

HIGH PRESSURE VALVE&FITTINGS. HIFLUX

# HYDROGEN PRODUCTS

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

Hydrogen Station



# HIFLUX HIGH PRESSURE NEEDLE VALVE

Control and open/close the flow, Manual valve

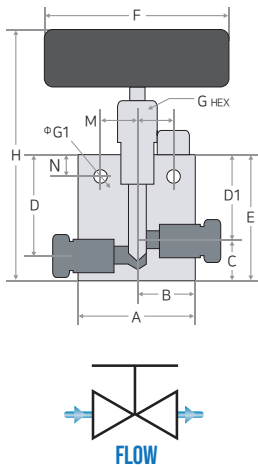


## FEATURES

- 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 material 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



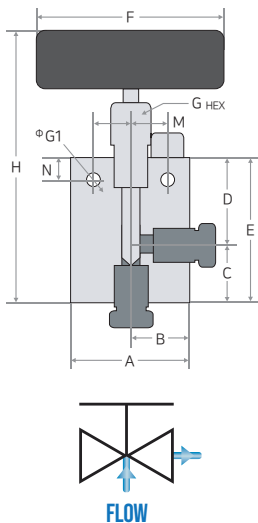
(Unit:mm)

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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 G1 : Hole size of the main positive  
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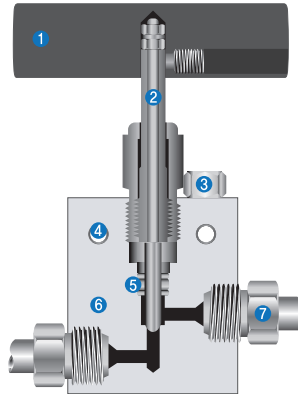
# HIGH PRESSURE NEEDLE VALVE

Control and open/close the flow, Manual valve



## EXPLODED VIEW & CONNECTION COMPONENTS

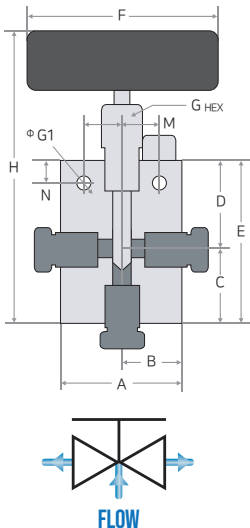
- ① Valve Handle
- ② Stem
- ③ Stem Locking
- ④ Valve Fixed Hole
- ⑤ Packing
- ⑥ Body Block
- ⑦ Connections



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

## 3WAY/10N PRESSURE TYPE

(Unit:mm)



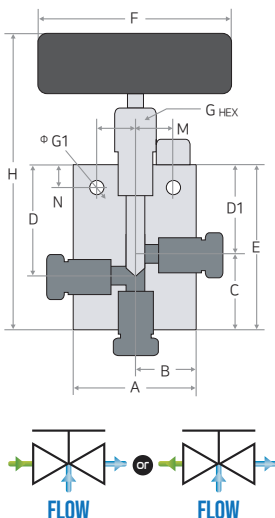
Catalog No.	Stem	Pressure Rating	Port Type	Tube Size	Cv	Orifice Size	Dimensions											Block Thickness				
							A	B	C	D	E	F	G	G1	H	M	N					
H-NV20VS04-O	Vee	20,000 psi	H2004	1/4"	0.31	3.2	50	25	32	30	62	80	17	6.5	130.63	15.7	9.7	20				
H-NV20RS04-O	Reg																					
H-NV20VS06-O	Vee						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		60,000 psi	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	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	60,000 psi	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

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

## 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		60,000 psi	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	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	60,000 psi	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																						

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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# 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

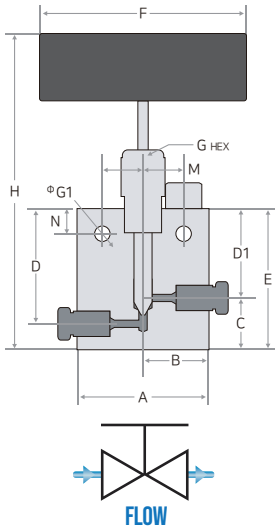
## FEATURES

- 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

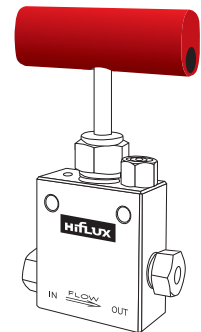
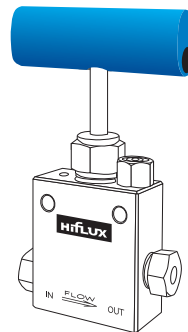
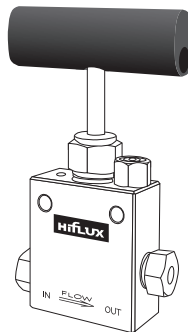
G1 : Hole size of the main positive

