

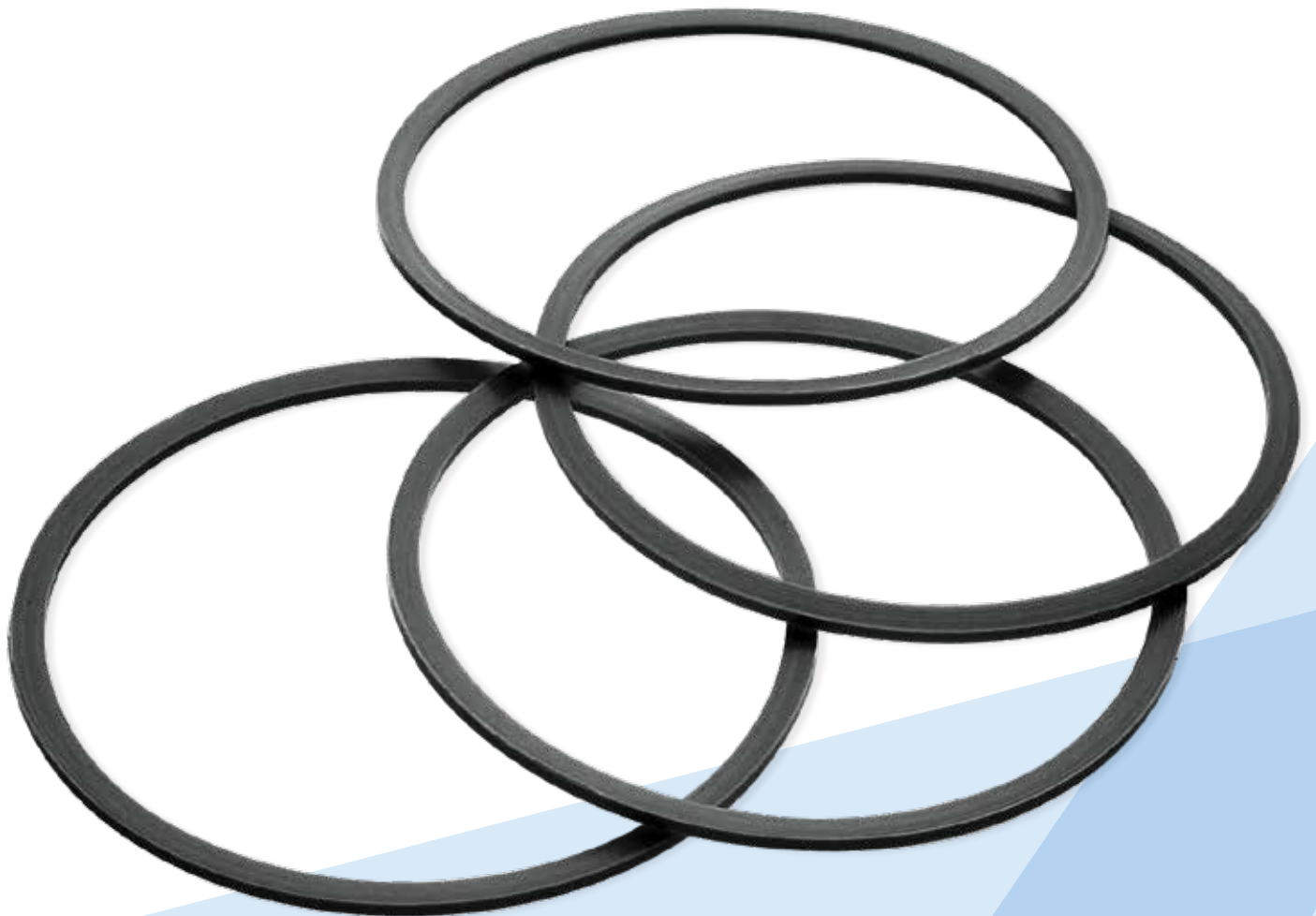


ES&C
ENGINEERED SEALS & COMPONENTS, LLC.

POLY-TREL SERIES 750 STANDARD BACK-UPS

KEY FEATURES OF SERIES 750 BACK-UPS:

- Maximum Chemical Resistance
- Avoids Twisting or Rolling
- Maximum Extrusion Resistance
- Designed for Industrial Grooves





ENGINEERED SEALS & COMPONENTS

ESC Series 750 Back-up Rings have been specifically designed for an industrial O-Ring groove. Series 750 was developed to fit into a groove for either a static or dynamic O-ring. The MS28774 specification was the guide for the sizing of this series.

