



HVAC Insulation



ULTIMATE Protect

Fire protection of air ducts



ISOVER
SAINT-GOBAIN



Introduction



Saint-Gobain Group

For more than three centuries, Saint-Gobain has applied its technological expertise and knowledge of markets to supply products that reflect its customers' and partners' needs. The Saint-Gobain Group has acquired a reputation for innovation, responsiveness and productivity.

By continuous investing in Research and Development, Saint-Gobain is able to provide all of its partners with a technological edge and the assurance of an ongoing focus on innovation. Saint-Gobain's presence in more than 64 countries is a source of synergies and a constant exchange of ideas that help deliver the most innovative and appropriate solutions.

ISOVER Technical Insulation

The ongoing rise in energy prices as well as the concern to protect the environment, has underlined the urgent need to reduce energy losses. This has led the insulation industry to focus on developing improved structural insulation products. The potential of energy savings in HVAC installations and components is also essential to improve energy efficiency in buildings.

As the world's leading insulation company, ISOVER has drawn attention to the importance of effective insulation in the so-called technical areas, such as Marine, Industry, HVAC and Original Equipment Manufacturer (OEM), where effective insulation is not only important to save energy, but also to provide fire safety and acoustic and thermal comfort.

We have used our recognised innovation skills to bring efficient technical solutions for these critically important markets.



ISOVER HVAC Insulation solutions

HVAC installations are designed to provide thermal and acoustic comfort to buildings' occupants. This should be done ensuring an efficient use of energy and complying fully with safety requirements. ISOVER provides a complete range of insulation solutions for HVAC ducts and pipes, which help not only to deliver desired levels of comfort but also to reduce energy

consumption and contribute to fire safety. These solutions are adapted to meet any customer need whatever the application should be. The best performance for each case will be obtained with two main materials: glasswool, providing excellent thermal and acoustical performance, or ISOVER latest innovation for fire resistance: high performing ULTIMATE mineral wool.

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

Fire protection has increasingly become the focus of architects and builders. At the same time, the growing use of air ducts and smoke extraction systems 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 advan-

tages of conventional products used for fire, thermal and acoustic insulation. On top, it offers significant cost reductions and substantial weight savings thanks to its outstanding insulation efficiency. This is complete confidence in ultimate safety.

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



Do not worry: fire safety without compromise.











There's nothing more vital for us than the air we breathe. We have a high demand for fresh air, both in our living and office rooms. It is essential that we have the highest Indoor Air Quality (IAQ) or comfort in all types of building. Today, this air is supplied via sophisticated ventilation systems and air ducts. These need to be protected

against fire since life safety is of paramount importance. 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.



ULTIMATE. The new standard for top performance.

The big 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:



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 Protect 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 amongst others as fulfilling EN 1366. Only a material that effortlessly masters its tasks can also optimally fulfil individual requirements. And this is what the ULTIMATE product range U Protect offers: customized solutions to meet your needs. We thus put you ahead of the game.

Good news about safety.

U Protect guarantees superior fire resistance and excellent thermal stability even at constantly high service temperatures up to 400°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. With U Protect solutions this is comfortable safety that you can build on.

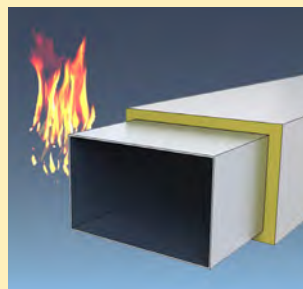
Fitting in with your needs.

The full performance spectrum of fire protection:

U Protect complies with fire resistance classification from 15 to 120minutes (EI15-EI-20).

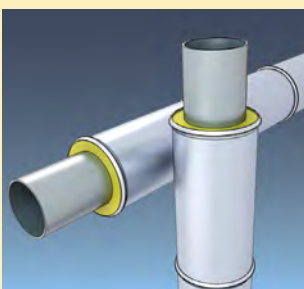


Whether circular or rectangular: solutions are available.

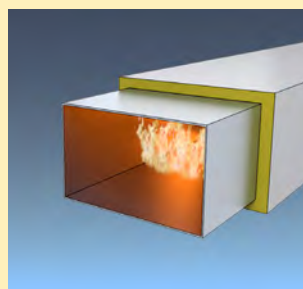


Whether the fire location is fire inside (Type B) or outside (Type A):

U Protect provides the ideal solution.



