Certificate no.:
TAP000032E

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Globe Valve

with type designation(s)
E HDLV01A, H HDLV08A, HDLV09A

issued to
Shanghai Hudong Marine Valve Manufacture Co., Ltd.
Shanghai, **China**

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV rules for classification – Ships Pt.6 Ch.2 Sec.5 Gas fuelled ship installations – Gas fuelled LNG
DNV class programme DNV-CP-0186 – Type approval – Valves

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Type:	Temperature range:	Max. working press.:	Sizes:
E HDLV01A	-196°C ~ +90°C	CL 150	DN 300
E HDLV01A	-196°C ~ +90°C	CL 300	DN 25
H HDLV08A	-196°C ~ +90°C	CL 150	DN 25, DN 50, DN 100; DN 350
HDLV09A	-196°C ~ +90°C	CL 150	DN 80
H HDLV08A	-196°C ~ +90°C	CL 300	DN 50

Issued at **Hamburg** on **2025-09-09**

This Certificate is valid until **2030-09-08**.

for **DNV**

DNV local unit: **Shanghai**

Approval Engineer: **Ana Cristina Do Carmo Insfran**

Product description

Cryogenic hydraulic globe valve: E HDLV01A, cryogenic swing check valve: H HDLV08A and cryogenic check valve: HDLV09A for applications in various cryogenic LNG liquid and natural gas vapour system installations as well as in machinery piping systems.

1- Cryogenic hydraulic globe valve: E HDLV01A

Valve type	Class	Temperature	Nominal Diameter (DN)
E HDLV01A	150	-196°C ~ 90°C	300
	300	-196°C ~ 80°C	25

Materials:

Valve part	Material	Standard
Body	CF3M + STL6, CF8M + STL6, CF3M	ASTM A351
Disc	F316 + STL6, F316	ASTM A182
Bonnet	CF8M	ASTM A351
Stem	F316	ASTM A182
Gasket	S21800; Metal +Graphite	ASTM A276

2- Cryogenic swing check valve: H HDLV08A

Valve type	Class	Temperature	Nominal Diameter (DN)
H HDLV08A	150	-196°C ~ 90°C	25, 50, 100, 350
	300		50

Materials:

Valve part	Material	Standard
Body	CF8M	ASTM A351
Disc	F316 + STL6	ASTM A182
Bonnet	CF8M	ASTM A351
Swing Arm, Support	CF8M	ASTM A351
Gasket	Metal + Graphite, CPS7020LCT	-

3- Cryogenic lift check valve: HDLV09A

Valve type	Class	Temperature	Nominal Diameter (DN)
HDLV09A	150	-196°C ~ 80°C	80

Materials:

Valve part	Material	Standard
Body	CF3M + STL6	ASTM A351
Disc	F316 + STL6	ASTM A182
Bonnet	CF8M	ASTM A351
Gasket	Metal + Graphite	-

Design conditions:
Face to face: ASME B16.34 /ASME B16.10
Test and acceptance: ASME B16.34
Flange connections: ASME B16.5

Design temperature: Depending on seat materials

Seat design type	Temperature range [°C]
Metal graphite	-196°C ~ +90°C

Application

Cryogenic hydraulic globe valve: E HDLV01A, cryogenic swing check valve: H HDLV08A and cryogenic check valve: HDLV09A are approved for the use in ships piping, machinery piping, fuel systems and cargo handling piping systems. Operating media include flammable gases, nitrogen and cryogenic liquefied gases including LNG.[1,2]

[1]: Valve designs for use and installation in ammonia (NH_3) and methanol (CH_3OH) ship fuel systems require additional approval by the flag state administration for each particular ship as these fuels are not covered by the IGF Code at present.
[2]: Valve designs for installation in ship's liquid nitrogen (LN_2) systems require additional approval by the flag state administration for each particular ship as liquid nitrogen (LN_2) with a design temperature of -196°C is not covered by the IGF Code and IGC Code. The minimum design temperature in the IGF Code and IGC Code is limited to -165°C for LNG, while LN_2 is only referred for testing with a test temperature of -196°C.

Limitation

Valves are not approved for liquid and gaseous hydrogen and for media specified as toxic and/or dangerous fluids.[3]

[3]: See United Nations (UN) Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Tests carried out

Test standards:	DNV Pt. 5 Ch. 7 Liquefied gas tankers DNV Pt. 6 Ch.2 Section 5 Gas fuelled ship installations DNV Rules Pt.4 Ch.6 – Piping systems; DNV Class Programme CP 0186 – Valves ASME B16.34
Valve test	Purpose
Pressure test	Minimum test pressure = 1,5 times the design pressure Test standard: DNV Pt.4 Ch. 6; DNV CP 0186
Seat tightness	To confirm the capability of the seat with the specified leakage rate Seat tightness test at ambient temperature, test fluid: Nitrogen
Seat tightness	Seat tightness test at cryogenic temperature, test temperature -196°C, test fluid Helium.
Flow and functional test	Flow and functional test at cryogenic temperature, test temperature -196°C.

