BRITISH STANDARD

BS EN 15659:2009

Secure storage units — Classification and methods of test for resistance to fire — Light fire storage units

ICS 13.220.40; 13.310; 91.060.01

BSI
British Standards

National foreword

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The UK participation in its preparation was entrusted to Technical Committee GW/2, Secure storage of cash, valuables and data media.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Wertbehältnisse - Klassifizierung und Methoden zur Prüfung des Widerstandes gegen Brand - Leichte Brandschutzschränke

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Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 15659:2009) has been prepared by Technical Committee CEN/TC 263 “Secure storage of cash, valuables and data media”, 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of an identical text or by endorsement, at the latest by October 2009, and conflicting national standards shall be withdrawn at the latest by October 2009.

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Introduction

The testing conditions given in this European Standard provide a basis for simulating fires to determine, in a reproducible way, the fire resistance of light fire storage units at various protection levels. The protection levels enable a comparison to be made of the resistance against fire provided by different constructions.

The threshold value for the maximum temperature increase of 150 K at every measuring point in the protection levels LFS 30 P and LFS 60 P for light fire storage units from a starting temperature of (21 ± 1)°C, as defined in this European Standard, refers to the relatively short-term stress due to high temperatures during a fire test. It is not normally experienced by paper media stored in light fire storage units in the normal and correct way.

1 Scope

This European Standard specifies requirements for light fire storage units providing protection against fire.

The method of test is specified to determine the ability of light fire storage units to protect paper media from the effects of fire. Two levels of fire exposure periods (LFS 30 P and LFS 60 P) are specified using the maximum temperature increase permitted within the storage space of the light fire storage unit.

Requirements are also specified for the test specimen, the technical documentation for the test specimen, correlation of the test specimen with the technical documentation, preparation for type testing and test procedures.

A scheme to classify the light fire storage units from the test results is also given (see Table 1).

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 1363-1:1999, *Fire resistance tests — Part 1: General requirements*

EN 60584-1, *Thermocouples — Part 1: Reference tables (IEC 60584-1:1995).*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
light fire storage unit
storage unit designed to protect paper media, except for paper grades where data loss occurs at temperatures below 172°C, as well as valuables against the effects of temperatures up to 172°C

NOTE A light fire storage unit can have doors, drawers, lids, connections and fittings.

3.2
compartment
part of a light fire storage unit which can be closed with a separate door, lid or cover

NOTE A compartment formed by inserting a shelf board is not a compartment within the meaning of this standard.

3.3
lock
device which verifies an entered code and performs a blocking function on the boltwork or the door

4 Requirements, classification and locks

4.1 Light fire storage units shall provide protection against the effects of fire (see Clause 6) and be classified as specified in Table 1.

Table 1 — Protection level requirements

Protection level		Maximum temperature increase
30 min	60 min	
LFS 30 P	LFS 60 P	150 K

NOTE 1 Where LFS is the symbol applied for light fire storage units.

NOTE 2 The numerical values in the protection level are the duration of fire exposure during the type test in minutes.

NOTE 3 P represents protection of data on paper, excluding those paper grades which lose data below 172ºC.

4.2 Light fire storage units shall be fitted with a lock.

5 Test specimen, technical documentation and correlation

5.1 Test specimen

Of several models of a series (with one door, two doors, drawers, etc.) having the same design, protection and construction features (type and thickness of construction and protective materials, rabbet geometry, etc.) as well as the same base (with a tolerance of ± 15 % each applicable to the internal dimensions of width and depth), the models with the smallest and largest internal height resp. the lowest and highest number of drawers shall be tested.

Light fire storage units with double doors shall be regarded as a separate model range.

Where a variety of locking options is available, the test specimen used in the type test shall be coordinated with the testing laboratory.

Two identical light fire storage units shall be available: one for the fire endurance test, the other for verifying correlation of the filling material with the technical documentation. The testing laboratory shall decide which test specimen will be used for the type test. The test specimen shall be modified at its base for installing the measuring instrumentation (see 6.3.1 and Figure 2) and may have, but need not have a plinth.

5.2 Technical documentation of the test specimen

Detailed technical documentation about the range and test specimen (drawings, specifications of materials, installation and processing advice) shall be submitted to the testing laboratory before the type test. The drawings shall give specifications as to height, width and depth of the test specimens, materials and their thicknesses, dimensions of rabbet edges, locking system, welds including the method of their execution, seals, etc. The mass of the plinth shall be given.

