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RESOLUTION A.602(15)
adopted on 19 November 1987

REVISED GUIDELINES FOR MARINE PORTABLE FIRE EXTINGUISHERS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING FURTHER that it adopted by resolution A.518(13) the Guidelines for Marine Portable Fire Extinguishers to supplement the requirements of chapter II-2 of the International Convention for the Safety of Life at Sea, 1974, as amended, as well as chapter V of the Torremolinos International Convention for the Safety of Fishing Vessels, 1977,

RECOGNIZING the need to improve these Guidelines in the light of experience gained,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-third session,

1. ADOPTS the Revised Guidelines for Marine Portable Fire Extinguishers, the text of which is annexed to the present resolution and which supersedes the Guidelines annexed to resolution A.518(13);
2. RECOMMENDS Governments concerned to apply the Revised Guidelines set out in the Annex, in conjunction with the appropriate requirements of the above instruments.

ANNEX

REVISED GUIDELINES FOR MARINE PORTABLE FIRE EXTINGUISHERS

1 SCOPE

These Guidelines have been developed to supplement the requirements for marine portable fire extinguishers* in the International Convention for the Safety of Life at Sea, 1974, and the Torremolinos International Convention for the Safety of Fishing Vessels, 1977. The Guidelines are offered to Administrations to assist them in determining appropriate design and construction parameters. The status of the Guidelines is advisory. Their content is based on current practices and does not exclude the use of designs and materials other than those indicated below.

2 DEFINITIONS

2.1 An "extinguisher" is an appliance containing an extinguishing medium which can be expelled by the action of internal pressure and be directed into a fire. This pressure may be stored pressure, or be obtained by a chemical reaction, or be obtained by release of gas from a cartridge.

2.2 A "portable extinguisher" is one which is designed to be carried and operated by hand and which in working order has a total weight of not more than 23 kg.

2.3 "Extinguishing medium" is the substance contained in the extinguisher the action of which causes extinction of fire.

2.4 "Charge of an extinguisher" is the mass or volume of the extinguishing medium contained in the extinguisher. The quantity of the charge of water or foam extinguishers is normally expressed in volume (litres) and that of other types of extinguishers in mass (kilograms).

* Wherever in the text of these Guidelines the word "extinguisher" appears it shall be taken as meaning "marine portable fire extinguisher".

3 CLASSIFICATION

Extinguishers are classified according to the type of extinguishing medium they contain. At present the types of extinguishers and the uses for which they are recommended are as follows:

Extinguishing medium	Recommended for use on fires involving
Water	wood, paper, textiles and similar materials
Foam	wood, paper, textiles and flammable liquids
Dry powder/dry chemical (standard)	flammable liquids, electrical equipment and flammable gases
Dry powder/dry chemical (multiple or general purpose)	wood, paper, textiles, flammable liquids, electrical equipment and flammable gases
Dry powder/dry chemical (metal)	combustible metals
Carbon dioxide	flammable liquids, electrical equipment and flammable gases
Halogenated hydrocarbons (Halon)	flammable liquids, electrical equipment and flammable gases

A table is provided in the appendix which describes the general characteristics of each type of extinguisher.

4 CONSTRUCTION

4.1 The construction of an extinguisher should be designed and manufactured for simple and rapid operation, and ease of handling.

4.2 Extinguishers should be manufactured to a national or other recognized standard which includes a requirement that the body, and all other parts subject to internal pressure, be tested to a pressure above the maximum

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expected during the service life of the extinguisher. In the design of components, selection of materials and determination of maximum filling ratios and densities, consideration should be given to the temperature extremes to which extinguishers may be exposed on board ships.

4.3 The materials of construction of exposed parts and adjoining dissimilar metals should be carefully selected to function properly in the marine environment.

5 FIRE CLASSIFICATIONS

Fire classifications are generally A, B, C and D. There are currently two standards, defining classes of fires according to the nature of the material undergoing combustion, as follows:

International Organization for Standardization (ISO standard 3941)*	National Fire Protection Association (NFPA 10)
Class A: Fires involving solid materials, usually of an organic nature, in which combustion normally takes place with the formation of glowing embers.	Class A: Fires in ordinary combustible materials such as wood, cloth, paper, rubber and many plastics.
Class B: Fires involving liquids or liquefiable solids.	Class B: Fires in flammable liquids, oils, greases, tars, oil base paints, lacquers, and flammable gases.
Class C: Fires involving gases.	Class C: Fires which involve energized electrical equipment where the electrical non-conductivity of the extinguishing medium is of importance. (When electrical equipment is de-energized, extinguishers for class A or B fires may be used safely).
Class D: Fires involving metals.	Class D: Fires in combustible metals such as magnesium, titanium, zirconium, sodium, lithium, and potassium.

* Comité Européen de Normalisation (CEN standard-EN2) closely follows ISO standard 3941.

6 TEST SPECIFICATIONS

Construction, performance and fire-extinguishing test specifications should be to the satisfaction of the Administration.

7 CRITERIA FOR ASSESSING COMPLIANCE WITH REGULATION II-2/6.1.1 OF THE 1974 SOLAS CONVENTION AND REGULATION 81(1) OF THE 1977 TORREMOLINOS CONVENTION

7.1 Regulation II-2/6.1.1 requires that extinguishers have a fire extinguishing capability at least equivalent to that of a 9 litre fluid extinguisher which may be water or foam as required by the Administration. This equivalence may be demonstrated by fire test ratings determined according to an international, national or other recognized standard.

7.2 The size and type of extinguishers should be dependent upon the potential fire hazards in the protected spaces. Care should also be taken to ensure that the quantity of extinguishing medium released in small spaces does not endanger personnel.

