SLOVENSKI STANDARD
SIST-TS CEN/TS 17441:2020

01-junij-2020

Laboratorijska oprema - Sistemi prezračevanja v laboratorijih

Laboratory installations - Ventilation systems in laboratories

Laboreinrichtungen - Lufttechnik in Laboratorien

Installations de laboratoire - Systèmes de ventilation pour laboratoires

Ta slovenski standard je istoveten z: **CEN/TS 17441:2020**

ICS:

71.040.10	Kemijski laboratoriji. Laboratorijska oprema	Chemical laboratories. Laboratory equipment
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

SIST-TS CEN/TS 17441:2020 **en,fr,de**

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 17441

April 2020

ICS 91.140.30; 71.040.10

English Version

Laboratory installations - Ventilation systems in laboratories

Installations de laboratoire - Systèmes de ventilation pour laboratoires

Laboreinrichtungen - Lufttechnik in Laboratorien

This Technical Specification (CEN/TS) was approved by CEN on 27 January 2020 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. CEN/TS 17441:2020 E

Contents

Page

European foreword ... 3
Introduction ... 4
1 Scope ... 5
2 Normative references ... 5
3 Terms and definitions ... 5
4 Tasks of the ventilation system ... 9
5 Design and construction of ventilation systems ... 10
5.1 General ... 10
5.2 Design criteria ... 11
5.3 Air volumes ... 12
5.4 Design parameter ... 13
5.5 Airflow within the room ... 15
5.6 Room air quality ... 15
6 Requirements for supply air systems ... 15
6.1 General ... 15
6.2 Supply air system ... 16
6.3 Ratio supply air to extract air ... 16
7 Requirements for extract air systems ... 16
7.1 Extract air layout ... 16
7.2 Extract air ducts ... 17
7.3 Arrestment and filter systems ... 19
7.4 Exhaust fans ... 19
7.5 Maintenance and repair ... 19
7.6 Explosion protection ... 19
8 Sound pressure level ... 20
9 Ventilation systems in microbiology laboratories ... 20
10 Ventilation system information and laboratory labelling ... 20
Annex A (informative) National regulations on ventilation ... 21
A.1 General ... 21
A.2 France ... 21
A.3 The Netherlands ... 21
A.4 Germany ... 21
A.5 Spain ... 22
Bibliography ... 23

European foreword

This document (CEN/TS 17441:2020) has been prepared by Technical Committee CEN/TC 332 “Laboratory equipment”, the secretariat of which is held by DIN.

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

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

Introduction

Operation of ventilation systems in laboratory buildings or in individual laboratory rooms requires particular care and attention due to its safety relevance. This applies for users of ventilation systems as well as for operators of laboratory buildings.

This technical specification supports design, planning, execution and maintenance tasks of these ventilation systems. A special expertise with regard to the operation and function of laboratories and the effectiveness of technical laboratory equipment is required, particularly because of the many possible interfaces for extract air equipment relevant to safety.

1 Scope

This document applies for the planning, design, installation and commissioning of ventilation systems in laboratories. It also applies for scientific classrooms in schools when equipped with a ventilation system.

The application of this document depends not on the term laboratory in its narrower sense but this document also applies also for laboratory-related rooms in which work with dangerous or health hazardous substances is performed.

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 12128:1998, *Biotechnology — Laboratories for research, development and analysis — Containment levels of microbiology laboratories, areas of risk, localities and physical safety requirements*

EN 12792:2003, *Ventilation for buildings — Symbols, terminology and graphical symbols*

EN 14175-2, *Fume cupboards — Part 2: Safety and performance requirements*

EN 14175-7, *Fume cupboards — Part 7: Fume cupboards for high heat and acidic load*

EN 14470-1, *Fire safety storage cabinets — Part 1: Safety storage cabinets for flammable liquids*

EN 14470-2, *Fire safety storage cabinets — Part 2: Safety cabinets for pressurised gas cylinders*

