HART O-Ring Sourcebook

HART *SURE SEAL O-RING UNIONS*

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MADE IN USA

HART O-Ring Sourcebook

HART
Sure Seal O-Ring Unions

HART Industrial O-Ring Unions are engineered to provide Class 3000 and 6000 Service and are the most popular union in the industry for general-purpose applications. The flat-face design provides a turbulence-free fit across the seats. This is ideal where piping requirements dictate the need for a flat face seal to make and break the pipeline.

HART Unions are available in nearly any combination of connection types, sizes, reductions, transitions, material combinations, and O-Ring seals for any application. Our expert engineers are ready to help specify the perfect union to meet your application needs.

Standard O-Ring Union Features:

- **Interchangeable End Connections:** Threaded (female and male NPT), sweat, socket weld, and butt weld ends are interchangeable. This feature reduces overall costs by eliminating unnecessary nipples, bushings, couplings, and inserts.

  (*ex: Female NPT x Socket Weld, Female NPT x Male NPT, Butt Weld x Male NPT, Female NPT x Copper Sweat, and more!)*

- **O-Ring Isolation:** The O-Ring seal is strategically located in the thread piece face eliminating O-Ring media contact and added protection against abrasives and erosion. A variety of o-rings for any application are available. The O-Ring seal allows for a smooth thru-bore, providing a turbulence-free fit across the seats.

- **Precision Machined Components:** All unions are precision machined to provide high quality and fail-safe, leak-proof reliability.

- **Material Versatility:** Unions can be provided in all standard metals or combinations. This includes 304 Stainless, 316 Stainless, A105 Carbon Steel, Brass, Monel 400, Hastelloy, and Titanium.

- **Excellent Vibration Resistance:** Seals will not loosen, even under extreme pressure and pressure surges.

- **No Maintenance:** Once initial seal is made, no further tightening is required.

Static Seal

The O-Ring is fitted into a machined groove between the two halves of the union. When the halves are drawn together, the O-Ring compresses to an ovalized cross-section, forming a positive, resilient seal that blocks the fluid, thus sealing even at low or no pressure.

Under Load

As pressure is increased, the O-Ring is forced to flow and is "squeezed" into the downstream side causing the O-Ring to conform to the shape of the end, blocking the groove gap. The more the system pressure increases, the more effective the seal.

Straight-Away Breakout

Flat-faced construction allows for sliding the component without disturbing the surrounding sections. Pipe alignment is much easier with HART unions since it is unnecessary to spring the line during make-up or disassembly.

SPECIALTY O-RINGS / SEALS
N Neoprene® Polycloroprene (CR)
K Kalrez® 4079 Perfluoroelastomer (FFKM)
HN Hydrogenated Nitrile (HNBR)
EP NSF-61 Approved EPDM (Ethylene Propylene)
G Metallic Graphite Spiral Wound Seal
I No O-Ring (Integral Seat "Ball to Cone")
Teflon®, Viton®, Kalrez® are Registered Trademarks from DuPont

STANDARD O-RINGS
V Viton® Fluorocarbon A (FKM-A)
E Ethylene Propylene (EPDM)
ES High-Temp Steam EPDM [up to 550*F max] (EPDM E0962)
T Teflon® Polytetrafluoroethylene (PTFE)
B Buna-N / Nitrile (NBR)

HART offers Viton, Buna-N, EPDM, Steam EPDM, and Teflon as standard options, but other elastomers and seals are available to fit your specific application needs.

