONG STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2	Slot Width	Slot Depth
10	0100	11.2	20.6	16.4	21.0	15.0	8.6	4.0	5.0
12	0120	13.2	22.6	18.4	23.0	15.0	8.6	4.0	5.0
14	0140	15.2	24.6	20.4	25.0	15.0	8.6	4.0	5.0
16	0160	17.2	26.6	22.4	27.0	15.0	8.6	4.0	5.0
18	0180	19.2	32.6	26.6	33.0	17.0	10.0	4.0	5.5
20	0200	21.2	34.6	28.6	35.0	17.0	10.0	4.0	5.5
22	0220	23.2	36.6	30.6	37.0	17.0	10.0	4.0	5.5
24	0240	25.2	38.6	32.6	39.0	17.0	10.0	4.0	5.5
25	0250	26.2	39.6	33.6	40.0	17.0	10.0	4.0	5.5
28	0280	29.2	42.6	36.6	43.0	17.0	10.0	4.0	5.5
30	0300	31.2	44.6	38.6	45.0	17.0	10.0	4.0	5.5
32	0320	33.2	47.6	41.6	48.0	17.0	10.0	4.0	5.5
33	0330	34.2	47.6	41.6	48.0	17.0	10.0	4.0	5.5
35	0350	36.2	49.6	43.8	50.0	17.0	10.0	4.0	5.5
38	0380	39.2	55.6	48.8	56.0	18.0	11.0	5.0	5.5
40	0400	41.2	57.6	50.8	58.0	18.0	11.0	5.0	5.5
43	0430	44.2	60.6	53.8	61.0	18.0	11.0	5.0	5.5

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2	lot Width	Slot Depth
45	0450	46.2	62.6	55.8	63.0	18.0	11.0	5.0	5.5
48	0480	49.2	65.6	58.8	66.0	18.0	11.0	5.0	5.5
50	0500	51.2	69.6	61.3	70.0	20.0	13.0	5.0	5.5
53	0530	54.2	72.6	64.3	73.0	20.0	13.0	5.0	5.5
55	0550	56.3	74.6	66.3	75.0	20.0	13.0	5.0	5.5
58	0580	59.2	77.5	69.3	78.0	20.0	13.0	5.0	5.5
60	0600	61.2	79.5	71.3	80.0	20.0	13.0	5.0	5.5
63	0630	64.2	82.5	74.3	83.0	20.0	13.0	5.0	5.5
65	0650	66.2	84.5	76.3	85.0	20.0	13.0	5.0	5.5
68	0680	69.2	89.5	80.5	90.0	22.0	15.3	5.0	5.5
70	0700	71.2	91.4	82.6	92.0	22.0	15.3	5.0	5.5
75	0750	76.2	96.4	87.6	97.0	22.0	15.3	5.0	5.5
80	0800	81.2	104.2	94.7	105.0	23.0	15.7	5.0	5.5
85	0850	86.2	109.2	99.7	110.0	23.0	15.7	5.0	5.5
90	0900	91.2	114.2	104.7	115.0	23.0	15.7	5.0	5.5
95	0950	96.2	119.2	109.7	120.0	23.0	15.7	5.0	5.5
100	1000	101.2	124.2	114.7	125.0	23.0	15.7	5.0	5.5

STANDARD SEAT MATERIALS

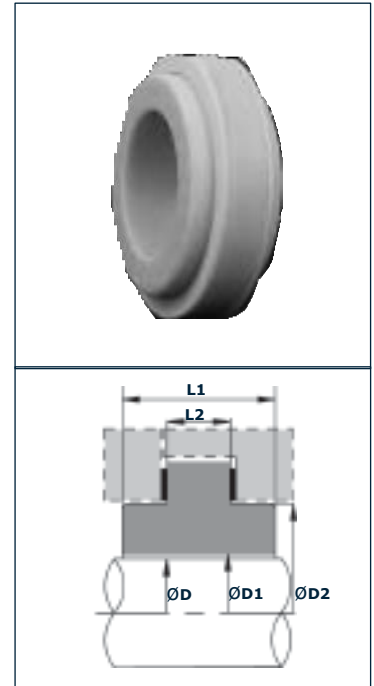
Ceramic, Silicon Carbide, Tungsten Carbide, Carbon. OTHER SEAT MATERIALS TO ORDER

TYPE 25

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		L1		L2		Gasket Thickness	
Inch	Metric	Code	Metric	Inch	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	13	0.512	0130	13.70	0.539	29.05	1.144	17.40	0.685	7.90	0.311	0.80	0.031
0.625	15.88	0158	16	0.630	0160	16.80	0.661	33.04	1.301	17.40	0.685	7.90	0.311	0.80	0.031
0.750	19.05	0191	19	0.748	0190	20.00	0.787	36.21	1.426	17.40	0.685	7.90	0.311	0.80	0.031
-	-	0200	20	0.787	0200	21.00	0.827	36.90	1.453	17.40	0.685	7.90	0.311	0.80	0.031
0.875	22.23	0222	22	0.866	0220	23.20	0.913	39.39	1.551	17.40	0.685	7.90	0.311	0.80	0.031
-	-	0250	25	0.984	0250	26.00	1.024	41.90	1.650	17.40	0.685	7.90	0.311	0.80	0.031
1.000	25.40	0254	-	-	-	26.40	1.039	42.56	1.676	17.40	0.685	7.90	0.311	0.80	0.031
1.125	28.58	0286	-	-	-	29.60	1.165	45.74	1.801	26.90	1.059	11.10	0.437	1.60	0.063
-	-	0300	30	1.181	0300	31.00	1.220	48.69	1.917	26.90	1.059	11.10	0.437	1.60	0.063
1.250	31.75	0317	32	1.260	0320	32.70	1.287	50.50	1.988	26.90	1.059	11.10	0.437	1.60	0.063
1.375	34.93	0349	35	1.378	0350	36.00	1.417	53.68	2.113	26.90	1.059	11.10	0.437	1.60	0.063
1.500	38.10	0381	38	1.496	0380	39.10	1.539	56.85	2.238	26.90	1.059	11.10	0.437	1.60	0.063
1.625	41.28	0412	-	-	-	42.20	1.661	63.20	2.488	26.90	1.059	11.10	0.437	1.60	0.063
1.750	44.45	0444	45	1.772	0450	45.40	1.787	66.38	2.613	26.90	1.059	11.00	0.433	1.60	0.063
1.875	47.63	0476	48	1.890	0480	49.00	1.929	69.55	2.738	26.90	1.059	11.10	0.437	1.60	0.063
-	-	0500	50	1.969	0500	51.00	2.008	71.90	2.831	26.90	1.059	11.10	0.437	1.60	0.063
2.000	50.80	0508	-	-	-	51.80	2.039	72.73	2.863	26.90	1.059	11.10	0.437	1.60	0.063
2.125	53.98	0539	-	-	-	54.90	2.161	79.08	3.113	33.30	1.311	14.30	0.563	1.60	0.063
2.250	57.15	0571	-	-	-	58.10	2.287	82.25	3.238	33.30	1.311	14.30	0.563	1.60	0.063
2.375	60.33	0603	60	2.362	0600	61.30	2.413	85.43	3.363	33.30	1.311	14.30	0.563	1.60	0.063
2.500	63.50	0635	-	-	-	64.50	2.539	88.60	3.488	33.30	1.311	14.30	0.563	1.60	0.063
2.625	66.68	0666	-	-	-	67.60	2.661	91.78	3.613	33.30	1.311	14.30	0.563	1.60	0.063
2.750	69.85	0698	70	2.756	0700	71.00	2.795	94.90	3.736	33.30	1.311	14.30	0.563	1.60	0.063
2.875	73.03	0730	-	-	-	74.00	2.913	98.13	3.863	33.30	1.311	14.30	0.563	1.60	0.063
3.000	76.20	0762	-	-	-	77.20	3.039	99.71	3.926	33.30	1.311	14.30	0.563	1.60	0.063
3.125	79.38	0794	-	-	-	80.40	3.165	102.89	4.051	33.30	1.311	14.30	0.563	1.60	0.063
3.500	88.90	0889	-	-	-	89.90	3.539	114.00	4.488	34.30	1.350	14.30	0.563	1.60	0.063
3.750	95.25	0953	-	-	-	96.30	3.791	120.35	4.738	34.30	1.350	14.30	0.563	1.60	0.063
4.000	101.60	1016	-	-	-	102.60	4.039	126.70	4.988	34.30	1.350	14.30	0.563	1.60	0.063
4.125	104.78	1050	105	4.134	1050	106.00	4.173	139.90	5.508	36.00	1.417	16.00	0.630	1.60	0.063
4.500	114.30	1143	-	-	-	115.30	4.539	139.40	5.488	34.30	1.350	14.30	0.563	1.60	0.063
5.500	139.70	1397	-	-	-	140.70	5.539	177.50	6.988	36.00	1.417	16.00	0.630	1.60	0.063

