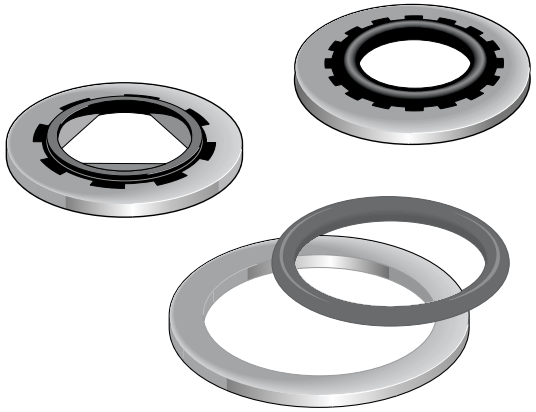
Introduction



Most fluid systems have fasteners that must be sealed. Parker's fastener seal designs found in the Stat-O-Seals® and ThredSeals® feature an elastomeric sealing element molded in place within a metal retainer (washer). Although resembling a simple o-ring groove concept, the mold in place fastener seal offers numerous advantages. Ideal for sealing small and miniature sizes, the Parker Lock-O-Seal® is a two-piece combination seal comprising a separately molded o-ring fitted within a surrounding metal washer. Other speciality fastener seals are also available.

Stat-O-Seals

- Intended to seal the shank of a bolt immediately under the head
- 600 Series: Intended for sealing standard series fasteners
- NAS1523 Series: Applications that require conformance to NAS1523
- 610 Series: Intended for sealing metric fasteners from 5mm to 22mm

ThredSeals

- Intended for sealing directly on the fastener threads
- 750 Series: Intended for sealing most UNC and UNF threads

Lock-O-Seals

- 800 Series: Intended to seal the shank of a bolt immediately under the head
- Ideal for sealing small and miniature sizes
- Special material combinations not available as a 600 Series Stat-O-Seal

Specialty Products

- Fastener seal kits
- 250 Lock-O-Seals for sealing straight tube fittings and banjo style fittings
- Food, beverage and FDA related applications
- Custom designed fastener and fitting seals

Parker Hannifin Corporation
Composite Sealing Systems Division
San Diego, CA

How to Use This Guide

Building a Part Number

This guide includes an intelligent part numbering system which allows users to build their own part number from a wide selection of available elastomers, retainer materials, and part sizes. Each material option and size is color coded to guide the user towards the most economical and readily available part number selections.

= Standard: General Application

Whenever possible materials and sizes represented in white should be selected. These material combinations and sizes are the most economical and readily available, and will work for most general industrial applications.

= Non-Standard

If there are specific application requirements such as sealing aggressive fluids, extreme temperatures, or certification requirements that are outside the recommended usage parameters for "white" coded materials, those that are color coded yellow should be evaluated next. Some part numbers built from "yellow" coded materials may have price premiums and/or slightly longer lead times due to raw material cost, manufacturability and economies of scale.

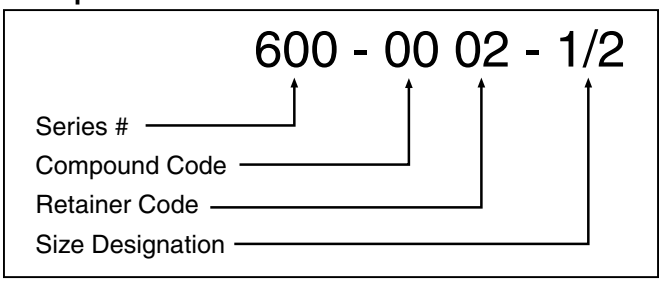
= Special: Consult Factory Prior to Ordering

When none of the "white" and/or "yellow" coded material or size combinations meet your application requirements the options that are color coded "gray" should then be considered. Consult the Parker CSS Division prior to ordering part numbers which consist of "gray" coded material or size options. Special minimums, production preparation charges, and/or extended lead times may apply. Some material and size combinations are not feasible to manufacture and are thus not available.

NAS1523 Series

Material color codes do not apply to NAS1523 Series. Material selections are governed by NAS specifications.

