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Established pursuant to Annex II of the Council Directive 89/106 of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (Construction Products Directive)

## **ETAG 026**

### GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL of

## **Fire Stopping and Fire Sealing Products**

### **Part 4**

## **Reactive and Mechanical Air Transfer Grilles, (Fire resistant and Cold Smoke Control Fire Resistant Types)**

Version May 2012

This Guideline for European Technical Approval is established and published in accordance with Article 11 of the Construction Products Directive as a basis for the preparation and issue of European Technical Approvals in accordance with Article 9.1 of the Construction Products Directive.

European Technical Approvals are issued by Approval Bodies authorised and notified in accordance with Article 10 of the Construction Products Directive. These bodies are organized in EOTA.

The European Technical Approval, according to the Construction Products Directive, is a favourable technical assessment of the fitness for use of a construction product and the technical specification of the assessed product, serving as basis for the CE marking of this product when and where a harmonised standard according to the Directive is not or not yet available.

Due to technical innovation and the progress of the state of the art, Guidelines for Technical Approval might not reflect the latest developments and experiences gained in approval procedures. The reader of this Guideline is therefore advised to check with an EOTA member whether there are further provisions which have to be taken into account in the use of the Guideline.

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## Table of contents

<b>Foreword</b>	4
<b>1. Scope of the ETAG</b>	5
1.1 Definition of the construction product	5
1.1.1 Fire Resistant Reactive Air Transfer Grilles (Type R):	5
1.1.2 Fire Resistant Heat Activated Mechanical Air Transfer Grilles (Type M):	5
1.1.3 Fire Resistant and Cold Smoke Control Reactive Air Transfer Grilles (Type RMS):	5
1.1.4 Fire Resistant and Cold Smoke Control Mechanical Air Transfer Grilles (Type MMS):	5
1.2 Intended use of the construction product	7
1.2.1 Fire Resistant Heat Activated Mechanical and Fire Resistant Reactive Air Transfer Grilles	7
1.2.2 Fire Resistant and Cold Smoke Control Mechanical Air Transfer Grilles and Fire Resistant and Cold Smoke Control Reactive Air Transfer Grilles	7
1.2.3 Use Categories	8
1.3 Assumed working life of the construction product	8
1.4 Terminology	9
1.4.1 Common terms relating to the Construction Products Directive	9
1.4.2 Specific terms used in this ETAG	9
1.5 Procedure in the case of a significant deviation from the ETAG	10
<b>2 Assessment of fitness for use</b>	10
2.1 Meaning of "fitness for use"	10
2.1 Elements of the assessment of fitness for use	10
2.2 Relationship of requirements to the product characteristics and methods of verification and assessment	10
2.4 Product characteristics which are relevant for the fitness for use	11
2.4.1 Reaction to fire	11
2.4.2 Resistance to fire	11
2.4.3 Air permeability	13
2.4.4 Watertightness (Liquid water permeability)	13
2.4.5 Content and/or release of dangerous substances	13
2.4.6 Safety in use	13
2.4.7 Adhesion	14
2.4.8 Acoustic properties – airborne sound insulation	14
2.4.9 Thermal resistance / Thermal transmission properties	14
2.4.10 Water vapour permeability	14
2.4.11 Aspects of durability	15
2.4.12 Serviceability	17
<b>3 Evaluation and attestation of conformity and CE marking</b>	18
3.1 System of attestation of conformity	18
3.2 Tasks and responsibilities for the manufacturer and notified bodies	18
3.2.1 Tasks for the manufacturer	18
3.2.2 Tasks for Notified Product Certification Body	19
3.2.3 Special methods of control and testing used for the evaluation	20
3.3 CE marking and accompanying information	20
<b>4 Assumptions under which the fitness for the intended use is assessed</b>	21
4.1 Manufacture of the product	21
4.2 Packaging, transport, storage of the product	21
4.3 Installation of the product in the works	21
4.3 Use, maintenance and repair	21
<b>5 Identification of the construction product</b>	22
5.1 Means of identification	22
<b>6 Format of ETAs issued on the basis of the ETAG</b>	22
<b>7 Reference documents</b>	23
7.1 EC Documents	23
7.2 Test and classification methods	23

7.3	Component and material specifications .....	24
<b>ANNEX A</b>	<b>Methods for FPC .....</b>	<b>25</b>
A.1	Dimensions.....	25
A.1.1	Thickness .....	25
A.1.2	Other dimensions .....	25
A.2	Checks on assembled products .....	25
A.2.1	Specification.....	25
A.2.2	Function testing.....	25
<b>ANNEX B</b>	<b>Clarifications for testing resistance to fire of Air Transfer Grilles .....</b>	<b>26</b>
B.1	Introduction.....	26
B.2	Performance criteria .....	26
B.3	Testing.....	26
B.4	Considerations on testing the integrity criterion (E) .....	28
B.5	Field of direct application of test results.....	31
<b>Addendum:</b>	<b>Model for an ETA issued on the basis of ETAG 026, Part 4.....</b>	<b>33</b>

## **Foreword**

This Guideline has been drawn up by the Task Group “Air Transfer Grilles”, part of the EOTA Working Group 11.01/04 *Fire-Stopping and Fire-Sealing Products*.

This ETA-Guideline 026 – Part 4 “Reactive and Mechanical Air Transfer Grilles” covers Fire Resistant Heat Activated Mechanical Air Transfer Grilles, Fire Resistant Reactive Air Transfer Grilles, Fire Resistant and Cold Smoke Control Mechanical Air Transfer Grilles and Fire Resistant and Cold Smoke Control Reactive Air Transfer Grilles. This Part shall be used, as applicable, in conjunction with the ETA-Guideline 026 “Fire Stopping and Fire Sealing Products” - Part 1 “General”. The same numbering of paragraphs as in Part 1 – “General” is used. If a paragraph is not mentioned, then the text in Part 1 – “General” applies without modification.

If the product is a reactive product or incorporates a reactive product or component, this ETA-Guideline – Part 4 shall be used in conjunction with the EOTA-Technical Report 024.

# 1. Scope of the ETAG

## 1.1 Definition of the construction product

This part of ETAG 026 covers reactive and mechanical air transfer grilles made of components forming an integral part of the product, and such components which are directly responsible for the activation or actuation of the air transfer grille. Other components that initiate the operation of air transfer grilles, such as smoke sensors, fire alarm panels or other remote switching devices, which may be necessary for the operation of the concerned product but are supplied by other manufacturers, are not covered by this ETAG part.

### 1.1.1 Fire Resistant Reactive Air Transfer Grilles (Type R):

Air transfer grilles which resist the spread of fire and hot gases by the intumescent action of their active components.

### 1.1.2 Fire Resistant Heat Activated Mechanical Air Transfer Grilles (Type M):

Air transfer grilles which resist the spread of fire and hot gases by the closure of blades, plates or slats which are normally in the open position.

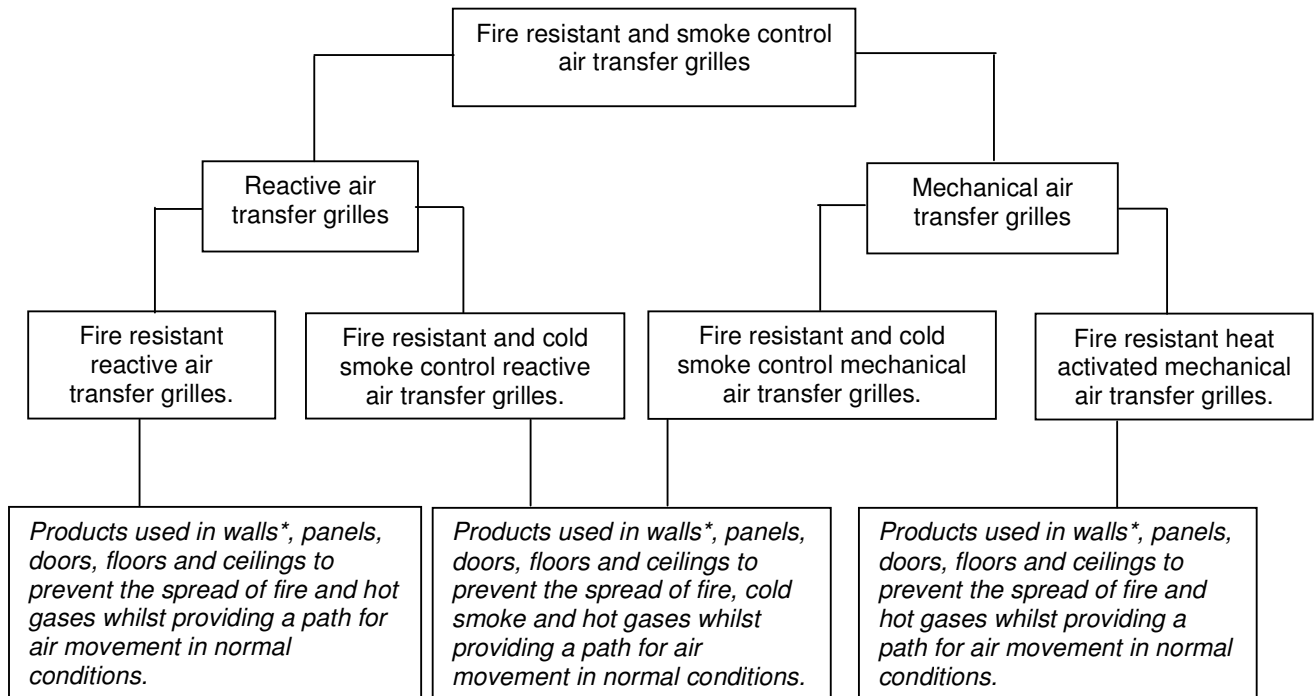
### 1.1.3 Fire Resistant and Cold Smoke Control Reactive Air Transfer Grilles (Type RMS):

Air transfer grilles which resist the spread of fire and hot gases by the intumescent action of their active components and, in addition, control the spread of cold smoke by the closure of plates or slats.

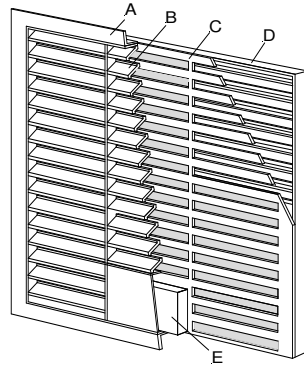
### 1.1.4 Fire Resistant and Cold Smoke Control Mechanical Air Transfer Grilles (Type MMS):

Air transfer grilles which resist the spread of fire and hot gases and control the spread of cold smoke by the closure of blades, plates or slats.

