

GEO STAFF

Specialist in fire protection and decorative gypsum products

TECHNICAL CATALOGUE

FIRE-PROTECTION

CARBON FIBER REINFORCEMENTS

**GLUE &
SCREW SYSTEM**

▶ NEXT

A FEW SITE REFERENCES



Also: CDG airport, Roissy - Palais des Congrès - Stade de France - Necker hospital, Paris 15 - Lille Metro - Stade de Lille - Ritz hotel - Paris-Orly airport - Melun hospital - Trocadero Business Centre - Grand Louvre - Georges V hotel - Presidential palace, Congo - AIG Tour Majunga - Toulon military hospital.

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WHO ARE WE ?

Since 1982, GEOSTAFF has been specialising in fire-protective products for passive fire protection, designed to meet the highest building industry standards.

The passive fire protection consists of integrating fire-stop systems into constructions, which will limit the spread of fire and smoke. Passive fire protection means:

Protection of individuals, allowing the occupants to evacuate the building in complete safety,

Protection of property, containing the fire for as long as possible while awaiting the emergency services.

As a pioneer in the field, the Geostaff team is constantly innovating in order to push safety standards to the highest level. Tested in certified laboratories, our systems excel in the most drastic tests in line with the latest European standards.

As a European manufacturer of 100% natural GRG* products, GEOSTAFF offers the following product ranges:

GEOTEC® for the construction of ventilation and smoke extraction ducts, for the fire-protection of service ducts and shafts and the protection of epoxy bonded reinforcement systems on concrete slabs and beams. The GEOTEC® range allows you to build fire safe solutions up to 120 minutes.

GEOFLAM® for the construction of ventilation and smoke extraction ducts and the fire-protection of service ducts and shafts. The GEOFLAM® range allows you to build fire safe solutions up to 240 minutes.

GEODECO® decorative range manufactured for the decoration of hotel suspended ceilings, luxury homes and castles.

*GRG: Glass Reinforced Gypsum (GRG) uses a combination of plaster and fiberglass. Glass Reinforced Gypsum is a more resistant plaster that allows the realization of our fire-protective elements and guarantees the excellent resistance and strength of our boards.

THIS DOCUMENTATION FOCALISES ON THE INNOVATIVE GEOTEC® SOLUTIONS.

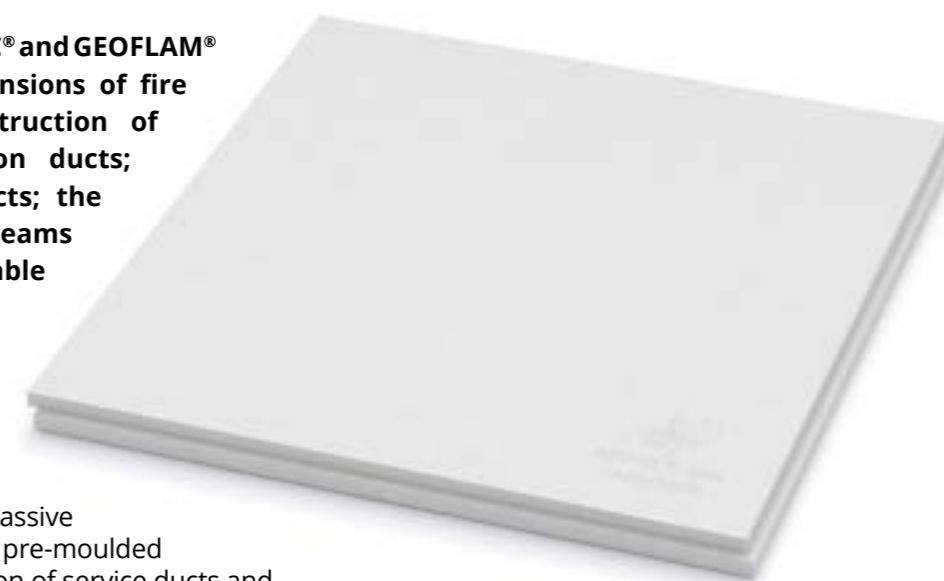
GEOTEC®

EI 30/60 S
EI 90/120 S
Glue & Screw assembly
Glue & Staple
Glue & Fiber reinforced gypsum

Geostaff offers, through the GEOTEC® and GEOFLAM® ranges, various models and dimensions of fire protective boards for the construction of ventilation and smoke extraction ducts; the fire-protection of service ducts; the protection of carbon fiber bonded beams as well as for the protection of cable trays.