Example Part Number

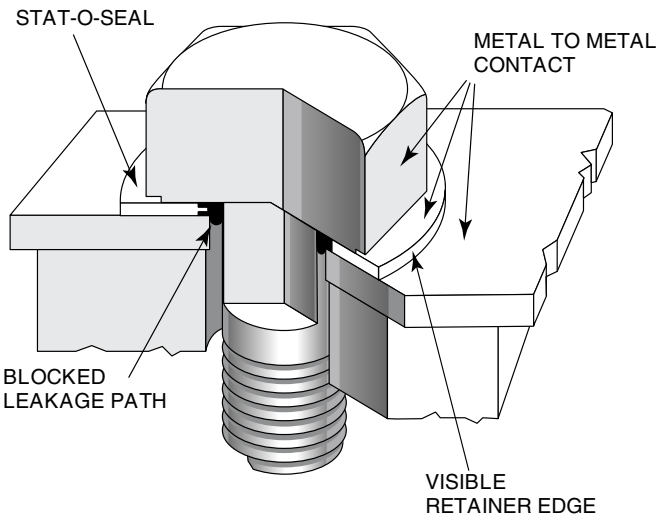


Stat-O-Seal

How the Stat-O-Seal Works

The Stat-O-Seal is designed with a pre-calculated interference factor built into the teardrop shaped elastomeric seal. The cross section free height of the rubber is greater than the metal retainer, providing the proper compression without squeezing the seal beyond its elastic limit.

As the fastener is installed into the mating hardware, the Stat-O-Seal is compressed down to the retainer thickness. The retainer provides a positive alternate load path for fastener torque and forms a protective gland area for the confinement of the seal in a controlled state. Since the elastomer seal cannot move outward, the mass of the seal is forced inward against the shank of the fastener and against the mating surfaces, creating a positive seal. This principle is known as **controlled confinement sealing.** The diameter of the fastener head should always exceed that of the maximum "E diameter" (see dimensional sketch on page 5) in order to preserve this principle.



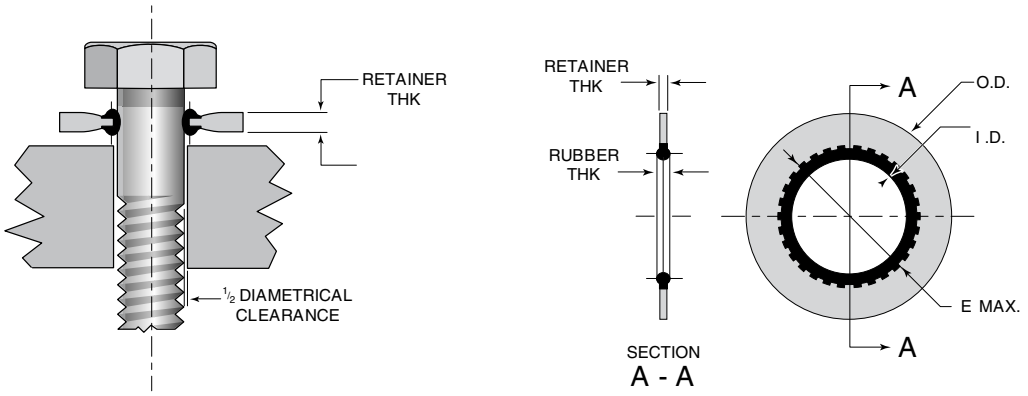
Stat-O-Seal Features

Parker Stat-O-Seals are one-piece, molded-in-place seals with the rubber sealing element mechanically and/or chemically bonded to the metal retainer. Parker's "Splined and Coined" mechanically bonding feature is used on many 600, NAS1523 and 610 series sizes. This feature ensures a positive attachment of the rubber to the retainer, eliminating missing or loose seal elements associated with bonded seals. Stat-O-Seals are designed to seal beneath the head of the fastener as shown for both internal and external pressure and vacuum systems.

