

James Walker® JaegerSeals

Engineered seals in PTFE & high-performance plastics

Issue 2

- *Seals & sealing systems from James Walker JaegerSeals*
- *High performance products*
- *With full worldwide technical support*



High Performance Sealing Technology



Introduction

James Walker JaegerSeals

Established in 1996, JaegerSeals encompasses vast experience of seal design and manufacture in PTFE and high-performance plastics.

Now, as a member of the global James Walker Group, the company is able to provide its products and services through 50 production, engineering, distribution and customer support locations spread across Europe, North and South America, China, India, SE Asia, Southern Africa, Australia and New Zealand. These, together with a network of James Walker official distributors, serve customers in well over 100 countries worldwide.

Products from James Walker JaegerSeals are recommended for applications in many industrial sectors, including:

- Chemical processing
- Oil, gas and petrochemical processing
- Hydraulics
- Pneumatics
- Food processing
- Pharmaceutical
- Engineering and manufacturing.

Every seal we provide is a highly effective safety element within a system. It is therefore of great importance that the correct seal design is chosen and specified.

With our experience and technical support, customers can be confident in receiving the correct sealing solution for their applications, manufactured to the highest quality standards.



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Seal jacket materials

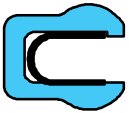
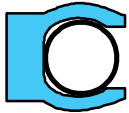

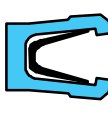

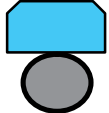
Jacket material code	Name and description	Colour	Application	Temperature range	Coefficient of friction (dynamic)
01	Jaegerlon 01 PTFE	White	Excellent for light dynamic and static service. Low gas permeability. Good cryogenic properties. Meets FDA requirements.	-260°C +200°C	0.09
02	Jaegerlon 02 PTFE Premium grade	Blue	Similar properties as Code 01 but with improved wear resistance.	-260°C +200°C	0.09
03	Jaegerlon 03 PTFE/Carbon/Graphite	Black	Excellent material for heat and wear resistance. Recommended for dry and poorly lubricated applications, suitable in water and steam service.	-260°C +300°C	0.09
04	Jaegerlon 04 PTFE/Glass/MoS₂	Grey	Recommended for high pressure hydraulic service, steam and water. Abrasive when running against soft metal in dynamic applications under high pressure.	-250°C +300°C	0.08
05	Jaegerlon 05 PTFE/ Carbon/Graphite	Black	Similar to Code 03 but increased wear resistance. Excellent in steam and water under severe conditions. Very good extrusion resistance at high temperature. Excellent material for back-up rings.	-250°C +300°C	0.10
06	Jaegerlon 06 PTFE Premium grade	Black	Excellent material for extreme dynamic conditions, with combinations such as high temperature, pressure, speed, dry running. Excellent in water and water based solutions. Abrasive when running against soft metals.	-250°C +300°C	0.09
07	Jaegerlon 07 PTFE/Bronze	Brown	Good abrasive resistance. Excellent in reciprocating hydraulic applications. Not recommended for rotary applications. Good for high pressures.	-150°C +290°C	0.08
08	Jaegerlon 08 PTFE/Polyester	Tan	Special compound for high temperature applications. Recommended for low to medium speed applications running against soft metals.	-240°C +300°C	0.13
09	Jaegerlon 09 EkonoI® filled PTFE	Brown	Special compound with superior heat and wear resistance characteristics. Non-abrasive. Recommended for low to high speed application running against soft metals. Not good in water.	-250°C +300°C	0.15
10	Jaegerlon 10 UHMWPE	White	Excellent wear material but limited heat and chemical resistance. Excellent for cryogenic applications. Meets FDA requirements.	-250°C +80°C	0.11
11	Jaegerlon 11 PTFE/Glass/MoS₂	Grey	Similar to Code 04 but softer for improved sealing at lower pressure. Can be abrasive when running against soft metals.	-250°C +300°C	0.09
12	Jaegerlon 12 PTFE/Graphite	Black	General purpose material with good heat and wear characteristics. Good in water, non-lubricating fluids and compatible with all hydraulic fluids and most chemicals	-250°C +300°C	0.09
13	Jaegerlon 13 PEEK™	Tan	A high modulus material with excellent high temperature resistance. Excellent for back-up rings only	-70°C +250°C	n/a
15	Jaegerlon 15	White	Meets FDA requirements.	-250°C +300°C	0.11

Other compounds available subject to application demands.

Spring & 'O' ring materials

Spring material

Our spring energised seals are available with the following spring energisers. These materials are compatible with most media. Other spring materials are available but may require minimum production quantities. Other elastomer compounds are available to suit special applications/media; please consult us for technical advice.

Spring material code	Description	Uni-Seal				Deina	Hydra
		Types J20 to J29	Types J01 to J10	Types J30 + J31	Types J40 to J42	Types J50 to J59	Types J70 to J81
							
01	AISI 301 1.4301	Standard		Standard	Standard		
02	Elgiloy®	Optional					
03	Phynox®		Optional				
04	17/7 PH 1.4568		Standard				
05	Viton® 'O' ring		Optional			Optional	Optional
06	Nitrile 'O' ring		Optional			Standard	Standard

Uni-Seal small diameter details

Uni-Seal is a spring actuated and pressure assisted sealing device consisting of a PTFE jacket and a corrosion resistant metal spring energiser. When the Uni-Seal is seated in the gland, the spring is under compression forcing the jacket against the hardware. The spring compensates for jacket wear and eccentricity. The system pressure assists the spring pressure. The spring load can be tailored to meet special low friction requirements in dynamic applications, and loading can be increased for cryogenic sealing.

(All dimensions in mm)

Types J01 to J08		
Cross section	Min Rod	Min Bore
1	2	5
2	4	9
3	7	13
4	15	25
5	60	72
6	85	105

Types J09, J10, J28, J29		
Cross section	Min ID	Min OD
1	6	10
2	12	15
3	20	26
4	45	50
5	85	95
6	100	110

Types J20 to J27		
Cross section	Min Rod	Min Bore
1	5	8
2	10	15
3	12	18
4	16	26
5	65	77
6	100	120





Types J30 + J31		
Cross section	Min ID	Min OD
3	20	26
4	40	45
5	85	95
6	100	120
7	120	150

Types J40 to J42		
Cross section	Min Rod	Min Bore
3	12	18
4	16	26
5	65	77
6	100	120

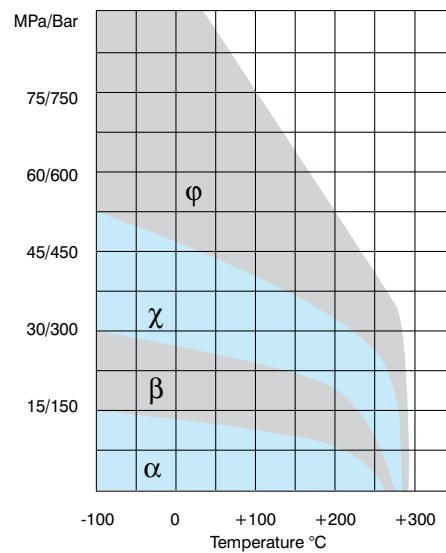
For diameters outside the ranges quoted, consult James Walker JaegerSeals.

Uni-Seal — technical specifications

Temperature, pressure and extrusion gap

	Material	α	β	χ	φ
 L width	Unfilled	0.10	0.07	0.05	
	Filled PTFE	0.15	0.10	0.07	
 L1 width	Unfilled	0.15	0.10	0.07	
	Filled PTFE	0.20	0.15	0.10	0.07
 L2 width	Filled Back-up	0.20	0.15	0.10	0.07
	PEEK™ Back-up	0.20	0.15	0.10	0.07
 L3 width	Filled Back-up	0.25	0.20	0.15	0.10
	PEEK™ Back-up	0.35	0.25	0.20	0.15

(All dimensions in mm)



(Note: Indicated pressure ratings depend on seal design and hardware.)

Maximum recommended diametral extrusion gap

When sealing high pressure and/or temperature the clearance between the hardware “Extrusion gap” becomes very important. At high pressure and /or temperature the jacket material can extrude into the gap causing premature sealing failure. The extrusion gap should be held to the minimum practical or should not exceed above values. Back-up rings are manufactured of a harder material than the seal material.

Surface finishes and hardness

Dynamic

The quality of the surface finish influences the relative wear of the cover material. The transfer of a thin film of PTFE from the seal cover to the mating dynamic surface will improve seal life. Relatively rough finishes wear the cover material too rapidly, whereas too smooth surfaces result in insufficient material transfer to form a thin film. As general rule, the higher the sealing surface hardness the better the seal performance. Higher hardness reduces wear and increases seal life. A 40 HRC or higher is recommended for slow to moderate movements.

