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80th in 2010 Anniversary
Fujikin Carp Group

Fujikin Carp Group

CAT:No.724-01E-A

V-Lok®

Tube Fittings

V-Lok® Tube Fittings

As we advance further into the 21st century:

An intelligent integrator for the new age,
Fujikin Carp Group.

To go beyond the limits.
Space Environmental Awareness,
Fujikin Carp Group.

Fujikin Carp Group




Shinya Nojima
President & COO

Fujikin Carp Group Technology can be found wherever something is flowing

The **Fujikin Carp Group** is a leading manufacturer of high-technology products for a wide range of industries. Our corporate policy is to defy boundaries and overcome limitations to technology, and we aim to be number one in every market we serve. Since our beginnings in 1930 as a wholesale dealer of pipe-laying materials and machinery tools, we have evolved into a global leader in the manufacture of specific-purpose valves, as well as precision valves and flow control systems. The **Fujikin Carp Group**'s products are known for their safety and reliability, and they are used throughout the semiconductor, aerospace, shipbuilding, chemical, electric power generation, and biotechnology industries. Our research and production facilities are at the cutting edge of technology, and we actively promote collaboration between industry, academia, and the government.

The **Fujikin Carp Group** is recognized not only as a manufacturer of technologically advanced products, but also as a leading integrated intelligent high-technology innovator. We believe in exploring the creative potential of partnerships with different industries at a global scale. Through these partnerships, we aim to meet the challenges of the twenty-first century. We appreciate your continued business, and we welcome your feedback.

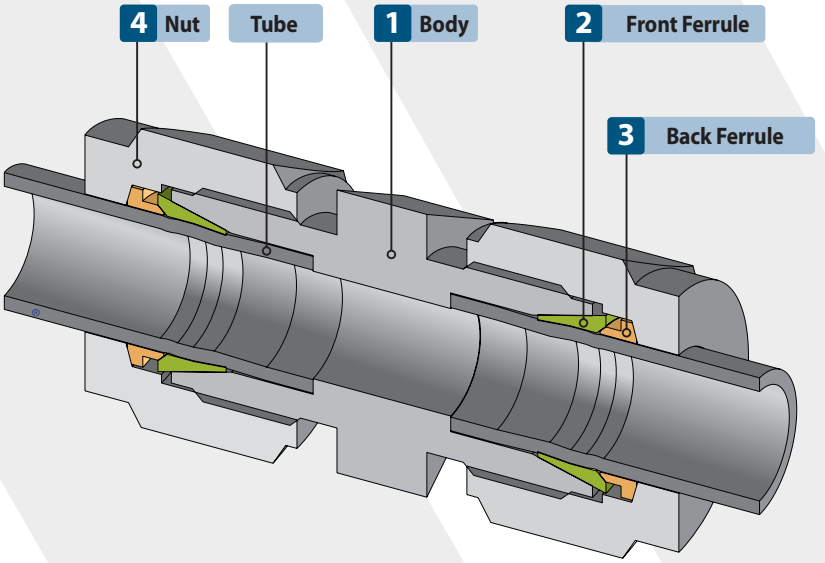
Fujikin Carp Group

Overview of V-Lok® Tube Fittings

V-Lok® is a high performance tube fitting that combines the sealing properties and quality control technologies required for power plant instrumentation fittings, other industies, and the ultra-pure construction required used in fittings used in semiconductor manufacturing equipment.

V-Lok® is new value series that provides high performance, cost effectiveness, and quick delivery.

V-Lok® tube fittings combine leading edge manufacturing technology and exceptional cost performance.



V-Lok® Tube Fittings are composed four parts:
1. Body **2**. Front Ferrule **3**. Back Ferrule **4**. Nut

V-Lok® How Does it Works?

The V-Lok® Tube Fittings is a mechanism used both to seal and to grip tubing. The mechanical advantage and geometry of this kind of fitting produces a leak-tight assembly.

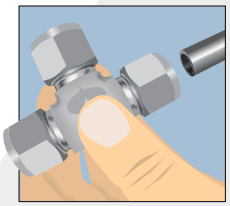
To assemble, simply insert the tube into the complete assembly until the tube bottoms-out against the shoulder of the fitting body (**1**). The two ferrules are driven forward between the nut (**4**) and fitting body using the mechanical force created by rotating the nut clockwise. The back ferrule (**3**) is driven against the tapered rear of the front ferrule (**2**) and the front ferrule is driven by force into the tapered mouth of the body.

The back ferrule is swaged radially inwards on the tube while lifting the front ferrule out to form a full-faced seal on the tapered surface of the body.

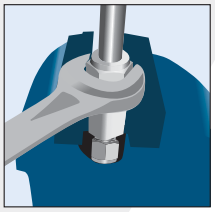
The 1 1/4 turn of the nut from the hand tight position assures consistent drive of the sealing parts. This ensures an effective seal against high pressure as well as ultra high vacuum conditions.

V-Lok® Installation Instructions

V-Lok® fittings are supplied assembled and hand tight. Disassembly before use can allow the entry of dirt or other particles.



Insert the tubing completely into the V-Lok® tube fittings.
Check that the tube point contacts with the fitting body shoulder and that the nut is hand tight. At this point it is recommended that a scribe mark be drawn on the hex of the nut extending onto the fitting body. This mark will serve as an indicator for the starting point and proper pull-up.



Tighten the nut.
1 1/4 turn of the nut are required for 1/4" (6 mm) and larger fittings (see Fig. A). 3/4 turn of the nut is required for 3/16" (4 mm) and smaller fittings (see Fig. B).

Figure A

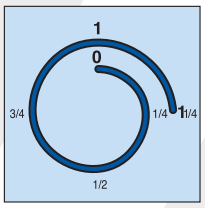
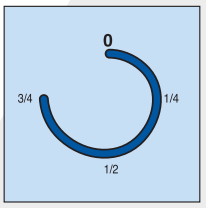


Figure B



Reassembly Instructions

V-Lok® tube fittings may be disconnected and reconnected repeatedly, without loss of the leak-tight seal.

1. Before reassembling the parts, ensure that there is no foreign matter on the sealing diagonal face of the fitting body and the front ferrule.
2. Insert the front ferrule until it reaches the body, and then manually tighten the nut enough.
3. With a wrench, tighten the nut approximately 1/4 turn. Assembly is then complete.

Note:

1. After reassembling, the fitting body and nut should return to their original position, or be tightened slightly further.
2. For fittings with nominal diameters between 1.6mm (1/16"OD) and 4mm, tighten the nut 1/6 turn.
3. For fittings with nominal diameters of 15.88mm (5/8"OD) or larger, it may occasionally be necessary to tighten the nut 1/4 turn or more.
4. Don't use the gap inspection gauge for reassembly.

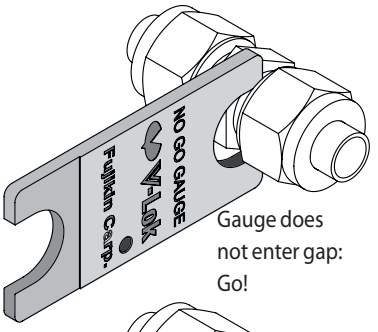
Before Installation

1. Use an austenitic stainless steel tube with a seamless bright anneal finish, a hardness of Hv200 or less, and a torelance within ±0.1mm of the tube O.D..
2. Please refer to "Tubing Data" on page 5 for recommended tube wall thickness.
3. There should be no visible scraches 30mm from either end of the tube. Remove any foreign matter.
4. Scratches on the tube may cause leaks. It is therefore important to handle the tube carefully to reduce the risk of leak. Please do not drag tube when taking out of the shelf and drag on the floor to avoide scraching on the tube.
5. Before assembling the fittings, cut the tubes to the required length.
6. Use a tube cutter to cut the tube. To attain a leak-free connection, the tubing must be cut squarely. A high-quality tube cutter with an appropriate blade for the tubing material is recommended.
   If it is necessary to use a different method, for example hacksaw cut ting, be sure to cut the tube at a right angle, and then remove burrs carefully from the outer circumstance by filling at a 45°angle to the center line.
7. Tube cutter blades should be replaced regularly to maintain sharpness.

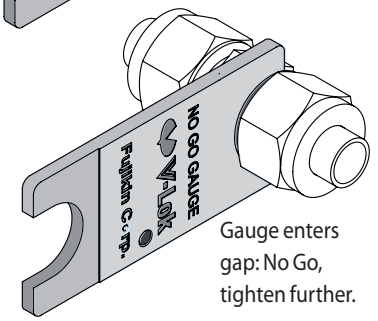
Post-assembly: Inspection with a "No-Go"gauge (New Fittings Only)

1. Position the "No-Go" gauge next to the gap between the nut and body.
2. If the gauge cannot fit into the gap, the fitting is sufficiently tightened.
3. If the gauge can enter the gap, additional tightening is required.