Viton ® (FKM-A) O-Rings Class 3000, Class 6000

Order Code : V

Typical Properties	
	Viton® (FKM-A)
Color	Brown / Green
Temperature Range	-17°F (-27°C) to 437°F (225°C)
Applications & Chemical Resistance	Green Hydrogen, oil, natural gas, gasoline, fuels and hydrocarbons, organic solvents and chemicals. Non-Polar Chemicals including acids and chlorinated solvents.
Notes	Low compression set. Excellent resistance to aging and ozone. *Not recommended for polar chemical applications (hot water, MEK, acetone, steam, anhydrous ammonia, etc),*
Image	

HART Size	Nominal Size	HART Part Numbers	
		Viton 3000	Viton 6000
1	1/4″	3-1-V	6-1-V
2	3/8″	3-2-V	6-2-V
3	1/2″	3-3-V	6-3-V
4	3/4″	3-4-V	6-4-V
5	1″	3-5-V	6-5-V
6	1-1/4″	3-6-V	6-6-V
7	1-1/2″	3-7-V	6-7-V
8	2″	3-8-V	6-8-V
9	2-1/2″	3-9-V	6-9-V
10	3″	3-10-V	6-10-V
11	3-1/2″	3-11-V	6-11-V
12	4″	3-12-V	--

Green Hydrogen O-Rings

Buna-N (NBR) O-Rings Class 3000, Class 6000

Order Code : B

Typical Properties	
	Buna-N (NBR)
Color	Black
Temperature Range	–31°F (–35°C) to 230°F (110°C)
Applications & Chemical Resistance	Oil, natural gas, gasoline, mineral oils, aliphatic hydrocarbons, hydraulic fluids
Notes	Excellent compression set resistance. *Not recommended for highly aromatic fuels and hydrocarbons, UV and ozone exposure, chlorinated hydrocarbons, polar solvents and chemicals, glycol brake fluids.*
Image	

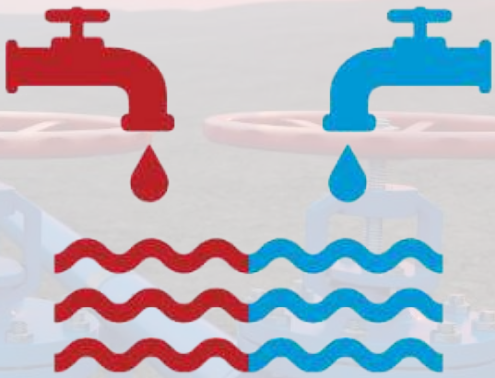
HART Size	Nominal Size	HART Part Numbers	
		Buna-N 3000	Buna-N 6000
1	1/4″	3-1-B	6-1-B
2	3/8″	3-2-B	6-2-B
3	1/2″	3-3-B	6-3-B
4	3/4″	3-4-B	6-4-B
5	1″	3-5-B	6-5-B
6	1-1/4″	3-6-B	6-6-B
7	1-1/2″	3-7-B	6-7-B
8	2″	3-8-B	6-8-B
9	2-1/2″	3-9-B	6-9-B
10	3″	3-10-B	6-10-B
11	3-1/2″	3-11-B	6-11-B
12	4″	3-12-B	--

EPDM O-Rings Class 3000, Class 6000

Order Code : E

Typical Properties	Ethylene-Propylene (EPDM)
Color	Black
Temperature Range	-65°F (–54°C) to 300°F (149°C)
Applications & Chemical Resistance	Hot and cold water, steam (up to 300°F), glycol brake fluids, many organic and inorganic acids, soda and potassium alkalis, etc.
Notes	Excellent resistance to aging and ozone. ANSI/NSF-61 approved version available upon request. *Not recommended for petroleum and mineral oil products (oils, greases, fuels, natural gas)*
Image	

HART Size	Nominal Size	HART Part Numbers	
		EPDM 3000	EPDM 6000
1	1/4″	3-1-E	6-1-E
2	3/8″	3-2-E	6-2-E
3	1/2″	3-3-E	6-3-E
4	3/4″	3-4-E	6-4-E
5	1″	3-5-E	6-5-E
6	1-1/4″	3-6-E	6-6-E
7	1-1/2″	3-7-E	6-7-E
8	2″	3-8-E	6-8-E
9	2-1/2″	3-9-E	6-9-E
10	3″	3-10-E	6-10-E
11	3-1/2″	3-11-E	6-11-E
12	4″	3-12-E	--



