

**Resolution A.951(23)**  
*Adopted on 5 December 2003*  
*Agenda item 17)*

**IMPROVED 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 ALSO that, by resolution A.602(15), it adopted the Revised guidelines for marine portable fire extinguishers, to supplement the relevant requirements of chapter II-2 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, as well as chapter V of the Torremolinos International Convention for the Safety of Fishing Vessels, 1977,

RECOGNIZING the need to further improve the said Revised guidelines following of the adoption of amendments to chapter II-2 of the 1974 SOLAS Convention and of the 1993 Torremolinos Protocol to the 1977 Torremolinos Convention referred to above, and in the light of the experience gained from the application of the Revised Guidelines,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its seventy-fifth session,

1. ADOPTS the Improved guidelines for marine portable fire extinguishers, the text of which is set out in the annex to the present resolution;
2. RECOMMENDS Governments concerned to apply the annexed Improved guidelines in conjunction with the appropriate requirements of the international instruments referred to above;
3. AUTHORIZES the Maritime Safety Committee to keep the Improved guidelines under review and amend or extend them as necessary;
4. REVOKES resolution A.602(15).

Annex

**IMPROVED GUIDELINES FOR MARINE PORTABLE FIRE EXTINGUISHERS**

**1 SCOPE**

These Guidelines have been developed to supplement the relevant requirements for marine portable fire extinguishers\* of the International Convention for the Safety of Life at Sea 74, as amended, the International Code for Fire Safety Systems (FSS Code) and the 1993 Torremolinos Protocol relating to 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.

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\* Wherever in the text of these Guidelines the word “portable extinguisher” appears it should be taken as meaning “marine portable fire extinguisher”.

## 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 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 which is discharged to cause 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).

## 3 CLASSIFICATION

**3.1** 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<br>Water with additives                                                | wood, paper, textiles and similar materials                                           |
| Foam                                                                         | wood, paper, textiles and flammable liquids                                           |
| Dry powder/dry chemical<br>(standard/classes B, C )                          | flammable liquids, electrical equipment and flammable gases                           |
| Dry powder/dry chemical<br>(multiple or general purpose/<br>classes A, B, C) | wood, paper, textiles, flammable liquids,<br>electrical equipment and flammable gases |
| Dry powder/dry chemical (metal)                                              | combustible metals                                                                    |
| Carbon dioxide                                                               | flammable liquids and electrical equipment                                            |
| Wet chemical for class F or K                                                | cooking grease, fats or oil fires                                                     |
| Clean agents*                                                                |                                                                                       |

**3.2** 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 recognized national or international standard\*, which includes a requirement that the body, and all other parts subject to internal pressure, be tested:

- .1** to a pressure of 5.5 MPa or 2.7 times the normal working pressure, whichever is the higher, for extinguishers with a service pressure not exceeding 2.5 MPa; or
- .2** in accordance with the recognized standard for extinguishers with a service pressure exceeding 2.5 MPa.

\* Refer to the recommendations by the International Organization for Standardization, in particular Publication ISO 7165:1999, *Fire-fighting – Portable fire extinguishers – Performance and construction*.

**4.3** 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 and operating temperature ranges specified in the recognized standards.

**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

**5.1** Fire classifications are generally indicated as A, B, C, D and F (or K). There are currently two standards, defining classes of fires according to the nature of the material undergoing combustion, as follows:

| <b>International Organization for Standardization<br/>(ISO standard 3941)*</b>                                                                                | <b>National Fire Protection Association<br/>(NFPA 10)</b>                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Class A:</b> Fires involving solid materials, usually of an organic nature, in which combustion normally takes place with the formation of glowing embers. | <b>Class A:</b> Fires in ordinary combustible materials such as wood, cloth, paper, rubber and many plastics.                                                                                                                                                 |
| <b>Class B:</b> Fires involving liquids or liquefiable solids.                                                                                                | <b>Class B:</b> Fires in flammable liquids, oils, greases, tars, oil base paints, lacquers and flammable gases.                                                                                                                                               |
| <b>Class C:</b> Fires involving gases.                                                                                                                        | <b>Class C:</b> 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.) |
| <b>Class D:</b> Fires involving metals.                                                                                                                       | <b>Class D:</b> Fires in combustible metals such as magnesium, titanium, zirconium, sodium, lithium and potassium.                                                                                                                                            |
| <b>Class F:</b> Fires involving cooking oils.                                                                                                                 | <b>Class K:</b> Fires involving cooking grease, fats and oils.                                                                                                                                                                                                |

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

## 6 TEST SPECIFICATIONS

**6.1** Construction, performance and fire-extinguishing test specifications should be to the satisfaction of the Administration, having due regard to an established international standard\*.

