DNV·GL

Certificate No:
TAF0000027

TYPE APPROVAL CERTIFICATE

This is to certify:

That the CO2 System

with type designation(s)
MARINE CO2 FIXED FIRE SUPPRESSION SYSTEM

Issued to
Kidde Fire Protection
BENTHAM NR. LANCASTER, United Kingdom

is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Det Norske Veritas' Offshore Standards
Det Norske Veritas' Interpretation of SOLAS 1974 Convention as Amended

Application :

Approved for use as total flooding fire extinguishing system for machinery spaces and cargo holds.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2016-02-29**.

Issued at **Høvik** on **2015-12-18**

for **DNV GL**

DNV GL local station: **Manchester**

Approval Engineer: **Ragnar Tonjer**

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

"Marine CO2 fixed fire suppression system"

is a high pressure total flooding CO2 system for protection of machinery spaces, cargo holds and similar spaces. Control of the system is by pulling cable, pneumatic, electric or manual, as applicable.

Only the main system concept is approved by this certificate. Cylinders, valves, pipes, couplings and other systems components are subject to case by case approval. The system is to be designed in accordance with the IMO FSS Code Ch.5 and DNV Statutory Interpretations Solas Ch. II-2 (December 2010 edition).

Application/Limitation

This type approval certificate provides a general design acceptance for the components specified under the item "Type Approval Documentation". Each system shall be plan approved on an individual basis and inspected on board by a DNV GL surveyor.

For all applications

1. All CO_2 cylinders are to be certified according to Pt. 4 Ch.7 Sec.1, E401. Flexible hoses are to be DNV type approved.
2. All CO_2 piping upstream of master valve is to be certified in accordance with DNV Rules. Section valve(s) to be at least PN100.
3. All connections on high pressure side are to be of approved type. Restrictions apply to threaded connections (Pt.4 Ch.6 Sec.6, E200). Use of section valves with treads will be considered on a case by case basis for valves of sizes up to DN25.
4. An automatic time delay unit is to be installed for spaces that are expected to be manned occasionally.
5. Non-return valves or similar arrangement are to be fitted between the separate bottles and the manifold in order that a bottle, if necessary, can be disconnected from the battery without putting the whole installation out of action.
6. All systems installed on ships with keel laid on or after 1st July 2010 shall be delivered with a device ensuring sequential release. (IMO MSC 206(81)).
7. The pilot cylinders shall have capacity to operate the system three times even under unfavourable temperature conditions.

The following documentation is to be submitted in each case for plan approval:

1. The system layout showing operation philosophy and assembly of components.
2. Arrangement plan identifying position of nozzles, routing and dimension of piping and location of the release stations.
3. CO_2 capacity calculations for all protected spaces.
4. Time discharge calculations, as applicable. Isometric drawing are required in case the piping layout do not provide sufficient information.
5. Documentation of visual and audible alarms and specification of automatic time delay unit for spaces required to have such devices (spaces expected to be manned occasionally).
6. Specification and details of CO_2 manifold, including connections.
7. Specification of all components in the system, including CO_2 distribution piping and approvals for the flexible hoses.
8. Arrangements for closing of all ventilation and stopping of fans (can be submitted separately by the yard).
9. Each system is to be supplied with a manual for installation, use and maintenance.

Installation testing:

- Alarms inside protected space and at a manned control stations and switchover to emergency power shall be tested.
- Other tests as required by DNV Statutory Interpretations, SOLAS Ch.II-2 (pressure and tightness testing of piping, etc.) and according to maker's manual shall be carried out.

Periodical testing:

- A biennial (every 24 months) for passenger ships and at each intermediate, periodical or renewal survey for cargo ships, an inspection is to be carried out by a service supplier acceptable to DNV.
- The system should also be tested and inspected as specified by the DNV Rules and DNV Statutory Interpretations, reference is made IMO MSC/Circ. 850 and IMO MSC.1/Circ. 1318.

Type Approval documentation

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

Folder, "High Pressure Carbon Dioxide product manual, December 2004" from Kidde Fire Protection, with the following data sheets (Those products, which require to be type approved according to DNV Rules, require such documentation):

6,8, 22,7 and 45 kg cylinder & klem valve assembly	811-9004 Rev.2.
¾" Safety Outlet	811-9016 Rev.3
Multi-container racking	811-9020 Rev.2
High pressure CO2 system valve actuator	811-9031 Rev.2
25 mm bore cylinder check valve manifold	811-9022 Rev.2
32 mm bore cylinder check valve manifold	811-9023 Rev.2
Cable clamp assembly	811-9033 Rev.2
Lever link	811-9032 Rev.2
Klem cylinder valve	811-9038 Rev.1
Pilot loops & pilot bleed	811-9040/9040A Rev.2
CO2 Nozzle & Duct adaptor	811-9151 Rev.2
¾" to 2" P.O.D. valves 811-9067/9068/9071/ 9072/9075/9076/9079/9080 (Rev.3)/9083/9084 all Rev.2	
3", 4" & 6" P.O.D. valves	811-9090 Rev.2
CO2 discharge delay unit	811-9112 Rev.2
Universal pressure switch assy	811-9119 Rev.2
Pressure trip	811-9123 Rev.2
Nozzle, CO2, flanged horn	811-9139 Rev.2
Nozzle, CO2, with horn	811-9148 Rev.2
CO2 delay nozzle	811-9154
Manual pull box assy	811-9220 Rev.2
Check valve assy	426 Rev.2
CO2 Nozzle	418A Rev.2
Control head options	823-9250 Rev.4
Electric control head	823-9521 Rev.2
Electric & Pneumatic actuators	823-9522, A to C, Rev.2
Safety & Reset pin for manual release	823-9523 Rev.2
Pilot valve & cylinder assy	823-9524a Rev.2
Control head brackets	823-9524b Rev.2
Mounting bracket – control head	823-9524c Rev.2
Pilot tube connections to inlet of P.O.D. valves	841-5036 Rev.3
Typical arrangement – 3 cyl. group, simultaneous discharge	841-5025 Rev.2
Typical arrangement, cylinders & manifold	841-5027 Rev.2
Pilot loop	811-9040 Rev.2
Manifold drawings	K21207 Rev.14, K21209 Rev.14, K21211 Rev.14, K21213 Rev.15, K21215 Rev.12, K21217 Rev.12, K21219, Rev.12, K21221, Rev.12

Marking of product

The product or packing 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 DNVGL-CP-0338 Section 4.