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Extended application of results from fire resistance tests for service installations - Part 2: Fire Dampers

Erweiterter Anwendungsbereich der Ergebnisse aus Feuerwiderstandsprüfungen für Installationen - Teil 2: Brandschutzklappen

Application étendue des résultats des essais de résistance au feu des installations de service - Partie 2 : Clapets résistant au feu

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Foreword

This document (EN 15882-2:2015) 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of an identical text or by endorsement, at the latest by October 2015 and conflicting national standards shall be withdrawn at the latest by October 2015.

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EN 15882, *Extended application of results from 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*

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

Introduction

It should be noted that fire-resisting dampers are special products that are exposed to different conditions to other elements of construction; in particular they are subjected to significantly different pressure regimes. Also, integrity is evaluated by leakage measurements. Consequently, this European Standard may adopt a different approach to other extended field of application standards, with more emphasis on testing.

1 Scope

This European Standard provides guidance and rules to notified bodies (for fire dampers) to allow them to produce/validate an extended field of application report for fire dampers. This standard identifies the parameters that affect the fire resistance of dampers. It also identifies the factors that need to be considered when deciding whether, or by how much, the parameter can be extended when contemplating the fire resistance performance of an untested, or untestable variation in the construction.

This European Standard explains 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 does not cover dampers used for smoke control.

This European Standard only applies to extended fields of application based on tests successfully undertaken to EN 1366-2. Only test reports that have a total test time where the criteria are fulfilled that is in excess of the required classification period by a margin of either 10 % or 12 min, whichever is the least, are to be considered. Each classification (E,I,S) is to be considered individually – consequently E (134 min achieved) may be extended, but EI (61 min achieved) may not be extended for a classification of EI60.

Additionally, leakage determined during such tests is to be at least 10 % below the leakage limits for E, or for E-S, dependent on classification achieved, given in EN 13501-3 before the EXAP rules can be applied. The 10 % below the leakage limits is to be fulfilled for the extended period in addition to the classification period.

By application of this European Standard, it should be possible to identify what specifications should be tested to maximize the field of application. Some information on test programmes is given for guidance purposes.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 1366-1:2014, *Fire resistance tests for service installations - Part 1: Ventilation ducts*

EN 1366-2, *Fire resistance tests for service installations - Part 2: Fire dampers*

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 15882-1, *Extended application of results from fire resistance tests for service installations - Part 1: Ducts*

ISO 10294-4, *Fire resistance tests - Fire dampers for air distribution systems - Part 4: Test of thermal release mechanism*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1 and EN 1366-2 and the following apply.

3.1
multiple section assemblies
assemblies of individual damper units to form larger units

3.2
horizontal orientation of damper
position of the damper mounted horizontally

EXAMPLE When installed in the plane of a floor or a ceiling.

3.3
vertical orientation of damper
position of the damper mounted vertically, e.g. when installed in the plane of a wall

3.4
supporting construction
construction used as part of the test assembly to support the test specimen and to fill in the furnace aperture

3.5
standard supporting construction
supporting construction that has known fire behaviour and for which a Direct Field of Application has been established

4 Determination of worst case

In certain circumstances a rule can call for a new test to be undertaken. To avoid having to re-test everything, a determination shall be made of 'worst case'.

Firstly consider the classification required: E, EI, E-S, EI-S. Consider all the test reports that give the required classification.

Determine which criteria failed first in each test. The resulting 'worst case' will be the one where the time to failure of each and any of the parameters was the lowest.

If the test periods show that none of the criteria failed before the classification period plus 10 % or 12 min, then the supporting construction shall be considered. The worst case shall be with the fire damper mounted in the lightest construction in terms of mechanical stability. The sponsor may pick a heavier supporting construction, but then any extended field of applications shall only apply to this supporting construction and those heavier and more dense as per direct field of application.

The method of determination of worst case and the related extended fields of application shall be reported in the extended field of application report.

5 Conditions and application rules

5.1 Change of fixing damper to supporting construction

a) No change in the location of the fixings relative to the damper and the supporting construction shall be permitted. The pitch between the fixings shall not be increased.

b) Alternative fixings may be used if their performance is proven by fire test, stress, linear expansion and loading information data. Any other information available may be considered.

c) Any alternative fixings shall be included as part of the extended field of application report.

d) Hanger and relating anchor information shall be assessed in accordance with EN 15882-1.

5.2 Multiple damper assemblies

5.2.1 E Classification only

5.2.1.1 Method

To allow the use of multiple assemblies of E classified fire dampers, either side by side or on top of each other, the following test shall be performed. An assembly consisting of fire dampers that have already successfully gained a classification conforming to EN 13501-3 shall be made and installed into a supporting construction using the proposed method.

A fire damper selected using the worst case method in accordance with Clause 4 shall be made into an assembly as shown in Figure 1. This will allow the other EXAP rules from the tables which follow to apply to multi-section units, as they do to single section units.

The unit to be tested shall be constructed so as to be made up of at least four sections and shall have a maximum overall size of 2 600 mm × 2 600 mm. This is to allow for a small gap around the outside of the damper and a minimum span of supporting construction of 200 mm all round. See Figure 1 which is applicable to both vertical (shown) and horizontal test installations.

The test method shall be generally as EN 1366-2 (note: also refer to intumescent fire damper test, if this becomes relevant), but instead of a closed plenum with a fan, an extended open duct 1 m long shall be fixed to the dampers.

