SLOVENSKI STANDARD
SIST EN 15650:2010

01-september-2010

Prezračevanje stavb - Požarne lopute v zračni napeljavi

Ventilation for buildings - Duct mounted fire dampers

Lüftung von Gebäuden - Brandschutzklappen in Luftleitungen

Lüftung von Gebäuden - Brandschutzklappen

Ta slovenski standard je istoveten z: **EN 15650:2010**

ICS:

13.220.01	Varstvo pred požarom na splošno	Protection against fire in general
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

SIST EN 15650:2010 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15650

April 2010

ICS 91.140.30

English Version

Ventilation for buildings - Fire dampers

Ventilation dans les bâtiments - Clapets coupe-feu

Lüftung von Gebäuden - Brandschutzklappen

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Ref. No. EN 15650:2010: E

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Foreword

This document (EN 15650:2010) has been prepared by Technical Committee CEN/TC 156 “Ventilation for 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of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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Introduction

This standard contains the basic performance and requirements for fire dampers.

A fire damper is used to prevent fire and reduce smoke spreading from one fire compartment to another through the air ductwork system which may penetrate fire separating walls and floors. Annex A gives descriptions of typical fire dampers.

Where the words separating element are used in this standard, they should be taken to mean e.g. a wall, a floor, a ceiling or any other barrier that is designed to maintain compartmentation. This covers any type of construction (e.g. block and mortar, concrete, board or mineral wool).

In the case of fire or elevated temperatures, the dampers should close automatically by means contained within their own construction (a thermal activation element). As an addition, fire dampers may be closed by an external input.

Particular reference should be made to EN 1366-2, which defines the furnace testing associated with these products and EN 13501-3, which provides details on their fire resistance classification. Consideration of any caution notices within any fire testing standards (e.g. health and safety) should be considered before undertaking any fire testing.

In addition, the aerodynamic performance of fire dampers should be tested to EN 1751, if such information is to be presented by a manufacturer.

The areas for which products supplied to this standard are considered applicable include, but are not limited to:

a) commercial premises;

b) shopping and retail centres;

c) hospitals;

d) multi-residential buildings.

1 Scope

This European Standard applies to fire dampers that are to be used in conjunction with fire separating elements to maintain fire compartments. This standard specifies requirements and gives reference to the test methods defined for fire dampers, which are intended to be installed in Heating, Ventilating and Air Conditioning (HVAC) installations in buildings. All fire dampers close automatically in response to raised temperatures indicating fire. Details are given for the provision of evaluation of conformity and marking of fire dampers.

To avoid duplication reference is made to a variety of other standards. To this end it is advised to read this standard in conjunction with EN 1366-2 and EN 1363-1 for details of the fire resistance testing and EN 13501-3 for classification.

Fire dampers meeting requirements of this standard may be considered suitable for both ducted and unducted applications.

This standard has not considered in detail the detrimental and/or corrosive effects that may be caused by chemical processes present in the atmosphere, which are drawn through the system intentionally or inadvertently and therefore does not apply to fire dampers used in such applications. An indication of salt spray corrosion may be determined using the method described in Annex B.

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 1366-2:1999, *Fire resistance tests for service installations — Part 2: Fire dampers*

EN 1751, *Ventilation for buildings — Air terminal devices — Aerodynamic testing of dampers and valves*

EN 13501-3:2005, *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 60068-2-52:1996, *Environmental testing — Part 2: Tests — Test Kb: Salt mist, cyclic (sodium chloride solution) (IEC 60068-2-52:1996)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN ISO 5135, *Acoustics — Determination of sound power levels of noise from air-terminal devices, air-terminal units, dampers and valves by measurement in a reverberation room (ISO 5135:1997)*

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

ISO 10294-4:2001, *Fire resistance tests — Fire dampers for air distribution systems — Part 4: Test of thermal release mechanism*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN ISO 13943:2000 and the following apply.

