

MICRO GOLD STEEL

**High-ductility, high-fluidity
fibre-reinforced cementitious
mortar (HPFRC) for structural
strengthening of concrete elements.**



FIELDS OF APPLICATION

- Low-thickness jacketing (20-50 mm) on r.c. elements, such as beams, columns, and beam-columns joints, and in foundation structures, even without traditional reinforcement elements.
- Low-thickness collaborating top concrete slabs (20-50 mm) for structural strengthening on concrete beam and block floors, timber, steel beams, hollow clay blocks, and corrugated steel deck sheets slabs.
- Repairing decks on bridge structures.
- Refurbishing of tunnel covers.
- Repairing special paving (airport runways, etc.)

METHOD OF USE

Preparing the substrate for horizontal applications

- The substrate where the product is to be applied (which forms an integral and structural parts of the slab) must be solid, resistant and free from any loose parts, dust or other residues; if necessary, eliminate any deteriorated and/or loose concrete, subject to prior approval from the Works Manager.
- To ensure **MICRO GOLD STEEL** adheres correctly to the substrate, the surface should have a degree of roughness of at least 5 mm, in addition, it should be treated with **CentroStorico Latex** (or be saturated with water) to prevent the product from drying out too quickly, which could cause it to crack.
- In the event that the mechanical strength or compactness of the existing slab is compromised in any way, before applying **MICRO GOLD STEEL** apply a coat of **CentroStorico Primer**, dusting with sand so as to consolidate the surface (rather than applying **CentroStorico Latex** and saturating the support with water).
- In the case of smooth substrates (where the degree of surface roughness is less than 5 mm) in brickwork

(e.g. self-supporting) or where it is necessary to enhance adhesion, apply **CentroStorico Chemical Connector** first.

Preparing the substrate for formwork applications

- Eliminate any loose material and previous repairs that do not adhere perfectly to the substrate.
- If necessary, clean the surfaces by sand-blasting or using low pressure water until they are suitable rough.
- Clean the concrete rebars, eliminating any dust, rust, grease, oils, varnishes or pre-existing paint.

Preparing the mix

- **MICRO GOLD STEEL** does not require any additional materials and may be prepared using normal concrete mixers, planetary mixers or screw mixers (not in continuous mode), providing the resulting mix is homogeneous.
- **MICRO GOLD STEEL** may be pumped using a concrete pump together with a premixing system.
- The product should be mixed according to the following proportions: 4 bags of premix (100 kg) + 1 pack of metallic fibres (3.5 kg) + 12-14 litres of clean water. If this is not possible, mix the components in the following ratio: 1 bag of premix + 0.875 kg of metallic fibres + 3-3.5 litres of clean water.
- Pour the specified quantity of water into the mixer, followed by the premix and mix for approx. 5-6 minutes until the resulting mix is homogeneous, with a fluid, lump-free consistency.
- Add the metallic fibres a few at a time so that they are completely enveloped in the mix.
- Continue mixing for approx. 5-6 minutes until the resulting mix is homogeneous, with a fluid, lump-free consistency.

APPLICATION

Horizontal applications (slabs, decking)

- Pour the **MICRO GOLD STEEL** over the surface, using a squeegee, if necessary to ensure it spreads evenly.
- When applying the product where it is exposed to the open air, direct sunlight, high temperatures, etc., cover the **MICRO GOLD STEEL** cast with an impermeable sheet for 2-3 days to ensure it cures correctly.

Formwork applications

- Prepare the cast by pouring the **MICRO GOLD STEEL** into the frame. The product should be poured continuously and always from the same side, so as to prevent any air from being trapped.
- In areas that are particularly heavily reinforced or that have complex geometry, apply slight mechanical vibration or use wooden elements or iron rods to facilitate the flow of **MICRO GOLD STEEL**.

IDENTIFICATION DATA

Classification EN 1504-3:2006	Product for repair work on concrete structures: Structural Repair - Class R4
Classification EN 1504-6:2007	Product for repair work on concrete structures: Anchoring the steel reinforcements
L.G. C.S.LL.PP. (Ministry of Public Works Guidelines) FRC:2021	Fibre-reinforced concrete (FRC) Fibre-reinforced micro-concrete for repair and strengthening work on reinforced concrete structures.
Compliance	Technical Evaluation Certificate (CVT) issued pursuant to the provisions of Chap.11, sect. 11.1 para. c) of Italian Ministerial Decree 17.1.2018 (Technical Regulations for constructions and relative circular)
Grain size of aggregates	0-2.5 mm
Density of hardened concrete (UNI EN 12390-7:2019)	Approx. 2300 kg/m ³

TECHNICAL SPECIFICATIONS

PERFORMANCE SPECIFICATIONS	REQUIREMENTS IN ACCORDANCE WITH EN 1504-3	REQUIREMENTS IN ACCORDANCE WITH UNI EN 1504-6	PRODUCT PERFORMANCE SPECIFICATIONS
Compressive strength after 28 days	≥ 45 MPa	-	Class R4 ≥ 110 MPa
Chloride content	≤ 0.05 %	≤ 0.05 %	Outdated specification ≤ 0.05 %
Adhesion bond	≥ 2.0 MPa	-	Outdated specification ≥ 2.0 MPa
Resistance to carbonatisation	$d_k \leq$ control concrete [MC (0.45)]	-	Outdated specification
Modulus of elasticity in compression after 28 days	≥ 20 GPa	-	Outdated specification ≥ 20 GPa
Thermal compatibility - freeze/thaw	Bonding force after 50 cycles ≥ 2.0 MPa	-	Outdated specification
Capillary absorption	≤ 0.5 kg·m ⁻² ·h ^{-0.5}	-	Outdated specification
Pull-out strength	-	Displacement ≤ 0.6 mm at 75 kN load	Outdated specification
Reaction to fire	-	-	Euroclass A1

