SLOVENSKI STANDARD
SIST EN 16081:2011+A1:2013

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Nadomešča:
SIST EN 16081:2011

Hiperbarične komore - Posebne zahteve za gasilne sisteme - Zahteve, vgradnja in preskušanje

Hyperbaric chambers - Specific requirements for fire extinguishing systems - Performance, installation and testing

Druckkammern - Spezifische Anforderungen an Feuerlöschsysteme - Leistung, Montage und Prüfung

Chambres hyperbares - Exigences spécifiques relatives aux systèmes de lutte contre l'incendie - Performances, installation et essais

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11.040.60	Terapevtska oprema	Therapy equipment
13.220.20	Požarna zaščita	Fire protection

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EUROPEAN STANDARD

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EN 16081:2011+A1

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ICS 13.220.20

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English Version

Hyperbaric chambers - Specific requirements for fire extinguishing systems - Performance, installation and testing

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This European Standard was approved by CEN on 8 July 2011 and includes Amendment 1 approved by CEN on 13 August 2013.

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Foreword

This document (EN 16081:2011+A1:2013) has been prepared by Technical Committee CEN/TC 359 “Project Committee - Hyperbaric chambers”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 16081:2011.

This document includes Amendment 1, approved by CEN on 2013-08-13.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1⟩ ⟨A1.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard is applicable to the performance and safety requirements of fire extinguishing systems and their associated test methods for multi-place chambers designed for pressures in excess of ambient atmospheric pressure and employed in medical installations for therapeutic purposes, in the following referred to as chambers.

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.

EN 14931:2006, *Pressure vessels for human occupancy (PVHO) — Multi-place pressure chamber systems for hyperbaric therapy — Performance, safety requirements and testing*

3 Terms and definitions

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

3.1
fire extinguishing system
system for active deployment of extinguishing medium inside the chamber in order to extinguish fire

3.2
extinguishing medium
liquid or gas used to extinguish fire

3.3
nozzle
mechanical device used to ensure dispersion of extinguishing medium inside the chamber with certain characteristics

4 Specific hazards regarding fire risks

A fire, as a physical phenomenon, is significantly influenced by the ambient pressure, the partial pressure of oxygen and the confined space of the hyperbaric chamber.

The rate of combustion will be directly related to ambient pressure and the oxygen level. In a hyperbaric environment with increased oxygen partial pressure, even materials thought to be non-combustible will burn fiercely. Owing to the confined space in the chamber, a fire would cause a sudden increase of temperature and high concentration of toxic gases and smoke. If such a fire occurs, it shall be dealt with quickly and all personnel and patients shall be evacuated from the chamber. People suffering from breathing difficulties and burns shall be cared for (see Annex B).

5 Performance and requirements

5.1 Fire extinguishing systems in hyperbaric chambers shall produce a specified extinguishing performance as stated in Clause 6.

5.2 Fire extinguishing systems shall suit the chamber's maximum operational pressure. They shall fully protect all chamber compartments for human occupancy.

5.3 The fire extinguishing system shall be installed in such a way that the risk of physical injury to persons inside the chamber is as low as possible.

5.4 Fire extinguishing systems shall have a manual release. Independent activation shall be possible from inside and outside the chamber. The release shall be easily accessible and protected against unintentional activation (e.g. safety button). For operation, see EN 14931:2006, 4.5.1.

An additional automatic release is permitted if its suitability is proven for hyperbaric conditions up to the chamber's maximum operational pressure and documented.

5.5 With both an automatic and manual release, a warning signal shall be heard at the control console. This warning signal may be temporarily muted, but there shall be no possibility to switch it off as long as the fire system is active.

5.6 The extinguishing nozzles shall be installed in such a way that the required extinguishing effect is ensured for any sitting and lying place inside the chamber. A lying place is to be considered as minimum three sitting places in one line.

NOTE The nozzles arrangement is stipulated by the manufacturer of the fire extinguishing system. He decides where and how many nozzles in accordance with seats or stretchers are to be placed.

Other areas shall be covered in the seating height by the equivalent of at least 50% of the required extinguishing medium flow specified per seat (see 6.2.14). This medium flow shall be delivered from nozzles of the same characteristic as in the test.

5.7 Pipes and hoses containing the extinguishing medium shall be made of suitable material concerning pressure and corrosion. For other pipes and hoses, see EN 14931:2006, 4.7.4.

For shut off devices, see EN 14931:2006, 4.2.15

5.8 Pipes and hoses of the fire extinguishing system shall be marked according to the medium and its function. Actuators (e.g. valves, press buttons and manual releases) shall be marked in such a way that they are distinguished from all other systems. For installation of pipes, see EN 14931:2006, 4.7.7.

5.9 The extinguishing medium tank shall be suitable for the intended pressure and protected against pressure exceeding the maximum allowable design pressure.

The material of the tank shall be suitable for the extinguishing medium or shall be adequately protected against corrosion.

The extinguishing medium supply tank shall be equipped with a controllable level indicator and pressure gauge.

