

Dualseal

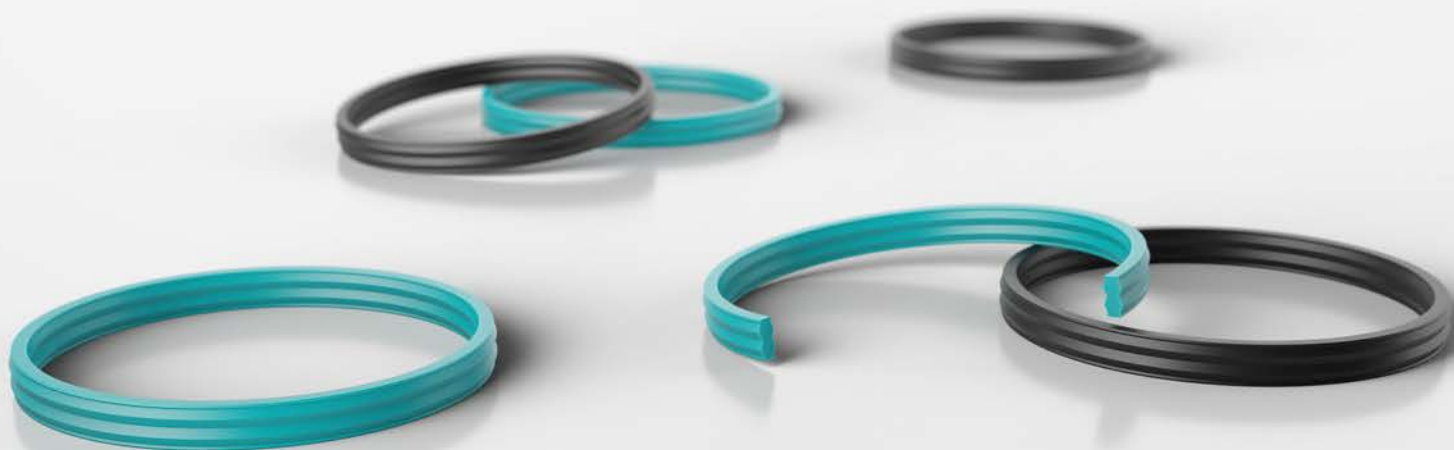


Single-acting/Double-acting

Radial sealing, for O-Ring grooves

Material:

Zurcon® and Elastomers



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■ Zurcon® Dualseal



DESCRIPTION

Current hydraulic cylinder designs mainly use O-Rings or O-Ring/Back-up Ring combinations as static seals. In applications with pressure pulses or where ingress of dirt is a concern,

Dualseal is the preferred solution. The single piece geometry is resistant to twisting during installation and operation and is an ideal solution for automatic assembly processes. High-specification Zurcon® material, combined with an innovative design, extends service life and increases reliability in fluid power applications.

FEATURES AND BENEFITS

- Single component with easy assembly
- No twisting in the groove
- Long service life
- High extrusion and abrasion resistance
- Wide temperature range and low compression set
- Stability under pulsating pressures
- Tighter fit within the groove

APPLICATION EXAMPLES

Dualseal is ideal for general use in hydraulic cylinders within:

- Forklifts
- Mobile hydraulics
- Industrial hydraulics
- Machine tools
- Injection molding machines
- Hydraulic presses
- Cartridge valves

OPERATING CONDITIONS

Pressure:	Max. 50 MPa / 7,250 psi
Temperature:	-35 °C to +110 °C -31 °F to +230 °F

IMPORTANT NOTE

The application limits for pressure and temperature given in this catalog are maximum values. Achieving these values in the field may not be possible due to the interaction of operating parameters and media. Contact your local Customer Solution Center for more information.



Table 20: Surface finish

Type of load	Surface	Rt μm	Rz μm	Ra μm
Axial-static	Mating surface	≤ 10.0	≤ 6.3	≤ 1.6
	Groove surface (groove bottom, groove flanks)	≤ 16.0	≤ 6.3	≤ 1.6
Under pulsating pressures	Mating surface	≤ 6.3	≤ 6.3	≤ 0.8
	Groove surface (groove bottom, groove flanks)	≤ 10.0	≤ 6.3	≤ 1.6

TESTING DATA

Dualseal operated without leakage and was highly extrusion resistant under the test conditions given in Table 21.

