

## **FIRE RESISTANCE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION FIRES-JR-008-15-NURE**

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**Loft shutter with retractable timber ladder, type LWF**

**Loft shutter with retractable steel ladder, type LMF**

**Loft shutter with retractable steel scissor ladder, type LSF**

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# FIRE RESISTANCE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION

**FIRES-JR-008-15-NURE**

**Name of the product:** Loft shutter with retractable timber ladder, type LWF  
Loft shutter with retractable steel ladder, type LMF  
Loft shutter with retractable steel scissor ladder, type LSF

**Sponsor:** FAKRO SP z o.o.  
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## 1. INTRODUCTION

This expert judgement report with classification defines the resistance to fire classification assigned to the **loft shutter with retractable ladder, type LWF, type LMF, type LSF** in accordance with the classes given in EN 13501-2 + A1: 2009.

Standard EN 1634-1: 2014 specifies a method for determining the fire resistance of door and shutter assemblies and openable windows designed for installation within openings incorporated in vertical separating elements. In comparison with EN 1634-1: 2008, actual version of standard EN 1634-1 does not comment the possibility of using this test method to determine the fire resistance of non-loadbearing horizontally oriented doors/shutters by analogy. As there is no test method to determine the fire resistance of such products, FIRES, s.r.o. chose EN 1634-1: 2014 during fire test [1] and also used paragraph 13 (of the standard) to define the field of application of test results. This expert judgement expresses the opinion of the FIRES and is based on the experience or internal rules of FIRES.

## 2. DETAILS OF CLASSIFIED PRODUCT

### 2.1 GENERAL

The element is used as a shutter with fire separating function fixed in the ceiling of houses, administrative and polyfunctional buildings.

### 2.2 PRODUCT DESCRIPTION

Individual types of product (LWF, LMF, LSF) differ from each other only by construction of retractable ladder.

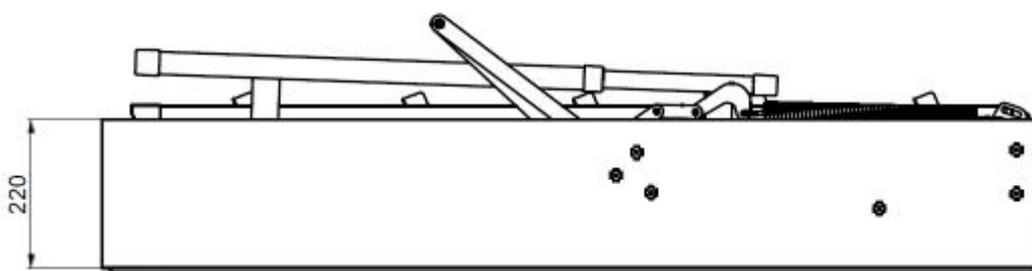
#### Dimensions of product

Overall dimensions of the shutter	(860 x 1400) mm
Overall dimension of the shutter leaf	(814 x 1354 x 80) mm (width x length x thickness)
Shutter opening	(800 x 1340) mm (width x length)

#### Shutter frame

Rebated shutter frame is made from pine timber with dimension (20 x 220) mm and bulk density higher than 520 kg/m<sup>3</sup>.

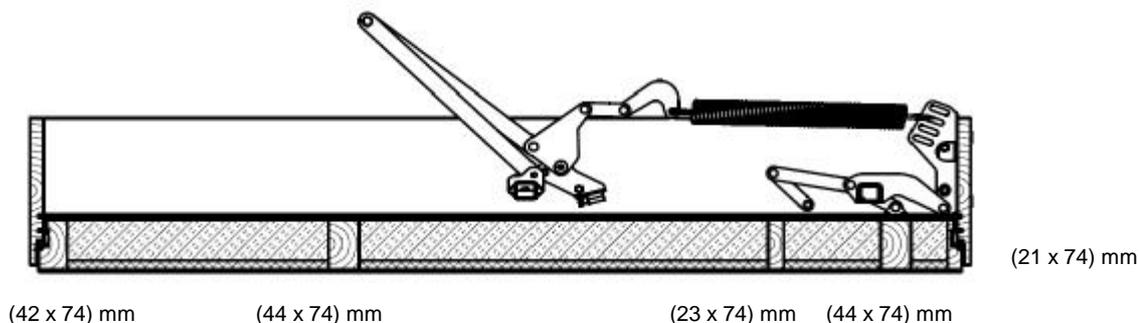
Frame of shutter has three lines of sealants, 2 x Santoprene sealant SJ531 and TPS sealant SJ521 (producer AiB).





