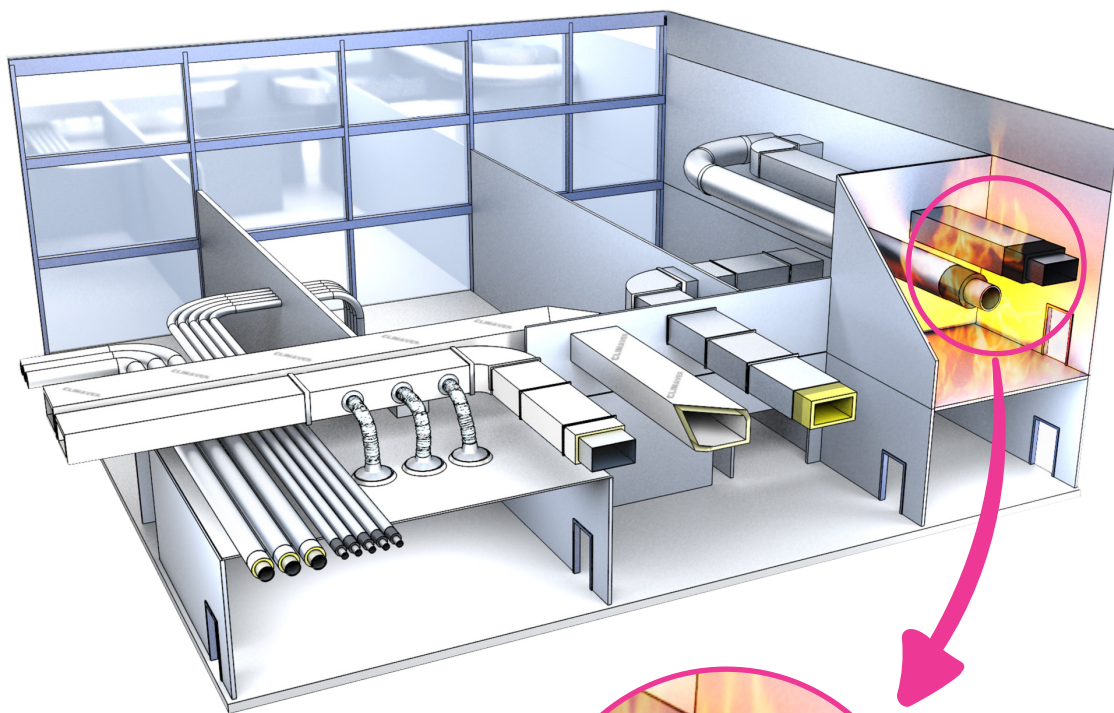


## U PROTECT®

Insulation solutions  
for fire rated HVAC systems



## Inside YOUR HVAC SYSTEM



**FIRE RATED HVAC APPLICATIONS**

# Make your **BUILDING PROJECTS FIRE SAFE**

**Fire safety is a serious concern for property owners, specifiers and occupants everywhere.**

Every day in Europe, 5000 or more fire incidents occur, with sometimes terrible consequences for people's life and health. As we spend 90% of our time in buildings, and new building designs often feature open spaces with fewer separations such as doors and walls, fire protection in buildings is more important than ever.

Special consideration should be given to HVAC systems which can be a pain point for fire safety: kilometres of pipes and ducts run through buildings and offer an ideal propagation route to fire.

Insulation is an efficient way to make your HVAC pipes and ducts fireproof.

## **COUNT ON OUR U PROTECT® SOLUTIONS TO PROTECT YOUR HVAC SYSTEMS**

Made of ULTIMATE™, our lightweight stone wool, **U PROTECT®** offers fire resistance up to 120 minutes.

With a full range of insulation solutions for your pipe- and ductwork, lightweight and easy-to-handle, it also offers best-in-class thermal and acoustic comfort.