ESC Series 750 Back-up ring have a larger cross section and generally larger tolerances than Series 758. In some static applications the cross section could be larger than the groove depth making assembly more difficult. Actual sizes have been furnished on the following pages.

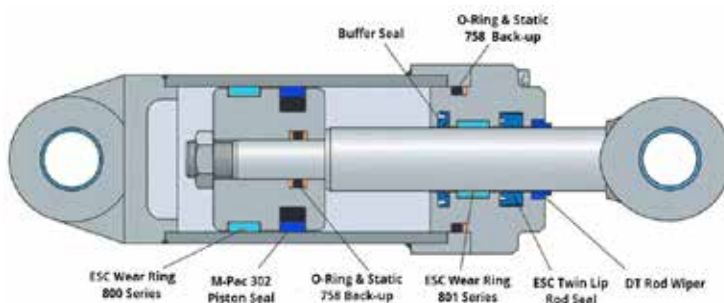
ESC Series 750 has been engineered to fit tightly in the groove. This small difference will make assembly of the hardware easier and faster. Series 750 Back-up rings do not twist or tip over upon assembly.

ESC engineering does not recommend using the 750 series in a double acting piston application where the system pressure oscillates rapidly. Series 756 "Vented" Back-ups are designed for this type system.

ESC Series 750 are molded from compound POLY-TREL HT55-BK, a formulation of DuPont Hytrel®. This 55D polyester elastomer has been formulated for maximum extrusion and chemical resistance. Operating temperatures may range from -65°F to +275°F. A Hydrolytically stable compound HT55-SHS-BK is available for even more demanding applications upon request. ESC also offers a Heat stable compound for extended time at elevated temperature, HT55-HS-BK.

ESC Series 750 most popular sizes are molded endless without a Gate Mark on the part. This proprietary process was developed by ESC to give the parts maximum strength and durability. Another major advantage is the parts will not "neck down" at the gate area, and there is no nit line. This makes for a perfectly smooth part, ID and OD.

Half-thickness back-ups in this series are also available. Ask for Series 750-xxx.5



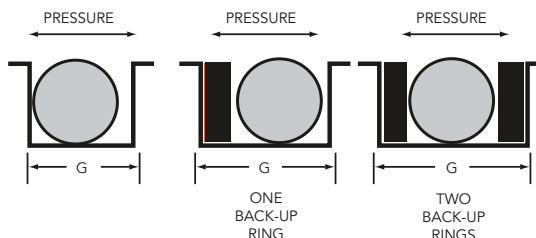
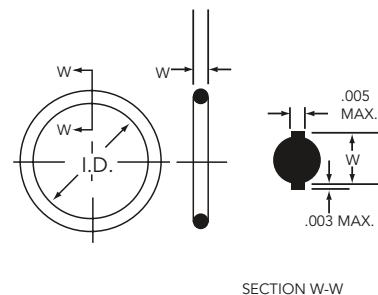
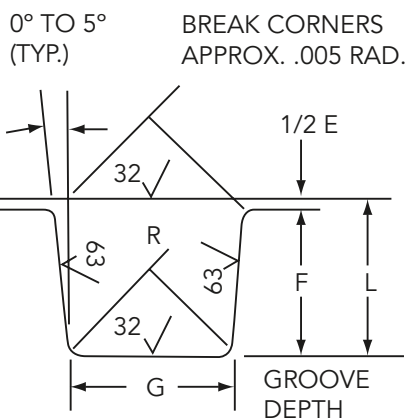
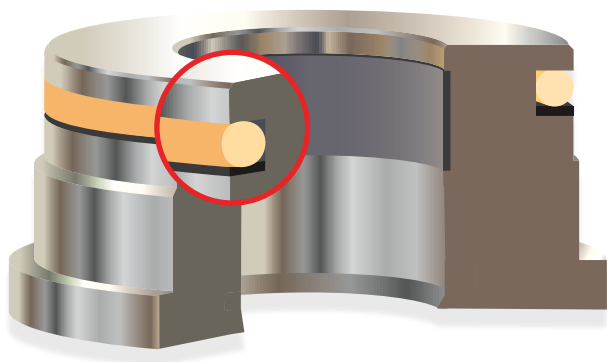
ADVANTAGES

- No more twisted back-ups.
- For use with Static or Dynamic Glands.
- Fire Resistant Fluids.
- Extended Range -65° to 275°.
- Dynamic pressure to 7,000 psi.
- Static Pressure to 20,000 psi.

For Cartridge Valves Too!



