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Fluid Power Seal Design Guide

Catalog EPS 5370

06/2014



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Symmetrical Seals for Rod or Piston Applications

Catalog EPS 5370/USA

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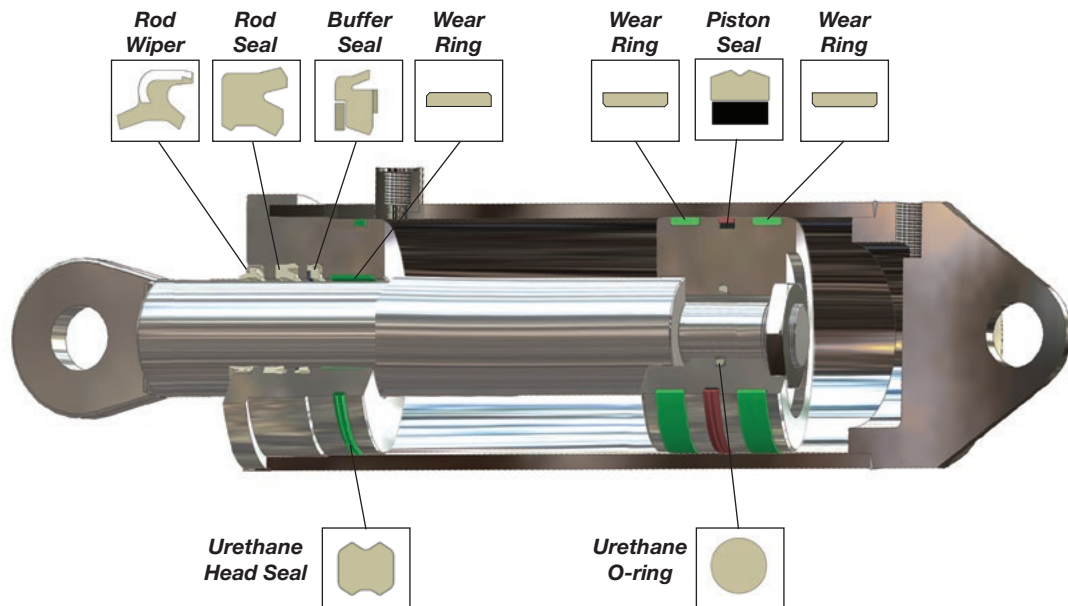
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Symmetrical Profiles

Parker symmetrical profiles are designed to fit the center of the gland. They are categorized as symmetrical profiles because the shape of the outside diameter sealing lip matches the shape of the inside diameter sealing lip. This symmetrical design, with its centered fit in the gland, allows the profile to function either as a rod or piston seal. Parker's wide range of profile options, proprietary compounds, and sizes establish Parker as a leader in the industry, providing quality solutions for pneumatic and hydraulic applications.

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Typical Hydraulic Cylinder



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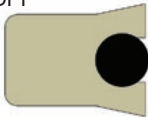



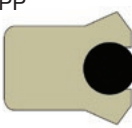




















Symmetrical Seal Product Offering (For Rod or Piston Applications)

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Profiles

Table 6-1: Product Profiles

Series	Description	Application (Duty)				Page
		Light	Medium	Heavy	Pneumatic	
SPP 	Square Cross-Section O-ring Energized Lip Seal					6-6
DPP 	O-ring Loaded Lip Seal with Straight Cut, Scraper Lip Design					6-10
BPP 	O-ring Energized Lip Seal with Beveled Lip Design					6-14
SL 	Dual Compound Dual Lip Seal					6-24
US 	Symmetrical U-cup Seal					6-27

Series	Description	Application (Duty)				Page
		Light	Medium	Heavy	Pneumatic	
8400 	Light Load U-cup with Beveled Lips					6-18
8500 	Light Load U-cup with Straight Cut, Scraper Lips					6-18
AN6226 	Symmetrical U-cup per Army/Navy (AN) Specification					6-30

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Symmetrical Seal Decision Tree

The Symmetrical product offerings are a part of the Decision Trees in the Rod and Piston sections (Sections 5 and 7). These Decision Trees are found on pages 5-3, 5-4, 7-3 and 7-4.

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PolyPak® Sealing

Parker's PolyPak® seal is a patented precision molded multi-purpose seal. The Parker PolyPak combines an o-ring type synthetic rubber o-spring with a conventional lip-type seal to produce a unique sealing device capable of sealing both vacuum, high and low pressure.

Conventional lip seals, such as the standard u-cups are prone to leakage under low pressure because little or no lip loading is inherent in the basic seal design. The Parker PolyPak however, is a squeeze type seal and provides high sealability at low pressure. As system pressure increases, additional force is applied to the PolyPak's seal interface and as pressure continues to increase, lip loading is automatically increased to compensate for this higher pressure and thus maintain a positive, leak-free seal from hard vacuum to over 60,000 psi with proper design and auxiliary devices.

In addition to providing superior sealing in vacuum, low and high pressure applications, the PolyPak seal offers a number of distinct advantages over conventional symmetrical or non-symmetrical u-cup seals including:

- The PolyPak seal's o-spring energizer stabilizes the seal under extreme pressures, preventing seal lip distortion and rolling or twisting in the gland.
- At low or high temperature extremes, the o-spring maintains lip loading on both I.D. and O.D. of the seal interface.
- The PolyPak seal can be stretched or squeezed to accommodate oversize cylinder bores and undersize rods. As long as the seal cross-section is correct in relation to the radial groove dimensions, the PolyPak will compensate and maintain proper lip loading.
- The range of materials available to the user of the PolyPak seal insures the proper combination for abrasion, extrusion, temperature resistance and fluid compatibility which produces high sealability and long life.

PolyPak seals are available in three styles:

1. Standard PolyPak (SPP Profile)
2. Deep PolyPak (DPP Profile)
3. Type B PolyPak (BPP Profile)

Rod Sealing with PolyPak® Seals

As a general rule, rod seals are more critical in nature than their companion piston seals. With increasing OEM requirements for “dry rod” capability, both to conserve system fluid and avoid leakage, the design and selection of the rod seal can be more challenging than its piston counterpart.

Parker recommends the use of the Type B PolyPak (BPP Profile) for rod seal applications due to its design features, including:

- Excellent film-breaking capability of the beveled lip design
- The higher level of lip loading provided by the Type B offers maximum sealability
- The long body of the design provides maximum stability

Piston Sealing with PolyPak Seals

Piston seals can be classified in two categories: single-acting and double-acting. The single acting seal is only required to seal in a single direction as system pressure is seen on only one end of the piston (return of the piston in a single-acting system is accomplished either by gravity or spring loading). The double-acting cylinder requires that the piston be sealed in both directions of stroke as system fluid is applied to one side or the other to achieve movement.

Please see the individual PolyPak profile pages for explanation and differentiation on selecting PolyPak profiles for piston applications.

PolyPak Material Combinations

PolyPak seals can be configured in numerous o-spring energizer and shell combinations. Table 6-2 represents “standard” combinations. Care should be taken to insure that both the PolyPak shell and its companion o-spring energizer are compatible with the system temperature, pressure, and fluid requirements.

Table 6-2. Standard Shell and O-Spring Energizer Combinations for PolyPak Seals

PolyPak Shell	O-Spring Energizer
Molythane®	70A Nitrile
Polymyte®	70A Nitrile, 75A FKM
Nitroxile®	70A Nitrile
Ethylene Propylene	80A EPR
Fluorocarbon	75A FKM
All Plastic and Rubber	Metal O-spring

Parker’s “smart” part numbering provides for varying standard and custom PolyPak shell and o-spring energizer material combinations. Please refer to the part number nomenclature tables and Technical Data in the PolyPak profile pages for PolyPak shell material options. See Table 6-3 for standard and custom o-spring energizer option details.

Positively-Actuated Back-ups Option

PolyPak seals can be designed with positively-actuated back-ups by designating that option in the part number. See page 10-16 for an explanation of the features of positively-actuated back-ups.

Table 6-3. PolyPak® O-Spring Energizers

Standard O-Spring Energizer		
O-Spring Energizer Code	Type of PolyPak	Description
– (dash)	Urethane (4615, 4622)	70A NBR o-spring energizer
	Rubber	Indicates that the o-spring material family is to match the rubber PolyPak shell material family. Example: XNBR 4263 PolyPak shell: code (“–”) indicates NBR o-ring EPR 4207 PolyPak shell: code (“–”) indicates EPR o-ring FKM 4208 PolyPak shell: code (“–”) indicates FKM o-ring FKM 4266 PolyPak shell: code (“–”) indicates FKM o-ring
	Polymyte® (4651)	Must be replaced by a custom o-spring energizer code
Custom O-Spring Energizers		
O-Spring Energizer Code	Energizer Description	
C	Continuous o-ring	
E	General EPR o-ring	
J	General HNBR o-ring	
L	Canted coil, spring-loaded with oval spring cavity	
N	General nitrile o-ring	
R	Low swell nitrile o-ring	
S	Spring energizer with o-ring groove	
U	Geothermal EPR o-ring	
V	Fluorocarbon o-ring	
W	Nuclear grade EPR o-ring	
X	Premium grade low-temperature o-ring	
Y	Low temperature nitrile o-ring	

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Symmetrical Seal SPP Profile, Standard PolyPak®

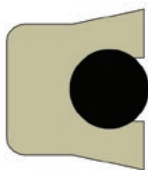
Catalog EPS 5370/USA

SPP Profile, Standard PolyPak® Square Cross-Section O-ring Energized Lip Seal



Parker's Standard PolyPak is a squeeze seal with a symmetrical profile for use in either rod or piston applications. The standard Molythane® shell provides high wear resistance and the o-ring energizer functions as a spring to maintain sealing contact under low pressure. The Standard PolyPak utilizes a straight cut scraper lip design formed by a precision trimming process. The scraper edge wipes both fluid film and contamination away from the seal. A wide selection of sizes and alternate compounds allow this profile to match up with many hydraulic applications. The Standard PolyPak is an economical choice as a stand alone rod or piston seal. With less squeeze force than the Deep or Type B profiles, the Standard PolyPak can be installed back-to-back, in separate glands, for bi-directional sealing. To protect against pressure trapping, it is recommended that the o-ring be removed from the Standard PolyPak facing the lower pressure side of the application.

6



Standard PolyPak Cross-Section

Technical Data

Standard Materials*	Temperature Range	Pressure Range†	Surface Speed
Shell			
P4615A90	-65°F to +200°F (-54°C to +93°C)	5000 psi (345 bar)	< 1.6 ft/s (0.5 m/s)
P4622A90	-65°F to +225°F (-54°C to +107°C)	5000 psi (345 bar)	< 1.6 ft/s (0.5 m/s)
Z4651D60	-65°F to +275°F (-54°C to +135°C)	7000 psi (482 bar)	< 1.6 ft/s (0.5 m/s)
N4263A90	-20°F to +275°F (-29°C to +135°C)	2000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
E4207A90	-65°F to +300°F (-54°C to +149°C)	2000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
V4208A90	-5°F to +400°F (-21°C to +204°C)	2000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
V4266A95	-5°F to +400°F (-21°C to +204°C)	2250 psi (155 bar)	< 1.6 ft/s (0.5 m/s)

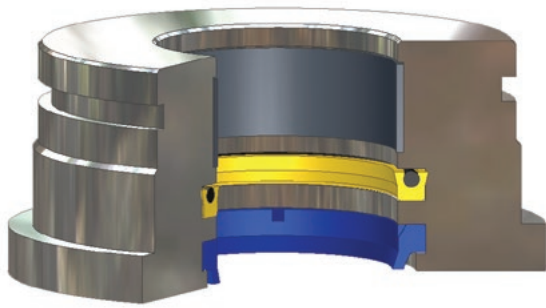
Energizer

For Seals With...	Standard Energizer Material*
4615 or 4622 PolyPak shell	Standard energizer is a nitrile o-ring
4651 PolyPak shell	O-spring energizer code must be identified
Rubber PolyPak shell	Standard energizer is an o-ring from the same rubber material family as the shell

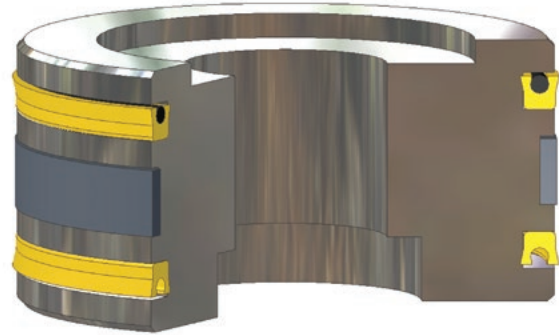
***Alternate Materials:** For custom energizer materials, see Table 6-3 on page 6-5. For applications that may require an alternate shell material, please see Section 3 or contact your local Parker representative.

†Pressure Range without wear rings. If used with wear rings, see Table 2-4, page 2-5.

