



ALPHA PINNACLE

▷ ALPHA Gabion

▷ ALPHA Mattress

▷ ALPHA MSE Wall

▷ ALPHA Green MSE Wall

▷ ALPHA Netting



RRE ENGINEERING SDN. BHD. is a Malaysian registered company, committed to the environment issues of today. Our team of qualified staff provide personalised and professional expertise for a wide range of environmental benefit with our unique products and technologies. Our customers are the government, non-government and private sectors. We strive and have succeeded again and again to provide our clients with an economic advantage in addition to environmental benefit.

We aim to be the best in each of the sector of our industry. This is made possible only with the support from:

- our partners who are world class leaders in their field
- our team who live and share our values
- and you, our valuable client

Our team share our values and are committed to the business vision. Most of all, our clients share our values in building and maintaining trust in our relationships, being reliable in delivery of commitments and trusting these are the foundations that we can and will achieve growth together.



Our products; Alpha Gabion, Alpha Mattress, Alpha MSE Wall, Alpha Green MSE Wall and Alpha Netting are solutions made to blend with the environment. It is manufactured according to ISO 9001:2008 certified by SIRIM QAS International. The solutions are only as good as the people who implement them. Hence, we bring you our expertise based on local knowledge, a range of proven products and personalized after-sales service.



ISO 9001:2008

Alpha Gabion, Alpha Mattress, Alpha MSE Wall, Alpha Green MSE Wall and Alpha Netting are made from double twist steel wire woven mesh and manufactured by certified ISO 9001:2008 company.

We are the only supplier in Malaysia with an ***Integrated Production System*** (having the ability to control the wire strength and chemical composition). The fully integrated manufacturing base comprise:-

- ➡ ***Steel wire rod drawing plant***
- ➡ ***Galvanising plant***
- ➡ ***PVC coating plant***
- ➡ ***Double twist line***
- ➡ ***Lab and quality control facilities***

This allows us the ability to ensure good quality control from the strength of the wire to the galvanizing process and control of chemical composition to the PVC coating. Thus we are ultimately producing a consistent and reliable gabion, mattress, netting etc.

