SLOVENSKI STANDARD
SIST EN 1366-4:2021

01-april-2021

Nadomešča:
SIST EN 1366-4:2006+A1:2010

Preskusi požarne odpornosti servisnih inštalacij - 4. del: Tesnilna sredstva za ravne stike

Fire resistance tests for service installations - Part 4: Linear joint seals

Feuerwiderstandsprüfungen für Installationen - Teil 4: Abdichtungssysteme für Bauteilfugen

Essais de résistance au feu des installations techniques - Partie 4 : Calfeutrements de joints linéaires

Ta slovenski standard je istoveten z: **EN 1366-4:2021**

ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
91.100.50	Veziva. Tesnilni materiali	Binders. Sealing materials

SIST EN 1366-4:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1366-4

February 2021

ICS 13.220.50

Supersedes EN 1366-4:2006+A1:2010

English Version

Fire resistance tests for service installations - Part 4: Linear joint seals

Essais de résistance au feu des installations techniques - Partie 4 : Calfeutrements de joints linéaires

Feuerwiderstandsprüfungen für Installationen - Teil 4: Abdichtungssysteme für Bauteilfugen

This European Standard was approved by CEN on 27 December 2020.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 1366-4:2021 E

Contents

Page

European foreword

This European Standard (EN 1366-4:2021) 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 August 2021, and conflicting national standards shall be withdrawn at the latest by August 2021.

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

This document supersedes EN 1366-4:2006+A1:2010.

The following changes have been made in comparison to EN 1366-4:2006+A1:2010:

— mechanically induced movement described only prior to fire exposure;

— clear definition of movement capability;

— detailed definition of Sealing types:

  7.2.1 Seals made of fabrics;

  7.2.2 Seals made of foams (foamed in situ);

  7.2.3 Membrane forming seals;

  7.2.4 Seals made of mineral wool (faced/coated or not faced/coated);

  7.2.5 Linear joint seal made of mortar/plaster;

  7.2.6 Linear joint seal made of sealants

  7.2.7 Linear joint seal made of pre-formed compressible strips;

  7.2.8 Linear joint seals made of pre-formed compressible composite strips;

  7.2.9 Linear joint seal made of pre-formed compressible ropes;

  7.2.10 Linear joint seal made of pre-formed strips;

— missing applications added or detailed testing procedure described:

  — top of wall Joint for walls abutting concrete slabs with profiled metal sheet;

  — flexible wall constructions;

  — top of wall Joint for flexible walls;

  - timber elements;

- missing distances on Thermocouples defined;
- thermocouples on Joint Seals < 12mm defined;
- chapter for direct field of application added on each sealing type.

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 (in course of preparation)*

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, Turkey and the United Kingdom.

Introduction

Linear joint seals are positioned in joints, voids, gaps or other discontinuities within one or between two or more construction elements.

Normally such openings are denoted as linear because their length is greater than their width - defined by a typical ratio of at least 10:1 in practice.

Joints are present in buildings due to the following:

a) acceptable dimensional tolerances between two or more building elements, e.g. between non-load bearing walls and floors;

b) by design to accommodate various movements induced by thermal differentials, seismicity and movement induced by wind loads;

c) as a result of inadequate design, inaccurate assembly, repairs or damage to the building.

The purpose of the tests in this document is to assess:

d) the effect of a linear joint seal on the integrity and insulation of the construction;

e) the integrity and insulation performance of the linear joint seal;

f) the effect of movement within the supporting construction on the fire resistance performance of linear joint seals (see Annex B).

The results of these tests are one factor in assessing the fire resistance performance of joint seals.

Annex A describes the principles of standard conditions for linear joint seals where no mechanically induced relative movement occurs between the joint faces.

Annex B provides standard conditions for joints with mechanically induced movement of opposing joint faces.

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, during their testing and during the 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 part of the EN 1366 series specifies a method for determining the fire resistance of linear joint seals based on their intended end use. Perimeter seals of curtain walling are excluded from this part of the EN 1366 series.

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

The following tests are included in this document:

— no mechanically induced movement;

— mechanically induced movement.