Note: Do not use the "No-Go"gauge on retightened or pre-tightened fittings.



Gauge does not enter gap: Go!



Gauge enters gap: No Go, tighten further.

Ordering Information for the V-Lok® "No-Go" gauge

Part No.	Fitting Size
G-VUW - 9.52 x 6.35	1/4", 6mm, 3/8"
G-VUW - 12.7 x 10	10mm, 1/2", 12mm

Attention!
1. A small amount of lubricant has been applied to the wetted area of this product. As a result, this product cannot be used in oxygen gas lines or any other high-purity gas lines. Do not remove this lubricant prior to use.
2. If you require oil-free ultra-pure compression fittings, use Fujikin's FINELOK fittings. For more information on these fittings, please refer to the FINELOK brochure.

Fujikin® Carp® Group

Physical Differences And Marking

V-Lok® Metric Fittings:

Tee & Elbow (see Fig. 1)
Body marked: MM
Straight Connectors: (see Fig. 2)
Body: Stepped shoulder
marked: F-CARP 316 AV[1]
Nut: (see Figs.1 & 2) Stepped shoulder
marked: V-LOK 316 6M[2] SD8[1]

V-Lok® INCH FITTINGS:

Tee & Elbow: (See Fig. 3)
Straight Fittings: (see Fig. 4)
Body: Shoulder marked:
F-CARP 316 AV2[1]
Nut: (See Fig. 3 & 4): Shoulder
marked V-LOK 316 1/2[2] BU2[1]

(1): Material Batch
(2): Tube O.D.

Fig. 1 Back side

Fig. 1 Front side

Fig. 2

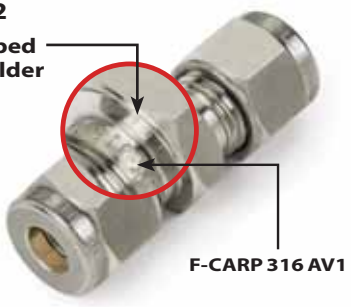


Fig. 3 Back side

Fig. 3 Front side

Fig. 4

V-Lok® Tubing Data

Table 1: Maximum Allowable Working Pressure Of Stainless Each Tube Wall Thickness

Tube Wall Thickness		0.010- less than 0.012	0.012- less than 0.014	0.014- less than 0.016	0.016- less than 0.020	0.020- less than 0.028	0.028- less than 0.035	0.035- less than 0.049	0.049- less than 0.065	0.065- less than 0.083	0.083- less than 0.095	0.095- less than 0.109	0.109- less than 0.120	0.120
mm	inch													
	1/16	5600	6860	8150	9480	12080								
2	1/8						8550	10950						
3	3/16						5500	7100	10300					
6	1/4						4100	5200	7600	10300				
8	5/16							4100	5900	8100				
10	3/8							3350	4850	6550				
12	1/2							2650	3750	5150	6750			
16	5/8								2950	4050	5250	6050		
20	3/4								2450	3350	4250	4950	5850	
22	7/8								2050	2850	3650	4250	4850	
25	1									2400	3100	3600	4200	4700

Table 2: Factors Used To Determine Allowable Working Pressure At Higher Temperature

°F	°C	A.I.S.I. 316
200	93	1
400	204	0.96
600	316	0.85
800	427	0.79
1000	538	0.76
1200	649	0.37

To determine allowable pressure at higher temperatures, multiply allowable working pressure from Tables 1 by factors shown in Table 2. For example: The allowable pressure for Type 316 stainless steel, size 1/2" O.D. x 0.049" wall at 800°F(427°C) would be equivalent to 3750 psi x 0.79 = 2962.5 psi. Regarding Min. Nominal Wall Thickness, please refer to Table 3.

Table 3: Gas Application Tubing

in		mm	
Tube O.D.	Min. Nominal Wall Thickness	Tube O.D.	Min. Nominal Wall Thickness
1/8" (3.17mm)	0.028" (0.7mm)	3 mm	0.8 mm
3/16" (4.76mm)	0.028" (0.7mm)	6 mm	0.8 mm
1/4" (6.35mm)	0.028" (0.7mm)	8 mm	1 mm
5/16" (7.93mm)	0.035" (0.89mm)	10 mm	1 mm
3/8" (9.52mm)	0.035" (0.89mm)	12 mm	1 mm
1/2" (12.7mm)	0.049" (1.24mm)	14 mm	1.2 mm
5/8" (15.87mm)	0.065" (1.65mm)	16 mm	1.5 mm
3/4" (19.05mm)	0.065" (1.65mm)	18 mm	1.5 mm
7/8" (22.22mm)	0.083" (2.1mm)	20 mm	1.8 mm
1" (25.4mm)	0.083" (2.1mm)	22 mm	2 mm
		25 mm	2.2 mm

For gas applications, we recommend tubing with a greater wall thickness. Table 3 shows the recommended min. wall thicknesses for greater safety and efficiency.

Attntion!

1. The value of Table 1 is a maximum allowable working pressure calculated from the tube thickness. The maximum allowable working pressure of the fitting is limited from the value of this table according to the application regulations, and use it, please after considering the application regulations and the standard of used equipment.
2. There is a possibility that the seal decreases remarkably, and consult separately, please when it is used for a long time exceeding 400°C.

V-Lok® Part Number Designation

All orders should include material description and ordering information (See product table).

V	U	W	H	—	6.35	B
Product Series	**Material**	**Type of Tube Fittings**	**Connector Type**		**Nominal Diameter**	**Thread Size**
V-Lok®	Stainless Steel	Double Ferrule Compression and Bite Type	Mail Connector		Outer Diameter of Tube	R1/4

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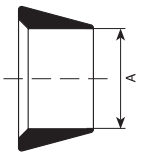
Front Ferrule

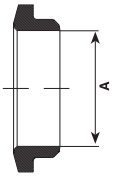
S



Metric		Inch			
Part Number	A Tube O.D. mm	Part Number	A Tube O.D. in	A Tube O.D. mm	
VUW-2S	2	VUW-1.6S	1/16	1.6	**Ferrule Sets**
VUW-3S	3	VUW-3.2S	1/8	3.2	All V-Lok® ferrules are available as sets.
VUW-4S	4	VUW-4.8S	3/16	4.8	
VUW-6S	6	VUW-6.35S	1/4	6.35	
VUW-8S	8	VUW-7.93S	5/16	7.93	
VUW-10S	10	VUW-9.52S	3/8	9.52	
VUW-12S	12	VUW-12.7S	1/2	12.7	
VUW-14S	14	VUW-15.88S	5/8	15.88	
VUW-15S	15	VUW-19.05S	3/4	19.05	
VUW-16S	16	VUW-22.22S	7/8	22.22	
VUW-18S	18	VUW-25.4S	1	25.4	
VUW-20S	20				
VUW-22S	22				
VUW-25S	25				

Back Ferrule

R

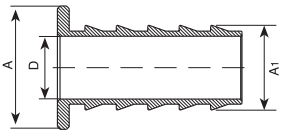


Metric		Inch			
Part Number	A Tube O.D. mm	Part Number	A Tube O.D. in	A Tube O.D. mm	
VUW-2R	2	VUW-1.6R	1/16	1.6	**Ferrule Sets**
VUW-3R	3	VUW-3.2R	1/8	3.2	All V-Lok® ferrules are available as sets.
VUW-4R	4	VUW-4.8R	3/16	4.8	
VUW-6R	6	VUW-6.35R	1/4	6.35	
VUW-8R	8	VUW-7.93R	5/16	7.93	
VUW-10R	10	VUW-9.52R	3/8	9.52	
VUW-12R	12	VUW-12.7R	1/2	12.7	
VUW-14R	14	VUW-15.88R	5/8	15.88	
VUW-15R	15	VUW-19.05R	3/4	19.05	
VUW-16R	16	VUW-22.22R	7/8	22.22	
VUW-18R	18	VUW-25.4R	1	25.4	
VUW-20R	20				
VUW-22R	22				
VUW-25R	25				

"D" - Dimension is minimum hole diameter - dimensions are for reference only, and are subject to change without notice.