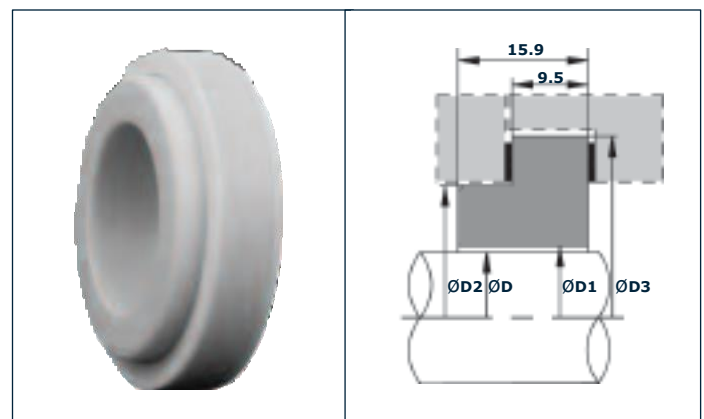
The Type 25 seat is an industry standard stationary design with 'V' shape profile, supplied complete with 2 off PTFE gaskets. Commonly used with a wide variety of seals, particularly the multi-spring Type 16XX series.



STANDARD SIZES

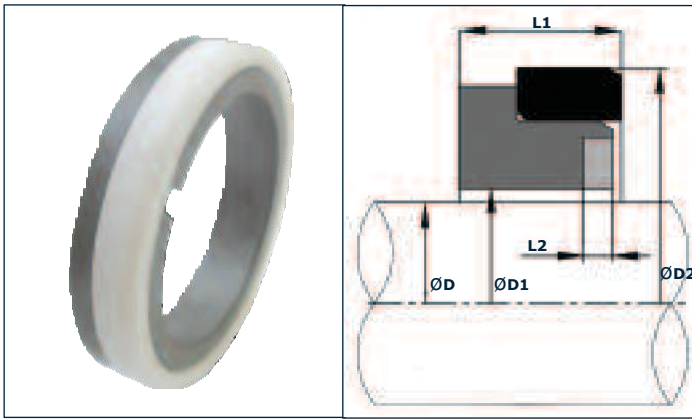
Inch Shaft Size D	Size Code	D1	D2	D3	Gasket Thick
0.750	0191	21.60	34.80	44.45	1.60
0.875	0222	24.75	37.95	47.65	1.60
1.000	0254	27.95	41.15	50.80	1.60
1.125	0286	31.10	44.30	53.95	1.60
1.187	0300	32.70	45.90	55.55	1.60
1.250	0317	34.30	47.50	57.15	1.60
1.375	0349	37.45	50.65	60.30	1.60
1.500	0381	40.65	57.00	66.65	1.60
1.625	0412	43.80	60.15	69.85	1.60
1.750	0444	47.00	63.35	76.20	1.60
1.875	0476	50.15	66.50	79.35	1.60
2.000	0508	53.35	69.70	82.55	1.60
2.125	0539	56.50	72.85	88.90	1.60
2.250	0571	59.70	76.05	92.05	1.60
2.375	0603	62.85	79.20	95.25	1.60
2.500	0635	66.00	82.40	101.50	1.60
2.625	0666	69.20	85.60	104.75	1.60
3.000	0762	78.00	93.50	121.00	1.60

TYPE 27



The Type 27 seat is an industry standard stationary design with 'L' shape profile, supplied complete with two off PTFE gaskets. Commonly used with multiple-spring balanced seals.

TYPE 23



'L'-shaped seat that seals to the housing by the P.T.F.E ring supplied. The design provides for use of an anti-rotation pin (recommended).

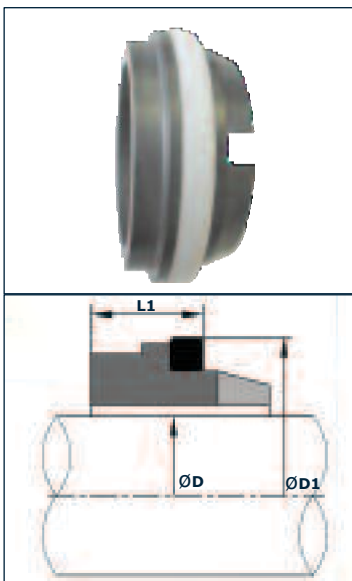
The P.T.F.E ring allows easy installation and helps the seat align, whilst providing exceptional chemical resistance.

STANDARD SIZES

Shaft Size DØ	D1		D2		L1		L2		
	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	
2.375	60.33	61.93	2.438	82.55	3.250	14.30	0.563	3.50	0.138
2.500	63.50	65.00	2.559	85.73	3.375	14.30	0.563	3.50	0.138
2.625	66.68	68.18	2.684	85.73	3.375	15.90	0.626	3.50	0.138
2.750	69.85	71.35	2.809	88.90	3.500	15.90	0.626	3.50	0.138
2.875	73.03	74.53	2.934	95.25	3.750	15.90	0.626	3.50	0.138
3.000	76.20	77.70	3.059	98.43	3.875	15.90	0.626	3.50	0.138
3.125	79.38	81.92	3.225	101.60	4.000	19.80	0.780	4.00	0.157
3.250	82.55	85.09	3.350	104.78	4.125	19.80	0.780	4.00	0.157
3.375	85.73	88.27	3.475	107.95	4.250	19.80	0.780	4.00	0.157
3.500	88.90	91.44	3.600	111.13	4.375	19.80	0.780	4.00	0.157
3.625	92.08	94.64	3.726	114.30	4.500	19.80	0.780	4.00	0.157
3.750	95.25	97.79	3.850	117.48	4.625	19.80	0.780	4.00	0.157
3.875	98.43	100.97	3.975	120.65	4.750	19.80	0.780	4.00	0.157
4.000	101.60	104.14	4.100	123.83	4.875	19.80	0.780	4.00	0.157

Shaft Size DØ	D1		D2		L1		L2		
	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	
2.375	60.33	61.93	2.438	82.55	3.250	14.30	0.563	3.50	0.138
2.500	63.50	65.00	2.559	85.73	3.375	14.30	0.563	3.50	0.138
2.625	66.68	68.18	2.684	85.73	3.375	15.90	0.626	3.50	0.138
2.750	69.85	71.35	2.809	88.90	3.500	15.90	0.626	3.50	0.138
2.875	73.03	74.53	2.934	95.25	3.750	15.90	0.626	3.50	0.138
3.000	76.20	77.70	3.059	98.43	3.875	15.90	0.626	3.50	0.138
3.125	79.38	81.92	3.225	101.60	4.000	19.80	0.780	4.00	0.157
3.250	82.55	85.09	3.350	104.78	4.125	19.80	0.780	4.00	0.157
3.375	85.73	88.27	3.475	107.95	4.250	19.80	0.780	4.00	0.157
3.500	88.90	91.44	3.600	111.13	4.375	19.80	0.780	4.00	0.157
3.625	92.08	94.64	3.726	114.30	4.500	19.80	0.780	4.00	0.157
3.750	95.25	97.79	3.850	117.48	4.625	19.80	0.780	4.00	0.157
3.875	98.43	100.97	3.975	120.65	4.750	19.80	0.780	4.00	0.157
4.000	101.60	104.14	4.100	123.83	4.875	19.80	0.780	4.00	0.157

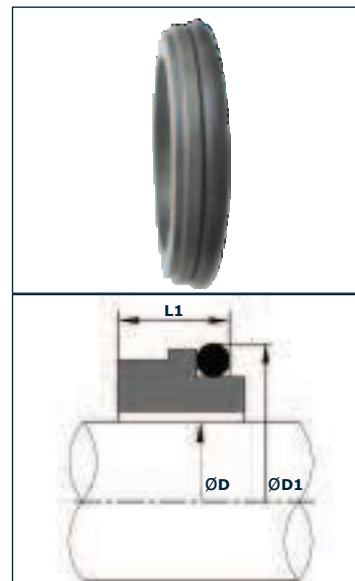
TYPE 24



TYPE 24 BEZL

DIN 24960 pinned seat designed to readily push fit, with a rectangular section seat ring in P.T.F.E. Pin diameter recommended is 3mm up to size 35mm and 4mm from 38mm to 100mm. Face profiled to accept a restraining bezel plate.