## Product family and sub-families



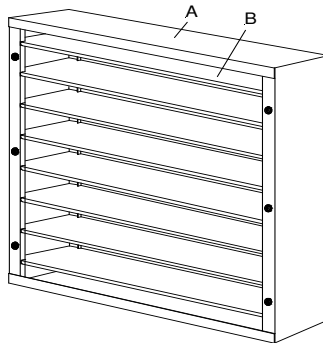
*\*This includes use in the walls of fire resistant service ducts which, in normal operating conditions, permit heat release from the cables within the duct.*



**Key**

- A Mounting frame
- B Louvered encapsulated intumescent slats
- C Sliding cold smoke control 'hit & miss' plates
- D Louvered encapsulated intumescent slats
- E Electrically powered actuator (interfaced with smoke sensors and alarm panel, not covered by this ETAG)

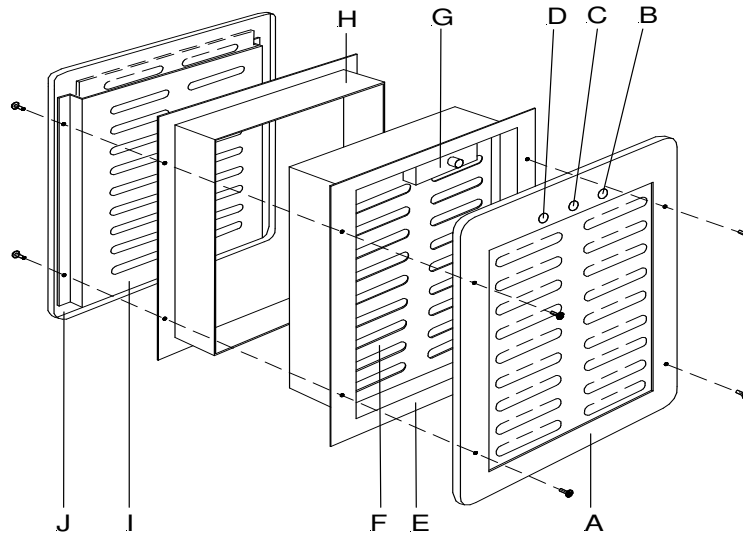
**Figure 1 – Typical door mounted fire resistant and smoke control reactive air transfer grille (Type RMS)**



**Key**

- A Rigid outer frame
  - B Encapsulated intumescent slats
- NB: Air transfer grilles of this type are usually protected by metal cover grilles on both faces

**Figure 2 – Typical wall mounted fire resistant air transfer grille (Type R)**



### Key

A  
B  
C  
D  
E

device

back casing

plate

E

Cover grille  
Release device

Mechanical status indication

Reset device

Support casing

Moving 'hit and miss' plate  
Thermal release

H Slip over

I Fixed hit and miss

J Cover grille

**Figure 3 – Mechanical Air Transfer Grille (Type M and MMS similar)**

## 1.2 Intended use of the construction product

Air transfer grilles are incorporated into various elements of a building structure to provide paths for ventilation and to enable such paths to be sealed automatically in a fire situation.

### 1.2.1 Fire Resistant Heat Activated Mechanical and Fire Resistant Reactive Air Transfer Grilles

Fire resistant reactive and heat activated air transfer grilles are used in walls, doors, panels, floors and ceilings and allow the free passage of air. In the event of a fire they automatically close, preventing the spread of fire and hot gases.

### 1.2.2 Fire Resistant and Cold Smoke Control Mechanical Air Transfer Grilles and Fire Resistant and Cold Smoke Control Reactive Air Transfer Grilles

Fire Resistant Heat Activated and Reactive Air Transfer Grilles with Cold Smoke Control are used in walls, doors, panels, floors and ceilings and allow the free passage of air in normal use. In the event of fire they function as described in 1.2.1 above. In addition, in response to a request from a smoke detector or alarm control panel, they automatically close, preventing the spread of cold smoke. Together, these functions allow the control of the spread of cold smoke and the prevention of the spread of fire and hot gases.

This ETAG does not cover the use of this type of products for the containment of fire suppressant gases or in heating, ventilation and air conditioning (HVAC) systems operating at pressures different to ambient pressure.

Air Transfer Grilles may be used in various environmental conditions, described by the following use categories, related to the type of environmental conditions. These are based on the general principles specified in Part 1 – “General”.

### 1.2.3 Use Categories

- Type X: Air transfer grilles intended for use in conditions exposed to weathering.
- Type Y<sub>1</sub>: Air transfer grilles intended for use at temperatures below 0 °C with exposure to UV but no exposure to rain.
- Type Y<sub>2</sub>: Air transfer grilles intended for use at temperatures below 0 °C, but with no exposure to rain or UV.
- Type Z<sub>1</sub>: Air transfer grilles intended for use in internal conditions with high humidity equal to or higher than 85 % RH, excluding temperatures below 0 °C<sup>1</sup>.
- Type Z<sub>2</sub>: Air transfer grilles intended for use in internal conditions with humidity lower than 85 % RH, excluding temperatures below 0 °C.

Requirements relevant for the establishment of the use categories are presented in 2.4.11.

**NOTE 1:** Products that meet requirements for type X, meet the requirements for all other types. Products that meet requirements for type Y<sub>1</sub> also meet the requirements for type Y<sub>2</sub>, Z<sub>1</sub> and Z<sub>2</sub>. Products that meet the requirements for type Y<sub>2</sub> also meet the requirements for type Z<sub>1</sub> and Z<sub>2</sub>. Products that meet the requirements for type Z<sub>1</sub>, also meet the requirements for type Z<sub>2</sub>.

Tests to assess the product's resistance to specific environmental conditions not listed above are not covered in this part of the ETAG (see 2.4.11). Such resistance may be assessed on a case by case basis as necessary. The Approval Body shall obtain suitable evidence for the assessment and present details in the ETA.

### 1.3 Assumed working life of the construction product

The provisions and the verification and assessment methods included or referred to in this ETAG have been written based upon the assumed working life of the fire resistant air transfer grilles and fire and cold smoke control air transfer grilles for the intended use of 10 to 25 years when installed in the works, provided that the products are subjected to appropriate installation, use and maintenance (see 4.4). These provisions are based upon the current state of the art and the available knowledge and experience.

“Assumed working life” means that, when an assessment following this ETAG part provisions is made, and when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the Essential Requirements<sup>2</sup>.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee given by the product manufacturer or his representative or the approval body issuing the ETA, but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works (see 5.2.2 of the Interpretative Documents).

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<sup>1</sup> These uses apply for internal humidity class 5 in accordance with EN ISO 13788.

<sup>2</sup> The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject and the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that, in these cases, the real working life of the product may also be shorter than the assumed working life.



## **1.4 Terminology**

### **1.4.1 Common terms relating to the Construction Products Directive**

For the meaning of these terms see EOTA document "Common terms used in Guidelines for European Technical Approval" published on the EOTA website.

### **1.4.2 Specific terms used in this ETAG**

#### **1.4.2.1 Air transfer grille:**

product that allows a path for air movement, through elements of construction.

#### **1.4.2.2 Fire resistant reactive air transfer grille:**

air transfer grille that resists the spread of fire and hot gases by the intumescent action of its active components. It usually takes the form of a matrix of slats or a honeycomb structure. The intumescent elements swell when exposed to heat, typically between 120 and 270 °C and seal off the air path through the grille. Other ablative or fire resistant materials may be used in their construction.

#### **1.4.2.3 Fire Resistant Heat Activated Mechanical Air Transfer Grilles:**

air transfer grille that resists the spread of fire and hot gases by the closure of blades, plates or slats, which are normally in the open position. When exposed to heat, the plates are moved to the closed position by a mechanism actuated by a thermal release device at a defined temperature, thereby sealing off the air path. Such products may incorporate intumescent materials in their construction, to enhance the fire resistance performance.

#### **1.4.2.4 Fire resistant and cold smoke control reactive air transfer grilles:**

air transfer grille that resists the spread of fire and hot gases by the intumescent action of its active components and, in addition, controls cold smoke by the closure of plates or slats.

The function of the blades, plates or slats is to prevent the spread of cold smoke at low temperatures, before intumescent activation commences. The plates are moved into the closed position by an actuator that is electrically connected to a smoke sensor, a fire alarm panel or building management system and will therefore close when cold smoke is detected. As the temperature increases the intumescent reactive elements are activated and swell to seal off the air path. Ablative or fire resistant materials may be used in the construction of the shutter plates and other components of the assembly.

#### **1.4.2.5 Fire Resistant and Cold Smoke Control Mechanical Air Transfer Grilles:**

air transfer grille that resists the spread of fire and hot gases and the control of cold smoke by the closure of blades, plates or slats. The plates are moved into the closed position by an actuator mechanism that is electrically connected to a smoke sensor or other remote switching device and therefore close when cold smoke is detected or there is a loss of electrical power. The closing mechanism also incorporates a thermal release device which activates at a defined temperature to close the blades, plates or slats if they have not been closed previously by electrical means, on detection of smoke. Either means of actuation results in sealing off the air path.

#### **1.4.2.6 Actuator:**

device which either closes, opens, or opens and closes the air transfer grille when a change to the signal status from the building's fire alarm system occurs. Actuators may be electrical, pneumatic, hydraulic, spring driven, gravitational or other mechanical devices.

#### **1.4.2.7 Thermal Release Device:**

device that when exposed to heat allows the fire control components of an air transfer grille to move into the closed position thus sealing the air path. Such devices are also used in parallel with an actuator on fire and cold smoke control air transfer grilles. Examples of these devices are fusible links, heat activated memory metals and bi-metal plates.

## 1.5 Procedure in the case of a significant deviation from the ETAG

The provisions of this ETAG apply to the preparation and issue of European Technical Approvals in accordance with Art. 9.1 of the CPD and section 3.1 of the Common Procedural Rules.

In cases in which a certain provision of this ETAG is not or not fully applicable or a particular aspect of a product and/or intended use to be assessed is not or not sufficiently covered by the methods and criteria of the ETAG, the procedure of Art. 9.2 of the CPD and section 3.2 of the Common Procedural Rules apply with regard to the deviation or aspects concerned for the preparation and issue of an ETA.

## 2 Assessment of fitness for use

### 2.1 Meaning of “fitness for use”

See Part 1 – “General”.

### 2.1 Elements of the assessment of fitness for use

See Part 1 – “General”.

### 2.2 Relationship of requirements to the product characteristics and methods of verification and assessment

The product characteristics, methods of verification and assessment criteria which are relevant for the fitness of fire resistant reactive air transfer grilles and fire resistant and cold smoke control reactive air transfer grilles for the intended use referred to in 1.2 are given in Table 1.

