Parker O-Ring Material Offering Guide

ORD 5712

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker

ENGINEERING YOUR SUCCESS.

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O-Ring Material Offering Guide

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Operations

Engineers in every industry - from automotive to fluid power to semiconductor processing - choose O-rings made by Parker Hannifin to keep their equipment running safely and reliably. That's because Parker's O-Ring Division, a developer, manufacturer and supplier of precision-engineered O-rings for over 50 years, offers a unique combination of experience, innovation and support.

Quality Assurance

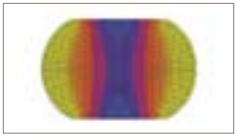
In the O-Ring Division's world-class facilities, skilled Parker technicians manufacture O-rings to exacting standards, closely monitoring each step of the process through a Controlled Batch Identification (CBI) program. From in-house mixing and tooling operations to the final non-contact inspection process, state-of-the art technology is employed to provide unparalleled material consistency and dimensional control. Quality registrations (AS 9100, ISO 9001, TS 16949 and VDA 6.1) are maintained to ensure superior product performance and process repeatability.

Research and Development

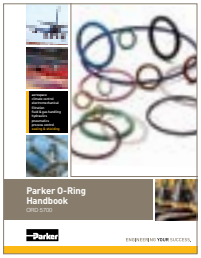
In its on-site research labs, Parker develops new O-ring material formulations and compounds to meet customers' needs. These materials are subjected to a broad range of mechanical, physical and environmental conditions, and their performance is evaluated through a comprehensive testing process.

Finite Element Analysis

Through the use of powerful computers and Finite Element Analysis (FEA) software specifically designed for elastomeric evaluation, Parker engineers can predict a seal's performance in a variety of media, temperatures and pressures before a single part is made. This eliminates the need for costly tooling, speeds the production process and ensures the selection of the right material and geometry for a customer's application.



Literature



Since its initial release decades ago, the Parker O-Ring Handbook (ORD 5700) has been a fixture on the reference shelves of engineers and seal specifiers worldwide.

This book contains extensive information about the properties of basic sealing elastomers, as well as examples of typical O-ring applications, fundamentals of static and dynamic seal design and O-ring failure modes.

It also provides an overview of international sizes and standards, and contains compatibility data for fluids, gases and solids. Abridged versions of the handbook, available as ORD 5712 (US) and 5705 (Europe), provides engineers with fast access to information on standard sizes and materials.

Seal Design Software

Parker's Mobile inPHorm™ is a web-based mobile app, which consists of modules for material recommendations, fluid compatibility, and gland/seal calculations. It uses a simple interface to guide users through a complete design analysis. It automatically cross-references thousands of part numbers, recommending materials based on the requirements of SAE, MIL, NORSOK and other industry standards. Mobile inPHorm also provides a fluid compatibility guide, supporting up to 5 blends at a time.

Online Tools

The Parker O-Ring Division's website at www.parkerorings.com offers many time-saving tools, including temperature and dimension converters, gland design recommendation charts, and a pressure calculator. The site also hosts our interactive web based apps and installation videos.

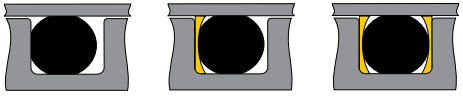
Product Lines

O-Rings

- Manufactured to US and international standards: AS 568B, ISO 3601, DIN 3771, JIS and metric. Custom sizes of almost any dimension.
- Miniature O-rings, large special O-rings, continuously molded and spliced cord.
- Perfluorinated (FFKM) O-rings, custom molded products and die-cuts. Broadest chemical resistance, highest purity and temperature resistance of any elastomeric family - up to 320°C/608°F.

Parbak® Back-up Rings

Prevent extrusion in high-pressure applications and help retain lubricant, extending O-ring life.



O-Ring Kits

Kits are conveniently arranged with various size O-rings for repair, assembly and workshop.

Accessories

Products to assist O-ring users include assembly greases and lubricants, sizing cones and extraction tools.

Material Offering

Compounds

O-rings can be molded in a wide range of compounds in hardnesses from 40 to 95 Shore A. These materials include:

- Acrylonitrile-Butadiene (NBR)
- Chloroprene (CR)
- Ethylene Propylene (EPDM)
- Fluorosilicone (FVMQ)
- Perfluoroelastomer (FFKM)
- Silicone (VMQ)
- Butyl (IIR)
- Ethylene Acrylic (AEM)
- Fluorocarbon (FKM)
- Hydrogenated Nitrile (HNBR)
- Polyacrylate (ACM)

Parker O-ring compounds are formulated to meet the most stringent industry standards, including NSF, Underwriters Laboratories (UL), Military (MIL-SPEC), Aerospace (AMS), NASA, FDA, USDA, USP, and many customer-specific requirements.

Wynn's Numbering System

Parker Hannifin acquired Wynn's International, parent company of Wynn's Precision and Goshen Rubber, in July 2000. As a result, some Wynn's products and materials were added to the Parker O-Ring Division's offering.

The Wynn's compound numbering system has been phased out; however, the old numbers are noted in parentheses (XXXXX) wherever applicable for reference purposes.

Parker O-Ring Compound Numbering Systems

Note: There are two types of nomenclature used to reference Parker O-Ring products. See tables below for description of these types.

TYPE I		
N	0674	-70
Polymer Code (Single Letter)	Sequence Number (four digits)	Durometer Indicator (two digits)

TYPE II			
A	A	150	-70
Polymer Code (Single Letter)	Special Property Description (Single Letter)	Sequence Number (three digits)	Durometer Indicator (two digits)

Polymer Codes

- A Polyacrylate
- B Butyl
- C Chloroprene (Neoprene®)
- E Ethylene Propylene
- F ULTRA™ FFKM
- H Hifluor™
- K HNBR
- L Fluorosilicone
- N Nitrile (Buna N) and HNBR
- P Polyurethane
- S Silicone
- V Fluorocarbon, AFLAS®, Hifluor™, ULTRA™
- Y Epichlorohydrin
- Z Exotic Polymers

Special Property Descriptions

- A General Purpose
- B Low Compression Set
- E Ethylene Acrylate or (Vamac®)
- F Fuel Resistant or Fully Fluorinated
- G Higher Fluorine Content
- J NSF / FDA / WRAS Approvals
- L Internally Lubed
- M Mil/ AMS Specifications
- P Low Temperature Flexible or (AFLAS)
- W Non-Black Compound
- X Carboxylated

Durometer Indicators (Hardness)

-40	40 ±5	Shore A Durometer
-45	45 ±5	Shore A Durometer
-50	50 ±5	Shore A Durometer
-55	55 ±5	Shore A Durometer
-60	60 ±5	Shore A Durometer
-65	65 ±5	Shore A Durometer
-70	70 ±5	Shore A Durometer
-75	75 ±5	Shore A Durometer
-80	80 ±5	Shore A Durometer
-85	85 ±5	Shore A Durometer
-90	90 ±5	Shore A Durometer
-95	95 ±5	Shore A Durometer

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COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR

POLYACRYLATE (ACM)

ACM (acrylic rubber) has good resistance to mineral oil, oxygen and ozone. The water compatibility and cold flexibility of ACM are considerably worse than with NBR.

AA150-70	Engines & Transmission Seals	-5 to 350	Black
AA154-75	Engines & Transmission Seals	-5 to 350	Black

ETHYLENE ACRYLATE (AEM)

Ethylene acrylate is a mixed polymer of ethylene, methyl acrylate and a small amount of carboxylated cure-site monomer. Developed as a lower-temperature version of Polyacrylate, but swells slightly more. Polymer is sold under the tradename VAMAC®.

AE152-70	Transmission Applications	-40 to 325	Black
AE153-75	Transmission Applications, Internally Lubed	-40 to 325	Black

BUTYL RUBBER (IIR)

Butyl rubber (isobutylene-isoprene rubber or IIR) has a very low permeability rate and good electrical properties, but poor short-term rebound.

B0318-70	General Purpose	-75 to 250	Black
B0612-70	Vacuum, Low Compression Set	-75 to 250	Black

POLYCHLOROPRENE RUBBER (CR)

Also known by the tradename Neoprene®, polychloroprene was the first synthetic rubber and exhibits generally good ozone, aging, and chemical resistance. It has good mechanical properties over a wide temperature range.

C0267-50	MIL-G-1149 Ty I Cl I, AMS 3208, Low Temperature	-60 to 250	Black
C0557-70	Drive Belt Applications, General Purpose	-35 to 250	Black
C0873-70	Refrigerant Gases, Low Extractibles, Low Compression Set	-35 to 225	Black

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
C0944-70	General Purpose	-35 to 250	Red
C1124-70	AMS 3209, Low Temperature	-60 to 250	Black
C1276-70	Super Neoprene, Low Compression Set	-35 to 250	Black
CL172-70	Internally Lubed	-35 to 225	Black
C1278-80	Super Neoprene, Low Compression Set	-35 to 250	Black

EPICHLOROHYDRIN (ECO)

Epichlorohydrin is a special-purpose seal material with good resistance to both refrigerant gases and gasoline, as well as inherent resistance to atmospheric ozone.

YB146-75	Refrigerant Gases, Gasoline, O-zone Resistant	-31 to 250	Black

ETHYLENE PROPYLENE RUBBER (EPM, EPR, EPDM)

EPM (EPR) is a copolymer of ethylene and propylene. EPDM is a terpolymer of ethylene, propylene, and a diene third monomer used for cross-linking.

E1100-50	General Purpose	-70 to 250	Black
EA454-50 (3575)	UL Listed	-70 to 250	Black
E1157-60	General Purpose	-70 to 250	Black
E1561-60	NSF 61, KTW, WRAS	-70 to 250	Black
E0751-65	Drive Belt Applications	-70 to 250	Black
E0603-70	General Purpose	-70 to 250	Black
E0667-70	Auto Disc Brakes	-70 to 250	Black
E0803-70	General Purpose	-70 to 250	Black
E1022-70	Internally Lubed, Brakes	-70 to 250	Black
E1028-70	FDA	-70 to 250	Black
E1244-70	NSF 61, Internally Lubed	-70 to 250	Black
E1549-70	NSF 61, WRAS, KTW, FDA	-70 to 250	Black
E1583-70	NSF 51, NSF 61, Internally Lubed	-70 to 250	Black

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
E3609-70	NSF 51, NSF 61, WRAS, KTW, FDA, USP Class VI	-70 to 250	Black
EJ273-70	Chloramine Resistant	-70 to 250	Black
EJ274-70	Internally lubed, NSF 61, Chloramine Resistant	-70 to 250	Black
E0740-75	Nuclear Applications	-70 to 250	Black
E0515-80	NAS 1613 Rev 2	-70 to 250	Black
E0540-80	General Purpose	-70 to 250	Black
E0893-80	General Purpose	-70 to 250	Purple
E1267-80	NAS 1613 Rev 5	-70 to 250	Black
E0652-90	General Purpose, Back-Up Rings	-60 to 250	Black
E0962-90	Excellent Steam to 500° F, ED Resistant	-60 to 250	Black

FLUOROSILICONE (FVMQ)

Fluorosilicone is a silicone polymer chains with fluorinated side-chains for improved oil and fuel resistance. The mechanical and physical properties are very similar to those of silicone.

LA163-70	AMS-R-25988, TY I, CL I, GR 70, UL listed	-100 to 350	Green
LM151-50 (11645)	General Purpose	-100 to 350	Blue
LM158-60	AMS-R-25988, TY 1, CL 1, GR 60, AMS 3325	-100 to 350	Blue
LM159-70	AMS-R-25988, TY 1, CL 1, GR 70	-100 to 350	Blue
L1120-70	AMS-R-25988, TY I, CL I, GR 70, UL listed	-100 to 350	Blue
L1077-75	AMS-R-25988, TY I, CL III, GR 75	-90 to 350	Blue
LM160-80	AMS-R-25988, TY 1, CL 1, GR 80	-90 to 350	Blue
L1186-80	PTFE Loaded	-85 to 350	Rust
40713-75	Automotive Fuel Quick Disconnects	-90 to 350	Yellow

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR

ACRYLONITRILE-BUTADIENE (NBR)

Nitrile rubber (NBR) is the general term for acrylonitrile-butadiene terpolymer. The acrylonitrile content of nitrile sealing compounds varies considerably (18 to 50%.) Polymers with higher ACN content exhibit less swell in gasoline and aromatic solvents, while lower ACN polymers exhibit better compression set and low temperature flexibility. Polymer is also called Buna-N.

N0545-40	AMS 3201	-45 to 225	Black
N0299-50	AMS 3205, UL listed	-55 to 225	Black
NL151-50 (8315)	Internally Lubed	-55 to 225	Black
N0406-60	General Purpose	-40 to 225	Black
N0525-60	AMS 3212, AMS 3220	-25 to 250	Black
NM506-65	AMS 7271	-70 to 180	Black
N0103-70	Low Temp.	-55 to 225	Black
N0287-70	Synthetic Lubricant, Resistant, AMS 7272	-35 to 250	Black
N0497-70	Low Swell, SAE 120R1 CL ll, UL listed	-35 to 212	Black
N0602-70	General Purpose, AMS-P-5315, Low Temp.	-70 to 180	Black
N0674-70	General Purpose, MIL-G-21569, Cl I, UL listed	-30 to 250	Black
N0757-70	NSF 61, UL Listed	-30 to 225	Black
N0818-70	Internally Lubed	-30 to 250	Black
N1069-70	FDA	-30 to 180	Black
N1220-70	NSF 51, FDA	-30 to 225	Black
N1470-70	General Purpose, X-rings	-40 to 250	Black
N1471-70	General Purpose	-40 to 250	Black
N1499-70	General Purpose, UL	-30 to 250	Black
N1510-70	NSF 61	-30 to 225	Black
N1527-70	UL Listed	-30 to 225	Black
NM071-70	AMS-R-7362	-60 to 180	Black

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
NW163-75 (40601)	Internally Lubed	-30 to 225	Rust
N0508-75	FDA, USDA	-30 to 180	Black
N0756-75	AMS-P-83461	-65 to 250/275	Black
N0951-75	High Temp, Low Compression Set	-25 to 275	Black
N1500-75	Low Swell, UL Listed, Fuel applications	-35 to 212	Black
NM304-75	MIL-DTL-25732	-65 to 225/250	Black
N0750-80	Carboxylated	-25 to 250	Black
NA155-80	General Purpose	-25 to 250	Black
N1090-85	"ELF" Pneumatic, Carboxylated, Internally Lubed	-25 to 225	Black
N0300-90	Back Up Rings	-40 to 180	Black
N0507-90	AMS-P-5510, Low Temp.	-65 to 180	Black
N0552-90	General Purpose	-30 to 250	Black
N0702-90	Low Compression Set	-30 to 275	Black
N1059-90	Low Compression Set	-30 to 275	Black
N1444-90	Parbaks only	-30 to 250	Black
N1490-90	General Purpose	-30 to 250	Black
NB194-90	Low Extrusion Set, Extrusion Resistant	-30 to 250	Black

HYDROGENATED NITRILE (HNBR, HSN)

Hydrogenated nitrile was developed as an air-resistant variant of nitrile rubber. In HNBR, the carbon-carbon double bonds in the main polymer chain are saturated with hydrogen atoms in a process called “hydrogenation” that improves the material’s thermal stability and oxidation resistance.