Table 21: Dualseal test conditions

	High pressure test	Pressure pulsation test
Pressure	40/52 MPa	30 MPa
Temperature	+100 °C / +80 °C	+60 °C (max. tank temperature)
Media	Hydraulic oil HLP 46	Hydraulic oil HLP 46
Test duration	72 h	500,000 Pressure pulsations

DESIGN INSTRUCTIONS

Correct design can help to eliminate possible sources of damage and seal failure from the outset.

Lead-in chamfers

Because Dualseal are squeezed during installation, lead-in chamfers and rounded edges are necessary.

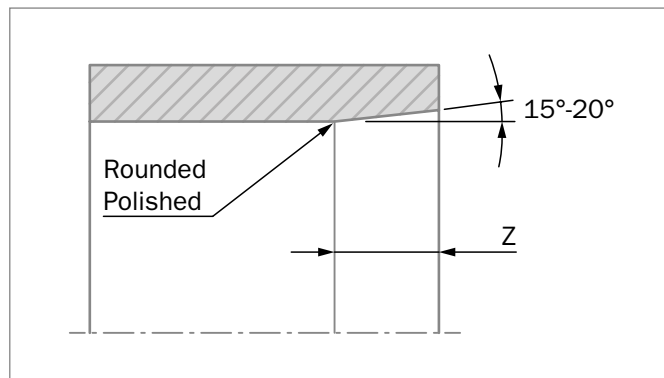


Figure 29: Lead-in chamfers

The minimum length of the lead-in chamfer is listed below as a function of groove depth:

Z = 3 mm for groove depth < 2.7 mm

Z = 5 mm for groove depth > 2.7 mm and ≤ 5.8 mm

Z = 6 mm for groove depth > 5.8 mm

Radial Clearance

Cylinder bore/gland fit H8/g6 is recommended.

Due to the high extrusion resistance of Zurcon® materials, a larger radial clearance can be used, depending on the maximum pressure and temperature in the application.

MATERIALS

Zurcon® Polyurethane has high abrasion resistance, a low compression set, high extrusion resistance and a wide temperature range.

Zurcon® Z20 Standard Polyurethane 93 Shore A

Temperature: -35 °C to +110 °C

Colour: Turquoise

Zurcon® Z22 Premium Polyurethane 93 Shore A

Temperature: -50 °C to +110 °C

Colour: Dark petrol

Other premium Zurcon® material grades that are able to extend temperature range or increase hydrolysis resistance are available on request.



