ISOVER

ULTIMATE air duct solutions.

Fire safety through high performance.

SAINT-GOBAIN

INSULATION

It's a comfortable feeling when your safety is in the best hands.

Fire protection has increasingly moved into the focus of architects and builders. At the same time, the growing use of air ducts constantly involves new challenges with respect to safety. Where reliability is crucial, ULTIMATE comes into play: the new, high-performance technology by ISOVER, the world market leader for insulation products. ULTIMATE combines all the advantages of conventional products used for fire, thermal and acoustic insulation. On top, it offers significant cost reductions und substantial weight savings thanks to its outstanding insulation efficiency. This is bundled competence for ultimate safety.

Don´t worry: fire safety without compromise.

There's nothing more vital for us than the air we breathe. It is an essential condition for comfort in all types of buildings. We therefore have a high demand for fresh air – both in our living and office rooms. Today, this air is supplied via sophisticated ventilation systems and air ducts. And these need to be protected against fire since otherwise the safety of human beings is at stake. Reliable and long-lasting fire protection is therefore crucial and has top priority when planning and installing these systems. ISOVER is your ideal partner for fire protection applications that need to meet the highest demands. We know: Safety is based on reliability.

Excellent temperature stability combined with outstanding thermal resistance at high temperatures – thanks to ULTIMATE's outstanding lambda values.

ULTIMATE. The new standard for top performance.

The latest insulation innovation from ISOVER comes with a unique high-performance profile: it combines top level fire resistance, easy handling and low weight. The all-in-one solution to meet your demands.

- Effective fire protection
- Thin solutions
- Optimal acoustic performance
- Excellent thermal insulation
- Fast installation
- Unique lightness
- Comfortable installation
- Outstanding flexibility
- Maximum compressibility
- Cost-effective solutions

ULTIMATE – the formula for efficient insulation of ventilation ducts:

Effective fire protection | *Comfortable installation* | *Unique lightness*

All strengths. One product. Perfectly combined by ISOVER.

Fire protection: ULTIMATE meets the highest standard for fire protection, ranging from top-rated performance in reaction to fire to excellent fire resistance. Each ULTIMATE product comes with the full innovative power of ISOVER.

Comfortable installation: Ultralight and adaptable, ULTIMATE makes cutting, bending or filling faster and more efficient than ever. But with ULTIMATE you are not only on the safe side of handling: the low package weight and grip-friendly touch also meet the most stringent standards for safety and health at the workplace.

Lightness: ULTIMATE combines peak performance in fire protection and thermal insulation with an extremely light weight. Up to 65 % lighter than conventional thermal, acoustic and fire insulation products, ULTIMATE sets totally new standards.

Perfectly safe and secure. With ULTIMATE on duty.

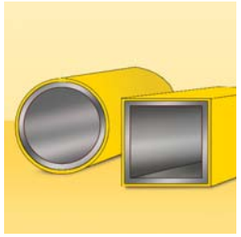
Safety is based on reliability. For this reason, ULTIMATE is your ideal partner for effective fire protection applications that need to meet the highest demands. Excellent material stability combined with outstanding thermal resistance at high temperatures: ULTIMATE is a top performer with respect to fire protection and thermal insulation, certified among others as fulfilling EN 1366-1. Only a material that effortlessly masters its tasks can also optimally fulfil individual requirements. And this is what ULTIMATE offers: customized solutions to meet your needs. We thus put you ahead of the game.

Good news about safety.

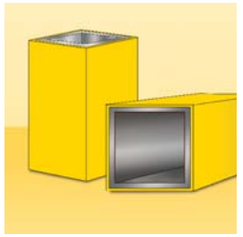
ULTIMATE guarantees superior fire resistance and excellent thermal stability even at constantly high service temperatures up to 660°C. And this is not mere lip service: ULTIMATE scores best in the Euroclass system (classification A1) and has been certified to comply with EN 1366-1. This is comfortable safety that you can build on.

Fitting in with your needs.

The full performance spectrum of fire protection: ULTIMATE complies with EI 15 - EI 120.



Whether circular or rectangular: solutions are available.