Stat-O-Seals offer users long and reliable service, a high degree of reusability and easy assembly. The Stat-O-Seal's unique features provide many advantages and benefits as shown below:

- No machined O-ring grooves are required in the mating flange
- Precisely controlled optimum percent squeeze eliminates over compression
- The retainer edge is visible after installation allowing for easy visual inspection and reducing failures caused by missing seals
- The ridged self centering design provides easy and accurate placement of the seal
- The solid metal to metal contact improves joint stability and eliminates re-torquing
- Long reliable service and a high level of reusability
- Rubber/bolt interference provides for easy assembly

600 Series Stat-O-Seal – Designed for Standard Series Fasteners



600 Series Stat-O-Seal Dimensions							
Fastener Size (Ref.)	**Thread Major Diameter (Ref.)**	**I.D. ± .010**	**E Diameter* Max.**	**O.D. ± .010**	**Retainer Thickness**	**Rubber Thickness**	**Diametrical Clearance** (Ref.)**
#6	0.138	.130	.229	.385	.040 ±.004	.050 ±.003	1/64 Max.
#8	.164	.156	.255	.385	.040 ±.004	.050 ±.003	1/64 Max.
#10	.190	.180	.317	.443	.050 ±.005	.072 ±.005	1/64 Max.
#10 O/S	.190	.186	.365	.468			1/64 to 1/32
1/4	.250	.240	.381	.505			1/64 Max.
1/4 OS	.250	.245	.422	.531			1/64 to 1/32
5/16	.312	.301	.488	.603			
3/8	.375	.364	.546	.666			
7/16	.438	.427	.618	.760			
1/2	.500	.490	.696	.880			
9/16	.562	.552	.759	1.067			
5/8	.625	.615	.818	1.193			
11/16	.688	.674	.898	1.260	.050 ±.005	.072 ±.005	
3/4	.750	.740	.982	1.322	.064 ±.005	.096 ±.005	
13/16	.812	.798	1.048	1.416			
7/8	.875	.864	1.105	1.510			
15/16	.938	.921	1.172	1.635			
1	1.000	.988	1.234	1.760			
1 1/16	1.063	1.050	1.290	1.822			
1 1/8	1.125	1.106	1.351	1.885			
1 3/16	1.188	1.167	1.442	1.947			
1 1/4	1.250	1.229	1.474	2.010			
1 5/16	1.313	1.290	1.567	2.072			
1 3/8	1.375	1.352	1.631	2.135			
1 7/16	1.438	1.413	1.693	2.197	.064 ±.005	.096 ±.005	
1 1/2	1.500	1.475	1.817	2.260	.091 ±.005	.133 ±.005	
1 5/8	1.625	1.600	1.942	2.385			
1 3/4	1.750	1.725	2.067	2.510			
1 7/8	1.875	1.850	2.192	2.635			
2	2.000	1.975	2.317	2.760	.091 ±.005	.133 ±.005	
3	3.000	2.975	3.430	5.500	.120 ±.005	.175 ±.005	1/64 to 1/32

Notes:

* The fastener head diameter must be greater than the "E" diameter. A cover washer is recommended when the fastener head is near or below the "E" diameter.