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

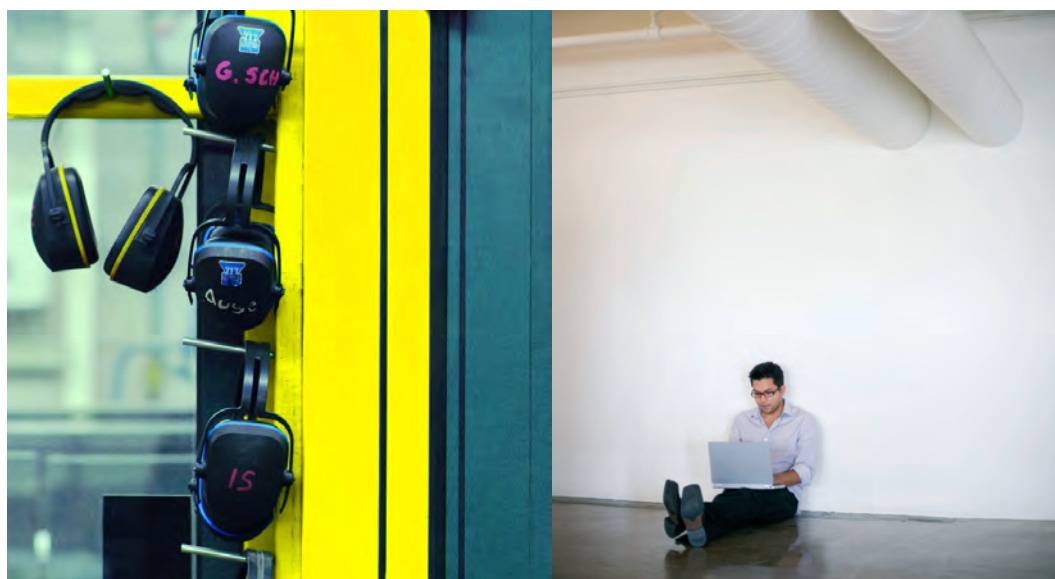
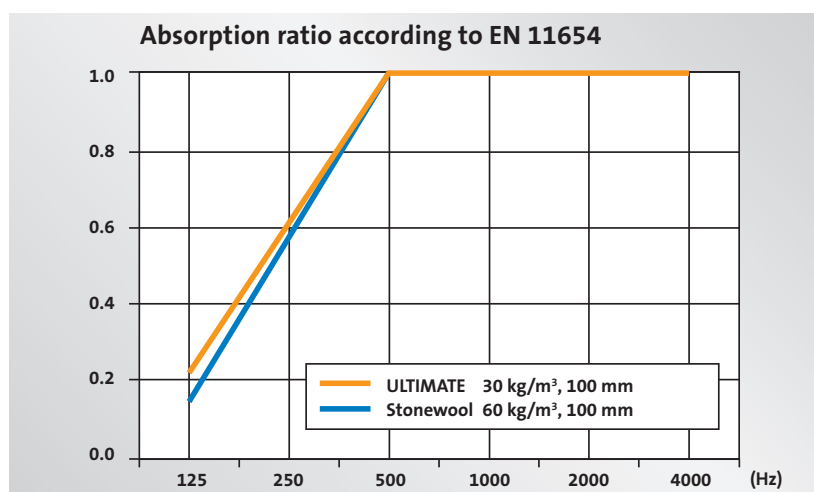


Unheard-of advantages for your workers and for you.



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 mineral wool structure. At the same time, the resonant 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) $\text{kPa}\cdot\text{s}/\text{m}^2$ | |
|---|--|
| ULTIMATE | Stonewool |
| 24-30 (kg/m^3): ≥ 15 | 30-50 (kg/m^3): ≥ 5 |
| 40-50 (kg/m^3): ≥ 30 | 70 (kg/m^3): ≥ 18 |
| 60-70 (kg/m^3): ≥ 48 | 100 (kg/m^3): ≥ 25 |
| 80-100 (kg/m^3): ≥ 70 | 120 (kg/m^3): ≥ 35 |



*Work more efficiently:
thanks to ULTIMATE
sound insulation.*



Insulation that pays off right from the start.

Insulation with U Protect 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 extremely low thicknesses. U Protect thus pays off with every single work step.

The material that everyone profits from: ULTIMATE Protect



Ultralight, never above 8,25 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.

| ULTIMATE Protect 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, no glue between joints) |

ULTIMATE.

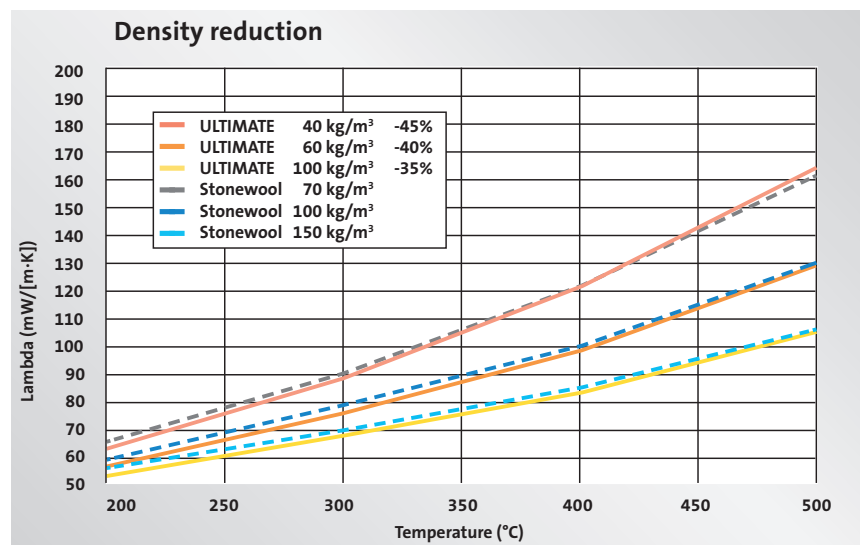
Adding efficiency to insulation.