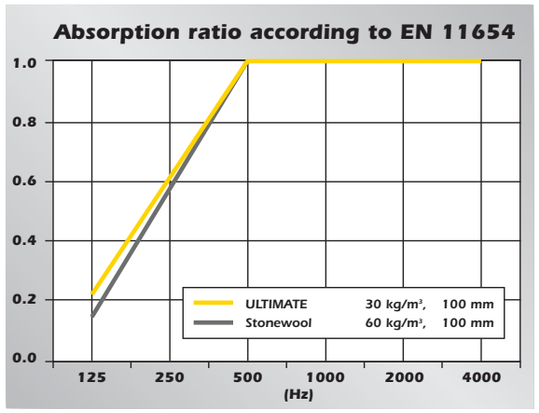
Whether vertical or horizontal ducts: optimum protection in every direction.

Whether interior or exterior fire: ULTIMATE provides the ideal solution.

ULTIMATE saves everyone a lot of trouble.

Unheard-of advantages – for your workers and for you.

The standards to be met by acoustic insulation are becoming more and more stringent. But ULTIMATE will help you make that decisive leap forward to state of the art. Due to its improved property profile, ULTIMATE reduces sound up to 50 % better than competitive products and thus clearly outclasses conventional solutions. As soon as sound waves penetrate this innovative material, their acoustic energy is drastically reduced by the friction in the fiber structure. At the same time, the resonance frequency of the sound waves drops below the audible range. In brief: it gets quiet. And compared to stonewool, ULTIMATE achieves this sound reduction at only half the weight.



Air flow resistance
(EN 29053) kPa•s/m²

ULTIMATE	STONEWOOL
25-30 (kg/m³) : ≥ 15	30-50 (kg/m³) : ≥ 5
40-50 (kg/m³) : ≥ 30	70 (kg/m³) : ≥ 18
60-70 (kg/m³) : ≥ 48	100 (kg/m³) : ≥ 25
80-100 (kg/m³) : ≥ 70	120 (kg/m³) : ≥ 35

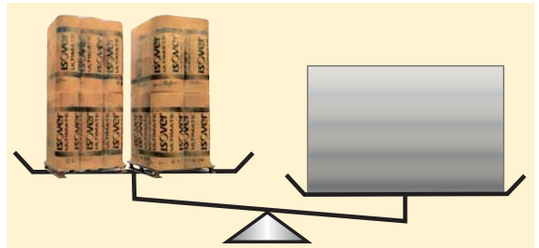
Work more efficiently: thanks to ULTIMATE sound insulation.

Insulation that pays off right from the start.

Insulation with ULTIMATE pays off even before the ventilation system is put into operation. Thanks to compressed packaging, the logistics – including intermediate storage on site – can be managed without any problems, even for larger projects. And the installation is not only done faster but also at drastically reduced material cost: no need for expensive prefabrication, no glue needed for joint protection, no edge break, but higher insulation efficiency achieved with extremly low thicknesses. ULTIMATE thus pays off with every single work step.

The material that everyone profits from: ULTIMATE.

Ultralight, never above 8 kg/m² and extremely adaptable: ULTIMATE ensures more freedom in the planning phase, less logistical effort and better working conditions. And once in place, you will soon profit from the new energy efficiency – day by day. This is improving profit the ULTIMATE way.

