

CE



PROJISO

Spray-on insulation coatings



Expertise and innovation for Projiso spray-on systems

Projiso, an expert in the manufacture and sale of fibrous and pasty spray-on coatings, offers a wide range of products with multiple features: fire resistance, thermal insulation, and acoustic correction and reduction.

All of these applications are validated by European Union reports, mandatory for construction projects for which a construction permit is filed after 01/04/2011.
As development and innovation are key elements in Projiso's strategy, only new systems and complementary product lines will be offered.

Projiso manufactures thermal insulation with a number of certifications (CE marking, AT, Acermi, SDS, FDES, DOP), an extensive range of products for passive fire protection (Concrete, Steel, Wood, Structural Floor Trays, Sheet Metal Ducts), acoustic products with an α_W of up to 1.00 and acoustic reduction up to +5dB.

Faithful to its strategic directions and attentive to the installation conditions of its approved applier partners, Projiso pays special attention to regulatory and environmental considerations. Thus, all of its products bear CE marking and are accompanied by FDESSs.

Thanks to its experience and its partners' expertise, Projiso has taken part in many projects in France and abroad.

Projiso is keen to maintain a close relationship with construction professionals. Projiso, the manufacturer of spray-on coatings serving the spray-on products industry.

Patrick Cerruti
General Director

Catalogue Contents

i

General information on insulation

pages 4 - 11

Passive fire protection

pages 4 - 5

Thermal insulation

pages 6 - 8

Acoustic correction and reduction

page 9

Selecting and installing fire, thermal and acoustic protection systems

pages 10 - 11

i

General information on fire protection

pages 12-17

Fibrexpand[®] technical datasheet and applications

pages 18 - 23

Fibrofeu[®] technical datasheet and applications

pages 24 - 30

Fibrogaine[®] technical datasheet and applications

pages 31 - 36

Glue and hardener technical datasheets

pages 37- 42

Construction site datasheet

pages 43 - 44

Passive fire protection

Fire protection is a determining factor in the construction or standardization of a building.

Installing active protection (sprinklers, extinguishers, etc.) is necessary but not sufficient.

As a building professional, you must comply with building safety standards.

The safety regulations are intended to:

- Prevent the formation, development and spread of fire
- Limit the fire's spread
- Ensure the stability of structural elements in case of fire

- Prevent the fire from spreading to neighbouring buildings
- Ensure that occupants are safe and can evacuate
- Facilitate firefighters' intervention
- Reduce operating losses

The primary aim is to enable occupants to evacuate under the best possible conditions. Some catastrophes can also cause irremediable damage to a building, causing a complete stoppage of its activities. Passive protection works due to its mere presence, without human intervention or energy requirements, and requires no maintenance.

Reaction to fire

Reaction to fire is a factor related to the material's intrinsic properties. It includes all of a material's characteristics in relation to its influence on the formation and spread of fire. In accordance with amended Decree of 21 November 2002, the Euroclasses (the classification system for reaction of materials to fire) are determined using new testing methods that are harmonized on the European level. The adjacent table presents the equivalencies between the Euroclasses (A1 to D) and the old fire reaction classes (M0 to M4).



SBI – Fire reaction test

Euroclasses of construction products other than floors (NF EN 13 501-1)			Regulatory requirements
A1	-	-	Non-combustible
A2	s1	d0	M0
A2	s1	d1	M1 Combustible, non-flammable
	s2	d0	
B	s3	d1	
	s1	d0 d1	
	s2		
s3			
C	s1	d0 d1	M2 Combustible, low flammability
	s2		
	s3		
D	s1	d0 d1	M3 Combustible, medium flammability
	s2		M4 Combustible, high flammability
	s3		

The Euroclasses include additional classifications:

S(1,2,3) for smoke production, d(0,1,2) for the falling of burning droplets and debris.

Fire resistance

Fire resistance, just like acoustic and thermal insulation, is a key parameter to take into consideration when designing a building. The methods for testing fire resistance and the resulting classifications are defined in the Decree of 22 March 2004 (which supersedes the Decree of 3 August 1999). Three criteria are used to assess the different fire resistance levels of buildings tested.

Mechanical Resistance (European classification «R»)

For horizontal structural elements, this criterion is deemed satisfactory if the warping caused does not exceed 1/30th of the range or if the warping speed does not exceed 3mm/min per metre of range. For vertical structural elements, this criterion is satisfactory if the collapse speed does not exceed 3mm/min per metre of height or if the collapse does not exceed 1/100th of the height.

Resistance against flames and hot, flammable gases (European classification «E»)

This criterion is no longer met when the following is observed:

- The inflammation of a layer of cotton wool placed near the sample
- Penetration to a defined opening size
- The spread or sustained production of flames on the non-exposed side

Thermal insulation (European classification «I»)

This criterion is met when the temperature of the surface not exposed to fire does not exceed an average of 140°C or 180°C at any given spot.

Regulatory texts

The regulatory texts classify buildings on the basis of the risks inherent to each building type (height, occupancy, activities etc.) and indicate the requirements that must be met for fire safety for each type.

The regulatory texts are the only applicable reference documents and must be consulted in their entirety.

Establishments are classified into the following categories:

Establishments open to the public (ERP): amended Decree of 25/06/80

High-rise buildings (IGH): amended Decree of 18/10/77

Residential buildings: amended Decree of 31 January 1986

Facilities classified for environmental protection (ICPE): Law of 19/07/1996 and standard decrees for facilities with declaration requirements

Workplaces: Labour code and amended Decree of 05/08/1992

Building classification

Establishments open to the public (ERP)

ERPs are classified in five categories and types. The building type depends on the use type. The categories are determined based on public and staff occupancies.

- 1: over 1500 people
- 2: between 701 and 1500 people
- 3: between 301 and 700 people
- 4: 300 people or less, excluding establishments in category 5
- 5: establishments mentioned in Article R 123-14 in which the public occupancy rate does not exceed the number specified by the safety regulations for each type of business.

The following classifications only apply to establishments in categories 1 to 4.

Facilities set up in a building

- J:** Care facilities for the elderly or people with disabilities
- L:** Courtrooms, conference and meeting rooms, concert halls and multipurpose halls
- M:** Stores, shopping centres
- N:** Restaurants, bars
- O:** Hotels, boarding houses
- P:** Dance halls, gaming rooms
- R:** Educational establishments, summer camps
- S:** Libraries, documentation centres
- T:** Exhibition halls
- U:** Sanitary facilities
- V:** Places of worship
- W:** Administration, banks, offices
- X:** Covered sporting facilities
- Y:** Museums

Special facilities

- EF:** Floating facilities
- GA:** Train stations
- OA:** Mountain hotels and restaurants
- PA:** Facilities for outdoor activities
- PS:** Covered parking garages
- SG:** Inflatable structures
- CTS:** Tents and awnings
- REF:** Mountain refuges

High-rise and very-high-rise buildings (IGHs and ITGHs)

An IGH is a building over 50m tall for residential buildings or over 28m tall for other types of buildings.

An ITGH is a building over 200m tall.

The Decree of 18 January 2012 (which supersedes that of 18 October 1977) includes general measures applicable to all classes of IGHs and special provisions applicable to the different classes of buildings.

The different classes are defined as follows:

GHA: buildings for residential use

GHO: buildings for hotel use

GHR: buildings for educational use

GHS: buildings to be used as archival storage

GHU: buildings for sanitary use

GHW1: buildings for office use: 28 m PBDN* 50 m

GHW2: buildings for office use: PBDN* > 50 m

GHZ: buildings for mixed use or including an ERP

*PBDN: last-level floor slab



The importance of thermal insulation

The importance of thermal insulation

Thermal insulation includes all of the materials and techniques used to limit heat transfer between a cold area and a warm area. It is used in textiles, automotive, industry and, of course, building, primarily to maintain a comfortable temperature inside rooms.

The design of a building's thermal insulation is not to be taken lightly. It is not enough to simply put together insulating layers. A building's insulation must be designed as a whole, with particular attention being paid to thermal bridges. Even when highly effective products are used, the existence of less- or unprotected areas in the building's thermal envelope can lead to the creation of thermal bridges, causing significant heat loss, areas of high humidity and, thus, increased primary energy consumption.

For this reason, it is important to create an envelope of continuous thermal insulation around a building's components.

The beneficial effects of this approach include:

- The reduction of primary energy consumption and maintenance costs.
- The reduction of greenhouse gases produced by fossil fuel combustion and, as a result, a decreased impact on global warming and climate change.
- The elimination of thermal bridges and, therefore, less risk of condensation.
- The reduction of random heat losses and increases, which has a significant impact on the comfort and stability of the indoor environment year-round.

Control of heat loss

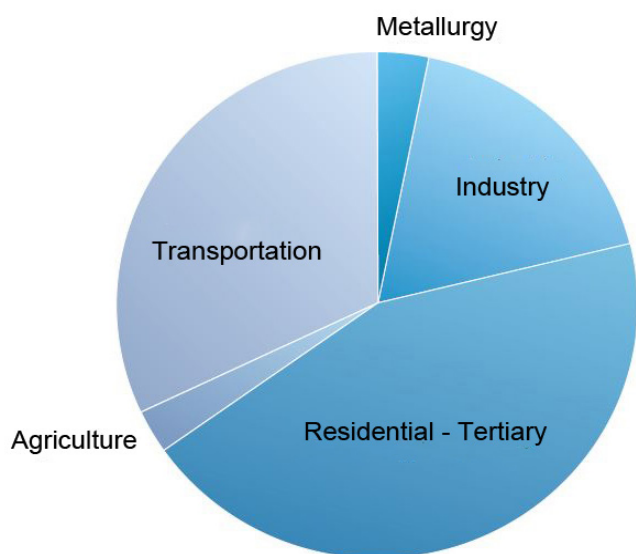
The heat passing through a wall is measured by heat transfer coefficient U, which is expressed as a quantity of energy in Watts per metre squared for each degree of difference between the interior and exterior of a building ($W/m^2.K$).

This coefficient U depends on the thermal resistance R (in $m^2.K/W$) of each layer of the wall, as well as its overall configuration, which can cause thermal bridges (beams or posts with different insulation levels, pipes passing through the wall, etc.).

Energy in France in figures

PRIMARY ENERGY CONSUMPTION

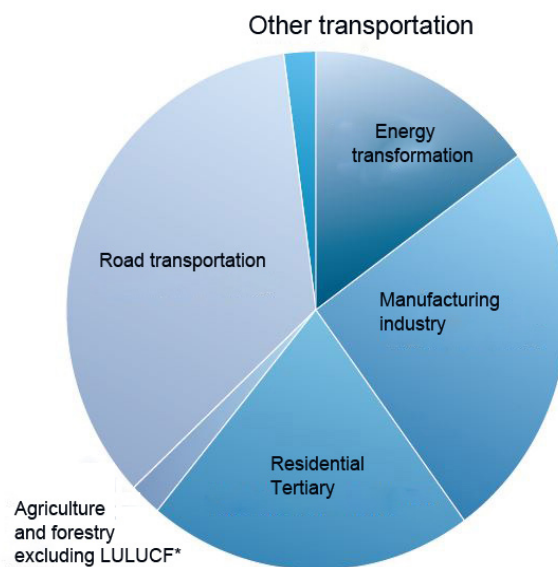
Distribution by sector of final primary energy consumption in metropolitan France



Source: SOeS calculation based on the available data by energy type

CO2 EMISSIONS

Distribution by sector of atmospheric CO2 emissions in metropolitan France (estimate)



* LULUCF: Land Use, Land-Use Change and Forestry
 ** Other transportation: as defined by the United Nations Framework Convention on Climate Change

2012 thermal regulations

RT 2012

The thermal regulations are intended to encourage those involved in the building process to design buildings that consume as little primary energy as possible, with the aim of reducing greenhouse gas consumption and contributing to French energy independence. These aims namely arise from Article 4 of the «Grenelle 1» law (2007).

With regard to RT 2012 more specifically, the key aim is to require primary energy consumption of less than 50 kWh/m²/year in buildings on average.

This aim works in correlation with three other aims:

- The adjustment of consumption requirements based on buildings' greenhouse gas emissions,
- The adjustment of the technical requirements (geographic location, building characteristics and uses),
- The additional setting of an ambitious threshold for buildings' maximum heating energy requirements in order to ensure the quality of the construction's energy system design.

More concretely, RT 2012 imposes three quantitative results based on these four aims.

Bioclimatic consumption: «Bbiomax»

This requirement involves limiting the energy needed for heating, cooling and lighting of the building; this requires buildings to be designed with good thermal insulation. The «Bbiomax» criterion is defined according to the geographical area, the altitude and the surface area of the building in question.

Maximum consumption requirement: «Cmax»

The «Cmax» coefficient requires that the building's primary energy consumption be limited. Five criteria are taken into account in calculating the coefficient: heating, hot water production, cooling, lighting and the auxiliary systems (fans, pumps). On average, the consumption limit imposed is of 50 kWh/m²/year. This limit can be adjusted depending on the building type (individual, collective, tertiary, etc.) and the geographical area in which it is located.

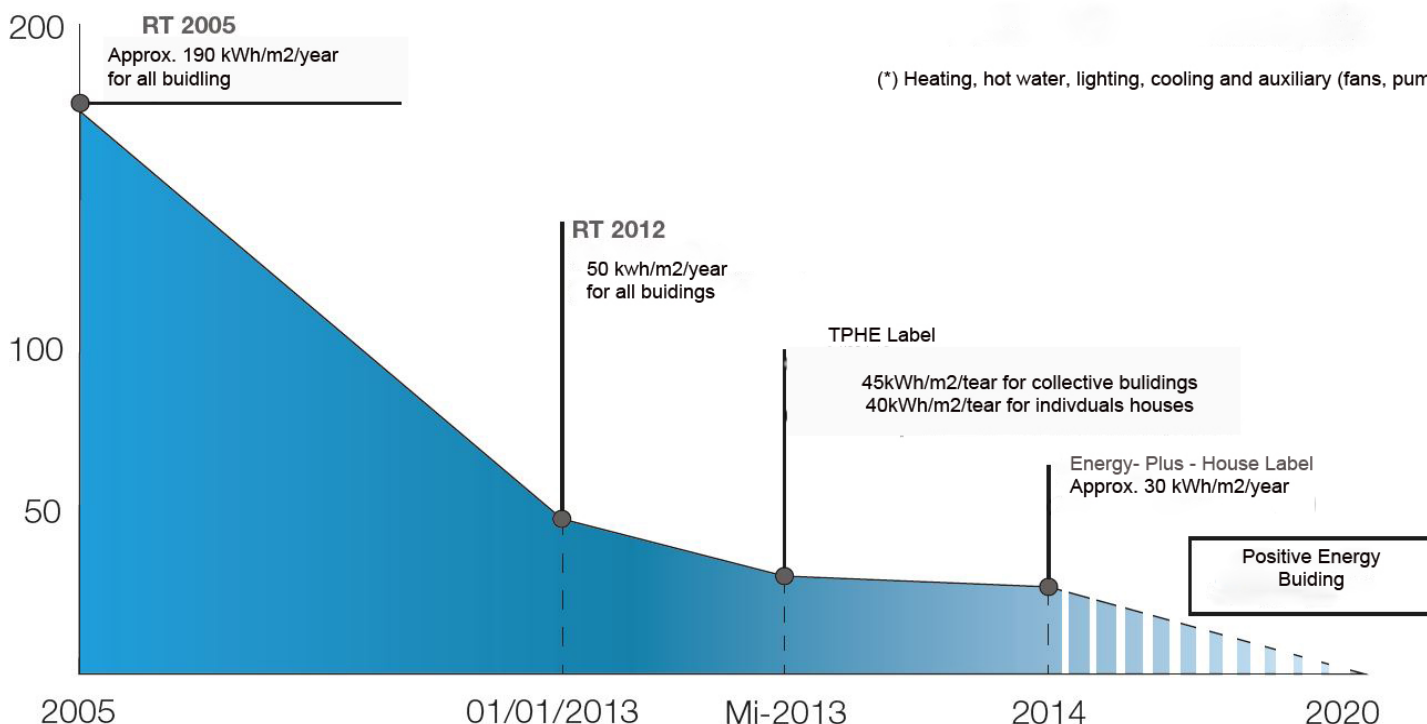
Building comfort during summer

After five days of heat exposure, the building's interior temperature must not exceed a certain level. This criterion is called TIC (conventional indoor temperature).

Treatment of thermal bridges

RT 2012 recommends that thermal bridges and airtightness be tightly controlled (the «blower door» test, for the latter, is now mandatory for collective buildings). These two criteria ensure the quality of the system's design and significantly reduce primary energy consumption. The thermal regulations (RT 2005, and now RT 2012) set maximum values for thermal bridges in new buildings.

Changes in the maximum consumption limits imposed for the five regulatory categories*



CSTB report on spray-on insulation performance

Multiple players in the trade have teamed up to conduct a study led by the CSTB to compare the thermal performance of spray-on insulation and rock wool panels.

According to the results of this study, the joints and metal fastenings of traditional insulation panels are a source of thermal bridges. An additional thermal bridge is formed due to the load-bearing structures, which are often impossible to insulate using this kind of system.

Conversely, spray-on insulation materials can cover all of the surface requiring insulation, providing continuous coverage and limiting thermal bridges.