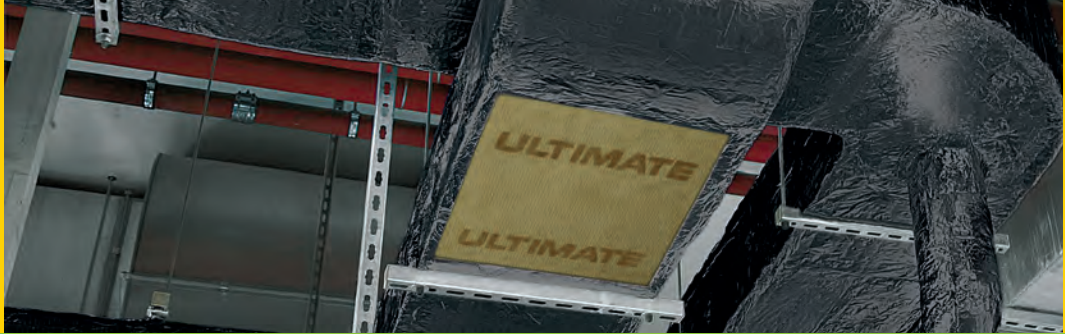


Energy losses are rapidly becoming a most critical cost factor for the economic viability of buildings. The ULTIMATE answer to this problem: add efficiency to insulation. Thanks to its exceptionally good thermal conductivity or lambda values, ULTIMATE produces a stronger insulation effect with up to 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 shot (unfiberised material). This pays off with increased insulation efficiency – improving your environment.

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 thermal conductivity 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.



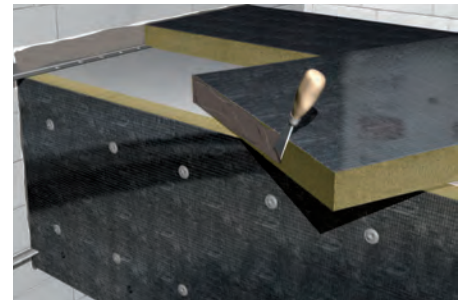
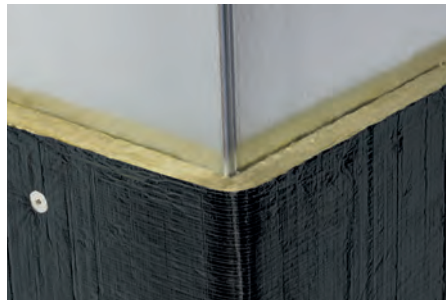


ULTIMATE: Get your insulation into shape the smart way.

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 shot
- Not harmful to health
- Extremely easy to handle and install
- 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.

Up to 60 % space gain



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.

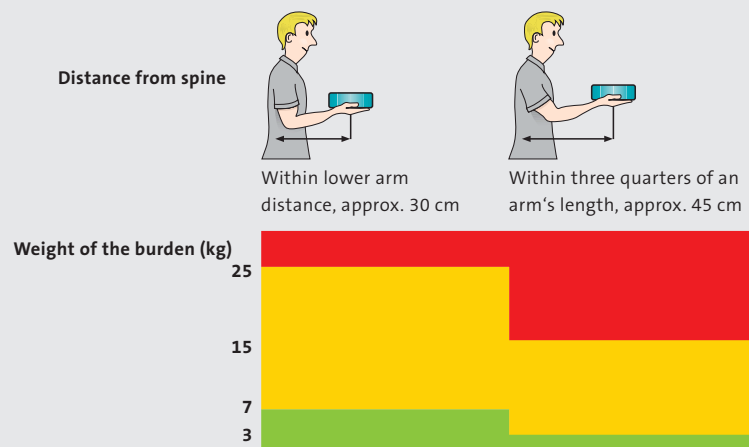
You should use the following lifting technique:

- 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 8,25 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. These test procedures are already referenced as 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) 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). |
| Smoke extraction | Duct system is used together with fan extraction. Purpose is to remove smoke and hot gases from an area where a fire has been developed |
| 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: EI15, 30, 60, 90 or 120?
3. Where is the fire located: inside, outside, both or smoke extraction?
4. In which direction do the ducts run: horizontally, vertically or in both directions?

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

Rectangular duct

| Insulation thickness needed (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) | 70 (80) | 80 (90) | Horizontal |
| | 35 | 50 | 80 | 90 | 100 | Vertical |
| Fire outside duct | | | | | | |
| Outside | 30 | 30 | 30 (40) | 70 | 80 | Horizontal |
| | 30 | 30 | 30 | 70 | 80 | Vertical |
| In case both fire locations need to be covered | | | | | | |
| Both | 30 | 40 | 60 (70) | 70 (80) | 80 (90) | Horizontal |
| | 35 | 50 | 80 | 90 | 100 | Vertical |
| Use of 1 product for both duct orientations | | | | | | |
| Inside | 30 | 30 | 30 (40) | 70 | 80 | Both |
| Outside | 35 | 50 | 80 | 90 | 100 | |
| Use of 1 product for all cases | | | | | | |
| Both | 35 | 50 | 80 | 90 | 100 | Both |

Number in parenthesis means thickness to use in case of flexible walls .