**Shutter leaf**

Rebated frame of leaf is made from timber profile with cross-section (42x74) mm at the front side and (21x74) mm at the back side with bulk density >520 kg/m<sup>3</sup>. The frame is reinforced by transom timber profile (44x74) mm with distance 426 mm from opening edge, (23x74) mm with distance 1070 mm from opening edge and (44x74) mm with distance 1236 mm from opening edge.



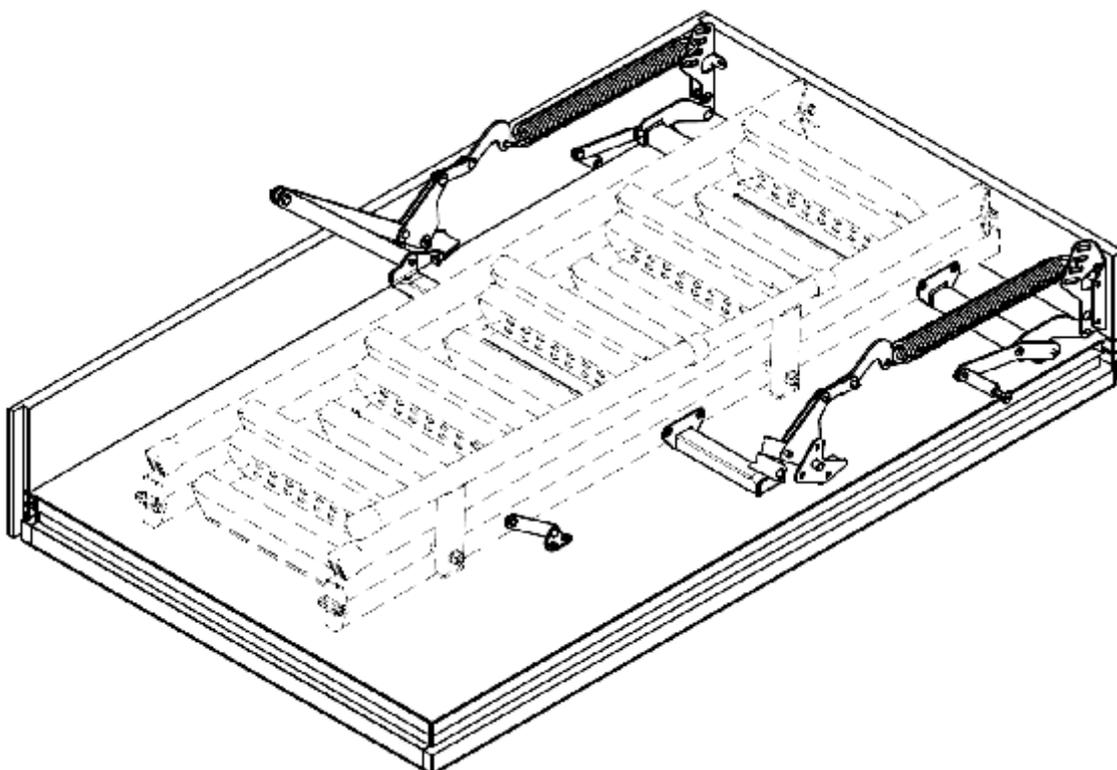
The core of the shutter leaf consists of mineral wool Rockwool ROCKLIT 150 (produced by ROCKWOOL Polska Sp z o.o., PL), 60 mm thick, with bulk density of 150 kg/m<sup>3</sup> and bottom layer of Polystyrene board EPS200-033 with thickness of 14 mm.

Shutter leaf is covered from both sides by 3 mm thick boards HDF (producer: Kronospan). Boards HDF are glued to frame and core by glue JOWACOLL 103.15 (producer: JOWAT AG, Germany).

Intumescent tapes, type PROMASEAL PL (producer: PROMAT) with dimensions (2 x 20) mm is placed along the perimeter of shutter leaf frame.

