
Ognjevarne omarice za shranjevanje kemikalij - 1. del: Ognjevarne omarice za shranjevanje vnetljivih tekočin

Fire safety storage cabinets - Part 1: Safety storage cabinets for flammable liquids

Feuerwiderstandsfähige Lagerschränke - Teil 1: Sicherheitsschränke für brennbare Flüssigkeiten

Armoires de stockage de sécurité incendie - Partie 1: Armoires de stockage de sécurité pour liquides inflammables (standards.iteh.ai)

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inflammables

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 332.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 14470-1:2021) has been prepared by Technical Committee CEN/TC 332 “Laboratory equipment”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14470-1:2004.

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prEN 14470-1:2021 (E)**Introduction**

This document describes the design and testing criteria for safety cabinets to be used in rooms to store flammable liquids in closed containers at normal room temperatures.

Primarily, this document covers the three major safety requirements for storage of flammable liquids, which are:

- a) minimizing the fire risk associated with the storage of flammable substances and protection of the cabinet's content in the event of fire for a known (tested) minimum length of time (fire rating);
- b) minimizing the amount of vapour released into the working environment;
- c) retention of accidental spillage within the cabinet.

Testing of the cabinet (see a) above) under fire conditions is a normative part of the standard and the procedures and interpretation of the tests are described in detail.

The fire test (see a) above) provides for four categories of fire protection/ratings. In practice the degree of fire protection/rating allows the user to select, depending on individual circumstances, a fire safety storage cabinet which will allow sufficient time for personnel to leave, and fire fighters to enter the room before it is likely that the flammables stored turn a possible minor/extinguishable fire into an uncontrollable one. The methods of achieving b) and c) above are sufficiently flexible to allow for local/national needs.

Caution should be exercised when determining the appropriate cabinet fire rating when flammables having auto-ignition temperatures below 200 °C and/or having high vapour pressures at room temperature are involved. When such flammable materials are being stored, expert advice should be sought.

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1 Scope

This document is a product specification, giving performance requirements for fire safety storage cabinet to be used for the storage of flammable liquids. It is applicable to cabinets with a total internal volume of not greater than 2 m³, which may be free standing, restrained to a wall or mounted on plinth or castors.

It is not applicable to brick enclosures or walk-in storage rooms.

This document does not apply to any support frame or mechanism other than the base which is integral to the cabinet.

Requirements are given in respect of the construction of the fire safety storage cabinet and its capacity to resist fire conditions on the outside. A classification of fire safety storage cabinets is given, according to the level of fire resistance offered, and a type test is included, see Annex A.

The tests described in this document are type tests.

This document does not discriminate between different flammable liquids, which may have considerably different physical properties.

Attention is drawn to national regulations, which can apply with regards to the storage of flammable liquids.

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.

EN 1363-1:2020, *Fire resistance tests — Part 1: General requirements*

EN 7010, *Aerospace series - Configuration - Definition and designation for product standards for externally threaded fasteners*

<https://standards.iteh.ai/catalog/standards/sist/72fbf4d1-1019-1019-1012-0067188711/e-sist-prEN-14470-1-2022>

EN 13165, *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

EN 13501-1:2018, *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*

EN 16121, *Non-domestic storage furniture — Requirements for safety, strength, durability and stability*

EN 16122, *Domestic and non-domestic storage furniture - Test methods for the determination of strength, durability and stability*

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full - Part 1: General principles and requirements (ISO 5167-1)*

prEN 14470-1:2021 (E)**3 Terms and definitions**

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

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

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1**type**

specimen of a design manufactured with the characteristics intended for series production

[SOURCE: EN 14175-1:2003, 7.12]

3.2**type test**

conformity testing on the basis of one or more specimens of product representative of the production

[SOURCE: EN 14175-1:2003, 7.13]

3.3**penetration**

<fire safety storage cabinet>

passage of a media line (pipe, hose, cable) through any orifice of the fire safety storage cabinet

3.4**access opening**

<fire safety storage cabinet>

opening through which user access to a fire safety storage cabinet interior is intended

3.5**door**

<laboratory furniture>

component of the cabinet, which closes the access opening

Note 1 to entry Example of a door would be a wing door, pull-out element with front part or cover

3.6**usable space**

<fire safety storage cabinet>

designated area inside the fire safety storage cabinet that can be used for the storage of flammable liquids

3.7**bottom of the cabinet**

lower fire integrity construction element of the fire safety storage cabinet

3.8**storage level**

fitting element carrying the goods to be stored

3.9**spill containment sump**

area intended to collect leakages and spilled liquids

3.10**superimposed load****<fire safety storage cabinet>**

load on top of the cabinet

3.11**weight load**

total gross cabinet weight including the maximum load and the optional superimposed load as defined by the manufacturer

3.12**small fire test**

comparative fire test where only a part of the penetrated wall, ceiling or bottom is tested

3.13**media line**

cable, hose or pipe

4 Classification

A fire safety storage cabinet shall be classified as one of the types given in Table 1.

Table 1 – Fire safety storage cabinet type classification

Type	Time taken for T to rise by 180 K min	Test according to EN 1363-1	Ventilation connection facility required	Self-closing doors
30	≥ 30	√	√	√
60	≥ 60	√	√	√
90	≥ 90	√	√	√

5 Construction**5.1 Fire protection**

In the case of a fire, the fire safety storage cabinet shall ensure that, for at least 30 min, the contents of the cabinet do not contribute any additional risks or spread of fire.