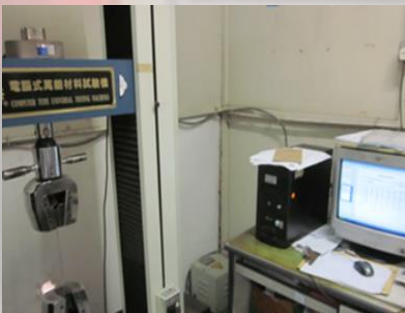
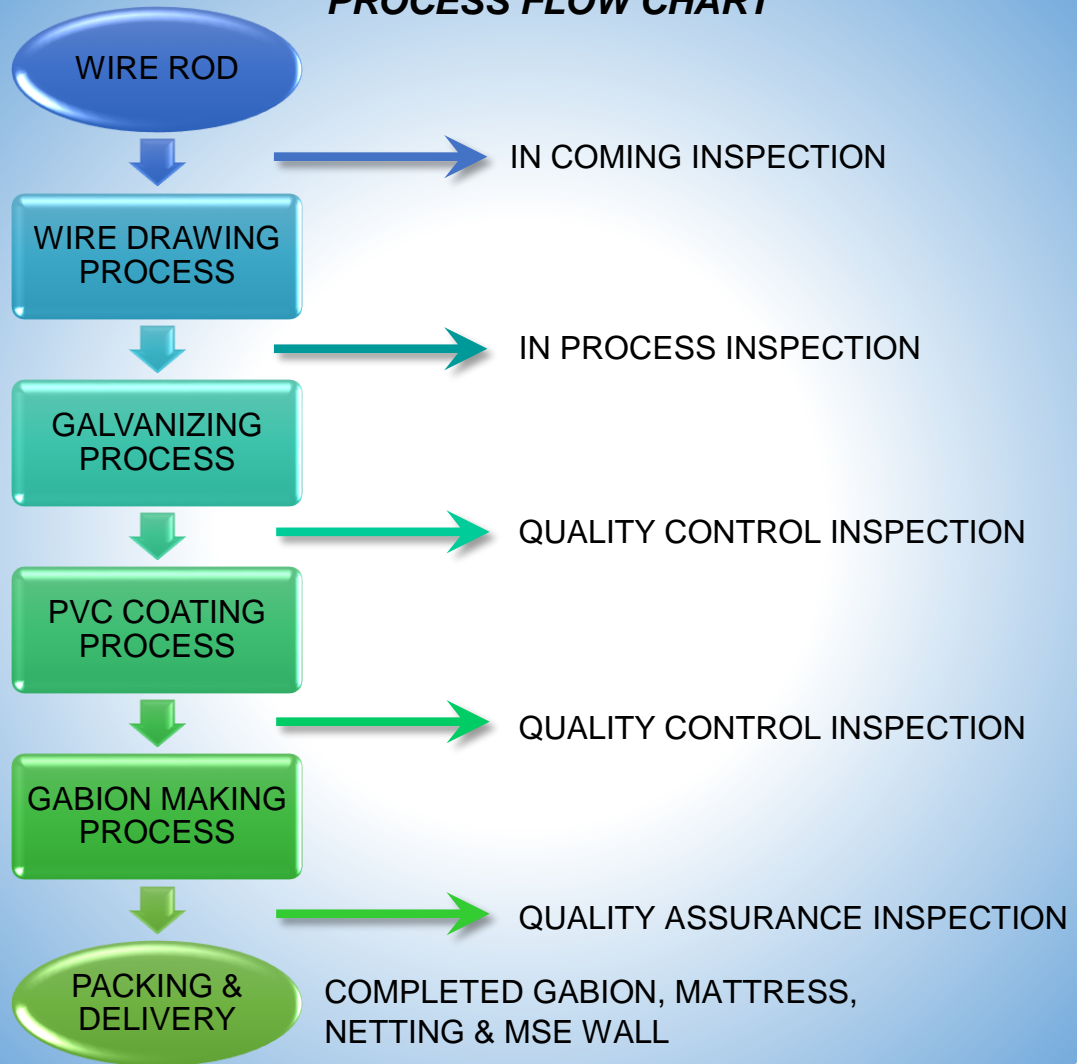


Galvanized iron zinc bath machine



Gabion machine

SUMMARY OF GABION MANUFACTURING PROCESS FLOW CHART



Universal Tensile Machine – tensile strength



Salt Spray Test – according to BS Standard



Galvanized wire wrapping test on its own diameter (mandrel 1XD) more stringent than BS specification requirement.



50% Acid hydrochloric test on PVC penetration to wires

STEEL WIRE

The steel wire comes in two (2) types of coating, a) Heavily galvanized or; b) Heavily galvanized with PVC (polyvinyl chloride). The steel wire diameter is manufactured following with requirement as per **BS 1052** and **JKR specification**.

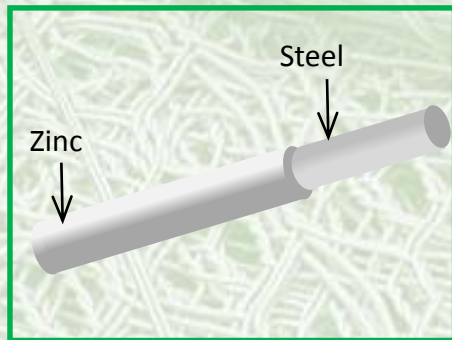
WIRE MESH

The double twist hexagonal shape wire mesh used for production is mesh type 80mm with dimensions shown as per layout below. The steel wire average tensile strength is 38 – 50 kg/mm² before PVC Coating.