Static

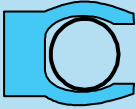
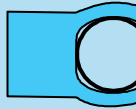
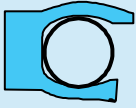
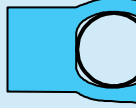


Ensure that the seal's counterfaces are free from scores and spiral machining marks.



Fluid Being Sealed	Surface Finish	
	Dynamic Surface	Static Surface
Cryogenics Helium gas Hydrogen gas	0.05 to 0.2 Ra	0.1 to 0.2 Ra 0.15 to 0.3 Ra
Air Nitrogen gas Argon gas Natural gas Petrol	0.15 to 0.3 Ra	0.4 to 1.6 Ra
Water Hydraulic oil Crude oil Greases	0.2 to 0.4 Ra	0.4 to 1.6 Ra



(All dimensions in μm)

Uni-Seal — J01- J10

Standard profiles: Types J01 to J10

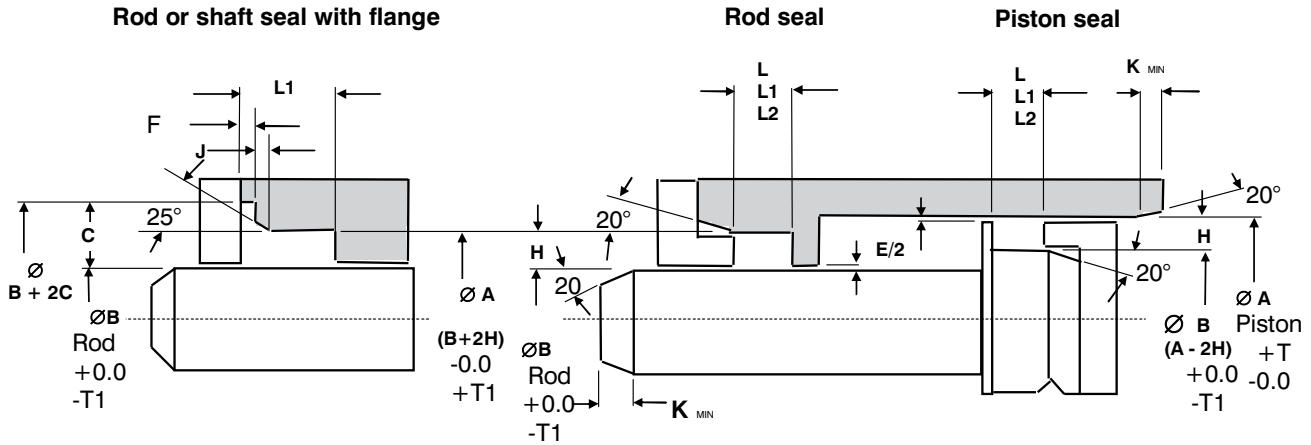
RADIAL SEALS				
	Type J01	Radial seal for static and dynamic application. Rod and piston seals. The medium to high spring load provides positive sealing but with some increase in seal friction. Suitable for medium to high pressure service. Type J01: Standard profile. Type J02: As J01 plus extended heel for high pressure.	Type J02	
	J03	As Type J01, but only for reciprocating movements. Scraper on inside diameter. Type J03: Standard profile. Type J04: As J03 plus extended heel for high pressures.	J04	
	J05	As Type J01, but only for reciprocating movements. Scraper on outside diameter. Type J05: Standard profile. Type J06: As J05 plus extended heel for high pressures.	J06	

RADIAL FLANGE SEALS		
	J07	As Type J01. Due to the clamping of the flange the seal will be prevented from turning with the shaft, this can occur with standard designs due to thermal expansion and other effects with dynamic applications.
	J08	As Type J01 and J07 but only for reciprocating movements. Scraper on inside diameter.

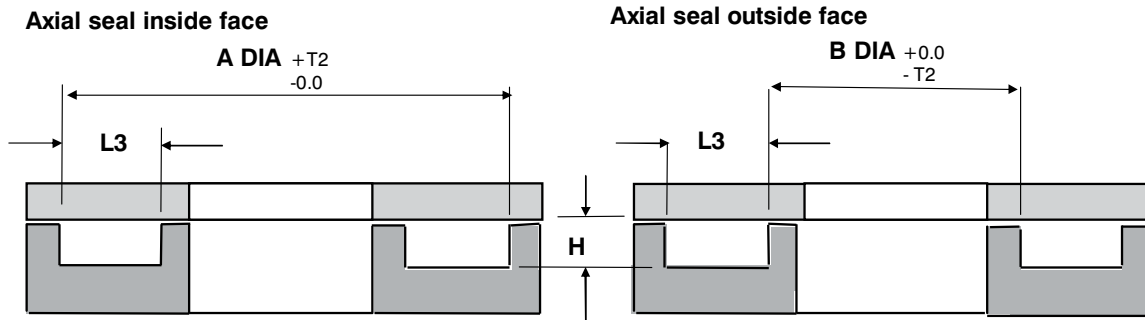
AXIAL SEALS		
	J09	Axial seal for static applications as in Type J01. Inside face seal.
	J10	Axial seal for static applications as in Type J01. Outside face seal.

Hardware design for J01 - J10

Radial seals



Axial seals

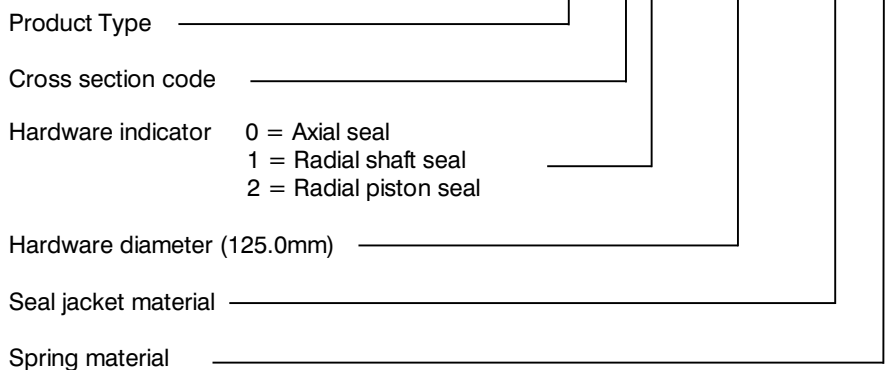


Cross section Code	C ± 0.15	E NOM	F ± 0.05	H	T1	T2	J ± 0.15	K Min	L $+0.3$ -0.0	L1 $+0.3$ -0.0	L2 $+0.3$ -0.0	L3 Min
1	3.4	0.10	0.40	1.42/1.47	0.05	0.13	0.8	3.5	2.4	3.8	5.3	2.4
2	4.3	0.13	0.58	2.26/2.31	0.05	0.13	0.9	4.5	3.6	4.6	6.2	3.6
3	5.5	0.15	0.70	3.07/3.12	0.05	0.15	1.3	6.0	4.8	6.0	7.7	4.8
4	8.5	0.18	0.80	4.72/4.78	0.06	0.15	1.8	7.5	7.1	8.5	10.8	7.1
5	11.5	0.20	1.20	6.05/6.12	0.07	0.20	2.3	8.5	9.5	12.1	14.7	9.5
6	15.5	0.24	1.6	9.35/9.40	0.08	0.25	3.3	10.0	13.5	15.0	18.0	13.5

(All dimensions in mm)

Order example

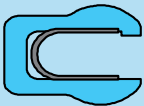
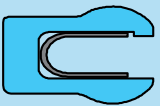

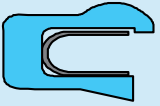

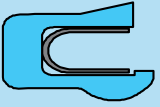
J02 3 1 - 01250 - 04 02



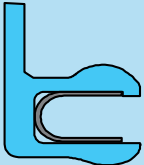

Uni-Seal — J20 - J29

Standard profiles: Types J20 to J29



RADIAL SEALS

	Type J20	Radial seal for dynamic applications. For rod and piston seal with low to medium pressure and /or speed. This spring has a low load and high deflection which provides low friction sealing and compensates for minor eccentricity or misalignment. Type J20: Standard profile. Type J21: As J20 plus extended heel for high pressures.	Type J21	
	J22	As Type J20, but only for reciprocation motion. Scraper on inside diameter. Type J22: Standard profile. Type J23: As J22 plus extended heel for high pressures.	J23	
	J24	As Type J20, but only for reciprocation motion. Scraper on outside diameter. Type J24: Standard profile. Type J25: As J24 plus extended heel for high pressures.	J25	

