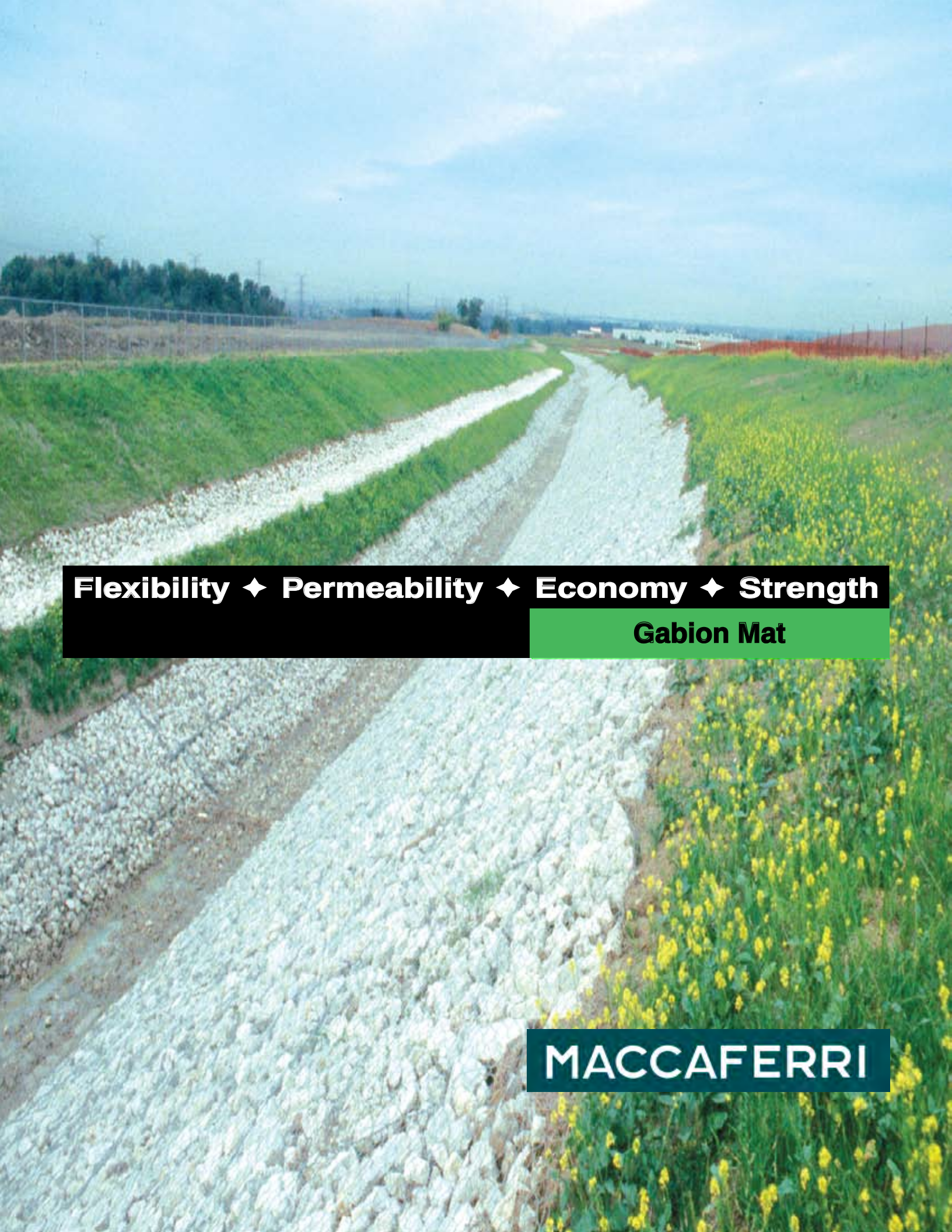


Flexibility ✦ Permeability ✦ Economy ✦ Strength

Gabion Mat

MACCAFERRI

Maccaferri Gabion Mats are large rectangular baskets that, when filled with rock, are used to provide tough, long term erosion control solutions for high water flow environments.

