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JUSTIFICATION OF THE A1 REACTION TO FIRE CLASSIFICATION OF GRACCO SURFACES PANELS

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1. Purpose of the report

The purpose of this report is to justify the A1 reaction to fire classification of GRACCO SURFACES panels, intended for cladding applications, in accordance with the applicable European regulations, by means of the Classification Without Further Testing (CWT) procedure.

2. Reference standards

- UNE-EN 15286:2013 – Agglomerated stone. Slabs for wall and ceiling cladding.
- UNE-EN 13501-1 – Fire classification of construction products and building elements.
- CTE DB-SI – Safety in case of fire.

3. Product description

GRACCO SURFACES panels are cladding panels manufactured from agglomerated stone, composed mainly of inorganic, mineral and non-combustible materials.

The product incorporates a GFRP reinforcement mesh type REBARMAT 100×100×3 mm, made of ECR glass fibre and epoxy resin:

- ECR glass fibre is an inorganic, non-combustible material that does not contribute to the fire load of the product.
- The epoxy resin associated with the mesh is the only organic material present in the panel.

The total epoxy resin content derived from the REBARMAT 100×100×3 mm mesh is less than 0.1% by mass relative to the total panel.

4. Regulatory justification of the fire classification

4.1 Justification according to UNE-EN 15286:2013

According to section 4.2.3 of UNE-EN 15286:2013, wall slabs or tiles manufactured from agglomerated stone may be classified without testing (CWT) as Class A1, provided that the organic material content:

- Does not exceed 0.1% by mass or volume when acting as a binder, and
- Does not exceed 1% by mass or volume when homogeneously distributed as an aggregate.

For GRACCO SURFACES panels:

- The GFRP REBARMAT 100×100×3 mm mesh acts exclusively as a localized structural reinforcement.
- The epoxy resin associated with this mesh is neither homogeneously distributed throughout the mass of the product nor does it act as an aggregate.
- The total organic material content is below 0.1% by mass, complying with the most restrictive criterion established by the standard.

Therefore, the product fully meets the conditions set out in section 4.2.3 of UNE-EN 15286:2013 and may be directly classified as Class A1 reaction to fire without testing.

4.2 Additional justification according to UNE-EN 12467:2013

Additionally, UNE-EN 12467:2013 – Fibre-cement flat sheets, establishes criteria for direct reaction to fire classification without testing, based on the organic material content of the product.

Section 7.5.1 of this standard states:

“It is considered that boards whose content of organic substances is less than or equal to 1% by mass or volume, whichever is more unfavourable, meet the requirements for Class A1 reaction to fire performance according to the provisions of amended Decision 96/603/EC, without the need for testing.”

In the case of GRACCO SURFACES panels:

- The total organic substance content of the product is below 0.1% by mass, well below the 1% limit established in UNE-EN 12467:2013.
- These organic substances are limited exclusively to the epoxy resin associated with the GFRP REBARMAT 100×100×3 mm mesh and are not homogeneously distributed within the main mass of the panel.
- All other components of the product are inorganic mineral materials with no significant contribution to the fire load.

Consequently, in accordance with section 7.5.1 of UNE-EN 12467:2013 and the provisions of amended Decision 96/603/EC, GRACCO SURFACES panels meet the requirements for Class A1 reaction to fire classification without testing.

5. Reaction to fire classification

In view of the above, and in accordance with:

- UNE-EN 15286:2013, section 4.2.3, and
- UNE-EN 12467:2013, section 7.5.1,

GRACCO SURFACES panels are classified as:

Reaction to fire: Class A1 (UNE-EN 13501-1)
Classification without testing (CWT).

6. Conclusion

The A1 reaction to fire classification of GRACCO SURFACES panels is fully justified by double regulatory reference, both of which allow direct classification without testing for products with a very low content of organic substances.

Given that the organic content of the product is below 0.1%, no additional testing is required. This classification is therefore valid for all regulatory purposes, including compliance with CTE DB-SI.

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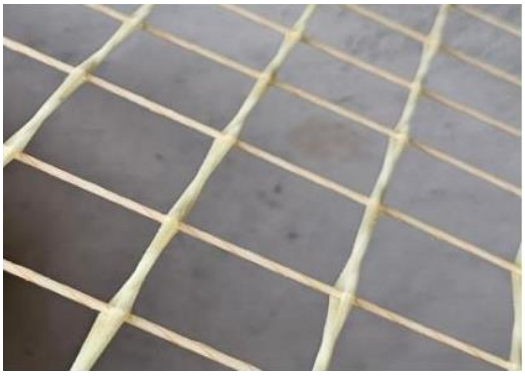
7. Rebarmat mesh Technical data sheet

REBARMAT MESH 3MM

LIGHT SIZE; 50x50, 100x100



Uniform GRP mesh for concrete reinforcement against cracks and shrinkage.
Non-structural reinforcement.