**Table 1 – Product characteristics and methods of verification and assessment**

Nr	Product characteristic	Option “No Performance Determined”	Method of verification and assessment	Expression of product performance (value, class, NPD, criterion, etc.)
Essential Requirement 1: Mechanical resistance and stability: Not relevant to these products				
Essential Requirement 2: Safety in case of fire				
1	Reaction to fire	Not permitted: (but class F according to EN 13501-1)	2.4.1	Classes E or F according to EN 13501-1
2	Resistance to fire	Not permitted	2.4.2	Classification of the element incorporating the grille, according to EN 13501-2
Essential Requirement 3: Hygiene, health and environment				
3	Air permeability	Not permitted	2.4.3	Declared value
4	Water tightness	Permitted	2.4.4	Pass / fail
5	Content and/or Release of dangerous substances	See Part 1 – “General”	2.4.5	Indication of dangerous substances or “No dangerous substances” <sup>3</sup>
Essential Requirement 4: Safety in use				
6	Mechanical resistance and stability	Permitted	2.4.6.1	Zone type according to EOTA TR 001:2003
7	Adhesion*	Permitted	2.4.7	See 2.4.6.1.1
Essential Requirement 5: Protection against noise				
8	Acoustic properties	Permitted	2.4.8	Single number rating
Essential Requirement 6: Energy economy and heat retention				
9	Thermal properties	Not relevant to this type of product	2.4.9	Not applicable
10	Water vapour permeability	Not relevant to this type of product	2.4.10	Not applicable

<sup>3</sup> EU data base see: [www.europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm](http://www.europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).

General aspects relating to fitness for use				
11	Aspects of durability and serviceability**	Not permitted	See 2.4.11	Use category regarding environmental conditions
12	Cold smoke leakage	Permitted (for air transfer grilles not claimed to limit spread of cold smoke)	2.4.12.12	Declared performance rating, expressed in $m^3h^{-1}m^2$ Index $S_a$
*	This characteristic is placed under ER 4 for convenience, but also relates to other ERs as well, particularly ER 2.			
**	Aspects of durability and economy of the works (see CPD Annex 1, sentence 1 and 2) which are not dealt with under Essential Requirements 2 to 5. Such aspects are also referred to as "serviceability".			

## 2.4 Product characteristics which are relevant for the fitness for use

### 2.4.1 Reaction to fire

#### 2.4.1.1 Method of verification

The product shall be tested and classified in accordance with EN 13501-1.

**NOTE 2:** For this type of product, depending on the regulations in the Member State where the product is to be used, it may be necessary to carry out tests according to EN ISO 11925-2<sup>4</sup> in order to determine whether the materials can satisfy the requirements for Class E to EN 13501-1.

#### 2.4.1.2 Method of assessing and judging

The product shall be classified according to EN 13501-1.

### 2.4.2 Resistance to fire

#### 2.4.2.1 Method of verification

There is currently no European testing standard specifically for testing the resistance to fire of reactive or heat activated air transfer grilles. Therefore, the procedure shall be based on the principle of testing the product as part of a final element. In the case of a non-loadbearing element (wall, ceiling, partition etc) the test shall be in accordance with EN 1364-1 or EN 1364-2. Where the grille is part of a door, the test shall be undertaken in accordance with EN 1634-1.

When applying EN 1364-1, EN 1364-2 or EN 1634-1 at least one thermocouple<sup>5</sup> shall be placed on the air transfer grille independent of the size of the air transfer grille.

The performance of reactive or heat activated mechanical air transfer grilles can vary considerably with different pressure and heat flux conditions in the test furnace. It is necessary, therefore, to test a range of grilles (usually the largest, circular and rectangular and different shapes and thickness of reactive material).

For the purposes of the test, the installation shall be representative of the manufacturer's installation and application details e.g. for fire doors, partition walling or sandwich panels, including the fitting of specific cover grilles if these are always to be used in practice.

Where the substrate includes voids, e.g. where fitting a reactive or heat activated air transfer grille into a hollow core door, voids shall be covered or filled, e.g. by framing around the opening. If a framing is used in the fire test, it shall be considered as part of the system and the same framing shall be used in practice.

<sup>4</sup> It is currently believed that no Member State regulates at higher than Class E but a higher classification will be acceptable on the basis of appropriate tests.

<sup>5</sup> The general principles of attachment and exclusion are given in EN 1363-1.

Fire resistant reactive or heat activated air transfer grilles intended for use in either the vertical or the horizontal plane (air flow moving horizontally or vertically) shall be tested in both planes and mounted in appropriately representative substrates. If the product is intended to be used at the upper (lower) part of a vertical building element it shall be tested at the upper (lower) part of the test furnace because of the difference in pressure at different levels and shall be used as tested.

All cold smoke control air transfer grilles and fire resistant heat activated mechanical air transfer grilles shall be tested for two hundred and fifty complete opening and closing cycles once installed in the furnace prior to conducting the fire test. During the test, the release mechanism shall be triggered as it would be on detection of heat or cold smoke, thus engaging the air sealing mechanism.

Returning the air sealing mechanism to the open position shall be performed by the actuator for two-way moving actuators, or manually for spring driven, gravitational or other mechanical devices.

Fire resistant heat activated mechanical air transfer grilles and fire resistant and cold smoke control mechanical air transfer grilles shall be in the open position at the commencement of the fire resistance test. This is because the primary purpose of the fire test is to confirm the ability of the grille to close when exposed to heat.

Shutter plates or blades in fire resistant and cold smoke control reactive air transfer grilles shall be in the powered open position at the commencement of the fire resistance test. The power may be disconnected when the device no longer draws electrical current.

The grilles shall be tested with exposure to fire to each face, unless the grille is symmetrical in construction.

For grilles in partitions or ceilings, the grille shall be positioned in the element no closer than 200 mm from the edge of the specimen.

Any apparent gaps between the air transfer grille perimeter and its supporting construction shall be assessed using either a gap gauge or a cotton pad applied in the manner prescribed in the test standard.

For air transfer grilles made of intumescent materials or intumescent components only the cotton pad shall be used to avoid inadvertent damage.

The particular characteristics of air transfer grilles require that insulation criteria (I) shall be determined for various locations on the unexposed face of the specimen and the peripheral interface with the supporting structure. The number and location of heat sensors will vary according to the size and shape of the specimen. Some air transfer grille types are manufactured from materials which deform or expand considerably during a fire test and often have irregular or unstable surfaces that prevent reliable thermal contact from being maintained with surface mounted thermocouples when attached by normal means. The Approval Body and test laboratory shall take this fact into account. The conventional roving thermocouple can be used but, in order to achieve more consistent results, consideration shall be given to the use of a custom-made device that applies the thermocouple in such a way that a constant contact pressure is maintained<sup>6</sup>. Devices based on a lever or telescopic tubes of determined mass may be used.

#### **2.4.2.2 Method of assessing and judging**

After 250 complete opening and closing cycles, no mechanical damage which impedes the operation of the cold smoke control air transfer grilles and fire resistant heat activated mechanical air transfer grilles shall have occurred. This is verified by performing the fire test on the same installed specimen. Any mechanical damage or limited operability is to be recorded prior to the continuation of the test sequence.

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<sup>6</sup> Take into consideration that because of the nature of intumescent materials a roving thermocouple will provide different results than a fixed thermocouple due to the restriction in contact with the material and the lack of an insulating pad.

The element, including the air transfer grille, shall be classified according to EN 13501-2, 7.5 "Classification of non-loadbearing elements".

Since the performance of the grille can be affected by its position in the vertical plane (due to the pressure gradient within the furnace), any classification is restricted to the position tested.

The type of grille and the fixings, including type and number of fixings, shall not be changed from those tested.

The number of grilles, when mounted in multiple arrangements, and the dimensions of the grilles, whether single grilles or multiples arrangements, may be decreased but shall not be increased from the tested configuration.

For grilles fitted to doors, the distance between the edges of the grille and the perimeter of the door leaf or the distance between the grilles shall not be reduced from those incorporated in the test specimen. Other positioning within the door can only be modified if this does not involve the removal or re-positioning of structural members.

### **2.4.3 Air permeability**

#### **2.4.3.1 Method of verification**

The test referred to in Part 1 "General" is not applicable for fire resistant or fire resistant and smoke control reactive or heat activated air transfer grilles because, by design, free air transfer through reactive air transfer grilles is required in normal use.

Airflow performance testing in terms of velocity and pressure differentials can be conducted and characteristics determined in accordance with the relevant sections of EN13141-1.

#### **2.4.3.2 Method of assessing and judging**

The air permeability shall be calculated and presented as described in EN 13141-1.

### **2.4.4 Watertightness (Liquid water permeability)**

#### **2.4.4.1 Method of verification**

If a manufacturer intends a product to be used in applications where exposure to rain can be anticipated then the product shall be tested in accordance with the principles of EN 13030.

#### **2.4.4.2 Method of assessing and judging**

The products shall be classified in accordance with EN 13030.

### **2.4.5 Content and/or release of dangerous substances**

See Part 1 "General".

EOTA TR 034 shall be used to identify the possible release scenarios, and any content limitations, and those substances which therefore shall be considered. However, other regulations on dangerous substances may exist and if so, they need to be taken into account.

### **2.4.6 Safety in use**

#### **2.4.6.1 Mechanical resistance and stability**

##### **2.4.6.1.1 Method of verification**

This aspect of performance relates to loads from a number of possible sources. However, it is considered that impact forces will expose more risk of a product becoming dangerous than, for

example, crowd pressure or air pressure and that loads from sources other than impacts need not be considered separately.

Single or multiple fire resistant or fire resistant and smoke control reactive or heat activated air transfer grilles, in vertical apertures >600 x 600 mm or in horizontal apertures >150 x 150 mm, shall be tested for resistance to structural damage from large impact loads. The method of installation and the supporting construction shall be representative of the manufacturer's specification and shall be consistent with the element for which resistance to fire is classified.

The purpose of the test is to determine whether there is a risk of persons falling through the grille(s), whether pieces could fall in a dangerous manner or whether sharp projections could be exposed.

Testing is not necessary if the products are always to be used with protection or if, regardless of size, they are always to be positioned where a person cannot fall against the product.

If impact testing is required, the test shall be conducted using a device and testing procedure as described in EOTA Technical Report TR 001:2003.

#### **2.4.6.1.2 Method of assessing and judging**

The impact energy (EOTA TR 001:2003) shall be given in the ETA together with the maximum dimensions of the air transfer grille and the type of impactor used.

#### **2.4.7 Adhesion**

##### **2.4.7.1 Method of verification**

Where relevant to the type of fixing (non-mechanical fixings e.g. press-fitted or glued in place), this is covered by consideration of impact resistance – see 2.4.6.1.1.

##### **2.4.7.2 Method of assessing and judging**

Adequacy of adhesion (fixing) is covered by verifications and/or tests performed according to 2.4.6.

