

## European Technical Assessment

**ETA 18/0690**  
of 12.12.2022



### General part

| <b>Technical Assessment Body issuing the ETA: ITeC</b>  |   |
|---|---|
| ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment). |   |
| <b>Trade name of the construction product</b>   | <b>Ultimate Protect Wired Mat 4.0</b><br><b>Ultimate Protect Wired Mat 4.0 Alu 1</b>  |
| <b>Product family to which the construction product belongs</b>   | Fire protective products.   |
| <b>Manufacturer</b>   | <b>SAINT-GOBAIN ISOVER G+H AG</b><br>Bürgermeister-Grünzweig-Straße 1<br>D-67059 Ludwigshafen<br>Germany  |
| <b>Manufacturing plant(s)</b>   | According to Annex N kept by ITeC.  |
| <b>This European Technical Assessment contains</b>  | 18 pages including 2 annexes which form an integral part of this assessment<br><br>and<br><br>Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available. |
| <b>This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of</b>  | European Assessment Document EAD 350142-00-1106.  |
| <b>This version replaces</b>  | ETA 18/0690 issued on 19.03.2020.   |

**General comments**

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es)).

## Specific parts of the European Technical Assessment

### 1 Technical description of the product

Ultimate Protect Wired Mat 4.0 is a fire protective mat made of mineral wool<sup>1</sup> impregnated with a synthetic binder, supplied with a surface wire net made of steel with an approximate weight per unit area of 270 g/m<sup>2</sup>. Ultimate Protect Wired Mat 4.0 Alu 1 is the faced product version with a reinforced aluminium foil of 66 g/m<sup>2</sup>. Both Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 are CE marked according to EN 14303<sup>2</sup>.

**Table 1:** Dimensions and density Ultimate Protect Wired Mat 4.0 & Alu 1.

| Characteristic                               | Nominal value | Tolerance     |
|--|---------------|---------------|
| Density (kg/m <sup>3</sup> ) at 23°C, 50% RH | 66            | ± 10 %        |
| Length of the roll (mm)                      | 2500          | ≥ Nom. value  |
| Width (mm)                                   | 600           | ± 10          |
| Thickness (mm)                               | 50            | - 2,5 / + 7,5 |
|  | 120           | - 5 / + 15    |

Assembled systems require additional products for their installation, as described in the annexes of this ETA. These products are not covered by this ETA and cannot be CE marked on its basis, as well as the installed system as a whole.

### 2 Specification of the intended use(s) in accordance with the applicable EAD

Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 are intended for the fire protection of ventilation circular steel ducts and multi-compartment smoke extraction circular steel ducts, i.e. category according to section 1.2.2 of EAD 350142-00-1106:

- Type 9: Fire protective products that contribute to the fire resistance of technical services assemblies in buildings.

The environmental use conditions assessed correspond to the following use category according to section 1.2.3 of EAD 350142-00-1106:

- Type Z<sub>2</sub>: Internal conditions excluding temperatures below 0°C, with humidity below 85% RH.

The provisions made in this ETA are based on a working life of the products of at least 25 years, provided that the conditions laid down in the manufacturer's instructions for the installation, use and maintenance are met. These provisions are based upon the current state of the art and the available knowledge and experience.

<sup>1</sup> Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 are certified by EUCEB as having the manufactured fibres in conformity with the Note Q of Regulation (EC) No 1272/2008.

<sup>2</sup> EN 14303 Thermal insulation products for building equipment and industrial installations. Factory made mineral wool (MW) products. Specification.

The indications given as to the working life cannot be interpreted as a guarantee given by the manufacturer or Assessment Body, but are to be regarded only as a means for choosing the appropriate product(s) in relation to the expected economically reasonable working life of the works.

### 3 Performance of the product and reference to the methods used for its assessment

#### 3.1 Performance of the product

The assessment of Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 has been performed in accordance with EAD 350142-00-1106 *Fire protective board, slab and mat products and kits (September 2017)*.

**Table 2:** Performance of the product.

| Product: Ultimate Protect Wired Mat 4.0<br>Ultimate Protect Wired Mat 4.0 Alu 1 |  | Intended use: Fire protective product |                             |
|---|--|---------------------------------------|-----------------------------|
| Basic requirement   | Essential characteristic                 |                                       | Performance                 |
|   | Reaction to fire                         |                                       | A1                          |
| BWR 2<br>Safety in case of fire   | Resistance to fire                       | Ventilation (50 mm)                   | EI 30 (ve-ho i ↔ o) S       |
|   |  | (120 mm)                              | EI 120 (ve-ho i ↔ o) S      |
|   |  | Smoke extraction (120 mm)             | EI 120 (ve-ho) S 1000 multi |
|   | Durability                               |                                       | Type Z <sub>2</sub>         |
| BWR 6<br>Energy economy and heat retention                                      | Thermal conductivity, $\lambda_{10,dry}$ |                                       | 0,031 W/(m·K)               |

The rest of characteristics included in EAD 350142-00-1106 have not been assessed in this ETA.

#### 3.2 Methods used for the assessment

##### 3.2.1 Reaction to fire

The performance of Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 has been tested according to EN ISO 1182<sup>3</sup> and EN ISO 1716<sup>4</sup>. Classification is given in accordance with EN 13501-1<sup>5</sup> and Regulation (EU) 2016/364.

<sup>3</sup> EN ISO 1182 Reaction to fire tests for products. Non-combustibility test.

<sup>4</sup> EN ISO 1716 Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value).

<sup>5</sup> EN 13501-1 Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests.