**Suspension and opening of the shutter leaf**

The shutter leaf is connected with the shutter frame by hinges with springs and side brackets:





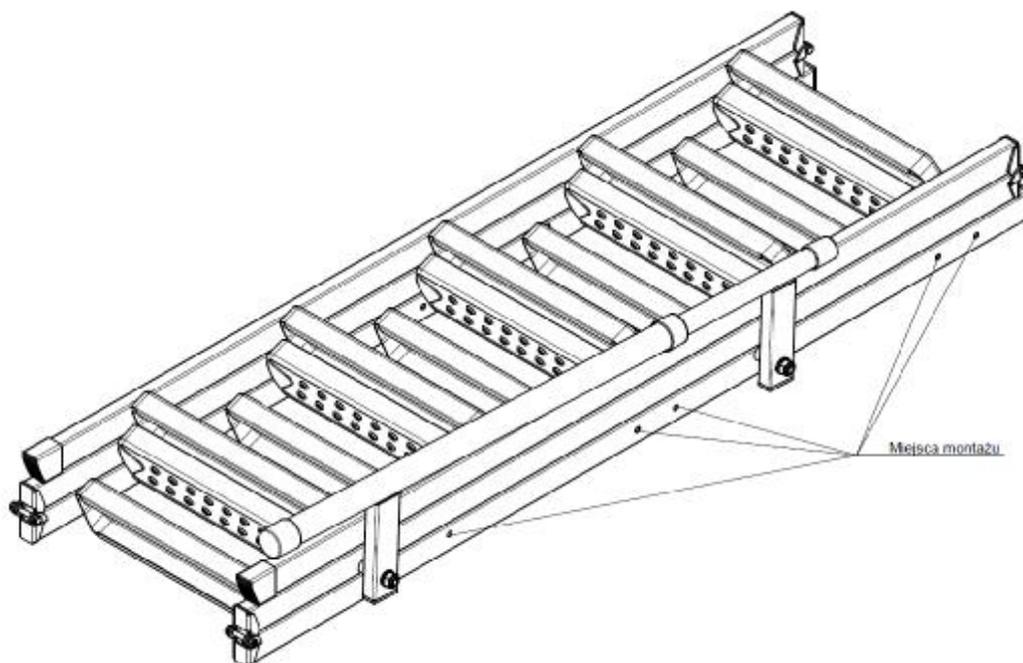
## Retractable ladder

Retractable ladder is installed from above of the shutter (i.e. from unexposed side of the product). Maximum weight of the ladder (including hinges, springs and side bracket) is 26,7 kg.

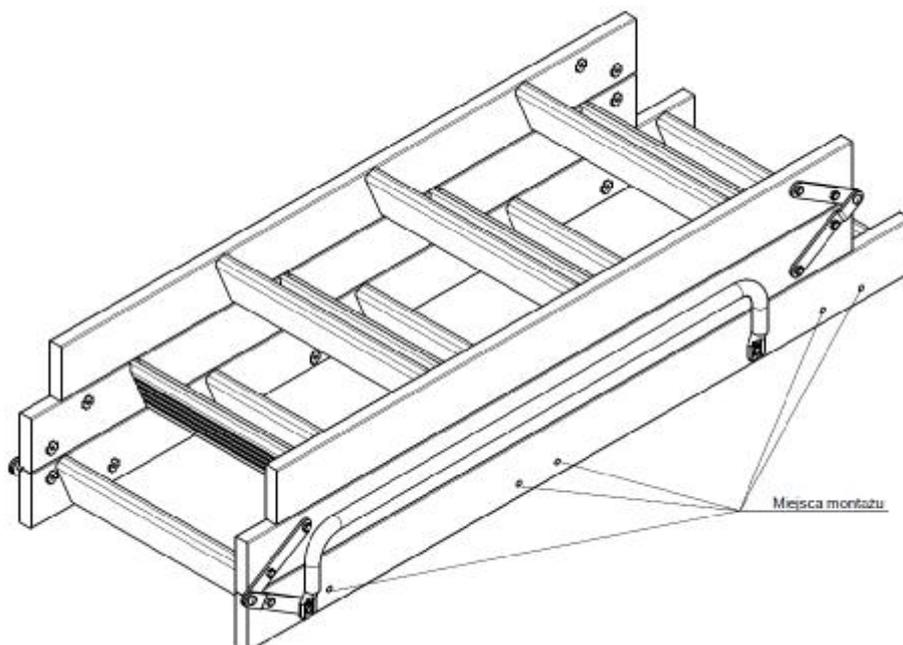
Types of retractable ladder:

- : 3- sections steel ladder in case of **loft shutter with retractable ladder, type LMF**
- : 3 or 4-sections timber ladder in case of **loft shutter with retractable ladder, type LWF**
- : steel ladder of scissor-type in case of **loft shutter with retractable ladder, type LSF**

