Officine Maccaferri S.p.A.
Via J.F. Kennedy, 10
40069 Zola Predosa (Bologna) - Italy
T: +(39) 051 643 6000
F: +(39) 051 643 6201
E: info@hq.maccaferri.com
maccaferri.com

Engineering a Better Solution

Maccaferri's motto is **'Engineering a Better Solution'**; We do not merely supply products, but work in partnership with our clients, offering technical expertise to deliver versatile, cost effective and environmentally sound solutions. We aim to build mutually beneficial relationships with clients through the quality of our service and solutions.

GLOBAL ENGINEERS

In the second half of the 19th century, we invented Gabions and dramatically changed the civil engineering landscape. We are still changing today. We work every day to find better solutions for our clients at every degree of latitude and longitude. Our worldwide network grows through innovation and diversification of sectors of activity and through an increasing range of high quality and environmentally friendly products and applications.

OFFICINE MACCAFERRI GROUP PROFILE

Founded in 1879, our Group soon became a worldwide reference in the design and development of advanced solutions, with offices in over 70 countries and 30 factories worldwide.

Our mission is to pursue excellence through continuous improvement, while delivering to customers engineered solutions that are innovative, advanced and environmentally friendly. We are committed to outstanding safety, quality and sustainability, to create value for all stakeholders as well as our communities.

MACCAFERRI APPLICATIONS

- RETAINING WALLS & SOIL REINFORCEMENT
- HYDRAULIC WORKS
- ROCKFALL PROTECTION & SNOW BARRIERS
- EROSION CONTROL
- SOIL STABILISATION & PAVEMENTS
- BASAL REINFORCEMENT
- COASTAL PROTECTION, MARINE STRUCTURES & PIPELINE PROTECTION
- ENVIRONMENT, DEWATERING & LANDFILLS
- DRAINAGE OF STRUCTURES
- TUNNELLING*
- LANDSCAPE & ARCHITECTURE
- SAFETY & NOISE BARRIERS
- FENCING & WIRE
- AQUACULTURE NETS/CAGES
- CONCRETE FLOORING, PRECAST & OTHER USES*
- INDUSTRIAL MANUFACTURING

MACCAFERRI

MACCAFERRI

PoliMac®

Wire protection for a changing world

THE ENVIRONMENTAL CONSEQUENCES PLACE GREATER DEMANDS ON THE SOLUTIONS WE PROVIDE.

Over the last 50 years, mostly due to Climate change, **the number of natural disasters** has exponentially grown. According to the WMO, the number of extreme hazards **has increased fivefold over the last decade** compared to the 1970s.

The increase in natural disasters, coupled with global warming and the continuous increase in **pollution is strongly altering marine, terrestrial and freshwater ecosystems.** , with a consequent **increase in the aggressiveness of the environments, an increase in floods and bank erosion**.

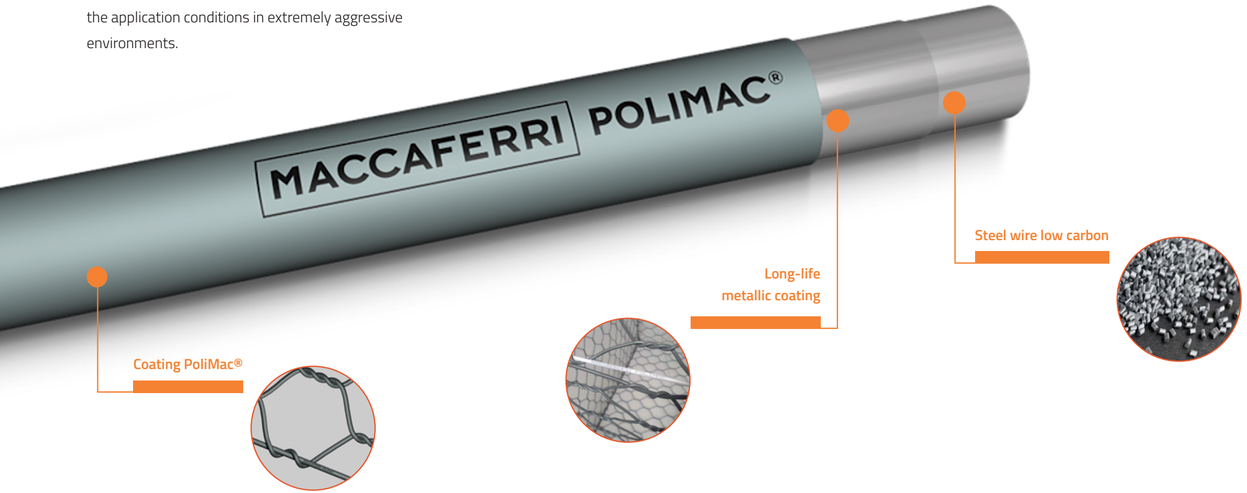
SOLUTIONS DESIGNED WITH THE FUTURE IN MIND

