HIFLUX®

HIGH PRESSURE VALVE&FITTINS. HIFLUX

HYDROGEN PRODUCTS

HIFLUX produces and supplies hydrogen products for hydrogen industry.
Special alloy material will be chosen for producing hydrogen products.

Hydrogen Station

www.hiflux.com

HIGH PRESSURE NEEDLE VALVE

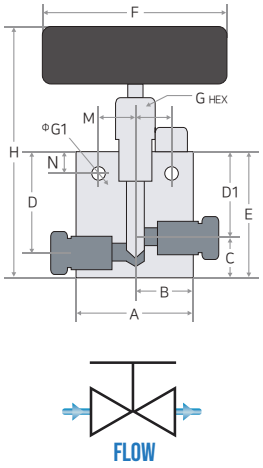
Control and open/close the flow, Manual valve

FEATURES

- 4 pattern Body Type. (Straight, Angle, 3Way/1on, 3Way/2on)
- Prevents galling due to the no-rotation stem.
- A valve using stainless steel 316 cold meterial for excellent corrosion resistant.
- Packing designed for reliable sealing.
- Metal to metal seating type to lengthen the life of the seat.
- 'Vee' or 'Regulating' stem for flow control and shut-off.

※ Parts have been changed from the high-pressure product to suitable materials for hydrogen.

STRAIGHT TYPE



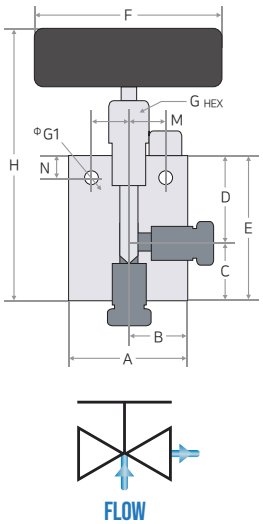
(Unit:mm)

Catalog No.	Stem	Pressure Rating	Port Type	Tube Size	Cv	Orifice Size	Dimensions												Block Thickness
							A	B	C	D	D1	E	F	G	G1	H	M	N	
H-NV20VS04-S	Vee	20,000 psi	H2004	1/4"	0.31	3.2	50	25	20	40	30	50	80	17	6.5	118.2	15.7	9.7	20
H-NV20RS04-S	Reg																		
H-NV20VS06-S	Vee		H2006	3/8"	0.75	5.5	50	25	20	40	30	50	80	17	6.5	117.5	15.7	9.7	20
H-NV20RS06-S	Reg																		
H-NV20VS09-S	Vee		H2009	9/16"	1.3	7.9	63	31.5	29	60	44	73	100	22	8	145	17.5	12.7	30
H-NV20RS09-S	Reg																		
H-NV60VS04-S	Vee	60,000 psi	H6004	1/4"	0.08	2	50	25	21	43	33	54	80	20.6	6.5	121.4	17	9.7	25
H-NV60RS04-S	Reg																		
H-NV60VS06-S	Vee		H6006	3/8"	0.09	2	50	25	24	43	33	57	80	20.6	6.5	124.9	17	9.7	25
H-NV60RS06-S	Reg																		
H-NV60VS09-S	Vee		H6009	9/16"	0.14	2	67	33.5	29	43	33	62	80	20.6	6.5	130	17	9.7	38
H-NV60RS09-S	Reg																		

G : The main top of the hole size
G1 : Hole size of the main positive
H : Height of the valve is fully closed

All dimensions may differ from the actual size for reference only.

ANGLE TYPE



(Unit:mm)

Catalog No.	Stem	Pressure Rating	Port Type	Tube Size	Cv	Orifice Size	Dimensions										Block Thickness
							A	B	C	D	E	F	G	G1	H	M	N	
H-NV20VS04-A	Vee	20,000 psi	H2004	1/4"	0.31	3.2	50	25	32	30	62	80	17	6.5	130.63	15.7	9.7	20
H-NV20RS04-A	Reg																	
H-NV20VS06-A	Vee		H2006	3/8"	0.75	5.5	50	25	32	30	62	80	17	6.5	128.59	15.7	9.7	20
H-NV20RS06-A	Reg																	
H-NV20VS09-A	Vee		H2009	9/16"	1.3	7.9	63	31.5	41.5	44	85.5	100	22	8	156.56	17.5	12.7	30
H-NV20RS09-A	Reg																	
H-NV60VS04-A	Vee	60,000 psi	H6004	1/4"	0.08	2	50	25	27.5	33	60.5	80	20.6	6.5	128.74	17	9.7	25
H-NV60RS04-A	Reg																	
H-NV60VS06-A	Vee		H6006	3/8"	0.09	2	50	25	33.5	33	66.5	80	20.6	6.5	134.74	17	9.7	25
H-NV60RS06-A	Reg																	
H-NV60VS09-A	Vee		H6009	9/16"	0.14	2	67	33.5	34	33	67	80	20.6	6.5	135.24	17	9.7	38
H-NV60RS09-A	Reg																	