## 7 CRITERIA FOR ASSESSING COMPLIANCE WITH CHAPTER 4 OF THE FSS CODE AND REGULATIONS V/20 AND V/38 OF THE 1993 TORREMOLINOS PROTOCOL RELATING TO THE 1977 TORREMOLINOS CONVENTION

**7.1** Chapter 4 of the FSS Code requires that extinguishers have a fire-extinguishing capability at least equivalent to that of a 9 ℓ fluid extinguisher having a rating of 2A on class A fire 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\*.

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\* Refer to the recommendations by the International Organization for Standardization, in particular Publication ISO 7165:1999, *Fire-fighting – Portable fire extinguishers – Performance and construction*.

**7.2** The size and type of extinguishers should be dependent upon the potential fire hazards in the protected spaces while avoiding a multiplicity of types. 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**

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

- .1** name of the manufacturer;
- .2** types of fire and rating 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, in addition to explanatory text in language understood by the likely user);
- .6** year of manufacture;
- .7** temperature range over which the extinguisher will operate satisfactorily; and
- .8** test pressure.

## **9 PERIODICAL INSPECTIONS AND MAINTENANCE**

**9.1** Extinguishers should be subject to periodical inspections in accordance with the manufacturer's instructions and serviced at intervals not exceeding one year.

**9.1.1** At least one extinguisher of each type manufactured in the same year and kept on board a ship should be test discharged at five-yearly intervals (as part of a fire drill).

**9.1.2** All extinguishers together with propellant cartridges should be hydraulically tested in accordance with the recognized standard or the manufacturer's instruction at intervals not exceeding ten years.

**9.1.3** Service and inspection should only be undertaken by, or under the supervision of, a person with demonstrable competence, based on the inspection guide in table 9.1.3.

**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** Extinguishers should be provided with a visual indication of discharge.

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

Table 9.1.3 – Inspection guide

| <b>ANNUAL INSPECTION</b>                         |                                                                                                                                                                                                                                           |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety clip and indicating devices               | Check to see if the extinguisher may have been operated.                                                                                                                                                                                  |
| Pressure-indicating device                       | Where fitted, check to see that the pressure is within limits. Check that dust covers on pressure-indicating devices and relief valves are in place.                                                                                      |
| External examination                             | Inspect for corrosion, dents or damage which may affect the safe operation of the extinguisher.                                                                                                                                           |
| Weight                                           | Weigh the extinguisher and check the mass compared to the fully charged extinguisher.                                                                                                                                                     |
| Hose and nozzle                                  | Check that hoses and nozzles are clear and undamaged.                                                                                                                                                                                     |
| Operating instructions                           | Check that they are in place and legible.                                                                                                                                                                                                 |
| <b>INSPECTION AT RECHARGE</b>                    |                                                                                                                                                                                                                                           |
| Water and foam charges                           | Remove the charge to a clean container if to be re-used and check if it is still suitable for further use. Check any charge container.                                                                                                    |
| Powder charges                                   | Examine the powder for re-use. Ensure that it is free flowing and that there is no evidence of caking lumps or foreign bodies.                                                                                                            |
| Gas cartridge                                    | Examine for damage and corrosion                                                                                                                                                                                                          |
| <b>INSPECTION AT FIVE AND TEN YEAR INTERVALS</b> |                                                                                                                                                                                                                                           |
| <b>INSPECTION AFTER DISCHARGE TEST</b>           |                                                                                                                                                                                                                                           |
| Air passages and operating mechanism             | Prove clear passage by blowing through vent holes and vent devices in the cap. Check hose, nozzle strainer, discharge tube and breather valve, as applicable. Check the operating and discharge control. Clean and lubricate as required. |
| Operating mechanism                              | Check that the safety pin is removable and that the lever is undamaged.                                                                                                                                                                   |
| Gas cartridge                                    | Examine for damage and corrosion. Weigh the cartridge to ascertain that it is within prescribed limits.                                                                                                                                   |
| O-rings washers and hose diaphragms              | Check O-rings and replace hose diaphragms if fitted.                                                                                                                                                                                      |
| Water and foam bodies                            | Inspect the interior. Check for corrosion and lining deterioration. Check separate containers for leakage or damage.                                                                                                                      |
| Powder body                                      | Examine the body and check internally for corrosion and lining deterioration.                                                                                                                                                             |
| <b>INSPECTION AFTER RECHARGE</b>                 |                                                                                                                                                                                                                                           |
| Water and foam                                   | Replace the charge in accordance with the manufacturer's instructions.                                                                                                                                                                    |
| Reassemble                                       | Reassemble the extinguisher in accordance with the manufacturer's instructions.                                                                                                                                                           |
| Maintenance label                                | Fill in entry on maintenance label, including full weight.                                                                                                                                                                                |
| Mounting of extinguishers                        | Check the mounting bracket or stand.                                                                                                                                                                                                      |
| Report                                           | Complete a report on the state of maintenance of the extinguisher.                                                                                                                                                                        |

