DNV·GL

Certificate No:
TAS000019H

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Emergency Towing Arrangement

with type designation(s)
ETS100A, ETS100AU, ETS/EPB100A, EPB100A, ETS200A, ETS200AU, ETS/EPB200A, EPB200A, ETS/SPM200F, ETS/SPM250F, ETS/SPM350F, ETS200FS, ETS2000A-SJ, ETS2000A-SJ (Water tight), CBETS2000A, ETS2000F-SJ, ETS4000ASR-SJ, ETS4000ASR-SJ (Water tight), KBETS4000AS-SJ, EPB2000PB-SJ, ETS4000FSR-SJ, ETS5000F, ETS4000/SPM7000-SJ, ETS4000FSB-SJ

Issued to
KTMI Co., Ltd.
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
OCIMF's Recommendations for Equipment Employed in the Bow Mooring of Conventional Tankers at Single Point Moorings, Fourth Edition May 2007

Application :

Emergency Towing System, Emergency Towing System & Escorting Pull Back, Escorting and Pull Back System, Emergency Towing System & Sigle Point Mooring as stated on page 2 of this certificate for tankers

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

Issued at **Høvik** on **2019-01-15**
This Certificate is valid until **2024-01-14**.
DNV GL local station: **Busan**

Approval Engineer: **Chi Wan Bang**

for **DNV GL**

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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Product description

1) Aft Emergency Towing System ETS100A in accordance with drawing No.: ETA100A-0000:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

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.: ETA100A-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

2) Aft Emergency Towing System ETS100AU in accordance with drawing No.: ETA100AU-0000 & ETA100AU-0001:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

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.: ETA100AU-0000 Rev.0 & ETA100AU-0001 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

3) Aft Emergency Towing System & Escorting Pull Back ETS/EPB100A in accordance with drawing No.: ETS/EPB 100A-0000:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

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.: ETS/EPB 100A-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

4) Escorting and Pull Back System EPB100A in accordance with drawing No.: EPB 100A-0000:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

The detailed information of the strong point and fairlead described in the drawing no.: EPB 100A-0000 Rev.1 dated 2018-06-12 as well as the detailed drawings from Type Approval Documentation.

5) Aft Emergency Towing System ETS200A in accordance with drawing No.: ETA200A-0000:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

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.: ETA200A-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

6) Aft Emergency Towing System ETS200AU in accordance with drawing No.: ETA200AU-0000 & ETA200AU-0001:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

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.: ETA200AU-0000 Rev.0 & ETA200AU-0001 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

7) Aft Emergency Towing System & Escorting Pull Back ETS/EPB200A in accordance with drawing No.: ETS/EPB 200A-0000:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

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.: ETS/EPB 200A-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

8) Escorting and Pull Back System EPB200A in accordance with drawing No.: EPB 200A-0000:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

The detailed information of the strong point and fairlead described in the drawing no.: EPB 200A-0000 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

9) Forward Emergency Towing System & Single Poing Mooring ETS/SPM200F in accordance with drawing No.: ETS/SPM200F-0000:

For Emergency Towing:
- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

For Single Point Mooring:
- Safe Working load (SWL): 200 tonnes

The detailed information of the chafing gear(chain), strong point(chain stopper) and fairlead is described in the drawing no.: ETS/SPM200F-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation. The charfing chain is only for Emergency Towing System and not intended for Single point Mooring use.

10) Forward Emergency Towing System & Single Poing Mooring ETS/SPM250F in accordance with drawing No.: ETS/SPM250F-0000:

For Emergency Towing:
- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

For Single Point Mooring:
- Safe Working load (SWL): 250 tonnes

The detailed information of the chafing gear(chain), strong point(chain stopper) and fairlead is described in the drawing no.: ETS/SPM250F-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation. The charfing chain is only for Emergency Towing System and not intended for Single point Mooring use.

