

TYPE APPROVAL CERTIFICATE

This is to certify:

That the CO2 System

with type designation(s)
HIGH PRESSURE CO2 FIRE EXTINGUISHING SYSTEM

Issued to

Fitech Engineering Pte Ltd
SINGAPORE, Singapore

is found to comply with
DNV GL rules for classification – Ships
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.

This Certificate is valid until **2020-06-30**.

Issued at **Høvik** on **2016-06-03**

DNV GL local station: **Singapore**

for **DNV GL**

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.

Product description

"High Pressure CO₂ Fire Extinguishing System"

is a total flooding system for protection of machinery spaces, pump rooms, cargo holds and similar spaces. Control of system may be remote pneumatic, local pneumatic as applicable.

Only components mentioned under Type Approval documentation are approved by this certificate, others system 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 GL Statutory Interpretations Solas Ch. II-2.

The system is designed by Fitech Engineering Pte Ltd, Singapore.

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, 5.2. Flexible hoses are to be of approved type.
2. All CO₂ piping upstream of master valve is to be certified in accordance with DNV GL Statutory Interpretations. 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.9, 5.2). Use of section valves with threads 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 Res. 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. 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 and details of CO₂ manifold, including connections.
7. Specification of all components in the system, including CO₂ 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 GL 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 GL.
- The system should also be tested and inspected as specified by the DNV GL Rules and DNV GL 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.

Technical documentation dated 19 March 2008 (Content list) from Fitech Engineering Pte Ltd, Singapore.

Drawing no:	Title:
Flexible hoses:	
F01-04001 Rev 00	Discharge Flexible hose 1/2", 330 mm
F01-04002 Rev 00	Discharge Flexible hose 1/2", 650 mm
F01-04003 Rev 00	Actuation Flexible hose 3/8", 290 mm
F01-04004 Rev 00	Actuation Flexible hose 3/8", 320 mm
F01-04005 Rev 00	Actuation Flexible hose 3/8", 600 mm
Cylinders:	
F01-01010 Rev 00	CO2 Cylinder 68 L, pressure operated valve
F01-01011 Rev 00	CO2 Cylinder 68 L, handwheel valve
F01-01012 Rev 00	CO2 Cylinder 68 L, pull handle valve
F01-01013 Rev 00	CO2 Cylinder 40 L, handwheel valve
Section valves:	
F01-03010 Rev 00	CO2 Distribution valve, DN 25 -50
F01-03011 Rev 00	CO2 Distribution valve, DN 80 -125
Cylinder valves:	
F01-03003 Rev 00	CO2 Cylinder top valve, Pressure operated
F01-03001 Rev 00	CO2 Cylinder top valve, Handwheel type
F01-03006 Rev 00	CO2 Cylinder top valve, pull handle type
Other valves:	
F01-03007 Rev 00	Manifold check valve 3/4"
F01-03008 Rev 00	Ball valve DN 13 – 25 (flow control on manifold)
F01-03009 Rev 00	Three way valve 3/4" (on manifold for cargo hold CO2 systems)
F01-03012 Rev 00	Air/shore connection 1/2"
F01-03013 Rev 00	Safety valve 3/4"
F01-03014 Rev 00	Double non-return valve (on pilot actuation line)
F01-03015 Rev 00	Emergency release valve 3/4"
Manifold:	
F01-05003 Rev 00	Typical manifold pipe for one row cylinder
F01-05004 Rev 00	Typical manifold pipe for two rows cylinder
Nozzles:	
F01-10001 Rev 00	CO2 Discharge nozzle 1/2"
F01-10002 Rev 00	CO2 Discharge nozzle 3/4"
Other:	
F01-05005 Rev 00	Plug 3/8", for actuation line
F01-06001 Rev 00	Pneumatic actuator for distribution valve DN 25- 50
F01-06002 Rev 00	Pneumatic actuator for distribution valve DN 65 - 100
F01-06003 Rev 00	Pneumatic actuator for distribution valve DN 125- 150
F01-07001 Rev 01	Release cabinet with 2x2,68L pilot cylinders
F01-09001 Rev 00	Pressure gauge 1/2"
F01-11003 Rev 00	Electrical horn with flash
F01-11006 Rev 00	Air horn
F01-11009 Rev 00	Alarm bell, Ø100 mm



Job Id: **262.1-010463-2**
Certificate No: **TAF000006B**

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.