Circular duct

| Insulation thickness needed (mm) | | | | | | |
|--|------------|-------|---------|----------|-----------|------------------|
| Fire location | Fire Class | | | | | Duct Orientation |
| | EI 15 | EI 30 | EI 60 | EI 90 | EI 120 | |
| Fire inside duct | | | | | | |
| Inside | 35 | 50 | 75 (80) | 95 (100) | 115 (125) | Horizontal |
| | 35 | 50 | 75 | 95 | 115 | Vertical |
| Fire outside duct | | | | | | |
| Outside | 30 | 30 | 60 | 90 | 100 | Horizontal |
| | 30 | 30 | 60 | 90 | 100 | Vertical |
| In case both fire locations need to be covered | | | | | | |
| Both | 35 | 50 | 75 (80) | 95 (100) | 115 (125) | Horizontal |
| | 35 | 50 | 75 | 95 | 115 | Vertical |
| Use of 1 product for both duct orientations | | | | | | |
| Outside | 30 | 30 | 60 | 90 | 100 | Both |
| Inside | 35 | 50 | 75 (80) | 95 (100) | 115 (125) | |
| Use of 1 product for all cases | | | | | | |
| Both | 35 | 50 | 75 (80) | 95 (100) | 115 (125) | Both |

Installation guidelines

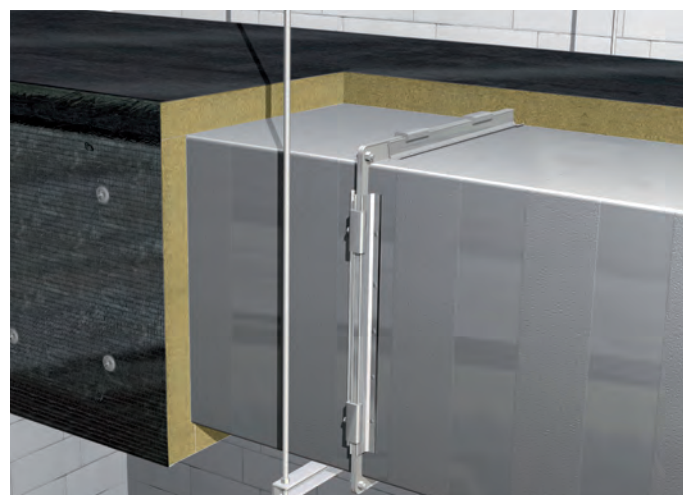
The insulation of ventilation air ducts can be easily and efficiently accomplished with U Protect products. Fire insulation requires a high level of accuracy and expert workmanship. In order to achieve greatest possible security, it is important to follow the guidelines for mounting the ducts, installing the insulation and producing pene-

trations in walls and floors. The installation guidelines for insulation is the same for both fire resistance and smoke extraction solution. In case of smoke extraction additional reinforcement profiles must be installed on the duct. 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

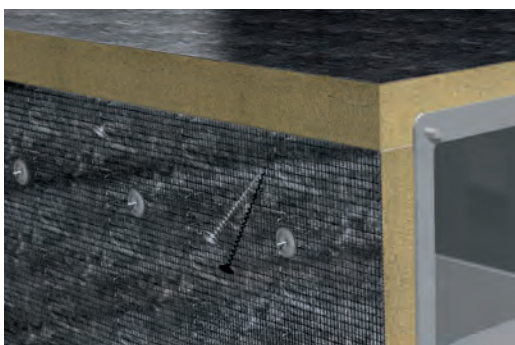


Rectangular ducts

Under EN1366, 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 EI30 and EI60, 6 N/mm² for EI90 and EI120.

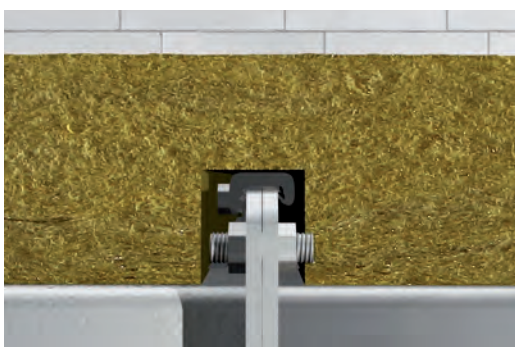
Fixation

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



Insulation is fixed to the duct with welded pins and washers. Corner joints are secured with Isover FireProtect Screws. Screw length must be 2 x the insulation thickness. The pins are fixed with a maximum center distance of 260 mm and not more than 80 mm from the slab edges or duct flanges. The slab on the top side is installed without any pins. Pins have a diameter of ≥ 2.7 mm and the washers of ≥ 30 mm. All joints are secured by pressing the slabs together (no additional glue needed).

Cutting for a duct joint.



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

In the case of small thicknesses (< 60 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 / 30 mm | Not needed | $c \leq 260$ | $c \leq 260$ distance from edge 80 mm |
| Screw | 2 x insulation thickness | | | $c \leq 260$ |

c is the maximum center distance

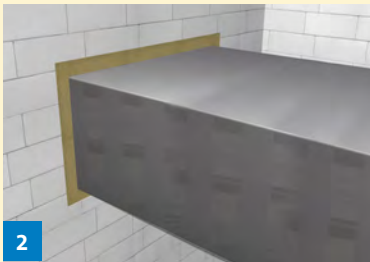
Wall / floor penetration, masonry walls

Insulated air ducts sometimes need to penetrate walls or floors. The solution of how to accomplish this is part of the **ULTIMATE Protect 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 masonry and lightweight partitions. 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 has to be ≤ 50 mm. The duct should have an internal support rod placed where the duct passes the construction.