For 140 years, we have been working to provide an answer to these problems with more resilient engineering solutions. More resilient solutions meaning the ability to face extreme events in order to maintain functionality, adaptability and therefore be durable over time; while also being natural integrated and environmentally friendly.

WIRE PROTECTION FOR A CHANGING WORLD

PoliMac® coating is a polymer blend with excellent adhesion to the wire, specially adapted to withstand the application conditions in extremely aggressive environments.

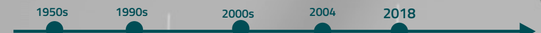
DESIGN THE CHANGE

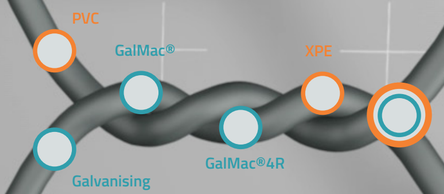


HISTORY OF MACCAFERRI WIRE COATINGS

Since 1879, our steel wire double twist mesh solutions have been **continuously improved.**

Better coatings have been introduced to **meet the evolution of demand** in the market.





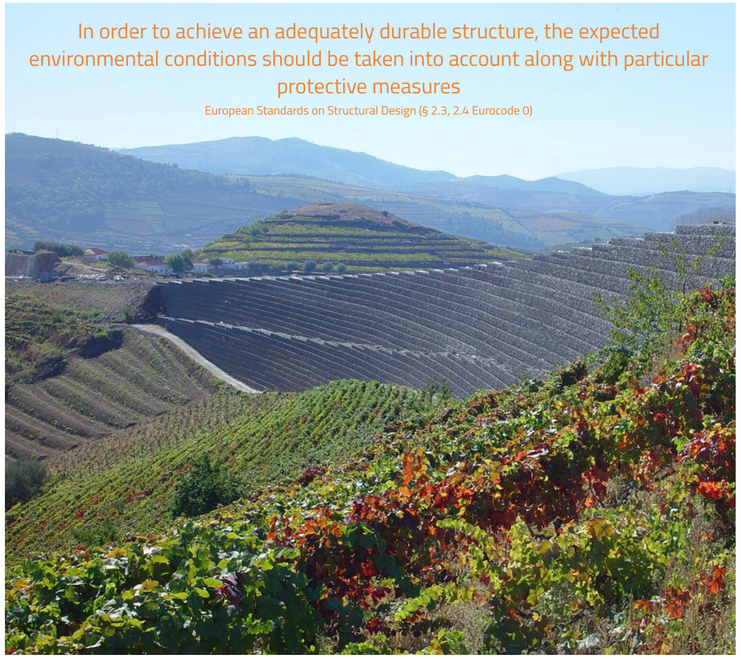
PROVEN PERFORMANCES

The world is changing more rapidly than it ever did in the past. The worsening environmental conditions require more resistant double twist steel wire solutions.