Steam EPDM O-Rings Class 3000, Class 6000

Order Code : ES

Typical Properties	Steam EPDM (Parker® E0962-90)
Color	Black
Temperature Range	-65°F (–54°C) to 500°F (260°C) *Short durations in steam up to 600°F (315°C)*
Applications & Chemical Resistance	Hot and cold water, steam (up to 500°F), glycol brake fluids, many organic and inorganic dilute acids, soda and potassium alkalis, amines, hydrogen sulfide, ozone, steam/oil mixtures (<10% petroleum)
Notes	Excellent resistance to aging and ozone. *Not recommended for petroleum and mineral oil products (oils, greases, fuels, natural gas)*
Image	

HART Size	Nominal Size	HART Part Numbers	
		Steam EPDM 3000	Steam EPDM 6000
1	1/4″	3-1-ES	6-1-ES
2	3/8″	3-2-ES	6-2-ES
3	1/2″	3-3-ES	6-3-ES
4	3/4″	3-4-ES	6-4-ES
5	1″	3-5-ES	6-5-ES
6	1-1/4″	3-6-ES	6-6-ES
7	1-1/2″	3-7-ES	6-7-ES
8	2″	3-8-ES	6-8-ES
9	2-1/2″	3-9-ES	6-9-ES
10	3″	3-10-ES	6-10-ES
11	3-1/2″	3-11-ES	6-11-ES
12	4″	3-12-ES	--

Parker® E0962-90 Steam EPDM O-Rings

Many applications involving steam exposure exceed the normal temperature range associated with traditional ethylene propylene (-57 to 121°C, -70 to 250°F) materials. Parker® EPDM compound E0962-90 has been developed to provide an effective sealing solution in the hostile chemical, pressure, and temperature conditions associated with many oil field applications. E0962-90 has been used successfully in applications with temperatures up to 260°C (500°F), and for short durations, up to 315°C (600°F) in steam. It will also perform with satisfactory results in applications involving petroleum fluids up to 10% in concentration.

Selected Reference Data:
Parker® E0962-90 (2-214 O-Rings)

Original Physical Properties

Hardness, Type A, pts.	87
Tensile Strength, psi	2150
Elongation, %	96
Modulus @ 100%, psi	N/A
Specific Gravity	1.13

Aging in Steam 168 HRS @ 288°C (550°F)

Hardness, Type A, chg. pts.	-5
Tensile Strength, chg. pts.	-19
Elongation, chg. %	+6
Modulus @ 100%, psi	1710
Volume Change, %	+2.1
Compression Set, %	46.7

Aging in Steam with 10% Mil-H-5606D Oil 168 HRS @ 288°C (550°F)

Hardness, Type A, chg. pts.	-15
Tensile Strength, chg. %	-52
Elongation, chg. %	+2
Modulus @ 100%, chg. %	N/A
Volume Change, %	+16.6
Compression Set, %	76.5

Reference Data: Parker Hannifin Corporation. *E0962-90 Steam Resistant Ethylene Propylene - Technical Bulletin*, Lexington, KY, 40512, https://www.parker.com/content/dam/Parker-com/Literature/O-Ring-Division-Literature/ord5723.pdf.

Teflon® (PTFE) O-Rings Class 3000, Class 6000

Order Code : T

Typical Properties	
	Teflon ® (PTFE)
Color	White
Temperature Range	-328°F (-200°C) to 482°F (250°C)
Applications & Chemical Resistance	Cryogenics, inert to nearly all known chemicals and solvents. *Not recommended for chlorine, trifluoride and elemental fluorine at extremely high temperatures.*
Notes	*PTFE's stiffness lacks the spring-back resiliency of elastomer o-rings, thus requiring periodic replacement when breaking and re-making a union seal.*
Image	

