

TYPE APPROVAL DESIGN CERTIFICATE

This is to certify:

That the Containerized System

with type designation(s)
40ft Containerized Solution for Tankers for the ERMA FIRST BWTS FIT

Issued to

ERMA FIRST ESK Engineering Solutions S.A.
Perama, Greece

is found to comply with

DNV class programme DNV-CP-0553 – Type approval – Containerized systems

Application :

This type approval design certificate (TADC) is applicable to the 40ft Containerized Solution for Tankers for the ERMA FIRST BWTS FIT.

The TADC covers the container design only. For the type approval of the ERMA FIRST BWTS FIT in accordance with the IMO BWMS Code adopted by Resolution MEPC.300(72) reference is made to type approval by Lloyd's Register (Certificate No. LR21290950TA) on behalf of the Hellenic Republic.

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

Issued at **Høvik** on **2023-02-17**

This Certificate is valid until **2028-02-16** .

for **DNV**

DNV local unit: **Piraeus**

Approval Engineer: **Michael Lehmann**

Dag Sæle-Nilsen
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

The 40ft Containerized Solution for Tankers is a 40ft container used as a deckhouse for installation of the ERMA FIRST BWTS FIT on open deck of a tanker.

Application/Limitation

This Type Approval Design Certificate (TADC) covers the design of the 40ft Containerized Solution for Tankers. This design is pre-approved for installation of the ERMA FIRST BWTS FIT on open deck of a ship as deckhouse.

Drawings showing the containerized solution for the ERMA FIRST BWTS FIT1500 Ex model were evaluated. However, the containerized solution may be used for the ERMA FIRST BWTS models FIT100 Ex, FIT200 Ex, FIT300 Ex, FIT400 Ex, FIT600 Ex, FIT800 Ex, FIT1000 Ex, FIT1200 Ex, FIT1500 Ex, FIT2000 Ex and FIT2500 Ex.

The TADC does not represent a type approval of the ERMA FIRST BWTS FIT. For the type approval of the ERMA FIRST BWTS FIT in accordance with the IMO BWMS Code adopted by Resolution MEPC.300(72) reference is made to type approval by Lloyd's Register (Certificate No. LR21290950TA) on behalf of the Hellenic Republic.

This TADC represents a pre-approval of the design of the containerized solution, but each installation of a containerized solution for the ERMA FIRST BWTS FIT on board a vessel will require approval of the vessel specific container. Moreover, the connection interface with the hull shall be evaluated separately for every installation. The vessel specific drawing of the foundation, including the way the container is mounted on board, shall be submitted to DNV for approval.

A product certificate for the containerized solution for a specific vessel is not mandatory by DNV rules. Instead of a product certificate, a case-by-case verification of the containerized solution may be carried out.

A DNV survey report confirming that the container has been manufactured in accordance with DNV-CP-0553 shall accompany each container and be available on board the vessel where the container is fitted. A survey checklist for evaluating each vessel specific containerized solution is included in the appendix to this TADC.

Ship specific installation drawings (interface), including the communication interface towards the ship's existing systems, are subject to approval for each vessel specific installation.

Structural assessment

The deckhouse structure has been evaluated to withstand a pressure of 135.35 kN/m² on the fore wall if it is not protected, 71.45 kN/m² on the side walls and 46.60 kN/m² on the roof. Prior to each installation onboard it shall be evaluated that the green sea pressure is within this design limitation.

The doors and hatches of the container are found to be of weathertight type and suitable to withstand the above stated pressures. Certificates confirming the suitability of the doors and hatches shall be provided for each vessel specific installation.

Strength against stacking and lifting of the containers are not included in the scope of this TADC.

Location

The location on deck for a containerized solution is subject to vessel specific approval. When selecting the location of the container, the following shall be considered:

- Entrance through air locks to non-hazardous spaces shall be arranged at a horizontal distance of at least 3 m from any opening to a cargo tank or hazardous space containing gas sources, such as valves, hose connections or pumps used with the cargo.
- Vent inlet to hazardous area of container shall be from gas safe area.
- Vent outlet to hazardous area of container shall be from an area which, in the absence of the considered outlet, would be of the same or lesser hazard than the ventilated space.

- Vent inlet to gas safe area of container shall be from gas safe area, at least 1.5 m away from any hazardous area.
- Vent outlet to gas safe area shall be located outside hazardous area.

