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Fire resistance tests for service installations - Part 9:
Single compartment smoke extraction ducts

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN 1366-9:2024 sisaldab Euroopa standardi EN 1366-9:2024 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 16.10.2024.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN 1366-9:2024 consists of the English text of the European standard EN 1366-9:2024.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 16.10.2024.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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ICS 13.220.50, 91.140.30

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EUROPEAN STANDARD

EN 1366-9

NORME EUROPÉENNE

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English Version

Fire resistance tests for service installations - Part 9: Single compartment smoke extraction ducts

Essais de résistance au feu des installations techniques
- Partie 9 : Conduits d'extraction de fumées relatifs à un
seul compartiment

Feuerwiderstandsprüfungen für Installationen - Teil 9:
Entrauchungsleitungen für einen Einzelabschnitt

This European Standard was approved by CEN on 2 September 2024.

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

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

Contents	Page
European foreword	5
Introduction	7
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions.....	9
4 Test equipment.....	10
4.1 General.....	10
4.2 Furnace	10
4.3 Perforated plate	10
4.4 Air velocity measuring station.....	11
4.5 Ambient temperature leakage measuring device.....	11
4.6 Pressure sensors for differential pressure control.....	11
4.7 Welded connecting tube.....	11
4.8 Extract fan connecting duct.....	11
4.9 Extraction fan	12
4.10 Thermocouples.....	12
4.11 Oxygen measuring equipment	12
4.12 Oxygen measurement probes.....	12
4.13 Restraint equipment.....	12
4.14 Deflection measurements.....	12
5 Test conditions	12
5.1 Differential pressure conditions.....	12
5.2 Heating and pressure conditions.....	12
6 Test specimen	13
6.1 Size	13
6.1.1 Length.....	13
6.1.2 Cross-section	13
6.2 Number	13
6.3 Design.....	13
7 Installation of test specimen.....	14
7.1 General.....	14
7.2 Supporting construction	14
7.3 Duct arrangement.....	14
7.4 Restraint of ducts.....	14
7.4.1 Inside the furnace	14
7.4.2 Outside the furnace.....	14
7.5 Perforated plate	15
8 Conditioning	15
8.1 General.....	15
8.2 Water based sealing materials.....	15
9 Application of instrumentation	15
9.1 Thermocouples.....	15

9.1.1	Furnace thermocouples (plate thermometers).....	15
9.1.2	Gas temperature within flow nozzles.....	15
9.2	Pressure	15
9.2.1	Furnace pressure.....	15
9.2.2	Differential under-pressure in duct.....	15
9.3	Oxygen measurements	16
9.4	Deflection measurement for determination of reduction of internal cross-sectional area	16
10	Test procedure	17
10.1	Pre-test adjustment	17
10.1.1	Oxygen-measuring instrument.....	17
10.1.2	Perforated plate	17
10.2	Leakage measurement at ambient temperature.....	17
10.3	Pre-fire test procedures	18
10.4	Fire test.....	18
10.5	Termination of test	19
11	Performance criteria	20
11.1	General requirements.....	20
11.2	Criteria at ambient temperature	20
11.2.1	Ambient leakage	20
11.2.2	Maintenance of cross-section under ambient conditions outside the furnace	20
11.3	Criteria under fire conditions	20
11.3.1	General	20
11.3.2	Integrity	20
11.3.3	Smoke leakage	21
12	Test report	21
13	Direct field of application of test results.....	21
13.1	General	21
13.2	Duct sizes.....	22
13.3	Suspension device	22
13.4	Pressure difference.....	22
13.5	Vertical part of duct.....	22
13.6	Steel ducts	22
Annex A	(informative) Measurement of volume/mass flow	36
A.1	Hints on measuring volume flow or mass flow with differential pressure devices	36
A.2	Density.....	36
A.3	Absolute pressure (barometric pressure)	36
A.4	Viscosity	37
A.5	Characteristic data of the inlet nozzles according to Figure 10.....	37
Annex B	(informative) Measurement of oxygen content.....	40
B.1	Details on measuring oxygen content with parametric cell analysers	40
B.2	Choice of O ₂ measuring devices.....	40
B.3	Effect of O ₂ measuring device errors	41
B.4	Zero and end point drift.....	41
B.5	Details on the creation of an oxygen content from 12,5 to 13,5 vol % within the furnace	43

Annex C (informative) The usage of correction factors for the consideration of different parameters.....	44
C.1 Details for the development of the correction factors and their error limits.....	44
C.2 The complete formula for the leakage mass flow and the parameters.....	44
C.3 Application of correction factors in the simple mass flow formulae and achievable accuracy	47
Bibliography	49

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European foreword

This document (EN 1366-9:2024) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

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 April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.

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.

This document supersedes EN 1366-9:2008.