### 3.2.2 Resistance to fire

The fire resistance performance has been determined following the test and assessment methods given in Annex A for ventilation ducts and Annex B for multi-compartment smoke extraction ducts. Classification is given in accordance with EN 13501-3<sup>6</sup> for ventilation ducts and EN 13501-4<sup>7</sup> for multi-compartment smoke extraction ducts.

### 3.2.3 Durability

The durability of Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 has been assessed for Type Z<sub>2</sub> conditions in accordance with section 2.2.2.3 of EAD 350142-00-1106 and EN 14303.

### 3.2.4 Thermal conductivity

The thermal conductivity of Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 has been tested in accordance with EN 12667<sup>8</sup>.

## 4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

According to the Decision 1999/454/EC of the European Commission, the system of AVCP (see EC delegated Regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table applies.

**Table 3:** AVCP System.

| Product(s)               | Intended use(s)  | Level(s) or class(es) | System(s) |
|--------------------------|--|-----------------------|-----------|
| Fire protective products | For fire compartmentation and/or fire protection or fire performance | Any                   | 1         |

<sup>6</sup> EN 13501-3 Fire classification of construction 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.

<sup>7</sup> EN 13501-4 Fire classification of construction products and building elements. Part 4: Classification using data from fire resistance tests on components of smoke control systems.

<sup>8</sup> EN 12667 Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance.

## 5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

All the necessary technical details for the implementation of the AVCP system are laid down in the Control Plan deposited with the ITeC and agreed in accordance with EAD 350142-00-1106, section 3.

The Control Plan is a confidential part of the ETA and only handed over to the notified product certification body involved in the assessment and verification of constancy of performance.

The factory production control operated by the manufacturer shall be in accordance with the above-mentioned Control Plan.

Issued in Barcelona on 12 December 2022

by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart  
Technical Director, ITeC

## ANNEX A. Specification and assessment of ventilation circular ducts fire protected with Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1

### A.1 Ventilation horizontal duct

#### A.1.1 Resistance to fire performance

The ventilation duct assembly has been tested and assessed according to EN 1366-1<sup>9</sup> and has a resistance to fire performance, classified in accordance with EN 13501-3, as follows:

- EI 30 (ho i ↔ o) S with 50 mm mats.
- EI 120 (ho i ↔ o) S with 120 mm mats.

#### A.1.2 Installation requirements

The provisions given in this ETA, which are based on the tests performed, should be followed. However, the range of installed systems will vary depending on the design of the ventilation ductwork and, therefore, the system installation should be carried out in accordance with the manufacturer's instructions.

##### A.1.2.1 Duct

Circular steel duct made of spiral folded hot dipped galvanised steel plates with minimum thickness of 0,7 mm, with maximum internal duct diameter of 1000 mm, and the characteristics given in the next table.

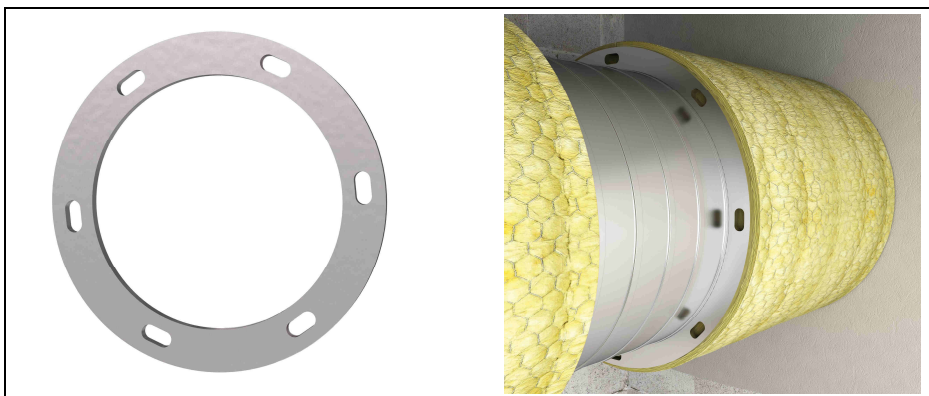
**Table A.1.1:** Circular steel duct specification.

| Case                    | Duct tightness class                                  | Stiffeners  |
|-------------------------|---|---|
| EI 30 with 50 mm mats   | Class D or better according to EN 12237 <sup>10</sup> | Not required  |
| EI 120 with 120 mm mats | Class D or better according to EN 12237               | 1 external stiffener positioned around the duct, midway between the hangers. The stiffeners are steel flat bar flanges with minimum dimensions 40 mm x 5 mm as shown in figure A.1.1. It is not needed to fix the flanges mechanically to the steel duct. |

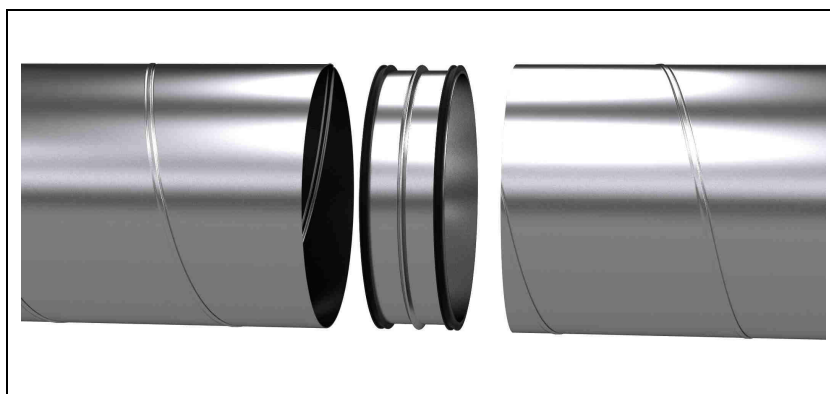
The circular duct sections should be connected using steel nipples as shown in figure A.1.2. The nipple should in both ends be fitted with a sealing strip of EPDM-rubber and a 20 mm x 3 mm inorganic tape. The duct sections should be fixed to the nipples using self-tapping screws c/c 150 mm.