3-sections steel ladder

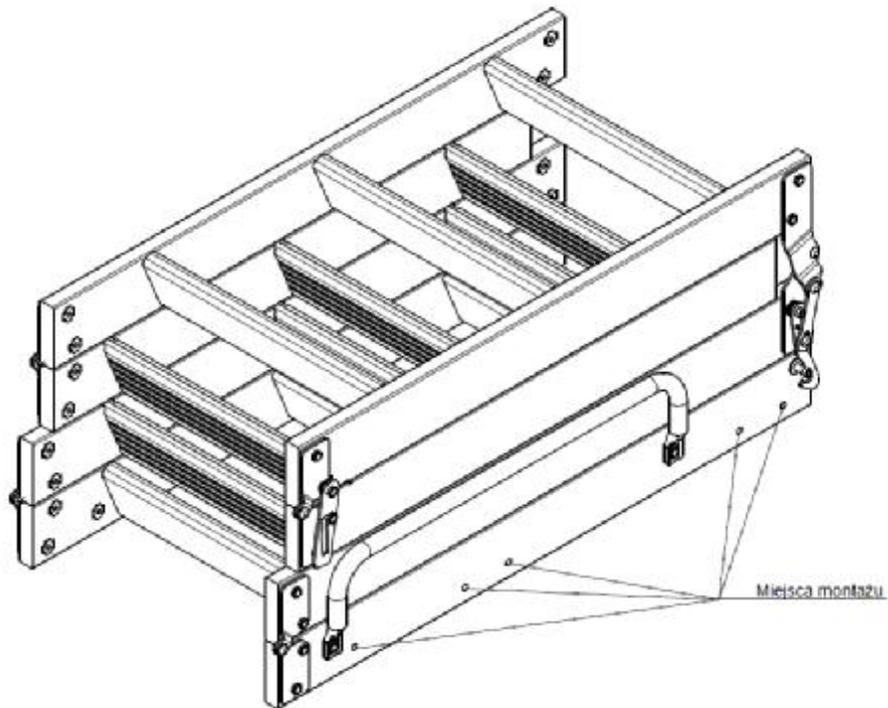


3 -sections timber ladder

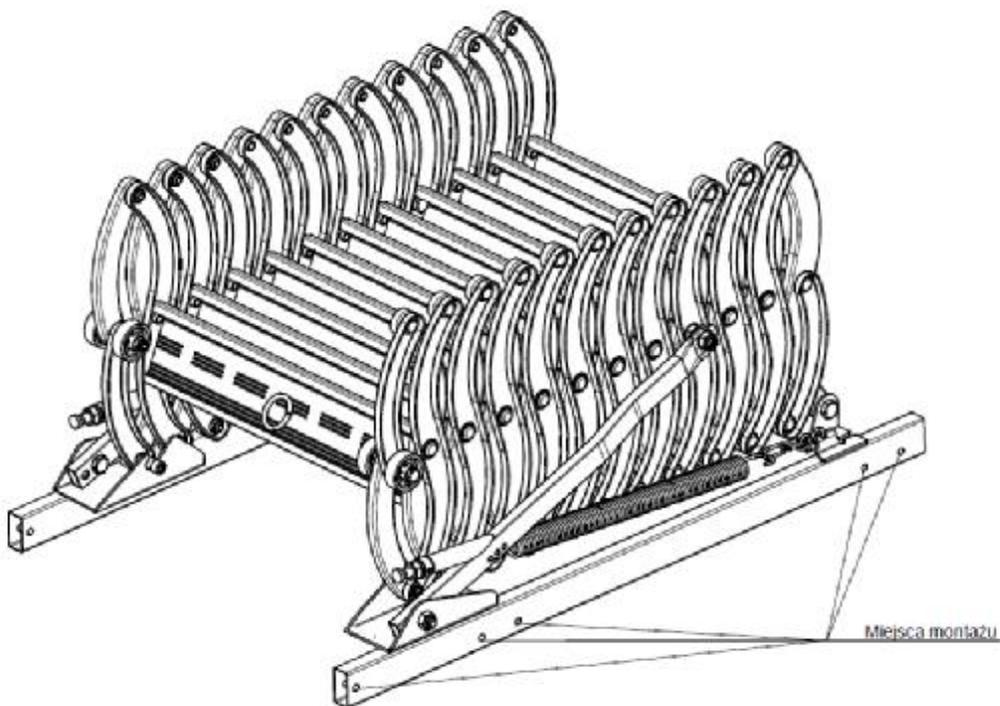




4 -sections timber ladder



steel ladder of scissor-type



More detailed information about product construction is shown in test report [1].