Installation Recommendation Dualseal

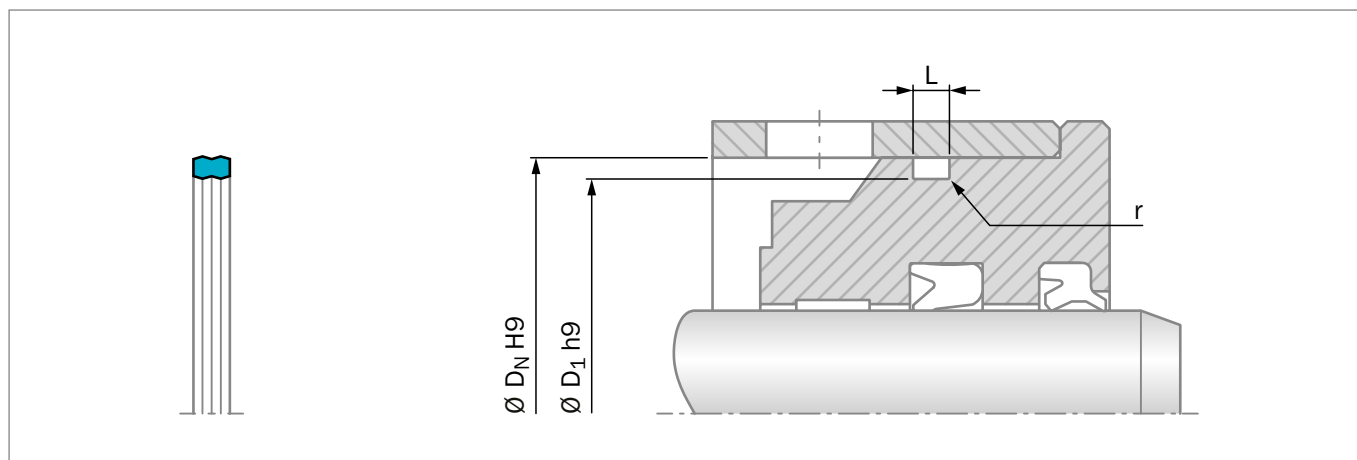


Figure 30: Installation drawing

Table 22: Installation Dimensions / TSS Part Numbers

Bore Dia.	Groove Dia.	Groove Width	Groove Radius	TSS Part No.	Bore Dia.	Groove Dia.	Groove Width	Groove Radius	TSS Part No.
D_N H9	D_1 h9	L +0.2	r +0.1		D_N H9	D_1 h9	L +0.2	r +0.1	
10.0	7.6	3.6	0.3	DU0000100	21.5	18.1	4.4	0.3	DU0000215
11.0	8.6	2.6	0.3	DU0000110	22.0	19.6	3.6	0.3	DU0000220
12.0	9.6	2.2	0.3	DU0100120	23.0	20.6	3.6	0.3	DU0000230
12.0	9.6	3.6	0.3	DU0000120	23.0	19.6	4.4	0.3	DU0100230
14.0	10.9	2.5	0.3	DU0000141	24.0	21.6	3.6	0.3	DU0100240
15.0	12.6	3.6	0.3	DU0000150	24.0	20.0	4.8	0.3	DU0000240
15.5	13.1	3.6	0.3	DU0000155	26.0	22.0	4.4	0.3	DU0000260
16.0	13.6	3.6	0.3	DU0000160	26.8	22.0	5.4	0.3	DU0000268
16.6	12.0	3.1	0.3	DU0000166	28.0	23.4	6.0	0.3	DU0100280
17.0	14.6	2.6	0.3	DU0000170	28.0	23.0	5.3	0.3	DU0000280
17.0	14.6	3.4	0.3	DU0100170	28.6	25.6	3.6	0.3	DU0000286
17.5	15.1	3.4	0.3	DU0100175	30.0	25.1	4.4	0.3	DU0000300
18.0	15.6	3.6	0.3	DU0000180	31.0	26.4	5.0	0.3	DU0000310
18.0	14.0	5.8	0.3	DU0100180	32.0	27.4	5.4	0.3	DU0000320
19.0	16.6	2.6	0.3	DU0200190	34.0	31.1	3.6	0.3	DU0100340
19.0	16.6	3.6	0.3	DU0300190	34.0	28.4	5.3	0.3	DU0000340
19.0	15.8	3.6	0.3	DU0400190	35.0	30.4	5.0	0.3	DU0000350
19.0	15.6	3.6	0.3	DU0000190	35.5	30.9	5.0	0.3	DU0000355
19.0	15.6	4.4	0.3	DU0100190	36.0	32.0	6.2	0.3	DU0000360
20.0	17.6	3.6	0.3	DU0400200	38.0	35.2	4.8	0.3	DU0100380
20.0	16.6	4.4	0.3	DU0100200	38.0	32.4	5.3	0.3	DU0000380
20.0	16.0	5.8	0.3	DU0000200	38.6	34.0	4.0	0.3	DU0000386
21.0	18.6	3.6	0.3	DU0100210	40.0	35.4	5.4	0.3	DU0100400
21.0	17.6	4.4	0.3	DU0000210	40.0	35.2	5.4	0.3	DU0000400