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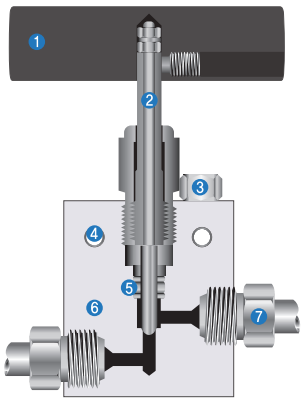
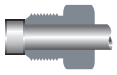
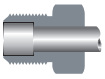
HIGH PRESSURE NEEDLE VALVE

Control and open/close the flow, Manual valve

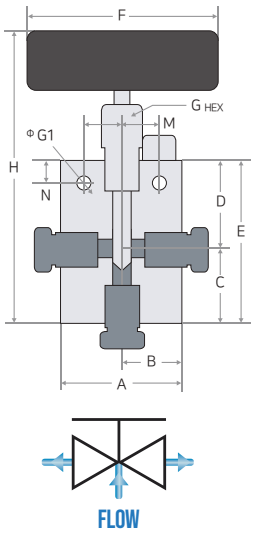
EXPLODED VIEW & CONNECTION COMPONENTS

1. Valve Handle
2. Stem
3. Stem Locking
4. Valve Fixed Hole
5. Packing
6. Body Block
7. Connections



	Medium Pressure 20,000psi
	High Pressure 30,000 ~ 60,000psi

3WAY/10N PRESSURE TYPE



(Unit:mm)

Catalog No.	Stem	Pressure Rating	Port Type	Tube Size	Cv	Orifice Size	Dimensions											Block Thickness
							A	B	C	D	E	F	G	G1	H	M	N	
H-NV20VS04-O	Vee	20,000 psi	H2004	1/4"	0.31	3.2	50	25	32	30	62	80	17	6.5	130.63	15.7	9.7	20
H-NV20RS04-O	Reg																	
H-NV20VS06-O	Vee		H2006	3/8"	0.75	5.5	50	25	32	30	62	80	17	6.5	129.49	15.7	9.7	20
H-NV20RS06-O	Reg																	
H-NV20VS09-O	Vee		H2009	9/16"	1.3	7.9	63	31.5	42	44	86	100	22	8	157.49	17.5	12.7	30
H-NV20RS09-O	Reg																	
H-NV60VS04-O	Vee	60,000 psi	H6004	1/4"	0.08	2	50	25	27.5	33	60.5	80	20.6	6.5	128.74	17	9.7	25
H-NV60RS04-O	Reg																	
H-NV60VS06-O	Vee		H6006	3/8"	0.09	2	50	25	34	33	67	80	20.6	6.5	135.24	17	9.7	25
H-NV60RS06-O	Reg																	
H-NV60VS09-O	Vee		H6009	9/16"	0.14	2	67	33.5	38.5	33	71.5	80	20.6	6.5	139.74	17	9.7	38
H-NV60RS09-O	Reg																	

G : The main top of the hole size
G1 : Hole size of the main positive
H : Height of the valve is fully closed

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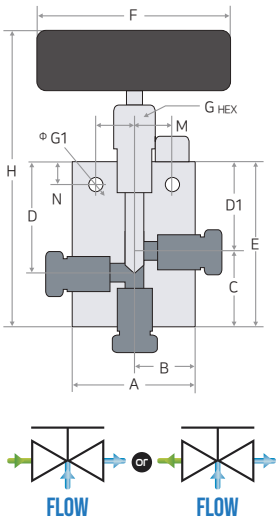
3WAY/20N PRESSURE TYPE



(Unit:mm)

Catalog No.	Stem	Pressure Rating	Port Type	Tube Size	Cv	Orifice Size	Dimensions												Block Thickness
							A	B	C	D	D1	E	F	G	G1	H	M	N	
H-NV20VS04-T	Vee	20,000 psi	H2004	1/4"	0.31	3.2	50	25	36.5	40	30	66.5	80	17	6.5	135.13	15.7	9.7	20
H-NV20RS04-T	Reg																		
H-NV20VS06-T	Vee		H2006	3/8"	0.75	5.5	50	25	36.5	40	30	66.5	80	17	6.5	133.99	15.7	9.7	20
H-NV20RS06-T	Reg																		
H-NV20VS09-T	Vee		H2009	9/16"	1.3	7.9	63	31.5	48	60	44	92	100	22	8	163.99	17.5	12.7	30
H-NV20RS09-T	Reg																		
H-NV60VS04-T	Vee	60,000 psi	H6004	1/4"	0.08	2	50	25	27.5	43	33	60.5	80	20.6	6.5	128.74	17	9.7	25
H-NV60RS04-T	Reg																		
H-NV60VS06-T	Vee		H6006	3/8"	0.09	2	50	25	38.5	43	33	71.5	80	20.6	6.5	139.74	17	9.7	25
H-NV60RS06-T	Reg																		
H-NV60VS09-T	Vee		H6009	9/16"	0.14	2	67	33.5	44	43	33	77	80	20.6	6.5	145.24	17	9.7	38
H-NV60RS09-T	Reg																		

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G1 : Hole size of the main positive
H : Height of the valve is fully closed

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NEEDLE VALVE FOR HYDROGEN FUEL STATION

Manual Valves for hydrogen fuel stations with controlled flow or opening and closing the flow of fluid or gas.