### 3. TEST REPORTS AND EXTENDED APPLICATION REPORTS IN SUPPORT OF CLASSIFICATION

#### 3.1 TEST REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method
[1]	FIRES, s.r.o., Batizovce, SR	FAKRO SP z o.o., Poland	FIRES-FR- 246-14-AUNE	16.12.2014	EN 1634-1: 2014

Test specimen was conditioned according to EN 1363-1 before the fire resistance test.

#### 3.2 TEST RESULTS

No./ Test method	Parameter	Results	
[1] EN 1634-1: 2014	applied load	-	
	supporting construction	the standard rigid supporting construction with high density – concrete panels, thickness 150 mm;	
	temperature curve	standard temperature time curve	
	loadbearing capacity	-	
	integrity	cotton pad	55 minutes
		gap gauges	55 minutes no failure
		sustained flaming	55 minutes
	thermal insulation	l <sub>1</sub>	50 minutes
		l <sub>2</sub>	55 minutes
	radiation	not evaluated*	
	mechanical action	-	
	self closing	-	
	other parameters	Test specimen: loft shutter with retractable steel ladder, type LMF; Orientation of the specimen during the fire test: stairs on unexposed face of shutter;	

\* Acc. to EN 1363-2, paragraph 8.1, there is no requirement to measure the radiation from a surface with a temperature below 300°C because the radiation emitted from such a surface is low (typically 6 kW/m<sup>2</sup> even with emissivity of 1,0).

[1] The test was discontinued in 57<sup>th</sup> minute because of integrity failure.

#### 4. CHANGES OF THE PRODUCT OR END USE CONDITIONS OUTSIDE OF THE FIELD OF DIRECT OR EXTENDED APPLICATION

- EN 1634-1: 2014 used as a test method during test [1]. Field of application of test results determined acc. to EN 1634-1: 2014, paragraph 13.
- Use of alternative ladders: 3 or 4-sections timber ladder or steel ladder of scissor-type with construction as shown on pages 4, 5 of the document and in the test report [1].
- Application of alternative mineral wool (instead of Rockwool ROCKLIT 150) as a core of the shutter.



## 5. ARGUMENTS IN FAVOR OF THE EXTENSION

Argument in favor of change 1

As there is no test method to determine the fire resistance of non-loadbearing horizontally oriented shutters, FIRES, s.r.o. chose EN 1634-1: 2014, a standard which deals with fire resistance of door and shutter assemblies and openable windows designed for installation within openings incorporated in vertical separating elements. Also field of application of test results defined in this fire resistance expert judgement report is elaborated in compliance with EN 1634-1: 2014, paragraph 13. On the base of long-term experience, FIRES, s.r.o. does not suppose that product changes (described in paragraph 6.3 of the document) allowed by EN 1634-1: 2014, paragraph 13 could lead to the decrease in fire resistance of product.

Argument in favor of change 2

Installation of alternative ladders on unexposed side of the loft shutter has no influence on fire resistance classification of product. Manufacturer is responsible that maximum weight of alternative ladder (including hinges, springs and side bracket) is 26,7 kg and the way of ladder fixation to the loft shutter is the same as it was during test [1].

Argument in favor of change 3

It is possible to use alternative mineral wool as a core of the shutter provided that its minimum thickness is 60 mm, minimum bulk density is 150 kg/m<sup>3</sup> and its reaction to fire classification acc. to EN 13501-1 is equal to or better than reaction to fire classification of Rockwool ROCKLIT 150. In case that alternative wool is thicker than 60 mm and/or it has higher bulk density than 150 kg/m<sup>3</sup>, the following conditions must be fulfilled:

- total increase in weight of the shutter leaf (in comparison with test [1]) is not greater than 25%;
- stronger springs (of the same type as tested ones) shall be fitted to the product in order to ensure that the force applied by springs responsible for closing the product (and also responsible for its remaining in closing position) is equal or higher than the force during the test [1];

## 6. CLASSIFICATION AND FIELD OF APPLICATION

### 6.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with classes defined in clause 7.5.5 of EN 13501-2 + A1: 2009.

### 6.2 CLASSIFICATION

The element:

- Loft shutter with retractable timber ladder, type LWF
- Loft shutter with retractable steel ladder, type LMF
- Loft shutter with retractable steel scissor ladder, type LSF

is classified according to the following combinations of performance parameters and classes as appropriate.