SERIES 750 POLY-TREL BACK-UP & O-RING GROOVE DESIGN GUIDE



INDUSTRIAL O-RING STATIC SEAL GLAND GUIDELINE

O-Ring Size	W Cross Section		L Gland Depth	Squeeze		E (a) (c) Diametral Clearance	G Groove Width			R Groove Radius	Eccentricity Max. (b)
	Nominal	Actual		Actual	%		No Back-up Ring	One Back-up Ring	Two Back-up Rings		
044 through 050	1/16	.070 ±.003	.050 to .052	.015 to .023	22 to 32	.002 to .005	.093 to .098	.138 to .143	.205 to .210	.005 to .015	.002
102 through 178	3/32	.103 ±.003	.081 to .083	.017 to .025	17 to 24	.002 to .005	.140 to .145	.171 to .176	.238 to .243	.005 to .015	.002
201 through 284	1/8	.139 ±.004	.111 to .113	.022 to .032	16 to 23	.003 to .006	.187 to .192	.208 to .213	.275 to .280	.010 to .025	.003
309 through 395	3/16	.210 ±.005	.170 to 173	.032 to .045	15 to 21	.003 to .006	.281 to .286	.311 to .316	.410 to .415	.020 to .035	.004
425 through 475	1/4	.275 ±.006	.226 to .229	.040 to .055	15 to 20	.004 to .007	.375 to .380	.408 to .413	.538 to .543	.020 to .035	.005

(a) Clearance gap must be held to a minimum consistent with design requirements for temperature range variation.

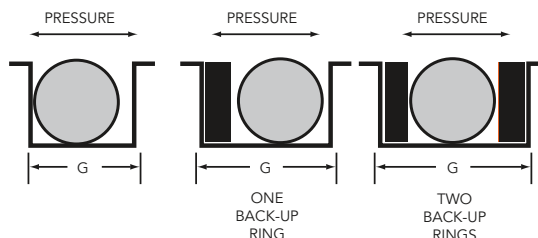
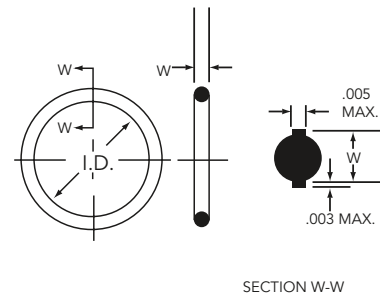
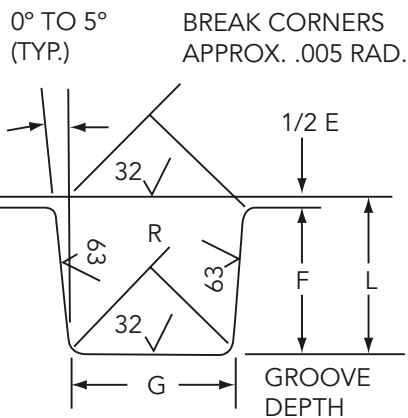
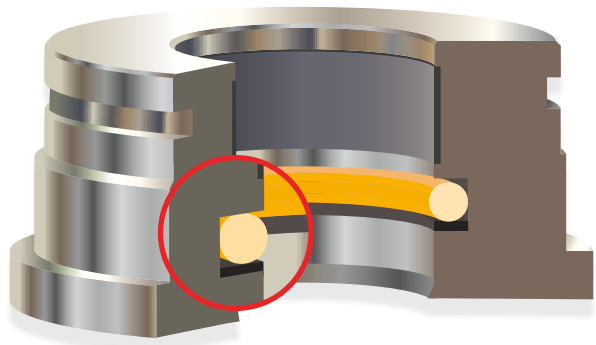
(b) Total Indicator reading between groove and adjacent bearing surface.

(c) Reduce maximum diametrical clearance 50% when using silicone O-rings.