HART Size	Nominal Size	HART Part Numbers	
		Teflon 3000	Teflon 6000
1	1/4″	3-1-T	6-1-T
2	3/8″	3-2-T	6-2-T
3	1/2″	3-3-T	6-3-T
4	3/4″	3-4-T	6-4-T
5	1″	3-5-T	6-5-T
6	1-1/4″	3-6-T	6-6-T
7	1-1/2″	3-7-T	6-7-T
8	2″	3-8-T	6-8-T
9	2-1/2″	3-9-T	6-9-T
10	3″	3-10-T	6-10-T
11	3-1/2″	3-11-T	6-11-T
12	4″	3-12-T	--

Hydrogenated Nitrile (HNBR) O-Rings Class 3000, Class 6000

Order Code : HN

Typical Properties	
	Hydrogenated Nitrile (HNBR)
Color	Black
Temperature Range	–30°F (–34.4°C) to 325°F (163°C)
Applications & Chemical Resistance	Increased temperature resistance and newly developed automotive fuels, R-134a, and oil lubricants.
Notes	Excellent compression set resistance. *Not recommended for highly aromatic fuels and hydrocarbons, UV and ozone exposure, chlorinated hydrocarbons, polar solvents and chemicals, glycol brake fluids.*
Image	

HART Size	Nominal Size	HART Part Numbers	
		HNBR 3000	HNBR 6000
1	1/4″	3-1-HN	6-1-HN
2	3/8″	3-2-HN	6-2-HN
3	1/2″	3-3-HN	6-3-HN
4	3/4″	3-4-HN	6-4-HN
5	1″	3-5-HN	6-5-HN
6	1-1/4″	3-6-HN	6-6-HN
7	1-1/2″	3-7-HN	6-7-HN
8	2″	3-8-HN	6-8-HN
9	2-1/2″	3-9-HN	6-9-HN
10	3″	3-10-HN	6-10-HN
11	3-1/2″	3-11-HN	6-11-HN
12	4″	3-12-HN	--

Kalrez ® 4079 (FFKM) O-Rings Class 3000, Class 6000

Order Code : K

Typical Properties	
	Kalrez®4079
Color	Black
Temperature Range	20°F (–5°C) to 600°F (315°C)
Applications & Chemical Resistance	Most universal chemical resistance of all the elastomers. Offers high-temperature stability for demanding applications. Kalrez compounds available for H2S performance as well.
Notes	*Often used for semiconductor environments. Offers excellent resistance to chemical attack and low volume swell.*
Image	

HART Size	Nominal Size	HART Part Numbers	
		Kalrez 3000	Kalrez 6000
1	1/4″	3-1-K	6-1-K
2	3/8″	3-2-K	6-2-K
3	1/2″	3-3-K	6-3-K
4	3/4″	3-4-K	6-4-K
5	1″	3-5-K	6-5-K
6	1-1/4″	3-6-K	6-6-K
7	1-1/2″	3-7-K	6-7-K
8	2″	3-8-K	6-8-K
9	2-1/2″	3-9-K	6-9-K
10	3″	3-10-K	6-10-K
11	3-1/2″	3-11-K	6-11-K
12	4″	3-12-K	--

Other Kalrez Compounds are available by special request!
Contact our Sales & Engineering Team for more information as well as pricing and lead time.

Neoprene Polychloroprene (CR) O-Rings Class 3000, Class 6000

Order Code : N

Typical Properties	
	Neoprene® Polychloroprene (CR)
Color	Black
Temperature Range	–40°F (–40°C) to 250°F (125°C)
Applications & Chemical Resistance	Increased temperature resistance and newly developed automotive fuels, R-134a, and oil lubricants.
Notes	Excellent compression set resistance. *Not recommended for highly aromatic fuels and hydrocarbons, UV and ozone exposure, chlorinated hydrocarbons, polar solvents and chemicals, glycol brake fluids.*
Image	

