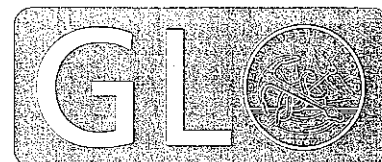


Type Approval Certificate



This is to certify that the undernoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No. 86 231 - 09 HH

Company Macron Safety Systems (UK) Ltd.
Burlingham House
Hewett Rd, Gapton Hall Industrial Estate
Great Yarmouth, Norfolk NR31 ONN, UK

Product Description Fixed gas fire extinguishing system using FK-5-1-12 ("NOVEC-1230")
(FSS Code Ch. 5/2.5; equivalent to that referred to in SOLAS 74 II-2/7/63)

Type NOVEC-1230

Environmental Category None

Technical Data /
Range of Application Extinguishing gas: FK-5-1-12 (NOVEC-1230)
Min./max. design concentration of extinguishing gas: 5.85 % / 10.0 %
Max. discharge time for 95 % of the design concentration: 10 sec

Main components:

GL approved gas cylinders with associated cylinder valves, release cabinet, audible / visual alarm, time delay unit, piping and discharge nozzles.

Discharge nozzles:

- Max. coverage height: 5 m
- Max. coverage area radius of 180° nozzle: 10.9 m
- Max. coverage area radius of 360° nozzle: 6.9 m

Fixed gas fire extinguishing system for machinery spaces, cargo pump rooms and spaces with similar fire hazards.

Test Standard MSC/Circ.848, as amended by MSC.1/Circ.1267

Documents - Macron Safety Systems, Novec-1230 design manual no. 14A-06M/T, issue date 2009-10, reviewed with our ref.-no. 09-156125
- Tyco Safety Products, type approval documentation reviewed in 2004
- USCG test report no. HAI Project #5087 of July 2002

Remarks System previously certified for the parent company "Tyco Safety Products" under certificate no. 24352-04 HH.

Valid until 2014-11-24

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Type Approval Symbol



File No. II.H.01

Hamburg, 2009-11-24

Germanischer Lloyd

Georg-Alexander Martin

Michael Kämpf

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CONDITIONS:

1. Installation of the system on board vessels is subject to acceptance / approval by the competent flag state Administration.
2. The total system to be in compliance with the principal requirements of IMO MSC/Circ.848, as amended by MSC.1/Circ.1267. Besides, the GL Rules are to be observed.
3. Prior to fitting on board, the following details are to be submitted to GL Head Office for approval for each installation:
 - operational diagram of the system,
 - capacity and hydraulic calculations,
 - release arrangements and nozzle arrangement drawings.
4. Prior to commissioning, each installation is subject to inspection and testing in presence of a Surveyor to Germanischer Lloyd in acc. with the manufacturers' specification.

PERIODICAL PRODUCTION AUDITS:

Germanischer Lloyd is to be given the permission to perform periodical production audits at any time during the validity of this certificate.

Valid until 2014-11-24

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Type Approval Symbol



File No. II.H.01

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Germanischer Lloyd

Georg-Alexander Martin

Michael Kämpf

This certificate is issued on the basis of "Guidelines for the Performance of Type Approvals Part 1, Procedure".