

Nederlandse norm

NEN-EN 1366-1

(en)

Bepaling van de brandwerendheid van installaties
- Deel 1: Ventilatiekanalen

Fire resistance tests for service installations - Part
1: Ventilation ducts

Vervangt NEN-EN 1366-1:1999;
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Nederlands voorwoord

Voor de in deze norm vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

<u>vermelde norm</u>	<u>Nederlandse norm</u>	<u>titel</u>
EN 1363-1	NEN-EN 1363-1	Bepaling van de brandwerendheid - Deel 1: Algemene eisen
EN 1364-1:1999	NEN-EN 1364-1:1999	Bepaling van de brandwerendheid van niet-dragende bouwdelen - Deel 1: Wanden
EN 1366-8	NEN-EN 1366-8	Bepaling van de brandwerendheid van installaties - Deel 8: Rookafvoerkanalen
EN 1507	NEN-EN 1507	Ventilatie van gebouwen - Rechthoekige dunwandige metalen luchtkanalen - Eisen voor sterkte en lekkage
EN 12237	NEN-EN 12237	Ventilatie van gebouwen - Luchtleidingen - Sterkte en lektheid van ronde dunwandige metalen
EN 15882-1	NEN-EN 15882-1	Uitbreiding geldigheidsgebied van resultaten van brandwerendheidsproeven voor installaties - Deel 1: Ventilatiekanalen
EN 60584-1	NEN-EN-IEC 60584-1	Thermokoppels - Deel 1: EMF specificaties en toleranties
EN ISO 898-1	NEN-EN-ISO 898-1	Mechanische eigenschappen van bevestigingsartikelen van koolstofstaal en gelegeerd staal - Deel 1: Bouten, schroeven en tapeinden met gespecificeerde eigenschapsklassen - Ruwe schroefdraad en metrische fijne schroefdraad
EN ISO 5167-1	NEN-EN-ISO 5167-1	Metingen van gas- en vloeistofstromen in leidingen met volledige stroming en een cirkelvormige doorsnede met gebruik van drukverschilmeters - Deel 1: Algemene principes en voorwaarden
EN ISO 5167-2	NEN-EN-ISO 5167-2	Metingen van gas- en vloeistofstromen in leidingen met volledige stroming en een cirkelvormige doorsnede met gebruik van drukverschilmeters - Deel 2: Meetschijven
EN ISO 5167-3	NEN-EN-ISO 5167-3	Metingen van gas- en vloeistofstromen in leidingen met volledige stroming en een cirkelvormige doorsnede met gebruik van drukverschilmeters - Deel 3: Nozzles en Venturi-nozzles
EN ISO 13943	NEN-EN-ISO 13943	Brandveiligheid - Woordenlijst

Voorbeeld
Preview

English Version

Fire resistance tests for service installations - Part 1: Ventilation ducts

Essais de résistance au feu des installations techniques -
 Partie 1: Conduits de ventilation

Feuerwiderstandsprüfungen für Installationen - Teil 1:
 Lüftungsleitungen

This European Standard was approved by CEN on 13 June 2014.

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Preview
 NEN-EN 1366-1:2014

Foreword

This document (EN 1366-1:2014) 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 2015 and conflicting national standards shall be withdrawn at the latest by April 2015.

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

This document supersedes EN 1366-1:1999.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the Construction Product Directive.

EN 1366 "Fire resistance tests for service installations" consists of the following:

- 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 floors;
- Part 7: Closures for conveyors and trackbound transportation systems;
- Part 8: Smoke extraction ducts;
- Part 9: Single compartment smoke extraction ducts;
- Part 10: Smoke control dampers (in course of preparation);
- Part 11: Protective Systems for Essential Services (in course of preparation);
- Part 12: Non-mechanical fire barrier for ventilation ductwork;
- Part 13: 1-, -2, 3- sided ducts;
- Part 14: Kitchen extract ducts;
- Part 15: Mixed penetrations including pipes cables, ducts and dampers.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The purpose of this test is to measure the ability of a representative ventilation duct assembly / system that is part of an air distribution system to resist the spread of fire from one fire compartment to another with fire attack from inside or outside the duct. It is applicable to vertical and horizontal ducts, with or without branches, taking into account joints and openings, as well as suspension devices and penetration points.

