International Standard

ISO 15779

Condensed aerosol fire extinguishing systems — Requirements and test methods for components and system design, installation and maintenance — General requirements

Systèmes d'extinction d'incendie utilisant des aérosols — Exigences et méthodes d'essai pour la conception des composants et des systèmes, l'installation et l'entretien — Exigences générales

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 8, *Gaseous media and firefighting systems using gas*.

This second edition cancels and replaces the first edition (ISO 15779:2011), which has been technically revised.

The main changes are as follows:

— in 6.2.2 and 7.8.1, a requirement concerning the time taken to reach minimum design density from the beginning of discharge has been added for Class B fires;

— Clause C.12, Impact test, has been removed;

— in D.6.1.3.2, Wood crib test, the total preburn time has been changed from 6 min to 2 min;

— figures have been updated to improve clarity;

— in the Bibliography, the reference to ISO 14520-1 has been removed and a reference to ATEX Directive has been added.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The firefighting systems covered in this document are designed to provide a supply of condensed aerosol extinguishing medium for the extinction of fire.

Several different methods for supplying condensed aerosol extinguishant to, and applying it at, the required point of discharge for fire extinction have been developed in recent years, and there is a need for dissemination of information on established systems and methods. This document has been prepared to meet this need.

The requirements of this document are made in the light of the best technical data known to the working group at the time of writing but, since a wide field is covered, it has been impracticable to consider every possible factor or circumstance that can potentially affect implementation of the recommendations.

It has been assumed in the preparation of this document that the execution of its provisions is entrusted to people appropriately qualified and experienced in the specification, design, installation, testing, approval, inspection, operation and maintenance of systems and equipment, for whose guidance it has been prepared, and who can be expected to exercise a duty of care to avoid unnecessary release of extinguishant.

It is important that the fire protection of a building or plant be considered as a whole. Condensed aerosol extinguishing systems form only a part, albeit an important part, of the available facilities. Their adoption does not remove the need to consider supplementary measures, such as the provision of portable fire extinguishers or other mobile appliances for first aid or emergency use, or to deal with special hazards.

For many years, condensed aerosol extinguishants have been a recognized effective medium for the extinction of flammable liquid fires and fires in the presence of electrical and ordinary Class A hazards. However, it is important to note in the planning of comprehensive schemes that there can be hazards for which these mediums are not suitable, and in certain circumstances or situations there can be dangers in their use requiring special precautions.

Advice on these matters can be obtained from the appropriate manufacturer of either the extinguishant or the extinguishing system, or both. Information can also be sought from the appropriate fire authority, the health and safety authorities and insurers. In addition, reference should be made as necessary to other national standards and statutory regulations of the particular country.

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Condensed aerosol fire extinguishing systems — Requirements and test methods for components and system design, installation and maintenance — General requirements

1 Scope

This document specifies the requirements and test methods for components of condensed aerosol firefighting systems. It gives recommendations for the design, installation, testing, maintenance and safety of these systems, as well as their application in buildings, plants or other structures. The characteristics of the extinguishants in the condensed aerosol firefighting systems are also specified, as well as the types of fire for which they are a suitable extinguishing medium. This document covers total flooding systems primarily related to buildings, plants and other specific applications, utilizing electrically non-conducting condensed aerosol fire extinguishants for which there are sufficient data currently available to enable validation of performance characteristics by an appropriate independent authority.

Local applications of condensed aerosol extinguishing systems are not covered by this document. Any local applications require a pre-engineered and pre-designed system which has been tested and approved for a specific application by a relevant authority.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3941, *Classification of fires*

EN 60068-2-6, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal)*

EN 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db and guidance: Damp heat, cyclic (12 h + 12 h cycle)*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
aerosol generator
non-pressurized container that, when activated, generates a *condensed aerosol* (3.7) extinguishing agent

3.2
aerosol generator assembly
aerosol generator (3.1) with its mounting bracket

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3.3
approved
acceptable to a relevant *authority* (3.4)

Note 1 to entry: In determining the acceptability of installations or procedures, equipment or materials, the authority can base acceptance on conformance to the appropriate standards.

3.4
authority
organization, office or individual responsible for approving equipment, installations or procedures

3.5
automatic
performing a function without the necessity of intentional human intervention

3.6
competent person
person who is suitably trained, qualified by knowledge and practical experience, and with the necessary instructions to enable the required system design, installation and maintenance

3.7
condensed aerosol
aerosol extinguishing agent
extinguishant
extinguishing medium consisting of finely divided solid particles, generally in the order of magnitude of microns in diameter suspended in gas which is generated and distributed by a combustion process of a solid aerosol-forming compound

3.8
coolant
heat-absorbing medium or process

3.9
design application density
extinguishing density multiplied by the safety factor, required for system design purposes

Note 1 to entry: Extinguishing density is the actual concentration of aerosol in the test room.

Note 2 to entry: The extinguishing density and the design application density are expressed in g/m^3.

3.10
discharge time
time from the generator activation until the end of its discharge

Note 1 to entry: Measured in s.

Note 2 to entry: The end of discharge is determined by the drop of the temperature (primary), sound (secondary) and visual indication if possible.