Type Approval documentation

Production testing and valve certification

I. Application for Liquefied gas tankers

1. Certification of valves [DN ≥ 100 **or** Working temperature < -55°C]
For all valves having a nominal diameter DN ≥ 100 or a working temperature below -55°C a Product Certificate (PC) shall be issued by DNV based on the following scope of tests and according to:
DNV Rules Part 5, Chapter 7 – Liquefied gas tankers, Section 5, Item 13.1.1 and 13.1.2

Type of test	Test pressure
Shell strength	1,5 times the design pressure
Tightness test of pressure bearing housing	1,1 times the design pressure
Seat tightness test	1,1 times the design pressure
Functional test	Design / work pressure

DNV Rules Pt. 5 Ch. 7, Section 1, Table 7 – Compliance documents

DN ≥ 100 or Working temperature < -55°C	Type of certificate / Issued by Product Certificate (PC) / DNV

2. Additional cryogenic testing – 10 % of each type and size of valve
In addition, cryogenic testing consisting of valve operation and leakage verification for a minimum of 10% of each type and size of valve intended to be used at a working temperature below -55°C shall be carried out.

3. Material certification of valves
DNV Rules Part 5, Chapter 7 – Liquefied gas tankers

Pt. 5 Ch. 7, Section 1, Table 8 – Compliance documents for material quality and testing
Material certificates of valve bodies

Valve nominal diameter	Type of Certificate / Issued by
DN > 100, design temperature <-55°C	Material Certificate (MC) / DNV
DN > 100, design temperature ≥ -55°C	Material Declaration (MD) / Manufacturer
DN ≤ 100	Material Declaration (MD) / Manufacturer

4. Certification of valves [DN < 100 and working temperature ≥ -55°C]
For all valves having a nominal diameter DN < 100 intended for use at a working temperature ≥ -55°C a Product Declaration (PD) shall be issued based on the tests listed above and according to DNV Rules Part 5, Chapter 7 – Liquefied gas tankers, Section 1, Table 7 – Compliance documents

Valve nominal size	Type of certificate / Issued by
DN < 100	Product Declaration (PD) / Manufacturer

Production testing and valve certification - continuation

II. Application in Gas as fuel systems

For each valve intended to be installed in ship's gas fuel supply systems a Product Certificate (PC) shall be issued based on the following scope of tests and according to
DNV Rules Part 6, Chapter 2, Section 5 – Gas fuelled ship installations

1.

Type of test	Test pressure
Shell strength	1,5 times the design pressure
Tightness test of pressure bearing housing	1,1 times the design pressure
Seat tightness test	1,1 times the design pressure
Functional test	Design / work pressure

2. Valves in LNG / Gas fuel system – Table 3 Certification required

Valve design conditions - Test and certification	Type of certificate / Issued by
Design temperature < 0°C / DNV Pt.5 Ch.7 irrespective of size	Product Certificate (PC) / DNV
Design pressure > 10 bar/ DNV Pt.5 Ch.7 irrespective of size	Product Certificate (PC) / DNV
Design pressure ≤ 10 bar Design temperature ≥ 0°C	Product Declaration (PD) / Manufacturer

3. Material certificates
DNV Pt. 6 Ch.2 Section 5 – Gas fuelled ship installations
Table 4 Certification of material quality and testing

Design temperature	Type of certificate / Issued by
< 0°C	Material Certificate (MC) / DNV
≥ 0°C	Material Declaration (MD) / Manufacturer

III Application in machinery piping systems

Valves intended to be installed in piping systems listed in DNV Rules Pt.4 Ch.6 – Section 1 shall be certified according to
DNV Rules Pt.4 Ch.6 – Piping systems, Section 1, Table 3 Compliance documents – piping components

Valve nominal size / Pressure rating	Type of certificate / Issued by
DN > 100 mm / PN > 16 bar	Product Certificate (PC) / DNV
DN ≤ 100 mm / PN ≤ 16 bar	Product Declaration (PD) / Manufacturer

Material certificates (valve bodies)
In accordance with DNV Rules Pt.4 Ch.6 – Piping systems, Section 2, Table 3 – Material certificates

Marking of product

Each valve shall be clearly marked for identification. The identification marking may be performed on the body or on a plate of non-corrosive material. When a metallic plate is used, the plate shall be permanently fixed to the body. Identification marking on the body shall be located to non-stressed areas and shall be clearly legible.
The identification marking shall as a minimum include the following:

- Manufacturer's name or trademark
- Valve type designation
- Size
- Maximum design pressure and temperature
- Arrow to indicate direction of flow on one-way flow valves

Periodical assessment

A condition for retention of the Type Approval Certificate in its validity period is that periodical assessments are successfully carried out.
For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to DNV-CP-0338, Sec.4.

END OF CERTIFICATE