

# FIRE RESISTANCE CLASSIFICATION REPORT No. 12664C

## Owner of the classification report:

RF-TECHNOLOGIES  
Lange Ambachtstraat 40  
9860 OOSTERZELE  
BELGIUM

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WFRGENT NV - Oitgensesteenweg-Zuid 711 - B-9000 Gent - België  
t: +32(0)9 243 77 50 - f: +32(0)9 243 77 51 - e: info@warringtonfiregent.net  
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## 1 Introduction

This classification report defines the classification assigned to a fire damper named SC60+ in accordance with the procedures given in EN 13501-3: 2005: Fire classification of 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.

The procedures for the extended application of results from fire resistance tests are carried out in accordance with the draft standard prEN 15080-11: 2006: Extended application of results from fire resistance tests – part 11: dampers.

## 2 Details of classified product

### 2.1 General

The element is defined as a fire damper SC60+. Its function is to resist fire in respect of the fire performance characteristics integrity, thermal insulation and resistance to smoke leakage given in clause 5 of EN 13501-3: 2005.

### 2.2 Product description

The fire damper is asymmetrical and consists of a cylindrical housing, damper blades and an internal energy based mechanism. Fire dampers with nominal diameters  $D_n$  of 100 mm and 200 mm have been tested.

#### 2.2.1 Damper housing

The damper housing consists of a galvanized sheet steel shaft with a thickness of 0.6 mm and a length of 60 mm (fire dampers SC60+). The housing of the fire dampers has an external diameter of  $(D_n-1)$  mm.

The housing has on the exterior a groove holding a U-formed sealing ring, covered on the inside with an intumescent graphite tape. The dampers are mounted so that the sealing ring is at the middle of the wall/ floor.

Profiles have been foreseen with a ring to secure the dampers' connecting duct to the wall/ floor.

#### 2.2.2 Damper blades

The damper consists of two semicircular damper blades made of fibre-silicate board with a thickness of 6 mm. The damper blades revolve around an axis. The axis

hinges in a galvanised steel support. The support is fixed to the damper blades by means of steel blind rivets.

The damper blades are covered at both sides with a layer of intumescent material stapled to the damper blades. One side is covered with a foam layer glued onto the damper blade. The foam layer is placed at the exposed side or at the unexposed side.

At the height of the damper blades at the interior of the damper housing an intumescent strip is glued. The gap between the damper blades and the damper housing of the fire dampers is between 1 mm and 2.6 mm.

### 2.2.3 Actuating mechanism

Two stainless steel locks holding the damper blades in the closed position, are fastened onto the body by means of steel blind rivets. The axis holds the hinges. The hinges are fixed to the damper housing by means of two steel rivets.

The damper blades are kept open by a fuse held within plastic supports. The supports have been fixed to the damper blades with a rivet.

If the fusible alloy opens, the internal spring puts the damper blades in closed position.

The damper consists of damper blades folding over an axis. The damper opens either in the direction of the current or against the current.

## 2.3 Construction

### 2.3.1 Construction in an aerated concrete wall

The fire damper is mounted in an aerated concrete wall according to the standard constructions in table 3 of EN 1366-2:1999 with a thickness of 100 mm in an opening of  $(D_n + 35)$  mm. The gap between the damper housing and the wall construction is completely filled with a standard cement mortar over the thickness of the wall (100 mm).

### 2.3.2 Construction in an aerated concrete floor

The fire damper is mounted in an aerated concrete floor construction with a thickness of 150 mm according to the standard constructions in table 5 of EN 1366-2:1999 in an opening of  $(D_n + 50)$ .

The gap between the damper housing and the floor construction is completely filled with a standard cement mortar over the thickness of the floor construction (100 mm).

### 2.3.3 Construction in a flexible wall

The damper is mounted in a flexible plasterboard wall according to the standard constructions in table 4 of EN 1366-2:1999 with a thickness of 100mm in the opening of  $(D_n + 25) \times (D_n + 25)$  mm.

The wall is mounted with profiles of 50 mm and a double layer of boards with a thickness of 12,5 mm each on both sides. Between the boards and the profiles rock wool of 40 kg/m<sup>3</sup> (NW) is placed.

The opening between the damper housing and the wall construction is being filled with rock wool with a density of 40 kg/m<sup>3</sup> (NW) and finished with a sealing plaster board.

- $D_n$  = nominal diameter – varies from 100 mm till 200 mm.

The detailed description of the element, SC60+, is fully described in the test reports 12664B and 12663A that have been issued in support of the EXAP report 12664D which in its turn is used for this classification and mentioned in clause 3.1.

## 3 Test report and test results in support of this classification

### 3.1 EXAP report

Name of the laboratory that performed the tests	Identification number of the EXAP report	Tested dimension	Supporting construction	Direction of exposure (i – o)	Orientation (ho , ve)	Working pressure
WFRGENT NV Registration N° : 1173	12664D	Ø200mm	Aerated concrete wall 100 mm	i↔o	h <sub>o</sub>	-300Pa
			Aerated concrete floor 150 mm	i↔o	v <sub>e</sub>	-300Pa
			Flexible wall 60' Standard construction	i↔o	h <sub>o</sub>	-300Pa

### 3.2 Test report

Name of the laboratory that performed the tests	Identification number of EXAP report	Tested dimension	Supporting construction	Direction of exposure (i - o)	Orientation (ho , ve)	Working pressure
WFRGENT NV Registration N° : 1173	12818 (*)	Ø100mm		i↔o	-	-300Pa

(\*) Leakage test at ambient temperature

#### Exposure conditions of the fire resistance tests:

Temperature/time curve: standard as in EN 1363-1: 1999.