Embrittlement caused by intense UV rays, reduction of mechanical properties over time and loss of mass due to abrasive wear are some of the effect of environmental changes on traditional polymer coatings.
Maccaferri solutions are designed to meet the needs of a changing scenario. Our retaining walls, hydraulic works, rockfall and erosion protection systems are engineered to withstand the most severe environmental conditions.

In order to achieve an adequately durable structure, the expected environmental conditions should be taken into account along with particular protective measures

European Standards on Structural Design (§ 2.3, 2.4 Eurocode 0)



EXTENSIVE TESTING HAS BEEN CARRIED OUT TO MAXIMISE THE PERFORMANCE OF COATED STEEL WIRE DOUBLE TWIST MESH STRUCTURES.

MECHANICAL PERFORMANCES

- ABRASION TEST - ASTM A975-21 - EAD 200019-01-0102
- HARDNESS TEST ASTM D 2240

ENVIRONMENTAL FRIENDLINESS

- LEACHATE TEST - EPA 1312
- ELUATE TEST - MGEOK E: 2016.

WEATHERING RESISTANCE

- LOW TEMPERATURE BRITTLENESS - ASTM D 746
- UV EXPOSURE - ISO 4892-3; ISO 527-1.
- CORROSION SPREAD TEST - ASTM A975-21

MECHANICAL PERFORMANCE

More frequent floods lead to an increase of the erosion rate and sediment transportation though rivers. This, combined with the higher velocities in the river, results in a more aggressive wearing effect of bedload materials on river structures

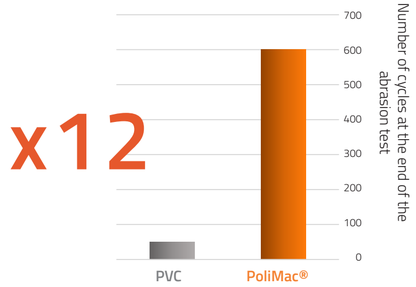
The friction caused by the water flow and the solid material wears away the plastic coating of the steel wire, damaging the solution and may cause the structure to rupture.

For this reason, we developed **PoliMac®**, an exclusive polymer coating for double twist wire products to withstand mechanical loads and chemical attacks that impact river structures.

ABRASION TEST

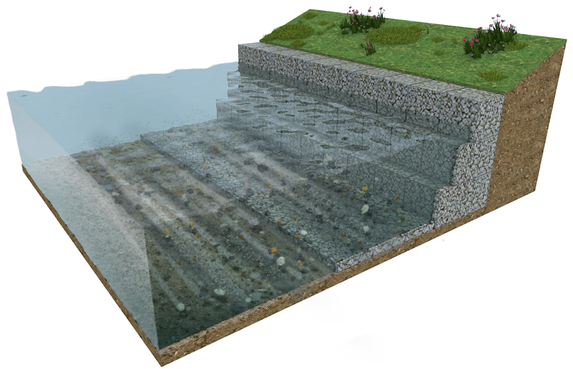
PoliMac® offers 12x better resistance than traditional polymer coating.

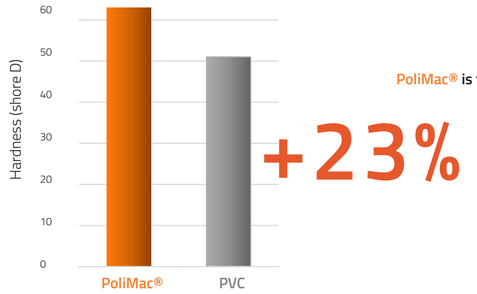
- Longer livespan hydraulic works
- Reuse of more marginal fills than before for Reinforced Soil Structures



ASTM A975-21 (Section 13.1.5) –"Standard Specification for Double-Twisted Hexagonal Mesh Gabions and Revet Mattresses (Metallic-Coated Steel Wire or Metallic-Coated Steel Wire With Poly(Vinyl Chloride) (PVC) Coating)"

More frequent floods lead to an increase of the erosion rate and sediment transportation through rivers. The latter, combined with the higher velocities in the river, results in a more aggressive wearing effect of bedload materials on river





HARDNESS TEST

PoliMac® is the 23% harder than traditional polymer.