RADIAL FLANGE SEALS

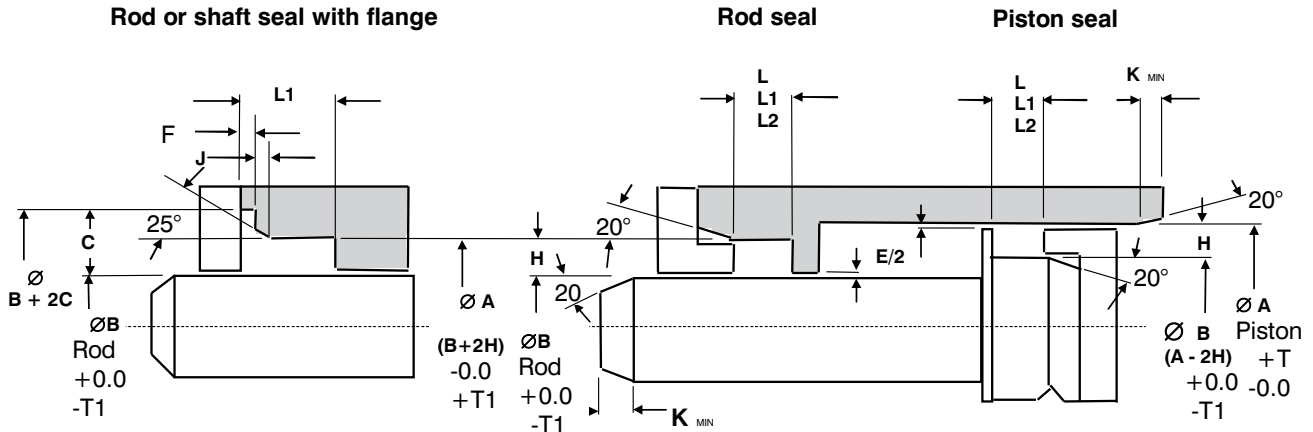
	J26	As Type J20. Due to the clamping of the flange the seal will be prevented from turning with the shaft, this can occur with standard designs due to thermal expansion and other effects with dynamic applications.
	J27	As Types J20 and J26, but only for reciprocating movements. Scraper on inside diameter.

AXIAL SEALS

	J28	Axial seal for static or dynamic applications as in Type J20. Inside face seal.
	J29	Axial seal for static or dynamic applications as in Type J20. Outside face seal.

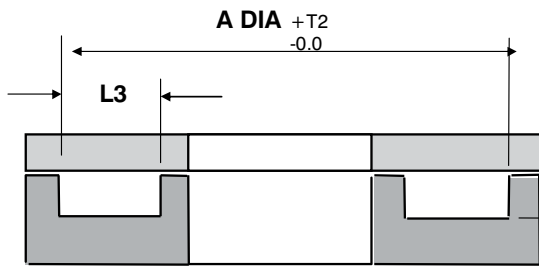
Hardware design for J20 - J29

Radial seals

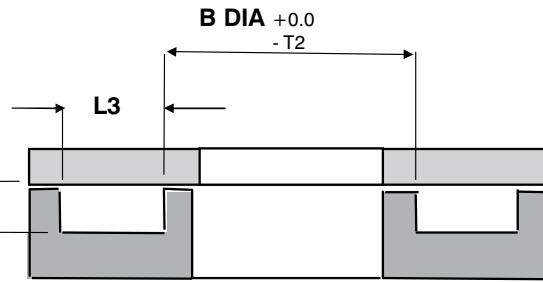


Axial seals

Axial seal inside face



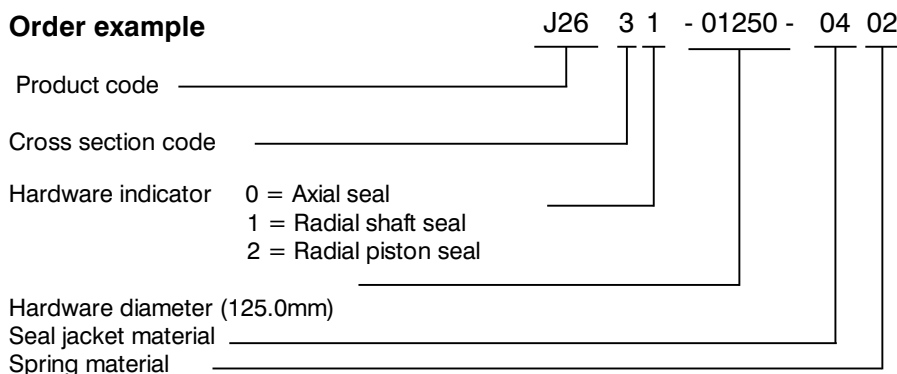
Axial seal outside face



Cross section Code	C ± 0.15	E NOM	F ± 0.05	H	T1	T2	J ± 0.15	K Min	L $+0.3$ -0.0	L1 $+0.3$ -0.0	L2 $+0.3$ -0.0	L3 Min
1	3.4	0.10	0.40	1.42/1.47	0.05	0.13	0.8	3.5	2.4	3.8	5.3	2.4
2	4.3	0.13	0.58	2.26/2.31	0.05	0.13	0.9	4.5	3.6	4.6	6.2	3.6
3	5.5	0.15	0.70	3.07/3.12	0.05	0.15	1.3	6.0	4.8	6.0	7.7	4.8
4	8.5	0.18	0.80	4.72/4.78	0.06	0.15	1.8	7.5	7.1	8.5	10.8	7.1
5	11.5	0.20	1.20	6.05/6.12	0.07	0.20	2.3	8.5	9.5	12.1	14.7	9.5
6	15.5	0.24	1.6	9.35/9.40	0.08	0.25	3.3	10.0	13.5	15.0	18.0	13.5

(All dimensions in mm)

Order example



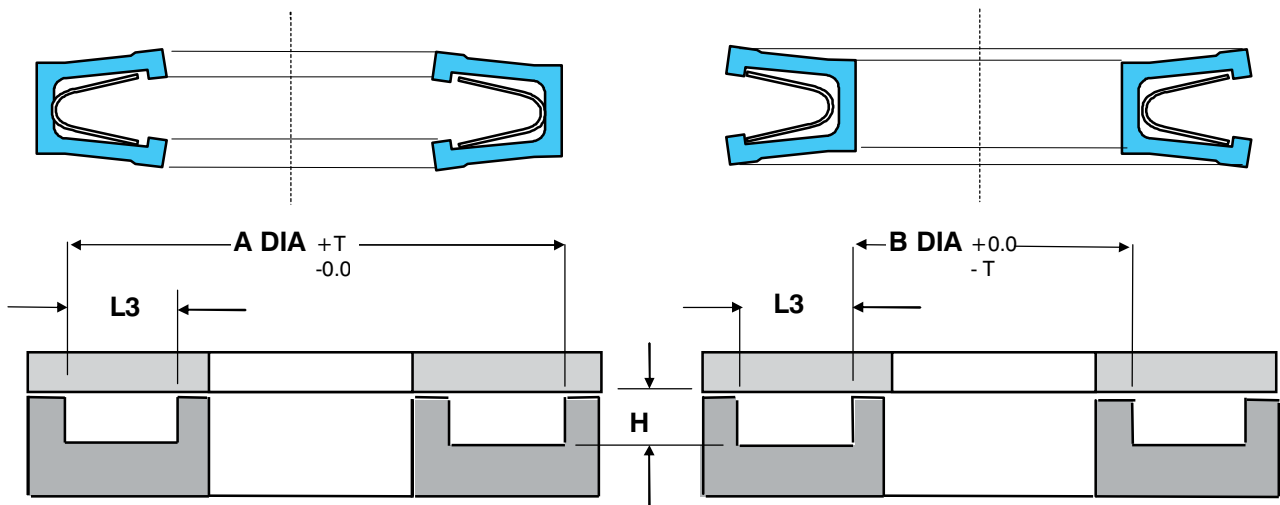
Uni-Seal — J30 - J31

Standard profiles: Types J30 and J31

The axial face seals Type J30 and J31 employ a heavy duty, high load spring. We recommend these seals for extreme sealing conditions, both static and dynamic.