** A chamfer with an outside diameter equal to that of the recommended diametrical clearance may be used.

Parker Hannifin Corporation
Composite Sealing Systems Division
San Diego, CA

600-XX XX - X

Code	Seal Compound	Specification	Recommended Uses	Recommended Operating Temp.
00	Commercial Standard Nitrile	None General Purpose	General industrial environments, petroleum fluids and cold/room temperature water	-30°F to +225°F
01	N406-60 Nitrile	SAE AMS-R-6855, CL 1 or 2, Grade 60 (*1)	General industrial environments, petroleum fluids and cold/room temperature water	-40°F to +225°F
04	47-071 Nitrile	SAE AMS-R-7362, TYPE 1or 2 Grade 60 (*1)	MIL-PRF-7808 Synthetic engine oil	-60°F to +180°F
06	S604-70 Silicone	SAE AMS 3304	Air, weathering and gases	-65°F to +400°F
07	C408-70 Neoprene	ASTM D2000 M3BC710 A14 B4 E034 F17 Z1	Refrigerant, Silicate ester fluids, weathering.	-35°F to +250°F
31	V720-75 Fluorocarbon	SAE AMS 7276	Air, petroleum fluids, hydrocarbons, silicone fluids, many acids, and vacuum applications	-20°F to +400°F
50	E1267-80 Ethylene Propylene	NAS 1613	Water, steam, ozone and weather resistant, automotive brake fluid, Skydrol, phosphate esters	-70°F to +250°F
60	L1830-60 Fluorosilicone	SAE AMS-R-25988, Type I, Class 1, Grade 60	Petroleum fluids, silicone fluids, silicate esters	-85°F to +350°F
63	S355-75 Silicone	SAE AMS 7267	FDA conforming compound: Air, weathering and gases.	-60°F to +400°F
83	E515-80 Ethylene Propylene	Commercial	Water, steam, ozone and weather resistant, automotive brake fluid, Skydrol, phosphate esters	-65°F to +250°F
02	N304-75 Nitrile	SAE AMS-P-25732	Jet fuel, low temperature applications, petroleum fluids and cold/room temperature water	-65°F to +225°F
05	N602-70 Nitrile	SAE AMS-P-5315	General industrial environments, petroleum fluids and cold/room temperature water	-70°F to +180°F
82	B318-70 Butyl	SAE AMS 3238	Skydrol and other phosphate esters, water, steam and air	-65°F to +212°F
81	E529-60 Ethylene Propylene	Commercial	Water, steam, ozone and weather resistant, automotive brake fluid, Skydrol, phosphate esters	-65°F to +250°F

600-XX XX - X

Code	Retainer Material	Finish
02	Low-Carbon Steel, ASTM A 109/A 109M	Zinc Plated, Commercial Grade
00	Low-Carbon Steel, Commercial Grade	Cadmium Plated, Commercial Grade
01	Low-Carbon Steel, ASTM A 109/A 109M	Cadmium Plated Per SAE AMS-QQ-P-416
15	7075-T6 Aluminum SAE AMS-QQ-A-250/12	Anodize Per MIL-A-8625, Type II, Class I
30	302/304 Stainless Steel, SAE AMS 5513	Passivate Per SAE AMS-QQ-P-35
42	4130 Chrome Molybdenum Steel, SAE-AMS 6350, Heat Treated to 125,000 psi min tensile strength	Cadmium Plated Per SAE AMS-QQ-P-416 Type II, Dyed Black, Class 2
43	4130 Chrome Molybdenum Steel, SAE-AMS 6350, Heat Treated to 125,000 psi min tensile strength	Zinc Plated Per ASTM B 633 Type II, Dyed Black

Size (dash number)
6
8
10
10 O/S
1/4
1/4 OS
5/16
3/8
7/16
1/2
9/16
5/8
3/4
7/8
1
11/16
13/16
15/16
1 1/16
1 1/8
1 3/16
1 1/4
1 5/16
1 3/8
1 7/16
1 1/2
1 5/8
1 3/4
1 7/8
2
3

= Standard: General application

= Non-Standard

= Special: Consult factory prior to ordering

Notes:

*1: Compound meets both the Class 1 and Class 2 requirements. Certs will be issued to Class 1 unless Class 2 is specifically requested.

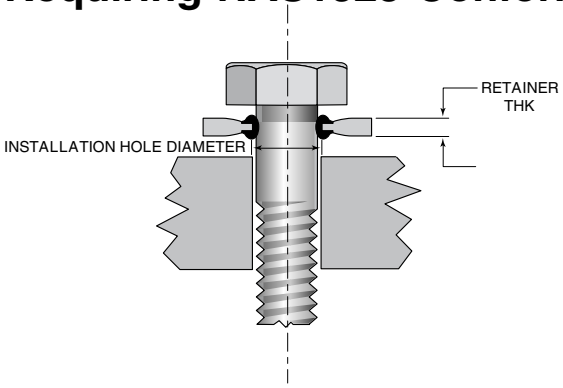
2: For more detailed compound information, see the Parker O-Ring Handbook (ORD 5700).

