DNV·GL

Certificate No:
TAF00000WU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the CO2 System

with type designation(s)
Survitec High Pressure CO2 System

Issued to
Survitec Fire Solutions Poland Sp. z o.o.
Doluje, Poland

is found to comply with
DNV GL offshore standards
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 space 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 **2018-10-03**
This Certificate is valid until **2023-10-02**.
DNV GL local station: **Gdansk CMC**

Approval Engineer: **Marius Mørner**

for **DNV GL**

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.

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Product description

"Survitec High Pressure CO2 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 or local mechanical, 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 system. The following systems are approved in principle, other systems arrangement will have to be considered case by case. Each system shall be plan approved on an individual basis and inspected on board by a DNV GL surveyor.

Drawing no.	Drawing name
Cylinders	
50-01-084	Cylinder CO2, 13.4 L, seamless steel, ABS, LR, DNV
50-01-085	Cylinder CO2, 13.4 L, seamless steel, BV, GL + PI
50-01-086	Cylinder CO2, 2.68 L, US DOT-3AA
50-01-095	Cylinder CO2, 67.5 L, seamless steel, TPED, BV, RINA
50-01-099	Cylinder CO2, 68.1 L, seamless steel, DOT-3AA
50-01-100	Cylinder CO2, 80 L, seamless steel, DOT-3AA
50-01-105	Cylinder assembly CO2, 13.4 L, pressure operated valve, ABS, LR, DNV
50-01-111	Cylinder assembly CO2, 2.68 L, manual operated valve, type 449, US DOT-3AA/ATI
50-01-112	Cylinder assembly CO2, 13.4 L, manual operated valve, type 449
50-01-113	Cylinder assembly CO2, 13.4 L, manual operated valve, type 449, BV, GL + PI
50-01-181	Cylinder assembly CO2, 67.5 L, EN ISO 9809-1 w/PI, wire operated valve, type EU
50-01-190	Cylinder CO2, 80 L, seamless steel, TPED / EN-ISO 9809-1:2010
50-01-191	Cylinder assembly CO2, 80 L, TPED, pressure operated valve type 580
50-01-192	Cylinder assembly CO2, 80 L, TPED, manual operated valve type 449
50-01-401	Cylinder assembly CO2, 80 L, US DOT 3AA/ATI, pressure operated valve type 580
50-01-402	Cylinder assembly CO2, 68.1 L, US DOT 3AA/ATI, pressure operated valve type 580
50-01-405	Cylinder assembly CO2, 67.5 L, ISO 9809-1, pressure operated valve type 580
50-01-406	Cylinder assembly CO2, 68.1 L, TC-3AAM, pressure operated valve type 580
50-01-410	Cylinder assembly CO2, 80 L, US DOT 3AA/ATI, manual operated valve type 449
50-01-411	Cylinder assembly CO2, 68.1 L, US DOT 3AA/ATI, manual operated valve type 449
50-01-413	Cylinder assembly CO2, 67.5 L, ISO 9809-1, manual operated valve type 449
50-01-414	Cylinder assembly CO2, 68.1 L, TC-3AAM, manual operated valve type 449
Valves	
50-03-004	Screw down valve, type K46
50-03-008	Shore/air connection
50-03-009	Relief valve 3/4" BSP TR.
50-03-010	Check valve 3/4" BSP.T., w/seal
50-03-018	Pressure operated valve, type K85
50-03-020	Slow leak valve
50-03-024	Solenoid valve with filter
50-03-026	Wire operated valve
50-03-030	Screw down valve, for leakage indicator
50-03-040	Double non-return valve, short type
50-03-043	Pressure operated valve, type 580
50-03-044	Manual operated valve, type 449
50-03-046	Non-return valve for pneumatic time delay
50-03-047	Pressure operated valve, type 580 for leakage indicator
50-03-048	Manual operated valve, type 449 for leakage indicator