KB190-50 (21705)	Automotive Applications	-25 to 300/325	Black
N1173-70	General Purpose	-25 to 300/325	Black

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
KA158-70	Low Temp.	-40 to 300/325	Black
N1239-70	Refrigerants	-25 to 300/325	Red
KA157-70 (21407)	General Purpose	-30 to 300/325	Black
KA174-75 (21107)	General Purpose	-25 to 300/325	Black
N1231-80	Explosive Decompression	-25 to 300/325	Black
KA453-80 (21508)	Low Swell, ED Resistant	-25 to 300/325	Black
KB162-80 (21378)	Oilfield, High Temp. Hydraulics	-25 to 300/325	Black
KA183-85	Low Temp.	-55 to 300/320	Black
KB163-90 (21379)	Oilfield, High Temp. Hydraulics, RGD Resistant, NORSOK M710	-25 to 300/325	Black
N4007-95	Extrusion Resistant, RGD Resistant, NORSOK M710	-25 to 300/325	Black

POLYURETHANE (AU, EU)

Polyurethane elastomers have excellent wear resistance, high tensile strength and high elasticity in comparison with any other elastomers. Permeability is good and comparable with butyl. Millable urethanes should not be confused with thermoplastic urethanes, which are generally harder, less flexible, and have slightly better wear resistance.

P0642-70	Drive Belt Applications, Millable	-40 to 180	Black

SILICONE RUBBER (VMQ, PVMQ)

Silicones possess good insulating properties and tends to be physiologically neutral. However, silicone elastomers have relatively low tensile strength, poor tear and wear resistance.

S0469-40	AMS 3301, USP Class VI, A-A-59588 CL 2a, 2b, GR 40	-75 to 400	Rust

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
S0802-40	FDA	-60 to 400	White
S0595-50	AMS 3302	-70 to 400	Rust
S0899-50	ZZ-R-765 CL 1a, 1b, 2a, 2b GR 50	-103 to 400	Rust
SA150-50	Low Organic Extractibles	-65 to 400	Trans
S0317-60	FDA, USDA, USP CL VI	-103 to 450	Rust
S0613-60	ZZ-R-765 Cl 2b, Gr 60, AMS 3303	-60 to 450	Rust
S0383-70	A-A-59588 CL 1a, 1b, GR 70, AMS 3337	-175 to 400	Rust
S0455-70	High Temperature	-65 to 450/500	Rust
S0604-70	ZZ-R-765 Cl 2a, 2b, Gr 70, AMS 3304, AMS 3357, MIL-G-21569 Class 2	-65 to 450	Rust
S1138-70	FDA, USP Class VI, USP <87>	-60 to 400	Rust
S1224-70	A-A-59588 Cl 2a, 2b, Gr 70, AMS 3357, MIL-G-21569 Class 2, AMS 3304	-65 to 450	Rust
SM355-75	AMS 7267, FDA, USP Class VI, USP <87>	-60 to 450	Rust
S0614-80	A-A-59588 CL 2a, 2b, GR 80, AMS 3305	-65 to 450	Rust

FLUOROCARBON (FKM, FPM)

Fluorocarbon (FKM) has excellent resistance to high temperature and a broad range of chemicals. Permeability and compression set are excellent.

V0986-50	General Purpose	-15 to 400	Brown
V0763-60	General Purpose	-15 to 400	Brown
V0769-60	General Purpose	-15 to 400	Black
V1262-65	Low Swell - Flex Fuel, Blends UL listed	-15 to 400	Black
VA150-65	General Purpose	-15 to 400	Black
VW252-65	Low Swell	-15 to 400	Green
V0680-70	FDA, USDA, NSF 51, USP Class VI	-15 to 400	Red
VB185-70	Acid Resistant, Steam	-15 to 400	Black
V0747-75	AMS-R-83248, TY I, CL I, UL listed	-15 to 400	Black

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
V0848-75	PTFE Loaded	-15 to 400	Black
V0884-75	General Purpose, UL listed	-15 to 400	Brown
V1163-75	"GFLT Type", UL listed	-35 to 400	Black
V1164-75	Low Compression Set,	-15 to 400	Black
V1226-75	Low Compression Set, AMS 7276, UL listed,	-15 to 400	Brown
V1260-75	Very Chemically Resistant, "Viton Extreme" Type	-15 to 400	Black
V1263-75	Low Swell, Flex Fuel Blends, UL listed	-15 to 400	Black
V1289-75	AMS 7379, Low Temp.	-55 to 400	Black
V1436-75	General Purpose, UL Listed	-15 to 400	Black
V1475-75	General Purpose, X-rings	-15 to 400	Black
V1476-75	General Purpose	-15 to 400	Brown
VA151-75 (19357)	General Purpose, UL Listed	-15 to 400	Black
VA203-75 (16737)	Extrusion Resistant, Diesel Fuel Injectors	-15 to 400	Black
VB153-75 (19717)	Good Compression Set, Fuels	-15 to 400	Black
VG162-75 (19727)	Good Fuel Resistance, "GF" Type	-15 to 400	Black
VG292-75	Engine Coolant Biodiesel Resistant	-15 to 400	Black
VM100-75	AMS 7276, Low Compression Set	-15 to 400	Black
VM125-75	"GLT" Type, AMS-R-83485	-40 to 400	Black
VM128-75	"GLT" Type, AMS-R-83485	-40 to 400	Black
VM835-75	"GLT" Type, AMS-R-83485	-40 to 400	Black
VW153-75 (16129)	General Purpose	-15 to 400	Brown
VW173-75	Automotive Applications	-15 to 400	Green
VW263-75	Biodiesel Resistant	-15 to 400	Brown

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
16327-75	Automotive Fuel Quick Disconnects, Good Fuel andPermeation Resistance	-15 to 400	Green
V1274-80	USP Class VI, ISO 10993, FDA, Low Swell	-15 to 400	Black
VA163-80 (19318)	Internally Lubed	-15 to 400	Black
VG286-85	ISO 23936 RGD & Extrusion Resistant, Low Compression Set	-50 to 400	Black
VP104-85	Base Resistant	+10 to +400	Black
V0709-90	AMS-R-83248, TY 1, CL 2, AMS 7259	-15 to 400	Black
V0894-90	General Purpose	-15 to 400	Brown
V1411-90	General Purpose	-15 to 400	Black
V1412-90	General Purpose	-15 to 400	Brown
VA153-90	General Purpose	-15 to 400	Black
VW155-90	General Purpose	-15 to 400	Green
VG109-90	ISO 23936 RGD & Extrusion Resistant, Low Compression Set	-50 to 400	Black
V1238-95	Extrusion & RGD Resistant	-15 to 400	Black

TETRAFLUOROETHYLENE - PROPYLENE (AFLAS)

This material is a copolymer of TFE and propylene. Its chemical resistance is excellent across a wide range of aggressive media. Polymer is sold under the tradename Aflas®.

V1006-75	AMS 7255	25 to 450	Black
VP101-80	General Purpose	25 to 450	Black
VP102-80	Low Compression Set	15 to 450	Black
V1041-85	RGD Resistant, General Purpose, NORSOK M710	15 to 450	Black
VP103-90	Extrusion Resistant	25 to 450	Black

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR

HIGH PERFORMANCE FLUOROELASTOMER (HiFluor)

Hifluor is Parker's tradename for high performance fluoroelastomers – materials that "bridge the gap" between traditional fluorocarbon and perfluoroelastomer.

HF355-65	USP Class VI, Extreme Low Extractibles	-15 to 400	Trans.
V3819-75	Chemically Resistant, Low Compression Set	-15 to 400	Black
HF391-75	Extreme Resistance to Plasma Etching	-15 to 375	Blue
HF359-80	Resistant to Plasma Etch, Low Metal Ions	-15 to 400	Tan

PERFLUOROELASTOMER (ULTRA) (FFKM)

Perfluoroelastomer is a rubber version of PTFE. Available from Parker under the tradenames Parofluor™ and Parofluor ULTRA™.

FF374-60	Low Particle Generation, Low Metal Ion Content	5 to 608	Purple
FF354-65	Low Closure Force	5 to 608	White
FF102-75	Acid Resistant, General Purpose	5 to 525	Black
FF106-75	General Purpose	5 to 500	Black
FF200-75	Low Comp Set, AMS7257, FDA	5 to 608	Black
FF302-75	Etch Resistant, Low Metal Ions	5 to 608	Brown
FF350-75	Plasma, High Purity, FDA, USP Class VI	5 to 608	White
FF352-75	General Purpose, Etch Resistant	5 to 608	White
FF370-75	Low Particle Generation, Low Metal Ions	5 to 608	Black
FF500-75	Broad Chemical Resistance, FDA	5 to 550	Black
FF580-75	Steam Resistant, Amine/Base Resistant	5 to 525	Black
V8545-75	FDA, General Purpose	5 to 572	Black
FF376-80	Low Particle Generation, Low Metal Ions	5 to 608	Purple

COMPOUND NO.	RECOMMENDED FOR	TEMP. RANGE (Degrees° F)	COLOR
FF400-80	Low Temp., RGD Resistant	-40 to 550	Black
FF202-90	Low Compression Set, Extrusion Resistant	5 to 608	Black
FF582-90	Steam Resistant, Amine/Base Resistant	5 to 525	Black
V8581-90	Plasma Etch Resistant, Low Stiction	5 to 550	White
V8588-90	Extrusion & RGD Resistant	5 to 572	Black

Note: Compound numbers in (XXXXX) are the obsolete Wynn's Precision compound numbering system.

Underwriters Laboratories Approved Services*

SERVICE	Fire Extinguishing Agents	Gasoline	Gasoline/Alcohol Blends*	Naptha or Kerosene	MPS Gas	MFG or Natural Gas	Diesel Fuel, Fuel Oil, Lubricating Oil	Heated Fuel Oil	Anhydrous Ammonia	LP-Gas	Laundry Detergents	Dishwashing Detergents	Suitable for use in UL 1081	Suitable for use in UL 262 applications	Suitable for UL 25 gasket applications	Dry Chemical, Carbon Dioxide, Water	E85
Code	A	B	C	D	E	F	G	H	I	J	L	M					
EA454-50 (3575)																	
EB152-70 (3407)																	
L1120-70																	
LM159-70																	
N0299-50																	
N0497-70																	
N0674-70																	
N1499-70																	
N1527-70 (67147)																	
N1500-75																	
V1262-65																	
V0747-75																	
V0884-75																	
V1163-75																	
V1226-75																	
V1263-75																	
V1436-75																	
VA151-75 (19357)																	

* Contact factory for specific ratios of alcohol (methyl and/or ethyl) and gasoline.
Note: Material certifications are subject to change. Please contact Parker's O-Ring Division for more information.

FDA, USDA, NSF 51, USP Approved Compounds

The Food and Drug Administration (FDA) has established a list of rubber compounding ingredients which tests have indicated are neither toxic nor carcinogenic. Rubber compounds produced entirely from those ingredients and which also pass the FDA extraction tests are said to "meet the FDA requirements". The FDA does not approve rubber compounds. It is the responsibility of the manufacturer to compound food grade materials from the FDA list of ingredients and establish whether they pass the necessary extraction requirements. Similar standards are established by the United States Department of Agriculture (USDA).

Additional requirements have been imposed upon seal manufacturers regarding food and beverage service. Parker has developed several materials that are certified to NSF 51, Food and Beverage Standard. In critical medical applications, seals often must be made from an even "cleaner" list of ingredients. The U.S. Pharmacopoeia (USP) Class VI outlines requirements for system toxicity and intracutaneous toxicity for these "cleaner" compounds. The USP Class VI compounds must be made from ingredients with clear histories of biocompatibility that meet tighter requirements for leachates.

Typical applications for our FDA, NSF 51, USDA materials are disposable medical devices, surgical instruments and medical fluid dispensing components, as well as a wide variety of food and beverage handling equipment. The type of approval/certification required generally rests with the end customer's regulatory expectations for the specific application.

Parker Compound	Polymer	Hardness	Color	Service
E1028-70	EPDM	70	Black	FDA
E3609-70	EPDM	70	Black	NSF 51, FDA, USP Class VI
FF200-75	FFKM	75	Black	FDA
FF350-75	FFKM	75	White	FDA, USP Class VI
FF500-75	FFKM	75	Black	FDA
V8545-75	FFKM	75	Black	FDA
V0680-70	FKM	70	Red	NSF 51, FDA, USDA
N1219-60	NBR	60	Black	NSF 51, FDA
N1069-70	NBR	70	Black	FDA
N1220-70	NBR	70	Black	NSF 51, FDA
N0508-75	NBR	75	Black	FDA, USDA
S0802-40	VMQ	40	White	FDA

Continued on next page

FDA, USDA, NSF 51, USP Approved Compounds

Parker Compound	Polymer	Hardness	Color	Service
S1538-55	VMQ	55	Translucent	FDA, USP Class VI
S0317-60	VMQ	60	Rust	FDA, USDA, USP Class VI
S1138-70	VMQ	70	Rust	FDA
SM355-75	VMQ	75	Rust	FDA, USDA
V1274-80	FKM	80	Black	USP Class VI

NSF 61 Approved Compounds

NSF 61 Drinking Water System Components - is the nationally recognized health effects standard for all devices, components and materials which contact drinking water. Parker's O-Ring Division has developed several materials that are certified to NSF 61. Many of these materials are approved for use in the United Kingdom (WRAS), and Germany (KTW) as well as North America.

NSF International is an industry regulating agency that was established in 1944. Recognized by ANSI (American National Standards Institute), NSF maintains qualification standards and criteria for a wide range of products, including potable water components and delivery systems.

Parker Compound	Polymer	Hardness	Water Contact Temp.	Service
E1561-60 (63446)	EPDM	60	Commercial Hot**	NSF 61, WRAS, KTW, Ideal for High Volume Applications
E1549-70 (63447)	EPDM	70	Commercial Hot**	NSF 61, WRAS, KTW, Excellent Compression Set Resistance, Ideal for High Volume Applications
E1583-70 (63017)	EPDM	70	Commercial Hot**	NSF 61, Internally Lubed, Ideal for High Volume Applications
E1244-70	EPDM	70	Commercial Hot**	NSF 61, Internally Lubed
E1512-70	EPDM	70	Commercial Hot**	NSF 61, Internally Lubed, Chloramine Resistant
E3609-70	EPDM	70	Commercial Hot**	NSF 61, WRAS, KTW, Excellent Compression Set Resistance
N0757-70	NBR	70	Cold Water***	NSF 61
N1510-70 (67997)	NBR	70	Commercial Hot**	NSF 61

* NSF 61 listed materials given a commercial hot water rating are also certified for cold water
** Commercial Hot = Tested at 82° C (180° F)
*** Cold Water = Tested at 23° C (73.4° F)

Aerospace Materials

AMS[1] and NAS[2] Rubber Specification Descriptions			
Rubber Specs	**Parker Compound**	**Durometer**	**Description**
AMS3201	N0545-40	35-45	Dry Heat Resistance
AMS3208	C0267-50	45-55	Weather Resistant, Chloroprene Type
AMS3209	C1124-70	65-75	Weather Resistant, Chloroprene Type
AMS3238	B0318-70	65-75	Phosphate-ester Resistant, Butyl Type
AMS3301	S0469-40	35-45	Silicone, General Purpose
AMS3302	S0595-50	45-55	Silicone, General Purpose
AMS3303	S0613-60	55-65	Silicone, General Purpose
AMS3304	S1224-70 S0604-70	65-75	Silicone, General Purpose
AMS3305	S0614-80	75-85	Silicone, General Purpose
AMS3325	LM158-60	55-65	Fluorosilicone Rubber, Fuel and Oil Resistant
AMS3337	S0383-70	65-75	Silicone, Extreme Low Temperature Resistant
AMS3357	S1224-70 S0604-70	65-75	Silicone Rubber, Lubricating Oil, Compression Set Resistant
AMS7257	FF200-75	70-80	Sealing Rings, Perfluorocarbon, High Temperature Resistant
AMS7267	S0355-75	70-80	Silicone, Heat Resistant, Low Compression Set
AMS7271	NM506-65	60-70	Fuel and Low Temperature Resistant
AMS7272	N0287-70	65-75	Synthetic Lubricant Resistant
AMS7276	VM100-75 V1226-75	70-80	High Temperature, Fluid Resistant, Very Low Compression Set FKM
NAS1613 REV 6	E1267-80	75-85	Packing O-ring, Phosphate Ester Resistant
AMS-P-5315	N0602-70	65-75	Packing O-ring, Hydrocarbon Fuel Resistant

1. Aerospace Material Specification issued by the Society of Automotive Engineers, Inc.
2. National Aerospace Standard issued by Aerospace Industries Association of America, Inc.

