SLOVENSKI STANDARD
SIST EN 14175-2:2003

01-oktober-2003

Fume cupboards - Part 2: Safety and performance requirements

Fume cupboards - Part 2: Safety and performance requirements

Abzüge - Teil 2: Anforderungen an Sicherheit und Leistungsvermögen

Sorbonnes - Partie 2: Exigences de sécurité et de performances

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EUROPEAN STANDARD

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Fume cupboards - Part 2: Safety and performance requirements

Sorbonnes - Partie 2: Exigences de sécurité et de performances

Abzüge - Teil 2: Anforderungen an Sicherheit und Leistungsvermögen

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 14175-2:2003) has been prepared by Technical Committee CEN/TC 332, "Laboratory Equipment", 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of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

This part of EN 14175 is applicable from the date of publication (DOP). For fume cupboards complying with a national standard in Europe until DOP, this part of EN 14175 or the national standard may be applied until DOP + 6 months.

This part of EN 14175 is not applicable to fume cupboards which have been installed in the workplace before DOP + 6 months if not otherwise declared by the manufacturer.

EN 14175 consists of the following parts, under the general title *Fume cupboards*

- Part 1: Vocabulary
- Part 2: Safety and performance requirements
- Part 3: Type test methods
- Part 4: On-site test methods
- Part 5: Recommendations for installation and maintenance (in preparation)
- Part 6: Variable air volume fume cupboards (in preparation)

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According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The performance of a fume cupboard can be expressed conveniently in qualitative terms as the ability to contain and remove a pollutant or pollutants released from a source within the workspace of the fume cupboard, as well as the ability to minimise possible perturbing influences, such as air draughts, operator movement, personnel traffic. This is effected by an inward airflow through its opening, reducing risk to the operator and other personnel which is the primary function of this type of protective device. Other important performance criteria are the protection against splashes, dangerous atmospheres and the effects of implosions.

The safety requirements given in this part 2 of the European Standard provide a guideline for the construction of fume cupboards and serve as basis for testing of fume cupboards.

Two different procedures to investigate the safety and performance are available:

a) type testing in accordance with the requirements given in this part 2 and the test methods given in part 3 of this European Standard;

b) testing on-site in accordance with the requirements given in this part 2 and the test methods given in part 4 of this European Standard. This on-site testing investigates an individual fume cupboard in its particular environment and does not constitute a type test. The results cannot be transferred to further production of the design or model of the fume cupboard concerned.

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1 Scope

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This part 2 of EN 14175 specifies safety and performance requirements and objectives for general purpose fume cupboards. In addition, dimensions and marking of general purpose fume cupboards are specified as well as requirements on the product manual to be supplied with fume cupboards.

Recommendations on the evaluation of conformity of general purpose fume cupboards with the requirements of this part 2 of EN 14175 are given in the informative annex A.

For terms and definitions of fume cupboards EN 14175-1 applies. For type testing of fume cupboards prEN 14175-3 applies. For microbiological safety cabinets EN 12469 applies.

This part of EN 14175 does not address recirculatory filtration fume cupboards or fume cupboards for carrying out work on radioactive materials. For special purpose fume cupboards other requirements may apply.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology.*

EN 292-2, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications.*

EN 12600:2002, *Glass in building - Pendulum test - Impact test method and classification for flat glass*

EN 13150:2001, *Workbenches for laboratories – Dimensions, safety requirements and test methods.*

EN 13792, *Colour coding of taps and valves for use in laboratories.*

EN 14175-1:2003, *Fume cupboards - Part 1: Vocabulary.*

prEN 14175-3:2003, *Fume cupboards - Part 3: Type test methods.*

EN 60529, *Degrees of protection provided by enclosures (IP-Code) (IEC 60529:1989).*

EN ISO 12543-1, *Glass in building - Laminated glass and laminated safety glass - Part 1: Definitions and description of component parts (ISO 12543-1:1998).*

3 Terms and definitions

For the purposes of this part 2 of EN 14175, the terms and definitions given in EN 14175-1:2003 apply.

4 Dimensions

4.1 Overall width of fume cupboard

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The overall width of fume cupboards shall be a multiple of 100 mm with preferable dimensions of 1200 mm and 1500 mm.

4.2 Overall depth of fume cupboard

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The overall depth of fume cupboards shall be between 600 mm and 1200 mm.

4.3 Height of work surface

The height of the work surface of fume cupboards shall not exceed (900^{+50}_{0}) mm with preferable heights of 0 mm, 500 mm, 720 mm and 900 mm with a tolerance of ± 50 mm.

4.4 Dimensions for customized fume cupboards

Other dimensions than those given in 4.1 to 4.3 may be agreed between customer and manufacturer. Tolerances shall be specified by the manufacturer.