Dimension table overleaf



TYPE 24 BEZS

DIN 24960 non-pinned short seat, designed to readily push fit. Seat is fitted with an elastomer 'O'-Ring, and the face is profiled to accept a restraining bezel plate.

Dimension table overleaf

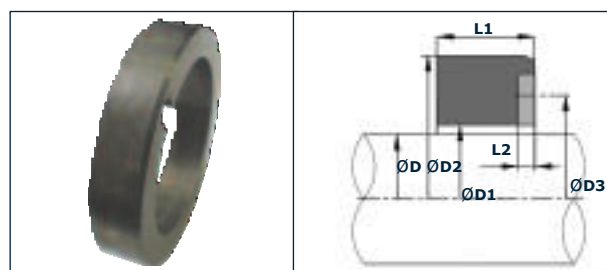
TYPE 24 BEZL / BEZS

Metric Shaft Size D	Size Code	D1	L1
20	0200	35.00	13.50
22	0220	37.00	13.50
24	0240	39.00	13.50
25	0250	40.00	13.00
28	0280	43.00	12.50
30	0300	45.00	12.00
32	0320	48.00	12.00
33	0330	48.00	12.00
35	0350	50.00	12.00
38	0380	56.00	13.00
40	0400	58.00	13.00
43	0430	61.00	13.00
45	0450	63.00	13.00
48	0480	65.00	13.00
50	0500	70.00	13.50

Metric Shaft Size D	Size Code	D1	L1
53	0530	73.00	13.50
55	0550	75.00	13.50
58	0580	78.00	13.50
60	0600	80.00	13.50
63	0630	83.00	13.50
65	0650	85.00	13.50
68	0680	90.00	13.50
70	0700	92.00	14.50
75	0750	97.00	14.50
80	0800	105.00	15.00
85	0850	110.00	15.00
90	0900	115.00	15.00
95	0950	120.00	15.00
100	1000	125.00	15.00

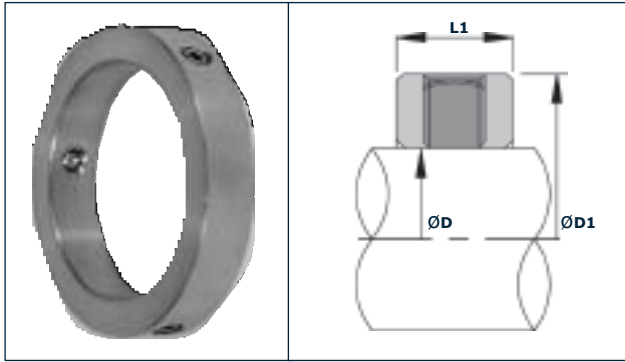
TYPE 32

The Type 32 seat is an 'O'-Ring mounted seat suited for higher pressure applications. Easy fitting and good heat transfer, leading to enhanced performance are features of this design.



Shaft Size DØ		D1		D2		D3 (slot PCD)		L1		L2		O-Ring Size
Inch	Metric	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	
0.500	12.70	13.80	0.543	25.30	0.996	19.80	0.780	7.90	0.311	2.50	0.098	BS214
0.625	15.88	16.98	0.669	31.65	1.246	24.20	0.953	10.30	0.406	2.50	0.098	BS215
0.750	19.05	20.15	0.793	34.82	1.371	27.75	1.093	10.30	0.406	2.50	0.098	BS216
0.875	22.23	23.33	0.919	38.00	1.496	31.00	1.220	10.30	0.406	2.50	0.098	BS217
1.000	25.40	26.50	1.043	41.18	1.621	34.10	1.343	11.15	0.439	2.50	0.098	BS218
1.125	28.58	30.08	1.184	44.35	1.746	37.30	1.469	11.15	0.439	2.50	0.098	BS219
1.250	31.75	33.25	1.309	47.53	1.871	40.50	1.594	11.15	0.439	2.50	0.098	BS220
1.375	34.93	36.43	1.434	50.70	1.996	43.60	1.717	11.15	0.439	2.50	0.098	BS221
1.500	38.10	39.60	1.559	53.88	2.121	46.80	1.843	11.15	0.439	2.50	0.098	BS222
1.625	41.28	42.78	1.684	60.23	2.371	51.60	2.031	12.75	0.502	3.00	0.118	BS223
1.750	44.45	45.95	1.809	63.40	2.496	54.80	2.157	12.75	0.502	3.00	0.118	BS224
1.875	47.63	49.13	1.934	66.58	2.621	57.90	2.280	12.75	0.502	3.00	0.118	BS225
2.000	50.80	52.30	2.059	69.75	2.746	61.10	2.406	12.75	0.502	3.00	0.118	BS226
2.125	53.98	55.48	2.184	76.10	2.996	65.90	2.594	14.33	0.564	3.50	0.138	BS227
2.250	57.15	58.65	2.309	79.28	3.121	69.00	2.717	14.33	0.564	3.50	0.138	BS228
2.375	60.33	61.83	2.434	82.45	3.246	72.20	2.843	14.33	0.564	3.50	0.138	BS229
2.500	63.50	65.00	2.559	85.63	3.371	75.40	2.969	14.33	0.564	3.50	0.138	BS230
2.625	66.68	68.18	2.684	85.63	3.371	77.00	3.031	15.93	0.627	3.50	0.138	BS231
2.750	69.85	71.35	2.809	88.80	3.496	80.20	3.157	15.93	0.627	3.50	0.138	BS232
2.875	73.03	74.53	2.934	95.15	3.746	84.90	3.343	15.93	0.627	3.50	0.138	BS233
3.000	76.20	77.70	3.059	98.33	3.871	88.10	3.469	15.93	0.627	3.50	0.138	BS234
3.125	79.38	81.92	3.225	101.50	3.996	91.30	3.594	19.84	0.781	3.50	0.138	BS235
3.250	82.55	85.09	3.350	104.68	4.121	94.40	3.717	19.84	0.781	3.50	0.138	BS236
3.375	85.73	88.27	3.475	107.85	4.246	97.60	3.843	19.84	0.781	3.50	0.138	BS237
3.500	88.90	91.44	3.600	111.03	4.371	100.80	3.969	19.84	0.781	3.50	0.138	BS238
3.625	92.08	94.62	3.725	114.20	4.496	104.00	4.094	19.84	0.781	3.50	0.138	BS239
3.750	95.25	97.79	3.850	117.38	4.621	107.10	4.217	19.84	0.781	3.50	0.138	BS240
3.875	98.43	100.97	3.975	120.55	4.746	110.30	4.343	19.84	0.781	3.50	0.138	BS241
4.000	101.60	104.14	4.100	123.73	4.871	113.50	4.469	19.84	0.781	3.50	0.138	BS242

CLAMP RINGS



Stainless Steel, working length setting, Clamp Rings, available in all common imperial and metric shaft sizes. Standard thickness as shown, but other sizes and widths available to order. All fitted with three grub screws at 120° apart.