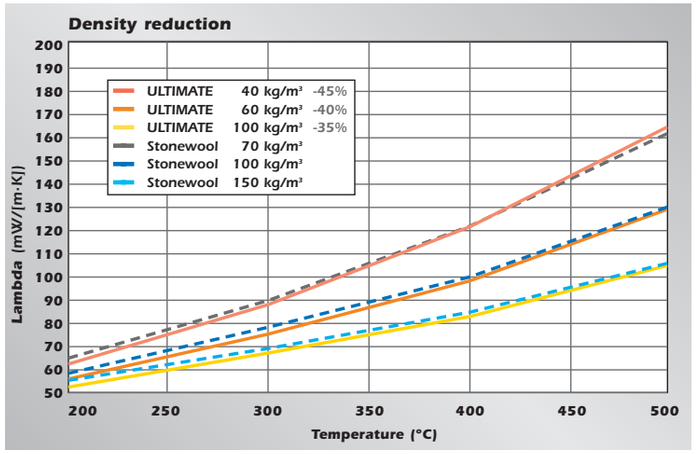


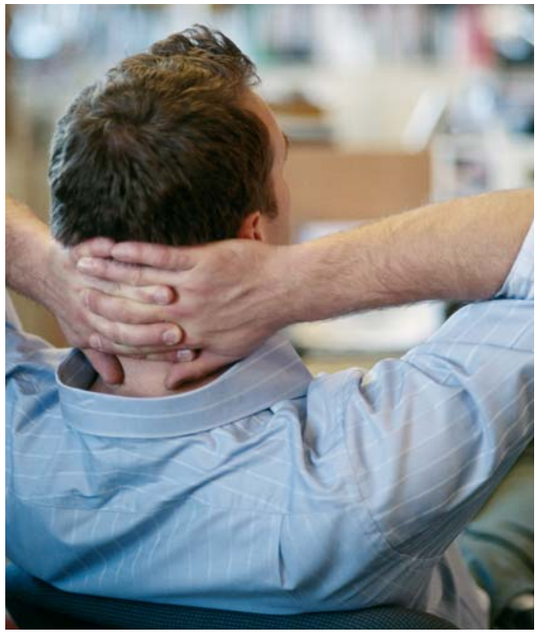
All benefits in one package.

ULTIMATE features	Your advantages
■ Lightest solution in the market	➡ Favourable working conditions
■ Flexible and time-saving	➡ Shorter installation time, less waste
■ Easy to transport	➡ Faster installation
■ Innovative, high-performance product for simple solutions	➡ Time and material savings (one layer instead of two)

ULTIMATE. Adding efficiency to insulation.

Energy losses are rapidly becoming a most critical cost factor for the economic viability of buildings. The ULTIMATE answer to this problem: add efficiency to insulation. ULTIMATE not only provides superior thermal insulation able to resist constant maximum service temperatures up to 660°C. Thanks to its exceptionally good lambda values, ULTIMATE produces a stronger insulation effect with up to 45 % less material than other conventional insulation products. ULTIMATE is able to achieve these excellent lambda values, because it has been converted 100 % from the basic raw material into efficient insulation and is completely free of slugs. This pays off with increased insulation efficiency – and a pleasant work atmosphere.





Superior comfort thanks to ULTIMATE.

Effective thermal insulation is indispensable for an advanced HVAC system. At the same time, concentrated work is only possible in an agreeable, well-balanced work climate. ULTIMATE is able to create such an environment – better than all other conventional insulation products. Even at 10°C, ULTIMATE's lambda difference amounts to as much as 25 % compared to products designed for the same application. And the higher the operation temperature, the greater the performance lead. Comfortable conditions for more safety and concentration at work. Quite simple with ULTIMATE.

ULTIMATE: Get your insulation into shape the smart way.

ULTIMATE perfectly adapts to all conditions on site such as uneven surface structures. It thus smoothes the way to a new era of cost effectiveness: Save yourself the time-consuming work of encasing or the cost of expensive prefabrication. And since the pliable fiber structure of ULTIMATE prevents it from breaking, installation can be done with next to no waste: off-cuts optimally fill niches and holes.

- Easy cutting
- Flexible shaping
- Robust and stable
- No edge breaks
- Even off-cuts can be used
- Virtually waste-free

ULTIMATE meets the EU criteria for the quality label "Products made of Mineral Wool".

- Free of slugs
- Extremely grip-friendly
- Not harmful to health
- EUCEB and RAL certificates

Increase workability. Decrease weight.

ULTIMATE is by up to 65 % lighter than conventional products for this application and thus makes light work of installation. It remains below the permissible weight of 15-25 kg per package stipulated by national working conditions regulations. ULTIMATE: minimum weight, maximum performance.

Fast, easy, comfortable: progressive insulation with ULTIMATE.

ULTIMATE does a more efficient job of installation. Even in the most difficult corners. And especially in awkward installation situations does ULTIMATE play its trump cards: unique lightness and excellent pliability. ULTIMATE quite flexibly adapts to your individual needs.