## Appendix

|                                                                                          | TYPES OF EXTINGUISHER                                                                                                                                                         |                                                                                                           |  |                                                                                                                                 |                                                                                                           |                                                                                                                                               |                                                                                                                                                                      |              |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
|                                                                                          | Water                                                                                                                                                                         |                                                                                                           |  | Foam                                                                                                                            |                                                                                                           | Powder                                                                                                                                        | Carbon dioxide                                                                                                                                                       | Clean agents |
| <b>Extinguishing medium used:</b>                                                        | Water, with possible salts in solution                                                                                                                                        |                                                                                                           |  |                                                                                                                                 | Water solution containing foam-generating substances                                                      | Dry chemical powders                                                                                                                          | Pressurized carbon dioxide                                                                                                                                           |              |
| <b>Expellant charge of the extinguisher (stored pressure or cartridge as indicated):</b> |                                                                                                                                                                               | Carbon dioxide or other pressurized inert gases or compressed air (stored pressure or separate cartridge) |  |                                                                                                                                 | Carbon dioxide or other pressurized inert gases or compressed air (stored pressure or separate cartridge) | Carbon dioxide or other inert gases or dry air (stored pressure or separate cartridge)                                                        |                                                                                                                                                                      |              |
| <b>The discharge of the extinguisher is achieved by:</b>                                 |                                                                                                                                                                               | Opening of the valve. Action of pressurized gas (opening of the cartridge)                                |  |                                                                                                                                 | Opening of the valve. Action of pressurized gas (opening of the cartridge)                                | Opening of the valve. Action of pressurized gas (opening of the cartridge)                                                                    | Opening of the valve of the container constituting the extinguisher                                                                                                  |              |
| <b>The discharged extinguishing medium consists of:</b>                                  | Water with possible salts in solution                                                                                                                                         |                                                                                                           |  |                                                                                                                                 | Foam containing the gas used                                                                              | Dry chemical powders and carbon dioxide or other gas                                                                                          | Carbon dioxide                                                                                                                                                       |              |
| <b>The discharged extinguishing medium causes the extinction of the fire by:</b>         | 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 and cooling in the case of class A fires |                                                                                                           | Inhibition of the combustion process by the interrupting the chemical reaction. Some separation of burning materials from the surrounding air | Formation of a local inert atmosphere (carbon dioxide) which isolates the burning material from the surrounding air. Smothering and cooling action of carbon dioxide |              |
| <b>The electrical resistance of the discharged extinguishing medium is:</b>              | Very low                                                                                                                                                                      | Very low                                                                                                  |  |                                                                                                                                 | Varied                                                                                                    | Very high. Under intense heat some powders may be electrically conductive                                                                     | Very high                                                                                                                                                            |              |

|                                          | TYPES OF EXTINGUISHER                                                                                                                                                                                                                                          |  |                                                                                                                                                                     |                                                                                          |                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                                                                                                                          |              |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
|                                          | Water                                                                                                                                                                                                                                                          |  |                                                                                                                                                                     | Foam                                                                                     |                                                                                                                                                                                                                                   | Powder                                                                                                                 | Carbon dioxide                                                                                                                                                                                                           | Clean agents |
| Operating peculiarities and limitations: | The jet or spray of the extinguisher should be directed towards the base of the fire                                                                                                                                                                           |  |                                                                                                                                                                     |                                                                                          |                                                                                                                                                                                                                                   | 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                                                                                                                    |              |
|                                          |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                     | The extinction of the fire achieved only when all the burning surface is covered by foam |                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                                                                                                                          |              |
| Disadvantages and dangers:               | Not to be used where there is electrical hazard                                                                                                                                                                                                                |  |                                                                                                                                                                     |                                                                                          |                                                                                                                                                                                                                                   | Generated powder mixtures may be suffocating and can impair vision. Powder can damage electrical contact               | Carbon dioxide may be suffocating                                                                                                                                                                                        |              |
|                                          |                                                                                                                                                                                                                                                                |  |                                                                                                                                                                     |                                                                                          |                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                                                                                                                          |              |
| Maintenance:                             | Extinguishers with copper or copper alloy body should not be polished with products of corrosive or abrasive nature which may cause wall thickness reduction. Such extinguishers should be avoided but where used they 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 a very high value |                                                                                          | 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 |              |