3.1
fire damper
device for use in heating, ventilation and air conditioning (HVAC) systems at fire boundaries to maintain compartmentation and protect means of escape in case of fire

3.2
insulated fire damper
fire damper of any type that shows classifiable insulation characteristics when tested

3.3
leakage rated fire damper
fire damper of any type that shows classifiable reduced leakage characteristics when tested

3.4
multi-section fire dampers
fire damper of any type constructed from smaller units

3.5
fire compartment
enclosed space, comprising one or more separate spaces, bounded by elements of construction having a specified fire resistance and intended to prevent the spread of fire (in either direction) for a given period of time

NOTE Fire compartment often has regulatory definitions and requirements. The term should not be confused with "room of origin" or "fire cell".

3.6
triggering device
device such as a fire detector system, smoke detector or pushbutton, which sends an activating signal to the initiation device

3.7
horizontal mounting
position of the damper mounted horizontally when installed in a floor or a ceiling

3.8
vertical mounting
position of the damper mounted vertically when installed in a wall

3.9
actuating mechanism
mechanism, integral or directly associated with the fire damper which, when initiated by the fire damper release device, which causes the movable component of the damper to change from the "open" to the "closed" position

3.10
thermal release mechanism
mechanism, containing/linked to the sensing element, that causes the open damper to release and close in response to elevated temperature

3.11
sensing element
device that senses temperature, that causes the thermal release mechanism to activate at a defined elevated temperature

4 Fire damper requirements

4.1 General

4.1.1 Fire resistance

The fire damper shall be fire resisting and demonstrate the following and shall be classified in accordance with EN 13501-3:

a) integrity: this shall be tested in accordance with test method in 5.2.2 and the integrity classification (E) declared;

b) insulation: this shall be tested in accordance with test method in 5.2.2 and the insulation classification (I) declared;

c) leakage: this shall be tested in accordance with test method in 5.2.3 and the leakage classification (S) declared.

4.1.2 General application

Where the manufacturer intends to provide information regarding aerodynamic characteristics, this shall be done according to EN 1751.

4.2 Construction and components: characteristics

4.2.1 Construction and operation

4.2.1.1 General

Fire dampers shall have one safety position, fully closed. This is required to maintain compartmentation.

4.2.1.2 Nominal activation conditions / Sensitivity

4.2.1.2.1 General

The units may be open as part of a heating and ventilating system and shall close only on the receipt of:

— an elevated temperature; or

— an external input.

Consequently, fire dampers shall:

a) move to and maintain their closed position;

b) have known leakage characteristics;

c) include a thermal release mechanism that causes the damper to close (this may be function of their design), where the thermal release mechanism uses a sensing element which shall be tested in accordance with 5.2.5;

d) be fire resisting to maintain compartmentation in closed position.

NOTE A facility for manual override to open and close the damper for inspection purposes may be useful and may be included in the product design. This would be of use during commissioning should no power be available.

4.2.1.2.2 Sensing element response temperature

The thermal release mechanism shall be equipped with a sensing element with response temperature to an increase of temperature in accordance with test method in 5.2.5.

4.2.1.2.3 Sensing element load bearing capacity

The thermal release mechanism shall be equipped with a sensing element which load bearing capacity is in accordance with test method in 5.2.5.

4.2.1.3 Response delay: closure time

Any temperature may be used, provided that the fire dampers' response delay (closure time) is within the time period of 2 min in accordance with test method in 5.2.4.

4.2.1.4 Position indication

When fire dampers incorporate blade positioning signalling devices, such devices shall be demonstrated to provide information (at ambient temperature) which is indicative of the actual blade position (open and closed) in accordance with Annex C (C.1).

4.2.2 Protection against corrosion

Where a manufacturer intends to demonstrate an enhanced salt spray corrosion resistant performance of a fire damper to give a guide on its durability, the test detailed in Annex B shall be performed and the result of these tests declared (i.e. pass/fail). Alternatively, this performance may be made by using of known-corrosion-resistance products, components and treatments and this shall be declared.