Axial seal for inside pressure: Type J30

Axial seal for outside pressure: Type J31



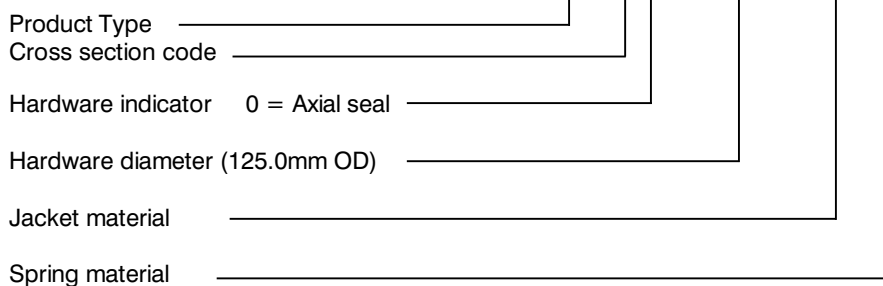
See page 5 for surface finish recommendations

Cross section Code	H	T	L3 Min
3	3.07/3.12	0.15	4.8
4	4.72/4.78	0.15	7.1
5	6.05/6.12	0.20	9.5
6	9.35/9.40	0.25	13.5
7	12.40/12.45	0.30	16.5

(All dimensions in mm)

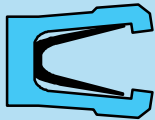

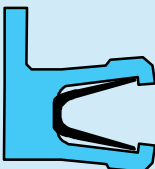
Order example

J30 3 0 - 01250 - 04 01



Uni-Seal — J40 - J42

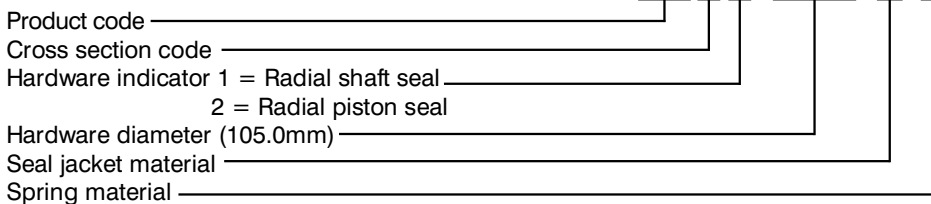
Standard profiles: Types J40, J41 and J42

RADIAL SEALS				
	Type J40	Type J40 utilises a wrapped and formed ribbon spring. The design offers the utmost in spring deflection for otherwise difficult sealing applications. Can be used for reciprocating and slow rotary motion in dynamic and static sealing. Type 41: as Type J40 plus extended heel for high pressures.	Type J41	
	J42	As Type 40. Due to the clamping of the flange the seal will be prevented from turning with the shaft. This can occur with standard designs due to thermal and other effects with dynamic applications.		

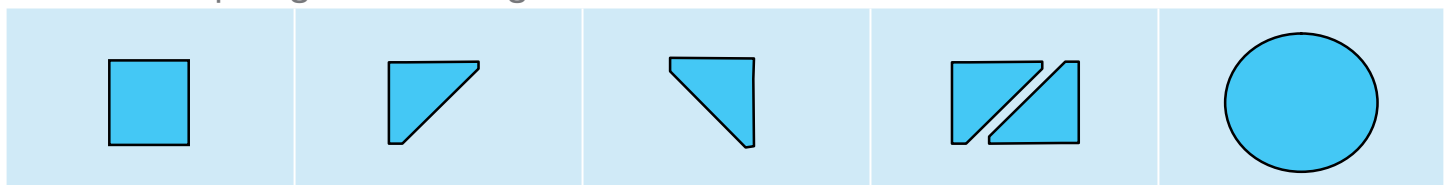
Hardware dimensions as per pages 7 or 9

Order example

J40 4 1- 01050 09 01

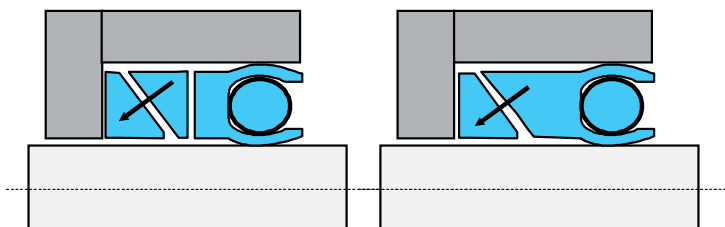


Solid back-up rings and 'O' rings



Back-up rings are used in combination with axial and radial seals when the extrusion gap is too big for the required pressure and temperature.

'O' rings made of PTFE are used in all applications in which the chemical resistance of conventional elastomer 'O' rings is not adequate. PTFE 'O' rings can only be used as static seals. PTFE 'O' rings are manufactured by machining, and can be produced in all sizes.



Order example

Back-up rings in combination with spring energised seals always have a special part number, eg J40-1234.

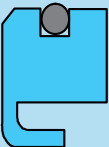
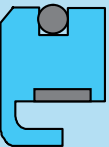
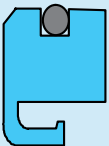
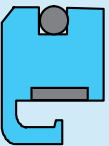
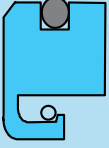
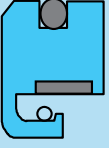
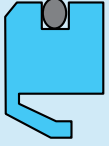
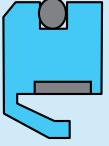
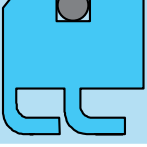
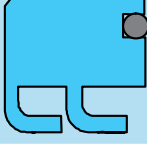
Deina seals — J50 - J59

Standard profiles: Types J50 to J59

These solid PTFE lip seals provide the designer with a significant improvement in performance over elastomer lip seals at a much lower cost than a mechanical face seal.

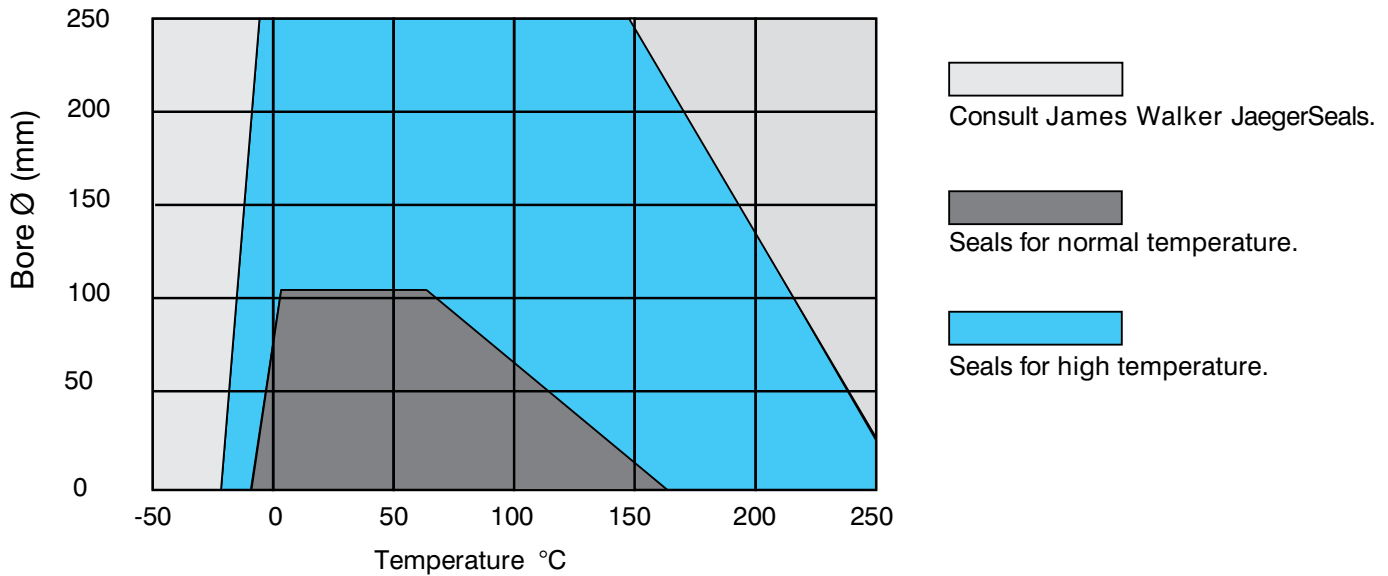
Advantage:

- Temperature -20°C to +200°C
- Pressure up to 3MPa/30bar
- High chemical resistance
- Low friction
- Surface speeds up to 25m/s
- Dry running or abrasive media
- Easy to install and replace
- For high temperatures a metal support ring can be installed to prevent deformation.

