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## Fire protection — Foam fire extinguishing systems —

### Part 5: Compressed air foam equipment

*Protection contre l'incendie — Installations fixes d'extinction par mousse physique —  
Partie 5: Équipement pour mousse physique à air comprimé*

ICS 13.220.10

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Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 7076-5 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 6, *Foam and powder media and firefighting systems using foam and powder*.

ISO 7076 consists of the following parts, under the general title *Fire protection — Foam fire extinguishing systems*:

- *Part 1: Foam proportioning equipment*
- *Part 2 Low expansion foam equipment*
- *Part 5: Compressed air foam equipment*

## Introduction

This part of ISO 7076 is prepared by ISO/TC 21/SC 6, and is based on NFPA 11 Standard for Low-, Medium-, and High-Expansion Foam, and FM Global Class 5130 Approval Standard on Foam Extinguishing Systems.

Compressed air foam equipment is required to function satisfactorily not only in the event of fire, but also during and after exposure to conditions it is likely to meet in practice, including corrosion, vibration, direct impact and indirect shock. Specific tests are intended to assess the performance of the equipment under such conditions.

The aim of using such systems is to improve the fire suppression effectiveness of the fire extinguishing agent on the burning materials for both Class A and Class B fires, by producing uniform and more stable bubbles, which improves the cooling effect of the applied media.

This part of ISO 7076 is not intended to place any other restrictions on the design and construction of compressed air foam equipment.

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# Fire protection — Foam fire extinguishing systems — Part 5: Compressed air foam equipment

## 1 Scope

This part of ISO 7076 specifies requirements, test and assessment methods and performance criteria for compressed air foam equipment of fixed foam extinguishing system for indoor or outdoor or both utilization.

Technical safety requirements concerning the design and manufacturing of drives, auxiliary equipment, sources of energy or pumps are outside the scope of this part of ISO 7076.

Special hazards arising from the particular conditions under which these systems are used are outside the scope of this part of ISO 7076.

Hazards relating to any kind of mechanical, electrical, hydraulic, pneumatic and other equipment dealt with by the respective standards for such equipment are outside the scope of this part of ISO 7076.

Hazards arising from the noise of systems are outside the scope of this part of ISO 7076.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*

IEC 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61310-2, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking*

IEC 61310-3, *Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators*

IEC 60068-1, *Environmental testing — Part 1: General and guidance*

ASTM B117, *Standard practice for operating salt spray (fog) apparatus*

EN 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 547-2, *Safety of machinery — Human body measurements — Part 2: Principles for determining the dimensions required for access openings*

EN 547-3, *Safety of machinery — Human body measurements — Part 3: Anthropometric data*

EN 659, *Protective gloves for firefighters*

EN 894-1, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators Part 1: General principles for human interactions with displays and control actuators*

EN 894-2, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*

EN 894-4, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 4: Location and arrangement of displays and control actuators*

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1846-2, *Firefighting and rescue service vehicles — Part 2: Common requirements — Safety and performance*

EN 1846-3:2002+A1:2008, *Fire-fighting and rescue service vehicles — Part 3: Permanently installed equipment — Safety and performance*

EN 14466:2005+A1:2008, *Fire-fighting pumps — Portable pumps — Safety and performance requirements, tests*

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*

## 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **air delivery rate**

volume of air, in normal condition, that is fed into a compressed-air foam system per unit of time

NOTE While inside the system the air-volume will be compressed according to the pressure applied. Once leaving the system from the nozzle to atmosphere, the air will expand to its normal volume again.

### 3.2

#### **air/foam solution volume ratio**

ratio stating how many parts of air (at normal condition) are mixed with one part of the foam solution in a compressed-air foam system

NOTE The ratio is expressed as the pair of values one part foam solution to x parts air (1: x).

### 3.3

#### **approved**

acceptable to the authority having jurisdiction

### 3.4

#### **Authority Having Jurisdiction**

#### **AHJ**

an organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure



**3.5****compressed air foam****CAF**

a homogenous foam produced by the combination of water, foam concentrate, and air or nitrogen under pressure

**3.6****compressed air foam generating method**

a method of generating compressed air foam recognized in this standard using a mixing chamber to combine air or nitrogen under pressure, water, and foam concentrate in the correct proportions. The resulting compressed air foam flows through piping to the hazard being protected.

**3.7****compressed air foam discharge device**

a device specifically designed to discharge compressed air foam in a predetermined pattern

**3.8****compressed air foam system****CAFS**

a system employing compressed air foam discharge devices attached to a piping system through which foam is transported from a mixing chamber. Discharge of CAFS begins with automatic actuation of a detection system, or manual actuation that opens valves permitting compressed air foam, generated in the mixing chamber, to flow through a piping system and discharged over the area served by the discharge devices.

**3.9****drainage time 25 %**

time taken for 25 % of the foam to collapse into solution

**3.10****wet foam**

foam produced by a compressed-air foam system and which has a foam solution/air volume ratio of between 1:3 to 1:10

**3.11****dry foam**

foam produced by a compressed-air foam system and which has a foam solution/air volume ratio of more than 1:10

**3.12****foam expansion ratio**

ratio of the volume of expanded foam and its solution

**3.13****foam solution**

mixture of water and foam concentrate

**3.14****(foam solution) delivery rate  $Q_w$** 

volume (of water plus foam concentrate) delivered per unit of time by a system

NOTE At proportioning ratios of up to 1 % the difference between water delivery rate and foam solution delivery rate can be neglected.

**3.15****Foam quality**

Quality of foam based on foam expansion ratio and 25 % drainage time

**3.16****Nozzle**

a specially designed device that can discharge foam in a predetermined pattern

**3.17**

**Operation pressure of the CAF system**

pressure at the system input connection at which all performance and safety requirements are met and which shall be specified by the compressed-air foam system

**3.18**

**operation range**

range (of conditions) specified by the manufacturer of a system and within which the system can be operated without limitations while achieving the intended performance characteristics

**3.19**

**proportioning ratio**

volume of foam concentrate added to water by volume, given as a percentage of the solution

**3.20**

**Listed**

equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose

**4 Abbreviated terms**

- CAF compressed air foam
- CAFS compressed air foam system

**5 Requirements**

**5.1 Compliance**

In order to comply with this part of ISO 7076, the CAF system shall meet the requirements of this clause, which shall be verified by technical inspection or engineering assessment, shall be tested as specified in 6 and shall meet the requirements of the tests.

**5.2 General**

- 5.2.1** A CAF system shall generate at least wet foam.
- 5.2.2** A homogeneous, finely-pored foam shall be discharged at the nozzles.
- 5.2.3** All components shall be listed for their intended use.
- 5.2.4** Where listings for components do not exist, components shall be approved.

**5.3 Water supplies**

- 5.3.1** The water supply to compressed air foam systems shall be permitted to be hard or soft, fresh or salt, but shall be of a quality so that adverse effects on foam formation or foam stability do not occur.
- 5.3.2** No corrosion inhibitors, emulsion breaking chemicals, or any other additives shall be present without prior consultation with the foam concentrate supplier.
- 5.3.3** The water supply shall be of a quantity to supply all the discharge devices that shall be permitted to be used simultaneously for the specified time.

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