

Embankments



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Gabions and Mattresses

Gabions are manufactured from dimensionally stable panels of mesh that are formed by welding transverse and longitudinal wires at each and every intersection to form a grid. The gabion box is then part assembled by hinging the face, back, sides and internal diaphragms to the base panel and the lid to the rear panel with 'C' rings or clips. The units are transported to site flat packed with lacing wire as standard for on site erection.

Once assembled, the gabions are filled with stone or rock and the lid secured to form a monolithic structure in accordance with the recommended installation procedures.

Welded Mesh Gabion 39 System

Standard Gabions

Welded mesh Gabion 39 System is available in mesh aperture 76.2mm x 76.2mm and in the following specifications to the nominal dimensions stated below. Other non-standard mesh apertures are available on request.

Gabion 39 Specifications

Coatings	Galfan Coated (95% Zinc 5% Aluminium), Zinc Coated Zinc / PVC Coated, Stainless Steel (to special order)
Wire Diameters (combinations thereof)	3.0mm (Galfan, Zinc or Stainless Steel), 4.0mm (Galfan, Zinc or Stainless Steel) 5.0mm (Galfan, Zinc or Stainless Steel), 2.7mm/3.2mm (Zinc/PV C Coated) 3.8mm/4.3mm (Zinc/PVC Coated)
Standard Nominal Sizes (non standard sizes available)	1.0m x 1.0m x 0.5m, 1.0m x 1.0m x 1.0m 1.5m x 1.0m x 0.5m, 2.0m x 1.0m x 0.5m, 2.0m x 1.0m x 1.0m



Welded Mesh Gabion 27 System

Modular Welded Mesh Gabions

The Gabion 27 System comprises of modular welded mesh units that are sub-divided into 686mm cells along the length of the cage. The base of the gabion forms the lid of the unit below. The base is extended by fixed dimensions on one face to allow for a predetermined stepping arrangement at each course. The base on the other face is flush, allowing for a flush faced wall to be constructed if required or coursing with a combination of flush and stepped faces.



Gabion 27 Specifications

Coatings	Galfan Coated (95% Zinc 5% Aluminium) Zinc / PVC Coated Stainless Steel (to special order)
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Mass Gravity Walls

Wire Diameters	3.0mm to the body of the unit 4.0mm to the front and rear faces
Standard Sizes	Lengths: 2.0m Widths: 0.7m, 1.0m, 1.4m, 1.7m, 2.1m, 2.4m, 2.7m Heights: 0.3m, 0.7m, 1.0m

Architectural Cladding Units

Wire Diameters	4.0mm, 5.0mm (combinations thereof)
Standard Sizes	Lengths: 1.0m, 2.0m Widths: 0.3m Heights: 0.7m, 1.0m, 1.4m, 2.07m

Trapezoidal Units

Wire Diameters	4.0mm, 5.0mm (combinations thereof)
Standard Nominal Sizes <small>(Base and Top Widths can be increased in increments of 152mm)</small>	Lengths: 1.0m, 2.0m Base Widths: Minimum 0.6m Top Widths: Minimum 0.46m Heights: 0.7m, 1.0m

Woven Mesh Gabions and Mattresses

The mesh fabric for all these products is formed by weaving adjacent strands of wire by twisting them through one and a half turns at intervals, forming a hexagonal shaped mesh. The ends of the mesh wires are wrapped around a heavier transverse edge wire to form the panels. The tensile strength of the mesh in the direction of the weave is greater than across the weave.

The gabion box is manufactured from a main panel that forms the face, base, rear and lid of the unit. The side panels and diaphragms are then jointed to the base section of the main panel. The unit is then folded flat for transportation. On site, the unit can be opened out into the required position and the sides, diaphragm and end panels are rotated vertically. The vertical joints are formed by a continuous lacing operation with the wire supplied or with 'C' rings to form the box shape.

Once assembled the gabions are filled with stone or rock and the lid secured to form a monolithic structure.