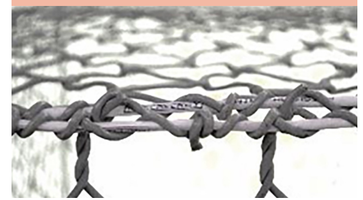
- Reduction of installation damage
- Easier and faster installation

ASTM D 2240 "Standard Test Method for Rubber Property - Durometer Hardness"

The expected worsening conditions of installation and use can damage the coating. **PoliMac®** is engineered to withstand the loads related to onsite activities (e.g. mechanized filling, mechanized soil compaction).

THICKER AND STRONGER WIRES FOR DEMANDING APPLICATION

With our formula we can coat wires with diameter **up to 3.4 mm**



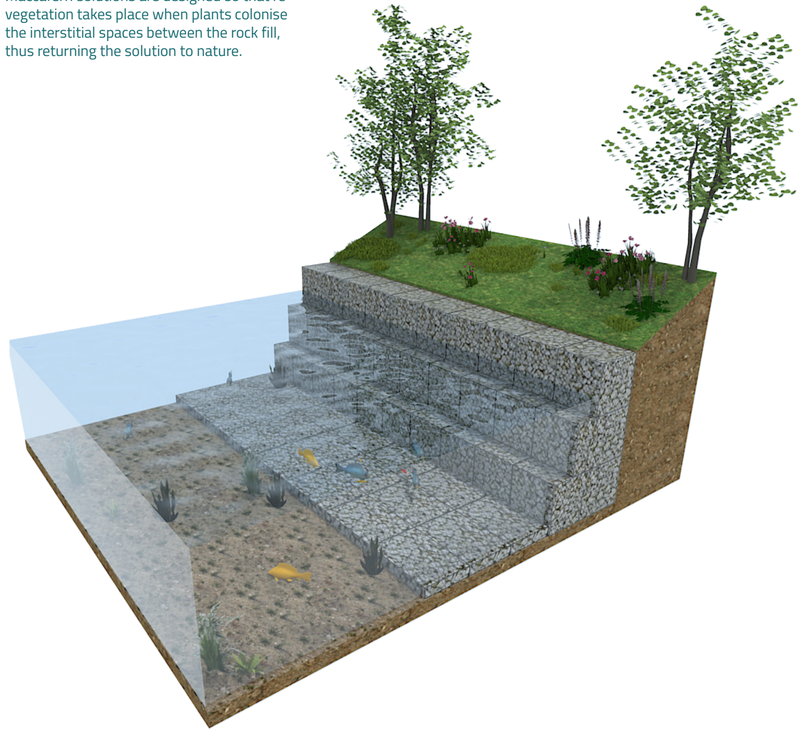
ENVIRONMENTAL FRIENDLINESS

The growth of urban centers brings with it an increase in aggressive chemical environments and a demand for greater durability and performance of the works.

Pollutants released, either uncontrolled or accidental, as a result of industrial and agricultural processes contaminate our rivers and atmosphere.

But we didn't stop there. Polimac® is not only suitable for use in the most aggressive environments, but it is also free of heavy metals and does not release polluting substances. Thus becoming one with the environment and its fauna. It is designed to integrate with the environment without any impact on living species.

Maccaferri solutions are designed so that re-vegetation takes place when plants colonise the interstitial spaces between the rock fill, thus returning the solution to nature.



LEACHATE TEST

EPA 1312 - Test report issued by Bureau Veritas

Synthetic Precipitation Leaching Procedure (SPLP). The test conducted by **Bureau Veritas Canada** was selected to assess the potential impact of PoliMac® when exposed to water. The results proved that there were **no metals** present in the SPLP extracts that were **above EU directive**, either the short- or long-term **Canadian water quality guidelines** for the protection of freshwater aquatic life, nor the **U.S. EPA's national recommended water quality** criteria for freshwater aquatic life.