# Add value at **EVERY STEP OF THE PROJECT**

**Choose U PROTECT® and add value across the entire life of your projects.**



## **AS A BUILDING OWNER**

- › Protect the occupants and your building in the event of a fire
- › Offer your customers thermal and acoustic comfort
- › Be assured that your HVAC system is working efficiently



## **AS A SPECIFIER**

- › Address the most stringent fire regulations
- › Implement effective passive fire protection
- › Design safe and high-performance HVAC systems for your customers



## **AS A CONTRACTOR**

- › Offer your customers a best-in-class fire insulation solution
- › Use the same product for all your insulation needs (thermal, acoustics, fire...)
- › Secure fire penetrations without changing the material
- › Work with lighter products, install easier and faster
- › Reduce installation time and costs, optimise your logistics

# UNDERSTANDING BUILDING FIRE SAFETY IN RELATION TO HVAC

Remember some key notions of fire protection in buildings, such as compartmentation, fire resistance or reaction to fire.

# Why fire safety is ESSENTIAL FOR BUILDINGS

**Population growth and urbanisation pose new challenges to the modern way of life. In large cities, buildings are often built high up and close to each other. Certain hazards such as the risk of fire have increased accordingly.**

The consequences of fire breaking out and spreading are of serious concern for property owners and occupants everywhere. Today's buildings are full of highly inflammable materials which immediately catch fire. Within only a few minutes, a fire spreads, meaning the temperature goes up and the room begins to fill with toxic smoke.

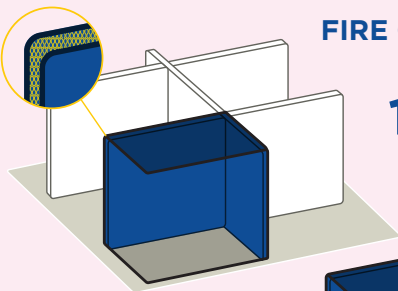
Smoke inhalation which can cause serious respiratory complications, is the primary cause of death for victims of fires.

**DID YOU KNOW**

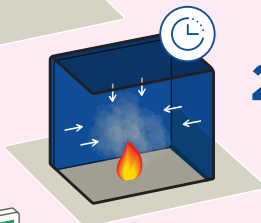
*90% of fire victims are victims of building fires.*

# 3

## things to know about FIRE COMPARTMENTATION



- 1** Fire compartmentation divides a building into smaller subsections **using fire-resistant building solutions.**



- 2** Its purpose is to slow down and **contain the spread of fire and smoke** for a defined period of time.



- 3** Fire compartmentation provides **escape routes from a building** and gives people more time to evacuate.

## CREATE FIRE COMPARTMENTS

The escalation of a fire within a building can be restricted by sub-dividing the building into fire compartments, separated from one another by fire-resistant walls and/or floors.

The main objective of compartmentation is to contain a fire within a specific section of a building, preventing the spread of flames and smoke during a certain period of time, and to reduce the likelihood of fires getting out of control. The aim is to provide the widest possible window for occupants to safely evacuate a building and for fire services to extinguish the flames.

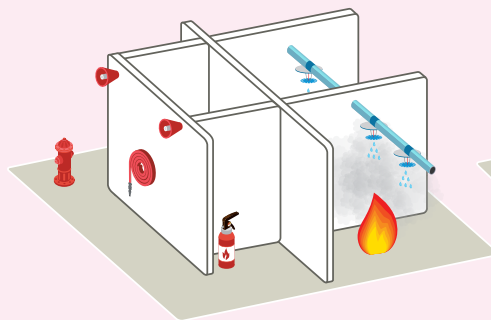
While safety is always of paramount importance, another common purpose of fire compartmentation is to prevent a fire from reaching parts of a building which are of particular value or contain hazardous materials, and ultimately to reduce potential repair costs.

Effective fire compartmentation is an integral part of any passive fire protection strategy. It is incorporated during the design phase of a construction project, in compliance with fire protection regulations and industry standards.

## What is the difference between **ACTIVE & PASSIVE PROTECTION** ?

### **ACTIVE PROTECTION**

Detecting, stopping and evacuating a fire by means of alarm systems, sprinklers, extinguishers etc.



### **PASSIVE PROTECTION**

Containing the fire and preventing it from spreading further during a certain period of time.



While active fire protection is about detecting, stopping and evacuating a fire, passive fire protection deals with containing the fire and preventing it from spreading further. Both strategies are complementary and should be implemented in any building to ensure the safety of people and property.

