

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Ball Valve**

with type designation(s)
C47W Cryogenic Diverter Ball Valve

Issued to

**Habonim Industrial Valves and Actuators
Kfar Hanassi, Israel**

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV GL class programme DNVGL-CP-0186 – Type approval – Valves
DNVGL-OS-E201 – Oil and gas processing systems, Edition July 2015

Application :

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

Temperature range: -196°C to 190°C
Max. working press.: class 150 acc. to ASME B16.34
Sizes: DN 65 (2 1/2")

Issued at **Høvik** on **2017-11-09**

for **DNV GL**

This Certificate is valid until **2022-11-08**.

DNV GL local station: **Haifa**

Approval Engineer: **Maheshraja Venkatesan**

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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

Three piece cryogenic ball valve designed in accordance with ASME B16.34:

Size : 2 1/2"
Model : C47
Pressure rating: class 150

Material:

Body : ASTM A351 Gr. CF8M
Bonnet : ASTM A479 Gr. 316
Ends : ASTM A479 Gr. 316
Ball : ASTM A479 Gr. 316
Stem : ASTM A564 630 17-4PH
Body and Bonnet Bolts: EN 3506-1 A2-70
Ball Seat : C.F.PTFE (P)
Body Seal : Graphite (G)

Application/Limitation

The approval is valid for ship machinery, LNG/LPG & cargo piping systems onboard DNV GL classed ships and mobile offshore units.

The approval does not include actuator and/or other equipment for remote control of the valves.

The approval does not cover use of valves in seawater applications.

Type Approval documentation

D/No: 25-FDC47W-666MPG-150-90 (Assembly drawing of 2 1/2" FDC47W SER. #150 VALVE)

Design calculations:

Walls and Bolts calculations, Rev HA
Stem Torque calculation, Rev HA
Body Stem Notc calculation, Rev HA

Cryogenic test, shell test, seat test – witnessed by DNVGL dated 15/12/2016.

Tests carried out

Cryogenic seat tightness, fire test

Production Testing

All valves are to be tested as below:

- Hydrostatic test of the valve body at a pressure equal to 1.5 times the design pressure.
 - Seat and stem leakage test at a pressure equal to 1.1 times the design pressure for valves.
- Production testing and acceptance criteria shall be in accordance with EN 12266-1 (leakage rate A).

For LNG/LPG applications (in addition to above tests):

- Cryogenic testing consisting of valve operation and leakage verification to be performed as per B6364 for a minimum of 10% of each delivery intended to be used at a minimum design temperature below -55°C.

Production tests for valves which are to be delivered with a DNV GL product certificate, shall be witnessed by DNV GL surveyor.

Certification

Material certificate requirements:

- For ship machinery, LNG/LPG & cargo piping systems applications:
 - o Valve bodies shall be delivered with Works certificate (W) issued by manufacturer approved by the Society.

- For E201 applications:
 - o All valve bodies shall be delivered according to ISO 10474 (EN10204) type 3.1 provided the manufacturer has a quality assurance system according to ISO 9001 or equivalent, certified by a qualified body. Otherwise the material certificate shall be of type 3.2.

Product certificate requirements:

- For DNV GL-RU-SHIP Pt.5 Ch.7 applications:
 - o Valves with minimum design temperature below -55 °C shall be delivered with DNV GL product certificate. Otherwise manufacturer's certificate is required.
- For DNV GL-RU-SHIP Pt.4 Ch.6 applications:
 - o Valves delivered with certificates issued by the manufacturer is acceptable.
- For E201 applications:
 - o Valves with equipment category I as per Table 15 of DNVGL-OS-E201 shall be delivered with product certificate issued by DNV GL. Otherwise works certificate prepared by the manufacturer is accepted

Marking of product

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

- manufacturer's name or trade mark
- valve type designation
- size
- maximum design pressure and temperature
- arrow to indicate direction of flow on one way flow valves

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years and 3.5 years in accordance with DNVGL-CP-0338 to verify that the conditions for the type approval have not been altered.

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

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