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Aerospace Materials

AMS[1] and NAS[2] Rubber Specification Descriptions			
Rubber Specs	**Parker Compound**	**Durometer**	**Description**
AMS-P-5510	N0507-90	85-95	Gasket, Straight Thread Tube Fitting Boss
AMS-R-7362	NM071-70	65-75	Rubber Sheet, Molded and Extruded Shapes, Synthetic Oil Resistant
MIL-DTL-25732	NM304-75	70-80	Packing, Preformed, Petroleum Hydraulic Fluid Resistant, Limited Performance
MIL-DTL-25988 Type 1 Class 1 Type 1 Class 3	 LM158-60 L1120-70 LM159-70 LM160-80 L1077-75	 Grade 60 Grade 70 Grade 80 Grade 75	Rubber, Fluorosilicone Elastomer, Oil and Fuel Resistant
AMS-R-83248 Type 1 Class 1 Type 1 Class 2	 V0747-75 V0709-90	 75 90	Rubber, Fluorocarbon Elastomer, High Temperature Fluid and Compression Set Resistant
AMS-R-83461	N0756-75	70-80	Packings, Preformed, Petroleum Hydraulic Fluid Resistant, Improved Performance
AMS-R-83485	VM835-75	70-80	Rubber, Fluorocarbon Elastomer, Improved Performance at Low Temperatures
AMS 7379	V1289-75	Grade 75	Rubber, Fluorocarbon Elastomer, High Temperature, Fuel, HTS Oil Resistant, Low Compression Set 70 or 80 Hardness, Low Temperature Tg -40°F.

1. Aerospace Material Specification issued by the Society of Automotive Engineers, Inc.
2. National Aerospace Standard issued by Aerospace Industries Association of America, Inc.

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Military Rubber Specifications

Note: In compliance with the Federal Acquisition Streamlining Act (FASA), most of these specifications are being revised to AMS specifications. For the most current information, contact the O-Ring Division.

Rubber Specs	Parker Compound	Description
ZZ-R-765/A-A-59588		Rubber, Silicone
Class 1a, 1b, 2a, 2b	S0899-50	103 to 437°F (-75 to 225°C)[1], Low and High Temperature Resistant, Low Compression Set
Class 1a, 1b	S0383-70	
Class 2a, 2b	S0614-80 S1224-70 S0604-70	80 to 437°F (-62 to 225°C)[1], High Temperature, Low Compression Set
AMS-P-5315	N0602-70	Packing, O-ring, Hydrocarbon Fuel Resistant (Jet Fuels) (Military O-ring series MS29512 and MS29513) -65 to 160°F (-54 to 71°C)[1]
MIL-P-5510	N0507-90	Gasket, Straight Thread Tube Fitting Boss (MIL-H-5606 Petroleum Based Hydraulic Fluid) -45 to 160°F (-43 to 71°C)[1] (Military O-ring Series MS28778)
AMS-R-7362	NM071-70	Rubber, Sheet, Molded and Extruded Shapes, Synthetic Oil Resistant (AMS3021) Synthetic, Di-Ester Base Lubricant -65 to 275°F (-54 to 135°C)[1] (Military O-ring series MS29561 and WAS617)
MIL-G-21569		
Class 1	N0674-70	Room Temperature to 194°F (90°C)[1]
Class 2	S0604-70	

1. These temperatures are limits for particular tests required by the specifications, but they do not necessarily represent operating temperature limits.

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O-Ring Material Offering Guide

Military Rubber Specifications

Note: In compliance with the Federal Acquisition Streamlining Act (FASA), most of these specifications are being revised to AMS specifications. For the most current information, contact the O-Ring Division.

Rubber Specs	Parker Compound	Description
MIL-DTL-25732	NM304-75	Packing, Preformed, Petroleum Hydraulic Fluid Resistant (MIL-H-5606) Petroleum Base Hydraulic Fluid -65 to 275°F (-54 to 135°C)[1] (Military O-ring series MS28775)
MIL-DTL-25988		
Type 1, Class 1, Grade 60	LM158-60	Rubber Fluorosilicone Elastomer, Oil and Fuel Resistant (MIL-H-5606 Petroleum Base) Hydraulic Fluid, Fuel, Air (-90 to 350°F) (-68 to 176°C)[1]
Type 1, Class 1, Grade 70	L1120-70 LM159-70	
Type 1, Class 1, Grade 80	LM160-80	
Type 1, Class 3, Grade 75/2	L1077-75	
AMS-R-83248C, Type 1		
Class 1	V0747-75	Rubber, Fluorocarbon Elastomer, High Temperature Fluid and Compression Set Resistant -15 to 400°F (-5 to 105°C)[1]
Class 2	V0709-90	
AMS-R-83485	VM128-75 VM835-75	Rubber, Fluorocarbon Elastomer, Improved Performance at Low Temperature
AMS-R-83461	N0756-75	Packings, Preformed, Petroleum Hydraulic Fluid Resistant, Improved Performance -65 to 275°F (-54 to 135°C)[1]

1. These temperatures are limits for particular tests required by the specifications, but they do not necessarily represent operating temperature limits.

Parker Materials Certified to NORSOK M-710, API 6A, ISO 23936-2 & Total

Rapid Gas Decompression Test Conditions

	NORSOK M-710	ISO 23936-2	Total
Gas Composition	10:90, CO_2:CH_4 3:97, CO_2:CH_4	10:90, CO_2:CH_4 10:90, CO_2:N_2	20:80, CO_2:CH_4
Temperature (°C)	100, 150, 200	100	75
Pressure (bar)	150, 200, 300	150	190
Exposure (hours)	72	68	48
Decomp Rate (bar/min)	20-40	20	90 sec Max (126.6)
Decomp Cycles	10	8	5
Seal Type	O-ring (2-325)	O-ring (2-312 to 2-329)	O-ring
Compression (%)	20	15	5-15%
Volume Fill (%)	80-85	85	70

Approved Parker O-Ring Materials for RGD Applications

Material Type	Parker Material	Temp.	NORSOK M-710 RGD Gas Composition 3:97, CO_2:CH_4	ISO 23936-2 RGD Gas Composition 10:90; CO_2:N_2	Total Gas Composition 20:80, CO_2:CH_4
HNBR	KA183-85	-55 to 300°F		√	
HNBR	KB163-90	-25 to 300°F	√	√	
HNBR	N4007-95	-25 to 300°F	√	√	
FKM	VP104-85	+10 to 400°F		√	
FKM	VG109-90	-50 to 400°F		√	√
FKM	V1238-95	-15 to 400°F	√	√	
TFE/P AFLAS®	V1041-85	+15 to 450°F	√	√	
TFE/P AFLAS®	VP103-90	+25 to 450°F		√	
FFKM	FF580-75	+5 to 480°F			
FFKM	FF400-80	-40 to 525°F		√	√
FFKM	FF582-90	+5 to 480°F		√	√
FFKM	V8588-90	+5 to 572°F			

*Testing in progress
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Sour Service Test Conditions

	NORSOK M-710	ISO 23936-2	API 6A (FF/HH) H_2S
Gas composition	(30% Vol.) 2:3:95; H_2S:CO_2:CH_4	1. (30% Vol.) 2:3:95; H_2S:CO_2:CH_4 2. (30% Vol.) 10:5:85; H_2S:CO_2:CH_4	(35% Vol.) 10:80:10; H_2S:CO_2:CH_4
Liquid composition	(60% Vol.) 70% heptane, 20% cyclohexane, 10% toluene	(60% Vol.) 70% heptane, 30% cyclohexane (60% Vol.) 70% heptane, 20% cyclohexane, 10% toluene	(60% Vol.) 70% heptane, 20% cyclohexane, 10% toluene
Other	(10% Vol.) Distilled water	(10% Vol.) De-ionised water	(5% Vol.) Distilled water
FKM temp. (°C)	210, 220, 230	195, 210, 220	200
HNBR temp. (°C)	150, 160, 170	136, 151, 166	150
Pressure (bar)	100	100	70
Exposure time	2-35 days	7, 14, 21, 35 days	160 hrs.
Test specimens	5	5	5
Acceptance criteria			Parker acceptance criteria
Swelling	+25%/-5%	+25%/-5%	+25%/-5%
Hardness	+10/-20	+10/-20	+10/-20
Tensile, elongation, modulus	±50%	±50%	±50%
Visual inspection	no dissolution tendency, cracking, blistering, deformation		no dissolution tendency, cracking, blistering, deformation

Approved Parker O-Ring Materials for Sour Service Applications

Material Type	Parker Material	Temp.	NORSOK M-710 H_2S	ISO 23936-2 H_2S	API 6A (FF/HH) H_2S
HNBR	KA183-85	-55 to 300°F	√	*	
HNBR	KB163-90	-25 to 300°F	√	*	√
HNBR	N4263-90	-20 to 275°F	√		
HNBR	N4007-95	-25 to 300°F	√	*	√
FKM	V1289-75	-55 to 400°F	√		
FKM	VP104-85	+10 to 400°F	√	*	
FKM	VG109-90	-50 to 400°F		*	√
FKM	V1238-95	-15 to 400°F		*	√
TFE/P AFLAS®	V1041-85	+15 to 450°F	√	*	
TFE/P AFLAS®	VP103-90	+25 to 450°F	√	*	
FFKM	FF102-75	+5 to 525°F	√		
FFKM	FF200-75	+5 to 608°F	√		
FFKM	FF580-75	+5 to 480°F		*	√
FFKM	FF202-90	+5 to 608°F	√		
FFKM	FF400-80	-40 to 525°F		*	
FFKM	FF582-90	+5 to 480°F		*	
FFKM	V8588-90	+5 to 572°F	√	*	√

*Testing in progress
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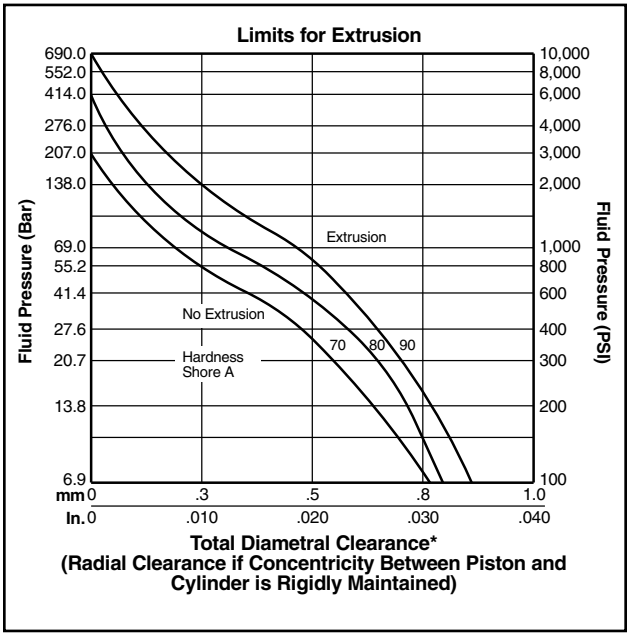
General Notes

Engineering Tools

The following charts are included to facilitate engineering analysis. Additional information is available in the Parker O-Ring Handbook (ORD 5700) or online at www.parkerorings.com

Extrusion



* Reduce the clearance shown by 60% when using silicone or fluorosilicone elastomers.

Basis for Curves

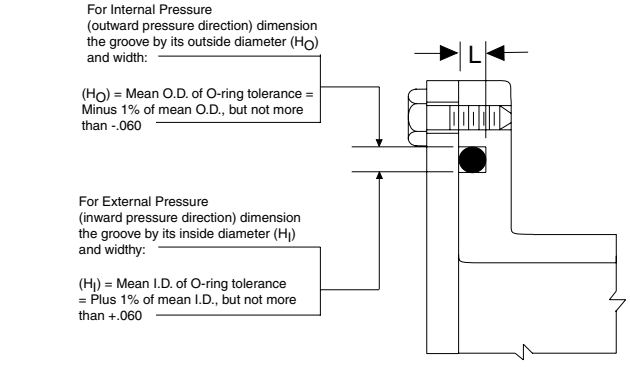
1. 100,000 pressure cycles at the rate of 60 per minute from zero to the indicated pressure.
2. Maximum temperature (i.e., test temperature) 71°C (160°F).
3. No back-up rings.
4. Total diametral clearance must include cylinder expansion due to pressure.
5. Apply a reasonable safety factor in practical applications to allow for excessively sharp edges and other imperfections and for higher temperatures.

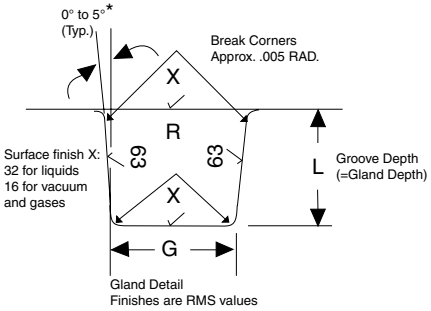
Gland Designs

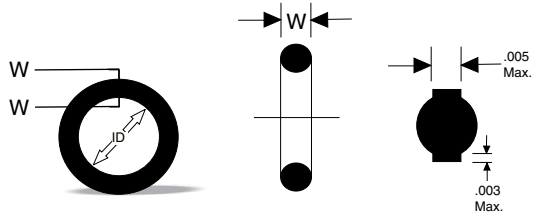
The following charts are included to facilitate engineering analysis. Additional information is available in the Parker O-Ring Handbook (ORD 5700) or online at www.parkerorings.com

Parker offers O-rings for use in static as well as dynamic sealing applications. Static seals are those where the mating parts of the gland do not have movement relative to each other. These seals include face, radial and dovetail. Examples of these seals and the corresponding design charts are found on pages 30-34. Dynamic seals include reciprocating, floating pneumatic, oscillating, and rotary applications. Dynamic seals are defined by one of the gland parts having movement relative to the other part. Gland design recommendations for a reciprocating seal are provided on pages 36 and 37.

For further design assistance and recommendations, access our Total inPHorm Seal Design software, or contact a Parker O-Ring Division Applications Engineer.







* Mean OD = ID + (2X Cross Section)

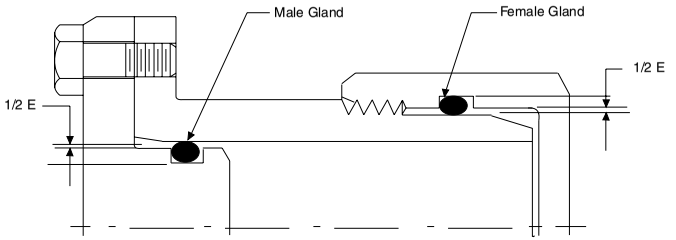
O-Ring Face Seal Glands

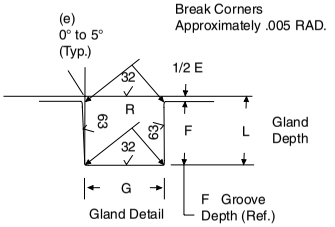
These dimensions are intended primarily for face type O-ring seals and low temperature applications.