50-03-060	Ventilation valve for pilot line with slow leak function
50-03-070	Ball valve, DN20-50, PN 160, for pneumatic actuator
50-03-071	Ball valve, DN80, PN 100/160, for pneumatic actuator
50-03-072	Ball valve, DN150, PN 100, for pneumatic actuator
50-03-073	Ball valve, DN65 - DN100, PN 100/160, for pneumatic actuator, spring loaded
50-03-074	Ball valve, DN125, PN 100, for pneumatic actuator, spring loaded
50-03-075	Ball valve, DN150, PN 100, for pneumatic actuator, spring loaded
50-03-076	Ball valve, with spring-loaded seats, DN20-50, PN 160
Flexible hoses	
50-04-001	Flexible hose - discharge line, type 10/330
50-04-002	Flexible hose - pilot line, type 6/290
50-04-008	Flexible hose 20/400, eng scavenge air belt system
50-04-009	Flexible hose - pilot line, type 6/600
50-04-019	Flexible hose - discharge line, type 10/650
50-04-020	Flexible hose - pilot line, type 6/320 - 8
50-04-021	Flexible hose - pilot line, type 6/340 T8
Pipes and fittings	
50-05-003	Manifold pipe connections
50-05-006	Pipe dimension tables
50-05-007	Flange mounting set, PN 100
50-05-010	Manifold pipe w welded inlets, one row of cylinders, type B
50-05-013	Manifold pipe w flowdrill inlets, one row of cylinders, type A
50-05-015	Manifold pipe w welded inlets, two rows of cylinders, type D
50-05-016	Manifold pipe w flowdrill inlets, two rows of cylinders, type C
50-05-017	Cylinder and one row manifold assembly, arrangement for manifold type A, B, E and F
50-05-018	Cylinder and two rows manifold assy., arrangement for manifold type C, D, G and H
50-05-023	Plug brass 3/8" BSP with copper gasket
50-05-029	Flange mounting set, PN 160
50-05-031	Manifold pipe w welded inlets, one row of cylinders, type B, PN 160
50-05-032	Manifold pipe w welded inlets, two rows of cylinders, type D, PN 160
50-05-035	Plug brass 3/4" BSPT
50-05-037	Manifold pipe w flowdrill inlets, three rows of cylinders
50-05-038	Cylinder and three row manifold assembly
50-05-039	Manifold pipe DN 40 for 2 cylinders
50-05-042	Double nipple 1/2" BSPT M-1/2" BSPT M
50-05-060	Pipe wall thickness tables
50-05-061	1 cylinder CO2 cabinet manifold and distribution pipe
50-05-062	4 cylinders CO2 cabinet manifold and distribution pipe
50-05-063	7 cylinders co2 cabinet manifold and distribution pipe
50-05-064	9 cylinders co2 cabinet manifold and distribution pipe
Release arrangement	
50-07-052	Time delay unit for discharge line for 1, 2 & 3 cylinders
Nozzles	
50-09-001	Axial nozzle 1/2"
50-09-002	Axial nozzle 3/4"
Pressure gauges	
50-11-004	Pressure gauge/ø100, 0-160 bar & 0-16.0 MPa
50-11-005	Pressure gauge/ø100, 0-250 bar & 0-25.0 MPa
50-11-006	Pressure gauge/ø56, 0-160 bar & 0-16.0 MPa
50-11-007	Pressure gauge/ø60, 0-160 bar & 0-16.0 MPa

For all applications:

1. All CO_2 cylinders are to be certified according to Pt.4 Ch.7 Sec.1, 5.1.2. Flexible hoses are to be DNV GL type approved. CO_2 manifold to be supplied with DNV GL Product Certificate.
2. All CO_2 piping upstream of master valve are to be certified in accordance with DNV GL 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.9, 5.2). 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, with the possibility to override, 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. 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 and CO_2 cylinders.
3. CO_2 capacity calculations for all protected spaces.
4. Time discharge calculations, as applicable. Isometric drawing are required in case the piping layout does 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 CO_2 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 to IMO MSC.1/Circ.1432 and IMO MSC.1/Circ.1318.

Type Approval documentation

Certification in accordance with Class Programme DNVGL-CP-0338, October 2017.

WSE General Manual, GM-50-3, rev. 05 (first issued March 1995).

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.