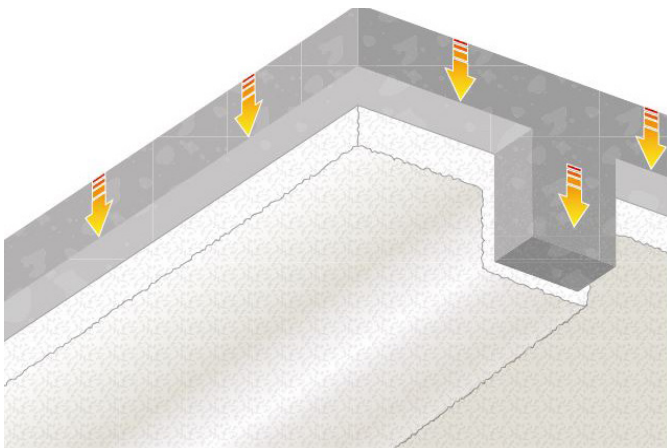
For this reason, although insulation panels may have better thermal conductivity lambda than spray-on insulation, insulation panels, due to their installation constraints, are likely to be less effective in terms of heat loss once they are installed.

Study DER/HTO2010-336-AD/LS conducted by the CSTB, which compared these two insulation types, confirms this reasoning.

The study report specifies that heat loss in a system insulated using spray-on coating is up to 34% lower than for a system using rock wool panels.

These conclusive results can be attributed to «the absence of integrated thermal bridges and the ability to insulate beams (with spray-on insulation)».

Thermal insulation on the underside of a concrete wall using FIBREXPAN®



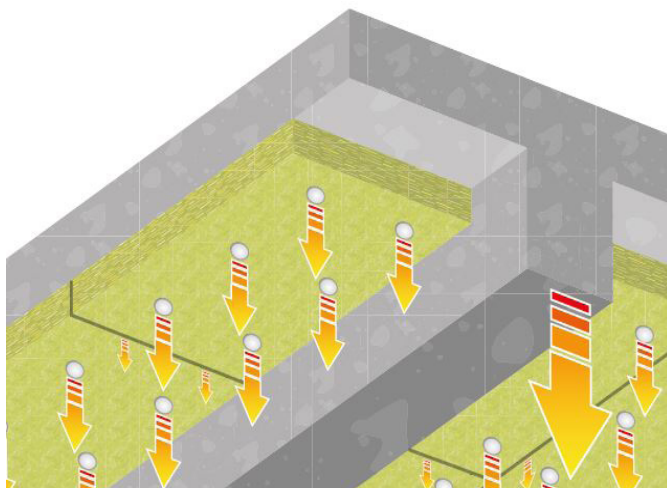
λ of 0.046 in 2010, now λ of 0.038

>Continuity of thermal insulation

>Beam insulation

**System heat loss:
0.44 to 0.46 W/m².K**

Thermal insulation on the underside of a concrete wall using rock wool panels



λ of 0.038 in 2010, still the same in 2016

>Seams between panels

>Attachments passing through the insulation

> Beams are difficult to insulate

**System heat loss:
0.64 to 0.70 W/m².K**

In the scenarios considered, the heat loss of the system insulated with FIBREXPAN is up to 34% less than that using rock wool panel insulation.

The metal attachments and the seams between the panels form integrated thermal bridges.

Conclusion of the CSTB report:

“For insulation with equal thermal resistance, the insulation technique using spray-on slag wool is superior due to the absence of integrated thermal bridges and the ability to insulate beams.”

The importance of acoustic control

Noise, or unwanted sound, can be an annoyance or, when it is excessive or prolonged, can disturb concentration, make speech difficult to hear or even damage hearing. Personal health, safety and productivity can be harmed as a result. As such, the control of background noise affects everybody.

Noise control

The occupants of a building experience sound in two ways:

- As reverberations (or echoes) when the sources of the sound are in the same space (we will discuss acoustic absorption or correction measures).
- As airborne noise or impacts when the sounds are produced in adjacent spaces (we will discuss sound insulation or noise reduction).

Acoustic correction

Sound absorption involves the reduction (or absorption/correction) of reverberating sound in the same space as the source of the sound. The usual method involves covering all or part of the space with a material that absorbs sound.

Sound waves' energy is partially deflected and partially absorbed when it encounters an object. The effectiveness with which a material absorbs sound is measured using its sound absorption coefficient, defined as the ratio of the sound energy absorbed to the total available sound energy on the surface.

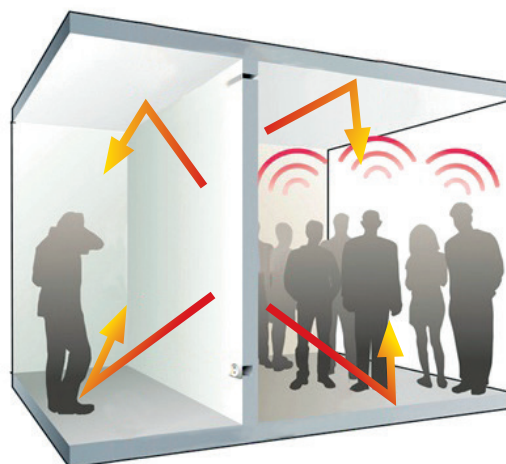
Acoustic correction

For example, a material that absorbs 75% of sound energy at a particular frequency that meets its surface, has a sound absorption coefficient s of 0.75 for this frequency. The sound absorption coefficient will vary by frequency.

Two methods are used to describe the absorbent properties of a material over the entire range of audible frequencies:

- The noise reduction coefficient (NRC) is the average of the sound absorption coefficients measured in the frequency range between 250 and 2000 Hertz.

- The weighted acoustic absorption coefficient α_{w} also takes into account the perception of the human ear, and is supplemented by a shape index that indicates when the product is especially effective in absorbing low (index L), mid (index M) or high (index H) frequencies.



Acoustic reduction

Increasing sound absorption in a space does not result in a corresponding increase in acoustic reduction between spaces, although it does help. There is no direct relationship between correction and reduction. It is therefore necessary to directly assess this property.

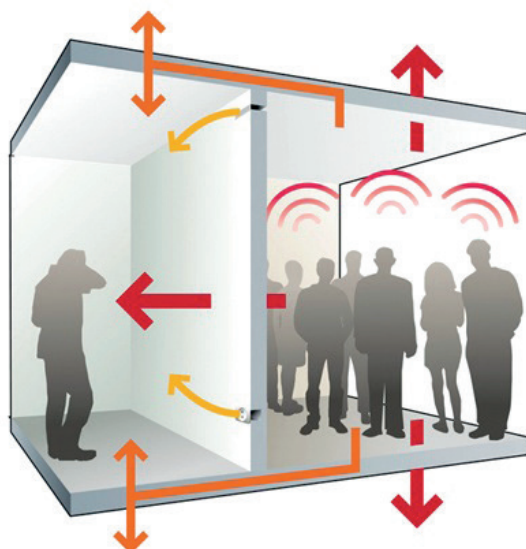
The measurement of a wall's acoustic reduction of airborne noises is carried out according to standard NF EN ISO 140-3, noting, for each frequency, the difference in intensity between the sound produced and the sound measured on the other side of the wall. This produces a curve representing the reduction R depending on the frequency.

This curve is used to determine the single weighted index R_w (C; C_{tr}) in dB.

Adapted terms C and C_{tr} are used to calculate:

- Reduction of neighbourhood noise and industrial or airport activities: $RA = R_w + C$ in dB
- Reduction of ground transport infrastructure noise: $RA_{tr} = R_w + C_{tr}$ in dB.

However, it is important to note that, in accordance with standard NF EN ISO 140-3: 1995, «The results of measurements [...] should not be directly applied in situ without taking other factors into account that influence acoustic insulation, including lateral transmission and the loss factor.»



Noise transmission: -> direct / -> indirect or lateral / -> parasitic

Selection of a suitable fire, thermal or acoustic protection system

For use with a concrete or steel structure, for example, the adviser must consider a series of questions when selecting the product to be sprayed.

1. Which kinds of performance are required (fire resistance, acoustic correction, thermal insulation)?
2. Will the product be exposed to physical damage?
3. Is weight an important factor?
4. Does price constitute an essential criterion for selection?
5. Is the installation speed essential?
6. Is the area difficult to access?
7. Are there interactions with other construction trades?
8. Must the product be used in the air circulation plenum?
9. Can the product be easily repaired?
10. Are the appearance and finishing type important?

This list of questions allows a product to be recommended with full background knowledge, preventing contractual issues that may require further work due to an unsuitable recommendation based only on the level of performance, such as a thermal resistance value. All advisers should first consider points 1 - 3 and 5 - 10.

Only when the product type best meeting the customer's needs is identified should point 4 (price) be included in the product evaluation process.

Advice and recommendations for the use of spray machine

Fibrous products

The machine is generally composed of:

- A feeding hopper
- A carding device
- A blowing device (fan, turbine or booster)
- A pipe to transport the spray mixture
- A spray gun to spray the mixture and water.

A qualified spray technician adjusts the flow rates according to the manufacturer's technical instructions.



Advice and recommendations for the use and application of fibrous spray-on products

Presentation of fibrous coatings

A fibrous mixture is a spray-on coating that comes in the form of wadding. The product is carded into a machine, then transported through a pipe, and launched using compressed air. The rim of the pipe is equipped with tubes supplied with water to moisten the product before it is sprayed onto the base.

The installation of fibrous products is detailed in DTU 27.1, standard NF P 15-202:2004.

Installation of fibrous coatings

Spray work must be carried out in compliance with the following conditions:

Installation must be performed by trained staff, ensured by the company's qualification.

The rooms must be roofed in and ventilated. The temperature of the room and the base must be above +5 °C and less than 45 °C.

Stone or concrete bases must be dry (drying period of at least 45 days for new bases).

If required by the specific contractual documents (DPM), metal structures must have been treated with the anticorrosive protection specified in these documents.

For fire protection applications, please refer to the classification or description report.

The building fixation devices to be implemented after spraying must be in place and the hoppers must be recapped before spraying to restore the stability of the base.

The building must not be subjected to impacts or vibrations during the work, nor during the period required for the product to take on its mechanical characteristics. This period depends on the type of product and the temperature and humidity conditions.

It is important to ensure that the recommended primer is carefully applied. If unsure, please contact our technical department.

Note: The qualification for the work in question is 7142 (Thermal insulation - Spray-on acoustic correction - Injection) or 7143 (Passive fire protection).



General Fire Protection Information

i

Fire protection of concrete structures

page 13

i

Fire protection of steel structures

page 14

i

**Fire protection of concrete floors with structural
stell floor trays**

page 15

i

**Fire protection of ventilation and smoke
extraction ducts**

**pages
16 and 17**

The fire stability of reinforced-concrete structures and supports is ensured by limiting temperature increases in the steel and framework enclosed in the concrete.

Forecasting methods to calculate the behaviour of concrete structures in the presence of fire are described in Eurocode NF EN 1992-1-2. They specify that concrete structural elements are fire resistant for 2 hours when their minimum thickness is 12cm and the coating on the steel is 4cm thick.

In nearly all buildings, the coating is normally 2 cm. It is for this reason that concrete elements require fire protection that compensates for this difference in thickness.

Ribbed slabs

The undersides of concrete floors are protected in exactly the same way as other structural elements, with the same fire-resistant products.

Floor slabs

The undersides of concrete or ceramic floor slabs with a grooved underside are protected in the same way as other structural elements with the same protective products.

For a ceramic floor slab protected with FIBROFEU®, a sheet of expanded metal is required.

Projiso offers multiple concrete structure fire protection solutions Fibrous coatings made from mineral wool (FIBREXPAN®, FIBROFEU®).

A product is selected depending on various factors specific to the construction site.

Excerpt from NF EN 1992-1-2

Filled slabs

Duration of resistance to fire	60 min	90 min	120 min	180 min	240 min
Slab thickness (mm)	80	100	120	150	175
Steel coating (mm)	20	30	40	55	65

Rectangular beams (beams on single supports)

Duration of resistance to fire	60 min	90 min	120 min	180 min	240 min
Beam thickness (mm)	120	150	200	240	280
Steel coating (mm)	40	55	65	80	90

Rectangular beams (continuous beams)

Duration of resistance to fire	60 min	90 min	120 min	180 min	240 min
Beam thickness (mm)	120	150	200	240	280
Steel coating (mm)	25	35	45	60	75

Load-bearing walls (exposed on one side)

Duration of resistance to fire	60 min	90 min	120 min	180 min	240 min
Wall thickness (mm)	130	140	160	210	270
Steel coating (mm)	10	25	35	50	60

The above tables specify the minimum thicknesses of structures and steel coatings to ensure that they have the required resistance to fire.

When the thicknesses of concrete structures are insufficient to achieve the desired fire resistance, the application of a spray-on product can be used to supply the missing thickness.

Critical temperature

Temperature increases significantly change the mechanical properties of steel.

At 400 °C, steel's yield strength is reduced to 60% its initial value. It has been proven that a steel structure subjected to heat can no longer perform its load-bearing functions after a certain amount of time, and will collapse. The temperature at which this occurs is called the critical temperature.

The critical temperature will change depending on the weight of the initial load and will depend on the admissible level of stress and the nature of this stress.

For the purpose of simplification, the following minimal critical temperature values may be used, based on Eurocode 1993-1-2:

- 500 °C for compressed elements or elements subject to bending and axial compression.

- 540 °C for isostatic beams and tensioned elements.

- 570 °C for hyperstatic beams.

Section factor

Section factor S/V expresses the relationship between the surface exposed to thermal flow S [m²] and the volume of an element by length unit [m³]. Its value considerably influences the behaviour of the structural element when exposed to fire.

An element with an S/V quotient [m⁻¹] with a low value will heat much more slowly than an element with a high section factor. It will therefore be more resistant to fire.

The following table provides the section factors for the commonly-used metal sections for beams exposed on 3 sides and posts exposed on 4 sides.

For other types, contact Projiso's technical department.

Section factors of commonly-used metal sections (in m⁻¹)

Metal beams exposed on 3 sides

	HEA	HEB	IPE	IPN	UAP
80	-	-	371	346	267
100	218	180	336	302	253
120	221	167	311	269	-
130	-	-	-	-	236
140	209	155	291	239	-
150	-	-	-	-	210
160	190	140	269	220	-
175	-	-	-	-	202
180	186	131	254	200	-
200	175	122	235	185	191
220	162	116	221	171	183
240	148	108	205	161	-
250	-	-	-	-	169
260	141	105	-	149	-
270	-	-	198	-	162
280	136	102	-	139	-
300	127	96	188	131	151
320	118	92	-	124	-
330	-	-	175	-	-
340	112	89	-	117	-
360	108	86	163	110	-
380	-	-	-	105	-
400	102	83	153	100	-
425	-	-	-	95	-
450	97	78	144	90	-
475	-	-	-	85	-
500	92	77	133	81	-
550	91	76	125	76	-

Metal beams exposed on 4 sides

	HEA	HEB	IPE	IPN	UAP
80	-	-	431	402	309
100	266	219	390	350	291
120	268	202	360	310	-
130	-	-	-	-	268
140	253	188	336	275	-
150	-	-	-	-	239
160	231	170	310	253	-
175	-	-	-	-	228
180	226	158	293	230	-
200	212	148	269	212	214
220	196	140	254	196	205
240	179	131	236	184	-
250	-	-	-	-	188
260	171	127	-	170	-
270	-	-	227	-	180
280	165	124	-	159	-
300	153	116	216	150	168
320	142	110	-	141	-
330	-	-	200	-	-
340	135	106	-	133	-
360	129	103	186	125	-
380	-	-	-	119	-
400	121	98	174	113	-
425	-	-	-	107	-
450	113	92	163	101	-
475	-	-	-	96	-
500	107	89	150	91	-
550	105	88	141	85	-

Working principle

The fibrous coating around a metal structure slows the heating speed of the steel, thereby improving its behaviour when exposed to fire.

The thickness of the coating to install will vary depending on:

- The type of protective material
- The section factor of the section to protect
- The critical temperature of the section to protect

Coating offered by Projiso

- A dry fibrous coating made from mineral wool, FIBROFEU®

Installation

- The base is untreated or rustproofed steel; while our products do not increase steel corrosion, a base treated with an alkyd or epoxy primer is recommended for long-term resistance to corrosion.
- The base must be clean, dry, free of dust, rolling residue, rust, oil or any other contaminant that may affect adhesion.
- A suitable primer must be applied before the fire protection coating is applied.

On the following pages, you will find examples of installation thicknesses.

Fire protection of concrete floors with structural steel floor trays

The issues encountered in the fire protection of concrete floors with structural steel floor trays are not fundamentally different from those presented by the protection of reinforced concrete floors.

Indeed, this also requires that the steel, which is visible in this case, be prevented from increasing in temperature.