O-Ring Size Parker No. 2-size AS568	W Cross Section		L	Squeeze		G Groove Width		R
	Nominal	Actual	Gland Depth	Actual	%	Liquids	Vacuum and Gases	Groove Radius
004 to 050	1/16	.070 ± .003	.050 to .054	.013 to .023	19 to 32	.101 to .107	.084 to .089	.005 to .015
102 to 178	3/32	.103 ± .003	.074 to .080	.020 to .032	20 to 30	.136 to .142	.120 to .125	.005 to .015
201 to 284	1/8	.139 ± .004	.101 to .107	.028 to .042	20 to 30	.177 to .187	.158 to .164	.010 to .025
309 to 395	3/16	.210 ± .005	.152 to .162	.043 to .063	21 to 30	.270 to .290	.239 to .244	.020 to .035
425 to 475	1/4	.275 ± .006	.201 to .211	.058 to .080	21 to 29	.342 to .362	.309 to .314	.020 to .035
Special	3/8	.375 ± .007	.276 to .286	.082 to .108	22 to 28	.475 to .485	.419 to .424	.030 to .035
Special	1/2	.500 ± .008	.370 to .380	.112 to 138	22 to 27	.638 to .645	.560 to .565	.030 to .045

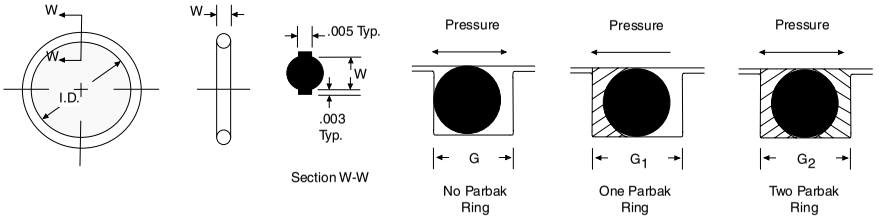
Note: These design recommendations assume metal-to-metal contact. In some hard vacuum applications, it may be necessary to increase compression on the seal to achieve proper sealing. Contact a Parker Applications Engineer for more information.

Industrial O-Ring Static Seal Glands





Finishes are RMS values.



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Industrial O-Ring Static Seal Glands

O-Ring 2-Size AS568B	W Cross Section		L Gland	Squeeze		E (a) Diametral Clearance	G Groove Width			R Groove	Max. Eccentricity (b)
	Nominal	Actual	Depth	Actual	%		No Parbak rings (G)	1 Parbak rings (G1)	2 Parbak rings (G2)	Radius	
004 - 050	1/16	.070 ± .003	.050 to .052	.015 to .023	22 to 32	.002 to .005	.093 to .098	.138 to .143	.205 to .210	.005 to .015	.002
105 -178	3/32	.103 ± .003	.081 to .083	.017 to .025	17 to 24	.002 to .005	.140 to .145	.171 to .176	.238 to .243	.005 to .015	.002
201 - 284	1/8	.139 ± .004	.111 to .113	.022 to .032	16 to 23	.003 to .006	.187 to .192	.208 to .213	.275 to .280	.010 to .025	.003
309 - 395	3/16	.210 ± .005	.170 to .173	.032 to .045	15 to 21	.003 to .006	.281 to .286	.311 to .316	.410 to .415	.020 to .035	.004
425 - 475	1/4	.275 ± .006	.226 to .229	.040 to .055	15 to 20	.004 to .007	.375 to .380	.408 to .413	.538 to .543	.020 to .035	.005

(a) Clearance (extrusion gap) must be held to a minimum consistent with design requirements for temperature range variation.
(b) Total indicator reading between groove and adjacent bearing surface.
(c) Reduce maximum diametral clearance 50% when using silicone or fluorosilicone O-rings.
(d) For ease of assembly, when Parbaks are used, gland depth may be increased up to 5%.

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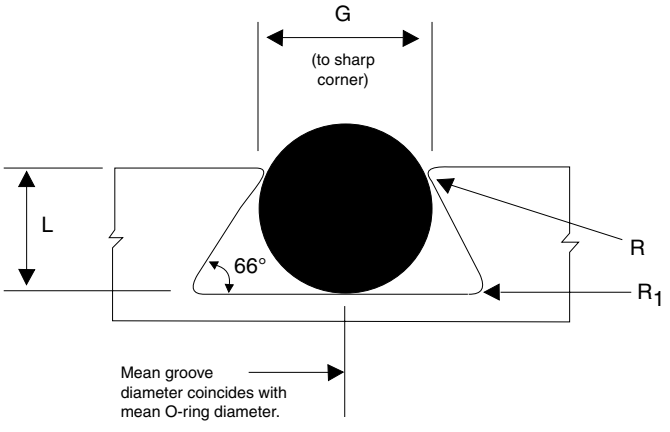
O-Ring Dovetail Grooves



Finishes are RMS values

It is often necessary to provide some mechanical means for holding an o-ring in a face seal groove during assembly and maintenance of equipment. An undercut or dovetail groove has proven beneficial in many applications to keep the o-ring in place. This is an expensive groove to machine, however, and thus should be used only when absolutely necessary.

It should be noted that although this method has been used successfully, it is not generally recommended. The inherent characteristics of the groove design limit the amount of void area. Normally acceptable tolerance extremes, wide service temperature ranges and fluid media that cause high swell of the elastomer are conditions that cannot be tolerated in this type of groove design.

NOTE: If needed, Applications Engineering can recommend where to purchase dovetail cutters.

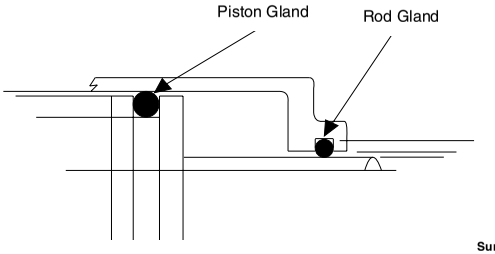
O-Ring Dovetail Grooves

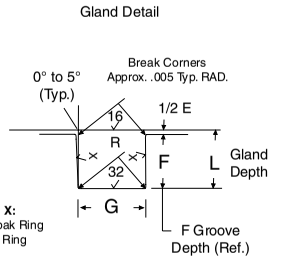
Radius "R" is CRITICAL. Insufficient radius will potentially cause damage to the O-ring during installation, while excessive radius may contribute to extrusion.

O-Ring Size AS568B	W Cross Section		L Gland Depth	Squeeze %	G Gland Width (to sharp corner)	R	R1
	Nominal	Actual					
004 - 050	1/16	.070 ± .003	.050 to .052	27	.055 to .059	.005	1/64
102 - 178	3/32	.103 ± .003	.081 to .083	21	.083 to .087	.010	1/64
201 - 284	1/8	.139 ± .004	.111 to .113	20	.113 to .117	.010	1/32
309 - 395	3/16	.210 ± .005	.171 to .173	18	.171 to .175	.015	1/32
425 - 475	1/4	.275 ± .006	.231 to .234	16	.231 to .235	.015	1/16
Special	3/8	.375 ± .007	.315 to .319	16	.315 to .319	.020	3/32

Note: These design recommendations assume metal-to-metal contact. In some hard vacuum applications, it may be necessary to increase compression on the seal to achieve proper sealing. Contact a Parker Applications Engineer for more information.

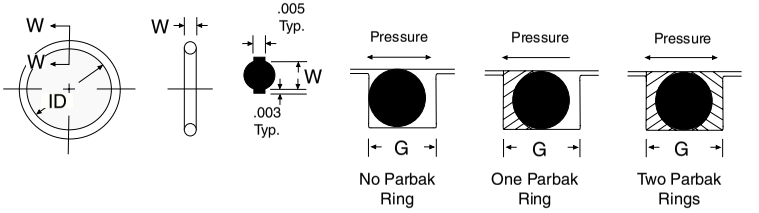
Industrial Reciprocating O-Ring Packing Glands





Surface Finish X:
32 Without Parbak Ring
63 With Parbak Ring

Finishes are RMS values



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ORD 5712
O-Ring Material Offering Guide

Industrial Reciprocating O-Ring Packing Glands

O-Ring 2-Size AS568B	W Cross-Section		L Gland	Squeeze		E (a) Diametral Clearance	G - Groove Width			R Groove	Max. Eccentricity (b)
							No Parbak	1 Parbak	2 Parbak		
	Nominal	Actual	Depth	Actual	%		Ring (G)	Ring (G1)	Rings (G2)	Radius	
006 to 012	1/16	.070 ± .003	.055 to .057	.010 to .018	15 - 25	.002 to .005	.093 to .098	.138 to .143	.205 to .210	.005 to .015	.002
104 to 116	3/32	.103 ± .003	.088 to .090	.010 to .018	10 - 17	.002 to .005	.140 to .145	.171 to .176	.238 to .243	.005 to .015	.002
201 to 222	1/8	.139 ± .004	.121 to .123	.012 to .022	9 - 16	.003 to .006	.187 to .192	.208 to .213	.275 to .280	.010 to .025	.003
309 to 349	3/16	.210 ± .005	.185 to .188	.017 to .030	8 - 14	.003 to .006	.281 to .286	.311 to .316	.410 to .415	.020 to .035	.004
425 to 460	1/4	.275 ± .006	.237 to .240	.029 to .044	11 - 16	.004 to .007	.375 to .380	.408 to .413	.538 to .543	.020 to .035	.005

(a) Clearance (extrusion gap) must be held to a minimum consistent with design requirements for temperature range variation.
(b) Total indicator reading between groove and adjacent bearing surface.
(c) O-rings not listed are not recommended for reciprocating applications.

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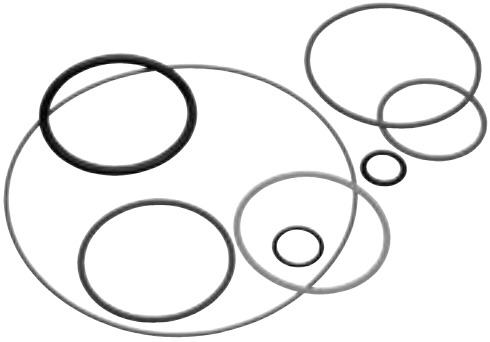
General Notes

Sizing Charts



The following charts provide dimensions for standard shrinkage materials only. These correspond to AS568 dimensions. O-rings manufactured from compounds with different shrinkage rates will provide slightly different dimensions and tolerances when standard tooling is used. Custom tooling may be necessary for some compounds in order to meet AS568 dimensions and tolerances. For further information contact a Parker O-Ring Applications Engineer.

2-xxx Sizes, Cross-Section: .070 ± .003 in (1,78 ± 0,08mm)				
Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm
2-001*	.029	.004	0,74	0,10
2-002*	.042	.004	1,07	0,10
2-003*	.056	.004	1,42	0,10
2-004	.070	.005	1,78	0,13
2-005	.101	.005	2,57	0,13
2-006	.114	.005	2,90	0,13
2-007	.145	.005	3,68	0,13
2-008	.176	.005	4,47	0,13
2-009	.208	.005	5,28	0,13
2-010	.239	.005	6,07	0,13
2-011	.301	.005	7,65	0,13
2-012	.364	.005	9,25	0,13
2-013	.426	.005	10,82	0,13
2-014	.489	.005	12,42	0,13
2-015	.551	.007	14,00	0,18
2-016	.614	.009	15,60	0,23
2-017	.676	.009	17,17	0,23
2-018	.739	.009	18,77	0,23
2-019	.801	.009	20,35	0,23
2-020	.864	.009	21,95	0,23
2-021	.926	.009	23,52	0,23
2-022	.989	.010	25,12	0,25
2-023	1.051	.010	26,70	0,25
2-024	1.114	.010	28,30	0,25
2-025	1.176	.011	29,87	0,28

2-xxx Sizes, Cross-Section: .070 ± .003 in (1,78 ± 0,08mm)				
Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm
2-026	1.239	.011	31,47	0,28
2-027	1.301	.011	33,05	0,28
2-028	1.364	.013	34,65	0,33
2-029	1.489	.013	37,82	0,33
2-030	1.614	.013	41,00	0,33
2-031	1.739	.015	44,17	0,38
2.032	1.864	.015	47,35	0,38
2-033	1.989	.018	50,52	0,46
2-034	2.114	.018	53,70	0,46
2-035	2.239	.018	56,87	0,46
2-036	2.364	.018	60,05	0,46
2-037	2.489	.018	63,22	0,46
2-038	2,614	.020	66,40	0,51
2-039	2.739	.020	69,57	0,51
2-040	2.864	.020	72,75	0,51
2-041	2.989	.024	75,92	0,61
2-042	3.239	.024	82,27	0,61
2-043	3.489	.024	88,62	0,61
2-044	3.739	.027	94,97	0,69
2-045	3.989	.027	101,32	0,69
2-046	4.239	.030	107,67	0,76
2-047	4.489	.030	114,02	0,76
2-048	4.739	.030	120,37	0,76
2-049	4.989	.037	126,72	0,94
2-050	5.239	.037	133,07	0,94

(a) The rubber compound must be added when ordering by the 2-size number (i.e., N0674 2-007).

(b) This chart provides dimensions for standard (AN) shrinkage materials ONLY. These correspond to AS568 dimensions. O-rings manufactured out of compounds with different shrinkage rates (other than AN) will produce slightly different dimensions and tolerances. For more information on shrinkage rates, see Parker O-Ring Handbook (ORD 5700).

* Please note: for 2-001 cross-section width = .040 in (1,02 mm)
for 2-002 cross-section width = .050 in (1,27 mm)
for 2-003 cross-section width = .060 in (1,52 mm)

2-xxx Sizes, Cross-Section: .103 ± .003 in (2,62 ± 0,08mm)				
Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm
2-102	.049	.005	1,24	0,13
2-103	.081	.005	2,06	0,13
2-104	.112	.005	2,84	0,13
2-105	.143	.005	2,84	0,13
2-106	.174	.005	4,42	0,13
2-107	.206	.005	5,23	0,13
2-108	.237	.005	6,02	0,13
2-109	.299	.005	7,59	0,13
2-110	.362	.005	9,19	0,13
2-111	.424	.005	10,77	0,13
2-112	.487	.005	12,37	0,13
2-113	.549	.007	13,94	0,18
2-114	.612	.009	15,54	0,23
2-115	.674	.009	17,12	0,23
2-116	.737	.009	18,72	0,23
2-117	.799	.010	20,30	0,25
2-118	.862	.010	21,89	0,25
2-119	.924	.010	23,47	0,25
2-120	.987	.010	25,07	0,25
2-121	1.049	.010	26,64	0,25
2-122	1.112	.010	28,24	0,25
2-123	1.174	.012	29,82	0,30
2-124	1.237	.012	31,42	0,30
2-125	1.299	.012	32,99	0,30
2-126	1.362	.012	34,59	0,30
2-127	1.424	.012	36,17	0,30
2-128	1.487	.012	37,77	0,30
2-129	1.549	.015	39,34	0,38
2-130	1.612	.015	40,94	0,38
2-131	1.674	.015	42,52	0,38
2-132	1.737	.015	44,12	0,38
2-133	1.799	.015	45,69	0,38
2-134	1.862	.015	47,29	0,38
2-135	1.925	.017	48,90	0,43
2-136	1.987	.017	50,47	0,43
2-137	2.050	.017	52,07	0,43
2-138	2.112	.017	53,64	0,43
2-139	2.175	.017	55,25	0,43
2-140	2.237	.017	56,82	0,43

2-xxx Sizes, Cross-Section: .103 ± .003 in (2,62 ± 0,08mm)				
Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm
2-141	2.300	.020	58,42	0,51
2-142	2.362	.020	59,99	0,51
2-143	2.425	.020	61,60	0,51
2-144	2.487	.020	63,17	0,51
2-145	2.550	.020	64,77	0,51
2-146	2.612	.020	66,34	0,51
2-147	2.675	.022	67,95	0,56
2-148	2.737	.022	69,52	0,56
2-149	2.800	.022	71,12	0,56
2-150	2.862	.022	72,69	0,56
2-151	2.987	0.24	75,87	0,61
2-152	3.237	.024	82,22	0,61
2-153	3.487	.024	88,57	0,61
2-154	3.737	.028	94,92	0,71
2-155	3.987	.028	101,27	0,71
2-156	4.237	.030	107,62	0,76
2-157	4.487	.030	113,97	0,76
2-158	4.737	.030	120,32	0,76
2-159	4.987	.035	126,67	0,89
2-160	5.237	.035	133,02	0,89
2-161	5.487	.035	139,37	0,89
2-162	5.737	.035	145,72	0,89
2-163	5.987	.035	152,07	0,89
2-164	6.237	.040	158,42	1,02
2-165	6.487	.040	167,77	1,02
2-166	6.737	.040	171,12	1,02
2-167	6.987	.040	177,47	1,02
2-168	7.237	.045	183,82	1,14
2-169	7.487	.045	190,17	1,14
2-170	7.737	.045	196,52	1,14
2-171	7.987	.045	202,87	1,14
2-172	8.237	.050	209,22	1,27
2-173	8.487	.050	215,57	1,27
2-174	8.737	.050	221,92	1,27
2-175	8.987	.050	228,27	1,27
2-176	9.237	.055	234,62	1,40
2-177	9.487	.055	240,97	1,40
2-178	9.737	.055	247,32	1,40

