DNV·GL

Certificate No:
TAF00000D7

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Waterbased Fixed Fire Extinguishing System

with type designation(s)
VID Fire-Kill K6 Pacific Fine Water Spray (ceiling), VID Fire-Kill K6 North Sea Fine Water Spray (ceiling), VID Fire-Kill K1 Biscay Water Mist (bilge), VID Fire-Kill F1 Tampa Water Mist (bilge)., VID Fire-Kill B1 Hudson (bilge), VID Fire-Kill B1 Bengal (bilge)

Issued to
Vid Fire-Kill ApS
Svendborg, Denmark

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 fixed fire extinguishing system for machinery spaces and cargo pump rooms.

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2021-08-10**.

Issued at **Høvik** on **2016-08-11**

for **DNV GL**

DNV GL local station: **Fredericia**

Approval Engineer: **Tomasz Werchowicz**

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.

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Product description

"VID Fire-Kill K6 Pacific Fine Water Spray" (ceiling), "VID Fire-Kill K6 North Sea Fine Water Spray" (ceiling), "VID Fire-Kill K1 Biscay Water Mist" (bilge), "VID Fire-Kill F1 Tampa Fine Water Spray" (bilge), "VID Fire-Kill B1 Hudson" (bilge) and "VID Fire-Kill B1 Bengal (bilge)"
are a dry pipe water mist system, composed of nozzles, stainless steel piping, section valves, strainers and electrically driven pumps.

Only the nozzles are type approved by this certificate.

The system is to be designed in accordance with IMO MSC/Circ. 1165 "Revised Guidelines for the Approval of Equivalent Water Based Fire-Extinguishing Systems for Machinery Spaces and Cargo Pump Rooms" as amended by MSC.1/Circ.1269 and MSC.1/Circ.1386. Pumps, pipes, couplings, valves and other systems components are subject to case by case approval

The nozzles are manufactured by Vid Fire-Kill Aps, Svendborg, Denmark.

Application/Limitation

The nozzles are to be installed to the following specifications:

Volume and height of protected spaces (K6 Pacific)	
Maximum ceiling height of protected space **1)**:	10.0 m
Maximum volume of protected space **2)**:	3842 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 4520 m^3). This volume shall include bilges, casings, etc.	

Volume and height of protected spaces (K6 North Sea)	
Maximum ceiling height of protected space **1)**:	10.0 m
Maximum volume of protected space **2)**:	2862 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) Volume can be increased to 5036 m^3 (height remain at 10.0 m) based on IMO MSC.1/Circ.1385. This volume shall include bilges, casings, etc.	

Ceiling mounted nozzles (K6 Pacific)	
Maximum horizontal nozzle spacing:	3.0 x 3.0 m
Maximum distance to bulkhead:	1.5 m
Maximum coverage area per nozzle (average):	9.0 m^2
Maximum ceiling height of nozzles:	10.0 m
Minimum pressure at nozzles:	8.0 bar
Nozzles type:	VID F-K K6
Nozzle orientation:	Downwards
The spray nozzles shall normally be installed approximately 0.1 - 0.2 m below deck. Where the spray nozzles are located less than 3 m above the protected object, a narrower nozzle spacing than 3 x 3 m or the use of spray nozzles intended for lower installation height should be considered. Arrangement to be approved case-by-case.	

Ceiling mounted nozzles (K6 North Sea)	
Maximum horizontal nozzle spacing:	3.0 x 3.0 m
Maximum distance to bulkhead:	1.5 m
Maximum coverage area per nozzle (average):	9.0 m^2
Maximum ceiling height of nozzles:	10.0 m
Minimum pressure at nozzles:	9.0 bar
Nozzles type:	VID F-K K6
Nozzle orientation:	Downwards
The spray nozzles shall normally be installed approximately 0.1 - 0.2 m below deck. Where the spray nozzles are located less than 3 m above the protected object, a narrower nozzle spacing than 3 x 3 m or the use of spray nozzles intended for lower installation height should be considered. Arrangement to be approved case-by-case.	