<sup>9</sup> EN 1366-1 Fire resistance tests for service installation. Part 1: Ducts.

<sup>10</sup> EN 12237 Ventilation for buildings. Ductwork. Strength and leakage of circular sheet metal ducts.



**Fig. A.1.1:** Duct external stiffeners (EI 120).



**Fig. A.1.2:** Nipples between duct sections.

Duct side branches, T-pieces or direction changing pieces can be installed according to the manufacturer’s instructions.

The duct is assessed to work at a pressure difference as shown in the next table.

**Table A.1.2:** Pressure difference.

| Case                                     | Pressure difference  |
|--|----------------------|
| Ventilation duct EI 30 with 50 mm mats   | – 500 Pa to + 500 Pa |
| Ventilation duct EI 120 with 120 mm mats | – 500 Pa to + 500 Pa |

**A.1.2.2 Duct suspension elements**

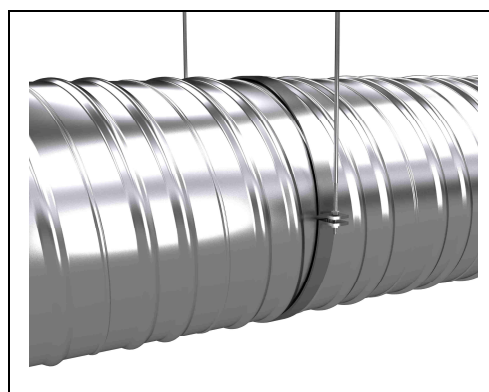
The steel duct suspension elements will be designed and positioned in accordance with section 13.6.1 of EN 1366-1 and section 9.2.2 of EN 15882-1 to limit the maximum stresses in the rods and fixings to the values given in Table 7 of EN 1366-1.

As a tested reference, shown in figure A.1.3, the main characteristics of the suspension elements are given in the next table.



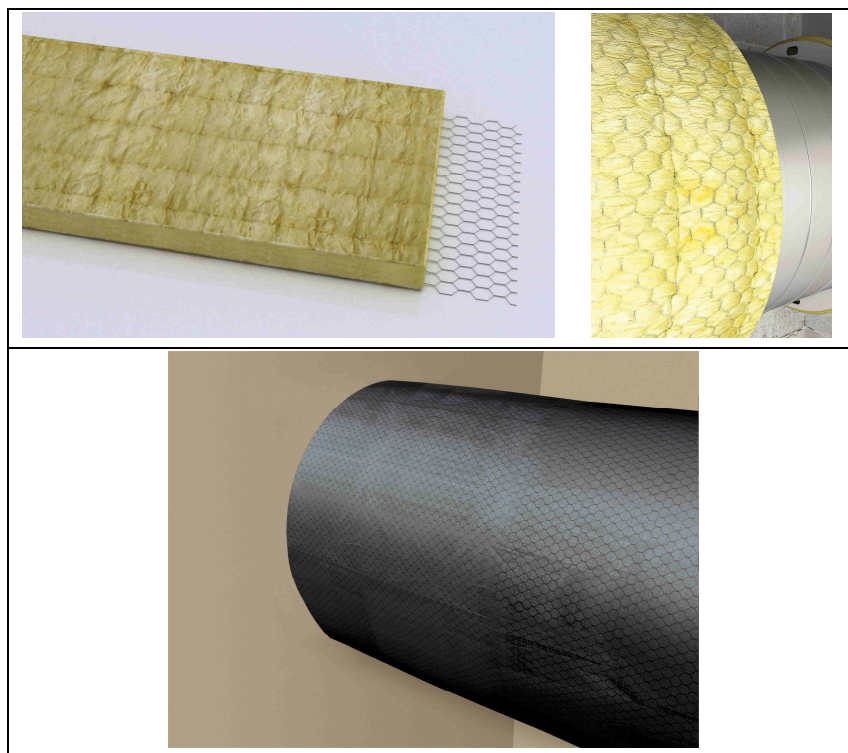
**Table A.1.3:** Tested suspension elements description.

|   | Duct EI 30 with 50 mm mats | Duct EI 120 with 120 mm mats |
|---|----------------------------|------------------------------|
| Maximum stress of steel rods in cold conditions                               | 9 MPa                      | 3 MPa                        |
| Distance from the rods' centreline to the duct outer surface                  | 50 mm                      | 20 mm                        |
| Largest distance between suspension elements                                  | 1750 mm                    | 1200 mm                      |
| Galvanized steel suspension brackets minimum dimensions                       | 30 mm x 3 mm               | 25 mm x 2 mm                 |
| Maximum distance from the suspension elements to the closest duct joint       | 835 mm                     | 600 mm                       |
| Maximum distance from the suspension elements to the closest insulation joint | 260 mm                     | 100 mm                       |

**Fig. A.1.3:** Duct suspension elements.

### A.1.2.3 Fire protective insulation

The duct is cladded with Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1, according to section 1 of this ETA, fixed by winding steel wire around the edges of the wire net, as shown in figure A.1.4.