2-xxx Sizes, Cross-Section: .139 ± .004 in (3,53 ± 0,10mm)					2-xxx Sizes, Cross-Section: .139 ± .004 in (3,53 ± 0,10mm)				
Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm	Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm
2-201	.171	.055	4,34	0,13	2-243	4.109	.028	104,37	0,71
2-202	.234	.005	5,94	0,13	2-244	4.234	.030	107,54	0,76
2-203	.296	.005	7,52	0,13	2-245	4.359	.030	110,72	0,76
2-204	.359	.005	9,12	0,13	2-246	4.484	.030	113,89	0,76
2-205	.421	.005	10,69	0,13	2-247	4.609	.030	117,07	0,76
2-206	.484	.005	12,29	0,13	2-248	4.734	.030	120,24	0,76
2-207	.546	.007	13,87	0,18	2-249	4.859	.035	123,42	0,89
2-208	.609	.009	15,47	0,23	2-250	4.984	.035	126,59	0,89
2-209	.671	.009	17,04	0,23	2-251	5.109	.035	129,77	0,89
2-210	.734	.010	18,64	0,25	2-252	5.234	.035	132,94	0,89
2-211	.796	.010	20,22	0,25	2-253	5.359	.035	136,12	0,89
2-212	.859	.010	21,82	0,25	2-254	5.484	.035	139,29	0,89
2-213	.921	.010	23,39	0,25	2-255	5.609	.035	142,47	0,89
2-214	.984	.010	24,99	0,25	2-256	5.734	.035	145,64	0,89
2-215	1.046	.010	26,57	0,25	2-257	5.859	.035	148,82	0,89
2-216	1.109	.012	28,17	0,30	2-258	5.984	.035	151,99	0,89
2-217	1.171	.012	29,74	0,30	2-259	6.234	.040	158,34	1,02
2-218	1.234	.012	31,34	0,30	2-260	6.484	.040	164,69	1,02
2-219	1.296	.012	32,92	0,30	2-261	6.734	.040	171,04	1,02
2-220	1.359	.012	34,52	0,30	2-262	6.984	.040	177,39	1,02
2-221	1.421	.012	36,09	0,30	2-263	7.234	.045	183,74	1,14
2-222	1.484	.015	37,69	0,38	2-264	7.484	.045	190,09	1,14
2-223	1.609	.015	40,87	0,38	2-265	7.734	.045	196,44	1,14
2-224	1.734	.015	44,04	0,38	2-266	7.984	.045	202,79	1,14
2-225	1.859	.018	47,22	0,38	2-267	8.234	.050	209,14	1,27
2-226	1.984	.018	50,39	0,46	2-268	8.484	.050	215,49	1,27
2-227	2.109	.018	53,57	0,46	2-269	8.734	.050	221,84	1,27
2-228	2.234	.020	56,74	0,51	2-270	8.984	.050	228,19	1,27
2-229	2.359	.020	59,92	0,51	2-271	9.234	.055	234,54	1,40
2-230	2.484	.020	63,09	0,51	2-272	9.484	.055	240,89	1,40
2-231	2.609	.020	66,27	0,51	2-273	9.734	.055	247,24	1,40
2-232	2.734	.024	69,44	0,60	2-274	9.984	.055	253,59	1,40
2-233	2.859	.024	72,62	0,61	2-275	10.484	.055	266,29	1,40
2-234	2.984	.024	75,79	0,61	2-276	10.984	.065	278,99	1,65
2-235	3.109	.024	78,97	0,61	2-277	11.484	.065	291,69	1,65
2-236	3.234	.024	82,14	0,61	2-278	11.984	.065	304,39	1,65
2.237	3.359	.024	85,32	0,61	2-279	12.984	.065	329,79	1,65
2-238	3.484	.024	88,49	0,61	2-280	13.984	.065	355,19	1,65
2-239	3.609	.028	91,67	0,71	2-281	14.984	.065	380,59	1,65
2-240	3.734	.028	94,84	0,71	2-282	15.955	.075	405,26	1,91
2-241	3.859	.028	98,02	0,71	2-283	16.955	.080	430,66	2,03
2-242	3.984	.028	101,19	0,71	2-284	17.955	.085	456,06	2,16

2-xxx Sizes, Cross-Section: .210 ± .005 in (5,33 ± 0,13mm)					2-xxx Sizes, Cross-Section: .210 ± .005 in (5,33 ± 0,13mm)				
Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm	Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm
2-309	.412	.005	10,46	0,13	2-353	4.975	.037	126,37	0,94
2-310	.475	.005	12,07	0,13	2-354	5.100	.037	129,54	0,94
2-311	.537	.007	13,64	0,18	2-355	5.225	.037	132,72	0,94
2-312	.600	.009	15,24	0,23	2-356	5.350	.037	135,89	0,94
2-313	.662	.009	16,81	0,23	2-357	5.475	.037	139,07	0,94
2-314	.725	.010	18,42	0,25	2-358	5.600	.037	142,24	0,94
2-315	.787	.010	19,99	0,25	2-359	5.725	.037	145,42	0,94
2-316	.850	.010	21,59	0,25	2-360	5.850	.037	148,59	0,94
2-317	.912	.010	23,16	0,25	2-361	5.975	.037	151,77	0,94
2-318	.975	.010	24,77	0,25	2-362	6.225	.040	158,12	1,02
2-319	1.037	.010	26,34	0,25	2-363	6.475	.040	164,47	1,02
2-320	1.100	.012	27,94	0,30	2-364	6.725	.040	170,82	1,02
2-321	1.162	.012	29,51	0,30	2-365	6.975	.040	177,17	1,02
2-322	1.225	.012	31,12	0,30	2-366	7.225	.045	183,52	1,14
2-323	1.287	.012	32,69	0,30	2-367	7.475	.045	189,87	1,14
2-324	1.350	.012	34,29	0,30	2-368	7.725	.045	196,22	1,14
2-325	1.475	.015	37,47	0,38	2-369	7.975	.045	202,57	1,14
2-326	1.600	.015	40,64	0,38	2-370	8.225	.050	208,92	1,27
2-327	1.725	.015	43,82	0,38	2-371	8.475	.050	215,27	1,27
2-328	1.850	.015	46,99	0,38	2-372	8.725	.050	221,62	1,27
2-329	1.975	.018	50,17	0,46	2-373	8.975	.050	227,97	1,27
2-330	2.10	.018	53,34	0,46	2-374	9.225	.055	234,32	1,40
2-331	2.225	.018	56,52	0,46	2-375	9.475	.055	240,67	1,40
2-332	2.350	.018	59,69	0,46	2-376	9.725	.055	247,02	1,40
2-333	2.475	.020	62,87	0,51	2-377	9.975	.055	253,37	1,40
2-334	2.600	.020	66,04	0,51	2-378	10.475	.060	266,07	1,52
2-335	2.725	.020	69,22	0,51	2-379	10.975	.060	278,77	1,52
2-336	2.850	.020	72,39	0,61	2-380	11.475	.065	291,47	1,65
2-337	2.975	.024	75,57	0,61	2-381	11.975	.065	304,17	1,65
2-338	3.100	.024	78,74	0,61	2-382	12.975	.065	329,57	1,65
2-339	3.225	.024	81,92	0,61	2-383	13.975	.070	354,97	1,78
2-340	3.350	.024	85,09	0,61	2-384	14.975	.070	380,37	1,78
2-341	3.475	.024	88,27	0,61	2-385	15.955	.075	405,26	1,91
2-342	3.600	.028	91,44	0,71	2-386	16.955	.080	430,66	2,03
2-343	3.725	.028	94,62	0,71	2-387	17.955	.085	456,06	2,16
2-344	3.850	.028	97,79	0,71	2-388	18.955	.090	481,41	2,29
2-345	3.975	.028	100,97	0,71	2-389	19.955	.095	506,81	2,41
2-346	4.100	.028	104,14	0,71	2-390	20.955	.095	532,21	2,41
2-347	4.225	.030	107,32	0,76	2-391	21.955	.100	557,61	2,54
2-348	4.350	.030	110,49	0,76	2-392	22.940	.105	582,68	2,67
2-349	4.475	.030	113,67	0,76	2-393	23.940	.110	608,08	2,79
2-350	4.600	.030	116,84	0,76	2-394	24.940	.115	633,48	2,92
2-351	4.725	.030	120,02	0,76	2-395	25.940	.120	658,88	3,05
2-352	4.850	.030	123,19	0,76					

2-xxx Sizes, Cross-Section: .275 ± .006 in (6,99 ± 0,15mm)					2-xxx Sizes, Cross-Section: .275 ± .006 in (6,99 ± 0,15mm)				
Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm	Parker No.	Inside Dia. in.	Tol. ± in.	Inside Dia. mm	Tol. ± mm
2-425	4.475	.033	113,67	0,84	2-451	10.975	.060	278,77	1,52
2-426	4.600	.033	116,84	0,84	2-452	11.475	.060	291,47	1,52
2-427	4.725	.033	120,02	0,84	2-453	11.975	.060	304,17	1,52
2-428	4.850	.033	123,19	0,84	2-454	12.475	.060	316,87	1,52
2-429	4.975	.037	126,37	0,94	2-455	12.975	.060	329,57	1,52
2-430	5.100	.037	129,54	0,94	2-456	13.475	.070	342,27	1,78
2-431	5.225	.037	132,72	0,94	2-457	13.975	.070	354,97	1,78
2-432	5.350	.037	135,89	0,94	2-458	14.475	.070	367,67	1,78
2-433	5.475	.037	139,07	0,94	2-459	14.975	.070	380,37	1,78
2-434	5.600	.037	142,24	0,94	2-460	15.475	.070	393,07	1,78
2-435	5.725	.037	145,42	0,94	2-461	15.955	.075	405,26	1,91
2-436	5.850	.037	148,59	0,94	2-462	16.455	.075	417,96	1,91
2-437	5.975	.037	151,77	0,94	2-463	16.955	.080	430,66	2,03
2-438	6.225	.040	158,12	1,02	2-464	17.455	.085	443,36	2,16
2-439	6.475	.040	164,47	1,02	2-465	17.955	.085	456,06	2,16
2-440	6.725	.040	170,82	1,02	2-466	18.455	.085	468,76	2,16
2-441	6.975	.040	177,17	1,02	2-467	18.955	.090	481,46	2,29
2-442	7.225	.045	183,52	1,14	2-468	19.455	.090	494,16	2,29
2-443	7.475	.045	189,87	1,14	2-469	19.955	.095	506,86	2,41
2-444	7.725	.045	196,22	1,14	2-470	20.955	.095	532,26	2,41
2-445	7.975	.045	202,57	1,14	2-471	21.955	.100	557,66	2,54
2-446	8.475	.055	215,27	1,40	2-472	22.940	.105	582,68	2,67
2-447	8.975	.055	227,97	1,40	2-473	23.940	.110	608,08	2,79
2-448	9.475	.055	240,67	1,40	2-474	24.940	.115	633,48	2,92
2-449	9.975	.055	253,37	1,40	2-475	25.940	.120	658,88	3,05
2-450	10.475	.060	266,07	1,52					

The following charts provide dimensions for standard shrinkage materials only. These correspond to AS568B dimensions. O-rings manufactured from compounds with different shrinkage rates will provide slightly different dimensions and tolerances when standard tooling is used. Custom tooling may be necessary for some compounds in order to meet AS568B dimensions and tolerances. Contact a Parker O-Ring Applications Engineer with any questions.

3-9xx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	W mm	Tol. ± mm
3-901	.185	.005	.056	.003	4,70	0,13	1,42	0,08
3-902	.239	.005	.064	.003	6,07	0,13	1,63	0,08
3-903	.301	.005	.064	.003	7,65	0,13	1,63	0,08
3-904	.351	.005	.072	.003	8,92	0,13	1,83	0,08
3-905	.414	.005	.072	.003	10,52	0,13	1,83	0,08
3-906	.468	.005	.078	.003	11,89	0,13	1,98	0,08
3-907	.530	.007	.082	.003	13,46	0,18	2,08	0,08
3-908	.644	.009	.087	.003	16,36	0,23	2,21	0,08
3-909	.706	.009	.097	.003	17,93	0,23	2,46	0,08
3-910	.755	.009	.097	.003	19,18	0,23	2,46	0,08
3-911	.863	.009	.116	.004	21,92	0,23	2,95	0,10
3-912	.924	.009	.116	.004	23,47	0,23	2,95	0,10
3-913	.986	.010	.116	.004	25,04	0,26	2,95	0,10
3-914	1.047	.010	.116	.004	26,59	0,26	2,95	0,10
3-916	1.171	.010	.116	.004	29,74	0,26	2,95	0,10
3-918	1.355	.012	.116	.004	34,42	0,30	2,95	0,10
3-920	1.475	.014	.118	.004	37,47	0,36	3,00	0,10
3-924	1.720	.014	.118	.004	43,69	0,36	3,00	0,10
3-928	2.090	.018	.118	.004	53,09	0,46	3,00	0,10
3-932	2.337	.018	.118	.004	59,36	0,46	3,00	0,10

(a) The rubber compound must be added when ordering by the 3-size number (i.e., N0552 3-910).
(b) Material with unusual shrinkage during molding will give slightly different dimensions.

O-Rings for Metric Tube Fittings (ISO 6149) (Similar to SAE J2244)

Parker O-Ring Divison is tooled in these sizes for Nitrile and Fluorocarbon rubber only. Contact the division for availability.

Port Thread	O-Ring Name	Parker Part No.	ID mm	Tol. ± mm	W mm	Tol. ± mm
M8x1	M8 ISO O-Ring	0024-0063	6,10	0,13	1,60	0,08
M10x1	M10 ISO O-Ring	0031-9063	8,10	0,13	1,60	0,08
M12x1.5	M12 ISO O-Ring	0036-6087	9,30	0,13	2,20	0,08
M14x1.5	M14 ISO O-Ring	0044-5087	11,30	0,13	2,20	0,08
M16x1.5	M16 ISO O-Ring	0052-4087	13,30	0,15	2,20	0,08
M18x1.5	M18 ISO O-Ring	0060-2087	15,30	0,18	2,20	0,08
M22x1.5	M22 ISO O-Ring	0076-0087	19,30	0,20	2,20	0,08
M27x2	M27 ISO O-Ring	0092-9114	23,60	0,23	2,90	0,10
M33x2	M33 ISO O-Ring	0116-5114	29,60	0,30	2,90	0,10
M42x2	M42 ISO O-Ring	0152-0114	38,60	0,36	2,90	0,10
M48x2	M48 ISO O-Ring	0175-6114	44,60	0,41	2,90	0,10
M60x2	M60 ISO O-Ring	0222-8114	56,60	0,46	2,90	0,10

Parker Series 5-XXX O-Ring Sizes

The following 5-XXX sizes are o-rings of non-standard dimensions for which Parker tooling was available as of April 1, 2004. This tooling will be maintained while volume demand continues. A mold scrapped as defective will not be replaced unless demand justifies the expense. Please note 5-XXX tooling does not exist for Parofluor Family compounds.

Note: These molds are cut to allow for standard "AN" shrinkage and in materials having standard shrinkage they will normally produce rings to the dimensions listed. Materials with other than standard shrinkage will give different dimensions and tolerances. Please consult the factory or your local Parker Distributor for the availability of special sizes not included in this list.