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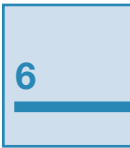
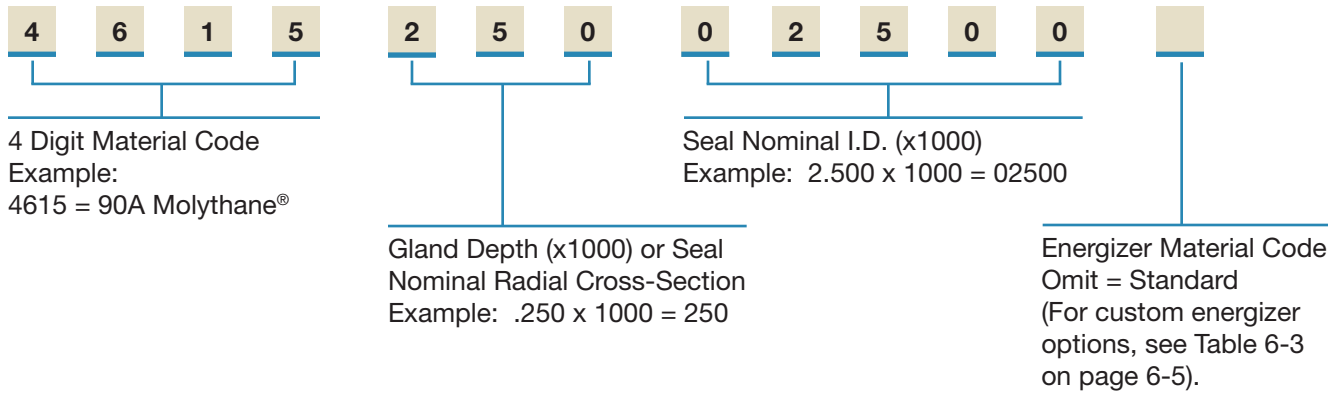
Standard PolyPak installed in Rod Gland



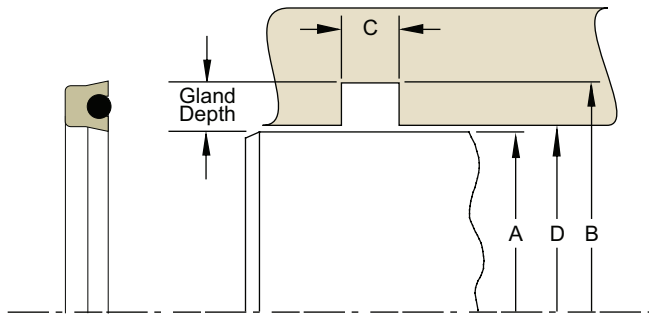
Standard PolyPak installed in Piston Gland

Part Number Nomenclature – SPP Profile, Standard PolyPak®

Table 6-4. SPP Profile, Standard PolyPak



Rod Gland Dimensions — SPP Profile, Standard PolyPak®



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-5. SPP Profile — Rod Gland Calculation, Rubber and Polyurethane (90A)

A Rod Diameter		Seal		B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -0.000	Calculation	Tol.
0.062 - 0.624	+0.000/-0.001	1/8 (.125)	1/8 (.125)	Dia. A + .250	+0.002/-0.000	0.138	Dia. A + .001	+0.002/-0.000
0.625 - 0.999	+0.000/-0.001	1/8 (.125)	1/8 (.125)	Dia. A + .250	+0.002/-0.000	0.138	Dia. A + .001	+0.002/-0.000
1.000 - 1.499	+0.000/-0.002	3/16 (.187)	3/16 (.187)	Dia. A + .375	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
1.500 - 1.999	+0.000/-0.002	3/16 (.187)	3/16 (.187)	Dia. A + .375	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
2.000 - 3.499	+0.000/-0.002	1/4 (.250)	1/4 (.250)	Dia. A + .500	+0.003/-0.000	0.275	Dia. A + .001	+0.003/-0.000
3.500 - 4.999	+0.000/-0.002	5/16 (.312)	5/16 (.312)	Dia. A + .625	+0.004/-0.000	0.343	Dia. A + .002	+0.003/-0.000
5.000 - 9.999	+0.000/-0.002	3/8 (.375)	3/8 (.375)	Dia. A + .750	+0.005/-0.000	0.413	Dia. A + .002	+0.004/-0.000
10.000 - 19.999	+0.000/-0.003	1/2 (.500)	1/2 (.500)	Dia. A + 1.000	+0.007/-0.000	0.550	Dia. A + .002	+0.005/-0.000
20.000 - 29.999	+0.000/-0.003	5/8 (.625)	5/8 (.625)	Dia. A + 1.250	+0.009/-0.000	0.688	Dia. A + .002	+0.006/-0.000
30.000 - 39.999	+0.000/-0.004	3/4 (.750)	3/4 (.750)	Dia. A + 1.500	+0.011/-0.000	0.825	Dia. A + .002	+0.007/-0.000
40.000 +	+0.000/-0.005	1 (1.000)	1 (1.000)	Dia. A + 2.000	+0.015/-0.000	1.100	Dia. A + .002	+0.009/-0.000

Table 6-6. SPP Profile — Rod Gland Calculation, Polymyte (60D)

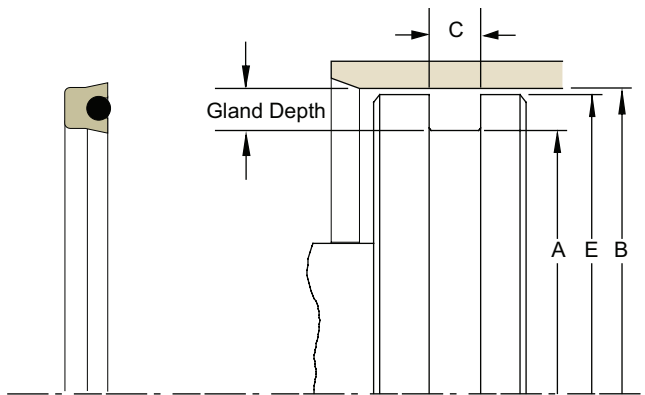
A Rod Diameter		Seal		A Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -0.000	Calculation	Tol.
0.062 - 0.999	+0.000/-0.001	1/8 (.125)	1/8 (.125)	Dia. A + .250	+0.002/-0.000	0.138	Dia. A + .001	+0.002/-0.000
1.000 - 1.749	+0.000/-0.001	1/8 (.125)	1/8 (.125)	Dia. A + .250	+0.002/-0.000	0.138	Dia. A + .001	+0.002/-0.000
1.750 - 2.249	+0.000/-0.002	3/16 (.187)	3/16 (.187)	Dia. A + .375	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
2.250 - 2.749	+0.000/-0.002	3/16 (.187)	3/16 (.187)	Dia. A + .375	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
2.750 - 3.499	+0.000/-0.002	1/4 (.250)	1/4 (.250)	Dia. A + .500	+0.003/-0.000	0.275	Dia. A + .001	+0.003/-0.000
3.500 - 4.999	+0.000/-0.002	5/16 (.312)	5/16 (.312)	Dia. A + .625	+0.004/-0.000	0.343	Dia. A + .002	+0.003/-0.000
5.000 - 9.999	+0.000/-0.002	3/8 (.375)	3/8 (.375)	Dia. A + .750	+0.005/-0.000	0.413	Dia. A + .002	+0.004/-0.000
10.000 - 19.999	+0.000/-0.003	1/2 (.500)	1/2 (.500)	Dia. A + 1.000	+0.007/-0.000	0.550	Dia. A + .002	+0.005/-0.000
20.000 - 29.999	+0.000/-0.003	5/8 (.625)	5/8 (.625)	Dia. A + 1.250	+0.009/-0.000	0.688	Dia. A + .002	+0.006/-0.000
30.000 - 39.999	+0.000/-0.004	3/4 (.750)	3/4 (.750)	Dia. A + 1.500	+0.011/-0.000	0.825	Dia. A + .002	+0.007/-0.000
40.000 +	+0.000/-0.005	1 (1.000)	1 (1.000)	Dia. A + 2.000	+0.015/-0.000	1.100	Dia. A + .002	+0.009/-0.000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

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Piston Gland Dimensions – SPP Profile, Standard PolyPak®



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-7. SPP Profile – Piston Gland Calculation, Rubber and Polyurethane (90A)

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.312 - 1.499	+0.002/-0.000	1/8 (.125)	1/8 (.125)	Dia. B - .250	+0.000/-0.002	0.138	Dia. B - .001	+0.000/-0.001
1.500 - 2.999	+0.002/-0.000	3/16 (.187)	3/16 (.187)	Dia. B - .375	+0.000/-0.002	0.206	Dia. B - .001	+0.000/-0.002
3.000 - 5.999	+0.003/-0.000	1/4 (.250)	1/4 (.250)	Dia. B - .500	+0.000/-0.003	0.275	Dia. B - .001	+0.000/-0.002
6.000 - 9.999	+0.003/-0.000	5/16 (.312)	5/16 (.312)	Dia. B - .625	+0.000/-0.004	0.343	Dia. B - .002	+0.000/-0.002
10.000 - 19.999	+0.004/-0.000	3/8 (.375)	3/8 (.375)	Dia. B - .750	+0.000/-0.005	0.413	Dia. B - .002	+0.000/-0.002
20.000 - 29.999	+0.005/-0.000	1/2 (.500)	1/2 (.500)	Dia. B - 1.000	+0.000/-0.007	0.550	Dia. B - .002	+0.000/-0.003
30.000 - 39.999	+0.006/-0.000	5/8 (.625)	5/8 (.625)	Dia. B - 1.250	+0.000/-0.009	0.688	Dia. B - .002	+0.000/-0.003
40.000 - 49.999	+0.007/-0.000	3/4 (.750)	3/4 (.750)	Dia. B - 1.500	+0.000/-0.010	0.825	Dia. B - .002	+0.000/-0.004
50.000 +	+0.009/-0.000	1 (1.000)	1 (1.000)	Dia. B - 2.000	+0.000/-0.012	1.100	Dia. B - .002	+0.000/-0.005

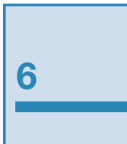


Table 6-8. SPP Profile – Piston Gland Calculation, Polymyte (60D)

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.312 - 2.749	+0.002/-0.000	1/8 (.125)	1/8 (.125)	Dia. B - .250	+0.000/-0.002	0.138	Dia. B - .001	+0.000/-0.001
2.750 - 4.499	+0.002/-0.000	3/16 (.187)	3/16 (.187)	Dia. B - .375	+0.000/-0.002	0.206	Dia. B - .001	+0.000/-0.002
4.500 - 5.999	+0.003/-0.000	1/4 (.250)	1/4 (.250)	Dia. B - .500	+0.000/-0.003	0.275	Dia. B - .001	+0.000/-0.002
6.000 - 9.999	+0.003/-0.000	5/16 (.312)	5/16 (.312)	Dia. B - .625	+0.000/-0.004	0.343	Dia. B - .002	+0.000/-0.002
10.000 - 19.999	+0.004/-0.000	3/8 (.375)	3/8 (.375)	Dia. B - .750	+0.000/-0.005	0.413	Dia. B - .002	+0.000/-0.002
20.000 - 29.999	+0.005/-0.000	1/2 (.500)	1/2 (.500)	Dia. B - 1.000	+0.000/-0.007	0.550	Dia. B - .002	+0.000/-0.003
30.000 - 39.999	+0.006/-0.000	5/8 (.625)	5/8 (.625)	Dia. B - 1.250	+0.000/-0.009	0.688	Dia. B - .002	+0.000/-0.003
40.000 - 49.999	+0.007/-0.000	3/4 (.750)	3/4 (.750)	Dia. B - 1.500	+0.000/-0.010	0.825	Dia. B - .002	+0.000/-0.004
50.000 +	+0.009/-0.000	1 (1.000)	1 (1.000)	Dia. B - 2.000	+0.000/-0.012	1.100	Dia. B - .002	+0.000/-0.005

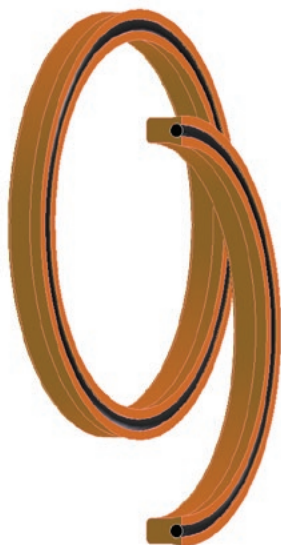
* If used with wear rings, refer to wear ring piston diameter, see Section 9.

Above table reflects recommended cross-sections for bore diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Symmetrical Seal DPP Profile, Deep PolyPak®

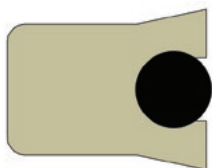
Catalog EPS 5370/USA

DPP Profile, Deep PolyPak®, O-ring Loaded Lip Seal with Scraper Lip Design



Parker's Deep PolyPak is a squeeze seal with a symmetrical profile for use in either rod or piston applications. Its rectangular shape ensures stability in the gland. The standard Molythane® shell provides high wear resistance and the o-ring energizer functions as a spring to maintain sealing contact under low pressure or vacuum applications. The Deep PolyPak straight cut scraper lip design cuts fluid film and moves contamination away from the seal. The sharp edge of the lip is formed by a precision knife trimming process. A wide selection of sizes and alternate compounds allow this profile to match up with many hydraulic applications. The Deep PolyPak is an economical choice as a stand alone rod or piston seal. Dual Deep PolyPak seals should not be installed back to back in bi-directional piston applications as a pressure trap between the seals may occur.