Seal type for normal temperatures	Type	Application details	Type	Seal type for high temperatures
	J50	Type J50: shaft speed up to 25 m/s. Maximum pressure 0.5MPa/5bar. Used in lubricated and non-lubricated applications. Maximum temperature 100 °C. Type J51: as Type J50 but due to the metal support ring can be used up to 200 °C or maximum 'O' ring material temperature.	J51	
	J52	Type J52: improved sealing of gases and abrasive media due to the higher lip load. Not recommended for shaft speed greater than 8m/s. Type J53: as Type J52 but due to the metal support ring can be used up to 200 °C or maximum 'O' ring material temperature.	J53	
	J54	Type J54: incorporates spring loading for use in applications where shaft run-out or misalignment exist. Pressures up to 0.3MPa/3bar. Speed up to 7m/s. Type J55: as Type J54 but due to the metal support ring can be used up to 200°C or maximum 'O' ring material temperature.	J55	
	J56	Type J56: shaft speed up to 30 m/s. Maximum pressure 0.15MPa/1.5bar. Low friction seal, used as environmental seals. Type J57: as Type J56 but due to the metal support ring can be used up to 200 °C or maximum 'O' ring material temperature.	J57	
	J58	Type J58 and Type J59: used in hydraulic high pressure applications, pumps, hydraulic motors. Operational PV factor is 6.5MPa m/s maximum (65bar m/s maximum). Type J59: as Type J58 but the clamping is in the axial direction which requires the gland width be held to seal width -0.0/+0.1mm.	J59	

Hardware design for J50 - J59

Hardware design



Shaft material and hardness

Hardened steel

- 40 to 65 HRC with hydraulic oil up to 1.5MPa/15bar
- 58 to 65 HRC with pressure > 1.5MPa/15bar and non-lubricating or abrasive media.

Finish

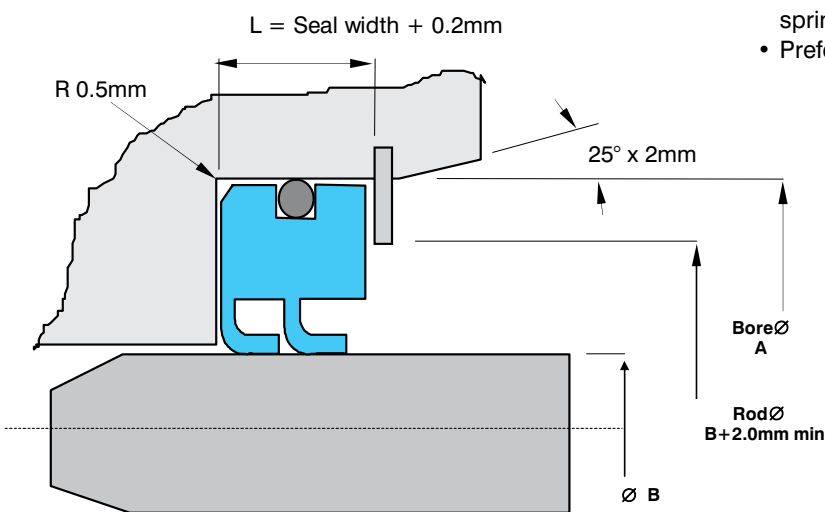
Shaft

- Ra 0.3 - 0.5 μm for lubricated applications
- Ra 0.2 - 0.4 μm for non-lubricated or abrasive media
- Ra \leq 0.2 μm in vacuum.

Bore or 'O' ring side

- Ra = 0.8-1.6 μm
- Maximum bore finish of 0.8 μm for Deina seals utilising a spring energized PTFE seal for OD sealing
- Preferred finishing method is plunge grinding with no lead.

Installation dimensions



Order example

Product Type J58 - 20 x 30 x 7 - 08
 Hardware dimension (A x B x L)
 Material

Hardware dimensions for J50 - J59

Nominal shaft diameter (mm)	Nominal bore diameter (mm)	Seal width (mm)
8	22	7
	24	
	26	
9	22	7
	24	
	26	
10	22	7
	24	
	26	
11	22	7
	26	
12	22	7
	24	
	28	
	30	
14	24	7
	28	
	30	
	35	
15	26	7
	30	
	32	
	35	
16	28	7
	30	
	32	
	35	
17	28	7
	30	
	32	
	35	
	40	
18	30	7
	32	
	35	
	40	
20	30	7
	32	
	35	
	40	
	47	
22	32	7
	35	
	40	
	47	
24	35	7
	37	
	40	
	47	
25	35	7
	40	
	42	
	47	
	52	

Nominal shaft diameter (mm)	Nominal bore diameter (mm)	Seal width (mm)
26	37	7
	42	
	47	
28	40	7
	47	
	52	
30	40	7
	42	
	47	
	52	
32	62	8
	45	
32	47	7
	52	
	52	
35	47	7
	50	
	52	
	62	
36	47	7
	50	
	52	
	62	
38	52	7
	55	
	62	
40	55	8
	60	
	62	
	72	
	72	
42	55	8
	60	
	62	
	72	
45	60	8
	62	
	65	
	72	
48	62	8
	65	
	72	
	72	
50	65	8
	68	
	72	
	80	
	80	
52	68	8
	72	
	72	
55	70	8
	72	
	80	
	80	
56	85	10
	70	
	72	
56	70	8
	72	
	80	
	85	

Nominal shaft diameter (mm)	Nominal bore diameter (mm)	Seal width (mm)
58	72	8
	80	
60	75	7
	80	
	24	
62	26	7
	80	
	85	
63	90	10
	85	
65	90	10
	100	
	100	
68	90	10
	100	
70	90	10
	100	
72	95	10
	100	
75	95	10
	100	
78	100	10
	100	
80	100	10
	110	
85	110	12
	120	
90	110	12
	120	
95	120	12
	125	
100	120	12
	125	
	130	
105	130	12
	140	
110	130	12
	140	
115	140	12
	150	
120	150	12
	160	
125	150	12
	160	
130	160	12
	170	
	170	
135	170	15
	170	
140	170	15
	170	
145	175	15
	175	
150	180	15
	180	
160	190	15
	190	
170	200	15
	200	
180	210	15
	210	
190	220	15
	220	
200	230	15
	230	

Bore and shaft dimensions are based on DIN 3760.
Please consult James Walker JaegerSeals for non-standard sizes to fit your existing hardware.

Hydra seal — J70 - J71

Types J70 and J71

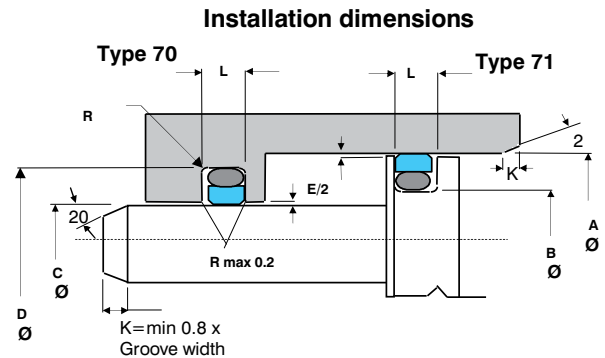
Hydra seal type J70 and J71 are double-acting seals that have been used successfully for many years to seal rods and pistons of working cylinders. Well proven in the fields of hydraulics and pneumatics as well as general engineering, these robust seals offer designers an excellent choice of sealing components.

Advantage:

- Excellent anti-friction characteristics
- No stick-slip effect during startup
- No adhesion effect
- Can be used in dry and lubricated media
- Single-piece piston and cylinder head applications
- Available up to 2000mm diameter
- Compact, simple groove design.

Operating ranges

- Reciprocating up to 40MPa/400bar and 5m/s (please consult us if higher pressures or speeds are anticipated)
- Temperature from -60 °C to + 200°C limited by the 'O' ring material.



Surface roughness

- Cylinder/Bore : Ra = 0.05 - 0.6µm
- Rod/Shaft: Ra = 0.05-0.5µm
- Groove dia: Ra = < 2.5µm
- Groove walls: Ra = < 4µm

Table for Type J70

Rod diameter C f8

Heavy duty J70A	Standard duty J70B	Light duty J70C	Groove D H9	Groove width L + 0.2	Diametal clearance E max.		Radius R	'O' ring series	'O' ring	
					0-20MPa/200bar	20MPa/200bar - 40MPa/400bar			C/S Ø	Inside Ø = C +
	3-7.9	8-18.9	C + 4.9	2.2	0.6-0.4	0.4-0.3	0.3-0.5	000	1.78	2
	8-18.9	19-37.9	C + 7.3	3.2	0.8-0.5	0.5-0.3	0.5-0.8	100	2.62	3.5
8-18.9	19-37.9	38-199.9	C + 10.7	4.2	0.8-0.5	0.5-0.4	0.8-1.2	200	3.53	5
19-37.9	38-199.9	200-255.9	C + 15.1	6.3	1.0-0.6	0.6-0.4	1.2-1.5	300	5.33	7
38-199.9	200-255.9	256-649.9	C + 20.5	8.1	1.0-0.6	0.6-0.5	1.5-2.0	400	7.00	9.5
200-255.9	256-649.9	650-999.9	C + 24.0	8.1	1.2-1.0	0.8-0.6	1.5-2.0	400	7.00	13
256-649.9	650-999.9		C + 27.3	9.5	1.4-1.0	1.0-0.7	2.0-3.0	500	8.40	14.5

(All dimensions in mm)