The test measures the length of time for which ducts, of specified dimensions, suspended as they would be in practice, satisfy defined criteria when exposed to fire from (separately) both inside and outside the duct.

The closed end of each horizontal duct at the back of the furnace is fully restrained. Outside the furnace, ducts exposed to fire from the outside are tested unrestrained, while ducts exposed to fire from the inside (horizontal only) are tested restrained.

The force measurement at horizontal duct B is not mandatory but can be done on the request of the sponsor.

The test takes into account the effect of fire exposure from the outside where a pressure differential is maintained in the duct as well as the effect of fire entering the ducts in conditions where forced air movement may or may not be present.

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 European Standard specifies a method for determining the fire resistance of vertical and horizontal ventilation ducts including those access panels, which are integral part of the tested ducts. The test examines the behaviour of ducts exposed to fire from the outside (duct A) and fire inside the duct (duct B). This European Standard is used in conjunction with EN 1363-1.

Annex A provides general guidance and gives background information.

This European Standard is not applicable to:

- a) ducts whose fire resistance depends on the fire resistance performance of a ceiling or wall (where ducts are located in cavities enclosed by fire-resistant shafts or ceilings);
- b) ducts containing fire dampers at points where they pass through fire separations;
- c) one, two or three sided ducts;
- d) fixing of suspension devices (e.g. anchors) to floors or walls.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 1364-1:1999, *Fire resistance tests for non-loadbearing elements - Part 1: Walls*

EN 1366-8, *Fire resistance tests for service installations - Part 8: Smoke extraction 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 15882-1, *Extended application of results from fire resistance tests for service installations - Part 1: Ducts*

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

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread (ISO 898-1)*

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)*

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

EN 1366-1:2014 (E)**3 Terms and definitions**

For the purposes of document, the terms and definitions given in EN 1363-1 and EN ISO 13943, together with the following, apply:

- 3.1 fire-resistant ventilation duct**
duct used for the distribution or extraction of air and designed to provide a degree of fire resistance
- 3.2 combustible lining**
lining / coating on the inner surface of the duct; reaction to fire classification of the lining material (tested in end use condition, treated as an external, non-substantial component) worse than class A2-s1,d0 according to EN 13501-1
- 3.3 self-supporting duct**
duct constructed e.g. from fire-protective boards without encasing a steel duct
- 3.4 suspension devices**
components used for suspending and fixing a duct from a floor or supporting a duct from a wall
- 3.5 supporting construction**
wall, partition or floor which the duct passes through in the test
- 3.6 compensator**
device used to prevent damage from the forces generated by expansion
- 3.7 access panel**
cover for an inspection opening within the duct
- 3.8 fire protected steel duct**
steel duct with an external insulation to provide fire resistance

4 Test equipment**4.1 General**

In addition to the test equipment specified in EN 1363-1 the following is required:

4.2 Furnace

This shall be capable of subjecting ventilation ducts to the standard heating and pressure conditions specified in EN 1363-1 and be suitable for testing ducts in the vertical (see Figure 1) or horizontal (see Figure 2) orientation.

4.3 Fan for duct A

This shall be able to produce at the start and throughout the test an underpressure of (300 ± 15) Pa within duct A (see Figure 4) and shall be connected either directly, or by a suitable length of flexible ducting, to the measuring station described in 4.5.

If the duct is used in practise as a smoke extraction duct, the duct shall be tested in accordance with EN 1366-8. In this case, fan A shall be adjusted to (500 ± 15) Pa for testing duct a according to this standard.

4.4 Fan for duct B

This shall be able to produce an air velocity when extracting gas from duct B (see Figure 5), of at least 3m/s measured at ambient temperature in the duct before the test. It shall be connected either directly, or by a suitable length of flexible ducting, to the air velocity measuring station described in 4.8. The fan shall be provided with a by-pass vent that can be opened prior to the damper described in 4.7 being shut.