3.11
effective mass
mass of discharged extinguishant required to achieve the design application density within the protected volume within the specified system discharge time

3.12
electrical activation device
device which automatically operates via an electrical input and is arranged to initiate the *aerosol-forming compound* (3.34).

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3.13
electrical clearance
unobstructed air distance between the *aerosol generator* (3.1) components and unenclosed or uninsulated live electrical components not at ground potential

3.14
emergency hold device
device that prevents the *electrical actuation* (3.12) of *aerosol generators* (3.1)

3.15
extinguishing density
effective minimum mass of discharged extinguishant per unit of enclosure volume required to extinguish fire involving a specific fuel under defined experimental conditions, using a specific *aerosol generator* (3.1) type and size, excluding any safety factor

Note 1 to entry: Measured in g/m^3.

3.16
family of condensed aerosol generators
range of *aerosol generators* (3.1) designed with the same solid compound, the same kind of cooling device, discharge outlet, ignition device, layout and internal/external architecture, with variation in the mass of the solid compound

3.17
hold time
period of time during which an extinguishant is required to maintain at least the extinguishing density to ensure even distribution throughout the protected volume

3.18
hot work
grinding, welding, thermal cutting, oxygen cutting, thermal heating, oxygen heating and other related heat-producing or spark-producing operations

3.19
ignition device
device that is able to ignite the *solid aerosol-forming compound* (3.34)

3.20
inspection
visual examination to give reasonable assurance that the extinguishing system is fully operable and has not been activated or tampered with, and that there is no obvious physical damage or condition to prevent operation

3.21
listed
systems or components that are included in a list published by a listing organization

3.22
listing organization
internationally recognized fire protection system or components test and certification organization

3.23
location drawing
layout diagram of protected volume clearly indicating the as-installed location of all *aerosol generator assemblies* (3.2), controls, *system isolate switch* (3.36), *emergency hold device* (3.14), and associated components of the firefighting system

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3.24
maintenance
thorough check to give maximum assurance that the extinguishing system will operate as intended

Note 1 to entry: Maintenance includes a thorough examination and any necessary repair or replacement of system components.

3.25
manual
requiring intentional intervention to accomplish a function

3.26
manufacturer
entity that manufactures a product or has a product designed or manufactured, and markets that product under its name or trademark

3.27
mass median aerodynamic diameter
MMAD
particle size and distribution of any aerosol statistically, based on the weight and size of the particle, along with the geometric standard deviation

3.28
monitoring
supervision of the operating integrity of an electrical, mechanical, pneumatic or hydraulic control feature of a system

3.29
normally occupied area
area that is occupied by persons, under normal circumstances

3.30
normally unoccupied area
area not normally occupied by people, but which may be entered occasionally for brief periods

3.31
particulate concentration
concentration of the solid fraction of the aerosol in the protected space after system discharge at the design application density

Note 1 to entry: Measured in g/m^3.

Note 2 to entry: This information is necessary to assess the potential health effects of accidental exposure to the agent and the potential degree of visibility obscuration.

3.32
release
physical discharge or emission of extinguishant as a consequence of the aerosol generator’s actuation

3.33
safety factor
multiplier of the extinguishing density to determine the aerosol design application density

3.34
solid aerosol-forming compound
mixture of oxidant, combustible component and technical admixtures producing fire-extinguishing aerosol upon ignition

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3.35
system discharge time
time from the first generator activation until the end of the last generator discharge time to achieve the design application density within the protected volume

Note 1 to entry: This time measurement is relevant to an extinguishing system of interconnected *aerosol generators* (3.1) intended to protect the same hazard.

3.36
system isolate switch
key-operated or dual mode switch manual device that prevents the *electrical actuation* (3.12) of aerosol generators by electrically isolating them from the released circuit

Note 1 to entry: The actuation of this device provides an indication of system isolation and shall result in an audible and visual alarm of system impairment at the control panel.

Note 2 to entry: The intention is to prevent the discharge of agent into the hazard area when the system isolation switch device is activated.

3.37
thermal activation device
device which automatically operates at a rated temperature and is arranged for the activation of the *solid aerosol-forming compound* (3.34)

3.38
thermal clearance
minimum air distance between both a *condensed aerosol* (3.1) generator surface and its discharge ports and either personnel, any structure or components sensitive to the temperature developed by the generator during and following discharge

3.39
total flooding system
firefighting system arranged to discharge extinguishant into an enclosed space to achieve the appropriate design application density

3.40
unoccupiable area
area which cannot be occupied due to dimensional or other physical constrains

EXAMPLE Shallow voids or cabinets.

3.41
user
entity for whom the system is designed, and who is responsible for operation and for ensuring the consistency of performance as described by the manufacturer and for following the legal regulation

4 Use and limitations

4.1 General

The design, installation, testing and maintenance of aerosol fire-extinguishing systems shall be performed by persons competent in this fire extinguishing system technology.

4.2 Aerosol agent description

4.2.1 Condensed aerosol

Condensed aerosol is an extinguishant consisting of finely divided solid particles, typically based on alkali metal salts, and gases mainly comprised of nitrogen, carbon dioxide, carbon monoxide and water vapour.

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