Bore Dia.	Groove Dia.	Groove Width	Groove Radius	TSS Part No.	Bore Dia.	Groove Dia.	Groove Width	Groove Radius	TSS Part No.
D _N H9	D ₁ h9	L +0.2	r +0.1		D _N H9	D ₁ h9	L +0.2	r +0.1	
42.0	36.4	4.8	0.3	DU0000420	80.0	75.4	5.4	0.3	DU0500800
43.4	37.8	6.2	0.3	DU0000434	80.0	74.4	5.3	0.3	DU0300800
45.0	40.0	5.4	0.3	DU0000450	80.0	74.3	5.3	0.3	DU0900800
45.6	41.0	4.0	0.3	DU0000456	80.0	73.8	6.9	0.3	DU0200800
48.0	44.4	4.5	0.3	DU0100480	80.0	73.6	6.4	0.3	DU0100800
50.0	45.4	3.9	0.3	DU0400500	80.0	70.8	9.0	0.6	DU0400800
50.0	45.4	5.4	0.3	DU0200500	80.6	76.0	4.0	0.3	DU0000806
50.0	44.6	6.2	0.3	DU0100500	85.0	79.4	5.3	0.3	DU0000850
50.0	44.4	5.3	0.3	DU0600500	85.1	80.5	3.9	0.3	DU0000851
50.0	44.3	5.3	0.3	DU0700500	86.4	80.0	5.5	0.3	DU0000864
50.0	43.8	5.6	0.3	DU0300500	90.0	84.4	4.8	0.3	DU0200900
52.0	47.9	3.6	0.3	DU0000520	90.0	83.0	6.5	0.3	DU0100900
55.0	51.0	3.6	0.3	DU0200550	90.0	81.4	9.0	0.6	DU0000900
55.0	49.9	5.3	0.3	DU0100550	93.0	87.4	5.3	0.3	DU0000930
55.0	49.6	6.2	0.3	DU0000550	94.0	89.5	3.8	0.3	DU0000940
57.0	52.2	4.1	0.3	DU0000570	95.0	89.4	6.2	0.3	DU0000950
60.0	55.0	5.3	0.3	DU0400600	100.0	94.3	5.3	0.3	DU0401000
60.0	54.6	6.2	0.3	DU0200600	100.0	93.8	6.9	0.3	DU0301000
60.0	54.4	5.8	0.3	DU0100600	100.0	91.6	8.6	0.3	DU0201000
63.0	58.4	5.4	0.3	DU0400630	100.0	91.4	9.0	0.6	DU0101000
63.0	57.6	6.2	0.3	DU0300630	100.0	90.8	9.7	0.6	DU0001000
63.0	57.4	4.8	0.3	DU0200630	101.0	96.0	5.0	0.3	DU0001010
63.0	57.3	5.3	0.3	DU0500630	101.0	94.6	6.7	0.3	DU0201010
63.0	56.6	6.4	0.3	DU0100630	102.0	95.8	6.2	0.3	DU0001020
65.0	60.4	5.0	0.3	DU0200650	104.0	99.5	3.8	0.3	DU0001040
65.0	59.6	6.2	0.3	DU0100650	108.0	98.9	7.2	0.6	DU0000988
65.0	59.4	5.0	0.3	DU0000650	110.0	104.5	4.5	0.3	DU0201100
68.0	62.7	5.0	0.3	DU0000680	110.0	101.4	9.0	0.6	DU0001100
69.6	65.0	3.9	0.3	DU0000696	111.4	105.0	5.5	0.3	DU0001114
70.0	65.0	5.0	0.3	DU0100700	112.0	105.8	6.2	0.3	DU0001120
70.0	64.6	6.2	0.3	DU0000700	113.0	107.4	5.3	0.3	DU0001130
70.0	61.3	8.0	0.6	DU0200700	115.0	107.0	6.5	0.3	DU0101150
72.0	66.4	5.0	0.3	DU0000720	115.0	106.6	8.6	0.3	DU0001150
72.6	68.0	3.8	0.3	DU0000726	117.0	108.4	9.0	0.6	DU0001170
73.5	70.0	5.0	0.3	DU0000735	120.0	113.0	6.0	0.3	DU0001200
74.6	70.0	3.8	0.3	DU0000746	120.0	111.6	8.6	0.3	DU0201200
75.0	69.6	6.2	0.3	DU0100750	125.0	119.8	6.8	0.3	DU0401250
75.0	69.4	5.3	0.3	DU0000750	125.0	119.3	5.3	0.3	DU0301250
76.4	70.0	5.5	0.3	DU0000764	125.0	116.6	8.6	0.3	DU0201250
77.0	70.8	6.2	0.3	DU0000770	125.0	116.4	9.0	0.6	DU0101250
78.0	73.0	5.0	0.3	DU0000780	125.0	115.8	9.7	0.6	DU0001250
80.0	76.0	3.6	0.3	DU0600800	127.7	122.0	5.4	0.3	DU0001277