Tube Insert

IN



Metric

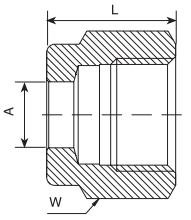
Part Number	A Tube O.D.	A1 Tube I.D.	D
	mm	mm	mm
VUW-IN-6X4	6	4	2.8
VUW-IN-8X6	8	6	4.4
VUW-IN-10X8	10	8	6.4
VUW-IN-12X8	12	8	6.4
VUW-IN-12X10	12	10	8.3

Inch

Part Number	A Tube O.D.		A1 Tube I.D.		D	
	in	mm	in	mm	in	mm
VUW-IN-4.8X3.2	3/16	4.8	1/8	3.2	0.09	2.3
VUW-IN-6.35X3.2	1/4	6.35	1/8	3.2	0.09	2.3
VUW-IN-6.35X4.3	1/4	6.35	0.17	4.3	0.11	2.7
VUW-IN-6.35X4.8	1/4	6.35	3/16	4.8	0.12	3.1
VUW-IN-7.93X3.2	5/16	7.93	1/8	3.2	0.09	2.3
VUW-IN-7.93X4.8	5/16	7.93	3/16	4.8	0.12	3
VUW-IN-7.93X6.35	5/16	7.93	1/4	6.35	0.18	4.6
VUW-IN-9.52X4.8	3/8	9.52	3/16	4.8	0.12	3.1
VUW-IN-9.52X6.35	3/8	9.52	1/4	6.35	0.18	4.6
VUW-IN-12.7X6.35	1/2	12.7	1/4	6.35	0.18	4.6
VUW-IN-12.7X9.52	1/2	12.7	3/8	9.52	0.31	7.8
VUW-IN-15.88X9.52	5/8	15.88	3/8	9.52	0.31	7.8
VUW-IN-15.88X12.7	5/8	15.88	1/2	12.7	0.44	11.1
VUW-IN-19.05X12.7	3/4	19.05	1/2	12.7	0.44	11.1
VUW-IN-19.05X15.88	3/4	19.05	5/8	15.88	0.56	14.2
VUW-IN-25.4X19.05	1	25.4	3/4	19.05	0.69	17.5

Nut

N



Metric

Part Number	A Tube O.D.	W	L
	mm	mm	mm
VUW-2N	2	12	11.9
VUW-3N	3	12	11.9
VUW-4N	4	12	12
VUW-6N	6	14	12.7
VUW-8N	8	16	13.5
VUW-10N	10	19	15.1
VUW-12N	12	22	17.4
VUW-14N	14	25	17.4
VUW-15N	15	25	17.4
VUW-16N	16	25	17.4
VUW-18N	18	30	17.4
VUW-20N	20	32	17.4
VUW-22N	22	32	17.4
VUW-25N	25	38	20.6

Inch

Part Number	A Tube O.D.		W		L	
	in	mm	in	mm	in	mm
VUW-1.6N	1/16	1.6	5/16	7.9	0.31	8
VUW-3.2N	1/8	3.2	7/16	11.1	0.47	11.9
VUW-4.8N	3/16	4.8	1/2	12.7	0.47	11.9
VUW-6.35N	1/4	6.35	9/16	14.3	0.5	12.7
VUW-7.93N	5/16	7.93	5/8	15.9	0.53	13.5
VUW-9.52N	3/8	9.52	11/16	17.5	0.56	14.3
VUW-12.7N	1/2	12.7	7/8	22.2	0.69	17.5
VUW-15.88N	5/8	15.88	1	25.4	0.69	17.5
VUW-19.05N	3/4	19.05	1 1/8	28.6	0.69	17.5
VUW-22.22N	7/8	22.22	1 1/4	31.8	0.69	17.5
VUW-25.4N	1	25.4	1 1/2	38.1	0.81	20.6

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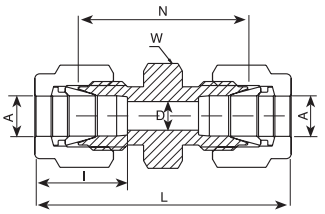
Union

F



Tube (Metric) To Tube (Metric)

Part Number	A Tube O.D.	D	W	N	L	I
	mm	mm	mm	mm	mm	mm
VUWF-2	2	1.7	12	22.4	35.6	12.9
VUWF-3	3	2.4	12	22.1	35.3	12.9
VUWF-4	4	2.4	12	24.1	37.3	13.7
VUWF-6	6	4.8	14	26.2	41	15.3
VUWF-8	8	6.4	15	28.2	43.2	16.2
VUWF-10	10	7.9	18	31	46.2	17.2
VUWF-12	12	9.5	22	31	51.2	22.8
VUWF-14	14	11	24	31.8	52	22.8
VUWF-15	15	12	24	31.8	52	24.4
VUWF-16	16	12.7	24	31.8	52	24.4
VUWF-18	18	15.1	27	33.3	53.5	24.4
VUWF-20	20	15.9	30	34.8	55	26
VUWF-22	22	18.3	30	34.8	55	26
VUWF-25	25	21.8	35	40.4	65	31.3

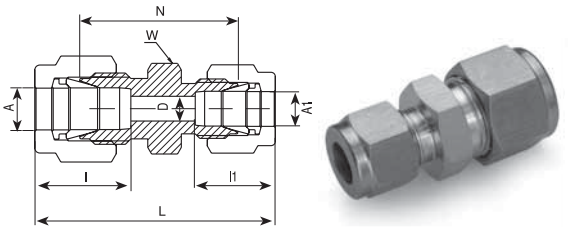
Tube (Inch) To Tube (Inch)

Part Number	A Tube O.D.		D		W		N		L		I	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
VUWF-1.6	1/16	1.6	0.05	1.3	5/16	7.9	0.69	17.5	0.99	25.1	0.34	8.6
VUWF-3.2	1/8	3.2	0.09	2.3	7/16	11.1	0.88	22.4	1.4	35.6	0.5	12.7
VUWF-4.8	3/16	4.8	0.12	3.1	7/16	11.1	0.95	24.1	1.47	37.3	0.54	13.7
VUWF-6.35	1/4	6.35	0.19	4.8	1/2	12.7	1.03	26.2	1.61	40.9	0.6	15.2
VUWF-7.93	5/16	7.93	0.25	6.4	9/16	14.3	1.11	28.2	1.69	42.9	0.64	16.3
VUWF-9.52	3/8	9.52	0.28	7.1	5/8	15.9	1.19	30.2	1.77	45	0.66	16.8
VUWF-12.7	1/2	12.7	0.41	10.4	13/16	20.6	1.22	31	2.02	51.3	0.9	22.9
VUWF-15.88	5/8	15.88	0.5	12.7	15/16	23.8	1.25	31.8	2.05	52.1	0.96	24.4
VUWF-19.05	3/4	19.05	0.62	15.8	1 1/16	27	1.31	33.3	2.11	53.6	0.96	24.4
VUWF-22.22	7/8	22.22	0.72	18.3	1 3/16	30.2	1.38	35.1	2.17	55.1	1.02	25.9
VUWF-25.4	1	25.4	0.88	22.3	1 3/8	34.9	1.59	40.4	2.55	64.8	1.23	31.2

"D" - Dimension is minimum hole diameter - dimensions are for reference only, and are subject to change without notice.

Reducing Union

F



Tube (Metric) To Tube (Metric)

Part Number	A Tube O.D.	A1 Tube O.D.	D	W	N	L	I	I1
	mm	mm	mm	mm	mm	mm	mm	mm
VUWF-3X2	3	2	1.7	12	22.1	35.3	12.9	12.9
VUWF-6X2	6	2	1.7	14	24.6	38.6	15.3	12.9
VUWF-6X3	6	3	2.3	14	24.6	38.6	15.3	12.9
VUWF-6X4	6	4	2.3	14	25.4	39.4	15.3	13.7
VUWF-8X6	8	6	4.8	15	27.4	42.3	16.2	15.3
VUWF-10X6	10	6	4.8	18	29.5	44.5	17.2	15.3
VUWF-10X8	10	8	6.4	18	30	45.1	17.2	16.2
VUWF-12X6	12	6	4.8	22	29.5	47	22.8	15.3
VUWF-12X8	12	8	6.4	22	30.2	47.8	22.8	16.2
VUWF-12X10	12	10	7.9	22	31	48.7	22.8	17.2
VUWF-16X10	16	10	7.9	24	31.8	49.5	24.4	17.2
VUWF-16X12	16	12	9.5	24	31.8	52	24.4	22.8
VUWF-18X12	18	12	9.5	27	33.3	53.5	24.4	22.8
VUWF-25X18	25	18	15.1	35	38.6	61	31.3	24.4
VUWF-25X20	25	20	15.9	35	39.9	62.3	31.3	26

Tube (Metric) To Tube (Inch)