Fire protective board GEOTEC®S

In order to meet all requirements for passive fire protection, Geostaff also produces pre-moulded fire-resistant elements for the protection of service ducts and shafts (for electrical cables, both combustible as non-combustible pipes and ducts : gas, medical fluids/gasses, air, combustibles...), for the protection of metal columns and fire-resistant inspection hatches.



Please download the GEOFLAM® documentation online or contact us at com@geostaff.fr for more informations on our solutions.

GEOFLAM®

EI 90/120S
EI 180 S
EI 240 S
Glue & Fiber reinforced gypsum



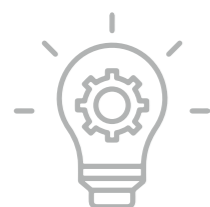
INTERNATIONAL COMPANY

Head office in France
Production plant in France
Research centre in Belgium
Logistic center in Paris & Nice
Worldwide references



KNOWLEDGE

35 years of experience
CE Marking
Declaration of Performance



SOLUTIONS

Certified solutions
EI 30/60 S, EI 90/120 S, EI 180 S, EI 240 S



Prefab C-Light pre-moulded element



GEOFLAM®DC pre-moulded element



Fire-resistant vertical inspection hatch

ICONS



Reaction to fire

A1 classification in accordance with fire resistance classification standard **EN 13501-1**.



European Conformity

Based on the European Assessment Document (EAD) n° **350142-00-1106**: "Fire-protective board, slab and mat products and kit".



ETA 18/0343

GEOTEC®S : European Technical Assessment **18/0343**.



ETA 15/0654

GEOFLAM®F : European Technical Assessment **15/0654**.



ETA 15/0653

GEOTEC®F-Light : European Technical Assessment **15/0653**.



Indoor air emission

Labelling of construction products Level of volatile pollutant emissions from the product A+ : Very low emissions.



Ventilation

Ventilation duct certificate according to the fire resistance test standard **EN 1366-1**.



Smoke extraction

Smoke extraction duct certificate according to the fire resistance test standard **EN 1366-8**.



Fire protection services

Service ducts and shafts certificate according to the fire resistance test standard **EN 1366-5**.



Carbon protection reinforcement

Protection of epoxy bonded reinforcement systems on concrete slabs and beams.



Fire-resistant inspection hatches

1 and 2 hours fire-protection **EN 13501-2**



Glue + Screw

[Duct internal dimension ≤ 2500 x 1500 mm].



Glue + Staple

[Duct internal dimension ≤ 1250 x 1000 mm].



Glue + Fiber reinforced gypsum

[Duct internal dimension ≤ 2500 x 2000 mm].



Geocol® Glue

Powder-coated adhesive especially formulated for mounting GEOFLAM® and GEOTEC® boards.



Paint application

A water-based acrylic paint may be applied to GEOTEC®S products without compromising their fire-protection properties.



Easy cutting

The product can be cut using a circular saw or a sabre saw.



Easy cutting

The product can be cut using a handsaw.



Water-repellent treatment

It is possible to apply a water-repellent treatment that does not alter the A1 classification by addition of water-repellent (option).



Environmentally friendly products

100% natural gypsum-based products meeting environmental and health standards (FDS) and observing safety standards (FDES).



Geostaff has been awarded the eco labels : EXCELL zone verte and Eco Bau.



Tailored dimensions

Tailored dimensions are delivered according to your project needs.



Duct palettizing

Palletizing of the products by ducts is possible.



Online calculation tool

Calculate your material requirements for the construction of all your GEOSTAFF systems online.



Transportation

Product must be transported and stored on a flat and protected surface.



Storage

Product must be kept away from water.



GRG

Glass Reinforced Gypsum.



Lightweight board

PROTECTING YOU FROM FIRE IS WHAT WE DO

How can we fulfil our mission and protect you in case of a fire?

Our first objective is to introduce fire-stop solutions inside all types of buildings (private, public, industrial, etc.) that will limit the spread of fire and smoke. These solutions are defined by the installation of horizontal and vertical smoke extraction and ventilation ducts, the protection of technical

ducts, the fire protection of various electrical cable trays, but also the installation of fire-resistant access hatches. All our products are designed with the aim of making these solutions possible and are tested and classified in accordance with all the existing European standards.

