



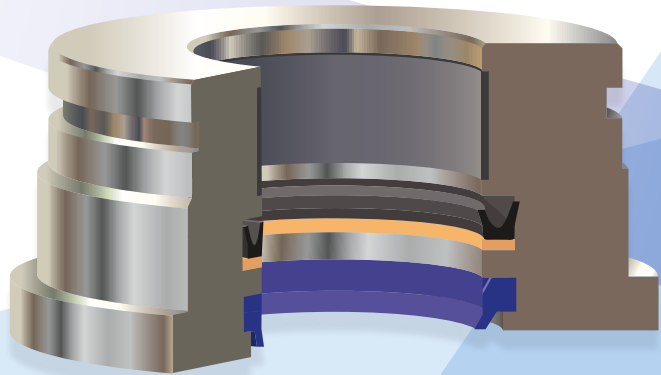
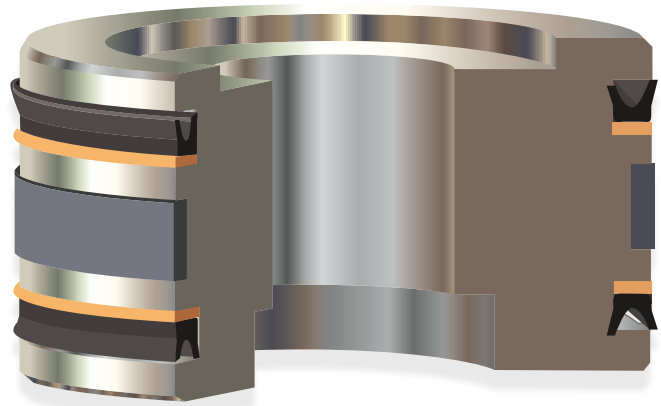
**ESCC**  
ENGINEERED SEALS & COMPONENTS, LLC.

# POLY-TREL SERIES 790 MODULAR BACK-UPS

For Loaded U-Cups & Standard U-Seals

## KEY FEATURES OF SERIES 790 BACK-UPS:

- Easy to Use, Solid or Split
- Increase Pressure and Temp. Range
- Maximum Extrusion Resistance
- Designed for Rod or Piston Applications





# SERIES 790 U-CUP SEAL BACK-UPS



Series 790 Profile

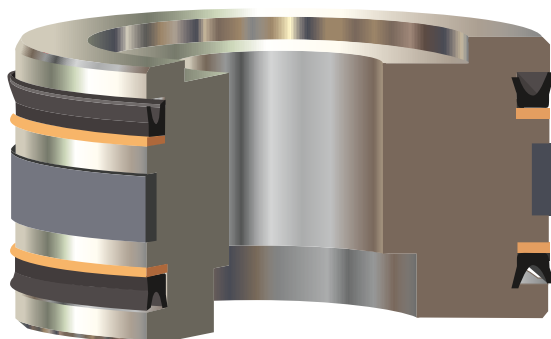
## 790 Series Back-up. Low Profile Modular Back-Up for Loaded U-Cup Seals and Rubber U-Cup Seals.

790 Series Back-up Rings provide added extrusion resistance for the U-Cups and Loaded U-Cup seals with only minimal increase in gland width. The 790 Series Back-up was originally designed to dramatically increase the pressure rating of Rubber U-Cups in applications where fluid compatibility or temperature prevent the use of urethane U-Cups. Additionally, the 790 Series Back-ups are perfect for adding higher pressure capabilities to medium duty urethane sealing systems. 790 Series Back-up Rings may be purchased either split or solid.

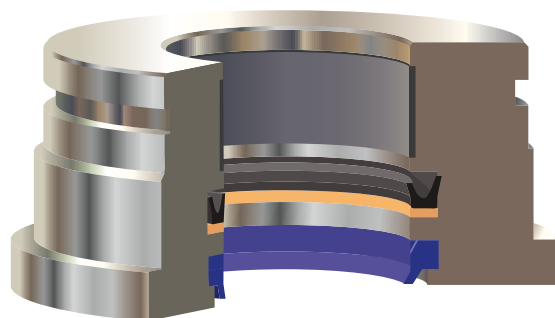
Standard Materials	Temperature	Max. Pressure Range**
HT-55-OR	-65°F to +275°F (-54°C to +135°C)	7,000 psi (482 bar)

**Alternate Materials:** For applications that may require an alternate material, please contact ESC.

\*\* 4,900 psi (337 bar) with tight-tolerance wear rings (.123/.125 c/s) Series 200 Ultra-Precision Wear Rings.  
3,500 psi (241 bar) with stand-tolerance wear rings (.120/.125 c/s).



