

HYDROGEN

Valves, Fittings and Tubing



Needle Valves and Air Actuators 20,000 PSI (1378 BAR)

Needle Valves

Available in a variety of body styles designed for operation at temperatures ranging from -58° to +392°F (-50° to +200°C).
Extended stuffing box allows for operation down to -423°F (-253°C).

20,000 PSI (1378 BAR) 2-Way Straight Needle Valve

Catalog Number	Stem Style	Connection	A	B	C	D	E	F	G	H	I	J	K	L	Thk.	Fig.
20UV41V-N-H2-S	Vee	1/4" M/P Tube	2.00"	1.00"	2.00"	4.50"	1.62"	1.19"	0.62"	0.38"	3.00"	0.25"	-	-	0.75"	1
20UV41R-N-H2-S	Reg		(50.8)	(25.4)	(50.8)	(114.3)	(41.1)	(30.2)	(15.7)	(9.7)	(76.2)	(6.4)	-	-	(19.1)	1
20UV61V-N-H2-S	Vee	3/8" M/P Tube	2.00"	1.00"	2.00"	4.50"	1.62"	1.19"	0.62"	0.38"	3.00"	0.25"	-	-	0.75"	1
20UV61R-N-H2-S	Reg		(50.8)	(25.4)	(50.8)	(114.3)	(41.1)	(30.2)	(15.7)	(9.7)	(76.2)	(6.4)	-	-	(19.1)	1
20UV91V-N-H2-S	Vee	9/16" M/P Tube	2.50"	1.25"	2.88"	6.32"	2.38"	1.75"	0.69"	0.50"	4.00"	0.34"	-	-	1.00"	1
20UV91R-N-H2-S	Reg		(63.5)	(31.8)	(73.2)	(160.5)	(60.5)	(44.5)	(17.5)	(12.7)	(101.6)	(8.6)	-	-	(25.4)	1
20V121V-N-H2-S	Vee	3/4" M/P Tube	3.00"	1.50"	3.75"	8.75"	3.00"	2.25"	0.88"	0.62"	8.00"	0.43"	-	-	1.38"	1
20V121R-N-H2-S	Reg		(76.2)	(38.1)	(95.3)	(222.3)	(76.2)	(57.2)	(22.4)	(15.7)	(203.2)	(10.9)	-	-	(35.1)	1
20V161V-N-H2-S	Vee	1" M/P Tube	4.12"	2.06"	4.75"	10.19"	3.75"	2.81"	1.25"	1.12"	10.00"	0.56"	-	-	1.75"	1
20V161R-N-H2-S	Reg		(104.6)	(52.3)	(258.8)	(258.8)	(95.3)	(71.4)	(31.8)	(28.4)	(254.0)	(14.2)	-	-	(44.5)	1

* -N Indicates material of construction being 316 SS with a minimum 12.5% Nickel content to resist hydrogen embrittlement.