SERIES 750 POLY-TREL BACK-UP & O-RING GROOVE DESIGN GUIDE



INDUSTRIAL O-RING DYNAMIC SEAL GLAND GUIDELINE

O-Ring Size	W Cross Section		L Gland Depth	Squeeze		E (a) (c) Diametral Clearance	G Groove Width			R Groove Radius	Eccentricity Max. (b)
	Nominal	Actual		Actual	%		No Back-up Ring	One Back-up Ring	Two Back-up Rings		
-044 through -050	1/16	.070 ±.003	.055 to .057	.010 to .018	15 to 25	.002 to .005	.093 to .098	.138 to .143	.205 to .210	.005 to .015	.002
-102 through -178	3/32	.103 ±.003	.088 to .090	.010 to .018	10 to 17	.002 to .005	.140 to .145	.140 to .145	.238 to .243	.005 to .015	.002
-201 through -284	1/8	.139 ±.003	.121 to .123	.012 to .022	9 to 16	.003 to .006	.187 to .192	.187 to .192	.275 to .280	.010 to .025	.003
-309 through -395	3/16	.210 ±.003	.181 to .188	.017 to .030	8 to 14	.003 to .006	.281 to .286	.281 to .286	.410 to .415	.020 to .035	.004
-425 through -475	1/4	.275 ±.003	.237 to .240	.029 to .044	11 to 16	.004 to .007	.375 to .380	.375 to .380	.538 to .543	.020 to .035	.005

(a) Clearance gap must be held to a minimum consistent with design requirements for temperature range variation.

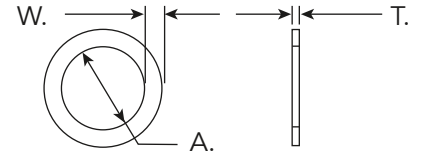
(b) Total Indicator reading between groove and adjacent bearing surface.

(c) Reduce maximum diametral clearance 50% when using silicone O-rings.





SERIES 750 POLY-TREL BACK-UP SIZES



Part # SERIES	ID		C/S		Width		STANDARD COMPOUND
	A	TOL	W	TOL	T	TOL	
750-339	3.250	± .015	.175	± .005	.070	± .006	HT55-BK
750-340	3.375	± .015	.175	± .005	.070	± .006	HT55-BK
750-341	3.500	± .015	.175	± .005	.070	± .006	HT55-BK
750-342	3.625	± .015	.175	± .005	.070	± .006	HT55-BK
750-343	3.750	± .015	.175	± .005	.070	± .006	HT55-BK
750-344	3.875	± .015	.175	± .005	.070	± .006	HT55-BK
750-345	4.000	± .015	.175	± .005	.070	± .006	HT55-BK
750-346	4.125	± .015	.175	± .005	.070	± .006	HT55-BK
750-347	4.250	± .015	.175	± .005	.070	± .006	HT55-BK
750-348	4.375	± .015	.175	± .005	.070	± .006	HT55-BK
750-349	4.500	± .015	.175	± .005	.070	± .006	HT55-BK
750-350	4.625	± .015	.175	± .005	.070	± .006	HT55-BK
750-351	4.750	± .015	.175	± .005	.070	± .006	HT55-BK
750-352	4.875	± .015	.175	± .005	.070	± .006	HT55-BK
750-353	5.000	± .015	.175	± .005	.070	± .006	HT55-BK
750-354	5.125	± .023	.175	± .005	.070	± .006	HT55-BK
750-355	5.250	± .023	.175	± .005	.070	± .006	HT55-BK
750-356	5.375	± .023	.175	± .005	.070	± .006	HT55-BK
750-357	5.500	± .023	.175	± .005	.070	± .006	HT55-BK
750-358	5.625	± .023	.175	± .005	.070	± .006	HT55-BK
750-359	5.750	± .023	.175	± .005	.070	± .006	HT55-BK
750-360	5.875	± .023	.175	± .005	.070	± .006	HT55-BK
750-361	6.000	± .023	.175	± .005	.070	± .006	HT55-BK
750-362	6.250	± .023	.175	± .005	.070	± .006	HT55-BK
750-363	6.500	± .023	.175	± .005	.070	± .006	HT55-BK
750-364	6.750	± .023	.175	± .005	.070	± .006	HT55-BK
750-365	7.000	± .023	.175	± .005	.070	± .006	HT55-BK
750-366	7.250	± .030	.175	± .005	.070	± .006	HT55-BK
750-367	7.500	± .030	.175	± .005	.070	± .006	HT55-BK
750-368	7.750	± .030	.175	± .005	.070	± .006	HT55-BK
750-369	8.000	± .030	.175	± .005	.070	± .006	HT55-BK
750-370	8.250	± .030	.175	± .005	.070	± .006	HT55-BK
750-371	8.500	± .030	.175	± .005	.070	± .006	HT55-BK
750-372	8.750	± .030	.175	± .005	.070	± .006	HT55-BK
750-373	9.000	± .030	.175	± .005	.070	± .006	HT55-BK
750-374	9.250	± .030	.175	± .005	.070	± .006	HT55-BK
750-375	9.500	± .030	.175	± .005	.070	± .006	HT55-BK
750-376	9.750	± .030	.175	± .005	.070	± .006	HT55-BK
750-377	10.000	± .030	.175	± .005	.070	± .006	HT55-BK
750-378	10.500	± .030	.175	± .005	.070	± .006	HT55-BK