Compact insulation for maximum logistic efficiency.

Logistical benefits thanks to the highly flexible fiber structure: ULTIMATE's extreme compressibility saves you 60 % of total freight mileage, reduces the cost of intermediate storage and allows easy transportation on site even to the most difficultly accessible spaces.

Important facts about weight, safety and health at work.

Protects against fire. And from back injuries.

Unrivalled low weight and a handy package size: these features make ULTIMATE ideally suited for the manual handling of loads in keeping with the requirements of the EU Agency for Safety and Health at Work. According to Council Directive 90/269/EEC, the criteria for the correct lifting, holding and putting down are as follows:

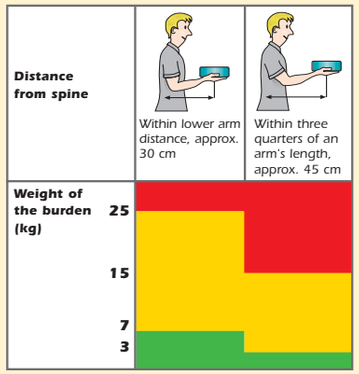
The risk of back injury increases if the load is

- Too heavy: a weight of 20–25 kg is heavy to lift for most people.
- Too large: it is not possible to follow the basic rules for lifting and carrying.
- Difficult to grasp, unbalanced or unstable: the object may slip and cause an accident.
- In addition, loads with sharp edges or made of dangerous materials may injure your workers.

You should use the following lifting technique:

- Put your feet around the load, with your body over it (if this is not feasible, try to move your body as close as possible to the load).
- Keep the load as close to the body as possible.
- Use the muscles of your legs when lifting.
- Straighten your back.
- Pull the load up as close as possible to your body.
- Lift and carry the load with your arms straight down.
- Avoid twisting and bending your back.

ULTIMATE solutions are never above 8 kg/m²



Source: Swedish Work Environment Authority

Fire Performance with U Protect products.

The fire resistance of ventilation air ducts is tested according to EN1366-1. This test procedure already is or will be the Europe-wide reference. Fire in ventilation systems can cause tremendous problems because in a duct the fire can spread from the point of origin. This is why it is of vital importance to develop safe and reliable solutions. The applicable standard (EN1366-1) describes a number of scenarios that we can find in a real fire situation. The ULTIMATE product range U Protect has been tested to meet the requirements of all possible scenarios. We can subdivide the scenarios by fire location, duct orientation and duct shape. The alternatives are:

Fire location	**Explanation**
Fire inside the duct	Duct opening or failure allows the fire to enter the duct. The fire must be prevented from spreading to adjacent rooms.
Fire outside the duct	The fire must be prevented from entering the duct, especially when the ventilation system continues to run during a fire. The duct can be used to extract the smoke (precondition: a slight negative pressure).
Duct orientation	
Horizontal	Ducts normally serving one level of a building.
Vertical	Ducts between levels.
Duct shape	
Rectangular	Rectangular shape of the metal duct.
Circular	Circular shape of the metal duct.

It is, of course, possible to develop a system that covers all cases with one solution. But this would result in a large number of oversized constructions. When offering only one solution, you will always have to proceed from the worst case scenario.

To offer optimum design, four questions need to be answered:

1. Which duct shape is required? Rectangular or circular?
2. Which fire rating is required: EI 15, 30, 60, 90 or 120?
3. Where is the fire located: inside, outside or both?
4. In which direction to the ducts run: horizontally, vertically or in both directions?

The two tables below show the insulation thicknesses required for rectangular and circular ducts.

