



UltraSeal™ Fittings

Catalog 4245-UltraSeal
June 2006



Parker
uhp

Introduction

Parker UHP products are designed as leak-free connections where ultra-high pure conditions are required. UltraSeal™ products, with their o-ring face seal design, and optional metal o-ring, provide a leak-free seal from vacuum to positive pressure.

Cleaning and Packing

Ultra-High Purity 'OMEGA' cleaning and packing in a class 100 clean room environment validated per Federal Standard 209E, is standard for all electropolished UltraSeal™ components.

Performance

Parker High Purity Components are rated to a helium leak rate of 1 x

10⁻⁹ cc/sec utilizing a helium mass spectrometer. Temperature ratings are governed by the choice of o-ring seal materials.

321 Stainless Steel (Silver or Nickel plated):	-350° to +1000° F (-212° to +538° C)
Fluorocarbon:	-15° to +400° F (-26° to +204° C)
PTFE:	-50° to +400° F (-46° to +232° C)

Pressure

Pressure ratings will be governed by the gland selected for a particular system. Working pressures are rated at room temperature based on a 4-to-1 design factor. Pressure ratings are calculated in accordance with A.N.S.I. Power Piping Code B31.1.










Materials










UltraSeal components are available in standard 316L, 316L VAR, and 316L VIM/VAR Stainless Steels. Consult your local Parker distributor or factory for details. Refer to tables 1 and 2 for respective material specifications of gaskets and o-rings.








Interior (I.D.) Surface Finishes

Parker High Purity components can be supplied with extremely low Ra internal surface finishes to meet requirements of ultra-high purity tubing systems. Electropolished internal surfaces can also be provided. Consult your local Parker distributor or the factory for more information.

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Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale" located on page 18.

WARNING

FAILURE, IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

Make-Up

For Leak-tight UltraSeal

Assemblies: A positive seal is achieved by advancing the nut no less than 1/4 turn from finger-tight position. When a sharp rise in torque is felt, the sealing faces have met and the o-ring seal is compressed into its groove.

UltraSeal is capable of repeated remakes; advance the nut to a finger-tight position and wrench until a sharp rise in torque is felt. No axial clearance is needed to remove components from a system; therefore, other system components are not disturbed.

Design

The UltraSeal coupling is designed to effect a helium leak-tight seal when the face of the gland makes full metal-to-metal contact with the face of the body, compressing the o-ring in the body groove.

The UltraSeal gland face and body o-ring groove are precision machined to accept either metallic (S.S.) or synthetic o-ring seals.

UltraSeal virtually eliminates turbulence and dead zones within the fitting. The bore diameter of body

and gland are matched in all sizes, providing a smoother flow path. At no point does the O-ring seal intrude into the flow path.

Disassembly

Position the o-ring UltraSeal Removal Tool against the seated o-ring and advance the nut to fingertight position. Continue to advance the nut until a sharp rise in torque is felt. The removal tool shoulder will seal against the body face preventing any over torque damage. The o-ring will "pinch" and release from the sealing groove.

TABLE 1

TYPICAL RAW Material SPECIFICATIONS			
FITTING Material	BAR STOCK	FORGINGS	RECOMMENDED TUBING SPECIFICATIONS
Stainless Steel 316 Stainless Steel 316L	ASTM A-276 TYPE 316 ASME SA-479 TYPE 316	ASME SA-182 GRADE F316	ASME SA-213 ASTM A-213 ASTM A-249
Stainless Steel 316L (VAR) Stainless Steel 316L (VIM/VAR)	ASME SA-479 TYPE 316L	ASME SA-182 GRADE F316L	ASTM A-269 MIL T-8504 MIL T-8506

MATERIAL IS MARKED WITH HEAT CODE TO ENSURE MATERIAL TRACEABILITY

TABLE 2

O-RINGS TYPICAL RAW Material SPECIFICATIONS / TEMPERATURE RATINGS		
	Material SPECIFICATIONS	TEMPERATURE RATINGS
Metal O-Rings	SAE AMS-5570 TYPE 321-SS (silver plated) SAE AMS-5576 TYPE 321-SS (silver plated)	(-350° to + 1000° F) (-212° to + 538° C)
Metal O-Rings	SAE AMS-5570 TYPE 321-SS (nickel plated) SAE AMS-5576 TYPE 321-SS (nickel plated)	(-350° to + 1000° F) (-212° to + 538° C)
Fluorocarbon O-Rings	MIL-R-25897 TYPE 1	(-15° to + 400° F) (-26° to + 204° C)
PTFE	SAE AMS-2651	(-50° to + 400° F) (-46° to + 232° C)

