

**Provning av brandmotstånd – Icke bärande
byggnadsdelar –**

Del 3: Curtain walling (t.ex. glasfasader)

**Fire resistance tests for non-loadbearing
elements –**

Part 3: Curtain walling – Full configuration
(complete assembly)

Europastandarden EN 1364-3:2003 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 1364-3:2003.

The European Standard EN 1364-3:2003 has the status of a Swedish Standard. This document contains the official English version of EN 1364-3:2003.

Dokumentet består av 23 sidor.

Upplysningar om **sakinnehållet** i standarden lämnas av SIS, Swedish Standards Institute, tel 08 - 555 520 00.

Standarder kan beställas hos SIS Förlag AB som även lämnar **allmänna upplysningar** om svensk och utländsk standard.

Postadress: SIS Förlag AB, 118 80 STOCKHOLM

Telefon: 08 - 555 523 10. *Telefax:* 08 - 555 523 11

E-post: sis.sales@sis.se. *Internet:* www.sis.se

EUROPEAN STANDARD

EN 1364-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2003

ICS 13.220.50

English version

Fire resistance tests for non-loadbearing elements - Part 3: Curtain walling - Full configuration (complete assembly)

Essais de résistance au feu des éléments non-porteurs
dans les bâtiments - Partie 3: Murs rideaux - Configuration
en grandeur réelle (assemblage complet)

This European Standard was approved by CEN on 20 February 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	page
Foreword.....	3
1 Scope	5
2 Normative references	5
3 Terms and definitions.....	5
4 Test equipment	6
5 Test conditions	6
6 Test specimen	7
6.1 Size	7
6.2 Number.....	7
6.3 Design	7
6.4 Construction.....	8
6.5 Verification.....	8
7 Installation of test specimen.....	8
7.1 General.....	8
7.2 Standard supporting constructions.....	8
8 Conditioning	8
9 Application of instrumentation	8
9.1 Thermocouples	8
9.2 Pressure.....	11
9.3 Deflection.....	11
9.4 Radiation.....	12
10 Test procedure	12
11 Performance criteria	12
12 Test report	12
13 Field of direct application of test results.....	13
Bibliography	21

Foreword

This document (EN 1364-3:2003) 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 October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

This document includes a Bibliography.

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

EN 1364-3:2003 (E)

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 can 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 curtain walling systems.

This standard should be read in conjunction with EN 1363-1.

The test method is applicable to curtain walls designed for the purpose of providing fire resistance. The test is not appropriate for testing curtain walls which incorporate non-fire resistant glazing.

This test method evaluates the performance of a complete assembly for classification purposes, tested with a heated area of 3 m x 3 m.

The fire resistance of curtain walls can be determined under internal or external exposure conditions. In the latter case the external fire exposure curve given in EN 1363-2 is used.

Tests on individual parts of a curtain wall (e.g. linear gap seal, panel or glazing) are performed using part 4 of this European Standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

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

EN ISO 13943:2000, *Fire safety – Vocabulary (ISO 13943:1999)*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1363-1:1999 and EN ISO 13943:2000 and the following apply.

3.1

non-loadbearing wall

wall designed not to be subject to any load other than its self-weight

3.2

curtain wall

external non-loadbearing wall which is independent of the structural frame and supported in place in front of the external edges of floors and cross-walls. A curtain wall typically includes panels, glazing, gap seals, fixings, transoms and mullions

3.3

fire resistant glazing

glazing system consisting of one or more transparent or translucent panes with a suitable method of mounting, with e.g. frames, seals and fixing materials, capable of satisfying the appropriate fire resistance criteria

EN 1364-3:2003 (E)

3.4

fire resistant insulated glazing

fire resistant glazing which satisfies both the integrity and insulation criteria for the anticipated fire resistance period

3.5

fire resistant uninsulated glazing

fire resistant glazing which satisfies the integrity and, where required, the radiation criteria for the anticipated fire resistance period but which is not intended to provide insulation

3.6

glazed elements

building elements with one or more (light transmissive) panes, that are built in a frame with fixings and seals

3.7

pane

single piece of glass

3.8

mullion

vertical framing member separating and supporting two adjacent panes of glass or panels

3.9

transom

horizontal framing member separating and supporting two adjacent panes of glass or panels

3.10

over-cladding system

protection system fixed to an external wall for weather protection, it is sometimes termed a rain screen

4 Test equipment

In addition to the test equipment specified in EN 1363-1, and if applicable EN 1363-2, the following is required.

A test frame, the rigidity of which shall be evaluated by applying an expansion force within the frame, at mid-way between two opposite members of the frame, and measuring the increase in the internal dimensions at these positions. This evaluation shall be conducted in both directions of the frame and the increase of the internal dimension shall be measured.

The increase in the internal dimensions of the test frame shall not exceed 5 mm with an applied force of 25 kN.

5 Test conditions

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

6 Test specimen

6.1 Size

6.1.1 General

If the actual exposed width and/or height is larger than can be accommodated in the furnace, the relevant exposed dimension shall be not less than 3 m.