Required insulation thickness (mm)						
Fire location	Fire class					Duct Orientation
	EI 15	EI 30	EI 60	EI 90	EI 120	
▼ Fire inside duct ▼						
Inside	30	40	60	70	80	Horizontal
	30	60	85	95	100	Vertical
▼ Fire outside duct ▼						
Outside	30	30	30	70	80	Horizontal
	30	30	30	70	80	Vertical
▼ In case both fire locations need to be covered ▼						
Both	30	40	60	70	80	Horizontal
	30	60	85	95	100	Vertical
▼ Use of 1 product for both duct orientations ▼						
Outside	30	30	30	70	80	Both
Inside	30	60	85	95	100	
▼ Use of 1 product for all cases ▼						
Both	30	60	85	95	100	Both

Rectangular duct

Required insulation thickness (mm)						
Fire location	Fire class					Duct Orientation
	EI 15	EI 30	EI 60	EI 90	EI 120	
▼ Fire inside duct ▼						
Inside	35	50	75	95	115	Horizontal
	35	50	75	95	115	Vertical
▼ Fire outside duct ▼						
Outside	30	30	30	90	100	Horizontal
	30	30	30	90	100	Vertical
▼ In case both fire locations need to be covered ▼						
Both	35	50	75	95	115	Horizontal
	35	50	75	95	115	Vertical
▼ Use of 1 product for both duct orientations ▼						
Outside	30	30	30	90	100	Both
Inside	35	50	75	95	115	
▼ Use of 1 product for all cases ▼						
Both	35	50	75	95	115	Both

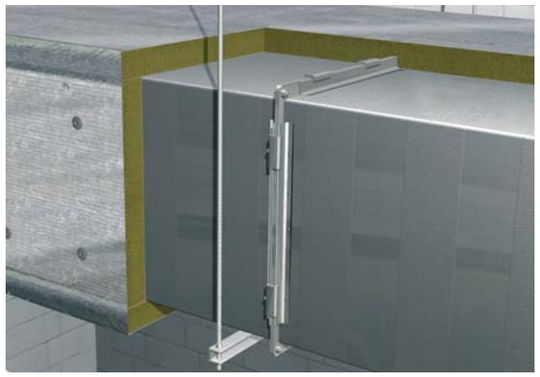
Circular duct

Installation guidelines

The insulation of ventilation air ducts can be easily and efficiently accomplished with U Protect products. Fire insulation requires a high level of accuracy and expert workmanship. In order to achieve greatest possible security, it is important to follow the guidelines for mounting the ducts, installing the insulation and producing penetrations in walls and floors. In addition to these guidelines, it is necessary to follow the instructions given by the duct manufacturers.

Rectangular ducts

Welded pins with washers are used to fix the insulation to the duct. Standard threaded rods and load-bearing U-profiles are used as hangers for the duct. The hangers are placed inside the insulation and the rods do not need to be protected with insulation material. One pair of hangers is needed at every duct joint.



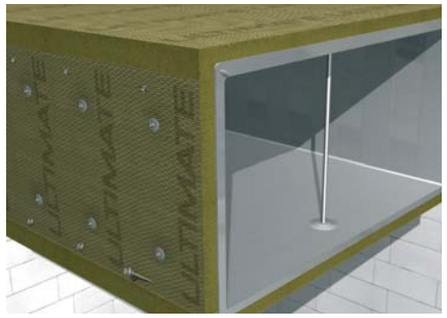
Installation principle for horizontal rectangular ducts

Rectangular ducts

The maximum duct size is 1250 x 1000 mm and the maximum duct length is 1250 mm. If the threaded rod M10 is used, no further control is needed. When using smaller dimensions, a weight calculation is needed. The acceptable tension is 9 N/mm² for EI 30 and EI 60, 6 N/mm² for EI 90 and EI 120.

Fixation

The insulation is fixed to the duct with welded pins and washers. Corner joints are secured with Isover Fire Protect Screws (use 3 screws per side => c ≤ 300 mm). The screw length must be 2 x the insulation thickness. The pins are fixed with a maximum center distance of 300 mm and not more than 80 mm from the joint. A full slab on the bottom side is secured with 3 additional pins in the center of the board. The slab on the top side is installed without any pins. The pins have a diameter of ≥ 2.7 mm and the washers of ≥ 38 mm. All joints are secured by pressing the slabs together (no additional glue needed).



Principle of fixing the insulation. Note the angle used for the screws to secure the joints.

At duct joints, the slabs need to be cut to fit. The same principle applies for slab joints as well as for slab passages (see picture opposite).

Cutting for a duct joint.