* -H2 Indicates for Hydrogen Service

* -S Indicates 316 SS Stem

20,000 PSI (1378 BAR) 2-Way Angle Needle Valve

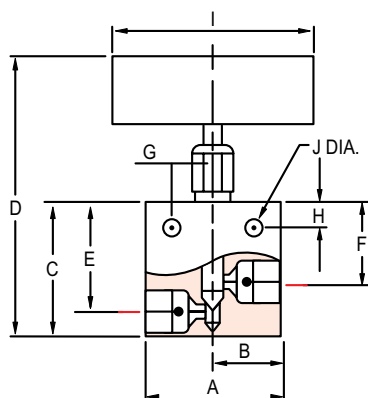
Catalog Number	Stem Style	Connection	A	B	C	D	E	F	G	H	I	J	K	L	Thk.	Fig.
20UV42V-N-H2-S	Vee	1/4" M/P Tube	2.00"	1.00"	2.00"	4.50"	1.62"	1.19"	0.62"	0.38"	3.00"	0.25"	-	-	0.75"	1
20UV42R-N-H2-S	Reg		(50.8)	(25.4)	(50.8)	(114.3)	(41.1)	(30.2)	(15.7)	(9.7)	(76.2)	(6.4)	-	-	(19.1)	1
20UV62V-N-H2-S	Vee	3/8" M/P Tube	2.00"	1.00"	2.00"	4.50"	1.62"	1.19"	0.62"	0.38"	3.00"	0.25"	-	-	0.75"	1
20UV62R-N-H2-S	Reg		(50.8)	(25.4)	(50.8)	(114.3)	(41.1)	(30.2)	(15.7)	(9.7)	(76.2)	(6.4)	-	-	(19.1)	1
20UV92V-N-H2-S	Vee	9/16" M/P Tube	2.50"	1.25"	2.88"	6.32"	2.38"	1.75"	0.69"	0.50"	4.00"	0.34"	-	-	1.00"	1
20UV92R-N-H2-S	Reg		(63.5)	(31.8)	(73.2)	(160.5)	(60.5)	(44.5)	(17.5)	(12.7)	(101.6)	(8.6)	-	-	(25.4)	1
20V122V-N-H2-S	Vee	3/4" M/P Tube	3.00"	1.50"	3.75"	8.75"	3.00"	2.25"	0.88"	0.62"	8.00"	0.43"	-	-	1.38"	1
20V122R-N-H2-S	Reg		(76.2)	(38.1)	(95.3)	(222.3)	(76.2)	(57.2)	(22.4)	(15.7)	(203.2)	(10.9)	-	-	(35.1)	1
20V162V-N-H2-S	Vee	1" M/P Tube	4.12"	2.06"	4.75"	10.19"	3.75"	2.81"	1.25"	1.12"	10.00"	0.56"	-	-	1.75"	1
20V162R-N-H2-S	Reg		(104.6)	(52.3)	(258.8)	(258.8)	(95.3)	(71.4)	(31.8)	(28.4)	(254.0)	(14.2)	-	-	(44.5)	1

* -N Indicates material of construction being 316 SS with a minimum 12.5% Nickel content to resist hydrogen embrittlement.

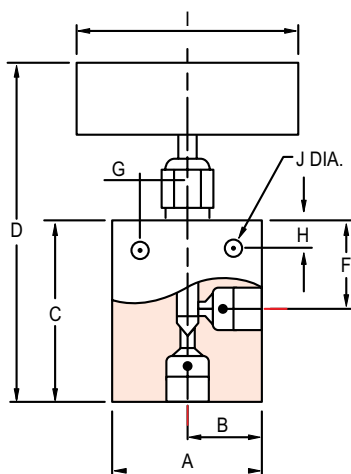
* -H2 Indicates for Hydrogen Service

* -S Indicates 316 SS Stem

20,000 PSI (1378 BAR) 2-Way Straight Needle Valve



20,000 PSI (1378 BAR) 2-Way Angle Needle Valve



Compact and Low-Maintenance Air Actuators

Air Actuators

Designed for remote control, BuTech air operators are virtually maintenance free – ideally suited for service in limited access areas. Their compact size and weight permits installation where space or weight is at a premium. Also available with limit switches and solenoid valves.

The single-acting actuators have a fail-safe feature: The Air-to-Open actuator closes the valve on loss of operating pressure, while the Air-to-Close actuator opens the valve on loss of operating pressure. These safety features are necessary in critical systems.