**DID  
YOU  
KNOW**

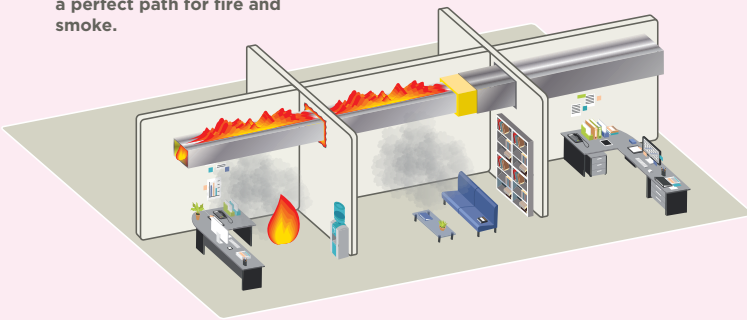
*The minimum period of fire resistance for a compartment wall or floor depends on the type of building and its specific purpose.*

## 3

things to know about  
**HVAC FIRE SAFETY**

**1** Pipes and ducts that run from room to room through buildings elements provide a **perfect path for fire and smoke.**

**2** That's why you need **fire resistant pipes and ducts.**



**3** Insulation minimises the **risk of fire spreading** and **help maintain the integrity of walls, ceilings or floors** where HVAC pipes and ducts pass through.

**PAY ATTENTION TO THE HVAC SYSTEM**

HVAC systems represent a potential risk for fire compartmentation. Pipes and ducts passing through fire-rated walls or floors from room to room represent potential gaps through which fire and smoke could spread easily.

These openings, known as penetrations, must therefore be protected to prevent the passage of flames and smoke and to guarantee the overall fire rating of the construction.

**DID YOU KNOW**

*Fire and smoke must never be allowed to spread from room to room via the pipe- or ductwork.*

**CHOOSE THE RIGHT MATERIALS**

The choice of materials can significantly affect the spread of fire and its rate of travel, even though they are not likely to be the first things to ignite.

Materials can be classified in terms of their reaction to fire, i.e. their potential contribution to flashover. Flashover is the spontaneous ignition of hot smoke and gases, which can lead to a fire spreading uncontrollably.

To address other hazards found in real-life fires and for risk assessment, two additional classifications are also available: “s” and “d”, providing information on the development of smoke and flaming droplets. Classes s1 to s3 refer to levels of smoke release, from insignificant (s1) to high (s3); and classes d0 to d2 refer to the emission of flaming droplets.

## What is FIRE REACTION ?

A **material's reaction to fire** defines how the material behaves when exposed to fire, taking into account these **3 aspects** :

### 1 SPREAD OF FIRE



How **easily it ignites** and how much **energy it releases**, and thus contributes to the spread of fire

### 2 SMOKE



How much **smoke it emits**

### 3 FLAMING DROPLETS



Whether it generates **flaming droplets**

### The Euroclass system:

| Degree of flammability                                           | Smoke production                   | Droplets generation                |
|------------------------------------------------------------------|------------------------------------|------------------------------------|
| A1: non-combustible,<br>No contribution to fire                  | s1: Low emission rate and speed    | d0: No droplets                    |
| A2: limited combustibility,<br>Very limited contribution to fire | s2: Medium emission rate and speed | d1: Limited generation of droplets |
| B: Combustible,<br>Limited contribution to fire                  | s3: High emission rate and speed   | d2: Not classified                 |
| C: Combustible,<br>Minor contribution to fire                    | -                                  | -                                  |
| D: Combustible,<br>Medium contribution to fire                   | -                                  | -                                  |
| E: Combustible,<br>High contribution to fire                     | -                                  | -                                  |
| F: Combustible,<br>Easily contribution to fire                   | -                                  | -                                  |

Our **U PROTECT®** range is classified as min. Euroclass A2<sub>s</sub>-s1, d0, meaning:

- › Products are non-combustible
- › They do not contribute to the spread of fire
- › They will not release smoke
- › They will not produce flaming droplets or particles

In addition, all **U PROTECT®** solutions have a melting point > 1,000 °C.