**Fig. A.1.4:** Ultimate Protect Wired Mat 4.0 & Alu 1 installation.

**A.1.2.4 Supporting construction**

The wall through which the duct passes is described in the next table.

**Table A.1.4:** Wall characteristics.

| Case                                     | Type   | Minimum thickness | Minimum resistance to fire |
|--|--|-------------------|----------------------------|
| Ventilation duct EI 30 with 50 mm mats   | Flexible or rigid wall                                   | 70 mm             | EI 30                      |
| Ventilation duct EI 120 with 120 mm mats | Rigid wall with minimum density of 575 kg/m <sup>3</sup> | 150 mm            | EI 120                     |

**A.1.2.5 Wall penetration seal**

The penetration seal is shown in figure A.1.5.

The gap between the steel duct and the supporting construction will have the maximum size as follows.

**Table A.1.5:** Penetration gap.

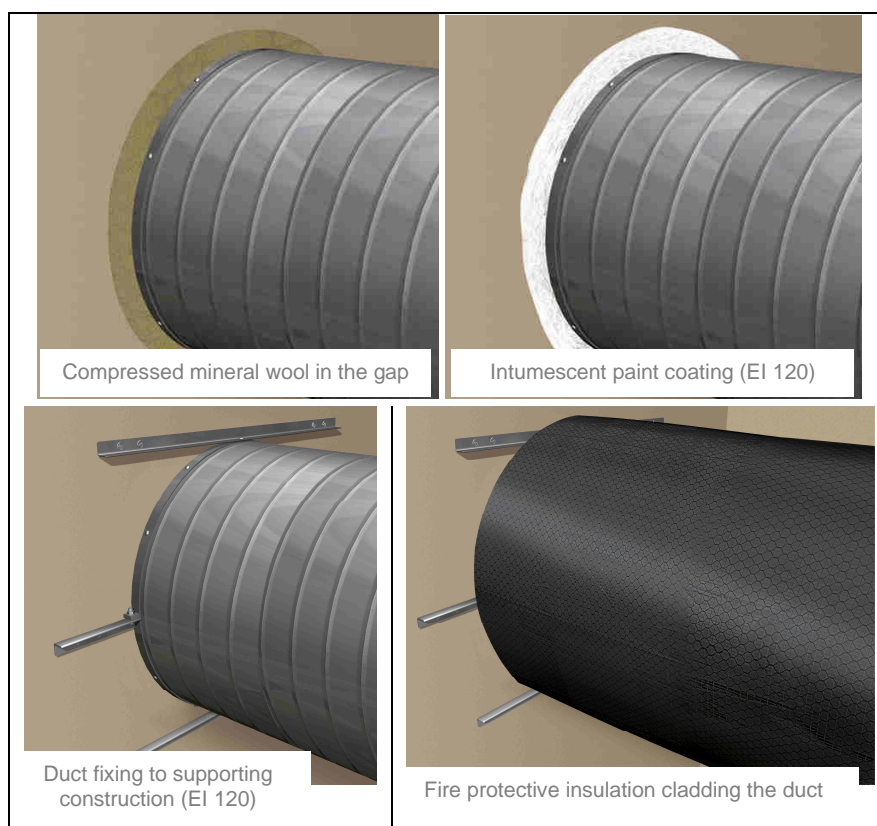
| Case                                     | Penetration gap size |
|--|----------------------|
| Ventilation duct EI 30 with 50 mm mats   | 20 mm                |
| Ventilation duct EI 120 with 120 mm mats | 50 mm                |

The gap between the steel duct and the supporting construction is fitted with compressed Ultimate Protect Wired Mat 4.0. In the case of a ventilation duct EI 120 with 120 mm mats, the insulation is coated at both sides of the penetration with intumescent paint Protect BSF from Isover G+H, applied at an approximate dry film thickness of 2 mm.

In the case of a ventilation duct EI 120 with 120 mm mats, the duct is fixed to the wall as follows. At both sides of the penetration, two L-profiles (30 mm x 30 mm x 3 mm and length of at least the duct diameter) are mounted at the top and bottom of the duct, which is fixed to the L-profiles with a steel rivet of diameter 4 mm and length 13 mm. Also, at both sides of the penetration, a suspension bracket of minimum 30 mm x 2 mm galvanized steel plates is screwed to the duct c/c 150 mm. Two L-profiles (30 mm x 30 mm x 3 mm and 150 mm length) are fixed with M8 bolts and nuts to the bracket eye. The L-profiles are fixed to the supporting construction using two screws of diameter 7,5 mm and length 60 mm at each end of the profile.

No mechanical fixing of the duct to the wall is required for ventilation ducts EI 30 with 50 mm mats.

At both sides of the penetration, the duct fire protective insulation Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1 is glued to the penetration surface using silicate glue Protect BSK from Isover G+H, applied at an approximate rate of 0,66 g/cm<sup>2</sup>.



**Fig. A.1.5:** Wall penetration seal.

## A.2 Ventilation vertical duct

### A.2.1 Resistance to fire performance

The ventilation duct assembly has been tested and assessed according to EN 1366-1 and has a resistance to fire performance, classified in accordance with EN 13501-3, as follows:

- EI 30 (ve i ↔ o) S with 50 mm mats.
- EI 120 (ve i ↔ o) S with 120 mm mats.

### A.2.2 Installation requirements

The provisions given in this ETA, which are based on the tests performed, should be followed. However, the range of installed systems will vary depending on the design of the ventilation ductwork and, therefore, the system installation should be carried out in accordance with the manufacturer's instructions.