Product Details

Valve Model			Normally Open Air-to-Close Actuators psi (bar)			Normally Closed Air-to-Open Actuators psi (bar)			Double-Acting Pneumatic Actuators psi (bar)		
			ATC5	ATC8	2XATC5	ATO5	ATO8	2XATO5	DA5	DA8	2XDA5
20UV4- 20UV6	MAWP	PSI (BAR)	18,000 (1241)	-	-	18,000 (1241)	-	-	18,000 (1241)	-	-
	Req'd Actuator Pressure	PSI (BAR)	74 (5)	-	-	82 (6)	55 (4)	-	63 (4)	-	-
20UV9	MAWP	PSI (BAR)	18,000 (1240)	18,000 (1240)	18,000 (1240)	10,000 (689)	18,000 (1240)	18,000 (1240)	18,000 (1240)	-	18,000 (1240)
	Req'd Actuator Pressure	PSI (BAR)	100 (7)	49 (3)	55 (4)	84 (6)	58 (5)	67 (5)	98 (7)	-	49 (5)
20V12	MAWP	PSI (BAR)	-	18,000 (1240)	10,000 (689)	-	12,500 (860)	10,500 (720)	-	18,000 (1240)	12,000 (830)
	Req'd Actuator Pressure	PSI (BAR)	-	100 (7)	90 (6)	-	66 (1)	79 (5)	-	-	89 (2)
20V16	MAWP	PSI (BAR)	-	12,000 (830)	8,000 (550)	-	7,500 (520)	-	-	12,000 (830)	-
	Req'd Actuator Pressure	PSI (BAR)	-	100 (3)	52 (4)	-	66 (5)	-	-	89 (4)	-



Air-Operated Needle Valve Designed for Medium Pressure Gas Applications

Soft Seat Needle Valve

Traditional metal-to-metal seated needle valves often fall short when it comes to achieving a leak-tight seal with gases. BuTech's new Soft Seat Needle Valve (Patent Pending) combines the trusted performance of a traditional needle valve, with Chevron packing and a soft seat, delivering a true leak-tight seal when closed.

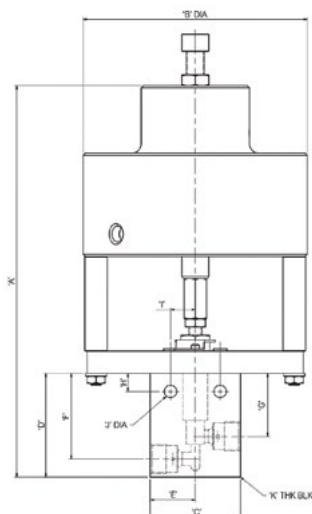
- Reliable containment for hydrogen and other gases
- Tested to ISO standards
- Ideal for Hydrogen refueling stations and compression systems, H2 generation, storage, and transfer, R&D lab gas distribution, test stands, tube trailer filling and general system shut off valves for most gases: Nitrogen, Hydrogen, Helium, Argon

Product Details

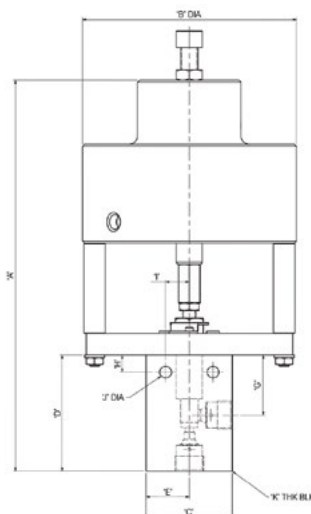
Catalog Number	Connection	MAWP	Min. Orifice	Cv	A	B	C	D	E	F	G	H	I	J	K
8.5SNVM91-P-H2-AT05	9/16" M/P	8,500 PSI	.25"	.78	10.88"	6.25"	2.50"	2.88"	1.25"	2.38"	1.75"	.50"	.69"	.34" Dia.	1.00"
8.5SNVM92-P-H2-AT05	9/16" M/P	8,500 PSI	.25"	1.17	11.37"	6.25"	2.50"	3.38"	1.25"	N/A	1.75"	.50"	.69"	.34" Dia.	1.00"
8.5SNVP81-P-H2-AT05	1/2" FNPT	8,500 PSI	.25"	.78	11.00"	6.25"	2.50"	3.00"	1.25"	2.38"	1.75"	.50"	.69"	.34" Dia.	1.00"
8.5SNVP82-P-H2-AT05	1/2" FNPT	8,500 PSI	.25"	1.17	11.37"	6.25"	2.50"	3.38"	1.25"	N/A	1.75"	.50"	.69"	.34" Dia.	1.00"

- **Material of construction:** 316 SS, PEEK, PTFE
- **Temperature Range:** -58°F to +392°F (-50°C to +200°C)
- Aluminum actuator (Air to Open)
- Available as 2-way straight and 2-way angle
- ATEX Approved

2-Way Straight Soft Seat Needle Valve



2-Way Angle Soft Seat Needle Valve



This design was tested with Nitrogen and Helium per ISO-19880-3 to 102,000 pressure cycles with the original packing set and soft seat.