Part Number	A Tube O.D.	A1 Tube O.D.	D	W	N	L	I	I1
	mm	in	mm	mm	mm	mm	mm	mm
VUWF-6.35X2	2	1/4	1.7	14	24	38.6	12.9	15.2
VUWF-3.2X3	3	1/8	2.3	12	22.1	35.2	12.9	12.7
VUWF-4X3.2	4	1/8	2.4	12	23.4	36.5	13.7	12.7
VUWF-6.35X4	4	1/4	2.4	14	25.4	39.4	13.7	15.2
VUWF-6X3.2	6	1/8	2.4	14	24.6	38.5	15.3	12.7
VUWF-6.35X6	6	1/4	4.8	14	26.2	41	15.3	15.2
VUWF-7.93X6	6	5/16	4.8	14	27.4	42.3	15.3	16.2
VUWF-8X3.2	8	1/8	2.4	15	25.9	39.9	16.2	12.7
VUWF-8X6.35	8	1/4	4.8	15	27.4	42.3	16.2	15.2
VUWF-9.52X8	8	3/8	6.4	16	29.5	44.3	16.2	16.8
VUWF-10X3.2	10	1/8	2.4	18	27.7	41.8	17.2	12.7
VUWF-10X6.35	10	1/4	4.8	18	29.5	44.5	17.2	15.2
VUWF-10X7.93	10	5/16	6.4	18	30	45.1	17.2	16.2
VUWF-10X9.52	10	3/8	7.1	18	31	46	17.2	16.8
VUWF-12X7.93	12	5/16	6.4	22	30.2	47.8	22.8	16.2
VUWF-12X9.52	12	3/8	7.1	22	31	48.4	22.8	16.8
VUWF-12.7X12	12	1/2	9.5	22	31	51.2	22.8	22.9
VUWF-15X12.7	15	1/2	10.4	24	31.8	52.1	24.4	22.9
VUWF-16X15.88	16	5/8	12.7	24	31.8	52	24.4	24.4
VUWF-19.05X18	18	3/4	15.1	27	33.3	53.5	24.4	24.4

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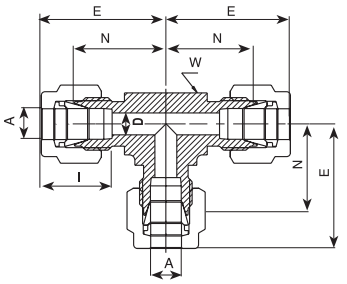
Union Tee

T



All Tube (Metric)							
Part Number	A Tube O.D.	D	W		N	E	I
	mm	mm	in	mm	mm	mm	mm
VUWT-2	2	1.7	3/8	9.5	15.7	22.3	12.9
VUWT-3	3	2.4	3/8	9.5	15.7	22.3	12.9
VUWT-4	4	2.4	1/2	12.7	18.8	25.4	13.7
VUWT-6	6	4.8	1/2	12.7	19.6	27	15.3
VUWT-8	8	6.4	5/8	15.9	22.4	29.9	16.2
VUWT-10	10	7.9	11/16	17.5	23.9	31.5	17.2
VUWT-12	12	9.5	13/16	20.6	25.9	36	22.8
VUWT-14	14	11	15/16	23.8	28.7	38.8	24.4
VUWT-15	15	12	15/16	23.8	28.7	38.8	24.4
VUWT-16	16	12.7	15/16	23.8	28.7	38.8	24.4
VUWT-18	18	15.1	1 1/16	27	29.7	39.8	24.4
VUWT-20	20	15.9	1 3/8	34.9	34.5	44.6	26
VUWT-22	22	18.3	1 3/8	34.9	34.5	44.6	26
VUWT-25	25	21.8	1 3/8	34.9	36.8	49.1	31.3

All Tube (Inch)												
Part Number	A Tube O.D.		D		W		N		E		I	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
VUWT-1.6	1/16	1.6	0.05	1.3	3/8	9.5	0.55	14	0.7	17.8	0.34	8.6
VUWT-3.2	1/8	3.2	0.09	2.3	3/8	9.5	0.62	15.7	0.88	22.4	0.5	12.7
VUWT-4.8	3/16	4.8	0.12	3	1/2	12.7	0.7	17.8	0.96	24.4	0.54	13.7
VUWT-6.35	1/4	6.35	0.19	4.8	1/2	12.7	0.77	19.6	1.06	26.9	0.6	15.2
VUWT-7.93	5/16	7.93	0.25	6.4	5/8	15.9	0.88	22.4	1.17	29.7	0.64	16.3
VUWT-9.52	3/8	9.52	0.28	7.1	5/8	15.9	0.91	23.1	1.2	30.5	0.66	16.8
VUWT-12.7	1/2	12.7	0.41	10.4	13/16	20.6	1.02	25.9	1.42	36.1	0.9	22.9
VUWT-15.88	5/8	15.88	0.5	12.7	15/16	23.8	1.13	28.7	1.53	38.9	0.96	24.4
VUWT-19.05	3/4	19.05	0.62	15.8	1 1/16	27	1.17	29.7	1.57	39.9	0.96	24.4
VUWT-22.22	7/8	22.22	0.72	18.3	1 3/8	34.9	1.36	34.54	1.76	44.7	1.02	25.9
VUWT-25.4	1	25.4	0.88	22.3	1 3/8	34.9	1.45	36.8	1.93	49	1.23	31.2

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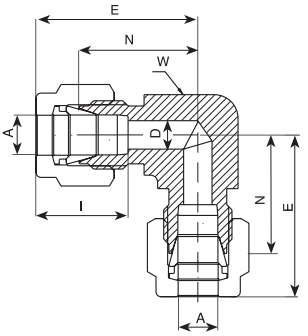
Union Elbow

L



Tube (Metric) To Tube (Metric)							
Part Number	A Tube O.D.	D	W		N	E	I
	mm	mm	in	mm	mm	mm	mm
VUWL-3	3	2.4	3/8	9.5	15.7	22.3	12.9
VUWL-4	4	2.4	1/2	12.7	18.8	25.4	13.7
VUWL-6	6	4.8	1/2	12.7	19.6	27	15.3
VUWL-8	8	6.4	9/16	14.3	21.3	28.8	16.2
VUWL-10	10	7.9	11/16	17.5	23.9	31.5	17.2
VUWL-12	12	9.5	13/16	20.6	25.9	36	22.8
VUWL-14	14	11	15/16	23.8	27.9	38	24.4
VUWL-15	15	12	15/16	23.8	27.9	38	24.4
VUWL-16	16	12.7	15/16	23.8	27.9	38	24.4
VUWL-18	18	15.1	1 1/16	27	29.7	39.8	24.4
VUWL-20	20	15.9	1 3/8	34.9	34.5	44.6	26
VUWL-22	22	18.3	1 3/8	34.9	34.5	44.6	26
VUWL-25	25	21.8	1 3/8	34.9	36.8	49.1	31.3

Tube (Inch) To Tube (Inch)												
Part Number	A Tube O.D.		D		W		N		E		I	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
VUWL-1.6	1/16	1.6	0.05	1.3	3/8	9.5	0.55	14	0.7	17.8	0.34	8.6
VUWL-3.2	1/8	3.2	0.09	2.3	3/8	9.5	0.62	15.7	0.88	22.4	0.5	12.7
VUWL-4.8	3/16	4.8	0.12	3	1/2	12.7	0.74	18.8	1	25.4	0.54	13.7
VUWL-6.35	1/4	6.35	0.19	4.8	1/2	12.7	0.77	19.6	1.06	26.9	0.6	15.2
VUWL-7.93	5/16	7.93	0.25	6.4	9/16	14.3	0.84	21.3	1.13	28.7	0.64	16.3
VUWL-9.52	3/8	9.52	0.28	7.1	5/8	15.9	0.91	23.1	1.2	30.5	0.66	16.8
VUWL-12.7	1/2	12.7	0.41	10.4	13/16	20.6	1.02	25.9	1.42	36.1	0.9	22.9
VUWL-15.88	5/8	15.88	0.5	12.7	15/16	23.8	1.1	27.9	1.5	38.1	0.96	24.4
VUWL-19.05	3/4	19.05	0.62	15.8	1 1/16	27	1.17	29.7	1.57	39.9	0.96	24.4
VUWL-22.22	7/8	22.22	0.72	18.3	1 3/8	34.9	1.36	34.5	1.76	44.7	1.02	25.9
VUWL-25.4	1	25.4	0.88	22.3	1 3/8	34.9	1.45	36.8	1.93	49	1.23	31.2

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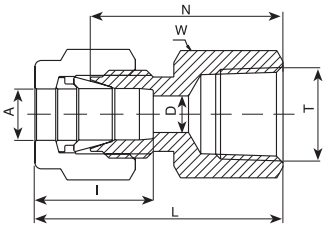
Female Connector (NPT) (continued)