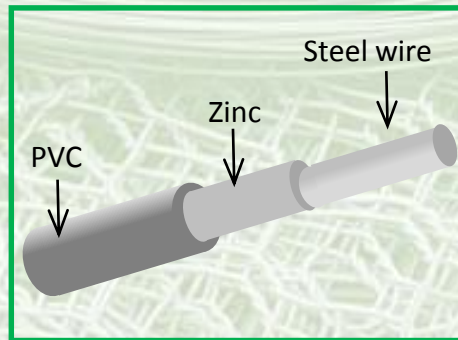
COATING

Zinc - The minimum weight of Zinc coating shall be according to **BS 443/1982 "Galvanized Coating on Wire"** as stated below. For quality control on Zinc adhesion, the wire is wrapped six times around four wire diameter size mandrel and the Zinc coating shall not flake or crack to the extent that any Zinc can be removed by rubbing with bare fingers.

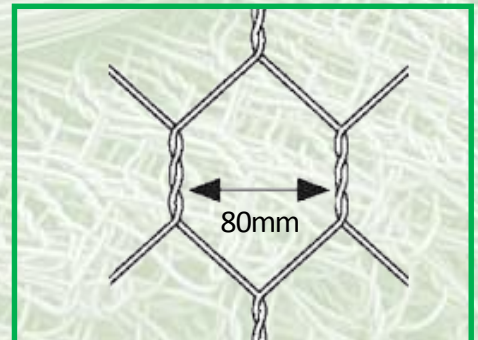
PVC - The PVC coating is grey in colour with average thickness of 0.55 mm. The wire and coating quality used in the production are follow with international specifications and manufactured by certified ISO 9001:2008 company. The coating shall be grey in colour and the average thickness is 0.55 mm, shall be capable of resisting deleterious effects of natural weather exposure, immersion in salt water and shall not show any material difference in its initial characteristics. The maximum penetration of corrosion of the wire core from a square cut end shall not be greater than 25mm when the specimen has been immersed for 2000 hours in a 50% solution of HCL (Hydrochloric Acid 12BE).



Heavily Galvanized (Zinc)
Coating



Heavily Galvanized (Zinc) with
PVC



Mesh Type 8

Wire & Mesh Type

- Steel wire with coating
- Mesh Type 8 (80mm)

Coating Type

1. Zinc coating
2. Zinc + PVC coating (PVC thickness 0.55mm)

Base Material

Steel Wire Diameter

1. Selvedge wire - 3.5mm
2. Mesh wire - 2.7mm
3. Binding Wire - 2.2mm

Steel wire + PVC coating diameter

1. Selvedge wire - 4.6mm
2. Mesh wire - 3.8mm
3. Binding Wire - 3.3mm

Min. zinc weight coating for wire

Ø 2.2mm = 240g/m²

Ø 2.7mm = 260g/m²

Ø 3.5mm = 275g/m²

ALPHA GABION

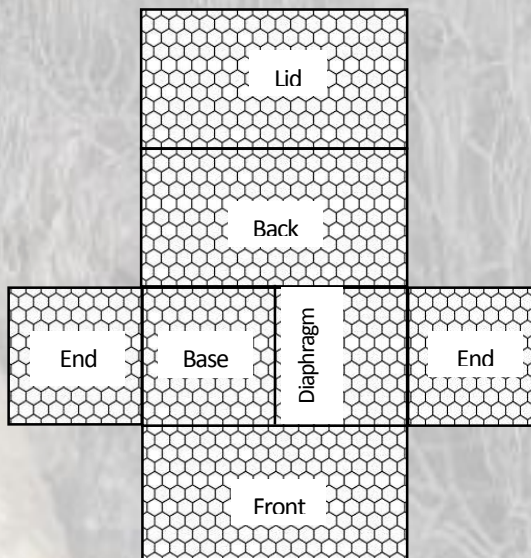
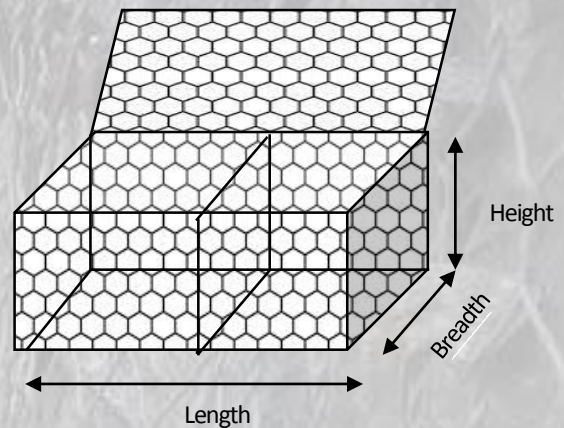
Alpha Gabions are rectangular baskets fabricated from double twist hexagonal steel wire mesh. Gabions are divided into cells by fitting with diaphragms for easier assembly and erection. The baskets are filled with rocks and stacked on top of each other and next to one another to form a homogenous gravity wall.