8 MARKING OF EXTINGUISHERS

Each extinguisher should be clearly marked with the following minimum information:

- .1 name of the manufacturer;
- .2 types of fire for which the extinguisher is suitable;
- .3 type and quantity of extinguishing medium;
- .4 approval details;
- .5 instructions for use and recharge (it is recommended that operating instructions be given in pictorial form);
- .6 year of manufacture;

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.7 temperature range over which the extinguisher will operate satisfactorily;

.8 test pressure;

9 PERIODICAL INSPECTIONS AND MAINTENANCE

9.1 Extinguishers should be subject to periodical inspections and maintenance in accordance with the manufacturer's instructions. The periods between such inspections and maintenance should not exceed the period between safety equipment surveys.

9.2 Records of inspections should be maintained. The records should show the date of inspection, the type of maintenance carried out, and whether or not a pressure test was performed.

9.3 Instructions for recharging extinguishers should be supplied by the manufacturer and be available for use on board.

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	TYPES OF EXTINGUISHER						
	Water		Chemical foam	Mechanical foam	Powder	Carbon dioxide	Halogenated hydrocarbons
	Water, with possible salts in solution	Basic water solution	Basic water solution with foam generating substances	Water solution containing foam generating substances	Dry chemical powders	Pressurized carbon dioxide	Halogenated hydrocarbons
Extinguishing medium used:							
Expellant charge of the extinguisher (stored pressure or cartridge as indicated):	One basic and one acid reagent; in general the basic reagent is a solution of sodium bicarbonate and the acid reagent is a solution of sulphuric or hydrochloric acid or of aluminium sulphate	Carbon dioxide or other pressurized inert gases or compressed air (storage pressure or separate cartridge)	Solution of sulphuric or hydrochloric acid or aluminium sulphate	Water solution and acid reagent (e.g. solution of aluminium sulphate)	Carbon dioxide or other pressurized inert gases or compressed air (stored pressure or separate cartridge)	-	-
The discharge of the extinguisher is achieved by:	Opening of the valve. Generation of carbon dioxide (chemical reaction which develops inside the extinguisher)	Opening of the valve. Action of pressurized gas (opening of the cartridge)	Opening of the valve. Generation of carbon dioxide (chemical reaction between the acid in the cartridge and the basic solution of the charge)	Opening of the valve. Generation of carbon dioxide (chemical reaction between the acid solution in the cartridge and the basic solution of the charge)	Opening of the valve. Action of pressurized gas (opening of the cartridge)	Opening of the valve of the container constituting the extinguisher	Opening of the valve of the container constituting the extinguisher
The discharged extinguishing medium consists of:	Water, with possible salts in solution	Water with salts in solution	Foam containing carbon dioxide	Foam containing the gas used	Dry chemical powders and carbon dioxide or other gas	Carbon dioxide	Halogenated hydrocarbons
The discharged extinguishing medium causes the extinction of fire by:	Cooling of the burning materials. Water evaporation and consequent formation of a local atmosphere (water/steam) which isolates the burning products from the surrounding air		Formation of a foam layer which isolates the burning products from the surrounding air		Inhibition of the combustion process by interrupting the chemical reaction. Some separation of burning materials from surrounding air	Formation of a local inert atmosphere (carbon dioxide) which isolates the burning materials from the surrounding air. Smothering and cooling action of carbon dioxide	Inhibition of the combustion process by interrupting the chemical reaction

	TYPES OF EXTINGUISHER							
	Water			Chemical foam	Mechanical foam	Powder	Carbon dioxide	Halogenated hydrocarbons
	Very low	Very low	Very low	Low	Low	Very high. Under intense heat some powders may be electrically conductive	Very high	Very high
The electrical resistance of the discharged extinguishing medium is:								
Operating peculiarities and limitations:	The jet of the extinguisher is to be directed towards the base of the fire The extinction of the fire is achieved only when all the burning surface is covered by foam.					Powder mixture subject to windage; they may therefore have reduced effectiveness in the open or in ventilated spaces.	Gas, subject to windage; they therefore have limited effectiveness in the open or in ventilated spaces.	Halon 1211 and 2402 are normally discharged as liquids whereas halon 1301 is normally discharged as a gas. When discharged as a gas, subject to windage, it has limited effectiveness in the open or in ventilated spaces. Caution should be exercised in selection of type of halogenated hydrocarbons and size of unit particularly if used in accommodation spaces. Avoid use in small enclosed spaces when persons are present inside the spaces.
Disadvantages and dangers:	Not to be used where there are electrical hazards					Generated powder mixtures may be suffocating. Powder can damage electrical contacts.	Carbon dioxide may be suffocating.	Halogenated hydrocarbons may be toxic at concentrations higher than limitations stated in regulation 11-2/5 of the 1974 SOLAS Convention as amended or when decomposed by pyrolysis.

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	TYPES OF EXTINGUISHER					
	Water	Chemical foam	Mechanical foam	Powder	Carbon dioxide	Halogenated hydrocarbons
Maintenance	Extinguishers with copper or copper alloy body should not be polished with products of corrosive nature which may cause wall thickness reduction. Such extinguishers should preferably be painted externally.			Some types of powder may be altered by humidity; therefore, avoid the refilling of the extinguisher in humid locations.		
	The charge can freeze at temperatures of about 0°C (unless the charge is made non-freezable chemically).					
	Avoid installing the extinguisher in excessively warm locations, where the internal pressure of the carbon dioxide in the cartridge might rise to very high values.		The charge can freeze at about -5°C. The charge can be altered by elevated temperatures (about 40°C or more). Therefore, the extinguisher should not be installed in positions where it may be exposed to high or low temperatures.			
					When a carbon dioxide container is provided, avoid the installation of the extinguisher in excessively warm locations, where the internal pressure of the carbon dioxide in the container might rise to very high values.	

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