Samples and detailed specifications of all heat protection materials and seals used in the test specimens shall accompany the test specimens.

The date(s) on which the test specimens were filled with fire protection materials shall be given.

NOTE 1 With reference to all heat protection materials, the technical documentation should include: a) quality control parameters, and b) details of the performance characteristics, or c) details of the constituent materials and processing methods.

NOTE 2 In connection with the type test, the testing laboratory should mark three sets of the technical documentation with signature, stamp and date. One set is sent to the applicant. One set is added to the monitoring documentation for certification and quality assurance. One set is kept in the testing files of the test laboratory.

5.3 Correlation of test specimens and technical documentation

The test specimens and the supplied technical documentation must correlate.

As to mass, the two test specimens shall not differ by more than 10 %.

In series production, the wall, ceiling and door thicknesses must not be below the specified minimum limit of the type-tested thickness by more than 3 %.

6 Test methods

6.1 Principle

The fire endurance of the test specimen is assessed by heating in a furnace.

During the type test the temperature in the interior of the test specimen is measured.

6.2 Test equipment

6.2.1 The furnace which must be capable of providing the uniform heating conditions specified in this standard, and constructed so that the four vertical walls of the test specimen can each be exposed to the same heating conditions with no direct flame impingement onto the test specimen.

The distance between the interior walls of the furnace and the surface of the test specimen shall be ≥ 750 mm. The furnace conditions shall conform to EN 1363-1. To meet these conditions, the setting of the neutral pressure level shall be made in accordance with 6.2.2 and the measurement of the temperature in the interior of the furnace shall be made with instrumentation in accordance with 6.2.3.

6.2.2 The furnace shall be operated such that the neutral pressure level is reached after 5 min of firing, measured at ± 5 Pa 1,000 mm above the furnace base. Test specimens with an external height of > 1,000 mm shall be placed on the furnace base during the type test. Test specimens with an external height of ≤ 1,000 mm shall be positioned on a plinth of brick with a height of 500 mm. For pressure measurements, pressure measuring heads in accordance with 4.5.2 of EN 1363-1:1999 shall be used.

NOTE In order to ensure consistent heating conditions, the width of the plinth area around the projected cross-sectional area of the test specimen should not exceed 200 mm.

6.2.3 Thermocouples of type K (NiCr-Ni) with a measurement uncertainty in accordance with EN 60584-1 for measuring the furnace temperature. The furnace thermocouples shall be plate thermometers according to 4.5.1.1 of EN 1363-1:1999.

6.2.4 Thermocouples consisting of 0.5 mm diameter wires of type K (NiCr-Ni) or type J (Fe-CuNi) with a measurement uncertainty in accordance with EN 60584-1 for measuring the air and surface temperatures in the test specimen. The measurement results shall be recorded at intervals not greater than 1 min. The contact measurement points shall be assembled in accordance with 4.5.1.2 and 4.5.1.4 of EN 1363-1:1999, respectively.

6.2.5 Timing device, capable of running continuously throughout the test period.

6.2.6 Equipment for weighing test specimens, with an error limit of ± 3 %.

6.3 Preparation for test

6.3.1 Suitably modify the base (see 6.3.3) of the test specimen for the fire endurance test (see 6.4.2) to allow the entry of thermocouple cables. Plinths and other elements that may prevent proper protection of the thermocouple cables may be removed.