HART Size	Nominal Size	HART Part Numbers	
		Neoprene 3000	Neoprene 6000
1	1/4″	3-1-N	6-1-N
2	3/8″	3-2-N	6-2-N
3	1/2″	3-3-N	6-3-N
4	3/4″	3-4-N	6-4-N
5	1″	3-5-N	6-5-N
6	1-1/4″	3-6-N	6-6-N
7	1-1/2″	3-7-N	6-7-N
8	2″	3-8-N	6-8-N
9	2-1/2″	3-9-N	6-9-N
10	3″	3-10-N	6-10-N
11	3-1/2″	3-11-N	6-11-N
12	4″	3-12-N	--

High-Temp / Steam Unions – Extreme Environment, Class 3000 Service

Application & Performance:

• Standard graphite spiral wound gasket union
Resistant to 850F (450C) for hydrocarbon and superheated steam service.

• Optional silicate spiral wound gasket union
Resistant to 1850F (1050C) for hydrocarbon, superheated steam service, and chemical service.

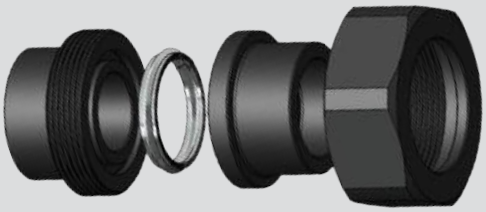
• Steam Systems (superheated)
Saturated steam, steam trap, valve, pump and compressor manifolds.
• Variety of process fluids and gases to 3000 PSIG (CWP)
Heat Transfer Fluids, acids, caustics, nitrogen, hydraulic fluids, and hot oils with extreme temperature requirements.
• Nuclear Power Plants

HART Size	Nominal Size	HART Part Numbers
		High Temp Class 3000
3	1/2″	3-3-G
4	3/4″	3-4-G
5	1″	3-5-G
6	1-1/4″	3-6-G
7	1-1/2″	3-7-G
8	2″	3-8-G

Features & Benefits

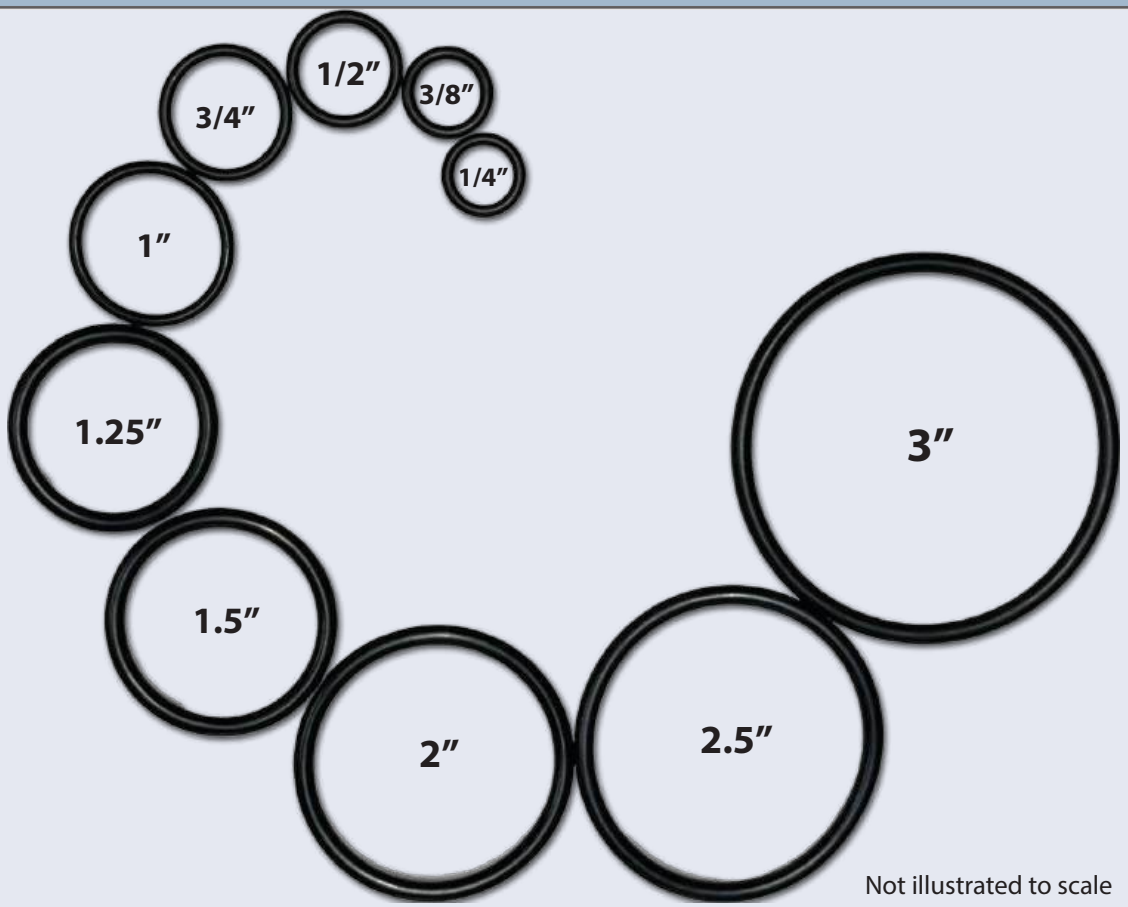
Turbulence free: All HART unions provide a turbulence-free fit across the seats.
Interchangeable Spiral Wound Gaskets: The common spiral wound gaskets used for the gas, oil, and power generation industries is 316 stainless steel with a graphite filler material. Options such as 347 stainless, Monel 400, Inconel 600, and Hastalloy windings are also available upon request in combination with different gasket fillers (graphite, silicate, PTFE).

