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Fire resistance tests for service installations - Part 8: Smoke extraction ducts

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Fire resistance tests for service installations - Part 8: Smoke extraction ducts

Essais de résistance au feu des installations techniques - Partie 8 : Conduits d'extraction de fumées

Feuerwiderstandsprüfungen für Installationen - Teil 8: Entrauchungsleitungen

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

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 1366-8:2024) 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of an identical text or by endorsement, at the latest by April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.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 1366-8:2004.

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

— method for determination of reduction in internal cross-sectional area is added;

— positions for measurement of deflection of cross-section outside furnace are defined;

— introduction of an alternative oxygen sampling probe;

— use of two separate O_2 analysers based on paramagnetic measurement method for the two sampling points is mandatory;

— accuracy of ambient leakage measuring device revised from ±5 % to ±2,5 %;

— standard for gas temperature thermocouples added;

— failure criteria for mechanical stability of duct inside furnace defined.

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.*

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 document has been prepared because a method of test for fire resisting smoke extraction ducts has become necessary to evaluate the ability of fire resisting ducts already tested to EN 1366-1 to function adequately as smoke extraction ducts.

Leakage is measured at both ambient and elevated temperatures. 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 elevated temperatures, oxygen concentration measuring techniques are used.

The method described in this test is complex and requires sophisticated instrumentation. It is not recommended therefore to try to test multiple assemblies in this test.

CAUTION — The attention of all persons concerned with managing and carrying out this fire resistance test is drawn to the fact that fire testing can be hazardous and that there is a possibility that toxic and/or harmful smoke and gases might be evolved during the test. Mechanical and operational hazards might 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 document specifies a test method for determining the fire resistance of smoke extraction ducts. It is applicable only to smoke extraction ducts that pass through another fire compartment apart from the compartment from where smoke needs to be extracted in case of fire. It represents fire exposure of a fully developed fire.

This method of test is only applicable to fire resistant ventilation ducts (same construction) with the following classification according to EN 13501-3:

— fire from inside and outside i ↔ o;

— applicable to a pressure difference up to 500 Pa in fire conditions;

NOTE 1 It is assumed that the duct A test(s) in accordance with EN 1366-1 has been performed with an under-pressure of minimum 500 Pa.

— with integrity (E) and insulation (I) criteria equal to or higher than the intended classification for the smoke extraction duct.

For the purposes of the test described in this document, the duct is referred to as duct C.

This test method has been designed to cover both vertical and horizontal smoke extraction ducts. A vertical system need not be evaluated to this method provided that:

— both horizontal (ho) and vertical (ve) classification according to EN 13501-3 has been obtained for the ventilation duct;

— it has been tested in a horizontal orientation to this method.

If the ventilation duct in practise is only used for vertical applications in smoke extraction systems, only vertical (ve) classification is obtained in accordance with EN 13501-3 and tested only in a vertical orientation to this test method.

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

NOTE 2 Reaction with components of the duct can affect the oxygen concentration inside the duct leading to inaccurate calculation of the leakage rate. If it is determined this has happened refer to Annex D.

This document applies to four sided rectangular and circular ducts only (with fire exposure on all sides). Ducts that utilize elements of construction for one, two or three sides are not covered. An alternative test method for one, two and three sided ducts will be developed separately.

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 10095, *Heat resisting steels and nickel alloys*

EN 13501-3, *Fire classification of construction products and building elements — Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers*

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

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

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)*