

TYPE APPROVAL CERTIFICATE

This is to certify:**That the CO2 System**

with type designation(s)
HP Carbon Dioxide gas fire extinguishing system

Issued to

Kidde-Fenwal
Ashland MA, United States

is found to comply with
DNV GL rules for classification – Ships
DNV GL offshore standards
DNV GL statutory interpretations DNVGL-SI-0364 – SOLAS interpretations

Application :

Approved for use as a "total flooding" fire extinguishing system for machinery spaces, pump rooms and cargo holds.

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

Issued at **Høvik** on **2017-10-05**

This Certificate is valid until **2022-10-04**.

DNV GL local station: **New York**

for **DNV GL**

Approval Engineer: **Synnøve Bolstad Eri**

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Mårten Schei-Nilsson
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

"HP Carbon Dioxide gas fire extinguishing system"

is a total flooding system for protection of machinery spaces, pump rooms, 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 DNVGL-SI-0364 – SOLAS Interpretations for SOLAS Ch. II-2.

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 CO₂ cylinders are to be certified according to Pt.4 Ch.7 Sec.1, E. Flexible hoses are to be DNV type approved.
2. All CO₂ piping upstream of master valve are 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. Two pilot cylinders should in general be provided for systems with more than 25 CO₂ cylinders. All CO₂ cylinders are to be certified according to DNVGL-RU-SHIP Pt.4 Ch.7 Sec.1 [5]. Flexible hoses are to be of approved type.
8. 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. CO₂ 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 of all components in the system, including CO₂ distribution piping and approvals for the flexible hoses.
7. Arrangements for closing of all ventilation and stopping of fans (can be submitted separately by the yard).
8. 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 DNVGL-SI-0364 – SOLAS Interpretations for 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 GL.
- The system should also be tested and inspected as specified by the DNV GL Rules and DNVGL-SI-0364 – SOLAS 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.

Design, Instalation, Operation and Maintance Manual, dated November 2008 from Kidde Fire Systems.

Supplement to Marine Carbon Dioxide Version 2.4 Design, Installation, Operation and Maintance Manual Rev. DA No. P/N 81-220610-002 dated October 2013 from Kidde Fire Systems.

Data sheet no:

Drawing no:	Title:
Flexible hoses:	
81-252184-000, Rev. AG	Flexible Loop – 5/8" Hose, 1/2 NPT (Rubber Covered Hose)
WK-251821-000, Rev. NJ	Flexible Loop – 5/8" Hose, 3/4 NPT (Rubber Covered Hose)
4-9	Flexible Hose, 3/16" (P/N 06-118193-003)
Cylinders:	
WK-240517-000, Rev. EG	Cylinder 25 LB. CO2
WK-670790-000, Rev. FF	Cylinder 35 LB. Capacity
WK-600100-000, Rev. BD	Cylinder 50 LB. Carbon Dioxide
06-236228-001, Rev. AD	Cylinder 68 LB. CO2 NK GAS
WK-641620-000, Rev. SG	Cylinder 75 LB. Capacity (with collar)
WK-635010-000, Rev. TE	Cylinder 100 LB. with collar 1" I.P.S.
Valves:	
WK-283888-000, Rev. BE	Valve - 1/4" Ball Type Locked N.C. Position
81-890010-000, Rev. SB	Valve – Stop (3" Pipe)
WK-264985-000, Rev. AB	Valve – Check (1/4 – 18 NPT Female)
WK-261193-000, Rev. BA	Valve – Check (3/8 – 18 NPT)
81-8000327-000, Rev. AE	Valve – Check (1/2 In - Line)
81-800266-000, Rev. ED	Valve – Check (3/4" In - Line)
WK- 800443-000, Rev. BC	Valve – Check (1" In - Line)
81-800444-000, Rev. AC	Valve – Check (1 1/4" In Line)
81-870023-X00, Rev. PC	Assembly – Valve (1/2")
81-870022-X00, Rev. QC	Assembly – Valve (3/4")
81-870122-X00, Rev. PD	Assembly – Valve (1")
81-870032-X00, Rev. QC	Assembly – Valve (1 1/4")
WK-981372-000, Rev. BD	Valve – .50 Vertical Flood
WK-840253-000, Rev. NG	Valve – 5/8 Vertical Flood
81-803242-000, Rev. DB	Vertical Flood Valve Disc (3/4" I.P.S.)
81-872442-000, Rev. CL	Head – Discharge (Vertical Flood Valve)
81-870100-000, Rev. DC	Valve – Check industrial or marine, 3" Pipe
81-890208-000	Stop Valve – Single Seat (4" Pipe Industrial or Marine)
82-878737-X00, Rev. DC	Valve – Actuator (Pressure Operated)
Cylinders and Valves:	
81-870486-000, Rev. LE	Assembly – Cylinder & Valve (25 LBS CO ₂)
81-982547-000, Rev. NC	Assembly – Cylinder & Valve (35 LBS CO ₂)
81-982548-000, Rev. LC	Assembly – Cylinder & Valve (50 LBS CO ₂)
81-100067-00X, Rev. AE	Assembly – Cylinder & Valve (68 L DOT CO ₂ NK ASSY)

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81-870287-000, Rev. JF	Assembly – Cylinder & Valve (75 LBS CO ₂)
81-870269-000, Rev. KD	Assembly – Cylinder & Valve (100 LBS CO ₂)
Nozzles:	
81-930066-000, Rev. AB	Assembly – Vent Nozzle (.039 orifice, #1)
81-930067-000, Rev. EB	Assembly – Vent Nozzle (.057 orifice, #1+)
81-919309-000, Rev. HA	Assembly – Vent Nozzle (.076 orifice, #2)
81-803327-000, Rev. EA	Assembly – Vent Nozzle (.0925 orifice, #2+)
81-929242-000, Rev. HA	Assembly – Vent Nozzle (.108 orifice, #3)
81-803328-000, Rev. EA	Assembly – Vent Nozzle (.125 orifice, #3+)
81-915876-000, Rev. JA	Assembly – Vent Nozzle (.137 orifice, #4)
81-803329-000, Rev. EA	Assembly – Vent Nozzle (.159 orifice, #4+)
WK-21472X-000, Rev. DA	Nozzle - Vent
81-802974-00, Rev. CC 81-802990-000, Rev. CC	Multijet Nozzle – Flanged Type 'S' (1/2" Pipe)
81-803365-000, Rev. DB 81-803381-000, Rev. DB	Multijet Nozzle –Straight Type 'S' (1/2" Pipe)
81-842319-000 81-842333-000	Nozzle- Multijet Assy Intermediate Size Type – M 3/4" Pipe
Other:	
WK-890190-000, Rev. ND	Assy – Pneumatic Control
81-874290-000, Rev. FB	Release Pressure Operated
81-871071-000, Rev. VE	Assy – Discharge Delay
81-871072-00X, Rev. AC	Assy – Nitrogen Discharge Delay (30 & 60 Sec. Delay)
81-897636-000, Rev. DE	Discharge Delay (CO ₂ Pressure Operated Assy.) 60 second
81-967082-000, Rev. HC	Assembly – Line Discharge indicator & Vent
81-979469-000, Rev. ZD	Control Head
82-878751-X00, Rev. AE	Control Head (Lever or Pressure Operated)
90-981574-001, Rev. AB	Siren nitrogen pressure Operated

Marking of product

The product or packing is to be marked with name of manufacturer and type designation.

Periodical Assessments for Retention of the Type Approval Certificate

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.