6



Deep PolyPak Cross-Section

Technical Data

Standard Materials*	Temperature Range	Pressure Range†	Surface Speed
Shell			
P4615A90	-65°F to +200°F (-54°C to +93°C)	5,000 psi (344 bar)	< 1.6 ft/s (0.5 m/s)
P4622A90	-65°F to +225°F (-54°C to +107°C)	5,000 psi (344 bar)	< 1.6 ft/s (0.5 m/s)
Z4651D60	-65°F to +275°F (-54°C to +135°C)	7,000 psi (482 bar)	< 1.6 ft/s (0.5 m/s)
N4263A90	-20°F to +275°F (-29°C to +135°C)	2,000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
E4207A90	-65°F to +300°F (-54°C to +149°C)	2,000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
V4208A90	-5°F to +400°F (-21°C to +204°C)	2,000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
V4266A95	-5°F to +400°F (-21°C to +204°C)	2,250 psi (155 bar)	< 1.6 ft/s (0.5 m/s)

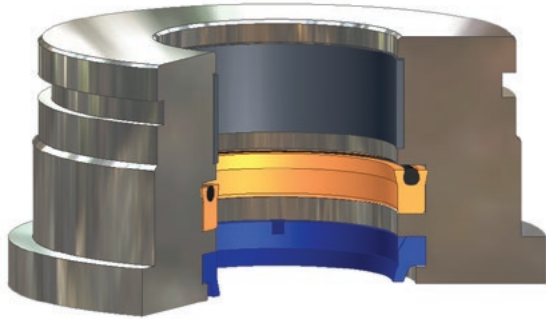
Energizer

For Seals With...	Standard Energizer Material*
4615 or 4622 PolyPak shell	Standard energizer is a nitrile o-ring
4651 PolyPak shell	O-spring energizer code must be identified
Rubber PolyPak shell	Standard energizer is an o-ring from the same rubber material family as the shell

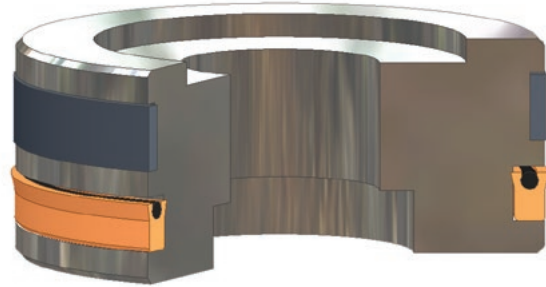
***Alternate Materials:** For custom energizer materials, see Table 6-3 on page 6-5. For applications that may require an alternate shell material, please see Section 3 or contact your local Parker Seal representative.

†Pressure Range without wear rings. If used with wear rings, see Table 2-4, page 2-5.

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Deep PolyPak installed in Rod Gland

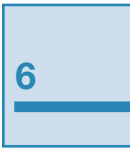


Deep PolyPak installed in Piston Gland

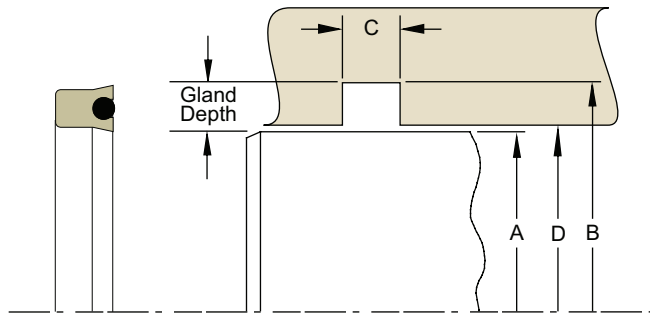
Part Number Nomenclature – DPP Profile, Deep PolyPak®

Table 6-9. DPP Profile, Deep PolyPak

4	6	1	5	2	5	0	0	2	0	0	0	-	3	7	5
└───┬───┘				└───┬───┘			└───┬───┘					└───┬───┘			
4 Digit Material Code				Gland Depth (x1000) or Seal Nominal Radial Cross-Section			Seal Nominal I.D. (x1000)					Seal Nominal Axial Width (x1000)			
Example: 4615 = 90A Molythane®				Example: .250 x 1000 = 250			Example: 2.000 x 1000 = 02000					Example: .375 x 1000 = 375			
												Energizer Material Code			
												Example: - (Dash) = 70A Nitrile O-ring (For custom energizer options, see Table 6-3 on page 6-5.)			



Rod Gland Dimensions – DPP Profile, Deep PolyPak®



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-10. DPP Profile – Rod Gland Calculation, Rubber and Polyurethane (90A)

A Rod Diameter		Seal		B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.062 - 0.624	+0.000/-0.001	1/8 (.125)	3/16 (.187)	Dia. A + .250	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
0.625 - 0.999	+0.000/-0.001	1/8 (.125)	1/4 (.250)	Dia. A + .250	+0.002/-0.000	0.275	Dia. A + .001	+0.002/-0.000
1.000 - 1.499	+0.000/-0.002	3/16 (.187)	5/16 (.312)	Dia. A + .375	+0.002/-0.000	0.343	Dia. A + .001	+0.002/-0.000
1.500 - 1.999	+0.000/-0.002	3/16 (.187)	3/8 (.375)	Dia. A + .375	+0.002/-0.000	0.413	Dia. A + .001	+0.002/-0.000
2.000 - 3.499	+0.000/-0.002	1/4 (.250)	3/8 (.375)	Dia. A + .500	+0.003/-0.000	0.413	Dia. A + .001	+0.003/-0.000
3.500 - 4.999	+0.000/-0.002	5/16 (.312)	1/2 (.500)	Dia. A + .625	+0.004/-0.000	0.550	Dia. A + .002	+0.003/-0.000
5.000 - 9.999	+0.000/-0.002	3/8 (.375)	5/8 (.625)	Dia. A + .750	+0.005/-0.000	0.688	Dia. A + .002	+0.004/-0.000
10.000 - 19.999	+0.000/-0.003	1/2 (.500)	3/4 (.750)	Dia. A + 1.000	+0.007/-0.000	0.825	Dia. A + .002	+0.005/-0.000
20.000 - 29.999	+0.000/-0.003	5/8 (.625)	1 (1.000)	Dia. A + 1.250	+0.009/-0.000	1.100	Dia. A + .002	+0.006/-0.000
30.000 - 39.999	+0.000/-0.004	3/4 (.750)	1-1/4 (1.250)	Dia. A + 1.500	+0.011/-0.000	1.375	Dia. A + .002	+0.007/-0.000
40.000 +	+0.000/-0.005	1 (1.000)	1-1/2 (1.500)	Dia. A + 2.000	+0.015/-0.000	1.650	Dia. A + .002	+0.009/-0.000

Table 6-11. DPP Profile – Rod Gland Calculation, Polymyte (60D)

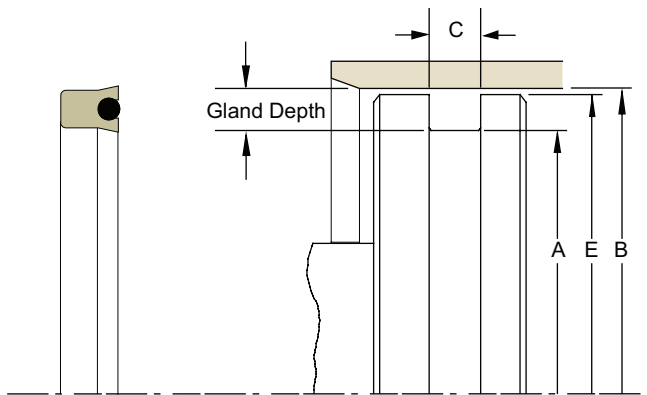
A Rod Diameter		Seal		B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.062 - 0.999	+0.000/-0.001	1/8 (.125)	3/16 (.187)	Dia. A + .250	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
1.000 - 1.749	+0.000/-0.001	1/8 (.125)	1/4 (.250)	Dia. A + .250	+0.002/-0.000	0.275	Dia. A + .001	+0.002/-0.000
1.750 - 2.249	+0.000/-0.002	3/16 (.187)	5/16 (.312)	Dia. A + .375	+0.002/-0.000	0.343	Dia. A + .001	+0.002/-0.000
2.250 - 2.749	+0.000/-0.002	3/16 (.187)	3/8 (.375)	Dia. A + .375	+0.002/-0.000	0.413	Dia. A + .001	+0.002/-0.000
2.750 - 3.499	+0.000/-0.002	1/4 (.250)	3/8 (.375)	Dia. A + .500	+0.003/-0.000	0.413	Dia. A + .001	+0.003/-0.000
3.500 - 4.999	+0.000/-0.002	5/16 (.312)	1/2 (.500)	Dia. A + .625	+0.004/-0.000	0.550	Dia. A + .002	+0.003/-0.000
5.000 - 9.999	+0.000/-0.002	3/8 (.375)	5/8 (.625)	Dia. A + .750	+0.005/-0.000	0.688	Dia. A + .002	+0.004/-0.000
10.000 - 19.999	+0.000/-0.003	1/2 (.500)	3/4 (.750)	Dia. A + 1.000	+0.007/-0.000	0.825	Dia. A + .002	+0.005/-0.000
20.000 - 29.999	+0.000/-0.003	5/8 (.625)	1 (1.000)	Dia. A + 1.250	+0.009/-0.000	1.100	Dia. A + .002	+0.006/-0.000
30.000 - 39.999	+0.000/-0.004	3/4 (.750)	1-1/4 (1.250)	Dia. A + 1.500	+0.011/-0.000	1.375	Dia. A + .002	+0.007/-0.000
40.000 +	+0.000/-0.005	1 (1.000)	1-1/2 (1.500)	Dia. A + 2.000	+0.015/-0.000	1.650	Dia. A + .002	+0.009/-0.000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

06/01/2014

Piston Gland Dimensions – DPP Profile, Deep PolyPak®



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-12. DPP Profile – Piston Gland Calculation, Rubber and Polyurethane (90A)

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.312 - 1.499	+0.002/-0.000	1/8 (.125)	1/4 (.250)	Dia. B - .250	+0.000/-0.002	0.275	Dia. B - .001	+0.000/-0.001
1.500 - 2.999	+0.002/-0.000	3/16 (.187)	5/16 (.312)	Dia. B - .375	+0.000/-0.002	0.343	Dia. B - .001	+0.000/-0.002
3.000 - 5.999	+0.003/-0.000	1/4 (.250)	3/8 (.375)	Dia. B - .500	+0.000/-0.003	0.413	Dia. B - .001	+0.000/-0.002
6.000 - 9.999	+0.003/-0.000	5/16 (.312)	1/2 (.500)	Dia. B - .625	+0.000/-0.004	0.550	Dia. B - .002	+0.000/-0.002
10.000 - 19.999	+0.004/-0.000	3/8 (.375)	5/8 (.625)	Dia. B - .750	+0.000/-0.005	0.688	Dia. B - .002	+0.000/-0.002
20.000 - 29.999	+0.005/-0.000	1/2 (.500)	3/4 (.750)	Dia. B - 1.000	+0.000/-0.007	0.825	Dia. B - .002	+0.000/-0.003
30.000 - 39.999	+0.006/-0.000	5/8 (.625)	1 (1.000)	Dia. B - 1.250	+0.000/-0.009	1.100	Dia. B - .002	+0.000/-0.003
40.000 - 49.999	+0.007/-0.000	3/4 (.750)	1-1/4 (1.250)	Dia. B - 1.500	+0.000/-0.010	1.375	Dia. B - .002	+0.000/-0.004
50.000 +	+0.009/-0.000	1 (1.000)	1-1/2 (1.500)	Dia. B - 2.000	+0.000/-0.012	1.650	Dia. B - .002	+0.000/-0.005



Table 6-13. DPP Profile – Piston Gland Calculation, Polymyte (60D)

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.312 - 2.749	+0.002/-0.000	1/8 (.125)	1/4 (.250)	Dia. B - .250	+0.000/-0.002	0.275	Dia. B - .001	+0.000/-0.001
2.750 - 4.499	+0.002/-0.000	3/16 (.187)	5/16 (.312)	Dia. B - .375	+0.000/-0.002	0.343	Dia. B - .001	+0.000/-0.002
4.500 - 5.999	+0.003/-0.000	1/4 (.250)	3/8 (.375)	Dia. B - .500	+0.000/-0.003	0.413	Dia. B - .001	+0.000/-0.002
6.000 - 9.999	+0.003/-0.000	5/16 (.312)	1/2 (.500)	Dia. B - .625	+0.000/-0.004	0.550	Dia. B - .002	+0.000/-0.002
10.000 - 19.999	+0.004/-0.000	3/8 (.375)	5/8 (.625)	Dia. B - .750	+0.000/-0.005	0.688	Dia. B - .002	+0.000/-0.002
20.000 - 29.999	+0.005/-0.000	1/2 (.500)	3/4 (.750)	Dia. B - 1.000	+0.000/-0.007	0.825	Dia. B - .002	+0.000/-0.003
30.000 - 39.999	+0.006/-0.000	5/8 (.625)	1 (1.000)	Dia. B - 1.250	+0.000/-0.009	1.100	Dia. B - .002	+0.000/-0.003
40.000 - 49.999	+0.007/-0.000	3/4 (.750)	1-1/4 (1.250)	Dia. B - 1.500	+0.000/-0.010	1.375	Dia. B - .002	+0.000/-0.004
50.000 +	+0.009/-0.000	1 (1.000)	1-1/2 (1.500)	Dia. B - 2.000	+0.000/-0.012	1.650	Dia. B - .002	+0.000/-0.005

* If used with wear rings, refer to wear ring bore diameter, see Section 9.