EN 16798-1, *Energy performance of buildings — Ventilation for buildings — Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics — Module M1-6*

EN 16798-3:2017, *Energy performance of buildings — Ventilation for buildings — Part 3: For non-residential buildings — Performance requirements for ventilation and room-conditioning systems (Modules M5-1, M5-4)*

CEN/TR 16798-4:2017, *Energy performance of buildings — Ventilation for buildings — Part 4: Interpretation of the requirements in EN 16798-3 — For non-residential buildings — Performance requirements for ventilation and room-conditioning systems (Modules M5-1, M5-4)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792 and the following apply. For the different types of air in a laboratory or in a laboratory building EN 16798-3:2017, Table 6, applies.

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

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

3.1
laboratory
workspace with associated areas, such as access and support areas, with specific technical requirements for which ventilation may be required

Note 1 to entry: In a laboratory, tasks are usually carried out during which possible hazards or potential sources of nuisance, e.g. due to substances or procedures, can be kept under control. A ventilation system is usually essential for such a task and can also be necessary for environmental control.

3.2
useable laboratory floor space
floor space of a laboratory room or a laboratory area; not included as useable laboratory floor space are constructionally separated corridors and areas used for writing or analysis of results with a separated ventilation

Note 1 to entry: Areas for writing or analysis of results can be considered to be separated from the useable laboratory floor space e.g. by a suitable directed air flow.

3.3
extract air equipment
laboratory equipment that requires specified extract air volumes for its proper function, e.g. fume cupboards, safety storage cabinets and local extract devices (see 3.9) or safety workbenches with extract air connection

Note 1 to entry: Extract air equipment may need constant, intermitting or a continuously changing (hereinafter referred to as “variable”) extracted air. Knowledge of all extract air equipment of a laboratory (see 3.4 to 3.17.) is important for balancing the air volumes of the ventilation system.

3.4
fume cupboard
protective device to be ventilated by an induced flow of air through an adjustable working opening

— with an enclosure designed to limit the spread of airborne contaminants to operators and other personnel outside the device,

— offering a degree of mechanical protection, and

— providing for the controlled release of airborne contaminants

Note 1 to entry: A fume cupboard is a ventilated enclosure complying with the requirements specified in EN 14175-2.

[SOURCE: EN 14175-1:2003, 3.1]

3.5
pressure cascade
process whereby air flows from one area, which is maintained at a higher pressure, to another area at a lower pressure

3.6
recirculatory filtration fume cupboard
protective device able, by trapping specified pollutants, to exhaust air back to the room

[SOURCE: EN 14175-1:2003, 3.6 modified - “room” was deleted from “room air” in the definition]

3.7
air-extracted workplace
containment device with the required level of protection established by risk assessment

Note 1 to entry: An air-extracted workplace may be regarded as a form of extract air equipment. At an air-extracted workplace, not all protective measures of a fume cupboard are achieved, e.g. physical protection against splashes and splinters cannot be given.

3.8
air-extracted enclosure
extract air equipment for a specific local routing of air that usually meets one of the protective aims named in 3.4, e.g. dilution of pollutants in the interior to avoid hazardous, explosive atmospheres

3.9
local extract device
extract air equipment for local routing of air, e.g. to extract air around appliances and open bottles or drums, typically with a flexible hose routing or articulated extract arm

Note 1 to entry: Articulated extract arm is abbreviated often by AEA.

3.10
microbiological safety cabinet
MSC
ventilated enclosure intended to offer protection to the user and the environment from the aerosols arising from the handling of potentially hazardous and hazardous microorganisms, with air discharged to the atmosphere being filtered

[SOURCE: EN 12469:2000, 3.3]

3.11
equipment vent lines
pipework in a laboratory, usually under negative pressure (relative to atmosphere), for laboratory equipment outlets without a significant extract air volume

Note 1 to entry: A relieving pipework (with pump that creates a vacuum) usually is extract air equipment.

