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**Provning av brandmotstånd för installationer i
byggnader –**
Del 3: Tätning av genomföringar

Fire resistance tests for service installations –
Part 3: Penetration seals

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Partie 3: Calfeutremments

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Contents

Foreword	4
Introduction	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 Test equipment.....	8
5 Test conditions.....	8
5.1 Heating conditions.....	8
5.2 Pressure conditions.....	8
6 Test specimen	8
6.1 General	8
6.2 Size	8
6.3 Number.....	8
6.4 Design	9
6.4.1 General.....	9
6.4.2 Support conditions for penetrating services	9
6.4.3 Pipe end configuration	9
6.4.4 Cable end configuration.....	10
6.4.5 Blank penetration seal.....	10
6.4.6 Subsequent addition of services.....	10
6.5 Construction.....	10
6.6 Verification.....	10
7 Installation of test specimen.....	10
7.1 General	10
7.2 Supporting construction	10
7.2.1 General.....	10
7.2.2 Standard supporting constructions.....	11
7.3 Installation of service	12
7.4 Installation of penetration seal	12
7.5 Multiple test specimens.....	13
8 Conditioning	13
9 Application of instrumentation	13
9.1 Thermocouples	13
9.1.1 Furnace thermocouples (plate thermometers)	13
9.1.2 Unexposed face thermocouples.....	13
9.1.3 Roving thermocouple	14
9.2 Integrity measurement.....	14
9.3 Pressure.....	14
10 Test procedure	15
10.1 General	15
10.2 Integrity	15
10.3 Insulation	15
10.4 Other observations	15
11 Performance criteria	15
11.1 Integrity	15
11.2 Insulation	15
11.3 Multiple penetrations	15

12	Test report	15
13	Field of direct application of test results	16
Annex A (informative) Explanatory notes		21
A.1	General	21
A.2	Notes on the scope and application of test results	21
A.3	Notes on test conditions	22
A.4	Notes on test construction	22
A.5	Suggested pipe end configurations for different end-uses	23
A.6	Notes on test procedure	23
A.7	Notes on test criteria	23
A.8	Notes on validity of test results	23
A.9	Notes on test report	24
A.10	Small diameter control cables	24
Annex B (normative) Standard configuration for cable penetration seals		25
B.1	Structure of specimens	25
B.2	Deviations from standard specimens	26
B.3	Field of direct application	26
Annex C (normative) Standard configuration and field of direct application for penetration seals for pipes		35
C.1	Standard configuration for penetration seals for metal pipes	35
C.2	Non-standard configurations	36
C.3	Direct field of application	37

EN 1366-3:2004 (E)

Foreword

This document (EN 1366-3:2004) 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 March 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

EN 1366 ‘*Fire resistance tests for service installations*’ consists of the following:

Part 1: Ducts

Part 2: Fire dampers

Part 3: Penetration seals

Part 4: Linear joint seals (in course of preparation)

Part 5: Service ducts and shafts

Part 6: Raised access floors and hollow floors (in course of preparation)

Part 7: Closures for conveyors and trackbound transportation systems (in course of preparation)

Part 8: Smoke extraction ducts

Part 9: Single compartment smoke extraction ducts (in course of preparation)

Part 10: Smoke control dampers (in course of preparation)

Introduction

This document has been prepared to provide a method of test for assessing the contribution of a penetration sealing system to the fire resistance of separating elements when they have been penetrated by a service or services.

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.

EN 1366-3:2004 (E)

1 Scope

This document specifies a method of test and criteria for the evaluation of the ability of a penetration sealing system to maintain the fire resistance of a separating element at the position at which it has been penetrated by a service. Excluded are chimneys, air ventilation systems, fire rated ventilation ducts, fire rated service ducts, shafts and smoke extraction ducts.

Supporting constructions are used in this document to represent separating elements such as walls or floors. These simulate the interaction between the test specimen and the separating element into which the sealing system is to be installed in practice.

This document is used in conjunction with EN 1363-1.

The purpose of this test described in this document is to assess:

- a) the effect of such penetrations on the integrity and insulation performance of the separating element concerned;
- b) the integrity and insulation performance of the penetration sealing system;
- c) the insulation performance of the penetrating service or services, and where necessary, the integrity failure of a service.

No information can be implied by the test concerning the influence of the inclusion of such penetrations and sealing systems on the loadbearing capacity of the separating element.

It is not the intention of this test to provide quantitative information on the rate of leakage of smoke and/or hot gases or on the transmission or generation of fumes. Such phenomena should only be noted in describing the general behaviour of test specimens during the test.

This test does not supply any information on the ability of the penetration sealing system to withstand stress caused by movements or displacements of the penetrating services.

Explanatory notes to this test method are given in Annex A.

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.

prEN 520, *Gypsum plasterboards – Definitions, requirements and test methods*.

EN 1363-1:1999, *Fire resistance tests — Part 1: General requirements*.

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

EN 10025, *Hot rolled products of non-alloy structural steels - Technical delivery conditions*.

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

HD 21.3 S3: 1995, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750V — Part 3: Non-sheathed cables for fixed wiring (IEC 60227-3:1993, modified)*.