Fire safety

The containerized solution for the ERMA FIRST BWTS FIT may only be installed on open deck and with the same fire rating A-15 as the boundary divisions.

The container is fitted with smoke detection and manual call points. Fire detection system components shall have MED approval when installed on EU vessels or a valid type approval certificate when installed on other vessels.

The fire control plan of the vessel shall be updated to accurately describe the arrangement of fire safety equipment fitted onboard after the alteration.

Fire extinguishing or fire detection is not required inside the container but, if present, shall be connected to the ships systems.

The container is not suitable to handle dangerous goods.

Safety

H₂ detector(s) are to be installed where dangerous gas may be leaked. Audible & visual alarm shall be given at a manned location, and a shutdown of the BWTS shall be initiated by a safety system, which is independent of BWTS control system.

The vent of the TRO Drain Tank (TGDT) shall be located at a well-ventilated location to minimize the risk of H₂ accumulation.

Hazardous area / Ex-proof

The 40ft Containerized Solution for Tankers has been evaluated and found to be in compliance with DNV Rules Pt.4 Ch.8 Sec.11 for hazardous area installations.

The 40ft container is divided into two main compartments with one being a hazardous area, where the main BWTS equipment is installed, and the other being a non-hazardous area, where equipment such as electrical panels, control panels and neutralizing agent tank will be placed.

The following list of equipment shall be de-energized upon an event of loss of overpressure in the non-hazardous area and gas concentration exceeding 30% LEL:

- Transformer Rectifier 1 (T/R1)
- Transformer Rectifier 2 (T/R2)
- Distribution Board
- BWTS Standard Control Panel

Where the air lock protecting the non-hazardous space opens into a hazardous zone 1, electrical equipment located in the non-hazardous area of the container that are not of the certified safe type shall be automatically de-energized in case of loss of overpressure in the non-hazardous space. As an alternative to automatic disconnection based on loss of ventilation, automatic disconnection may be based on fixed gas detection within the protected space at a gas concentration exceeding 30% LEL. The gas detection equipment shall be located where gas may accumulate and/or in the ventilation outlets. Gas dispersal analysis or a physical smoke test shall be used to find the best arrangement. An alarm shall be activated upon automatic disconnection.

Where the air lock protecting the non-hazardous space opens into a hazardous zone 1, during initial start-up or after shut-down of the ventilation and before energizing any electrical equipment within the protected space, non-hazardous

space shall be purged and pressurized until the gas concentration does not exceed 30% of LEL. The purging and pressurization system shall be operable when the equipment in the protected space is de-energized. The pressurization system includes the pressurization control system, means of disconnection of electrical power, the system fan and its motor and gas detectors.

Ex-certification is not covered by this certificate. Installation in a hazardous area is to be approved in each case according to the Rules and Ex-certification / Special Condition for Safe Use, listed in a valid Ex-certificate issued by a notified/recognized Certification Body.

Type Approval documentation

The following documents by ERMA FIRST ESK Engineering Solutions S.A.: have been reviewed by DNV for approval:

- 40ft Containerized BWTS Solution – Technical Specifications, Document No. 201-09-0037, rev. 03
- 40ft Containerized BWTS Solution – Construction Drawing, Document No. 101-2008-001, rev. 04
- 40ft Containerized BWTS Solution – Piping & Instrumentation Diagram, Document No. 0000-70001-01, rev. 02
- 40ft Containerized BWTS Solution – Deckhouse Internal Wiring Diagram, Document No. 102-8001-033
- 40ft Containerized BWTS Solution – Lights & Fans Wiring Electrical Diagram, Document No. 102-8001-034, rev. 0
- 40ft Containerized BWTS Solution – Structural Fire Integrity Diagram, Document No. 0000-70001-207, rev. 04
- 40ft Containerized BWTS Solution – Fire Detection Diagram & Arrangement, Document No. 0000-70001-210, rev. 01
- 40ft Containerized BWTS Solution – Ventilation Diagram, Document No. 0000-70001-209, rev. 02
- 40ft Containerized BWTS Solution – Ex Equipment Table, Document No. 201-09-0036, rev. 01
- 40ft Containerized BWTS Solution – IS Calculation Report, rev. 0

Marking of product

Manufacturer name and containerized system type designation.

Periodical assessment

This TADC is based on a design assessment in accordance with DNV-CG-0550 Sec.3 [3.2.1].

Periodical assessment is not required.

Modifications/changes to the design shall be reported to DNV and TADC shall be updated accordingly.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>