PROPERTIES OF THE FIBRES

Shape	Hooked
Aspect ratio	78.9
Material	Steel
Material density	8.5 g/cm ³
Length	30 mm
Equivalent diameter	0.38 mm
Tensile strength	> 3000 MPa
Modulus of elasticity	200 GPa

CHARACTERISTICS OF THE HPFRC COMPOSITE SYSTEM

Certified in accordance with the "FRC Guidelines 11/2021" - Designed in accordance with "CNR-DT204/2006" (National Research Council Technical Guidelines)

PERFORMANCE SPECIFICATIONS	TEST METHOD AND REFERENCE STANDARDS	PRODUCT PERFORMANCE SPECIFICATIONS
Fibres content	-	$\geq 1\%$ by volume $\geq 3.5\%$ by weight
Consistency class	EN 12350-1,2,3,5	SF3
Compressive strength class	EN 12390-1,2,3	C 80/95
Modulus of elasticity	NTC 2018 § 11.2.10.3 (Technical Construction Regulations)	42.42 GPa
Poisson's ratio	NTC 2018 § 11.2.10.4 (Technical Construction Regulations)	0-0.2
Coefficient of linear thermal expansion	NTC 2018 § 11.2.10.5 (Technical Construction Regulations)	$10 \cdot 10^{-6} \text{ }^{\circ}\text{C}^{-1}$
Toughness class	EN 14651	7d
Strength at the limit of proportionality (mean value) $f_{ct,Lm}^f$	EN 14651	5.58 MPa
Strength at the limit of proportionality (characteristic value) $f_{ct,Lm}^f$	EN 14651	3.87 MPa
$f_{R1k} / f_{ct,Lk}^f$	EN 14651	1.836
f_{R3k} / f_{R1k}	EN 14651	1.102
Tensile strength (mean value) f_{ctm}	NTC 2018 § 11.2.10.2 (Technical Construction Regulations)	4.84 MPa
Tensile strength (characteristic value) f_{ctm}	NTC 2018 § 11.2.10.2 (Technical Construction Regulations)	3.39 MPa
Exposure class	EN 206	X0 XC1, XC2, XC3, XC4 XD1, XD2, XD3 XS1, XS2, XS3 XF1, XF2, XF3, XF4
Resistance to freeze/thaw cycle	EN 12390-9	20 cycles
Pressurised water penetration depth	UNI EN 12390-8	0 mm
Residual flexural tensile strength (characteristic values)	EN 14651	$f_{R1k} = 7.11 \text{ MPa (CMOD1)}$ $f_{R2k} = 9.15 \text{ MPa (CMOD2)}$ $f_{R3k} = 7.83 \text{ MPa (CMOD3)}$ $f_{R4k} = 6.48 \text{ MPa (CMOD4)}$

APPLICATION DATA

Mixing water per 25 kg bag	approx. 3 - 3.5 litres
Mix consistency	Super fluid (Self-compacting)
Treadability	approx. 24 hours
Mix durability	approx. 30-45 minutes
Application temperature	From +5°C up to +35°C
Coverage	approx. 20 kg/m ² per cm of application thickness
Application thickness	20-50 mm
Packaging	Part A: Disposable wooden pallet laden with 60 x 25 kg bags, equivalent to 1500 kg of loose product Part B: 15 x 3.5 kg boxes of fibres
Storage conditions (Italian Ministerial Decree 10/05/2004)	In original packaging, indoors, in a cool, dry, unventilated place
Durability (Italian Ministerial Decree 10/05/2004)	Not more than 12 months from packing date.

SPECIFICATION ITEM

Supply and implementation of a Technical Evaluation certified HPFRC concretes, consisting of pourable, premix mortar with hooked steel fibres, highly adhesive to any type of support, with very good ductility and durability. Non-hardening post-cracking behaviour, e.g. Ruregold **MICRO GOLD STEEL**, compressive strength class C80/95, mean flexural tensile strength per UNI EN 14651: $f_{R1} = 9.39$ Mpa, $f_{R2} = 10.83$ Mpa, $f_{R3} = 9.68$ Mpa, $f_{R4} = 8.41$ Mpa. The HPFRC system with steel fibres may be used to create low-thickness jacketing for structural elements such as beams and columns, reducing or eliminating the need for additional rebars, and for low-thickness strengthening on concrete beam and block floor and timber slabs, beams or bridge deck slabs, replacing the electrowelded steel mesh. The surfaces must be prepared and the concrete applied in accordance with the manufacturer's instructions.

Edition 01/2025. Revision 01

This technical data sheet is not a specification. The provided figures, and content thereof, are based on our best knowledge and experience, and are purely indicative in nature. The user is responsible for determining whether or not the product is suitable for the intended use, assuming all responsibility for its use and application. Laterlite reserves the right to change the packaging and the contained quantity without prior notice. Check that the revision of the TDS is the one currently in force. Laterlite products are intended for professional use only.

This Technical Data Sheet cancels and replaces previous editions, which are no longer in force.