ELUATE TEST

MgeoK E 2016 - Test report issued by KIWA

In addition of proving PFAS Free, PoliMac® proved to be **free of PCB, CHC, Pesticides, PAH and Heavy Metals** after being left in water according to M GeoK E:2016 (German Standards on quality of water table)

FREE OF HEAVY METALS, PFAS AND OTHER HARMFUL SUBSTANCES

Double twist products are a way to secure nature with itself!

WEATHERING PERFORMANCES

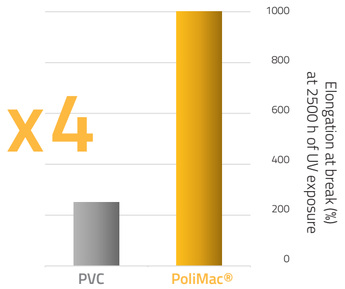
Record heat, fires, but also cold waves and floods. These are the extreme climatic phenomena with which we must learn to live with, in a world increasingly affected by global warming.

To meet these needs, **Polimac®** has been studied and tested to withstand the most diverse climatic conditions

UV RESISTANCE

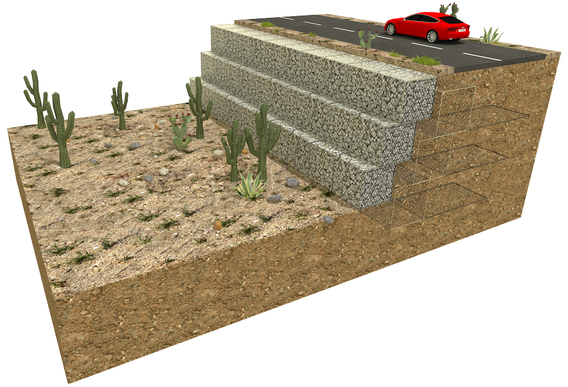
PoliMac® has 4 times better elongation at break than PVC

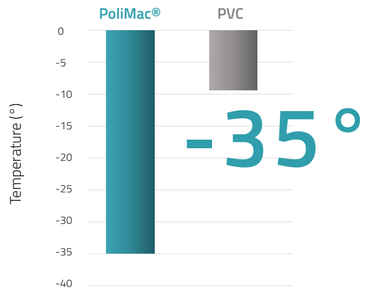
- **PoliMac®** tensile strength were measured after 2500 hours of UV exposure**.**
- **PoliMac®** was exposed to UV radiation an apparatus designed to simulate the weathering effects that occur when materials are exposed in actual end-use environments to global solar radiation



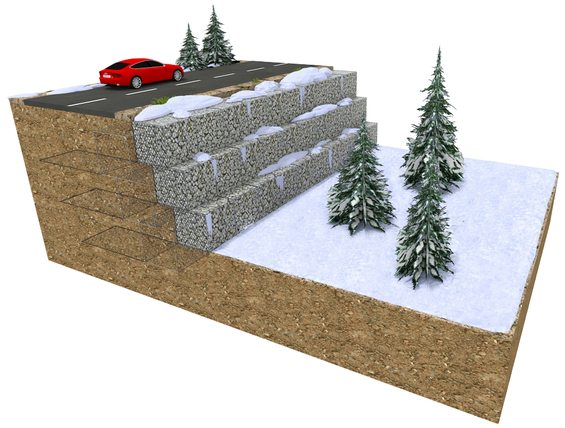
ISO 4892-3 "Plastics - Methods of exposure to laboratory light sources (Fluorescent UV lamps)" ISO 527-1"Determination of Tensile Properties"

PoliMac® is able to protect coated wire samples from degradation from UV light.
Specifically, the PoliMac® coating was able to adequately retain its yield strength and hardness after being subjected to UV light.





