

# System data sheet

## Insulation system ULTIMATE Protect for fire resistant ducts Fire resistance EI 15, 30, 45, 60, 90 and 120 S

### ■ SYSTEM DESCRIPTION

Insulation system ULTIMATE Protect for fire protection of air ducts. It is possible to reach fire resistance of 15 till 120 minutes by a single layer of insulation for rectangular and circular ducts in horizontal and vertical orientation and both for outside fire location (duct type A according to EN 1366-1) and inside fire location (duct type B according to EN 1366-1).

### ■ DUCTWORK

The steel duct is constructed in sections of galvanised steel sheet minimum 0.7 mm thick (standard duct sheeting for rectangular ducts specified in DIN 24190, for circular ducts in DIN 24145). Segments of rectangular ducts connected by flanges height 30 mm, segments of spirally wound circular ducts connected by steel sleeves. Use a ceramic tape gasket or intumescent silicone between the flanges to seal the joints. Flanges of the rectangular duct have to be fastened together with steel clamps with nuts M8 in quantity of 4 pieces per 1 meter of the flange length.

Attach steel stiffeners at a 90° angle to any side of the duct section where the width exceeds 500 mm. Position these at mid-width and mid-length in each duct section. Each stiffener should consist of a steel tube (16 mm diameter x 2 mm thick). Circular duct is without inner stiffening.

### ■ DROP RODS AND HANGERS

Rectangular horizontal duct suspended with steel hangers consisting of two threaded drop rods M10, a channel section bearer 30 x 30 x 3 mm and hexagonal nuts and washers. The drop rods are positioned inside the insulation, maximum spacing of the hangers is 1250 mm.

Circular horizontal duct suspended by steel hangers consisting of two threaded drop rods, minimum M8 and a two-part circular band, 25 mm wide and 2 mm thick. The ends of each band section are bent outwards. Fasten the band sections together and attach them to the drop rods with hexagonal nuts and washers. Place these hangers inside the insulation. The rods do not need to be protected by insulation.

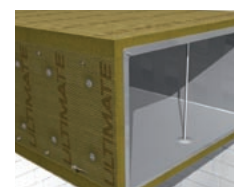
### ■ INSULATION

Rectangular ducts are insulated by slabs U Protect Slab 4.0. Circular ducts are insulated by wired mats U Protect Wired Mat 4.0. Thickness is dependent on required fire resistance (see the table below). Density of both products is just 66 kg/m<sup>3</sup> thus makes cutting, bending or filling faster and more efficient than ever. Both products have reinforced aluminium foil facing. Insulation slabs (wired mats) need to be cut to fit the duct as tightly as possible. Install the insulation so that one slab (wired mat) is adjacent and tightly fitted against the other. No gaps must be present between butt joints of insulation. In the case of small thicknesses (30 and 40 mm), the joint needs to be covered with an extra strip of insulation (width ≥ 120 mm and thickness ≥ 30 mm).

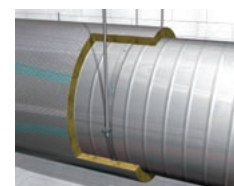
The insulation is fixed to a rectangular duct using stud-welded steel pins. Corner joints are secured with Isover FireProtect Screws (distance 260 mm), the screw length must be 2 x the insulation thickness.

For a circular duct use clamping rings to secure the joints of the insulation mats together (distance ca 50 mm) or alternatively twist the wired mesh of the mats together. No pins required for a circular duct.

Required insulation thickness (mm) – rectangular duct							
Fire location	Fire resistance						Duct orientation
	EI 15	EI 30	EI 45	EI 60	EI 90	EI 120	
Outside (o → i) type A	30	30	30	30	80	80	ve+ho
Inside (i → o) type B	30	40	60	60	80	80	ho
Inside (i → o) type B	40	60	80	80	100	100	ve



Required insulation thickness (mm) – circular duct							
Fire location	Fire resistance						Duct orientation
	EI 15	EI 30	EI 45	EI 60	EI 90	EI 120	
Outside (o → i) type A	30	30	30	60	100	100	ve+ho
Inside (i → o) type B	40	60	60	75	100	120	ve+ho



Duct type B according to EN 1366-1 is exposed to fire from both outside and inside, test results and classification for the duct type B is therefore not only for inside fire location (i → o), but also for both side exposition (i ↔ o).