Product Application and Specification

Alpha Gabions are used as a gravity retaining wall for slope stabilization and as erosion protection in dry application or in constant contact with water. It is widely accepted and used as a retaining wall due to its flexibility, permeability, ease and speed of construction, most of all due to its cost and technical benefits.

Overall Size

Length (m)	Breadth (m)	Height (m)	Example (m)
1, 2, 3 & 4	1	0.5 & 1	4 x 1 x 1 (L x B x H)



ALPHA MATTRESS

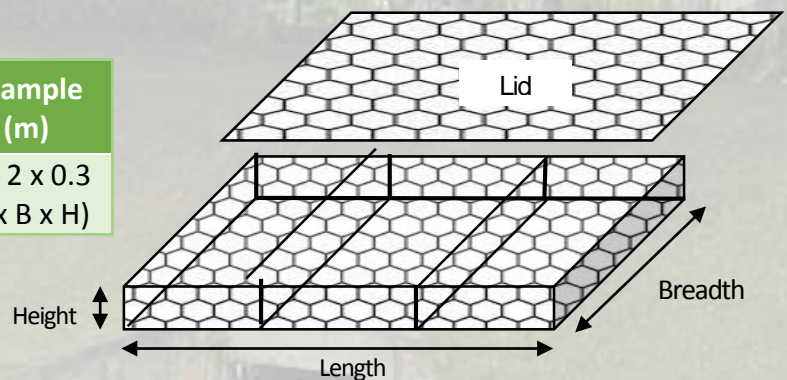
Alpha Mattresses are rectangular baskets fabricated from double twist hexagonal steel wire mesh which are slimmer in height. The wire quality and galvanizing coating meets all international specifications. Mattresses are divided into cells by fitting diaphragms at 1.0m intervals for easier assembly and erection. The mattresses are filled with rocks and laid on top of the river bank, along the river embankment and even extended onto the river bed acting as an erosion and scour protection system.

Product Application and Specification

Alpha Mattresses are used as an erosion protection in dry slopes or in constant contact with water, especially for applications in river protection and channel lining.

Overall Size

Length (m)	Breadth (m)	Height (m)	Example (m)
3 or 6	2	0.23 & 0.3	6 x 2 x 0.3 (L x B x H)



ALPHA MSE WALL

Alpha MSE Wall or Mechanically Stabilized Earth is made from PVC coated heavily galvanized double twist steel wire mesh, box-shaped basket with a section of the mesh extending into the soil to act as reinforcement into the backfill material. Attractive stone filling on the front facing is used to enhance aesthetic value of the system and to provide erosion protection in river or stream applications, where the system is exposed to continuous contact with water.

Alpha MSE Wall provide designers with a wide range of choices on slope angle for the most cost-effective use of land while achieving maximum aesthetic and environmental value whilst benefiting economic savings.