KOLAS test passed

※ Test reports are enclosed 13p

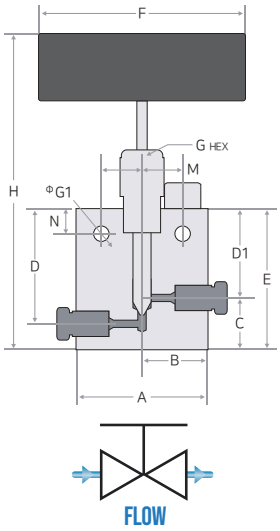
FEATURES

- Prevents galling due to the no-rotation stem.
- Packing designed for reliable sealing.
- Metal to metal sealing type to lengthen the life of the seat.
- Excellent corrosion resistance.
- Straight Body Type.

MATERIAL

- Body : STS 316CW
- Stem : STR 660
- O-ring : EPDM
- Packing : TEFLON

STRAIGHT TYPE



(Unit:mm)

Catalog No.	Pressure Rating	Port Type	Tube Size	Orifice Size	Dimensions												Block Thickness
					A	B	C	D	D1	E	F	G(HEX)	G1(Ø)	H	M	N	
HRS-NV20VS04-S	H70 Pressure Class	H2004	1/4"	3.2	50	25	20	44.5	34.5	54.5	80	17	6.5	122.15	15.7	9.7	20
HRS-NV20VS06-S		H2006	3/8"	5.5	50	25	20	44.5	34.5	54.5	80	17	6.5	122.15	15.7	9.7	20
HRS-NV20VS09-S		H2009	9/16"	7.9	63	31.5	29	63	47	76	100	22	8	150.7	17.5	12.7	30
HRS-NV20VS12-S		H2012	3/4"	11	76	38	38	81	62	100	253	30	10	177.63	23	15.8	35

G : The main top of the hole size
G1 : Hole size of the main positive
H : Height of the valve is fully closed

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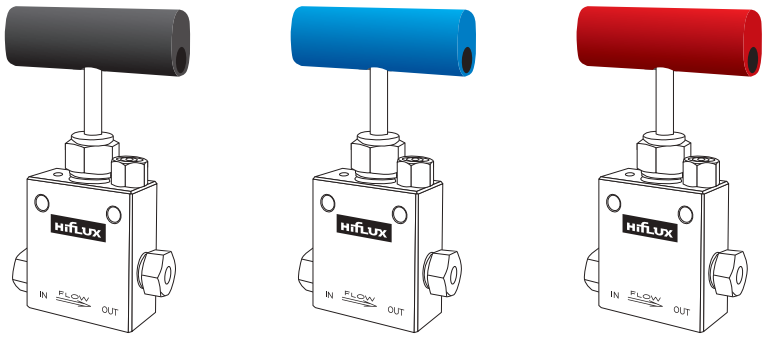
OPTION

- Lets you select a handle color. (Black is the default color.)
- Black, Blue, Red (3 Colors)



HYDROGEN CHECK VALVE

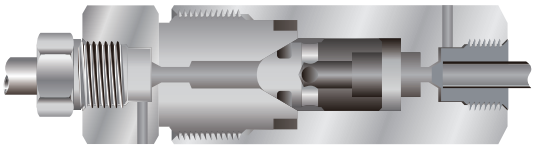
Gas or liquid prevents flowing backward

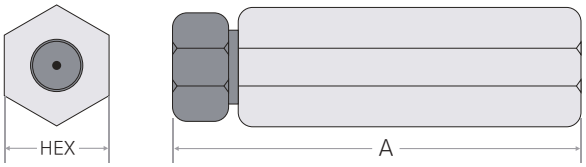
FEATURES

- Check valve of U-packing type
- Excellent corrosion resistant.
- A valve using stainless steel 316 cold material for preventing reverse flow.
- A valve that facilitates one-directional movement by blocking the reverse flow of gas or liquid.
- Cone and thread connection to prevent gas or liquid leaking.

※ Parts have been changed from the high-pressure product to suitable materials for hydrogen.

HYDROGEN CHECK VALVE





(Unit:mm)

Catalog No.	Pressure Rating	Port Type	Tube Size	Orifice Size	Dimensions	
					A	HEX
HRS-CV20US04-00-00	H70 Pressure Class	H2004	1/4"	2.8	77.9	25.4
HRS-CV20US06-00-00		H2006	3/8"	5.2	81.06	25.4
HRS-CV20US09-00-00		H2009	9/16"	7.9	106.2	36

All dimensions may differ from the actual size for reference only.