#### A.2.2.1 Duct

Circular steel duct of tightness class D or better, according to EN 12237, made of spiral folded hot dipped galvanised steel plates with minimum thickness of 0,7 mm, with maximum internal duct diameter of 1000 mm. Stiffeners are not required.

The circular duct sections should be connected using steel nipples as shown in figure A.2.1. The nipple should in both ends be fitted with a sealing strip of EPDM-rubber and a 20 x 3 mm inorganic tape. The duct sections should be fixed to the nipples using self-tapping screws c/c 150 mm.



Fig. A.2.1: Nipples between duct sections.

Duct side branches, T-pieces or direction changing pieces can be installed according to the manufacturer's instructions.

The duct can pass through any number of storeys provided that the distance between floors, where the duct is supported (see section A.2.2.4), does not exceed 5 m and the limitation on buckling is satisfied. To prevent damage to the construction from buckling of vertical ducts, the ratio between the length (height) of the duct fire exposed in the compartment to the outer diameter of the duct does not exceed 8:1, unless additional lateral supports are provided. If additional supports are provided, the ratio of the distance between the additional supports, or the distance between the supports and the supporting construction, to the outer diameter of the duct shall not exceed 8:1.

The duct is assessed to work at a pressure difference as shown in the next table.

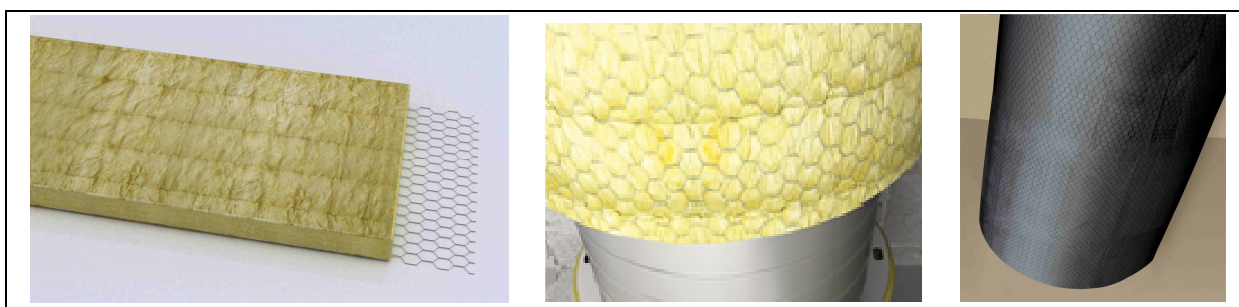
**Table A.2.1:** Pressure difference.

| Case                                     | Pressure difference  |
|--|----------------------|
| Ventilation duct EI 30 with 50 mm mats   | – 500 Pa to + 500 Pa |
| Ventilation duct EI 120 with 120 mm mats | – 300 Pa to + 300 Pa |

### A.2.2.2 Fire protective insulation

The duct is clad with Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1, according to section 1 of this ETA, fixed by winding steel wire around the edges of the wire net, as shown in figure A.2.2.

In the case of a ventilation duct EI 120 with 120 mm mats, a row of pins (every 200 mm) of diameter 2,7 mm and length 120 mm, with washer of diameter 30 mm, is used to fix Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1 to the duct at mid height of each insulation roll.

**Fig. A.2.2:** Ultimate Protect Wired Mat 4.0 and Alu 1 installation.

### A.2.2.3 Supporting construction

The floor through which the duct passes is made of aerated concrete (or other type of rigid floor) with minimum density of 575 kg/m<sup>3</sup> and the characteristics as given in the next table.

**Table A.2.2:** Rigid floor characteristics.

| Case                                     | Minimum thickness | Minimum resistance to fire |
|--|-------------------|----------------------------|
| Ventilation duct EI 30 with 50 mm mats   | 100 mm            | EI 30                      |
| Ventilation duct EI 120 with 120 mm mats | 150 mm            | EI 120                     |

### A.2.2.4 Floor penetration seal

The penetration seal is shown in figure A.2.3. The gap between the steel duct and the supporting construction will have the maximum size as follows.

**Table A.2.3:** Penetration gap.

| Case                                     | Penetration gap size |
|--|----------------------|
| Ventilation duct EI 30 with 50 mm mats   | 20 mm                |
| Ventilation duct EI 120 with 120 mm mats | 50 mm                |