## ■ STUD-WELDED PINS

The insulation is fixed to the duct using stud-welded steel pins, 2.7 mm nominal diameter, and spring steel washers 30 mm diameter. The length of pin should be equal to the insulation thickness + 3 mm. Approximate pin's quantity for a rectangular horizontal duct is 18 pcs/m<sup>2</sup> and for a vertical one 25 pcs/m<sup>2</sup>. The pins are fixed with a maximum distance of 260 mm and not more than 80 mm from the joint. The slab on the top side is installed without any pins. All joints are secured by pressing the slabs together (no additional glue needed). Corner joints are secured with Isover Fire Protect Screws. No pins and screws required for a circular duct.

## ■ FIRE-STOPPING (WALL/FLOOR PENETRATION)

Insulated air ducts sometimes need to penetrate fire-separation walls or floors. The solution of how to accomplish this is part of the ULTIMATE system. We kept the design simple and at the same time easy to install. The same principle is used for both horizontal and vertical ducts as well as for massive and light-weight walls.

The duct is placed in the opening of the construction. The distance between duct wall and opening is to be ≤ 50 mm. The duct should have an internal rod stiffener placed where the duct passes the construction. Fill the space between duct and fire-separation construction with the insulation slab to completely fill the opening (if wired mat is used, wire mesh is removed first).

Seal the joint with Isover Protect BSF to prevent gas leakage. This must be done on both sides of the construction. Use a spatula to apply a layer of ~2 mm thickness.

Frame the duct by fixing an L-profile (30 x 30 x 3 mm) around it. The L-profile is fixed to the duct with steel rivets (3.2 x 10 mm) at the distances of 100 mm. The top and bottom profiles are fixed to the construction with two steel screws each (7.5 x 60 mm). The profiles need to be installed on both sides of the construction.

Install the insulation slabs so that they abut the construction. The slabs/mats must be cut with excessive width so that they exert some pressure. To avoid leakage caused by elongation of the steel, the slabs/mats need to be glued to the construction using Isover Protect BSK (thickness ~ 2 mm).

## ■ FIRE CLASSIFICATION

Fire protective system ULTIMATE Protect has been tested by the fire testing laboratory Danish Institute of Fire and Security Technology (DBI), classification protocol in Czech was issued by an authorised body PAVUS, a.s. Classification protocols on the request. Fire protection system ULTIMATE Protect has been tested in accordance with EN 1366-1 (both outside and inside fire locations). Maximum size for the rectangular duct is according to the standard 1250 x 1000 mm and for the circular duct up to diameter 1000 mm.

More information can be download at: [www.isover.cz/en/TI](http://www.isover.cz/en/TI).

<b>Fire resistance EI 15, 30, 45, 60, 90 a 120 S</b>				
Part	Description	Unit	Rectangular duct	Circular duct
<b>Duct</b>	Maximum length of each segment	mm	1250	1250
	Minimum thickness of steel sheet	mm	0,7	0,7
	Duct sections connected by	-	flanges	sleeves
	Flange fastening with steel clamps with bolts M8	-	4 pcs/m'	-
	Use a ceramic tape gasket or intumescent silicone between the flanges to seal the joints	-	compulsory	compulsory
	Internal rod stiffener placed in each duct segment	-	compulsory	-
<b>Hangers</b>	Diameter of threaded drop rod	mm	M10	M8
	Position of the drop rods	-	inside the insulation	-
	Need to insulate the drop rods	-	no	no
	Maximum spacing of the hangers	mm	1250	1250
	Minimum length of expanding anchors when fastening the threaded rod hangers to concrete soffits	mm	60	60
<b>Insulation</b>	Insulation material ULTIMATE	-	U Protect Slab 4.0	U Protect Wired Mat 4.0
	Thickness dependent on the fire resistance	mm	30 to 100	30 to 120
	Density	kg/m <sup>3</sup>	66	66
	Number of layers	-	1	1
	Minimum covering of duct flanges with the thickness	mm	30	-
<b>Fixing of the insulation</b>	Orientation quantity of stud-welded pins - horizontal / vertical duct	pcs/m <sup>2</sup>	18 / 25	-
	Maximum distance between pins	mm	260	-
	Recommended distance from duct edges and joints	mm	80	-
	Diameter of spring steel washers	mm	30	-
	Corner joints secured with Isover Fire Protect Screws in distance 260 mm	-	compulsory	-
<b>Fire separation</b>	Distance between duct wall and opening	mm	≤ 50	≤ 50
	Internal rod stiffener	-	compulsory	-
	External L-profile stiffening (30 x 30 x 3 mm)	-	compulsory	compulsory
	Use of the intumescent paint Isover Protect BSF	-	compulsory	compulsory
	Use of non-combustible glue Isover Protect BSK to glue butt joint of insulation to the fire-separation	-	compulsory	compulsory