Tests in accordance with this part of the EN 1366 series are not intended 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 are only noted in the test report in describing the general behaviour of test specimens during the test.

The load-bearing capacity of a linear joint seal is not addressed in this part of the EN 1366 series. No information can be implied by the test concerning the influence of the inclusion of linear joint seals on the loadbearing capacity of the separating element.

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

EN 1994-1-1, *Eurocode 4: Design of composite steel and concrete structures — Part 1-1: General rules and rules for buildings*

EN 1994-1-2, *Eurocode 4 — Design of composite steel and concrete structures — Part 1-2: General rules - Structural fire design*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1 and EN ISO 13943 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
linear joint
linear void having a length to width ratio of at least 10:1 within one or between two or more juxtaposed construction elements

Note 1 to entry: Typical locations of linear joints include floors, the perimeter of floors, walls, ceilings and roofs.

3.2
linear joint seal
system designed to maintain the fire separating function and, if relevant, to accommodate a specified degree of movement within the linear joint

3.3
movement capability
maximum amount of movement the joint seal is able to tolerate as stated by the manufacturer or the test sponsor, expressed as a percentage of the nominal width

Note 1 to entry: The percentage given is not the total displacement between minimum and maximum joint width, but the displacement in one direction, e.g. for lateral movement either elongation (+x%) or compression (-x%).

Note 2 to entry: The movement capability is usually the same over the entire range of the nominal widths.

3.4
nominal joint width
specified width of a joint seal, to be selected by the manufacturer or test sponsor

3.5
splice
connection or junction between or within the length of a linear joint seal

3.6
supporting construction
construction that may be required for the testing of some separating elements into which the test specimen is assembled, e.g. the wall into which a linear joint seal is fitted

3.7
test construction
complete assembly of the test specimen(s) together with its supporting construction

3.8
test specimen
linear joint seal of a specific material, design and dimensions provided for the purpose of determining either its fire resistance or its contribution to the fire resistance of another separating element

4 Test equipment

In addition to the test equipment specified in EN 1363-1, and if applicable EN 1363-2, the internal dimensions of the test furnace shall be such that a distance of at least 200 mm exists between the long edge of a linear joint and the wall of the furnace, subject to a minimum internal size of 1 m × 1 m × 0,75 m. Where the nominal width of the linear joint seal is greater than 300 mm, the internal size of the furnace shall be at least 3 m × 3 m × 0,75 m (see 6.2). Where the nominal width of the linear joint seal in the test specimen is greater than 100 mm and less than or equal to 300 mm, the

size of the furnace shall at least be able to heat a length of 10 times the nominal width of the linear joint, subject to deviations from this rule given in 6.2.

5 Test conditions

5.1 Heating conditions

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

5.2 Pressure conditions

A vertical furnace shall be operated so that a minimum pressure of 15 Pa exists in the centre of the test specimen mounted in the lowest position.

A horizontal furnace shall be operated so that a pressure of (20 ± 3) Pa is established at a position (100 ± 10) mm below the lowest point of the test construction.

6 Test specimen

6.1 General

The test specimen consists of a linear joint seal. One test specimen shall be prepared for each type of supporting construction and type of movement, if relevant, for which the sponsor seeks classification (see Annexes A and B).

6.2 Size

A linear joint seal shall be of uniform design cross-sectional area and of the maximum length that can be accommodated in the separating element selected for test. For non-movement joints a shorter length may be used subject to a minimum of 900 mm. In order to avoid boundary effects, the distance between the long edge of the linear joint seal and the outer perimeter of the heated part of the separating element shall be not less than 200 mm at any point.

A typical minimum length to width ratio for a linear joint seal is 10:1. The length to width ratio may be < 10:1 in case the heated length of the linear joint seal is ≥ 2 600 mm.

6.3 Number of test specimens

In the case of vertical elements two tests shall be carried out, one from each direction of exposure. If in practice the fire risk can be identified as coming from one side only, or where the linear joint seal is fully symmetrical, then only one specimen may be tested with the appropriate face exposed to the heating regime.

Where it can be established clearly in a non-symmetrical construction that there is a weaker direction of exposure only one specimen may be tested. In such a case, a full justification for the procedure adopted shall be included in the report.