Bore Dia.	Groove Dia.	Groove Width	Groove Radius	TSS Part No.
D _N H9	D ₁ h9	L +0.2	r +0.1	
128.0	119.6	8.6	0.3	DU0101280
133.0	124.6	8.6	0.3	DU0001330
133.4	125.0	7.0	0.3	DU0001334
137.0	128.6	8.6	0.3	DU0101370
140.0	131.6	8.5	0.3	DU0101400
140.0	130.8	9.7	0.6	DU0201400
140.0	128.4	12.3	0.6	DU0001400
148.4	140.0	7.0	0.3	DU0001484
150.0	141.6	8.6	0.3	DU0101500
150.0	140.8	9.7	0.6	DU0201500
150.0	138.4	12.3	0.6	DU0001500
158.4	150.0	7.0	0.3	DU0001584
160.0	154.3	5.3	0.3	DU0201600
160.0	150.8	9.7	0.6	DU0101600
160.0	148.4	12.3	0.6	DU0001600
165.0	156.6	8.6	0.3	DU0101650

Bore Dia.	Groove Dia.	Groove Width	Groove Radius	TSS Part No.
D _N H9	D ₁ h9	L +0.2	r +0.1	
165.0	155.8	9.7	0.6	DU0201650
170.0	160.8	9.7	0.6	DU0101700
170.0	158.4	12.3	0.6	DU0001700
180.0	171.6	8.6	0.3	DU0101800
180.0	168.4	12.3	0.6	DU0001800
188.2	180.0	7.0	0.3	DU0001882
188.6	180.0	9.0	0.6	DU0001886
190.0	178.4	12.3	0.6	DU0001900
200.0	194.3	5.3	0.3	DU0302000
200.0	191.6	8.6	0.3	DU0102000
200.0	188.4	12.3	0.6	DU0002000
208.6	200.0	9.0	0.6	DU0002086
225.0	213.0	10.9	0.6	DU0002250
228.6	220.0	9.0	0.6	DU0102286
250.0	238.0	10.9	0.6	DU0002500

Other sizes available on request.

This table shows the possible range of available Dualseal dimensions. Not all sizes will always be available in stock. Contact your local Customer Solution Center for recommendations specific to your application.

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■ Elastomeric Dualseal



DESCRIPTION

Developed to address a need in the fluid power industry, the Elastomeric Dualseal is a one-piece alternative to O-Rings and Back-up Rings for static sealing. As a single component, it can easily retrofit existing standard ISO 3601-1/AS 568 O-Ring groove sizes and provides the advantage of improved performance in most applications.

As an addition to Trelleborg Sealing Solutions wide range of technically superior time-saving products for the fluid power industry, Elastomeric Dualseal is recommended for heavy-duty applications in cylinders and valves. Easy to install, the seal's features and benefits contribute to a long service life and ultimately increase reliability in applications.