Gabion Mats are made from Maccaferri's double twisted steel wire mesh, **proven worldwide for over 125 years to offer strength, flexibility, integrity, and longevity.**

Gabion Mats offer flexible, permeable, naturally integrated erosion protection in many applications:

- Streambank protection
- Channel linings
- Shorelines
- Culverts and ditches
- Bridge abutments
- Grade control structures

Because of their large size, **Gabion Mats** can be installed much more rapidly than regular **gabions;** less assembly and erection is required for the same area of erosion protection. This makes Gabion Mats particularly attractive to construction professionals on large projects who want to **increase construction efficiency and value.**

Gabion Mats integrate with their surroundings, encouraging the preservation and restoration of the natural environment. Having 35% voids, the permeability and filtering capability of the rock fill allows soil, water, air, and vegetation to interact. Vegetation can be established even more quickly by integrating soil bioengineering techniques. More information can be found on this by visiting our website, **www.maccaferri-usa.com** or by requesting our **Soil Bioengineering** brochure and manual.

Fig. 1

Maccaferri double twisted hexagonal wire mesh is manufactured from heavily galvanized steel wire, with a tough PVC coating for additional protection.

The double twisted hexagonal mesh is very robust and can accommodate large differential settlements without rupturing or unraveling. Stresses in the mesh are dissipated in two dimensions throughout the mesh, even if wires are cut or damaged! This is vital, particularly in critical infrastructure erosion control applications where there is the potential for differential settlement.

Maccaferri software is available to design erosion protection solutions, including Gabion Mats. Our Macra1 software allows the user to check both unvegetated and vegetated solutions very easily.

For more information on Gabion Mats, technical specifications, installation guidelines, or any other Maccaferri solution, please contact your local Maccaferri representative. **Our engineers and sales professionals are ready for your challenge!**

Table 1 — Standard Gabion Mats (8 x 10 mesh type)

Mesh wire diameter: Galvanized or Galfan® diameter 0.120 " (3.05 mm).
Galvanized and PVC nominal internal diameter 0.106" (2.7 mm), nominal external diameter 0.146" (3.7 mm).

Length ft (m)	Width ft (m)	Height ft (m)	Number of Cells*	Capacity yd^3 (m^3)
99 (30)	6 (1.9)	1 (0.3)	22	22 (16.8)
99 (30)	9 (2.8)	1 (0.3)	33	33 (25.2)
99 (30)	6 (1.9)	1.5 (0.45)	22	33 (25.2)
99 (30)	9 (2.8)	1.5 (0.45)	33	49.5 (37.8)

Available in zinc coated, Galfan® coated, and zinc + PVC coated wire.
Note: All sizes and dimensions are nominal.
*Cell dimensions: standard are 9 ft x 3 ft (2.8 m x 0.91 m); also available, 3 ft x 3 ft (0.91 m x 0.91 m).

Design Considerations

- Design the application by calculating the applied tractive force from the water flow and selecting a Gabion Mat with the appropriate allowable shear resistance. Select the mesh coating requirements.
- Install the Gabion Mat on a separation geotextile to limit the washout of fine soil particles from beneath the mat.
- In extreme flows, the Gabion Mat can also be installed in combination with a gravel filter to offer a greater interface limit velocity.
- Protect the toe of the slope from undermining by installing Gabion Mat units into the channel bed, below the scour depth.
- Soil bioengineering vegetation techniques can be used with Gabion Mats including: live staking, seeding, rooted plants, and emergent aquatic plants. These techniques can be implemented during or after the construction phase, depending on site and seasonal constraints.
- **NB: A designer cannot rely on vegetation for the entire life of the structure.** It could become diseased or washed out by storm events. Therefore, when designing channel linings with vegetation, be sure to use the residual channel shear resistance; i.e. with no vegetation.
- As a fully vegetated channel is rougher than an unvegetated one, the flow will slow down, and may overtop the channel banks. A design check should be carried out to avoid this.

