



## Gabions

The modern Yuanxi gabions is a rectangular woven wire mesh box. Its strength lies in its double twisted hexagonal mesh of steel wire which is reinforced by selvages of heavier wire running along the edges and by transverse diaphragms. Gabions, by virtue of their matchless strength, excellent engineering adaptability and proven reliability, have become the chosen building material for the tremendous variety of construction works. These includes road construction, Retaining walls, Water recharge dams, soil erosion protection, Bridge protection, Coastal defence, Harbour works, River training works, Culverts, weirs & Rock slide protection works.

**The protective coating is typically either:**

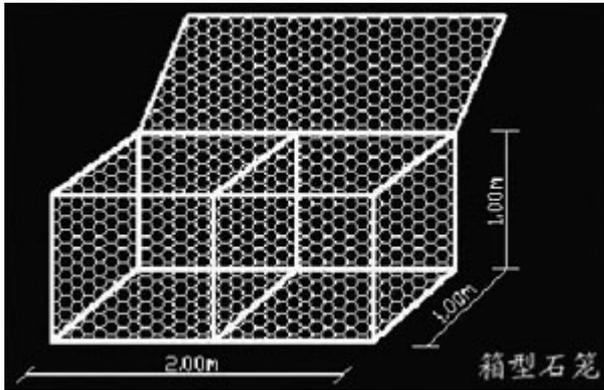
- heavily zinc galvanised wire
- as above PLUS heavy duty PVC coating
- Galfan coated with a 95% Zinc + 5% Aluminium Mischmetal Alloy
- as above PLUS heavy duty PVC coating





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**Galmac (or Galvan)** wire units offer enhanced durability, and are available upon request. This coating type is the most durable wire coating available internationally and is being increasingly used within Australia to ensure **gabions** structures achieve a longer design life (2 to 3 times more durable than zinc coatings of the same mass), thereby significantly reducing the life-cycle cost of the structure.



## Application:

Roadway Protection, Retaining Walls, Rock fall Protection, Bridges and Culverts Protection, Coastline Structure and Protection, Channel Lining.

**Roadway Protection:** The protection of highways and roads from environmental disasters are facilitated with the use of **R gabions** that stabilize the slopes protecting the shoulders which

are susceptible to erosion.

**Retaining Walls:** gabions used as retaining walls are functional, economical solution and a good alternative to other types of retaining structures due to their flexibility and permeability.

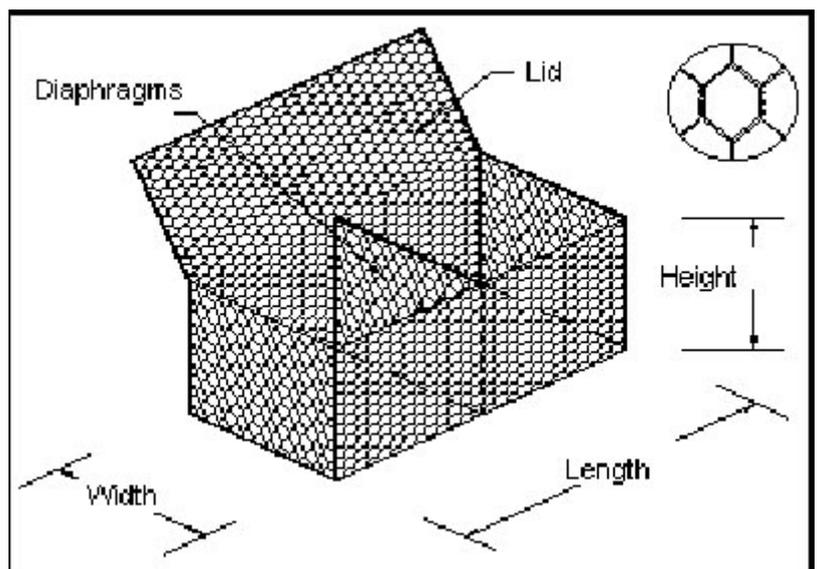
**Rock fall Protection:** Rolls of fabric with lacing, done by joining together, are provided as a blanket to cover the surface of the slopes to protect any infrastructure built on the foot of the slopes against rockfall. Gabion constructed as retaining wall is an alternative.

