



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **F-20615**

This is to certify that the
Equivalent Sprinkler System

with type designation(s)
Heien-Larsen FlexiFOG micro Water Mist Fire Suppression System

Issued to
Autronica Fire and Security AS
NØTTERØY, Norway

is found to comply with
Det Norske Veritas' Interpretation of SOLAS 1974 Convention as Amended
Det Norske Veritas' Rules for Classification of Ships

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

This Certificate is valid until **2017-12-31**.

Issued at **Høvik** on **2013-12-09**

DNV local station: **Sandefjord**

Approval Engineer: **Martin Gjelstad**

for **Det Norske Veritas AS**

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Petter Langnes
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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Product description

"Heien-Larssen FlexiFOG micro Water Mist Fire Suppression System"

is an automatic fast response low-pressure water mist system of wet pipe type. The system is composed of sprinkler heads, stainless steel piping, sprinkler valves, control system, strainers, pumps and pressurized back-up tank.

The system is to be designed in accordance with "Principal Requirements for the System" as defined in IMO Res. A.800 (19) and as amended by IMO Resolution MSC.265(84). Only the sprinkler heads are type approved by this certificate. Other components are to be approved and/or certified case by case.

The sprinkler heads are manufactured by VID ApS, Svendborg, Denmark.

Application/Limitation

Installation should be in accordance with table 1, appendix 2, IMO Res. A.800 (19):

Protected area	Nozzle	Bulb	Projection	Max. spacing / coverage ¹⁾
Cabins ²⁾ , < 18 m ²	CA01	Job 2, 57 deg C	Pendant	One per room, centred
Corridors and stairways	CO01	Job 2, 57 deg C	Pendant	3.5 m spacing, centred ³⁾
Public spaces, ceiling (h < 2.5 m)	PS01	Job 2, 57 deg C	Pendant	4.0 m spacing
Public spaces, ceiling (h < 5.0 m)	PS02	Job 2, 57 deg C	Pendant	4.0 m spacing ⁴⁾
Storage areas	ST01	Job 2, 57 deg C	Pendant	4.0 m spacing

Notes:

- 1) Maximum distance to bulkheads should not exceed 1.5 m for public spaces and 2.0 m for storage. For cabins, the applications do only address the gross area.
- 2) Exclusive wet room unit.
- 3) Maximum width of corridor should not exceed 1.5 m.
- 4) Ceiling height of more than 5 meter is subject to case by case approval.

Sprinkler	Article number (*)	k-factor (lpm/bar ^{1/2})	Flow (lpm)	Pressure (bar)	Drawings (931028- and 940610-)
CA01	116-900800.XX	14.6	41.07	7.91	71211-487B
CO01	116-900810.XX	10.44	33	9.9	71121-475D
PS01	116-900820.XX	11	32.5	9	71213-490C
PS02	116-900830.XX	11.50	34.7	9	80220-525
ST01	116-900840.XX	21.67	65	9	80930-599A

* The suffix xx will be the temperature setting for the bulb (i.e. 57 = 57°C, 68 = 68°C etc)

For all applications

- A. Maximum system working pressure is 16 bars, while the minimum working pressure at the sprinkler heads is 9 bars for all application.
- B. Sprinkler heads to be installed in a pendant (downward) position.
- C. All nozzles are made of brass, and fitted with Job 2.0 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.
- D. The pumps (or pump unit) and gas cylinders shall be delivered with DNV product certificate, whereas other system components are to be certified or inspected in accordance with DNV Rules (or equivalent standard as specified by the Flag Administration).
- E. Redundant pump arrangement is to be approved on a case by case basis.
- F. 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.
- G. Pipes, couplings and other components are regarded as "Class III" piping.
- H. 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 submitted for approval for each project:

- i. System arrangement plans including location of sprinklers, pipes, sections valves, control system and pump-unit.
- ii. Specification of pipes, valves, electrical motor, pumps, pressurised tank(s) and associated components (including water supply specifications).
- iii. Pressure drop calculations and water capacity calculations.
- iv. Arrangement of power supply and control system.
- v. 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.
- Water from reservoir and all tested nozzles to be sampled and checked on board for compliance with manufacturer's specification for water quality. Dependent on the results, a further laboratory analysis of a sample from each failing section shall be conducted on shore.
- Automatic start and stop of pumps.
- Automatic change over from main to emergency electric supply.
- Other tests as required by DNV Rules (pressure testing of piping, etc.) and according to maker's manual.

Periodical testing:

- The testing shall comply with instructions from flag administration, DNV Statutory Interpretations and maker's maintenance manual.
- Full flow test of minimum 2 sprinklers shall be carried out each year. If any sprinkler fail to operate at the minimum operating pressure (pilot pressure), extended testing in accordance with DNV Statutory Interpretations, Appendix A to be performed. Select sprinklers shall not recently have been tested/replaced.
- Periodical flushing, control and inspection to be in accordance with maker's system description manual and DNV Rules.

Type Approval documentation

Certification in accordance with Standard for Certification No. 1.2, Type Approval, January 2013.

Autronica Fire and Security As Application for Type Approval Binder No. 1 of 1, Sprinkler system equivalent to that referred to in SOLAS Regulation II-2/10 in accordance with MSC Resolution 265(84).

Danish Fire Laboratories, Fire Performance Test Reports:
071004-15 dated 21 April 2008 (cabin and corridor)
080912-22 dated 5 November 2008 (shopping and storage)
081013-01 dated 24 November 2008 (component test)
081106-24 dated 1 December 2008 (public space)
090208-03 dated 8 February 2009 (component test)
090226-34 dated 4 March 2009 (corridor)
090320-35 dated 1 April 2009 (ventilation test)

Statements dated 18 February 2009 from Danish Fire Laboratories (playwood and drawings)

Tests carried out

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

Marking of product

The sprinklers are 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 Standard for certification No. 1.2 Type Approval Item 4.