Orientation: mounted in a floor construction ( $v_e$  = vertical orientation) and wall construction ( $h_o$  = horizontal orientation)

Direction of exposure: this concerns an asymmetrical construction which validates the results for one direction only ( $i \rightarrow o$ ). Based on the EXAP report 12664D the classification is valid for both directions ( $i \leftrightarrow o$ ) provided that the fire dampers are mounted in a symmetrical standard construction and a symmetrical sealing between the fire damper housing and the supporting construction.

3.2 Test results

Parameter	Limits	Results in minutes		
		Ø 200 mm (floor) (i↔o)	Ø 200 mm (flexible wall) (i↔o)	Ø 200 mm (aerated concrete wall) (i↔o)
<b><u>Integrity (E criterion):</u></b>				
Leakage through the fire damper after five minutes	360 Nm <sup>3</sup> /h.m <sup>2</sup>	(1) 107 minutes	(2) Not during the test	(3) Not during the test
Ignition of the cotton pad		Not during the test	Not during the test	Not during the test
Fail test with the 6 mm and 25 mm gauges		Not during the test	Not during the test	Not during the test
Spontaneous, continuous flames		Not during the test	Not during the test	Not during the test
<b><u>Thermal insulation (I criterion):</u></b>				
A maximum temperature rise at the unexposed side (T1, T2, Ts)	180°C	95 minutes	67 minutes	62 minutes
An average temperature rise at the unexposed side (T2)	140°C	93 minutes	Not during the test	Not during the test
<b><u>Smoke leakage (S criterion):</u></b>				
Leakage through the fire damper at an ambient temperature after five minutes	200 Nm <sup>3</sup> /h.m <sup>2</sup>	Satisfied	Satisfied	Satisfied
Leakage through the fire damper during the test after five minutes	200 Nm <sup>3</sup> /h.m <sup>2</sup>	200Nm <sup>3</sup> /h.m <sup>2</sup> after 106 minutes	Not during the test	Not during the test
<b><u>Actuating mechanism:</u></b>				
Any sign of mechanical damage after the opening and closing test of 50 cycles		No damage	No damage	No damage
Time at which the fully-open fire damper closes	2 minutes	12 seconds	57 seconds	30 seconds

- (1) Floor:  
The leakage measurements are valid till 107 minutes.  
The full test duration was 136 minutes.
- (2) Flexible wall:  
The full test duration was 69 minutes.
- (3) Aerated concrete wall:  
The full test duration was 69 minutes.

The total test duration of the leakage test at an ambient temperature for the smallest fire damper ( $D_n = \varnothing 100$  mm) was 30 minutes (test number 12818).

The following results were obtained:

Parameter	Limits	Results in minutes
		12818 ( $D_n = \varnothing 100$ mm)
<u>Smoke leakage (S)</u>  Leakage through the fire damper at an ambient temperature	200 Nm <sup>3</sup> /(h.m <sup>2</sup> )	17,6 Nm <sup>3</sup> /(h.m <sup>2</sup> )

## 4 Classification and field of application

### 4.1 Reference of classification

This classification has been carried out in accordance with clause 7.2.3.4 of EN 13501-3: 2005.

### 4.2 Classification

The element is classified according to the following combinations of performance parameters and classes as appropriate. No other classifications are permitted.

The in table 3.1 mentioned EXAP report allows a larger series of combinations of parameters and time categories. This classification report only mentions one of the allowed classes on the sponsors request.

For dampers (SC60+) from Ø100mm till Ø200mm placed in an aerated concrete wall of 100 mm thick:

**Classification:**

**EI 60 (v<sub>e</sub> i↔o) S**

For dampers (SC60+) from Ø100mm till Ø200mm placed in an aerated concrete floor of 150 mm thick:

**Classification:**

**EI 60 (h<sub>o</sub> i↔o) S**

For dampers (SC60+) from Ø100mm till Ø200mm placed in flexible plasterboard wall:

**Classification:**

**EI 60 (v<sub>e</sub> i↔o) S**

#### 4.3 Field of direct application

This classification is valid for the following end use applications according to EN 13501-3: 2005 and EN 1366-2:1999: fire damper in a vertical and horizontal ventilation duct.



This classification is also valid for the following production varieties:

- **Size of the damper:**

For classes without S: the test results are valid for the same type of fire damper with a maximum dimension of  $\varnothing$  200 mm.

For classes with S: the test results are valid for the same type of damper with a minimal diameter  $\varnothing$  100 mm and a maximum diameter  $\varnothing$  200 mm.

- **Direction of exposure:**

Fire dampers for vertical and horizontal ducts are permitted as mentioned in clause 4.2. of this document.

- **Distance between the fire dampers, and between fire dampers and construction elements.**

Between the fire dampers installed in separate ducts a minimum distance of 200 mm needs to be obtained. Between the fire dampers and the construction elements a minimum distance of 75 mm is requested.

The filling between the fire damper and the wall or floor needs to be done in practice as mentioned in clause 2.3.1, 2.3.2 or 2.3.3 of this document.

- **Supporting construction**

A supporting construction of the same type with a fire resistance equal or greater than the tested supporting construction (thicker, denser and/or larger integrity).

The test results are also valid for the supporting construction in hollow masonry slabs with a fire resistance equal or greater than the tested supporting construction.

## 5 Duration of the validity of the classification report

Limited until the publication of the standard EN 15080-11.

## 6 Warning

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

Report	Name	Signature*	Date
Prepared by	Ing. N. De Klerck		23 MEI 2007
Reviewed by	Prof. dr. ir. P. VANDEVELDE		23 MEI 2007
* For and on behalf of WFRGENT N.V.			

EN 13501-3:2005 - FSG REC 017 - FSG REC 011-version 1

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