The Clamp Rings have a variety of uses, most particularly to set or amend seal housing depth to suit the preferred seal's working length.

STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		L1	
Inch	Metric	Code	Metric	Inch	Code	Metric	Inch	Metric	Inch
0.375	9.53	0095	10	0.394	0100	19.00	0.748	7.50	0.295
0.500	12.70	0127	12	0.472	0120	21.00	0.827	7.50	0.295
-	-	-	14	0.551	0140	23.00	0.906	7.50	0.295
-	-	-	15	0.591	0150	24.00	0.945	7.50	0.295
0.625	15.88	0158	16	0.630	0160	25.00	0.984	7.50	0.295
0.750	19.05	0191	18	0.709	0180	31.00	1.220	7.50	0.295
-	-	-	20	0.787	0200	33.00	1.299	7.50	0.295
0.875	22.23	0222	22	0.866	0220	35.00	1.378	7.50	0.295
-	-	-	24	0.945	0240	37.00	1.457	7.50	0.295
1.000	25.40	0254	25	0.984	0250	38.00	1.496	7.50	0.295
1.125	28.58	0286	28	1.102	0280	41.00	1.614	7.50	0.295
-	-	-	30	1.181	0300	43.00	1.693	7.50	0.295
1.250	31.75	0317	32	1.260	0320	45.00	1.772	10.00	0.394
-	-	-	33	1.299	0330	46.00	1.811	10.00	0.394
1.375	34.93	0349	35	1.378	0350	48.00	1.890	10.00	0.394
1.500	38.10	0381	38	1.496	0380	53.00	2.087	10.00	0.394
1.625	41.28	0412	40	1.575	0400	55.00	2.165	10.00	0.394
-	-	-	43	1.693	0430	58.00	2.283	10.00	0.394
1.750	44.45	0444	45	1.772	0450	60.00	2.362	10.00	0.394
1.875	47.63	0476	48	1.890	0480	63.00	2.480	10.00	0.394
2.000	50.80	0508	50	1.969	0500	65.00	2.559	10.00	0.394
2.125	53.98	0539	53	2.087	0530	68.00	2.677	10.00	0.394
2.250	57.15	0571	55	2.165	0550	70.00	2.756	10.00	0.394
-	-	-	58	2.283	0580	70.00	2.756	10.00	0.394
2.375	60.33	0603	60	2.362	0600	79.00	3.110	10.00	0.394
2.500	63.50	0635	63	2.480	0630	82.00	3.228	10.00	0.394
2.625	66.68	0666	65	2.559	0650	84.00	3.307	12.00	0.472
-	-	-	68	2.677	0680	87.00	3.425	12.00	0.472
2.750	69.85	0698	70	2.756	0700	89.00	3.504	12.00	0.472
2.875	73.03	0730	73	2.874	0730	95.00	3.740	12.00	0.472
3.000	76.20	0762	75	2.953	0750	98.00	3.858	12.00	0.472
3.125	79.38	0794	80	3.150	0800	103.00	4.055	12.00	0.472
3.250	82.55	0826	-	-	-	103.00	4.055	12.00	0.472
3.375	85.73	0857	85	3.346	0850	108.00	4.252	12.00	0.472
3.500	88.90	0889	90	3.543	0900	113.00	4.449	12.00	0.472
3.625	92.08	0921	-	-	-	113.00	4.449	12.00	0.472
3.750	95.25	0953	95	3.740	0950	118.00	4.646	12.00	0.472
3.875	98.43	0984	-	-	-	121.00	4.764	12.00	0.472
4.000	101.60	1016	100	3.937	1000	123.00	4.843	12.00	0.472

STANDARD CLAMP RINGS MATERIALS

304 Stainless Steel as standard
316 Stainless Steel and other metals available to order.



EQUIVALENTS LISTING TO OTHER SEAL SUPPLIERS

BURGMANN®	ABIS	AES®	ABIS	JOHN CRANE®	ABIS	M.T.U.®	ABIS
BT-AR, BT-AR3	Type 18	N-B01	Type 18	1 (USA)	Type A5	Europa 1	Type 12.DIN
BT-FN	Type 13	N-B012	Type 192	1A (UK)	Type A1	Europa 2	Type 12
H7N	Type 1678	N-B013	Type 193	2 (UK)	Type A2	Europa 4	Type 8B
H12N or H17GN	Type 82	N-B02	Type 19	2 (USA)	Type A4	FA	Type 18
HJ92	Type 40S	N-B03	Type 70	4 (UK)	Type 1644	FG 1	Type 19
M2	Type 9	N-B03U	Type 75	6A (USA)	Type 75	FG 2	Type 192
M2N	Type 9L	N-B04	Type 60	6A (UK)	Type 70	FG 3	Type 193
M2N4	Type 9S	N-B04U	Type 65	6D / 6J	Type 66	FP/D	Type 24
M3	Type 8B	N-B05	Type 14DIN	8-1	Type 1609S	FP/T35	Type 11
M3N	Type 8.DIN	N-B052	Type 142DIN	8-1T	Type 1645S	SIMPLEX	Type 13
M3N4	Type 8S	N-B053	Type 143DIN	8B1	Type 1609BS	SIMPLEX DIN	Type 13.DIN
M32	Type 8	N-B07	Type 1724	8B1T	Type 1645BS	TIPO 1 Seat	Type 19B
M32N	Type 8.DIN	N-BP02	Type 1520	9	Type 1609	TIPO 2 Seat	Type 8.DINS
M32N4	Type 8S	N-BP04	Type 1511	9T	Type 1645		
M37	Type 8	N-BP05	Type 1522	9BT	Type 1645B		
M37N	Type 8.DIN	N-C01	Type CLAM	21	Type 11		
M37N4	Type 8S	N-M01	Type 1609	58B	Type 1659BS	ROTEN®	ABIS
M37G	Type 8	N-M01S	Type 1609S	58U	Type 1659S	Roten® 2	Type 12
M37GN	Type 8.DIN	N-M02	Type 1609B	59B	Type 1659B	Roten® 3	Type 13
M37GN4	Type 8S	N-M02S	Type 1609BS	59U	Type 1659	Roten® 4	Type 12 with FEPs fitted
M377S6	Type 8W	N-M03	Type 1659	80	Type 1688		Type 7 with FEPs fitted
M7N	Type 1677	N-M03S	Type 1659S	87	Type 1682	Roten® 45	Type 7
M74 or H74	Consult Abis	N-M04	Type 1659B	106 (USA)	Type 65		Type 7B
MG1	Type 19	N-M04S	Type 1659BS	106 (UK)	Type 60	Roten® 5	Type 7
MG12	Type 192	N-M05	Type 1645	109	Type 1609	Roten® 5H2	Type 7B
MG13	Type 193	N-M05S	Type 1645S	109B	Type 1609B	Roten® 7K	Type 1688U
MG1S/20	Type 1520	N-M06	Type 1645B	502	Type 1724	Roten® EHS	Type 40U
MG1S	Consult Abis	N-M06S	Type 1645BS	521	Type 24	Uniten® 2	Type 12.DIN
MG901	Type 22	N-M07	Type 50	2100 K	Type 142	Uniten® 3	Type 13.DIN
MG910	Type 10	N-P01	Type 10	2100 N	Type 143	Uniten® 4	Type 12.DIN
MG912	Type 24	N-P01U	Type A1	2100 S	Type 14		FEPs fitted
MG913	Type 143	N-P02	Type 20	502	Type 1724	Uniten® 45	Type 7D with FEPs fitted
MG920	Type 20	N-P02U	Type A2	521	Type 24		Type 7D
MG921	Type 11	N-P03	Type 24			Uniten® 5	Type 135
		N-P04	Type 11	SEATS ONLY;		Uniten® 5K	Type 1688L
		N-P04U	Type A4			Uniten® 7K	Type 40L
		N-P05	Type 22	A	Type 23	Uniten® EHS	
		N-P05U	Type A5	BC	Type 24.BEZS		
SEATS ONLY;		N-P06	Type 26	BD	Type 24.BEZL	ROTEN® UK	ABIS
G1 or G2	Consult Abis	N-P07	Consult Abis	BO	Type 24.DINS	16	Type 65
G4	Type 8.STD	N-P08	Type 95	BP	Type 24.DINL	21	Type 20
G6	Type 8.DINS	N-P080	Type 98	BS	Type 8.TDP	21A	Type 11
G7 & G8	Type 8.BEZ	N-P09	Type 94	DF	Type 1688	37	Type 26
G9	Type 8.DINL	N-S01	Type 8.STD	EI/EJ	Type 1682	41	Type 28
G13	Type 8B seat	N-S02	Type 8.DINL	FH	Type STAL	51	Type 10
G15 or G115	Consult Abis	N-S03	Type 8.DINS	H	Type 34	51A	Type 22
G16	Consult Abis	N-S04	Type 24 STAT	J	Type 33	52	Type 24
G30	Consult Abis	N-S040	Type 19B STAT	L	Type 27	68	Type 75
G46	Type 24.DINL	N-S05	Type 24.DINL	M	Type 19B		
G50	Type 20 seat	N-S06	Type 24.DINS	N/NG	Type 20 seat	TEKHNI SEAL®	ABIS
G55	Type 11 seat	N-S07	Type 21 STAT	P/PP/PG	Type 32	100	Type 10
G60	Type 19B	N-S070	Type 31 STAT	V	Type 25	200	Type 20
G61	Type 24 seat	N-S08	Type 25 STAT	W/WM	Type 21	304	Type 26
		N-S09	Type 23	X	Type 1644 seat	400	Type 12
EAGLE®	ABIS	N-T01	Type 8	Y	Type 36	402	Type 13
15M5	Type 97	N-T01.DIN	Type 8.DIN	Z	Type 20 seat	404	Type 13.DIN
1505	Type 97	N-T02	Type 8B			406	Type 12.DIN
		N-T03	Type 12	FLEXIBOX®	ABIS	500	Type 24
		N-T03.DIN	Type 12.DIN	R00	Type 95	552	Type 24
		N-T04	Type 13	R10	Type 96	600	Type 65
		N-T04.DIN	Type 13.DIN	R20	Type 97	700	Type 75
		N-T05	Type 06 Range	R30	Type 95N	800	Type 11
PILLAR®	ABIS	N-W01	Type 1688	R40	Type 96N	900	Type 22
CCU	Type 98	N-W02	Type 1688L	R50	Type 97N		
CGU	Type 97	N-W03	Type 1688W				
US-1	Type 98	N-W04	Type 1688Y				
US-2	Type 97	N-W07D	Type 1677				
US-3	Type 97						