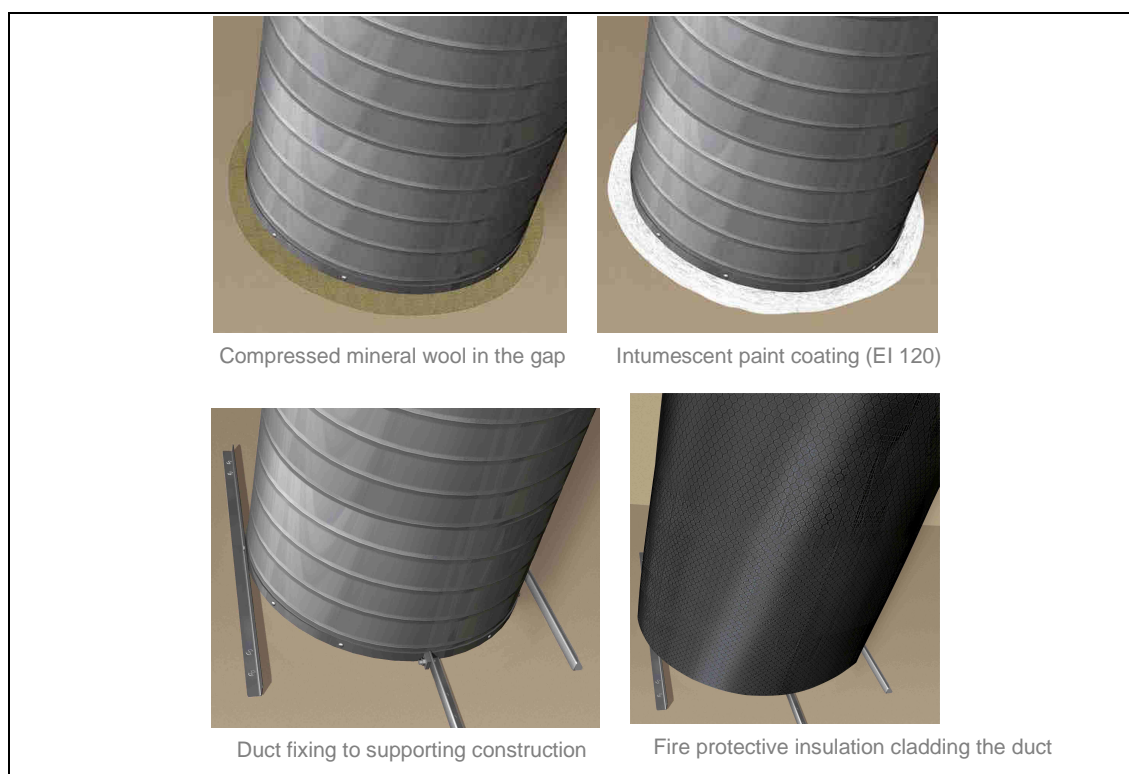
The gap between the steel duct and the supporting construction is fitted with compressed Ultimate Protect Wired Mat 4.0. In the case of a ventilation duct EI 120 with 120 mm mats, the insulation is coated at both sides of the penetration with intumescent paint Protect BSF from Isover G+H, applied at an approximate dry film thickness of 2 mm.

At both sides of the penetration, the duct is fixed to the floor with two L-profiles (30 mm x 30 mm x 3 mm and length of at least the duct diameter + 270 mm), using the fixing means as follows.

**Table A.2.4:** Fixing of the duct to the floor.

| Case                    | Duct fixing to L-profiles                       | Suspension brackets  | L-profiles fixing to the floor  |
|-------------------------|---|--|---|
| EI 30 with 50 mm mats   | Steel rivet of diameter 3,2 mm and length 10 mm | Not required   | 2 screws of diameter 7,5 mm and length 60 mm at each end of the profile |
| EI 120 with 120 mm mats | Steel rivet of diameter 4 mm and length 16 mm   | At both sides of the penetration, a suspension bracket of minimum 30 mm x 2 mm galvanized steel plates is screwed to the duct c/c 150 mm. Two L-profiles (30 mm x 30 mm x 3 mm and 250 mm length) are fixed with M8 bolts and nuts to the bracket eye. | 2 screws of diameter 7,5 mm and length 80 mm at each end of the profile |

At both sides of the penetration, the duct fire protective insulation Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1 is glued to the penetration surface using silicate glue Protect BSK from Isover G+H, applied at an approximate rate of 0,66 g/cm<sup>2</sup>.



**Fig. A.2.3:** Floor penetration seal.

## ANNEX B. Specification and assessment of multi-compartment smoke extraction circular ducts fire protected with Ultimate Protect Wired Mat 4.0 and Ultimate Protect Wired Mat 4.0 Alu 1 of 120 mm thickness

### B.1 Resistance to fire performance

The multi-compartment smoke extraction duct assembly described in this Annex has been tested and assessed according to EN 1366-8 <sup>11</sup> and has a resistance to fire of EI 120 (ve-ho) S 1000 multi classified in accordance with EN 13501-4, using 120 mm mats.

### B.2 Installation requirements

The provisions given in this ETA, which are based on the tests performed, should be followed. However, the range of installed systems will vary depending on the design of the ventilation ductwork and, therefore, the system installation should be carried out in accordance with the manufacturer's instructions.

#### B.2.1 Duct

Circular steel duct of tightness class D or better, according to EN 12237, made of spiral folded hot dipped galvanised steel plates with minimum thickness of 0,7 mm. The maximum internal duct diameter is 1000 mm.

For horizontal ducts, the exterior of the steel duct is stiffened using steel flat bar flanges with minimum dimensions 40 mm x 5 mm as shown in figure B.1. The flanges are positioned around the duct, midway between the hangers. It is not needed to fix the flanges mechanically to the steel duct.

For vertical ducts, the exterior of the steel duct is stiffened using steel flat bar flanges with minimum dimensions 40 mm x 5 mm every 1200 mm. The flanges are laid on top of a suspension bracket fixed together with M10 bolts and nuts. At the fixing of the bracket, a 25 mm x 60 mm L-fastener is installed as support for the flat bar flange. See figure B.2.

The circular duct sections should be connected using steel nipples as shown in figure B.3. The nipple should in both ends be fitted with a sealing strip of EPDM-rubber and a 20 x 3 mm inorganic tape. The duct sections should be fixed to the nipples using self-tapping screws c/c 150 mm.