#### **2.4.8 Acoustic properties – airborne sound insulation**

##### **2.4.8.1 Method of verification**

Not normally applicable, since air transfer grilles are designed to allow the free passage of air in normal conditions.

At the request of the manufacturer, an air transfer grille designed specifically to limit airborne sound transmission shall be tested in accordance with the test standard given in Part 1 "General" to establish its performance.

##### **2.4.8.2 Method of assessing and judging**

See Part 1 "General".

#### **2.4.9 Thermal resistance / Thermal transmission properties**

Not applicable, since free air transfer through Fire Resistant Air Transfer Grilles is required in normal use.

#### **2.4.10 Water vapour permeability**

Not applicable to this type of product.

## **2.4.11 Aspects of durability**

### **2.4.11.1 General**

The product specification shall be examined and tests carried out where necessary, to ensure that the product durability is appropriate for the intended use. It is necessary to assess the individual components and materials as well as their behaviour as an assembly (compatibility of components/materials), of any type of Air Transfer Grille, in accordance with EOTA TR 024:2009. In cases where the product includes a mechanical function as well as a reactive function, only those components forming an integral part of the product shall be examined. Thus, smoke sensors or other remote switching devices are not included. The durability assessment shall take due account of the need for the product to perform its function in allowing air passage in non-fire conditions as well as retaining its potential to be activated when a fire and/or smoke event occurs.

Generally, this document refers to dry internal operating conditions. In exceptional cases, a manufacturer may wish to have a fire resistant or a fire resistant and cold smoke control air transfer grille assessed for use in more aggressive conditions (e.g. exposed to external conditions, salt laden or chlorine atmospheres or other forms of chemical pollution). In such cases, the entire assembly shall be preconditioned in accordance with the procedures for reactive products given in EOTA TR 024:2009. The assembly shall be exposed to the conditions in which it is designed to operate to ensure that the various materials used in its construction do not interact or have any detrimental effect upon each other. The air transfer grille assembly shall then be tested for satisfactory operation of the moving parts (depending on the final use and the regulation in the Member State where the product is to be used but at least 1 000 cycles) and, where relevant, electrical or electronic integrity.

References and other information, in the following paragraphs, relate to materials and components commonly used in all types of air transfer grille. Where materials are used that are not covered by these standards the Approval Body may make use of documented evidence of performance, existing approvals or compliance with other standards especially with those accepted in the Member State(s) of destination of the product.

### **2.4.11.2 Reactive components**

Reactive components complete with their protective coverings or encapsulations, if applicable, shall be tested and classified in accordance with the relevant paragraphs of the EOTA TR 024:2009.

### **2.4.11.3 Miscellaneous materials**

The following materials may be encountered in the construction of air transfer grilles or in cover plates or frames forming part of the product:

— Painted carbon steel

The adequacy of a coating on steel can be assessed by reference to EN ISO 12944 in its various parts.

— Zinc or aluminium coated steel

The adequacy of zinc corrosion protection can be assessed by reference to EN ISO 14713, which gives general recommendations on corrosion protection.

— Coil-coated steel

Coil coated steel can be assessed by reference to EN 10169.

— Coil coated aluminium

Coil coated aluminium can be assessed against EN 1396.

— Stainless steel

Stainless steels shall be classified by reference to EN 10088. Annex B of EN 10088-1:2005 contains general guidance on the use of stainless steels including the aspect of corrosion resistance.

**NOTE 3:** Ferritic stainless steels have relatively low corrosion resistance and their use will normally be restricted to mild indoor or similarly protected environments. This type of stainless steel is suitable for use in use categories Z1, Z2 and Y.

Austenitic stainless steel: The most common alloys are 1.4301 (X5CrNi18-10) and 1.4401 (X5CrNiMo17-12-2). These austenitic stainless steels are normally suitable for use in all use categories as defined in 1.2. However, where high chloride contents or more severe conditions are likely to be present in the environment (e.g. rooms with indoor swimming pools, facades in cities with heavy traffic, in coastal areas), alloys with higher molybdenum content, e.g. 1.4429 (X2CrNiMoN17-13-3), 1.4539 (X1NiCrMoCu25-20-5) or 1.4529 (X1NiCrMoCuN25-20-7), may be necessary.

Austenitic-ferritic steels, e.g. 1.4462 (X2CrNiMoN22-5-3), are comparable to a CrNiMo-steel with 2,5 % to 3 % Mo.

— Thermoplastics – e.g. PVC-U, polypropylene<sup>7</sup>

Thermoplastic polymeric materials used in these products are generally used to form cover plates, frames etc. and thus do not fulfil a primary function. It is therefore sufficient to ensure that the component/material possesses characteristics that define it as being an acceptable quality moulding or extrusion.

Extruded profiles in PVC-U shall be designated and assessed for suitability using EN 13245-1 and the associated tests in EN 13245-2. These standards allow a distinction to be made between profiles that are intended to be externally exposed and those that are for internal use only.

In determining suitability of a profile in a particular application, the Approval Body shall take due account of the consequences of failure, in particular related to the costs of access and the associated dismantling of the building.

For injection moulded components, the effects of heating shall be determined, using the method described in EN 763, on 3 samples selected from each of 5 production batches.

After conditioning, no weld line shall have opened completely and no cracks or de-lamination shall penetrate more than 50 % of the thickness, at the point of injection. If 1 of any 3 specimens exhibits a failure a retest may be undertaken on 6 further specimens. If any of these samples fails the product shall be deemed unacceptable.

— Paper/cardboard

Paper and cardboard materials shall be considered as having limited durability unless the moisture content of the air stream through the air transfer grille is less than 50 % humidity or unless they are adequately protected. Unprotected use may be acceptable where these materials become redundant after the grille is installed. The latter would be the case where the product has a perimeter tape of paper or cardboard strip, which is fully supported by the surrounding structure in the installed state.

— GRP (Glass fibre reinforced plastic)

Where GRP is used in the construction of an air transfer grille, its durability can be assessed, in the absence of standardised methods, by undertaking the following tests to determine how moisture might affect the long-term strength of the composite:

- Effects of boiling in water. An accelerated ageing test shall be undertaken by boiling a sample of the component in water, followed by tensile strength tests perpendicular to the faces. The samples shall correspond to the provisions of EN 1607. The sample shall be boiled for a period of (120 ± 10) min. The tensile strength, perpendicular to the faces, in accordance with EN 1607, shall be determined before and after this accelerated ageing.

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<sup>7</sup> This assessment is not intended to assess the durability and tightness of wrappings/casings used to protect reactive materials that are not durable on their own. These are assessed as part of the reactive component.



- Effects of condensation. Samples shall be exposed to condensation by assembling the components above a heated water bath, followed by a tensile strength test perpendicular to the faces. The samples shall correspond to the provisions of EN 1607. The temperature of the water shall be  $(65 \pm 2)$  °C and the exposure period is  $(35 \pm 1)$  days. The tensile strength, perpendicular to the faces, in accordance with EN 1607, shall be determined before and after this accelerated ageing.

It is for the Approval Body to judge the significance of the results of the above tests, based on the way the GRP component is used in the air transfer grille and its likely contribution to long term behaviour.

- Wood

The adequacy of wood components in air transfer grilles can be judged by reference to EN 350-1 and -2 and EN 335-1 and-2.

- Component and materials compatibility

The Approval Body shall examine the design of the air transfer grille and make an assessment, using well-established principles, of the suitability of materials in contact with each other. It is impossible to prescribe all the possible risk areas but these include the possibility of bi-metallic corrosion, the effects of wood preservatives on metals and the effects of solvent based coatings on the impact strength of plastics.

## **2.4.12 Serviceability**

### **2.4.12.1 Product cycling**

#### **2.4.12.1.1 Fire Resistant Reactive Air Transfer Grilles**

No test possible or necessary.

#### **2.4.12.1.2 Fire Resistant Heat Activated Mechanical Air Transfer Grilles**

These products are required to operate only in the event of fire and are not subject to repeated operation in the event of e.g. a false alarm in service. Therefore, they shall be subjected to 250 cycles of normal operation as a means of determining robustness (see 2.4.2).

#### **2.4.12.1.3 Fire Resistant and Cold Smoke Control Reactive Air Transfer Grilles and Fire Resistant and Cold Smoke Control Mechanical Air Transfer Grilles (Type RMS and MMS)**

See also 2.4.2.

These products may be subjected to repeated operation in normal service due, for example, to false alarms or system tests. They shall be subjected to a minimum of 5 000 cycles of normal operation in order to establish robustness/durability. It is for the Approval Body to determine a suitable means of carrying out this cycling, due to the variety of product types available. As an example, if the device is operated by an electric motor then that motor shall be included in the test as it forms part of the product. If periodic lubrication forms part of the maintenance plan for the product, this may be applied during the cycling test in accordance with the manufacturer's instructions.

### **2.4.12.2 Smoke control failsafe test and cold smoke leakage (Type RMS and MMS only)**

#### **2.4.12.2.1 Methods of verification**

These procedures are relevant only for fire resistant and cold smoke control reactive air transfer grilles and fire resistant and cold smoke control mechanical air transfer grilles.

#### **2.4.12.2.1.1 Failsafe test of cold smoke control system**

Prior to measuring the leakage, durability testing shall be undertaken of the cold smoke control system for the number of opening and closing cycles and at the air pressure differentials claimed by the manufacturer (see also 2.4.11). At least 10 % of the closing operations shall be induced by interrupting the power supply to the actuator. The specimen used in this cycling test shall be used for the cold smoke leakage test.

#### **2.4.12.2.1.2 Cold smoke leakage**

Cold smoke leakage is determined with all the mechanical components of the grille in the closed position. The test method shall be generally in accordance with EN 1634-3 but, for the purpose of testing air transfer grilles, the specimen shall be mounted and edge-sealed into a plywood panel or similar impermeable material. The inclusion of a heating device, as described in the test standard, is not required as only the leakage rate at ambient temperature is to be determined. The measurement of retention force, also mentioned in the standard, is not relevant.

Where more than one size is offered, a range of grille sizes including maximum and minimum areas (but also taking account of maximum linear dimensions where necessary) shall be tested and the results set in graphical form, plotting leakage rate against area, to allow interpolation of leakage for intermediate sizes.

#### **2.4.12.2.2 Method of assessing and judging**

The number of opening and closing cycles completed without repair shall be recorded.

If Member States require that the products shall meet the cycling requirement without lubrication, the test shall be performed without lubrication. It shall be noted in the ETA whether maintenance lubrication was undertaken during the test.

**NOTE 4:** In some Member States e.g. Belgium, only products will be permitted that can meet the cycling requirement without maintenance lubrication.

