

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Safety Relief Valve for LNG/LPG Service**with type designation(s)
HSP-OVT-DR & HSP-OVT-WDR

Issued to

Mt. H Control Valves Co., Ltd.
Busan 11, Republic of Korea

is found to comply with

DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV GL class programme DNVGL-CP-0186 – Type approval – Valves**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****K. factor:** See certificate
Temperature range: -196 °C to +50 °C
Max. working press.: See certificateIssued at **Høvik** on **2017-09-13**This Certificate is valid until **2021-12-31**.for **DNV GL**DNV GL local station: **Gimhae Station**Approval Engineer: **Sinisa Sedlan**.....
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.



Product description

Pilot operated safety relief valves.

Design: HSP-OVT-DR: Stainless steel body with Teflon diaphragm of main valve.
HSP-OVT-WDR: Stainless steel body without diaphragm retainer of main valve.

Stainless steel body A351-CF8M

VALVE SIZE inlet x outlet [inches]	Design type	Discharge coefficient Kd	Maximum working pressure [kPa]
2 x 3	HSP-OVT-DR	0,8514	50
4 x 6	HSP-OVT-DR	0,801	50
6 x 6	HSP-OVT-WDR	0,549	10
6 x 8	HSP-OVT-DR	0,734	50
8 x 10	HSP-OVT-DR	0,712	50
10 x 12	HSP-OVT-DR	0,725	50
12 x 16	HSP-OVT-DR	0,6813	50

Capacity calculations according to API RP 520.

Application/Limitation

Valves covered by this certificate may be used in LNG/LPG applications under the following design conditions:

Service : Liquefied Gas - Cryogenic Service
Temperature range : -196 °C to +50 °C
Max. working pressure : 10 kPa (type HSP-OVT-WDR); 50 kPa (type HSP-OVT-DR)
Sizes and types : As given in Product Description

Type Approval documentation

Tests carried out

Flow capacity, ambient and cryogenic test

Production Testing

The following tests (each valve) are to be performed under the supervision by a surveyor of DNV GL:

- Hydraulic test to 1.5 times the maximum allowable pressure setting.
- Checking of set pressure (popping pressure) and reset pressure at room temperature. Set pressure to be sealed.
- Leak test after reset at 90% of each set pressure at room temperature.
- Sufficient valve capacity is to be approved for each application.

Certification

Valves with sizes with DN > 100 mm (all valves listed in this certificate other than size 2×3") shall be delivered with product certificate, regardless of minimum design temperature. Valve size 2×3" shall be certified by DNV GL when minimum design temperature is less than -55°C (reference is made to DNV GL Ship Rules Pt.5 Ch.7 Sec.1 Table 7). Otherwise manufacturer's certificate may be accepted.

VL material certificate is required for the body material for valves with DN > 100 mm and design temperature < -55 °C

Works material certificate is required for the body material:

Job Id: **262.1-004657-4**
Certificate No: **TAP00000ZR**

- for valves with DN > 100 mm and design temperature > -55 °C.
- for valves with DN < 100 mm regardless of design temperature.

Marking of product

For traceability to this type approval the valves are to be marked as a minimum with:

- Manufacturers name or trade mark
- Valve type designation
- Size
- Maximum design pressure and temperature
- Arrow to indicate direction of flow

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment every second year and before the expiry date of this certificate, to verify that the conditions for the type approval are complied with.

When possible, this assessment may be harmonised with normal surveys for product certification and / or other surveys and audits carried out.

The main elements of the certificate retention survey are:

- Verification of the TA applicant's production and quality system w.r.t. ensuring continued
- consistent production of the type approved products at the TA applicant's own premises
- Review of Type Approval documentation and assurance that it is still used as basis for production
- Review of possible changes in design, materials and performance
- Assurance of traceability between manufacturer's product type marking and Type Approval Certificate.

Renewal should be applied for in writing before the certificate expires.