DNV·GL

Certificate No:
TAP0000065

TYPE APPROVAL CERTIFICATE

This is to certify:

That the High Velocity Pressure Relief Valve

with type designation(s)
U-ISO-H

Issued to
TANKTECH CO., LTD.
Busan, Republic of Korea

is found to comply with
Det Norske Veritas' Rules for Classification of Ships Pt.5, Ch.3 "Oil Carriers"
Det Norske Veritas' Rules for Classification of Ships Pt.5, Ch.4 "Chemical Carriers"

Application :

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

Design: **Integrated weight loaded high velocity valve**
Sizes: **DN65, DN80, DN100, DN125, DN150, DN200, DN250 and DN300**

This Certificate is valid until **2016-12-31**.

Issued at **Høvik** on **2016-04-18**

for **DNV GL**

DNV GL local station: **Pusan**

Approval Engineer: **Adel Samiei**

Marianne Spæren Marveng
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Job Id: **262.1-006809-12**
Certificate No: **TAP0000065**

Product description

Integrated high velocity pressure relief valve; design and tested in accordance with:

- ISO15364:2007 – Standard for ships and marine technology – Pressure/vacuum valves for cargo tanks
- IMO MSC/Circ. 677 (as amended by MSC/Circ.1009 and MSC.1/Circ.1324) - Revised Standards for The Design, Testing and Locating of Devices to Prevent the Passage of Flame into Cargo Tanks in Tankers

Materials:

Upper Body:	Ductile Cast iron - FCD450, Cast steel- A216-WCB SC480	Stainless steel - SCS 14A/13A/16A
Lower Body:	Ductile Cast iron - FCD450 STPG	Stainless steel – SUS 304TP/316TP/316LTP
Pressure disc, seat and stem:	Stainless steel - SUS316/316L, SCS14A/16A	Stainless steel - SUS316L/316L, SCS14A/16A
Weight	SS400	Stainless steel - SUS 316/304/316L
Pad	SS400	Stainless steel - SUS 316/304/316L

Application/Limitation

Products covered by this certificate may be used as vents on tanks for cargo on board ships having class notation "Tanker for Oil", "Tanker for Oil Products" or "Tanker for Chemicals" for products having a MESG of 0.9 mm and greater (Apparatus Group IIA).

The approval is valid for the following pipe lengths and valve settings:

Valve type	H-65	H-80	H-100	H-125
Pipe connection	ND65mm	ND80mm	ND100mm	ND125mm
Max .length*)	26.5m	26.5m	26.5m	26.5m
Pressure	2,100 mmWG 1,400 mmWG	2,100 mmWG 1,400 mmWG	2,100 mmWG 1,400 mmWG	2,100 mmWG 1,400 mmWG

Valve type	H-150	H-200	H-250	H-300
Pipe connection	ND150mm	ND200mm	ND250mm	ND300mm
Max .length*)	26.5m	10m	3.5m	3.5m
Pressure	2,100 mmWG 1,400 mmWG	2,100 mmWG 1,400 mmWG	1,400 mmWG	1,400 mmWG

*) The length of standpipe between cargo tank and valve is restricted with regard to hammering. The maximum allowable dynamic pressure drop in the standpipe between the cargo tank and the valve is not to exceed the equivalent (steel-) pipe length as indicated.

Sizing and location are to be in accordance with the latest revision of MSC/Circ. 450 and MSC/Circ. 731.

Installation on board is to comply with the DNV Rules Pt.5 Ch.3 Sec.5B for vessels with notation "Tanker for Chemicals" and with DNV Rules Pt.5 Ch.4 Sec.9B for vessels with notations "Tanker for Oil" or "Tanker for Oil Products".

High velocity pressure relief valves covered by this certificate are only permitted to be installed on tanks protected with inert gas systems.

Cargo tanks connected to the combined pressure-vacuum main vent line must carry the same type of cargo.

Drawings of stand pipes showing hatches and openings are to be approved in each separate case.

In order to ensure tightness, the valve house on each unit is to be subjected to a hydraulic pressure test at 1.5 times design pressure. No leakage is permitted.

A copy of the instruction manual shall be kept on board, and is to include:

- Installation and Operating instructions
- Maintenance requirements including cleaning
- A copy of the laboratory report
- Flow test data, incl. flow rates under both positive and negative pressures, operating pressures, operating sensitivity, flow resistance and velocity

Each finished device shall be visually and dimensionally checked to ensure that the device complies with this type approval certificate and type approval documentation (Reference is made to ISO15364:2007 annex E). Also it shall be leakage tested using air to verify the maximum leakage rate specified according to ISO15364:2007 6.1.

Type Approval documentation

Tests carried out

Corrosion, Hydraulic Pressure, Flash Back, Hammering, Freezing, Flow Condition Test, Maximum leakage rate test

Marking of product

For traceability to this type approval each device is at least to be marked with:

- Manufacturer's name or trade mark.
- Type designation
- Additional marking acc. IMO MSC/Circ. 677

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey - before the expiry date of this certificate - to verify that the conditions for the type approval are complied with.