Product Application and Specification

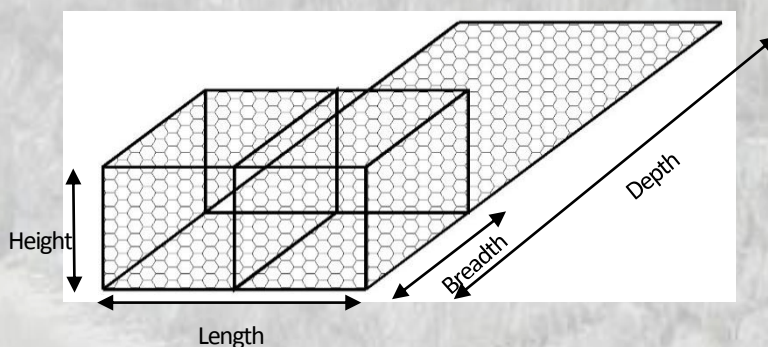
Alpha MSE Wall is use for retaining walls, bridge abutment, dams and dikes to stabilize unstable slopes and retain the soil. The stability of the system comes from friction of the reinforcement and interlocking of the compacted backfill within the mesh. The backfill material can be either

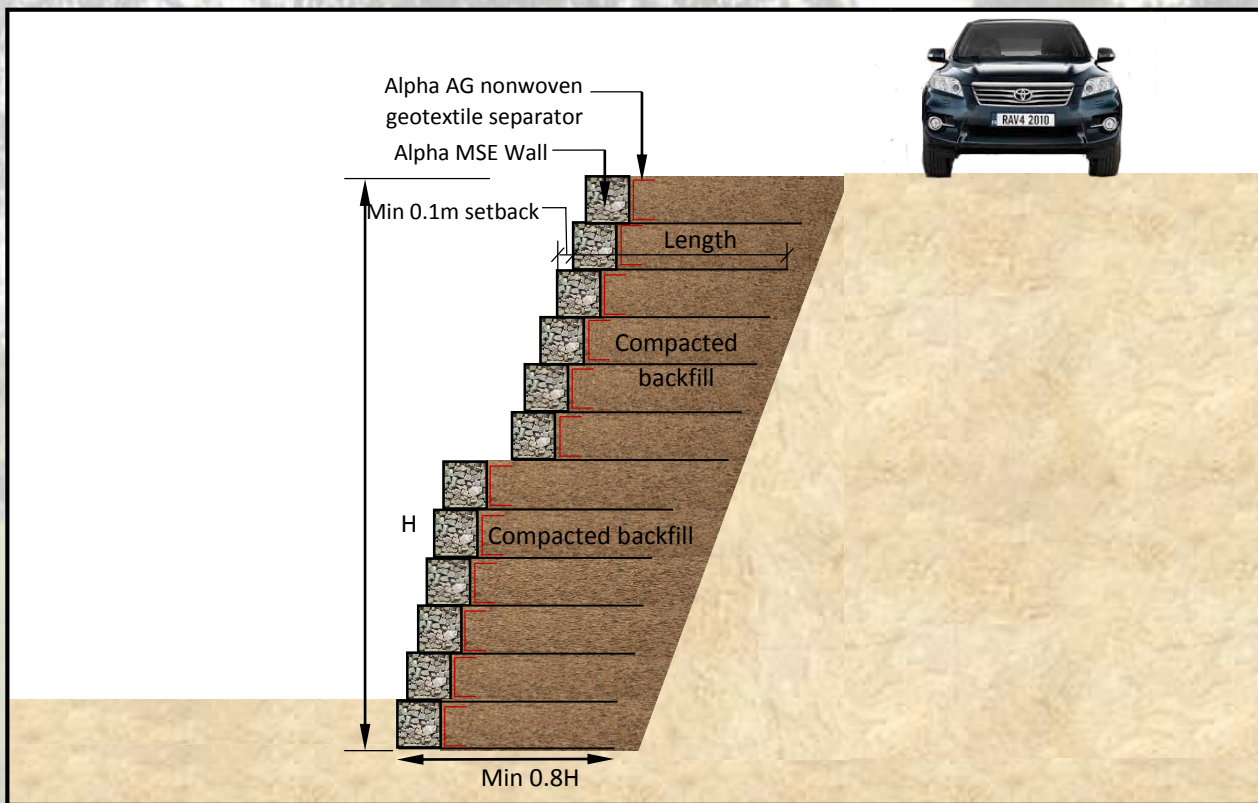
- a) Granular material
- b) Suitable earth fill