H : Height of the valve is fully closed

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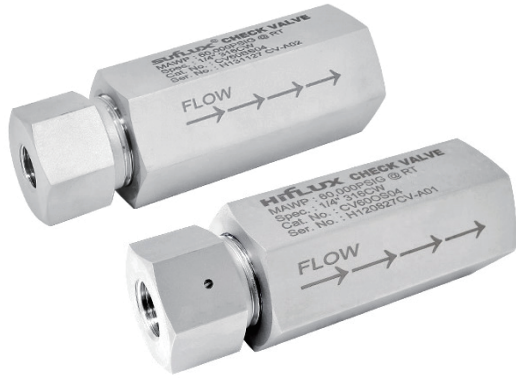
## OPTION

- 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

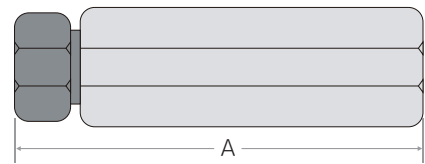
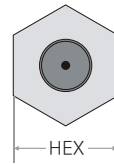
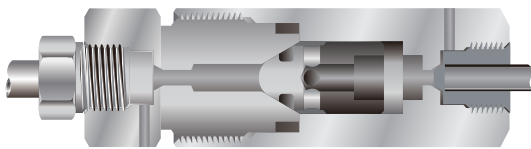


## FEATURES

- 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.

# HIFLUX HIGH PRESSURE FITTING

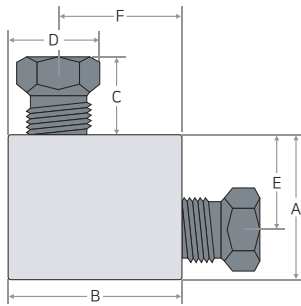
Fitting & accessory used simple structure design and wear resistant material for high pressure connection



## 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°F (-252°C) to 1200°F (649°C) Fitting is used for connecting.
- Tubes at high pressure and has a high-flow property and diverse sized orifice according to pressure.

## ELBOW TYPE

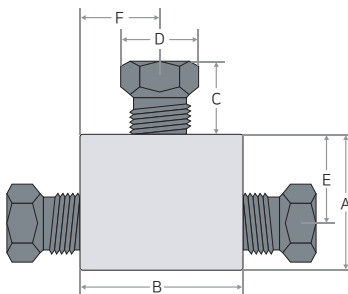


(Unit:mm)

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

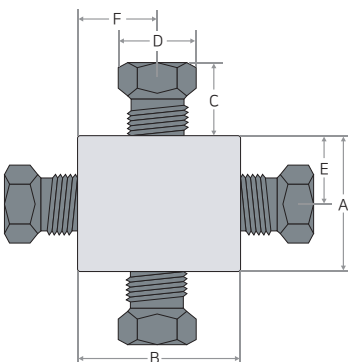


(Unit:mm)

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(mm <sup>2</sup> )	Working pressure psi (bar)				
				Outside Diameter	Inside Diameter			-198~37.8°C -325~100°F	93°C 200°F	204°C 400°F	316°C 600°F	427°C 800°F
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(mm <sup>2</sup> )	Working Pressure psi (bar)				
				Outside Diameter	Inside Diameter				-198~37.8°C -325~100°F	93°C 200°F	204°C 400°F	316°C 600°F	427°C 800°F
N20S04	20,000 psi	H2004	1/4"	6.35	2.77	1.78	70	5.81	1378.93	1378.93	1327.22	1244.48	1158.30
N20S06		H2006	3/8"	9.53	5.16	2.18	88	20.65	1378.93	1378.93	1327.22	1244.48	1158.30
N20S09		H2009	9/16"	14.29	7.92	3.18	110	49.03	1378.93	1378.93	1327.22	1244.48	1158.30
N20S12		H2012	3/4"	19.05	11.13	3.96	118	97.42	1378.93	1378.93	1327.22	1244.48	1158.30
N20S16		H2016	1"	25.4	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	2.11	2.11	74	3.23	4136.79	4136.79	3981.66	3740.35	3495.59
N60S06		H6006	3/8"	9.53	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 : 043-750-1946