Shape	round bar
Surface structure	Lisa
Profiling geometry	None
Core fiber material	ECR fiberglass
Impregnation material	Epoxy resin
Color	From greenish to yellow

Geometry and structure

	Unit	Worth	Tolerance	Standard
Nominal diameter	[mm]	3.00	± 0.2 mm	EAD 260023000301
Static cross section area	[mm²]	7.06	-	EAD 260023000301
Weight per square meter 50x50	[g/m²]	490	± 4 %	
Weight per square meter 100x100	[g/m²]	250	± 4 %	

Material properties

		Unit	Worth	Tolerance	Standard
Glass transition temperature (GST)		[°C]	≥ 100	-	EN ISO 113572
Bulk density of fiber composite		[g/cm³]	2.2	2.1 – 2.2	ISO 11831
Coefficient of thermal expansion α sp	Longitudinal	[10−6 K−1]	5	± 0.6	ISO 113592
	Cross	[10−6 K−1]	2.2	± 0.4	ISO 113592
Class of building material		[]	my	-	EN 135011

Mechanical properties

		Unit	Worth	Standard
Average short-term tensile strength relative to nominal cross-sectional area		[N/mm²]	≥ 900	EAD 260023000301
Average modulus of elasticity in relation to nominal cross-sectional area		[N/mm²]	≥ 50000	EAD 260023000301
Characteristic elongation at break		[%]	≥ 2.2	EAD 260023000301
Characteristic maximum service temperature		[Tmax °C]	70	EAD 260023000301
Medium compressive strength		[N/mm²]	546	ASTM D69510
Average compression modulus		[N/mm²]	52200	ASTM D69510
Medium shear resistance	Cross	[N/mm²]	≥ 56	EAD 260023000301
	Longitudinal	[N/mm²]	≥ 241	EAD 260023000301
Characteristic resistance force		[kN]	6.36	EAD 260023000301

Delivery methods

		Unit	Worth	Tolerance
Rolls (standard) 1 m high	Length	[m]	2050	0.1
Sheets (minimum/maximum length) 1m wide	Length	[m]	13	0.1

Storage conditions Alternative to replace steel

Protect from direct sunlight.	**46 mm; 100 x 100 150 x 150**

Main benefits

1. **Crack Control:** GFRP fiberglass mesh helps to distribute tensile stresses evenly, thereby controlling the formation and propagation of cracks caused by shrinkage and other tensile forces.
2. **Corrosion Resistance:** Unlike steel, GFRP fiberglass does not corrode, which improves the durability and service life of concrete structures, especially in harsh environments.
3. **Lightness:** GFRP fiberglass is significantly lighter than steel, making it easier to handle and install and reducing transportation costs.
4. **High strength-to-weight ratio:** Despite its lightness, GFRP fiberglass offers high tensile strength, contributing to the structural integrity of the concrete.
5. **Non-Magnetic and Non-Conductive:** GFRP fiberglass is non-magnetic and electrically non-conductive, making it suitable for applications where electromagnetic interference or conductivity are a concern.
6. **Reduced protective concrete layer:** Due to the specific properties of the GFRP material, the concrete cover layer can be reduced to a minimum of 10 mm, except in cases where the concrete has a compressive strength of >= 80 MPa; in these cases, the cover can be reduced to 5 mm. The cover layer is for adhesion purposes only, so the mesh in the cut areas can be left fully exposed to any environment, except for prolonged exposure to the sun, which would degrade the material only in the exposed area.

Applications of GFRP fiberglass mesh:

- **Concrete slabs:** GFRP fiberglass mesh is used in concrete slabs to control cracks induced by shrinkage and temperature changes. It is particularly beneficial in slabs exposed to corrosive environments, such as coastal areas or industrial floors.
- **Pavements and Driveways:** Used to reinforce concrete pavements and driveways, providing crack control and extending the life of the concrete.
- **Precast Concrete Elements:** GFRP fiberglass mesh is incorporated into precast concrete elements such as panels, pipes and barriers, improving their durability and crack resistance.
- **Architectural and Decorative Concrete:** For architectural applications, GFRP fiberglass mesh helps maintain the aesthetic integrity of decorative concrete by preventing visible cracks.