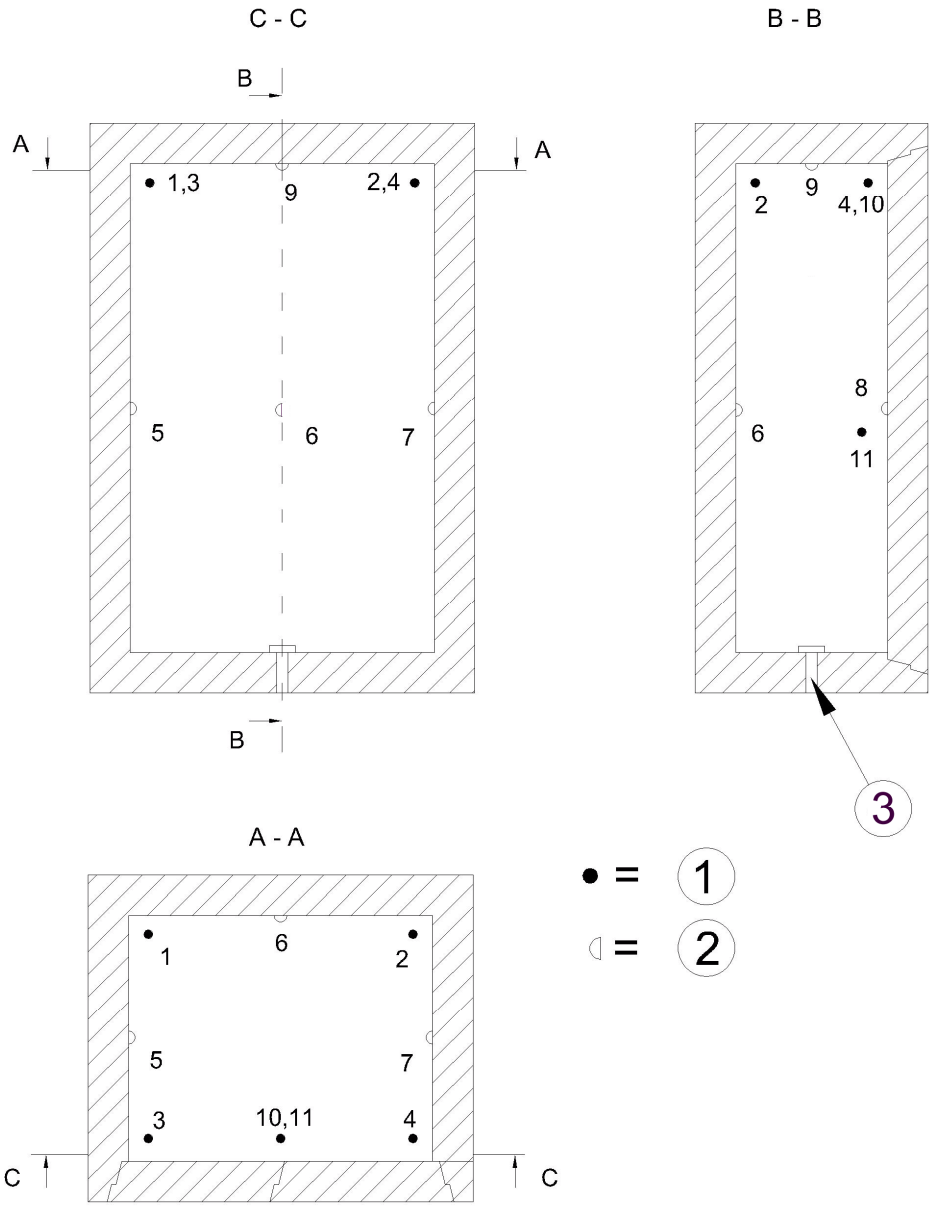
6.3.2 For the fire endurance test (see 6.4.2) install thermocouples (see 6.2.4) at the following measuring points in the test specimen to enable temperature measurement:

a) Four thermocouples for measuring the air temperature in the upper corners each (26.5 ± 1.5) mm from the walls, interior door surface and ceiling (see measuring points 1, 2, 3 and 4 of Figure 1).

b) One thermocouple for measuring the surface temperature on each of the ceiling, side walls, rear wall, and door, approximately in the centre of each surface (see measuring points 5, 6, 7, 8 and 9 of Figure 1).

c) For two-door cabinets only, two additional thermocouples for measuring the air temperature at (26.5 ± 1.5) mm from the centre door joint, one (26.5 ± 1.5) mm from the ceiling and the other approximately half-way up the cabinet (see measuring points 10 and 11 of Figure 1).

d) For test specimens with several compartments (e.g. drawers), additional thermocouples in each compartment (drawer), as in a) and b).