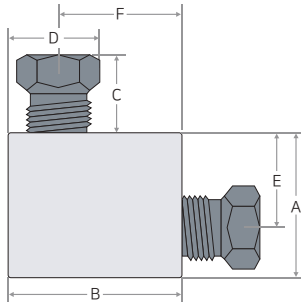
HIGH PRESSURE FITTING

Fitting & accessory used simple structure design and wear resistant material for high pressure connection

FEATURES

- 3 patterns body types. (Elbow, Tee, Cross Type)
- A valve using stainless steel 316 cold material for excellent corrosion resistant.
- Cone and thread connection is strong in relation to water.
- leaks even when using gas and liquid.
- The operation temperature ranges from −423℉ (−252℃) to 1200℉ (649℃) Fitting is used for connecting.
- Tubes at high pressure and has a high−flow property and diverse sized orifice according to pressure.

ELBOW TYPE

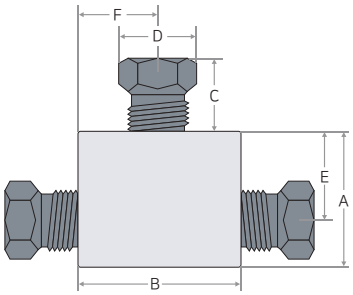


(Unit:mm)

Catalog No.	Pressure Rating	Port Type	Tube Size	Orifice Size	Dimensions						Block Thickness
					A	B	C	D(HEX)	E	F	
FT20ES04	20,000 psi	H2004	1/4"	2.8	28.5	28.5	13.8	12	19	19	16
FT20ES06		H2006	3/8"	5.2	35	35	14.2	16	25	25	20
FT20ES09		H2009	9/16"	7.9	45	45	19.3	22	31.5	31.5	25
FT20ES12		H2012	3/4"	13	57	57	19.3	28	38	38	35
FT20ES16		H2016	1"	17.5	76	76	21.7	35	52.5	52.5	45
FT60ES04	60,000 psi	H6004	1/4"	2.4	35	35	12.83	16	22.5	22.5	25
FT60ES06		H6006	3/8"	3.2	38	45	18.6	20	25	31.5	25
FT60ES09		H6009	9/16"	4.8	47.5	67	21.66	30	28.5	48	38

All dimensions may differ from the actual size for reference only.

TEE TYPE

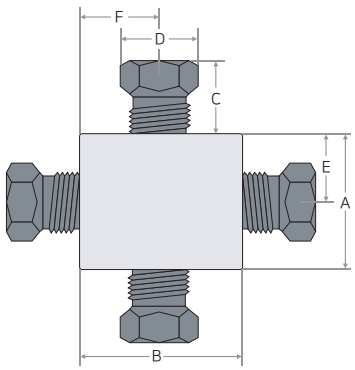


(Unit:mm)

Catalog No.	Pressure Rating	Port Type	Tube Size	Orifice Size	Dimensions						Block Thickness
					A	B	C	D(HEX)	E	F	
FT20TS04	20,000 psi	H2004	1/4"	2.8	28.5	38	13.8	12	19	19	16
FT20TS06		H2006	3/8"	5.2	35	50	14.2	16	25	25	20
FT20TS09		H2009	9/16"	7.9	45	63	19.3	22	31.5	31.5	25
FT20TS12		H2012	3/4"	13	57	76	19.3	28	38	38	35
FT20TS16		H2016	1"	17.5	76	105	21.7	35	52.5	52.5	45
FT60TS04	60,000 psi	H6004	1/4"	2.4	35	50	12.83	16	22.5	25	25
FT60TS06		H6006	3/8"	3.2	40	50	18.6	20	27	25	25
FT60TS09		H6009	9/16"	4.8	54	67	21.66	30	35	33.25	38

All dimensions may differ from the actual size for reference only.

CROSS TYPE



(Unit:mm)

Catalog No.	Pressure Rating	Port Type	Tube Size	Orifice Size	Dimensions						Block Thickness
					A	B	C	D(HEX)	E	F	
FT20CS04	20,000 psi	H2004	1/4"	2.8	38	38	13.8	12	19	19	16
FT20CS06		H2006	3/8"	5.2	50	50	14.2	16	25	25	20
FT20CS09		H2009	9/16"	7.9	63	63	19.3	22	31.5	31.5	25
FT20CS12		H2012	3/4"	13	76	76	19.3	28	38	38	35
FT20CS16		H2016	1"	17.5	105	105	21.7	35	52.5	52.5	45
FT60CS04	60,000 psi	H6004	1/4"	2.4	38	50	12.83	16	19	25	25
FT60CS06		H6006	3/8"	3.2	50	54	18.6	20	25	27	25
FT60CS09		H6009	9/16"	4.8	67	70	21.66	30	33.25	35	38

All dimensions may differ from the actual size for reference only.

HIGH PRESSURE TUBING

Using stainless steel 316 cold material for excellent corrosion resistant

FEATURES

- Tube is sold in a 6000mm (6M) unit.
- Using stainless steel 316 cold material for excellent corrosion resistant.
- If you want a water pressure test conducted, we can conduct the test based on a rule under pressure to be used.
- Suitable for chemical, oil refining, research, oil and gas companies, this product is used for various pressures.
- Customizable with other materials for a variety of fluids and gases.