The leakage measured shall include the interface with the grille and the aperture in the mounting board as well as the grille assembly and shall be expressed in  $\text{m}^3\text{h}^{-1}\text{m}^{-2}$  for the area of the grille. For the product to be classified as a smoke control type, the leakage rate shall be given in  $\text{XX m}^3\text{h}^{-1}\text{m}^{-2}$ .

The measured figure shall be given as an index by the letter  $S_a$  denoting the leakage rate for ambient temperature smoke.

Extrapolation beyond the maximum dimension of the tested range is not permitted.

**NOTE 5:** In some Member States e.g. France, only products without any leakage will be permitted.

### **3 Evaluation and attestation of conformity and CE marking**

#### **3.1 System of attestation of conformity**

See Part 1 "General".

#### **3.2 Tasks and responsibilities for the manufacturer and the Notified Product Certification Body**

##### **3.2.1 Tasks for the manufacturer**

The cornerstones of the actions to be undertaken by the manufacturer of the Fire Stopping and/or Fire Sealing Product in the procedure of attestation of conformity are laid down in Part 1 –"General" and in Table 3.

The alternatives for implementation are:

- the ETA holder produces the product, i.e. he ensures FPC himself,
- the product/component is supplied to the ETA holder, i.e. the ETA holder needs to ensure the supplier performs the FPC as specified in the ETA or accompanying documentation.

### 3.2.2 Tasks for the Notified Product Certification Body

The cornerstones of the actions to be undertaken by the Notified Product Certification Body in the procedure of attestation of conformity for Fire Stopping and/or Fire Sealing Products are laid down in Table 4.

#### 3.2.2.1 Initial type-testing of the product (ITT)

Direct tests related to the properties listed in the mandate (fire resistance, mechanical resistance and stability, adhesion, resistance to impact/movement, release of dangerous substances) will already have been done as part of the approval tests and it will not normally be necessary for these to be repeated for ITT. However, depending on the degree to which the samples used for the approval testing were representative of the product produced under the conditions of current production (e.g. when prototypes were used), some confirmatory tests may need to be undertaken, chosen from the list given in Table 4.

#### 3.2.2.2 Initial inspection of factory and factory production control (FPC)

The relevant properties are listed in Table 4.

#### 3.2.2.3 Continuous surveillance, judgment and assessment of factory production control (FPC)

The relevant properties are listed in Table 4. The minimum surveillance frequency is normally twice a year.

**Table 3 – Control plan for the manufacturer; cornerstones**

Nr	Subject/type of control ( <i>product, raw/constituent material, component – indicating characteristic concerned</i> )	Test or control method	Criteria, if any	Minimum number of specimens <sup>8</sup>	Minimum frequency of control
<b>Factory production control (FPC)</b>					
<b>Table 3.1 Reactive material<sup>9</sup></b>					
1	Density	EOTA TR 024:2009, clause 3.1.4	–	–	1/b
2	Loss of mass on heating (ash)	EOTA TR 024:2009, clause 3.1.8	–	–	1/10b
3	Expansion ratio (if relevant)	EOTA TR 024:2009, clause 3.1.11	–	–	1/b
4	Content of non-volatile components	EOTA TR 024:2009, clause 3.1.7	–	See <sup>9</sup>	1/10b

<sup>8</sup> One specimen is normally considered to be sufficient. The final number of specimens is to be defined in the ETA or accompanying documents by the Approval Body.

<sup>9</sup> Where the reactive material is supplied as an incoming material, these checks may be made by the supplier and the results presented in the form of a certificate of conformity.

<b>Table 3.2 Reactive components – slats, honeycomb etc.</b>					
1	Dimensions	EOTA TR 024:2009; clause 3.1.2	–	–	1/b
2	Mass per unit area	EOTA TR 024:2009, clause 3.1.5	–	–	Reference: TR 024:2009, clause 3.3
3	Expansion ratio	EOTA TR 024:2009, clause 3.1.11	–	–	Reference: TR 024:2009, clause 3.3
4	Content of non-volatile components	EOTA TR 024:2009, clause 3.1.7	–	See <sup>9</sup>	1/10b
<b>Table 3.3 Other components (Non-reactive) and the assembled unit<sup>10</sup></b>					
1	Specification of incoming materials e.g. steel sheet (and protective coatings where relevant), plastics sheets, paper, cardboard	Compliance with specification (Declaration of Conformity)	–	–	1/b
2	Dimensions	Annex A1	–	–	1/b
3	Assembled products	Annex A2	–	–	1/b

**Table 4 – Control plan for the Notified Product Certification Body; cornerstones**

<b>Nr</b>	<b>Subject/type of control</b>	<b>Test or control method</b>	<b>Criteria, if any</b>	<b>Minimum number of specimens</b>	<b>Minimum frequency of control</b>
<b>Initial type-testing of the product (ITT)</b>					
See clauses 2.4.1 to 2.4.12 The approval tests are normally acceptable for ITT					
<b>Initial inspection of factory and factory production control (FPC)</b>					
See Part 1 – “General” and Table 3 of this part					
<b>Continuous surveillance, judgment and assessment of factory production control (FPC)</b>					
See Part 1 – “General” and Table 3 of this part					

**3.2.3 Special methods of control and testing used for the evaluation**

See Annex A.


**3.3 CE marking and accompanying information**

See Part 1 – “General”.

Example of CE marking and accompanying information:

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<sup>10</sup> Other checks may be undertaken, as agreed between the Approval Body and the ETA applicant.

 1234	“CE” marking  Identification number of Notified Product Certification Body
Any Company Street 1, City, Country  10 1234-CPD-0321	Name and address or the identifying mark of the producer or his authorised representative established in the EEA  Two last digits of year of affixing CE marking Number of EC certificate of conformity
ETA-12/1234 ETAG 026 – Part 4 Fire Resistant Reactive Air Transfer Grille “YYY” See ETA-12/123 for relevant characteristics	ETA number ETAG number  Designation of the product (YYY); type according to 1.1 and use category Reference to the ETA for relevant characteristics

## 4 Assumptions under which the fitness for the intended use is assessed

### 4.1 Manufacture of the product

The product is to be indelibly marked to indicate the manufacturer, product type and batch number or date of manufacture.

### 4.2 Packaging, transport, storage of the product

See Part 1 “General”.

Where the product is intended for interior use only it is assumed that guidance will be given on correct site storage and/or protection. The product is to be packaged in such a way that it is protected from the effects of reasonable handling and storage conditions. In order to prevent premature opening and possible loss of items, the package shall be clearly marked externally with the identity of the contents.

Fitting/installation instructions are to be included in the package together with commissioning information.

### 4.3 Installation of the product in the works

See Part 1 “General”.

It is assumed that the manufacturer provides information on:

- (a) the use conditions in terms of environmental conditions (e.g. dry indoor use) as covered by the ETA,
- (b) the method of preparation of the supporting construction (wall, floor, door, etc.) before installation of the air transfer grille.

### 4.3 Use, maintenance and repair

See Part 1 “General”.

All types of fire and fire and cold smoke control air transfer grilles in normal use (the stipulations of Clauses 1 and 2 shall be taken into consideration) encounter debris laden air conditions that may clog the free area of the grille. Excessive clogging will not only impede airflow in normal conditions but may be detrimental to the fire performance of air transfer grilles in the event of fire. It is therefore assumed

that the frequency of recommended inspection, maintenance and cleaning schedules will be established.

## **5 Identification of the construction product**

All components of fire and fire and cold smoke air transfer grilles shall be clearly identified in accordance with of Part 1 – “General”, Clause 5.

Preferably harmonised European Technical Specifications shall be used to identify the individual component. If the product is a reactive material, EOTA TR 024:2009 “Characterisation, Aspects of Durability and Factory production Control for Reactive Materials, Components and Products” shall be taken into account.

If the option "Fingerprint" is taken, for most products Infra-Red Spectroscopy plus a TGA (Thermogravimetric Analysis) or DTA (Differential Thermal Analysis) will be appropriate.

Alternatively, or in addition, the applicant or a third party on the applicant's request, may deposit the formulation for identification purposes.

Drawings will be useful particularly for products that are pre-formed or contain components with a specific geometrical shape or dimensions etc.

In many cases a combination of the options will be appropriate to cover all aspects for a technical assessment.

### **5.1 Means of identification**

The product which is the subject of the Technical Approval shall be identified by:

- testing of product characteristics (geometry, density, mechanical strength, etc.),
- fingerprinting (infrared, gas chromatography, TGA/DTA, etc.),
- formulation (chemical constitution, recipes, composition of raw materials, amounts, components specified by characteristics, compliance with other specifications e.g. an EN or by mass, volume, percentage, etc.),
- manufacturing process parameters (temperature, pressure, time, product/production codes),
- dimensional checks of components, using suitably calibrated instruments and gauges, against the product drawings taking account of the manufacturer's declared tolerances.

The EOTA TR 024:2009 gives details for the identification of reactive materials, components and products. Apart from testing the intumescent or ablative performance of the material itself, it is important for the assessment to take into account the characteristics of the reactive component, e.g. a slat or matrix, as used in a reactive air transfer grille and not just as a material in its basic form.

For specific products it will be helpful to support the identification with a careful and detailed description of the specific product and its final use and an accurate drawing.

Whichever method(s) is/are used it is necessary to recognise practical tolerances in relation to results/data collected. It is also essential, however, that these techniques/methods shall be introduced only as far as they have or could have an influence on the fulfilment of the Essential Requirements, including aspects of durability.

## **6 Format of ETAs issued on the basis of the ETAG**

Manufacturers shall ensure that, where relevant, products comply with the requirements of other applicable EU directives (e.g. the Low Voltage Directive 2006/95/EC and Electro-Magnetic

Compatibility Directive 2004/108/EC), and make the necessary declaration. Comment on this shall be included in the ETA.

European Technical Approvals issued on the basis of this ETAG shall be in accordance with the ETA format given in the Addendum to this ETAG.

## **7 Reference documents**

This ETA-Guideline Part 4 incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed below. For dated references subsequent amendments to, or revisions of these publications, apply to this ETAG only when incorporated in it by amendment or revision. For undated references the latest dated revision of the publication referred to apply.

### **7.1 EC Documents**

Commission Decision 96/603/EC

Commission Decision of 4 October 1996 establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products.

Commission Decision 2000/605/EC

Commission Decision of 26 September 2000 amending Decision 96/603/EC establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products.

Commission Decision 2003/424/EC

Commission Decision of 6 June 2003 amending Decision 96/603/EC establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products.

Low Voltage Directive (LVD) 2006/95/EC

Directive of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of the Member States relating to electrical equipment designed for use within certain limits.