Ventilation and smoke extraction ducts

The construction of a ventilation or smoke extraction system involves using a flow of air to flush the space to be cleared of smoke. This means clearing smoke on the one hand (smoke extraction duct or high-level ventilation) and bringing in fresh air on the other (ventilation duct or low-level ventilation).

Two cases are therefore possible:



Protecting the internal volume of a duct from fire, the common expression "external fire" using **ventilation ducts or introduction of air** (low-level ventilation).



In the rooms that it crosses, protecting the entire length of ducting from an "internal" fire, using **smoke extraction ducts** (high-level ventilation).

Please refer to the chapter "SMOKE EXTRACTION AND VENTILATION DUCTS" from page 29.

Fire protection of service ducts and shafts



The service duct is defined as a usually accessible enclosed volume containing combustible or non-combustible service installations such as pipes or cables. The main purpose of the fire resistant protection of service ducts and shafts is to prevent fire from spreading from one room to another through these service installations or to protect these installations from fire and guarantee their functionality.

Protection to epoxy bonded reinforcement systems on concrete slabs and beams



The fire stability of reinforced concrete structures and substrates is obtained by restricting the temperature rise in the steelwork within the concrete.

GEOSTAFF® proposes validated solutions using GEOTEC®S to protect the carbon fibre reinforcements installed under the floor slab and concrete beam, depending on the desired levels of fire performance and the critical temperatures provided by the manufacturer.

Fire-resistant inspection hatches



GEOSTAFF fire-resistant inspection hatches can be installed both in our fire protective systems as standardized constructions to access inside the service ducts. They allow inspections and enable repairs.



Fire classification and tests standards

Geostaff products are tested and classified in accordance with all European standards in force.

Fire resistance classification standards

EN 13501-1

Fire classification of construction products and building elements - Part 1 : Classification using test data from reaction to fire tests.

EN 13501-3

Fire classification of products and construction elements - Part 3: Classification using fire resistance test data for the products and elements used in maintenance installations: fire-resistant ducts and fire dampers.

Fire resistance tests standards

EN 1366-1

Fire resistance tests for plant installations - Part 1: Ducts. To obtain a ventilation duct certificate, tests in accordance with EN 1366-1 (horizontal and/or vertical ducts type A and B, as defined in the standard) are required.

EN 1366-8

Fire resistance tests for service installations - Part 8: Smoke extraction ducts. To obtain a certificate for a smoke extraction duct, tests in accordance with EN 1366-1 and 8 (horizontal and/or vertical ducts type A, B and C, as defined in the standard) are required.

EN 13501-2

Fire classification of construction products and building elements - Part 2 : Classification using data from fire resistance tests, excluding ventilation services.

EN 13501-4

Fire classification of products and constructional elements - Part 4: Classification based on fire resistance test data for the components of smoke control systems.

EN 1366-5

Fire resistance tests for service installations - Part 5 : Service ducts and shafts.

Declaration of performance in accordance with CE product standard EN 12101-7 for factory-made duct sections : contact Geostaff for the possibilities.

SOLUTION	Fire-rated performance	Classification standards	Fire-resistant tests
Horizontal and vertical ventilation ducts	EI 30/60 - 90 /120 - 180 - 240 (S)	EN 13501-3	EN 1366-1
Horizontal and vertical smoke extraction ducts	EI 30/60 - 90/120 - 180 - 240 (S)	EN 13501-4	EN 1366-8
Service ducts and shafts	EI 30/60 - 90/120 - 180 - 240	EN 13501-2	EN 1366-5
Fire-resistant inspection hatches	EI 30/60 - 90/120	EN 13501-2	EN 1634-1
Protection of epoxy bonded reinforcement systems	30 - 60 - 90 -120 -180 min	-	-

CE Marking

To guarantee the performance of our fire protection systems, Geostaff decided, by means of a daily product inspection, to implement annual third party certification audits to obtain CE marking of fire-protective boards.

The different CE markings of our products have been made according to the European Assessment Document (EAD) n° 350142-00-1106 : "Fire-protective board, slab and mat products and kit". They were created within the framework of the European legislation and certify the conformity of our products with the declared performances.

