

# EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV GL AS under the authority of the Government of Norway.

## This is to certify:

**That the Sprinkler systems components for accommodation spaces, service spaces and control stations equivalent to that referred to in SOLAS 74 Regulation II-2/12**

with type designation(s)  
**HI-FOG 3000**

Issued to

**MARIOFF CORPORATION OY**  
**VANTAA, Finland**

is found to comply with the requirements in the following Regulations/Standards:

Regulation **(EU) 2019/1397**,

**item No. MED/3.9. SOLAS 74 as amended, Regulation II-2/7, II-2/9, II-2/10 & X/3, HSC Code 7, FSS Code 8, IMO MSC/Circ.912, IMO MSC/Circ. 1556 , IMO Res.MSC.44(65),IMO Res. A.800(19) as amended**

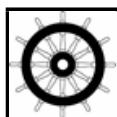
Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2025-07-01**.

Issued at **Høvik** on **2020-07-02**

DNV GL local station:  
**Finland CMC**

Approval Engineer:  
**Tessa Biever**



Notified Body  
No.: **0575**

for **DNV GL AS**

**Roald Vårheim**  
**Head of Notified Body**



The mark of conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-surveillance module (D, E or F) of Annex B of the MED is fully complied with and controlled by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representative in accordance with Directive 2014/90/EU.

This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV GL AS of any changes to the approved equipment. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.

Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.

**LEGAL DISCLAIMER:** Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

"HI-FOG 3000"

is an automatic, fast response sprinkler system composed of spray heads, stainless steel piping, sections valves, control systems, break tank, sprinkler pumps and accumulator unit.

The system is to be designed in accordance with the "Principal Requirements for the System" in IMO Res.A.800(19) as amended by IMO Res. MSC.265(84).

Only the spray heads are type approved by this certificate. Other components are to be approved and/or certified case by case.

## Application/Limitation

Approved for use as an automatic water sprinkler system for accommodation areas, public spaces, service spaces and store rooms.

Installation shall be in accordance with table 1, appendix 2, IMO Res. MSC. 265(84):

| Application                                  | Nozzle ID | Location | Projection | Spacing [m] | Dist. to wall [m] |
|----------------------------------------------|-----------|----------|------------|-------------|-------------------|
| Cabin, < 12 m <sup>2</sup> <sup>(1)</sup>    | DAV       | Ceiling  | Pendent    | Single      | Centre            |
| Cabin, < 17.55 m <sup>2</sup> <sup>(1)</sup> | DAG       | Ceiling  | Pendent    | Single      | Centre            |
| Cabin, < 28 m <sup>2</sup> <sup>(1)</sup>    | DAH       | Ceiling  | Pendent    | Single      | Centre            |
| Cabin, < 34 m <sup>2</sup> <sup>(1)</sup>    | DAM       | Ceiling  | Pendent    | Single      | Centre            |
| Corridor                                     | DAT       | Ceiling  | Pendent    | 5.0         | Centre            |
| Corridor                                     | DAR       | Ceiling  | Pendent    | 6.0         | Centre            |
| Public space (h < 2,5 m)                     | DAC       | Ceiling  | Pendent    | 3.85        | 1.95              |
| Public space (h < 2,5 m)                     | DAS       | Ceiling  | Pendent    | 5.3         | 2.65              |
| Public space (h < 5,0 m) <sup>(2)</sup>      | DAT       | Ceiling  | Pendent    | 4.75        | 2.375             |
| Public space (h < 5,0 m) <sup>(2)</sup>      | DAD       | Ceiling  | Pendent    | 5.3         | 2.65              |
| Storage areas                                | DAT       | Ceiling  | Pendent    | 3.35        | 1.675             |

(1) Cabin gross area, including wet unit. Net area excluding wet unit is 1.5 m<sup>2</sup> less.

(2) Ceiling height of more than 5 meter is subject to case by case approval.

| Nozzle type <sup>(1)</sup> | Nozzle ID <sup>(2)</sup> | k-factor [lpm/bar <sup>1/2</sup> ] | Min. Pressure [bar] | Flow [lpm]  | Data Sheet           |
|----------------------------|--------------------------|------------------------------------|---------------------|-------------|----------------------|
| DAVX-xxC                   | DAV                      | 1.12                               | 50                  | 7.9         | K0010724 p.7         |
| DAGX-xxC                   | DAG                      | 1.98                               | 50                  | 14.0        | K0010724 p.7         |
| DAHX-xxC                   | DAH                      | 3.75                               | 50                  | 26.5        | K0010724 p.7         |
| DAMX-xxC                   | DAM                      | 6.11                               | 50                  | 43.2        | K0010724 p.7         |
| DARX-xxC                   | DAR                      | 5.58                               | 50                  | 39.5        | K0010724 p.6         |
| DACX-xxC                   | DAC                      | 2.03                               | 50                  | 14.4        | K0010724 p.4         |
| DASX-xxC                   | DAS                      | 7.01                               | 50                  | 49.6        | K0010724 p.3         |
| DADX-xxC                   | DAD                      | 6.56                               | 50                  | 46.4        | K0010724 p.5         |
| DATX-xxC                   | DAT                      | 3.93                               | 40 / 50             | 24.9 / 27.8 | K0010724 p.2, 5 or 6 |

(1) xxC refers to bulb temperature.

