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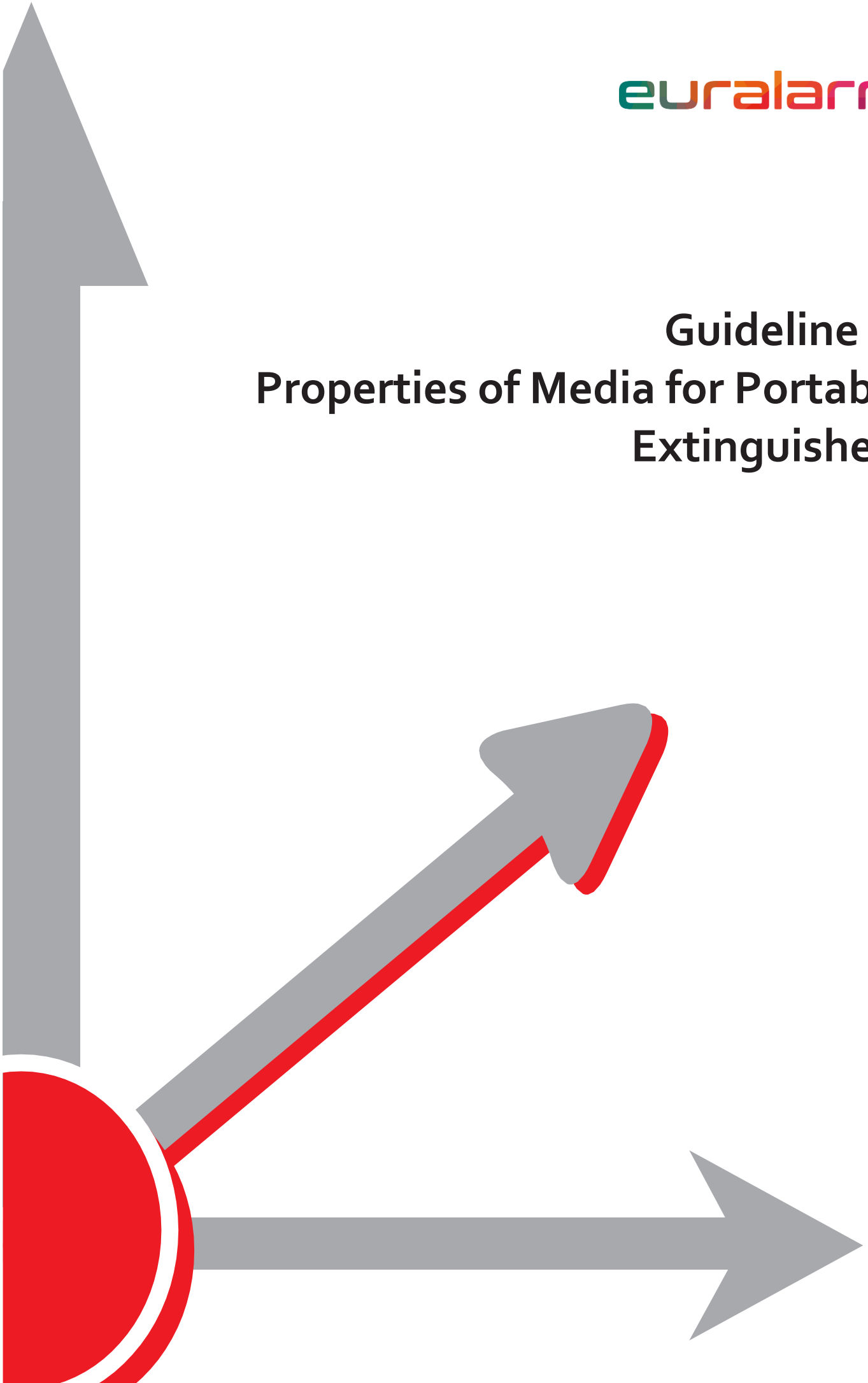
Guideline on Properties of Media for Portable Extinguishers



Revision table

Date	Rev #	Paragraph / Page	Change
December 2024	1.0	-	First release

FOREWORD

This document is intended as a general guidance and is not a substitute for detailed advice in specific circumstances. Although great care has been taken in the compilation and preparation of this publication to ensure accuracy, Euralarm cannot in any circumstances accept responsibility for errors, omissions or advice given or for any losses arising from reliance upon information contained in this publication.

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Note: The English version of this document SC-EXT-140 is the approved Euralarm reference document.

Euralarm • Gubelstrasse 11 • CH-6300 Zug • Switzerland

E: secretariat@euralarm.org
W: www.euralarm.org

Introduction

This Euralarm guidance document is intended to explain the properties of media contained in portable fire extinguishers and repeats the information given in the British Standard for the selection and installation of portable fire extinguisher BS 5306-8 and is repeated with the permission of BSI.

