STEELGRID® HR POLIMAC® SYSTEM
HIGH CORROSION PROTECTION GEOCOMPOSITE MESH SYSTEM

The new **Steelgrid®** HR PoliMac® System is an innovative complete system for rockfall mitigation and slope consolidation works. The **Steelgrid®** HR PoliMac® System combines a patented high strength steel wire mesh geocomposite which is used in conjunction with anchor plates, specific U-bolts and mesh connectors. The **Steelgrid®** HR PoliMac® mesh is a composite of double twisted steel wire hexagonal mesh with high tensile strength steel cables, woven into the mesh during the manufacturing process.
The high level corrosion protection for the steel wire mesh and ropes (GalMac® and PoliMac® coated), and for the accessories makes the **Steelgrid®** HR PoliMac® System ideal for use in environments ranging from near-coastal regions and splash zones to high alpine areas.

Innovation in the Maccaferri manufacturing process adapts the traditional twisting process to create a 'hybrid mesh'; the mesh features a combination of full and half-hexagonal shaped mesh apertures. To provide high tensile strength and punching resistance at low-strain, the steel cables lie predominantly straight within the hexagonal mesh. As the mesh offers immediate resistance to loads at minimal strain, there is no requirement to pre-tension the mesh.

The post-manufacturing alignment of the steel cables within **Steelgrid®** HR PoliMac® can vary depending on the rope spacing and position within the roll. Performance testing is carried out in compliance with this natural variability. When the mesh is installed and loaded, the ropes lie straight within the mesh offering high strength and stiffness (strength at low strain). In comparison with traditional double twist and single twist meshes; elongation of **Steelgrid®** HR PoliMac® is in the range of 5-9% compared with 16-23% for double twist meshes depending on mesh / wire combinations. Punch resistance, tested in accordance with UNI 11437, shows a greater improvement, with average increases of 20-40% compared with double twist meshes.

Figure 1: Production

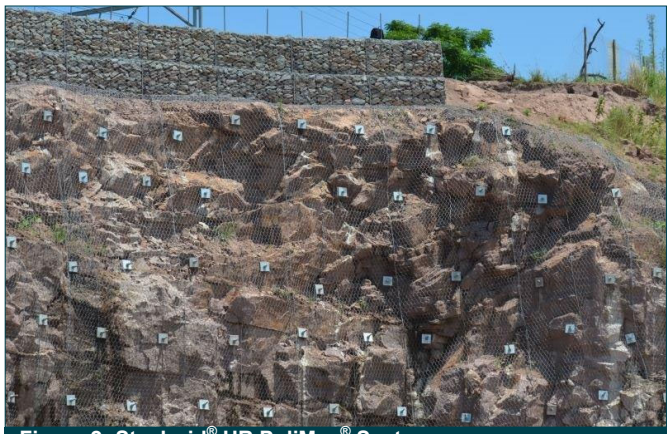


Figure 2: Steelgrid® HR PoliMac® System

Table 1: Longitudinal Tensile Performance

Steelgrid® HR PoliMac® variant	Nominal longitudinal tensile strength (Peak value)
HR PoliMac® 20	145 ± 5 kN/m
HR PoliMac® 30	120 ±10 kN/m
HR PoliMac® 50	90 ±7 kN/m
HR PoliMac® 100	75 ±5 kN/m

Table 2: Punch test performance (UNI 11437)

Steelgrid® HR PoliMac® variant	Ultimate punching force	Ultimate punching displacement
HR PoliMac® 20	145 ± 5 kN	260 ±30 mm
HR PoliMac® 30	135 ±12 kN	430 ±50 mm
HR PoliMac® 50	110 ±10 kN	450 ±50 mm
HR PoliMac® 100	80 ±10 kN	450 ±50 mm

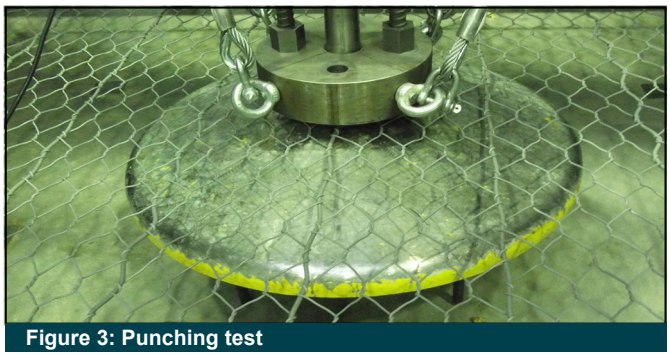


Figure 3: Punching test

Certification accompanying materials:
Prior to the installation and for each delivery the contractor shall deliver to the DL Declaration of Performance (DOP), issued in the original, in which must be specified the type and trade name of the product, the name of the producing company, the company to which the product is delivered, the location of the site and the quantities supplied.

ETA n. 16/0758

CE 1301-CPR-1228

Steelgrid® HR PoliMac® system is installed in the same general way as conventional double twist mesh. It is easy to handle and will not require extensive modification of existing method statements and installation techniques. The inclusion of the steel ropes greatly enhances the transfer of loads from the mesh into the anchorage system thereby increasing safety, capacity and durability of the mesh as a complete system.
The accessories supplied by Maccaferri together with the **Steelgrid® HR PoliMac® system** (especially the steel plate to be combined together with possible anchors) deliver a system characterized by high performance and reassurance.