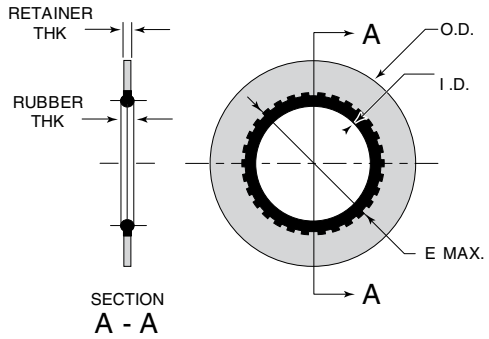
Example Part Number:

600-0002-1/2 = Commercial Standard Nitrile, Steel-Zinc Plated, Size 1/2

Parker Hannifin Corporation
Composite Sealing Systems Division
San Diego, CA

NAS1523 Series Stat-O-Seal – Designed for Applications Requiring NAS1523 Conformance





NAS1523 Stat-O-Seal Dimensions							
NAS Dash Number	Fastener Size (Ref.)	I.D. ± .010	E Diameter Max.	O.D. + .020 / - .005	Retainer Thickness	Rubber Thickness	Installation Hole Dia. (Ref.)
-06	#6	.130	.229	0.375	.040 ±.004	.050 ±.003	.137/.154
-08	#8	.156	.255	0.375	.040 ±.004	.050 ±.003	.165/.180
-3	#10	.180	.317	0.438	.050 ±.005	.072 ±.005	.191/.205
-4	1/4	.240	.445	0.500			.251/.265
-5	5/16	.301	.508	0.593			.327/.344
-6	3/8	.364	.571	0.656			.390/.405
-7	7/16	.427	.634	0.750			.453/.468
-8	1/2	.490	.696	0.875			.515/.531
-9	9/16	.552	.759	1.062			.577/.594
-10	5/8	.615	.818	1.188			.640/.656
-11	11/16	.674	.924	1.250	.050 ±.005	.072 ±.005	.703/.718
-12	3/4	.740	.982	1.312	.064 ±.005	.096 ±.005	.765/.781
-13	13/16	.798	1.048	1.406			.827/.843
-14	7/8	.864	1.105	1.500			.890/.906
-15	15/16	.921	1.172	1.625			.953/.968
-16	1	.988	1.234	1.750			1.015/1.032
-17	1 1/16	1.050	1.290	1.812			1.077/1.093
-18	1 1/8	1.106	1.351	1.875			1.140/1.156
-19	1 3/16	1.167	1.413	1.937			1.203/1.218
-20	1 1/4	1.229	1.474	2.000			1.265/1.281
-21	1 5/16	1.290	1.536	2.062			1.328/1.344
-22	1 3/8	1.352	1.597	2.125			1.390/1.406
-23	1 7/16	1.413	1.641	2.187	.064 ±.005	.096 ±.005	1.452/1.468
-24	1 1/2	1.475	1.820	2.250	.091 ±.005	.133 ±.005	1.515/1.531
-26	1 5/8	1.600	1.945	2.375			1.640/1.656
-28	1 3/4	1.725	2.070	2.500			1.765/1.781
-30	1 7/8	1.850	2.195	2.625			1.890/1.906
-32	2	1.975	2.320	2.750	.091 ±.005	.133 ±.005	2.015/2.031

NAS1523 XX XX X

Code	Retainer Material	Finish
AA	7075-T6 Aluminum SAE-AMS-QQ-A-250/12 (*1)	Anodize Per MIL-A-8625, Type II, Class I
C	302/304 Stainless Steel, SAE AMS 5513	Passivate Per SAE AMS-QQ-P-35
—	4130 Chrome Molybdenum Steel, SAE AMS 6350, Heat Treated to Rockwell C26 to C33	Cadmium Plated Per SAE AMS-QQ-P-416 Type II, Class 2, Dyed Black

Code	Size (dash number)
06	6
08	8
3	10
4	1/4
5	5/16
6	3/8
7	7/16
8	1/2
9	9/16
10	5/8
11	11/16
12	3/4
13	1 3/16
14	7/8
15	1 5/16
16	1
17	1 1/16
18	1 1/8
19	1 3/16
20	11/4
21	1 5/16
22	1 3/8
23	1 7/16
24	1 1/2
26	1 5/8
28	1 3/4
30	1 7/8
32	2