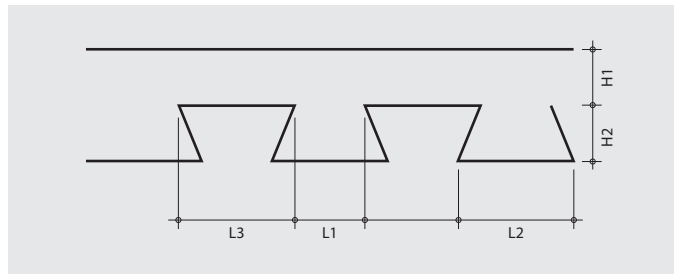
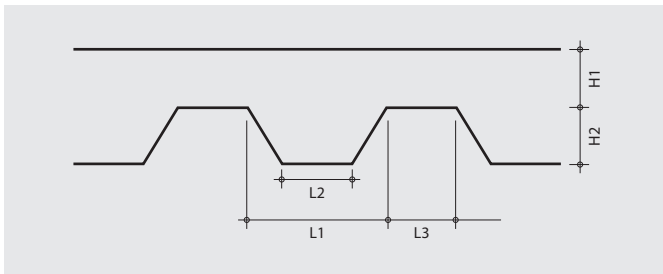
Projiso offers a fire-resistant solution:

- A fibrous coating made from mineral wool

The solution for the protection of mixed slabs with structural steel floor trays offered by Projiso can be used as long as the following conditions are met:

- Structural steel floor trays with a currently valid Technical Notice
- Structural steel floor tray sheet thickness greater than or equal to 0.75 mm
- Undulation trough width (L2) of the structural steel floor trays less than or equal to 187 mm
- Undulation crest (H2) of the structural steel floor trays less than or equal to 87 mm
- Applies to all mixed slabs with trapezoidal structural steel floor trays with an effective thickness* greater than or equal to 73 mm
- Applies to all mixed slabs with dovetailed structural steel floor trays with an effective thickness* greater than or equal to 80 mm

$$* \text{Effective thickness} = H1 + \frac{H2 \times (L1 + L2) / 2}{L1 + L3}$$



Ventilation ducts

In the event of a fire, ventilation ducts ensure that fresh air is brought in and the neighbouring rooms are overpressurized. These ducts sometimes pass through areas where the fire is active before reaching protected areas. It is therefore essential to ensure that the ventilation ducts have the following properties, whether the fire is outside (normal functioning) or inside the duct (if the duct has been damaged):

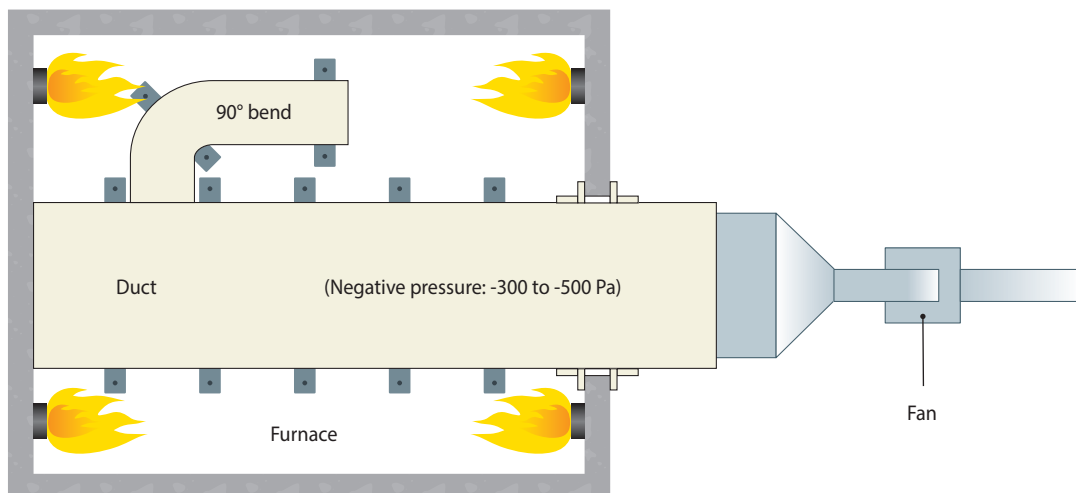
- Fireproofed, so as to not spread the fire from one room to another
- Thermal insulation to limit temperature increases
- Limited warping and mechanical resistance of the duct and its system so it can fulfil its function for the intended timespan
- Smoke tightness (optional) to limit the spread of asphyxiant gases.

To ensure this, standard EN 1366-1 offers two types of tests:

- «Duct A» test: the fire is outside the duct, which is kept at negative pressure. This test primarily serves to measure the fire and smoke resistance of the duct, but also its thermal insulation and its mechanical resistance in the event of an external fire.
- «Duct B» test: the fire is outside and inside the duct, where airflow is provided by a fan; temperature measurements are taken outside the furnace. This test primarily serves to measure the thermal insulation of the duct walls when the fire is inside, but also its behaviour when damaged; the fan at the end of the duct is also regularly stopped to simulate a breakdown.

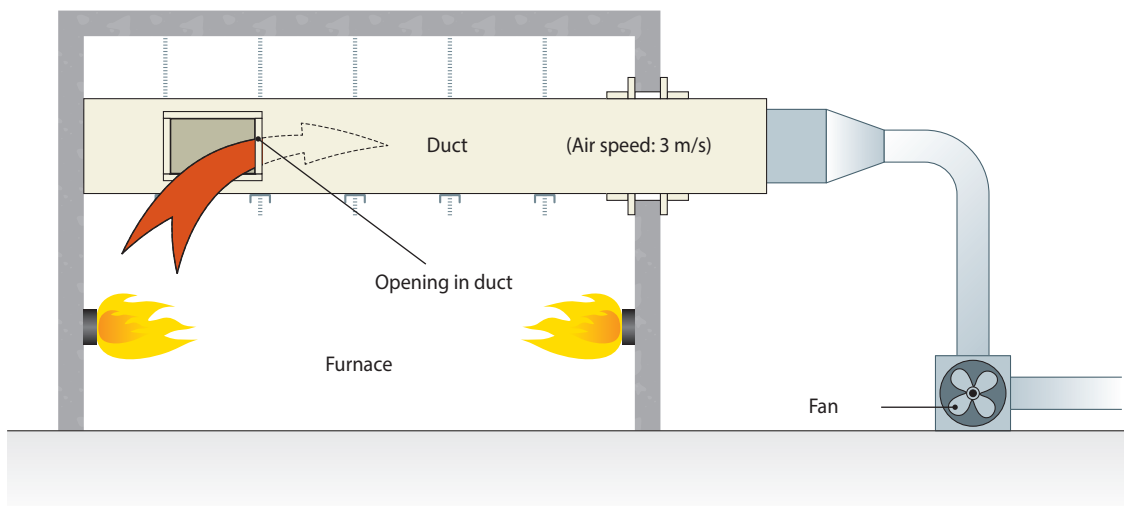
Duct A - View from above

Main purpose: Measure resistance to flame, smoke and hot and flammable gases in the event of an exterior fire.



Duct B - Side view

Main purpose: Measure thermal insulation.



Smoke extraction ducts

The role of the smoke extraction ducts is to extract hot exhaust air to limit temperature increases in the rooms and facilitate the intervention of emergency personnel. In addition to the properties of the ventilation ducts, the smoke extraction ducts must exhibit the following properties:

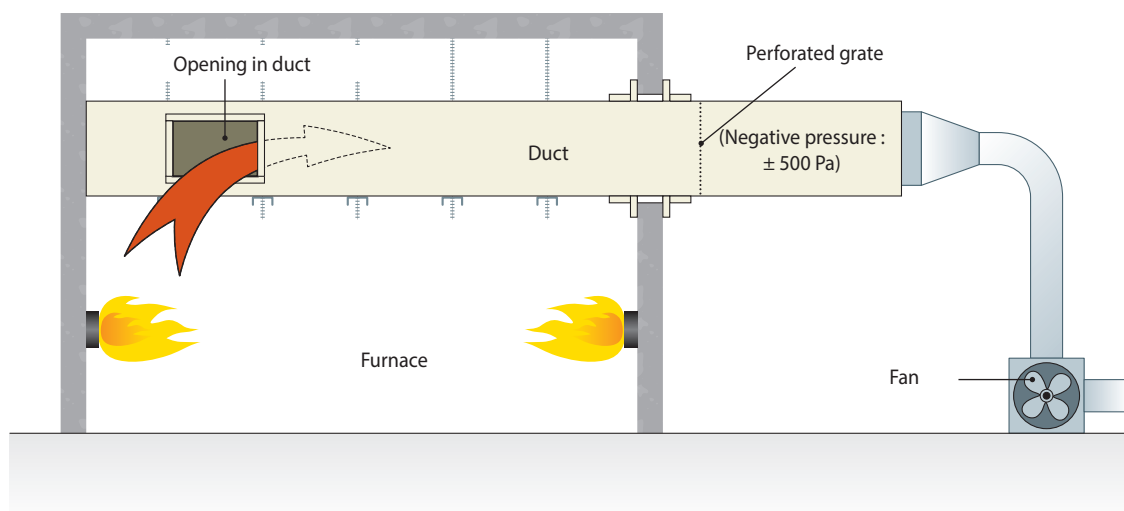
- Mechanical resistance when the fire is inside and outside the duct.
- Airtightness when the fire is only inside the duct and it is kept at negative pressure. This is necessary to ensure that the gases sucked in are the smoke and hot gases produced by the fire, and not the surrounding clean air filtering through leaks in the duct.

To demonstrate this performance, the ducts are tested according to standard EN 1366-8, which requires that ducts pass the tests of:

- Standard EN 1366-1 (ducts A and B)
- With additional «Duct C» test: the fire is inside and outside the duct. A fan extracts the hot air from the furnace and a perforated grate is placed between the section of the duct in the furnace and the exterior section; this creates negative pressure in the exterior section. This test checks the duct's mechanical resistance when it is subjected to fire inside and outside, and checks, using oxygen probes, that the air in the exterior section of the duct comes from the furnace area rather than from outside through duct leaks.

Duct C

Main purpose: Measure the airtightness and mechanical stability in the event of an interior fire.



Duct fire resistance classification

Following these tests, the performance of the ventilation or smoke extraction ducts is expressed using the following classifications:

- E: leak-tightness to flame and hot gases
- I: thermal insulation: temperature increase on the side not exposed to fire of less than 140°C on average and 180°C at any spot
- S: leak-tightness to smoke, optional
- ho and/or ve: depending on the configuration in which they were tested (horizontal or vertical)
- → i, o ← i or o ↔ i: only for ventilation ducts depending on whether they are tested with exterior fire (duct A, classification o → i) or interior fire (duct B, classification o ← i) or both (classification o ↔ i). Amended Decree of 22 March 2004 requires ventilation ducts installed in buildings to be checked with both exterior and interior fire tests. All FIBROGAIN® ventilation ducts have obtained both classifications and are therefore classified o ↔ i.
- Multi: for smoke extraction ducts only, indicates that they can be used to extract smoke in multi-compartment zones.
- Operating pressure: for smoke extraction ducts only, indicates the maximum admissible negative or positive pressure when cold.

Fibrexpans[®] technical datasheet and applications



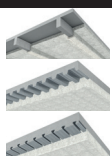
Fibrexpans[®] technical datasheet

page 19



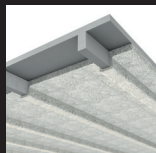
Fibrexpans[®] thermal insulation

page 20



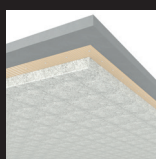
Fibrexpans[®] thermal conductivity

page 21



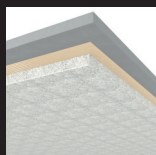
Fire protection of concrete structures using Fibrexpans[®]

page 22



Acoustic correction using Fibrexpans[®]

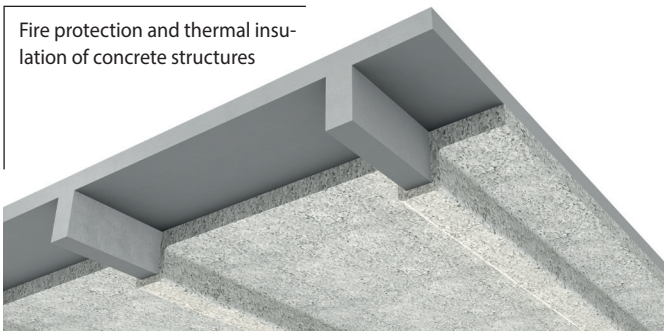
page 23



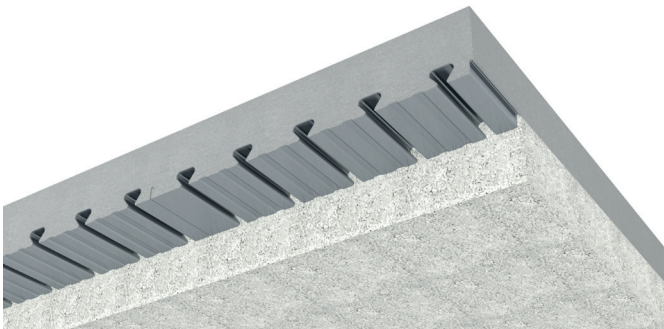
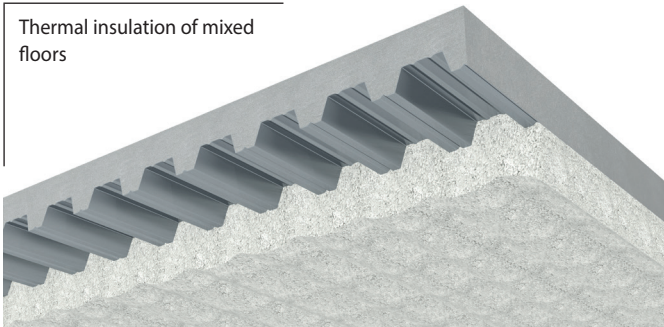
Acoustic reduction using Fibrexpans[®]

page 23

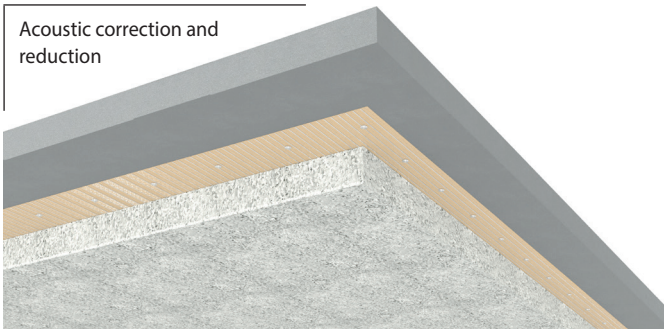
Fire protection and thermal insulation of concrete structures



Thermal insulation of mixed floors



Acoustic correction and reduction



Characteristics	
Colour	Off-white
Appearance	Rolled or compressed
Density	150 kg/m ³ ± 15 %
Reaction to fire	A1 – CSTB report RH 08-0388 A
pH	9
Initial setting time	24 hours at 20°C and 50% RH
Setting method	Hydraulic setting
Use temperature	5 - 45°C
Low biopersistence	According to Directive 97/69EC
Thermal conductivity	0.038 W/m.K(ACERMI certificate 16/224/1187)
VOC classification	A+
Other	FDES – SDS – CE Marking

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as use conditions are outside our control.

Areas of application

Thermal insulation
Acoustic reduction
Acoustic correction
Fire protection



Description

Fibrexpand® is a spray-on coating to be used as thermal insulation on surfaces not exposed to weathering. Fibrexpand® is a dry material composed of slag wool, hydraulic and semi-synthetic binders and various additives; it comes in the form of flakes.

Application

- Concrete floors and structures (thermal insulation, fire protection, acoustic correction and reduction)
- Joist floors and concrete floor slabs (thermal insulation, fire protection, acoustic correction and reduction)
- Concrete slabs with structural steel floor trays (thermal insulation and acoustic reduction)

Properties and performance

- Rot-proof
- Non-combustible
- Easy to install

Installation

Refer to the reference report and installation rules given in the Technical Notice (Technical Notice reference 20/12-345*V1).

Primers

PROJISO FIXO-B® (concrete) – PROJISO FIXO-M® (metal)

Finishing

PROJISO® FIXO-DUR

Environment and safety

Refer to the Environmental and Health Declaration (FDES) and Safety Data Sheet (SDS), available upon request.
Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

Packaging and storage

- Shelf life: maximum 12 months from the manufacturing date in unopened packaging.
- Storage conditions: protect from frost, humidity, excessive heat and excessive direct sunlight.
- Packaging: 20kg plastic bag.
- Palletising: 30 bags per pallet, or 600kg.

ACERMI

The Fibrexpan® product is ACERMI certified.

For the certified conductivity and thermal resistance values, see the following page.

ACERMI is the product of a dual commitment:

- The manufacturer's commitment to implementing a quality system and the resources required to monitor the quality of its products and maintain this quality over time.
- The commitment of the certifier, a competent, recognized independent organization, whose role is to guarantee the truthfulness of the claimed characteristics and reassess them regularly.

For more information, visit the website www.acermi.com.

Application document (DTA) and Technical Notice

ACERMI certification, which guarantees the product's thermal characteristics upon delivery, is supplemented by a Technical Application Document (a Technical Notice specific to products with CE marking). Fibrexpan is the subject of a DTA.

This specific document, which supplements DTU 27.1, validates:

- The installation of Fibrexpan up to 240 mm thick on a masonry or concrete base without an inner frame (except for altitudes greater than 900 m)
- The installation conditions for Fibrexpan on a wide range of bases, including insulation panels, plaster or gypsum panels, wood floors, etc...
- The precautions to be taken to ensure high-quality spraying.

The DTA also specifies a self-check method, which is essential to demonstrate that the performance guaranteed by ACERMI certification upon delivery is correctly reproduced on the construction site. The results of the self-checks are reported in the construction site datasheet.

Construction site datasheet

The purposes of the construction site datasheet are to:

- Indicate the quantity of spray-on insulation,
- Ensure the traceability of the bulk finished product from delivery until application on the construction site (part 2 of the datasheet),
- Guarantee thermal performance on the basis of a density and thickness installed by machine and by thickness.

The datasheet is prepared in three copies:

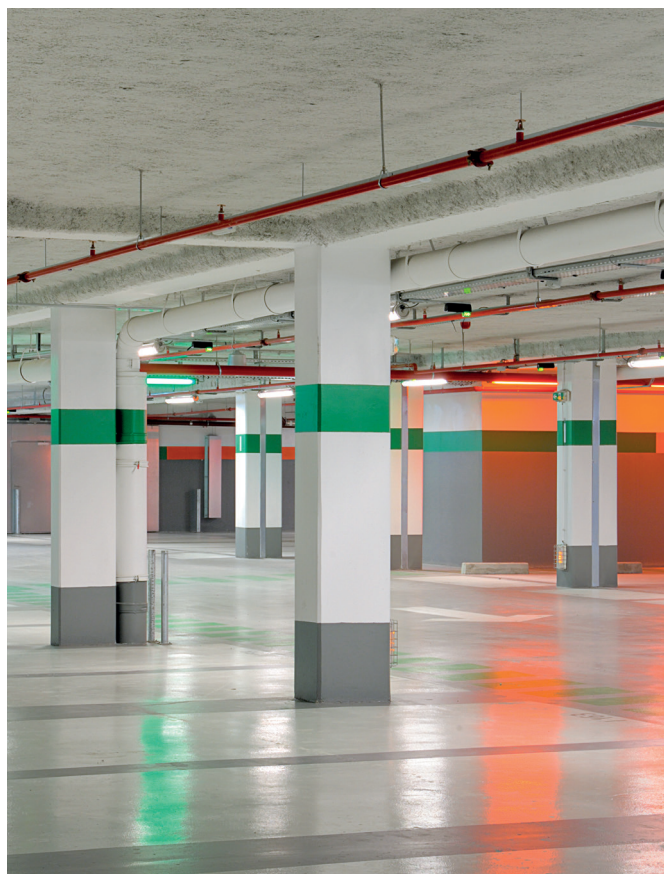
- One copy is kept by the spray technician,
- One copy is kept by the ordering entity,
- One copy is kept by the project owner.