TUBE

(Unit:mm)

Catalog No.	Pressure Rating	Port Type	Tube Size	Dimensions		Thickness	Flow Area(㎟)	Working pressure psi (bar)				
				Outside Diameter	Inside Diameter			-198~37.8℃ -325~100℉	93℃ 200℉	204℃ 400℉	316℃ 600℉	427℃ 800℉
T20S04	20,000 psi	H2004	1/4"	6.35	2.77	1.78	5.81	1378.93	1378.93	1327.22	1244.48	1158.30
T20S06		H2006	3/8"	9.53	5.16	2.18	20.65	1378.93	1378.93	1327.22	1244.48	1158.30
T20S09		H2009	9/16"	14.29	7.92	3.18	49.03	1378.93	1378.93	1327.22	1244.48	1158.30
T20S12		H2012	3/4"	19.05	11.13	3.96	97.42	1378.93	1378.93	1327.22	1244.48	1158.30
T20S16		H2016	1"	25.4	14.27	5.56	160.0	1378.93	1378.93	1327.22	1244.48	1158.30
T60S04	60,000 psi	H6004	1/4"	6.35	2.11	2.11	3.23	4136.79	4136.79	3981.66	3740.35	3495.59
T60S06		H6006	3/8"	9.53	3.18	3.18	7.74	4136.79	4136.79	3981.66	3740.35	3495.59
T60S09		H6009	9/16"	14.29	4.78	4.75	18.06	4136.79	4136.79	3981.66	3740.35	3495.59

All dimensions may differ from the actual size for reference only.

NIPPLE

(Unit:mm)

Catalog No.	Pressure Rating	Port Type	Tube Size	Dimensions		Thickness	Minimum Length	Flow Area(㎟)	Working Pressure psi (bar)				
				Outside Diameter	Inside Diameter				-198~37.8℃ -325~100℉	93℃ 200℉	204℃ 400℉	316℃ 600℉	427℃ 800℉
N20S04	20,000 psi	H2004	1/4"	6.35 20.65	2.77	1.78	70	5.81	1378.93	1378.93	1327.22	1244.48	1158.30
N20S06		H2006	3/8"	9.53 49.03	5.16	2.18	88	20.65	1378.93	1378.93	1327.22	1244.48	1158.30
N20S09		H2009	9/16"	14.29 97.42	7.92	3.18	110	49.03	1378.93	1378.93	1327.22	1244.48	1158.30
N20S12		H2012	3/4"	19.05 160.0	11.13	3.96	118	97.42	1378.93	1378.93	1327.22	1244.48	1158.30
N20S16		H2016	1"	25.4 3.23	14.27	5.56	168	160.0	1378.93	1378.93	1327.22	1244.48	1158.30
N60S04	60,000 psi	H6004	1/4"	6.35 7.74	2.11	2.11	74	3.23	4136.79	4136.79	3981.66	3740.35	3495.59
N60S06		H6006	3/8"	9.53 18.06	3.18	3.18	104	7.74	4136.79	4136.79	3981.66	3740.35	3495.59
N60S09		H6009	9/16"	14.29	4.78	4.75	135	18.06	4136.79	4136.79	3981.66	3740.35	3495.59

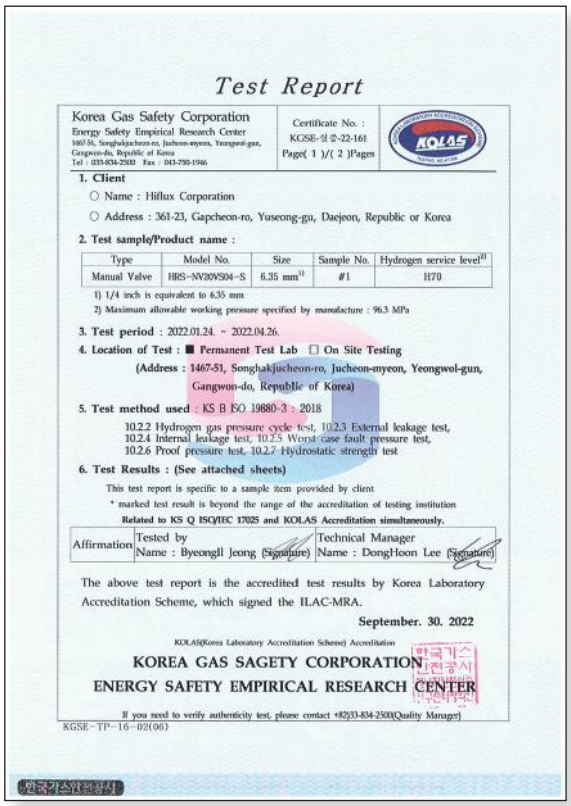
All dimensions may differ from the actual size for reference only.