HD 22.4 S3: 1995, *Rubber insulated cables of rated voltages up to and including 450/750V — Part 4: Cords and flexible cables (IEC 60245-4:1994, modified).*

HD 22.7 S2: 1995, *Rubber insulated cables of rated voltages up to and including 450/750V — Part 7: Cables with increased heat resistance for internal wiring for a conductor temperature of 110 °C.*

HD 22.9 S2: 1995, *Rubber insulated cables of rated voltages up to and including 450/750V — Part 9: Single core non-sheathed cables for fixed wiring having low emission of smoke and corrosive gases.*

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

penetration

aperture in a separating element for the passage of one or more services

3.2

service

system such as a cable, conduit, pipe (with or without insulation), or trunking

3.3

penetration seal

system used to maintain the fire resistance of a separating element at the position where there is provision for services to pass through the separating element

3.4

penetration sealing system

assembly for test consisting of the penetrating service or services and the penetration seal, materials or devices, together with any service supporting construction, designed to maintain the integrity and insulation performance of the separating element for the duration of the fire test

3.5

service support construction

mechanical support provided in the form of clips, ties, hangers, ladder racks or trays, or any device designed to carry the load of the penetrating services

3.6

standard supporting construction

form of construction of known fire resistance used to close off the furnace and support the penetration sealing system being evaluated

3.7

blank penetration seal

aperture of specified size in the separating element which is sealed or closed by the specified seal without incorporation of penetrating services

3.8

flexible construction

horizontal or vertical supporting construction consisting of studs or joists, including linings and optional insulation

EN 1366-3:2004 (E)

4 Test equipment

In addition to the test equipment specified in EN 1363-1, and if applicable EN 1363-2, the minimum internal dimensions of the furnace shall be 1 m × 1 m × 1 m.

5 Test conditions

5.1 Heating conditions

The heating conditions and the furnace atmosphere shall conform to those given in EN 1363-1 or, if applicable, EN 1363-2.

5.2 Pressure conditions

5.2.1 Pressure conditions shall be as given in EN 1363-1.

5.2.2 Where there is only a single vertical penetration that has a maximum height of 1 m, a pressure of (15 ± 2) Pa shall be established at the centre of this penetration.

5.2.3 If a single vertical penetration sealing system is tested which has a height of more than 1 m, it shall be tested with a pressure of (20 ± 2) Pa at its top and in such cases penetrating services shall be included in the zone where positive pressure exceeds 10 Pa (see Figure 1).

5.2.4 If more than one penetration sealing systems is tested in a single vertical supporting construction, the pressure conditions specified in 5.2.2 or 5.2.3 shall apply to the lowest penetration.

5.2.5 For horizontal separating elements the pressure of (20 ± 2) Pa shall be maintained in the horizontal plane (100 ± 10) mm below the underside of the supporting construction.

6 Test specimen

6.1 General

The test specimen consists of a single penetration sealing system together with a supporting construction.

6.2 Size

A penetration and the accompanying penetration seal shall be as in practice. In order to avoid boundary effects, the distance between the perimeter of the penetration sealing system and the internal surfaces of the furnace shall be not less than 200 mm at any point.

In cases where multiple test specimens are included in a single test construction, the minimum distance between adjacent penetration seals shall be not less than 200 mm. Each penetration with its associated service(s) and penetration sealing system(s) shall be the subject of a separate evaluation, provided the standard test conditions are maintained throughout the test with respect to the penetration being evaluated.

6.3 Number

For vertical separating elements the number of test specimens required is given in EN 1363-1.

For horizontal separating elements only one test specimen is required with fire exposure from the underside.¹⁾ Fire from below floors is generally more critical than fire from above. However, in addition to

the classification requirements from below, requirements from below, requirements can also be related to the thickness and quality of the flooring /floor and its subsequent design to safeguard from above.

Where a penetration sealing system is intended for use both in floors and walls, the systems shall be tested both vertically and horizontally.

6.4 Design

6.4.1 General

The test specimen shall be either:

- a) fully representative of the service and penetration sealing system used in practice, including any special features which are unique to that installation; or
- b) a standard configuration (see Annexes B and C, and Table 2 or 3 for the supporting construction) which is deemed to cover a wide range of practical applications.

6.4.2 Support conditions for penetrating services

The support conditions for the service(s) shall be chosen from the following:

- a) without support;
- b) standard service support construction (see Table 2 and /or 3);
- c) full-scale representation as in practice together with any calculation and the application of a load to simulate practical conditions.

In each condition the method of support (if any) shall be fully described in the test report.

6.4.3 Pipe end configuration

When pipes are to be tested, the pipe end configurations shall be chosen from Table 1.

Table 1 — Pipe end configuration

Test condition	Pipe end configuration	
	Inside the furnace	Outside the furnace
A	Uncapped	Uncapped
B	Capped	Uncapped
C	Uncapped	Capped
D	Capped	Capped

Capping of pipes shall be carried out by closing the pipe end by inserting a mineral wool disc of a thickness of (75 ± 10) mm and a density of (150 ± 50) kg/m³ into the end of the pipe, fixed in place with an appropriate adhesive (e.g. sodium silicate adhesive). Alternatively, the pipe may be capped by welding a disc of the same material as the pipe onto the end of the pipe together with the mineral wool above. In cases where vertical pipes are tested, the mineral wool shall be fixed additionally by mechanical means.