Table for Type J71

Cylinder diameter A H9

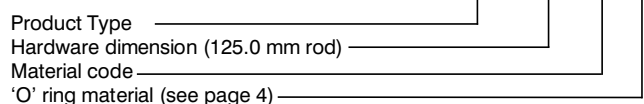
Heavy duty J73A	Standard duty J71B	Light duty J71C	Groove B H9	Groove width L + 0.2	Diametal clearance E max.		Radius R	'O' ring series	'O' ring C/S
					0-20MPa/200bar	20MPa/200bar - 40MPa/400bar			
	8-14.9	15-39.9	A - 4.9	2.2	0.6-0.4	0.4-0.3	0.3-0.5	000	1.78
	15-39.9	40-79.9	A - 7.5	3.2	0.8-0.5	0.5-0.3	0.5-0.8	100	2.62
15-39.9	40-79.9	80-132.9	A - 11.0	4.2	0.8-0.5	0.5-0.3	0.8-1.2	200	3.53
40-79.9	80-132.9	133-329.9	A - 15.5	6.3	1.0-0.6	0.6-0.4	1.2-1.5	300	5.33
80-132.9	133-329.9	330-669.9	A - 21.0	8.1	1.0-0.6	0.6-0.4	1.5-2.0	400	7.00
133-329.9	330-669.9	670-999.9	A - 24.5	8.1	1.2-1.0	1.0-0.6	1.5-2.0	400	7.00
330-669.9	670-999.9		A - 28.0	9.5	1.4-1.0	1.0-0.7	2.0-3.0	500	8.40

As a guide, the 'O' ring ID for series J71 should be equal to or up to less than 5% of the groove diameter B

(All dimensions in mm)

Order example

J70B - 01250 - 07 06



Hydra seal — J72 - J73

Types J72 and J73

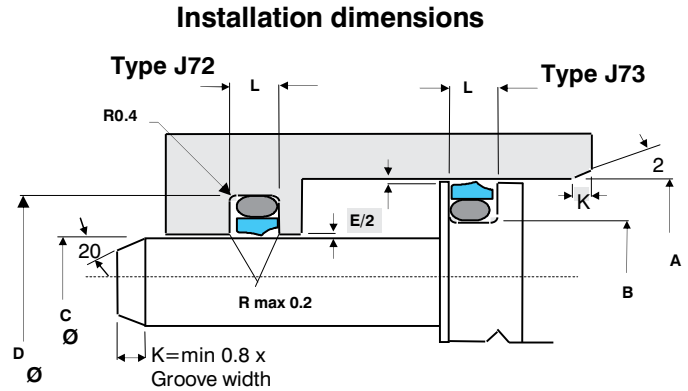
Hydra seal Type J72 and J73 are single-acting well proven rod and piston seals for working cylinders in hydraulic and pneumatics plus many applications in general engineering such as automotive and machine tools. Like Hydra piston seals, they offer wide choice of sealing components.

Advantage:

- Excellent anti-friction characteristics
- No stick-slip effect during startup
- No adhesion effect
- Can be used in dry and lubricated media
- Single-piece piston and cylinder head applications
- Available up to 2000mm diameter
- Compact simple groove design.

Operating ranges

- Reciprocating up to 40MPa/400bar and 5m/s (please consult us if higher pressures or speeds are anticipated)
- Temperature from -60 °C to + 200°C limited by the 'O' ring material.



Surface roughness

- Cylinder/Bore: Ra = 0.05 - 0.6µm
- Rod/Shaft: Ra = 0.05 - 0.5µm
- Groove dia: Ra = < 2.5µm
- Groove walls: Ra = < 4µm

Table for Type J72

Rod diameter C f8

Heavy duty J72A	Standard duty J72B	Light duty J72C	Groove Ø D H9	Groove width L + 0.2	Diametal clearance E max.		Radius R	'O' ring series	'O' ring	
					0-20MPa/200bar	20MPa/200bar - 40MPa/400bar			C/S Ø	Inside Ø = C +
	3-7.9	8-18.9	C + 4.9	2.2	0.6-0.4	0.4-0.3	0.3-0.5	000	1.78	2
	8-18.9	19-37.9	C + 7.3	3.2	0.8-0.5	0.5-0.3	0.5-0.8	100	2.62	3.5
8-18.9	19-37.9	38-199.9	C + 10.7	4.2	0.8-0.5	0.5-0.4	0.8-1.2	200	3.53	5
19-37.9	38-199.9	200-255.9	C + 15.1	6.3	1.0-0.6	0.6-0.4	1.2-1.5	300	5.33	7
38-199.9	200-255.9	256-649.9	C + 20.5	8.1	1.0-0.6	0.6-0.5	1.5-2.0	400	7.00	9.5
200-255.9	256-649.9	650-999.9	C + 24.0	8.1	1.2-1.0	0.8-0.6	1.5-2.0	400	7.00	13
256-649.9	650-999.9		C + 27.3	9.5	1.4-1.0	1.0-0.7	2.0-3.0	500	8.40	14.5

(All dimensions in mm)

Table for Type J73

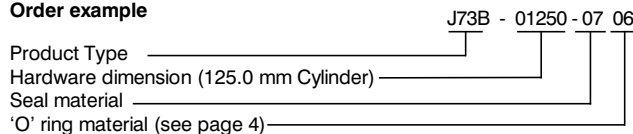
Cylinder diameter A H9

Heavy duty J73A	Standard duty J73B	Light duty J73C	Groove Ø B H9	Groove width L + 0.2	Diametal clearance E max.		Radius R	'O' ring series	'O' ring C/S
					0-20MPa/200bar	20MPa/200bar - 40MPa/400bar			
	8-16.9	17-26.9	A - 4.9	2.2	0.6-0.4	0.4-0.3	0.3-0.5	000	1.78
	17-26.9	27-59.9	A - 7.3	3.2	0.8-0.5	0.5-0.3	0.5-0.8	100	2.62
17-26.9	27-59.9	60-199.9	A - 10.7	4.2	0.8-0.5	0.5-0.4	0.8-1.2	200	3.53
27-59.9	60-199.9	200-255.9	A - 15.1	6.3	1.0-0.6	0.6-0.4	1.2-1.5	300	5.33
60-199.9	200-255.9	256-669.9	A - 20.5	8.1	1.0-0.6	0.6-0.4	1.5-2.0	400	7.00
200-255.9	256-669.9	670-999.9	A - 24.0	8.1	1.2-0.7	0.7-0.5	1.5-2.0	400	7.00
256-669.9	670-999.9		A - 27.3	9.5	1.4-0.8	0.8-0.6	2.0-3.0	500	8.40

As a guide, the 'O' ring ID for series J73 should be equal to or up to less than 5% of the groove diameter B

(All dimensions in mm)

Order example



Hydra seal R — J74 - J75

Types J74 and J75

Hydra seal R Types J74 and J75 are double-acting seals for rotary rod and piston designs, in rotary distributors for example.

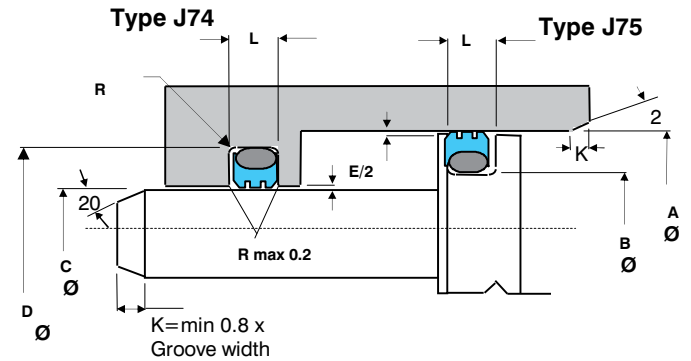
Advantage:

- Excellent anti-friction characteristics
- No stick-slip effect during start-up
- No adhesion effect
- Can be used in dry and lubricated media
- Single-piece piston and cylinder head applications
- Available up to 2000mm diameter.

Operating ranges

- Up to 30MPa/300bar
- Oscillatory up to 5m/s, intermittent. Continuous up to 1m/s
- Temperature from -60°C to + 200°C, limited by the 'O' ring material.

