

ALLIANCE GEOTECHNICAL SOLUTIONS (LLC)

ASTM 975 – 11 (2016) SPECIFICATIONS GABION BASKET & GABION MATTRESS METALLIC COATED & PVC COATED

This gabion material specification data sheet illustrates the product configuration, composition, wire coating and formation. Gabions are double twisted hexagonal steel wire mesh baskets and mattresses that are interconnected and filled with specified stone material. Gabions are an ideal solution for various civil, structural and geotechnical engineering applications.

1. Description

Gabions are elements of rectangular prismatic form, conformed by a double twisted hexagonal steel wire mesh, filled on site with approved stone fill of appropriate dimension, hardness and weight. Gabions can be either gabion baskets or gabion mattresses depending on the dimensions.

A gabion basket shall have a height of 1' – 3' while a gabion mattress shall have a height of 6" – 1'. The gabion units are divided by diaphragms forming internal cells with dimensions of 3' for gabions and 3'-6' for mattresses depending on application.

The dimensions of the gabions (baskets and mattresses) are indicated on Tables N° 1 and 2; their tolerances are in conformance with ASTM A975-11.

Gabions are made of single unit construction manufactured so that the base, ends, internal diaphragms, and lids are pre-attached at the production facility. For gabion mattresses the base, ends, internal diaphragms shall be pre-attached, and the lid shall be a panel or roll material applied separately during construction.

Table No. 1 DIMENSIONS OF THE GABIONS – BASKET TYPE
(Nominal measures of the gabions) (8x10cm)

Large (ft)	Width (ft)	Height (ft)	Nº of Diaphragms
6.0	3.0	3.0	2
9.0	3.0	3.0	3
12.0	3.0	3.0	4
6.0	3.0	1.5	2
9.0	3.0	1.5	3
12.0	3.0	1.5	4
6.0	3.0	1.0	2
9.0	3.0	1.0	3
12.0	3.0	1.0	4

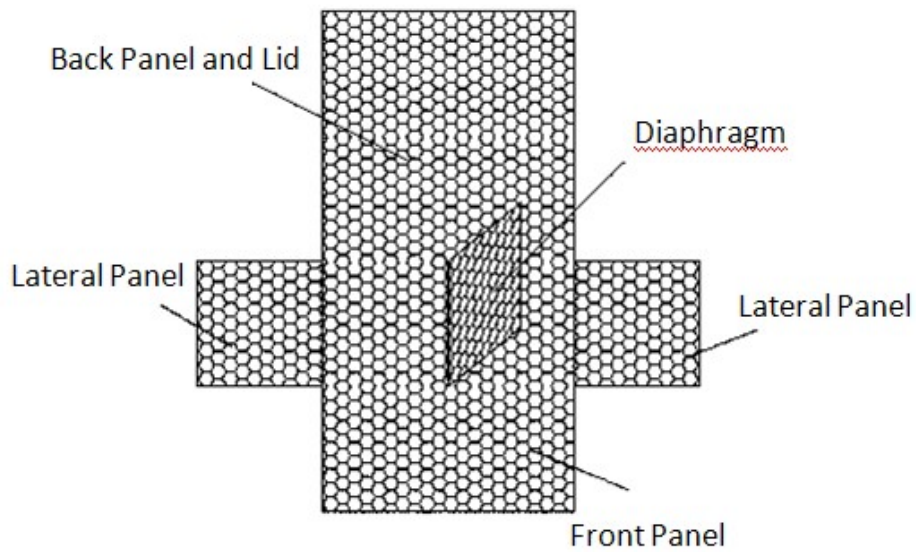
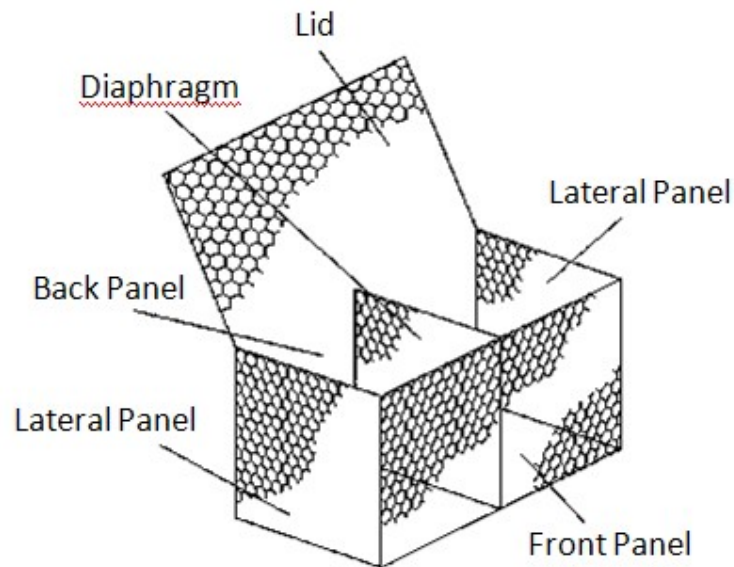
f