They are therefore especially suitable for escape routes or spaces where flashover and spread of smoke present a significant risk.

## What is FIRE RESISTANCE ?

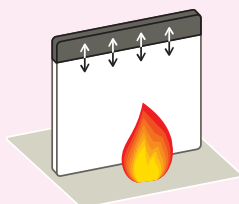
The **fire resistance** of a building element (e.g. a wall, ceiling, floor...) indicates how long it is able to withstand a fire.



It is **expressed in minutes** (e.g. 30, 60, 90, 120).

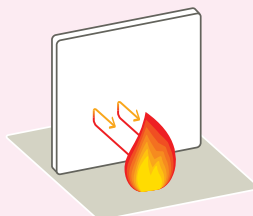
These **3 parameters** are typically considered:

### 1 LOAD-BEARING (R)



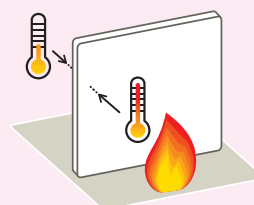
Capacity of the building element to **resist mechanically**, without losing its structural properties

### 2 INTEGRITY (E)



Capacity of the building element to **prevent the passage of fire** and hot gases into an area not affected by the fire

### 3 INSULATION (I)



Capacity of the building element to **prevent the temperature increase** in the face not directly exposed to the fire

Fire rated pipes and ducts ensure fire compartmentation, i.e. they prevent the spread of fire and heat between two compartments.

**U PROTECT®** offers a wide range of solutions for pipes, as well as ventilation and smoke extraction ducts, whatever their size, orientation, configuration or operating pressure. With **U PROTECT®**, you will meet all fire resistance requirements from 30 minutes (EI 30) to 120 minutes (EI 120), including smoke leakage (S).

# **FIRE SAFETY FOR ALL HVAC APPLICATIONS**

**The choice of materials in building design is an important factor for fire safety, including the type of pipes and ducts that run from room to room in buildings. Ensuring that the pipes and ductwork are insulated can significantly reduce the risk.**

## Fire RATED PIPEWORK

**Pipework is part of any HVAC system in buildings where fluids must be conveyed.**

A heating system consists of a boiler, radiators and the pipework that connects them. Refrigeration systems are carrying lower than ambient temperature liquids through a system including condenser, evaporator and compressor. In these systems, the risk of condensation leading to corrosion is very high and it is crucial to use a suitable insulating material. Sanitary pipework is used to supply hot and cold water to toilets, sinks, baths, showers, dishwashers, washing machines, etc. and to carry waste water out of the building to the sewage system. The pipe system comprises many different components, including pipes of different diameters, supports, gaskets, flanges, bolts, valves, strainers, connections and expansion joints. Pipework has a major impact on the efficiency and comfort level of buildings, and pipe insulation will provide thermal stability and acoustic comfort as well as fire safety.

Pipes can be made of non-combustible materials, such as steel, stainless steel and copper, but also of combustible materials such as PE, PVC or aluminium composites. Insulation can make both non-combustible and combustible pipes fire safe! It is typically used to ensure stability, minimise temperature rise and prevent the passage of flames and smoke.

Pipework may run from room to room through a building. The openings in walls or floors, for the purpose of accommodating the passage of pipework, are called pipe penetrations. Proper sealing is required to keep the openings fire- and smoke-proof, as they participate in the building's fire compartmentation.

### YOUR INSULATION SOLUTION

#### › U PROTECT® PIPE SECTION ALU2



## Fire RATED DUCTWORK

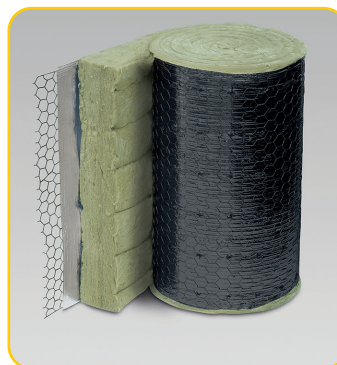
Ductwork refers to the system of ducts used to transport air from HVAC equipment throughout a building. The airflows include supply air, return air, and exhaust air. Air ducts are important to ensure an acceptable indoor air quality as well as thermal comfort for the occupants. Air ducts come in different sizes, shapes, and materials - they can for instance be round (circular) or rectangular. The proper duct design is critical to maintain optimal air flow in the system and to avoid discomfort, high energy costs, bad air quality, and increased noise levels. Ductwork has a major impact on the efficiency and comfort level of buildings. It is therefore important to insulate it properly to ensure that the air flowing silently through the system stays at the desired temperature and does not “leak”.