Part # SERIES	ID		C/S		Width		STANDARD COMPOUND
	A	TOL	W	TOL	T	TOL	
750-379	11.000	± .030	.175	± .005	.070	± .006	HT55-BK
750-381	12.000	± .030	.175	± .005	.070	± .006	HT55-BK
750-425	4.500	± .015	.236	± .005	.105	± .006	HT55-BK
750-426	4.625	± .015	.236	± .005	.105	± .006	HT55-BK
750-427	4.750	± .015	.236	± .005	.105	± .006	HT55-BK
750-428	4.875	± .015	.236	± .005	.105	± .006	HT55-BK
750-429	5.000	± .015	.236	± .005	.105	± .006	HT55-BK
750-430	5.127	± .023	.236	± .005	.105	± .006	HT55-BK
750-431	5.250	± .023	.236	± .005	.105	± .006	HT55-BK
750-432	5.375	± .023	.236	± .005	.105	± .006	HT55-BK
750-433	5.500	± .023	.236	± .005	.105	± .006	HT55-BK
750-434	5.625	± .023	.236	± .005	.105	± .006	HT55-BK
750-435	5.750	± .023	.236	± .005	.105	± .006	HT55-BK
750-436	5.875	± .023	.236	± .005	.105	± .006	HT55-BK
750-437	6.000	± .023	.236	± .005	.105	± .006	HT55-BK
750-438	6.250	± .023	.236	± .005	.105	± .006	HT55-BK
750-439	6.500	± .023	.236	± .005	.105	± .006	HT55-BK
750-440	6.750	± .023	.236	± .005	.105	± .006	HT55-BK
750-441	7.000	± .023	.236	± .005	.105	± .006	HT55-BK
750-442	7.250	± .030	.236	± .005	.105	± .006	HT55-BK
750-443	7.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-444	7.750	± .030	.236	± .005	.105	± .006	HT55-BK
750-445	8.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-446	8.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-447	9.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-448	9.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-449	10.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-450	10.530	± .030	.236	± .005	.105	± .006	HT55-BK
750-451	11.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-452	11.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-453	12.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-454	12.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-455	13.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-456	13.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-457	14.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-458	14.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-459	15.000	± .030	.236	± .005	.105	± .006	HT55-BK
750-460	15.500	± .030	.236	± .005	.105	± .006	HT55-BK
750-461	16.000	± .030	.236	± .005	.105	± .006	HT55-BK

Part numbers shaded in Blue, when installed on a piston application, may not recover when over stretched. A softer POLY-TREL compound may be needed.

Series 750 Poly-Trel O-Ring Groove Back-up Rings

ESC's Series 750 back-up rings offer extrusion resistance up to 7,000 psi for dynamic applications and 20,000 psi for static applications. ECS Series 750 are interchangeable with most existing O-ring back-ups being used today. The Black color also ensures that the parts can be easily identified. Compound HT55-BK provides excellent extrusion resistance when compared to Nitrile and has a better fluid compatibility range than other back-up ring compounds.

Technical Data

Standard Material
HT55-BK

Temperature
-65°F to +275°F
(-54° C to +135°C)

HT65-N (Optional)
-65°F to +275°F
(-54° C to +135°C)

Max Pressure Range

Dynamic* 7,000 psi (482 bar)

Static 20,000 psi (1,379 bar)