In the case of small thicknesses (30-40 mm), the joint needs to be covered with an extra strip of insulation (width ≥ 100 mm and thickness ≥ 30 mm).

Summary

	Dimensions	Horizontal/ Top slab	Horizontal/ Bottom slab	Vertical slab
Pins	2.7/38 mm	Not needed	c ≤ 300 + 3 in center on full slab	c ≤ 300
Screw	2 x insulation thickness			c ≤ 300

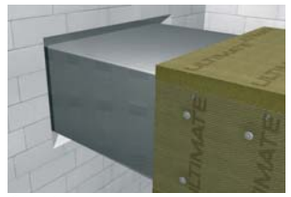
Rectangular ducts

Wall / floor penetrations

Insulated air ducts sometimes need to penetrate 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 installation is done in 5 steps.

Step 1: Positioning

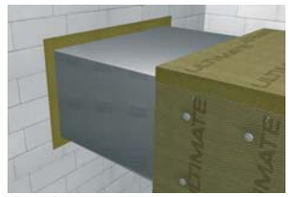
The duct is placed in the opening of the construction. The distance between duct wall and opening is to be ≤ 50 mm. The duct should have an internal support rod placed where the duct passes the construction.



Step 1

Step 2: Insulation

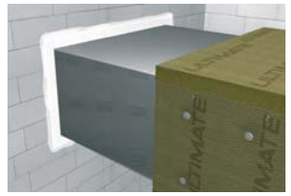
Fill the space between duct and construction with the insulation board (it should be compressed to completely fill the opening).



Step 2

Step 3: Sealing

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.



Step 3

Step 4: Reinforcing the duct

Frame the duct by fixing an L-profile (30x30x3) around it (see picture opposite). The L-profile is fixed to the duct with steel rivets (4x13 mm) of c ≤ 100 mm. The top and bottom profiles are fixed to the construction with two steel screws each. The profiles need to be installed on both sides of the construction.

Step 4

Step 5: Duct insulation

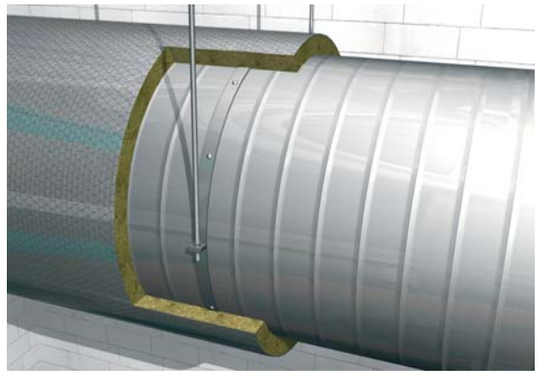
Install the insulation slabs so that they abut the construction. The slabs must be cut with excessive width so that they exert some pressure. To avoid leakage caused by elongation of the steel, the slabs need to be glued to the construction using Isover Protect BSK (thickness ~ 2 mm).

Step 5

Circular ducts

The joints of the insulation mats are secured with clamping rings or stitched together with steel thread. Standard threaded rods and suspension brackets are used as hangers for the duct. The hangers are placed inside the insulation and the rods do not need to be protected with insulation material. The maximum distance between the hangers is 1500 mm.

The maximum duct size is Ø 1000 mm. If the threaded rod M 8 is used as in picture 2, no further control is needed. (When using smaller dimensions, a weight calculation is needed. The acceptable tension is 9 N/mm² for EI 30 and EI 60, 6 N/mm² for EI 90 and EI 120.)



Installation principle for horizontal circular ducts

Fixation

In the case of vertical installation, the insulation mats are secured with pins and washers. Pins are placed in two rows around the duct with c ≤ 200 mm, at 100 mm distance from the mat joint. The pins have a diameter of ≥ 2.7 mm, the washers of ≥ 38 mm. All joints are secured by pressing the slabs together (no additional glue needed).

Thanks to its flexibility, there is no need to cut the insulation at duct joints.

The insulation mat easily wraps around duct joints and brackets without any off-cuts.

Circular ducts

Wall / floor penetrations

Insulated air ducts sometimes need to penetrate 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 installation is done in 5 steps.