When ducts pass through different fire compartments, they must be fire rated complying with the resistance of fire compartment at minimum. As a passive fire protection solution, insulation is used to ensure stability, minimise temperature rise reasoned by the duct and prevent the passage of flames and smoke through the ductwork to secure fire protection where it is needed. The openings in walls or floors, for the purpose of accommodating the passage of ducts from room to room, are called duct penetrations. They must be sealed properly to make sure they are fire- and smoke-proof, as they participate in the building’s fire compartmentation.

Fire rated ducts must be tested for both fire outside and fire inside criteria.

### YOUR INSULATION SOLUTION

- › **U PROTECT® SLAB 4.0 Alu1**
- › **U PROTECT® WIRED MAT 4.0 Alu1**
- › **U PROTECT® VENT SECTION Alu2**



With the appropriate accessories (PROTECT BSF PAINT, PROTECT BSK GLUE), these products are perfectly suitable for sealing the penetrations.

## Smoke EXTRACTION DUCTS

**Smoke extraction is a key element in controlling fires and protecting people, since smoke is the main source of fire propagation in a building and toxic gases can block building exits.**

Smoke extraction ducts are used to remove smoke from buildings in the event of a fire, to allow emergency evacuation and to support fire compartmentation. Smoke extractors can be activated automatically via smoke detectors, or manually. They open ventilation slots such as windows or skylights which draw smoke and heat energy away from the building.

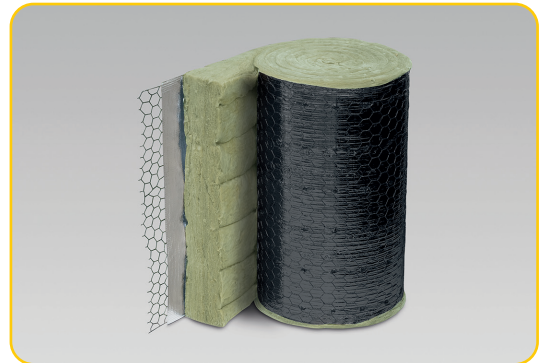
Smoke extraction ducts must be fire rated equal to the compartment walls or floors through which they pass for stability, integrity and insulation.

Insulation is used to ensure stability, minimise temperature rise and prevent the passage of flames and smoke.



### YOUR INSULATION SOLUTION

- › U PROTECT® SLAB 4.0 Alu1
- › U PROTECT® WIRED MAT 4.0 Alu1



# **U PROTECT® – A COMPLETE RANGE FOR HVAC FIRE PROTECTION**

**Choose from a full range  
of lightweight stone wool  
solutions, designed to meet  
the highest HVAC fire safety  
requirements and trusted by  
customers around the world.**

## Which product is best FOR YOUR APPLICATION?

Whether for your pipework or your rectangular or circular ducts, you will find the right solution within our U PROTECT® range, to make your HVAC system fireproof:

|                  |                                                                |
|------------------|----------------------------------------------------------------|
| Circular Duct    | U PROTECT® VENT SECTION Alu2*<br>U PROTECT® WIRED MAT 4.0 Alu1 |
| Rectangular Duct | U PROTECT® SLAB 4.0 Alu1<br>U PROTECT® WIRED MAT 4.0 Alu1      |
| Pipework         | U PROTECT® PIPE SECTION Alu2                                   |

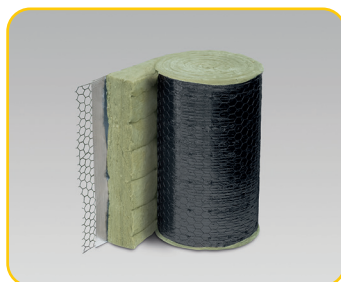
\*suitable for ducts with a diameter of up to 250 mm