The ETA numbers corresponding to Geostaff products are as follows:

GEOFLAM®F : European Technical Assessment ETA n° 15/0654

GEOFLAM®F-Light : European Technical Assessment ETA n° 15/0653

GEOTEC®S : European Technical Assessment ETA n° 18/0343

For all Geostaff products with the CE marking, the Declarations of Performance for these products are available on the www.geostaff.fr website.

Classification criteria

E: Integrity (flames and hot gases)	o → i: Direction of the "external" fire
I: Thermal insulation (temperature on the unexposed side < 140°C on average or 180°C at a point)	i → o: Direction of the "internal" fire
t: Duration of the classification expressed in minutes	i ↔ o: Arbitrary direction of the "internal" or "external" fire
S: Smoke leakage (leakage per unit surface area < 10 m³/hr.m² for ventilation, 5 m³/hr.m² for smoke extraction)	Multi: Indicates that the smoke extraction duct can extract smoke from several compartmentalised zones
ve: Vertical position of the duct being tested	Service pressure: Indicates the positive and negative pressures at which the duct was tested
ho: Horizontal position of the duct being tested	

Example of classification

EI 60 : HORIZONTAL & VERTICAL Fire rated ventilation duct with 30 mm GEOTEC®S fire-protective boards. (Dimension up to 2500 x 1500 mm)

E	I	t	ve	ho	i	↔	o	S
E	I	60	ve	ho	i	↔	o	S

EI 120 : HORIZONTAL & VERTICAL Fire rated multi-compartment smoke extraction duct with 45 mm GEOTEC®S fire-protective boards. (Dimension up to 2500 x 1500 mm)

E	I	t	S	ve	ho	Service pressure	Multi
E	I	120	S	ve	ho	-1500 Pa / +1500 Pa 500Pa	Multi

EI 120 : HORIZONTAL & VERTICAL Fire rated protection of service ducts and shafts with 45 mm GEOTEC®S fire-protective boards. (Dimension up to 2500 x 1500 mm)

E	I	t	ve	ho	i	↔	o
E	I	120	ve	ho	i	↔	o

Why choosing the Geostaff solution ?

By choosing Geostaff fire-protective products you can now have the solution that best fits your needs.

CERTIFIED SOLUTION

The Geostaff boards are made in France with respect of the highest European quality standards in addition to CE* certification under a DOP*.

Geostaff has tested the widest range of solutions with respect to large dimensions, complex shapes, extra standards pressure levels or wall penetrations. These solutions cover beyond the basic requirements for fire rated ventilation ducts (EN 1366-1), multi compartment smoke evacuation ducts (EN 1366-8) and the protection of services (EN 1366-5).

Geostaff products are meeting environmental and health standards ("Fiche de Déclaration Environnementale et Sanitaire": **FDES**) and are observing safety standards ("Fiche de Données de sécurité" : **FDS**).

Please visit our website to find our products safety standards : www.geostaff.fr

*CE : European Conformity

*DOP : Declaration Of Performance.

ONE SHOP STOP SOLUTION

The online calculation tool enables you to calculate your material requirements for all the Geostaff solutions. Besides generating a full Bill of Material (BoM) that allows the Geostaff partners to have a perfect view and control on the material costs, a technical drawing is provided for the various duct section.

Please visit our website and ask for your login to access our online calculation tool.

Also, Geostaff has an extended stock to meet short delivery times.

TAILORED AND FLEXIBLE SOLUTION

Geostaff uses Glass Reinforced Gypsum to mould the various board dimensions and accessories. The tailored boards allow a quick installation with a minimum of material waste.

Geostaff material is characterized by an easy manipulation. The boards can be cut both manually as mechanically. The plaster-based GEOCOL® glue is used on the joints both as glue and as a filler (maximally 1/3rd of the board thickness). It allows larger tolerances during installation hence minimizing material waste and maximizing installation speed.






The pre-molded accessories have a perfect fit and are easy to install.

Products are easily paintable and a water-repellent treatment is optional.

EXPERTISE AT YOUR SERVICE

Our engineers and specialists are at your service to search for the best certified solution for your project. In combination with our logistical team, we can deliver specific duct sections on separate pallets to prosper installation time. Please contact us for more details.