Electromagnetic Compatibility Directive (EMC) 2004/108/EC

Directive of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

### **7.2 Test and classification methods**

EN 1364-1	Fire resistance tests for non-loadbearing elements – Part 1: Walls.
EN 1364-2	Fire resistance tests for non-loadbearing elements – Part 2: Ceilings.
EN 1607	Thermal insulating products for building applications – Determination of tensile strength perpendicular to faces.
EN 1634	Fire resistance tests for door and shutter assemblies – Part 1: Fire doors and shutters. Part 3: Smoke control doors and shutters.
EN 1751	Ventilation for buildings – Air terminal devices – Aerodynamic testing of dampers and valves.
EN 13141-1	Ventilation for buildings, Performance testing of components/products for residential ventilation;

## Part 1: Externally and internally air transfer grilles

EN 13030	Ventilation for buildings; Terminals; Performance testing of louvres subjected to simulated rain.
EN 13501	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests. Part 2: Classification using data from resistance to fire tests, excluding ventilation services.
EN ISO 13788	Hygrothermal performance of building components and building elements
EN ISO 11925-2:2002	Reaction to fire tests – Ignitability of building products subjected to direct impingement of flame – Part 2: Single-flame source test.
EOTA TR 001:2003	Determination of Impact Resistance of Panels and Panel Assemblies.
EOTA TR 024:2009	Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products.
EOTA TR 034:	General ER3 Checklist for ETAG/CUAP/ETA – Content and/or release of dangerous substances in products/kits;

**7.3 Component and material specifications**

EN 335	Durability of wood and wood based products - Definition of use classes Part 1 General Part 2 Application of solid wood.
EN 350	Durability of wood and wood based products – Natural durability of solid wood – Part 1 Guide to the principles of testing and classification of natural durability of wood. Part 2 Guide to the natural durability and treatability of selected wood species of importance in Europe.
EN 763	Plastics piping and ducting systems. Injection-moulded thermoplastics fittings – Test method for visually assessing the effects of heating.
EN 1396	Aluminium and aluminium alloys – Coil coated sheet and strip for general applications.
EN 10088-1:2005	Stainless steels – Part 1: List of stainless steels.
EN 10169	Continuously organic coated (coil coated) steel flat products; Technical delivery conditions.
EN 13245	Plastics, Un-plasticised poly(vinyl) chloride (PVC-U) profiles for building applications – Part 1: Designation of PVC-U profiles. Part 2: PVC-U profiles and PVC-UE profiles for internal and external wall and ceiling finishes.
EN ISO 12944	Paints and varnishes – Corrosion protection of steel structures by protective paint systems.
EN ISO 14713	Zinc coatings – Guidelines and recommendations for the protection against corrosion of iron and steel in structures Part 1: General principles of design and corrosion resistance Part 2: Hot dip galvanizing Zinc coatings Part 3: Sherardizing



## **ANNEX A**

### **Methods for FPC**

#### **A.1 Dimensions**

##### **A.1.1 Thickness**

The thickness of components/products comprising plates, sheets, boards, strips, fabrics, etc. is determined by means of a suitable gauge to the nearest 0,1 mm at 5 locations of the specimen. The minimum size of the specimen is 10 cm x 10 cm or a minimum length of 50 cm in case of strips.

For foils and similar products/components thickness is determined to the nearest 0,01 mm.

##### **A.1.2 Other dimensions**

The dimensions shall be determined to an accuracy of 0,5% by means of a suitable gauge.

#### **A.2 Checks on assembled products**

##### **A.2.1 Specification**

The product shall be checked for conformity with the product specifications with regard to: product type, colour, physical dimensions and accompanying items such as cover grilles, control devices, fixings. Other aspects may be controlled as agreed between the ETA applicant and the Approval Body

##### **A.2.2 Function testing**

Where applicable, the completed product shall be tested for satisfactory function of the mechanism (relevant only to products having a mechanical function for provision of fire resistance or cold smoke control). Where the product is electrically powered it shall be tested by connection to the final terminals on the product, i.e. those to which the installer will make connections. The closing forces shall be measured whilst the function test is conducted using methods agreed with the Approval Body to ensure compatibility with the design specifications of the closing mechanism.

## ANNEX B

### Clarifications for testing resistance to fire of Air Transfer Grilles

#### B.1 Introduction

This annex is based on the clarification of test procedure related to number, position and fixing of the thermocouples and classification of products, elaborated by EGOLF (30/11/2010).

#### B.2 Performance criteria

The reactive air transfer grille is defined as a product that resists the spread of fire and hot gasses by the intumescent action of their active components. Both the criteria integrity (E) and thermal insulation (I) can be considered.

Where no evaluation against the insulation criteria is required for the building element no temperature measurements are required.

Where the insulation criteria are required to be evaluated, thermocouples of the type specified in EN 1363-1 shall be attached to the unexposed face for the purpose of obtaining the mean and maximum surface temperatures. The general principles of the attachment and exclusion of thermocouples are given in EN 1363-1.

**NOTE 6:** For the criterion I it is advisable to take into account the dimensions of the air transfer grille in order to use the mean unexposed surface area as part of the criterion.

#### B.3 Testing

- **Number of thermocouples, position and fixing:**

There will be a significant difference in testing a grille in a door with dimensions of e.g. 800 mm x 800 mm and a grille of e.g. 200 mm x 200 mm as well as the component it is tested in. The reactive air transfer grille is tested as part of an element according to EN 1364-1, EN 1364-2 or EN 1634-1 and classified accordingly. Therefore the application of thermocouples of each specific test method is to be followed.

Several thermocouples shall be placed in order to determine the insulation criteria of the specimen. It is specified in both EN1364-1 and EN1634-1 that no thermocouples are positioned on discrete areas of less than 0,1 m<sup>2</sup>. For air transfer grilles this would imply that grilles could be classified (I) without having any thermocouples positioned. Additional thermocouples are therefore required for this ETAG, as described in the following. This implies that all rules regarding thermocouple positioning according to EN 1363-1, EN 1364-1 and EN 1634-1 are followed plus some additional thermocouples.

- **Mean temperature:**

Each reactive air transfer grille, considered as a normal feature, shall be evaluated individually for mean temperature rise. The mean temperature rise shall be measured by thermocouples evenly distributed over each grille.

The mean temperature thermocouples shall be fixed onto the air transfer grille at a density depending on the grill surface area, according to Table A.1:

**Table A.1 – Number of thermocouples**

Surface area m <sup>2</sup>	Number of thermocouples
< 0,04	0
≥ 0,04 ... < 0,10 m <sup>2</sup>	2
≥ 0,10 ... < 0,36 m <sup>2</sup>	3
≥ 0,36	5

For air grilles with surface area less than 0,04 m<sup>2</sup> one maximum thermocouple shall be placed in the centre of the air transfer grille.

The thermocouples shall be located no closer than 50 mm from the edge of the air transfer grille.

- **Maximum temperature:**

The maximum temperature shall be determined from the thermocouples fixed to determine the mean temperature and from additional thermocouples fixed according to the specific test standards as described below.

For air transfer grilles with surface area less than 0,04 m<sup>2</sup> one maximum thermocouple shall be placed in the centre of the air transfer grille.

#### **Testing air grilles installed in doors (EN 1634-1), see Figure 1a**

Thermocouples shall be fixed to the face of the air grille surface as follows:

1. at mid height 100 mm in from the vertical perimeter frames,
2. at mid width 100 mm down from the horizontal top perimeter frame,
3. 100 mm in from the vertical perimeter frames, 100 mm down from the horizontal top perimeter frame.

If the distance between thermocouple 1 and 3 is less than 550 mm, the thermocouple specified in point 2 may be omitted.

For air transfer grilles with surface area less than 0,1 m<sup>2</sup> the 100 mm thermocouples are omitted.

One thermocouple on a door shall be positioned 15 mm above the top perimeter frame at mid width.

If necessary, thermocouples could be positioned for the supplementary procedure as above but with a 25 mm distance. If the distance between thermocouple 1 and 3 is closer than 575 mm, the thermocouple specified in point 2 is omitted for the supplementary procedure.

#### **Testing air transfer grilles installed in walls (EN 1364-1), see Figure 1b**

Position one thermocouple on the air grille surface at mid point 15 mm from each perimeter frame (4 thermocouples in total). For air transfer grilles with surface area less than 0,1 m<sup>2</sup> these thermocouples may be omitted.

One thermocouple shall be positioned on the top member of the perimeter frame at mid width 15 mm from the air grille surface.

#### **Testing air transfer grilles installed in ceilings/floors (EN 1364-2), see Figure 1b**

One thermocouple shall be positioned on the air transfer grille surface at mid point 15 mm from each perimeter frame (4 thermocouples in total). For air transfer grilles with surface area less than 0,1 m<sup>2</sup> these thermocouples may be omitted.

One thermocouple shall be positioned on one of the longest members of the perimeter frame at mid width 15 mm from the air transfer grille surface.

One thermocouple shall be positioned on the ceiling/floor 15 mm from the longest members of the perimeter frame at mid width.

- **Fixing:**

It is usually possible to fix thermocouples to an air transfer grille (even if the ATG is made from intumescent materials) by the following means:

- Either a custom-made thermocouple shall be designed where the copper disc is formed to follow the surface contours of the air transfer grill slat or the thermocouple shall be positioned at a junction of the horizontal and vertical slats where such junctions exist. In the latter case, EN 1363-1 allows the insulating pad to be cut to a more suitable size.
- Where intumescent slat thicknesses are 6 mm or less, a smaller copper disc shall be considered that does not overlap the available slat contact area and is completely in contact with the slat.
- For fixing the thermocouples in the middle of the intumescent air transfer grille (if applicable), the position of the thermocouple shall be allowed to be adjusted slightly, if possible, so that a larger surface area can be used to fix the thermocouples on (see Figure 2).

#### **B.4 Considerations on testing the integrity criterion (E)**

The cotton pad shall be used to confirm that there is no fire hazard from any apparent gaps within the grille.

Any gaps that develop between the grille perimeter and its supporting construction can be assessed using either a gap gauge or a cotton pad applied in the manner described in the specific test standard.

Sustained flaming is to be considered for the evaluation of the integrity criterion.