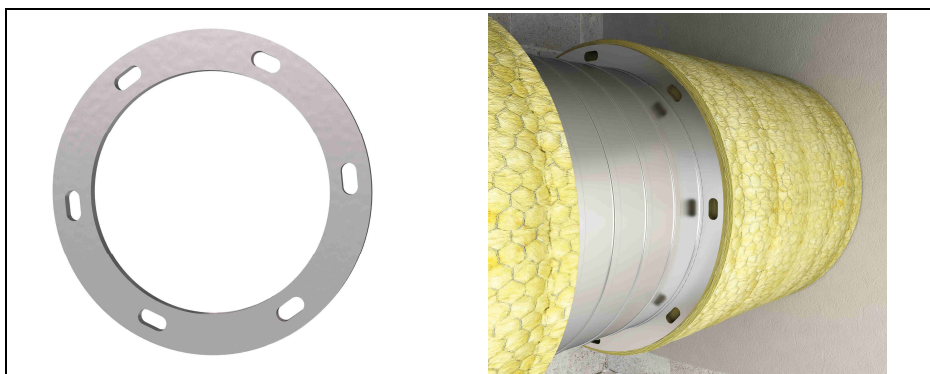
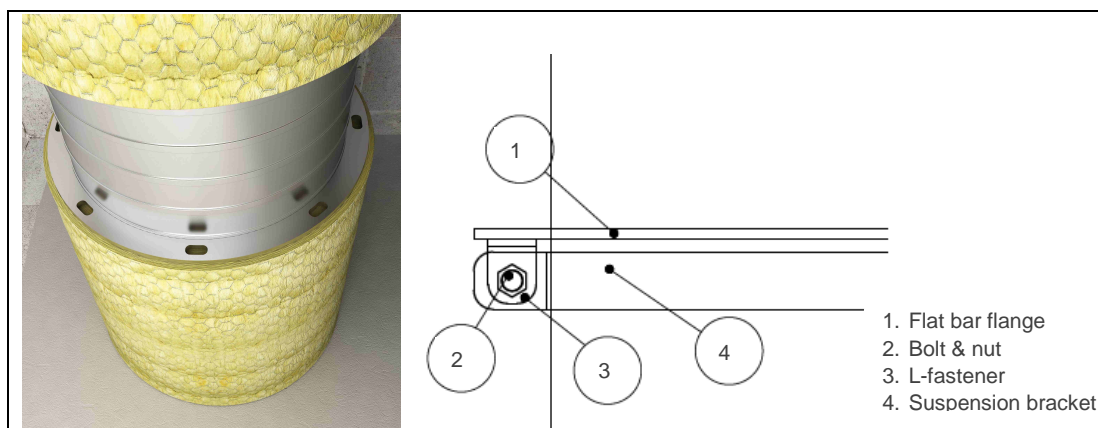
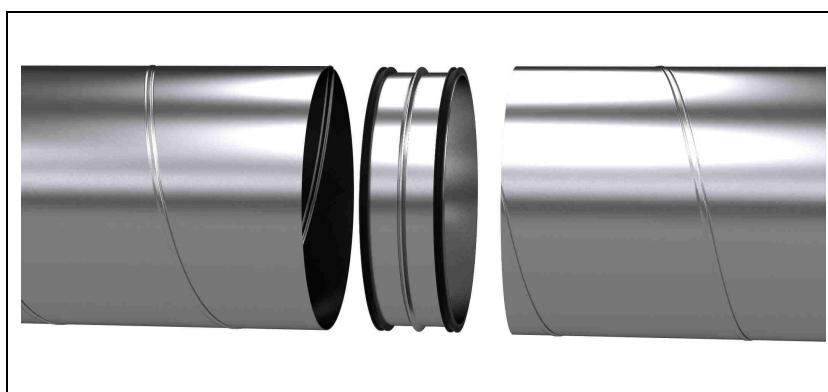


Fig. B.1: Duct external stiffeners for horizontal ducts.

<sup>11</sup> EN 1366-8 Fire resistance tests for service installations. Part 8: Smoke extraction ducts.



**Fig. B.2:** Duct external stiffeners for vertical ducts.



**Fig. B.3:** Nipples between duct sections.

Duct side branches, T-pieces or direction changing pieces can be installed according to the manufacturer's instructions.

In the case of vertical ducts, the duct can pass through any number of storeys provided that the distance between floors, where the duct is supported (see section B.2.5), does not exceed 5 m and the limitation on buckling is satisfied. To prevent damage to the construction from buckling of vertical ducts, the ratio between the length (height) of the duct fire exposed in the compartment to the outer diameter of the duct does not exceed 8:1, unless additional lateral supports are provided. If additional supports are provided, the ratio of the distance between the additional supports, or the distance between the supports and the supporting construction, to the outer diameter of the duct shall not exceed 8:1.

The duct is assessed to work at a pressure difference between – 1000 Pa to + 500 Pa.

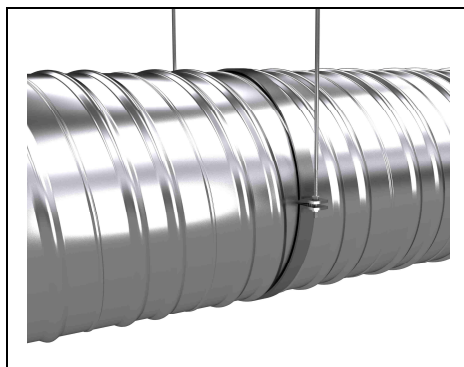
### B.2.2 Duct suspension elements for horizontal ducts

The steel duct suspension elements will be designed and positioned in accordance with section 13.6.1 of EN 1366-1 and section 9.2.2 of EN 15882-1 to limit the maximum stresses in the rods and fixings to the values given in Table 7 of EN 1366-1.

