SLOVENSKI STANDARD
SIST EN 15882-1:2012+A1:2018

01-januar-2018

Nadomešča:
SIST EN 15882-1:2012

Razširjena uporaba rezultatov preskusov požarne odpornosti servisnih inštalacij - 1. del: Požarni kanali

Extended application of results from fire resistance tests for service installations - Part 1: Ducts

Erweiterter Anwendungsbereich der Ergebnisse aus Feuerwiderstandsprüfungen für Installationen - Teil 1: Leitungen

Application étendue des résultats des essais de résistance au feu des installations de service - Partie 1: Conduits

Ta slovenski standard je istoveten z: **EN 15882-1:2011+A1:2017**

ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
91.060.40	Dimniki, jaški, kanali	Chimneys, shafts, ducts

SIST EN 15882-1:2012+A1:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15882-1:2011+A1

November 2017

ICS 13.220.50; 91.140.30

Supersedes EN 15882-1:2011

English Version

Extended application of results from fire resistance tests for service installations - Part 1: Ducts

Application étendue des résultats des essais de résistance au feu des installations de service - Partie 1: Conduits

Erweiterter Anwendungsbereich der Ergebnisse aus Feuerwiderstandsprüfungen für Installationen - Teil 1: Leitungen

This European Standard was approved by CEN on 22 October 2011 and includes Amendment 1 approved by CEN on 11 September 2017.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

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European foreword

This document (EN 15882-1:2011+A1:2017) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

This document includes Amendment 1 approved by CEN on 1 May 2017.

This document supersedes ▌A1⟩ EN 15882-1:2011 ⟨A1▌.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ▌A1⟩ ⟨A1▌.

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 May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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.

This European Standard has the general title *Extended application of results from fire resistance tests for service installations* and consists of the following parts:

- *Part 1: Ducts;*
- *Part 2: Dampers;*
- *Part 3: Penetration seals;*
- *Part 4: Linear joint seals.*

The Enquiry phase of this project (00127162) took place under the reference prEN 15080-10.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

There are a number of practical limitations on the size and design of elements that can be tested by the standard methods of fire resistance test. When these elements are larger, or are of a modified design, there is a necessity to be able to confirm their performance, i.e. whether the classification(s) is (are) given in the classification report in relation to the relevant criteria identified in the Interpretative Document are maintained, without the ability of being able to test them. To achieve this, extended application documents for the various elements are under development.

It is not allowed to change any detail of the duct construction. If this is done outside the DiAP[1)] and EXAP[2)], the duct has another design and cannot be classified in accordance with EN 13501-3 without further appropriate testing.

Before there can be any consideration for extended application the duct shall be tested in accordance with EN 1366-1 to achieve a test result which could generate a classification in accordance with EN 13501-3 at least equal to the classification subsequently required from extended application considerations.

The extended application report should be based on the evaluation of one or more fire resistance test reports on the same proprietary construction of duct.

A review of the duct construction parameters may indicate that one or more criteria (integrity, insulation, leakage) may be improved by a particular parameter variation. In the case of ducts, this should never lead to an increased classification period for any specific parameter beyond that achieved during any one test.

1) DiAP = Direct field of application.

2) EXAP = Extended field of application.

1 Scope

This European Standard identifies parameters that affect the fire resistance of ducts for ventilation purposes. It also identifies the factors that need to be considered when deciding whether, or by how much a parameter can be extended either positively or negatively when contemplating the fire resistance on an untested variation in the construction.

This European Standard, where applicable, gives guidance on additional tests that are needed to extend the field of application.

The European Standard gives the principles behind how a conclusion on the influence of specific parameters/constructional details relating to the relevant criteria (E, I, S) can be achieved.

This European Standard only applies to ducts tested to EN 1366-1. Duct sections for use other than in fire resisting heating, ventilation and air conditioning (HVAC) systems are not covered by this European Standard. It does not cover ducts used for smoke control which are tested in accordance with EN 1366-8 or EN 1366-9.

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〈A1〉:2012〈A1〉, *Fire resistance tests — Part 1: General requirements*

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

EN 13501-3, *Fire classification of construction products and building elements — Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: Fire resisting ducts and fire dampers*

EN ISO 898-1, Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specific property classes — Coarse thread and fine pitch thread *(ISO 898-1:2009)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1 and EN 1366-1 and the following apply.

3.1
self-supporting duct
duct constructed from fire protective boards to provide fire resistance without using a conventional steel duct

3.2
fire protected steel duct
steel duct with or without external insulation or coating to provide integrity or integrity and insulation in case of fire

3.3
duct system
complete system, consisting of the duct sections, duct joints, suspensions and penetration seals

3.4
duct section
element of a fire resisting duct constructed to form part of a duct system which has to be fire resistant

3.5
structural supports
means of retaining the fire resisting duct section to the building structure

〈A1〉 3.6
duct system with one variable parameter
duct system where all essential components are the same, with the exception of one parameter in one component (e.g. density of the insulation, thickness of insulation)

Note 1 to entry: By changing the variable parameter, the individual duct system gets different classification times 〈A1〉

4 Critical parameters and factors

4.1 General

The following parameters and factors are considered to affect the fire resistance performance of a duct system and shall be taken into account when determining the field of extended application. The parameters vary depending upon the nature of the element to be considered. The parameters for the common, identifiable forms of duct construction are given in 4.2, 4.3 and 4.4.