Installation dimensions



Surface roughness

- Cylinder/Bore: Ra = 0.05 - 0.4µm
- Rod/Shaft: Ra = 0.05 - 0.4µm
- Groove dia: Ra = < 2.5µm
- Groove walls: Ra = < 4µm

Table for Type J74

Series	Rod Ø C f8	Groove Ø D H9	Groove width L + 0.2	Diametal clearance E max.		Radius R	'O' ring series	'O' ring	
				0-15MPa/150bar	0-15MPa/150bar - 30MPa/300bar			C/S Ø	Inside Ø = C +
J74A	8-18.9	C + 4.9	2.2	0.4-0.25	0.25-0.15	0.3-0.5	000	1.78	1.5
J74B	19-37.9	C + 7.5	3.2	0.6-0.40	0.40-0.20	0.5-0.8	100	2.62	3.0
J74C	38-199.9	C + 11.0	4.2	0.6-0.40	0.40-0.20	0.8-1.2	200	3.53	5.0
J74D	200-255.9	C + 15.5	6.3	0.8-0.55	0.55-0.30	1.2-1.5	300	5.33	6.5
J74E	256-649.9	C + 21.0	8.1	0.8-0.55	0.55-0.30	1.5-2.0	400	7.00	9.0
J74F	650-999.9	C + 28.0	9.5	1.2-0.85	0.85-0.50	2.0-3.0	500	8.40	12.0

(All dimensions in mm)

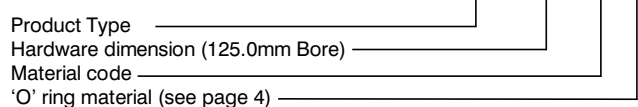
Table for Type J75

Series	Bore Ø A H9	Groove Ø B H9	Groove width L + 0.2	Diametal clearance E max.		Radius R	'O' ring series	'O' ring C/S
				0-15MPa/150bar	0-15MPa/150bar - 30MPa/300bar			
J75A	8-39.9	A - 4.9	2.2	0.4-0.25	0.25-0.15	0.3-0.5	0	1.78
J75B	40-79.9	A - 7.5	3.2	0.6-0.40	0.40-0.20	0.5-0.8	100	2.62
J75C	80-132.9	A - 11.0	4.2	0.6-0.40	0.40-0.20	0.8-1.2	200	3.53
J75D	133-329.9	A - 15.5	6.3	0.8-0.55	0.55-0.30	1.2-1.5	300	5.33
J75E	330-669.9	A - 21.0	8.1	0.8-0.55	0.55-0.30	1.5-2.0	400	7.00
J75F	670-999.9	A - 28.0	9.5	1.2-0.85	0.85-0.50	2.0-3.0	500	8.40

As a guide, the 'O' ring ID for series J75 should be equal to or up to less than 5% of the groove diameter B (All dimensions in mm)

Order example

J75E - 01250 - 07 06



Hydra seal — J76 - J77 wipers

Types J76 and J77

Hydra seal Type J76 is a double wiper with two geometrically profiled wiper lips and an 'O' ring energiser.

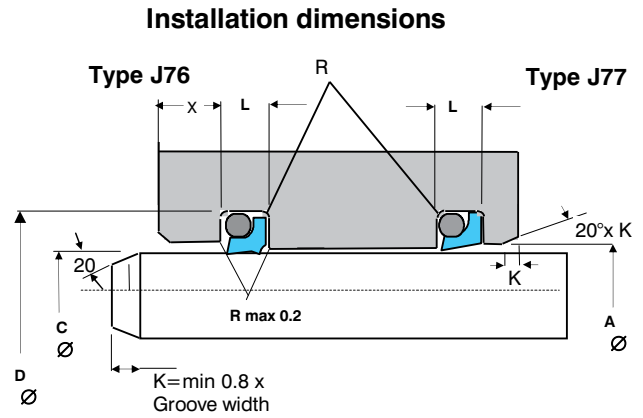
Advantage:

- Very good external wiping effect even when subject to firmly adhering dirt and ice
- Very good internal wiping effect for the residual oil film if using Type J72 seal
- Abrasion resistant
- Low friction
- Available up to 2000mm diameter.

Operating ranges

- Reciprocating up to 15 m/s.
- Temperature from -60 °C to + 200°C limited by the 'O' ring material.

Hydra seal Type J77: as Type J76 but only single wiper action.



Surface roughness

- Rod/Shaft: Ra = 0.05 - 0.5µm
- Groove dia: Ra = < 2.5µm
- Groove walls: Ra = < 4µm

Table for Type J76

Series	Rod Ø C f8	Groove Ø D H9	Groove width L + 0.2	Radius R	Groove Ø A + 0.3	'O' ring series	X mm	'O' ring	
								C/S Ø	Inside Ø = C +
J76A	19-39.9	C + 7.6	4.2	0.8	C + 1.0	000	3	1.78	2.5
J76B	40-69.9	C + 8.8	6.3	0.8	C + 1.5	100	3	2.62	3.5
J76C	70-139.9	C + 12.2	8.1	1.5	C + 2.0	200	4	3.53	4
J76D	140-399.9	C + 16.0	9.5	1.5	C + 2.5	300	5	5.33	5
J76E	400-649.9	C + 24.0	14.0	1.5	C + 2.5	400	8	7.00	6
J76F	650-999.9	C + 27.3	16.0	2.0	C + 2.5	500	10	8.40	7

(All dimensions in mm)

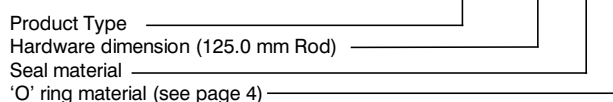
Table for Type J77

Series	Rod Ø C f8	Groove Ø D H9	Groove width L + 0.2	Radius R	Groove Ø A + 0.3	'O' ring series	X mm	'O' ring	
								C/S Ø	Inside Ø = C +
J77A	6-11.9	C + 4.8	3.7	0.4	C + 1.5	000	2	1.78	2
J77B	12-64.9	C + 6.8	5.0	0.7	C + 1.5	100	2	2.62	3
J77C	65-250.9	C + 8.8	6.0	1.0	C + 1.5	200	3	3.53	4
J77D	251-420.9	C + 12.2	8.4	1.2	C + 2	300	3	5.33	4
J77E	421-650.9	C + 16.0	11.0	1.5	C + 2	400	4	7.00	5
J77F	651-999.9	C + 20.0	14.0	2.0	C + 2.5	500	5	8.40	6

(All dimensions in mm)

Order example

J77C - 01250 - 07 06

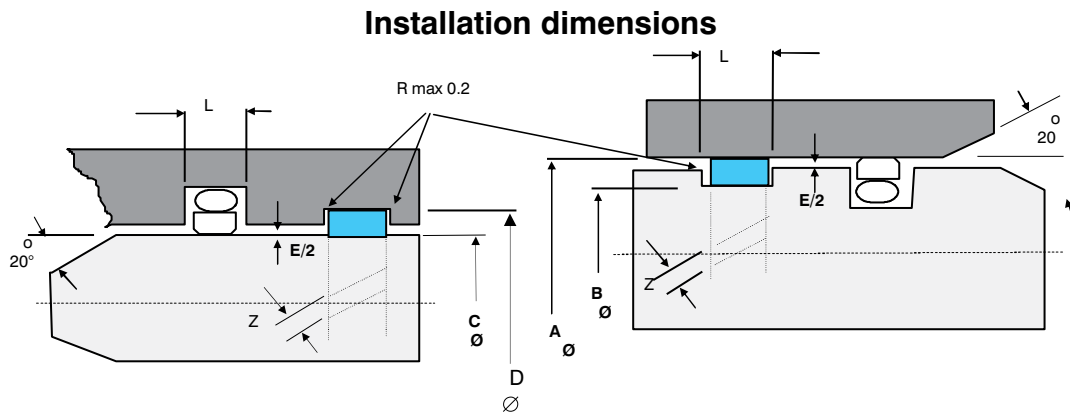


Wear rings — J80 - J81

Types J80 and J81

J80xxC Tape
J81xxC Rings

J80xxA Tape
J81xxA Rings



Wear rings are designed to guide piston and the piston rods of power cylinders and to absorb the lateral forces which occur. They also prevent metal to metal contact between sliding parts. Wear rings are available in tape or machined rings.

An important advantage is that metallic seizure cannot occur with the correct design. The most frequently used non-metallic wear ring materials are filled PTFE and compounds of PTFE and fabric materials.

Wear rings are fitted easily into closed grooves on the piston or in the gland. The number of wear rings to be used will depend on the radial forces and the permissible surface pressure of the wear ring material in addition to the length of stroke, the diameter and other design factors.

Advantage:

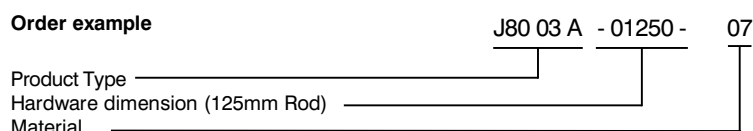
- Very good anti-friction behaviour
- No stick-slip effect
- Good dry running characteristics
- Good wear resistance with long service life.