As a tested reference, shown in figure B.4, the duct is suspended with hangers consisting of steel rod at maximum stress of 4 MPa and suspension brackets made from minimum 25 mm x 2 mm galvanized steel plates. The lateral distance between the outer surface of the steel duct and the centreline of the suspension rod shall not exceed 20 mm. The largest distance between suspension elements is



1200 mm. The maximum distance from the suspension devices to the closest duct joint must not exceed 600 mm.

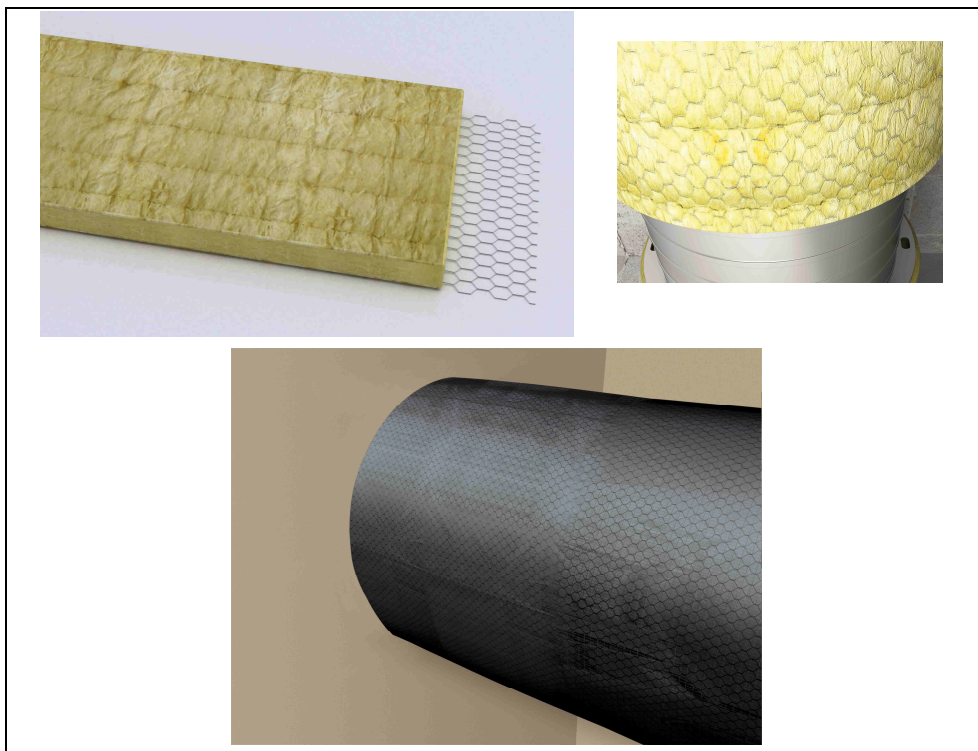


**Fig. B.4:** Duct suspension elements.

### B.2.3 Fire protective insulation

The duct is clad with Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1 of thickness 120 mm, according to section 1 of this ETA, fixed by winding steel wire around the edges of the wire net, as shown in figure B.5.

Furthermore, for vertical ducts a row of pins, every 200 mm, of diameter 2,7 mm and length 120 mm with washer of diameter 30 mm is used to fix Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1 to the duct at mid height of each insulation roll.



**Fig. B.5:** Ultimate Protect Wired Mat 4.0 & Alu 1 installation.

## **B.2.4 Supporting construction**

### **B.2.4.1 Walls passed by horizontal ducts**

The wall through which the duct passes is made of aerated concrete (or other type of rigid wall) with a minimum thickness of 150 mm and a minimum density of 575 kg/m<sup>3</sup>, and a resistance to fire equal to or greater than EI 120.

### **B.2.4.2 Floors passed by vertical ducts**

The floor through which the duct passes is made of aerated concrete (or other type of rigid floor) with a minimum thickness of 150 mm and a minimum density of 575 kg/m<sup>3</sup>, and a resistance to fire equal to or greater than EI 120.

## **B.2.5 Penetration seal**

The penetration seal is shown in figure A.1.5 for horizontal ducts and A.2.3 for vertical ducts.

The gap between the steel duct and the supporting construction is 45 mm maximum.

The gap between the steel duct and the supporting construction is fitted with compressed Ultimate Protect Wired Mat 4.0. The insulation is coated at both sides of the penetration with intumescent paint Protect BSF from Isover G+H, applied at an approximate dry film thickness of 2 mm.

At both sides of the penetration, two L-profiles (30 mm x 30 mm x 3 mm and length of at least the duct diameter) are mounted at the sides of the duct (top and bottom for horizontal duct), which is fixed to the L-profiles with a steel rivet of diameter 4 mm and length 16 mm. Also, at both sides of the penetration, a suspension bracket of minimum 30 mm x 2 mm galvanized steel plates is screwed to the duct c/c 150 mm. Two L-profiles (30 mm x 30 mm x 3 mm and 250 mm length) are fixed with M8 bolts and nuts to the bracket eye. The L-profiles are fixed to the supporting construction using two screws of diameter 7,5 mm and length 80 mm at each end of the profile.

At both sides of the penetration, the duct fire protective insulation Ultimate Protect Wired Mat 4.0 or Ultimate Protect Wired Mat 4.0 Alu 1 is glued to the penetration surface using silicate glue Protect BSK from Isover G+H, applied at an approximate rate of 0,66 g/cm<sup>2</sup>.