For a more comprehensive and upto date listings please see the comparison sheet on your customer web portal www.abistechs.com.

All information contained in this table is supplied in good faith and was considered correct at the time of going to press. However, VEL cannot guarantee that using this information will always result in an entirely suitable replacement, especially as specifications can change.

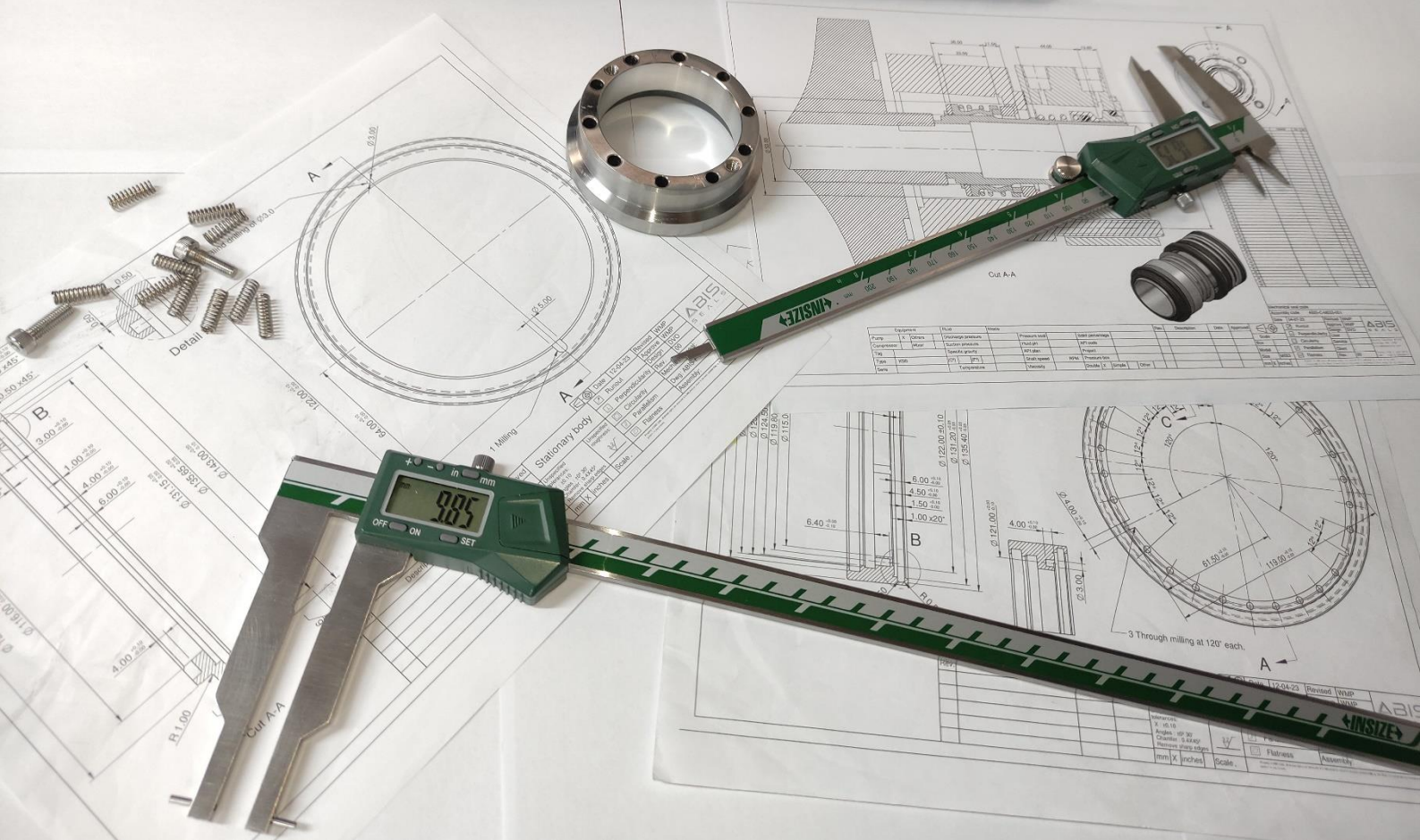


COMMON USA SEAL CODES TO ABIS X REFERENCE LIST

USA	CODE	USA	CODE	USA	CODE	USA	CODE
100	SPSR15	264	0317.A5J.N.F.	378V	0381.11.V.C.	535	0444.A5J.N.F.
101	0191.M65D.N.C.	265	0191.11J.N.F.	380	0254.M11.N.C.	537	0539.A5.N.C.
102	0158.11.N.C.	267	0508.11.N.C.	380V	0254.M11.V.C.	538	0476.MA5.N.C.
102V	0158.11.V.C.	267V	0508.11.V.C.	381	0317.11.N.C.	539	0254.22.N.C.
106	0127.11.N.C.	268	0603.11J.N.F.	381V	0317.11.V.C.	542	0666.A5J.N.F.
108N	0317.MA5.O.C.	269	0635.11J.N.F.	382	0381.11.N.C.	542 21	0666.22J.N.F.
109	0158.11.N.C.SEAL	270	0730.11J.N.F.	383	0317.11.N.C.	543	0539.11.N.C.
112	0191.11B.N.C.	274	0158.A5.N.C.	383V	0317.11.V.C.	543V	0539.11.V.C.
112V	0191.11B.V.C.	275	0191.A5.N.C.	384	0286.A5.N.C.	544	0412.11J.N.F.
116	0191.11C.N.C.	278	0603.A5J.N.F.	384V	0286.A5.V.C.	546	0317.A5J.N.F.
127	0269.11.N.C.	278 21	0603.22J.N.F.	394	0317.A5J.N.F.	547	0349.A5J.N.F.
128	0191.M11.N.C.	279	0635.A5J.N.F.	395	0381.A5J.N.F.	548	0254.11J.N.C.
137	0317.A5.N.C.	279 21	0635.22J.N.F.	397	0254.11.N.C.SEAL	550	0444.11J.N.F.
137V	0317.A5.V.C.	282	0286.22J.N.F.	397V	0254.11.V.C.SEAL	552	0158.11J.N.F.
142	0127.70T.N.C.	282 21	0286.22J.N.F.	398	0254.M11.V.C.	553	0381.11J.N.F.
144	0222.11U.N.F.	283	0381.11.N.C.	399	0191.11.N.C.SEAL	554	0476.MA5U.N.F.
147	0444.11.N.C.SEAL	288	0444.11.N.C.	400	0127.M11.N.C.SEAL	555	0444.MA5.N.C.
150	0127.70.N.C.SEAL	288V	0444.11.V.C.	401	0127.11.N.C.SEAL	557	0254.A5J.N.F.
153	0158.M65B.N.C.	290	0158.11.N.C.	401A	0127.11B.N.C.	564	0191.A5.N.C.SEAL
153V	0158.M65B.V.C.	290V	0158.11.V.C.	402	0317.11B.N.C.	578	0222.11.N.C.SEAL
154	0317.11.N.C.SEAL	292	0381.M11B.N.C.	409	0158.D73.N.C.	584	0286.A5J.N.F.
157	0191.11.N.C.SEAL	298	0127.65.N.C.SEAL	416	0317.11.N.C.SEAL	586	0476.A5J.N.F.
159N	0254.THK1.O.F.	299	0158.65.N.C.SEAL	425	0158.M65.N.C.	588	0286.11J.N.F.
162	0127.65.N.C.	300	0158.65.N.C.	436	0444.11J.N.F.	593	0476.11.N.C.
163	0127.70.N.C.	300V	0158.65.V.C.	436V	0444.11V.V.F.	593V	0476.11.V.C.
164	0127.D73.N.C.	303	0222.11.N.C.	440	0191.C73.N.C.	594	0603.11J.N.F.
165	0127.D73.N.C.	303V	0222.11.V.C.	445	0508.11.N.C.	595	0412.A5J.N.F.
168	0127.N11T.N.C.	305	0381.A5.N.C.	445V	0508.11.V.C.	597	0317.11B.N.C.
172	0349.11.N.C.SEAL	305V	0381.A5.V.C.	446	0444.11.N.C.	598	0317.11V.N.F.
172 52	0349.A5.N.C.SEAL	309	0222.11.N.C.	446V	0444.11.V.C.	601	0191.75.N.C.
177	0349.11.N.C.	309V	0222.11.V.C.	447	0158.73.N.C.	601SS	W-0191.75.N.C.
177V	0349.11.V.C.	312	0476.11J.N.F.	447V	0158.73.V.Q.	601V	0191.75.N.C.
185	0317.11.N.C.	314	0381.A5U.N.Q.	448	0444.11.N.C.	604	0286.11J.N.F.
185V	0317.11.V.C.	316	0381.A5U.N.Q.	453	0158.73.N.C.	605	0286.11.N.C.
186	0349.11.N.C.	317	0444.A5B.N.C.	458	0412.MA5.N.C.	605V	0286.11.V.C.
186V	0349.11.V.C.	319	0508.A5U.N.Q.	460	0254.M11.N.C.	606	0191.75B.N.C.
188	0222.A5.N.C.	320	0381.11B.N.C.	460V	0254.M11.V.C.	607	0286.A5U.N.F.
188V	0222.A5.V.C.	321	0698.22J.N.F.	461	0412.11.N.C.	608	0286.A5U.N.F.
192	0349.M11J.O.F.	323	0571.A5J.N.F.	461V	0412.11.V.C.	609	0412.A5B.N.C.
193N	0508.11J.O.F.	324	0762.22J.N.F.	462	0508.11.N.C.	609V	0412.A5B.N.C.
196	0508.11.N.C.SEAL	326	0317.M11U.N.Q.	462V	0508.11.V.C.	610	0412.A5B.N.C.
