

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Hot Bolting Flange Clamps**

with type designation(s)
Morsafe

Issued to

Hydratight Ltd
Wednesbury, West Midlands, United Kingdom

is found to comply with

ASME B31.3, Process Piping, 2016

DNVGL-OS-E201 – Oil and gas processing systems, Edition July 2018

ASME B16.5-2017, Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard

2017 ASME Boiler and Pressure Vessel Code VIII Div. 2 Rules for Construction of Pressure Vessels

Application :**Clamp with two different applications:**

- securing pressurized ASME B16.5 flange connections with degraded bolting
- maintenance barrier for ASME B16.5 flange connections during live bolt renewing

Temperature range: -101°C to 250°C (-150°F to 480°F)

Max working pressure: Equal maximum ASME B16.5 rating pressure from CL150 and up and including CL1500

Sizes: All 4-bolt ASME B16.5 flange connections up and including CL1500 rating.

Temperature range: -101°C to 250°C (-150°F to 480°F)

Max. working press.: 20 bar - 250 bar

Sizes: 0.5 inches - 3.0 Inches

Issued at **Høvik** on **2019-06-18**

This Certificate is valid until **2024-06-17**.

for **DNV GL**

DNV GL local station: **Oslo Mooring, Diving & Offshore Equipment**

Approval Engineer: **Chenyu Sun**

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Inger-Helene Hals
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

Clamp with two different applications:

- securing pressurized ASME B16.5 flange connections with degraded bolting
- maintenance barrier for ASME B16.5 flange connections during live bolt renewing

Temperature range: -101°C to 250°C (-150°F to 480°F)

Max working pressure: Equal maximum ASME B16.5 rating pressure from CL150 and up and including CL1500

Sizes: All 4-bolt ASME B16.5 flange connections up and including CL1500 rating

Application/Limitation

Temperatures down to -101 °C provided pressure reduced to 50% of design pressure (at end of blow down).

Tolerances: ISO 2768-1 fine

Allowable external forces: Statoil TR 1968 Ver. 4 Appendix J.

Material requirements: Material selection based on minimum design temperature for the application, but minimum 300MPa yield strength. TA design assessment is based on EN10025-2 S355J2. Clamps for permanent application to have similar properties as the original flanges.

Design life: Allowable number of bolt pretensions is 200 before bolt replacement

Type Approval documentation

<u>Drawing No:</u>	<u>Rev.</u>	<u>Title</u>
20151102H	8	Design documentation Hot Bolting Clamps
TR1968	4	Flange Bolt Tension App J. External forces
201302-02H	10	Hot Bolting Clamps dimensions for ASME B16.5 PRO-8.20 rev2 DNV GL type approval HBC 3in CL150
15-305791		Kalibreingsbevis manometer
W-SER-20285	AJ	Hot Bolting or Flange Clamp Assembly and Installation Procedure
MT2014-F010	1	Report -4inchcl1500-signed
MT2014-F059	Draft	Project Report Hotbolting 8inches class 150 IFG_draft PRO-8.23 rev2 DNV GL type approval HBC 1,5in CL1500 PRO-8.22 rev2 DNV GL type approval HBC 1,5in CL600 PRO-8.21 rev2 DNV GL type approval HBC 1,5in CL300
TR1968	4	Flange Bolt Tension App J. External forces
P-TRA-11492-AE		HT53 Technical Theory Module - Hot Bolt Clamp
104246-S00008-CT-Z-0001	4	hotbolting_report_draft_5 FEM report Irgens Data sheet the Hot Bolting Clamp
B12.4		B12.4.Prosedyre for Hot Bolting
104246-S00018-CT-Z-0001-02 0690_001	2	Finite Element Analysis of Hot Bolting Clamps; Technical Report Test checklists

Job Id: **262.1-019701-2**
Certificate No: **TAP00001V7**

Tests carried out

3" CL150 with graphite gasket
1,5" CL300 with graphite gasket
1,5" CL600 with spiral wound gasket
1,5" CL600 with Ring Type Joint gasket
1,5" CL1500 with spiral wound gasket
1,5" CL1500 with Ring Type Joint gasket

Applied external forces according to Statoil TR 1968 Ver. 4 Appendix J.

Marking of product

For traceability to this type approval, the couplings should at least be marked with:

- Manufacturer's drawing number.

Periodical assessment

For retention of this Type Approval, a DNVGL surveyor shall perform a periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days). The objective of the periodical assessment is to verify that the conditions for the Type Approval have not been altered. (Ref DNVGL-CP-0338 Type approval scheme).