**Bridges and Culverts Protection:** Bridge abutments and culverts are potentially at risk

of scouring during heavy rains and strong flow of water. Gabion boxes and mattresses can be used as abutments and protective structure that aid the flow of water avoiding the danger of erosion due to their good permeability characteristics.

**Coastline Structure and Protection:** gabions and mattresses are highly resistant to corrosion and other environmental effects which are suitable for marine works, such as; retaining walls, ramps, beach protection, small jetties, groins, and piers built at great speed and minimum cost. The use of gabions and mattresses dissipate wave energy conserving beaches from being eroded.

**Channel Lining:** Channels are protected using gabion and mattress structures against erosion which control and guide the movement of water naturally. Boundary or Security Fences: units can be used as fences which are cost effective compared to concrete fences.





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## Advantages of Gabion:

- Permeability of the front face, ensuring drainage of backfill and no hydrostatic pressures behind the wall
- Flexibility, ensures the woven mesh gabions accommodate different settlements unlike rigid systems eg. welded mesh cages
- Ease of construction
- One of the most economical retaining systems on the market
- Incorporation as required of vegetation throughout the structure
- Versatility, as the structure can be formed with a vertical, battered or stepped front face as required.

Standard sizes in mesh 80mm x 100mm nominal, internal wire diameter 2.7mm		
Length m	Width m	Height m
2	0.5	0.5
2	1	0.5
4	1	0.5
2	1	1
4	1	1
2	1.5	1
6	2	0.5

## Design support

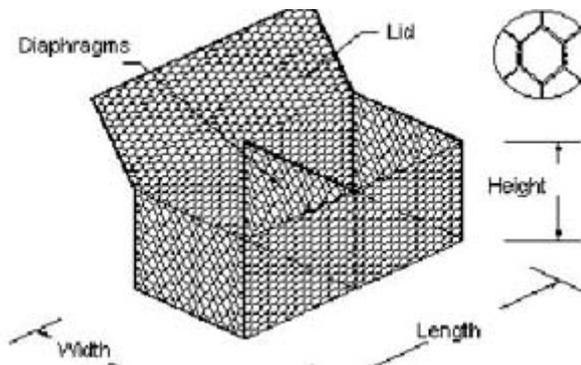
- Free preliminary design assistance or review (including free design software, drawings, etc) to ensure the design of the structure is the most appropriate and cost-effective solution to your problem
- Provision of product and installation specification to assist in the tender preparation process
- Free training seminars or presentations held at your offices
- Free software for design or support, including an Architectural CD designed specifically for landscape architects or other professionals working with the built environment.

## Installation support

- Pneumatic lacing tools and high-strength lacing rings, which dramatically reduce the labour time and effort required in installing the gabion units
- **Gabion** closing tools to assist in the installation process
- Specialist non-standard sizes to ensure supply costs are reduced for a specific gabion structure, on-site installation training for major projects for either installers or site supervisors (including quality checklists)
- Tensioning tools to assist in achieving a high quality finish in the installed structure
- Preformed braces to assist with achieving a high standard



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Heavy hexagonal mesh, also called big type hexagonal mesh. This mesh enjoys wide application. **Heavy type hexagonal wire** mesh can be made into gabion boxes which can be used in control and guide of water or flood, flood bank or guiding bank, reinforcing of rock breaking, water and soil protection, bridge protection, strengthening structure of soil, protection engineering of seaside area, seaport engineering, isolation walls, protection of road, etc.

**Galvanized Hexagonal Wire Mesh Heavy Type:** Made with high quality low-carbon steel wire to weave, steel wire tensile strength is 38kg/M<sup>2</sup>. The wire diameter may reach 2.0mm-4.0mm. The steel wire is usually galvanized. And the galvanizing layer thickness can be made according to the customers request. Max. galvanizing quantity can be 300g/ M<sup>2</sup>.

**PVC Coated Hexagonal Wire Mesh Heavy Type:** PVC coated hexagonal Mesh is made of pvc coated wire that offers longer service life and better anticorrosion property.