The plate thermometers for control of furnace temperature shall be placed at the centre of area of each fire damper section.

Leakage shall not be measured. A 300 Pa differential pressure shall not be set across the unit.

The criteria used shall be the integrity at all of the following:

— round the joint between the damper installation and the supporting construction;

— any point within the damper assembly, (joints, blades, etc.);

— sustained flaming at any point around the perimeter or at the blades or joints.

If the individual fire damper sections do not close within the first 90 s, provision shall be made to manually close the sections after 2 min (air may be drawn into the bottom of the furnace having a cooling effect). Wire thermocouples shall be placed at each thermal sensing element for information purposes. This information shall be recorded.

Classification will be as the original single section units with regard to the E classification as long as the above integrity criteria are fulfilled.

5.2.1.2 Field of application

If, due to the size restriction of 2 600 mm × 2 600 mm, the assembly is made up of four individual units which are smaller than or of the same size as the original single unit tested, assemblies for application may be made of units up to the single unit size tested.

EXAMPLE 1 An assembly of four units with an overall size of 2 600 mm × 2 600 mm, made from individual units with overall size 1 300 mm × 1 300 mm, representing a single section size tested of 1 500 mm × 1 300 mm, allows an assembly of overall size 3 000 mm × 2 600 mm to be used.

If the assembly is made up of four or more units, leading to whatever overall size, the size of unit to be used shall have been tested previously as a single unit. For application, the units then used to make up assemblies shall not exceed the size of the units tested as part of the assembly. This test may not be used to allow larger units to be back assessed to single sections for classification to EN 13501-3:

EXAMPLE 2 An assembly of 6 units of individual overall size 600 mm × 600 mm, giving an assembly size of 1 200 mm × 1 800 mm, allows the use of multiple assemblies of units of individual size 600 mm × 600 mm.

If the individual unit tested was 1 000 mm × 1 000 mm, the use of this to build assemblies is not now permitted as this could have been assembled to form a unit 2 000 mm × 2 000 mm, which could be tested (i.e. is less than 2 600 mm × 2 600 mm).

If the 600 mm × 600 mm size has not been tested individually and only a 500 mm × 500 mm unit has been tested previously, this is not permitted and back assessment of the 500 mm × 500 mm is also not permitted as there is no pressure differential in this EXAP test.

For dampers tested following these directions, the standard direct field of application from EN 1366-2 shall apply.

All details with respect to multiple damper assemblies, the installation methods and their associated testing, and any direct field of application and further EXAP, shall be included in the extended application report.

Using the information ascertained above, larger assemblies of individual dampers are permitted, providing that they are also structurally supported to a fire-safe design provided by competent structural engineers.

5.2.2 EI, E-S, EI-S Classifications

5.2.2.1 Method

Make a multiple assembly, fit a single connecting duct to the whole assembly and perform the complete test in accordance with EN 1366-2. Classify the assembly in accordance with EN 13501-3. Horizontal and vertical tests are required if each application is to be used.

5.2.2.2 Field of application

Having done the above test(s) the results may be applicable to dampers extended on the width only. Larger assemblies of individual dampers shall be structurally supported to a fire-safe design provided by competent structural engineers.

5.3 Alternative penetration seals

Alternative penetration seals shall be tested in association with a fire damper in accordance with EN 1366-2, with the following exception:

Tested standard mortar may be replaced by fire resisting refractory mortars with relevant test evidence with regard to fill and supporting distance.

6 Influence of parameters and factors on fire damper performance

This standard takes into account the parameters and factors that can affect the fire resistance performance of fire resisting dampers when tested in accordance with the method of test in EN 1366-2. These have been listed in Table 1 to Table 4.

The influence on integrity, insulation and, where appropriate, smoke leakage, shall be evaluated in accordance with the clauses and tables in this standard.

The parameters and factors of the anticipated influence on damper performance are specified in Table 1 to Table 4.

Consideration of the parameters and factors in Clause 7 have led to the development of the rules in Clause 8, which state whether any conclusions may be drawn or a requirement for further testing, whichever is relevant.

7 Critical parameters and factors

7.1 General

The following parameters and factors are considered to affect the fire resistance performance of a fire damper and shall be taken into account when determining the field of extended application.

7.2 Common operational parameters and factors

Table 1 — Common operational parameters and factors

Line	Parameter and rule reference	Factor
1	Fire exposure	Exposed or not exposed
2	Changes in pressure (positive or negative)	Lower or higher

7.3 Constructional parameters

Table 2 — Constructional parameters

Line	Parameter	Factor
1	Change in location of damper blade according to the housing	Closer or further from exposed flange
2	Change in axis position according to the housing	Horizontal or vertical or any angle
3	Change in location of temperature sensing element	Lower or higher from horizontal center plane, further or closer (to fire), in front or behind damper blade
4	Change in location of actuating mechanism and actuator	Fully exposed, partially exposed (in the wall/floor) or fully non-exposed
5	Change in geometrical shape	Rectangular to circular or oval or vice versa
6	Change in height of cross section	Greater or less than tested
7	Change in width of cross section	Greater or less than tested
8	Change in height/width aspect ratio	Greater or less than tested
9	Change in diameter of cross section	Greater or less than tested
10	Change in length of damper housing	Greater or less than tested
11	Change in number of blades (multi-blade dampers)	More or less than tested