HIGH PRESSURE NEEDLE VALVE

Control and open/close the flow, Manual valve

KOLAS CERTIFICATION

KOLAS Hydrogen charging station valve certificate



Test Report

Korea Gas Safety Corporation
Energy Safety Empirical Research Center
1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea
Tel : 033-834-2500 Fax : 033-750-1946

Certificate No. : KGSE-성중-22-161
Page(1)/(2)Pages

1. Client
○ Name : Hiflux Corporation
○ Address : 361-23, Gapcheon-ro, Yuseong-gu, Daejeon, Republic or Korea

2. Test sample/Product name :

Type	Model No.	Size	Sample No.	Hydrogen service level[2]
Manual Valve	HRS-NV20VS04-S	6.35 mm[1]	#1	H70

1) 1/4 inch is equivalent to 6.35 mm
2) Maximum allowable working pressure specified by manufacture : 96.3 MPa

3. Test period : 2022.01.24. ~ 2022.04.26.
4. Location of Test : ■ Permanent Test Lab □ On Site Testing
(Address : 1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea)
5. Test method used : KS B ISO 19880-3 : 2018
10.2.2 Hydrogen gas pressure cycle test, 10.2.3 External leakage test,
10.2.4 Internal leakage test, 10.2.5 Worst case fault pressure test,
10.2.6 Proof pressure test, 10.2.7 Hydrostatic strength test
6. Test Results : (See attached sheets)
This test report is specific to a sample item provided by client
* marked test result is beyond the range of the accreditation of testing institution
Related to KS Q ISO/IEC 17025 and KOLAS Accreditation simultaneously.

Affirmation	Tested by	Technical Manager
	Name : Byeongll Jeong (Signature)	Name : DongHoon Lee (Signature)

The above test report is the accredited test results by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

September. 30. 2022

KOLAS(Korea Laboratory Accreditation Scheme) Accreditation
KOREA GAS SAGETY CORPORATION
ENERGY SAFETY EMPIRICAL RESEARCH CENTER

If you need to verify authenticity test, please contact +82)33-834-2500(Quality Manager)

KGSE-TP-16-02(06)

Test Results

Korea Gas Safety Corporation
Energy Safety Empirical Research Center
1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea
Tel : 033-834-2500 Fax : 033-750-1946

Certificate No. : KGSE-성중-22-161
Page(2)/(2)Pages

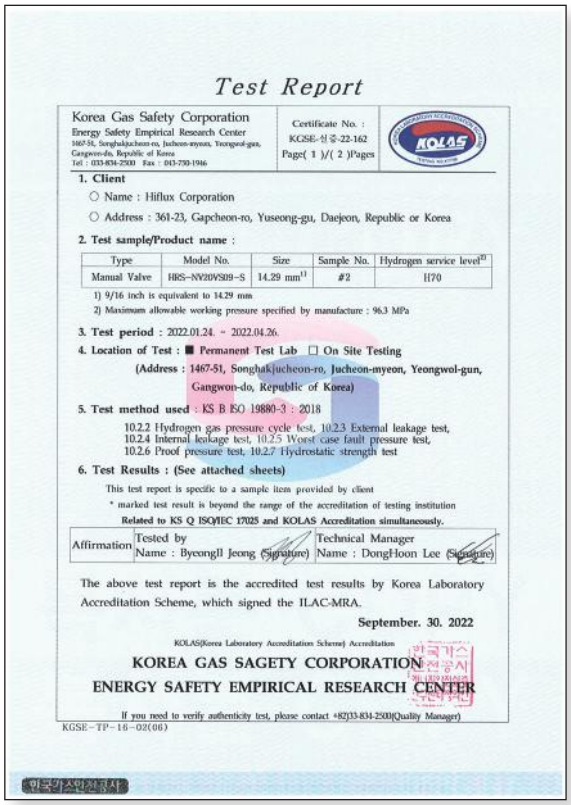
○ Test results

Number	Test items		Unit	Result	Notes
1	Hydrogen gas pressure cycle test[1]	Room test temperature	Cycle	100 000	Sample NO. #1
		Minimum test temperature	Cycle	1 000	
		Maximum test temperature	Cycle	1 000	
2	External leakage test[2]		–	Bubble-free	
3	Internal leakage test[3]	High pressure	–	Bubble-free	
		Low pressure	–	Bubble-free	
4	Worst case fault pressure test[4]		Cycle	10	
	Leakage	External leakage test[4]	–	Bubble-free	
		Internal leakage test[3] High pressure	–	Bubble-free	
		Low pressure	–	Bubble-free	
5	Proof pressure test[5]		–	No leakage	
6	Hydrostatic strength test[6]		–	No leakage	

