
Razširjena uporaba rezultatov preskusov požarne odpornosti in/ali dimotesnosti za vrata, zaporne elemente in okna, ki se odpirajo, vključno z njihovim okovjem - 11. del: Požarna odpornost ognjevarnih zaves

Extended application of test results for fire resistance and/or smoke control for door, shutter and openable window assemblies, including their elements of building hardware - Part 11: Fire resistance for operable fabric curtains

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Erweiterter Anwendungsbereich von Prüfergebnissen zum Feuerwiderstand und/oder zur Rauchdichtigkeit von Türen, Toren, Abschlüssen und Fenstern einschließlich ihrer Baubeschläge - Teil 11: Feuerwiderstandsfähigkeit von Feuerschutzvorhängen

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Application étendue des résultats d'essais en matière de résistance au feu et/ou d'étanchéité à la fumée des blocs-portes, blocs-fermetures et ouvrants de fenêtre, y compris leurs éléments de quincaillerie intégrés - Partie 11 : Résistance au feu des rideaux en toile manoeuvrables

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Extended application of test results for fire resistance and/or smoke control for door, shutter and openable window assemblies, including their elements of building hardware - Part 11: Fire resistance for operable fabric curtains

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

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EN 15269-11:2018 (E)**European foreword**

This document (EN 15269-11:2018) 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of an identical text or by endorsement, at the latest by October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN and CENELEC by the European Commission and the European Free Trade Association.

EN 15269, *Extended application of test results for fire resistance and/or smoke control for door, shutter and openable window assemblies, including their items of building hardware*, consists of the following parts:

- *Part 1: General requirements;*
- *Part 2: Fire resistance of hinged and pivoted steel door assembly;*
- *Part 3: Fire resistance of hinged and pivoted timber door assemblies and openable timber framed windows;*
- *Part 5: Fire resistance of hinged and pivoted, metal framed, glazed doorsets and openable windows 1);*
- *Part 6: Fire resistance of sliding timber door assemblies 1);*
- *Part 7: Fire resistance of sliding steel door assemblies;*
- *Part 10: Fire resistance of steel rolling shutter assemblies;*
- *Part 11: Fire resistance of operable fabric curtains 1);*
- *Part 20: Smoke control for hinged and pivoted steel, timber and metal framed glazed doorsets.*

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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

This European Standard is one of a series of standards intended to be used for the purpose of producing an extended application report based on the evaluation of one or more fire resistance and/or smoke control tests. These standards may also be used to identify the best selection of test specimens required to cover a wide range of product variations.

Before there can be any consideration for extended application the doorset should have been tested in accordance with EN 1634-1 to achieve a test result which could generate a classification in accordance with EN 13501-2 at least equal to the classification subsequently required from extended application considerations.

A review of the door assembly construction parameters can indicate that one or more characteristics may be improved by a particular parameter variation. All evaluations should be made on the basis of retaining the fire resistance classifications obtainable from testing to EN 1634-1, including those lower than the test duration. However, this should never lead to an increased classification for any specific fire resistance and/or smoke control performance parameter beyond that achieved during any one test unless specifically identified in the relevant Construction Parameter Variation tables within this series of standards.

The effect on the maintaining of the self closing function (C-classification) of the door assemblies following an extended application process is not addressed in this series of standards.

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EN 15269-11:2018 (E)**1 Scope**

This document covers vertically mounted types of manual or powered, operable fabric curtain assemblies with downward closing operation. Curtain systems are different from (are separated from) door systems due to their not rigid closure element typically made of thin walled materials as for instance woven or knitted fabrics and foils. These closure elements are not able to carry significant loads normal to their surface by their bending stiffness. In other words: curtain systems are separated from door systems because they can only conduct pulling forces by tensile stress in plane to their surface. Pushing forces are not conducted in plane to their surface.

This document establishes the methodology for extending the application of test results obtained from test(s) conducted in accordance with the EN 1634-1 test method for shutters.