Code	Seal Compound	Specification	Recommended Uses	Recommended Operating Temp.	Color Code
B	N406-60 Nitrile	SAE AMS-R-6855, CL 1, Grade 60	General industrial environments, petroleum fluids and cold/room temperature water	-40°F to +225°F	Black
E	V720-75 Fluorocarbon	SAE AMS 7276	Air, pertoleum fluids, hydrocarbons, silicone fluids, many acids, and vaccum applications	-20°F to +400°F	Gray
F	N406-60 Nitrile	SAE AMS-R-6855, CL 1, Grade 60	General industrial environments, petroleum fluids and cold/room temperature water	-40°F to +225°F	None
H	S355-75 Silicone	SAE AMS 7267	Air, weathering and gases. FDA conforming.	-60°F to +400°F	Brown
N	B318-70 Butyl	SAE AMS 3238	Skydrol and other phosphate esters, water, steam and air	-65°F to +212°F	Green
P	E1267-80 Ethylene Propylene	NAS 1613	Water, steam, ozone and weather resistant, automotive brake fluid, Skydrol, phoshate esters	-70°F to +250°F	Purple
R	L1830-60 Fluorosilicone	SAE AMS-R-25988, Type I, Class 1, Grade 60	Petroleum fluids, silicone fluids, silicate esters	-85°F to +350°F	Red
W	S604-70 Silicone	SAE AMS 3304	Air, weathering and gases	-65°F to +400°F	White
Y	47-071 Nitrile	SAE AMS-R-7362, Type 1, Grade 60	MIL-L-7808 Synthetic engine oil	-60°F to +180°F	Yellow

Notes:

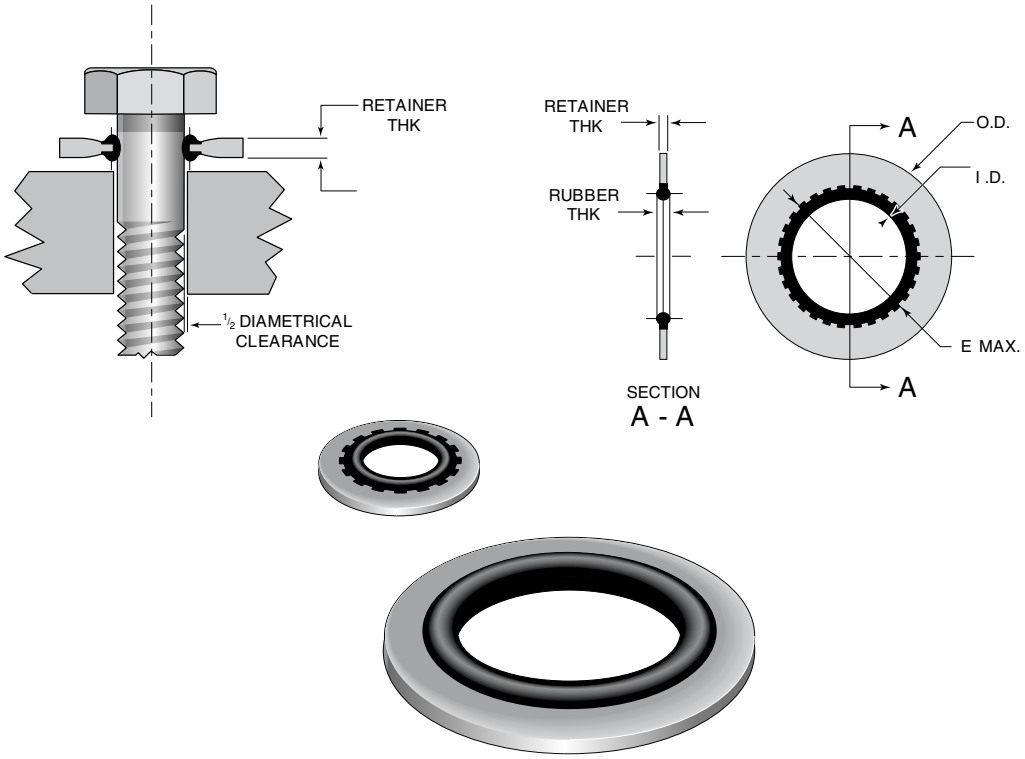
*1. Material specifications shown are prior to molding. The processing conditions for some elastomers may slightly anneal the retainer.