G



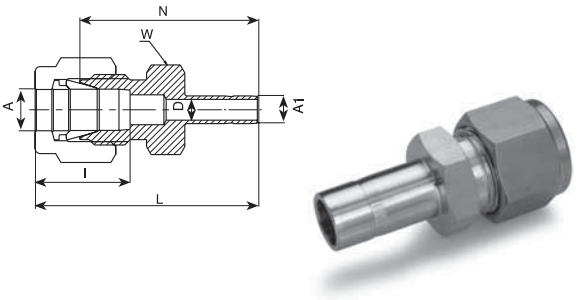
Tube (Inch) To Female NPT Thread

Part Number	A Tube O.D.		T	D		W		N		L		I	
	in	mm		in	mm	in	mm	in	mm	in	mm	in	mm
VUWG-3.2AN	1/8	3.2	1/8NPT	0.09	2.3	9/16	14.3	0.87	22.1	1.13	28.7	0.5	12.7
VUWG-3.2BN	1/8	3.2	1/4NPT	0.09	2.3	3/4	19.1	1.06	26.9	1.32	33.5	0.5	12.7
VUWG-4.8AN	3/16	4.8	1/8NPT	0.12	3.04	9/16	14.3	0.91	23.11	1.17	29.7	0.54	13.7
VUWG-6.35AN	1/4	6.35	1/8NPT	0.19	4.8	9/16	14.3	0.94	23.9	1.23	31.2	0.6	15.2
VUWG-6.35BN	1/4	6.35	1/4NPT	0.19	4.8	3/4	19.1	1.12	28.5	1.41	35.8	0.6	15.2
VUWG-6.35CN	1/4	6.35	3/8NPT	0.19	4.8	7/8	22.2	1.19	30.2	1.48	37.6	0.6	15.2
VUWG-6.35DN	1/4	6.35	1/2NPT	0.19	4.8	1 1/16	27	1.38	35	1.67	42.4	0.6	15.2
VUWG-7.93AN	5/16	7.93	1/8NPT	0.25	6.35	9/16	14.3	0.97	24.6	1.26	32	0.64	16.3
VUWG-7.93BN	5/16	7.93	1/4NPT	0.25	6.35	3/4	19.1	1.16	29.5	1.45	36.8	0.64	16.3
VUWG-9.52AN	3/8	9.52	1/8NPT	0.28	7.1	5/8	15.9	1	25.4	1.29	32.8	0.66	16.8
VUWG-9.52BN	3/8	9.52	1/4NPT	0.28	7.1	3/4	19.1	1.19	30.2	1.48	37.6	0.66	16.8
VUWG-9.52CN	3/8	9.52	3/8NPT	0.28	7.1	7/8	22.2	1.25	31.8	1.54	39.1	0.66	16.8
VUWG-9.52DN	3/8	9.52	1/2NPT	0.28	7.1	1 1/16	27	1.44	36.6	1.73	43.9	0.66	16.8
VUWG-12.7BN	1/2	12.7	1/4NPT	0.41	10.4	13/16	20.6	1.19	30.2	1.59	40.4	0.9	22.9
VUWG-12.7CN	1/2	12.7	3/8NPT	0.41	10.4	7/8	22.2	1.25	31.8	1.65	41.9	0.9	22.9
VUWG-12.7DN	1/2	12.7	1/2NPT	0.41	10.4	1 1/16	27	1.44	36.6	1.84	46.7	0.9	22.9
VUWG-12.7EN	1/2	12.7	3/4NPT	0.41	10.4	1 5/16	33.3	1.5	38.1	1.9	48.3	0.9	22.9
VUWG-15.88CN	5/8	15.88	3/8NPT	0.5	12.7	15/16	23.8	1.25	31.8	1.65	41.9	0.96	24.4
VUWG-15.88DN	5/8	15.88	1/2NPT	0.5	12.7	1 1/16	27	1.44	36.6	1.84	46.7	0.96	24.4
VUWG-19.05DN	3/4	19.05	1/2NPT	0.62	15.8	1 1/16	27	1.44	36.6	1.84	46.7	0.96	24.4
VUWG-19.05EN	3/4	19.05	3/4NPT	0.62	15.8	1 5/16	33.3	1.5	38.1	1.9	48.3	0.96	24.4
VUWG-22.22EN	7/8	22.22	3/4NPT	0.72	18.3	1 5/16	33.3	1.56	39.6	1.96	49.8	1.02	25.9
VUWG-25.4EN	1	25.4	3/4NPT	0.88	22.3	1 3/8	34.9	1.62	41.1	2.1	53.3	1.23	31.2
VUWG-25.4FN	1	25.4	1NPT	0.88	22.3	1 5/8	41.3	1.97	50	2.45	62.2	1.23	31.2

"D" - Dimension is minimum hole diameter - dimensions are for reference only, and are subject to change without notice.

Reducer (continued)

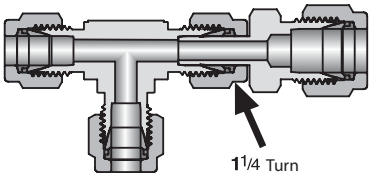
R



Tube (Inch) To Stub (Inch)

Part Number	A Tube O.D.		A1 Tube O.D.		D		W		N		L		I	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
VUWR-1.6X3.2	1/16	1.6	1/8	3.2	0.05	1.3	5/16	7.9	1	25.4	1.15	29.2	0.34	8.6
VUWR-1.6X6.35	1/16	1.6	1/4	6.35	0.05	1.3	5/16	7.9	1.09	27.7	1.24	31.5	0.34	8.6
VUWR-3.2X1.6	1/8	3.2	1/16	1.6	0.03	0.8	7/16	11.1	0.88	22.4	1.14	29	0.5	12.7
VUWR-3.2X4.8	1/8	3.2	3/16	4.8	0.09	2.3	7/16	11.1	1.09	27.7	1.35	34.3	0.5	12.7
VUWR-3.2X6.35	1/8	3.2	1/4	6.35	0.09	2.3	7/16	11.1	1.16	29.5	1.42	36.1	0.5	12.7
VUWR-3.2X9.52	1/8	3.2	3/8	9.52	0.09	2.3	7/16	11.1	1.22	31	1.48	37.6	0.5	12.7
VUWR-3.2X12.7	1/8	3.2	1/2	12.7	0.09	2.3	9/16	14.3	1.48	37.6	1.74	44.2	0.5	12.7
VUWR-4.8X3.2	3/16	4.8	1/8	3.2	0.09	2.3	7/16	11.1	1.11	28.2	1.37	34.8	0.54	13.7
VUWR-4.8X6.35	3/16	4.8	1/4	6.35	0.12	3.1	7/16	11.1	1.2	30.5	1.46	37.1	0.6	13.7
VUWR-6.35X3.2	1/4	6.35	1/8	3.2	0.09	2.3	1/2	12.7	1.16	29.5	1.45	36.8	0.6	15.2
VUWR-6.35X4.8	1/4	6.35	3/16	4.8	0.12	3	1/2	12.7	1.19	30.2	1.48	37.6	0.6	15.2
VUWR-6.35X6.35	1/4	6.35	1/4	6.35	0.17	4.2	1/2	12.7	1.25	31.8	1.54	39.1	0.6	15.2
VUWR-6.35X7.93	1/4	6.35	5/16	7.93	0.19	4.8	1/2	12.7	1.28	32.5	1.57	39.9	0.6	15.2
VUWR-6.35X9.52	1/4	6.35	3/8	9.52	0.19	4.8	1/2	12.7	1.31	33.3	1.6	40.6	0.6	15.2
VUWR-6.35X12.7	1/4	6.35	1/2	12.7	0.19	4.8	9/16	14.3	1.53	38.9	1.82	46.2	0.6	15.2
VUWR-6.35X15.88	1/4	6.35	5/8	15.88	0.19	4.8	11/16	17.5	1.6	40.6	1.89	48	0.6	15.2
VUWR-6.35X19.05	1/4	6.35	3/4	19.05	0.19	4.8	13/16	20.6	1.59	40.4	1.88	47.8	0.6	15.2
VUWR-7.93X9.52	5/16	7.93	3/8	9.52	0.25	6.4	9/16	14.3	1.36	34.5	1.65	41.9	0.64	16.3
VUWR-7.93X12.7	5/16	7.93	1/2	12.7	0.25	6.4	9/16	14.3	1.58	40.1	1.87	47.5	0.64	16.3
VUWR-9.52X6.35	3/8	9.52	1/4	6.35	0.17	4.2	5/8	15.9	1.34	34	1.63	41.4	0.66	16.8
VUWR-9.52X9.52	3/8	9.52	3/8	9.52	0.27	6.9	5/8	15.9	1.41	35.8	1.7	43.2	0.66	16.8
VUWR-9.52X12.7	3/8	9.52	1/2	12.7	0.28	7.1	5/8	15.9	1.62	41.2	1.91	48.5	0.66	16.8
VUWR-9.52X15.88	3/8	9.52	5/8	15.88	0.28	7.1	11/16	17.5	1.69	42.9	1.98	50.3	0.66	16.8
VUWR-9.52X19.05	3/8	9.52	3/4	19.05	0.28	7.1	13/16	20.6	1.69	42.9	1.98	50.3	0.66	16.8
VUWR-12.7X6.35	1/2	12.7	1/4	6.35	0.17	4.2	13/16	20.6	1.37	34.8	1.77	45	0.9	22.9
VUWR-12.7X9.52	1/2	12.7	3/8	9.52	0.27	6.9	13/16	20.6	1.44	36.6	1.84	46.7	0.9	22.9
VUWR-12.7X12.7	1/2	12.7	1/2	12.7	0.37	9.4	13/16	20.6	1.66	42.2	2.06	52.3	0.9	22.9
VUWR-12.7X15.88	1/2	12.7	5/8	15.88	0.41	10.4	13/16	20.6	1.72	43.7	2.12	53.8	0.9	22.9
VUWR-12.7X19.05	1/2	12.7	3/4	19.05	0.41	10.4	13/16	20.6	1.72	43.7	2.12	53.8	0.9	22.9
VUWR-12.7X25.4	1/2	12.7	1	25.4	0.41	10.4	1 1/16	27	1.97	50	2.37	60.2	0.9	22.9
VUWR-15.88X19.05	5/8	15.88	3/4	19.05	0.5	12.7	15/16	23.8	1.75	44.5	2.15	54.6	0.96	24.4
VUWR-15.88X22.22	5/8	15.88	7/8	22.22	0.5	12.7	15/16	23.8	1.81	46	2.21	56.1	0.96	24.4
VUWR-15.88X25.4	5/8	15.88	1	25.4	0.5	12.7	1 1/16	27	2	50.8	2.4	61	0.96	24.4
VUWR-19.05X12.7	3/4	19.05	1/2	12.7	0.37	9.4	1 1/16	27	1.75	44.5	2.15	54.6	0.96	24.4
VUWR-19.05X25.4	3/4	19.05	1	25.4	0.62	15.8	1 1/16	27	2.06	52.3	2.46	62.5	0.96	24.4