Above table reflects recommended cross-sections for piston diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Symmetrical Seal BPP Profile, Type B PolyPak®

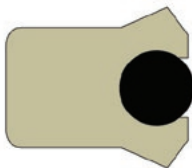
Catalog EPS 5370/USA

BPP Profile, Type B PolyPak® O-ring Energized Lip Seal with Beveled Lip Design



Parker's BPP profile, Type B PolyPak is a squeeze seal with a symmetrical profile for use in either rod or piston applications. The rectangular shape of its cross section ensures stability in the gland. The standard Molythane® shell provides high wear resistance and the o-ring energizer functions as a spring to maintain sealing contact under low pressure or vacuum applications. The beveled lip design of the seal is excellent for cutting fluid film and is formed by a precision knife trimming process. A wide selection of sizes and alternate compounds allow this profile to match up with many hydraulic applications. The Type B PolyPak is an economical choice as a stand-alone seal or can be used in tandem with a buffer seal. In piston applications, this seal will function as a unidirectional seal. Dual Type B PolyPak seals should not be installed back-to-back in bi-directional pressure applications, as a pressure trap between the seals may occur. Instead, for bi-directional piston sealing, incorporate a PIP Ring® (see page 7-15).

6



Type B PolyPak
Cross-Section

Technical Data

Standard Materials*	Temperature Range	Pressure Range†	Surface Speed
Shell			
P4615A90	-65°F to +200°F (-54°C to +93°C)	5,000 psi (344 bar)	< 1.6 ft/s (0.5 m/s)
P4622A90	-65°F to +225°F (-54°C to +107°C)	5,000 psi (344 bar)	< 1.6 ft/s (0.5 m/s)
Z4651D60	-65°F to +275°F (-54°C to +135°C)	7,000 psi (482 bar)	< 1.6 ft/s (0.5 m/s)
N4263A90	-20°F to +275°F (-29°C to +135°C)	2,000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
E4207A90	-65°F to +300°F (-54°C to +149°C)	2,000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
V4208A90	-5°F to +400°F (-21°C to +204°C)	2,000 psi (138 bar)	< 1.6 ft/s (0.5 m/s)
V4266A95	-5°F to +400°F (-21°C to +204°C)	2,250 psi (155 bar)	< 1.6 ft/s (0.5 m/s)

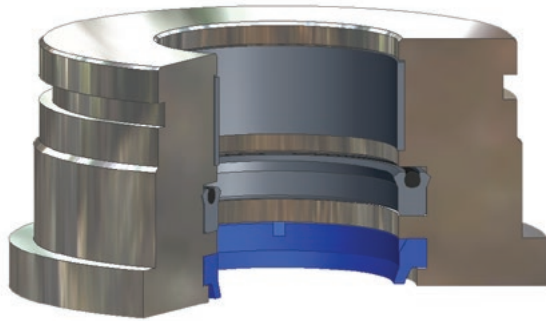
Energizer

For Seals With...	Standard Energizer Material*
4615 or 4622 PolyPak shell	Standard energizer is a nitrile o-ring
4651 PolyPak shell	O-spring energizer code must be identified
Rubber PolyPak shell	Standard energizer is an o-ring from the same rubber material family as the shell

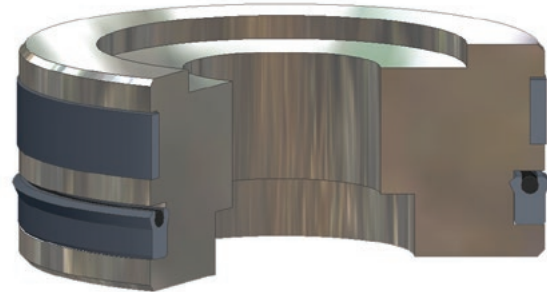
***Alternate Materials:** For custom energizer materials, see Table 6-3 on page 6-5. For applications that may require an alternate shell material, please see Section 3 or contact your local Parker seal representative.

†Pressure Range without wear rings. If used with wear rings, see Table 2-4, page 2-5.

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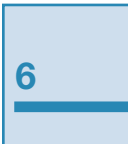
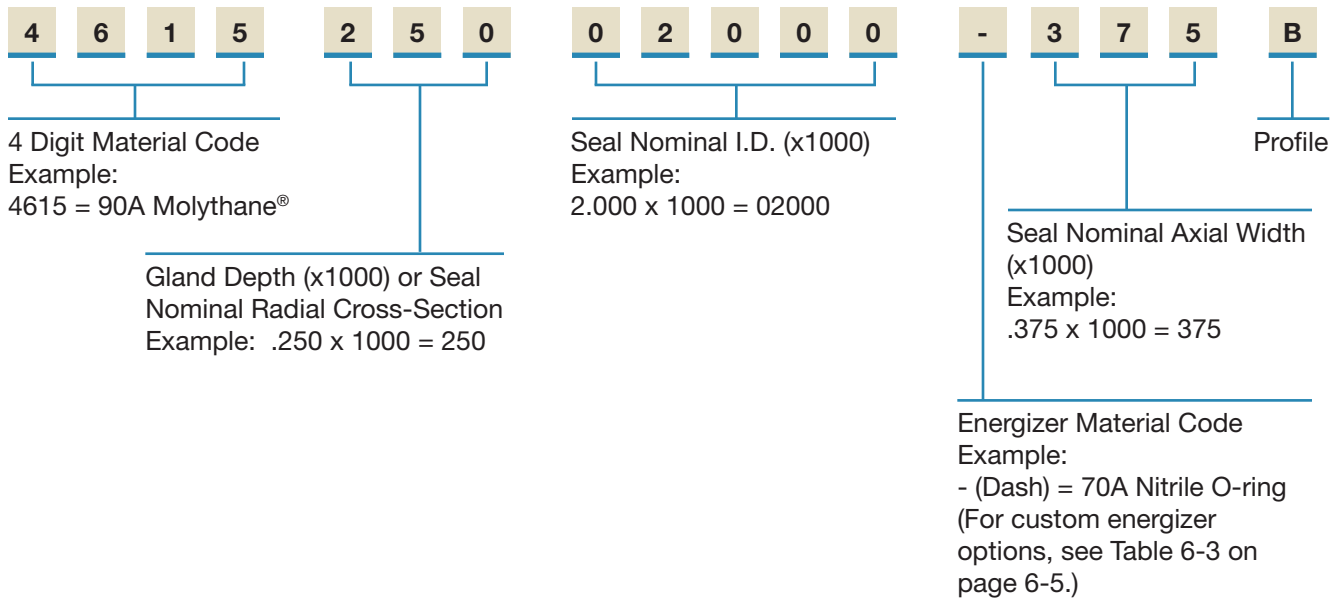
Type B PolyPak installed in Rod Gland



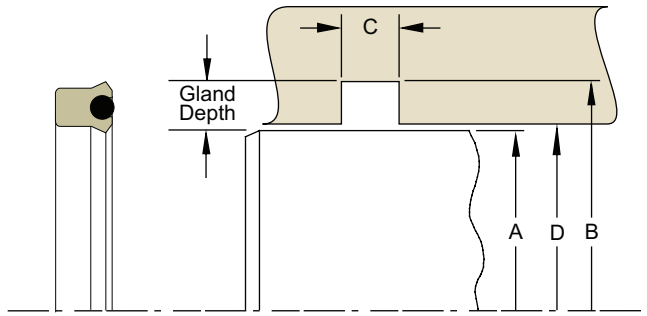
Type B PolyPak installed in Piston Gland

Part Number Nomenclature – BPP Profile, Type B PolyPak®

Table 6-14. BPP Profile



Rod Gland Dimensions — BPP Profile, Type B PolyPak®



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-15. BPP Profile — Rod Gland Calculation, Rubber and Polyurethane (90A)

A Rod Diameter		Seal		B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.062 - 0.624	+0.000/-0.001	1/8 (.125)	3/16 (.187)	Dia. A + .250	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
0.625 - 0.999	+0.000/-0.001	1/8 (.125)	1/4 (.250)	Dia. A + .250	+0.002/-0.000	0.275	Dia. A + .001	+0.002/-0.000
1.000 - 1.499	+0.000/-0.002	3/16 (.187)	5/16 (.312)	Dia. A + .375	+0.002/-0.000	0.343	Dia. A + .001	+0.002/-0.000
1.500 - 1.999	+0.000/-0.002	3/16 (.187)	3/8 (.375)	Dia. A + .375	+0.002/-0.000	0.413	Dia. A + .001	+0.002/-0.000
2.000 - 3.499	+0.000/-0.002	1/4 (.250)	3/8 (.375)	Dia. A + .500	+0.003/-0.000	0.413	Dia. A + .001	+0.003/-0.000
3.500 - 4.999	+0.000/-0.002	5/16 (.312)	1/2 (.500)	Dia. A + .625	+0.004/-0.000	0.550	Dia. A + .002	+0.003/-0.000
5.000 - 9.999	+0.000/-0.002	3/8 (.375)	5/8 (.625)	Dia. A + .750	+0.005/-0.000	0.688	Dia. A + .002	+0.004/-0.000
10.000 - 19.999	+0.000/-0.003	1/2 (.500)	3/4 (.750)	Dia. A + 1.000	+0.007/-0.000	0.825	Dia. A + .002	+0.005/-0.000
20.000 - 29.999	+0.000/-0.003	5/8 (.625)	1 (1.000)	Dia. A + 1.250	+0.009/-0.000	1.100	Dia. A + .002	+0.006/-0.000
30.000 - 39.999	+0.000/-0.004	3/4 (.750)	1-1/4 (1.250)	Dia. A + 1.500	+0.011/-0.000	1.375	Dia. A + .002	+0.007/-0.000
40.000 +	+0.000/-0.005	1 (1.000)	1-1/2 (1.500)	Dia. A + 2.000	+0.015/-0.000	1.650	Dia. A + .002	+0.009/-0.000

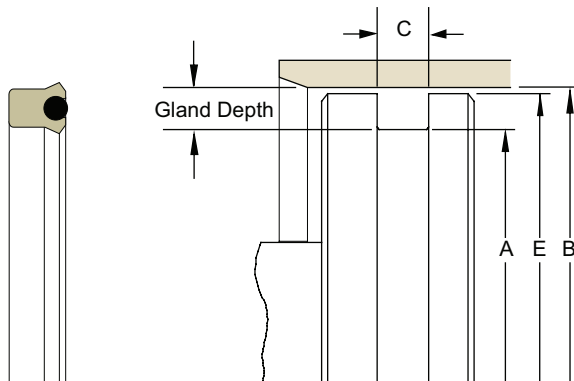
Table 6-16. BPP Profile — Rod Gland Calculation, Polymyte (60D)

A Rod Diameter		Seal		B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.062 - 0.999	+0.000/-0.001	1/8 (.125)	3/16 (.187)	Dia. A + .250	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
1.000 - 1.749	+0.000/-0.001	1/8 (.125)	1/4 (.250)	Dia. A + .250	+0.002/-0.000	0.275	Dia. A + .001	+0.002/-0.000
1.750 - 2.249	+0.000/-0.002	3/16 (.187)	5/16 (.312)	Dia. A + .375	+0.002/-0.000	0.343	Dia. A + .001	+0.002/-0.000
2.250 - 2.749	+0.000/-0.002	3/16 (.187)	3/8 (.375)	Dia. A + .375	+0.002/-0.000	0.413	Dia. A + .001	+0.002/-0.000
2.750 - 3.499	+0.000/-0.002	1/4 (.250)	3/8 (.375)	Dia. A + .500	+0.003/-0.000	0.413	Dia. A + .001	+0.003/-0.000
3.500 - 4.999	+0.000/-0.002	5/16 (.312)	1/2 (.500)	Dia. A + .625	+0.004/-0.000	0.550	Dia. A + .002	+0.003/-0.000
5.000 - 9.999	+0.000/-0.002	3/8 (.375)	5/8 (.625)	Dia. A + .750	+0.005/-0.000	0.688	Dia. A + .002	+0.004/-0.000
10.000 - 19.999	+0.000/-0.003	1/2 (.500)	3/4 (.750)	Dia. A + 1.000	+0.007/-0.000	0.825	Dia. A + .002	+0.005/-0.000
20.000 - 29.999	+0.000/-0.003	5/8 (.625)	1 (1.000)	Dia. A + 1.250	+0.009/-0.000	1.100	Dia. A + .002	+0.006/-0.000
30.000 - 39.999	+0.000/-0.004	3/4 (.750)	1-1/4 (1.250)	Dia. A + 1.500	+0.011/-0.000	1.375	Dia. A + .002	+0.007/-0.000
40.000 +	+0.000/-0.005	1 (1.000)	1-1/2 (1.500)	Dia. A + 2.000	+0.015/-0.000	1.650	Dia. A + .002	+0.009/-0.000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Piston Gland Dimensions – BPP Profile, Type B PolyPak®



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-17. BPP Profile – Piston Gland Calculation, Rubber and Polyurethane (90A)