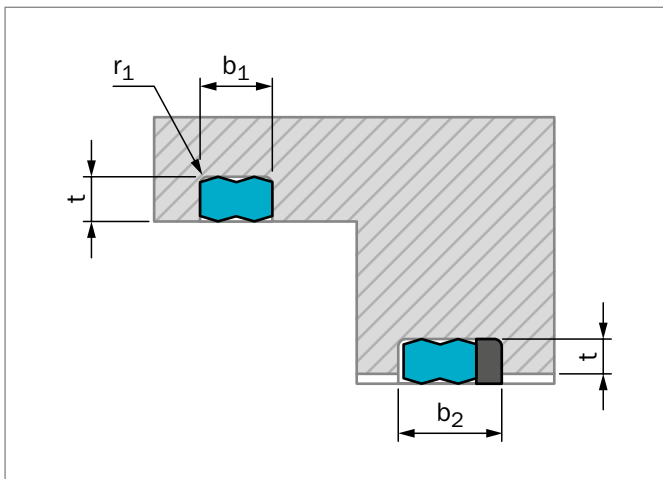


Figure 31: Elastomeric Dualseal installation drawing

FEATURES AND BENEFITS

- One-piece design ideal for automated assembly eliminates the risk of installing the wrong size
- Excellent sealing performance
- Compatible with the latest hydraulic fluids
- Extended service life
- Cost optimization
- Resistant to twisting post-installation
- Stability at pulsating pressures
- Low contamination

APPLICATION EXAMPLES

- Fork Lifts
- Industrial Hydraulics
- Mobile Hydraulics
- Machine Tools
- Cartridge Valves
- Hydraulic Presses
- Injection Molding Presses

OPERATING CONDITIONS

Pressure:	Up to 21 MPa / 3,000 psi
Temperature:	-30 °C to +100 °C -22 °F to +212 °F
Extrusion Gap:	0.15 mm / 0.005 inch max. radial
Media/ compatibility:	Petroleum-based Hydraulic Fluids (Refer to the Chemical Compatibility Guide to verify material applicability)

IMPORTANT NOTE

The application limits for pressure and temperature given in this catalog are maximum values. Achieving the maximum values in the field may not be possible due to the interaction of operating parameters and media. Contact your local Customer Solution Center for more information.