SERIES 750 STANDARD COMPOUND

POLY-TREL Compound HT55-BK

TPC-ET thermoplastic polyester elastomer

Property	Test Method	Units	Value
Tensile Modulus	ISO 527-1/-2	psi	27,557
Stress @5% Strain	ISO 527-1/-2	psi	1,000
Stress @10% Strain	ISO 527-1/-2	psi	1,600
Stress @ 50% Strain	ISO 527-1/-2	psi	2,030
Stress at Break	ISO 527-1/-2	psi	5,800
Nominal Strain at Break	ISO 527-1/-2	%	780
Strain at Break	ISO 527-1/-2	%	>300
Flexural Modulus	ISO 178	psi	29,000
Shear Modulus	ISO 6721	psi	9,430
Tensile creep modulus, 1000h	ISO 899-1	psi	18,900
Charpy Impact Strength, 23°C	ISO 179/1eU	ftlb/in ²	N
Charpy Impact Strength, -30°C	ISO 179/1eU	ftlb/in ²	N
Charpy Notched Impact Strength, -30°C	ISO 179/1eU	ftlb/in ²	71.4
Charpy Notched Impact Strength, -40°C	ISO 179/1eU	ftlb/in ²	14.3
Poisson's Ratio			.48
Compression Set at 70°C	ISO 815	%	60
Brittleness Temperature	ISO 974	°F	-144
Shore D Hardness, 15s	ISO 868	D	51
Shore D Hardness, Max	ISO 868	D	55
Tear Strength, parallel	ISO 34-1	kN/m	133
Tear Strength, Normal	ISO 34-1	kN/m	133
Abrasion Resistance	ISO 4649	mm ³	120
Melting Temperature, 10°C/min	ISO 11357-1/-3	°F	397
Glass Transition Temperature (10°C/min)	ISO 11357-1/2	°F	-4
Vicat Softening Temperature, 50°C/h, 10N	ISO 306	°F	356
Coeff. Of Linear Therm. Expansion, Parallel	ISO 11359-1/2	E-4/°F	1.11