11) Forward Emergency Towing System & Single Poing Mooring ETS/SPM350F in accordance with drawing No.: ETS/SPM350F-0000:

For Emergency Towing:
- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

For Single Point Mooring:
- Safe Working load (SWL): 350 tonnes

The detailed information of the chafing gear(chain), strong point(chain stopper) and fairlead is described in the drawing no.: ETS/SPM350F-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from

Type Approval Documentation. The charfing chain is only for Emergency Towing System and not intended for Single point Mooring use.

12) Forward Emergency Towing System ETS200FS in accordance with drawing No.: ETS200FS-0000:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

The detailed information of the chafing gear(chain), strong point(smit bracket) and fairlead is described in the drawing no.: ETS200FS-0000 Rev.0 dated 2017-05-25 as well as the detailed drawings from Type Approval Documentation.

13) Aft Emergency Towing System ETS2000A-SJ in accordance with drawing No.: ETS2000A-SJ2:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

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.: ETS2000A-SJ2 Rev.0 dated 2000-09 as well as the detailed drawings from Type Approval Documentation.

14) Aft Emergency Towing System ETS2000A-SJ Water tight type in accordance with drawing No.: ETS2000A-SJ-5:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

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.: ETS2000A-SJ-5 Rev.0 dated 2007-09-03 as well as the detailed drawings from Type Approval Documentation.

15) Aft Emergency Towing System and Escorting and pull back system CBETS2000A in accordance with drawing No.: CBETS2000A-0000:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

The detailed information of the buoy, pick-up gear, towing pennant, towing pennant stopper socket, groove spelter socket, fairlead/strongpoint, chock, storage box and storage drum is described in the drawing no.: CBETS2000A-0000 Rev.0 dated 2015-02-05 as well as the detailed drawings from Type Approval Documentation.

16) Forward Emergency Towing System ETS2000F-SJ in accordance with drawing No.: ETS2000F-SJ1:

- Safe Working load (SWL): 1 000kN (equivalent to 102 tonnes)

The detailed information of the chafing gear, chain stopper and fairlead is described in the drawing no.: ETS2000F-SJ1 Rev.0 dated 2000-09 as well as the detailed drawings from Type Approval Documentation.

17) Aft Emergency Towing System ETS4000ASR-SJ in accordance with drawing No.: ETS4000ASR-SJ2:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

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.: ETA4000ASR-SJ2 Rev.1 dated 2014-12-05 as well as the detailed drawings from Type Approval Documentation.

18) Aft Emergency Towing System ETS4000ASR-SJ Water tight type in accordance with drawing No.: ETS4000ASR-SJ-5:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

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.: ETA4000ASR-SJ2 Rev.1 dated 2014-12-05 as well as the detailed drawings from Type Approval Documentation.

19) Aft Emergency Towing System and Escorting and pull back system KBETS4000AS-SJ in accordance with drawing No.: KBETS4000AS-SJ2:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

The detailed information of the buoy, pick-up gear, towing pennant, towing pennant stopper socket, groove spelter socket, fairlead/strongpoint, chock, storage box and storage drum is described in the drawing no.: KBETS4000AS-SJ2 Rev.1 dated 2014-12-05 as well as the detailed drawings from Type Approval Documentation.

20) Aft Escorting and pull back system EPB2000PC-SJ in accordance with drawing No.: EPB2000PB-01:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

The detailed information of the fairlead/strongpoint and chock is described in the drawing no.: EPB2000PB-01 Rev.1 dated 2014-08 as well as the detailed drawings from Type Approval Documentation.

21) Forward Emergency Towing System and Single point mooring ETS4000FSR-SJ in accordance with drawing No.: ETS4000FSR-SJ1:

For Emergency Towing:
- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

For Single Point Mooring:
- Safe Working load (SWL): 204 tonnes

The detailed information of the Chafing gear, chain stopper and fairlead is described in the drawing no.: ETS4000FSR-SJ1 Rev.1 2014-12-05 as well as the detailed drawings from Type Approval Documentation.