790 installed in Piston Gland

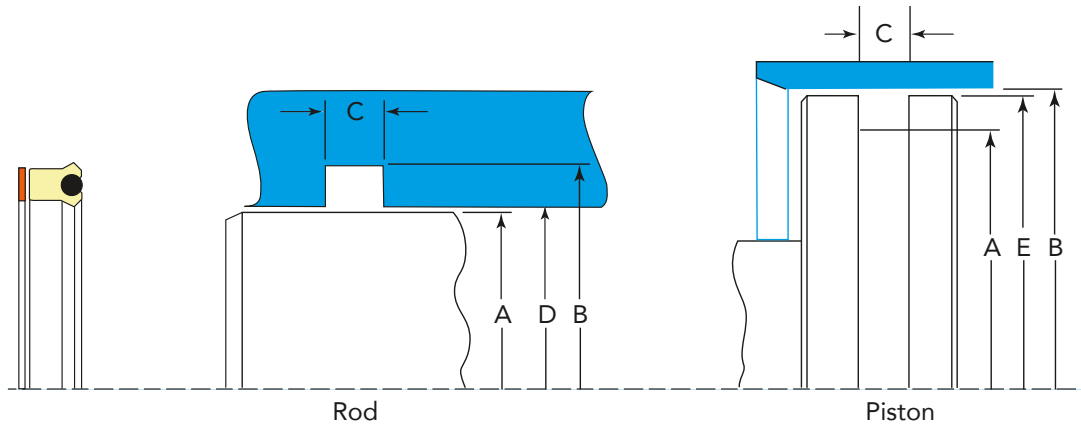


790 installed in Rod Gland



# SERIES 790 BACK-UP RING GROOVE WIDTH DESIGN GUIDE

## How to Determine the Gland Width when using 790 Series Back-up Ring



Series 790 back-up ring allows you to extend the pressure rating of a seal that fits into the common gland used by such seals as Loaded U-cups, Un-Loaded U-Cups, Rubber U-Cups, Symmetrical U-Cups, and many other styles of U- Cup seals.

In order to use the 790 series Back- up ring, the width of the gland, **C**., must be extended to accommodate the height of the back-up ring.

Utilizing the axial gland length you have already calculated per the manufacturer specification, add the value shown in **Table 790.1** to the calculated gland width of the seal being used to get the new groove width to be machined.

**Table 790.1 Added Gland Width Values**

Seal Cross Section	Added Gland Width
1/8	.062
3/16	062
1/4	062
5/16	062
3/8	062
7/16	062
1/2	062
5/8	062
3/4	062
1	062



Series 790 Profile

For non-standard cross sections, the added gland width can be determined by adding 0.062" to the width of the groove, **C**., to be used.



# SERIES 790 AVAILABLE SIZES LOW PROFILE BACK-UP RINGS

Part Number	DESCRIPTION					
	ID		O.D.	C/S	Width	
790-15	0.500	X	0.750	X	0.125	0.062
790-17	0.625	X	0.875	X	0.125	0.062
790-19	0.750	X	1.000	X	0.125	0.062
790-214	1.000	X	1.250	X	0.125	0.062
790-227	2.125	X	2.375	X	0.125	0.062
790-228	2.250	X	2.500	X	0.125	0.062
790-237	3.375	X	3.625	X	0.125	0.062
790-239	3.625	X	3.875	X	0.125	0.062
790-32	1.000	X	1.312	X	0.156	0.062
790-34	1.187	X	1.500	X	0.156	0.062
790-36	1.375	X	1.687	X	0.156	0.062
790-324	1.375	X	1.750	X	0.187	0.062
790-325	1.500	X	1.875	X	0.187	0.062
790-45	1.625	X	2.000	X	0.187	0.062
790-46	1.750	X	2.125	X	0.187	0.062
790-48	2.000	X	2.375	X	0.187	0.062
790-49	2.125	X	2.500	X	0.187	0.062
750-358	5.625	X	6.000	X	0.187	0.062
790-54	2.500	X	2.937	X	0.218	0.062
790-57	2.812	X	3.250	X	0.218	0.062
790-58	3.000	X	3.500	X	0.218	0.062
790-66	3.500	X	4.000	X	0.250	0.062
790-68	4.000	X	4.500	X	0.250	0.062
790-70	4.500	X	5.000	X	0.250	0.062

Part Number	DESCRIPTION					
	ID		O.D.	C/S	Width	
790-73	4.437	X	5.000	X	0.281	0.062
790-75	5.000	X	5.562	X	0.281	0.062
790-5.43X6	5.437	X	6.000	X	0.281	0.062
790-6.43X7	6.437	X	7.000	X	0.281	0.062
790-79	5.375	X	6.000	X	0.312	0.062
790-5.5X6.12	5.500	X	6.125	X	0.312	0.062
790-83	6.375	X	7.000	X	0.312	0.062
790-84	7.375	X	8.000	X	0.312	0.062
790-85	9.312	X	10.000	X	0.343	0.062
790-86	11.250	X	12.000	X	0.375	0.062
790-13.187	13.187	X	14.000	X	0.406	0.062
790-11X12	11.000	X	12.000	X	0.500	0.062
790-87	13.000	X	14.000	X	0.500	0.062
Solid is standard						
For Split Back-ups add -S after the P/N						

Consult factory for sizes not listed.

## Materials Available

**STANDARD MATERIAL**  
Poly-Trel HT55-OR

**OPTIONAL MATERIALS**  
POLY-TREL HT63-OR  
POLY-TREL HT72-N  
POM95-Acetal  
PA101-Nylon

PA940-Glass filled Nylon  
THE-100-Virgin PTFE  
TFE-155Glass Filled PTFE





# SERIES 790 STANDARD COMPOUND

## POLY-TREL™ Compound HT55-OR, 55 Shore D

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 <sup>2</sup>	N
Charpy Impact Strength, -30°C	ISO 179/1eU	ftlb/in <sup>2</sup>	N
Charpy Notched Impact Strength, -30°C	ISO 179/1eU	ftlb/in <sup>2</sup>	71.4
Charpy Notched Impact Strength, -40°C	ISO 179/1eU	ftlb/in <sup>2</sup>	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 <sup>3</sup>	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			ORANGE

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 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 phosphat 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

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## 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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