Heavy hexagonal mesh			
Mesh Opening (MM)	Iron Wire Diameter (MM)	(PVC Wire)/ Inside diameter/Outer diameter(MM)	Roll Width (M)
60X80	2.0-2.8	2.0/3.0-2.5/3.5	4.3
80X100	2.0-3.2	2.0/3.0-2.8/3.8	4.3
80X120	2.0-3.2	2.0/3.0-2.8/3.8	4.3
100X120	2.0-3.4	2.0/3.0-2.8/3.8	4.3
100X150	2.0-3.4	2.0/3.0-2.8/3.8	4.3
120X150	2.0-4.0	2.0/3.0-3.0/4.0	4.3

## Description:

**Gabions** are rectangular baskets fabricated from a hexagonal mesh of heavily galvanized steel wire. The baskets are filled with rock and stacked atop one another to form a gravity- type wall. Gabions depend mainly



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on the interlocking of the individual stones and rocks within the wire mesh for internal stability, and their mass or weight to resist hydraulic and earth forces. Gabions are a porous type of structure that can sometimes be vegetated. Gabions are considered to be a “hard” structural solution that has minimal habitat and aesthetic value.



## **Applicability:**

Gabions are used to slow the velocity of concentrated runoff or to stabilize

slopes with seepage problems and/or non-cohesive soils. Gabions can be used at soil-water interfaces, where the soil conditions, water turbulence, water velocity, and expected vegetative cover are such that the soil may erode under the design flow conditions. Gabions can be used on steeper slopes than riprap and are sometimes the only feasible option for stabilizing an area where there is not enough room to accommodate a “softer”, vegetated solution.

## **Advantages:**

Some advantages of gabion walls are:

- Ease of handling and transportation
- Speed of construction
- Flexibility (Gabions tolerate movement)
- Permeability to water (Good drainage)
- Gabions offer an easy-to-use method for decreasing water velocity and protecting slopes from erosion.

## **Gabions Disadvantages/Problems:**

- Gabions are sometimes criticized as being unsightly. They can be made more attractive by use of attractive facing stone toward the front of the wall and by establishing vegetation in the spaces between the rocks.
- Low habitat value.
- Gabions are more expensive than either vegetated slopes or riprap.
- The wire baskets used for gabions may be subject to heavy wear and tear due to wire abrasion by bedload movement in streams with high velocity flow.
- Difficult to install, requiring large equipment.

## **Planning Considerations:**

For easy handling and shipping, gabions are supplied folded into a flat position and bundled together. Gabions are readily assembled by unfolding and binding together all vertical edges with lengths of connecting wire stitched around the vertical edges. The empty gabions are placed in position and wired to adjoining gabions. They are then filled with cobblestone-size rock (10-30 cm in diameter) to one-third their depth. Connecting wires, placed in each direction, brace opposing gabion walls together. The wires prevent them from “bulging” as they are filled. This operation is repeated until the gabion is filled. After filling, the top is folded shut and wired to the ends, sides, and diaphragms. During the filling operation live rooting plant species, such as willow, may



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be placed among the rocks. If this is done, some soil should be placed in the gabions with the branches, and the basal ends of the plants should extend well into the backfill area behind the gabion breast wall.

Several different design configurations are possible with gabions. They may have either a battered (sloping) or a stepped-back front. The choice depends upon application, although the stepped-back type is generally easier to build when the wall is more than 10 feet high. If large rocks are readily accessible, inexpensive, and near the proposed site, then their use in construction of a rock wall may be preferable. On the other hand, if rock must be imported or is only available in small sizes, a gabion wall may be preferable.

## **Sequence of Construction:**

- Since gabions are used where erosion potential is high, construction must be sequenced so that they are put in place with the minimum possible delay. Disturbance of areas where gabions are to be placed should be undertaken only when final preparation and placement can follow immediately behind the initial disturbance.
- Where gabions are used for outlet protection, they should be placed before or in conjunction with the construction of the pipe or channel so that they are in place when the pipe or channel begins to operate.

## **Gabions Maintenance:**

- Gabions should be inspected on a regular basis and after every large storm event.
- All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to assure continued performance of their intended function.
- All maintenance and repair shall be conducted in accordance with an approved manual.

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