### A RANGE OF PRODUCTS DESIGNED FOR HVAC FIRE PROTECTION



#### U PROTECT® SLAB 4.0 ALU1

- › Energy efficiency
- › Thermal and acoustic comfort
- › Lightweight
- › Easy to install
- › Suitable for rectangular ventilation and smoke extraction ducts up to EI 120



#### U PROTECT® WIRED MAT 4.0 ALU1

- › Energy efficiency
- › Thermal and acoustic comfort
- › Lightweight
- › Easy to install
- › Suitable for circular and rectangular ventilation and smoke extraction ducts up to EI 120



#### U PROTECT® VENT SECTION ALU2

- › Energy efficiency
- › Thermal and acoustic comfort
- › Lightweight
- › Easy to install (no material change or accessories needed for penetrations)
- › Suitable for fire rated circular ductwork and duct penetrations up to EI 60



### U PROTECT® PIPE SECTION ALU2

- › Energy efficiency
- › Thermal and acoustic comfort
- › Lightweight
- › Easy to install (no material change needed for penetrations)
- › Aluminium facing providing an efficient water vapour barrier
- › Suitable for pipes and pipe penetrations up to EI 120

All the accessories needed to complete the system:



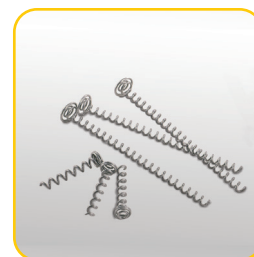
**PROTECT  
BLACK TAPE**



**PROTECT  
BSK GLUE**



**PROTECT BSF  
PAINT**



**ISOVER FIRE  
PROTECT SCREW**

To find out more about our **HVAC range**, discover our general HVAC Insulation Brochure.



## ULTIMATE™ Light stone wool. EXPERIENCE THE DIFFERENCE!

Made of ULTIMATE™, our unique light stone wool, U PROTECT® is a range of all-in-one solutions, providing the fire protection offered by stone wool, combined with better thermal and acoustic performances and a lower weight.

What is ULTIMATE™ light stone wool?

Thanks to intense and continuous R&D efforts, involving a composition of raw material equivalent to that of stone wool and a patented fiberising process allowing us to transform 100% of the material into insulation performance, we are pleased to offer our customers this revolutionary stone wool solution. Every gram of ULTIMATE™ benefits the customer.



## 8 Good reasons TO CHOOSE U PROTECT®



› **Fire safety first:** U PROTECT® solutions are non-combustible, meaning they will not spread fire, develop smoke or produce flaming droplets.



› **Get Greener:** With climate change being an increasingly important issue, insulating your HVAC system with U PROTECT® offers many environmental benefits throughout the entire lifecycle of your buildings: from energy savings and reduced CO<sub>2</sub> emissions to water savings and recyclability.



› **Save on your energy bill:** An HVAC system is only as efficient as the insulation of its duct- and pipework. U PROTECT® offers optimal thermal insulation, with less weight and thickness compared to traditional stone wool products.



› **Heat and cool where and when you need it:** A well-balanced thermal environment is essential to guarantee that the occupants of your buildings will feel comfortable. U PROTECT® solutions provide low thermal conductivity which helps keep pipes and ducts at the desired temperature.



› **Keep the noise down:** Insulating your HVAC system with U PROTECT® will largely enhance the overall acoustic performance of the system and contribute to the comfort and well-being of the building's occupants.



› **Go for safer and healthier materials:** All U PROTECT® products offer safe and comfortable installation thanks to being up to 50% lighter than traditional stone wool solutions. They are RAL- and EUCEB-certified and fulfil the low-emission requirements for green-labelled buildings.



› **Design HVAC systems for more usable space:** Our U PROTECT® range offers great design flexibility where clearances are limited and space is narrow. With its exceptional thermal performances in all insulation thicknesses, it reduces heat loss or gain over a wide range of temperatures.