Configuraton	Description
Standard	316 Stainless Steel with Flexible Graphite Filler
Optional	316 Stainless Steel with Silicate Filler
Custom Materials	Monel 400, Inconel 600, Hastalloy, 347 Stainless, and more!



O-Ring Size Guide

HART Size	Nominal Size
1	3/8″
2	1/4″
3	1/2″
4	3/4″
5	1″
6	1.25″
7	1.5″
8	2″
9	2.5″
10	3″



Not illustrated to scale

HART

SURE SEAL O-RING UNIONS

Scan here for more info and expert application support on HART Unions!

HOW TO ORDER

1 Hour Response during normal business hours!

The chart below contains the necessary information to place an order. Use the appropriate code that corresponds to your application.
When a size reduction or change in material is needed, simply use at slash ("/") between the sizes or materials.
Please reference the two examples below which include descriptions of the unions and their corresponding HART Part Numbers.

OPTIONS (PREFIX)

O	**ORIFICE:** Flat Orifice Plate with Double O-Ring Seal
D	**DIELECTRIC (Insulating):** Dielectric Coating applied to union tailpiece
H	**HAMMER NUT:** 3-Lug Hammer Blow / Lug Nut Option

DESCRIPTION	TAIL PIECE	THREAD PIECE
Female NPT (FNPT) Class 3000 Pipe	31	31
Male NPT (MNPT) Class 3000 Pipe	32	32
Socket Weld (SW) Class 3000 Pipe	33	33
Socket Weld (TUBE) Class 3000 Tube	34	34
Butt Weld (BW) Class 3000 Pipe	35	35
Copper Sweat (SWEAT) Class 3000 Tube	36	36
Female NPT (FNPT) Class 6000 Pipe	61	61
Male NPT (MNPT) Class 6000 Pipe	62	62
Socket Weld (SW) Class 6000 Pipe	63	63
Socket Weld (TUBE) Class 6000 Tube	64	64
Butt Weld (BW) Class 6000 Pipe	65	65