6.1.2 Internal fire exposure

The test specimen (see Figure 1) shall be of sufficient height to allow:

- a) a minimum of 500 mm of the test specimen to extend beyond the top of the upper simulated floor construction (see Figure 3), and
- b) the test specimen to be level with the soffit of the test frame or lower simulated floor construction (see Figure 3).

The test specimen shall be of sufficient width to allow a minimum of 500 mm of the test specimen to extend beyond both sides of the test frame or simulated wall construction (see Figure 4).

6.1.3 External fire exposure

The 500 mm extensions of the test specimen beyond the sides of the simulated floor and wall constructions, specified in 6.1.2, may be reduced or removed when using external fire exposure (see also NOTE in 6.3.1).

6.2 Number

The number of test specimens shall be as given in EN 1363-1. However, where information is required under different exposure conditions, additional tests shall be undertaken for each situation using separate test specimens.

6.3 Design

6.3.1 General

The test specimen shall be either:

- a) fully representative of the construction intended for use in practice, including fixings, expansion joints, linear gap seals, any surface finishes and fittings which are essential and may influence its behaviour in the test, or
- b) be designed to obtain the widest applicability of the test result to other similar constructions.

The design features which influence fire performance that should be included to give the widest application can be derived from the field of direct application, see clause 13.

NOTE When testing for external fire exposure, a fully representational 3-dimensional test construction is not necessary since the gap seals and the fixings will not be subjected to the fire. However, they can be reproduced in order to provide a representation of the system under test.

EN 1364-3:2003 (E)

6.3.2 Restraint

The test specimen shall be fixed at the top and bottom edges of the simulated floor construction.

One vertical edge shall be unrestrained and the other vertical edge shall be fixed and sealed as in practice.

6.4 Construction

The test specimen shall be constructed as described in EN 1363-1.

6.5 Verification

Verification of the test specimen shall be carried out as described in EN 1363-1.

7 Installation of test specimen

7.1 General

The test specimen shall be supported by the test frame and simulated floor and wall constructions, see 7.2, as in practice.

The test specimen shall be mounted as illustrated in Figures 3 and 4.

The area of the test construction indicated 1 in Figure 2 shall be exposed to the heating conditions.

7.2 Standard supporting constructions

7.2.1 Simulated floor construction

The floor shall have a minimum thickness of 150 mm and width 500 mm. The floor shall be made from reinforced concrete with a density of $(2\ 000 \pm 500)$ kg/m³. The floor shall be fixed to the restraint frame.

7.2.2 Simulated wall construction

The wall shall have a minimum thickness of 150 mm and width 500 mm. The wall shall be made from any non-combustible material with a minimum density of 1 200 kg/m³. If the wall is not providing support it shall be located adjacent to the face of the test frame in order to prevent leakage of hot gases, otherwise it shall be fixed to the test frame.

8 Conditioning

The test construction shall be conditioned in accordance with EN 1363-1.

9 Application of instrumentation

9.1 Thermocouples

9.1.1 General

With reference to Figures 1 and 2, the following surfaces are defined:

a) Internally heated:

- Surface 1 is the exposed surface and is the internal surface of the curtain wall,
- Surface 2 is the unexposed surface and is the external surface of the curtain wall,
- Surface 3 is the unexposed surface and is the top internal surface of the curtain wall,
- Surface 4 is the unexposed surface and is the side internal surface of the curtain wall,
- Surface 5 is the unexposed surface and is the top external surface of the curtain wall,
- Surface 6 is the unexposed surface and is the side external surface of the curtain wall.

b) Externally heated:

- Surface 1 is the exposed surface and is the external surface of the curtain wall,
- Surface 2 is the unexposed surface and is the internal surface of the curtain wall,
- Surface 3 is the unexposed surface and is the top external surface of the curtain wall,
- Surface 4 is the unexposed surface and is the side external surface of the curtain wall,
- Surface 5 is the unexposed surface and is the top internal surface of the curtain wall,
- Surface 6 is the unexposed surface and is the side internal surface of the curtain wall.

9.1.2 Furnace thermocouples

Plate thermometers shall be provided in accordance with EN 1363-1. There shall be at least one for every 1,5 m² of the exposed surface area of the test construction. The plate thermometers shall be oriented so that side 'A' faces the back wall of the furnace.

9.1.3 Unexposed face thermocouples

9.1.3.1 General

Unexposed face thermocouples shall be placed on the internal and external faces of the test specimen as shown in Figures 5, 6 and 7.

The general rules for the attachment and exclusion of thermocouples given in EN 1363-1 shall apply.

9.1.3.2 Mean temperature

9.1.3.2.1 Surface 2 (Figure 1)

a) Uniform curtain walls

For test specimens which are uniform with respect to their expected thermal insulation, the mean temperature of the heated area of surface 2 (Figure 1) shall be measured by means of five thermocouples, one located close to the centre of the specimen and one close to the centre of each quarter section, see Figure 5.

b) Non-uniform curtain walls