Subject to the completion of the appropriate test or tests selected from those identified in Clause 4, the extended application may cover all or some of the following non-exhaustive list of examples:

- uninsulated (E), radiation (EW) or insulated (EI1 or EI2) classifications;
- coiling mechanisms;
- wall/ceiling fixed elements;
- items of building hardware;
- decorative finishes;
- intumescent, draught or acoustic seals;
- alternative supporting construction(s).

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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, *Fire resistance tests — Part 1: General Requirements*

EN 1634-1, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware — Part 1: Fire resistance test for door and shutter assemblies and openable windows*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 15269-1, *Extended application of test results for fire resistance and/or smoke control for door, shutter and openable window assemblies, including their elements of building hardware — Part 1: General requirements*

EN 1993-1-2, *Eurocode 3: Design of steel structures — Part 1-2: General rules — Structural fire design*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

full scale test

test in accordance with EN 1634-1

3.1.2

small scale test

test of parts of the fabric curtain

3.1.3

parts

for definition of parts see Figure A.1

3.1.4

safety edge

electronic device to prevent damage or injuries caused by collision with the bottom bar

Note 1 to entry: Typically fixed on to the bottom bar (Figure A.1: part B3).

3.2 Abbreviations used for Annex B and C calculations

U_t	maximum deflection during fire test	[mm]
G_t	maximum gap between the bottom bar and the floor level	[mm]
H_t	clear height of test specimen	[mm]
W_s	scaled distance between side guides	[mm]
U_s	scaled distance neutral line to max. deflection (horizontal direction)	[mm]
r_s	Radius of scaled deflection	[mm]
P_s	Pressure (20 N/m ²)	[N/m ²]
$C_{s,h}$	horizontal bow length of up scaled curtain	[mm]
$C_{s,v}$	vertical bow length of up scaled curtain	[mm]
t	Thickness of curtain material	[mm]
s_h	space in side guides (horizontal slack)	[mm]
δ_h	horizontal shrinkage (%)	
δ_v	vertical shrinkage (%)	

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$F_{S,h}$	horizontal pulling force per meter height	[N/m]
$F_{Ls,v}$	vertical fabric length considering vertical shrinkage	[mm]
H_S	up scaled drop length of intended system	[mm]
$A_{FLs,v}$	additional fabric length of up scaled curtain in vertical direction	[mm]
$m_{S,ges}$	total weight of up scaled curtain material and bottom bar	[kg]
$m_{S,F}$	total weight of up scaled curtain material	[kg]
$m_{S,BB}$	total weight of up scaled bottom bar	[kg]
σ_S	maximum stress in up scaled curtain	[N/mm ²]
$\sigma_{S,v}$	maximum stress in vertical direction in up scaled curtain	[N/mm ²]
$\sigma_{S,h}$	stress in scaled curtain in horizontal direction	[N/mm ²]
g	acceleration of gravity (9,81 m/s ²)	[m/s ²]
F_t	load during small scale fire test	[N]
m_t	mass of heft for small scale fire test	[kg]
W	width of curtain carrying load during small scale fire test	[mm]
I_B	moment of inertia for the barrel	[mm ⁴]
Z_B	section modulus for the barrel	[mm ³]
W_L	Curtain weight	[kg]
D_B	Barrel outside diameter	[m]
L_L	Curtain width	[m]
h_{SA}	Height of fire curtain aperture	[m]
ρ_L	Weight per unit area of curtain	[kg/m ²]
W_B	Weight of barrel including springs, axles, tubular motor, etc.	[kg]
t_B	Barrel wall thickness	[mm]
W_L	Full weight of curtain including bottom rail	[kg]
σ_B	Barrel stress	[N/mm ²]
W_{BA}	Barrel assembly weight	[N]
L_B	Barrel length for fixed barrel bearing on both ends, distance between intermediate barrel supports for floating barrel bearing	[mm]
E_B	Young's Modulus	[N/mm ²]
$W_{r 1}$	bracket potential support	[N]
I_{SB}	Support bracket moment of inertia	[mm ⁴]