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-118	0.059	0.004	0.040	0.003	1.50	0.10	1.02	0.08
5-187	0.070	0.005	0.036	0.003	1.78	0.13	0.91	0.08
5-051	0.070	0.005	0.040	0.003	1.78	0.13	1.02	0.08
5-101	0.100	0.005	0.038	0.003	2.54	0.13	0.97	0.08
5-578	0.102	0.005	0.074	0.003	2.59	0.13	1.88	0.08
5-632	0.110	0.005	0.040	0.003	2.79	0.13	1.02	0.08
5-102	0.116	0.005	0.038	0.003	2.95	0.13	0.97	0.08
5-178	0.120	0.005	0.040	0.003	3.05	0.13	1.02	0.08
5-683	0.122	0.005	0.063	0.003	3.10	0.13	1.60	0.08
5-646	0.126	0.005	0.040	0.003	3.20	0.13	1.02	0.08
5-103	0.128	0.005	0.050	0.003	3.25	0.13	1.27	0.08
5-190	0.132	0.005	0.070	0.003	3.35	0.13	1.78	0.08
5-579	0.133	0.005	0.074	0.003	3.39	0.13	1.88	0.08
5-669	0.146	0.005	0.040	0.003	3.71	0.13	1.02	0.08
5-148	0.154	0.005	0.038	0.003	3.91	0.13	0.97	0.08
5-105	0.154	0.005	0.050	0.003	3.91	0.13	1.27	0.08
5-106	0.154	0.005	0.066	0.003	3.91	0.13	1.68	0.08
5-580	0.165	0.005	0.074	0.003	4.19	0.13	1.88	0.08
5-193	0.176	0.005	0.040	0.003	4.47	0.13	1.02	0.08
5-108	0.176	0.005	0.050	0.003	4.47	0.13	1.27	0.08
5-124	0.176	0.005	0.056	0.003	4.47	0.13	1.42	0.08
5-107	0.176	0.005	0.066	0.003	4.47	0.13	1.68	0.08
5-125	0.180	0.005	0.040	0.003	4.57	0.13	1.02	0.08
5-581	0.192	0.005	0.074	0.003	4.88	0.13	1.88	0.08
5-685	0.208	0.005	0.094	0.003	5.28	0.13	2.39	0.08
5-582	0.224	0.005	0.074	0.003	5.69	0.13	1.88	0.08

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-194	0.228	0.005	0.040	0.003	5.79	0.13	1.02	0.08
5-638	0.233	0.005	0.076	0.003	5.92	0.13	1.93	0.08
5-179	0.239	0.005	0.040	0.003	6.07	0.13	1.02	0.08
5-151	0.239	0.005	0.051	0.003	6.07	0.13	1.30	0.08
5-127	0.239	0.005	0.074	0.003	6.07	0.13	1.88	0.08
5-197	0.242	0.005	0.040	0.003	6.15	0.13	1.02	0.08
5-180	0.248	0.005	0.048	0.003	6.30	0.13	1.22	0.08
5-686	0.248	0.005	0.094	0.003	6.30	0.13	2.39	0.08
5-583	0.251	0.005	0.074	0.003	6.38	0.13	1.88	0.08
5-052	0.270	0.005	0.070	0.003	6.86	0.13	1.78	0.08
5-202	0.278	0.005	0.046	0.003	7.06	0.13	1.17	0.08
5-698	0.283	0.005	0.040	0.003	7.19	0.13	1.02	0.08
5-584	0.283	0.005	0.074	0.003	7.19	0.13	1.88	0.08
5-687	0.287	0.005	0.094	0.003	7.29	0.13	2.39	0.08
5-1004	0.290	0.005	0.045	0.003	7.39	0.13	1.14	0.08
5-056	0.301	0.005	0.038	0.003	7.65	0.13	0.97	0.08
5-710	0.301	0.005	0.054	0.003	7.65	0.13	1.37	0.08
5-673	0.305	0.005	0.074	0.003	7.75	0.13	1.88	0.08
5-204	0.312	0.005	0.036	0.003	7.92	0.13	0.91	0.08
5-205	0.312	0.005	0.092	0.003	7.92	0.13	2.34	0.08
5-160	0.312	0.005	0.103	0.003	7.92	0.13	2.62	0.08
5-712	0.313	0.005	0.051	0.003	7.95	0.13	1.30	0.08
5-585	0.314	0.005	0.074	0.003	7.98	0.13	1.88	0.08
5-664	0.320	0.005	0.070	0.003	8.13	0.13	1.78	0.08
5-1006	0.322	0.005	0.070	0.003	8.18	0.13	1.78	0.08
5-206	0.326	0.005	0.103	0.003	8.28	0.13	2.62	0.08
5-1007	0.330	0.005	0.050	0.003	8.38	0.13	1.27	0.08
5-133	0.332	0.005	0.031	0.003	8.43	0.13	0.79	0.08
5-612	0.344	0.005	0.070	0.003	8.74	0.13	1.78	0.08
5-586	0.350	0.005	0.074	0.003	8.89	0.13	1.88	0.08
5-587	0.350	0.005	0.106	0.004	8.89	0.13	2.69	0.10
5-018	0.352	0.005	0.113	0.004	8.94	0.13	2.87	0.10
5-699	0.353	0.005	0.094	0.003	8.97	0.13	2.39	0.08
5-700	0.354	0.005	0.118	0.004	8.99	0.13	3.00	0.10
5-716	0.362	0.005	0.118	0.004	9.19	0.13	3.00	0.10

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-057	0.364	0.005	0.045	0.003	9.25	0.13	1.14	0.08
5-209	0.370	0.005	0.040	0.003	9.40	0.13	1.02	0.08
5-211	0.375	0.005	0.187	0.005	9.53	0.13	4.75	0.13
5-212	0.384	0.005	0.070	0.003	9.75	0.13	1.78	0.08
5-614	0.391	0.005	0.103	0.003	9.93	0.13	2.62	0.08
5-718	0.395	0.005	0.040	0.003	10.03	0.13	1.02	0.08
5-134	0.410	0.005	0.031	0.003	10.41	0.13	0.79	0.08
5-588	0.413	0.005	0.106	0.004	10.49	0.13	2.69	0.10
5-002	0.416	0.005	0.059	0.003	10.57	0.13	1.50	0.08
5-215	0.418	0.005	0.094	0.003	10.62	0.13	2.39	0.08
5-218	0.425	0.005	0.025	0.003	10.80	0.13	0.64	0.08
5-682	0.426	0.005	0.040	0.003	10.82	0.13	1.02	0.08
5-058	0.426	0.005	0.050	0.003	10.82	0.13	1.27	0.08
5-613	0.437	0.005	0.070	0.003	11.10	0.13	1.78	0.08
5-1011	0.447	0.005	0.103	0.003	11.35	0.13	2.62	0.08
5-222	0.455	0.005	0.128	0.004	11.56	0.13	3.25	0.10
5-223	0.458	0.005	0.053	0.003	11.63	0.13	1.35	0.08
5-225	0.469	0.006	0.094	0.003	11.91	0.15	2.39	0.08
5-615	0.469	0.006	0.103	0.003	11.91	0.15	2.62	0.15
5-652	0.473	0.006	0.071	0.003	12.01	0.15	1.80	0.08
5-726	0.484	0.006	0.056	0.003	12.29	0.15	1.42	0.08
5-566	0.489	0.006	0.055	0.003	12.42	0.15	1.40	0.08
5-230	0.500	0.006	0.125	0.004	12.70	0.15	3.18	0.10
5-231	0.501	0.006	0.062	0.003	12.73	0.15	1.57	0.08
5-675	0.508	0.006	0.049	0.003	12.90	0.15	1.24	0.08
5-616	0.516	0.006	0.103	0.003	13.11	0.15	2.62	0.08
5-1014	0.525	0.007	0.071	0.003	13.34	0.18	1.80	0.08
5-135	0.526	0.007	0.031	0.003	13.36	0.18	0.79	0.08
5-162	0.554	0.007	0.070	0.003	14.07	0.18	1.78	0.08
5-239	0.570	0.007	0.106	0.004	14.48	0.18	2.69	0.10
5-156	0.575	0.007	0.060	0.003	14.61	0.18	1.52	0.08
5-563	0.583	0.007	0.040	0.003	14.81	0.18	1.02	0.08
5-735	0.583	0.007	0.103	0.003	14.81	0.18	2.62	0.08
5-736	0.590	0.007	0.070	0.003	14.99	0.18	1.78	0.08
5-591	0.594	0.007	0.106	0.004	15.09	0.18	2.69	0.10

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-609	0.600	0.007	0.094	0.003	15.24	0.18	2.39	0.08
5-242	0.600	0.007	0.105	0.004	15.24	0.18	2.67	0.10
5-021	0.603	0.007	0.125	0.004	15.32	0.18	3.18	0.10
5-243	0.604	0.007	0.103	0.003	15.34	0.18	2.62	0.08
5-676	0.610	0.007	0.058	0.003	15.49	0.18	1.47	0.08
5-247	0.623	0.007	0.125	0.004	15.82	0.18	3.18	0.10
5-248	0.625	0.007	0.050	0.003	15.88	0.18	1.27	0.08
5-617	0.625	0.007	0.103	0.003	15.88	0.18	2.62	0.08
5-250	0.627	0.007	0.062	0.003	15.93	0.18	1.57	0.08
5-251	0.631	0.007	0.062	0.003	16.03	0.18	1.57	0.08
5-005	0.640	0.007	0.080	0.003	16.26	0.18	2.03	0.08
5-136	0.643	0.007	0.031	0.003	16.33	0.18	0.79	0.08
5-643	0.650	0.007	0.045	0.003	16.51	0.18	1.14	0.08
5-252	0.652	0.007	0.070	0.003	16.56	0.18	1.78	0.08
5-254	0.660	0.007	0.064	0.003	16.76	0.18	1.63	0.08
5-592	0.665	0.007	0.106	0.004	16.89	0.18	2.69	0.10
5-256	0.707	0.008	0.103	0.003	17.96	0.20	2.62	0.08
5-594	0.720	0.008	0.141	0.004	18.29	0.20	3.58	0.10
5-257	0.722	0.008	0.113	0.004	18.34	0.20	2.87	0.10
5-593	0.724	0.008	0.106	0.004	18.39	0.20	2.69	0.10
5-181	0.725	0.008	0.040	0.003	18.42	0.20	1.02	0.08
5-964	0.744	0.008	0.109	0.004	18.90	0.20	2.77	0.10
5-263	0.750	0.008	0.061	0.003	19.05	0.20	1.55	0.08
5-264	0.752	0.008	0.070	0.003	19.10	0.20	1.78	0.08
5-266	0.766	0.008	0.080	0.003	19.46	0.20	2.03	0.08
5-137	0.775	0.008	0.031	0.003	19.69	0.20	0.79	0.08
5-595	0.779	0.008	0.141	0.004	19.79	0.20	3.58	0.10
5-006	0.796	0.008	0.080	0.003	20.22	0.20	2.03	0.08
5-751	0.820	0.009	0.150	0.005	20.83	0.23	3.81	0.13
5-003	0.836	0.009	0.059	0.003	21.23	0.23	1.50	0.08
5-596	0.838	0.009	0.141	0.004	21.29	0.23	3.58	0.10
5-708	0.850	0.009	0.045	0.003	21.59	0.23	1.14	0.08
5-753	0.857	0.009	0.123	0.004	21.77	0.23	3.12	0.10
5-273	0.879	0.009	0.040	0.003	22.33	0.23	1.02	0.08
5-022	0.890	0.009	0.125	0.004	22.61	0.23	3.18	0.10

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-138	0.898	0.009	0.031	0.003	22.81	0.23	0.79	0.08
5-597	0.905	0.009	0.141	0.004	22.99	0.23	3.58	0.10
5-598	0.968	0.010	0.141	0.004	24.59	0.25	3.58	0.10
5-278	0.979	0.010	0.103	0.003	24.87	0.25	2.62	0.08
5-139	0.987	0.010	0.031	0.003	25.07	0.25	0.79	0.08
5-709	1.000	0.010	0.055	0.003	25.40	0.25	1.40	0.08
5-677	1.004	0.010	0.081	0.003	25.50	0.25	2.06	0.08
5-279	1.004	0.010	0.218	0.005	25.50	0.25	5.54	0.13
5-761	1.010	0.010	0.062	0.003	25.65	0.25	1.57	0.08
5-618	1.016	0.010	0.139	0.004	25.81	0.25	3.53	0.10
5-599	1.031	0.010	0.141	0.004	26.19	0.25	3.58	0.10
5-004	1.070	0.010	0.065	0.003	27.18	0.25	1.65	0.08
5-763	1.080	0.010	0.050	0.003	27.43	0.25	1.27	0.08
5-600	1.094	0.010	0.141	0.004	27.79	0.25	3.58	0.10
5-140	1.112	0.010	0.031	0.003	28.24	0.25	0.79	0.08
5-601	1.153	0.012	0.141	0.004	29.29	0.30	3.58	0.10
5-291	1.186	0.012	0.070	0.003	30.12	0.30	1.78	0.08
5-1028	1.190	0.012	0.250	0.006	30.23	0.30	6.35	0.15
5-602	1.212	0.012	0.141	0.004	30.78	0.30	3.58	0.10
5-294	1.213	0.012	0.149	0.004	30.81	0.30	3.78	0.10
5-295	1.225	0.012	0.275	0.006	31.12	0.30	6.99	0.15
5-141	1.226	0.012	0.031	0.003	31.14	0.30	0.79	0.08
5-296	1.229	0.012	0.070	0.003	31.22	0.30	1.78	0.08
5-297	1.230	0.012	0.197	0.005	31.24	0.30	5.00	0.13
5-301	1.259	0.012	0.092	0.003	31.98	0.30	2.34	0.08
5-603	1.279	0.012	0.141	0.004	32.49	0.30	3.58	0.10
5-157	1.338	0.012	0.092	0.003	33.99	0.30	2.34	0.08
5-604	1.342	0.012	0.141	0.004	34.09	0.30	3.58	0.10
5-605	1.401	0.014	0.141	0.004	35.59	0.36	3.58	0.10
5-780	1.412	0.014	0.073	0.003	35.86	0.36	1.85	0.08
5-008	1.421	0.014	0.080	0.003	36.09	0.36	2.03	0.08
5-670	1.437	0.014	0.070	0.003	36.40	0.36	1.78	0.08
5-142	1.450	0.014	0.047	0.003	36.83	0.36	1.19	0.08
5-312	1.454	0.014	0.105	0.004	36.93	0.36	2.67	0.10
5-657	1.465	0.014	0.103	0.003	37.21	0.36	2.62	0.08

