



TYPE EXAMINATION CERTIFICATE (MODULE B)

Certificate No:
MERB00001WD
Revision No:
0

This Certificate is issued by DNV UK Limited based on authorisation of the Maritime & Coast Guard Agency (MCA) as an UK Approved Body to undertake conformity assessments on marine equipment in accordance with the requirements of the Merchant Shipping (Marine Equipment) Regulations 2016 as amended.

This is to certify:

That the Equivalent fixed gas fire extinguishing systems components (extinguishing medium, head valves and nozzles) for machinery spaces and cargo pump rooms

with type designation(s)
INERGEN Fire Extinguishing System

Issued to
Fire Eater A/S
Hillerød, Denmark

is found to comply with the requirements in the following Regulations/Standards:
Regulation **MSN 1874 Amendment 7**,
item No. UK/3.45. SOLAS 74 as amended Regulation II-2/10 & X/3, IMO MSC/Circ. 848, IMO MSC.1/Circ.1313, FSS Code 5, IGF Code 11 and 2000 HSC Code 7

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2026-11-14**.

Issued at **London** on **2023-06-13**

DNV local unit:
Sweden CMC



for **DNV UK Ltd.**

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MER Service Responsible



**Maritime &
Coastguard
Agency**

UK Approved Body Authorised
by the MCA

This certificate will not be valid if the manufacturer makes any changes or modifications to the approved type of equipment, which have not been notified to, and agreed with the approved body named on this certificate.
During the period of validity of this certificate the applicable regulations (international conventions and the relevant resolutions and circulars of the IMO) and testing standards may change, therefore the product conformity may need to be re-assessed by the Approved Body.
"The Mark of Conformity" may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-control phase module (D, E or F) of Schedule 2 of the Merchant Shipping (Marine Equipment) Regulations 2016, as amended is fully complied with and controlled by a written inspection agreement with an approved body. In case limitations of use apply, these should be indicated in the Annex.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

INERGEN Fire Extinguishing System,

is a fixed gas fire extinguishing system using fire extinguishing agent Inergen stored in cylinders and distributed through pipes and nozzles.

The extinguishing concentration and nozzles are covered by this type approval certificate. Documentation for the other system components shall be submitted and approved for each project.

The system is to be designed in accordance with the "Principal Requirements" in IMO MSC/Circ.848 as amended by IMO MSC.1/Circ.1267.

The gas is to be produced by a maker certified by Fire Eater.

Physical properties of extinguishing agent:

| | |
|---|--|
| Trade name | INERGEN® 52/40/08 (IG541) |
| Composition | Nitrogen (N2): 52% ± 10% Argon (Ar): 40% ± 10% Carbon Dioxide (CO2): 8% ± 5% |
| Design concentration (C) ¹⁾ | 46.2% |
| Design concentration ($V_{\text{agent}}/V_{\text{protected area}}$) ²⁾ | 0.620 |
| Physiological Effects, No Effect Level ³⁾ | 43% |
| Physiological Effects, Low Effect Level ³⁾ | 52% |

1) To be applied in conjunction with IMO MSC/Circ.848, 3.4.2.3.2.

2) When calculated at 20 °C. Ambient temperature to be determined case by case for each project

3) NOAEL/LOAEL equivalent

Application/Limitation

The design concentration (based on oil fuel) shall be minimum 46.2% (applied on a net volume) and the maximum agent discharge time shall be 120 seconds for 85% of design concentration. The extinguishing system shall be designed and installed according to SOLAS Ch. II-2, IMO MSC/Circ.848 as amended by IMO MSC.1/Circ.1267 and the makers manual.

The following additional limitations will apply:

- A. Inergen is approved for use in engine rooms, cargo pump rooms (hydrocarbon only) and similar spaces. This certificate does not address use of the system for protection of cargo holds and cargo handling spaces for other cargoes than oil (alcohol, LPG, LNG). This will have to be considered by the applicable Administration on a case-by-case basis.
- B. Evacuation time and warning procedures as per IMO MSC.1/Circ.1267, 6.2 should be considered for each project.
- C. Steel storage cylinders are available with sizes of 2 L to 80 L at 200 bar or 300 bar. Cylinders being 81 L or larger is only accepted when arrangements are provided on board to ensure that cylinders can be easily moved (even to shore) for service and recharging.
- D. Cylinders are to be delivered with product certificate or equivalent certificates acceptable to the Flag administration and Class.
- E. Cylinders to be located in a separate room in accordance with SOLAS Ch. II-2 Reg. 10.4.3 or distributed throughout the protected space in accordance with the requirements in IMO MSC/Circ.848 item 11 as amended by IMO MSC.1/Circ.1267. When distributed within the protected space, the agent concentration (after any single failure) shall be minimum 34.4%.
- F. Components in the system will be regarded as pressure class I with a maximum design pressure as per the hydraulic calculations for each project. Consideration will though be made for piping and couplings inside the protected space.
- G. Nozzle types 2104xx or 2105xx are to be used. These nozzles are made of brass or stainless steel and the initial pressure at the nozzles is typically 75 bar (and less than 20 bar after discharge of 85% of the agent).
- H. The nozzles are to be located in accordance with the Fire Eater Inergen Design, Installation, Operation and Maintenance Manual. The maximum coverage height for a row of nozzles is 5 m. Horizontally, a basic rule is that nozzles can be installed in:
 - a. a grid (360° nozzle - directed downwards) with maximum spacing of 8.0 m, or
 - b. vertically (180° nozzle), covering an area of maximum 5.0 m x 5.0 m
- I. Bilges (except open bilges in small volume engine rooms) are to be protected with a dedicated nozzle network.
- J. In no case should the design concentration exceed 52% (calculated on net volume at maximum expected ambient temperature).

The following documentation is to be submitted to the flag administration in each case:

- a. Plans showing location of cylinders, piping, nozzles and release stations as well as the assembled system.
- b. Capacity calculations, including hydraulic flow calculations.
- c. Plans defining release lines and alarm system.
- d. Material specification and dimensions for piping and specifications for all other components.
- e. Ship specific release procedures and post discharge ventilation procedures.
- f. Manual containing design, inspection, operation and maintenance procedures.
- g. Control arrangements for closure of openings and stop of fans and any pressure relief devices as per IMO MSC/Circ.848, item 13. These plans can also be supplied by yard.

Testing at installations and periodical surveys

- The system shall be tested as per maker's manual, flag administration and class requirements.
- The system is subject to biennial (every 2nd year) inspection by an approved service supplier. The attending surveyor will also apply requirement relevant for flag administration and/or class on newbuilding and ship in operation surveys.

Type Examination documentation

Test report "Fire extinguishing test with clean agent INERGEN" dated 5 August 1999 from DIFT, Copenhagen, Denmark.

INERGEN 200 & 300 bar Marine Approval Manual from Fire Eater A/S.

Ci UL FM manual dated 29th December 2015 from Fire Eater A/S.

Tests carried out

Tested according to IMO MSC/Circ.776 (IMO MSC/Circ.848 and IMO MSC.1/Circ.1267).

Marking of product

The nozzles and other main components in the system are to be marked with name and address of manufacturer, type designation and the UK Mark of Conformity (see first page).