

Loss Prevention Standard

LPS 1162: Issue 4.1

Requirements and tests for the LPCB approval and listing of fire dampers

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PARTICIPATING ORGANISATIONS

This standard was approved by the BRE Global Governing Body and Expert Group D. The following organisations participated in the preparation of this standard:-

Association for Specialist Fire Protection (ASFP)
 Association of British Insurers (ABI)
 Association of Insurance Surveyors
 BAA plc
 British Automatic Fire Sprinkler Association (BAFSA)
 British Property Federation (BPF)
 British Rigid Urethane Foam Manufactures Association (BRUFMA)
 Chief Fire Officers' Association (CFOA)
 Construction Industry Council (CIC)
 Construction Products Association
 Co-op Banking
 Door & Hardware Federation
 Engineered Panels in Construction (EPIC)
 Fire Industry Association (FIA)
 Glass & Glazing federation (GGF)
 Heating, Ventilation & Air Conditioning Manufacturers Association (HEVAC)
 Home Builders Federation (HBF)
 Homes & Communities Agency (HCA)
 International Association for Cold Storage construction (IACSC)
 Intumescent Fire Seals Association (IFSA)
 Lend Lease
 London Underground Ltd
 Modular & Portable Building Association (MPBA)
 Mineral Wool Insulation Manufacturer Association (MIMA)
 National Access & Scaffolding Confederation (NASC)
 NHBC
 RIBA
 RICS
 Risktech Ltd
 Sustainability + Architecture
 Sustainable by Design

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REVISION OF LOSS PREVENTION STANDARDS

Loss Prevention Standards will be revised by issue of revised editions or amendments. Details will be posted on our website at www.redbooklive.com

Technical or other changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments. (See amendments table on page 14)

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

USERS OF LOSS PREVENTION STANDARDS SHOULD ENSURE THAT THEY POSSESS THE LATEST ISSUE AND ALL AMENDMENTS.

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FOREWORD

This standard identifies the evaluation and testing practices undertaken by LPCB for the purposes of approval and listing of products. LPCB listing and approval of products and services is based on evidence acceptable to LPCB:-

- that the product or service meets the standard
- that the manufacturer or service provider has staff, processes and systems in place to ensure that the product or service delivered meets the standard

and on:-

- periodic audits of the manufacturer or service provider including testing as appropriate
- compliance with the contract for LPCB listing and approval including agreement to rectify faults as appropriate

NOTES

Compliance with this LPS does not of itself confer immunity from legal obligations. Users of LPSs should ensure that they possess the latest issue and all amendments.

LPCB welcomes comments of a technical or editorial nature and these should be addressed to “the Technical Director” at enquiries@breglobal.co.uk.

The BRE Trust, a registered charity, owns BRE and BRE Global. BRE Global and LPCB (part of BRE Global) test, assess, certificate and list products and services within the fire and security sectors. For further information on our services please contact BRE Global, Watford, Herts. WD25 9XX or e-mail to enquiries@breglobal.co.uk

Listed products and services appear in the LPCB “List of Approved Products and Services” which may be viewed on our website: www.redbooklive.com or by downloading the LPCB Red Book App from the App Store (for iPhone and iPad), from Google Play (for Android devices) or from the Windows Store (for Windows 8 Phones and Tablets from 2014).

This document should be read in conjunction with scheme document SD 198.

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1 SCOPE

This standard specifies the test and performance requirements for fire dampers used as fire compartmentation and installed in Heating, Ventilating and Air Conditioning (HVAC) installations in buildings that are exposed to a fully developed fire (as represented by the time temperature curve of EN 1363-1: Fire Resistance tests, general requirements). The scope of certification will be limited to the standard supporting construction and installation details used in the specific damper tests or as detailed in appropriate extended application (EXAP) and/or assessment reports.

This standard does not cover dampers intended for smoke extraction systems only, as detailed in the EN 12101 series of standards. (It should be noted that a damper activated solely by heat cannot satisfy the ambient leakage requirement for the “S” classification defined in BS 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, during a developing fire until activation has occurred. Therefore, it will not control the spread of ambient smoke).

2 DEFINITIONS

For the purposes of this standard, the definitions detailed in EN 15650:2009, Ventilation for buildings – Fire dampers, apply.

3 REQUIREMENTS

In addition to the general requirements given in SD 198, an LPCB approved fire damper shall satisfy the appropriate requirements of the tests specified in 3.2 to 3.6 as applicable.

3.1 Documentation:

It is important that all relevant information is supplied relating to the product specification so that the maximum field of application can be accommodated. The following information is intended to provide applicants with appropriate guidance on the type of detail required; however, it is not to be regarded as a definitive list.

- Intended orientation of dampers.
- Installation details relevant to masonry, concrete and plasterboard walls etc.
- Installation details for light-weight concrete floors, dense concrete floors and timber floors etc.
- Range of sizes offered.
- Assembly drawings together with list of components.
- Detailed drawings of damper blades, installation frame, operating mechanism, including full specification of materials used.
- When intumescent materials are used, a full specification of each type of intumescent material used together with thickness, width and geometric shape (as appropriate).

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- Details of fusible links or other thermal release mechanism.
- Details of any fire stopping or sealing system used.
- Full test reports to the relevant standards as detailed in this document including any EXAP/Assessment reports as applicable.
- Classification reports in accordance with BS EN 13501-3.

3.2 Testing methods

The design and installation and condition of the test sample shall be representative of end use application. The supporting construction details are very important to the test results. Where design alternatives exist within the proposed specification, the test shall be undertaken on a specimen incorporating those features, which, in the opinion of the LPCB, will give rise to the most onerous test configuration. Where such a situation cannot be identified, more than one test may be required by the LPCB.

Different dampers shall be subjected to different tests as appropriate depending on their end use application, in accordance with;

- a) Fire resistance test to;
 - BS EN 1366-2, Fire resistance tests for service installations - Part 2: Fire dampers,
 - Or
 - BS ISO 10294-5, Fire resistance tests - Fire dampers for air distribution systems – Part 5: Intumescent fire dampers

Where furnace temperature is measured by plate thermocouples.

- b) Prolonged cycle testing to assess durability in service (Appendix A).
- c) Corrosion resistance of industrial dampers (Appendix B).

The adoption of the above tests depends on the intended application and end-use requirements. See Table 1.

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| Table 1 - Requirements for ducted dampers related to typical end use application | | | |
|---|-------------------------------------|--|---|
| APPLICATION | BS EN 13501-3 CLASSIFICATION | LPS 1162 Class | |
| | | Standard | Enhanced |
| | | LPS 1162 test requirement | |
| Fire resisting dampers | E EI | Fire resistance test including 50 opening and closing test to BS EN 1366-2 Corrosion test in accordance with clause 3.5 | As standard plus Extended Corrosion test to Appendix B |
| Automatic Fire Dampers | E EI E-S EI-S | Fire resistance test including 50 opening and closing test to BS EN 1366-2 Corrosion test in accordance with clause 3.5 | As standard plus Prolonged cycling testing to assess durability in service (Appendix A). And Extended Corrosion test to Appendix B |
| Intumescent fire dampers (E)/(EI) | E* EI* | Fire resistance test to clause 4 of ISO 10294-5 | As standard plus Reaction to fire tests defined in clause 5 of ISO 10294-5 |
| Leakage rated combined fire and smoke | E-S EI-S | Fire resistance test including 50 opening and closing test to BS EN 1366-2 Corrosion test in accordance with clause 3.5. | As standard plus Prolonged cycling testing to assess durability in service (Appendix A) |
| Combined intumescent and sliding plate mechanical fire damper (E)(EI)(EIS) | E EI EI-S | Fire resistance test including 50 opening and closing test to BS EN 1366-2 Corrosion test 3.5 in accordance with clause 3.5 | As standard plus Prolonged cycling testing to assess Durability in service (Appendix A) |

* Intumescent dampers cannot currently be tested in accordance with BS EN 1366-2 and classified in accordance with BS EN 13501-3. Until a revised version of EN1366-2 is published, intumescent dampers will be tested in accordance with ISO 10294-5 and classified in accordance with ISO 10294-2.

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3.3 Fire Resistance

The damper shall be tested in its vertical and horizontal plane unless the unit is only designed to work in one plane.

A test shall be undertaken for each type of wall and floor supporting construction and installation method for which the damper design is intended (see EN 1366-2). The damper shall be tested in accordance with the procedures and criteria as defined in BS EN 1366-2 or BS ISO 10294-5 (intumescent dampers only).