Step 1: Positioning

The duct is installed in the opening of the construction. The distance between duct wall and opening is to be ≤ 50 mm. (The same principle applies as for the rectangular duct.)

Step 2: Insulation

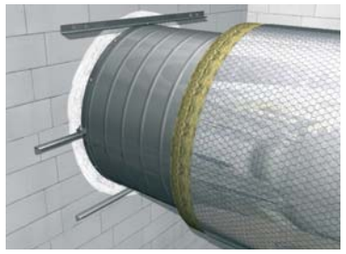
Fill the space between duct and construction with the insulation mat (it should be compressed to completely fill the opening). (The same principle applies as for the rectangular duct.)

Step 3: Sealing

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. (The same principle applies as for the rectangular duct.)

Step 4: Reinforcing the duct

A suspension bracket (30 x 2 mm) is screwed to the duct (c ≤ 150 mm) on each side of the construction. Long L-profiles (30x30x3 mm) are fixed above and below the bracket with one rivet each (4x13 mm) and whereas short L-profiles (30 x 30 x 3 mm) are fixed with nuts and bolts (M8) to the bracket eye. The profiles need to be installed on both sides of the construction.



Step 5: Duct insulation

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

Your product compass.

ULTIMATE has a complete solution for metal ventilation air ducts, based on a streamlined portfolio of standard products. The clear-cut assortment offers advantages for storage and transportation – but also for on site installation where mix-ups can effectively be avoided.

Slabs

U Protect
Slab 4.0 N
Slab: 1200 x 600 mm
Facing: no

U Protect
Slab 4.0 V1
Slab: 1200 x 600 mm
Facing: glass tissue

U Protect
Slab 4.0 Alu 1
Slab: 1200 x 600 mm
Facing: alu

Wired Mats

U Protect
Wired Mat 4.0 N
Wired Mat: L x 600 mm
Facing: no

U Protect
Wired Mat 4.0 Alu 1
Wired Mat: L x 600 mm
Facing: alu

Facings

Glass tissue

Reinforced aluminium foil

Other products

Isover Protect BSF
Solvent-free and pH-neutral, white, aqueous intumescent dispersion

Isover Protect BSK
Non-combustible, inorganic adhesive based on alkali sodium silicate

Isover Fire Protect Screw
Spiral shaped screw made of stainless steel.

ULTIMATE: On top of the table.

		Product name				
		U Protect Slab 4.0 N	U Protect Slab 4.0 V1	U Protect Slab 4.0 Alu1	U Protect Wired Mat 4.0 N	U Protect Wired Mat 4.0 Alu1
Dimensions	Length [mm]	1200	1200	1200	*	*
	Width [mm]	600	600	600	600	600
	Thickness [mm]	30	30	30	30	30
		40	40	40	40	40
		50	50	50	50	50
		60	60	60	60	60
		70	70	70	70	70
		80	80	80	80	80
		90	90	90	90	90
		100	100	100	100	100
Facing	No	X			X	
	Glass tissue		X			
	AL			X		X
Fire reaction	Euroclass EN 13501	A1	A1	A1	A1	A1
Acoustics	Sound absorption, EN ISO 11654	1.00	1.00	–	1.00	–
	Specific airflow resistance EN 29053	48	48	48	48	48
Thermal conductivity in W/mK with average temperatures in °C according to EN12667	10	0.030	0.030	0.030	0.030	0.030
	50	0.034	0.034	0.034	0.034	0.034
	100	0.039	0.039	0.039	0.039	0.039
	200	0.053	0.053	0.053	0.053	0.053
	300	0.072	0.072	0.072	0.072	0.072
	400	0.098	0.098	0.098	0.098	0.098
	500	0.130	0.130	0.130	0.130	0.130
	600	0.170	0.170	0.170	0.170	0.170

Data obtained on unfaced product according to EN 12667
** Depending on thickness, see technical data sheet for each product*

ULTIMATE – An answer to every question.

Which information do you need next? Find all topics covered in our Technical Data Sheets. We'll immediately send them to you free of charge. And our sales staff will be glad to offer comprehensive advice. Why don't you fix a date, right now?

Belarus
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