Bilge nozzles (K1 Biscay)	
Maximum horizontal nozzle spacing:	1.7 x 0.5 m
Maximum distance to bulkhead:	0.85 m
Maximum coverage area per nozzle (average):	0.43 m^2
Height of nozzle above tank top/floor level:	0.37 – 0.45 m [1)]
Minimum operation pressure at nozzles:	11.0 bar
Nozzle type:	VID F-K K1
Nozzle orientation:	Horizontal [2)]

Notes:

1) The bilge plate was located at 0.75 m in the fire test. Installations on vessels with bilges and nozzle higher or lower than these figures will be considered case by case.
2) Spacing between nozzles pointing the same direction is 0.5 m along the distribution pipe and 1.7 m between distribution pipes. Nozzles of two adjacent rows shall be installed pointing against each other. The nozzles along a row (distribution pipe) are installed with alternating pointing directions, thus with half spacing between them (0.25 m). The manufacturer's pre-fabricated N-pipe should be used as distribution pipe (consisting of a PN16 Stainless Steel pipe with prefabricated holes and threading for mounting of the K1 nozzles).

Bilge nozzles (F1 Tampa)	
Maximum horizontal nozzle spacing:	1.75 x 0.75 m
Maximum distance to bulkhead:	0.85 m
Maximum coverage area per nozzle (average):	0.66 m^2
Height of nozzle above tank top/floor level:	0.35 – 0.37 m [1)]
Minimum operation pressure at nozzles:	11.0 bar
Nozzle type:	VID F-K F1
Nozzle orientation:	Horizontal [2)]

Notes:

1) The bilge plate was located at 1.1 m in the fire test. Installations on vessels with bilges and nozzle higher or lower than these figures will be considered case by case.
2) Spacing between nozzles pointing the same direction is 0.75 m along the distribution pipe and 1.75 m between distribution pipes. Nozzles of two adjacent rows shall be installed pointing against each other. The nozzles along a row (distribution pipe) are installed with alternating pointing directions, thus with half spacing between them (0.375 m). The manufacturer's pre-fabricated N-pipe should be used as distribution pipe (consisting of a PN16 Stainless Steel pipe with prefabricated holes and threading for mounting of the F1 nozzles).

Bilge nozzles (B1 Hudson)	
Maximum horizontal nozzle spacing:	1.5 x 4.0 m
Maximum coverage area per nozzle (average):	6.0 m^2
Height of nozzle above tank top/floor level:	0.30 – 0.60 m[1)]
Minimum operation pressure at nozzles:	10.5 bar
Nozzle type:	B1
Nozzle orientation:	Horizontal[2)]

Notes:

1) The bilge plate was located at 1.0 m in the fire test. Installations on vessels with bilges and nozzle higher or lower than these figures will be considered case by case.
2) Spacing between nozzles pointing the same direction is 1.5 m along the distribution pipe and 4.0 m between distribution pipes. Nozzles of two adjacent rows shall be installed pointing against each other.

3) Approved STHAMEX AFFF foam concetrate (or equivalent) is to be applied with 1% admixture to water after 7 minutes of activating the system.

Bilge nozzles (B1 Bengal)	
Maximum horizontal nozzle spacing:	1.5 x 4.0 m
Maximum coverage area per nozzle (average):	6.0 m^2
Height of nozzle above tank top/floor level:	0.30 – 0.50 m 1)
Minimum operation pressure at nozzles:	6 bar
Nozzle type:	B1
Nozzle orientation:	Horizontal 2)

Notes:
1) The bilge plate was located at 1.1 m in the fire test. Installations on vessels with bilges and nozzle higher or lower than these figures will be considered case by case.
2) Spacing between nozzles pointing the same direction is 1.5 m along the distribution pipe and 4.0 m between distribution pipes. Nozzles of two adjacent rows shall be installed pointing against each other.
3) Approved FOMTEC AFFF foam concetrate (or equivalent) is to be applied with 1% admixture to water after system activation.