Coeff. Of Linear Therm. Expansion, Normal	ISO 11359-1/2	E-4/°F	1.11
Shelf Life	ISO R1183		10 years
Service Temperature Range*			-65°F to +275°F
Color			BLACK

Test specimen for ISO 527 is 1BA (2mm) at 50mm/min; all other ISO & ASTM mechanical properties measured at 4mm; electrical properties measured at 2mm.

All mechanical & electrical properties measured on injection molded specimens.

Test temperatures are 23C unless otherwise stated.

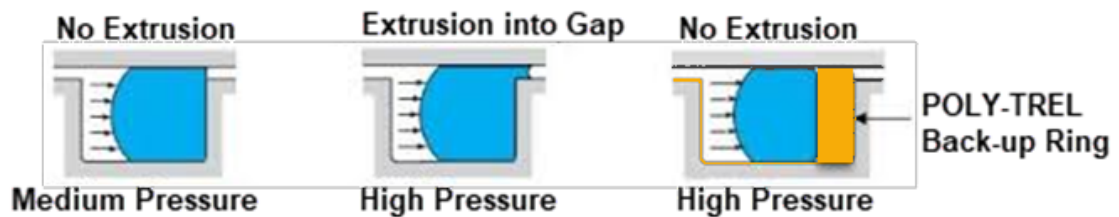
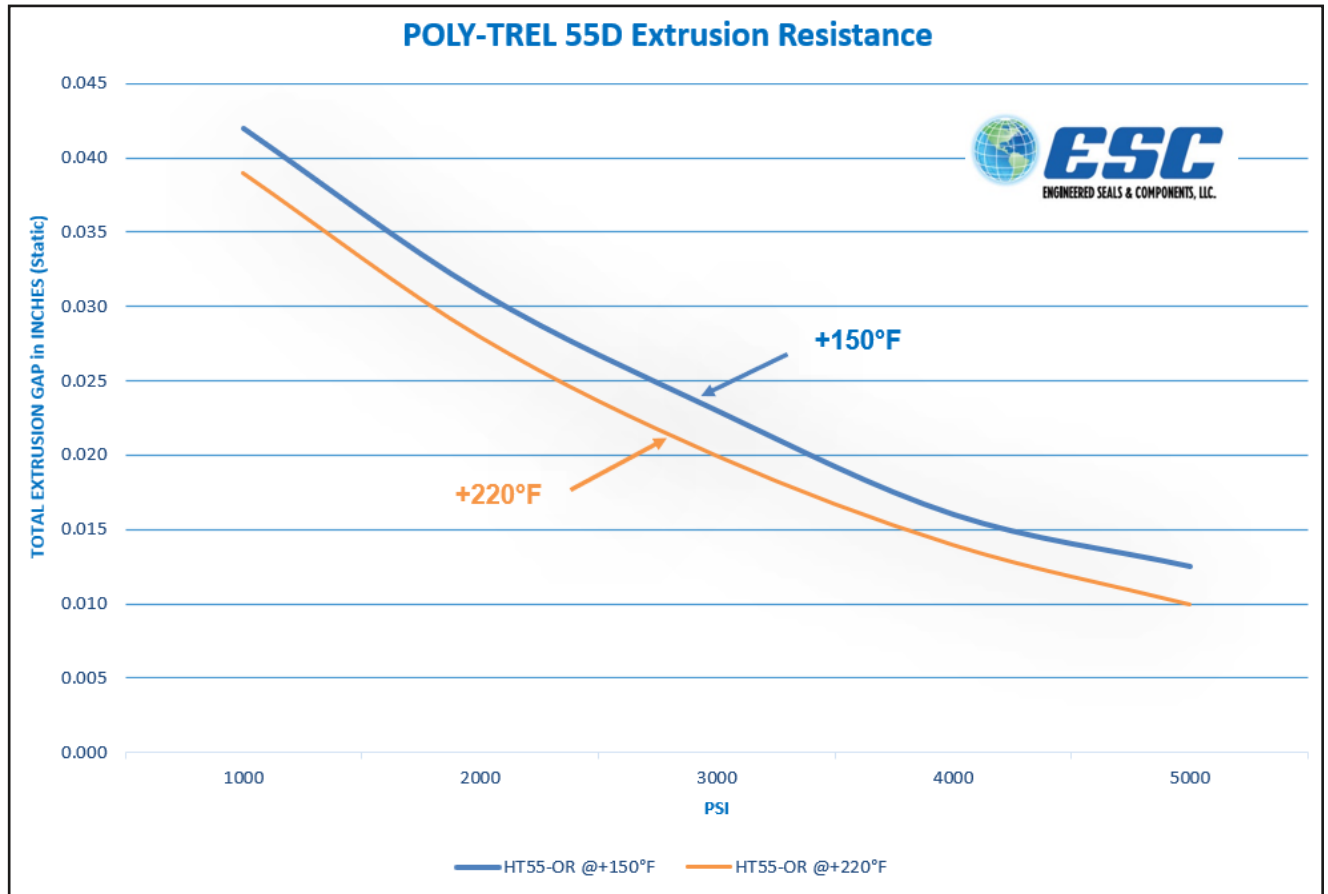
The information provided in this data sheet corresponds to our knowledge on the subject at the date of this publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such materials used in combination with any other material, additives or pigments or in any process, unless expressly indicated otherwise. The data provided should not be used to establish specifications limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to do to determine the suitability of a specific compound for your particular purpose. Since Engineered Seals, LLC cannot anticipate all variation in actual end-use conditions ESC makes no warranties and assumes no liability in connection with any use of this information. Caution: Do not use this product in medical application involving permanent implantation in the human body.





