

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Inside Air Foam Fire Extinguishing System**with type designation(s)
KASHIWA Inside Air High Expansion Foam System

Issued to

Kashiwa Co., Ltd., Tsukuba Works
Bando Ibaraki Pref., Japanis 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 fixed foam fire extinguishing system for machinery spaces, cargo spaces, cargo pump-rooms (HC) and vehicle, special category and ro-ro spaces.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2017-05-19**This Certificate is valid until **2018-12-31**.for **DNV GL**DNV GL local station: **Yokohama**Approval Engineer: **Helge Bjørnarå**

Marte Eknæs Edvardsen
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.



Product description

"KASHIWA Inside Air Foam System",

consists of foam generators, foam concentrate as specified below and other system components like water and foam pumps, 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.

The generators are produced by Kashiwa, Tsukuba Works at Ibaraki, Japan.

Application/Limitation

The system shall be installed according to the below specifications:

Volume of protected space	Minimum required filling rate [m ³ /min]
Up to 500 m ³	2.1
Between 500 m ³ and 3500 m ³	$1.95 + 0.000050 \times (3500 - V)$
Above 3500 m ³	1.95 ¹⁾

- 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 3500 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:

	30MD/V2 (1/2F JJP)	60MD/V2 (3/4F JJP)
Foam production ¹⁾	14 m ³ /min at 2 bar 35 m ³ /min at 4 bar 44 m ³ /min at 6 bar	32 m ³ /min at 2 bar 70 m ³ /min at 4 bar 83 m ³ /min at 6 bar
k-factor ($Q = k \times p^{1/2}$) ¹⁾	8.43 lpm/bar ^{1/2} ³⁾	16.91 lpm/bar ^{1/2} ³⁾
Premix consumption ²⁾	37 lpm at 2 bar 50 lpm at 4 bar 63 lpm at 6 bar	74 lpm at 2 bar 100 lpm at 4 bar 125 lpm at 6 bar
Expansion ratio ¹⁾	1:700	1:700
Drawing	HAU-07587	HAU-07587

1) cold condition, fresh water

2) solution of foam concentrate and water

3) at 4 bar

The following additional applications/limitations apply:

- Nominal pressure is 4.0 bar. Approved pressure range is 2-6 bar. Application of generators at a pressure above or below the approved pressure range is subject to case by case approval.
- Only type approved foam concentrate "STHAMEX-SV-HT" (2 %) manufactured by Fabrik Chemischer Praeparate von Dr.Richard Sthamer GmbH & Co.KG shall be used.
- The foam generators shall be equally spaced in a horizontal plane at a level above the main and auxiliary engines. Generators shall also be arranged to cover other high-risk objects at all levels in the machinery spaces. Extra foam generators may be required in locations where the normally required generators have problem to reach due to obstructions like gratings, (semi-)tight bulkhead/decks, structures, etc.
- The generators shall have at least 1 m free space in front of the foam outlet without obstructions. Positions exposed to overpressure in case of boiler and crankshaft explosions shall be avoided as far as practicable. Foam generators shall be arranged to cover high-risk objects at all levels in the machinery spaces. Extra foam generators are required in locations not adequately covered by the normally required generators due to obstructions like gratings, (semi-)tight bulkhead/decks, structures, etc. The orientation of the generators shall be horizontally or vertically downwards.

- E. 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).
- F. A strainer with mesh openings of maximum 1.5 mm shall be fitted on the water supply line before the foam proportioner (this to avoid clogging).
- G. The system shall be fitted with DNV approved centralized foam mixing system of type "Pressure Direct Mixing system" incl. approved constant flow control valve. Ambient room temperature for foam mixing equipment/foam container should be between 4°C and 45°C.

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 DNV GL Rules and according to maker's manual.

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 foam the 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 Approval documentation

Certification in accordance with Class Programme DNVGL-CP-0338, October 2015.

Test reports No. 16-371(E) dated 25 January 2017 RIME, Japan
Drawing No.: HSA-00167, Rev.4 dated 8 May 2017 from Kashiwa CO., Ltd.

Test reports No. 09-183(E) dated 25 December 2009 RIME, Japan
Test reports No. 09-184(E) dated 22 October 2009 from RIME, Japan
Test reports No. 09-185(E) dated 22 October 2009 from RIME, Japan
Test reports No. 10-062(E) dated 21 May 2010 from RIME, Japan
Drawing No.: HAS-00337 dated 24 May 2010 from Kashiwa CO., Ltd.

Tests carried out

Tested according to IMO MSC.1/Circ.1271 in accordance with IMO MSC.1/Circ.1384, 3 and IMO MSC.1/Circ.1384.



Job Id: **262.1-007097-4**
Certificate No: **TAF00000NB**

Marking of product

The foam generators, foam mixer and other main components in the system are to be marked with type designation, whereas the main pump unit is to be marked with the name of manufacturer.

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.