Step 2: Insulation

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



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 4: Reinforcing the duct

Frame the duct by fixing an L-profile (30 x 30 x 3 mm) around it (see picture opposite). The L-profile is fixed to the duct with steel rivets (3,2 x 10 mm) of $c \leq 100$ mm. The top and bottom profiles are fixed to the construction with two wall anchors each. The profiles need to be installed on both sides of the construction in horizontal installation. In case of vertical installation profiles are only needed on the upper side.



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 first slabs need to be glued to the construction using Isover Protect BSK (thickness ~ 2 mm). Use ISOVER Protect Black Tape to cover the thickness of U Protect Slab.



Wall penetration, light-weight partition walls

Letting an air duct pass through a light weight construction is complicated from a fire performance point of view. The wall is often bending in case of fire and still the penetration must be secured.

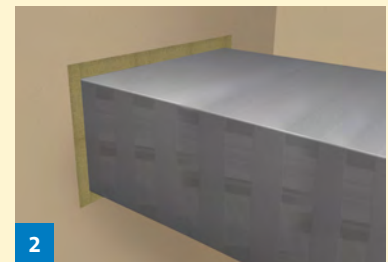
Step 1: Positioning

The duct is placed in the opening of the construction. The distance between duct wall and opening has to be ≤ 50 mm. The duct should have an internal support rod placed where the duct passes the construction. The wall opening should be reinforced with a metal frame using same profile or similar as use for wall studs. Frame is installed in all four sides. (See details page 21)



Step 2: Insulation

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



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.



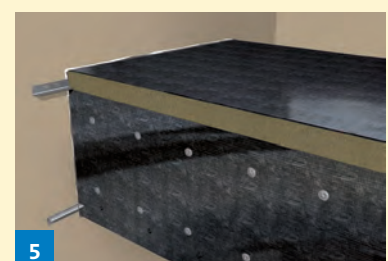
Step 4: Reinforcing the duct

Frame the duct by fixing an L-profile (30 x 30 x 3 mm) around it (see picture opposite). The L-profile is fixed to the duct with steel rivets (3,2 x 10 mm) of $c \leq 100$ mm. The top and bottom profiles are fixed to the construction with two wall anchors each. The profiles need to be installed on both sides of the construction in horizontal installation.



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 first slabs need to be glued to the construction using ISOVER Protect BSK (thickness ~ 2 mm). Use ISOVER Protect Black Tape to cover the thickness of U Protect Slab.



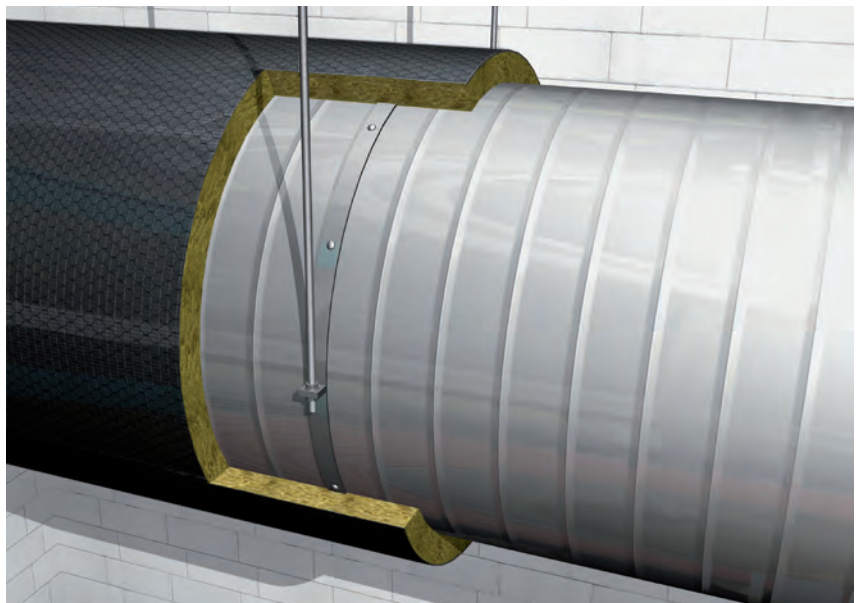
Circular ducts

The maximum duct size is $\varnothing 1000$ 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 EI30 and EI60, 6 N/mm² for EI90 and EI120.

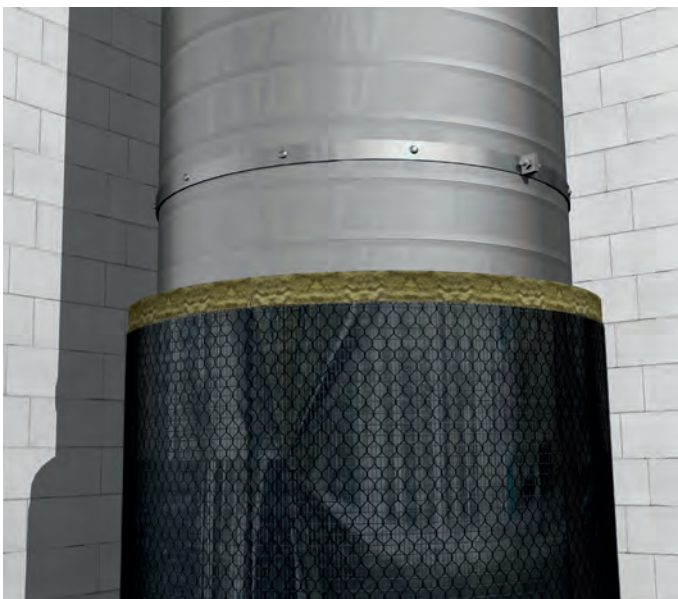
The joints of the insulation mats are secured with either clamping rings, C-shaped hooks or stitched together with steel thread with the wired net attached to itself. Standard threaded rods and suspension brackets are used as hangers for the duct. The hangers are placed inside the insulation and the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