5.2 Access opening

5.2.1 In case of fire, the access opening shall be closed off by the door/s automatically and completely.

The closing time of fully opened doors, from the time of door release, shall not exceed 20 s.

If a hold-open feature is included, the access opening shall be closed off fully in the event of a temperature of (50^{+0}_{-10}) °C being reached in the vicinity of the access opening of the cabinet. The temperature release

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sensor for this shall be positioned in freely circulating air of the access opening, so that it can heat up rapidly.

5.2.2 The temperature release component of the closing device shall be conforming to the temperature range specified in 5.2.1. This shall be confirmed in the manufacturer's declaration.

5.2.3 If the closing of the doors is actuated or triggered by an external power source, the mechanism shall be working even if the external power source fails.

5.2.4 Moving components of the closing mechanism shall not reach into the usable space of the cabinet.

5.2.5 Doors and their surroundings shall be designed such that the static force shall not exceed 100 N between the main closing edge and the counter closing edge to prevent injuries.

5.2.6 It shall be possible to operate each door single-handedly.

5.2.7 If the doors are lockable, the locking device shall not compromise the self-closing performance as required in 5.2.1.

5.2.8 The functioning of the closing mechanism shall be tested during the type test according to Annex A.

5.3 Construction materials and surface areas

Coatings and/or decors inside the cabinet, which may be used to improve the durability/impact-resistance, shall be classified at least as class D or E according to EN 13501-1:2018. The surface areas of the cabinet interior shall be resistant to the flammable liquids that can correctly be stored inside the cabinet.

5.4 Weight load

The cabinet including supporting elements, e.g. castors, plinths, shall be constructed in such a way that it is capable of carrying the total cabinet weight including additional load given by the manufacture without any damaging distortion at the testing temperature according to Annex A.

5.5 Ventilation

5.5.1 Cabinets shall be equipped with openings for inlet and exhaust air, enabling the connection of the cabinet to an exhaust air system. The openings for the inlet and exhaust air shall be positioned to each other in such a way that a uniform ventilation of the entire cabinet interior is maintained. These openings should close in the event of fire. For testing details see C.3.

NOTE Attention is drawn to national regulations regarding the connection of fire safety storage cabinets to exhaust air systems.

5.5.2 In a cabinet connected to a ventilation system, with the doors closed, air exchange at a rate of at least 10 times the volumetric capacity of the empty cabinet per hour shall take place. The differential pressure at the connection point to the ventilation system shall not exceed 150 Pa compared to the ambient pressure. The low pressure, which the ventilation system causes inside the cabinet, shall not significantly compromise the opening of the closing elements. Part of the ventilation shall be effective immediately above the bottom tray of the cabinet. For testing details see C.3.

NOTE An air exchange rate of greater than 10 h⁻¹ can be necessary for other reasons and is not covered by this standard.

5.6 Storage level

The storage levels and their fastenings shall be of non-absorbent material and shall carry the load specified in the user information (see Clause 7). The storage levels shall not hinder the automatic closure of the doors. This shall be tested by a functional test. Pull-out storage levels shall not cause the cabinet to topple, not even when it is fully loaded.

NOTE For better ventilation, perforated storage levels or gratings as storage levels can be useful.

The highest storage level shall be not higher than 1,75 m from the floor.

5.7 Spill containment sump

The spill containment sump shall have a minimum capacity of 10 % of the volume of all the containers stored in the cabinet, or at least 110 % of the volume of the largest single container, whichever is the greater. All spillages or condensation up to this volume shall be retained.

In multi-level storage cabinets, the lowest spill containment sump shall be below the lowest storage level. In the case where the spill containment sump constitutes at the same time the lowest storage level, it shall be designed such that it meets the requirements regarding the minimum capacity of collection even when this storage level is fully loaded.

The sump shall perform its function at 220 °C during the entire time of its type classification according to Table 1. This shall be certified by the manufacturer's declaration.

Attention should be paid to national regulation, as these may request higher collection capacities than mentioned above, e.g. out of environmental protection reasons.

5.8 Penetrations for pipes, hoses and electrical cables

Pipes, hoses and electrical cables, if installed, shall only be lead through predefined penetrations parts which shall be indicated in the manufacturer's specifications. The pipes, hoses and electrical cables shall not compromise the requirements for fire resistance established in the type test according to Annex A (see Clause 6).

Unused penetrations shall be sealed according to the manufacturer's specifications.

The materials of the pipes, tubes and electrical cables shall comply with the requirements defined in the additional small fire test according to Annex B and shall be given in the user information (see Clause 7).

6 Fire resistance

The fire resistance capability of the cabinet shall be investigated by a type test. This test shall be performed by heating the cabinet in a furnace according to the time-temperature curve described in EN 1363-1:2020, 5.1.1, and measuring the temperature increase inside the cabinet. The cabinet shall then be classified as type 30, 60 or 90, according to the time for which the interior temperature does not rise by more than 180 K at any point of measuring, starting at a temperature of (20 ± 5) °C. The test is given in Annex A.

Annex B specifies the requirements of the type test of cabinets with construction alterations compared to a model already tested.