Our installation methods

EI 30 - 60 S EI 90 - 120 S		Glue + screw	GEOTEC®	Duct internal dimension ≤ 2500 x 1500 mm
EI 30 - 60 S EI 90 S		Glue + staple	GEOTEC®	Duct internal dimension ≤ 1250 x 1000 mm
EI 30 - 60 S EI 90 - 120 S		Glue + fiber reinforced gypsum	GEOTEC®	Duct internal dimension ≤ 2500 x 2000 mm
EI 180 S		Glue + fiber reinforced gypsum	GEOFLAM® FX	Duct internal dimension ≤ 2500 x 2000 mm
EI 90 - 120 S		Glue + fiber reinforced gypsum	GEOFLAM® F Light	Duct internal dimension ≤ 1250 x 1000 mm



Additional technical data

Airflow performance

Hot sealing: Classification S in accordance with standards EN 1366-1 and 1366-8

i.e. a leakage flowrate per unit surface area of $<10 \text{ m}^3/\text{hr.m}^2$ for ventilation ducts and $<5 \text{ m}^3/\text{hr.m}^2$ for smoke extraction ducts.

Cold sealing: Class B in accordance with standard EN 1507

Class	$\text{m}^3.\text{s}^{-1}.\text{m}^{-2}$	$\text{m}^3.\text{h}^{-1}.\text{m}^{-2}$
A	$0.027 \times p^{0.65} \times 10^{-3}$	$0.0972 \times p^{0.65}$
B	$0.009 \times p^{0.65} \times 10^{-3}$	$0.0324 \times p^{0.65}$
C	$0.003 \times p^{0.65} \times 10^{-3}$	$0.0108 \times p^{0.65}$
D	$0.001 \times p^{0.65} \times 10^{-3}$	$0.0036 \times p^{0.65}$

Pressure drop

The GEOTEC® system also addresses the basic principles of air conditioning techniques with a roughness factor for untreated internal walls similar to that of steel ducts, i.e. $\epsilon = 0.05 \text{ mm}$ (for the smooth surface of the panel only).

Acoustic performance

Acoustic attenuation with lining

With the aim of restricting airborne noise propagated by the ducts and hence providing better acoustic performance, Geostaff proposes solutions for attaching a lining to the GEOTEC® ducts; the characteristics are listed in the table below:

Thickness GEOTEC® S	$R_w(C; C_{tr}) \text{ dB}$		
	1 BA13 + LdV 45 mm	2 BA13 + LdV 45 mm	3 BA13 + LdV 85 mm
30	49 (-3;-9)	53 (-2;-7)	57 (-1;-4)
45	50 (-2;-7)	54 (-1;-6)	60 (-1;-4)

Rw + C : Acoustic attenuation to indoor noise

Rw + Ctr : Acoustic attenuation to outdoor noise

BA13 : Standard plasterboard (13 mm thickness)

LdV : glass wool

dB : decibel

Seismic performance

To guarantee that the GEOTEC® system works properly in seismically active zones or in buildings subject to significant vibration such as airports, stations or even underground car-parks, GEOTEC® ducts have been validated in accordance with the S2 set of spectra at 5% damping as per standard CRT 91 C 112 00. Carried out by the SOPEMEA laboratory (RE 1E31169ME), these calculations showed the excellent resistance to seismic activity and vibration of the GEOTEC® system.

Performance under damp conditions

Where ventilation or smoke extraction ducts are constructed in rooms where the humidity is high, we propose that our products be treated with a water repellent. This treatment is applied to the bulk of the material, and does not alter the fire resistant properties of the products in any way.



CARBON FIBER REINFORCEMENTS

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- 3. PROTECTION UNDER THE BEAM 17

1. SYSTEM GENERAL OVERVIEW

The fire stability of reinforced concrete structures and substrates is obtained by restricting the temperature rise in the steel-work within the concrete.

If the existing load-bearing structures need to be strengthened (in the case of a change of use, anti-seismic confinement, refurbishment, etc.), one solution involves bonding carbon fibre reinforced boards with an epoxy resin adhesive.

With the aim of guaranteeing the strength and performance of these carbon reinforcements in the event of fire, the solution has to guarantee a temperature of the adhesive used.

This maximum temperature, varying between 45 and 80° C, appears in the technical notes of the manufacturers to whom the reader should refer.

Following the fire resistance tests carried out at the Efectis laboratory, and via the intermediary of Laboratory Assessment EFR-18-001644, GEOSTAFF® proposes validated solutions using GEOTEC®S to protect the carbon fibre reinforcements installed under the floor slab and concrete beam, depending on the desired levels of fire performance and the critical temperatures provided by the manufacturer.