The leakage rates shall be measured and recorded. The leakage shall be within the limits given in BS EN 13501-3.

3.4 Cyclic Testing (mandatory for all mechanical dampers)

3.4.1. Test procedure

3.4.1.1 Standard classification

All mechanical dampers shall be tested. The specimen shall be tested for 50 cycles prior to fire testing as defined in BS EN 1366-2. The operation of the damper shall be controlled by the manufacturer's control unit or by its operating mechanism.

One cycle shall comprise of the damper starting from the closed position fully opening and then completely closing. Each cycle shall be completed in less than 2 minutes unless otherwise agreed with the LPCB.

3.4.1.2 Enhanced classification

For enhanced classification, automatic mechanical and leakage rated combined fire and smoke dampers shall undergo prolonged cyclic testing as defined in Appendix A to assess operability in service; this test shall be conducted on a sample representing the largest size damper in the range, and in each orientation to be approved.

Following the cyclic test an operational and visual check shall be conducted to ensure that the damper is still fully operational and that no wear or damage has occurred that could affect the correct function of the damper. It is not intended that the sample undergoing prolonged cyclic test is subject to the fire resistance test.

This test is not applicable to intumescent fire dampers where no moving parts are used.

3.5 Corrosion Test

All mechanical dampers shall be subjected to a salt mist test in general accordance with the procedures in BS EN 60068-2-11:1999, Environmental testing – Part 2: Tests – Test Ka: salt mist, and complying with the specific clauses from BS EN 60068-2-11:1999 given below.

The specimen shall not exceed 500mm in height and 500mm in width.

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Clause 4.1.1 Salt Solution Concentration.

The salt solution concentration shall be 19-21% by weight.

Clause 5 Initial Measurements.

The damper shall be fully operational before the test.

Clause 6 Pre-Conditioning.

No pre-conditioning of the specimen shall be undertaken by either the test laboratory or the manufacturer. The specimen shall be representative of that installed in practice.

Clause 7.1 Position of the specimens during test.

The specimen shall be positioned in the orientation that it would be installed in practice.

Clause 7.6 Test Duration.

The test duration shall be 120 hours.

Clause 8 Recovery.

The specimen shall be washed in running tap water for 5 minutes and allowed to dry. The temperature of the water used for washing shall not be less than 5°C or exceed 35°C.

Clause 9 Final Measurement.

The damper shall be fully operational after test.

3.6 Thermal release mechanism

The thermal release mechanism shall be tested and be compliant to the requirements of BS ISO 10294-4, Fire resistance tests – Fire dampers for air distribution systems - Part 4: Test of thermal release mechanism. Dampers that are to be approved under the Enhanced classification (see Table 1) shall incorporate a thermal release mechanism type that has undergone the additional reliability tests as described in Annex A of BS ISO 10294-4.

3.7 Installation

The manufacturer shall provide details of all installation methods, supporting constructions, maintenance requirements and any other information that is necessary, with all dampers supplied, to ensure that they will operate correctly in end use.

LPCB certificated fire resisting dampers shall only be installed using the installation method and supporting construction as described in the appropriate fire test report and LPCB certification listing.

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Comprehensive installation instructions shall be provided by the manufacturer at the time of tender or on delivery.

If the product is not installed in accordance with the approved field of application and installation method as described in the LPCB certification listing, the LPCB approval mark and reference number shall be omitted and the system shall not be considered as LPCB certificated.

4 CLASSIFICATION AND DESIGNATION

Classification shall be in accordance with BS EN 13501-3. A classification report shall be prepared by the test laboratory or by BRE Global.

Where test results are provided to ISO 10294-5, LPCB shall review this data in respect to ISO 10294-2 (Fire resistance tests – fire dampers for air distribution systems- Part 2: Classification, criteria and field of application)

Additionally, the damper shall be classified as either standard or enhanced relating to the requirements specified in Table 1 of this standard.

5 MARKING, LABELLING AND PACKAGING

The manufacturer shall provide appropriate marking, labelling and packaging for the safe transport and subsequent installation and performance of the damper system. This shall clearly show the manufacturers name, contact address, the damper system identification reference as well as any other relevant safety requirements.