The gabion mattress is a box unit where the plan area is large compared to its height. Each unit is subdivided into compartments normally to give cells 2m x 1m in plan. The units are laid on the bed of rivers. Once filled with stone or rock and the lid closed, they form a blanket erosion control system.

Mattresses are also used to provide under scour protection to retaining structures.

Woven Mesh Gabions Specifications

Coatings	Zinc Coated / Zinc / PVC Coated
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Mass Gravity Walls

Wire Diameters	2.70mm for the fabric <small>(3.70mm overall for PVC coated units)</small>
	3.40mm for the selvedge wires <small>(4.40mm overall for PVC coated units)</small>
Standard Nominal Sizes	1.0m x 0.5m x 0.5m, 1.0m x 1.0m x 0.5m 1.0m x 1.0m x 1.0m, 1.5m x 1.0m x 0.5m 1.5m x 1.0m x 1.0m, 2.0m x 0.5m x 0.5m 2.0m x 1.0m x 0.5m, 2.0m x 1.0m x 1.0m

Applications:

- ▣ Mass gravity retaining walls
- ▣ River and coastal protection
- ▣ Landfill
- ▣ Weirs
- ▣ Acoustic barriers
- ▣ Abutments
- ▣ Temporary works.

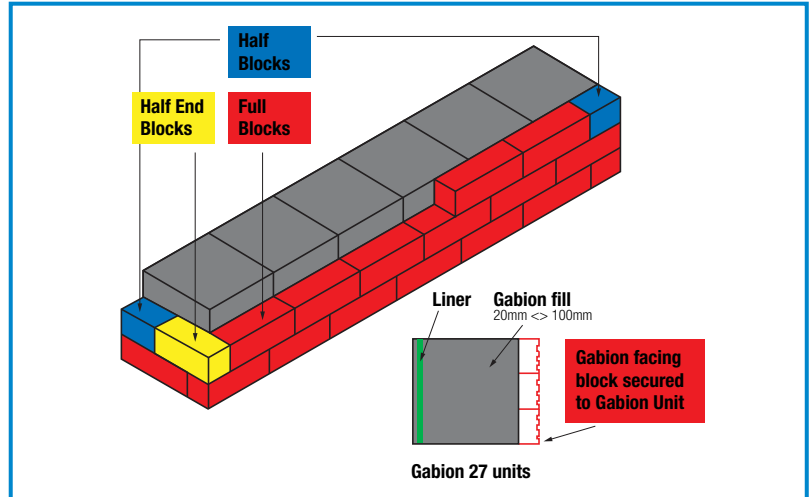
Ceranablok®

Rock filled gabions have been around for many years. The success of the welded mesh gabion system has resulted in a much higher quality of installation with them now becoming the market leader for architectural, commercial, housing and landscaping solutions to retaining and cladding structures.

Developing the system further has resulted in a new complementary facing, Ceranablok®, a concrete block facing with a textured rock face secured externally to the gabion face giving the appearance of a natural rock face with no visible mesh wires. The block being securely fixed to the gabion provides a monolithic structure whereby the mass of the block and the gabion provide the stability.

The blocks are available as full blocks (0.686m x 0.235m x 120mm), half blocks (0.343m x 0.235m x 120mm) and end blocks for wall returns enabling a stretcher bond laying pattern to be achieved.

In addition the units can be lined simply on site internally with a corrugated polymer liner enabling the use of local granular fill materials that are smaller than the mesh aperture. The combination of the block face and the liner result in quick construction with the appearance of a segmental block walling.



Advantages:

- Ease of construction
- Use of locally available fills or recycled fills
- Flexibility of wire diameter and mesh specifications enabling the required functionality and aesthetics to be achieved.

Redi-rock™

The Redi-Rock™ retaining wall system is an ingenious, space saving solution for the retention of earth for a wide range of retaining, force protection, landscaping and flood protection applications. This 'big block system' has the appearance of stone and is versatile enough to achieve height without compromising strength. Each one tonne block interlocks with the next and is dry laid, resulting in extremely fast installation times and cost savings.