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.312 - 1.499	+0.002/-0.000	1/8 (.125)	1/4 (.250)	Dia. B - .250	+0.000/-0.002	0.275	Dia. B - .001	+0.000/-0.001
1.500 - 2.999	+0.002/-0.000	3/16 (.187)	5/16 (.312)	Dia. B - .375	+0.000/-0.002	0.343	Dia. B - .001	+0.000/-0.002
3.000 - 5.999	+0.003/-0.000	1/4 (.250)	3/8 (.375)	Dia. B - .500	+0.000/-0.003	0.413	Dia. B - .001	+0.000/-0.002
6.000 - 9.999	+0.003/-0.000	5/16 (.312)	1/2 (.500)	Dia. B - .625	+0.000/-0.004	0.550	Dia. B - .002	+0.000/-0.002
10.000 - 19.999	+0.004/-0.000	3/8 (.375)	5/8 (.625)	Dia. B - .750	+0.000/-0.005	0.688	Dia. B - .002	+0.000/-0.002
20.000 - 29.999	+0.005/-0.000	1/2 (.500)	3/4 (.750)	Dia. B - 1.000	+0.000/-0.007	0.825	Dia. B - .002	+0.000/-0.003
30.000 - 39.999	+0.006/-0.000	5/8 (.625)	1 (1.000)	Dia. B - 1.250	+0.000/-0.009	1.100	Dia. B - .002	+0.000/-0.003
40.000 - 49.999	+0.007/-0.000	3/4 (.750)	1-1/4 (1.250)	Dia. B - 1.500	+0.000/-0.010	1.375	Dia. B - .002	+0.000/-0.004
50.000 +	+0.009/-0.000	1 (1.000)	1-1/2 (1.500)	Dia. B - 2.000	+0.000/-0.012	1.650	Dia. B - .002	+0.000/-0.005

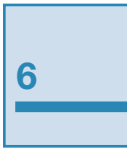


Table 6-18. BPP Profile – Piston Gland Calculation, Polymyte (60D)

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.312 - 2.749	+0.002/-0.000	1/8 (.125)	1/4 (.250)	Dia. B - .250	+0.000/-0.002	0.275	Dia. B - .001	+0.000/-0.001
2.750 - 4.499	+0.002/-0.000	3/16 (.187)	5/16 (.312)	Dia. B - .375	+0.000/-0.002	0.343	Dia. B - .001	+0.000/-0.002
4.500 - 5.999	+0.003/-0.000	1/4 (.250)	3/8 (.375)	Dia. B - .500	+0.000/-0.003	0.413	Dia. B - .001	+0.000/-0.002
6.000 - 9.999	+0.003/-0.000	5/16 (.312)	1/2 (.500)	Dia. B - .625	+0.000/-0.004	0.550	Dia. B - .002	+0.000/-0.002
10.000 - 19.999	+0.004/-0.000	3/8 (.375)	5/8 (.625)	Dia. B - .750	+0.000/-0.005	0.688	Dia. B - .002	+0.000/-0.002
20.000 - 29.999	+0.005/-0.000	1/2 (.500)	3/4 (.750)	Dia. B - 1.000	+0.000/-0.007	0.825	Dia. B - .002	+0.000/-0.003
30.000 - 39.999	+0.006/-0.000	5/8 (.625)	1 (1.000)	Dia. B - 1.250	+0.000/-0.009	1.100	Dia. B - .002	+0.000/-0.003
40.000 - 49.999	+0.007/-0.000	3/4 (.750)	1-1/4 (1.250)	Dia. B - 1.500	+0.000/-0.010	1.375	Dia. B - .002	+0.000/-0.004
50.000+	+0.009/-0.000	1 (1.000)	1-1/2 (1.500)	Dia. B - 2.000	+0.000/-0.012	1.650	Dia. B - .002	+0.000/-0.005

* If used with wear rings, refer to wear ring bore diameter, see Section 9.

Above table reflects recommended cross-sections for piston diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Symmetrical Seals

8400 & 8500 U-cup ♦ Preferred Profile

Catalog EPS 5370/USA

8400 Profile, Light Load U-cup with Beveled Lips; 8500 Profile, Light Load U-cup with Scraper Lips

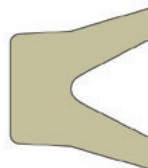


Parker's 8400 and 8500 Series u-cups are symmetrical lip seals for use in either rod or piston sealing applications. The thin, flexible lip design reacts to low pressure and provides an extremely smooth, steady movement with less break away force required because of the inherent low friction. Both the 8400 and 8500 u-cups are produced from the same molds. The 8400 style utilizes a beveled lip, ideal for wiping fluid film, while the 8500 design utilizes a straight cut scraper lip that yields additional lip interference and wipes contamination away from the sealing edge. Both u-cup profiles are available in a variety of rubber compounds to cover a wide range of applications. While the 8400 and 8500 u-cups are primarily designed for pneumatic applications, they can also be used in low to medium pressure hydraulic applications. The pressure range of the u-cups may be extended by incorporating an 8700 back-up ring.

6



8400 Cross-Section



8500 Cross-Section

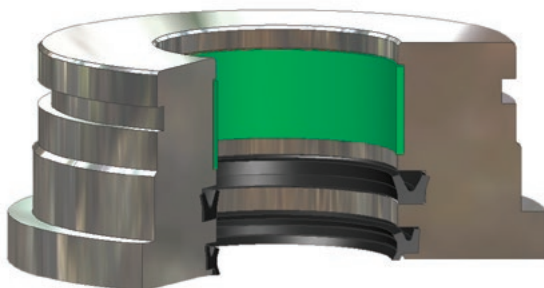
Technical Data

Parker Standard Material*	Temperature Range	Pressure Range†		Surface Speed**
		Hydr.	Pneu.	
N4180A80	-40°F to +250°F (-40°C to +121°C)	1,250 psi (86 bar)	250 psi (17 bar)	< 1.6 ft/s (0.5 m/s)
Additional Materials				
N4274A85	-10°F to +250°F (-23°C to +121°C)	1,750 psi (120 bar)	250 psi (17 bar)	< 1.6 ft/s (0.5 m/s)
V4208A90	-5°F to +400°F (-21°C to +204°C)	2,000 psi (138 bar)	250 psi (17 bar)	< 1.6 ft/s (0.5 m/s)
E4259A80	-65°F to +300°F (-54°C to +149°C)	1,250 psi (86 bar)	250 psi (17 bar)	< 1.6 ft/s (0.5 m/s)

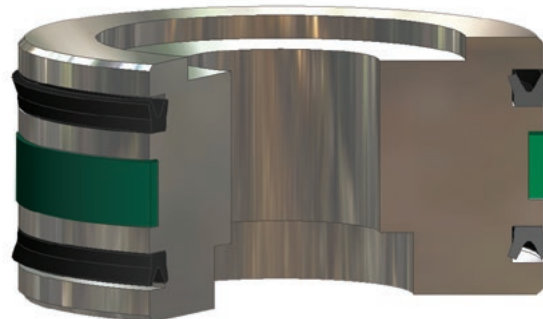
***Alternate Materials:** For applications that may require an alternate material, please contact your local Parker seal representative.

†**Pressure Range** without wear rings. If used with wear rings, see Table 2-4, page 2-5.

****Surface Speed** for pneumatic applications < 3.3 ft/s (1.0 m/s).



8400 installed in Rod Gland

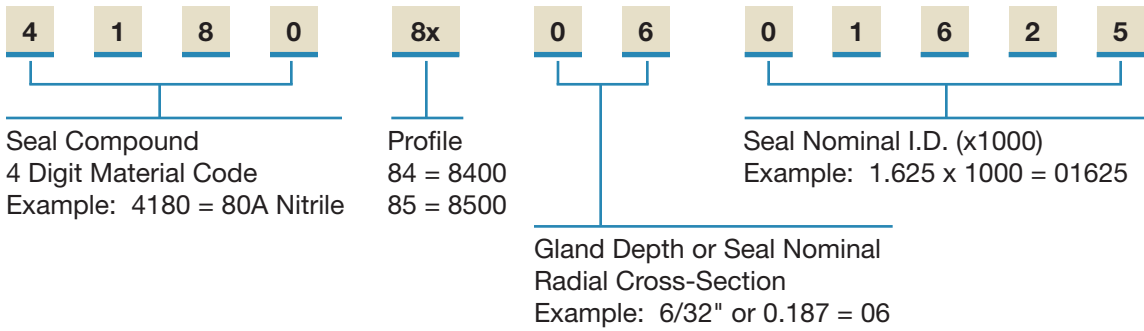


8400 installed in Piston Gland

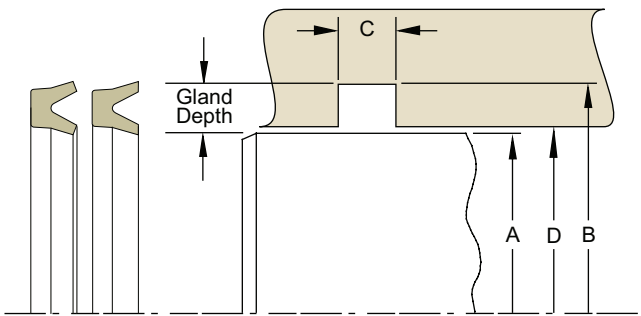
06/01/2014

Part Number Nomenclature — 8400 and 8500 Profiles

Table 6-19. 8400 and 8500 Profile



Rod Gland Calculations — 8400 and 8500 Profiles



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.



Table 6-20. 8400 and 8500 Profiles — Rod Gland Calculation

A Rod Diameter		Seal	B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Calculation	Tol.	+0.015/-.000	Calculation	Tol.
0.125 - 0.249	+0.000/-.002	02/32 (.062)	Dia. A + .125	+0.002/-.000	0.093	Dia. A + .001	+0.002/-.000
0.250 - 0.374	+0.000/-.002	03/32 (.094)	Dia. A + .187	+0.002/-.000	0.125	Dia. A + .001	+0.002/-.000
0.375 - 1.124	+0.000/-.002	04/32 (.125)	Dia. A + .250	+0.002/-.000	0.156	Dia. A + .001	+0.002/-.000
1.125 - 1.624	+0.000/-.002	05/32 (.156)	Dia. A + .312	+0.002/-.000	0.188	Dia. A + .001	+0.002/-.000
1.625 - 3.249	+0.000/-.002	06/32 (.187)	Dia. A + .375	+0.002/-.000	0.218	Dia. A + .001	+0.002/-.000
3.250 - 4.999	+0.000/-.003	08/32 (.250)	Dia. A + .500	+0.003/-.000	0.281	Dia. A + .002	+0.003/-.000
5.000 - 5.499	+0.000/-.003	09/32 (.281)	Dia. A + .562	+0.003/-.000	0.312	Dia. A + .002	+0.003/-.000
5.500 - 8.999	+0.000/-.003	10/32 (.312)	Dia. A + .625	+0.004/-.000	0.344	Dia. A + .002	+0.003/-.000
9.000 +	+0.000/-.004	12/32 (.375)	Dia. A + .750	+0.005/-.000	0.406	Dia. A + .002	+0.004/-.000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Table 6-21. 8400 and 8500 Profiles — Rod Gland Dimensions, †Parker Standard Sizes

A Rod Diameter		B Groove Diameter		C Groove Width	D Throat Diameter*		Part Number (Replace "8x" with appropriate Profile Code)
Dia	Tol.	Dia	Tol.	+0.015/-.000	Dia	Tol.	
0.125	+0.000/-.001	0.250	+0.002/-.000	0.093	0.126	+0.002/-.000	41808x0200125
0.187	+0.000/-.001	0.312	+0.002/-.000	0.093	0.188	+0.002/-.000	41808x0200187
0.250	+0.000/-.001	0.437	+0.002/-.000	0.125	0.251	+0.002/-.000	41808x0300250
0.312	+0.000/-.001	0.500	+0.002/-.000	0.125	0.313	+0.002/-.000	41808x0300312
0.375	+0.000/-.001	0.625	+0.002/-.000	0.156	0.376	+0.002/-.000	41808x0400375
0.437	+0.000/-.001	0.687	+0.002/-.000	0.156	0.438	+0.002/-.000	41808x0400437
0.500	+0.000/-.001	0.750	+0.002/-.000	0.156	0.501	+0.002/-.000	41808x0400500
0.625	+0.000/-.001	0.875	+0.002/-.000	0.156	0.626	+0.002/-.000	41808x0400625
0.750	+0.000/-.001	1.000	+0.002/-.000	0.156	0.751	+0.002/-.000	41808x0400750
0.875	+0.000/-.001	1.125	+0.002/-.000	0.156	0.876	+0.002/-.000	41808x0400875
1.000	+0.000/-.001	1.250	+0.002/-.000	0.156	1.001	+0.002/-.000	41808x0401000
1.125	+0.000/-.001	1.437	+0.002/-.000	0.188	1.126	+0.002/-.000	41808x0501125
1.250	+0.000/-.001	1.562	+0.002/-.000	0.188	1.251	+0.002/-.000	41808x0501250
1.375	+0.000/-.001	1.687	+0.002/-.000	0.188	1.376	+0.002/-.000	41808x0501375
1.500	+0.000/-.001	1.812	+0.002/-.000	0.188	1.501	+0.002/-.000	41808x0501500
1.625	+0.000/-.002	2.000	+0.002/-.000	0.218	1.626	+0.002/-.000	41808x0601625
1.750	+0.000/-.002	2.125	+0.002/-.000	0.218	1.751	+0.002/-.000	41808x0601750
1.875	+0.000/-.002	2.250	+0.002/-.000	0.218	1.876	+0.002/-.000	41808x0601875
2.000	+0.000/-.002	2.375	+0.002/-.000	0.218	2.001	+0.002/-.000	41808x0602000
2.125	+0.000/-.002	2.500	+0.002/-.000	0.218	2.126	+0.002/-.000	41808x0602125
2.250	+0.000/-.002	2.625	+0.002/-.000	0.218	2.251	+0.002/-.000	41808x0602250
2.375	+0.000/-.002	2.750	+0.002/-.000	0.218	2.376	+0.002/-.000	41808x0602375
2.500	+0.000/-.002	2.875	+0.002/-.000	0.218	2.501	+0.002/-.000	41808x0602500
2.625	+0.000/-.002	3.000	+0.002/-.000	0.218	2.626	+0.002/-.000	41808x0602625
2.750	+0.000/-.002	3.125	+0.002/-.000	0.218	2.751	+0.002/-.000	41808x0602750
3.000	+0.000/-.002	3.375	+0.002/-.000	0.218	3.001	+0.002/-.000	41808x0603000
3.250	+0.000/-.002	3.750	+0.003/-.000	0.281	3.252	+0.003/-.000	41808x0803250
3.500	+0.000/-.002	4.000	+0.003/-.000	0.281	3.502	+0.003/-.000	41808x0803500
3.750	+0.000/-.002	4.250	+0.003/-.000	0.281	3.752	+0.003/-.000	41808x0803750
4.000	+0.000/-.002	4.500	+0.003/-.000	0.281	4.002	+0.003/-.000	41808x0804000
4.250	+0.000/-.002	4.750	+0.003/-.000	0.281	4.252	+0.003/-.000	41808x0804250
4.500	+0.000/-.002	5.000	+0.003/-.000	0.281	4.502	+0.003/-.000	41808x0804500
4.750	+0.000/-.002	5.250	+0.003/-.000	0.281	4.752	+0.003/-.000	41808x0804750
5.000	+0.000/-.002	5.562	+0.003/-.000	0.312	5.002	+0.003/-.000	41808x0905000
5.500	+0.000/-.002	6.125	+0.004/-.000	0.344	5.502	+0.003/-.000	41808x1005500
6.000	+0.000/-.002	6.625	+0.004/-.000	0.344	6.002	+0.003/-.000	41808x1006000
6.500	+0.000/-.002	7.125	+0.004/-.000	0.344	6.502	+0.003/-.000	41808x1006500
7.000	+0.000/-.002	7.625	+0.004/-.000	0.344	7.002	+0.003/-.000	41808x1007000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