Tubing, Fittings, Connection Components 20,000 PSI (1378 BAR)

Tubing

Description	Part No.
1/4" MP Tube 0.109" ID	20-109-316
3/8" MP Tube 0.203" ID	20-203-316
9/16" MP Tube 0.312" ID	20-312-316
3/4" MP Tube 0.438" ID	20-438-316
1" MP Tube 0.562" ID	20-562-316



Elbow

Description	Part No.
1/4" MP Elbow	20L4-N
3/8" MP Elbow	20L6-N
9/16" MP Elbow	20L9-N
3/4" MP Elbow	20L12-N
1" MP Elbow	20L16-N



Tee

Description	Part No.
1/4" MP Tee	20T4-N
3/8" MP Tee	20T6-N
9/16" MP Tee	20T9-N
3/4" MP Tee	20T12-N
1" MP Tee	20T16-N



Cross

Description	Part No.
1/4" MP Cross	20X4-N
3/8" MP Cross	20X6-N
9/16" MP Cross	20X9-N
3/4" MP Cross	20X12-N
1" MP Cross	20X16-N



Straight Coupling

Description	Part No.
1/4" MP Straight Coupling	20F4-N
3/8" MP Straight Coupling	20F6-N
9/16" MP Straight Coupling	20F9-N
3/4" MP Straight Coupling	20F12-N
1" MP Straight Coupling	20F16-N



Bulk Coupling

Description	Part No.
1/4" MP Bulkhead	20BF4-N
3/8" MP Bulkhead	20BF6-N
9/16" MP Bulkhead	20BF9-N
3/4" MP Bulkhead	20BF12-N
1" MP Bulkhead	20BF16-N



Gland

Description	Part No.
1/4" MP Gland	20G4
3/8" MP Gland	20G6
9/16" MP Gland	20G9
3/4" MP Gland	20G12
1" MP Gland	20G16



Collar

Description	Part No.
1/4" MP Collar	20C4
3/8" MP Collar	20C6
9/16" MP Collar	20C9
3/4" MP Collar	20C12
1" MP Collar	20C16



Plug

Description	Part No.
1/4" MP Plug	20P4-N
3/8" MP Plug	20P6-N
9/16" MP Plug	20P9-N
3/4" MP Plug	20P12-N
1" MP Plug	20P16-N



Cap

Description	Part No.
1/4" MP Cap	20CA4-N
3/8" MP Cap	20CA6-N
9/16" MP Cap	20CA9-N
3/4" MP Cap	20CA12-N
1" MP Cap	20CA16-N



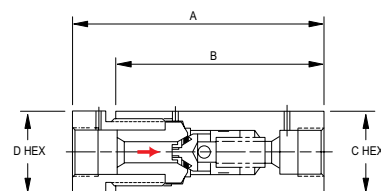
Anti-Vibration Collet Gland

Description	Part No.
1/4" MP Anti-Vibration Assembly	20AVCG4
3/8" MP Anti-Vibration Assembly	20AVCG6
9/16" MP Anti-Vibration Assembly	20AVCG9
3/4" MP Anti-Vibration Assembly	20AVCG12
1" MP Anti-Vibration Assembly	20AVCG16



Check Valves

Rugged construction provides assurance of fail-safe operation at pressures up to 20,000 PSI (1378 BAR). For operation in temperatures ranging from -320° to 500°F (-195° to 260°C).