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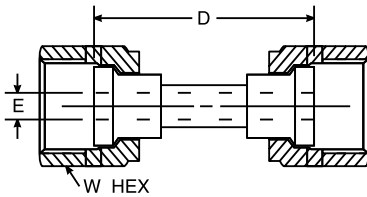
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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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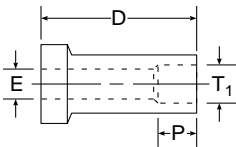
UltraSeal Gland Union (Welded) Q1HBQ1



Part No.	Inches		
	W Hex	D	*E Bore
4-4 Q1HBQ1	11/16	1.33	.18
6-6 Q1HBQ1	7/8	1.25	.25
8-8 Q1HBQ1	1	1.25	.31

*Note: Machined bore diameters to match machined bore in body.

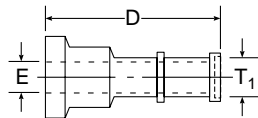
UltraSeal Gland to Weld-lok Socket Q1W



Part No.	T ₁ Tube OD	Inches			Working Pressure
		D	P	*E Bore	
4-2 Q1W	1/8	1	.16	.09	10,000
4-4 Q1W	1/4	1	.25	.18	7,700
6-4 Q1W	1/4	1	.28	.18	10,000
6-6 Q1W	3/8	1	.31	.25	5,000
8-4 Q1W	1/4	1	.25	.18	10,000
8-6 Q1W	3/8	1	.34	.31	9,500
8-8 Q1W	1/2	1	.41	.38	4,300
12-12 Q1W	3/4	1.50	.50	.50	4,600

*Note: Machined bore diameters to match machined bore in body.

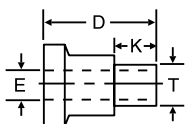
UltraSeal Gland to Automatic Buttweld Q1Y



Part No.	T ₁	Inches		**Auto Buttweld Wall Size	Working Pressure
		D	*E Bore		
4-4 Q1Y	1/4	1.13	.18	.035	7,700
6-4 Q1Y	1/4	1.19	.18	.035	7,700
6-6 Q1Y	3/8	1.19	.31	.035	4,900
8-4 Q1Y	1/4	1.19	.18	.035	7,700
8-6 Q1Y	3/8	1.19	.31	.035	4,900
8-8 Q1Y	1/2	1.34	.41	.049	5,000
12-12 Q1Y	3/4	1.50	.50	.065	3,900

*Note: Machine bore diameters to match machined bore in body.

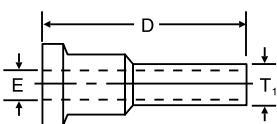
UltraSeal Gland to MiniButtweld Q1M



Part No.	Inches				Working Pressure
	D	*E Bore	T	K	
4-4 Q1M	.60	.18	.25	.25	5,400
6-6 Q1M	.62	.25	.38	.25	4,300
8-8 Q1M	.62	.31	.50	.25	3,600

*Note: Machined bore diameters to match machined bore in body.

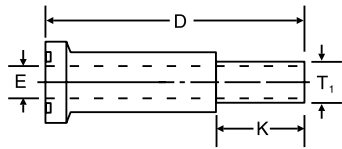
UltraSeal Gland to Tube Stub Adapter Q1T2/Q1TU



Part No.	Inches			Working Pressure
	T ₁	D	*E Bore	
4-4 Q1T2 (CPI™)	1/4	1.25	.18	4,500
6-6 Q1T2	3/8	1.38	.25	6,700
8-8 Q1T2	1/2	1.68	.31	6,250
12-12 Q1T2	3/4	2.31	.50	6,250
4-4 Q1TU (A-lok®)	1/4	1.21	.18	4,500
6-6 Q1TU	3/8	1.38	.25	6,700
8-8 Q1TU	1/2	1.56	.31	6,250
12-12 Q1TU	3/4	2.25	.50	6,250

*Note: Machined bore diameters to match machined bore in body.

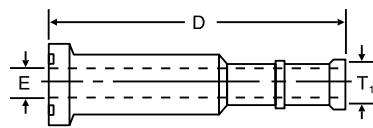
UltraSeal Inverted Gland to Male Tube Weld Q1RT3



Part No.	Inches			
	D	E	T ₁	K
4-4 Q1RT3	1.70	.18	.25	.75

*Note: Machined bore diameters to match machined bore in body.