200	0158.65.N.C.	327	0539.A5J.N.F.	463	0635.11J.N.F.	610V*	0412.A5B.V.C.
200A	0158.75E.N.C.	328	0666.A5J.N.F.	463V	0635.11V.V.F.	617	0222.11J.N.F.
200V	0158.65.V.C.	328 21	0666.22J.N.F.	464	0698.11J.N.F.	618	0317.11J.N.F.
201	0191.65.N.C.	329	0730.22J.N.F.	465	0762.11J.N.F.	628	0158.65E.N.C.
201V	0191.65.V.C.	332	0568.11J.N.F.	466	0317.11C.N.C.	631	0127.11.N.C.
204	0286.A5.N.C.	334	0365.11.N.C.	466V*	0317.11C.V.C.	632	0127.11T.N.C.
204V	0286.A5.V.C.	336	0539.11.N.C.	468	0635.11U.N.F.	633	0158.11B.N.C.
205	0444.A5.N.C.	338	0539.11J.N.F.	469	0635.11U.N.F.	633V	0158.11B.N.C.
205V	0444.A5.V.C.	340	0476.11.N.C.	471	0158.11.N.C.	637	0158.65J.N.F.
207	0191.11C.N.C.	342N	0508.A5J.O.F.	472	0317.11.N.C.	642	457805
208	0222.11.N.C.SEAL	344	0286.11.N.C.	474	0158.11B.N.C.	647	0191.75.N.C.SEAL
210	0349.11.N.C.	346	0412.A5B.N.C.	475	0762.22J.N.F.	659	0381.11.N.C.
210V	0349.11.V.C.	347	0381.11.N.C.	477	0476.A5J.N.F.	659V	0381.11.V.C.
218	0158.65.N.C.SEAL	347V*	0381.11.V.C.	477V	0476.A5J.V.F.	666	0127.N11T.N.C.
223	0476.11.N.C.SEAL	348	0286.11.N.C.SEAL	478	0508.MA5U.N.F.	677	0349.22.N.C.
224	0381.A5J.O.F.	349	0635.A5J.N.F.	479	0508.A5.N.C.	677V	0349.22.V.C.
227	0254.M11B.N.C.	349 21	0635.22J.N.F.	483	0698.11J.N.F.	682	0381.11C.N.C.
229	0222.A5J.N.F.	349V	0635.A5J.V.F.	484	0412.A5B.N.C.	687	0222.11.N.C.
235	0254.11.N.C.	350	0603.A5J.N.F.	485	0158.A5C.N.C.	687V	0222.11.V.C.
235V	0254.11.V.C.	350 21	0603.22J.N.F.	486	0158.A5D.N.C.	695N	0254.A5C.O.F.
236	0254.A5.N.C.	351	0571.A5.N.C.	487	0158.A5B.N.C.	703	0222.11.N.C.
23621	0254.A5.V.C.	351V	0571.A5.V.C.	491	0349.11.N.C.	703V	0222.11.V.C.
236V	0254.A5.V.C.	353	0539.A5J.N.F.	491V	0349.11.V.C.	712	0158.75U.N.Q.
237	0444.11.N.C.	354	0349.22.N.C.	492	0603.11J.N.F.	714	0158.75U.N.Q.
237V	0444.11.V.C.	354V	0349.22.V.C.	499	0254.11J.N.C.	715	0158.75U.N.Q.
238	0412.11.N.C.	355	0286.11.N.C.	501	0158.M65.N.C.	732	0158.11U.N.Q.
238V	0412.11.V.C.	355V	0286.11.V.C.	501V	0158.M65.V.C.	734	0158.11U.N.Q.
239	0412.11.N.C.	356	0286.11.N.C.	506	0127.65T.N.C.	735	0158.11.N.C.
239V	0412.11.V.C.	356V	0286.11.V.C.	507	0158.65B.N.C.	738	0158.A5J.N.F.
245	0254.11.N.C.	357	0254.11.N.C.	507V	0158.65B.N.C.	739	0158.A5J.N.F.
245V	0254.11.V.C.	357V	0254.11.V.C.	508	0158.11.N.C.	744	0412.A5.N.C.
246	0317.11.N.C.	358	0191.11.N.C.	508V	0158.11.V.C.	744V	0412.A5.V.C.
246V	0317.11.V.C.	358V	0191.11.V.C.	510	0317.11C.N.C.	745	0412.A5.N.C.
247	0381.11C.N.C.	359	0158.11.N.C.	513	0476.A5.N.C.	745V	0412.A5.V.C.
248	0254.11.N.C.	359V	0158.11.V.C.	513V	0476.A5.V.C.	746	0412.A5.N.C.
248V	0254.11.V.C.	360	0254.65.N.C.	514	0412.11.N.C.	747	0412.A5.N.C.
249	0317.11.N.C.	360V	0254.65.V.C.	514V	0412.11.V.C.	750	0191.11.N.C.
249V	0317.11.V.C.	361	0317.A5.N.C.	515	0381.A5V.N.F.	750V	0191.11.V.C.
250	0222.11J.N.F.	361V	0317.A5.V.C.	516	0158.65.N.C.	752	0191.75B.N.C.
251	0254.M11.N.C.	366	0444.A5.N.C.	517	0317.11J.N.F.	752V	0191.75B.V.C.
252	0254.M11J.N.F.	366V	0444.A5.V.C.	518	0158.65D.N.C.	754	0254.A5.N.C.
253	0286.M11.N.C.	370	0254.65.N.C.	519	0444.MA5J.N.F.	754V	0254.A5.V.C.
254	0286.11J.N.F.	371	0381.11.N.C.	523	0476.A5.N.C.	756	0317.11.N.C.
257	0349.MA5.N.C.	371V	0381.11.V.C.	524	0158.65B.N.C.	756V	0317.11.V.C.
258	0381.A5J.N.F.	373	0191.A5B.N.C.	525	0317.11J.N.F.	758	0381.11.N.C.
258 21	0381.22J.N.F.	374	0381.A5.N.C.	529	0286.11J.N.F.	758V	0381.11.V.C.
259	0381.11J.N.F.	374V	0381.A5.V.C.	530	05086.A5J.N.F.	760	0191.M65J.N.F.
262	0444.A5J.N.F.	376	0349.11.N.C.SEAL	532	0508.11J.N.F.	761	0762.11J.N.F.
		378	0381.11.N.C.	534	0381.11J.N.F.	762	0191.L65J.N.F.

