DNV·GL

Certificate No:
MEDB00000E9

EC-TYPE EXAMINATION CERTIFICATE

Application of: Council Directive 96/98/EC of 20 December 1996 on Marine Equipment as amended by directive 2014/93/EU, issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Directorate. This Certificate is issued by DNV GL AS under the authority of the Government of the Kingdom of Norway.

This is to certify:

That the Nozzles for equivalent water-mist fire extinguishing systems for machinery spaces and cargo pump rooms

with type designation(s)
HI-FOG MT4 System

Issued to
MARIOFF CORPORATION OY
Vantaa, Finland

is found to comply with the requirements in the following Regulations/Standards:
Annex A.1, item No. A.1/3.39 and Annex B, Module B in the Directive. SOLAS 74, Regulation II-2/10 & X/3, 2000 HSC Code 7 and FSS Code 7

Further details of the equipment and conditions for certification are given overleaf.

Høvik, 2015-12-03
for **DNV GL AS**

This Certificate is valid until
2020-12-02

Notified Body No.: **0575**

Vidar Dolonen
Head of Department

DNV GL local office:
Helsinki

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Surveyor

Job Id: **344.1-000388-13**
Certificate No: **MEDB00000E9**

Product description

"HI-FOG MT4 System"
"HI-FOG MT4 System" is a high pressure water mist system composed of nozzles, stainless steel piping, section valves and pump unit(s).

Only the nozzles are type approved by this certificate. Pipes, couplings, valves and other systems components are subject to case by case approval. The system is to be designed in accordance with the "Principal Requirements for the System" in IMO MSC/Circ. 1165.

The nozzles are manufactured by Marioff at Vantaa, Finland.

Application/Limitation

The nozzles are to be installed to the following specifications:

General	
Maximum ceiling height of protected space [1]:	11.0 m
Maximum volume of protected space [2]:	3300 m^3
The system is to be designed with one layer of ceiling mounted nozzles and one layer of bilge nozzles. Casings and areas under platforms and other similar obstruction shall be protected by additional nozzles. For areas of limited height, nozzles with lower installation height are recommended used. Distance between nozzle and ceiling should normally be between 0.1 to 0.3 m.	
Notes: 1) Standard casings need in general not to be considered when assessing this height limitation. 2) Net volume can be increased to 6600 m^3 (height remain at 11.0 m) based on IMO MSC.1/Circ.1385 as extinguishing time is within 10 min. This volume shall include bilges, casings, etc.	

Ceiling mounted nozzles (type 5S 1MC 8MC 1000):	
Maximum nozzle spacing	4.0 m
Maximum distance to bulkhead	3.75-4.0 m
Minimum average volumetric flow rate	0.14 lpm/m^3
Maximum average area coved by a nozzle	23 m^2
Minimum pressure at the nozzle	50 bar
Nozzle type:	5S 1MC 8MC 1000
Nozzle orientation:	Downwards

Bilge nozzles (type 3S 1MB 6MB 1000)	
Maximum nozzle spacing:	2.5 m
Maximum distance to bulkhead:	1.25 m
Maximum coverage area per nozzle (average):	6.25 m^2
Height of nozzle above tank top:	0.75 m [3]
Minimum operation pressure at nozzles:	35 bar
Nozzle type:	3S 1MB 6MB 1000
Nozzle orientation:	Downwards
Notes: 3) Installations on vessels with bilge plates higher or lower than 0.75 m will be considered case by case.	

Nozzle information

Sprinkler type	k-factor [lpm/bar$^{1/2}$]	Flow [lpm] 4)	Operating pressure [bar] 5)	Max installation height [m]	Data Sheet
5S 1MC 8MC 1000	3.9	27.6	50	11	TC0320
4S 1MC 8MB 1000	1.9	13.4	50	5 6)	TC0160
4S 1MB 6MB 1000	1.4	9.9	50	3 6)	TC0140
3S 1MB 6MB 1000	1.45	8.6	35	0.75	DOC000 2012A

Notes:
4) At applicable minimum operation pressure.
5) Pressure at nozzle.
6) Additional horizontal layer(s) of nozzles to be installed in a staggered pattern when used at height exceeding maximum installation height, but not exceeding 11 meters.

For all applications

A. The pump or pump unit shall be delivered with DNV GL product certificate, whereas other system components are to be inspected in accordance with DNV GL 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. The pump unit and section valves shall be installed in a room having ambient temperature between +4 degree C and +45 degree C;
D. Stainless steel piping and couplings or equivalent shall be applied. The primary water supply shall be fresh water (see maker's recommendations);
E. Pipes, couplings and other components are regarded as "Class I" piping.

The following items are to be approved and filed by the flag administration for each project:

i. System arrangement plans including routing of pipes, location of nozzles, sections valves, release stations and water supply;
ii. Documentation of power supply and control system;
iii. Specification of pipes, motors, pumps, valves and associated components;
iv. Pressure drop calculations and water mist capacity calculations;
v. Design, installation, operation and maintenance manual.

Installation testing:

- The periodical testing shall comply with instructions from flag administration, DNV GL Statutory Interpretations and maker's maintenance manual;
- All sections should be tested with full flow 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 DNV GL 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, DNV Statutory Interpretations and maker's maintenance manual;
- At least one section should each year be tested with full flow through the spray heads (not the same section each year).

Type Examination documentation

Type Approval Documentation Hi-Fog MT4 Systems dated June 2009.

Fire test reports:

- VTT Report RTE2580/05 dated 7 July 2005 (fire tests - 5S 1MC 8MC 1000)
- VTT Report RTE2184/05 dated 10 June 2005 (fire tests - 4S 1MC 8MB 1000)
- VTT Report VTT-S-2241-09 dated 30 March 2009 (fire tests - 3S 1MB 6MB 1000)

Component test reports:

- VTT Report RTE11340/95 dated 22 November 1995
- UL Report, EX4553 dated 30 November 1995
- DNV Report No. 98-1147 dated 25August 1998
- VTT Report RTE2025/02 dated 14 June 2002
- VTT Report VTT-S-4715-09 dated 25 June 2009

Tests carried out

Tested according to IMO MSC/Circ.1165 (fire and component tests).

Marking of product

The nozzles and other main component in the system are to be marked with type designation and MED Mark of Conformity.

Mark of Conformity

The manufacturer is allowed to affix the Mark of Conformity according to Article 11 in the Council Directive 96/98/EC on Marine Equipment and shall issue a Declaration of Conformity, only when the module D or E or F of Annex B in the same directive is fully complied with.

Module D: The quality system for production and testing shall be approved by the Notified Body.

Module E: The quality system for inspection and testing shall be approved by the Notified Body.

Module F: Compliance of the products to type as described in this EC Type-Examination Certificate must be verified by the Notified Body who also shall issue a Certificate of Conformity.