1) Hydrogen gas pressure cycle test : 100 000 cycles shall be completed at room temperature, with additional 1 000 cycles at an ambient temperature of -40 °C (+0 °C, -3 °C) and 1 000 cycles at an ambient temperature of 85 °C (+3 °C, -0 °C)
- Pressure : Less than 5 % of the component pressure rating and the component press rating (+3 %, -0 %)
2) External leakage test
- Pressure : At least 100 % of the component pressure rating
- Temperature : -40 °C (+0 °C, -3 °C) and 85 °C (+3 °C, -0 °C)
3) Internal leakage test
- Pressure : The pressure for th high pressure test is at least 100 % of the component pressure rating, and the pressure for the low pressure test is 2.5 % or less of the component pressure rating.
- Temperature : -40 °C (+0 °C, -3 °C) and 85 °C (+3 °C, -0 °C)
4) Worst case fault pressure cycle test : Cycling is completed between 5 % or less of 110 % of the component pressure rating and at least 110 % of the component pressure rating (+3 %, -0 %)
5) Proof pressure test : The pressure is slowly increased to 150 % of the component pressure rating and maintain that pressure for 10 min
6) Hydrostatic strength test : pressure is increased to 2.4 times of the component pressure rating

– End –

KGSE-TP-16-02(06)



Test Report

Korea Gas Safety Corporation
Energy Safety Empirical Research Center
1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea
Tel : 033-834-2500 Fax : 033-750-1946

Certificate No. : KGSE-성중-22-162
Page(1)/(2)Pages

1. Client
○ Name : Hiflux Corporation
○ Address : 361-23, Gapcheon-ro, Yuseong-gu, Daejeon, Republic or Korea

2. Test sample/Product name :

Type	Model No.	Size	Sample No.	Hydrogen service level[2]
Manual Valve	HRS-NV20VS09-S	14.29 mm[1]	#2	H70

1) 9/16 inch is equivalent to 14.29 mm
2) Maximum allowable working pressure specified by manufacture : 96.3 MPa

3. Test period : 2022.01.24. ~ 2022.04.26.
4. Location of Test : ■ Permanent Test Lab □ On Site Testing
(Address : 1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea)
5. Test method used : KS B ISO 19880-3 : 2018
10.2.2 Hydrogen gas pressure cycle test, 10.2.3 External leakage test,
10.2.4 Internal leakage test, 10.2.5 Worst case fault pressure test,
10.2.6 Proof pressure test, 10.2.7 Hydrostatic strength test
6. Test Results : (See attached sheets)
This test report is specific to a sample item provided by client
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Affirmation	Tested by	Technical Manager
	Name : Byeongll Jeong (Signature)	Name : DongHoon Lee (Signature)

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September. 30. 2022

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KGSE-TP-16-02(06)

Test Results

Korea Gas Safety Corporation
Energy Safety Empirical Research Center
1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea
Tel : 033-834-2500 Fax : 033-750-1946

Certificate No. : KGSE-성중-22-162
Page(2)/(2)Pages

○ Test results

Number	Test items		Unit	Result	Notes
1	Hydrogen gas pressure cycle test[1]	Room test temperature	Cycle	100 000	Sample NO. #2
		Minimum test temperature	Cycle	1 000	
		Maximum test temperature	Cycle	1 000	
2	External leakage test[2]		–	Bubble-free	
3	Internal leakage test[3]	High pressure	–	Bubble-free	
		Low pressure	–	Bubble-free	
4	Worst case fault pressure test[4]		Cycle	10	
	Leakage	External leakage test[4]	–	Bubble-free	
		Internal leakage test[3] High pressure	–	Bubble-free	
		Low pressure	–	Bubble-free	
5	Proof pressure test[5]		–	No leakage	
6	Hydrostatic strength test[6]		–	No leakage	

1) Hydrogen gas pressure cycle test : 100 000 cycles shall be completed at room temperature, with additional 1 000 cycles at an ambient temperature of -40 °C (+0 °C, -3 °C) and 1 000 cycles at an ambient temperature of 85 °C (+3 °C, -0 °C)
- Pressure : Less than 5 % of the component pressure rating and the component press rating (+3 %, -0 %)
2) External leakage test
- Pressure : At least 100 % of the component pressure rating
- Temperature : -40 °C (+0 °C, -3 °C) and 85 °C (+3 °C, -0 °C)
3) Internal leakage test
- Pressure : The pressure for th high pressure test is at least 100 % of the component pressure rating, and the pressure for the low pressure test is 2.5 % or less of the component pressure rating.
- Temperature : -40 °C (+0 °C, -3 °C) and 85 °C (+3 °C, -0 °C)
4) Worst case fault pressure cycle test : Cycling is completed between 5 % or less of 110 % of the component pressure rating and at least 110 % of the component pressure rating (+3 %, -0 %)
5) Proof pressure test : The pressure is slowly increased to 150 % of the component pressure rating and maintain that pressure for 10 min
6) Hydrostatic strength test : pressure is increased to 2.4 times of the component pressure rating