NOTE Except for products used in a corrosive/contaminated environment, there are no corrosion resistance requirements on products for other uses.

4.2.3 Actuators

Actuators shall be constructed and assembled to have the strength and rigidity necessary to perform the design operations to which it may be subjected, without the loosening or displacement of parts, or other serious defects when subjected to the tests referred to in Annex C. Actuators shall be assessed by an IP42 test as a minimum according to EN 60529:1991.

Actuator construction shall be such that it does not cause a fire damper to fail the test by flaming outside of the furnace and outside the duct.

Where modulating actuators allowing fire dampers to give variable volume control are to be supplied, these shall be subjected to more extensive cycle testing according to Annex C.

As smoke is seen as being as, if not more, dangerous than fire, closing actuators may be used that close the unit early as the result of, for instance, a fire alarm. These shall form a part of the tested construction if the actuator is seen as being the prime mover of the unit. If an actuator is associated with a fire damper for everyday use, it should be tested at the same time as the fire damper to ensure that it does not cause the fire damper to fail in any way that may have not been foreseen.

4.3 Fire resistance performance criteria

4.3.1 Fire dampers: integrity, insulation, leakage, operational reliability

The assessment of integrity (E) of fire dampers, as one of the fire resistance performance characteristics, shall be made on the basis of:

a) Largest size − 50 cycles prior to the fire test (unless it is impossible to re-open the damper in any way once it has been closed). Except for fire dampers which have "single use" (no mechanical closing element), but giving closure by change of state, such as a fully intumescent style product, may be exempted from the 50 cycle test and the cold leakage test and consequently cannot be considered for extra restriction on leakage.

   The operational reliability shall be satisfied by the 0 or 50 cycle test at ambient temperature;

b) Largest size − leakage (measured continuously) through the damper when closed after 5 min from the start of the fire test;

c) Cracks or openings in excess of given dimensions and ignition of a cotton pad and sustained flaming on the non-exposed side at the perimeter of the damper junction with the wall or floor or duct (the penetration).

   When insulation characteristics (I) are proven for fire dampers, this shall be classified and declared, together with integrity.

   A smoke leakage performance requirement is described in EN 1366-2 to allow the (S) classification, and this shall be applied, if the damper is intended for the end uses where this performance is required (largest and smallest sizes at ambient and largest size (measured continuously) after 5 min from the start of the fire test).

4.3.2 Fire resistance classification and designation

Having achieved the performance criteria in 4.3.1, the fire damper shall be classified and designated in accordance with EN 13501-3.

The following shall be declared for each fire damper:

a) integrity class "E", integrity and insulation class "EI" (in accordance with EN 13501-3:2005);

b) indication(s) of suitability for vertical and/or horizontal use, together with mounting in, or on to, a wall or in a duct passing through a wall or in, or on to, a floor, or in a duct passing through a floor, or both, respectively: as $\underline{v_e}$ and/or $\underline{h_o}$. The classification is completed by "(i → o)", "(o → i)", or (i ←→ o)" to indicate whether the element has been tested and fulfils the requirements from the inside of outside only or both. In addition, the symbols "v_e" and/or "h_o" indicate the suitability for vertical and/or horizontal use. The addition of the symbol "S" indicates the satisfaction of an extra restriction on leakage.

NOTE $\underline{v_e}$ or $\underline{h_o}$ should not be taken to imply the direction of operation, nor the orientation of the axis of the damper blade.

EXAMPLE EI 60 ($\underline{v_e}$) S.

4.3.3 Durability

4.3.3.1 Durability of response delay

Following the test described in 5.2.5 demonstrates the durability of response delay by testing the sensing element for response temperature and load bearing capacity.

4.3.3.2 Durability of operational reliability

To ensure requirements on this durability aspect, the following proxy characteristics shall be taken in account:

The ability of the fire damper to demonstrate its operational reliability over the life of the system shall be determined by the open and closing cycle tests shown in Annex C.