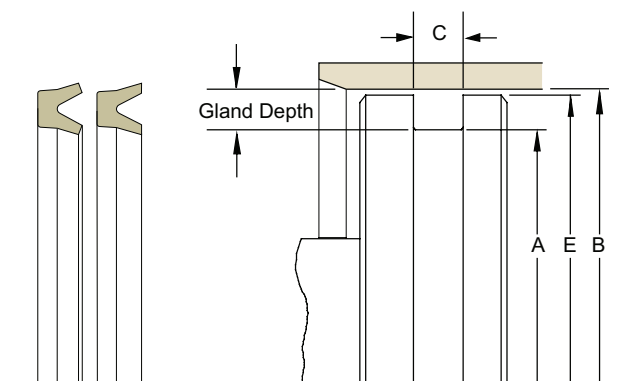
Table 6-21. 8400 and 8500 Profiles – Rod Gland Dimensions, ♦Parker Standard Sizes (cont'd)

A Rod Diameter		B Groove Diameter		C Groove Width	D Throat Diameter*		Part Number (Replace "8x" with appropriate Profile Code)
Dia	Tol.	Dia	Tol.	+0.015/-.000	Dia	Tol.	
7.500	+0.000/-.002	8.125	+0.004/-.000	0.344	7.502	+0.003/-.000	41808x1007500
8.000	+0.000/-.002	8.625	+0.004/-.000	0.344	8.002	+0.003/-.000	41808x1008000
8.500	+0.000/-.002	9.125	+0.004/-.000	0.344	8.502	+0.003/-.000	41808x1008500
9.000	+0.000/-.002	9.750	+0.005/-.000	0.406	9.002	+0.004/-.000	41808x1209000
9.500	+0.000/-.002	10.250	+0.005/-.000	0.406	9.502	+0.004/-.000	41808x1209500
10.000	+0.000/-.002	10.750	+0.005/-.000	0.406	10.002	+0.004/-.000	41808x1210000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Piston Gland Calculations – 8400 and 8500 Profiles



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

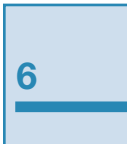


Table 6-22. 8400 and 8500 Profiles – Piston Gland Calculation

B Bore Diameter		Seal Cross Section	A Groove Diameter		C Groove Width +0.015/-.000	E Piston Diameter*	
Range	Tol.		Calculation	Tol.		Calculation	Tol.
0.250 - 0.436	+0.002/-.000	2/32 (.062)	Dia. B - .125	+0.000/-.002	0.093	Dia. B - .001	+0.000/-.001
0.437 - 0.624	+0.002/-.000	3/32 (.094)	Dia. B - .187	+0.000/-.002	0.125	Dia. B - .001	+0.000/-.001
0.625 - 1.374	+0.002/-.000	4/32 (.125)	Dia. B - .250	+0.000/-.002	0.156	Dia. B - .001	+0.000/-.001
1.375 - 1.749	+0.002/-.000	5/32 (.156)	Dia. B - .312	+0.000/-.002	0.188	Dia. B - .001	+0.000/-.001
1.750 - 2.999	+0.002/-.000	6/32 (.187)	Dia. B - .375	+0.000/-.002	0.218	Dia. B - .001	+0.000/-.002
3.000 - 3.999	+0.003/-.000	7/32 (.219)	Dia. B - .437	+0.000/-.003	0.250	Dia. B - .001	+0.000/-.002
4.000 - 5.499	+0.003/-.000	8/32 (.250)	Dia. B - .500	+0.000/-.003	0.281	Dia. B - .001	+0.000/-.002
5.500 - 6.999	+0.003/-.000	9/32 (.281)	Dia. B - .562	+0.000/-.003	0.312	Dia. B - .002	+0.000/-.002
7.000 - 9.999	+0.003/-.000	10/32 (.312)	Dia. B - .625	+0.000/-.004	0.344	Dia. B - .002	+0.000/-.002
10.000 - 11.999	+0.004/-.000	11/32 (.344)	Dia. B - .687	+0.000/-.004	0.375	Dia. B - .002	+0.000/-.002
12.000 - 13.999	+0.004/-.000	12/32 (.375)	Dia. B - .750	+0.000/-.005	0.406	Dia. B - .002	+0.000/-.002
14.000 - 17.999	+0.004/-.000	13/32 (.406)	Dia. B - .812	+0.000/-.005	0.437	Dia. B - .002	+0.000/-.002
18.000 +	+0.005/-.000	14/32 (.437)	Dia. B - .875	+0.000/-.006	0.469	Dia. B - .002	+0.000/-.002

* If used with wear rings, refer to wear ring bore diameter, see Section 9.

Above table reflects recommended cross-sections for piston diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

06/01/2014



Table 6-23. 8400 and 8500 Profiles — Piston Gland Dimensions, ♦Parker Standard Sizes

B Bore Diameter		A Groove Diameter		C Groove Width	E Piston Diameter*		Part Number (Replace "8x" with appropriate Profile Code)
Dia	Tol.	Dia	Tol.	+0.015/ -.000	Dia	Tol.	
0.250	+0.002/-.000	0.125	+0.000/-.002	0.093	0.249	+0.000/-.001	41808x0200125
0.312	+0.002/-.000	0.187	+0.000/-.002	0.093	0.311	+0.000/-.001	41808x0200187
0.375	+0.002/-.000	0.250	+0.000/-.002	0.093	0.374	+0.000/-.001	41808x0200250
0.437	+0.002/-.000	0.250	+0.000/-.002	0.125	0.436	+0.000/-.001	41808x0300250
0.500	+0.002/-.000	0.312	+0.000/-.002	0.125	0.499	+0.000/-.001	41808x0300312
0.625	+0.002/-.000	0.375	+0.000/-.002	0.156	0.624	+0.000/-.001	41808x0400375
0.750	+0.002/-.000	0.500	+0.000/-.002	0.156	0.749	+0.000/-.001	41808x0400500
0.875	+0.002/-.000	0.625	+0.000/-.002	0.156	0.874	+0.000/-.001	41808x0400625
1.000	+0.002/-.000	0.750	+0.000/-.002	0.156	0.999	+0.000/-.001	41808x0400750
1.125	+0.002/-.000	0.875	+0.000/-.002	0.156	1.124	+0.000/-.001	41808x0400875
1.250	+0.002/-.000	1.000	+0.000/-.002	0.156	1.249	+0.000/-.001	41808x0401000
1.375	+0.002/-.000	1.062	+0.000/-.002	0.188	1.374	+0.000/-.001	41808x0501062
1.500	+0.002/-.000	1.187	+0.000/-.002	0.188	1.499	+0.000/-.001	41808x0501187
1.625	+0.002/-.000	1.312	+0.000/-.002	0.188	1.624	+0.000/-.001	41808x0501312
1.750	+0.002/-.000	1.375	+0.000/-.002	0.218	1.749	+0.000/-.002	41808x0601375
1.875	+0.002/-.000	1.500	+0.000/-.002	0.218	1.874	+0.000/-.002	41808x0601500
2.000	+0.002/-.000	1.625	+0.000/-.002	0.218	1.999	+0.000/-.002	41808x0601625
2.125	+0.002/-.000	1.750	+0.000/-.002	0.218	2.124	+0.000/-.002	41808x0601750
2.250	+0.002/-.000	1.875	+0.000/-.002	0.218	2.249	+0.000/-.002	41808x0601875
2.375	+0.002/-.000	2.000	+0.000/-.002	0.218	2.374	+0.000/-.002	41808x0602000
2.500	+0.002/-.000	2.125	+0.000/-.002	0.218	2.499	+0.000/-.002	41808x0602125
2.625	+0.002/-.000	2.250	+0.000/-.002	0.218	2.624	+0.000/-.002	41808x0602250
2.750	+0.002/-.000	2.375	+0.000/-.002	0.218	2.749	+0.000/-.002	41808x0602375
2.875	+0.002/-.000	2.500	+0.000/-.002	0.218	2.874	+0.000/-.002	41808x0602500
3.000	+0.003/-.000	2.562	+0.000/-.003	0.250	2.999	+0.000/-.002	41808x0702562
3.250	+0.003/-.000	2.812	+0.000/-.003	0.250	3.249	+0.000/-.002	41808x0702812
3.500	+0.003/-.000	3.062	+0.000/-.003	0.250	3.499	+0.000/-.002	41808x0703062
3.750	+0.003/-.000	3.312	+0.000/-.003	0.250	3.749	+0.000/-.002	41808x0703312
4.000	+0.003/-.000	3.500	+0.000/-.003	0.281	3.999	+0.000/-.002	41808x0803500
4.250	+0.003/-.000	3.750	+0.000/-.003	0.281	4.249	+0.000/-.002	41808x0803750
4.500	+0.003/-.000	4.000	+0.000/-.003	0.281	4.499	+0.000/-.002	41808x0804000
4.750	+0.003/-.000	4.250	+0.000/-.003	0.281	4.749	+0.000/-.002	41808x0804250
5.000	+0.003/-.000	4.500	+0.000/-.003	0.281	4.999	+0.000/-.002	41808x0804500
5.500	+0.003/-.000	4.937	+0.000/-.003	0.312	5.498	+0.000/-.002	41808x0904937
6.000	+0.003/-.000	5.437	+0.000/-.003	0.312	5.998	+0.000/-.002	41808x0905437
6.500	+0.003/-.000	5.937	+0.000/-.003	0.312	6.498	+0.000/-.002	41808x0905937
7.000	+0.003/-.000	6.375	+0.000/-.004	0.344	6.998	+0.000/-.002	41808x1006375
8.000	+0.003/-.000	7.375	+0.000/-.004	0.344	7.998	+0.000/-.002	41808x1007375

* If used with wear rings, refer to wear ring bore diameter, see Section 9.

Above table reflects recommended cross-sections for piston diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Table 6-23. 8400 and 8500 Profiles – Piston Gland Dimensions, ♦Parker Standard Sizes (cont'd)

B Bore Diameter		A Groove Diameter		C Groove Width	E Piston Diameter*		Part Number (Replace "8x" with appropriate Profile Code)
Dia	Tol.	Dia	Tol.	+0.015/ -0.000	Dia	Tol.	
10.000	+0.004/-0.000	9.312	+0.000/-0.004	0.375	9.998	+0.000/-0.002	41808x1109312
12.000	+0.004/-0.000	11.250	+0.000/-0.005	0.406	11.998	+0.000/-0.002	41808x1211250
14.000	+0.004/-0.000	13.187	+0.000/-0.005	0.437	13.998	+0.000/-0.002	41808x1313187
16.000	+0.004/-0.000	15.187	+0.000/-0.005	0.437	15.998	+0.000/-0.002	41808x1315187
18.000	+0.005/-0.000	17.125	+0.000/-0.006	0.469	17.998	+0.000/-0.002	41808x1417125

* If used with wear rings, refer to wear ring bore diameter, see Section 9.

Above table reflects recommended cross-sections for piston diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Symmetrical Seal SL Profile

Catalog EPS 5370/USA

SL Profile, Dual Compound Dual Lip Seal

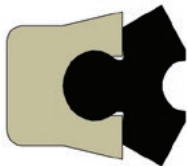


Parker's SL profile is considered a multiple lip seal. The primary sealing lip is provided by the precision knife trimmed rubber element that snaps into the Molythane® base. The base of the SL profile provides the secondary lip which is aligned directly below the primary lip to provide extrusion, and wear resistance. The SL profile combines the sealing benefit of rubber with the wear and strength of Molythane. The beveled rubber lip geometry is excellent for cutting fluid film and the squeeze forces across the lips maintain sealing contact under low pressure or vacuum. The ability of Parker to supply a variety of rubber compounds allows the SL profile to be compatible with a wide range of pressure, temperature and fluids. The SL profile is designed to work as a stand alone rod seal or can be used in tandem with a buffer seal. In piston applications, this seal will function as a unidirectional seal. Dual SL profile seals should not be installed back-to-back in bi-directional pressure applications, as a pressure trap between the seals may occur.

