



Confirmation of Product Type Approval 20/OCT/2010

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product.

This is to certify that, pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 08/JUL/2014. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until 03/JUN/2014 subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

TYCO SAFETY SYSTEMS (MACRON SAFETY SYSTEMS LTD) Model Name(s): NOVEC 1230

Presented to:

TYCO SAFETY SYSTEMS (MACRON SAFETY SYSTEMS LTD)
BURLINGHAM HOUSE
GAPTON HALL INDUSTRIAL ESTATE
GREAT YARMOUTH
United Kingdom

Intended Service:

For use in the protection of Category A Machinery Spaces, Cargo Pump Rooms, Emergency Generator Rooms, Flammable Liquid Stores, Cargo Auxiliary Rooms (compressor rooms) and Pump Rooms of LNG / LPG carriers and other areas of high risk on Ships.

Description:

Total Flood NOVEC 1230 Fixed Gas Fire Extinguishing System, equipment comprising of high pressure cylinders (nominal pressure 25 bar at 20 deg C), valve assembly, system actuation units, nozzles, associated equipment and electrical components and electronic equipment.

Ratings:

Ratings in accordance with Tyco Novec 1230 Design Manual 14A-06M/T, issue 02, dated 2009-10. (1) The minimum design concentration for net volume total flooding of Machinery Spaces and Pump Rooms is 5.85% v/v minimum at the lowest expected minimum ambient operating temperature (not greater than 0 deg C) and a maximum design concentration of 10% v/v (NOAEL) at 50 deg C. (2) Maximum fill density of agent storage is 1.442 kg/litre. (3) Cylinder pressure at 20 deg C equals 25 bar and maximum cylinder pressure at 50 deg C equals 28 bar. (4) Horizontal nozzle spacing is not to exceed 8 meters for 360 degree nozzle or 11 meters for 180 degree nozzle. (5) Vertical nozzle spacing is not to exceed 5 meters. (6) Minimum nozzle pressure is to be 5.5 bar. (7) Where the system is installed in cargo pumping, compressor, cargo auxiliary spaces the volume of released extinguishing agent is to be not less than 7.2% for LNG carriers and 6.5% for LPG carriers.

Service Restrictions:

(1) When calculating the net volume of a protected space, the net volume should

include the bilge volume, the volume of the casing and the volume of the free air contained within the air receivers that may in the event of a fire be released into the protected space. (2) The objects that should be subtracted from the gross volume of the space include, but are not necessarily limited to; Auxiliary Machinery; boilers; condensers; evaporators; main engines; reduction gears; tanks and trunks isolated from the protected space. (3) 95% of the extinguishing agent is to be discharged in 10 seconds. (4) The maximum quantity of agent to be discharged from each nozzle is 100 Kg. (5) The distribution piping is to have a minimum wall thickness as per 4-7-3/Table 2 of the ABS Rules. (6) ABS Certification is to be provided for each cylinder, inclusive of main and pilot cylinders, and be made available to the attending Surveyor when the system is to be installed. (7) ABS Certification is to be provided for each manifold and be made available to the attending Surveyor when the system is to be installed. (8) Burst test certificates for the flexible hoses are to be made available to the attending Surveyor. (9) The equipment covered in the type approval includes control boxes and time delay units. However, in each installation, the system arrangement indicating the following details are to be submitted to the ABS technical department: (a) The system layout showing operation philosophy; (b) The manifold(s) design and pipe scantling details; (c) Capacity calculations and Flow calculations in accordance with requirements of the Tyco Manual; (d) Control Panel schematics, wiring diagrams and cable specifications showing cable layout, alarm circuitry and location; (e) Locations of the principle system components and release boxes; (f) Dimensions and material of shipyard pipework; (g) Control arrangements for the closing of all ventilation and stopping fans within the protected space prior to any discharge. (10) The system should be supplied by both the main and emergency sources of power, with the emergency power supply being provided from outside the protected space. (11) The facility to ventilate the protected space from a power source other than that within the protected space is to be available. The shipyard/owner is to be advised of this at the earliest opportunity. (12) Automatic actuation will not be permitted. (13) Alarms are to sound for a period of at least 20 seconds prior to the release of the agent. (14) Suitable warning of the possible products of agent decomposition is to be posted at the release station and personnel advised not to enter. (15) Unit Certification is not required for this product. If the manufacturer or purchaser's request an ABS Certificate for compliance with a specification or standard, the specification or standard, must be clearly defined.

Comments:

The following are to be determined for each application as per the Rules/Codes/Standards mentioned below: (1) Storage of extinguishing medium within the protected space is discouraged. Such arrangements should be considered only after all alternatives have been evaluated. (2) It should be noted that NOVEC 1230 is not for the protection of ships cargo holds. (3) After discharge the integrity of the space protected is to be maintained to prevent the decomposition products from migrating to adjacent spaces. (4) After extinguishment, a minimum agent hold time of 15 minutes must be maintained. (5) Boundary cooling of the space may be required. (6) Suitable warnings should also be posted to say that the integrity of the space is to be maintained after release of the agent and that the products of decomposition and combustion are not to be ventilated into areas where personnel could be present. (7) When fire fighting conditions are severe and total thermal decomposition of the product is possible, the re-entry teams should wear self-contained breathing apparatus, personal protective clothing and protective suits suitable for the hazards likely to be encountered. (8) Before ventilating the protected space it must be ensured that the fire is completely extinguished. (9) When ventilating the protected space of products of combustion, care should be taken to allow smoke, decomposition products, etc., to clear the vessel away from personnel, muster stations and embarkation areas. (10) If the system is to be of the modular type, i.e. with the cylinders distributed within the machinery space, acceptance of the agent by the appropriate Flag Administration will be required.

Notes / Documentation:

This Product Design Assessment (PDA) is valid only for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

Term of Validity:

This product/model is covered under Product Design Assessment (PDA) Certificate # 04-LD372681/3-PDA, dated 04/Jun/2009. This PDA Certificate expires 03/Jun/2014. It will remain valid for 5 years from date of issue or until the Rules or

specifications used in the assessment are revised (whichever occurs first). It is valid for all vessels contracted on or before the date of the Rules used in this evaluation.

ABS Rules:

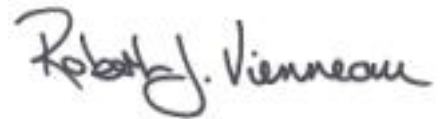
2009 Steel Vessel Rules 1-1-4/7.7, 4-6-2/7, 4-7-1/1, 4-7-2/1.1.1(i) and 4-7-3/3.1

National Standards:**International Standards:**

IMO MSC/Circ.848 as amended by MSC.1/Circ. 1267, IMO SOLAS 74/78 and Amendments Reg. II-2/5.1, IMO SOLAS 2000 Amendments Reg. 10.4 & 10.5, IMO FSS Code.

Government Authority:**EUMED:****Others:**

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	04-LD372681/3-PDA	04/JUN/2009	03/JUN/2014


ABS Programs

ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.