These documents are to be kept for at least 10 years and in accordance with current regulations.

One datasheet should be filled out for each machine and each spray thickness (i.e. each setting).



Thermal, fire solution using Fibrexpan® with a Sidairless® finishing coating.



Thermal, fire solution using Fibrexpan®, raw finishing.

Thermal conductivity and resistance

Certified thermal conductivity: $\lambda = 0.038 \text{ W/m.K}$

Fibrexpan® thickness applied (mm)	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
R (m².K/W)	2,60	2,85	3,15	3,40	3,65	3,90	4,20	4,45	4,70	5,00	5,25	5,50	5,75	6,05	6,30

Fibrexpan thicknesses to apply depending on the thickness of the reinforced concrete slab and the desired heat transfer coefficient U, taking surface resistances into account, for a downward flow and a wall facing a closed, unheated room.

(Rs = 0.21 m².K/W):

Reinforced concrete: $\lambda = 2 \text{ W/m.K}$

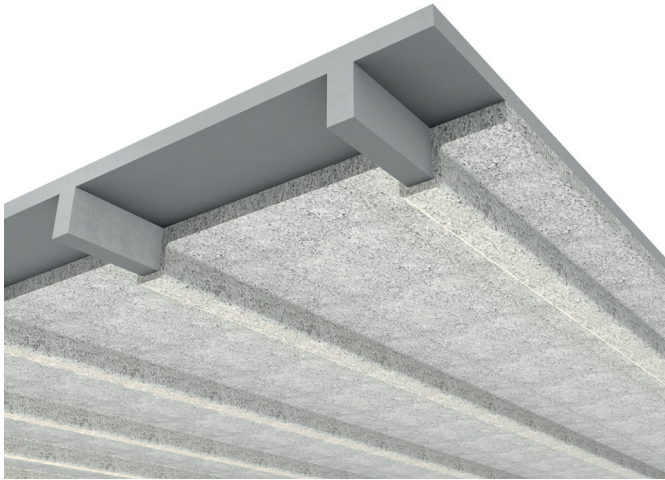
Fibrexpan: $\lambda = 0.038 \text{ W/m.K}$

Slab thickness in mm	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
Thermal resistance of concrete slab in m².K/W	0,050	0,055	0,060	0,065	0,070	0,075	0,080	0,085	0,090	0,095	0,100	0,105	0,110	0,115	0,120
Heat transfer coefficient U in W/m².K	0,17	215	215	215	215	215	215	215	215	215	215	215	215	215	215
	0,19	195	190	190	190	190	190	190	190	190	190	190	190	190	190
	0,21	175	175	175	170	170	170	170	170	170	170	170	170	170	170
	0,23	155	155	155	155	155	155	155	155	155	155	155	155	155	155
	0,25	145	145	145	145	145	140	140	140	140	140	140	140	140	140
	0,27	130	130	130	130	130	130	135	130	130	130	130	130	130	130
	0,29	120	120	120	120	120	120	120	120	120	120	120	120	120	120
	0,31	115	115	115	115	110	110	110	110	110	110	110	110	110	110
	0,33	105	105	105	105	105	105	105	105	105	105	105	105	105	105
	0,35	100	100	100	100	100	100	100	95	95	95	95	95	95	95
	0,37	95	95	90	90	90	90	90	90	90	90	90	90	90	90
	0,39	85	85	85	85	85	85	85	85	85	85	85	85	85	85
	0,41	80	80	80	80	80	80	80	80	80	80	80	80	80	80
	0,43	80	80	80	75	75	75	75	75	75	75	75	75	75	75
	0,45	75	75	75	75	75	75	75	75	70	70	70	70	70	70
	0,47	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	0,49	65	65	65	65	65	65	65	65	65	65	65	65	65	65
	0,51	65	65	65	65	65	65	65	60	60	60	60	60	60	60
	0,53	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	0,55	60	60	60	60	55	55	55	55	55	55	55	55	55	55
0,57	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
0,59	55	55	55	55	55	50	50	50	50	50	50	50	50	50	
0,61	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
0,63	50	50	50	50	50	50	50	50	50	45	45	45	45	45	
0,65	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
0,67	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
0,69	45	45	45	45	45	45	45	40	40	40	40	40	40	40	
0,71	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
0,73	40	40	40	40	40	40	40	40	40	40	40	40	40	40	

For example, to obtain a heat transfer coefficient U = 0.30 W/m².K with a slab 180 mm thick, 120 mm of Fibrexpan must be sprayed on.

R/REI 60 - 240

Area of validity



- Application on solid reinforced concrete elements
- Protection thickness for flat slabs between 44 and 215 mm
- Protection thickness for load-bearing walls between 44 and 80 mm
- Protection thickness for rectangular beams between 40 and 80 mm
- Application on exposed and poured concrete structures with mineral oil or emulsion separating agents
- Application on flat slabs, rectangular beams, walls exposed on one side only
- Flat slab thickness of at least 120 mm
- Épaisseur des murs porteurs supérieure ou égale à 130 mm
- Rectangular beam width of at least 150 mm
- Base treated with PROJISO FIXO-B® before application

Required thickness for the protection of reinforced concrete slabs sized in accordance with EUROCODE EN 1992-1-2

Slab Thickness \geq 120 mm Any initial steel coating	Performance				
	REI 60	REI 90	REI 120	REI 180	REI 240
Minimum Fibrexpan® thickness (in mm)	44	44	44	44	90

Required thickness for the protection of reinforced concrete beams sized in accordance with EUROCODE EN 1992-1-2

Beam on single supports Width \geq 150 mm	Performance																			
	R 60				R 90				R 120				R 180				R 240			
Initial steel coating (in mm)	0	10	20	30	0	10	20	30	0	10	20	30	0	10	20	30	0	10	20	30
Fibrexpan® thickness (in mm)	40	40	40	40	40	40	40	40	40	40	40	40	50	45	40	40	65	55	50	45

Required thickness for the protection of reinforced concrete beams sized in accordance with EUROCODE EN 1992-1-2

Continuous beam Width \geq 150 mm	Performance																			
	R 60				R 90				R 120				R 180				R 240			
Initial steel coating (in mm)	0	10	20	30	0	10	20	30	0	10	20	30	0	10	20	30	0	10	20	30
Fibrexpan® thickness (in mm)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	55	50	50	50

Required thickness for the protection of load-bearing reinforced concrete walls sized in accordance with EUROCODE EN 1992-1-2

Wall exposed on one side only Thickness \geq 130 mm Any initial steel coating	Performance		
	REI 60	REI 90	REI 120
Minimum Fibrexpan thickness (in mm)	44	44	44

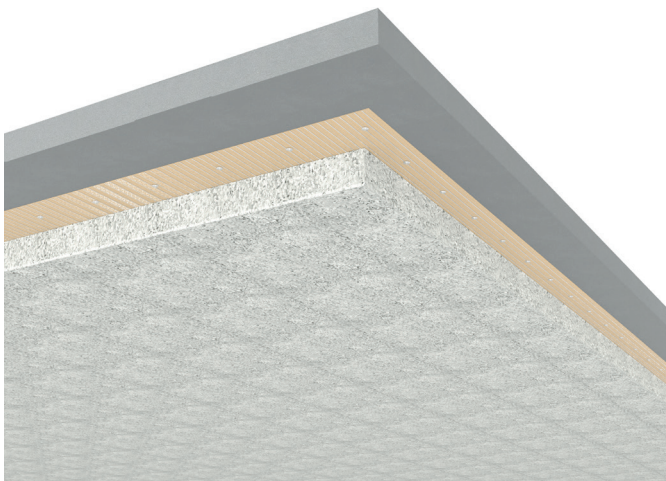
For all other applications, please contact us.

Fibrexpan® - Study report : CSTB

Fibrexpan® thickness	Base	Fréquency in hertz																	α_w	
		100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000		5000
		Absorption coefficient α_s																		
100 mm calculated	Solid	0,48	0,53	0,58	0,62	0,64	0,65	0,79	0,79	0,79	0,82	0,84	0,88	0,90	0,91	0,92	0,93	0,94	0,95	0,85
110 mm calculated	Solid	0,50	0,55	0,60	0,63	0,64	0,71	0,80	0,78	0,80	0,83	0,85	0,88	0,90	0,92	0,93	0,94	0,94	0,95	0,85
120 mm calculated	Solid	0,53	0,57	0,61	0,63	0,64	0,82	0,78	0,79	0,82	0,84	0,88	0,89	0,91	0,92	0,93	0,94	0,95	0,95	0,85
130 mm calculated	Solid	0,55	0,59	0,63	0,64	0,75	0,80	0,79	0,81	0,83	0,86	0,89	0,90	0,92	0,93	0,94	0,94	0,95	0,95	0,90
140 mm calculated	Solid	0,57	0,61	0,64	0,65	0,85	0,80	0,81	0,83	0,84	0,88	0,90	0,91	0,92	0,93	0,94	0,95	0,95	0,95	0,90
150 mm calculated	Solid	0,59	0,63	0,63	0,80	0,82	0,81	0,83	0,84	0,87	0,90	0,91	0,92	0,93	0,94	0,95	0,95	0,95	0,96	0,90
160 mm measured	Solid	0,31	0,56	0,73	0,86	0,80	0,87	0,86	0,90	0,97	1,01	0,97	1,01	1,01	1,00	0,98	1,01	1,03	1,04	1,00

Primers: PROJISO FIXO-B® and PROJISO FIXO-M®

Study report : CSTB



Projiso offers an innovative solution based on the spraying of Fibrexpan®, which improves acoustic insulation between superimposed spaces.

Installation principle

Attachment of an expanded metal sheet with a paper covering to the concrete slab or without expanded metal sheet to the concrete slab.

Spraying of one or multiple layers of Fibrexpan® to the desired thickness.

The following table gives acoustic reduction values R_w+C for a raw concrete slab and a slab covered with varying thicknesses of Fibrexpan® coating installed as described above.

Rw+C (dB)	Reinforced concrete slab thickness												
	140 mm	150 mm	160 mm	170 mm	180 mm	190 mm	200 mm	210 mm	220 mm	230 mm	240 mm	250 mm	
Fibrexpan® thickness without grilling plus sidairless	80 to 120 mm	50	52	53	54	55	56	57	58	58	59	60	61
	130 to 160 mm	49	51	52	53	54	55	56	57	58	58	59	60
	80 to 160 mm	49	51	52	53	54	55	56	57	58	58	59	60
Fibrexpan® thickness + grilling + sidairless	100 to 110 mm	56	58	59	60	61	62	63	64	64	65	66	67
	120 to 130 mm	57	59	60	61	62	63	64	65	65	66	67	68
	140 to 150 mm	58	60	61	62	63	64	65	66	66	67	68	69
	160 mm	59	61	62	63	64	65	66	67	67	68	69	70
	80 to 160 mm	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2	Adding +2

Example: A system composed of an 180 mm thick slab sprayed with 150 mm of Fibrexpan® installed as described above will have an acoustic reduction of $R_w+C = 63$ dB instead of 59 dB for the raw slab.

These values were obtained by calculations based on laboratory tests. Depending on the construction site and the installation conditions, on-site results may differ slightly.

Fibrofeu® technical datasheet and applications



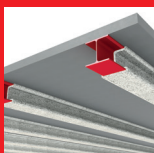
Fibrofeu® technical datasheet

page 25



Fire protection of concrete structures using Fibrofeu®

page 26



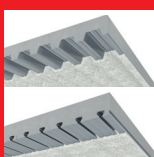
Fire protection of steel beams using Fibrofeu®

page 27



Fire protection of steel posts using Fibrofeu®

page 28



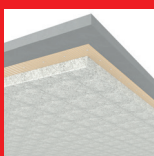
Fire protection of structural floor trays using Fibrofeu®

page 29



Fire protection of wood floors using Fibrofeu®

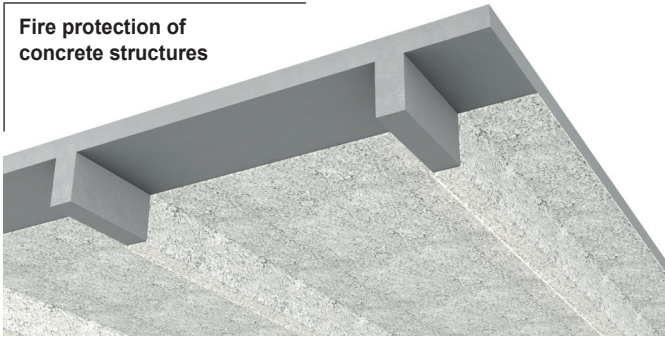
page 30



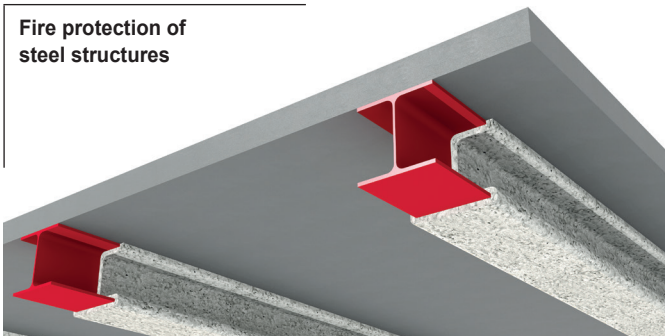
Acoustic correction using Fibrofeu®

page 30

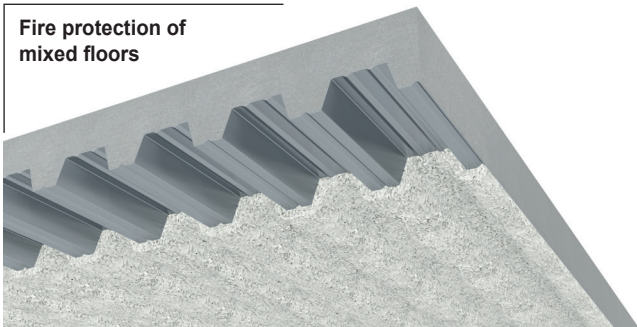
Fire protection of concrete structures



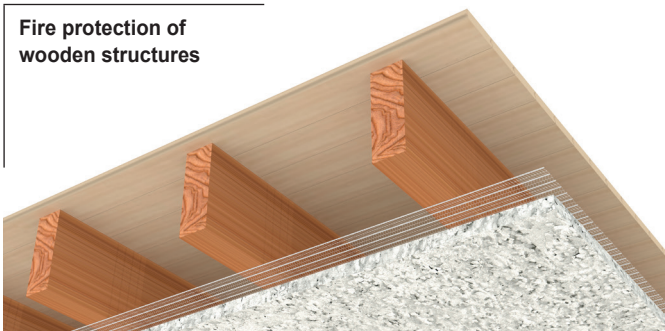
Fire protection of steel structures



Fire protection of mixed floors



Fire protection of wooden structures



Area of application

Fire protection



Product description

Fibrofeu® is a spray-on fibrous mixture used for fire protection. The material is composed of slag wool and hydraulic and inorganic binders. It comes in the form of small flakes.

Applications

- Concrete floors and structures
- Joist floors and floor slabs
- Concrete slabs with structural steel floor trays
- Wood floors (sprayed onto an expanded metal sheet)
- Steel structures

Properties and performance

- Rot-proof – Non-combustible
- Easy to install

Installation

Refer to the reference report and the installation rules specified in DTU 27.1.

Primers

PROJISO FIXO-B® (concrete) – PROJISO FIXO-M® (metal)

Finishing

PROJISO FIXO-DUR®

Environment and safety

Refer to the Environmental and Health Declaration (FDES) and Safety Data Sheet (SDS), available upon request. Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

Conditioning and packaging

- Shelf life: maximum 12 months from the manufacturing date with unopened packaging.
- Storage conditions: protect from frost, humidity, excessive heat and excessive direct sunlight.
- Packaging: 20kg plastic bag.
- Palletization: 30 bags per pallet, or 600 kg.

Characteristics

Colour	Off-white
Appearance	Rolled or compressed
Density	250 kg/m ³ ± 15 %
Réaction au feu	A1 – SINTEF report 102010.02/09.024A
pH	10
Initial setting time	24 hours at 20°C and 50% RH
Setting method	Hydraulic setting
Use temperature	5 - 45°C
Low biopersistence	According to Directive 97/69/EC
Thermal conductivity	0,05 W/m.k (cf RT 2012)
VOC classification	A+
Other	FDES – SDS – CE Marking

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as use conditions are outside our control.