› **Increase your on-site productivity:** At a time when skilled manpower is becoming a scarce resource, our U PROTECT® solutions offer comfortable handling and faster installation, as the weight is up to 50% lower than traditional stone wool.



# Expertise and testing resources, AT THE SERVICE OF OUR CUSTOMERS

**With our Fire Competence Centre, located in Ladenburg (Germany), we have extensive fire testing facilities and offer comprehensive passive fire protection services.**



Fire Competence Centre

Established to accelerate the development of our products and solutions, our Fire Competence Centre is also available to our customers, particularly for the co-development of fire protection systems.

**Mission:** To develop passive fire protection products and systems together with expertise on new technologies through continuous development of fire knowledge, equipment and skills.

**Vision:** To launch new products and systems while increasing safety and ensuring performance.

We offer complete support at all stages of solution or product design, while guaranteeing total confidentiality, without the strict requirements of impartiality to which all accredited laboratories are limited. We deliver results that can be easily replicated at launch in a formal test at an accredited laboratory. We are committed to providing excellent customer service and adding value to any product line in development or already on the market.

## Our service offering includes:

- › Evaluation of performance of materials and solutions
- › Solution and product design
- › Advisory on test standards, EXAPs (Extended Field of Application of Test Results), classification standards etc.
- › CPD (Continuing Professional Development) training sessions on test methods and structures under fire
- › Regular fire resistance and reaction to fire testing on existing products (as part of our quality control of new formulations)

## Characterisation of products – Reaction to fire testing

Our Fire Competence Centre is fully equipped for classification according to EN 13501-1:

- › ISO furnace for non-combustibility test
- › “Calorimetric bomb” to determine the gross calorific potential (PCS)
- › SBI (single burning item) to measure heat release, smoke production, falling of droplets...
- › Small flame test

Furthermore, we also offer tests for glowing combustion, melting point >1000 °C, or small scale sample testing and additional characterisation of materials (density, LOI...).

## Characterisation of systems – Fire resistance testing

- › 3 different testing scales (full scale vertical furnace – 3 m x 3 m, full scale horizontal furnace – 4 m x 3 m, medium and smaller scale furnaces)
- › Possibilities to determine EI-criteria for different applications



# WHAT OUR CUSTOMERS ARE SAYING

A hand with a white manicure is pointing its index finger at a yellow five-pointed star. The star is part of a row of similar stars that are faded out to the left. The background is a light gray gradient.

Trusted by customers  
around the world,  
U PROTECT® is widely used  
for HVAC fire protection  
applications, in all types  
of buildings.

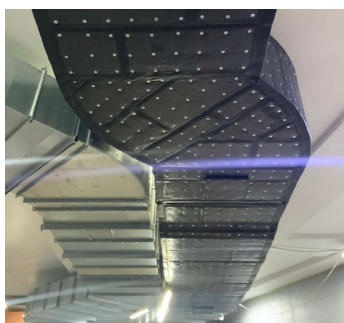
## Some customers SHARE EXPERIENCES

### One Nine Elms Tower (London, UK)

One Nine Elms Tower is a skyscraper under construction in Nine Elms (London). This 58-storey building comprises a 200 bed five-star luxury hotel, retail space, offices and 491 residential apartments.

To comply with fire regulations in force in this type of buildings, more than 15,000 m<sup>2</sup> of **U PROTECT® SLAB 4.0 Alu1** were used to insulate the HVAC ductwork.

The system was particularly appreciated by installers, as it offered many other advantages, ranging from exceptional thermal performance to quick and easy installation.



### “ UP TO 2 HOURS OF FIRE PROTECTION

The lightweight **U PROTECT®** slabs, in addition to offering up to 2 hours fire protection, have greatly facilitated handling and installation! A real key advantage over other insulation systems!

A certain number of technical meetings with the specifier and the duct manufacturer were certainly necessary to confirm the compliance of the product installation with the EN1366 standard and to adapt some of the initial design details.

But thanks to close collaboration with ISOVER UK and all the different stakeholders involved in the project, everything went very smoothly.