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-606	1.468	0.014	0.141	0.004	37.29	0.36	3.58	0.10
5-980	1.475	0.014	0.275	0.006	37.47	0.36	6.99	0.15
5-024	1.515	0.015	0.125	0.004	38.48	0.38	3.18	0.10
5-320	1.540	0.015	0.070	0.003	39.12	0.38	1.78	0.08
5-158	1.550	0.015	0.092	0.003	39.37	0.38	2.34	0.08
5-009	1.553	0.015	0.080	0.003	39.45	0.38	2.03	0.08
5-321	1.559	0.015	0.139	0.004	39.60	0.38	3.53	0.10
5-788	1.591	0.015	0.071	0.003	40.41	0.38	1.80	0.08
5-327	1.640	0.015	0.139	0.004	41.66	0.38	3.53	0.10
5-143	1.670	0.015	0.047	0.003	42.42	0.38	1.19	0.08
5-329	1.670	0.015	0.070	0.003	42.42	0.38	1.78	0.08
5-1018	1.671	0.015	0.139	0.004	42.44	0.38	3.53	0.10
5-330	1.674	0.015	0.210	0.005	42.52	0.38	5.33	0.13
5-671	1.680	0.015	0.080	0.003	42.67	0.38	2.03	0.08
5-025	1.765	0.016	0.125	0.004	44.83	0.41	3.18	0.10
5-035	1.786	0.016	0.139	0.004	45.36	0.41	3.53	0.10
5-1023	1.788	0.016	0.070	0.003	45.42	0.41	1.78	0.08
5-335	1.802	0.016	0.062	0.003	45.77	0.41	1.57	0.08
5-794	1.812	0.016	0.070	0.003	46.02	0.41	1.78	0.08
5-1042	1.817	0.016	0.257	0.006	46.15	0.41	6.53	0.15
5-795	1.850	0.016	0.070	0.003	46.99	0.41	1.78	0.08
5-981	1.850	0.016	0.275	0.006	46.99	0.41	6.99	0.15
5-011	1.860	0.016	0.080	0.003	47.24	0.41	2.03	0.08
5-337	1.873	0.016	0.062	0.003	47.57	0.41	1.57	0.08
5-1043	1.882	0.017	0.118	0.004	47.80	0.43	3.00	0.10
5-144	1.891	0.017	0.047	0.003	48.03	0.43	1.19	0.08
5-796	1.913	0.017	0.070	0.003	48.59	0.43	1.78	0.08
5-338	1.925	0.017	0.210	0.005	48.90	0.43	5.33	0.13
5-701	1.937	0.017	0.139	0.004	49.20	0.43	3.53	0.10
5-342	1.980	0.017	0.038	0.003	50.29	0.43	0.97	0.08
5-343	2.000	0.018	0.075	0.003	50.80	0.46	1.91	0.08
5-655	2.020	0.018	0.070	0.003	51.31	0.46	1.78	0.08
5-037	2.036	0.018	0.139	0.004	51.71	0.46	3.53	0.10
5-346	2.046	0.018	0.139	0.004	51.97	0.46	3.53	0.10
5-642	2.051	0.018	0.070	0.003	52.10	0.46	1.78	0.08

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-1044	2.060	0.018	0.139	0.004	52.32	0.46	3.53	0.10
5-027	2.140	0.018	0.125	0.004	54.36	0.46	3.18	0.10
5-1046	2.140	0.018	0.315	0.010	54.36	0.46	8.00	0.25
5-145	2.141	0.018	0.047	0.003	54.38	0.46	1.19	0.08
5-347	2.163	0.018	0.062	0.003	54.94	0.46	1.57	0.08
5-348	2.172	0.018	0.070	0.003	55.17	0.46	1.78	0.08
5-800	2.225	0.018	0.275	0.006	56.52	0.46	6.99	0.15
5-1047	2.281	0.020	0.093	0.003	57.94	0.51	2.36	0.08
5-015	2.296	0.020	0.080	0.003	58.32	0.51	2.03	0.08
5-702	2.312	0.020	0.139	0.004	58.72	0.51	3.53	0.10
5-039	2.411	0.020	0.139	0.004	61.24	0.51	3.53	0.10
5-354	2.471	0.020	0.070	0.003	62.76	0.51	1.78	0.08
5-355	2.524	0.020	0.103	0.003	64.11	0.51	2.62	0.08
5-805	2.535	0.020	0.070	0.003	64.39	0.51	1.78	0.08
5-703	2.563	0.020	0.139	0.004	65.10	0.51	3.53	0.10
5-358	2.576	0.020	0.082	0.003	65.43	0.51	2.08	0.08
5-361	2.671	0.022	0.139	0.004	67.84	0.56	3.53	0.10
5-159	2.683	0.022	0.115	0.004	68.15	0.56	2.92	0.10
5-982	2.725	0.022	0.275	0.006	69.22	0.56	6.99	0.15
5-807	2.782	0.022	0.103	0.003	70.66	0.56	2.62	0.08
5-704	2.812	0.022	0.139	0.004	71.42	0.56	3.53	0.10
5-697	2.878	0.022	0.080	0.003	73.10	0.56	2.03	0.08
5-367	2.924	0.022	0.103	0.003	74.27	0.56	2.62	0.08
5-705	2.937	0.022	0.139	0.004	74.60	0.56	3.53	0.10
5-368	3.020	0.024	0.103	0.003	76.71	0.61	2.62	0.08
5-044	3.036	0.024	0.139	0.004	77.11	0.61	3.53	0.10
5-369	3.037	0.024	0.103	0.003	77.14	0.61	2.62	0.08
5-810	3.041	0.024	0.062	0.003	77.24	0.61	1.57	0.08
5-1052	3.080	0.024	0.111	0.004	78.23	0.61	2.82	0.10
5-374	3.112	0.024	0.070	0.003	79.04	0.61	1.78	0.08
5-557	3.125	0.024	0.103	0.003	79.38	0.61	2.62	0.08
5-813	3.130	0.024	0.100	0.003	79.50	0.61	2.54	0.08
5-815	3.156	0.024	0.060	0.003	80.16	0.61	1.52	0.08
5-045	3.161	0.024	0.139	0.004	80.29	0.61	3.53	0.10
5-816	3.162	0.024	0.070	0.003	80.31	0.61	1.78	0.08

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-819	3.210	0.024	0.103	0.003	81.53	0.61	2.62	0.08
5-984	3.225	0.024	0.275	0.006	81.92	0.61	6.99	0.15
5-821	3.300	0.026	0.070	0.003	83.82	0.66	1.78	0.08
5-825	3.350	0.026	0.275	0.006	85.09	0.66	6.99	0.15
5-1053	3.354	0.026	0.070	0.003	85.19	0.66	1.78	0.08
5-380	3.363	0.026	0.155	0.005	85.42	0.66	3.94	0.13
5-979	3.443	0.026	0.275	0.006	87.45	0.66	6.99	0.15
5-381	3.475	0.026	0.275	0.006	88.27	0.66	6.99	0.15
5-985	3.600	0.026	0.275	0.006	91.44	0.66	6.99	0.15
5-031	3.640	0.028	0.125	0.004	92.46	0.71	3.18	0.10
5-828	3.661	0.028	0.090	0.003	92.99	0.71	2.29	0.08
5-986	3.725	0.028	0.275	0.006	94.62	0.71	6.99	0.15
5-390	3.957	0.028	0.147	0.004	100.51	0.71	3.73	0.10
5-987	3.975	0.028	0.275	0.006	100.97	0.71	6.99	0.15
5-831	4.020	0.030	0.147	0.004	102.11	0.76	3.73	0.10
5-1054	4.080	0.030	0.209	0.005	103.63	0.76	5.31	0.13
5-833	4.085	0.030	0.103	0.003	103.76	0.76	2.62	0.08
5-394	4.096	0.030	0.070	0.003	104.04	0.76	1.78	0.08
5-988	4.100	0.030	0.275	0.006	104.14	0.76	6.99	0.15
5-395	4.117	0.030	0.070	0.003	104.57	0.76	1.78	0.08
5-396	4.171	0.030	0.070	0.003	105.94	0.76	1.78	0.08
5-989	4.225	0.030	0.275	0.006	107.32	0.76	6.99	0.15
5-060	4.390	0.030	0.044	0.003	111.51	0.76	1.12	0.08
5-836	4.427	0.030	0.140	0.004	112.45	0.76	3.56	0.10
5-401	4.531	0.030	0.070	0.003	115.09	0.76	1.78	0.08
5-1060	4.609	0.033	0.150	0.004	117.07	0.84	3.81	0.10
5-842	4.664	0.035	0.122	0.004	118.47	0.89	3.10	0.10
5-844	4.682	0.035	0.140	0.004	118.92	0.89	3.56	0.10
5-402	4.750	0.035	0.188	0.005	120.65	0.89	4.78	0.13
5-848	4.875	0.035	0.060	0.003	123.83	0.89	1.52	0.08
5-850	4.925	0.035	0.260	0.006	125.10	0.89	6.60	0.15
5-403	4.930	0.035	0.103	0.003	125.22	0.89	2.62	0.08
5-851	4.984	0.035	0.147	0.004	126.59	0.89	3.73	0.10
5-852	5.030	0.035	0.210	0.005	127.76	0.89	5.33	0.13
5-853	5.057	0.035	0.233	0.006	128.45	0.89	5.92	0.15

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-407	5.249	0.035	0.123	0.004	133.32	0.89	3.12	0.10
5-408	5.265	0.035	0.139	0.004	133.73	0.89	3.53	0.10
5-410	5.340	0.035	0.070	0.003	135.64	0.89	1.78	0.08
5-412	5.414	0.035	0.103	0.003	137.52	0.89	2.62	0.08
5-855	5.444	0.035	0.124	0.004	138.28	0.89	3.15	0.10
5-856	5.465	0.035	0.070	0.003	138.81	0.89	1.78	0.08
5-413	5.475	0.035	0.164	0.005	139.07	0.89	4.17	0.13
5-414	5.487	0.035	0.062	0.003	139.37	0.89	1.57	0.08
5-858	5.500	0.035	0.168	0.005	139.70	0.89	4.27	0.13
5-416	5.553	0.035	0.120	0.004	141.05	0.89	3.05	0.10
5-062	5.604	0.040	0.070	0.003	142.34	1.02	1.78	0.08
5-417	5.616	0.040	0.127	0.004	142.65	1.02	3.23	0.10
5-063	5.750	0.040	0.070	0.003	146.05	1.02	1.78	0.08
5-862	5.789	0.040	0.252	0.006	147.04	1.02	6.40	0.15
5-421	5.882	0.040	0.110	0.004	149.40	1.02	2.79	0.10
5-573	5.968	0.040	0.070	0.003	151.59	1.02	1.78	0.08
5-567	5.985	0.040	0.070	0.003	152.02	1.02	1.78	0.08
5-428	6.361	0.040	0.108	0.004	161.57	1.02	2.74	0.10
5-666	6.520	0.040	0.070	0.003	165.61	1.02	1.78	0.08
5-869	6.609	0.045	0.139	0.004	167.87	1.14	3.53	0.10
5-434	7.108	0.045	0.275	0.006	180.54	1.14	6.99	0.15
5-696	7.110	0.045	0.103	0.003	180.59	1.14	2.62	0.08
5-691	7.139	0.045	0.072	0.003	181.33	1.14	1.83	0.08
5-873	7.230	0.045	0.070	0.003	183.64	1.14	1.78	0.08
5-975	7.425	0.045	0.260	0.006	188.60	1.14	6.60	0.15
5-875	7.580	0.050	0.210	0.005	192.53	1.27	5.33	0.13
5-438	7.613	0.050	0.070	0.003	193.37	1.27	1.78	0.08
5-439	7.640	0.050	0.125	0.004	194.06	1.27	3.18	0.10
5-877	7.802	0.050	0.104	0.003	198.17	1.27	2.64	0.08
5-445	8.277	0.050	0.275	0.006	210.24	1.27	6.99	0.15
5-880	8.350	0.050	0.275	0.006	212.09	1.27	6.99	0.15
5-575	8.875	0.055	0.070	0.003	225.42	1.40	1.78	0.08
5-450	9.071	0.055	0.062	0.003	230.40	1.40	1.57	0.08
5-635	9.370	0.055	0.103	0.003	238.00	1.40	2.62	0.08
5-883	9.820	0.060	0.103	0.003	249.43	1.52	2.62	0.08

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-884	9.984	0.060	0.070	0.003	253.59	1.52	1.78	0.08
5-885	10.171	0.060	0.139	0.004	258.34	1.52	3.53	0.10
5-886	10.178	0.060	0.112	0.004	258.52	1.52	2.84	0.10
5-457	10.232	0.060	0.139	0.004	259.89	1.52	3.53	0.10
5-458	10.340	0.060	0.139	0.004	262.64	1.52	3.53	0.10
5-887	10.343	0.060	0.275	0.006	262.71	1.52	6.99	0.15
5-165	10.359	0.060	0.139	0.004	263.12	1.52	3.53	0.10
5-889	10.372	0.060	0.104	0.003	263.45	1.52	2.64	0.08
5-976	10.425	0.060	0.260	0.006	264.80	1.52	6.60	0.15
5-890	10.606	0.060	0.103	0.003	269.39	1.52	2.62	0.08
5-623	10.630	0.060	0.139	0.004	270.00	1.52	3.53	0.10
5-464	10.656	0.060	0.070	0.003	270.66	1.52	1.78	0.08
5-891	10.734	0.060	0.139	0.004	272.64	1.52	3.53	0.10
5-466	10.749	0.060	0.210	0.005	273.03	1.52	5.33	0.10
5-469	10.883	0.060	0.103	0.003	276.43	1.52	2.62	0.08
5-471	10.995	0.060	0.149	0.004	279.27	1.52	3.78	0.10
5-894	10.996	0.060	0.103	0.003	279.30	1.52	2.62	0.10
5-474	11.331	0.060	0.275	0.006	287.81	1.52	6.99	0.15
5-898	11.335	0.060	0.103	0.003	287.91	1.52	2.62	0.08
5-069	11.750	0.070	0.139	0.004	298.45	1.78	3.53	0.10
5-482	12.109	0.070	0.139	0.004	307.57	1.78	3.53	0.10
5-164	12.160	0.070	0.210	0.005	308.86	1.78	5.33	0.13
5-901	12.234	0.070	0.139	0.004	310.74	1.78	3.53	0.10
5-485	12.260	0.070	0.139	0.004	311.40	1.78	3.53	0.10
5-486	12.299	0.070	0.137	0.004	312.39	1.78	3.48	0.10
5-902	12.360	0.070	0.210	0.005	313.94	1.78	5.33	0.13
5-487	12.380	0.070	0.139	0.004	314.45	1.78	3.53	0.10
5-488	12.463	0.070	0.103	0.003	316.56	1.78	2.62	0.08
5-569	12.475	0.070	0.139	0.004	316.87	1.78	3.53	0.10
5-905	12.623	0.070	0.140	0.004	320.62	1.78	3.56	0.10
5-906	12.705	0.070	0.070	0.003	322.71	1.78	1.78	0.08
5-907	12.725	0.070	0.275	0.006	323.22	1.78	6.99	0.15
5-908	12.840	0.070	0.139	0.004	326.14	1.78	3.53	0.10
5-611	12.900	0.070	0.159	0.005	327.66	1.78	4.04	0.13
5-619	12.915	0.070	0.139	0.004	328.04	1.78	3.53	0.10

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-492	13.248	0.070	0.139	0.004	336.50	1.78	3.53	0.10
5-070	13.270	0.070	0.139	0.004	337.06	1.78	3.53	0.10
5-910	13.375	0.070	0.210	0.005	339.73	1.78	5.33	0.13
5-071	13.410	0.070	0.139	0.004	340.61	1.78	3.53	0.10
5-072	13.460	0.070	0.210	0.005	341.88	1.78	5.33	0.13
5-493	13.490	0.070	0.139	0.004	342.65	1.78	3.53	0.10
5-494	13.541	0.070	0.210	0.005	343.94	1.78	5.33	0.13
5-496	13.616	0.070	0.141	0.004	345.85	1.78	3.58	0.10
5-498	13.650	0.070	0.139	0.004	346.71	1.78	3.53	0.10
5-912	13.734	0.070	0.139	0.004	348.84	1.78	3.53	0.10
5-1097	13.750	0.070	0.103	0.003	349.25	1.78	2.62	0.08
5-073	13.820	0.080	0.139	0.004	351.03	2.03	3.53	0.10
5-502	14.088	0.080	0.210	0.005	357.84	2.03	5.33	0.13
5-624	14.111	0.080	0.139	0.004	358.42	2.03	3.53	0.10
5-074	14.234	0.080	0.139	0.004	361.54	2.03	3.53	0.10
5-504	14.430	0.080	0.139	0.004	366.52	2.03	3.53	0.10
5-505	14.470	0.080	0.139	0.004	367.54	2.03	3.53	0.10
5-506	14.570	0.080	0.141	0.004	370.08	2.03	3.58	0.10
5-507	14.600	0.080	0.210	0.005	370.84	2.03	5.33	0.13
5-508	14.674	0.080	0.139	0.004	372.72	2.03	3.53	0.10
5-166	14.722	0.080	0.139	0.004	373.94	2.03	3.53	0.10
5-920	14.780	0.080	0.175	0.005	375.41	2.03	4.45	0.13
5-921	14.795	0.080	0.071	0.003	375.79	2.03	1.80	0.08
5-512	15.171	0.080	0.139	0.004	385.34	2.03	3.53	0.10
5-076	15.260	0.080	0.210	0.005	387.60	2.03	5.33	0.13
5-077	15.300	0.080	0.139	0.004	388.62	2.03	3.53	0.10
5-924	15.410	0.080	0.210	0.005	391.41	2.03	5.33	0.13
5-925	15.465	0.080	0.188	0.005	392.81	2.03	4.78	0.13
5-079	15.540	0.080	0.139	0.004	394.72	2.03	3.53	0.10
5-515	15.548	0.080	0.210	0.005	394.92	2.03	5.33	0.13
5-516	15.740	0.080	0.139	0.004	399.80	2.03	3.53	0.10
5-517	15.750	0.080	0.275	0.006	400.05	2.03	6.99	0.15
5-518	16.031	0.080	0.256	0.006	407.19	2.03	6.50	0.15
5-571	16.234	0.090	0.139	0.004	412.34	2.29	3.53	0.10
5-930	16.285	0.090	0.250	0.006	413.64	2.29	6.35	0.15