Table for Type J80 and J81

Wear rings: Rod							Wear rings: Cylinder
Band / Ring	Rod Ø C f8	Groove Ø D + 0.08	Groove width L + 0.2	Diametral clearance E max. *	Groove Ø B - 0.05	Cylinder Ø A H9	Band / Ring
J8003C/J8103C	8-20	C + 3	3.2	0.4-1.0	A - 3	10-25	J8003A/J8103A
J8004C/J8104C	15-35	C + 5	4.2	0.5-2.0	A - 5	20-40	J8004A/J8104A
J8006C/J8106C	20-75	C + 5	6.3	0.5-2.0	A - 5	25-80	J8006A/J8106A
J8008C/J8108C	30-250	C + 5	8.1	0.5-2.0	A - 5	40-270	J8008A/J8108A
J8009C/J8109C	50-300	C + 5	9.7	0.5-2.0	A - 5	60-320	J8009A/J8109A
J8010C/J8110C	50-300	C + 5	10	0.5-2.0	A - 5	60-320	J8010A/J8110A
J8015C/J8115C	120-900	C + 5	15	0.5-2.0	A - 5	120.900	J8015A/J8115A
J8020C/J8120C	200+	C + 5	20	0.5-2.0	A - 5	200+	J8020A/J8120A
J8025C/J8125C	300+	C + 5	25	0.5-2.0	A - 5	300+	J8025A/J8125A
J8030C/J8130C	300+	C + 5	30	0.5-2.0	A - 5	300+	J8030A/J8130A
J8040C/J8140C	300+	C + 5	40	0.5-2.0	A - 5	300+	J8040A/J8140A
J8050C/J8150C	300+	C + 5	50	0.5-2.0	A - 5	300+	J8050A/J8150A

* The extrusion gap applies only to the area around the wear ring and not the area around the seal

(All dimensions in mm)



Wear rings — J80 - J87

Calculating wear ring widths

$$T = 1.5 \frac{F}{F_g \times A}$$

T = Ring width
 F = Side load, (kgf/kp)
 F_g = Material specific load (table)
 A = Cylinder diameter
 or
 C = Shaft diameter

Calculating wear ring lengths and gap

W = π (C + P) - Z for Rod
 W = π (A - P) - Z for Piston
 C = Rod dia (mm)
 A = Bore dia (mm)
 P = Thickness of the wear ring (mm)
 Z = Gap between ends of installed
 Wear ring (see table)

Dia A or C (mm)	Z (mm) up to 120°C	Z (mm) at 200°C
50	3.5	5.5
100	6	8
200	11	13
300	16	20
600	30	37
800	38	48

Material for Wear rings

Code No	Composition	Temp	Material-Load (kgf/mm ²)	Application	Coefficient of friction
05	Jaegerlon 05 PTFE/carbon/Graphite	-250°C +300°C	0.85 at 50°C 0.65 at 85°C	Water and air	0.10
07	Jaegerlon 07 PTFE/Bronze	-150°C +290°C	1.6 at 50°C 0.9 at 85°C	Hydraulic oil	0.08
10	Jaegerlon 10 UHMPE	-150°C +80°C	16.5 at 50°C	Water	0.11

(Consult also material list on page 3)

Bearing capacities are given for speeds up to 1.5 m/s. Above this value, please consult James Walker JaegerSeals.

The wear rings can be used in all hydraulic oil media.

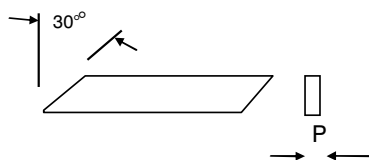
PTFE materials have a low coefficient of friction but also low load characteristics. They are therefore better used for low load applications.

Thermoplastic materials have a higher friction coefficient but also high load characteristics and can be used in high pressure applications.

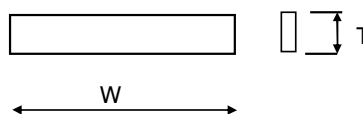
Cuts

Wear rings are made with different cuts

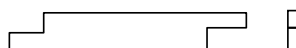
X- Cut For reciprocating movement



Y- Cut For rotary movement



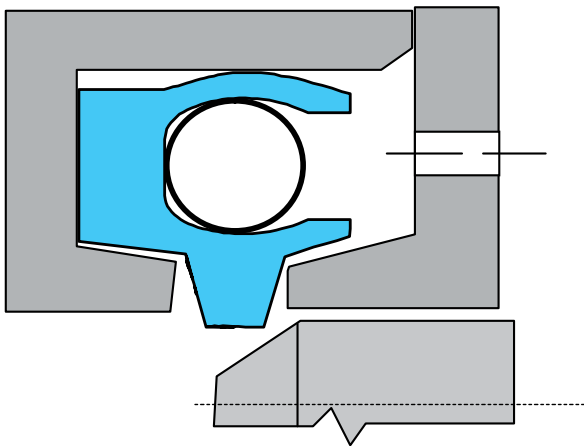
Z- Cut For reciprocating or rotary movements in contaminated systems to protect the seal



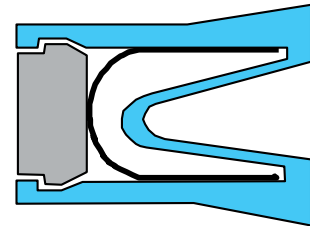
In extremely contaminated systems, consideration should be given to the use of Code 07 material in-board of one of our seals, with other wear ring materials in the out-board position.

Special designs

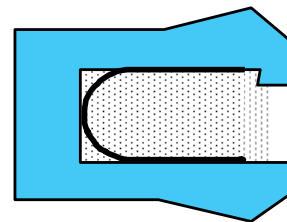
Anti-blowout seal



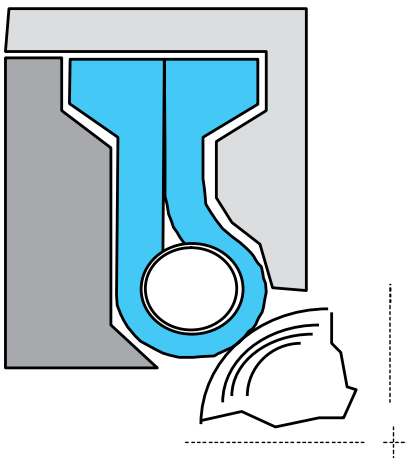
Sanitary seal



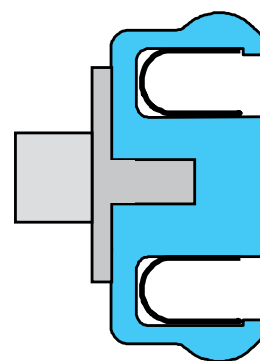
Sanitary seal with silicon filling



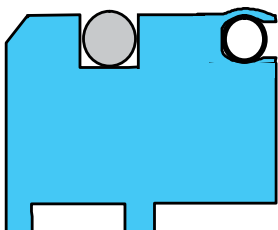
Butterfly valve seal



Integral piston seal



Rotary lip seal with spring integrated energised seal



These special design profiles are only a part of the many sealing solutions available from James Walker JaegerSeals. From your inquiry, you can be sure of our attention to detail, from the offer of a sealing proposal through to the manufacture of the product, which includes our in-house moulding, sintering, machining and assembly.

Application data form

Please photocopy this page if you intend to use the form again.

Application data form			
James Walker JaegerSeals , Kanaalstraat 200, B3971, Heppen, Belgium Tel: +32 (0)11 393154 Fax: +32 (0)11 393155			
Company		Name	
Address		Department	
		Tel.	Extension
		Fax & email	
Product:		<input type="checkbox"/> In Test	
Application:		<input type="checkbox"/> In Production	
Present Seal:		<input type="checkbox"/> In house equipment	
No Seal/Unit Sample	Delivery
Uni-Seal <input type="checkbox"/>		Deina Seal <input type="checkbox"/>	
Hydra Seal <input type="checkbox"/>			

Operating conditions			
Media to be sealed		Amount in seal area	
Media pressure Operating:	Pressure cycle	Full head	Half Shaft
Min.			
Max.			
Media Temperature °C: Min Max			Temperature cycle
If shaft is reciprocating or oscillating, give cycle, stroke/min, etc.			
<input type="checkbox"/> Static	Stroke length	<input type="checkbox"/> Rod Seal	
<input type="checkbox"/> Reciprocating	Strokes per min	<input type="checkbox"/> Piston Seal	
<input type="checkbox"/> Rotary	RMP	<input type="checkbox"/> Axial seal Outside face	
<input type="checkbox"/> Oscilating		<input type="checkbox"/> Axial seal Inside face	

Dimensions			
Rod or ID		Cylinder or OD	
Rod ID	Tol	Cylinder OD	Tol
Groove width	Tol	X-section	
Material		Material	
Hardnes		Hardnes	
Surface finish		Surface finish	
Extrusion gap		Eccentricity	
Indicate pressure side			

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