In the case of horizontal elements the test specimen shall be exposed to heating from the underside.

Where a linear joint seal is intended for use in both horizontal and vertical separating elements, each orientation shall be tested.

7 Installation of test specimen

7.1 General

All materials used in the construction, fabrication and installation process of the test specimen shall be representative of the design, materials and workmanship of those to be used in practice.

Where voids exist within a linear joint seal (e.g. when it is in the form of a tube), the ends shall be hermetically sealed in order to prevent airflow through the test specimen. For tests with movement, the sealing of the voids shall be done after imposing the movement to avoid damaging the seal during the movement.

When a primer is part of the system, it shall be included in the test. Each primer shall be tested separately.

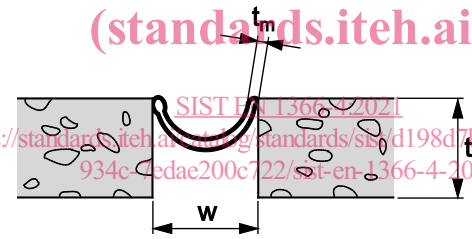
The standard conditions are given in Annexes A and B.

7.2 Requirements for specific seal types

7.2.1 Seals made of fabrics

For definitions of the relevant dimensions see Figure 1.

For seals made of either various thicknesses or several layers of one thickness of fabric the maximum nominal joint width shall be used with the relating intended number of layers in the seal and with the minimum and maximum (if relevant) material thickness for the intended fire resistance performance.



Key

t thickness of the supporting construction

t_m thickness of fabric

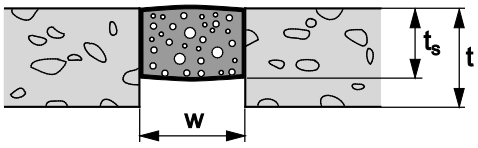
w nominal joint width

Figure 1 — Linear joint seal made of fabrics

7.2.2 Seals made of foams (foamed in situ)

For definitions of the relevant dimensions see Figure 2.

The maximum nominal joint width at the lowest seal depth intended (see Figure 2) shall be used.



Key

t thickness of the supporting construction

t_S seal depth

w nominal joint width

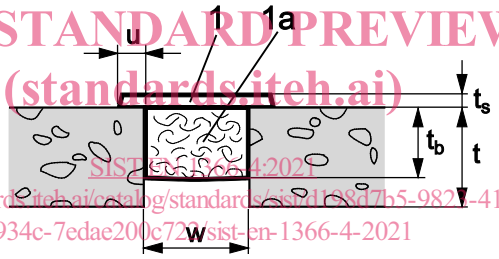
Figure 2 — Linear joint seal made of foam – foamed in situ

7.2.3 Membrane forming seals

For definitions of the relevant dimensions see Figure 3.

The minimum thickness of the membrane t_S, the minimum depth of the backing material (e.g. mineral wool), the maximum joint width and the minimum overlap at the substrate shall be used.

In case of a void between the membrane and the backfilling material, the largest and the minimum void shall be tested.



Key

1 membrane

1a backfilling material

t thickness of the supporting construction

t_b thickness of the backfilling material

t_S seal depth

u overlap

w nominal joint width

Figure 3 — Membrane forming seal

7.2.4 Seals made of mineral wool (faced/coated or not faced/coated)

For definitions of the relevant dimensions see Figure 5.

The compression characteristics through a slab of mineral wool will vary depending on which axis the compression is applied. As a result, the field of application for a mineral wool joint seal will depend on its orientation within the joint. Similarly, this can also be dependent on the fibre orientation introduced during production and the way it was cut from its original slab.

Figure 4 depicts a slab of mineral wool, with the three potential directions of applying the required compression to produce a linear joint seal:

A⇔A – through the slab thickness, as produced;

B⇔B – along the slab length;

C⇔C – across the slab width.