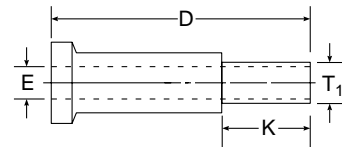
UltraSeal Inverted Gland to Automatic Butt weld Q1RY



Part No.	Inches			**Auto Butt weld Wall Size	Working Pressure
	T ₁	D	*E Bore		
4-4 Q1RY	1/4	1.72	.18	.035	7,700

*Note: Machine bore diameters to match machined bore in body.

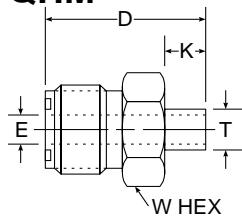
UltraSeal Gland to Male Tube Weld Q1T3



Part No.	Inches			
	D	E	T ₁	K
4-4 Q1T3	1.25	.18	.25	.75
8-6 Q1T3	1.50	.31	.38	.75
8-8 Q1T3	1.50	.41	.50	.75
12-12 Q1T3	1.22	.50	.75	.75

*Note: Machined bore diameters to match machined bore in body.

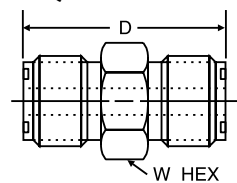
UltraSeal Body to MiniButt weld QHM



Part No.	Inches				
	T	D	K	*E Bore	W Hex
4-4 QHM .035	.25	1.00	.25	.18	5/8
6-6 QHM .035	.38	1.03	.25	.25	15/16
8-8 QHM .049	.50	1.00	.25	.31	15/16

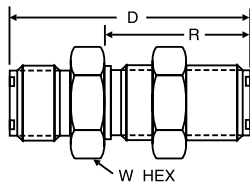
*Note: Machined bore diameters to match machined bore in body.

UltraSeal Union HQ



Part No.	Inches	
	W Hex	D
4-4 HQ	5/8	1.19
6-4 HQ	13/16	1.22
6-6 HQ	13/16	1.22
8-4 HQ	15/16	1.25
8-8 HQ	15/16	1.25
12-12 HQ	1-3/8	1.59

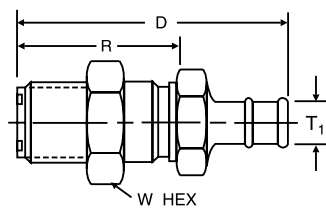
UltraSeal to Bulkhead Connector WBQ



Part No.	Inches		
	W Hex	D	R
4-4 WBQ	3/4	1.59	.88
6-6 WBQ	15/16	2.00	.88
8-8 WBQ	1-1/16	1.69	.91
12-12 WBQ	1-9/16	2.09	1.06

Note: Fitting includes WLZ bulkhead lock nut.

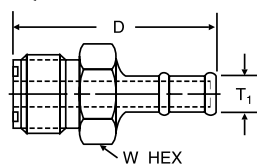
UltraSeal Bulkhead to Automatic Butt Weld Connector YH2BQ



Part No.	Inches			
	W Hex	D	T ₁	R
4-4 YH2BQ	3/4	2.11	1/4	.88
6-6 YH2BQ	15/16	1.91	3/8	.88
8-8 YH2BQ	1-1/16	2.13	1/2	.91

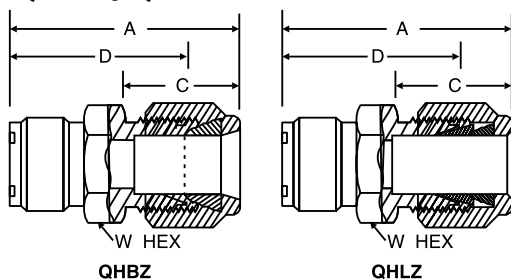
Note: Fitting includes WLZ bulkhead lock nut.