Fixation

In the case of both vertical and horizontal installations, the insulation mats do not need to be fixed with pins and washers. All joints are secured by pressing the mats together (no additional glue needed). Thanks to its flexibility, there is no need to cut insulation at duct joints



Installation principle for horizontal circular ducts



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

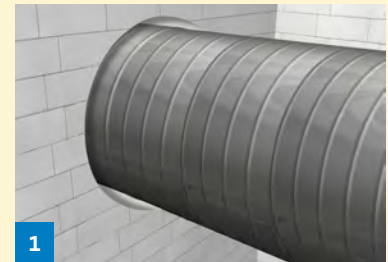


Wall / floor penetration, masonry walls

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 with masonry and light-weight partition walls. The installation is done in 5 steps. (The same principle applies as for the rectangular duct.)

Step 1: Positioning

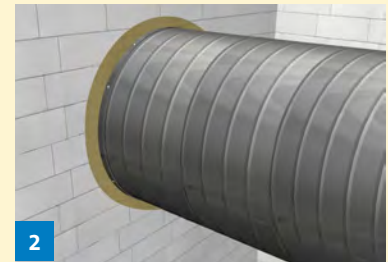
The duct is installed in the opening of the construction. The distance between duct wall and opening has to be ≤ 50 mm.



1

Step 2: Insulation

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



2

Step 3: Sealing

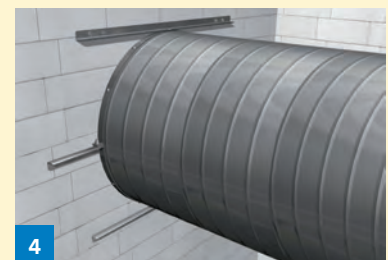
Seal the joint with ISOVER Protect BSF to prevent gas leakage. This must be done on both sides of the construction. Use a spatula to apply a layer of ~ 2 mm thickness.



3

Step 4: Reinforcing the duct

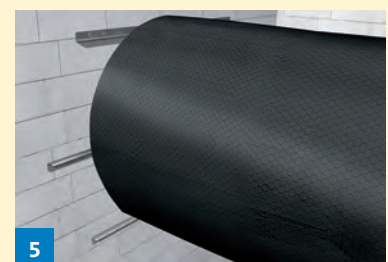
A suspension bracket (30 x 2 mm) is screwed to the duct ($c \leq 150$ mm) on each side of the construction. Longer L-profiles (30 x 30 x 3 mm) are fixed above and below the bracket with one rivet each (3,2 x 10 mm) and whereas short. L-profiles (30 x 30 x 3 mm) are fixed with nuts and bolts (M8) to the bracket eye. Fixation to the construction is done with wall anchors. The profiles need to be installed on both sides of the construction.



4

Step 5: Duct insulation

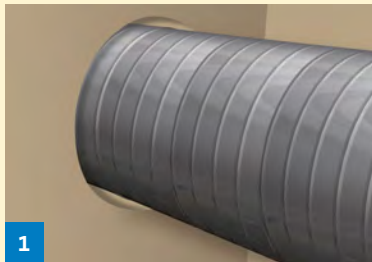
Install the wired mats so that they abut the construction. To avoid leakage caused by elongation of the steel, the wired mat needs to be glued to the construction using ISOVER Protect BSK (thickness ~ 2 mm).



5

Wall penetration, light-weight partition walls

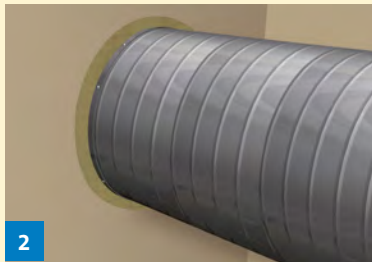
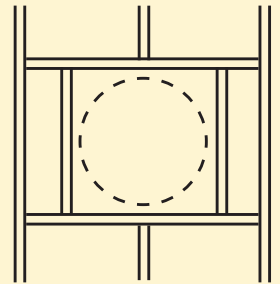
Letting an air duct pass through a light weight construction is from a fire performance point of view complicated. The wall is often bending in case of fire and still the penetration must be secured. (The same principle applies as for the rectangular duct.)



Step 1: Positioning

The duct is installed in the opening of the construction. The distance between duct wall and opening has to be ≤ 50 mm.

The wall opening should be reinforced with a metal frame using same profile or similar as used for wall studs. Frame is installed in all four sides (See sketch).



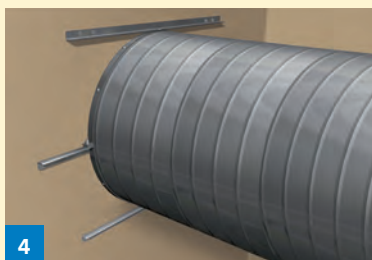
Step 2: Insulation

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



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.