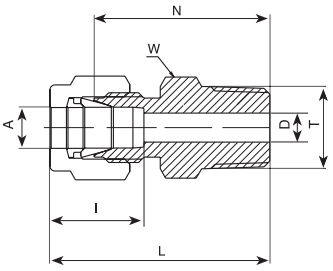
Assembly Instructions



"D" - Dimension is minimum hole diameter - dimensions are for reference only, and are subject to change without notice.

Male Connector (NPT) (continued)

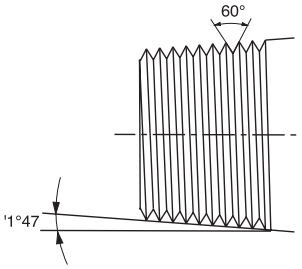
H



Tube (Inch) Male NPT Thread													
Part Number	A Tube O.D.		T	D		W		N		L		I	
	in	mm		in	mm	in	mm	in	mm	in	mm	in	mm
VUWH-1.6AN	1/16	1.6	1/8NPT	0.05	1.3	7/16	11.1	0.88	22.35	1.03	26.2	0.34	8.6
VUWH-3.2AN	1/8	3.2	1/8NPT	0.09	2.3	7/16	11.1	0.94	23.9	1.2	30.5	0.5	12.7
VUWH-3.2BN	1/8	3.2	1/4NPT	0.09	2.3	9/16	14.3	1.14	29	1.4	35.6	0.5	12.7
VUWH-4.8AN	3/16	4.8	1/8NPT	0.12	3.1	7/16	11.1	0.97	24.6	1.23	31.2	0.54	13.7
VUWH-4.8BN	3/16	4.8	1/4NPT	0.12	3.1	9/16	14.3	1.17	29.7	1.43	36.3	0.54	13.7
VUWH-6.35AN	1/4	6.35	1/8NPT	0.19	4.8	1/2	12.7	1	25.4	1.29	32.8	0.6	15.2
VUWH-6.35BN	1/4	6.35	1/4NPT	0.19	4.8	9/16	14.3	1.2	30.5	1.49	37.9	0.6	15.2
VUWH-6.35CN	1/4	6.35	3/8NPT	0.19	4.8	11/16	17.5	1.22	31	1.51	38.4	0.6	15.2
VUWH-6.35DN	1/4	6.35	1/2NPT	0.19	4.8	7/8	22.2	1.47	37.3	1.76	44.7	0.6	15.2
VUWH-7.93AN	5/16	7.93	1/8NPT	0.19	4.8	9/16	14.3	1.05	26.7	1.34	34	0.64	16.2
VUWH-7.93BN	5/16	7.93	1/4NPT	0.25	6.4	9/16	14.3	1.23	31.2	1.52	38.6	0.64	16.2
VUWH-9.52AN	3/8	9.52	1/8NPT	0.19	4.8	5/8	15.9	1.1	27.9	1.39	35.3	0.66	16.8
VUWH-9.52BN	3/8	9.52	1/4NPT	0.28	7.1	5/8	15.9	1.28	32.5	1.57	39.9	0.66	16.8
VUWH-9.52CN	3/8	9.52	3/8NPT	0.28	7.1	11/16	17.5	1.28	32.5	1.57	39.9	0.66	16.8
VUWH-9.52DN	3/8	9.52	1/2NPT	0.28	7.1	7/8	22.2	1.52	38.9	1.82	46.2	0.66	16.8
VUWH-9.52EN	3/8	9.52	3/4NPT	0.28	7.1	1 1/16	27	1.59	40.4	1.88	47.8	0.66	16.8
VUWH-12.7AN	1/2	12.7	1/8NPT	0.19	4.8	13/16	20.6	1.13	28.7	1.53	38.9	0.9	22.9
VUWH-12.7BN	1/2	12.7	1/4NPT	0.28	7.1	13/16	20.6	1.31	33.3	1.71	43.4	0.9	22.9
VUWH-12.7CN	1/2	12.7	3/8NPT	0.38	9.6	13/16	20.6	1.31	33.3	1.71	43.4	0.9	22.9
VUWH-12.7DN	1/2	12.7	1/2NPT	0.41	10.4	7/8	22.2	1.53	38.9	1.93	49	0.9	22.9
VUWH-12.7EN	1/2	12.7	3/4NPT	0.41	10.4	1 1/16	27	1.59	40.4	1.99	50.5	0.9	22.9
VUWH-12.7FN	1/2	12.7	1NPT	0.41	10.4	1 3/8	34.9	1.85	47	2.25	57.2	0.9	22.9
VUWH-15.88CN	5/8	15.88	3/8NPT	0.38	9.6	15/16	23.8	1.34	34	1.74	44.2	0.96	24.4
VUWH-15.88DN	5/8	15.88	1/2NPT	0.47	11.9	15/16	23.8	1.53	38.9	1.93	49	0.96	24.4
VUWH-15.88EN	5/8	15.88	3/4NPT	0.5	12.7	1 1/16	27	1.59	40.4	1.99	50.5	0.96	24.4
VUWH-19.05DN	3/4	19.05	1/2NPT	0.5	11.9	1 1/16	27	1.59	40.4	1.99	50.5	0.96	24.4
VUWH-19.05EN	3/4	19.05	3/4NPT	0.62	15.8	1 1/16	27	1.59	40.4	1.99	50.5	0.96	24.4
VUWH-19.05FN	3/4	19.05	1NPT	0.62	15.8	1 3/8	34.9	1.85	47	2.25	57.2	0.96	24.4
VUWH-22.22EN	7/8	22.22	3/4NPT	0.72	18.3	1 3/16	30.2	1.59	40.4	1.99	50.5	1.02	25.9
VUWH-25.4EN	1	25.4	3/4NPT	0.72	18.3	1 3/8	34.9	1.78	45.2	2.26	57.4	1.23	31.2
VUWH-25.4FN	1	25.4	1NPT	0.88	22.3	1 3/8	34.9	1.97	50	2.45	62.2	1.23	31.2

Reference Specifications:

American Standard Pipe Thread (NPT).
NPT (National Pipe Tapered) is made to specifications outlined in ASNI B1.20.1.