Installation and best practices:

1. Make sure the GFRP mesh is placed in the correct position within the concrete. It should be located in the tensile zone, where cracks are most likely to form.
2. Maintain sufficient concrete cover over the GFRP mesh to protect it from potential damage during construction and ensure it is fully embedded.
3. The mesh must be securely fastened to prevent shifting during concrete pouring and compaction.
4. Overlap adjacent mesh sheets sufficiently (usually at least one grid space) and ensure that joints are handled appropriately to maintain uniform reinforcement.

GFRP Rebarmat mesh in UHPC (Ultra-High Performance Concrete) applications:

For GFRP Rebarmat mesh in UHPC (Ultra-High Performance Concrete) applications, there is the potential to reduce the concrete cover below the typical 10mm . This is because UHPC has a much denser matrix and higher compressive strength, which generally provides better protection for embedded materials compared to standard concrete.

Considerations for reducing cover:

Increased durability: The higher density and lower permeability of UHPC reduce the risk of moisture and chemical penetration, which are the main factors requiring a protective cover on traditional concrete.

Bond strength: With GFRP, bond strength is less dependent on the thickness of the coating and more on the adhesive bond with the UHPC blend. A high-performance blend could allow for a thinner coating while maintaining adequate bond performance.

Potential reduction: Depending on project specifications and exposure conditions, it may be feasible to reduce coverage by a few millimeters. However, I would recommend performing a small-scale test or consulting with a structural engineer familiar with UHPC applications to confirm the minimum coverage that provides sufficient bond strength and durability in this specific case.

By using REBARMAT GFRP mesh uniformly, you can significantly improve the performance of concrete structures in terms of crack control and shrinkage resistance, **ensuring long-term durability** and **reducing maintenance costs** .

Measurement
The identified values have been determined directly from the product. Variations in these properties may be observed in the structural element or during its processing. It is recommended to validate these values by means of appropriate tests on the structural component, using the specific formulation used in each case.

Industrial Safety and Health
When cutting, sanding or drilling fibre composites, fine particles and fibres can be released into the air. These can be harmful if inhaled or if they come into contact with the skin or eyes. Therefore, it is essential to use appropriate personal protective equipment (PPE) such as masks, safety glasses and gloves. Good ventilation or extraction systems are also important in work areas. Special tools and techniques are often required for cutting and machining fibre composites. Standard tools can wear out quickly due to the abrasive nature of the fibres. Diamond-coated tools are recommended.

Country-specific regulations
The application of this product is subject to the relevant national regulations in the country of use. Design processes are carried out in accordance with the standards applicable to reinforced concrete components. This includes adherence to Eurocode 2 (EU EN 1992) and the forthcoming Annex R, which refers to embedded FRP (Fibre Reinforced Polymer) reinforcement.

Processing Information
Only qualified and trained personnel should install GFRP. Damaged rods should not be used as this compromises the load-bearing capacity. The product's specified values, especially tensile strength, are valid only when used as intended.

Ecology and health protection
This product is classified as an 'article' according to Article 3 of Regulation (EC) No 1907/2006 (REACH) and does not release substances during normal use. Consequently, a safety data sheet according to Article 31 is not required for marketing, transport or use. Adherence to the guidelines in this data sheet is essential for safe use. According to current knowledge, the product does not contain any Substances of Very High Concern (SVHC) listed in Annex XIV of REACH or on the European Chemicals Agency Candidate List in concentrations exceeding 0.1% (w/w).

Legal information
This information is based on our experience and knowledge, assuming that the product is transported, stored, used and processed correctly in accordance with the guidelines in this Product Data Sheet and the Technical Information for our REBARMAT PRO reinforcing bars. The effectiveness of our products depends largely on their use and processing. It is your responsibility to verify the suitability of the product for your specific application.

As most countries do not yet have building regulations for non-metallic reinforcement, it is vital to consult with planners, specialists, building authorities, structural engineers and load-bearing structure experts, and to comply with country-specific regulations (such as obtaining individual approvals, where necessary). Non-load-bearing use is generally less regulated, but it is still crucial to ensure compliance with local and safety regulations to ensure the integrity and longevity of the project.
We reserve the right to change product specifications. Existing third party industrial property rights must be respected. Our standard terms and conditions of sale and delivery apply in all other respects. The most recent product data sheet at the time of your purchase applies.

Certified by: