DNV·GL

Certificate No:
TAS00000SU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Emergency Towing Arrangement

with type designation(s)
ETS4000-DHF, ETS4000S-DHF, ETS4000-DHA, ETS4000U-DHA

Issued to
DHMC Co., Ltd. (Noksan Branch)
Busan, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships
IMO Resolution MSC 35 (63) of 20 May 1994
OCIMF Mooring Equipment Guidelines, Third Edition 2008

Application :

Emergency Towing Arrangement as stated on page 2 of this certificate for tankers of 50 000 tonnes deadweight and above - Safe Working Load 2 000 kN

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

This Certificate is valid until **2018-12-31**.

Issued at **Høvik** on **2016-11-18**

for **DNV GL**

DNV GL local station: **Busan**

Approval Engineer: **Chi Wan Bang**

Aldo Matteucci
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:
Certificate No: **TAS00000SU**

Product description

Forward Emergency Towing Arrangement ETS4000-DHF in accordance with drawing No.: DHF4000-001:

- Safe Working load (SWL): 2 000kN (equivalent to 204t)
- Minimum breaking load (MBL): 4 000kN (equivalent to 408t)

The detailed information of the strong point(chain stopper), fairlead and chafing gear(chain) is described in the drawing no.: DHF4000-001 dated 2016-09-30 as well as the detailed drawings from Type Approval Documentation.

Forward Emergency Arrangement ETS4000S-DHF in accordance with drawing No.: DHF4000S-001:

- Safe Working load (SWL): 2 000kN (equivalent to 204t)
- Minimum breaking load (MBL): 4 000kN (equivalent to 408t)

The detailed information of the smit bracket, fairlead and chafing gear(chain) is described in the drawing no.: DHF4000S-001 dated 2016-09-30 as well as the detailed drawings from Type Approval Documentation.

Aft Emergency Towing Arrangement ETS4000-DHA in accordance with drawing No.: DHA4000-001:

- Safe Working load (SWL): 2 000kN (equivalent to 204t)
- Minimum breaking load (MBL): 4 000kN (equivalent to 408t)

The detailed information of the buoy, pick-up gear, towing pennant, towing pennant stopper socket, groove spelter socket, fairlead, strongpoint, storage box and storage drum is described in the drawing no.: DHA4000-001 dated 2016-09-30 as well as the detailed drawings from Type Approval Documentation.

Aft Emergency Towing Arrangement ETS4000U-DHA in accordance with drawing No.: DHA4000U-001:

- Safe Working load (SWL): 2 000kN (equivalent to 204t)
- Minimum breaking load (MBL): 4 000kN (equivalent to 408t)

The detailed information of the buoy, pick-up gear, towing pennant, towing pennant stopper socket, groove spelter socket, fairlead, strongpoint, storage box and storage drum is described in the drawing no.: DHA4000U-001 dated 2016-09-30 as well as the detailed drawings from Type Approval Documentation.

Application/Limitation

- The connection and support of the above components to the ship's structure are to be covered by separate approvals.
- If installed on DNVGL vessels, a DNVGL product certificate is to be issued for each product and the following will apply:
  - Materials for load carrying parts are to be delivered with required material certificates in accordance with Pt.5 Ch.5 Sec.1 4.2 from the mentioned Rules.

- Where charpy impact testing is not specified by the materials standard, materials of main load bearing components shall be Charpy V-notch tested and impact energy is to be minimum 27J at 0 deg C.
- The manufacturer is required to have a DNVGL surveyor witness all important production and tests as required.
- Non-destructive testing is to be carried out to the attending surveyor's satisfaction.
- All welding is to be carried out by approved welders and according to approved welding procedures.
- Towing pennant and pick-up gear may be delivered with maker's certificate.

Type Approval documentation

Tests carried out

Prototype strength test of ETS4000-DKF(ETS4000-DHF), ETS4000S-DKF(ETS4000S-DHF), ETS4000-DKA (ETS4000-DHA) and ETS4000U-DKA (ETS4000U-DHA) was carried out in the presence of ABS, BV, DNV, GL and RINA on 2009-05-07.

Deployment test of ETS4000-DKF(ETS4000-DHF), ETS4000S-DKF(ETS4000S-DHF) and ETS4000-DKA (ETS4000-DHA)was carried out in the presence of LR on 2009-07-31.

Marking of product

The load bearing components are to be marked with the SWL, manufacturers name or trademark and type number identification.

Periodical assessment

For retention of the Type Approval, DNVGL surveyor shall perform a survey every second year and before expiry date of this certificate in order to verify that the conditions of the type approval are complied with.

END OF CERTIFICATE