Example Part Numbers:

Material color codes do not apply. Material selections are governed by NAS specifications.

NAS1523AA12R = 7075-T6 Aluminum – Anodized, L1830-60 Elastomer, 3/4 Size
NAS1523C10B = 302/304 Stainless Steel – Passivated, N406-60 Elastomer, 5/8 Size
NAS1523-10B = Chrome Moly Steel – Cad Plated, N406-60 Elastomer, 5/8 Size

610 Series Stat-O-Seal – Designed for Metric Fasteners



610 Series Stat-O-Seal Dimensions						
Fastener Size mm (Ref.)	**I.D. ± 0.25 mm (± .010 in.)**	**E Diameter* ± 0.25 mm (± .010 in.)**	**O.D. ± 0.25 mm (± .010 in.)**	**Retainer Thickness ± 0.13 mm (± .005 in.)**	**Rubber Thickness ± 0.13 mm (± .005 in.)**	**Diametrical Clearance** Max. (Ref.) mm (in.)**
5	4.83 (.190)	6.40 (.252)	9.78 (.385)	1.02 (.040)	1.32 (.052)	0.25 (.010)
6	5.79 (.228)	7.80 (.307)	11.25 (.443)	1.27 (.050)	1.68 (.066)	0.25 (.010)
8	7.77 (.306)	10.57 (.416)	13.49 (.531)	1.27 (.050)	1.68 (.066)	0.38 (.015)
10	9.73 (.383)	12.24 (.482)	15.32 (.603)	1.27 (.050)	1.68 (.066)	0.38 (.015)
12	11.71 (.461)	15.52 (.611)	19.30 (.760)	1.27 (.050)	1.68 (.066)	0.38 (.015)
14	13.67 (.538)	17.60 (.693)	22.35 (.880)	1.27 (.050)	1.68 (.066)	0.38 (.015)
16	15.67 (.617)	19.18 (.755)	27.10 (1.067)	1.27 (.050)	1.68 (.066)	0.38 (.015)
20	19.66 (.774)	24.21 (.953)	33.38 (1.314)	1.63 (.064)	2.44 (.096)	0.38 (.015)
22	21.62 (.851)	27.38 (1.080)	31.50 (1.240)	1.27 (.050)	1.68 (.066)	0.38 (.015)

Notes:

* The fastener head diameter must be greater than the "E" diameter. A cover washer is recommended when the fastener head is near or below the "E" diameter.

** A chamfer with an outside diameter equal to that of the recommended diametrical clearance may be used.

Parker Hannifin Corporation
Composite Sealing Systems Division
San Diego, CA

610-XX XX - X

Code	Seal Compound	Specification	Recommended Uses	Recommended Operating Temperature
15	N1840-90 Nitrile	ASTM D2000 M3CH910 B34 E016 E036	General industrial environments, petroleum fluids and cold temperature water	-40°F to +225°F
31	V720-75 Fluorocarbon	ASTM D2000 M2HK710 A1-10 SAE-AMS 7276	Air, petroleum fluids, hydrocarbons, silicone fluids, many acids, and vacuum applications	-20°F to +400°F

Code	Retainer Material	Finish
44	4130 Chrome Molybdenum Steel, SAE-AMS 6350, Heat Treated to 120,000 psi min tensile strength, HRc 25-30	Zinc Plated Per ASTM B 633 Type II, Dyed Clear
43	4130 Chrome Molybdenum Steel, SAE AMS 6350, Heat Treated to 175,000 psi min tensile strength	Zinc Plated Per ASTM B 633 Type II, Dyed Black
02	Low-Carbon Steel	Zinc Plated

Size (dash number)
5
6
8
10
12
14
16
20
22

	= Standard: General application
	= Non-Standard
	= Special: Consult factory prior to ordering

Example Part Number:

610-1543-10 = N1840-90 Elastomer, 4130 Chrome Moly HT to 175,000 psi tensile strength – Zinc plated, Size 10 mm

Parker Hannifin Corporation
Composite Sealing Systems Division
San Diego, CA