R/REI 60 - 240



Area of validity

- Application on solid reinforced concrete elements
- Protection thickness for flat slabs or walls between 14 and 36 mm
- Protection thickness for rectangular beams between 17 and 48 mm
- Application on exposed or poured concrete structures with mineral oil or emulsion separating agents
- Application on flat slabs, rectangular beams, walls exposed on one side only
- Flat slab thickness of at least 120 mm
- Load-bearing wall thickness of at least 130 mm
- Rectangular beam width of at least 150 mm
- Base treated with PROJISO FIXO-B® primer before application

Required thickness for the protection of reinforced concrete slabs sized in accordance with EUROCODE EN 1992-1-2

Slab Thickness 120 mm Any initial steel coating	Performance				
	REI 60	REI 90	REI 120	REI 180	REI 240
Minimum Fibrofeu® thickness (in mm)	14	14	14	17	36

Required thickness for the protection of reinforced concrete beams sized in accordance with EUROCODE EN 1992-1-2

Beam on single supports Width ≥ 150 mm	Performance				
	R 60	R 90	R 120	R 180	R 240
Initial steel coating (in mm)	0 10 20 30	0 10 20 30	0 10 20 30	0 10 20 30	0 10 20 30
Fibrofeu® thickness (in mm)	17 17 17 17	17 17 17 17	20 17 17 17	32 26 20 17	48 48 48 48

Required thickness for the protection of reinforced concrete beams sized in accordance with EUROCODE EN 1992-1-2

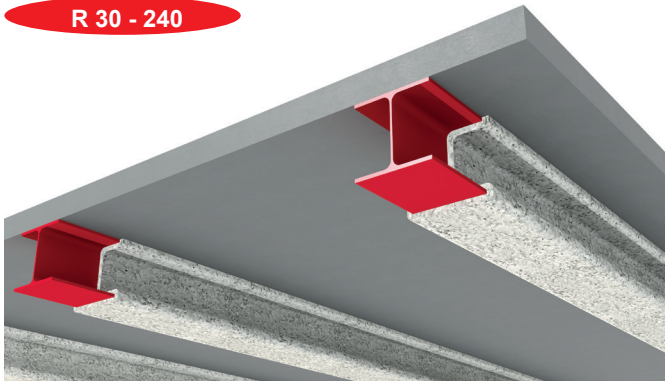
Continuous beam Width ≥ 150 mm	Performance				
	R 60	R 90	R 120	R 180	R 240
Initial steel coating (in mm)	0 10 20 30	0 10 20 30	0 10 20 30	0 10 20 30	0 10 20 30
Fibrofeu® thickness (in mm)	17 17 17 17	17 17 17 17	17 17 17 17	20 17 17 17	48 48 48 48

Required thickness for the protection of reinforced concrete load-bearing walls sized in accordance with EUROCODE EN 1992-1-2

Wall exposed on one side Thickness ≥ 130 mm Any initial steel coating	Performance			
	REI 60	REI 90	REI 120	REI 180
Minimum Fibrofeu® thickness (in mm)	14	14	14	33

For all other applications, please contact us.

R 30 - 240



Area of validity

- Application on an untreated or rustproofed steel base; while our products do not increase steel corrosion, a treated base (galvanization or an alkyd, epoxy, zinc or zinc silicate epoxy primer) is recommended for long-term resistance to corrosion.
- Application on a clean, dry base free of dust, rolling residue, rust, oil, or any other contaminant that may affect adhesion.
- Application on a base first treated with PROJISO FIXO-M® primer.
- Critical temperature: 570°C.

Required thickness for R 30 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	15	15	15
100	15	15	15	15	15
120	15	15	15	15	-
130	-	-	-	-	15
140	15	15	15	15	-
150	-	-	-	-	15
160	15	15	15	15	-
175	-	-	-	-	15
180	15	15	15	15	-
200	15	15	15	15	15
220	15	15	15	15	15
240	15	15	15	15	-
250	-	-	-	-	15
260	15	15	-	15	-
270	-	-	15	-	15
280	15	15	-	15	-
300	15	15	15	15	15
320	15	15	-	15	-
330	-	-	15	-	-
340	15	15	-	15	-
360	15	15	15	15	-
380	-	-	-	15	-
400	15	15	15	15	-
425	-	-	-	15	-
450	15	15	15	15	-
475	-	-	-	15	-
500	15	15	15	15	-
550	15	15	15	15	-
600	15	15	15	15	-

Required thickness for R 60 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	35	33	28
100	24	20	32	30	27
120	25	19	31	28	-
130	-	-	-	-	25
140	23	18	30	25	-
150	-	-	-	-	23
160	21	16	28	24	-
175	-	-	-	-	23
180	21	16	27	22	-
200	20	15	25	21	22
220	19	15	25	20	21
240	17	15	23	19	-
250	-	-	-	-	19
260	17	15	-	17	-
270	-	-	22	-	19
280	16	15	-	16	-
300	15	15	21	16	18
320	15	15	-	15	-
330	-	-	20	-	-
340	15	15	-	15	-
360	15	15	19	15	-
380	-	-	-	15	-
400	15	15	18	15	-
425	-	-	-	15	-
450	15	15	17	15	-
475	-	-	-	15	-
500	15	15	16	15	-
550	15	15	15	15	-
600	15	15	15	15	-

Required thickness for R 90 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	54	52	45
100	40	35	51	49	44
120	41	33	50	45	-
130	-	-	-	-	42
140	39	32	48	42	-
150	-	-	-	-	39
160	36	28	45	40	-
175	-	-	-	-	39
180	35	28	44	37	-
200	35	27	42	36	37
220	33	25	41	35	36
240	30	23	39	33	-
250	-	-	-	-	33
260	30	23	-	30	-
270	-	-	37	-	33
280	28	23	-	28	-
300	27	21	36	28	32
320	25	21	-	27	-
330	-	-	35	-	-
340	25	19	-	25	-
360	23	19	33	23	-
380	-	-	-	23	-
400	23	19	32	21	-
425	-	-	-	21	-
450	21	17	30	19	-
475	-	-	-	19	-
500	21	17	28	19	-
550	21	17	27	17	-
600	19	17	25	15	-

Required thickness for R 120 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	71	69	62
100	56	49	69	66	61
120	57	47	67	62	-
130	-	-	-	-	58
140	54	45	65	58	-
150	-	-	-	-	54
160	51	41	62	56	-
175	-	-	-	-	54
180	51	41	61	53	-
200	49	39	58	51	53
220	47	36	57	49	51
240	43	34	54	47	-
250	-	-	-	-	47
260	43	34	-	43	-
270	-	-	53	-	47
280	41	34	-	41	-
300	39	31	51	41	45
320	36	31	-	39	-
330	-	-	49	-	-
340	36	28	-	36	-
360	36	28	47	34	-
380	-	-	-	34	-
400	34	28	45	31	-
425	-	-	-	31	-
450	31	26	43	28	-
475	-	-	-	28	-
500	31	26	41	28	-
550	31	26	39	26	-
600	28	26	36	23	-

Required thickness for R 180 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	-	-	-
100	-	77	-	-	-
120	-	74	-	-	-
130	-	-	-	-	-
140	-	72	-	-	-
150	-	-	-	-	-
160	79	66	-	-	-
175	-	-	-	-	-
180	79	66	-	-	-
200	77	63	-	79	-
220	74	60	-	77	79
240	69	56	-	74	-
250	-	-	-	-	74
260	69	56	-	69	-
270	-	-	-	-	74
280	66	56	-	66	-
300	63	52	79	66	72
320	60	52	-	63	-
330	-	-	77	-	-
340	60	48	-	60	-
360	56	48	74	56	-
380	-	-	-	56	-
400	56	48	72	52	-
425	-	-	-	52	-
450	52	44	69	48	-
475	-	-	-	48	-
500	52	44	66	48	-
550	52	44	63	44	-
600	48	44	60	39	-

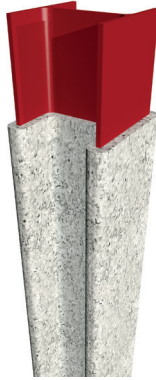
Required thickness for R 240 performance

	HEA	HEB	IPE	IPN	UAP
220	-	-	-	-	-
240	-	78	-	-	-
250	-	-	-	-	-
260	-	78	-	-	-
270	-	-	-	-	-
280	-	78	-	-	-
300	-	73	-	-	-
320	-	73	-	-	-
330	-	-	-	-	-
340	-	68	-	-	-
360	78	68	-	78	-
380	-	-	-	78	-
400	78	68	-	73	-
425	-	-	-	73	-
450	73	62	-	68	-
475	-	-	-	68	-
500	73	62	-	68	-
550	73	62	-	62	-
600	68	62	-	56	-

Note:

These thicknesses are in mm and were calculated for a critical temperature of 570°C, for beams exposed on 3 sides.

R 30 - 240



Area of validity

- Application on an untreated or rustproofed steel base; while our products do not increase steel corrosion, a treated base (galvanization or an alkyd, epoxy, zinc or zinc silicate epoxy primer) is recommended for long-term resistance to corrosion.
- Application on a clean, dry base free of dust, rolling residue, rust, oil, or any other contaminant that may affect adhesion.
- Application on a base first treated with PROJISO FIXO-M® primer.
- Critical temperature: 500°C.

Required thickness for R 30 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	-	17	15
100	15	15	16	15	15
120	15	15	15	15	-
130	-	-	-	-	15
140	15	15	15	15	-
150	-	-	-	-	15
160	15	15	15	15	-
175	-	-	-	-	15
180	15	15	15	15	-
200	15	15	15	15	15
220	15	15	15	15	15
240	15	15	15	15	-
250	-	-	-	-	15
260	15	15	-	15	-
270	-	-	15	-	15
280	15	15	-	15	-
300	15	15	15	15	15
320	15	15	-	15	-
330	-	-	15	-	-
340	15	15	-	15	-
360	15	15	15	15	-
380	-	-	-	15	-
400	15	15	15	15	-
425	-	-	-	15	-
450	15	15	15	15	-
475	-	-	-	15	-
500	15	15	15	15	-
550	15	15	15	15	-
600	15	15	15	15	-

Required thickness for R 60 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	-	39	34
100	31	27	38	36	33
120	31	26	37	34	-
130	-	-	-	-	31
140	30	24	36	32	-
150	-	-	-	-	28
160	28	22	34	30	-
175	-	-	-	-	27
180	27	20	33	27	-
200	27	19	31	27	27
220	25	18	30	25	26
240	23	18	28	24	-
250	-	-	-	-	24
260	23	17	-	22	-
270	-	-	27	-	23
280	22	17	-	20	-
300	20	16	27	19	22
320	19	15	-	19	-
330	-	-	25	-	-
340	18	15	-	18	-
360	17	15	24	17	-
380	-	-	-	16	-
400	17	15	23	16	-
425	-	-	-	15	-
450	16	15	22	15	-
475	-	-	-	15	-
500	15	15	19	15	-
550	15	15	19	15	-
600	15	15	17	15	-

Required thickness for R 90 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	-	60	53
100	50	44	59	57	53
120	50	43	57	53	-
130	-	-	-	-	50
140	49	40	56	51	-
150	-	-	-	-	46
160	46	37	53	49	-
175	-	-	-	-	45
180	45	36	53	45	-
200	44	34	50	44	44
220	41	32	49	41	43
240	39	32	46	40	-
250	-	-	-	-	40
260	39	30	-	37	-
270	-	-	45	-	39
280	37	30	-	36	-
300	36	28	44	34	37
320	34	26	-	34	-
330	-	-	41	-	-
340	32	26	-	32	-
360	30	26	40	30	-
380	-	-	-	28	-
400	30	24	39	28	-
425	-	-	-	26	-
450	28	24	37	26	-
475	-	-	-	24	-
500	26	22	34	24	-
550	26	22	34	22	-
600	26	22	30	19	-

Required thickness for R 120 performance

	HEA	HEB	IPE	IPN	UAP
80	-	-	-	78	71
100	68	61	77	75	71
120	68	60	75	71	-
130	-	-	-	-	68
140	66	56	74	69	-
150	-	-	-	-	64
160	64	53	71	66	-
175	-	-	-	-	63
180	63	50	71	63	-
200	61	48	68	61	61
220	58	46	66	58	60
240	54	46	64	56	-
250	-	-	-	-	56
260	54	44	-	53	-
270	-	-	63	-	54
280	53	44	-	50	-
300	50	41	61	48	53
320	48	38	-	48	-
330	-	-	58	-	-
340	46	38	-	46	-
360	44	38	56	44	-
380	-	-	-	41	-
400	44	35	54	41	-
425	-	-	-	38	-
450	41	35	53	38	-
475	-	-	-	35	-
500	38	32	48	35	-
550	38	32	48	32	-
600	38	32	44	29	-

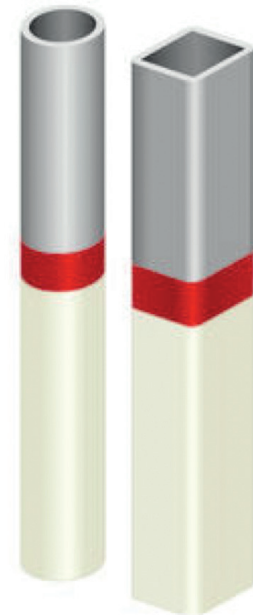
Required thickness for R 180 performance

	HEA	HEB	IPE	IPN	UAP
180	-	79	-	-	-
200	-	76	-	-	-
220	-	73	-	-	-
240	-	73	-	-	-
250	-	-	-	-	-
260	-	70	-	-	-
270	-	-	-	-	-
280	-	70	-	79	-
300	79	67	-	76	-
320	76	63	-	76	-
330	-	-	-	-	-
340	73	63	-	73	-
360	70	63	-	70	-
380	-	-	-	67	-
400	70	58	-	67	-
425	-	-	-	63	-
450	67	58	-	63	-
475	-	-	-	58	-
500	63	54	76	58	-
550	63	54	76	54	-
600	63	54	70	49	-

Note:

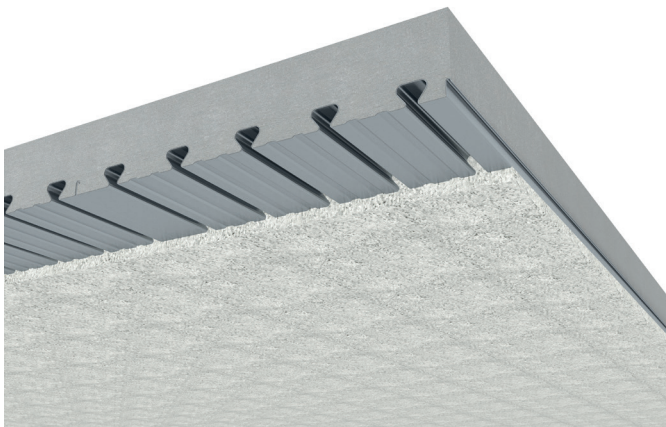
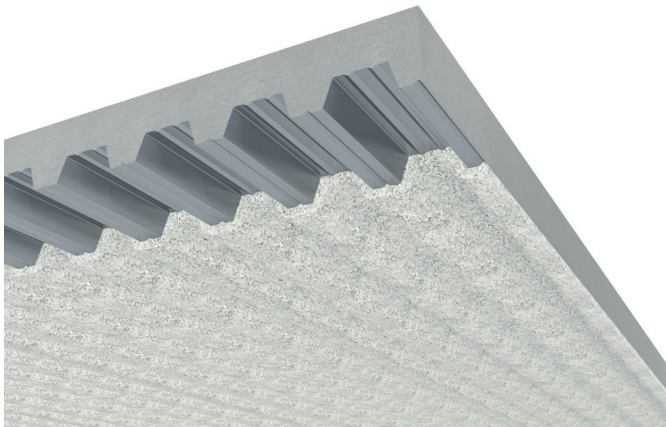
These thicknesses are in mm and were calculated for a critical temperature of 500°C, for beams exposed on 4 sides.

For all other applications, please contact us.



For rectangular or circular hollow pipes, please contact us.

REI 30 - 180



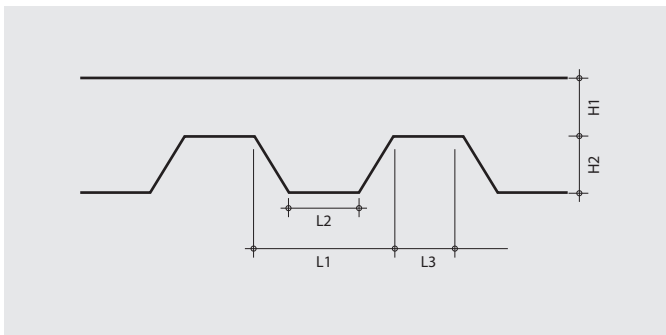
Area of validity

- Protection thickness between 13 and 31 mm for trapezoidal structural steel floor trays
- 23 to 39 mm for dovetailed structural steel floor trays
- Structural steel floor tray sheet thickness greater than or equal to 0.75 mm
- Undulation trough width (L2) of the structural steel floor trays less than or equal to 187 mm
- Undulation crest (H2) of the structural steel floor trays less than or equal to 87 mm
- Applies to all mixed slabs with trapezoidal structural steel floor trays with an effective thickness* greater than or equal to 73 mm
- Applies to all mixed slabs with dovetailed structural steel floor trays with an effective thickness* greater than or equal to 80 mm

Cleaning of steel trays

- Application of primer
- Spraying of one or multiple layers of Fibrofeu® to obtain the thickness required by the report

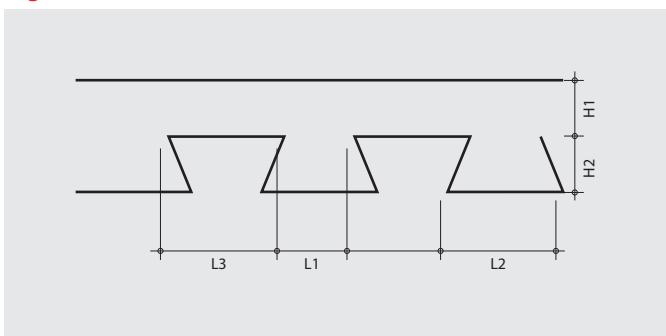
Figure 1



Required thickness for structural steel floor trays with trapezoidal undulations (figure 1)

REI	Fibrofeu® thickness
30	13 mm
60	15 mm
90	23 mm
120	31 mm

Figure 2

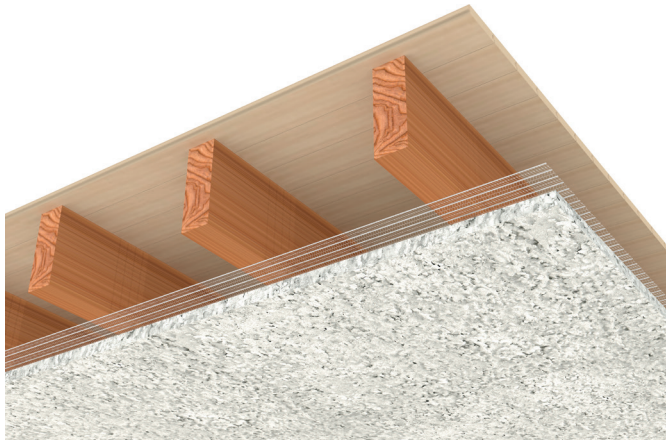


Required thickness for structural steel floor trays with dovetail undulations (figure 2)

REI	Fibrofeu® thickness
30	23 mm
60	23 mm
90	23 mm
120	27 mm
180	39 mm

*Effective thickness =
$$H1 + \frac{H2 \times (L1 + L2)}{L1 + L3}$$

REI 30-120



General Info

The fire stability of wooden bases and structures is ensured by preventing the wood from increasing in temperature.