σ_{SB}	Support bracket maximum stress	[N/mm ²]
a	Distance between centreline of axle and rear of barrel support bracket	[mm]
y	Distance between barrel support centre of gravity and the point of greatest stress	[mm]
W_{R2}	bracket component	[N]
b	Barrel support length	[mm]
A_{sb}	Support bracket cross-sectional area	[mm ²]
W_{R3}	casing hood component	[N]
t_{CH}	Casing thickness	[mm]
L_{CH}	Casing length	[mm]
b	Casing soffit length	[mm]
W_R	$W_{R1} - W_{R2} - W_{R3}$	(N)
Total		
W_{BA}	Barrel assembly weight	[N]
Z_A	Axle section modulus	[mm ³]
D_A	Axle diameter	[mm]
σ_{A1}	Axle bending stress	[N/mm ²]
W_A	50 % of barrel assembly weight	[N]
W_{AL}	Motor weight	[kg]
L_A	Axle length	[mm]
σ_{A2}	Axle shear stress	[N/mm ²]
W_{EEL}	Weight of fixing angle	[N]
h_E	Endplate height	[mm]
A_{FA}	Fixing angle cross-sectional area	[mm ²]
ρ_{steel}	density of steel = 7 850	[kg/m ³]
A_E	Endplate horizontal cross-sectional area	[mm ²]
w_E	Endplate width	[mm]
t_E	Endplate thickness	[mm]
Φ	Area correction factor (dimensionless)	
ϕ	Length correction factor (dimensionless)	
L_{FA}	Fixing angle leg length (attached to endplate)	[mm]
σ_{EB}	Endplate bending stress	[N/mm ²]

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W_E	50 % of barrel assembly weight	[N]
L_E	Axle end bearing length	[mm]
W_M	Load on endplate	[N]
L_M	Effective motor shaft length	[mm]
γ	$= [1 + \Phi + \phi]$	(dimensionless)
W_{ESL}	Endplate self-weight weight	[N]
W_{EL}	Eccentric loading	[N]
W_{AL}	Weight on endplate from motor	[kg]
W_T	Total endplate load	[N]
τ_{EFB}	Shear stress in all endplate fixing bolts	[N/mm ²]
n_B	Number of bolts	
a_B	Total area of bolts	[mm ²]
F_{EFB}	Tensile force in top endplate fixing bolt	[N]

4 Determination of the field of extended application**4.1 General**

Before there can be any consideration for extended application the operable fabric curtain shall have been tested and classified in accordance with EN 1634-1 and EN 13501-2 respectively in order to establish a classification for the operable fabric curtain.

A review of the construction parameters can indicate that one or more characteristics may be improved by a particular parameter variation. All evaluations shall be made on the basis of retaining the classifications obtainable from testing to EN 1634-1, including those lower than the test duration. However, this shall never lead to an increased classification for any specific parameter beyond that achieved during any one test unless specifically identified in the relevant Construction Parameter Variation tables.

All evaluations shall be made on the basis of retaining the classification obtained from testing to EN 1634-1.

If, by following the ensuing procedure, any part of the classification cannot be achieved by extended application rules that part of classification shall be omitted from the subsequent extended application report and classification report.

4.2 Procedure for maximum field of extended application

Identify the variations from the original test specimen(s) which are required to be covered by an extended application report - see Figure A.1 for a typical operable curtain.

Locate the variations in the appropriate parameter variation by reference to columns (1) and (2) of Table A.1.

Review the type of classification to be retained from column (3) of Table A.1 and establish from the contents of column (4) of Table A.1 whether any extended application is available without the need for further testing.

Where this is deemed to be possible this can be recorded in the extended application report together with any appropriate restrictions and the stated rules from column (4) in Table A.1.

Where the variations required can only be achieved from additional testing according to column (5) in Table A.1, the additional test can be made on a similar specimen type to the original test against which the extended application is sought. Alternatively, column (5) in Table A.1 identifies an option for alternative testing and relevant test parameters.

4.3 Procedure for maximum field of extended application

It is possible to provide a limited field of extended application from the results of a single test. However, where a manufacturer intends to produce a range of operable fabric curtains, it is recommended that careful consideration is given to the complete range of designs and options in order to minimize the testing required before testing commences.