Certificate No. : KCSE-선승-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 <sup>1)</sup>
Manual Valve	HRS-NV20V504-S	6.35 mm <sup>1)</sup>	#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  
Name : Byeongil Jeong (Signature)

Technical Manager  
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 : 043-750-1946

Certificate No. : KCSE-선승-22-161  
Page( 2 ) / ( 2 ) Pages

**0 Test results**

Number	Test items	Unit	Result	Notes
1	Hydrogen gas pressure cycle test <sup>1)</sup>	Room test temperature	Cycle	100 000
		Minimum test temperature	Cycle	1 000
		Maximum test temperature	Cycle	1 000
2	External leakage test <sup>2)</sup>	High pressure	-	Bubble-free
		Low pressure	-	Bubble-free
3	Internal leakage test <sup>3)</sup>	High pressure	-	Bubble-free
		Low pressure	-	Bubble-free
		Worst case fault pressure test <sup>4)</sup>	Cycle	10
4	Leakage	External leakage test <sup>2)</sup>	-	Bubble-free
		Internal leakage test <sup>3)</sup>	-	Bubble-free
5	Proof pressure test <sup>5)</sup>	High pressure	-	Bubble-free
		Low pressure	-	No leakage
6	Hydrostatic strength test <sup>6)</sup>	-	-	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 (+3 °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 : 043-750-1946

Certificate No. : KCSE-선승-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 <sup>1)</sup>
Manual Valve	HRS-NV20V509-S	14.29 mm <sup>1)</sup>	#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  
 \* 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  
Name : Byeongil Jeong (Signature)

Technical Manager  
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 : 043-750-1946

Certificate No. : KCSE-선승-22-162  
Page( 2 ) / ( 2 ) Pages

**0 Test results**

Number	Test items	Unit	Result	Notes
1	Hydrogen gas pressure cycle test <sup>1)</sup>	Room test temperature	Cycle	100 000
		Minimum test temperature	Cycle	1 000
		Maximum test temperature	Cycle	1 000
2	External leakage test <sup>2)</sup>	High pressure	-	Bubble-free
		Low pressure	-	Bubble-free
3	Internal leakage test <sup>3)</sup>	High pressure	-	Bubble-free
		Low pressure	-	Bubble-free
		Worst case fault pressure test <sup>4)</sup>	Cycle	10
4	Leakage	External leakage test <sup>2)</sup>	-	Bubble-free
		Internal leakage test <sup>3)</sup>	-	Bubble-free
5	Proof pressure test <sup>5)</sup>	High pressure	-	Bubble-free
		Low pressure	-	No leakage
6	Hydrostatic strength test <sup>6)</sup>	-	-	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 (+3 °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 : 043-750-1946		Certificate No. : KGSE-관중-22-163 Page( 1 )/( 2 )Pages	
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**1. Client**

Name : Hiflux Corporation

Address : 361-23, Gapcheon-ro, Yuseong-gu, Daejeon, Republic of Korea

**2. Test sample/Product name :**

Type	Model No.	Size	Sample No.	Hydrogen service level <sup>1)</sup>
Manual Valve	HRS-NV20VSI2-S	19.05 mm <sup>1)</sup>	#3	II70

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

**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 Byeonggil Jeong Technical Manager  
Name : Byeonggil 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 SAFETY 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 : 043-750-1946		Certificate No. : KCSE-관중-22-163 Page( 2 )/( 2 )Pages	
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**o Test results**

Number	Test items	Unit	Result	Notes	
1	Hydrogen gas pressure cycle test <sup>1)</sup>	Room test temperature	Cycle	100 000	
		Minimum test temperature	Cycle	1 000	
		Maximum test temperature	Cycle	1 000	
2	External leakage test <sup>2)</sup>	High pressure	-	Bubble-free	Sample NO. #3
		Low pressure	-	Bubble-free	
3	Internal leakage test <sup>3)</sup>	Worst case fault pressure test <sup>4)</sup>	Cycle	10	
		External leakage test <sup>5)</sup>	-	Bubble-free	
		Internal leakage test <sup>6)</sup>	High pressure	-	
4	Leakage	Internal leakage test <sup>7)</sup>	Low pressure	-	Bubble-free
		External leakage test <sup>8)</sup>	Low pressure	-	Bubble-free
5	Proof pressure test <sup>9)</sup>	-	-	No leakage	
6	Hydrostatic strength test <sup>1)</sup>	-	-	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 the 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 -

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