UltraSeal to Automatic Butt Weld Connector QHY



Part No.	Inches			*Auto Butt Weld Wall Size
	T ₁	W Hex	D	
4-4 QHY	1/4	5/8	1.47	.035
6-4 QHY	1/4	13/16	1.50	.035
6-6 QHY	3/8	13/16	1.53	.049
8-4 QHY	1/4	15/16	1.66	.035
8-6 QHY	3/8	15/16	1.53	.035
8-8 QHY	1/2	15/16	1.66	.049
12-12 QHY	3/4	1-3/8	2.03	.065

UltraSeal to Compression Tube Union QHBZ/QHLZ

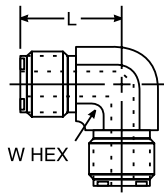


Part No.	Inches				
	Tube O.D.	W Hex	C	A	D
4-4 QHBZ (CPI™)	1/4	5/8	.70	1.42	1.13
6-4 QHBZ	1/4	13/16	.70	1.45	1.16
6-6 QHBZ	3/8	13/16	.76	1.51	1.22
8-4 QHBZ	1/4	15/16	.70	1.48	1.19
8-6 QHBZ	3/8	15/16	.76	1.55	1.25
8-8 QHBZ	1/2	15/16	.87	1.65	1.25
12-12 QHBZ	3/4	1-3/8	.87	1.89	1.49

Part No.	Inches				
	Tube O.D.	W Hex	C	A	D
4-4 QHLZ (A-lok®)	1/4	5/8	.70	1.42	1.13
6-4 QHLZ	1/4	13/16	.70	1.45	1.16
6-6 QHLZ	3/8	13/16	.76	1.51	1.22
8-4 QHLZ	1/4	15/16	.70	1.48	1.19
8-6 QHLZ	3/8	15/16	.76	1.55	1.25
8-8 QHLZ	1/2	15/16	.87	1.65	1.25
12-12 QHLZ	3/4	1-3/8	.87	1.89	1.49

UltraSeal Union Elbow

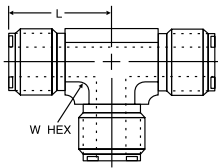
EQ



Part No.	Inches	
	W Hex	L
4-4 EQ	9/16	.84
6-6 EQ	3/4	.97
8-8 EQ	7/8	1.03
12-12 EQ	1-3/8	1.46

UltraSeal Union Tee

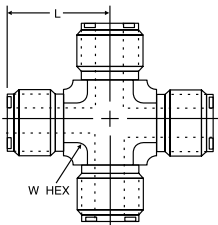
JQ



Part No.	Inches	
	W Hex	L
4-4-4 JQ	9/16	.84
6-6-6 JQ	3/4	.97
8-8-8 JQ	7/8	1.03
12-12-12 JQ	1-5/16	1.31

UltraSeal Union Cross

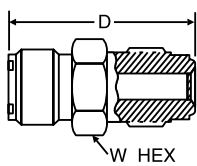
KQ



Part No.	Inches	
	W Hex	L
4 KQ	9/16	.84
6 KQ	3/4	.97
8 KQ	7/8	1.03

UltraSeal to VacuSeal

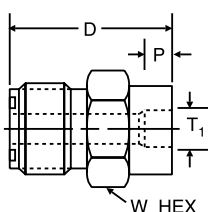
VHQ



Part No.	Inches	
	W Hex	D
4-4 VHQ	5/8	1.39
8-8 VHQ	15/16	1.55

UltraSeal to Socket Weld Connector

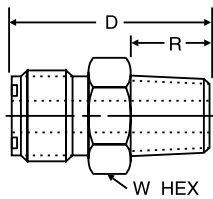
QHW



Part No.	Inches			
	T ₁ Tube O.D.	W Hex	D	P
4-2 QHW	1/8	5/8	1.02	.16
4-4 QHW	1/4	5/8	1.09	.25
6-4 QHW	1/4	13/16	1.06	.28
6-6 QHW	3/8	13/16	1.16	.31
8-4 QHW	1/4	15/16	1.03	.25
8-6 QHW	3/8	15/16	1.13	.34
8-8 QHW	1/2	15/16	1.19	.41
12-12 QHW	3/4	1-3/8	1.53	.50

UltraSeal to Male Pipe Connector

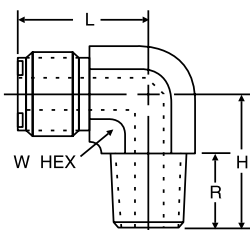
FQ



Part No.	Inches			
	Pipe Thread	W Hex	D	R
4-2 FQ	1/8	5/8	1.09	.38
4-4 FQ	1/4	5/8	1.28	.56
6-4 FQ	1/4	13/16	1.31	.56
6-6 FQ	3/8	13/16	1.31	.56
8-4 FQ	1/4	15/16	1.34	.56
8-6 FQ	3/8	15/16	1.34	.56
8-8 FQ	1/2	15/16	1.53	.75
12-8 FQ	1/2	1-3/8	1.78	.75
12-12 FQ	3/4	1-3/8	1.78	.75