Nozzle information

Nozzle	Application	k-factor [lpm/bar$^{1/2}$]	Flow at operating pressure [lpm]	Operating pressure [bar]	Drawing no.
VID F-K K6 ***)** (Pacific)	Ceiling	5.6	15.84	8.0	100714-836 Rev.C
VID F-K K6 ***)** (North Sea)	Ceiling	5.6	16.80	9.0	100714-836 Rev.C
VID F-K K1 ****)** (Biscay)	Bilge	0.9	2.98	11.0	100303-807 Rev.B
VID F-K F1 ****)** (Tampa)	Bilge	1.1	3.7	11.0	120216-1043 dated 03.03.2010, 120216-1044 dated 27.06.2011
VID F-K B1 *****)** (Hudson)	Bilge	2.8	9.1	10.5	71203-478B Rev. B
VID F-K B1 *****)** (Bengal)	Bilge	2.8	6.85	6.0	71203 - 478B

***)** The nozzle is made of Naval brass + NiSn / AISI 316, and have a maximum rated pressure of 16 bar.
****)** The nozzle is made of Naval brass + NiSn / AISI 316 + AISI 303 housing, and have a maximum rated pressure of 16 bar.
*****)** The nozzle is made of Naval brass / SS316 and have a maximum rated pressure of 16 bar.

For all applications:

A. The pumps or pump unit and the pressure tank are to be delivered with DNV GL product certificate. Other system components are to be certified or inspected in accordance with DNV GL Rules.
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. Pipes, couplings and other components are regarded as "Class III" piping.
E. For nozzles F1 and K1 piping and piping components shall be made of stainless steel or equivalent material. For nozzles K6 and B1 piping and piping components can be made of of galvanised steel or equivalent material.
F. For nozzles F1 and K1 only fresh water shall be used in the system.
For nozzles K6 and B1 only water complying with maker's specification shall be used in the system. This includes testing and flushing operations.

The following items are to be approved and filed by the flag administration for each project:

- System arrangement plans including routing of pipes, location of nozzles, section valves, release stations, pump unit with back-up capacity and water supply.
- Documentation of power supply and control system.
- Specification of pipes, section valves, electrical motors, pumps and associated components.
- Pressure drop calculations and water mist capacity calculations.
- Design, installation, operation and maintenance manual.

Other documents:

- Pumps or pump unit are to be delivered with DNV GL product certificates.
- Documentation for other components (according to EN 3.1B and EN 2.2, as applicable) shall be submitted to the site representative of DNV GL.

Installation testing:

- System to be cleaned in accordance with the maker's specification, installation, operation and maintenance manual.
- Water to be sampled from the sprinkler tank, the pump unit and from a representative number of sections and tested for the relevant contaminations identified by maker's specification
- 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 GL Rules (pressure testing of piping, etc.) and according to maker's manual shall be carried out.

Periodical testing:

- The periodocal testing shall comply with instructions from flag administration, DNV GL Statutory Interpretations and maker's maintenance manual.
- Water to be sampled annually from sprinkler tank, pump unit and from a representative number of sections and tested for the relevant contaminations identified by maker's specification.
- Not less than 5 sprinkler heads shall be tested annually(not the same section each year). Further testing will be required in case of failure(s).

Type Approval documentation

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

Fire Performance Testing:

- Test report No. 110315-52 dated 21 March 2011,
- Test report No. 110630-55 dated 18 August 2012,
- Test report No. 111025-59 dated 28 October 2011,
- Test report No. 120308-65 dated 19 March 2012,
- Test report No. 71205-016 dated 31 March 2008,
- Test report No. 140229-136 dated 30 April 2014,

all from Danish Fire Laboratories (DFL), Svendborg, Denmark.

Component Testing:

- Test report No. 110414-1 dated 15 April 2011,
- Test report No. 110414-2 dated 24 August 2011,
- Test report No. 111004-7 dated 28 October 2011,
- Test report No. 120424-8 dated 30 April 2012,
- Test report No. 090109-2 dated 15 April 2011,
- Test report No. 141028-148 dated 3 December 2014,

all from Danish Fire Laboratories (DFL), Svendborg, Denmark.

Drawings from manufacturer:

- 100714-836 Rev.C dated 20 April 2012,
- 100303-807 Rev.B dated 03 March 2010,
- 120216-1043 dated 03 March 2010,
- 120216-1044 dated 27 June 2011,
- 71203-478E Rev.E dated 3 December 2014,
- 100714-839 Rev.G dated 28 November 2014.

Tests carried out

Fire performance testing according to IMO MSC/Circ.1165.
Component testing according to IMO MSC/Circ.1165, as amended by MSC.1/Circ.1269 Appendix A.

Marking of product

The nozzles and other main component in the system are to be marked with 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.