TECHNICAL DATA

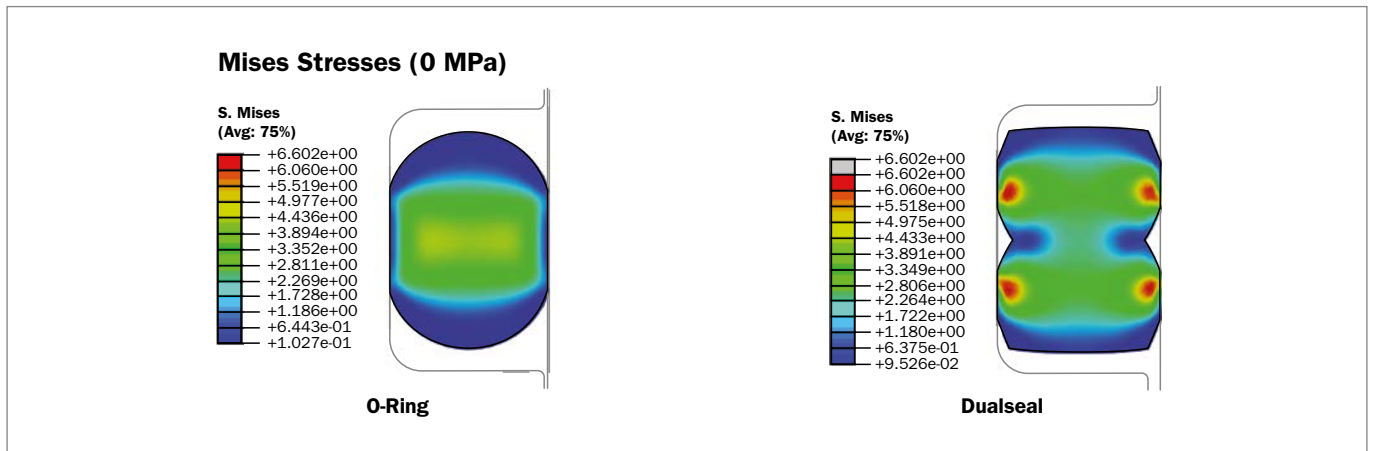


Figure 32: Elastomeric Dualseal, Mises Stresses

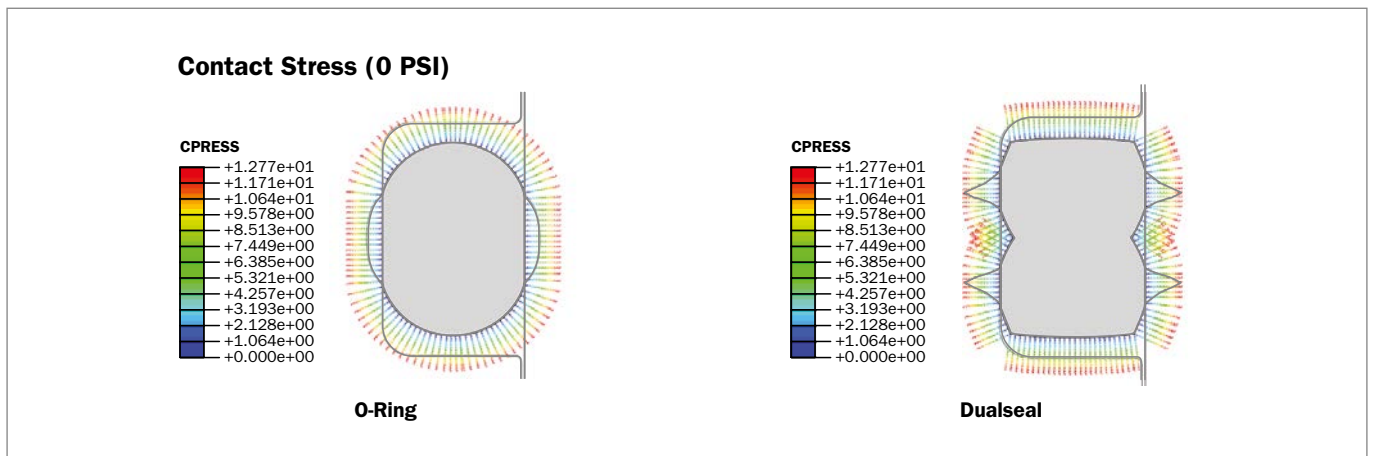


Figure 33: Elastomeric Dualseal, Contact Stress

HARDWARE GUIDELINES

- Zero Back-up Ring Dualseal (DUR00B***) is designed to replace an O-Ring (ISO 3601-1/AS568***) in industry standard grooves.
- Custom grooves can be utilized with the same design considerations for squeeze and occupancy as standard O-Rings.
- Take into consideration that the Zero Back-up Ring Dualseal has a volume approximately 7.5% larger than the O-Ring it replaces.
- In applications with groove occupancy calculated over 85% for the O-Ring, or expectations of high swell or high temperature, additional care should be taken during groove design.

- One Back-up Ring Dualseal (DUR10B***) is designed to replace an O-Ring (ISO 3601-1/AS568***) and a concave Back-up Ring made of NBR 90 Shore A in industry standard grooves.
- Standard surface quality specifications: TSS TBS-00051, AQL 1.0 ISO 2859-1, general inspection level II, normal.

Custom grooves can be utilized following the squeeze and area guidelines in Table 23.

**Table 23: Groove Dimensions**

ISO3601-1/AS568 Sizes	Cross-Section mm inch	Groove Depth (t) mm inch		0 Back-up Groove Area Minimum (t x b ₁)	1 Back-up Groove Area Minimum (t x b ₂)
		Minimum	Maximum	mm ² inch ²	mm ² inch ²
004 through 050	1.78 0.070	1.25 0.049	1.58 0.062	3.00 0.0047	4.45 0.0069
102 through 178	2.62 0.103	1.97 0.078	2.42 0.095	7.32 0.0113	8.94 0.0139
201 through 284	3.53 0.139	2.65 0.104	3.33 0.131	13.39 0.0208	14.90 0.0231
309 through 395	5.33 0.210	4.00 0.157	5.13 0.202	30.82 0.0478	34.11 0.0529
425 through 475	6.99 0.275	5.24 0.206	6.79 0.267	54.68 0.0848	59.49 0.0922

ORDERING

For more information on this product, or for orders and enquiries, contact your local Customer Solution Center.

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