– End –

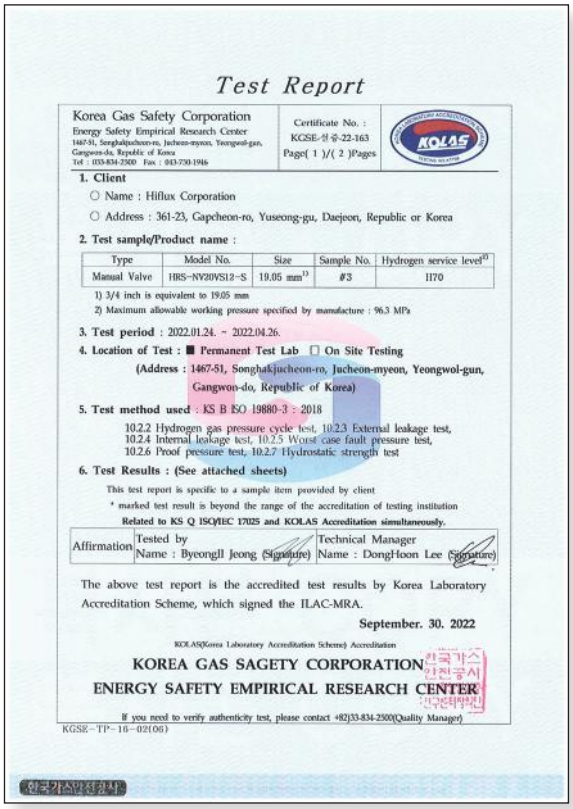
KGSE-TP-16-02(06)

HIGH PRESSURE NEEDLE VALVE

Control and open/close the flow, Manual valve

KOLAS CERTIFICATION

KOLAS Hydrogen charging station valve certificate



Test Report

Korea Gas Safety Corporation
Energy Safety Empirical Research Center
1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea
Tel : 033-834-2500 Fax : 043-730-1946

Certificate No. : KGSE-성중-22-163
Page(1)/(2)Pages

1. Client
○ Name : Hiflux Corporation
○ Address : 361-23, Gapcheon-ro, Yuseong-gu, Daejeon, Republic or Korea

2. Test sample/Product name :

Type	Model No.	Size	Sample No.	Hydrogen service level[2]
Manual Valve	HRS-NV20VS12-S	19.05 mm[1]	#3	H70

1) 3/4 inch is equivalent to 19.05 mm
2) Maximum allowable working pressure specified by manufacture : 96.3 MPa

3. Test period : 2022.01.24. ~ 2022.04.26.
4. Location of Test : ■ Permanent Test Lab □ On Site Testing
(Address : 1467-51, Songhakjucheon-ro, Jucheon-myeon, Yeongwol-gun, Gangwon-do, Republic of Korea)
5. Test method used : KS B ISO 19880-3 : 2018
10.2.2 Hydrogen gas pressure cycle test, 10.2.3 External leakage test,
10.2.4 Internal leakage test, 10.2.5 Worst case fault pressure test,
10.2.6 Proof pressure test, 10.2.7 Hydrostatic strength test
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	Name : ByeongIl Jeong (Signature)	Name : DongHoon Lee (Signature)

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Test Results

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Certificate No. : KGSE-성중-22-163
Page(2)/(2)Pages

○ Test results

Number	Test items		Unit	Result	Notes
1	Hydrogen gas pressure cycle test[1]	Room test temperature	Cycle	100 000	Sample NO. #3
		Minimum test temperature	Cycle	1 000	
		Maximum test temperature	Cycle	1 000	
2	External leakage test[2]		–	Bubble-free	
3	Internal leakage test[3]	High pressure	–	Bubble-free	
		Low pressure	–	Bubble-free	
4	Worst case fault pressure test[4]		Cycle	10	
	Leakage	External leakage test[2]	–	Bubble-free	
		Internal leakage test[3] High pressure	–	Bubble-free	
		Low pressure	–	Bubble-free	
5	Proof pressure test[5]		–	No leakage	
6	Hydrostatic strength test[6]		–	No leakage	

1) Hydrogen gas pressure cycle test : 100 000 cycles shall be completed at room temperature, with additional 1 000 cycles at an ambient temperature of -40 °C (+0 °C, -3 °C) and 1 000 cycles at an ambient temperature of 85 °C (+3 °C, -0 °C)
- Pressure : Less than 5 % of the component pressure rating and the component press rating (+3 %, -0 %)
2) External leakage test
- Pressure : At least 100 % of the component pressure rating
- Temperature : -40 °C (+0 °C, -3 °C) and 85 °C (+3 °C, -0 °C)
3) Internal leakage test
- Pressure : The pressure for th high pressure test is at least 100 % of the component pressure rating, and the pressure for the low pressure test is 2.5 % or less of the component pressure rating.
- Temperature : -40 °C (+0 °C, -3 °C) and 85 °C (+3 °C, -0 °C)
4) Worst case fault pressure cycle test : Cycling is completed between 5 % or less of 110 % of the component pressure rating and at least 110 % of the component pressure rating (+3 %, -0 %)
5) Proof pressure test : The pressure is slowly increased to 150 % of the component pressure rating and maintain that pressure for 10 min
6) Hydrostatic strength test : pressure is increased to 2.4 times of the component pressure rating

- End -

KGSE-TP-16-02(06)

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