The system can be designed to address technical challenges such as weak soils, potential for differential settlement, heavy loading and non-standard backfill material. It is also commonly adopted and used to rectify slope and embankment failures in Malaysia. In addition, it is suitable to be used for high walls and slopes that is present in most residential development, civil infrastructure and industrial projects of varying site conditions.

Overall Size

Length (m)	Breadth (m)	Height (m)	Depth (m)	Example (m)
2	1	0.5 & 1	3,4,5 & 6	2 x 1 x 1 x 6 (L x B x H X D)





Alpha MSE Wall Typical Section

ALPHA GREEN MSE WALL

Alpha Green MSE Wall or Green Mechanically Stabilized Earth is made from PVC coated heavily galvanized double twist steel wire mesh that comes with brackets and steel mesh combined with erosion control mat. The steel wire mesh extending into the soil act as a reinforcement into the backfill material and could be combined with geogrids for better results.

The front facing of this system could be vegetated to enhance aesthetic value, blending with the surrounding creating a natural and environmental friendly atmosphere.

Alpha Green MSE Wall provide designers with choices on slope angle either 45° , 60° or 70° to obtain the most cost-effective use of land while achieving maximum aesthetic and environmental friendly value.

Product Application and Specification

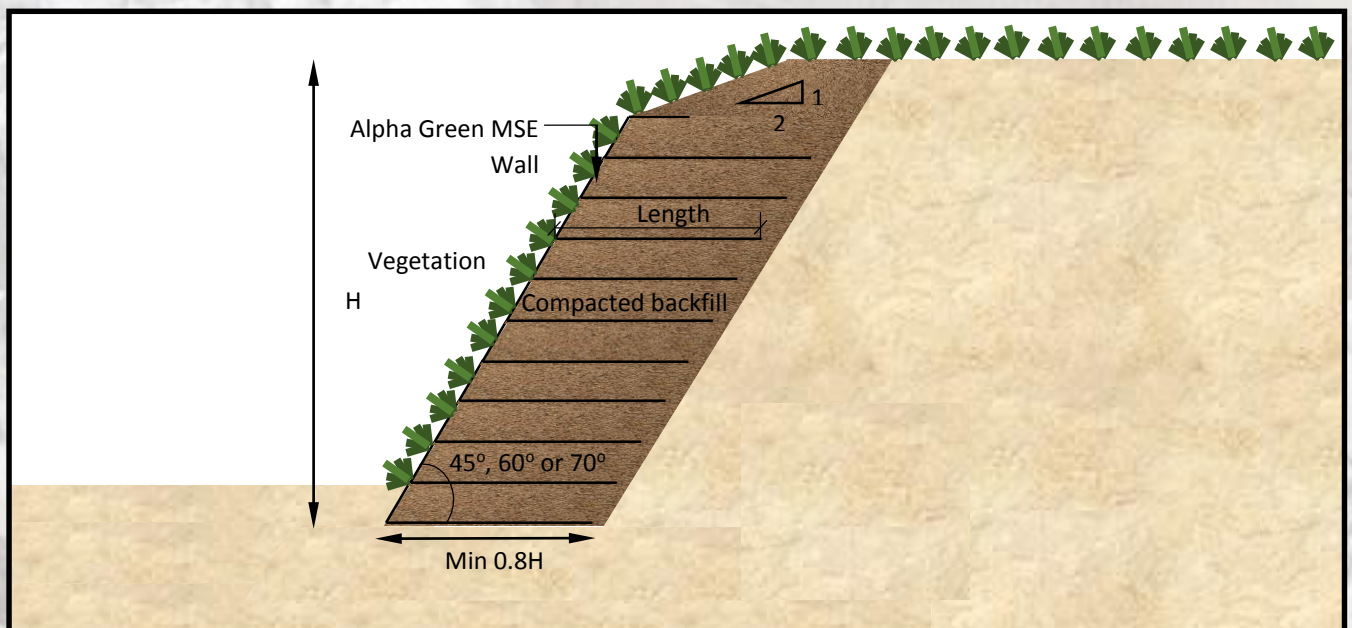
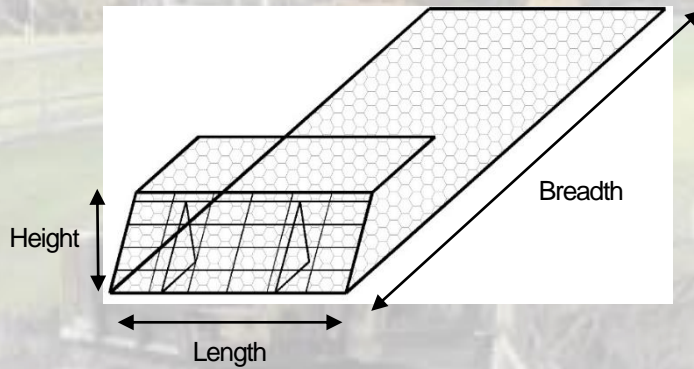
Alpha Green MSE Wall is suitable for reinforced embankment slope to stabilize unstable slopes and retaining the soil. The stability of the system comes from friction of the reinforcement and interlocking of compacted backfill within the mesh, which the backfill material can be either