6

Technical Data

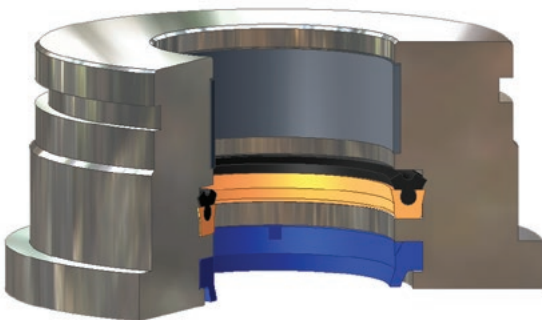
Standard Materials*	Temperature Range	Pressure Range†	Surface Speed
Rubber Element: N4180A80	-40°F to +250°F (-40°C to +121°C)		
N4182A75	-65°F to +275°F (-54°C to +135°C)		
Base: P4615A90	-65°F to +200°F (-54°C to +93°C)	5,000 psi (344 bar)	< 1.6 ft/s (0.5 m/s)



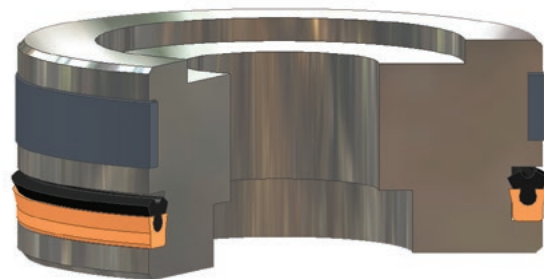
SL Cross-Section

***Alternate Materials:** For applications that may require an alternate material, please contact your local Parker seal representative.

†Pressure Range without wear rings. If used with wear rings, see Table 2-4, page 2-5.



SL installed in Rod Gland

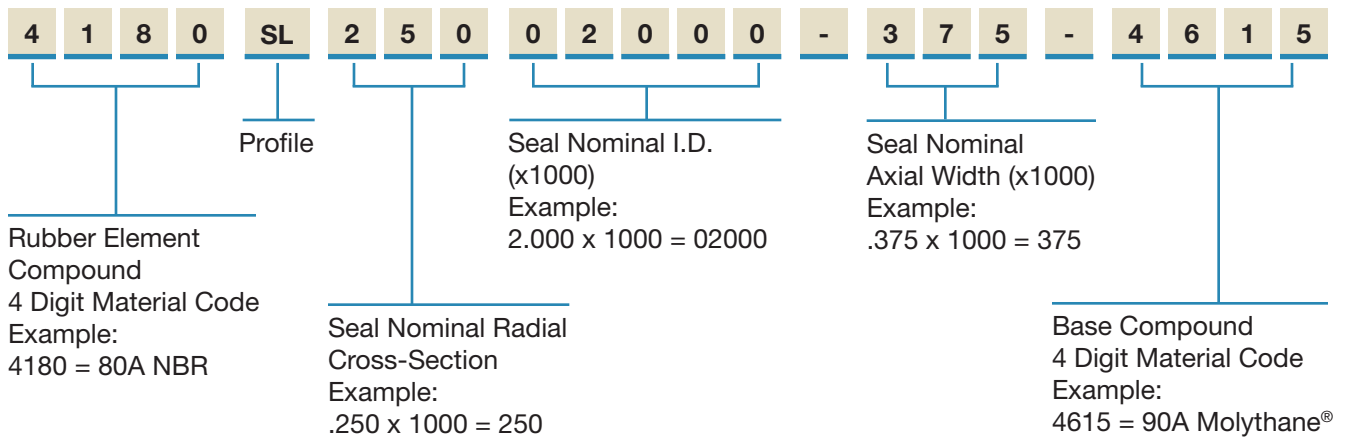


SL installed in Piston Gland

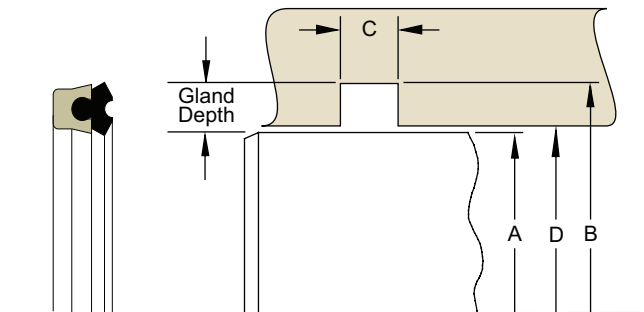
06/01/2014

Part Number Nomenclature – SL Profile

Table 6-24. SL Profile



Rod Gland Dimensions – SL Profile



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.



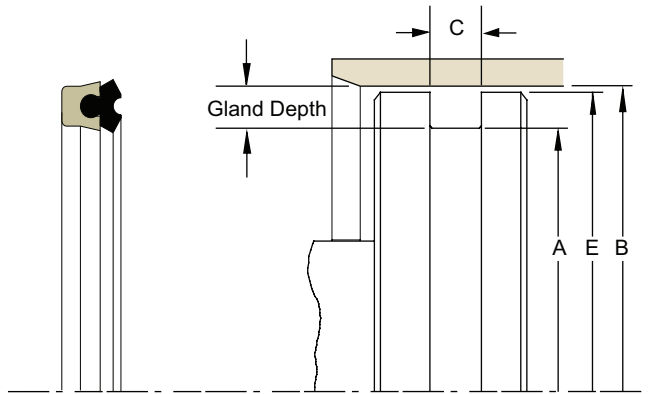
Table 6-25. SL Profile – Rod Gland Calculation

A Rod Diameter		Seal		B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/-.000	Calculation	Tol.
1.000 - 1.999	+0.000/-.002	3/16 (.187)	5/16 (.312)	Dia. A + .375	+0.002/-.000	0.343	Dia. A + .001	+0.002/-.000
2.000 - 5.999	+0.000/-.002	1/4 (.250)	3/8 (.375)	Dia. A + .500	+0.003/-.000	0.412	Dia. A + .001	+0.003/-.000
6.000 +	+0.000/-.002	3/8 (.375)	5/8 (.625)	Dia. A + .750	+0.005/-.000	0.687	Dia. A + .002	+0.004/-.000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Piston Gland Dimensions – SL Profile



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-26. SL Profile – Piston Gland Calculation

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/-0.000	Calculation	Tol.
1.500 - 2.499	+0.002/-0.000	3/16 (.187)	5/16 (.312)	Dia. A - .375	+0.000/-0.002	0.343	Dia. A - .001	+0.000/-0.002
2.500 - 7.499	+0.003/-0.000	1/4 (.250)	3/8 (.375)	Dia. A - .500	+0.000/-0.003	0.412	Dia. A - .001	+0.000/-0.002
7.500 +	+0.004/-0.000	3/8 (.375)	5/8 (.625)	Dia. A - .750	+0.000/-0.005	0.687	Dia. A - .002	+0.000/-0.002

* If used with wear rings, refer to wear ring bore diameter, see Section 9.

Above table reflects recommended cross-sections for piston diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Symmetrical Seal US Profile

Catalog EPS 5370/USA

US Profile, Symmetrical U-cup Seal

The Parker US profile is a symmetrical, beveled lip u-cup designed for use in hydraulic cylinder applications. The symmetrical shape allows interchangeability between rod and piston applications. A precision knife trimming process is utilized to create the beveled sealing lips. This ensures that the inside and outside diameter sealing edges provide excellent fluid wiping action. The US profile is a single acting seal. Two seals can be installed back to back, in separate grooves, to seal dual acting pistons without pressure trapping fluid between the seals. The US profile is an economical choice, available in Parker's wear resistant and extrusion resistant Molythane® compound.



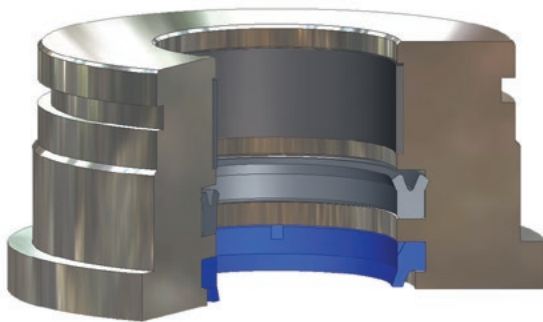
US Cross-Section

Technical Data

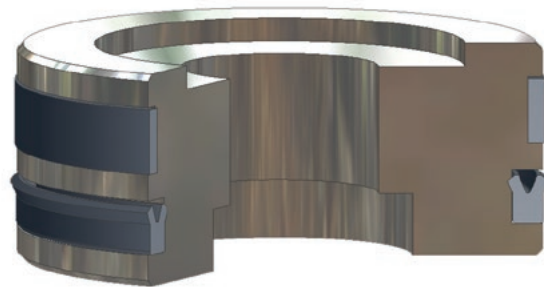
Standard Materials*	Temperature Range	Pressure Range†	Surface Speed
P4615A90	-65°F to +200°F (-54°C to +93°C)	5,000 psi (344 bar)	< 1.6 ft/s (0.5 m/s)

***Alternate Materials:** For applications that may require an alternate material, please contact your local Parker seal representative.

†**Pressure Range** without wear rings. If used with wear rings, see Table 2-4, page 2-5.



US installed in Rod Gland

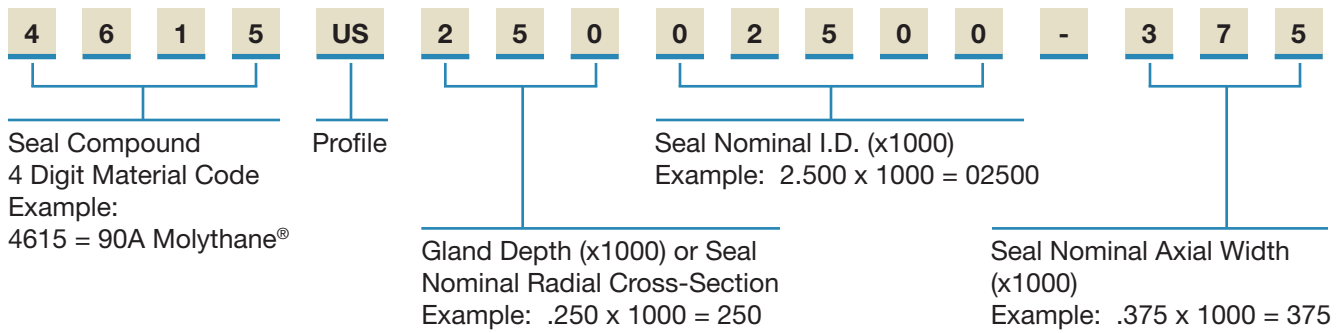


US installed in Piston Gland

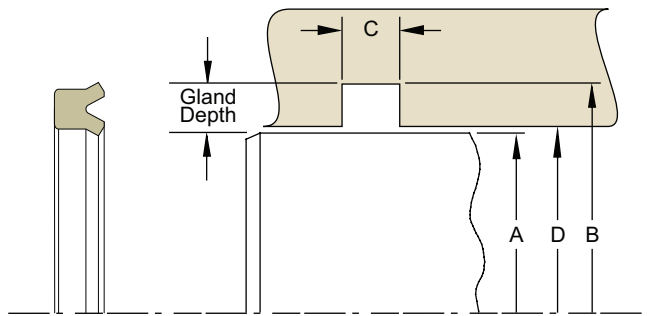
US Profile

Part Number Nomenclature – US Profile

Table 6-27. US Profile



Rod Gland Dimensions – US Profile



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

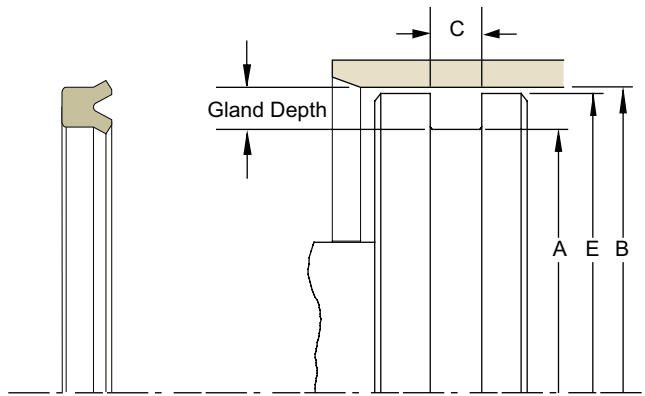
Table 6-28. US Profile – Rod Gland Calculation

A Rod Diameter		Seal		B Groove Diameter		C Groove Width	D Throat Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.062 - 0.624	+0.000/-0.001	1/8 (.125)	3/16 (.187)	Dia. A + .250	+0.002/-0.000	0.206	Dia. A + .001	+0.002/-0.000
0.625 - 0.999	+0.000/-0.001	1/8 (.125)	1/4 (.250)	Dia. A + .250	+0.002/-0.000	0.275	Dia. A + .001	+0.002/-0.000
1.000 - 1.499	+0.000/-0.002	3/16 (.187)	5/16 (.312)	Dia. A + .375	+0.002/-0.000	0.343	Dia. A + .001	+0.002/-0.000
1.500 - 1.999	+0.000/-0.002	3/16 (.187)	3/8 (.375)	Dia. A + .375	+0.002/-0.000	0.413	Dia. A + .001	+0.002/-0.000
2.000 - 3.499	+0.000/-0.002	1/4 (.250)	3/8 (.375)	Dia. A + .500	+0.003/-0.000	0.413	Dia. A + .001	+0.003/-0.000
3.500 - 4.999	+0.000/-0.002	5/16 (.312)	1/2 (.500)	Dia. A + .625	+0.004/-0.000	0.550	Dia. A + .002	+0.003/-0.000
5.000 +	+0.000/-0.002	3/8 (.375)	5/8 (.625)	Dia. A + .750	+0.005/-0.000	0.688	Dia. A + .002	+0.004/-0.000

* If used with wear rings, refer to wear ring throat diameter, see Section 9.