SIZE

0	*(1/8")*
1	*(1/4")*
2	*(3/8")*
3	*(1/2")*
4	*(3/4")*
5	*(1")*
6	*(1-1/4")*
7	*(1-1/2")*
8	*(2")*
9	*(2-1/2")*
10	*(3")*
11	*(3-1/2")*
12	*(4")*

O-RING

STANDARD O-RINGS	
V	Viton® Fluorocarbon A (FKM-A)
E	Ethylene Propylene (EPDM)
ES	High-Temp Steam EPDM [up to 550°F max] (EPDM E0962)
T	Teflon® Polytetrafluoroethylene (PTFE)
B	Buna-N / Nitrile (NBR)
SPECIALTY O-RINGS / SEALS	
N	Neoprene® Polychloroprene (CR)
K	Kalrez® 4079 Perfluoroelastomer (FFKM)
HN	Hydrogenated Nitrile (HNBR)
EP	NSF/ANSI-61 Approved Ethylene Propylene (EPDM)
G	Metallic Spiral Wound Graphite Seal
I	No O-Ring / Integral Seat ("Ball and Cone")

Viton®, Teflon®, Neoprene®, and Kalrez® are registered trademarks of their respective owners.

MATERIAL

A	Aluminum 6061
B	Brass 360 or 464
CS	A108 (12L14) and A105/A350-LF2 Carbon Steel
CSN	A105 Normalized (specialty) Carbon Steel
304L	A182F304/304L Stainless Steel
316L	A182F316/316L Stainless Steel
73	70/30 Copper Nickel
91	90/10 Copper Nickel
H	Hastelloy C276
I	Inconel 600
M	Monel 400
T	Titanium T-2
A20	Alloy 20 (Carpenter Steel C20)

SUFFIX (ADDITIONAL INFO)

Male NPT (MNPT), Socket Weld (SW), and Butt Weld (BW):
Place desired Wall Thickness in parentheses. Note: S40 Standard for Class 3000 and S80 Standard for Class 6000 unless otherwise specified.

Examples: 6262-5-V-304(S160) 3335-7-E-CS(S80)

Orifice Unions: Place desired drilled orifice bore in parentheses.
For blank plate, omit the bore or note "(blank)". Plates can drilled at no additional cost!

Examples: O-3131-5-V-304(0.250") O-3333-4-B-316(blank)

CUSTOM OPTIONS AVAILABLE

BSPT-F	BSPT (British Standard Pipe Taper) - Female, Rc
BSPT-M	BSPT (British Standard Pipe Taper) - Male, R
BW TUBE	Butt Weld with Tube O.D.
MALE PIPE END	Male Pipe End (unthreaded) for socket welding
ACME Nut	ACME Thread Nut for specialty applications

Example 1:
Class 3000, 1" Female NPT x 1" Female NPT, Viton O-Ring,
Stainless Steel 316 connections.

3131 - 5 - V - 316
Tail / Thread Size O-Ring Material

Detailed Breakdown:

UNION NUT
SIZE 5 (1")
STAINLESS STEEL

CLASS 3000 FNPT (31) TAILPIECE
SIZE 5 (1")
STAINLESS STEEL

O-RING
VITON (V)

CLASS 3000 FNPT (31) THREADPIECE
Size 5 (1")
STAINLESS STEEL

Example 2:
Dielectric, Class 3000, 1" Male NPT x 3/4" Copper Sweat, EPDM O-Ring,
Stainless Steel 304L Tailpiece with dielectric coating, Lead-free Brass 464 Threadpiece.

D - 3236 - 5/4 - E - 304L/B464
Option (Prefix) Tail / Thread Size O-Ring Tail Material / Thread Material

Detailed Breakdown:

UNION NUT
SIZE 5 (1")
BRASS

DIELECTRIC CLASS 3000 MNPT (32) TAILPIECE
SIZE 5 (1")
STAINLESS 304

O-RING
EPDM (E)

CLASS 3000 COPPER SWEAT (36) THREADPIECE
Size 4 (3/4")
BRASS 464