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PASSIVE FIRE PROTECTION OF FRP REINFORCEMENTS: REQUIREMENTS, CRITICAL ISSUES AND DEDICATED SOLUTIONS

Why organic resins make FRP reinforcements vulnerable to fire, why passive fire protection must be integrated from the design stage with certified solutions compatible with strengthening systems, and how Protherm Light FRP, the system developed by Edilteco for this specific application, meets the need.

Edilteco S.p.A.

Passive fire protection of FRP structural reinforcements is a key design issue for structural engineers and fire safety professionals. FRP systems offer lightness, high mechanical performance and fast installation, but the presence of **organic resins** makes them **vulnerable to high temperatures**.

For this reason, **fire protection** cannot be treated as a secondary check or a decision to be defined at a later stage of the project: **it must be integrated from the very early design phases**. Only in this way can the reinforcement maintain its effectiveness even under the most severe conditions, ensuring consistency between structural safety and the overall fire strategy.

Why FRP reinforcements are vulnerable to fire

The critical point is well known. FRP reinforcements owe their effectiveness to the presence of an **organic resin** that ensures adhesion to the substrate. It is an **essential component**, but also **the one most vulnerable to high temperatures**. In the event of fire, the resin's thermal degradation can quickly compromise the reinforcement's performance, calling its structural contribution into question precisely under the most severe conditions.

For designers, this means something very concrete: it is not enough for the reinforcement to work – it must continue to work even when conditions become extreme.

And this is where passive fire protection stops being a detail and becomes an integral part of the system.

> **What is passive fire protection for FRP reinforcements**
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> Passive fire protection for FRP systems consists of applying certified solutions designed to limit the temperature rise of the resin matrix, preserving adhesion and the structural contribution of the reinforcement in the event of fire. It is part of the overall fire strategy and must be coordinated with the structural design.

Protherm Light FRP: a dedicated system for the fire protection of FRP reinforcements

It is precisely from this need that **Protherm Light® FRP** was developed – Edilteco's solution for the passive fire protection of structural reinforcements in FRP with organic resin. Not an adapted product, but a system conceived from the outset for this specific application field, with the aim of filling a real gap in the design of FRP strengthening systems.

Composition and technical features

The logic is simple: to provide **effective protection** without undermining the principles that make **FRP** systems so attractive and efficient. Protherm Light FRP comes as a bonded composite panel, consisting of a nanotechnology panel combined with **Protherm Light** cement-based plaster, with a **total thickness of just 40 mm**. This thickness makes it possible to integrate the protection even in work on existing buildings, where every additional centimetre can become a design constraint.

Its **low weight, around 11 kg/m^2**, follows the same logic: protect without adding unnecessary load, staying consistent with the structural approach typically associated with FRP systems.

Section of the composite panel for the fire protection of FRP systems: insulating layer and cement-based pl

Section of the composite panel for the fire protection of FRP systems: insulating layer and cement-based plaster integrated into a reduced thickness

The issue is particularly relevant in **seismic upgrading or retrofitting works** on existing buildings, where FRP reinforcements are often applied to beams, columns and the soffit of reinforced concrete slabs. In these cases, fire protection must ensure continuity even on irregular surfaces and complex structural joints.

Reaction-to-fire classes and EN 1363-1 testing

From a fire safety perspective, the system is based on components with **high reaction-to-fire classifications** (**A2-s1,d0 for the panel** and **A1 for the plaster**) and has been **tested in recognised laboratories** according to **EN 1363-1**: a key element enabling designers to correctly frame the solution within the overall fire prevention strategy, with clear and verifiable technical references.

Protherm Light FRP was conceived to work with strengthening systems, not to interfere with them. Application on substrates compliant with FRP technical assessments, together with standardised installation procedures, makes it possible to achieve **continuous and consistent protection even on beams, slabs and complex soffits**.

Find out more about Protherm Light FRP

Edilteco tools supporting designers

To support the design process, Edilteco provides a **dedicated installation manual** and assistance from its technical department. In this way, passive fire protection for FRP reinforcements stops being an item to "sort out later" and becomes a conscious design choice, integrated from the very first

phases of the intervention.

> **Coordination between structural design and fire strategy**
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> The selection of the FRP system and that of the passive fire protection cannot be addressed independently. The structural designer and the fire safety professional must jointly define the required performance, installation methods and compatibility with the fire resistance verifications required by current regulations.

With **Protherm Light FRP**, Edilteco provides a **concrete response to a real critical issue**: a dedicated solution, compatible with FRP systems, designed for professionals who need to make technical decisions today and want to do so with clear, reliable and consistent tools.

> **Technical FAQ on the fire protection of FRP strengthening systems**
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> **Why is fire protection of FRP a critical design issue?** Because organic resins rapidly lose performance at high temperatures, compromising the effectiveness of the reinforcement in the event of fire.
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> **Is Protherm Light FRP a dedicated or an adapted solution?** It is a dedicated solution, designed specifically for the passive fire protection of FRP reinforcements.
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> **What is the impact in terms of thickness and weight?** A total thickness of 40 mm and a weight of around 11 kg/m^2, suitable for work on existing buildings.
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> **Is the system backed by laboratory tests?** Yes, it has been tested in recognised laboratories according to EN 1363-1.
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> **Is it compatible with existing FRP systems?** Yes, it is designed to be applied on substrates compliant with the technical assessments of FRP reinforcements.