ex. 20SC6-TFE-2-H2-S

Product Details

Catalog Number	Connection	MAWP	Cv	A	B	C	D
20SC4-N-2-H2-S	1/4" M/P Tube	20,000 PSI (1378 BAR)	0.25	2.94" (74.7)	2.50" (63.5)	1.00" (25.4)	0.88" (22.4)
20SC6-N-2-H2-S	3/8" M/P Tube	20,000 PSI (1378 BAR)	0.8	3.12" (79.2)	2.62" (66.5)	1.12" (28.4)	0.88" (22.4)
20SC9-N-2-H2-S	9/16" M/P Tube	20,000 PSI (1378 BAR)	2.30	4.23" (107.4)	3.50" (88.9)	1.38" (35.1)	1.38" (35.1)
20SC12-N-2-H2-S	3/4" M/P Tube	20,000 PSI (1378 BAR)	3.40	5.89" (149.6)	4.75" (120.7)	1.75" (44.5)	1.38" (35.1)
20SC16-N-2-H2-S	1" M/P Tube	20,000 PSI (1378 BAR)	7.4	6.50" (165.1)	5.55" (141.0)	2.12" (53.8)	1.75" (44.5)

Operating Temperature Ranges

O-Ring Material	Operating Temp Range	Catalog Suffix
Viton	-40° to +500° F (-40° to +260° C)	-
Teflon	-320° to +400° F (-195° to +204° C)	-TFE

Sintered Cup Filters and Regulating Valves

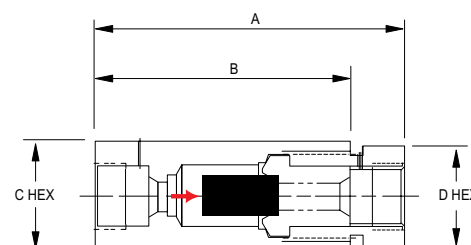
Sintered Cup Filters

Provide maximum filtration surface area for removal of contaminating particles from the fluid system. May be used in systems requiring high flow rates with minimum pressure drop. Available in nominal ratings of: 5, 10, 20, 40 and 100 micron.

Product Details

Catalog Number	Connection	MAWP	Area*	A	B	C	D
20SCF4-N-*	1/4" M/P Tube	20,000 PSI (1378 BAR)	0.54 in ² 348 mm ²	3.22" (81.8)	2.50" (63.5)	1.00" (25.4)	0.88" (22.4)
20SCF6-N-*	3/8" M/P Tube	20,000 PSI (1378 BAR)	0.99 in ² 639 mm ²	3.12" (79.2)	2.50" (63.5)	1.38" (34.9)	1.12" (28.4)
20SCF9-N-*	9/16" M/P Tube	20,000 PSI (1378 BAR)	1.47 in ² 948 mm ²	4.22" (107.2)	3.50" (88.9)	1.38" (34.9)	1.38" (34.9)
20SCF12-N-*	3/4" M/P Tube	20,000 PSI (1378 BAR)	1.75 in ² 1129 mm ²	5.90" (149.9)	4.75" (120.7)	1.75" (44.5)	1.38" (34.9)
20SCF16-N-*	1" M/P Tube	20,000 PSI (1378 BAR)	4.86 in ² 3135 mm ²	6.48" (164.6)	5.55" (141.0)	2.12" (53.8)	1.75" (44.5)

*Required micron rating of the filter element (choose 5, 10, 20, 40 or 100 microns).
Ex. 20SCF9-N-20



Tools and Assembly Procedure

Tools

Hand Tools

BuTech hand tools are designed to permit on-sight end preparation for tubing. The coning tool uses a precision collet to maintain concentricity between the tube and the cutter blades. The threading tool uses an adjustable split die and a precision guide bushing to cut a perfect thread.

Tube OD	Series	Coning Tool	Threading Tool
1/4"	20,000 PSI	20HCT4	THT4-H
3/8"	20,000 PSI	20HCT6	THT6-H
9/16"	20,000 PSI	20HCT9	THT9-H
3/4"	20,000 PSI	20HCT12	THT12-H
1"	20,000 PSI	20HCT16	THT16-H

Power Tools

BuTech power tools are designed to be used with a variable speed power hand drill. This unique feature makes them perfect for fast machining of several tube ends.