UltraSeal to Male Elbow

CQ

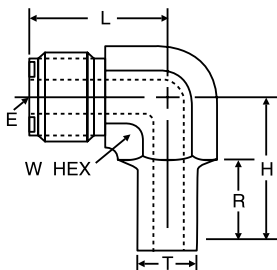


Part No.	Inches				
	Pipe Thread	W Hex	H	L	R
4-4 CQ	1/4	9/16	1.00	.84	.56
6-4 CQ	1/4	3/4	1.13	.97	.56
6-6 CQ	3/8	3/4	1.13	.97	.56
8-6 CQ	3/8	7/8	1.25	1.03	.56
8-8 CQ	1/2	7/8	1.31	1.03	.75
12-12 CQ	3/4	1-5/16	1.66	1.31	.75

UltraSeal to Tube Stub Weld

Elbow

QET3

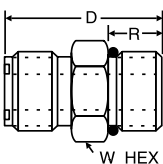


Part No.	Inches					
	H	*E Bore	L	R	W Hex	T
4-4 QET3	1.03	.18	.84	.65	9/16	.25

UltraSeal to Male Connector

Straight Thread

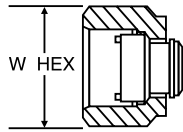
QHAO



Part No.	Inches			
	Straight Thread Size	W Hex	D	R
4-2 QHAO*	5/16-24	5/8	1.03	.30
4-4 QHAO	7/16-20	5/8	1.09	.36
4-6 QHAO	9/16-18	11/16	1.13	.39
6-6 QHAO	9/16-18	7/8	1.14	.39
6-8 QHAO	3/4-16	7/8	1.19	.44
8-8 QHAO	3/4-16	15/16	1.31	.47

*Note: Mass flow controller fitting with .125" orifice in straight thread end. Fitting is assembled with Fluorocarbon O-Ring. Other materials are available upon request.

UltraSeal O-Ring Removal Tool

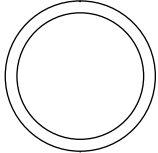


Part No.	Inches	
	W	Hex
4 O-Ring Removal Tool	11/16	
6 O-Ring Removal Tool	7/8	
8 O-Ring Removal Tool	1	

Note: For O-Ring removal instructions, see page 3.

UltraSeal O-Rings

QO



Stainless Steel

Part No.	Material
4QO-SS	321 (SILVER PLATED)
6QO-SS	321 (SILVER PLATED)
8QO-SS	321 (SILVER PLATED)
12QO-SS	321 (SILVER PLATED)

Fluorocarbon Rubber

Part No.	Material Compound
4QO-VI	FLUOROCARBON
6QO-VI	FLUOROCARBON
8QO-VI	FLUOROCARBON
12QO-VI	FLUOROCARBON

Nickel

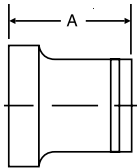
Part No.	Material
4QO-SS-NIC	321 (NICKEL PLATED)
6QO-SS-NIC	321 (NICKEL PLATED)
8QO-SS-NIC	321 (NICKEL PLATED)

PTFE

Part No.	Material Compound
4QO-TE	PTFE
6QO-TE	PTFE
8QO-TE	PTFE
12QO-TE	PTFE

UltraSeal Plug

FNQ1

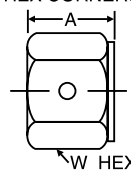


Part No.	Inches	
	A	
4 FNQ1	.69	
6 FNQ1	.81	
8 FNQ1	.84	
12 FNQ1	1.00	

UltraSeal Nuts

BQ

VIEW ACROSS HEX CORNERS



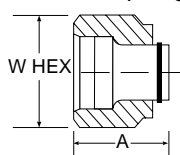
Part No.	Inches		
	W Hex	A	Straight Thread Size
4 BQ	11/16	.56	9/16-20
6 BQ	7/8	.69	3/4-20
8 BQ	1	.69	7/8-20
12 BQ	1-1/2	.81	1-5/16-20

Note: UltraSeal nuts are silver plated (I.D.) only to provide for lubrication during assembly.

UltraSeal Plug Assembly

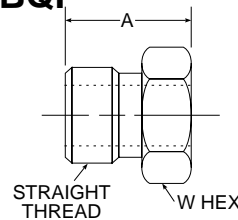
FNQ

Assembly includes plug, nut and snap ring



Part No.	Inches	
	A	W Hex
4 FNQ	1.02	11/16
6 FNQ	1.19	7/8
8 FNQ	1.21	1
12 FNQ	1/42	1-1/2

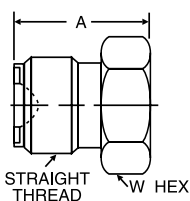
BQ1*



Part No.	Inches		
	W Hex	A	Straight Thread Size
4 BQ1*	5/8	.65	9/16-20

*For use with Q1RY inverted glands.