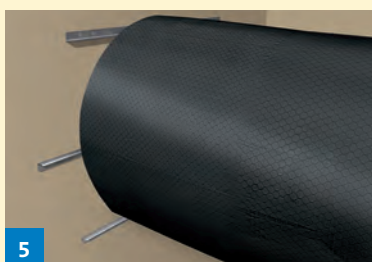


Step 4: Reinforcing the duct

A suspension bracket (30 x 2 mm) is screwed to the duct ($c \leq 150$ mm) on each side of the construction. Longer L-profiles (30 x 30 x 3 mm) are fixed above and below the bracket with one rivet each (3,2 x 10 mm) and whereas short.

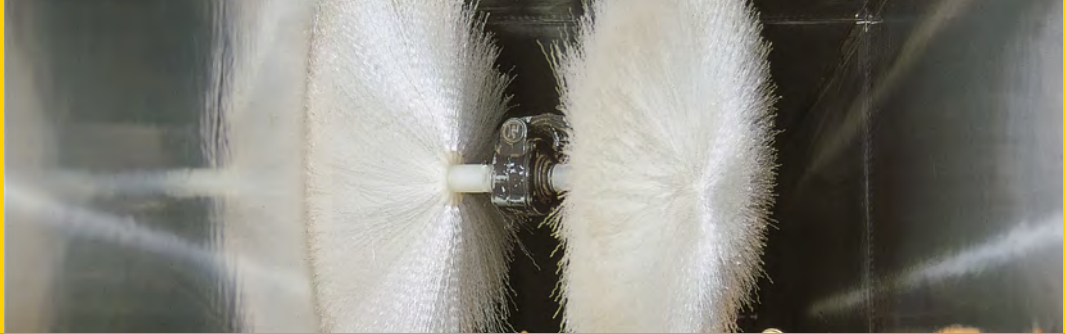
L-profiles (30 x 30 x 3 mm) are fixed with nuts and bolts (M8) to the bracket eye. Fixation to the construction is done with wall anchors.

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. To avoid leakage caused by elongation of the steel, the wired mat needs to be glued to the construction using ISOVER Protect BSK (thickness ~ 2 mm).

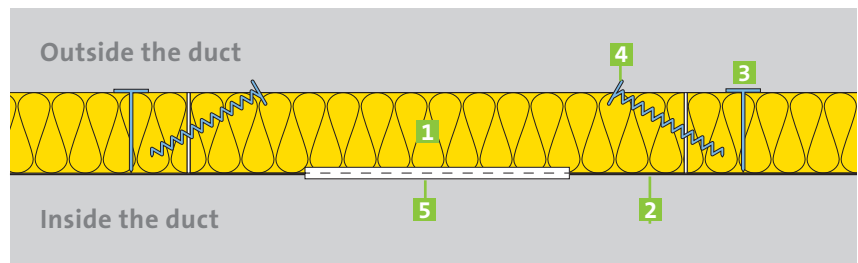


Details

The installation of a ventilation system in a building is complex. A system is normally passing through the whole building. The duct system must be adapted to the building, as well allowing inspection and maintenance with maintain level of fire safety.

Inspection hatch

In the case when a non-fire rated inspection hatch is installed to the duct it's important to have a fire safe solution that can be easily removed and installed again (see picture). The opening is limited to a size of 290x420 mm, in case of bigger hatches, it is recommended to use a fire rated one.



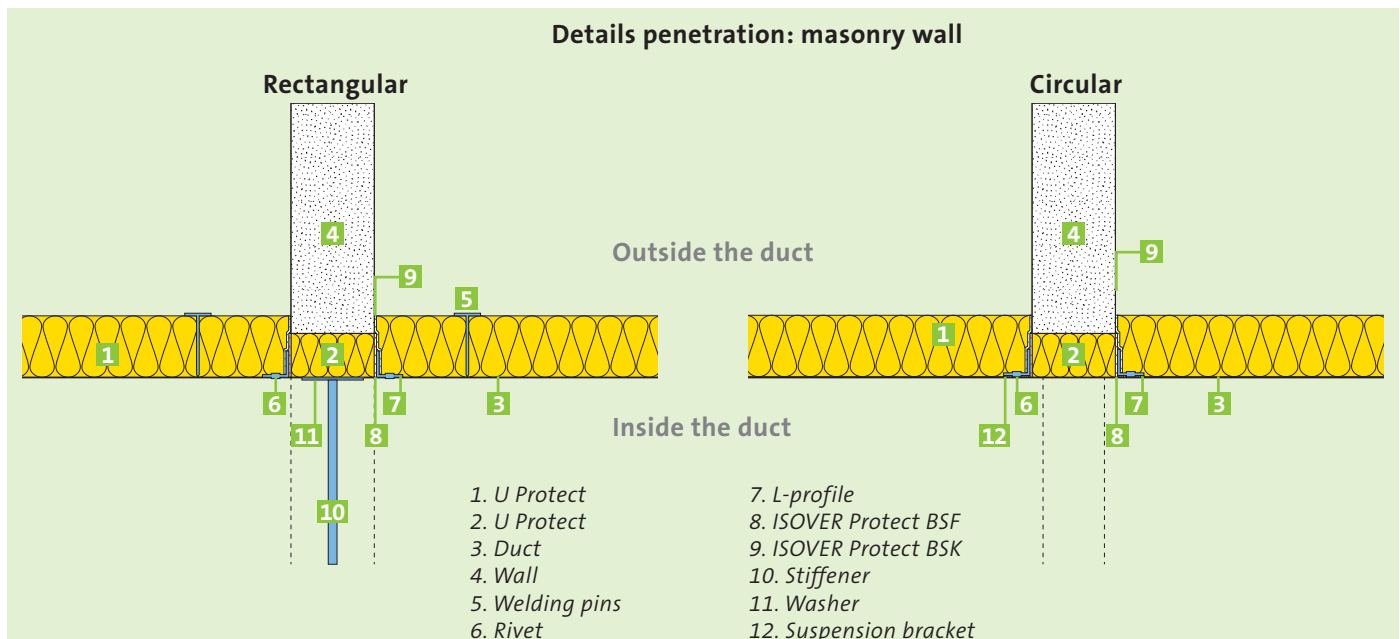
1. U Protect
2. Duct
3. Welding pin
4. FireProtect screw
5. Inspection Hatch