- Granular material or
- Suitable earth fill

The system can be designed to address technical challenges such as potential for differential settlement and seismic activity, heavy loading and non-standard backfill materials and available for nearly every different size structures and site conditions for residential development, civil infrastructure and industrial projects. The system is best applied for high embankment slopes.

Overall Size

Length (m)	Breadth (m)	Height (m)	Example
2	3,4,5 & 6	0.45 & 0.60	2 x 4 x 0.6 (L x B x H)



Alpha Green MSE Wall Typical Section

System Advantages

Item	Conventional Method Using Reinforced Concrete Wall	ALPHA MSE & GREEN MSE WALL
Structure	Rigid	Flexible
Height	5	5
Construction Time	10 – 25m ² / day	40 – 55m ² / day
Appearance	Concrete	Stone finishing or vegetation
Cost	RM300 - 350/m ²	RM260 - 300/m ²
Installation	Time consuming due to installation of rebar, formwork, concreting and curing time	Easier and faster in installation, skilled workers are not required

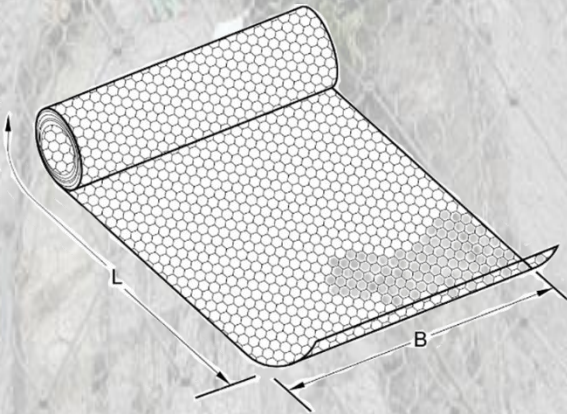


ALPHA NETTING

Alpha Netting is a double twist wire mesh that comes in a roll with specified width and length. The netting is used for rock slope protection system and with special solutions, capable to establish vegetation on rock slopes. The netting is meant to capture or guide small loose rocks into a catchment area. It is highly economical and effective in safeguarding buildings, highways, roads and railways.

Roll size

Length (m)	Width (m)
25 or 50	2, 3 & 4



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