PNQ



Part No.	Inches		
	W Hex	A	Straight Thread Size
4 PNQ	5/8	.72	9/16-20
6 PNQ	13/16	.75	3/4-20
8 PNQ	15/16	.81	7/8-20

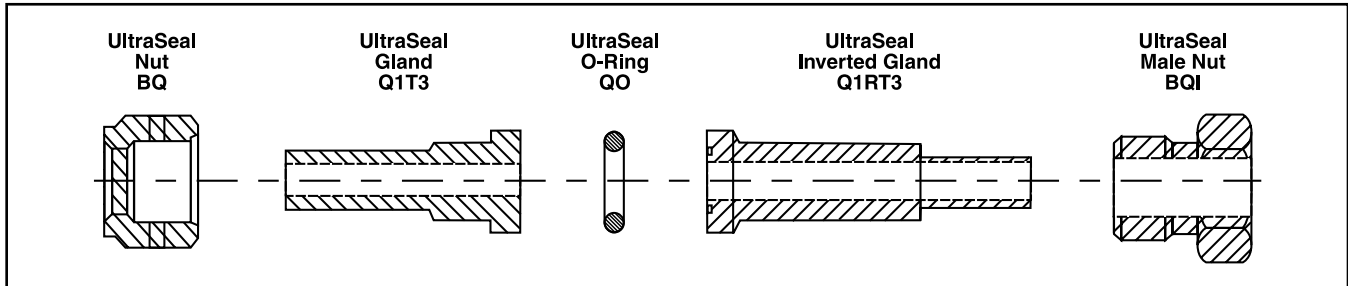
Nomenclature

UltraSeal coupler part numbers are constructed from symbols that identify the size and configuration of the fitting and material used.

How To Order

Parker UltraSeal components are ordered by part number, as listed in this catalog. Note: Each component must be ordered separately.

Example: If your system requires an UltraSeal coupler going from 1/4" tubing to 1/4" tubing, you would order the following part. (Keep in mind that you must order each component separately.)



To Order:

- 4 BQ-SS Size 4 UltraSeal Nut Stainless Steel
- 4-4 Q1T3-SSR Size 4 UltraSeal Gland to Size 4 Male Tube Weld – Stainless Steel
- 4 QO-SS Size 4 Stainless Steel O-Ring
- 4-4 Q1RT3-SSR.035 Size 4 UltraSeal Inverted Gland to Size 4 Male Tube – Stainless Steel
- 4 BQI-SS Size 4 UltraSeal Male Nut Weld

Size: Tube and Pipe Thread sizes are designated by the number of sixteenths of an inch (1/4" Pipe Thread = 4/16" = 4).

Straights, Elbows and Tees: Call out the UltraSeal end first, followed by the corresponding Pipe Thread size or Weld-lok end.

Type: A letter or combination of letters and numbers are used to designate the type of UltraSeal fitting (i.e., F = Male Connector, H = Union, etc.). See Visual Index for other type fittings.

Special Fittings: If there is any question as to the fitting desired, particularly for special fitting configurations, it is suggested that a customer print be submitted with the request for quote.

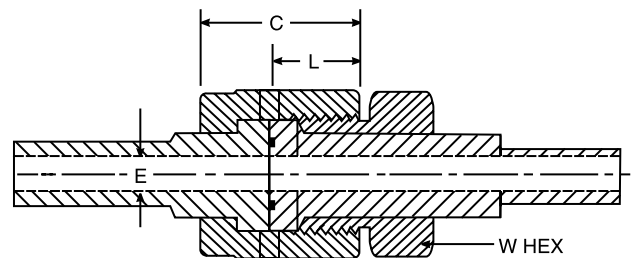
Availability: Only items as standard are carried in stock. Non-standard items can be quoted on request for quantities or materials specified.

UltraSeal End Data Information

Size	UltraSeal Straight Thread	Inches			
		*L	**C	W Hex	E Diameter
4	9/16-20	.46	.73	11/16	.18
8	7/8-20	.47	.85	1	.31
12	1-5/16-20	.57	1.05	1-3/8	.50

*Average Value

**Dimension C is shown in the finger tight position



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2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

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6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property, Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

9/91-P



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