

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Bow Loading**

with type designation(s)
BLS Loading Manifold

Issued to

APL Norway AS
Kolbjørnsvik, Norway

is found to comply with
DNV GL rules for classification – Ships
DNV GL rules for classification – Offshore units

Application :

The loading manifold may be used as a connector between the crude oil loading hose from an FPSO and the crude oil line.

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

Issued at **Høvik** on **2017-03-24**

This Certificate is valid until **2022-03-23**.

DNV GL local station: **Kristiansand S**

for **DNV GL**

Approval Engineer: **Sindre Bauck Sole**

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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

The loading manifold consists of a T-piece in which an elbow has been welded. A ball joint is bolted to the T-piece, and a coupler valve is bolted to the ball joint. This coupler valve is the connection to the crude oil hose.

Hydraulic cylinders help the loading manifold rotate.

The loading manifold is connected to the ships structure by two brackets.

Manufacturers

The BLS Loading manifold may be produced at the following locations:

- **AMEK AS**
4994 Akland
Norway
- **Fortaco OY**
Vammaksentie 1
Fi-38210, sastamala - Finland
- **IKM Årdal Mekaniske Verksted AS**
Breivikv. 17 Nordmarka
4120 Tau
Norway
- **Panterra AS**
Frolandsveien 6,
4847 Arendal
Norway
- **HSM Industrie AS**
Bredstrupvej 50
8500 Grenaa
DENMARK

Application/Limitation

For the sector limited to an angle of 25 degrees to each side and between an angle of 0 degrees and 75 degrees outwards to the vertical:

Max pressure in the crude oil line	7 bar	20 bar
Pull in hose, ULS condition (including dynamic effects)	84 ton	40 ton
Pull in hose, accidental condition	125 ton	125 ton

The flow restrictor controlling the closing time of the coupler valve (pos. 116 on drawing no. 091-APL-R-XG-SM-0031) shall be placed on the coupler valve.

APL has, as holder of the certificate the responsibility for the products compliance with DNV Rules

The connection to the ships structure and supporting structure in the ship is not covered by this type approval.

Type Approval documentation

Tests carried out

No type testing has been performed, and each loading manifold shall be tested separately. This testing shall include (but not necessary be limited to):

- Functional testing
- Pressure testing (30 bar for 15 minutes)
- The closing time of the coupler valve shall be tested. The closing time shall be minimum 15 seconds and a maximum 25 seconds.



Job Id: **262.1-006482-4**
Certificate No: **TAS00000YY**

Marking of product

The loading manifolds are to be marked with the manufacturers name or trademark, type designation and serial number. In addition, the surveyor shall stamp each unit with NV mark and DNV product certificate number, i.e.

TAS00000YY.

Initial and Certificate retention survey

For retention of the type approval, DNVs representative shall carry out biennial product audits if regular certification no longer takes place.

The initial surveys and the retention surveys shall be carried out at all manufacturers listed on page 2.

END OF CERTIFICATE