(2) All nozzles to be of coating type D01.

### For all applications

- Minimum working pressure at the sprinkler heads is 50 bar, the maximum working pressure is 140 bar. For storage areas minimum working pressure at the spray heads is 40 bar.
- All nozzles are made of brass, and fitted with Job 2.5 mm, 57 °C (orange code) bulbs. Bulbs with higher temperature ratings, but not more than 30 °C over ambient temperature, are subject to approval in each case.
- 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).
- Redundant pump arrangement is to be approved on a case by case basis.

- E. Only stainless steel piping or equivalent corrosion resistant pipes are to be applied (to avoid clogging of sprinklers). Primary water supply shall be fresh water of potable quality.
- F. Pipes, couplings and other components are regarded as "Class I" piping.
- G. 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 location of sprinklers, pipes, sections valves, control system and pump-unit
- b. Specification of pipes, valves, electrical motor, pumps, pressurised tank(s) and associated components (including water supply specifications)
- c. Pressure drop calculations and water capacity calculations
- d. Arrangement of power supply and control system
- e. Manual containing installation, operation and maintenance instructions

#### Installation

- Water to be in accordance with manufacturer's specification for water quality. No chemicals shall be added to the water, for the purpose of e.g. cleaning, bacterial control, corrosion inhibition, etc., without the acceptance from the Manufacturer.

#### Installation testing:

- Not less than 2 sprinkler heads in each section shall be tested. Testing may be limited to 10 sections, i.e. 2 x 10 sprinkler heads if it is successful.
- Automatic start and stop of pumps.
- Automatic change over from main to emergency electric supply.
- Other tests as required by Class Rules (pressure testing of piping, etc.) and according to maker's manual.

#### Periodical testing:

- The testing shall comply with instructions from flag administration, Statutory Interpretations and maker's maintenance manual.
- Not less than 2 sprinkler heads shall be tested annually. Further testing will be required in case of failure(s) or for systems older than 5 years.

### **Type Examination documentation**

| Test Report No.                                        | Dated      | From                    | Test description                      |
|--------------------------------------------------------|------------|-------------------------|---------------------------------------|
| VTT-S-01483-15                                         | 2015-04-15 | VTT Expert Services Ltd | Sprinklers component test statement   |
| VTT-S-01475-15                                         | 2015-04-15 | VTT Expert Services Ltd | Sprinklers lateral discharge test     |
| VTT-S-01478-15                                         | 2015-04-08 | VTT Expert Services Ltd | Sprinklers impact test                |
| VTT-S-01440-15                                         | 2015-04-08 | VTT Expert Services Ltd | Sprinklers vibration tests            |
| VTT-S-01477-15                                         | 2015-04-08 | VTT Expert Services Ltd | Sprinklers cold tests                 |
| VTT-S-01256-15                                         | 2015-03-30 | VTT Expert Services Ltd | Stress corrosion test                 |
| VTT-S-04725-14                                         | 2014-10-15 | VTT Expert Services Ltd | Sprinklers clogging tests             |
| VTT-S-04708-14                                         | 2014-10-22 | VTT Expert Services Ltd | Sprinklers K-factor measurements      |
| VTT-S-04150-14                                         | 2014-09-11 | VTT Expert Services Ltd | Sprinklers functional tests           |
| VTT-S-03387-14                                         | 2014-07-03 | VTT Expert Services Ltd | Sprinklers functional tests           |
| Project<br>4786185179 and<br>4786185185 File<br>NC8784 | 2014-09-04 | UL LLC                  | Sprinklers Res. A.800 component tests |

Job Id: **344.1-000388-20**  
Certificate No: **MEDB00006R0**

|                                   |            |                         |                                                           |
|-----------------------------------|------------|-------------------------|-----------------------------------------------------------|
| VTT-S-05736-13                    | 2013-08-29 | VTT Expert Services Ltd | Fire Tests for Storage Areas                              |
| VTT-S-04671-14                    | 2014-10-15 | VTT Expert Services Ltd | Fire Tests for Accommodation                              |
| VTT-S-04670-14                    | 2014-10-15 | VTT Expert Services Ltd | Fire Tests for Public Spaces                              |
| MO/ES/39/DIOM/<br>IMO/14 Ver. 1.0 | October 14 | Marioff Corporation Oy  | Design, Installation, Operation and<br>Maintenance Manual |

### Tests carried out

Tested according to IMO Res. A.800(19) as amended by IMO Resolution MSC.265(84).

### Marking of product

The spray heads are to be marked with type designation, the MED Mark of Conformity, Notified Body No. and the year of manufacturing (see first page) whereas the pump unit is to be marked with name and address of manufacturer and type designation.