The requirements for the LPCB marking or labelling of a damper system are described in scheme document SD 198 and in the “Use of the Certification Mark” publication PN103.

6 PUBLICATIONS REFERRED TO:

For undated references please refer to the latest published issue.

| | |
|--------------|--|
| BS EN 12101 | Smoke and heat control systems. |
| BS EN 1366-2 | Fire resistance tests for service installations - Part 2: Fire dampers. |
| BS EN 1363-1 | Fire Resistance tests, Part 1 - general requirements |
| ISO 10294-2 | Fire resistance tests - Fire dampers for air distribution systems - Part 2: Classification, criteria and field of application of test results. |

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| ISO 10294-4 | Fire resistance tests - Fire dampers for air distribution systems - Part 4: Thermal release mechanism. |
| ISO 10294-5 | Fire resistance tests - Fire dampers for air distribution systems – Part 5: Intumescent fire dampers. |
| BS EN 60068-2-11:1999 | Environmental testing – Part 2: Tests – Test Ka: salt mist. |
| BS EN 60068-2-52:1996 | Environmental testing – Part 2: Tests – Test Kb salt mist cyclic. |
| SD 198 | Scheme Document for LPCB Approval of passive fire protection products. |
| BS 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 15650:2009 | Ventilation for buildings – Fire dampers. |
| PN 103 | Use of the BRE and LPCB Certification marks. |

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APPENDIX A PROLONGED CYCLING TEST

This is based on EN 15650:2009, Ventilation for buildings – Fire dampers.

One cycle shall comprise an opening and a closing operation.

A.1 Mechanical Fire dampers for use only in the case of an emergency and are not test cycled automatically or used to control air flow in the ventilation system under normal conditions

100 cycles at nominal operating power less 10%, followed by
100 cycles at nominal operating power plus 15%, followed by
100 cycles at nominal operating power

The results shall record that the cycles were fully completed, without any indication of failure to operate.

A.2 Mechanical Fire Dampers for use as part of a general HVAC system, or as part of a control system that is cycled every day to check operation

10,000 cycles at nominal operating power
100 cycles at nominal operating power less 10%, followed by
100 cycles at nominal operating power plus 15%.

The results shall record that the cycles were fully completed, without any indication of failure to operate.

A.3 Mechanical Fire damper for use as part of a general HVAC system as well as a Smoke control systems, that uses a modulating actuator

10,000 cycles at nominal operating power (0 to 90°), followed by
10,000 cycles at nominal operating power (45° to 60°)

The results shall record that the full cycles were fully completed, without any indication of failure to operate.

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**APPENDIX B
EXTENDED CORROSION TESTING OF DAMPERS
(Salt mist cyclic test)**

A specimen not exceeding 500mm in height and 500mm in width shall be tested in accordance with BS EN 60068-2-52: 1996 Environmental testing – Part 2: Tests – Test Kb salt mist cyclic and the following specific clauses:

Clause 6 Severities.

Severity (1) shall be used.

Clause 7 Initial Measurements.

The damper shall be fully operational before the test.

Clause 8 Pre-conditioning.

No pre-conditioning of the specimen shall be undertaken by either the test house or the manufacturer. The specimen shall be representative of that installed in practice.

Clause 9.1 Position of the specimens during test.

The specimen shall be positioned in the orientation that it would be installed in practice.

Clause 10 Recovery.

The specimen shall be washed in running tap water for 5 minutes and allowed to dry. The temperature of the water used for washing shall not be less than 5°C or exceed 35°C.

Clause 11 Final Measurement.

The damper shall be fully operational after test.

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Amendments Issued Since Publication

| DOCUMENT NO. | AMENDMENT DETAILS | SIGNATURE | DATE |
|--------------|---|-----------|-----------|
| LPS 1162-4.0 | <ol style="list-style-type: none"> 1. Changed to test method to BS EN 1366-2 2. Classification to BS EN 13501-3 introduced 3. Enhanced classifications for loss prevention purposes 4. Testing and classification for intumescent fire dampers introduced | TB | Jan 2011 |
| LPS 1162-4.1 | <ol style="list-style-type: none"> 1. New front cover 2. Title added to header 3. Contents page moved to Page 1 4. Notes and Foreword page amended on Page 4. 5. Repagination 6. Update to copyright information | DC | Jan. 2014 |