Above table reflects recommended cross-sections for Rod diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Piston Gland Dimensions – US Profile



Please refer to Engineering Section 2, page 2-8 for surface finish and additional hardware considerations.

Table 6-29. US Profile – Piston Gland Calculation

B Bore Diameter		Seal		A Groove Diameter		C Groove Width	E Piston Diameter*	
Range	Tol.	Cross Section	Axial Width	Calculation	Tol.	+0.015/ -.000	Calculation	Tol.
0.312 - 1.499	+0.002/-.000	1/8 (.125)	1/8 (.125)	Dia. B - .250	+0.000/-.002	0.138	Dia. B - .001	+0.000/-.001
1.500 - 2.999	+0.002/-.000	3/16 (.187)	3/16 (.187)	Dia. B - .375	+0.000/-.002	0.206	Dia. B - .001	+0.000/-.002
3.000 - 5.999	+0.003/-.000	1/4 (.250)	1/4 (.250)	Dia. B - .500	+0.000/-.003	0.275	Dia. B - .001	+0.000/-.002
6.000 - 9.999	+0.003/-.000	5/16 (.312)	5/16 (.312)	Dia. B - .625	+0.000/-.004	0.343	Dia. B - .002	+0.000/-.002
10.000 +	+0.004/-.000	3/8 (.375)	3/8 (.375)	Dia. B - .750	+0.000/-.005	0.413	Dia. B - .002	+0.000/-.002

* If used with wear rings, refer to wear ring bore diameter, see Section 9.

Above table reflects recommended cross-sections for piston diameters shown. Alternate cross-sections and additional sizes may be considered. Consult www.parker.com/eps/FluidPower for additional cross-sections and sizes, hardware specifications, and part number availability. Contact your Parker representative for assistance.

Symmetrical Seal AN6226 Profile

Catalog EPS 5370/USA

AN6226 Profile, Industrial, Standard, Light Load Rubber U-cup



Parker's AN6226 Style u-cup has a square format where the nominal cross section is equal to the height. Although widely used in the fluid power industry for low friction pneumatics, this profile was originally designed for early aircraft and ordnance service. Many units still use this type u-cup. The AN6226 profile is available in the most popular sizes per Army/Navy (AN) specifications and is made of a standard 70 Shore A nitrile compound.

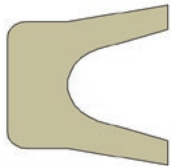
Technical Data

Standard Material*	Temperature Range	Pressure Range†		Surface Speed**
		Hydr.	Pneu.	
N4295A70	-40°F to +250°F (-40°C to +121°C)	800 psi (55 bar)	250 psi (17 bar)	< 1.6 ft/s (0.5 m/s)

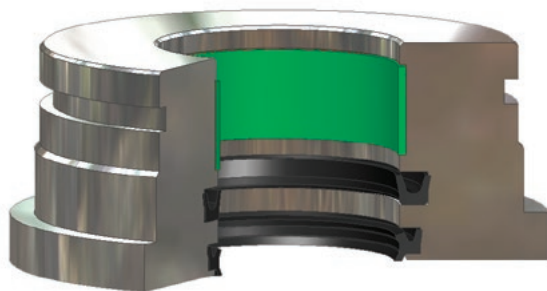
***Alternate Materials:** For applications that may require an alternate material, please contact your local Parker seal representative.

†**Pressure Range** without wear rings. If used with wear rings, see Table 2-4, page 2-5.

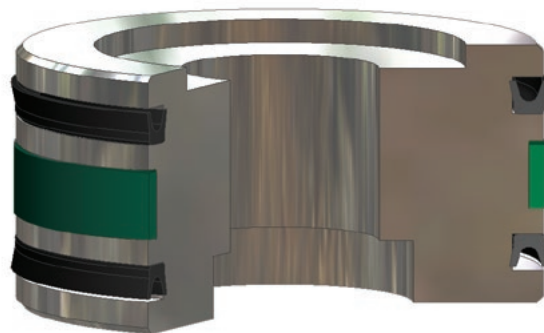
****Surface Speed** for pneumatic applications < 3.3 ft/s (1.0 m/s).



AN6226 Cross-Section



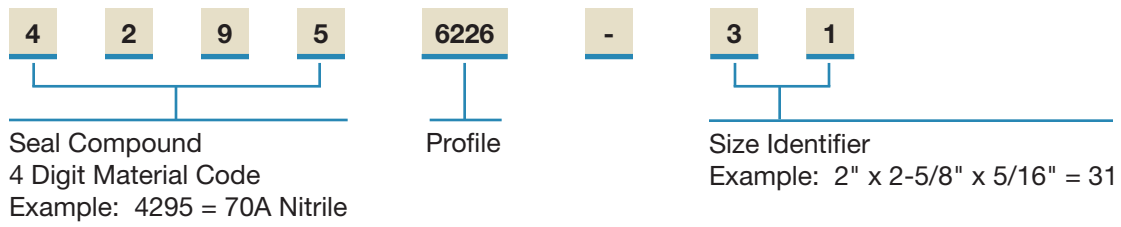
AN6226 installed in Rod Gland



AN6226 installed in Piston Gland

Part Number Nomenclature – AN6226 Profile

Table 6-30. AN6226 Profile



Gland Dimensions – AN6226 Profile – See Appendix D

Design Action Request Form

NEED HELP? If you need assistance, please photocopy these pages. Fill out the required information and fax to 801 973 4019. Submit a sketch if necessary. Use the information below and other information in this catalog to determine the dimensions needed. We will contact you to discuss your specific application and make recommendations. If you need help filling out this form, please call Parker's Applications Engineering team at 801 972 3000.

ENGINEERED POLYMER SYSTEMS DIVISION DESIGN ACTION REQUEST

EPS Division

2220 South 3600 West
Salt Lake City, UT
Tel: (801) 972-3000
Fax: (801) 973-4019

Applications Engineering Use:

Project # _____
Date Entered _____
Date Required _____
Prepared by _____
Territory Mgr. _____
Distributor _____
Dist. Sales _____

Referred by _____
Lead # _____

COMPANY: _____ FAX NUMBER: _____
ADDRESS: _____ P.O. BOX: _____ MAIL STOP: _____
CITY: _____ STATE: _____ ZIP: _____ COUNTRY: _____
CONTACT: _____ TITLE: _____ PHONE: _____ EXT: _____
ALT. CONTACT: _____ TITLE: _____ PHONE: _____ EXT: _____
E-MAIL: _____

EQUIPMENT/MANUFACTURER: _____ MODEL NO.: _____
EXISTING SEAL MANUFACTURER: _____ PART NO.: _____
REASON FOR CHANGE: PERFORMANCE DELIVERY NEW APPLICATION PRICE
CURRENT PRICE: _____ @ _____ PCS. MONTHLY USAGE: _____ HOURS OPERATION: _____ HOURS SERV. LIFE: _____
TARGET PRICE: _____ @ _____ PCS. QUOTE QTY.: _____ PROTO QTY.: _____ DATE PROTO REQ'D.: _____
SPECIAL INSPECTION REQUIREMENTS: YES NO SPECIAL PACKAGING REQUIREMENTS: YES NO
EXPLAIN: _____

MOTION

STATIC RECIPROCATING OSCILLATORY ROTARY

PRODUCT TYPE

NON-ROTARY — FILL OUT SECOND PAGE

ROD/SHAFT WIPER
 PISTON BEARING
 INTERNAL FACE VANE
 EXTERNAL FACE NON-SEAL

ROTARY — FILL OUT THIRD PAGE

SOLID SEAL PTFE LIP SEAL
 SPLIT SEAL ELASTOMER LIP SEAL
 BEARING ISOLATOR



Design Action Request Form

A

OPERATING PARAMETERS

TEMPERATURE: _____
 PRESSURE: _____
 STROKE LENGTH (RECIPROCATING): _____
 CYCLE RATE: _____
 DEGREE OF ARC (OSCILLATING): _____
 VELOCITY: _____
 VACUUM: _____
 ROTARY SPEED _____
 MEDIA TO BE SEALED: _____

UNIT (CIRCLE ONE)

°K °F °C
 PSI BAR MPA
 INCH MM
 CYCLES/MIN CYCLES/HR HZ
 DEGREES
 FT/MIN. MM/MIN.
 IN HG TORR
 RPM

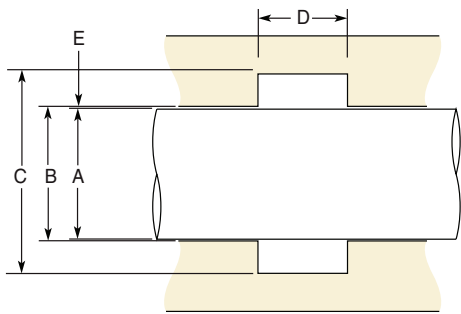
MINIMUM

OPERATING

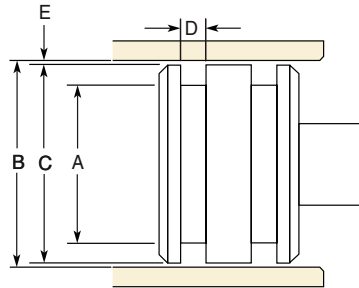
MAXIMUM

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

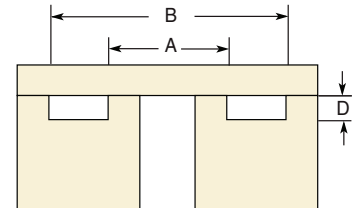
Rod



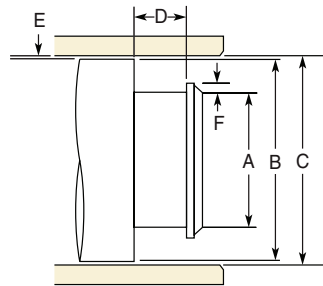
Piston



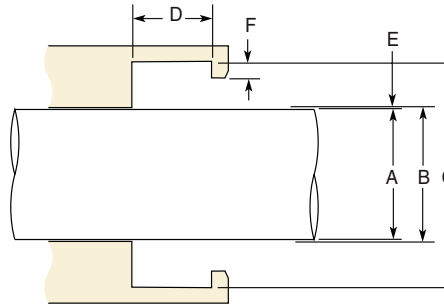
Face Seal



Other Piston



Other Rod



HARDWARE SPECIFICATIONS

A DIAMETER: MIN. _____ MAX. _____
 B DIAMETER: MIN. _____ MAX. _____
 C DIAMETER: MIN. _____ MAX. _____
 D GROOVE WIDTH: MIN. _____ MAX. _____
 E RADIAL CLEARANCE: MIN. _____ MAX. _____
 F ROD / PISTON STEP HEIGHT: MIN. _____ MAX. _____
 SIDE LOAD (LBS. NEWTONS): _____
 MIL-G-5514 O-RING DASH #: _____ BACK-UP WIDTH _____
 AS4716 O-RING DASH #: _____ BACK-UP WIDTH _____
 RUNOUT (TIR) _____
 ECCENTRICITY _____

HARDWARE DRAWINGS INCLUDED WITH DAR: YES NO

HARDNESS _____ FINISH _____ MAT'L _____
 HARDNESS _____ FINISH _____ MAT'L _____
 HARDNESS _____ FINISH _____ MAT'L _____
 CAN HARDWARE BE CHANGED? YES NO
 HOW? _____

PERFORMANCE REQUIREMENTS (CIRCLE ONE)

FRICITION: LBS OZ GMS BREAKOUT _____ DYNAMIC _____
 EXPECTED LIFE: CYC HRS YRS _____
 MAX. LEAKAGE: DROPS CC/MIN _____
 MOST CRITICAL ASPECT: _____
 CONTAMINATION: _____

GLAND TYPE

___ SPLIT ___ OPEN

METRIC

YES

Worldwide Fluid Power Sealing

North America

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Salt Lake City, Utah

phone 801 972 3000

fax 801 973 4019

Asia Pacific

China

**Parker Hannifin Motion &
Control (Shanghai) Co., Ltd.**

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fax 49 7142 351293

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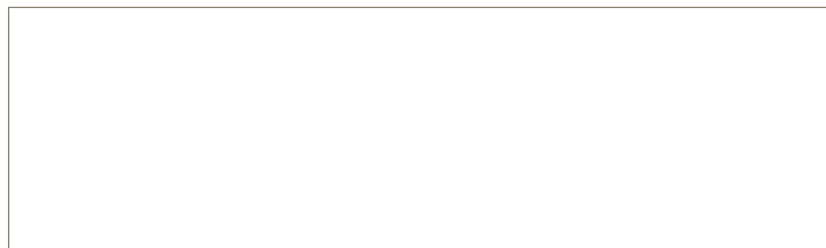
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