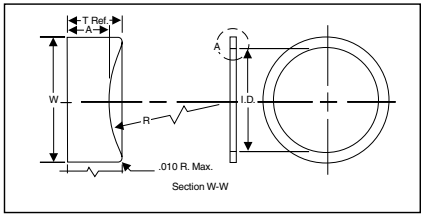
5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-520	16.435	0.090	0.139	0.004	417.45	2.29	3.53	0.10
5-522	16.507	0.090	0.225	0.006	419.28	2.29	5.72	0.15
5-524	16.640	0.090	0.210	0.005	422.66	2.29	5.33	0.13
5-622	16.750	0.090	0.275	0.006	425.45	2.29	6.99	0.15
5-525	16.765	0.090	0.125	0.004	425.83	2.29	3.18	0.10
5-935	17.100	0.090	0.275	0.006	434.34	2.29	6.99	0.15
5-526	17.250	0.090	0.187	0.005	438.15	2.29	4.75	0.13
5-082	17.250	0.090	0.240	0.006	438.15	2.29	6.10	0.15
5-937	17.390	0.090	0.139	0.004	441.71	2.29	3.53	0.10
5-529	17.455	0.090	0.139	0.004	443.36	2.29	3.53	0.10
5-1100	17.500	0.090	0.139	0.004	444.50	2.29	3.53	0.10
5-939	17.870	0.090	0.210	0.005	453.90	2.29	5.33	0.13
5-083	17.910	0.090	0.139	0.004	454.91	2.29	3.53	0.10
5-084	18.062	0.090	0.281	0.006	458.77	2.29	7.16	0.15
5-533	18.169	0.090	0.096	0.003	461.49	2.29	2.44	0.08
5-1102	18.265	0.090	0.210	0.005	463.93	2.29	5.33	0.13
5-085	18.350	0.090	0.210	0.005	466.09	2.29	5.33	0.13
5-534	18.405	0.090	0.210	0.005	467.49	2.29	5.33	0.13
5-1104	18.500	0.090	0.188	0.005	469.90	2.29	4.78	0.13
5-1105	18.635	0.090	0.139	0.004	473.33	2.29	3.53	0.10
5-943	18.870	0.100	0.275	0.006	479.30	2.54	6.99	0.15
5-944	18.880	0.100	0.139	0.004	479.55	2.54	3.53	0.10
5-947	19.380	0.100	0.139	0.004	492.25	2.54	3.53	0.10
5-541	19.500	0.100	0.250	0.006	495.30	2.54	6.35	0.15
5-086	19.580	0.100	0.210	0.005	497.33	2.54	5.33	0.13
5-948	19.725	0.100	0.210	0.005	501.02	2.54	5.33	0.13
5-950	19.960	0.100	0.139	0.004	506.98	2.54	3.53	0.10
5-1010	20.609	0.100	0.139	0.004	523.47	2.54	3.53	0.10
5-088	21.180	0.100	0.147	0.004	537.97	2.54	3.73	0.10
5-547	21.564	0.100	0.139	0.004	547.73	2.54	3.53	0.10
5-953	22.360	0.100	0.132	0.004	567.94	2.54	3.35	0.10
5-089	23.406	0.120	0.281	0.006	594.51	3.05	7.14	0.15
5-551	23.540	0.120	0.139	0.004	597.92	3.05	3.53	0.10
5-090	23.576	0.120	0.139	0.004	598.83	3.05	3.53	0.10
5-552	23.612	0.120	0.275	0.006	599.74	3.05	6.99	0.15

5-xxx Sizes								
Parker No.	ID in.	Tol. ± in.	Width in.	Tol. ± in.	ID mm	Tol. ± mm	Width mm	Tol. ± mm
5-167	23.780	0.120	0.375	0.007	604.01	3.05	9.52	0.18
5-169	25.153	0.120	0.214	0.005	638.89	3.05	5.44	0.13
5-091	25.474	0.120	0.139	0.004	647.04	3.05	3.53	0.10
5-170	25.500	0.120	0.275	0.006	647.70	3.05	6.99	0.15
5-171	26.125	0.120	0.275	0.006	663.58	3.05	6.99	0.15
5-173	26.188	0.120	0.210	0.005	665.18	3.05	5.33	0.13
5-631	26.408	0.120	0.139	0.004	670.76	3.05	3.53	0.10
5-172	27.485	0.120	0.275	0.006	698.12	3.05	6.99	0.15
5-092	27.625	0.120	0.275	0.006	701.68	3.05	6.99	0.15
5-955	28.801	0.140	0.275	0.006	731.55	3.56	6.99	0.15

General Notes

Parker Series 8-XXX Compounds Sizes

Developed primarily for service in petroleum based hydraulic fluids at -40°C to 121°C (-40°F to 250°F), Parker's standard Parbak N0300-90 and N1444-90 compounds provide the maximum benefits in back-up ring service. Compounds for use in other fluids and for temperatures up to 204°C (400°F) are available on request. Parbaks will stretch up to 50%, and are quickly and easily installed. Advantages of the contour design are obtained regardless of how Parbaks are installed — they may be installed with the concave face in either direction, toward or away from the O-ring.



Parbak sizes are designed to correspond with the Parker 2-xxx, 3-xxx and AS568B series O-ring with which they are used.

Complete call-out consists of the digit 8, the dash number for the size wanted and the rubber material.

Example: N0300 8-009

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.087	.049	.045	.003	.053	.003

Parker No.	ID in.	Tol. ±
8-004	.096	.005
8-005	.127	
8-006	.140	
8-007	.171	
8-008	.202	
8-009	.234	
8-010	.265	
8-011	.327	
8-012	.390	
8-013	.455	
8-014	.518	.007
8-015	.580	.009
8-016	.643	
8-017	.705	
8-018	.768	
8-019	.830	
8-020	.893	
8-021	.955	
8-022	1.018	.010
8-023	1.080	
8-024	1.143	
8-025	1.205	.011
8-026	1.268	
8-027	1.330	
8-028	1.393	.013
8-029	1.518	
8-030	1.643	
8-031	1.768	.015
8-032	1.893	
8-033	2.018	.018
8-034	2.143	
8-035	2.268	
8-036	2.393	
8-037	2.518	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.087	.049	.045	.003	.053	.003

Parker No.	ID in.	Tol. ±
8-038	2.643	.020
8-039	2.768	
8-040	2.893	
8-041	3.018	.024
8-042	3.268	
8-043	3.518	
8-044	3.768	.027
8-045	4.018	
8-046	4.268	.030
8-047	4.518	
8-048	4.768	
8-049	5.018	.037
8-050	5.268	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.129	.053	.045	.003	.086	.003

Parker No.	ID in.	Tol. ±
8-102	.077	.005
8-103	.109	
8-104	.140	
8-105	.171	
8-106	.202	
8-107	.234	
8-108	.265	
8-109	.327	
8-110	.390	
8-111	.452	
8-112	.515	
8-113	.577	.007
8-114	.640	.009
8-115	.702	
8-116	.765	
8-117	.831	.010
8-118	.893	
8-119	.956	
8-120	1.018	
8-121	1.081	
8-122	1.143	
8-123	1.206	.012
8-124	1.268	
8-125	1.331	
8-126	1.393	
8-127	1.456	
8-128	1.518	
8-129	1.581	.015
8-130	1.643	
8-131	1.706	
8-132	1.768	
8-133	1.831	
8-134	1.893	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.129	.053	.045	.003	.086	.003

Parker No.	ID in.	Tol. ±
8-135	1.956	.017
8-136	2.018	
8-137	2.081	
8-138	2.143	
8-139	2.206	
8-140	2.268	
8-141	2.331	.020
8-142	2.393	
8-143	2.456	
8-144	2.518	
8-145	2.581	
8-146	2.643	
8-147	2.706	.022
8-148	2.768	
8-149	2.831	
8-150	2.893	
8-151	3.018	.024
8-152	3.268	
8-153	3.518	
8-154	3.768	.028
8-155	4.018	
8-156	4.268	.030
8-157	4.518	
8-158	4.768	
8-159	5.018	.035
8-160	5.268	
8-161	5.518	
8-162	5.768	
8-163	6.018	
8-164	6.268	.040
8-165	6.518	
8-166	6.768	
8-167	7.018	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.129	.053	.045	.003	.086	.003

Parker No.	ID in.	Tol. ±
8-168	7.268	.045
8-169	7.518	
8-170	7.768	
8-171	8.018	
8-172	8.268	.050
8-173	8.518	
8-174	8.768	
8-175	9.018	
8-176	9.238	.055
8-177	9.518	
8-178	9.768	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.174	.050	.040	.003	.118	.004

Parker No.	ID in.	Tol. ±
8-201	.202	.005
8-202	.265	
8-203	.327	
8-204	.390	
8-205	.455	
8-206	.518	
8-207	.580	.007
8-208	.643	.009
8-209	.705	
8-210	.766	.010
8-211	.828	
8-212	.891	
8-213	.953	
8-214	1.016	
8-215	1.078	
8-216	1.141	.012
8-217	1.203	
8-218	1.266	
8-219	1.334	
8-220	1.397	
8-221	1.459	
8-222	1.522	.015
8-223	1.647	
8-224	1.772	
8-225	1.897	.018
8-226	2.022	
8-227	2.147	
8-228	2.272	.020
8-229	2.397	
8-230	2.522	
8-231	2.631	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.174	.050	.040	.003	.118	.004

Parker No.	ID in.	Tol. ±
8.232	2.756	.024
8-233	2.881	
8-234	3.006	
8-235	3.131	
8-236	3.256	
8-237	3.381	
8-238	3.506	
8-239	3.631	.028
8-240	3.756	
8-241	3.881	
8-242	4.006	
8-243	4.131	
8-244	4.256	.030
8-245	4.381	
8-246	4.506	
8-247	4.631	
8-248	4.768	
8-249	4.893	.035
8-250	5.018	
8-251	5.143	
8-252	5.268	
8-253	5.393	
8-254	5.518	
8-255	5.643	
8-256	5.768	
8-257	5.893	
8-258	6.018	
8-259	6.268	.040
8-260	6.518	
8-261	6.768	
8-262	7.018	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.174	.050	.040	.003	.118	.004

Parker No.	ID in.	Tol. ±
8-263	7.268	.045
8-264	7.518	
8-265	7.768	
8-266	8.018	
8-267	8.268	.050
8-268	8.518	
8-269	8.768	
8-270	9.018	
8-271	9.268	.055
8-272	9.518	
8-273	9.768	
8-274	10.018	
8-275	10.518	
8-276	11.018	.065
8-277	11.518	
8-278	12.018	
8-279	13.018	
8-280	14.018	
8-281	15.018	
8-282	15.989	.075
8-283	16.989	.080
8-284	17.989	.085

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.262	.076	.060	.004	.183	.005

Parker No.	ID in.	Tol. ±
8-309	.450	.005
8-310	.513	
8-311	.575	.007
8-312	.638	.009
8-313	.700	
8-314	.763	.010
8-315	.825	
8-316	.888	
8-317	.950	
8-318	1.013	
8-319	1.075	
8-320	1.138	.012
8-321	1.200	
8-322	1.263	
8-323	1.316	
8-324	1.388	
8-325	1.513	.015
8-326	1.638	
8-327	1.763	
8-328	1.888	
8-329	2.013	.018
8-330	2.138	
8-331	2.268	
8-332	2.393	
8-333	2.518	.020
8-334	2.643	
8-335	2.768	
8-336	2.893	
8-337	3.018	.024
8-338	3.143	
8-339	3.273	
8-340	3.398	
8-341	3.523	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.262	.076	.060	.004	.183	.005

Parker No.	ID in.	Tol. ±
8-342	3.648	.028
8-343	3.773	
8-344	3.989	
8-345	4.028	
8-346	4.153	
8-347	4.278	.030
8-348	4.403	
8-349	4.528	
8-350	4.653	
8-351	4.778	
8-352	4.903	
8-353	5.028	.037
5-354	5.153	
8-355	5.278	
8-356	5.403	
8-357	5.528	
8-358	5.653	
8-359	5.778	
8-360	5.903	
8-361	6.028	
8-362	6.278	.040
8-363	6.528	
8-364	6.778	
8-365	7.028	
8-366	7.278	.045
8-367	7.528	
8-368	7.778	
8-369	8.028	
8-370	8.278	.050
8-371	8.528	
8-372	8.778	
8-373	9.028	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.262	.076	.060	.004	.183	.005

Parker No.	ID in.	Tol. ±
8-374	9.278	.055
8-375	9.528	
8-376	9.778	
8-377	10.028	
8-378	10.528	.060
8-379	11.028	
8-380	11.528	.065
8-381	12.028	
8-382	13.028	
8-383	14.028	.070
8-384	15.028	
8-385	16.008	.075
8-386	17.008	.080
8-387	18.008	.085
8-388	19.006	.090
8-389	20.006	.095
8-390	21.006	
8-391	22.006	.100
8-392	22.993	.105
8-393	23.993	.110
8-394	24.993	.115
8-395	25.993	.120

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.344	.117	.096	.005	.236	.006

Parker No.	ID in.	Tol. ±
8-425	4.551	.003
8-426	4.676	
8-427	4.801	
8-428	4.926	
8-429	5.051	.037
8-430	5.176	
8-431	5.301	
8-432	5.426	
8-433	5.551	
8-434	5.676	
8-435	5.801	
8-436	5.926	
8-437	6.051	
8-438	6.274	.040
8-439	6.524	
8-440	6.774	
8-441	7.024	
8-442	7.274	.045
8-443	7.524	
8-444	7.774	
8-445	8.024	
8-446	8.524	.055
8-447	9.024	
8-448	9.524	
8-449	10.024	
8-450	10.524	.060
8-451	11.024	
8-452	11.524	
8-453	12.024	
8-454	12.524	
8-455	13.024	
8-456	13.524	.070
8-457	14.024	
8-458	14.524	
8-459	15.024	
8-460	15.524	

8-XXX Sizes					
R ± .010	Tol. Ref.	A in.	Tol. ±	Width in.	Tol. ±
.344	.117	.096	.005	.236	.006

Parker No.	ID in.	Tol. ±
8-461	16.004	.075
8-462	16.504	
8-463	17.004	.080
8-464	17.504	.085
8-465	18.004	
8-466	18.504	
8-467	19.004	.090
8-468	19.504	
8-469	20.004	.095
8-470	21.004	
8-471	22.004	.100
8-472	23.004	.105
8-473	24.004	.110
8-474	25.004	.115
8-475	26.004	.120

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