POLY-TREL BACK-UP RING EXTRUSION DESIGN GUIDE

POLY-TREL HT55-OR Extrusion Resistance at +150F and +220F



O-Ring Deformation Under Pressure With and with out Back-up Ring

Above data was acquired in a test laboratory. No side load, shock loads, or dynamic motions were applied. Your results may be different. This information is to be used as a guideline only. It is always good practice to test in actual or specific conditions and applications.



POLY-TREL BACK-UP RING FLUID RESISTANCE DESIGN GUIDE

Chemical	Rating*	Chemical	Rating*	Chemical	Rating*
Acetic acid, 20%	A	Diocetyl phthalate	A	Nitrobenzene	C
Acetic acid, 30%	A	Epichlorohydrin	X	Oleic acid	A
Acetic acid, glacial	A	Ethyl acetate	A,B	Oleum 20-25%	C
Acetic acid, glacial (+100° F - +38° C)	B	Ethyl alcohol	A	Palmitic acid	A
Acetic Anhydride	T	Ethyl chloride	C	Perchloroethylene	B,C
Acetone	B	Ethylene dichloride	B,C	Phenol	C
Acetylene	A	Ethylene glycol	A	Pickling Solution (20% nitric acid, 4% HF)	X
Aluminum chloride solutions	T	Ethylene oxide	A	Pickling Solution (17% nitric acid, 4% HF)	X
Aluminum sulfate solutions	T	Ferric chloride solutions	T	Potassium dichromate solutions	T
Ammonium chloride solutions	A	Fluosilicic acid	T	Potassium hydroxide solutions	A
Ammonium hydroxide solutions	T	Formaldehyde 40%	B	Pydraul 312C	A
Ammonium sulfate solutions	B	Formic Acid	B	Pyridine	X
Amyl Acetate	B	FREON®-11	A	SAE 10 oil	A
Amyl alcohol	A	FREON®-12	A	Sea water	A
Aniline	C	FREON-113® (130° F - 55° C)	A	Silicone grease	A
ASTM oil = 1 (300° F - 149° C)	A	FREON®-114	A	SKYDROL 500	A
ASTM oil = 3 (300° F - 149° C)	A	Gasoline	A	Soap solutions	A
ASTM reference fuel A (158°F - 70° C)	A	Glue	A	Sodium chloride solutions	A
ASTM reference fuel B (158°F - 70° C)	A	Glycerin	A	Sodium dichromate 20%	T
ASTM reference fuel C	A	n-Hexane	A	Sodium hydroxide 20%	A
ASTM reference fuel C (158°F - 70° C)	B	Hydrazine	C	Sodium hypochlorite 5%	B
Asphalt	T	Hydrochloric acid 20%	B	Sodium hydroxide 46.5%	A
Barium hydroxide solutions	T	Hydrocyanic acid	T	Soybean oil	T
Beer	A	Hydrofluoric acid 48%	X	Stannous chloride 15%	T
Benzene	B	Hydrofluoric acid 75%	X	Steam (212° F - 100° C) stabilized	B
Borax solutions	A	Hydrofluoric acid, anhydrous	X	Steam (230° F - 110° C) stabilized	C
Boric acid solutions	A	Hydrogen	A	Stearic acid	T
Bromine anhydrous liquid	X	Hydrogen sulfide	A	Styrene	X
Butane	A	Isooctane	A	Sulfur, molten	T
Butyr acetate	B	Isopropyl alcohol	A	Sulfur dioxide, liquid	T
Butyric acid	T	JP-4	A	Sulfur dioxide, gas	T
Calcium chloride solutions	A	Kerosene	T	Sulfuric acid up to 50%	A
Calcium hydroxide solutions	T	Lacquer solvents	A,B	Sulfuric acid 50-80%	C
Calcium hypochlorite 5%	A	Lactic acid	T	Sulfuric acid 60%	C
Carbon bisulfide	B	Linseed oil	T	Sulfuric acid 90%	C
Carbon dioxide	A	Lubricating oils	A	Sulfuric acid 95%	C
Carbon monoxide	A	Magnesium chloride solutions	T	Sulfuric acid fuming (20% oleum)	C
Carbon tetrachloride	A,B,C	Magnesium hydroxide solutions	T	Sulfurous acid	B
Castor oil	A,B	Mercuric chloride solutions	T	Tannic acid 10%	A
Chlorine gas, dry	X	Mercury	A	Tartanic acid	T
Chlorine gas, wet	X	Methyl alcohol	A	Tetrahydrofuran	A,B
Chloroacetic acid	X	Methyl ethyl ketone	A,B	Toluene	B
Chlorobenzene	X	Methylene chloride	C	Trichloroethylene	C
Chloroform	C	Mineral oil	A	Triethanolamine	C
Chlorosulfonic acid	C	Naphtha	A	Trisodium phosphata solution	C
Citric acid solutions	A	Naphthalene	A,B	Tung oil	T
Copper chloride solutions	A	Nitric acid 10%	B	Water (158° F - 70° C)	A
Copper sulfate solutions	A	Nitric acid 30%	C	Water (212° F - 100° C) with stabilizer	B
Cottonseed oil	A	Nitric acid 60%	C	Xylene	A,B
Cyclohexane	A	Nitric acid 70%	C	Zinc chloride solutions	A
Dibufyl phthalate	A	Nitric acid, red fuming	C		
Diethyl sebacate	A				

* Rating Key
 A- Fluid has little or no effect
 B- Fluid has minor to moderate effect

C- Fluid has severe effect
 T-No data- likely to be compatible
 X- No Data-not likely to be compatible

Unless otherwise noted concentrations of aqueous solutions are saturated. All ratings are at room temp. unless specified.

We emphasize that this tabulation should be used as a guide only. It is based primarily on laboratory and service tests but does not take into account all variables that can be encountered in actual use. Therefore, it is always advisable to test the material under actual service conditions before specification. If this is not practical, tests should be devised that simulate service conditions as closely as possible.





WARRANTY AND REMEDY

Important Notice:

We reserve the right to make changes without notice in our products and in the information content of this brochure / catalog. The statements and information in the brochure / catalog are intended to serve as a guide only. They are not warranties or binding descriptions of the products.

Requests for more information are welcome. In particular, we will be glad to provide samples for your to inspect and test in your assemblies and plant before you make a final decision for you application.

Notice of Exclusive Warranty and Remedy

Briefly, our exclusive warranty is against defects in materials and workmanship at the time of shipment. It is in lieu of all other warranties. There is no implied warranty of merchantability or fitness for a particular purpose. The exclusive remedy is replacement of defective products, or at our option, refund of their purchase price. All damages exceeding the purchase price are excluded, weather consequential or otherwise and regardless of cause. The terms and conditions on our printed quotation contain a much more complete statement of our Exclusive Warranty and Remedy





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