4.2 Common thermal and mechanical parameters and factors

Table 1 — Factors relating to thermal and mechanical parameters

Line	Parameter and rule reference	Factor
a	Fire exposure	Outside or inside
b	Changes in pressure (positive or negative)	Lower or higher
c	Change in wall/floor type or thickness	Rigid or flexible constructions Greater or lower thickness
d	Forces at wall/floor penetrations	Value of force higher or lower

4.3 Common constructional parameters and factors

Table 2 — Factors relating to Common constructional parameters

Line	Parameter and rule reference	Factor
a	Orientation	Vertical, horizontal or sloping
b	Change in shape	Rectangular to circular or oval
c	Change in height of cross-section	Greater or less than tested
d	Change in width of cross-section	Greater or less than tested
e	Change in diameter of cross-section	Greater or less than tested
f	Protection material	Change of material

4.4 Specific constructional parameters and factors

Table 3 — Factors relating to Specific constructional parameters

Line	Parameter and rule reference	Factor
a	Thickness of protection	Greater or less than tested
b	Distance between joints/stiffeners	Greater or less than tested
c	Number of protective layers	Greater or less than tested
d	Change in penetration sealing system around duct	Dependant on test data available
e	Expansion provision	Greater or less than tested
f	Presence of combustible materials within duct	Yes or no
g	Length of vertical ducts between supports	Greater or less than tested
h	Distance and arrangements between the joints of various layers	Greater or less than tested, different arrangement
i	Self-weight of duct	Effect on hangers/supports
j	Length of horizontal duct between supports/hangers	Greater or less than tested
k	Effect of supports on vertical ducts	Bending moment, section modulus
l	Length of duct between flanges/spigots	Greater or less than tested
m	Change of structure of steel ducts (e.g. type of steel, gauge, … etc.)	Yes or no
n	Effect of access panels	Yes or no Size of access panels Access panels protected?
o	Hanger protection and arrangement	Greater or less than tested, different arrangement
p	Hangers	Length Tensile stress Position relative to any duct joint
q	Bearers	Bending stress Shear stress Section modulus
r	Anchors	Type of anchor, chemical or mechanical strength Penetration depth
s	Compensators	Yes or no
t	Components integrated within the duct (fan cases, silencers etc.)	Yes or no
u	Shape of joints in protection boards or insulation	Mitred, butted or rebate edge
v	Fixing and jointing details	Yes or no

5 Methodology

When preparing an extended application for a construction product, the parameters listed in Clause 4 relating to ducts shall be considered in turn and their relevance shall be identified. This can normally be achieved in a tabular manner with using “yes” to identify those parameters that are relevant, and “no” to identify those that are not.

For each relevant parameter the appropriate factors from those given in Clause 4 shall be analysed to establish their influence (positive or negative) on the fire resistance of the duct. In this case, the influence shall be established for integrity and insulation in turn and where appropriate smoke leakage. The analysis shall take the form of considering influence of the proposed variation against:

a) The application of the requirements in this European Standard;

b) The use of calculations and rules defined in EN 1366-1 or in EN 15882-1.

For each factor this analysis shall be transparent and the report shall include the justification.

Table 4 — Factor influence on criteria

Parameter	Factors	Factor influence on criteria			
		Integrity (E)	Insulation (I)	Smoke leakage (S)	Rules
Orientation	Vertical or horizontal	See rule	See rule	See rule	Covered by EN 1366-1, shall test in appropriate orientation
Fire exposure	Outside or fire inside	See rule	See rule	See rule	Covered by EN 1366-1, shall test for both situations
Presence of combustible materials within duct (inside)	See rule	See rule	See rule	See rule	Combustible materials can be used provided they have been included in the test specimen. Combustible materials in the test specimen can be omitted in practice.
Changes in negative pressure	Increased under-pressure greater than 300 Pa	Worse [-E]	Worse [-I]	Worse [-S]	Additional test necessary, see ▌A1⟩ 8.2 ⟨A1▌
	Decreased under-pressure	OK [= /+E]	OK [= /+I]	OK [= /+S]	Assume that classification will be maintained
Positive pressure	Greater than 300 Pa (500 Pa, if in DIAP of EN 1366-1)	Worse [-E]	Worse [-I]	Worse [-S]	Additional test necessary, see ▌A1⟩ 8.2 ⟨A1▌
Change in shape (e.g. rectangular to circular)	See rule	See rule	See rule	See rule	Additional test necessary, see EN 1366-1
Pieces of duct for change of directions or cross sections of for separation of airstreams	See rule	OK [= /+E]	OK [= /+I]	OK [= /+S]	These pieces of duct are covered by the test according to EN 1366-1 provided the same materials, thickness are used and the same technique of jointing
Height of cross-section	Increase height	Worse [-E]	Worse [-I]	Worse [-S]	Additional test data needed, guidance given in Figure 1 to Figure 4
	Decrease height	OK [= /+E]	OK [= /+I]	OK [= /+S]	Assume that classification will be maintained
Width of cross-section	Increase width	Worse [-E]	Worse [-I]	Worse [-S]	Additional test data needed, guidance given in Figure 1 to Figure 4
	Decrease width	OK [= /+E]	OK [= /+I]	OK [= /+S]	Assume that classification will be maintained, if the maximum distance in width between duct wall and stiffeners as well as between two stiffeners shall not exceed the tested distance.
Thickness of protection	Increase thickness	OK [= /+E]	OK [= /+I]	OK [= /+S]	Assume that classification will be maintained unless the thickness is increased for not more than 20 %, subject to checking that supports will take additional weight
	Decrease thickness	Worse [-E]	Worse [-I]	Worse [-S]	Additional test necessary, see EN 1366-1