DNV·GL

Certificate No:
**MEDB00003ND**

# 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 Inside air high expansion foam systems for the protection of machinery spaces, cargo pump rooms, vehicle and ro- ro spaces, special category spaces and cargo spaces**

with type designation(s)
**SKUM Hotfoam System**

Issued to
## Tyco Fire Protection Products
**Great Yarmouth Norfolk, United Kingdom**

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2017/306,**
**item No. MED/3.61a. SOLAS 74 as amended Regulation II-2/10 and FSS Code 6**

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

This Certificate is valid until **2023-04-18**.

Issued at **Høvik** on **2018-04-19**

DNV GL local station:
**Newcastle-upon-Tyne**

Approval Engineer:
**Helge Bjørnarå**

Notified Body
No.: **0575**

for **DNV GL AS**

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

NORWEGIAN ACCREDITATION PROD 019

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 This certificate remains valid unless suspended, withdrawn, recalled or cancelled.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.



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Job Id: **344.1-007781-1**
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## Product description

"SKUM Hotfoam System"
is a fixed high-expansion inside air foam fire-fighting system consisting of foam generator(s), foam concentrate, water and foam pump(s), foam proportioner, steel distribution piping, strainer, valves, test and blow through lines, power and control system.

The system is accepted for use in machinery spaces, cargo-pump rooms and similar spaces. The system can also be used for ro-ro, special category and cargo spaces. The system is to be designed according to IMO FSS Code Ch.6 as amended by IMO Res. MSC.327(90) for fixed high-expansion inside air foam fire-fighting systems.

Only the foam generators are type approved by this certificate. All other system components are subject to case-by-case approval.

## Application/Limitation

The system shall be installed according to the below specifications:

| Volume of protected space | Minimum required filling rate |
|---|---|
| Up to 500 $m^3$ | 3.5 m per minute |
| Between 500 $m^3$ and 3000 $m^3$ | 1.75 + 0.0007 x (3000 – V) m per minute |
| Above 3000 $m^3$ 1) | 1.75 m per minute |

1) The filling rate may also be applied to systems for the protection of small spaces within protected machinery spaces having volumes less than test 3000 m3, such as workshops and similar spaces not containing combustion engines, boilers, purifiers and similar equipment (IMO MSC.1/Circ.1384, Annex, 7.1.3).

The inside air system is approved for use with the below specifications for the foam generators:

| | HG-15 | HG-25 |
|---|---|---|
| Foam production 1) | 6.1 $m^3$/min at 3.0 bar<br>11.4 $m^3$/min at 6.0 bar<br>7.8 $m^3$/min at 9.0 bar | 19.0 $m^3$/min at 2.6 bar<br>58.7 $m^3$/min at 6.1 bar<br>37.2 $m^3$/min at 9.1 bar |
| k-factor (Q = k x $p^{1/2}$) 1) | 12.7 lpm/$bar^{1/2}$ 3) | 38.1 lpm/$bar^{1/2}$ 3) |
| Premix consumption 2) | 23.3 lpm at 3.0 bar<br>31.8 lpm at 6.0 bar<br>37.8 lpm at 9.0 bar | 64.7 lpm at 2.6 bar<br>92.7 lpm at 6.1 bar<br>112 lpm at 9.1 bar |
| Expansion ratio 1) | 1:263 at 3.0 bar<br>1:360 at 6.0 bar<br>1:208 at 9.0 bar | 1:294 at 2.6 bar<br>1:633 at 6.1 bar<br>1:332 at 9.1 bar |
| Drawing | F12664 and F12665 | F12663 and F12668 |

1) Cold condition, fresh water
2) Solution of foam concentrate and water
3) At 6.0 bar

The following additional applications / limitations apply:

A. Nominal working pressure is 6.0 bar. Approved pressure range is 3-9 bar. Application of generators at a pressure above or below the approved pressure range is subject to case by case approval.
B. Only MED approved foam concentrate "SKUM HOTFOAM 2%" manufactured by Tyco shall be used.
C. With respect to cargo pump rooms, the system is approved for pump rooms which handle oil cargos only, the system cannot be applied for pump rooms which are also intended for alcohol cargos (polar solvents).
D. A strainer with maximum mesh openings of maximum 1.5 mm shall be fitted on the sea water pressure line before the foam proportioner (this to avoid clogging).
E. Pipes, couplings and other components are regarded as "Class III" piping.
F. Ambient room temperature for foam pump / foam container should be between 4 °C and 45 °C.
G. The pump(s) unit shall be delivered with product certificate, whereas other system components are to be inspected in accordance with Class Rules (or equivalent standard as specified by the Flag Administration).

The following items are to be submitted for approval for each project:

- System arrangement plans including location of generators, section valves, release stations, pumps, foam tank and foam proportioner.
- Documentation of power supply and control system.
- Specification of pipes, section valves, electrical motors, pumps, foam concentrate, foam tank, foam proportioner and associated components.
- Foam capacity calculations and pressure drop calculations, including actual pressure characteristic (pump curve) of water supply pump.
- Design, installation, operation (including emergency operation) and maintenance manual.

Installation testing:

- Pipes, valves and fittings and assembled systems shall be tested to the satisfaction of the Society.
- All distribution piping shall be blown through with air to ensure that the piping is free from obstructions.
- Function testing of the foam proportioner shall be performed as per its type approval certificate. A mixing range of 2-2.6% will normally be accepted. The mixing ratio shall be measured.
- Function testing of the power and control systems, water pump(s), foam pumps(s), valves, remote and local releases stations and alarms shall be carried out.
- Other tests as required by Class Rules (pressure testing of piping, etc.) and according to maker's manual shall be carried out.

Periodical testing:

- Every 3rd month: function test of water and foam pumps
- Annually (minimum): foam mixer to be function tested, with water and foam pumps running (or an equivalent test procedure)
- Annually: Distribution pipes shall be blow through with air annually and nozzles inspected for debris
- After 3 years and then annually: condition test for the foam concentrate
- Renewal survey: Distribution pipes should be flushed properly with fresh water and inspected to ensure that they are free from debris and not clogged

Test log and condition test report for foam concentrate shall be presented to the surveyor. Other tests may be required on a case by case basis.

## Type Examination documentation

Fire test reports:
No. 3P07570 dated 10 February 2014 from SP, Borås, Sweden

Component test reports:
No. 7P07781 dated 23 February 2018 from RISE, Borås, Sweden
No. 7P07781-01 dated 14 March 2018 from RISE, Borås, Sweden
No. 7P07781-02 dated 22 February 2018 from RISE, Borås, Sweden
No. 7P07781-03 dated 27 February 2018 from RISE, Borås, Sweden
No. 297672, Issue 2, dated 24 November 2014 from BRE, Watford Herts, UK

Drawings, foam generators:
No. F12664, Rev.01, dated 11 September 2017 from maker (HG15)
No. F12665, Rev.01, dated 25 October 2017 from maker (HG15)
No. F12663, Rev.01, dated 26 October 2017 from maker (HG25)
No. F12668, Rev.01, dated 26 September 2012 from maker (HG25)

## Tests carried out

The foam generators have been tested according to IMO MSC.1/Circ.1384, including selected items of IMO MSC/Circ.1165 and EN 13565-1.

## Marking of product

The foam generators and other main components in the system are to be marked with name of manufacturer, type designation and MED Mark of Conformity (see first page).