22) Forward Emergency Towing System and Single point mooring ETS5000F-SJ in accordance with drawing No.: ETS4000/SPM5000F-1000:

For Emergency Towing:
- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

For Single Point Mooring:
- Safe Working load (SWL): 250 tonnes

The detailed information of the Chafing gear, chain stopper and fairlead is described in the drawing no.: ETS5000F-SJ Rev.0 dated 2015-01-28 as well as the detailed drawings from Type Approval Documentation.

23) Forward Emergency Towing System and Single point mooring ETS4000/SPM7000-SJ in accordance with drawing No.: ETS4000/SPM7000-1000:

For Emergency Towing:
- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

For Single Point Mooring:
- Safe Working load (SWL): 350 tonnes

The detailed information of the Chafing gear, chain stopper and fairlead is described in the drawing no.: ETS4000/SPM7000-SJ Rev.0 dated 2015-01-28 as well as the detailed drawings from Type Approval Documentation.

24) Forward Emergency Towing System ETS4000FSB-SJ in accordance with drawing No.: ETS4000FSB-01:

- Safe Working load (SWL): 2 000kN (equivalent to 204 tonnes)

The detailed information of the Chafing gear, smit bracket and fairlead is described in the drawing no.: ETS4000FSB-SJ1 Rev.0 dated 2014-12-05 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 not included in this approval and 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:
  - 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.

For Emergency Towing:
- Materials for load carrying parts are to be delivered with required material certificates in accordance with DNVGL-RU-SHIP Pt.5 Ch.5 Sec.1 [4.2].
- Materials specified to other standards than DNV GL Rules in general shall fulfill the relevant corresponding rules requirment in Pt.2 e.g. steel forgings for Ch.2 Sec.6, steel castings for Sec.8 and etc.
- Where Charpy V-notch impact testing is not specified by the materials standard, materials of welded parts shall be Charpy V-notch tested and impact energy is to be minimum 27J at 0 deg C accorrding to DNVGL-RU-SHIP Pt.5 Ch.5 Sec.2 [2.2.5].
- Towing pennant and pick-up gear may be delivered with maker's certificate.
- For ETS100AU, ETA 2000A-SJ, ETS200AU, ETS4000ASR-SJ Water Tight Types, alarm shall be fitted in bilge well in room for underdeck ETA. Hull penetration shall be located such that distance from sea water level (SWL fully loaded) will be minimum 0.02 x L, where L is 'rule length' of the ship in meters.
- The arrangements and positioning of the above components shall comply with the requirements in IMO Resolution MSC.35(63), DNVGL-RU-SHIP Pt.5 Ch.5 Sec.2 [2.2] and OCIMF's regulations.

For Single Point Mooring:
- Materials for load carrying parts are to be delivered with required material certificates in accordance with DNVGL-RU-SHIP Pt.6 Ch.5 Sec.12 [2.1].
- Materials specified to other standards than DNV GL Rules in general shall fulfill the relevant corresponding rules requirment in Pt.2 e.g. steel forgings for Ch.2 Sec.6, steel castings for Sec.8 and etc.

-The materials used for bow chain stopper shall comply with the requirements specified in Pt.3 Ch.11 Sec.1 [6.2] according to DNVGL-RU-SHIP Pt.6 Ch.5 Sec.12 [3.1.2].
- The arrangements and positioning of the above components shall comply with the requirements in DNVGL-RU-SHIP Pt.6 Ch.5 Sec.12 [4] and OCIMF's regulations.

Type Approval documentation

Tests carried out

Load test reports for the above mentioned equipment(No.1 to 12) witnessed by DNV GL Gimhae station. Omittance of deployment testing is accepted based upon previous testing (98.09.30) of similar equipment for the ETS – 4000F & -4000A from S-8623.
For Aft CBETS2000A, Load test reports dated 2004-03-24 for the above mentioned equipment witnessed by DNVGL Busan station.
For Aft ETS4000ASR-SJ Water tight type, Load test reports dated 2007-08-23 for the above mentioned equipment witnessed by DNVGL Busan station.

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, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.

END OF CERTIFICATE