COMMON USA SEAL CODES TO ABIS X REFERENCE LIST

USA CODE	USA CODE	USA CODE	USA CODE
764	0191.L65.N.C.	942	0571.11.N.C.SEAL
765	0191.75.N.C.	946	0476.MA5V.N.F.
766	0191.75.N.C.	947	0381.NA5V.N.F.
767	0191.11J.N.F.	949	0476.MA5V.N.F.
768	0191.11J.N.C.	950	0381.NA5V.N.F.
769	0191.11J.N.F.	952	0158.M65.N.C.
771	0191.A5J.N.F.	954	0158.M65B.N.C.
773	0191.A5J.N.F.	961	0158.75.N.C.
774	0222.11J.N.F.	964	0158.75B.N.C.
775	0222.11J.N.F.	973	0191.65B.N.C.
776	0222.A5J.N.F.	974	0191.65.N.C.SEAL
777	0254.65.N.C.	975	0254.65.N.C.SEAL
778	0254.65.N.C.	976	0317.20B.N.C.
779	0254.A5.N.C.	977	0317.20B.N.C.
786	0317.11.N.C.	978	0317.20B.N.C.
788	0127.75C.N.C.	979	0317.20B.N.C.
789	0254.M11J.N.F.	980	0158.11.N.C.
791	0254.A5J.N.F.	981	0317.A4J.N.F.
801	0286.11J.N.F.	982	0254.22.N.C.
802	0286.11J.N.F.	983	0286.M22.N.C.
804	0317.11J.N.F.	1000	0158.75.N.C.
805	0349.11J.N.C.	1000V	0158.75.V.C.
806	0349.11J.N.C.	1002	0127.11.N.C.
807	0349.A5J.N.F.	1002V	0127.11.V.C.
808	0349.22J.N.C.	1013	SPTT12
809	0349.22J.N.C.	1014	0254.65.V.C.
816	0381.11J.N.F.	1015	0317.A5.N.C.SEAL
817	0381.11J.N.F.	1017	0508.22.N.C.
818	0412.11J.N.F.	1018	0317.11W.N.F.
819	0412.11J.N.F.	1021	0158.73.N.C.
821	0412.11J.N.F.	1023	0254.M11.N.C.
822	0412.A5J.N.F.	1024	0191.70.N.C.SEAL
825	0444.11J.N.F.	1030	0254.A5J.N.F.
826	0444.11J.N.F.	1031	0444.A5J.N.F.
827	0476.11J.N.F.	1031V	0444.A5J.V.F.
828	0476.11.N.C.	1031V	0444.22J.V.F.
829	0476.MA5V.N.F.	1032	0444.A5.N.C.
831	0476.MA5V.N.F.	1033	0444.A5J.N.F.
832	0508.11J.N.F.	1042	0444.A5.N.C.
833	0508.11J.N.F.	1042	0444.22.N.C.
834	0603.11J.N.F.	1046	0254.M11.N.C.
835	0635.11J.N.F.	1047	0317.A4.V.C.
836	0698.11J.N.F.	1050	0127.11.N.C.SEAL
837	0698.A4J.N.F.	1053V	0317.11J.V.C.
838	0698.22J.N.F.	1057	0539.11J.N.F.
839	0730.11J.N.F.	1057V	0539.11J.V.F.
841	0730.22J.N.F.	1058	0635.11.V.C.SEAL
842	0508.11.N.C.	1058V	0635.11J.V.F.
843	0508.A5.N.C.	1059	0762.22J.N.F.
844	0539.11B.N.C.	1059V	0762.22J.V.F.
846	0571.11J.N.F.	1060	0762.MA5.N.C.
847	0571.11J.N.F.	1060V	0762.MA5.V.C.
848	0571.A5J.N.F.	1066	0158.11J.N.F.
849	0571.A5J.N.F.	1067	0286.A5.N.C.
850	0127.11D.N.C.	1079	0158.11.O.C.
851	0191.65.N.C.	1080	0158.11.O.C.
853	0635.11J.N.F.	1081	0317.11.O.C.
854	0539.11H.N.Q.	1082	0317.11.O.C.
855	0539.11H.N.C.	1083	0317.22.O.C.
856	0539.A5H.N.Q.	1084	0317.22.O.C.
857	0539.A5H.N.C.	1085	0158.M11.N.C.
858	0444.NA5J.N.F.	1085V	0158.M11.N.C.
859	0444.NA5J.N.F.	1097	0476.11.N.C.
864	0349.M22J.N.F.	1109	0317.22J.N.F.
865	0349.M22J.N.F.	1110	0381.22J.N.F.
866	0286.MA5J.N.F.	1125	0191.P11.N.C.
867	0286.MA5J.N.F.	1128	0317.MA4J.N.F.
874	0571.11.N.C.	1130	0191.MA4.O.F.
876	0508.11J.N.F.	1131	0286.A4.O.F.
877	0191.N11.N.C.	1132	0349.MA4C.O.F.
877V	0191.N11.N.C.	1136	0317.A4.N.C.
882	0158.N65.N.C.SEAL	11410	0365.89.V.S.
885	0286.A5J.N.F.	1145	0508.11J.N.F.
898	0476.MA5U.N.F.	1149	0127.E73.N.C.
899	0381.MA5J.N.F.	1152	0158.75.N.C.
905	0191.11U.N.F.	1156	0158.11.N.C.
908	0191.O11.N.C.	1160	0191.11.N.C.
912	0254.A5D.N.C.	1164	0254.65.N.C.
916	0635.A5J.V.F.	1165	0254.A5.N.C.
921	0191.N65.N.C.	1166	0254.A5.N.C.
926	0381.11V.N.F.	1168	0286.A5.N.C.
930	0127.11.N.C.SEAL	1169	0286.A5.N.C.
933	0158.11.N.C.SEAL	1170	0286.A5B.N.C.
935	0222.A5.N.C.	1171	0286.A5B.N.C.
935V	0222.A5.V.C.	1172	0286.A5V.N.F.
936	0222.A5.N.C.	1173	0286.A5V.N.F.
937	0254.A5.N.C.SEAL	1174	0286.A5.N.C.
939	0381.11.N.C.SEAL	1175	0286.A5.N.C.
941	0571.11.N.C.	1181	0317.A5.N.C.
941V	0571.11.V.C.	1182	0317.A5.N.C.
		1183	0317.A5J.N.C.
		1184	0317.A5J.N.C.
		1185	0317.MA5.O.C.
		1186	0317.A5C.N.C.
		1189	0381.11B.N.C.
		1190	0381.A5.N.C.
		1191	0381.A5.N.C.
		1192	0381.A5J.N.F.
		1196	0444.A5.N.C.
		1199	0444.A5J.N.F.
		1510	0191.11D.N.C.
		1514	0191.11C.N.C.
		1522	0191.65.N.C.SEAL
		1608	0476.11.N.C.
		1609	0508.11B.N.C.