 **BEKAERT**

better together

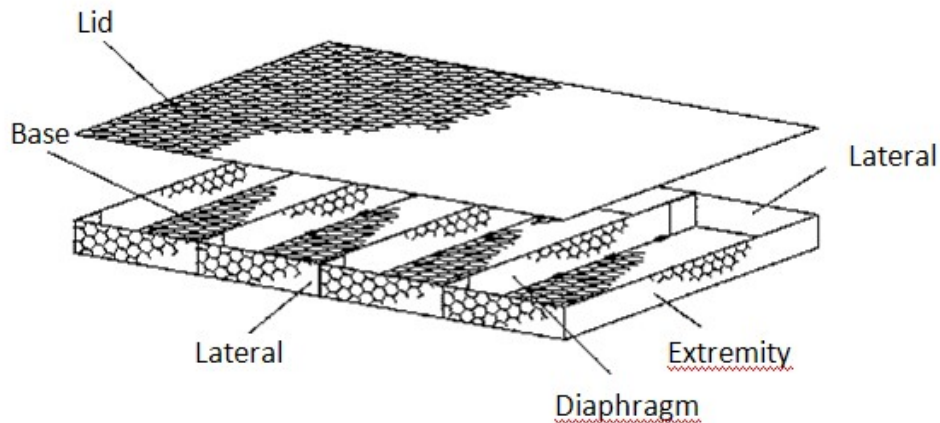
ALLIANCE GEOTECHNICAL SOLUTIONS (LLC)



ALLIANCE GEOTECHNICAL SOLUTIONS (LLC)

Table No. 2 DIMENSIONS OF THE GABIONS – MATTRESS TYPE
(Nominal measures of the gabions) (8x10cm), (6x8cm)

Large (ft)	Width (ft)	Height (ft)	Nº of Diaphragms
9.0	6.0	0.5	3
12.0	6.0	0.5	4
9.0	6.0	0.75	3
12.0	6.0	0.75	4
9.0	6.0	1.0	3
12.0	6.0	1.0	4



2. Characteristics of Double Twisted Hexagonal Mesh (ASTM 975-11) (8x10cm)

Tensile strength of mesh: Parallel to twist	<i>3500 lbs/ft galvanized</i>	<i>2900 lbs/ft pvc coated</i>
Tensile strength of mesh: Perpendicular to twist	<i>1800 lbs/ft galvanized</i>	<i>1400 lbs/ft pvc coated</i>
Connection to selvedge wire:	<i>1400 lbs/ft galvanized</i>	<i>1200 lbs/ft pvc coated</i>
Panel to Panel connection:	<i>1400 lbs/ft galvanized</i>	<i>1200 lbs/ft pvc coated</i>
Punch strength of mesh:	<i>6000 lbs/ft galvanized</i>	<i>5300 lbs/ft pvc coated</i>

Double Twisted Hexagonal mesh shall not unravel if one or more wires are broken within a given panel. The mesh shall be formed by weaving the hexagonal mesh pattern with the joints formed by twisting two wires through three and a half turns.



BEKAERT

better together

ALLIANCE GEOTECHNICAL SOLUTIONS (LLC)

3. Wire diameter

The wire diameter must be as detailed on Tables N° 3 and 4 which tolerances are adjusted to BS 443-82 Norm.

**Table N° 3 WIRE DIAMETERS FOR GABION BASKETS
Galvanized & Galvanized plus PVC Coating
ASTM 975-11 Classifications Style 3**

WIRE TYPE	Metallic Coated	PVC Coated
Aperture size of the mesh	8 x 10	
Mesh wire	3.05 mm (0.120 in)	2.70 mm + PVC (0.106 in + PVC)
Selvedge wire	3.80 mm (0.150 in)	3.40 mm + PVC (0.134 in + PVC)
Lacing wire	2.20 mm (0.087 in)	2.20 mm + PVC (0.087 in + PVC)

**Table N° 4 WIRE DIAMETERS FOR MATTRESSES GABIONS
Galvanized & Galvanized plus PVC Coating
ASTM 975-11 Classifications Style 1 & 3**

WIRE TYPE	Metallic Coated		PVC Coated	
	6x8	8x10	6x8	8x10
Mesh wire	2.20 mm (0.087 in)	3.05 mm (0.120 in)	2.20 mm + PVC (0.087 in + PVC)	2.70 mm + PVC (0.106 in + PVC)
Selvedge wire	2.70 mm (0.105 in)	3.80 mm (0.150 in)	2.70 mm + PVC (0.105 in + PVC)	3.40 mm + PVC (0.134 in + PVC)
Lacing wire	2.20 mm (0.087 in)	2.20 mm (0.087 in)	2.20 mm + PVC (0.087 in + PVC)	2.20 mm + PVC (0.087 in + PVC)

4. Characteristics of the Wire

The wire used for the production, assembly and installation of the gabions must be of steel quality SAE 1008 as per the following specification:

Material base

CARBON	:	% C	0.06 - 0.10
PHOSPHORUS	:	% P	0.04 maximum
SULFUR	:	% S	0.05 maximum

The resistance of the traction must fulfill the BS 443-82 Norm.