Fire protection cannot be directly applied to the wood, but must instead be accompanied by the installation of a sheet of expanded metal.

Protection is composed of Nergalto NG1 or equivalent sheets installed perpendicular to the joists (sheets are placed side by side with a 100 mm overlap) and an application of Fibrofeu®.

Area of validity

- Centre-to-centre joist spacing less than or equal to 600 mm
- Joist height greater than or equal to 220 mm

Required thickness for REI performance

REI	Fibrofeu® thickness
30	24 mm
60	33 mm
90	54 mm
120	80 mm

For all other applications, please contact us.

Fibrofeu® – TNO test report

Fibrofeu® thickness	Base	Fréquency in hertz																α_w		
		100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150		4000	5000
		Absorption coefficient α_s																		
75 mm	Plaster panel on 80mm gap	0,78	0,53	0,67	0,60	0,73	0,78	0,82	0,88	0,90	0,91	1,00	0,98	1,00	1,03	0,99	1,02	1,07	0,97	0,90
35 mm	Solid	0,10	0,14	0,21	0,34	0,48	0,65	0,74	0,88	0,94	1,05	1,01	1,07	1,03	0,98	0,99	1,04	1,01	0,89	0,80 (H)
25 mm	Solid	0,06	0,08	0,15	0,18	0,33	0,41	0,57	0,70	0,87	0,88	0,96	1,06	1,09	1,01	1,03	1,04	1,00	0,89	0,60 (MH)
15 mm	Solid	0,02	0,04	0,06	0,09	0,15	0,22	0,30	0,43	0,55	0,67	0,78	0,88	0,94	0,95	1,03	1,00	1,01	0,86	0,45 (MH)

Primers: PROJISO FIXO-B® and PROJISO FIXO-M®

Fibrogaine® technical datasheet and applications

i

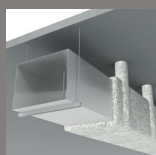
Fibrogaine® technical datasheet

page 32



Protection of circular horizontal sheet metal ventilation ducts using Fibrogaine®

page 33



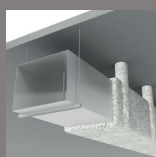
Protection of rectangular horizontal sheet metal ventilation ducts using Fibrogaine®

page 34



Protection of circular horizontal sheet metal smoke extraction ducts using Fibrogaine®

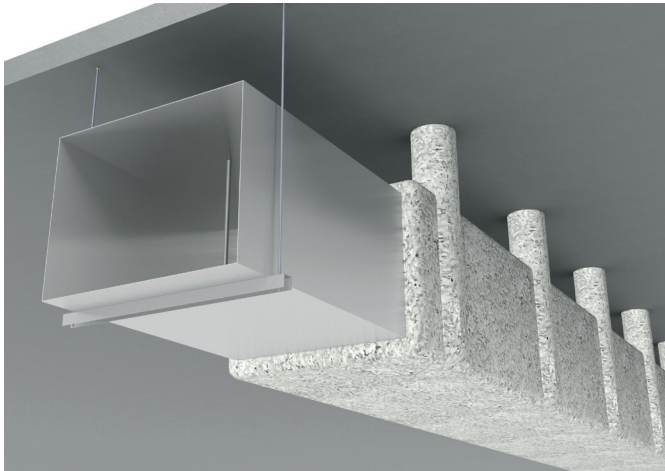
page 35



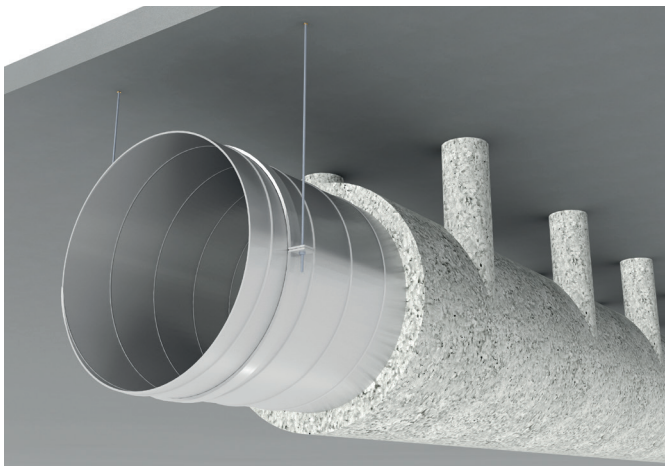
Protection of rectangular horizontal sheet metal smoke extraction ducts using Fibrogaine®

page 36

Fire protection of rectangular horizontal ventilation or smoke extraction ducts made of steel sheet



Fire protection of circular horizontal ventilation or smoke extraction ducts made of steel sheet



Characteristics	
Color	Off-white
Appearance	Rolled or compressed
Density	240 kg/m ³ ± 15 %
Reaction to fire	LNE report M0 no. A030987-CEMAT/2
pH	9
Initial setting time	24 hours at 20°C and 50% RH
Setting method	Hydraulic setting
Use temperature	5 - 45°C
Low biopersistence	According to Directive 97/69/EC
VOC classification	A+
Other	FDS - FDES

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as use conditions are outside our control.

Area of application

Fire protection



Description

FIBROGAINE® is a spray-on fibrous mixture intended for fire protection.

The mixture is composed of slag wool and special additives.

Application

Circular or rectangular horizontal ventilation or smoke extraction ducts made of galvanized steel sheet

Properties and performance

- Rot-proof
- Non combustible
- Easy to install

Installation

Refer to the reference report and the installation rules specified by DTU 27.1.

Application without primer.

See safety data sheet (SDS).

Environment and safety

Refer to the environmental and sanitary declaration (FDES) and the safety data sheet (SDS), available upon request.

Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

Packaging and storage

- Shelf life: maximum 12 months from the manufacturing date in unopened packaging.
- Storage conditions: protect from frost, humidity, excessive heat and excessive direct sunlight.
- Packaging: 20kg plastic bag.
- Palletization: 30 bags per pallet, or 600kg.

Ducts tested according to NF / EN 1366-1 – Classification according to NF / EN 13501-3

Performance of circular horizontal ventilation ducts

FIBROGAINE® thickness	E	I	t	ve	ho	i	<—>	O	S
67 mm	E	I	90	-	ho	i	<—>	O	S
75 mm	E	I	120	-	ho	i	<—>	O	S

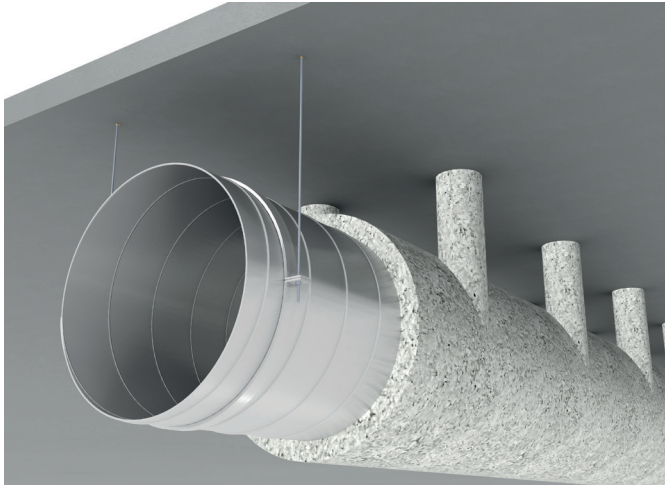


Diagram 1 – Duct assembly

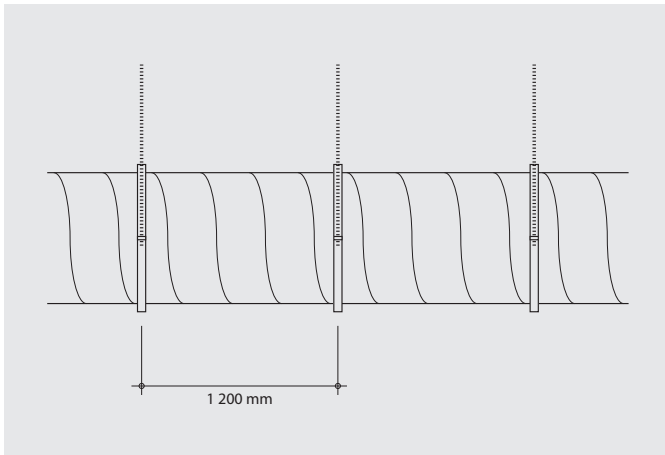
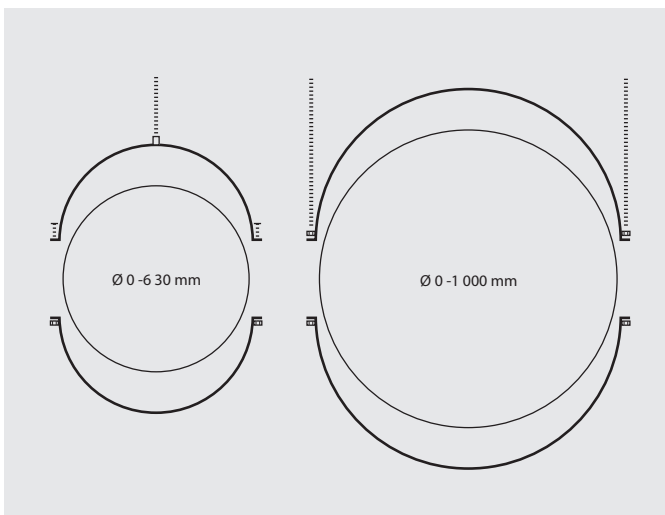


Diagram 2 – Supporting principle



Area of validity

- Circular horizontal ducts
- Duct diameter between 0 and 1000 mm
- Maximum section length: 3000 mm
- Duct sheet metal thickness

Duct diameter (mm)	0 - 250	251 - 560	561 - 1 000
Minimum sheet thickness (mm)	5/10	6/10	8/10

- Maximum centre-to-centre spacing of support systems: 1200 mm
- FIBROGAINE® density: 247 kg/m³ ± 15 %
- Negative/positive pressure: ± 500 Pa

Duct installation principle

The duct is composed of sections with a maximum length of 3000 mm. These components are joined with a 200 mm wide sleeve attached to the sections with 4.5 x 16 mm self-tapping screws spaced 200 mm apart around the perimeter of the duct.

The section joints are sealed using an A1 acrylic sealant. The duct body is supported with 1.20 m spacing (see diagram 1).

The support system is composed of (see diagram 2):

- Ø ≤ 630 mm: two half-brackets attached together by M6 nuts and bolts and supported in the centre by a single threaded rod
- Ø ≤ 1000 mm: two half-brackets attached together and supported on each side by a threaded rod.

Protection installation principle

Duct body protection

- A first layer approximately 30 mm thick of FIBROGAINE® is applied to the duct (without primer).
- A 25 mm hexagonal grate (Ø = 0.8 mm) is then installed all around the duct.
- A second layer of FIBROGAINE® is applied to achieve the desired final thickness.

Protection of support systems

The half-brackets are contained in the duct body protection. The threaded rods can be protected by a rock wool shell (30 mm, 65/70 kg/m³) as well as FIBROGAINE® or by installing a grate and applying FIBROGAINE®. In both cases, the total thickness of the protection (shell + FIBROGAINE® or FIBROGAINE® only) will have a thickness identical to that applied to the duct.

Ducts tested according to NF / EN 1366-1 – Classification according to NF / EN 13501-3

Performance of rectangular horizontal ventilation ducts

FIBROGAINE® thickness	E	I	t	ve	ho	i	↔	O	S
71 mm	E	I	120	-	ho	i	↔	O	S

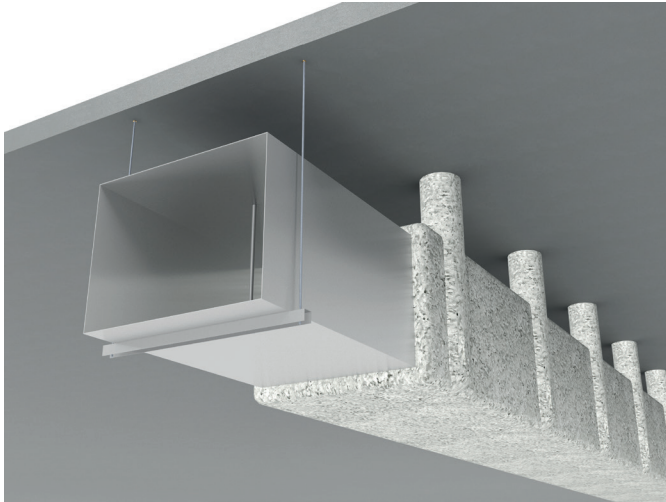


Diagram 1 – Duct assembly

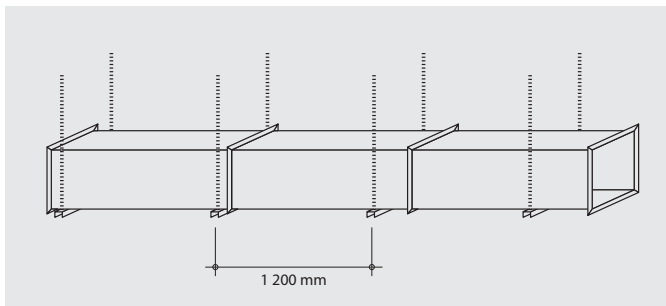


Diagram 2 – Supporting principle

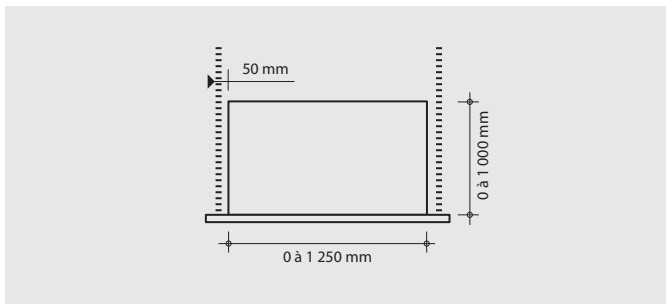
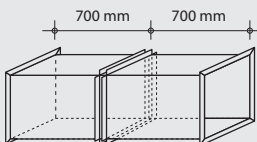
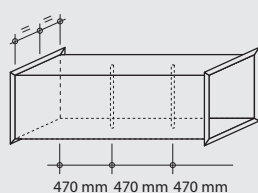


Diagram 3 – Duct reinforcement (width > 625 mm)

External reinforcement



Internal reinforcement



Area of validity

- Rectangular horizontal ducts
- Cross section between 0 x 0 mm and 1250 x 1000 mm (l x h)
- Maximum section length: 1400 mm
- Duct sheet metal thickness

Duct diameter (mm)	0 - 400	401 - 900	901 - 1 250
Minimum sheet thickness (mm)	6/10	8/10	10/10

- Maximum centre-to-centre spacing of support systems: 1200 mm
- Width ≤ 625 mm, without duct reinforcement
- FIBROGAINE® density: 209 kg/m³ ± 15 %
- Negative/positive pressure: ± 500 Pa

Duct installation principle

The duct is composed of sections with a maximum length of 1400 mm. These elements are joined with flanges attached together with M8 nuts and bolts on the edges and anchor bolts spaced 350 mm apart around the duct. The section joints are sealed using an A1 acrylic sealant. The duct body is supported with 1200 mm spacing (see diagram 1). The support system is composed (see diagram 2) of a 41 x 41 perforated crossbar and two threaded rod hangers.

- For ≤ 625 mm duct widths, reinforcement is not necessary.
- For duct widths > 625 mm, ducts must be equipped with bracings (internal or external) (see diagram 3):
 - Internal bracings composed of 13 x 17 mm (Ø int x Ø ext) steel spacers positioned lengthwise in the sections at mid-width and with 470 mm centre-to-centre spacing.
 - External bracings composed of U-shaped 25 x 50 x 25 mm profiles positioned at mid-length of the sections (max. 700 mm between bracings or flanges) and attached to the perimeter of the duct using 35 mm self-tapping screws spaced 225 mm apart.

Protection installation principle

Duct body protection

- A first layer approximately 30 mm thick of FIBROGAINE® is applied to the duct (without primer).
- A 25 mm hexagonal grate (Ø = 0.8 mm) is then installed all around the duct.
- A second layer of FIBROGAINE® is applied to achieve the desired final thickness.