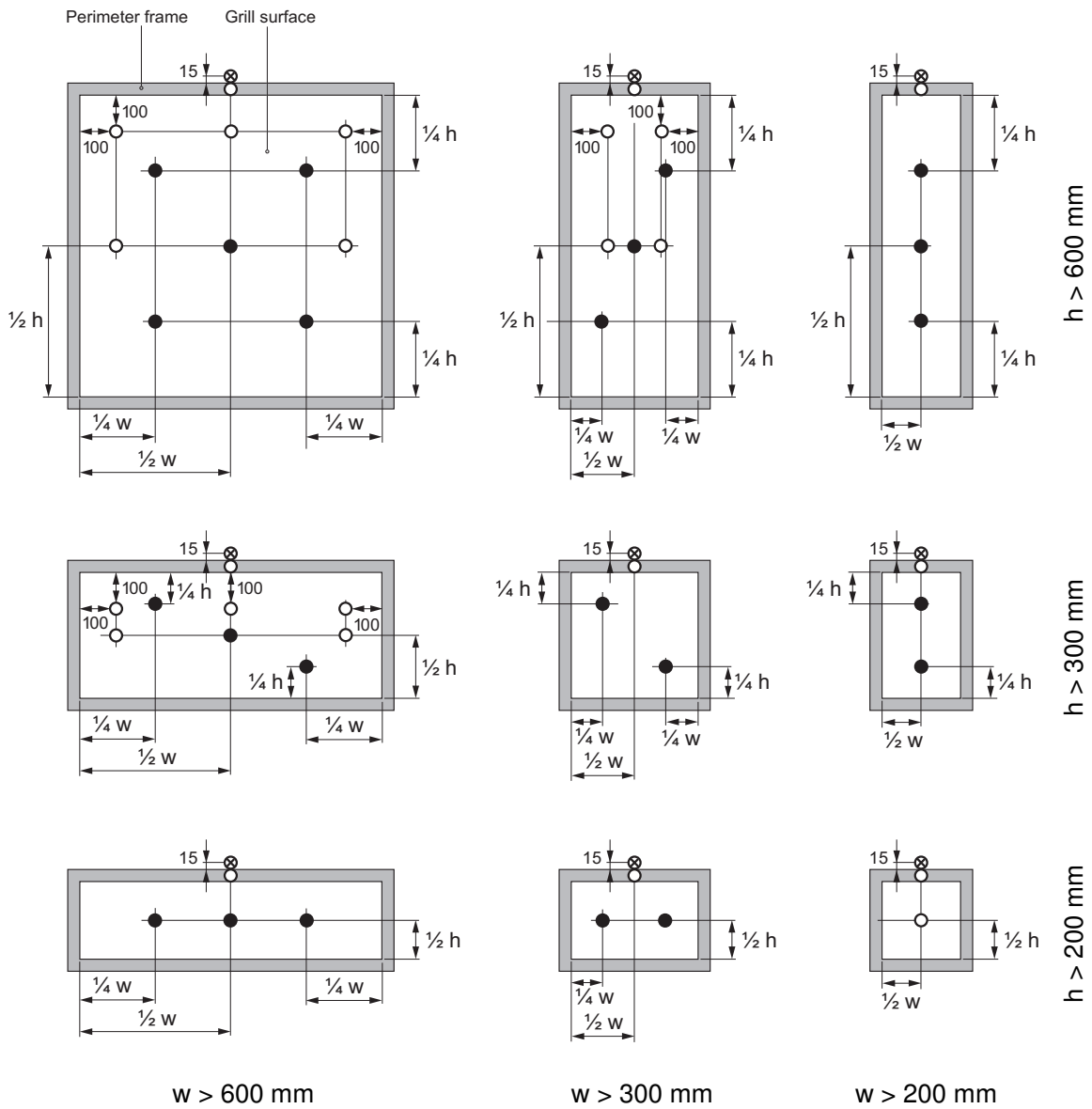
**NOTE 7:** The use of the gap gauge can damage the intumescent products and should therefore be used with extreme care.

**NOTE 8:** Results from the use of cotton pad may be, for air transfer grilles with the intended classification E, disregarded (see EN 13501-2, 5.2.2.1).

- **Position of the air transfer grille in the component**

For grilles in partitions or ceilings, the grille shall not be positioned in the element closer than 200 mm from the edge of the specimen.

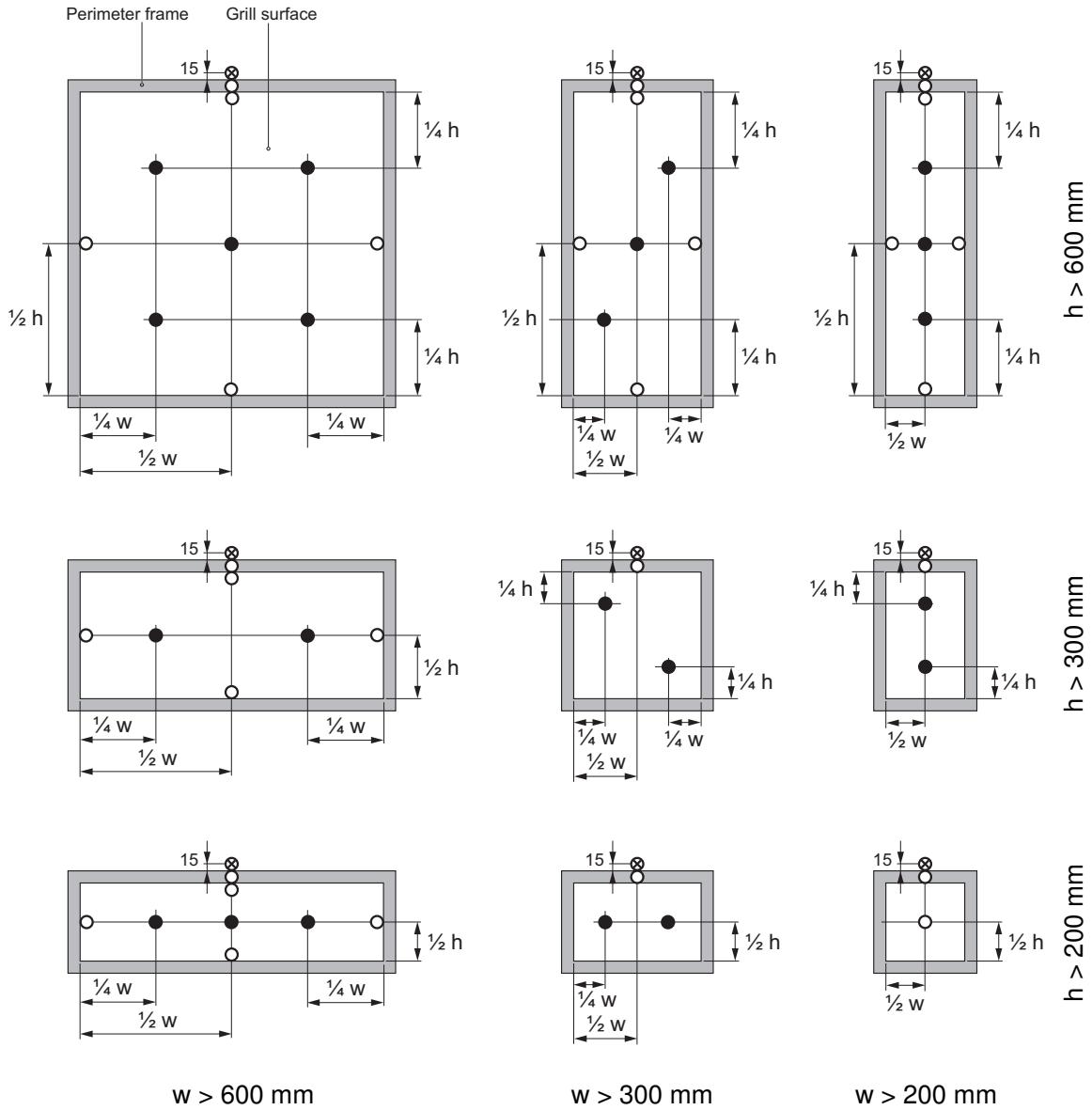
For grilles in doors, the distance between the edges of the grille and the perimeter of the door leaf or distance between the grilles shall be as in practice.



**Key**

- Thermocouple for mean temperature positioned on grilles
- Thermocouple for maximum temperature positioned on grilles and perimeter frame
- ⊗ Thermocouple for maximum temperature positioned on component (the door)

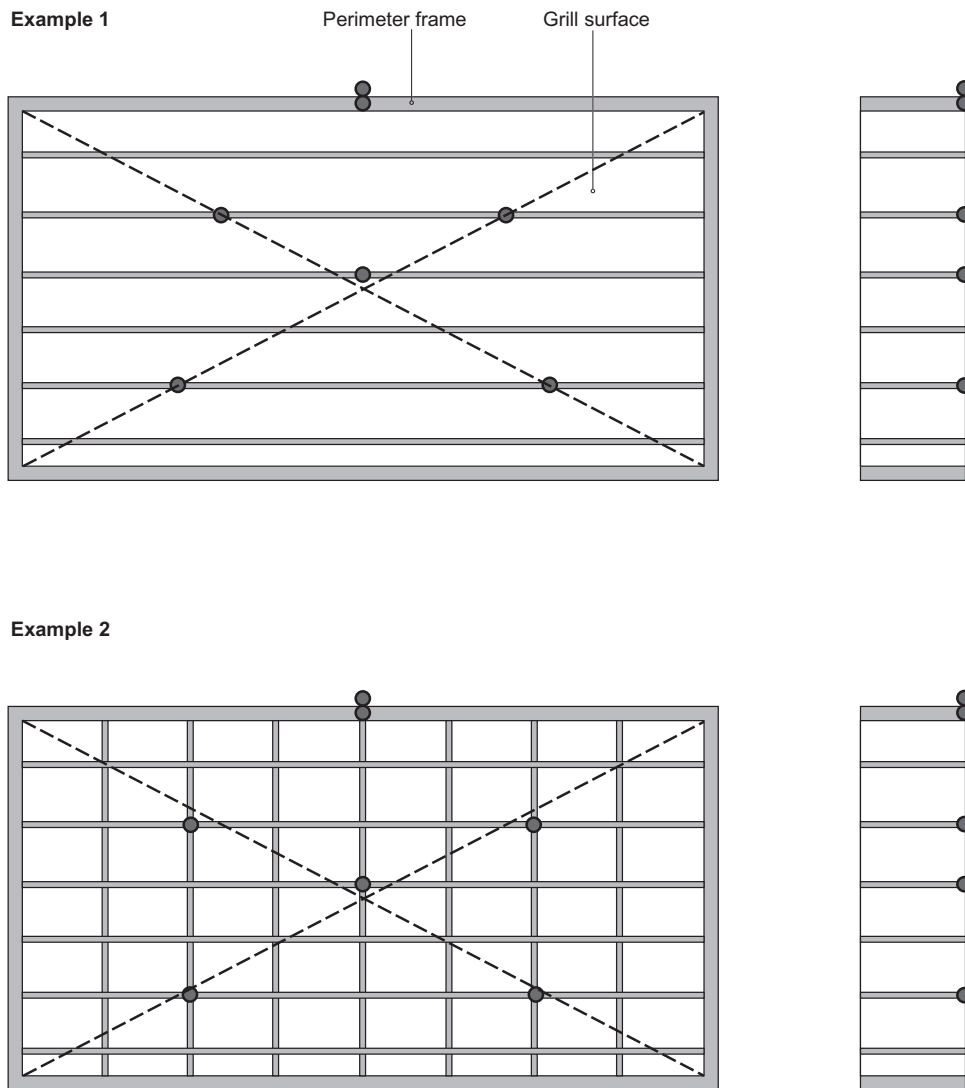
**Figure 1a**  
**Example of positioning of thermocouples on air transfer grilles installed in doors**



**Key**

- Thermocouple for mean temperature positioned on grilles
- Thermocouple for maximum temperature positioned on grilles and perimeter frame
- ⊗ Thermocouple for maximum temperature positioned on component (the wall/floor)

**Figure 1b**  
**Example of positioning of thermocouples on air transfer grilles installed in walls, ceilings and floors**

**Key**

- Re-adjusted position of thermocouples deviating from rules illustrated in Figure 1a and 1b

**Figure 2**  
**Re-positioning of thermocouples for air transfer grilles**

**B.5 Field of direct application of test results**

The results of the fire test are directly applicable to similar constructions where one or more of the changes listed are made and the construction continues to comply with the appropriate design code for its stiffness and stability:

- a) decrease in the linear dimensions of the grille,
- b) decrease in the distance between the horizontal or vertical slats,
- c) increase in number of fixings,
- d) the material, used to seal the gap between the air transfer grille and the supporting/associated construction as tested, provided the reaction to fire classification of the gap filling material is equal to or higher than that tested (for mineral wool: every mineral wool of the same melting point may be used) .