**Fire resistance classification:**  
**E 45-C0 / EI<sub>1</sub> 45-C0 / EI<sub>2</sub> 45-C0 / EW 30-C0 <sup>2)</sup>**  
**/retractable ladder on unexposed side <sup>1)</sup> /**

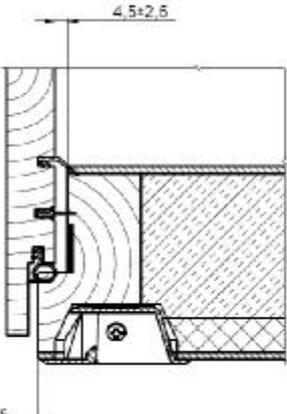
<sup>1)</sup> Fire resistance of the product refers only to one side of the classified product, whereupon retractable ladder is always located on unexposed side.

<sup>2)</sup> Standard EN 13501-2, clause 7.5.5.4 does not define class EW 45 (only EW 20, EW 30, EW 60). Anyway product fulfills criteria of integrity as well as radiation during 45 minutes of fire.



### 6.3 FIELD OF APPLICATION

This classification is valid for the following end use applications:

<p>Materials and construction</p>	<ul style="list-style-type: none"> <li>- the shutter leaf thickness and/or density may be increased provided:                             <ul style="list-style-type: none"> <li>- the total increase in weight is not greater than 25% and</li> <li>- stronger springs (of the same type as tested ones) are fitted to the product in order to ensure that force applied by springs responsible for closing the product (and also responsible for its remaining in closing position) is equal or higher than the force during the test [1];</li> </ul> </li> <li>- for timber based board products (e.g. particle board, blockboard etc.), the composition (e.g. type of resin) shall not change from that tested; the density shall not be reduced but may be increased;</li> <li>- the cross-sectional dimensions and/or the density of the timber frames (including rebates) shall not be reduced but may be increased;</li> <li>- the number, size, location and orientation of any joints in the timber framing shall not be changed;</li> <li>- it is possible to use alternative mineral wool as a core of the shutter on conditions defined in paragraph 5 of the document;</li> </ul>
<p>Decorative finishes</p>	<ul style="list-style-type: none"> <li>- where the paint finish is not expected to contribute to the fire resistance of the shutter, alternative paints are acceptable and may be added to leaf or frame;</li> <li>- decorative laminates and timber veneers up to 1,5 mm thickness may be added to the faces (but not the edges).</li> </ul>
<p>Permissible size variations</p>	<ul style="list-style-type: none"> <li>- product dimensions increase is permitted up to 15% length, 15% width, 20% area on condition that the fire resistance classification according to cl. 6.2 of this document is changed to E 45-C0 / EI<sub>1</sub> 30-C0 / EI<sub>2</sub> 45-C0 / EW 30-C0. For larger sizes of the product the following shall apply:                             <ul style="list-style-type: none"> <li>: stronger springs (of the same type as tested ones) are fitted to the product in order to ensure that force necessary to close the shutter is equal or higher than the force necessary to close the test specimen [1];</li> <li>: amount of fixings used to fasten the product to the supporting construction shall be increased in such way that tension in the fixing is not higher than during the test [1];</li> </ul> </li> <li>- unlimited size reduction is permitted;</li> </ul>
<p>Fixings</p>	<ul style="list-style-type: none"> <li>- the number of fixings used to attach the product to supporting constructions may be increased but shall not be decreased and the distance between fixings may be reduced but shall not be increased;</li> </ul>
<p>Supporting construction and product fixation</p>	<ul style="list-style-type: none"> <li>- the shutter is fixed in supporting construction made of reinforced concrete with minimum thickness 150 mm by nail plugs Ø 6x80 mm in maximum spacing of 400 mm. Gap between shutter frame and supporting construction is filled by strips of mineral wool with bulk density 60 kg/m<sup>3</sup> and sealed at both sides by mastic PROMASEAL.</li> </ul>
<p>Gaps</p>	<ul style="list-style-type: none"> <li>- range of gaps specified by manufacturer:</li> </ul> 



## 7. LIMITATIONS

This classification document does not represent type approval or certification of the product.

The classification is valid until 03. 02. 2019 provided that the product, field of application and standards and regulations are not changed.

Approved:

Signed:

Ing. Štefan Rástocký  
leader of the testing laboratory



Ing. Henrieta Lapková  
technician of the testing laboratory