Certificate no.:
TAF00001VD

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Waterbased Fixed Fire Extinguishing System

with type designation(s)
GTN (X-MIST)

issued to
Tanktech Co., Ltd.
Busan, **Republic of Korea**

is found to comply with
DNV statutory interpretations DNV-SI-0364 – SOLAS interpretations, Edition July 2021
DNV rules for classification – Ships
DNV offshore standards

Application:

Approved for use as fixed fire extinguishing system for machinery spaces and cargo pump rooms.

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

Issued at **Høvik** on **2024-02-08**
This Certificate is valid until **2029-02-07**.
DNV local unit: **Gimhae Station**

for **DNV**

Approval Engineer: **Helge Bjørnarå**

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

GTN (X-MIST),
is a water mist system composed of nozzles, stainless steel piping, sections valves and pump unit.

The system is to be designed in accordance with the "Principal Requirements for the System" in IMO MSC/Circ.1165 as amended.

Only the nozzles are type approved by this certificate. Pipes, couplings, valves and other systems components are subject to case-by-case approval.

Application/Limitation

Approved for use as fixed fire extinguishing system for machinery spaces and cargo pump rooms.

The nozzles are to be installed to the following specifications with one layer of ceiling mounted nozzles (including nozzles under every platform):

Volume and height of protected spaces	
Maximum ceiling height of protected space [1]:	7.3 m
Maximum volume of protected space [2]:	3200 m^3
Notes: 1) Standard casings need in general not to be considered when assessing this height limitation. 2) Net volume can be increased to 6400 m^3 based on IMO MSC.1/Circ.1385 as average time to extinguishment for the three fires with the longest extinguishing times is less than 10 minutes. This volume shall include bilges, casings, etc.	

Ceiling mounted nozzles (Type GTN)	
Maximum horizontal spacing:	2.0 m x 2.0 m
Maximum distance to bulkhead:	1.0 m
Maximum cover area per nozzle (average):	4.0 m^2
Minimum pressure at nozzle:	10.0 bar
Nozzle orientation:	Downwards
Nozzles should be fitted at ceiling level, maximum 300 mm below the deck head. Combustible materials or fire risk objects should not be located above the nozzles. A separate system for the bilges, approved according to IMO MSC/Circ.1165, is to be provided. Casings and areas under platforms and other similar obstruction shall be protected by additional nozzles. Nozzles are to be uniformly distributed throughout the space.	

Nozzle information:

Nozzle type	Application	K-factor [lpm/bar$^{1/2}$]	Flow [lpm]	Operating pressure [bar]	Drawing
GTN	Ceiling	4.7	14.9	10.0	GTN NOZZLE ASS'Y
Nozzles are made of stainless steel (STS316) and the maximum operating pressure is 16 bar.					

For all applications

A. The pumps (or pump unit) shall be delivered with product certificate, whereas other system components are to be certified or inspected in accordance with Class rules (or equivalent standard as specified by the Flag Administration).
B. Redundant pump arrangement is to be approved on a case-by-case basis.
C. Only stainless steel piping or equivalent corrosion resistant pipes are to be applied (to avoid clogging of nozzles). Primary water supply shall be a fresh water of potable quality.
D. Pipes, couplings and other components are regarded as “Class III” piping.
E. The pump unit and section valves shall be installed in a room having ambient temperature between 4 °C and 45 °C.

The following items are to be approved and filed by the Flag Administration for each project:

a. System arrangement plans including routing of pipes, location of nozzles, sections valves, release stations and water supply.
b. Documentation of power supply and control system.
c. Specification of pipes, motors, pumps, valves and associated components.
d. Pressure drop calculations and water mist capacity calculations.
e. Design, installation, operation and maintenance manual.

Other documents:

- Gas cylinders, gas pumps, any pipes above DN 50 mm, valves and couplings above DN 100 mm are to be delivered with product certificates (or standards considered by the Flag Administration to be equivalent).

- Documentation for other components (according to EN 3.1B and EN 2.2, as applicable) shall be submitted to the site representative of the Flag Administration.

Installation testing:
- System to be cleaned in accordance with routines outlined in makers installation manual.
- All sections should be tested with full flow of water through the nozzles.
- Manual release of all section valves and start of pumps shall be carried out.
- Alarms inside protected space and at a manned control stations and switchover to emergency power shall be tested.
- Other tests as required by Class rules (pressure testing of piping, etc.) and according to maker's manual shall be carried out.

Periodical testing:
- The periodical testing shall comply with instructions from flag administration, statutory interpretations and maker's maintenance manual.
- At least one section should each year be tested with full flow through the nozzles (not the same section each year).

Type Approval documentation
System manual Rev.0 dated 21 July 2023 from manufacturer.

Fire test report:
Test report No. R2023-0316E dated 25 August 2023 from FILK, Gyeonggi-do, Korea.

Component test report:
Test report No. R2023-0316E dated 25 August 2023 from FILK, Gyeonggi-do, Korea.

Drawings, nozzle:
Drawing "GTN NOZZLE DRAWING" Rev.0 dated 29 July 2023 from manufacturer.
Drawing "GTN NOZZLE ASS'Y" Rev.0 dated 29 July 2023 from manufacturer.

Tests carried out
Fire performance test in accordance with IMO MSC/Circ.1165 and IMO MSC.1/Circ.1269.

Component test in accordance with IMO MSC/Circ.1165 and IMO MSC.1/Circ.1269.

Marking of product
The nozzle is to be marked with type designation whereas pump / control unit is to be marked with name of manufacturer and type designation.

Periodical assessment
DNV's surveyor is to be given permission to perform Periodical Assessments at any time during the validity of this certificate and at least every second year. The arrangement is to be in accordance with procedure described in Class Programme DNV-CP-0338, Section 4