The control console of the chamber shall indicate at least the status of the fire-extinguishing system (filling level, supply pressure).

5.10 Conveying of the extinguishing medium shall be done by pump system (positive-displacement pumps) or a pressure tank system each exclusive to the extinguishing system.

5.11 Within 2 s following the release of the fire extinguishing system the pressure build-up in the fire extinguishing system shall be realised and the extinguishing medium shall come out in the chamber.

5.12 The extinguishing medium flow shall automatically switch off before the extinguishing medium is exhausted to prevent any gas or liquid other than the extinguishing medium entering the compartment.

Manual shutdown of the fire extinguishing system as well as repeated switching on by the chamber operator (outside) shall be possible at any given time. It shall be impossible to manually switch off the fire extinguishing system from inside the chamber.

5.13 The required supply of extinguishing medium shall be calculated to ensure at least 1 min of extinguishing medium flow taking into account 5.6 and 6.2.14.

5.14 If extinguishing medium other than water of drinking water quality or distilled water is used, its safety to health shall be proven without additional (e.g. gas mask) measures.

5.15 Installation of the fire extinguishing system with all its components shall be protected against freezing.

5.16 Pressure vessels shall be designed, examined and marked according to the applicable standard.

5.17 Should an electric power supply be necessary for operating the fire extinguishing system, it shall be connected to an uninterruptible power supply (UPS) as a back-up.

5.18 Fire extinguishing systems shall be labelled with a permanently readable and well visible type plate containing at least the following details:

— name or trade name and address of the manufacturer;

— type;

— working pressure;

— date of manufacturing and serial number;

— test interval;

— name of the organisation which performed the concept test.

5.19 Operating instructions of the fire extinguishing system shall be provided by the manufacturer according to EN 14931:2006, Clause 5.

The manufacturer will propose a maintenance programme comprising an annual test in order to verify the efficiency of the fire extinguishing system and in case of a wet test a purge of each part (nozzles included) of the fire extinguishing system.

6 Test requirements for fire extinguishing systems

6.1 A concept test consists of a hot test and a wet test. A third party certification is required for the concept test. For each type of fire-extinguishing system and parameters of the chamber, a fire test series (***hot test***) must be carried out in a test chamber according to specifications given in 6.2 under consideration of 6.3.4.

The wet test is part of a functioning and acceptance test of the installation of the fire extinguishing system to show that the items according to 6.3.2 are fulfilled, as well as the extinguishing means capacity and performance and the spray pattern of each system manufactured (acceptance test at the final installation at least for the first system).

The concept test will be certified by a third party certification organisation having the experience (qualified by education and training).

The documentation of the test shall include at least: time from activation to start of deployment as well as the deployment time, supply pressure, leakage test of system, releasing points, direction and location of nozzles, function of nozzles and comparison with design documents.

6.2 Parameters and conditions of fire extinguishing tests (hot test).

6.2.1 Tests of fire extinguishing systems shall be performed under the following conditions:

— 1 test at 200 kPa (2,0 bar gauge) pressure with 21 vol.-% oxygen (O_2);

— 2 tests at 150 kPa (1,5 bar gauge) pressure with 30 vol.-% O_2;

— 1 test at max. working pressure of the chamber with 21 vol.-% O_2.

6.2.2 For simulation of persons, dressed dummies that are inflammable and impenetrable to the extinguishing medium must be used.

6.2.3 For each extinguishing test at least two torso dummies shall be used. The dummies shall be the size of a normal adult (see Annex A) and be positioned on seats next to each other with a distance of 15 cm between the arms.

6.2.4 During the extinguishing test, the dummies shall be put on closed seat shells with the seatback made of steel plate, width and depth according to EN 14931:2006, 4.2.8 and a seat height of ≥50 cm in a seated position.

6.2.5 For each extinguishing test each dummy shall be dry and is to be dressed in dry clothing as follows:

— 1 short sleeve cotton undershirt;

— 1 short cotton underwear;

— 1 mixed fabric shirt with long sleeves (max. 70% cotton);

— 1 pair of cotton trousers (long);

— 1 hair decoy out of lambskin strips, about 10 cm wide, normal hairline at forehead and neck.

6.2.6 Commonly used, fast reacting thermo elements (TE) are to be fixed on each dummy in the following positions:

— 1TE on the dummy, front side, just above the waistband;

— 1TE on the dummy, front side, shoulder area;

— 1TE on the head;

— 1TE 30 cm in front of face;

— 1TE 60 cm above the head.

6.2.7 The thermo elements are to be fixed on the dummy's bodies in such a way that no falsifying heat influence of the thermo elements can occur.

6.2.8 Suitable thermo elements that have been checked for proper function and signs of thermal damage are to be used for the fire extinguishing tests.

6.2.9 The arrangement of extinguishing nozzles in relation to the dummy in this test shall reflect the locations and distances between those elements in the chamber to be delivered.

The arrangement of the nozzles shall be included in the test records.

6.2.10 The fire shall be ignited on one dummy, front side, just above the waistband. An electric resistance wire of smallest possible weight is to be used as the ignition source.