4 Provision of extinguishers – General recommendations

COMMENTARY ON CLAUSE 4
The media available in portable extinguishers, their firefighting properties, and their effects on people, property and the environment are described below.

a) Water

1. **Firefighting properties of water**
   Water, which is applied for wetting and surface cooling, is widely used as a firefighting medium. It has a high heat capacity, absorbing large amounts of heat as a liquid, and even greater amounts by its conversion to steam. Therefore, it is an effective medium for suppressing class A fires in jet, spray or mist form, even when these fires are deep-seated.

2. **Effects of water on people, property and the environment**
   Water is not normally a danger to respiration unless it is discharged directly into the face, contains bacteria, and/or is inhaled in aerosol form.

   Water conducts electricity. Use of purified water (e.g. distilled, deionized or de-mineralized) on a fire introduces CO_2 from the air, impurities from the products of combustion, and an increase in temperature. This causes the water to reassume its natural properties, and as a result can render the originally purified water electrically conductive.

   Water can be corrosive, particularly to iron and steel, and can cause damage to paper, cardboard and materials with soluble dyes running out. Water can also cause damage by short-circuiting live electrical equipment.

   Water is not usually subject to environmental controls.

b) Water-based media

NOTE Examples of water-based media are water-with-additive, foam, alcohol-resistant foam and wet chemical.

1. **Firefighting properties of water-based media**
   Water-based media are essentially chemical solutions in water. Whilst water delivers class A firefighting capability, the chemical added is for fire-penetration, enhanced wetting, and film-, bubble- or crust-formation to deal with other classes of fire.

   Most added chemicals, when applied, form a spreading barrier between fire and air. There are specific agents for the fire hazard presented by different substances, for example:
   - cooking fat and oils;
   - polar solvents, ketones, alcohols and other water-miscible liquids; and
   - hydrocarbons and other water-immiscible liquids.

Other chemicals increase the wetting characteristics of water by reducing water's natural surface tension, allowing the water to better adhere to and soak into materials.

2. **Effects of water-based media on people, property and the environment**
   The commonly added chemicals can irritate skin. They are unlikely to be a danger to respiration.

   Water-based media conduct electricity in the same way as water does.

   In addition to the effect water can have on property, most water-based media can cause corrosion, even if only by removing the grease layer from metal. Some solutions are corrosive to other materials. Equipment wetted in the course of firefighting might need to be carefully cleaned afterwards, particularly if its subsequent corrosion is likely to affect its life or operation.

   Water-based media cannot be discharged to groundwater or surface drains. Some water-based media [e.g. those containing per- and polyfluoroalkyl substances (PFAS), which commonly have a Class B fire rating] are subject to environmental and health considerations and need to be contained, collected and incinerated.

   The hot fat/oil extinguished by a wet chemical extinguisher has to be allowed to cool thoroughly before clean-up.

c) Powder

1. **Firefighting properties of powder**
   Powder is a finely divided chemical with a controlled range of particle size, often with siliconized additives to promote flow. Fires are quickly tackled by powder, thereby preventing oxygen in the air from contacting the burning material.

2. **Effects of powder on people, property and the environment**
   Powder can reduce visibility in the immediate vicinity of discharge and might impair breathing, either of which could hinder escape.

   ABC and BC powders are electrically non-conductive. Class D powders can be electrically conductive.

   When discharged on to equipment, powder clings to decorated surfaces, metals, glass, ceramics, grease-films, etc. Equipment and spaces contaminated with powder need to be cleaned as soon as possible. Powder, when moistened, can be corrosive. Powder also hangs suspended in still air for some time, and contaminated areas could require cleaning more than once.

   Some class D powders are graphite-based. Floor surfaces become very slippery where this is used. Graphite-based powers are black/dark grey in colour and can stain heavily.

   Discharged powder needs to be contained, collected (often by vacuum cleaner) and disposed of safely, in an environmentally acceptable manner.

d) Carbon dioxide (CO_2)

1. Firefighting properties of CO_2

CO_2 is stored as a liquid under high pressure and produces a white fog-like discharge as the liquid expands into gas. It tackles fire by preventing oxygen in the air from contacting the burning material. It is highly effective in penetrating electrical equipment, even high voltage equipment.

2. Effects of CO_2 on people, property and the environment

CO_2 is electrically non-conductive. Its discharge is louder than that of other extinguishers.

It does not leave any residual deposits that require cleaning up after extinction and is not usually subject to environmental controls.

CO_2 can be hazardous to persons in enclosed rooms of small volume with restricted ventilation.

Publication date: December 2024

Euralarm
Gubelstrasse 22
CH-6301 Zug (Switzerland)

Swiss Commercial Registration No: CHE-222.522.503

E secretariat@euralarm.org
W www.euralarm.org