

GABIONS 8x10 3.0

Double twisted steel wire mesh gabions with high abrasion resistance (Polimac®) coated wire

 applicable to European Countries only

PART 1 – PRODUCT

1.1 DESCRIPTION

Double twisted steel wire mesh gabions shall be manufactured in compliance with BS EN 10223-3, with Zn-Al alloy and high resistance (Polimac® or equivalent) polymer coated steel wire. Units are manufactured in compliance with The Construction Products (Amendment etc.)(EU Exit) Regulations 2020 on the basis of UKAD 200019-00-0102 and UKTA-0836-22/0019.

[For Republic of Ireland: The units are manufactured in accordance with Construction Product Regulation CPR 305/2011 and have a CE marking in compliance with EAD 200019-00-0102].

The management and production system of the supplier shall be certified in compliance with ISO 9001.

All listed performances must be verifiable on laboratory test reports conducted by independent research institutes, the relevant documentation shall be submitted to the supervisor for the acceptance of the material.

1.2 FUNCTIONAL CHARACTERISTICS

In order to allow for the design at both Ultimate (ULS) and Serviceability (SLS) limit states, the gabion manufacturer shall provide the following characteristics:

- Punch resistance of the wire mesh: tests on 1x1 m sample laterally constrained following the ASTM A975-23 test methodology;
- Unconfined compression strength and displacement for gabion elements
- Long-term (120 years) degradation effects on wire mesh due to chemical and environmental effects, installation damage, UV-ray exposure, and abrasion.
- The tensile strength of the steel wire mesh shall be 65 ± 5 kN/m, in accordance with BS EN 10223-3.

1.3 MATERIALS

The double twisted steel wire mesh shall be manufactured with hexagonal 8x10 mesh type (BS EN 10223-3, Table 2), woven with a drawn steel wire core of 3.00 mm in diameter, with a minimum quantity of 255 g/m² of Zn-Al metallic coated alloy, in accordance with ISO 7989-2 and BS EN 10244-2, Table 2, Class A.

The double twisted steel wire mesh shall be resistant to outwearing accelerated ageing when subject to test in a Sulphur dioxide environment (ISO 22479): after 28 cycles of discontinuous test, the mesh shall not show more than 5% of DBR (Dark Brown Rust).

The metallic coated wire core shall be protected with a high resistance polymer coating (Polimac® or equivalent), grey in colour, with a nominal thickness of 0.5 mm, resulting in a nominal overall diameter of 4.00 mm.

1.4 POLYMER COATING

The polymer coating shall comply with the following requirements:

- Long-term durability: service life greater than 125 years at 25 °C
- Outwearing accelerated ageing in salt spray (ISO 9227): after 20,000 hours of exposure, the mesh shall not show more than 5% of DBR (Dark Brown Rust).
- Abrasion resistance in wet conditions (ISO 22182): after 40,000 abrading cycles the weight loss shall not be greater than 3%
- Abrasion resistance in dry conditions (ASTM A975): after 450 cycles the polymer coating shall not expose the metal wire.
- Resistance to UV radiation (ISO 4892-3, type 1A): after 2,500 hours of exposure to QUV-A the tensile strength and elongation at break of the base compound shall not change more than 25% from the initial test results.
- Brittleness temperature: lower than -35°C (ASTM D746).
- Corrosion spread test (ASTM A975): after 2,500 hours immersion of the wire sample in a HCl solution the maximum corrosion length shall be less than a mesh repetition.

1.5 LACING

Stainless steel rings shall be used for fastening operations and shall have the following characteristics:

- Diameter: 3.00 mm
- Tensile strength > 1,550 MPa
- Pull-apart strength > 2.0 kN

1.6 ENVIRONMENTAL AND SUSTAINABILITY PROPERTIES

1.6.1 Environmental Product Declaration

The gabion units shall have a Type III Environmental Product Declaration (EPD) registered and certified in accordance with ISO 14025 and BS EN15804, to evaluate the environmental impact and give the possibility to calculate the Life Cycle Assessment (LCA) of the designed technical solution.

Such sustainability performances/requirements have to be reported in the Type III EPD certificate; certifications of not authorised bodies or self-certificates issued by the manufacturer, are not allowed.

The value shall be declared, as per Table 1, in terms of Global Warming Potential (GWP 100 years) and expressed in *kg CO₂-Equiv./kg*.

Table 1 – Environmental and sustainability properties

Global Warming Potential (GWP 100 years)	ISO 14025 BS EN15804	certified numeric value	[kg CO ₂ -Equiv./kg]
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1.6.2 Environmental Harmlessness

The polymer-coated steel wires shall be tested to ensure their Environmental Harmlessness according to the following procedures:

- Synthetic Precipitation Leaching Procedure (SPLP) preparation as per EPA 1312 and Metals in Water by ICPMS (low level) as per EPA 6020B in which the presence or not of 31 different metals shall be analysed using atomic spectroscopy.
The results shall be in compliance with (a) Water Framework Directive 2000/60/EC; (b) CCME Water Quality Guidelines for the Protection of Aquatic Life, Freshwater; (c) U.S. EPA National Recommended Water Quality Criteria (Aquatic Life, Freshwater), 2006.
- PFAS test in water by SPE/LCMS as per EPA 537.1 in which the presence or not of 28 different PFAS shall be analysed, showing that the polymer-coated steel wires are PFAS free. Resulting in a concentration lower than 2 ng/L of PFOS and PFOA and < 4 ng/L for other PFAS.
- ELUATE Tests on environmental safeness, conducted as per M GEOK E:2016, shall ensure that the polymer coating is not critical for the environment.
- Smoke toxicity tests conducted as per ISO 5659-2 and BS EN17084 shall ensure a Gases Conventional Index of Toxicity after 8 minutes sampling CIT_G (8) < 0.10 and a HCl concentration < 36 ppm

PART 2 – EXECUTION

The product's conformity shall be certified by a third-party Notified Body, according to the The Construction Products (Amendment etc.)(EU Exit) Regulations 2020, which shall assess the quality control process at the supplier's production facility.

[For Republic of Ireland: The product's conformity shall be certified by a third party Notified Body, according to CPR 305/2011, who shall assess the quality control process at the supplier's production facility. Prior to the installation, and on each consignment of gabion units to the job site, the contractor shall provide the Supervisory Body with the relevant documentation (Declaration of Performance, D.o.P.) in original form, where product and supplier names, quantities and destination are specified.]

Once gabion units are assembled and the foundation has been prepared, pre-assembled units shall be placed in position empty and shall be tied or fastened to adjacent gabions along all containing edges in order to form a continuously connected, monolithic structural unit. All connections shall be in accordance with BS EN10223-3; then filling operations, both mechanical and manual, may start.

The stone fill material shall be provided in the proper sizes and quality. Rocks shall be hard, angular to round,

durable and of such quality that they shall not disintegrate on exposure to water or weathering during the life of the structure. When placing the stones, care shall be taken to ensure that the polymer coating is not damaged.

After a layer of rock has been placed in the cell, sufficient hand manipulation of the rock shall be performed to minimise voids and achieve a maximum density of rock in the gabion. Bracing wires should be installed at the intervals recommended by the gabion supplier. Rocks in exposed vertical faces shall be hand-placed to reduce voids on the outer face. Units shall be overfilled to approximately 25-40 mm to allow for natural settlement.