3.12
ventilated storage cabinet
ventilated laboratory equipment to store and provide substances that may constitute toxic hazards or may contribute to the fire load or other hazards

Note 1 to entry: Safety storage cabinets are extract air equipment as soon as they are operated with extract air. This is the most frequent operating mode. For safety storage cabinets for flammable liquids, see EN 14470-1, for safety storage cabinets for pressurized gas cylinders see EN 14470-2.

Note 2 to entry: Ventilated storage cabinets should generally comply with EN 14056.

3.13
ventilated animal enclosure
enclosure to house animals and to limit exposure to allergenic substances or to provide containment for pathogens

Note 1 to entry: Individually ventilated cages (IVCs).

3.14
ventilated weighing workplace
workplace with directed air routing for weighing toxic substances without affecting the weighing process with airflows

3.15
bench extraction
extract air equipment for a directed air routing above or on the side of a laboratory bench

Note 1 to entry: A bench extraction usually is executed as a hood to capture ascending gases or vapours, e.g. for hydrogen or hot exhaust air, from e.g. analytical equipment.

3.16
underbench extraction
extract air equipment for a directed air routing below a laboratory bench

Note 1 to entry: An underbench extraction usually is executed to extract gases or vapours with a higher density than air and can e.g. be carried out by means of a perforated worktop (downdraught bench).

3.17
floor extraction
extract air equipment where air is extracted at, close to or through a floor

Note 1 to entry: The floor extraction may stand alone in the room, be integrated into laboratory furniture or embedded in floors or walls.

3.18
ventilation system for laboratories
totality of fix installed technical devices for supply and disposal of air in a laboratory room or laboratory building

Note 1 to entry: Laboratory ventilation systems usually contain air intakes and outlets, piping and ducts for ventilation purposes, dampers, valves, control devices, fans, sound attenuators, etc. The interface to the laboratory furniture usually is at the scheduled ventilation connection of the respective laboratory furniture or in the wall or ceiling intake and outlet of the laboratory (room).

3.19
air exchange rate
number of times per hour that the total volume of the air movement due to the ventilation system is exchanged with outdoor air in comparison to the volume of the space

3.20
chemicals storage room
room that is particularly used to store or provide chemicals in closed vessels

Note 1 to entry: Collection rooms in schools are not regarded as chemicals storage rooms.

3.21
solvents room
room with special equipment for storage or provision of organic solvents and other substances with a low ignition point in closed vessels

3.22
outdoor air
total volume or proportion of air entering the system or opening from outdoors before any air treatment

[SOURCE: EN 16798-3:2017, Table 6 modified - "total volume or proportion of" was added in the beginning]

3.23
supply air
airflow entering the treated room, or air from the system entering the room after any treatment

3.24
extract air
airflow leaving the treated room and entering the air treatment system

[SOURCE: EN 16798-3:2017, Table 6]

3.25
recirculation air
extract air that is returned to the air treatment system and reused as supply air

[SOURCE: EN 16798-3:2017, Table 6]

3.26
exhaust air
airflow leaving the extract air treatment system and discharged to the atmosphere

[SOURCE: EN 16798-3:2017, Table 6]

3.27
secondary air
airflow taken from a room and returned to the same room after any treatment

[SOURCE: EN 16798-3:2017, Table 6, modified - note has been removed]

3.28
separative devices
isolators, glove boxes and similar total containment devices

Note 1 to entry: See EN ISO 14644-7.

4 Tasks of the ventilation system

Ventilation systems in laboratories shall meet following requirements:

a) They shall dilute and remove small amounts of hazardous substances (gases, vapours, dust, and aerosols) which can be released in laboratories to such an extent that health risks by inhalation are avoided. Hazardous substances should be captured or contained as close to their point of origin as possible, e.g. by extract air equipment;

NOTE The room air in the common area, usually from the floor to a room height of 2 m, is regarded as accessible to breathing.