ASTM D 746 "Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact"



RESISTANCE TO LOW TEMPERATURE

PoliMac® mantains its properties up to -35°

- More resistant to brittle behaviors allow the installation of **PoliMac®** coated solutions in very cold climate conditions
- TRI results indicated that the brittleness temperature was less than -35 °C

The temperature at which **PoliMac®** shows brittle behavior is significantly lower than the requirement for PVC, making it more resistant to brittle behaviors at colder temperatures.

CORROSION SPREAD TEST

ASTM A975-21.

The measured maximum corrosion length is **less than a mesh repetition**, in compliance with the requirements of ASTM A975-21.

LESS THAN **30%** OF THE MESH OPENING

HYDRAULIC WORKS

PoliMac® coating is highly suited for use in hydraulic works with abrasive or chemically aggressive environments such as:

- Channels with solid waste
- Channels with high or variable pH levels
- Marine works
- Channels or rivers with chemically/biologically contaminated waters

INFRASTRUCTURE WORKS

PoliMac® coating is suited to Infrastructure works that may have direct contact with abrasive or chemically aggressive environments such as:

- Containment structures exposed to severe abrasion conditions
- Works that are exposed to environments with acid rain or industrial pollution
- Channels or gullies carrying contaminated water
- Works constructed in contaminated soils

ROCKFALL PROTECTION

PoliMac® outstanding resistance to aggressive environmental conditions reduce the need of maintenance and enlarge the service life of rockfall protection systems.

PoliMac® benefits in rockfall applications:

- Resistance to installation damages;
- Resistance to long-term ultraviolet radiation and low temperature effects;
- UV resistance.

MINING WORKS

PoliMac® coated products are also suited for use in Mining works where there are abrasive or chemically aggressive environments such as:

- Containment structures exposed to severe abrasion conditions
- Mining tailings dams
- Crusher walls

QUALITY WITH NATURE

Approval on the product quality including testing in laboratories, onsite evaluations, quality management checks and inspections of production.

Continuous control of product performance in compliance with EU legislation.

Rigorous certification procedure to ensure that the performances of commercial kits conform to predefined performances criteria.

Our PoliMac® achieved the Environmental Product Declaration (EPD), an independently verified and registered document that communicates transparent and comparable information about the life-cycle environmental impact of products.

WE CARE!

All of our solutions are designed and developed with an eye on the quality of life and on preserving the environment and our communities for future generations. Rigorously tested and certified, our nature inclusive systems ensure long-term performance and sustainable blend with the environment.

SUSTAINABLE DEVELOPMENT GOALS

POLIMAC® ADVANTAGES

The changing climate and environmental conditions require a change in the way we think about design. Maccaferri designs its PoliMac® **coated solutions at 120 years** with the aim of cut maintenance cost and **ensure the most sustainable integration with the natural environment**

INSTALLATION

PoliMac® allows a **faster and easier installation,** being engineered to **withstand the loads related to onsite activities** (e.g. mechanized filling, mechanized soil compaction). PoliMac® also **maintains its properties** right **down to -35°C** preventing cracks when products are installed at very low temperature

DESIGN

PoliMac® solutions are engineered to be **highly cost-effectiveness** in the **long term**. Indeed, the **outstanding performance under extreme conditions**, such as it's **prominent abarsion resistance**, dramatically reduces the need of maintenance over the years.

MAINTENANCE

PoliMac® not only is **suitable for use in the most aggressive environments**, but it is also free of heavy metals and **does not release polluting substances**. Thus, **becoming one with the environment** and its **fauna**. It is designed to integrate with the environment without any impact on living species.

ENVIRONMENTAL FRIENDLY

PoliMac®
WIRE PROTECTION FOR A CHANGING WORLD
OVER
120
YEARS
DESIGN LIFE

BIO POLIMAC®

PoliMac® is also available as full green wire coating.

BIO PoliMac® is the bio version of our polymer coating. BIO PoliMac® is made of bio-nafta derived from sustainable raw materials originated from organic wastes