Redi-Rock™ is partially manufactured from recycled materials to provide a sustainable solution for a wide range of landscaping applications. We offer a full design and installation service if required and can also supply gabion facing blocks and reinforced panels.

Applications:

- Modular Redi-Rock™ retaining walls
- Modular Redi-Rock™ free standing
- Flood protection
- Landscaping
- Reinforced panels
- Gabion facing blocks
- L sections.



Cellular Confinement[®]

Erosion control

Erosion occurs when the forces exerted by water or wind dislodge and transport away soil particles. The amount of erosion depends on the strength of the wind/water, the dimensions of the slope (height, length and steepness) and type of soil. Many variables affect the installation and performance of cellular confinement systems, including slope grade, subsurface stability, infill material, rainfall and artificial watering conditions, hydraulic characteristics of ground water flow and sub-base anchoring quality. It is important therefore that due consideration is given to all relevant design criteria on a project specific basis.



Design Considerations:

- ▀ Slope angle
- ▀ Slope drainage
- ▀ Slope length
- ▀ Slope substrate
- ▀ Hydrology
- ▀ Required finish on slope.

Keyline Rail offer both the Terram geocell geotextile based system and the HDPE Presto geoweb original geocell cellular confinement system. Cellular confinement systems are suitable for cut or fill embankments, dams or spillways, revetments, abutment protection, geomembrane protection, soil-nailing cover, and also for tree root protection where cellular confinement is a suggested solution in no dig situations under Arboricultural Practice Note APN12.

Rock Fall Protection

Rock fall protection netting is a hexagonal woven wire mesh manufactured in the same method as the gabion mesh fabric. A woven mesh is preferable to a welded mesh as it can follow the contours of the rock face.

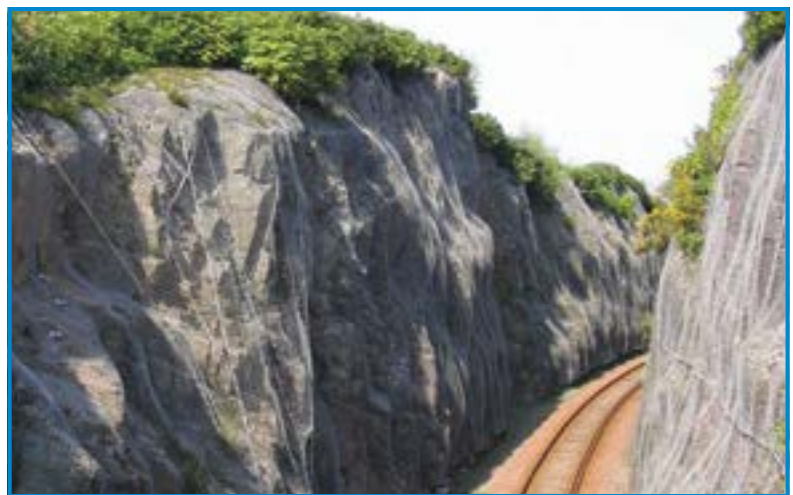
Rock fall protection can be dealt with in two ways:

- ▀ By curtain meshing the rock faces
- ▀ By catch walling

By curtain meshing the face, falling rocks can be either held in place by pinning the mesh to the rock strata or by draping it over the face guiding the falling rocks harmlessly to the base of the escarpment.

The mesh facing normally has vertical and/or horizontal cabling secured to the mesh/rock to provide fixity and integrity to the jointing of the panels. It is normal to seek advice from specialist installation companies as to the design of this type of work. Additional anchoring of large unstable rock masses on the face may be required.

Catch walling is a freestanding gabion wall of sufficient mass to withstand impact of falling rocks. Location of the catch wall and height of the wall is important to ensure the trajectory of the falling rocks will be impacted on or behind the wall.