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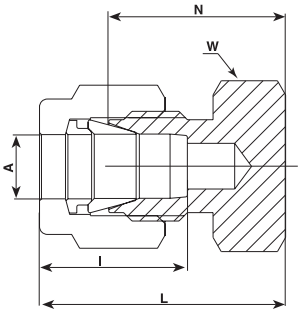
Cap

JC



Capping End Of Tube (Metric)					
Part Number	A Tube O.D.	W	N	L	I
	mm	mm	mm	mm	mm
VUWJC-2	2	12	13.5	20.1	12.9
VUWJC-3	3	12	13.5	20.1	12.9
VUWJC-4	4	12	14.7	21.3	13.7
VUWJC-6	6	14	15.7	23.1	15.3
VUWJC-8	8	15	17	24.5	16.2
VUWJC-10	10	18	19	26.6	17.2
VUWJC-12	12	22	19	29.1	22.8
VUWJC-15	15	24	19.8	29.9	24.4
VUWJC-16	16	24	19.8	29.9	24.4
VUWJC-18	18	27	21.3	31.4	24.4
VUWJC-20	20	30	23.9	34	26
VUWJC-22	22	30	23.9	34	26
VUWJC-25	25	35	26.2	38.5	31.3

Capping End Of Tube (Inch)										
Part Number	A Tube O.D.		W		N		L		I	
	in	mm	in	mm	in	mm	in	mm	in	mm
VUWJC-1.6	1/16	1.6	5/16	7.9	0.44	11.2	0.59	15	0.34	8.6
VUWJC-3.2	1/8	3.2	7/16	11.1	0.53	13.5	0.79	20.1	0.5	12.7
VUWJC-4.8	3/16	4.8	7/16	11.1	0.58	14.7	0.84	21.8	0.54	13.7
VUWJC-6.35	1/4	6.35	1/2	12.7	0.63	16	0.92	23.4	0.6	15.2
VUWJC-7.93	5/16	7.93	9/16	14.3	0.67	17	0.96	24.4	0.64	16.2
VUWJC-9.52	3/8	9.52	5/8	15.9	0.72	18.3	1.01	26.7	0.66	16.8
VUWJC-12.7	1/2	12.7	13/16	20.6	0.75	19.1	1.15	29.2	0.9	22.9
VUWJC-15.88	5/8	15.88	15/16	23.8	0.78	19.8	1.18	30	0.96	24.4
VUWJC-19.05	3/4	19.05	1 1/16	27	0.84	21.3	1.24	31.5	0.96	24.4
VUWJC-22.22	7/8	22.22	1 3/16	30.2	0.94	23.9	1.34	34	1.02	25.9
VUWJC-25.4	1	25.4	1 3/8	34.9	1.03	26.2	1.51	38.4	1.23	31.2

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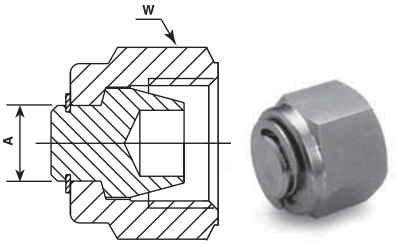
Plug

JP



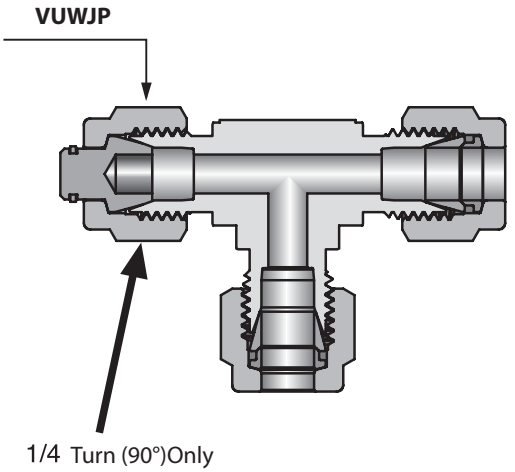
Plugging Unused Port Of Fitting (Metric)

Part Number	A	W
	mm	mm
VUWJP-3	3	12
VUWJP-4	4	12
VUWJP-6	6	14
VUWJP-8	8	16
VUWJP-10	10	19
VUWJP-12	12	22
VUWJP-15	15	25
VUWJP-16	16	25
VUWJP-18	18	30
VUWJP-20	20	32
VUWJP-22	22	32
VUWJP-25	25	38

Plugging Unused Port Of Fitting (Inch)

Part Number	A		W	
	in	mm	in	mm
VUWJP-1.6	1/16	1.5	5/16	7.9
VUWJP-3.2	1/8	3.1	7/16	11.1
VUWJP-4.8	3/16	4.8	1/2	12.7
VUWJP-6.35	1/4	6.35	9/16	14.3
VUWJP-7.93	5/16	7.93	5/8	15.9
VUWJP-9.52	3/8	9.52	11/16	17.5
VUWJP-12.7	1/2	12.7	7/8	22.2
VUWJP-15.88	5/8	15.8	1	25.4
VUWJP-19.05	3/4	19	1 1/8	28.6
VUWJP-25.4	1	25.4	1 1/2	38.1

Plug Assembly Instructions



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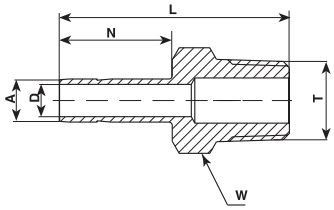
Male Adapter
Tube To Pipe (NPT) (continued)

A

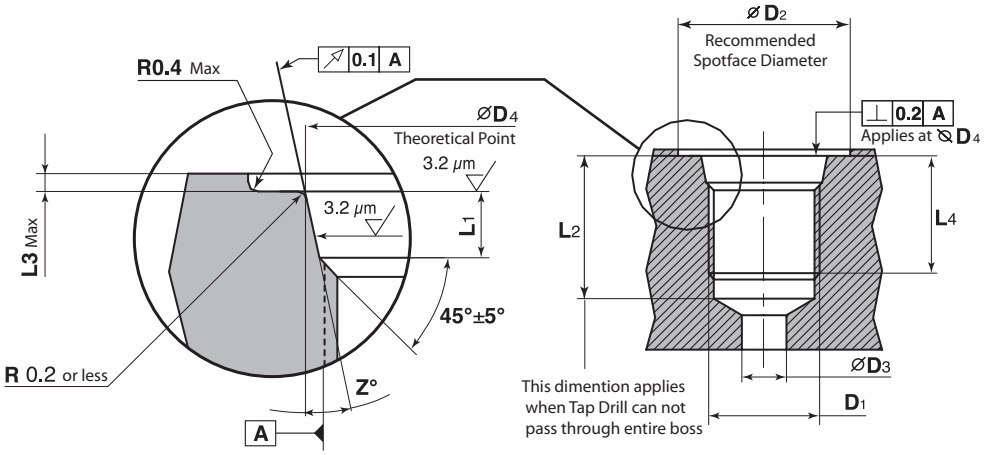


Tube (Inch) Male pipe												
Part Number	A Tube O.D.		T	D		W		N		L	
	in	mm		in	mm	in	mm	in	mm	in	mm
VUW-A-3.2AN	1/8	3.2	1/8NPT	0.09	2.2	7/16	11.1	0.53	13.5	1.16	29.5
VUW-A-3.2BN	1/8	3.2	1/4NPT	0.09	2.2	9/16	14.3	0.53	13.5	1.37	34.8
VUW-A-4.8AN	3/16	4.8	1/8NPT	0.12	3	7/16	11.1	0.56	14.2	1.19	30.2
VUW-A-4.8BN	3/16	4.8	1/4NPT	0.12	3	9/16	14.3	0.56	14.2	1.4	35.6
VUW-A-6.35AN	1/4	6.35	1/8NPT	0.17	4.2	7/16	11.1	0.62	15.8	1.25	31.8
VUW-A-6.35BN	1/4	6.35	1/4NPT	0.17	4.2	9/16	14.3	0.62	15.8	1.46	37.1
VUW-A-6.35CN	1/4	6.35	3/8NPT	0.17	4.2	11/16	17.5	0.62	15.8	1.49	37.9
VUW-A-6.35DN	1/4	6.35	1/2NPT	0.17	4.2	7/8	22.2	0.62	15.8	1.71	43.4
VUW-A-7.93AN	5/16	7.93	1/8NPT	0.24	6	7/16	11.1	0.66	16.8	1.29	32.7
VUW-A-7.93BN	5/16	7.93	1/4NPT	0.24	6	9/16	14.3	0.66	16.8	1.5	38.1
VUW-A-9.52AN	3/8	9.52	1/8NPT	0.27	6.9	7/16	11.1	0.69	17.5	1.32	33.5
VUW-A-9.52BN	3/8	9.52	1/4NPT	0.27	6.9	9/16	14.3	0.69	17.5	1.53	38.9
VUW-A-9.52CN	3/8	9.52	3/8NPT	0.27	6.9	11/16	17.5	0.69	17.5	1.56	39.6
VUW-A-9.52DN	3/8	9.52	1/2NPT	0.27	6.9	7/8	22.2	0.69	17.5	1.78	45.2
VUW-A-12.7BN	1/2	12.7	1/4NPT	0.37	9.4	9/16	14.3	0.91	23.1	1.75	44.5
VUW-A-12.7CN	1/2	12.7	3/8NPT	0.37	9.4	11/16	17.5	0.91	23.1	1.78	45.2
VUW-A-12.7DN	1/2	12.7	1/2NPT	0.37	9.4	7/8	22.2	0.91	23.1	2	50.8
VUW-A-15.88CN	5/8	15.88	3/8NPT	0.39	9.9	11/16	17.5	0.97	24.7	1.81	47.6
VUW-A-15.88DN	5/8	15.88	1/2NPT	0.47	11.9	7/8	22.2	0.97	24.7	2.06	52.3
VUW-A-15.88EN	5/8	15.88	3/4NPT	0.5	12.7	1 1/16	27	0.97	24.7	2.06	52.3
VUW-A-19.05DN	3/4	19.05	1/2NPT	0.47	11.9	7/8	22.2	0.97	24.7	2.06	52.3
VUW-A-19.05EN	3/4	19.05	3/4NPT	0.59	15	1 1/16	27	0.97	24.7	2.06	52.3
VUW-A-19.05FN	3/4	19.05	1NPT	0.59	15	1 3/8	34.9	0.97	24.7	2.28	57.3
VUW-A-22.22EN	7/8	22.22	3/4NPT	0.6	15.9	1 1/16	27	1.05	26.6	2.09	54.3
VUW-A-25.4EN	1	25.4	3/4NPT	0.62	15.8	1 1/16	27	1.3	33	2.31	58.7
VUW-A-25.4FN	1	25.4	1NPT	0.8	20.3	1 3/8	34.9	1.3	33	2.6	66.4

"D" - Dimension is minimum hole diameter - dimensions are for reference only, and are subject to change without notice.