5 Basic safety and performance objectives

Fume cupboards shall be designed such that

- hazardous concentrations or quantities of airborne contaminants are prevented from escaping from the fume cupboard into the room;
- fumes are removed efficiently to reduce the susceptibility to an explosive or hazardous atmosphere inside the workspace;
- the user is protected by a front sash against splashes of substances and flying particles.

6 Materials

6.1 General requirements

Fume cupboards shall be made of materials which withstand the anticipated mechanical, chemical and thermal stresses during expected use and shall not be easily combustible.

The materials of construction of those parts of the fume cupboard (excluding services) that are likely to come into contact with the fumes shall be selected to suit the nature of the process carried out within the fume cupboard.

6.2 Glass components

Any glass component ≥ 0,1 m^2 and any part of which is less than 900 mm above the floor shall comply with EN 12600:2002, type 2B or type 2C.

6.3 Sash

The sash shall be transparent. It shall be made from materials to give optimal physical protection from the accidental emission of substances.

Toughened or laminated glass in accordance with EN 12600, type 2B or type 2C or in accordance with EN ISO 12543-1 or suitable plastics materials shall be used for the sash between the operator and the workspace.

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7 Basic safety requirements

7.1 General requirements

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Fume cupboards shall comply with relevant safety requirements specified in EN 13150:2001, clause 5, and with the following clauses of this European Standard.

7.2 Construction

7.2.1 Workspace

The workspace of a fume cupboard shall be enclosed by side walls, rear wall, front wall with sash, top wall and work surface. There shall be no sashes in side walls to the room. Openings and ducts in side walls between fume cupboards shall be closable.

7.2.2 Work surface

The work surface of bench type and low level fume cupboards shall be flat with a raised edge at the front. Preferably, the raised edge should surround the work surface at all sides. If a spillage tray is fitted, provision shall be made for spillage to pass down to, and be contained by, the spillage tray underneath. The spillage tray shall be ventilated. Gaps at the side of the work surface shall be provided to allow spilt liquid to drain into the spillage tray rapidly.

The work surface shall carry a minimum load of 2000 N applied on an area of 120 mm x 120 mm without damage or deformation. The work surface of walk-in fume cupboards may be integrated in the floor of the room.

7.2.3 Baffles

Baffles shall be constructed in such a way as to be easily cleaned and maintained. It shall not be possible to alter their position from the original design positions.

7.2.4 Pressure relief

If a pressure relief for the case of an explosion in the workspace is required, a means of effectively relieving a pressure wave shall be provided. The fume cupboard shall be designed such that the pressure relief cannot be a danger for the operating personnel or any other person in the fume cupboard's surrounding.

7.2.5 Maintenance access

Provision shall be made for safe and reasonably convenient access to all mechanical and electrical equipment provided as part of the fume cupboard.

7.2.6 Base

The base of the fume cupboard shall carry the fume cupboard and the minimum surface load in accordance with 7.2.2 without deformation or unsteadiness.

7.3 Sash

7.3.1 Operational sash opening

The operational sash opening shall be variable in the direction of the sash movement. Its maximum position should preferably be 500 mm in the direction of sash movement and shall not exceed 600 mm. This dimension shall be clearly marked on the fume cupboard. No limits are specified for walk-in and low level fume cupboards.

7.3.2 Sash stop

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For vertical sash(es), some form of stop shall be incorporated to prevent the sash being opened more than the maximum operational sash opening. It shall not be possible to override the stop more than the maximum operational sash opening without a deliberate act on the part of the operator. The design of the sash stop shall ensure that the sash stop is automatically reset when the sash is returned to a position less than the maximum operational sash opening.

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An audible and visual sash alarm should also be incorporated to indicate to the operator that the sash is opened to more than the maximum operational sash opening. The audible alarm may be silenced once alarmed.

7.3.3 Sash suspension

When tested in accordance with prEN 14175-3:2003, 6.1, a vertical sash shall be such that it cannot fall when one suspension device fails. Closing and opening the sash shall not present a danger of injury. The sash shall be capable of being stopped in any position.

Sash suspension devices shall either not be exposed to the workspace atmosphere or otherwise be appropriately protected against corrosive atmospheres.

7.3.4 Sash displacement force

When measured in accordance with prEN 14175-3:2003, 6.2, the force necessary to move a single sash shall be a maximum of 30 N or a maximum of 50 N for multiple sashes..

If the fume cupboard is provided with a powered sash, the automatic movement shall be capable of being overridden by manual interaction. It should have a detection device to stop movement if an obstruction occurs. This obstruction may be transparent. The speed for automatic movement shall not exceed 0,5 m/s. Powered sash(es) shall comply with EN 292-1 and EN 292-2.

7.3.5 Protection against splashes

The sash shall be designed in such a way as to minimise danger from splashes of substances or flying particles when the sash is closed to its minimum position. Spilled liquids dropping from the sash should be prevented from escaping outside the workspace.