Other changes are not permitted.

Test results are only applicable to the orientation in which the grille was tested. Because the performance of the grille can be affected by its position in the vertical plane any classification is restricted to the position tested. This is in a positive pressure zone or a negative pressure zone between the pressure levels tested.

For grilles fitted in doors, the distance from the edge of the grille and the perimeter of the door leaf shall not be decreased from that tested.

For grilles tested in wall or floors, the distance from the edge of the grille and the perimeter of the construction shall not be decreased from that tested.

The position of grilles installed in doors or walls shall not be higher above the notional floor level than the position tested.

Other positioning in the door can only be modified if this does not involve the removal or re-positioning of structural members of the door leaf.

The number of grilles mounted in multiple arrangements may be decreased but shall not be increased from the tested configuration.



## Addendum: Model for an ETA issued on the basis of ETAG 026, Part 4

### Cover page of the ETA

according to Document 5.1 (new ETA), Document 5.2 (modified ETA) or Document 5.3 (ETA with extended period of validity), as relevant.

### Page 2 of the ETA

with headline Page 2 of ETA-xx/024x, issued on dd.mm.yyyy, validity extended on dd.mm.yyyy

#### I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European Technical Approval is issued by ...*(name of approval body)* in accordance with:
- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>11</sup> modified by Council Directive 93/68/EEC<sup>12</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>13</sup>;
  - ...*(indicate respective national law transposing the CPD; only if the national law of the Member State of the issuing Approval Body so requires)*;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC<sup>14</sup>;
  - Guideline ...*(indicate title and number of ETA Guideline on the basis of which the ETA is granted, unless ETA is issued without an ETA Guideline in accordance with point 3.2 of the Common Procedural Rules, pursuant to Article 9(2) of the CPD)*.
- 2 The ...*(name of issuing Approval Body)* is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant(s). Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.
- 3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those /indicated on page 1/ laid down in the context/ of this European Technical Approval *(delete as appropriate)*.
- 4 This European Technical Approval may be withdrawn by ...*(name of issuing Approval Body)*, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of ...*(name of issuing Approval Body)*. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.
- 6 The European Technical Approval is issued by the Approval Body in its official language(s). This (These) version(s) corresponds (correspond) fully to the version circulated in EOTA. Translations into other languages have to be designated as such.

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11 Official Journal of the European Communities N° L 40, 11.2.1989, p. 12  
12 Official Journal of the European Communities N° L 220, 30.8.1993, p. 1  
13 Official Journal of the European Union N° L 284, 31.10.2003, p.1  
14 Official Journal of the European Communities N° L 17, 20.1.1994, p. 34

**Page 3 and following pages of the ETA**

with headline Page ... of ETA-xx/024x, issued on dd.mm.yyyy[, validity extended on dd.mm.yyyy]

**II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL**

**1 Definition of product(s) and intended use**

**1.1 Definition of the construction product**

This European Technical Approval refers to ... (*specific type of the Air transfer grille*) with the designation "...".

*(Specific text: description of the Air Transfer Grille (e.g. design, details of the materials and the dimensions), details regarding permissible fasteners or required framings), instructions for the installation of the grille.....*

**1.2 Intended use**

*Specific text: Type of product (according to 1.1.1 to 1.1.4 of ETAG 026 Part 4), description of type and thickness of the separating elements in which the Air Transfer Grille is allowed to be installed, the use category (type and description according to 1.2.2 of ETAG 026 Part 4) etc.*

The provisions made in this European Technical Approval are based on an assumed working life of the ...(*product*) of ... years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

**2 Characteristics of product(s) and methods of verification**

..... (*Specific text*)

*The ETA shall clearly specify the tested assembly, identifying the components used (e.g. supporting construction, mechanical fasteners, etc.), the dimension or range of sizes, the configuration etc.*

*The field of application shall be specified, taking account of all relevant parameters, e.g. dimension of the Air Transfer Grille, type of supporting construction, the use conditions in terms of environmental conditions (e.g. dry indoor use), the method of preparation of the supporting construction before installation of the Air Transfer Grille, etc.*

**The following statements may be considered for inclusion in the ETA:**

**General:**

Manufacturers/applicants shall ensure that, where relevant, products comply with the requirements of other applicable EU directives (e.g. the Low Voltage Directive 2006/95/EC and Electro-Magnetic Compatibility Directive 2004/108/EC), and make the necessary declaration.

When installed in a hollow core door, the opening in the door must be lined with timber.

The durability assessment does not take account of the possible effect of contamination, for example decoration of surrounding surfaces.

## 2.[ ] Emission of dangerous substances or radiation

..... (Specific text)

**NOTE:** In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

## 3 Evaluation and attestation of conformity and CE marking

### 3.1 System of attestation of conformity

According to the decision 1999/454/EC of the European Commission<sup>15</sup> the system 1 of attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by a Notified Product Certification Body on the basis of:

(a) *Tasks for the manufacturer:*

(1) *factory production control;*

(2) *further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;*

(b) *Tasks for the Notified Product Certification Body:*

(3) *initial type-testing of the product;*

(4) *initial inspection of factory and of factory production control;*

(5) *continuous surveillance, assessment and approval of factory production control.*

### 3.2 Responsibilities

#### 3.2.1 Tasks of the manufacturer

##### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European Technical Approval.

The manufacturer may only use initial / raw / constituent materials (*as relevant*) stated in the technical documentation of this European Technical Approval.

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<sup>15</sup> Official Journal of the European Communities L 178 of 14/07/1999

The factory production control shall be in accordance with the "Control Plan of ...(*date*) relating to the European Technical Approval ETA -...(*number*) issued on ...(*date*)" which is part of the technical documentation of this European Technical Approval. The "Control Plan" is laid down in the context of the factory production control system operated by the manufacturer and deposited at the ...(*name of the Approval Body*)<sup>16</sup>.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the "Control Plan".

#### 3.2.1.2 Other tasks of the manufacturer

..... (*Specific text, if relevant*)

#### **Additional information**

The manufacturer shall provide a technical data sheet and an installation instruction with the following minimum information:

*Technical data sheet:*

(a) *Field of application:*

Building elements for which the Air Transfer Grille is suitable, type and properties of the building elements such as minimum thickness, density and, in case of lightweight constructions, the construction requirements.

(b) Construction of the Air Transfer Grille including the necessary components and additional products (e.g. backfilling material) with clear indication whether they are generic or specific.

*Installation instruction:*

(c) Steps to be followed

(d) Procedure in case of retrofitting, where permissible.

The manufacturer shall, on the basis of a contract, involve a body (bodies) which is (are) competent to perform the tasks referred to in section 3.1 in the field of ...(*product*) in order to undertake the actions laid down in section 3.3. For this purpose, the "control plan" referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the Notified Product Certification Body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of the European Technical Approval ETA ...(*number*) issued on ...(*date*).

#### **3.2.2 Tasks of Notified Product Certification Body**

The Notified Product Certification Body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the "Control Plan of ...(*date*) relating to the European technical approval ETA -...(*number*) issued on ...(*date*)".

The Notified Product Certification Body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in (a) written report (reports).

The Notified Product Certification Body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European Technical Approval.

In cases where the provisions of the European Technical Approval and its "Control Plan" are no longer fulfilled the Notified Product Certification Body shall withdraw the certificate of conformity and inform the ...*(name of Approval Body)* without delay.


### 3.3 CE marking

The CE marking shall be affixed on the ...*(product itself - indicate where on the product, if necessary; or the label attached to it; packaging; accompanying commercial document)*. The marking "CE" shall be followed by the identification number of the Notified Product Certification Body and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacturer),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European Technical Approval,
- the number of the Guideline for European Technical Approval,

....

*Example(s) of CE marking and accompanying information for ...*(product)*:*

 1234	<b>"CE"-marking</b>  Identification number of the Notified Product Certification Body
Any Company Street 1, City, Country 07 1234-CPD-0321	Name and address or the identifying mark of the producer or its authorised representative established in the EEA  Two last digits of year of affixing CE marking Number of EC certificate of conformity
ETA-07/1234 ETAG 024 – Part 4 Fire Resistant Reactive Air Transfer Grille "YYY"; See ETA-JJ/XYZ for relevant characteristics	ETA number ETAG number Designation of the product (YYY); type according to 1.1 and use category  Reference to ETA for the relevant characteristics

..... *(If the content of the CE marking and accompanying information is not the same for all products covered in the ETA, give further examples of CE marking and accompanying information for each of the possible cases in accordance with the provisions of the ETAG)*

**4 Assumptions under which the fitness of the product(s) for the intended use was favourably assessed**

**4.1 Manufacturing**

..... *(Specific text, as far as relevant)*

The European Technical Approval is issued for the product on the basis of agreed data/information, deposited with the ...*(Approval Body name)*, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, shall be notified to the ...*(Approval Body name)* before the changes are introduced. The ...*(Approval Body name)* will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

**4.2 Installation**

..... *(Specific text, as far as relevant)*

**5 Indications to the manufacturer**

**5.1 Packaging, transport and storage**

..... *(Specific text, as far as relevant)*

**5.2 Use, maintenance, repair**

..... *(Specific text, as far as relevant)*

**ANNEX 1 – DESCRIPTION OF PRODUCT(S)**

..... *(Specific text and/or drawings, as far as relevant)*

..... *(Give further annexes as far as necessary)*