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

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EUROPEAN STANDARD
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EN 1366-9

March 2008

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English Version

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

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

Feuerwiderstandsprüfungen für Installationen - Teil 9:
Entrauchungsleitungen für einen Einzelabschnitt

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SS-EN 1366-9:2008 (E)

Foreword

This document (EN 1366-9:2008) 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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of 89/106/EEC Directive.

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

Part 1: 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 (in course of preparation)

Part 7: Conveyor systems and their closures

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)

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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.

SS-EN 1366-9:2008 (E)

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 (euro class A1 and A2-s1, d0).

It is applicable only to four sided and circular ducts. One, two and three sided ducts are not covered.

This test has been designed to cover horizontal smoke extraction ducts intended for single compartment applications only.

This test method of part 9 is applicable only to smoke extraction ducts that do not pass through into other fire compartments. It represents fire exposure of a developing fire (pre-flashover). For smoke extraction ducts that pass through into other compartments, the method of test described in EN 1366-8 should be used.

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

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

2 Normative references

The following referenced documents are indispensable for the application 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 1363-1:1999, *Fire resistance tests - Part 1: General requirements*

EN 1363-2, *Fire resistance tests - Part 2: Alternative and additional procedures*

EN 1366-1:1999, *Fire resistance tests for service installations - Part 1: Ducts*

EN 1751, *Ventilation for buildings - Air terminal devices - Aerodynamic testing of dampers and valves*

EN 60584-1, *Thermocouples - Part 1: Reference tables (IEC 60584- 1:1995)*

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 5167-1:2003)*

EN ISO 13943:2000, *Fire safety - Vocabulary (ISO 13943:2000)*

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 1363-1:1999 and EN ISO 13943:2000 and the following apply.

3.1

single compartment smoke control system ducts

ducts for use within single fire compartment application

3.2

suspension devices

the components used for suspending and fixing a duct from a floor soffit or supporting a duct from a wall

3.3

supporting construction

the wall, partition or floor which the duct passes through in the test

3.4

single fire compartment

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

3.5

smoke zone (zones)

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

3.6

smoke barrier

a barrier to restrict the spread of smoke and hot gases from a fire, forming part of the boundary of a smoke reservoir or used as a channelling screen, or used as a void edge boundary

3.7

compensator

a device that is used to prevent damage from the forces generated by expansion

3.8

smoke and heat exhaust ventilation system (SHEVS)

system consisting of products and/or components jointly selected to exhaust smoke and heat. The products and/or components form a system in order to establish a buoyant layer of warm gases above cooler cleaner air

4 Test equipment

4.1 General

In addition to the test equipment specified in EN 1363-1, the equipment in 4.2 and 4.3 is required. The overall test arrangement is shown in Figure 1. Details of instrumentation and other details are shown in Figures 2 to 10.

4.2 Furnace

The furnace shall be capable of subjecting fire resisting smoke extraction ducts to the standard heating and pressure conditions specified in EN 1363-1 and be suitable for testing ducts in the horizontal orientation (see Figure 1).