		1617	0539.A5J.N.F.
		1620	0476.11J.N.F.
		1636	0286.A5V.N.F.
		1636V	0286.A5V.V.F.
		1637	0286.A5V.N.F.
		1637V	0286.A5V.V.F.
		1638	0286.A5V.N.F.
		1638V	0286.A5V.V.F.
		1639	0286.A5V.N.F.
		1639V	0286.A5V.V.F.
		1644	0381.A5J.V.F.
		1645	0381.A5J.V.F.
		1654	0476.A5J.N.F.
		1656	0476.A5J.N.F.
		1657	0476.A5J.N.F.
		1659V	0476.NA5J.V.F.
		1660V	0476.NA5J.V.F.
		1666	0539.A5J.N.F.
		1667	0349.22.N.C.
		1674	0444.22.N.C.
		1676	0571.11J.N.F.
		1678	0571.11J.N.F.
		1679	0571.11.N.C.
		1680	0571.11.N.C.
		1683	0412.A5J.N.F.
		1684	0444.A5U.N.F.
		1685	0508.A5J.N.F.
		1686	0539.11J.N.F.
		1687	0539.11J.N.F.
		1688	0571.A5J.N.F.
		1696	0762.11.N.C.SEAL
		1697	0412.A4J.N.C.
		1698	0412.A4J.N.C.
		1699	0412.A5J.N.F.
		2000	0158.A4.N.C.
		2001	0158.A4.N.C.
		2002	0158.A4J.N.C.
		2003	0158.A4J.N.C.
		2004	0158.A4C.N.C.
		2005	0158.A4C.N.C.
		2006	0158.A4V.N.F.
		2007	0158.A4D.N.C.
		2008	0191.A4.N.C.
		2009	0191.A4.N.C.
		2010	0191.A4J.N.C.
		2011	0191.A4J.N.C.
		2012	0191.A5.N.C.
		2013	0191.A5.N.C.
		2014	0191.A5J.N.C.
		2015	0191.A5J.N.C.
		2016	0158.A5.N.C.
		2017	0158.A5.N.C.
		2018	0158.A5J.N.F.
		2019	0158.A5J.N.F.
		2020	0158.A5C.N.C.
		2021	0158.A5C.N.C.
		2022	0158.A5V.N.F.
		2023	0158.A5D.N.C.
		2024	0222.A4.N.C.
		2025	0222.A4.N.C.
		2026	0222.A4J.N.C.
		2027	0222.A4J.N.C.
		2028	0222.A5.N.C.
		2029	0222.A5.N.C.
		2030	0222.A5J.N.C.
		2031	0222.A5J.N.C.
		2032	0254.A4.N.C.
		2033	0254.A4J.N.F.
		2034	0254.A4J.N.F.
		2035	0254.A5.N.C.
		2036	0254.A5.N.C.
		2041	0317.A4.N.C.
		2042	0317.A4.N.C.
		2043	0317.A4J.N.F.
		2044	0317.A4J.N.F.
		2045	0349.11.N.C.
		2046	0349.11.N.C.
		2047	0349.11J.N.C.
		2048	0349.11J.N.C.
		2049	0349.22.N.C.
		2050	0349.22.N.C.
		2051	0381.A4.N.C.
		2052	0381.A4.N.C.
		2053	0381.A4J.N.F.
		2054	0381.A4J.N.F.
		2055	0412.A4.N.C.
		2056	0412.A4.N.C.
		2057	0412.A5.N.C.
		2058	0412.A5.N.C.
		2059	0444.11.N.C.
		2060	0444.11.N.C.
		2061	0444.11J.N.F.
		2062	0444.11J.N.F.
		2065	0476.11.N.C.
		2066	0476.11.N.C.
		2067	0476.11J.N.F.
		2068	0476.11J.N.F.
		2069	0476.A5.N.C.
		2070	0476.A5.N.C.
		2071	0476.A5J.N.F.
		2072	0476.A5J.N.F.
		2073	0508.11.N.C.
		2074	0508.11.N.C.
		2075	0508.11J.N.F.
		2076	0508.11J.N.F.
		2077	0508.A5.N.C.
		2078	0508.A5.N.C.
		2079	0508.A5J.N.F.
		2084	0539.A5.N.C.
		2085	0539.A5.N.C.
		2086	0539.A5J.N.F.
		2087	0539.11.N.C.
		2087	0571.11.N.C.
		2088	0571.11.N.C.
		2089	0539.11J.N.F.
		2089	0571.11J.N.F.
		2090	0539.11J.N.F.
		2090	0571.11J.N.F.
		2091	0571.A5.N.C.
		2092	0571.A5.N.C.
		2093	0539.11J.N.F.
		2094	0571.A5J.N.F.
		2097	0603.A5J.N.F.
		2098	0603.A5J.N.F.
		2098V	0603.A5J.V.F.
		2101	0635.A5J.N.F.
		2101V	0635.A5J.V.F.
		2102	0539.11J.N.F.
		2103	0286.A5.N.C.SEAL
		2104	0349.22.N.C.SEAL
		2105	0381.11.N.C.SEAL
		2106	0381.A5.N.C.SEAL
		2107	0412.11.N.C.SEAL
		2108	0444.11.N.C.SEAL
		2109	0444.A5.N.C.SEAL
		2110	0476.A5.N.C.SEAL
		2111	0508.11.N.C.SEAL
		2112	0508.A5.N.C.SEAL
		2113	0571.A5.N.C.SEAL
		2114	0476.11J.N.F.
		2115	0762.11J.N.F.
		2116	0762.11J.N.F.
		2117	0381.11B.N.C.
		2120	0635.11.N.C.
		2122	0317.A4.N.C.
		2123	0317.A4.N.C.
		2124	0698.11J.O.F.
		2127	0381.A4J.V.F.
		2131	0158.65.N.C.SEAL
		2133	0508.22.N.C.
		2134	0349.22.N.C.
		2135	0444.22.N.C.
		2137	0381.11C.N.C.
		2142	0444.22.N.C.
		2145	0254.11U.N.F.
		2150	0444.22J.N.F.
		2151	0444.22J.N.F.
		2151V	0444.22J.V.F.
		2152	0698.11J.N.F.
		2160	0158.N11.N.C.
		2161	0158.75Y.N.C.
		12519	0635.A5.N.C.SEAL
		12520	0635.M5.V.H.
		32517	0635.M5.V.H.
		80702	0191.75.N.C.SEAL



This document is designed to provide dimensional information and an indication of general parameters. For further information and safe operating limits contact our technical specialists at the locations below.



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