Tube OD	Series	Coning Tool	Threading Tool
1/4"	20,000 PSI	20CT4	THT4-P
3/8"	20,000 PSI	20CT6	THT6-P
9/16"	20,000 PSI	20CT9	THT9-P

Tube Vises

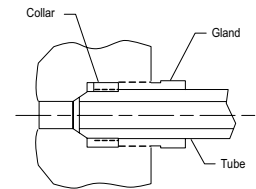
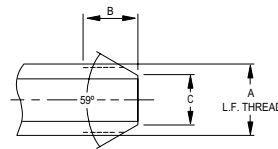
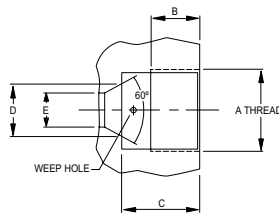
BuTech tube vises are the lightweight and inexpensive way to hold tubing tightly during coning and threading operations.

Catalog Number	Tube OD
TV4	1/4"
TV6	3/8"
TV9	9/16"
TV12	3/4"
TV16	1"

Tube Bender

The BuTech tube bender is designed to provide fast, accurate and reliable bending of heavy wall tubing with only one setup.

Catalog Number	Tube OD
MTB4	1/4"
MTB6	3/8"
MTB9	9/16"
MTB469	1/4", 3/8", 9/16"



Connection	A Thread	B	C	D	E
1/4" M/P	7/16" -20	0.28" (7.1)	0.50" (12.7)	0.19" (4.8)	0.109" (2.8)
3/8" M/P	9/16" -18	0.38" (9.7)	0.62" (15.7)	0.31" (7.9)	0.203" (5.2)
9/16" M/P	13/16" -16	0.44" (11.2)	0.75" (19.1)	0.50" (12.7)	0.312" (7.9)
3/4" M/P	3/4" -14 NPSM	0.50" (12.7)	0.94" (23.9)	0.62" (15.7)	0.437" (11.1)
1" M/P	1-3/8" -12	0.81" (20.6)	1.31" (33.3)	0.88" (22.4)	0.562" (14.3)

Connection	A Thread	B	C
1/4" M/P	1/4" -28	0.34" (8.6)	0.140" (3.6)
3/8" M/P	3/8" -24	0.44" (11.2)	0.250" (6.4)
9/16" M/P	9/16" -18	0.50" (12.7)	0.406" (10.3)
3/4" M/P	3/4" -14	0.62" (15.7)	0.562" (14.3)
1" M/P	1" -16	0.78" (19.8)	0.718" (18.2)

Tube Size	Engagement Allowance	Required Torque
1/4"	0.55" (14.0)	20 lb-ft (27 Nm)
3/8"	0.69" (17.5)	30 lb-ft (41 Nm)
9/16"	0.84" (21.3)	55 lb-ft (75 Nm)
3/4"	1.01" (25.7)	90 lb-ft (122 Nm)
1"	1.47" (31.3)	125 lb-ft (170 Nm)

Assembly Procedure

- Slip gland nut onto tubing or nipple.
- Screw collar onto threaded end of tubing or nipple. Allow one or two threads to be exposed on tubing or nipple between collar and coned tubing.
- Lubricate male threads of gland nut with a non-hardening lubricant suitable for use on stainless steel. Lubricant chosen should also be compatible with working temperature requirements.
- Insert tubing into female connection of valve or fitting. Screw gland into connection until finger-tight.
- Tighten gland nut to torque value shown at right which corresponds to connection size being assembled.



BuTech®

An Ingersoll Rand Business

BuTech high quality valves and components for hydrogen service are constructed of high-performance 316 Stainless Steel with a minimum of 12.5% Nickel content and engineered to withstand the demands of hydrogen service. Their durability and resistance to hydrogen embrittlement make them ideal for applications such as compression for hydrogen storage, transfer and dispensing, or fuel cell testing.

BuTech, a business of Ingersoll Rand, is a leading brand of high-pressure valves, fittings and tubing designed to meet the rigorous requirements of today's most critical applications.

For more information on our high-pressure products, visit butech-valve.com or contact your local BuTech representative at hq@butech-valve.com.

Ingersoll Rand (NYSE:IR), is a global leader in mission-critical flow creation and industrial technologies.

For more information, visit www.IRCO.com



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