Duct to duct connection

A duct system consists of many connections between ducts with different shape and/or dimensions. The connections can be solved in many ways. It is just important to secure an intact insulation, not to create a weakness at a junction. Make sure that you:

- Press joints together alternatively bend the product to create continuous insulation
- Fix insulation properly (better one extra fixation point).

Details penetration: masonry wall



1. U Protect
2. U Protect
3. Duct
4. Wall
5. Welding pins
6. Rivet

7. L-profile
8. ISOVER Protect BSF
9. ISOVER Protect BSK
10. Stiffener
11. Washer
12. Suspension bracket

Your product compass.

ISOVER 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
Slab: 1200 x 600 mm
Facing: no



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

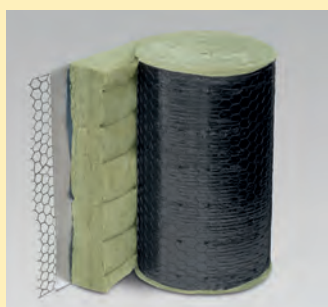


U Protect Slab 4.0 Alu1
Slab: 1200 x 600 mm
Facing: aluminium

Wired Mats



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



U Protect Wired Mat 4.0 Alu1
Wired Mat: L x 600 mm
Facing: aluminium

Facings



Glass tissue



Reinforced aluminium foil

Accessories



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 FireProtect Screw
Spiral shaped screw made of stainless steel.



ISOVER Protect Black Tape
self-adhesive aluminum tape



ULTIMATE Protect: On top of the table.

Dimensions and Facings

| Product Name | | | U Protect Slab 4.0 | | |
|--------------|-------------------|--------|--------------------|---------------|--|
| Dimensions | | | Length [m] | Width [mm] | |
| | Thickness [mm] | 30 | 1,2 | 600 | |
| | | 40 | | | |
| | | 50 | | | |
| | | 60 | | | |
| | | 70 | | | |
| | | 80 | | | |
| | | 90 | | | |
| | | 100 | | | |
| | | Facing | | | |

| Product Name | | | U Protect Wired Mat 4.0 | | |
|--------------|-------------------|-----|---------------------------------------|---------------|-----|
| Dimensions | | | Length [m] | Width [mm] | |
| | Thickness [mm] | 30 | 10,0 | 600 | |
| | | 40 | | | 7,5 |
| | | 50 | | | 6,0 |
| | | 60 | | | 5,0 |
| | | 70 | | | 4,3 |
| | | 75 | | | 4,0 |
| | | 80 | | | 3,7 |
| | | 90 | | | 3,3 |
| | | 100 | | | 3,0 |
| | 120 | 2,5 | | | |
| Facing | | | Aluminium Glass tissue (non-woven) | | |

In some countries not all thicknesses will be commercially available. Please contact the local ISOVER team for specific installation details.

Performances

| Product Name | | | U Protect Slab 4.0 | U Protect Wired Mat 4.0 |
|--------------------|---|-----|--------------------|-------------------------|
| Fire Reaction | Euroclass EN 13501 | | A1 | |
| Thermal Properties | Thermal Conductivity in W/m.K according temperature in °C (EN 12 667) | 10 | 0,033 | |
| | | 50 | 0,035 | |
| | | 100 | 0,040 | |
| | | 150 | 0,047 | |
| | | 200 | 0,054 | |
| | | 300 | 0,072 | |
| | | 400 | 0,096 | |

Products are CE marked according EN 14303

The technical information in this brochure corresponds to our present state of knowledge and experience at the date of printing (see imprint). No legal guarantee can be given, unless it has been explicitly agreed. The state of experience and knowledge is developing continuously. Please ensure that you always use the latest edition of this information. The described product applications do not take special circumstances in consideration. Please verify whether our products are appropriate for the specific application. For further information please contact our Isover sales offices. We deliver only according to our terms of trade and terms of delivery.

For further information and contact details, please visit our website at:
www.isover-technical-insulation.com or contact your local ISOVER organization.

02.03.2015

Saint-Gobain Insulation
"Les Miroirs"
92096 La Défense Cedex
France
www.ISOVER.com