4.5 Volume flow measuring station

This shall consist of a venturi, orifice plate, or other suitable device and (where necessary) an airflow straightener, installed in straight lengths of pipe, all sized to EN ISO 5167-1, EN ISO 5167-2 and EN ISO 5167-3. It shall be connected to the end of the condensing unit to determine the volume flow rate of gas passing through duct A during the test. The measuring device shall be capable of measuring to an accuracy of $\pm 5\%$. Regardless of whether vertical or horizontal ducts are being tested, the volume flow measuring station shall always be used in a horizontal orientation.

4.6 Condensing unit

This shall be installed between the end of duct A and the flow-measuring device and shall allow for sufficient drainage. The gas temperature adjacent to the flow-measuring device shall be measured by sheathed thermocouple, type K according to EN 60584-1, max. 2 mm in diameter, with an insulated hot junction, arranged pointing upwards to allow for draining moisture. Its measuring junction shall be located at the centre line of the measuring tube and at a distance equal to twice the diameter of the measuring tube downstream from the flow-measuring device. The temperature measured by this thermocouple shall not exceed 40 °C.

4.7 Damper

This shall be installed between the fan and the air velocity measuring station to shut off the airflow in duct B during evaluation of integrity in the "fan-off" condition.

4.8 Air velocity measuring station

This shall determine air velocity in duct B and shall consist of one or two inlet nozzle(s), or other suitable device, installed in a straight length of pipe sized to EN ISO 5167-1, EN ISO 5167-2 and EN ISO 5167-3, connected to the end of both the vertical and horizontal duct B outside the furnace. The temperature of the extracted hot gas shall be measured with a sheathed thermocouple type K according to EN 60584-1, max. 2 mm in diameter, with an insulated hot junction, arranged pointing upwards to allow for draining moisture. Its measuring junction shall be located at the centre line of the pipe and at a maximum distance of 100 mm downstream from the flange. If larger distance is necessary, the pipe between flange and measuring point shall be insulated.

4.9 Equipment for measuring gas pressure

This shall be provided in the laboratory, in the furnace and inside duct A. The measuring equipment for measuring pressures differentials between duct A and the laboratory shall be provided with an accuracy of $\pm 5\%$ relative to the intended pressure difference, i.e. 300 or 500 Pa.

EN 1366-1:2014 (E)**4.10 Thermal expansion/contraction measuring device**

This shall be provided for measuring longitudinal expansion/contraction of duct A and shall have an accuracy of ± 1 mm.

This measurement shall be at (400 ± 50) mm from the unexposed surface of the supporting construction (knowing that elongation outside the furnace will not be taken into account).

Any interference between thermocouples and the measurement of expansion/contraction should be avoided; in case of any such interference, placement of thermocouples takes precedence. The result of the expansion/contraction is not taken into account for classification, but for information of the test sponsor.

4.11 Force measuring device

If the sponsor requests the force measurement, the appropriate measuring device shall be installed at the point of applying restraint in duct B according to Figure 18.

5 Test conditions

The heating conditions and the furnace atmosphere shall conform to those given in EN 1363-1.

The furnace pressure shall be controlled to 15 Pa throughout the test at the mid-height position of the horizontal ducts. For vertical ducts the furnace pressure shall be controlled to 20 Pa 100 mm below the ceiling. The tolerance of the pressure differential is given in EN 1363-1.

If horizontal ducts A and B are tested one above the other, duct B should be at the lowest position (see Figure 8) and the furnace pressure shall be controlled to (15 ± 3) Pa at the mid height of duct B.

Details of test conditions within the ducts during the test are given in Clause 10.

6 Test specimen**6.1 Size****6.1.1 General**

For duct specimens of sizes other than those given in Table 2, the field of direct application is restricted (see Clause 13).

6.1.2 Length

The minimum lengths of the parts of the test specimen inside and outside the furnace shall be as given in Table 1 (see also Figures 1 and 2):

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