2. PROTECTION UNDER CONCRETE FLOOR SLAB



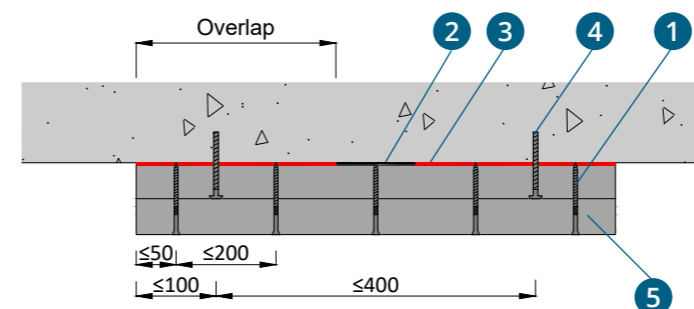
In this configuration, GEOCOL® adhesive is applied around the periphery of the carbon fibre reinforcement.

A first protective thickness using GEOTEC®S is attached to the concrete using masonry screws 400 mm apart in both directions.

The second thickness is attached to the first via offset joints, using woodscrews 200 mm apart in both directions.

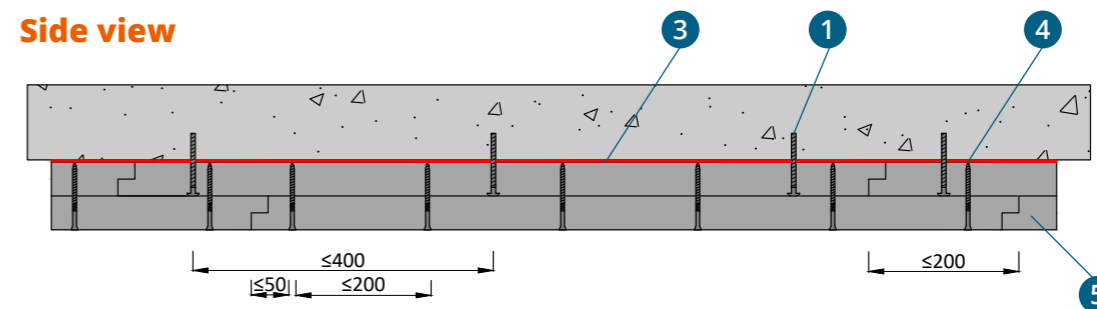
If a third layer is to be used, it should be fixed to the second layer by means of wood screws every 200 mm.

Front view



- 1 Fisher Ultracut FBS II 85K screw Ø8 L=80
- 2 Carbon fiber reinforcements
- 3 Geocol® glue
- 4 Woodscrews Ø 5
- 5 GEOTEC®S fire resistant board

Side view



Desired interface temperature (°C)	GEOTEC®S PROTECTIVE THICKNESS				
	Desired fire performance				
	30 min	60 min	90 min	120 min	180 min
45	2x30 mm (Overlap 100 mm)	2x45 mm (Overlap 100 mm)	2x45 mm (Overlap 350 mm)	3x45 mm* (Overlap 250 mm)	-
60	2x30 mm (Overlap 100 mm)	2x30 mm (Overlap 100 mm)	2x45 mm (Overlap 100 mm)	2x45 mm (Overlap 200 mm)	-
80	2x30 mm (Overlap 100 mm)	2x30 mm (Overlap 100 mm)	2x30 mm (Overlap 100 mm)	2x45 mm (Overlap 100 mm)	2x45 mm (Overlap 100 mm)

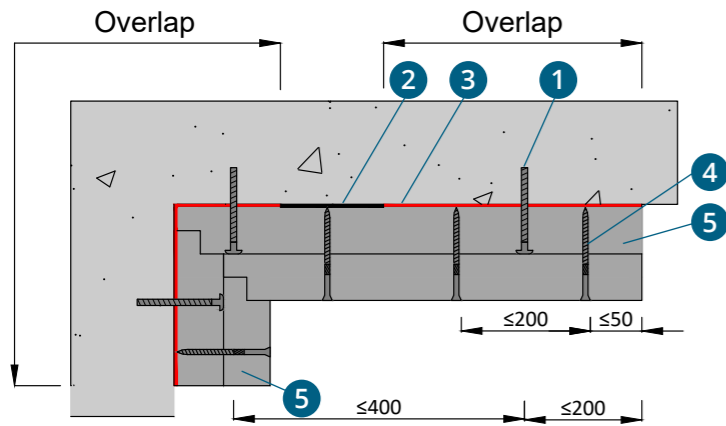
* Glue must be applied between each layer

