DNV·GL

Certificate No:
MED-B-10017
Item No:
A.1/3.39
Job Id:
344.1-002617-3

EC-TYPE EXAMINATION CERTIFICATE

Application of: Council Directive 96/98/EC of 20 December 1996 on Marine Equipment as amended by directive 2013/52/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)
FlexiFOG Total Flooding

Issued to
Autronica Fire and Security AS
Nøtterøy, Norway

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, 2015-06-12
for **DNV GL AS**

Marianne Strand Valderhaug
Head of Department

This Certificate is valid until
2020-06-02

Notified Body No.: **0575**

DNV GL local office:
Sandefjord

Piotr Orzechowski
Surveyor

The Certificate is subject to terms and conditions overleaf. Any significant changes in design or construction of the product, or amendments to the Directive or Standards referenced above may render this Certificate invalid. The product liability rests with the manufacturer or his representative in accordance with Council Directive 96/98/EC, as amended. The Mark of Conformity may only be affixed to the product and a Declaration of Conformity may only be issued when the production/product assessment module referred to in the council directive, is fully complied with.

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Product description

"FlexiFOG Total Flooding",
is a dry pipe water mist system with a 1% AFFF foam concentrate additive, composed of nozzles, galvanised steel piping, section valves, strainers and electrically driven pumps.

Only the nozzles are type approved by this certificate. Pumps, 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 M2 and M5 nozzles are manufactured by GW-Sprinkler AS, Glamsbjerg, Denmark.
The B1 nozzle is manufactured by VID Firekill, Svendborg, Denmark.

Application/Limitation

The nozzles are to be installed to the following specifications:

Volume and height of protected spaces	
Maximum ceiling height of protected space [1]:	10.1 m
Maximum volume of protected space [2]:	3348 m^3
The system is to be designed with one layer of ceiling mounted nozzles and one layer of bilge nozzles. Areas under platforms and other similar obstruction shall be protected by additional nozzles. For areas of limited height, nozzles with lower installation height (shorter spacing and less flow) are recommended used.	
Notes 1) Standard casings need in general not to be considered when assessing this height limitation. 2) This will in general be accepted as the maximum net volume for any protected space (corresponding to a typical gross volume of 3940 m^3). This volume shall include bilges, casings, etc.	

Ceiling mounted nozzles (type M5)	
Maximum horizontal nozzle spacing:	3.0 x 3.0 m
Maximum distance to bulkhead:	2.2 m
Maximum coverage area per nozzle (average):	13.3 m^2
Maximum ceiling height of nozzles:	10.1 m
Minimum pressure at nozzles:	10.7 bar
Nozzles type:	M5
Nozzle orientation:	Downwards
The nozzles are to be installed approximately 0.1 m below the deck head.	

Bilge nozzles (type B1)	
Maximum horizontal nozzle spacing:	4.0 m x 1.5 m
Maximum distance to bulkhead:	2.0 m x 1.5 m
Maximum coverage area per nozzle (average):	6.0 m^2
Height of nozzle above tank top:	0.30 – 0.60 m [1]
Minimum operation pressure at nozzles:	10.3 bar
Nozzle type:	B1
Nozzle orientation:	Horizontal
Notes 1) The bilge plate was located at 1.0 m in the fire test. Installations on vessels with bilges higher or lower than this arrangement will be considered case by case.	

Nozzle information				
Nozzle	**k-factor [lpm/bar$^{1/2}$]**	**Flow at operating pressure [lpm]**	**Operating pressure [bar]**	**Drawing no.**
M2	2.0	6.5	10.7 bar	900940-PDS-D
M5	4.76	15.6	10.7 bar	900930-PDS-D-TF
B1	2.80	9.0	10.3 bar	900950-PDS-A
The nozzles are to be made of naval brass. Maximum operating pressure is 16 bar.				

For all applications

A. The pumps shall be delivered with DNV product certificate, whereas other system components are to be inspected in accordance with DNV Rules (or equivalent standard as specified by the Flag Administration).
B. The back up 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. Piping and couplings shall be made of galvanised steel or equivalent material. The piping may be regarded as class III.
E. Water is to be applied continuously for at least 30 minutes at full pressure. AFFF foam concentrate is to be applied with 1% admixture to water after 7 minutes to both the ceiling and bilge nozzles. Foam concentrate for at least 22 minutes discharge is to be provided.

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, section valves, release stations, pump unit with back-up capacity and water supply
ii. Documentation of power supply and control system
iii. Specification of pipes, section valves, electrical motors, pumps and associated components
iv. Pressure drop calculations and water mist capacity calculations
v. Design, installation, operation and maintenance manual

Other documents:

- Pumps or pump unit are to be delivered with DNV GL 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:

- The periodical testing shall comply with instructions from flag administration, DNV Statutory Interpretations and maker's maintenance 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 DNV 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

Fire Performance Testing:

- SINTEF Report NBL F06118, November 2006
- DFL Report 070601-012, June 2007
- DFL Report 071205-016, March 2008

Component testing of nozzles:

- FM Approvals, Project 3013524, February 2002
- DFL Report 090109-02, January 2009

DFL Statement, September 2007
Toxic information / procedures for Sthamex AFFF, August 2007

Manuals for periodical testing, inspection and maintenance, issued by AFS

Tests carried out

Tested according to IMO MSC/Circ. 1165

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.