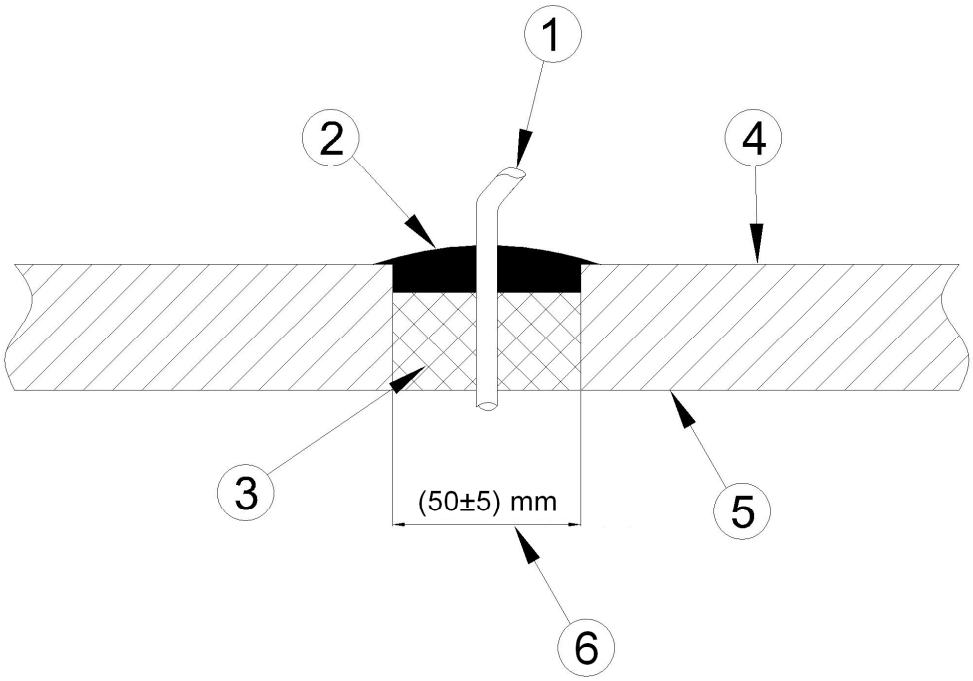


Key

1 Air temperature measuring point
2 Surface temperature measuring point
3 Cable entry hole

Figure 1 — Measurement points

6.3.3 For the fire endurance test, the base shall be modified for the fixing of the measuring devices in the test specimen. The cables shall be placed into a plastic shrink tubing. The holes in the base through which the cables enter shall be sealed with mineral wool, ceramic fibre or similar material as shown in Figure 2. In test specimens with several self-contained compartments, any hole for the entry of the measuring cable shall be sealed equally at both sides.



Key

1 Instrument cable
2 Silicone
3 Mineral wool, ceramic fibre or similar material
4 Inside of the base of the test specimen
5 Outside of the base of the test specimen
6 Diameter

Figure 2 — Cable entry hole and sealing

6.3.4 Except for the instrumentation required in 6.3.2., the test specimen shall be tested under a serviceable condition expecting the maximum temperature increase.

6.3.5 After all instrumentation has been installed maintain the test specimens in a controlled climate of temperature (21 ± 1)°C and relative humidity (50 ± 5) % for a minimum of 16 h prior to the beginning of the type test. All compartments or drawers of the test specimens shall be open during the conditioning period.

Close all doors and compartments (e.g. drawers) prior to removing the cabinet from the controlled environment and commence testing within 1 h.

6.3.6 Install the instrumentation for measuring the furnace temperature (see 6.2.3) in the furnace (see 6.2.1) at four measuring points. Locate the measuring points (100 ± 10) mm from the walls of the test specimens and approximately in the centre of the vertical surfaces of the test specimens.

The temperature of the furnace immediately prior to ignition shall be (20 ± 10)°C.