In comparison with the previous edition, the following technical modifications have been made:

- method for determination of reduction in internal cross-sectional area was added;
- positions for measurement of deflection of cross-section outside furnace were defined;
- introduction of an alternative oxygen sampling probe;
- use of two separate O₂ analysers based on paramagnetic measurement method for the two sampling points is mandatory;
- direct field of application for vertical parts of duct within the smoke compartment was added, without penetrating any wall/floor where fire resistance is required;
- details of holes in perforated plate for circular ducts were included in figures;
- standard for gas temperature thermocouples were added;
- location of compensators (if used) were amended.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

EN 1366, *Fire resistance tests for service installations* consists of the following parts:

- *Part 1: Ventilation ducts*
- *Part 2: Fire dampers*
- *Part 3: Penetration seals*
- *Part 4: Linear joint seals*
- *Part 5: Service ducts and shafts*
- *Part 6: Raised access and hollow core floors*
- *Part 7: Conveyor systems and their closures*
- *Part 8: Smoke extraction ducts*

- *Part 9: Single compartment smoke extraction ducts*
- *Part 10: Smoke control dampers*
- *Part 11: Fire protective Systems for cable systems and associated components*
- *Part 12: Non-mechanical fire barrier for ventilation ductwork*
- *Part 13: Chimneys*
- *Part 14: Partial penetration seals*

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, 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, Türkiye and the United Kingdom.

Introduction

This part of this European Standard has been prepared because a method of test for smoke extraction ducts used in single compartment applications has become necessary. This test exposes a smoke extraction duct to conditions intended to represent the pre-flashover stage of a fire.

Leakage is measured at both ambient temperature and exposure at 600 °C. During the tests, air/gases are drawn through the duct at a differential pressure between the inside and outside of the duct. Leakage is determined at ambient temperature by sealing the openings in the duct located in the furnace and taking flow measurements through a flow measuring device located just before the extraction fan. With respect to determining leakage at 600 °C, oxygen-measuring techniques are used.

CAUTION — The attention of all persons concerned with managing and carrying out this fire resistance test is drawn to the fact that fire testing may be hazardous and that there is a possibility that toxic and/or harmful smoke and gases may be evolved during the test. Mechanical and operational hazards may also arise during the construction of the test elements or structures, their testing and disposal of test residues.

An assessment of all potential hazards and risks to health should be made and safety precautions should be identified and provided. Written safety instructions should be issued. Appropriate training should be given to relevant personnel. Laboratory personnel should ensure that they follow written safety instructions at all times.

1 Scope

This part of EN 1366 specifies a test method for determining the fire resistance of smoke extraction ducts that are used for single compartment applications only. In such applications, the smoke extraction system is only intended to function up to flashover (typically 600 °C).

This method of test is only suitable for ducts constructed from non-combustible materials (class A1 and A2-s1, d0 according to EN 13501-1).

It is applicable only to four sided and circular ducts. One-, two- and three-sided ducts are not covered. This document is applicable only for the standard sizes or smaller as described.

This test method of part 9 is applicable only to smoke extraction ducts that do not pass into other fire compartments. For smoke extraction ducts that pass into other compartments, the method of test described in EN 1366-8 is used.

The smoke extraction duct is part of the smoke extraction system which also includes smoke control dampers and smoke extract fans.

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, *Fire resistance tests — Part 1: General requirements*

EN 1366-1, *Fire resistance tests for service installations — Part 1: Ventilation ducts*

EN 1507, *Ventilation for buildings — Sheet metal air ducts with rectangular section — Requirements for strength and leakage*

EN 12237, *Ventilation for buildings — Ductwork — Strength and leakage of circular sheet metal ducts*

EN 10095, *Heat resisting steels and nickel alloys*

EN 13501-4, *Fire classification of construction products and building elements — Part 4: Classification using data from fire resistance tests on components of smoke control systems*

EN 60584-1, *Thermocouples — Part 1: EMF specifications and tolerances (IEC 60584-1)*

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)*

EN ISO 5167-2, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 2: Orifice plates (ISO 5167-2)*

EN ISO 5167-3, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 3: Nozzles and Venturi nozzles (ISO 5167-3)*

ISO 10294-3:1999, *Fire resistance tests — Fire dampers for air distribution systems — Part 3: Guidance on the test method*

EN ISO 13943, *Fire safety — Vocabulary (ISO 13943)*

ISO 5221, *Air distribution and air diffusion — Rules to methods of measuring air flow rate in an air handling duct*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1 and EN ISO 13943 and the following 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

single compartment smoke extraction ducts

ducts for use within single fire compartment application

3.2

suspension devices

components used for securing a duct to a load bearing structure

[SOURCE: EN 1366-8:2024, definition 3.4]

3.3

supporting construction

wall which the duct passes through in the test

3.4

single fire compartment

fire area of a single compartment building bounded by fire-resistant elements

3.5

smoke zone (zone)

area into which a construction work is divided for the extraction of smoke and hot gases and served by a SHEVS (or sub-system of a SHEVS), which is initiated by a signal from a single or group of initiation devices associated with the zone

3.6

compensator

device used to prevent damage to the duct and/or the structural elements (horizontal or vertical) from the forces that are generated by the thermal expansion of the duct and/or its suspension devices

3.7

smoke and heat exhaust ventilation system

SHEVS

system consisting of products and/or components jointly selected to exhaust smoke and heat

Note 1 to entry: The products and/or components form a system in order to establish a buoyant layer of warm gases above cooler cleaner air

[SOURCE: EN 12101-7:2011, definition 3.8]