Establish all the parameter variations which are required to be part of the product range.

Select specimen(s) for the first test(s) in the series to ensure that the most important parameter variations for the manufactured products are covered.

Complete the first test or a series of tests and prepare a field of direct application and possibly a classification report from the results of the test(s).

Establish which of the original desired parameter variations have not been covered by the direct application and classification report.

Identify these parameter variations in Annex A and establish if any extended application is possible without further testing.

Record this for the extended application report together with any restrictions and rules given in column (5) in Table A.1.

Evaluate which, if any, of the desired parameter variations have not been covered by the field of direct application or the initial field of extended application derived from 4.3.7 above.

Select the required outstanding parameter variations from column (1) and column (2) of Table A.1 and observe from column (5) of Table A.1 which are the most appropriate weakest specimen options for further testing.

If the complete selection of required parameter variations has not been covered by the tests completed in accordance with 4.3.9 above, then an appropriate test or tests may be repeated with the additional product variations incorporated.

4.4 Interpretation of test results

In order to maximize the field of extended application, it is important that the test reports shall record details of any integrity and/or insulation failures throughout the test duration.

Where a series of tests have been conducted, the field of extended application shall be based on the lowest performance achieved from the complete series of tests unless premature failure has been attributed to one or more specific construction parameter variation.

Where it has been possible, to identify specific parameter failures, the extended application for all other construction parameter variations can be based on the performance achieved after isolating the premature failure(s).

4.5 Additional measurements

To use extended application the following measurements are to be taken:

— Figure A.3 S = Shrinking allowance;

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- Figure A.54 S_t = Bottom bar deflection;
- Figure A.55 U_t = Maximum curtain deflection.

5 Extended application report

Prepare an extended application report in accordance with the requirements of Clause 5 of EN 15269-1:2010, based on the results of evaluations in accordance with the above.

6 Classification report

The classification report shall be determined from the results of the extended application report and presented in accordance with EN 13501-2.

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Annex A (normative)

Construction parameter variations for Fabric Curtain assemblies

Table A.1 is designed to provide criteria for the creation of extended application reports by experts in the field of fire resistance testing of operable fabric curtain assemblies.

Table A.1 shall only be used to evaluate a field of extended application when at least one positive fire resistance test to EN 1634-1 has resulted in a classification according to EN 13501-2.

The first two columns identify possible variations to the construction details of the specimen tested.

The type of classification achieved from the test can be identified from the 'Performance characteristic' section of Table A.1 column 3 as insulation, radiation control or integrity only.

The effect of the change in each parameter is evaluated for each characteristic in column 3 under E for effects on integrity, I for effects on insulation (whether an I1 or I2) and W for the effects on radiation control for EW curtains.

Where symbols are used these relate to the following definitions:

- a) < - forecast is a worse performance;
- b) > - forecast is a better performance;
- c) = - forecast is no significant difference;
- d) ≤ - forecast is a worse or equal performance;
- e) ≥ - forecast is a better or equal performance;
- f) > = < - forecast unknown.

These evaluations lead to the judgement of the possibility of the extension of the field of application the results of which are given in column 4. In certain cases, in Column 4, it is a requirement to achieve Category B, the details for which are given in EN 1634-1:2014, 13.3.2, Table 1.

Where additional tests are deemed to be necessary the type of specimen approved for incorporation of the changed parameter is defined in column 5. Add additional text clearing up on which parameters these results are relevant.

Where it is possible to use information from tests performed on one configuration for evidence on a different configuration, this allowance has been made in order to reduce the overall number of tests required for extended application evaluation.

The rules given for size increase (width, height, area) of the curtain assembly are applicable for operable curtains tested in size equal or bigger than the maximum size which can be tested in a standard size furnace (normally 3 m x 3 m). All size variations based on the results of more than one test with specimens of different sizes can be combined.

Where construction parameter variations result in an increase in the weight of the curtain, the requirements given in Annex B shall be satisfied.