Protection of support systems

The crossbar is encased in the duct body protection. The threaded rods can be protected by a rock wool shell (30 mm, 65/70 kg/m³) as well as FIBROGAINE® or by installing a grate and applying FIBROGAINE®. In both cases, the total thickness of the protection (shell + FIBROGAINE® or FIBROGAINE® only) will have a thickness identical to that applied to the duct.

Ducts tested according to NF / EN 1366-1 and NF / EN 1366-8 – Classification according to NF / EN 13501-4

Performance of circular horizontal smoke extraction ducts

FIBROGAINE® thickness	E	I	t	ve	ho	S	Operating pressure	Multi
71,5 mm	E	I	90	-	ho	S	-500/+500 Pa	Multi
75 mm	E	I	120	-	ho	S	-500/+500 Pa	Multi

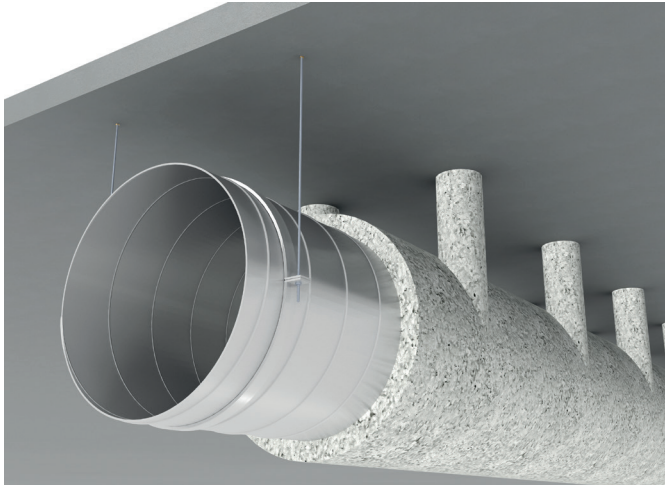


Diagram 1 – Duct assembly

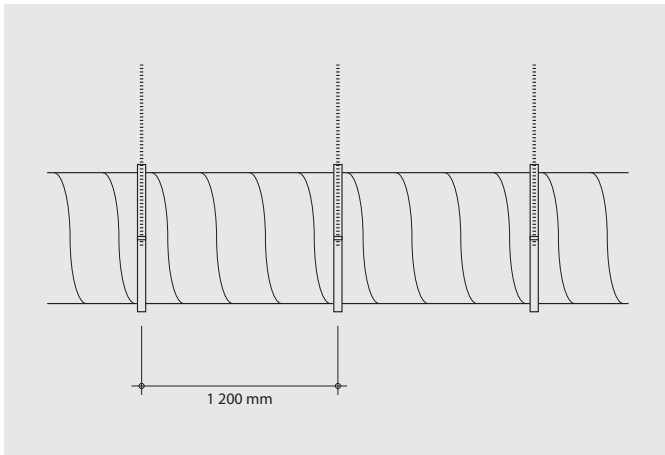
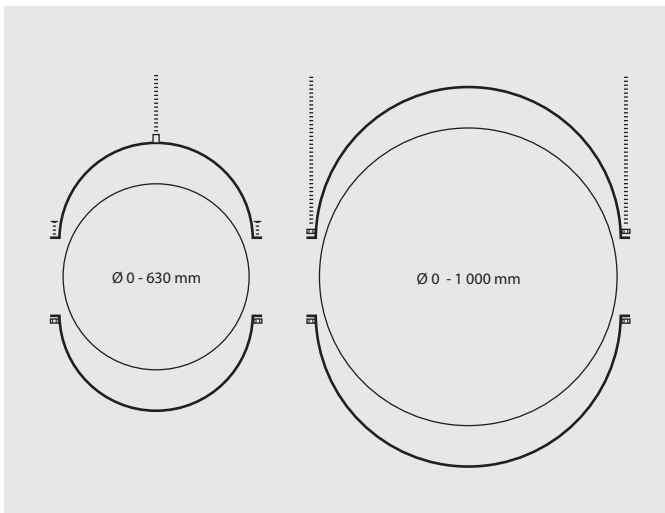


Diagram 2 – Supporting principle



Area of validity

- Circular horizontal ducts
- Duct diameter between 0 and 1000 mm
- Maximum section length: 3000 mm
- Duct sheet metal thickness

Duct diameter (mm)	0 - 250	251 - 560	561 - 1 000
Minimum sheet thickness (mm)	5/10	6/10	8/10

- Maximum centre-to-centre spacing of support systems: 1200 mm
- FIBROGAINE® density: 234 kg/m³ ± 15 %

Duct assembly principle

The duct is composed of sections with a maximum length of 3000 mm. These components are joined with a 200 mm wide sleeve attached to the sections with 4.5 x 16 mm self-tapping screws spaced 200 mm apart around the perimeter of the duct.

The section joints are sealed using an A1 acrylic sealant. The duct body is supported with 1200 mm spacing (see diagram 1).

The support system is composed of (see diagram 2):

- Ø ≤ 630 mm: two half-brackets attached together by M6 nuts and bolts and supported in the centre by a single threaded rod
- Ø ≤ 1000 mm: two half-brackets attached together and supported on each side by a threaded rod

Protection installation principle

Duct body protection

- A first layer approximately 30 mm thick of FIBROGAINE® is applied to the duct (without primer).
- A 25 mm hexagonal grate (Ø = 0.8 mm) is then installed all around the duct.
- A second layer of FIBROGAINE® is applied to achieve the desired final thickness.

Protection of support systems

The half-brackets are contained in the duct body protection. The threaded rods can be protected by a rock wool shell (30 mm, 65/70 kg/m³) as well as FIBROGAINE® or by installing a grate and applying FIBROGAINE®. In both cases, the total thickness of the protection (shell + FIBROGAINE® or FIBROGAINE® only) will have a thickness identical to that applied to the duct.

Ducts tested according to NF / EN 1366-1 and NF / EN 1366-8 – Classification according to NF / EN 13501-4

Performance of rectangular horizontal smoke extraction ducts

FIBROGAINE® thickness	E	I	t	ve	ho	S	Service pressure	Multi
71 mm	E	I	120	-	ho	S	-500/+500 Pa	Multi

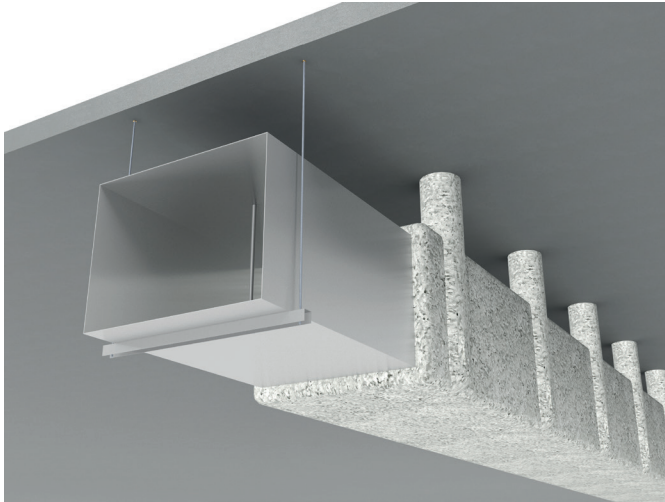


Diagram 1 – Duct assembly

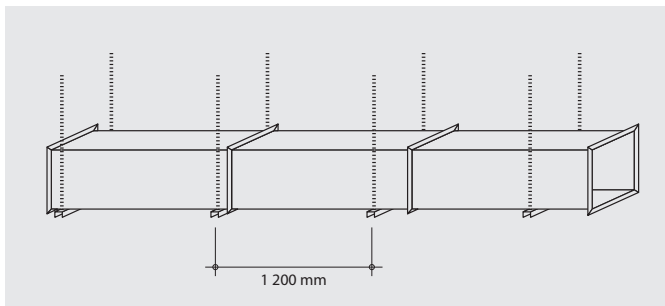


Diagram 2 – Supporting principle

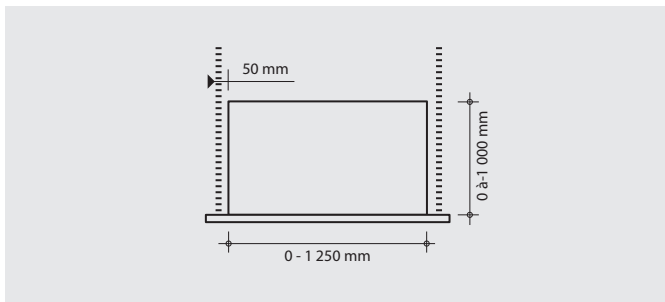
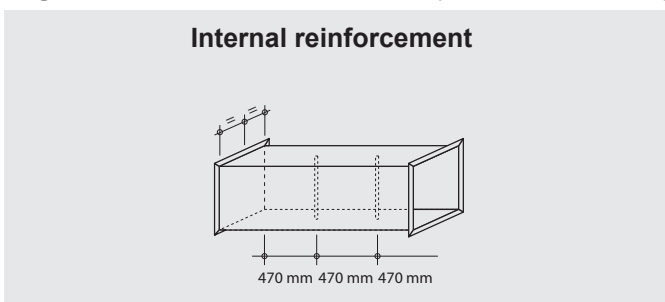


Diagram 3 – Duct reinforcement (width > 625 mm)

Internal reinforcement



Area of validity

- Rectangular horizontal ducts
- Cross section between 0 x 0 mm and 1250 x 1000 mm (l x h)
- Maximum section length: 1400 mm
- Duct sheet metal thickness

Duct diameter (mm)	0 - 400	401 - 900	901 - 1 250
Minimum sheet thickness (mm)	6/10	8/10	10/10

- Maximum centre-to-centre spacing of support systems: 1200 mm
- $C \leq 625$ mm, without duct reinforcement
- FIBROGAINE® density: 223 kg/m³ ± 15 %

Duct assembly principle

The duct is composed of sections with a maximum length of 1400 mm. These elements are joined with flanges attached together with M8 nuts and bolts on the edges and anchor bolts spaced 350 mm apart around the duct. The section joints are sealed using an A1 acrylic sealant. The duct body is supported with 1200 mm spacing (see diagram 1). The support system is composed (see diagram 2) of a 41 x 41 perforated crossbar and two threaded rod hangers.

- For ≤ 625 mm, duct widths, reinforcement is not necessary.
- For duct widths > 625 mm, ducts must be equipped with bracings (internal or external) (see diagram 3):
 - Internal bracings composed of 13 x 17 mm (\varnothing int x \varnothing ext) steel spacers positioned lengthwise along the sections at mid-width and with 470 mm centre-to-centre spacing

Protection installation principle

Duct body protection

- A first layer approximately 30 mm thick of FIBROGAINE® is applied to the duct (without primer).
- A 25 mm hexagonal grate ($\varnothing = 0.8$ mm) is then installed all around the duct.
- A second layer of FIBROGAINE® is applied to achieve the desired final thickness.

Protection of support systems

The crossbar is encased in the duct body protection. The threaded rods can be protected by a rock wool shell (30 mm, 65/70 kg/m³) as well as FIBROGAINE® or by installing a grate and applying FIBROGAINE®. In both cases, the total thickness of the protection (shell + FIBROGAINE® or FIBROGAINE® only) will have a thickness identical to that applied to the duct.

Technical datasheets and construction site datasheet

i

PROJISO FIXO-B® technical datasheet

page 38

i

PROJISO FIXO-M® technical datasheet

page 39

i

PROJISO FIXO-DUR® technical datasheet

page 40

i

SIDAIRLESS® technical datasheet

page 41

i

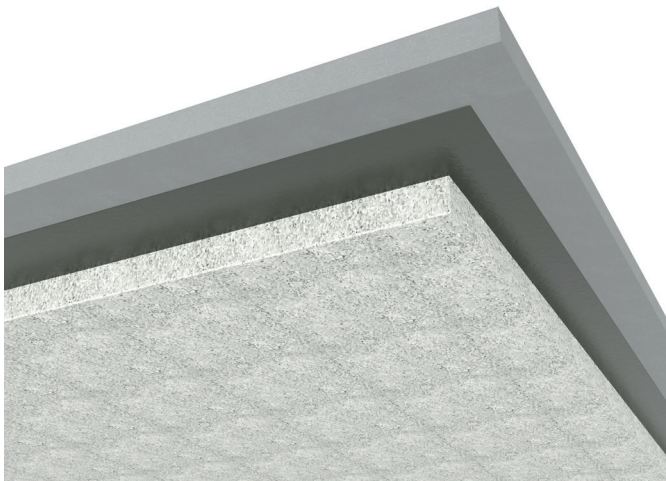
FIXO-M+® technical datasheet

page 42

i

FIBREXPAN® construction site datasheet

pages 43 - 44



Area of application

Primer for concrete base



Description

PROJISO FIXO-B is a vinyl derivative solution with a high molecular weight and a high degree of polymerization. It is a primer for mineral fibres sprayed onto concrete.

Installation

PROJISO FIXO-B® is installed using a brush, roller or low-pressure sprayer on a clean, intact base. The spray-on coating must be sprayed while the primer is still sticky.

Environment and safety

Refer to the environmental and safety declaration (FDES) and the safety datasheet (SDS), available upon request. Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

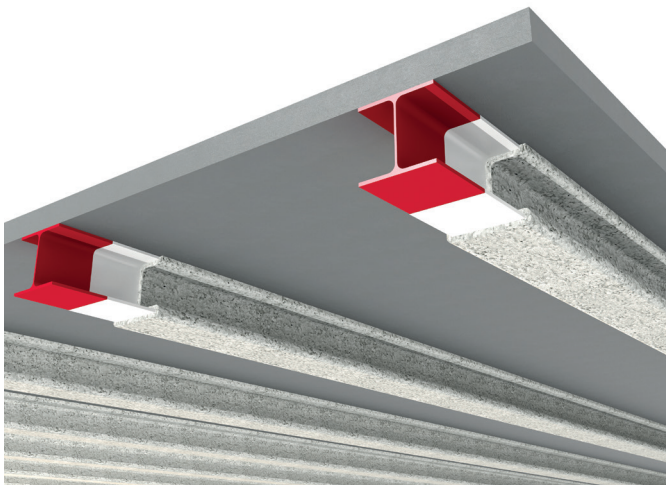
Packaging and storage

- Shelf life: maximum 12 months in the original hermetically sealed barrels.
- Storage conditions: store indoors in dry conditions between 5 and 45°C. Avoid frost.
- Packaging: 25 kg PE barrels.
- Palletization: At least 24 barrels per pallet, or 600kg.

Characteristics

Colour	Colourless
Specific weight	1 ± 0,5 g/cm ³
pH	5
Dilution	Do not dilute
Consumption	Approximately 100 g/m ² May depend on the base quality
Application temperature	5 - 45 °C
Film formation time	Around 30 minutes at 20°C / 60% RH
Drying time at 20°C and 60% RH	1 hour (dry to the touch) 3 – 4 days to fully dry
Brookfield viscosity at 25°C	280-380 cps
Number of coats	NA
Setting method	Air drying
Reaction to fire	NA
VOC classification	A+

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as the use conditions are outside our control.



Area of application

Primer for metal base



Description

PROJISO FIXO-M® is a watery dispersion of a styrene butadiene copolymer.

It is a synthetic adhesive designed to be used to fasten the sprayed-on mineral fibre to the metal base.

Installation

PROJISO FIXO-M® is installed using a brush, roller or low-pressure sprayer on a clean, intact base. The spray-on coating must be sprayed while the primer is still sticky.

Environment and safety

Refer to the environmental and safety declaration (FDES) and the safety datasheet (SDS), available upon request.

Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

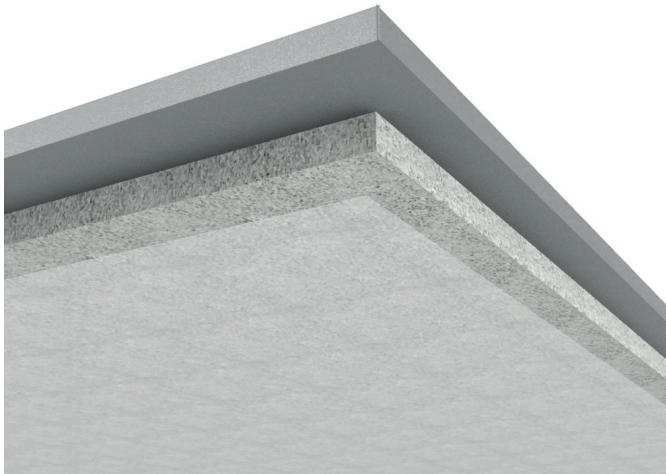
Packaging and storage

- Shelf life: maximum 12 months in the original hermetically sealed barrels.
- Storage conditions: store indoors in dry conditions between 5 and 45°C. Avoid frost.
- Packaging: 25 kg PE barrels.
- Palletization: 24 barrels per pallet, or 600kg.

Characteristics

Colour	Milky white
Specific weight	1,15 ±0,05 g/cm ³
pH	7
Dilution	Do not dilute
Consumption	200 à 250 g/m ²
Application temperature	5 - 45 °C
Film formation time	Around 45 minutes at 20°C / 60% RH
Drying time at 20°C and 60% RH	6 hours (dry to the touch) 3 – 4 days to fully dry
Brookfield viscosity at 25°C	1600 - 2200 cps
Number of coats	NA
Setting method	Air drying
Reaction to fire	NA
VOC classification	A+

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as the use conditions are outside our control.



Area of application

Hardener for fibrous coatings



Description

PROJISO FIXO-DUR® is a complex water-based mixture of silicates and acrylic copolymers.

Properties and performance

PROJISO FIXO-DUR® works by impregnation and its original formula combined with its especially low viscosity (approximately 4 – 6 cps) ensures that it can only penetrate the coating up to 15 mm. It does not change the acoustic or fire protection qualities of the fibrous coating.