Mounting Dimensions

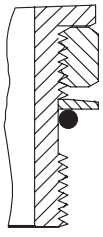
FOR SAE J1926 & MS 16142 BOSS



Mounting Dimensions For Oring-Seal Connectors (SAE/MS)								
D1 Thread Size	**D2** Min. Diameter	**D3** Min. Diameter	**D4** ± 0.05	**L1** ± 0.02	**L2** Min.	**L3** Max.	**L4** Min. Full Thread	**Z** ± 1°
	mm	mm	mm	mm	mm	mm	mm	°
5/16 - 24 UNF - 2B	17	1.6	9.15	2.1	12	1.6	10	12
3/8 - 24 UNF - 2B	19	3.5	10.75	2.1	12	1.6	10	12
7/16 - 20 UNF - 2B	21	4.5	12.45	2.6	14	1.6	11.5	12
1/2 - 20 UNF - 2B	23	6	14.05	2.6	14	1.6	11.5	12
9/16 - 18 UNF- 2B	25	7.5	15.7	2.7	15.5	1.6	12.7	12
3/4 - 16 UNF -2B	30	10	20.65	2.7	17.5	2.4	14.3	15
7/8 - 14 UNF - 2B	34	12.5	24	2.7	20	2.4	16.7	15
1 1/16 - 12 UNF - 2B	41	16	29.2	3.5	23	2.4	19	15
1 3/16 - 12 UN - 2B	45	18	32.4	3.5	23	2.4	19	15
1 5/16 - 12 UN - 2B	49	21	35.55	3.5	23	3.2	19	15

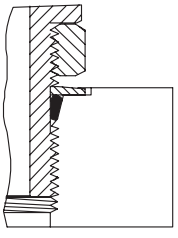
Installation Instructions:

Figure 1
Locking backed off



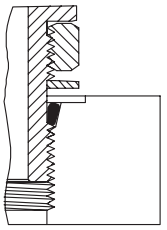
Lubricate the O-ring by inserting it into the groove adjacent to the face of the metal back - up washer which is assembled at the extreme end of the groove as shown in Figure 1.

Figure 2
Fitting install hand tight



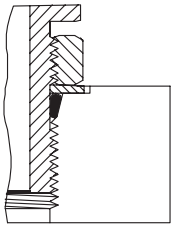
Install the fitting into the S.A.E. straight thread boss, figure 2, until the metal back - up washer contacts the face of the boss as shown in Figure 2.

Figure 3
Fittings backed-off for alignment (1 turn maximum)



Position the fitting by turning it counter clockwise up to a maximum of one turn (see Figure 3).

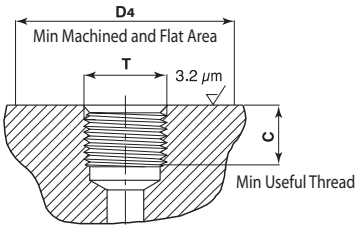
Figure 4
Fitting locknut tight to appropriate torque



Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face as shown in Figure 4.

"D" - Dimension is minimum hole diameter - dimensions are for reference only, and are subject to change without notice.

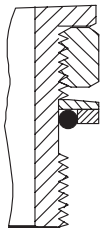
ISO Parallel Thread (Reference)



Mounting Dimensions Of Connectors				
T	D4		C Min useful Thread	
	in	mm	in	mm
G1/8	0.53	13.5	0.28	7

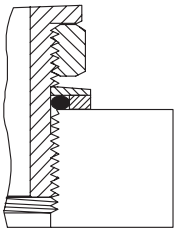
Installation Instructions:

Figure 1
Locking backed off



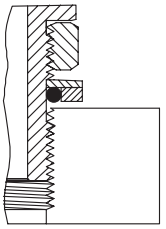
Set the O-ring by inserting it into the groove adjacent to the face of the metal back - up washer which is assembled at the extreme end of the groove as shown in Figure 1.

Figure 2
Fittings install hand tight



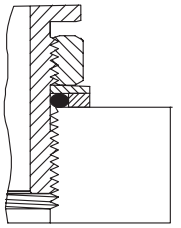
Install the fitting into the ISQ straight thread boss untill the metal back - up washer contacts the face of the boss as shown in Figure 2.

Figure 3
Fittings backed-off for O-ring alignment (1 turn maximum)



Position the fitting by turning it counter clockwise up to a maximum of one turn. See Figure 3.

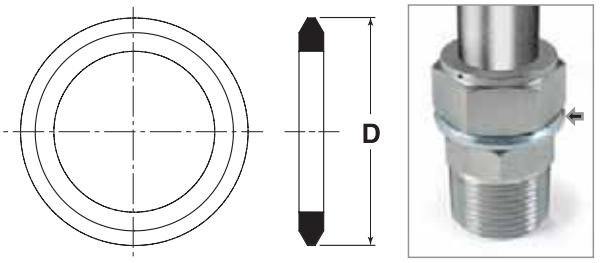
Figure 4
Fittings locknut tight to appropriate torque



Holding the body of the fitting with a wrench, tighten the locknut and washer against the face as shown in Figure 4.

Stop Collar

V-LOK®		D	
in	mm	in	mm
1/4	6.35	0.69	17.5
3/8	9.52	0.84	20.6
1/2	12.7	1.1	27
3/4	19.05	1.31	33.3
1	25.4	1.68	42.7



1. Remove the nut and ferrules from the fitting.
2. Insert the stop collar.
3. Assemble the nut and ferrules until hand tight.
4. Tighten the fitting until the stop collar no longer rotates (by hand).
   At this stage the fitting is tightened correctly.

Ordering Information For Assembeled Stop Collar (With Fitting)

V U W H	-	6.35 BN	-	SC	-	**S** = Stainless Steel **B** = Carbon Zinc Plated
Fitting type (male V-Lok® Fittings)		Tube O.D. The O.D. size is always the first to be described.		Stop Collar		Stop Collar Material

How To Order Stop Collar Only

VUW-6.35 SC	-	**S** = Stainless Steel **B** = Carbon Zinc Plated

FINE BUBBLE® Leak Detection Fluid

Concentration of Impurities (Units: ppm)

Impurities	Na	K	Ca	Cl	F
Concentration	<1	<1	<1	<1	<1

Ordering No.	Container Size	Quantity per Pack	Container
LL-S-1	60cc	6 bottles/pack	Squeeze bottle
LL-M-1	300cc	1 bottle/pack	Squeeze bottle with nozzle cap
LL-L-1	4ℓ	1container/pack	Refill container

60cc 300cc

4ℓ

Features

- With its viscosity and rapid foaming action, FINE BUBBLE® dectects the smallest leaks even when it is applied in small amounts.
- Noncorrosive; does not react with metal, coatings, rubber, or plastic surfaces.
- Dries clean and without staining.
- Minimal impurities such as sodium, potassium, calcium, chlorine, fluorine, bromine, and sulfur compounds.
- Nonflammable; does not react with oxygen.
- Available in three convenient sizes: 60cc (squeeze bottle), 300cc (squeeze bottle with nozzle cap), and 4L (refill container).
- Read the instructions carefully before use.

FINE BUBBLE® Test Data

Corrosion Test Results

Tube Material (25 x 50 x 15t #400 finish)	Leak Detection Fluid			
	FINE BUBBLE®	Brand B	Brand C	Duration
S55C	○	X3	X3	24 hours
A1050P	○	○	△120	120 hours
C2801P	△3	△3	△3	120 hours
SUS304	○	○	○	120 hours

Key: ○: Almost no changes at the end of the test
△: Discolored or slightly corroded
x : Corroded
* Numbers next to the icon indicate when (in terms of hours) changes to the metal were visually observed.

Immersion Corrosion Test

The metal samples were immersed in the leak detection fluids at 30°c and inspected for changes.

FINE BUBBLE® Brand B

Brand C

S55C samples after 24 hours of immersion in the leak detection fluids

Note: Materials and dimention are subject to change without notice.