6.4 Procedure

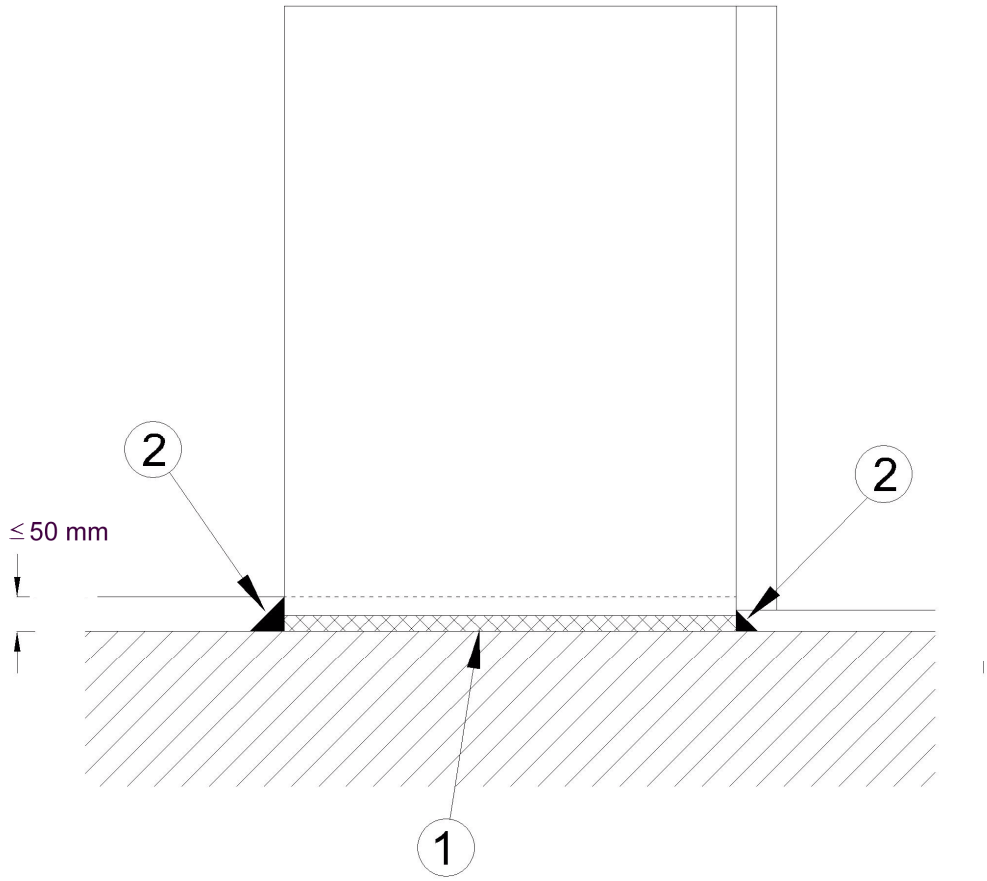
6.4.1 Correlation

Examine the correlation of the test specimens with the technical documentation before the type test. Establish that the dimensions, clearances, closure details, design, materials and type of construction of the test specimens correspond to the technical documentation (see 5.2).

Make a photographic record of the following construction details: The outside of the fire storage unit, the inside of the fire storage unit, rabbet edges, seals and plinth.

6.4.2 Fire endurance test

The test specimen is mounted on a 30 mm (uncompressed) layer of mineral wool or similar material to protect the instrument cables as they pass from the fire storage unit through the furnace floor. A mortar fillet is added around the fire storage unit to a maximum height of 50 mm to complete the protection (see Figure 3).



Key

1 Mineral wool or similar material
2 Circulate mortar fillet

Figure 3 — Protection of instrument cables

Expose the test specimen to the furnace flames and maintain the mean furnace temperature in accordance with the time-temperature curve in accordance with EN 1363-1 for 30 min or 60 min as required for the appropriate protection level (see Clause 4). The fire exposure time commences when any of the furnace thermocouples exceeds 50°C.

After 30 min or 60 min turn off the flames. The temperature measurement shall end when the burners are switched off.

Record the temperature increase at all measuring points (see Figure 1).

NOTE Observations can be made during the type test. They should be recorded and photographed.

6.4.3 Examination

After type testing remove, examine and compare samples of the test specimen with the technical documentation and material samples provided for the type test. Observations of the unit´s post-test condition, such as the weight and material condition, shall be recorded.

Make a photographic record of the following construction details: The outside of the tested specimen, the plinth of the test specimen, the areas where samples have been removed.

7 Test report

The test report shall contain the following information:

a) number and/or title of this European Standard;

b) name of the manufacturer, and place and year of manufacture of the test specimens and product name of the test specimens;

c) one copy of the technical documentation of the test specimen (see 5.2);

d) name of testing laboratory;

e) unique test report number;

f) Annex list of drawings examined (see 5.2) and any deviations recorded;

g) date(s) and location of the type testing (i.e. town, country);

h) details of the location of measuring points (see 6.3.2);

i) lock configuration and status;

j) details of temperature recordings made before and during the type test;

k) relevant observations recorded before, during and after the test procedure (see 6.4.2);

l) description of the specimen after the type test (see 6.4.3) including the condition and operability of locks and boltwork;

m) photographs taken before, during and after the type test (see 5.3, 6.4.3);

n) protection level achieved;

o) the report should contain a statement that the results obtained relate only to the sample tested, and should be regarded as only the basis for certification. The report itself should not be considered to be a Certificate of Conformance.

8 Marking

Light fire storage units conforming to EN 15659 shall be legibly and indelibly marked with the following information:

a) manufacturer's identification;

b) number of this European Standard and its date of issue, e.g. EN 15659;

c) protection level (e.g. LFS 30 P for light fire storage units);

d) year of manufacture;

e) weight of the product.

The following information may also be given:

f) type, model number, or size;

g) serial number.

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BSI Group
Headquarters 389
Chiswick High Road,
London, W4 4AL, UK
Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
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