Note:
When the protection is adjacent to a wall corner:

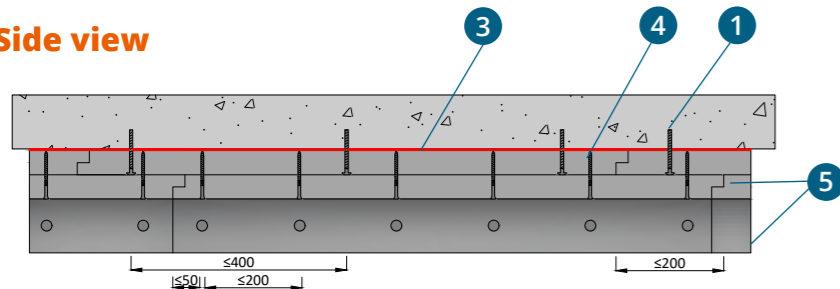


In the case of a protection adjacent to a wall corner, the installation must be adapted so the overlap remain the same as indicated in the table (see above page 147).

Front view



Side view



- 1 Fisher Ultracut FBS II 85K screw $\varnothing 8$ L=80
- 2 Carbon fiber reinforcements
- 3 Geocol® glue
- 4 Woodscrews $\varnothing 5$
- 5 GEOTEC® S fire resistant board

3. PROTECTION UNDER THE BEAM



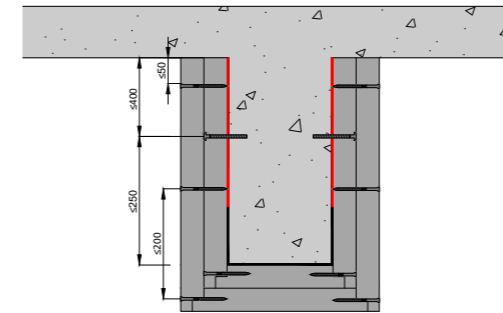
In this configuration, the beam is covered on all three sides. The carbon reinforcement is glued on the periphery with GEOTEC® adhesive.

The first layer of GEOTEC® protection is fixed on the one hand to the two vertical sides by means of concrete screws (centre distance: 400 mm) and on the other hand to the bottom of the beam by means of wood screws (centre distance: 200 mm).

The second layer of protection is fixed at offset joints to the first layer by means of wood screws (centre distance 200 mm in both directions).

If a third layer of protection is required, it should be fixed to the second layer by means of wood screws (centres: 200 mm in both directions).

Front view



Reinforcement installed on the bottom of the beam

Desired interface temperature (°C)	GEOTEC®S PROTECTIVE THICKNESS			
	Desired fire performance			
	30 min	60 min	90 min	120 min
45	2x45 mm	2x45 mm	3x45 mm	-
60	2x45 mm	2x45 mm	2x45 mm + 30 mm	3x45 mm
80	2x30 mm	2x45 mm	2x45 mm	2x45 mm

Reinforcement installed on the side of the beam

Desired interface temperature (°C)	GEOTEC®S PROTECTIVE THICKNESS			
	Desired fire performance			
	30 min	60 min	90 min	120 min
45	2x45 mm	2x45 mm	2x45 mm + 30 mm	3x45 mm*
60	2x30 mm	2x45 mm	2x45 mm	2x45 mm + 30 mm
80	2x30 mm	2x30 mm	2x45 mm	2x45 mm

* Glue must be applied between each layer

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Opening hours

Monday to Thursday:
9:00 - 12:30 / 13:30 - 18:00
Friday:
9:00 - 12:30 / 13:30 - 17:00

Contact us

com@geostaff.fr

GEOSTAFF FACTORY

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It may be possible to pick up some of our products from this address. Please contact us for further information.

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Opening hours

Open from Monday to
Thursday: 6:30 - 17:00
Friday: 6:30 - 12:30

Contact us

com@geostaff.fr

For ease of collection in **the South of France**, there is a GEOSTAFF warehouse at **ZAC LA GRAVE 06150 CARROS** (Alpes-Maritimes).

Please contact us for further information.

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