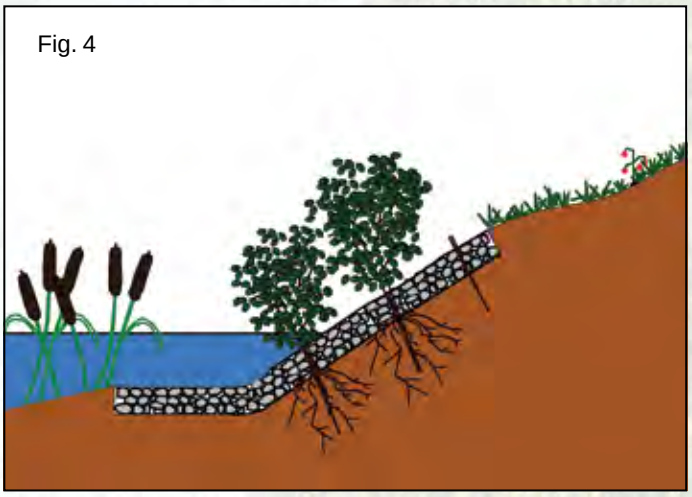
Fig. 2

before

Fig. 3

after

Fig. 4



Cross section of joint planting through a Gabion Mat.

Table 2 — Indicative Gabion Mat Thicknesses In Relation to Allowable Shear Stress

Type	Thickness ft (m)	Filling Stones		Unvegetated Allowable Shear* lb/ft^2 (N/m^2)	Vegetated Allowable Shear* lb/ft2 (N/m^2)
		Stone Size in (mm)	d_{50}		
Gabion Mat	1 (0.30)	4-8 (100-200)	0.150	7.0 (336)	9.4 (450)
	1.5 (0.50)	4-8 (100-200)	0.150	9.8 (470.4)	10.4 (500)
*Long term 60 hour duration storm events.					

Assembly and Installation

Maccaferri Gabion Mats are delivered to the job site in rolls. The bases and lids are rolled separately. Base rolls appear larger than lid rolls because of the diaphragms attached to the base.

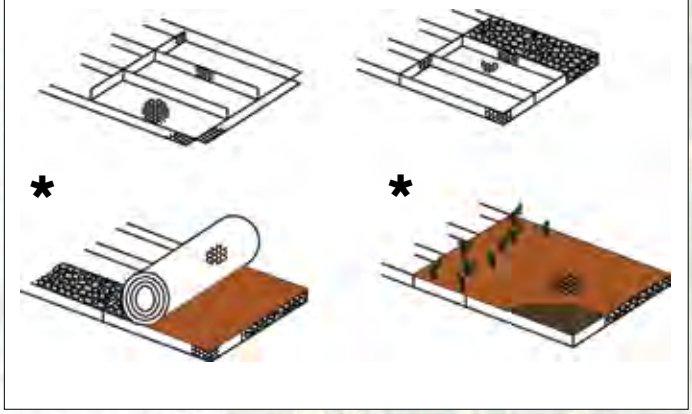
1. Unroll the Gabion mat base on or close to its final location.
2. Erect the sides, diaphragms, and end panels to form open cells.
3. Connect panel edges using the appropriate lacing techniques or fasteners. **Lacing:** Continuous wire looped tightly around every mesh opening, alternating single and double loops. **Fasteners:** Use a pneumatic or hand tool, employing Spenax "C" shaped fasteners. For closure and strength, the recommended spacing is every mesh opening, not to exceed 6" (150 mm).
4. Fasten internal diaphragms.
5. Fill the cells with suitable rockfill, beginning at the bottom of the slope using appropriate equipment. Hand placing is often necessary in the cell corners to minimize the void volume. The mats should be overfilled by 1" (25 mm) to allow for future settlement of the rockfill.
6. Unroll the Gabion Mat lids over the rock-filled bases. Lids should be stretched/pulled tight so that the mesh applies pressure to the rockfill confining it. Connect the lid to the sides, ends, diaphragms, and adjoining Gabion Mats.

Detailed installation guidelines are available from Maccaferri or by visiting **www.maccaferri-usa.com.**

Fig. 5

Fig. 6

Fig. 7



* optional soil bioengineering techniques

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