Specification

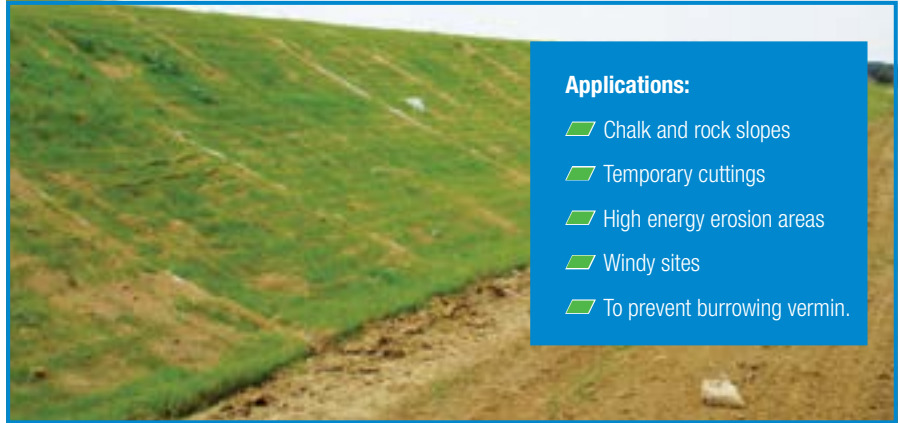
Rock netting is available in mesh aperture 80mm x 100mm and in the following specification to the nominal dimensions below:

Coatings	Zinc / PVC coated
Wire Diameters	2.70mm for the fabric (3.70mm overall for PVC coated units) 3.40mm for the selvedge wires (4.40mm overall for PVC coated units)
Standard Roll Sizes	2m wide x 25m

Rockmat

Manufactured from (coir/straw and F3) fibres with a choice of galvanised or hexagonal twist steel wire. Rockmat provides additional long term support and protection to vulnerable slopes.

Superb vegetation establishment is possible due to the Eromat blanket protecting young seedlings and upper reinforcement ensures prevention of slope face degradation from water run off or frost heave.



Applications:

- ▣ Chalk and rock slopes
- ▣ Temporary cuttings
- ▣ High energy erosion areas
- ▣ Windy sites
- ▣ To prevent burrowing vermin.

Rockmat provides a highly effective anti-vermin protection layer where rabbits and foxes, etc., are likely to create slope instability due to burrowing. Rockmat is available with coir fibre or coir/straw fibre matrix or F3. Coir fibres will last 3-5 years.

Rabbit / Badger Netting

Delivers an effective and low-cost solution for controlling rabbits and badgers, preventing the damage and economic loss they can cause.

Applications:

- ▣ Rabbit control
- ▣ Badger control

Finish:

- ▣ Heavily galvanised to BS EN 10244 Class A.



Features:

- ▣ Available in a range of heights and mesh sizes, including premium and budget, for a choice of cost effective solutions
- ▣ Suitable for a variety of applications and environments.

Biodegradable Erosion Control – C350

C350 is composed of a permanent, high strength, three-dimensional matting structure, incorporated with a 100% coconut fibre matrix that supplements the permanent matting structure's initial mulching and erosion control capabilities for up to 36 months.



Specification		
Material Content		
Coconut fibre	-	0.27 kg/m ²
Nettings	Top	Polypropylene 3.91 kg/100 m ² approx. wt.
	Middle	Polypropylene 11.7 kg/100 m ² approx. wt.
	Bottom	Polypropylene 3.91 kg/100 m ² approx. wt.
Thread	-	Polypropylene, U.V. stable
Standard roll specification		
Width	-	2.0m
Length	-	20.0m
Weight	-	20kg +/-10%
Area	-	40m ²

C350 is designed to provide long-term, erosion protection and permanent turf reinforcement in a range of applications that include critical-flow channels, stream banks and rail cuttings.