Installation

Shake vigorously before use.

Depending on the desired results, apply PROJISO FIXO-DUR® hardener by pneumatic spray between 1 and 2 kg/m² directly onto the fibres (wet or dry).

Environment and safety

Refer to the environmental and safety declaration (FDES) and the safety datasheet (SDS), available upon request.

Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

Packaging and storage

- Shelf life: maximum 12 months in the original hermetically sealed barrels.
- Storage conditions: store indoors in dry conditions between 5 and 45°C. Avoid frost.
- Packaging: 25 kg PE barrels.
- Palletization: 24 barrels per pallet, or 600kg.

Characteristics

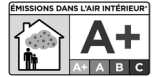
Color	White
Specific weight	1,1 ± 0,5 g/cm ³
pH	12
Dilution	Do not dilute
Colouring	None
Consumption	1 à 2 kg/m ²
Application temperature	5 - 45 °C
Drying time at 20°C and 60% RH	8 hours (dry to the touch) 48 hours to fully dry
Brookfield viscosity at 25°C	4 à 6 cps
Number of coats	NA
Setting method	NA
Reaction to fire	NA
VOC classification	A+

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as the use conditions are outside our control.



Area of application

Top coat for fibrous coatings.



Description

SIDAIRLESS® is a water-based dispersion of vinyl copolymers with inert mineral fillers. It is a fine, ready-to-use coating specially designed for the surfacing and mechanical reinforcement of fibrous coatings.

Properties and performances

Bases composed of spray-on fibrous coatings compliant with DTU 27.1.

Installation

SIDAIRLESS® is delivered ready-to-use (without blending or dilution). It is applied by spraying using Airless paint pumps with a minimum flow rate of 5.6 L/min and with nozzles between 25 and 29.

The product is applied on a fibrous or pasty coating that has been left to dry for at least 48 hours (at 20°C and 60% RH).

Do not apply below 5°C, with a hygrometry level greater than 65%, or on a heated base.

The application speed is approximately 100 m²/h.

Pastel colouring can be added directly on the construction site. It is possible to use a concentrated universal dye. Mixing can be performed using a paste turbine mixer. It is recommended to first carry out a dye test.

Other types of dyes can also be prepared during production; please contact us.

Environment and safety

Refer to the environmental and safety declaration (FDES) and the safety datasheet (SDS), available upon request.

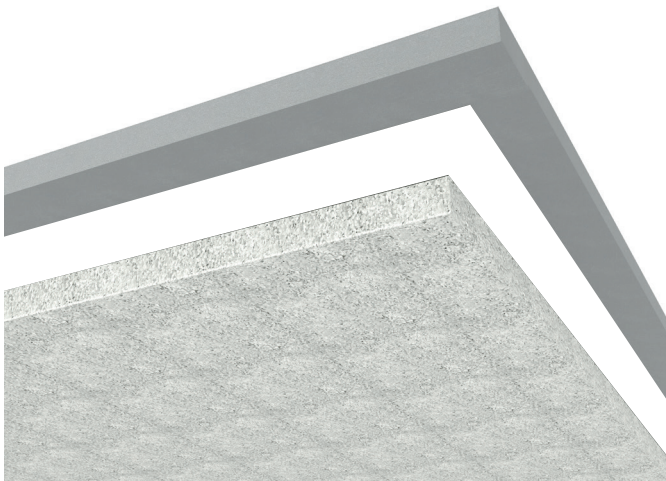
Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

Packaging and storage

- Shelf life: maximum 9 months in the original hermetically sealed barrels.
- Storage conditions: store indoors in dry conditions between 5 and 30°C. Avoid frost.
- Packaging: 25 kg PE barrels.
- Palletization: 33 barrels per pallet, or 825kg.

Characteristics	
Color	White
Specific weight	1,60 ± 0,1 g/cm ³
pH	8,5 ± 0,5
Dilution	Do not dilute
Colouring	On site or at manufacturing
Consumption	0,7 à 2 kg/m ² depending of the base quality
Application temperature	5 à 30 °C
Drying time at 20°C and 60% RH	12 hours/mm
Brookfield viscosity at 25°C	78 000 à 82 000 cps
Number of coats	NA
Setting method	NA
Reaction to fire	A1

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as the use conditions are outside our control.



Area of application

High grip performance primer



Description

PROJISO FIXO-M+® is a watery emulsion primer, made of modified acrylic copolymers and additives with high adhesive strength on metal and concrete bases. It comes in the form of a film that retains its full flexibility even at low temperatures, and which does not cause flash rusting when applied to metal surfaces.

Recommended as a primer for fibrous and pasty coatings, it permanently retains a sticky feel.

Installation

The base to be treated must be carefully cleaned; metal surfaces must be completely free of rust, scale and dirt. Concrete surfaces must be cleaned and removed of efflorescence salpeter, etc...

It is ready to use. It is generously applied by pneumatic spraying as a pre-coating on concrete or steel bases to be applied with the determined thickness of mineral fibre. It is recommended to apply 0.1kg/m² of PROJISO FIXO-M+® to metal bases, and 0.2kg/m² to concrete. It may be applied at temperatures greater than 5°C. Tools must be cleaned with water immediately after use.

Environment and safety

Refer to the environmental and safety declaration (FDES) and the safety datasheet (SDS), available upon request.

Do not discharge into drains, rivers or soil. Use the garbage bags provided for this purpose.

Packaging and storage

- Shelf life: maximum 12 months in the original hermetically sealed barrels.
- Storage conditions: store indoors in dry conditions between 5 and 45°C. Avoid frost.
- Packaging: 25 kg barrels.
- Palletization: At least 24 barrels per pallet, or 600kg.

Characteristics

Color	White
Specific weight	1,05 ± 0,05 g/cm ³
pH	7/8
Dilution	Do not dilute
Application temperature	5 - 45 °C
Brookfield viscosity at 25°C	2600 - 3600 cps
Film formation time	Approximately 1 hour at 20°C / 60% RH
Drying time at 20°C and 60% RH	1 hour (dry to the touch) 3 - 4 days to fully dry

The information given in this technical document is based on real tests and is presumed to be specific to the product. Results are not implicitly guaranteed, as the use conditions are outside our control.

Construction site reference:
Quote reference:

COMPLIANT WITH DTU 27.1 NF P15-202-1 AND NF P15-202-2

Name of spraying company:

THE CONSTRUCTION SITE

Site address:
Postal code:
City :
Type of work: New Renovation
Type of base: Concrete Steel Wood Other
If other, specify:

INSTALLATION

Insulation brand: FIBREXPAN® Bag weight: 20 kg
Product reference: FIBREXPAN®
Manufacturer's name: Projiso
ACERMI certificate number: 12/147/775
Technical report number: 20/12-247
Primer: Brand:
Fixing frame:
Finishing coating: Brand:

MACHINE SETTING TEST

Machine setting test summary: sprayed surface for 10 bags

PART 1: EXECUTION REPORT

Sprayed surface: m²
Average thickness measured after finishing (flat surfaces): mm
Average thickness measured after finishing (beams): mm
Quantity consumed: Primer: kg
Insulation: kg
Top coat: kg
Thermal resistance (flat surfaces): expected installed
Thermal resistance (beams) : expected installed

SPRAY TECHNICIAN

Company:
Spraying start date: / /
Spraying end date: / /
Company seal and signature:

ORDERING CUSTOMER

Company:
Company seal and signature:

Name : Name :
Function: Function :

PART 2: MACHINE SETTING TEST DETAILS

Machine brand:

Machine serial number:

Insulation brand name: FIBREXPAN®

Product reference: FIBREXPAN®

Manufacturer's name: Projiso

Bag weight: 20 kg

Batch number
Bag no.1
Bag no.2
Bag no.3
Bag no.4
Bag no.5
Bag no.6
Bag no.7
Bag no.8
Bag no.9
Bag no.10

Sprayed surface for 10 bags:m².....

Number of thickness measurements: 25

Measured thickness readings of machine setting test

mm	1	2	3	4	5	Total
A						
B						
C						
D						
E						
Total						

Average thickness measured after finishing = Total / 25 =mm

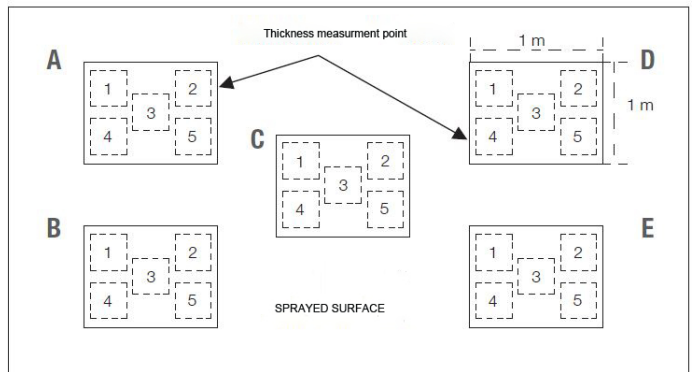
Consumption:

Calculation of the number of bags for 100 m² = 1 000 / sprayed surface for 10 bags: :

The average thickness measured and the consumption must correspond to the values on the ACERMI label.

Thickness measurement method (flat surface)

Number of measurements required for 10 bags sprayed:
25 = 5 sections of 5 measurements



Construction site reference :

General terms of sale applicable as of 01/06/2016

All product orders imply unreserved acceptance by the buyer and his adherence to these general terms of sale, which shall prevail over any other buyer document, including all general terms of sale, unless otherwise expressly agreed beforehand by our company.

1. Sales

1.1 Our sales are made with the pricing and quantity conditions applicable upon order placement, except in circumstances beyond our control, and excluding backorders or deliveries by instalment, in which case our sales are made with the pricing conditions in force on the delivery date.

Our sales are only definitively valid once we have sent an acknowledgement of order receipt. Orders cannot be changed or cancelled less than 48 hours before delivery and, after this time, shall be considered firm and final. Our prices apply to all customers on the same date. These prices may be increased during the year, following prior notice to our customers. All changes shall be effective on the date indicated on the new price.

1.2 Transfer of ownership of our products is suspended until their price is paid in full by the customer, including both the principal and other charges, even when a payment deadline is granted. Payment is considered to be the actual receipt of the amount by our company. Any contrary clauses, namely those inserted into the general terms of purchase, shall be deemed unwritten.

Our company may exercise its rights under this retention of title clause for any of its claims, on all products in a customer's possession, without prejudice to its right to request the cancellation of sales in progress.

The customer must ensure that the goods delivered are identifiable in his inventory and kept in strict compliance with the conditions required for these products. He will insure them against any risks, this clause in no way forbidding the risks to be transferred to the buyer upon delivery. In the event of damage or loss of the goods before ownership is transferred, payments made by the customer's insurer shall be collected by our company, notwithstanding any other recourse by our company against the customer.

Our company may unilaterally, following the issue of formal notice, take an inventory of its products in the possession of the customer, who hereby agrees to grant free access to his warehouses, stores or other premises for this purpose. Goods must be immediately returned to our company, at the customer's expense and risk, even in cases of force majeure, unforeseeable circumstances or third party actions. The claiming of our goods does not relieve the customer of his obligation to immediately pay the principal price and other charges. Our company is therefore entitled to continue the execution of the sale, even after having repossessed the goods, unless it prefers to request a termination. In the latter event, any instalments already paid shall remain held by our company without prejudice to any other damages. In the event of seizure, the customer must immediately inform our company. Generally speaking, the customer shall be required to defend by any legal means against any claims, threats, actions, procedures or any other measure which might jeopardize the seller's right of ownership which third parties might assert on the goods sold. He shall immediately inform the seller to enable him to safeguard his interests.

2. Delivery and warranties

2.1 Delivery timeframes are given for indicative purposes only due to carrier availability and order priority. However, the buyer may request cancellation of his order if the goods are not delivered within 60 days of a formal notice which has remained ineffective, it being understood that this formal notice may only be served following the expected delivery date given as an indication and that any delays shall not entitle the customer to cancel the sale, refuse the goods or claim damages.

2.2 The seller is required to guarantee against hidden defects in the goods sold pursuant to Articles 1641 et seq. of the Civil Code.

2.3 The company's contractual warranty is limited to the replacement by exchange of any parts proven to be defective due to a manufacturing defect noted contradictorily. It shall take effect upon delivery of the goods.

2.4 Any use of our goods for purposes other than those for which they were manufactured completely clears us of liability. This also applies in the event that the goods are modified by third parties or damaged due to unsuitable storage, transportation or handling conditions.

2.5 With the exception of those involving the carrier's liability, declarations of any kind shall only be deemed valid if they are made within eight days from the provision of the goods by registered letter with acknowledgement of receipt.

3. Shipping

3.1 Regardless of the destination of the goods and the conditions of sale (including sales prices with prepaid shipping), delivery is carried out by handing over the goods to the customer or his carrier or to the carrier chosen by our company on behalf and for account of the customer.

3.2 The transfer of risk occurs at the time of delivery. Consequently, goods travel at the risk and peril of the customer, who is responsible, upon receipt, for making note of any reservations, precisely and in full, on the transport document and then confirming these reservations with the carrier by registered letter with acknowledgement of receipt within three days from delivery of the goods in accordance with Article L. 133-3 of the Commercial Code. In no case will our company be held liable for damage or loss related to transport operations.

3.3 Any other claims regarding inconsistency of the delivery with the order must, in order to be valid, be addressed to our company by fax or registered letter with acknowledgement of receipt within eight days following the date of the delivery. This claim must be accompanied by the delivery note. No returns will be made without the prior written consent of our company. In the event that a claim is accepted, our company's liability is strictly limited to the obligation to replace the non-compliant goods, excluding any damages.

Any claim addressed to our company outside the aforementioned deadline shall be null and void and the delivered goods will be irrefutably presumed to be consistent with the order.

3.4 Goods ready in our factories that are not removed by the customer or the carrier acting on his behalf within 15 days from the sending of a fax reminding him of the obligation to remove the goods, the customer shall be solely responsible for any damage sustained by these goods.

3.5 Notwithstanding our company's agreement to bear the cost of transportation, the cost of road delivery of the goods to the address or construction site indicated by the customer shall be borne by the customer when this location is inaccessible by the vehicles normally used (Article 4 of the General Conditions for the Application of Road Transport Prices for Goods).

4. Payment

4.1 Our invoices are payable in cash, except where other conditions apply. This deadline is the deadline for the effective collection of the payment, rather than for receipt of the means of payment. If deferred payment is requested by the customer, we reserve the right, depending on his financial situation, to set a payment deadline, within the limits and in compliance with legislation on payment, an overdraft limit, and to ask for guarantees. The occurrence of a new element modifying our assessment of the risk may justify, at any time, the requirement of a cash payment or new guarantees.

No discount will be granted for early payment. Payments are to be addressed to PROJISO, Service comptabilité, 41 rue Paul Vaillant couurier 03100 Montluçon.

4.2 Failure to pay by the due date shall render immediately payable the entire debt by forfeiture of the term. Late penalties, applicable without a reminder being necessary, as well as a lump-sum payment for collection costs shall automatically become due on the day following the payment date indicated on the invoice, in the event that the amount owed is paid after this date. The rate shall be equal to the key rate of the European Central Bank on the first day of the semester in question, plus 10 points. The amount of the lump-sum payment for collection costs is 40 euros. An additional penalty may be claimed when the collection costs incurred are greater than this lump-sum payment with presentation of proof.

4.3 Furthermore, we reserve the right to suspend or cancel outstanding orders, even those that have been accepted, without prejudice to any other recourse.

4.4 Delivery delays or claims of any nature and at any time shall not affect the terms of payment.

5. Force majeure

Are considered as cases of force majeure or fortuitous events, events outside our control, insofar as their occurrence renders completely impossible the performance of the obligations. Cases of force majeure or fortuitous events that relieve our responsibility include: strikes, fires, floods, war, and production stoppages due to accidental breakdowns, epidemics, roadblocks, and supply interruptions not attributable to our company. Our company shall inform the customer as soon as possible of the occurrence of any of the events listed and shall endeavour to remove its effects as soon as possible. However, if the fulfilment of an order appears to us to be permanently compromised, our company shall be entitled to cancel it without incurring any liability as a result.

6. Tolérance

The supplies are made with the normal tolerances in terms of quality, quantity, dimensions, thicknesses and weights, which is expressly accepted by the customer without the latter being entitled to claim a reconsideration of the order or a modification of the prices.

7. Termination clause

In the event of non-execution by the customer of any of his obligations, and 8 calendar days after formal notice by registered letter remained wholly or partially ineffective during this period, the sales contract shall be automatically terminated without notice. The goods must then be returned to our company on first request at the expense and risk of the customer, who accepts this, without prejudice to other damages owed to our company. Any instalments already paid shall remain definitively acquired as first compensation.

8. Miscellaneous

Buyers may not, without our approval, sell our products, either directly or indirectly, to other manufacturers of similar products, or under names other than those of our registered trademarks.

9. Intellectual property

All technical and/or commercial documents provided to the customer remain the exclusive and entire property of our company, the sole holder of intellectual property rights to these documents. These documents may only be used in connection with the performance of the requested service. All documents provided, as well as any reproductions, shall be returned to our company upon request and in all events following completion of the service.

10. Attribution of jurisdiction

Any claims shall be brought before the court of Montluçon, which the sellers and buyers acknowledge to be exclusively competent notwithstanding any contrary provisions, even in the event of a recourse in warranty.

N.B.: We reserve the right to modify these terms of sale without prior notice.

N.B : We reserve the right to modify these terms of sale without prior notice.





MANUFACTURER OF SPRAY-ON INSULATION PRODUCTS

41, rue Paul Vaillant Couturier - 03100 MONTLUÇON

Ph.+33 (0)4 70 02 05 00

www.projiso.fr - contact@projiso.fr