

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Fixed Water Based Local Application System**with type designation(s)
Sinorix H2O Jet

Issued to

Siemens Schweiz AG
Zug, ZG, Switzerland

is found to comply with

DNV GL statutory interpretations DNVGL-SI-0364 – SOLAS interpretations
DNV GL rules for classification – Ships
DNV GL offshore standards**Application :****Approved for use as a fixed water based local application system for machinery spaces of category A.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2019-09-18**for **DNV GL**This Certificate is valid until **2024-09-17**.DNV GL local station: **France CMC**Approval Engineer: **Helge Bjørnarå****Mårten Schei-Nilsson**
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.



Job Id: **262.1-019448-5**
 Certificate No: **TAF000000J**
 Revision No: **2**

Product description

“Sinorix H₂O Jet”

is a low pressure, two-phase flow (water and nitrogen in a single tube) water mist local application system. The system is composed of three distinct parts; gas part, water part and gas and water part. The gas part consists of pressurized nitrogen cylinder(s), gas manifold, actuator, check valves, hoses and a distribution block. The water part consists of water tank(s), water manifold and pipes (hoses and pipes). The gas and water part consists of a mixing point, pipes and spray head type “BUCEFAO IMO”.

The system is to be designed according to principal requirements for the system, IMO MSC.1/Circ.1387 and SOLAS Ch.II-2, Reg.10.5.6.

Only the spray heads are type approved by this certificate. Cylinders/tanks, pipes, hoses, valves, couplings and other systems components are subject to case by case approval.

The spray heads are produced by Siemens SAS, Buc, France.

Application/Limitation

The spray heads are to be installed above the protected objects according to the following specifications:

Spray head type “BUCEFAO IMO” 1.6 mm diameter orifice	
Maximum horizontal spacing:	2 m
Approved height above protected object	3–5 m
Minimum pressure at spray head:	8.2 bar
Average percentage of mixed nitrogen (wt%):	6.5 ± 1.0 %
Spray head code:	A6E60200786
Spray heads are to be installed out to a position being at the periphery of the protected object (see IMO MSC.1/Circ.1387, annex 3.4.2.2). The spray heads are to be installed in a pendant (downward) position. Single spray heads or single rows are accepted when half spacing is used.	

Spray head type “BUCEFAO IMO” 1.6-2.4 mm diameter orifice (for asymmetric piping network)	
Maximum horizontal spacing:	2 m
Approved height above protected object	3–5 m
Minimum pressure at spray head:	8.2 bar
Average percentage of mixed nitrogen (wt%):	6.5 ± 1.0 %
Spray head code:	A6E60200786
Spray heads are to be installed out to a position being at the periphery of the protected object (see IMO MSC.1/Circ.1387, annex 3.4.2.2). The spray heads are to be installed in a pendant (downward) position. Single spray heads or single rows are accepted when half spacing is used.	

Spray head type “BUCEFAO IMO” 2.4 mm diameter orifice	
Maximum horizontal spacing:	2 m
Approved height above protected object	3–9 m
Minimum pressure at spray head:	7.3 bar
Average percentage of mixed nitrogen (wt%):	6.5 ± 1.0 %
Spray head code:	A6E60200786
Spray heads are to be installed out to a position being at the periphery of the protected object (see IMO MSC.1/Circ.1387, annex 3.4.2.2). The spray heads are to be installed in a pendant (downward) position. Single spray heads or single rows are accepted when half spacing is used.	

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Spray head information

Spray head	k-factor [lpm/bar ^{1/2}]	Flow [lpm]	Drawing no.
BUCEFAO-IMO 1.6 mm diameter orifice	17.4	17.8 at 8.2 bar	PLA A6E60200786
BUCEFAO-IMO 2.4 mm diameter orifice	41.0	27.8 at 7.3 bar	PLA A6E60200786
Spray heads are to be made of aluminium-bronze. Max. operating pressure is 12 bar			

For all systems:

- A. System components are to be inspected in accordance with the DNV GL Rules. High pressure gas pipes operating pressure (up-stream distribution block) is 100 bar (PN100). Low pressure gas pipes operating pressure (down-stream distribution block) is 27 bar (PN30). Water pipe operating pressure is 30 bar (PN30).
- B. Turbo machinery should also be covered by the system but with gentle application of water. Essential electrical equipment and air intakes should preferably not be directly exposed to the water discharge. Electrical equipment as per DNV GL Rules (Pt.4 Ch.8 Sec.10, Table 1) shall be applied for new buildings.
- C. The pressure cylinder shall be delivered with product certificate, whereas other system components are to be certified or inspected in accordance with DNV GL Rules.
- D. 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 spray heads, sections, release stations and pressure and tank unit(s), water supply, including any heating facilities for skid/unit room.
- ii. Specification of pipes, pressure cylinder, valves and associated components.
- iii. Pressure drop calculations and water mist capacity calculations
- iv. Final residual oxygen concentration must be checked (not to be less than 12%)
- v. Arrangement of power supply and control system.
- vi. Arrangement of interface to fire detection and alarm system (if applicable)
- vii. Manual with design, installation, operation, test and maintenance instructions

Installation testing:

- A 30 seconds water mist discharge is to be carried out for at least one section.
- Test of manual and remote release of all section valves and start of pumps.
- Testing of alarms (SOLAS Ch. II-2, Reg.10.5.6.4).
- Pressure testing of water pipe system to at least 1.5 times maximum working pressure.
- System to be cleaned in accordance with routines outlined in makers installation manual.
- Testing of automatic release of system (in case of unattended machinery spaces).
- 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, statutory interpretations and maker's maintenance manual.
- At least one section should each year be tested with full flow through the spray heads.

Type Approval documentation

Certification in accordance with Class Programme DNVGL-CP-0338, September 2018.

System manual No. "A6V10487810_en--_a" dated 2015-03-26 from Manufacturer

Fire Performance Test Reports:

Test Report No. SPFR F14115, version 2, dated 2015-04-10 from SP, Trondheim, Norway

Component Test Reports:

Test Report No. SPFR F15104, version 1, dated 2015-04-27 from SP, Trondheim, Norway

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Test Report No. SPFR 4P04340-03 dated 2015-04-24 from SP, Borås, Sweden
Test Report No. SPFR 5P00497-1 dated 2015-02-24 from SP, Copenhagen, Denmark
Test Report No. SPFR F15103, version 2, dated 2015-04-14 from SP, Trondheim, Norway
Test Report No. SPFR 5P00497-2 dated 2015-02-26 from SP, Copenhagen, Denmark
Test Report No. SPFR 4P04340-01 dated 2015-03-09 from SP, Borås, Sweden
Test Report No. 4786799250 dated 2015-07-25 from UL LLC, Northbrook, Illinois, USA

Tests carried out

Tested according to IMO MSC.1/Circ.1387.

Marking of product

The spray head is to be marked with type designation whereas skid/control unit is to be marked with name of manufacturer and type designation.

Periodical assessment

DNV GL'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 DNVGL-CP-0338, Section 4.