5. Zinc Coating of wire (galvanized)



ALLIANCE GEOTECHNICAL SOLUTIONS (LLC)

- Class III, finish 5 soft ASTM A641 & A641M.
- According to ASTM A-90 & A-90M

WIRE TYPE 8x10cm Wire use	Wire Diameter		Zinc coating	
	diam. inches	diam. mm	oz/ft ²	Class
Mesh wire	0.120	3.05	0.85	3
Selvedge wire	0.150	3.80	0.90	3
Lacing wire	0.087	2.20	0.75	3

6. PVC Coating of Galvanized core wire.

In accordance with ASTM 975-11, Federal Specification-QQ-W-461H,

Polyvinyl Chloride Coating or PVC coating shall be gray in color and shall possess a nominal thickness of 0.50 mm (0.02 in.) but not less than 0.38 mm (0.015 in.) in thickness. The PVC shall be resistant to immersion in salt or poor water quality and shall not show any visible material difference in its initial properties. Galvanized Coating shall be applied to the steel wire prior to being double twisted into mesh or coated with additional PVC protection. PVC coating shall be extruded bonded to the galvanized core wire before being double twisted into mesh.

Initial Properties of polyvinyl chloride coating:

Specific Gravity:	<i>ASTM D792, range 1.30-1.35</i>
Tensile Strength:	<i>ASTM D412, not less than 20.6 MPa (2985 psi)</i>
Modulus of Elasticity:	<i>ASTM D412, not less than 18.6 MPa (2700 psi)</i>
Resistance to abrasion:	<i>ASTM D1242, weight loss less than 12%</i>
Brittleness Temperature:	<i>ASTM D746, not higher than -9°C (15°F)</i>
Hardness:	<i>ASTM D2240, between 50-60 shore D</i>
Creeping Corrosion:	<i>: Maximum corrosion penetration to wire core from square cut end shall not be more than 25mm when specimen has been immersed for 2000 hours in a 50% solution HC1.</i>

7. Gabion & Mattress Stone Fill

The stone material for filling the gabions shall be dense, clean, persistent, durable and free of cracks and strange substances adhered whose later alteration could affect the construction work stability. The Specific Gravity of the stone fill shall be as directed by the project engineer.

Stone fill material for gabion baskets shall be angular and range from 4 in. -8 in. and shall have D50 6 in. Stone fill for revet mattresses shall range from 3 in. -6 in.

For revet mattresses, it is advisable for this type of gabion to contain at least two layers of stone fill material.

8. Assembling and Placing

- The base of the foundation where the gabions will be placed must be previously graded in accordance with requirements shown in plans.



ALLIANCE GEOTECHNICAL SOLUTIONS (LLC)

- Each gabion shall be unfolded over a rigid and flat surface lifting the lateral panels and placing the diaphragms in vertical position. After this, the 4 connecting seams shall be tightened together using lacing wire or fasteners, it happens with diaphragms and lateral panels.
 - Before proceeding with the filling each gabion shall be joined to their adjacent. The unions should be made using Hog Rings (fasteners).
 - To achieve a better finished the gabions could be tractioned before being fulfilled.
 - During the filling operation with stones, connecting wire shall be inserted according to manufacturer's instructions every 1' vertical lift of the gabion unit. For gabions of 1' and 1.5' height it is necessary to place connecting wire just on the middle of the baskets.
 - It is important to avoid dropping stone from a height over 1.5 feet, consistency and functionality of the gabions depends on this.
-
- After the filling, the closure of the gabion must be done by dropping the lid, so it can be firmly tightened to the edges of vertical panels. The stone fill must be completed so the lid stays tightened confining the stone.
 - Tolerances admitted on a job:
 - Wire diameter : $\pm 2.50\%$
 - Gabion's height : $\pm 5.00\%$
 - Gabion's width and length : $\pm 5.00\%$
 - Revet mattress's height : $\pm 10.00\%$
 - Revet mattress's width and length : $\pm 5.00\%$

The weight of the gabion is abided by a tolerance of $\pm 5.00\%$ which corresponds to a lower tolerance of 2.50% admitted for the wire diameter.

Alliance Geotechnical Solutions