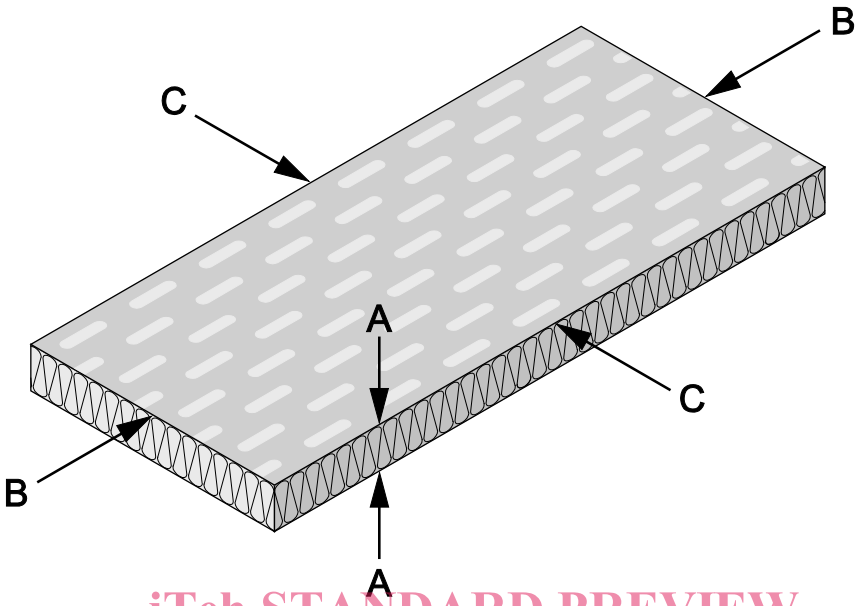
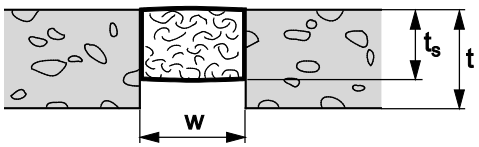


Figure 4 — Mineral wool – compression directions

When a seal with a constant depth but variable joint width is considered, it shall be subjected to a fire resistance test at the maximum nominal joint width, provided the smallest intended seal width can be filled in the intended seal depth. The degree of initial compression (%) of the mineral wool exerted on the seal by the joint width shall be recorded.



Key

t thickness of the supporting construction

t_S seal depth

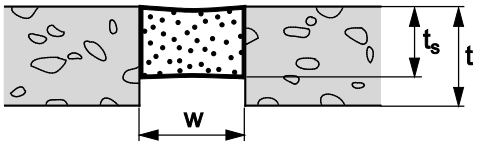
w nominal joint width

Figure 5 — Linear joint seal made of mineral wool

7.2.5 Linear joint seal made of mortar/plaster

For definitions of the relevant dimensions see Figure 6.

The maximum nominal joint width at the lowest seal depth intended shall be used.



Key

t thickness of the supporting construction

t_s seal depth

w nominal joint width

Figure 6 — Linear joint seal made of mortar/plaster

7.2.6 Linear joint seal made of sealants

For definitions of the relevant dimensions see Figure 7.

Sealants are normally used in combination with a backing material. The seal depth is the sum of the thicknesses of the sealant and the backing material. If a backing material is used without a contribution to the fire resistance performance, only the depth of the sealant is considered as the overall seal depth.

NOTE Backing materials of reaction to fire class A1 or A2 in accordance with EN 13501-1 such as mineral wool are considered to contribute to the fire performance of a linear joint seal. Materials of reaction to fire class B to F in accordance with EN 13501-1, e.g. Polystyrene, Polyethylene, are considered not to contribute to the fire performance of a linear joint seal.

A B

Key

A seal with backfilling material contributing to the fire resistance performance

B seal with backfilling material without contribution to the fire resistance performance[a]

t thickness of the supporting construction

t_b thickness of the backfilling material

t_s seal depth

w nominal joint width

[a] The type of cross section is an example only

Figure 7 — Linear joint seal made of sealants

Where only one seal depth, with a specified sealant thickness, is intended being used for various joint widths in practice, the maximum nominal joint width shall be used.

If the sealant thickness or the backing material thickness varies with the joint width, a test shall be conducted at the maximum nominal joint width for each related seal depth specified by the test sponsor.

7.2.7 Linear joint seal made of pre-formed compressible strips

For definitions of the relevant dimensions see Figure 8.