Steel Wire Used for Double Twist Hexagonal Mesh

1. **Tensile strength:** the wire used to manufacture the mesh shall have a tensile strength between 350-550 N/mm^2 as per EN10223-3:2013. Wire tolerances (Table 4) are in accordance with EN10218-2 (Class T1).
2. **Elongation:** Elongation shall not be less than 8%, according to EN10223-3:2013.
3. **GalMac® coating:** minimum quantities of GalMac® shown at Table 4 meet the requirements of EN10244-2 (Table 2-Class A).
4. **Adhesion of GalMac®:** the adhesion of the GalMac® coating must be in accordance with EN 10244-2.
5. **Outwearing accelerated aging test** in a general condensation of moisture containing sulfur dioxide (28 cycles) in accordance with EN ISO 6988 the mesh shall not show more than 5% of red rust.
6. **Outer Polymer coating:** Continuous extruded PoliMac® coating nominal thickness 0.5 mm.

Steel Wire Ropes

- **Surface Finish of Component Rope Wires:** Zinc-Aluminium alloy (Zn-5%Al) coated to Class A ["A (Zn/Al)"] in accordance with EN 10264-2.
- **Rope Outer Coating:** Continuous extruded PoliMac® coating of nominal thickness 1 mm.
- **Steel wire Rope Diameter:** 6 mm (measured across the broadest diameter in accordance with the relevant standard). Rope overall diameter including PoliMac® coating: 8 mm.
- **Rope Construction:** Diameter 6mm, “6x7WC - WSC” described in accordance with relevant standards EN 12385-2 2008 and EN 12385-4 2008.
- **Nominal Grade of Rope:** 1770 N/mm^2 defined according to EN 12385-4 2008.
- **Minimum Breaking Load (MBL) of Rope:** 22.9 kN as defined in EN 12385-4 2008.

PoliMac® Coating Used on Wires and Ropes

- **Colour:** grey RAL 7012.
- **Resistance to UV radiation:** the tensile strength and elongation at break of the base compound after 2500 hours of exposure to QUV-A (ISO 4892-3 mode 1) cannot change more than 25% from the initial test results.
- **Chemical resistance:** the polymer shall resist the chemical agents in concentrations that are representative of soil and water normally found in civil works.
- **Outwearing accelerated ageing test in salt spray:** when the polymer coated wire mesh is subjected to the neutral salt spray test (ISO 9227) after 6000 hours of exposure the mesh shall not show more than 5% of DBR (Dark Brown Rust).

Table 3: Standard production data

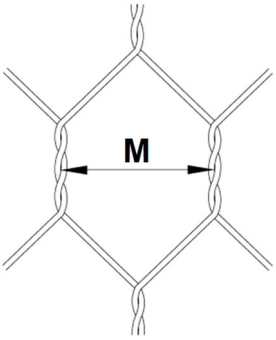
Steelgrid® HR PoliMac® variant	Nominal roll width (by truck)	Nominal roll width (by container)	Nominal roll length
HR PoliMac® 20	3.25m	2.75m	25/40m
HR PoliMac® 30	3.15m	2.85m	25/40m
HR PoliMac® 50	3.25m	2.75m	25/40m
HR PoliMac® 100	3.10m	2.85m	25/40m

All sizes and dimensions are nominal. Confirmation should be sought from regional office prior to placement of an order. Mesh production tolerances of ±3% of the length, ±5% of the width, ±8% of rope spacing shall be permitted. Other roll dimensions are available on request. The product, once unrolled, might present ondulations.

Table 4: Standard double twist mesh and wire data

Mesh type	D (mm)	ø Wire (mm)
8x10	80	2.70
Mesh wire diameter	**ø mm**	2.70
Mesh wire overall diameter	**ø mm**	3.70
Wire diameter tolerance	**(±) ø mm**	0.06
GalMac® minimum quantity	**gr/m^2**	245
PoliMac® coated rope diameter	**ø mm**	8.00

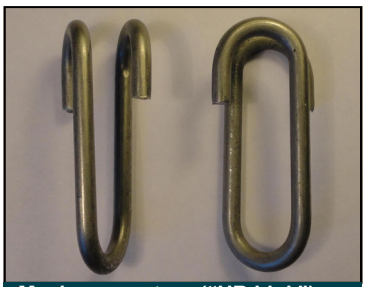
The tolerance on the opening of mesh ‘M’ being the distance between the axis of two consecutive twists, is according to EN 10223-3



Double Twisted Hexagonal Mesh detail information

U-bolt wire rope grip (“HR Grip”)

Steel plate (“HR Plate”)



Mesh connectors (“HR Link”)

WARNING: Install all rockfall and mesh products in accordance with National or Local Legal and Security Requirements. If the installation is performed by working insuspension or using security ropes, personal protective equipment against fall risk must be connected with anchor points in agreement with EN 795 or other relevant regional equivalanent standards and practices.

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