*Leon Clarke, Company Owner at L.C Insulation Services*

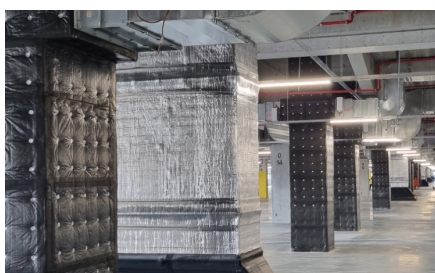
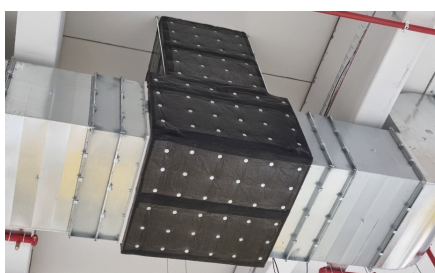
”

## Amazon – Distribution Centre (Kojetín, Czech Republic)



The Amazon Center located in Kojetín in Czech Republic is the first multi-storey distribution center of the country with a building area of 52,000 m<sup>2</sup> on four floors, providing a total of 190,000 m<sup>2</sup> of warehousing.

ISOVER Czech Republic provided 5,500 m<sup>2</sup> of **U PROTECT® SLAB 4.0 Alu1**, for EI30 smoke extraction ducts, a completely new solution on the local market and breaking with the habits of local insulators.



### “ LIGHTWEIGHT AND EASY TO HANDLE ”

ISOVER has been training us for a few years on fire resistance and smoke extraction. So we were ready to take up the challenge and convince the customer that **U PROTECT®** is the optimal fire protection solution.

In addition, it offers many other advantages, such as great energy savings and noise reduction. For us as installers, thanks to its lightness, it is easy to handle and saves valuable installation time!”

*Míra Šindler, Company Owner at BS Realisations s.r.o.*

”

## The Humboldt Forum (Berlin, Germany)

Completed in 2020, behind the reconstructed facades of the Berlin Palace, the Humboldt Forum is a new radiant landmark in the capital's cultural offerings. An impressive building with more than 30,000 m<sup>2</sup> of usable space. And almost as impressive as the building itself is the 45,000-metre-long pipework installed to heat and cool the building.

The contractor IIC Industrie Isolierung Chemnitz GmbH chose **U PROTECT® PIPE SECTION Alu2** to make sure the job could be completed to high specifications and to tight deadlines. The all-in-one nature of the product allowed for continuous, fire-safe insulation even through floor and wall penetrations.



## A FLEXIBLE AND FAST SOLUTION

We had to stick to an extremely tight schedule! And that's where **U PROTECT® PIPE SECTIONS** made our job a lot easier: In comparison with conventional stone wool products, they weigh around 50% less. With around 45,000 linear metres of pipes to be insulated, this is a tangible physical advantage.

What's more, it simply makes a difference whether you have to set aside the sectional insulation for each penetration and take a separate product or whether you can 'work through' it with a non-combustible system.

The length of the pipe section was also important, because instead of the usual 1 m sections, **U PROTECT® PIPE SECTIONS** are 1.20 m long, which means that 20% more pipe can be insulated with each operation."

*Danyel Schlennstedt, Project manager at IIC Industrie Isolierung Chemnitz GmbH*



# ABOUT US



**Discover the Saint-Gobain Group, and read more about Saint-Gobain Technical Insulation, the world leading supplier of sustainable insulation solutions.**



# MAKING THE WORLD A BETTER HOME

Saint-Gobain designs, manufactures and distributes solutions for the construction, mobility, healthcare and other industrial application markets. Developed through a continuous innovation process, they provide wellbeing, performance and safety while addressing the challenges of sustainable construction, resource efficiency and the fight against climate change.

This strategy of responsible growth is guided by the Saint-Gobain purpose, “MAKING THE WORLD A BETTER HOME”, which responds to the shared ambition of the women and men in the Group to act every day to make the world a more beautiful and sustainable place to live in.







**Saint-Gobain ISOVER**

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12 place de l'Iris  
92096 La Défense Cedex - France

[www.isover-technical-insulation.com](http://www.isover-technical-insulation.com)

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