

# TERRA AQUA PVC COATED GABION

## **Scope:**

This specification data sheet covers the use of PVC coated steel double twisted hexagonal wire mesh baskets filled with stone used for various applications including but not limited to retaining walls, mechanically stabilized soil retaining structures, stream and river bank protection, slope paving, outfall structures, weirs and drop structures etc...

## **Definition:**

- a) Gabions are defined as double twisted woven wire mesh box shaped baskets of various sizes and dimensions.
- b) The selvages of the gabion baskets are the thicker perimeter and edge wires to which the wire mesh is secured as to withstand sudden or gradual stress from any direction.
- c) Reinforcing wires are the thicker wires incorporated into the netting during fabrication.
- d) The diaphragms are internal wire mesh partitions which divide the gabions into cells.
- e) Lacing or tie wire is the wire used to assemble and join the gabion units.
- f) Connecting wires are the internal wires used to prevent the gabions from bulging.
- g) Alternative fasteners are ASTM approved wire fasteners used in lieu of lacing wire.

## **Fabrication:**

Double Twisted Hexagonal Steel Wire PVC Coated Mesh Gabions. Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown in the drawings. Gabions shall be of single unit construction: the base, lid, ends and sides shall be either woven into a single unit or edge of these members connected to the base section of the gabion in such a manner that strength and flexibility at the connecting point does not compromise the engineered structural design of the gabion. Where the length of the gabion exceeds one and one half its horizontal width, the gabion shall be divided by diaphragms of the same mesh and gauge as the body of the gabion, into cells whose length does not exceed the horizontal width. The gabion shall be furnished with the necessary diaphragms secured in proper position on the base in such a manner that no additional tying is required at this juncture.

### **Mesh Formation:**

The double twisted hexagonal wire mesh shall have deformability sufficient to permit minimum of mesh elongation equivalent to 10% of the unstretched length of the mesh test section without reducing the gauge or the tensile strength of the individual wire strands to values less than those for similar wire, one gauge smaller in diameter.

### **Non-Raveling:**

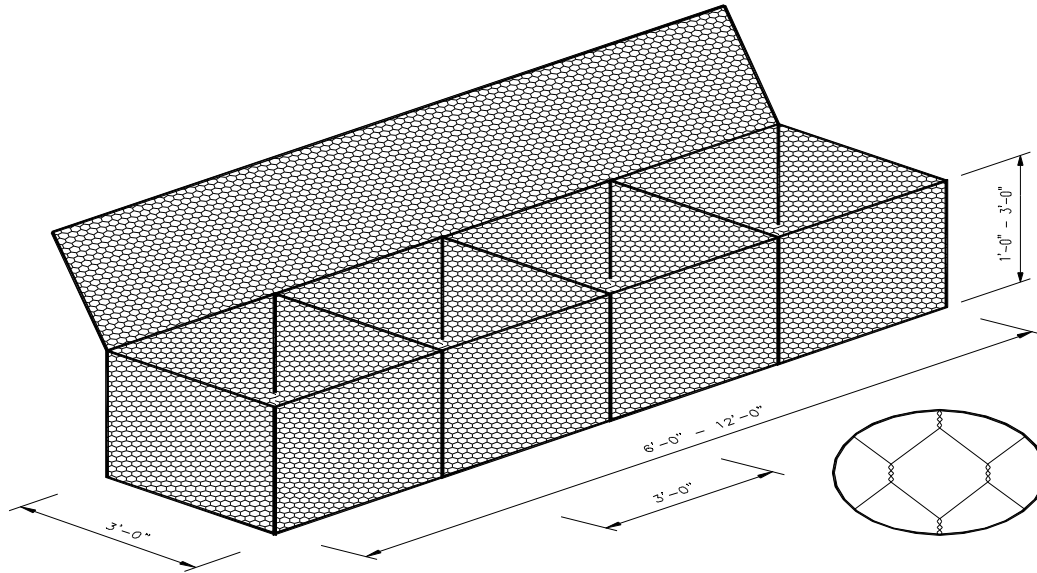
The wire mesh is to be fabricated in such a manner as to be non raveling. This is defined as the ability to resist pulling apart at any of the twists or connections forming the mesh when a single wire strand in a section of mesh is cut.

### **Gabion Fill:**

The stone fill material used for filling the gabion units shall be clean, hard stone with pieces ranging from 4-8 inches on the greatest dimensions. Stone filling shall not exceed 24 inch vertical drop above the gabion basket. All effort shall be made to ensure that the stone fill material utilized in the design of the structure match the stone fill used in constructing the gabion structure.

### **Assembling and placing:**

- a) Each gabion shall be assembled by tying or fastening all untied edges. The binding wire shall be tightly looped around every other mesh opening along the seams in such a manner that single and double loops are alternated. Alternative fasteners may be used in lieu of lacing wire. The alternative wire fasteners shall be applied at approximately 4" to 6" intervals on all vertical seams. No less than 3 fasteners per one foot on any given vertical or horizontal seam.
- b) A line of empty gabions shall be placed into position according to the contract drawings. Lacing wire or alternative fasteners shall be used to secure each unit to the adjoining one along the vertical reinforced edges and the top selvages. An approved corner closure tool shall be used to adjoin adjacent gabions to insure a tight, neat seam and minimize gabion wire joint deformation. The base of the empty gabions placed on top of the filled line of gabions shall be tightly wired or fastened to the latter at front and back. The lid shall be secured with an approved closure tool to insure proper closure without excessive mesh deformation.
- c) To achieve optimum alignment and finish for retaining walls, a minimum amount of stretching may be required.
- d) Connecting wires shall be inserted during the filling operation as follows: Install according to manufacturers instructions every 1' vertical lift of the gabion unit.



**terra aqua gabion unit standard sizes: custom jumbo sizes available**

<b>Gabion Unit Size</b>	<b>Capacity Cubic Yards</b>	<b>No. Of Internal Cells</b>
6x3x3	2	2
9x3x3	3	3
12x3x3	4	4
6x3x1.5	1	2
9x3x1.5	1.5	3
12x3x1.5	2	4
6x3x1	.666	2
9x3x1	1	3
12x3x1	1.33	4

**Tolerances:** All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturers stated dimensions.

**Minimum Strength Requirements For Gabions:**

<b>Test Description</b>	<b>Galvanized/Galfan Gabions</b>	<b>PVC Coated Gabions</b>
Tensile strength of mesh parallel to wire twist:	3500 lbs/ft	2900 lbs/ft
Tensile strength of mesh perpendicular to wire twist:	1800 lbs/ft	1400 lbs/ft
Connection to selvedge:	1400 lbs/ft	1200 lbs/ft
Panel to panel:	1400 lbs/ft	1200 lbs/ft
Punch strength of mesh:	6000 lbs/ft	5300 lbs/ft

### **Material data:**

PVC coated galvanized steel wire: mesh opening 3 1/4 by 4 1/2 inches

- \* diameter of mesh core wire: 0.1063 inches
- \* diameter of mesh core wire plus PVC coating: 0.146 inches
- \* diameter of selvedge core wire: 0.1338 inches
- \* diameter of selvedge core wire plus PVC coating: 0.173 inches
- \* diameter of lacing core wire: 0.091 inches
- \* diameter of lacing core wire plus PVC coating: 0.127 inches
- \* Zinc coating of wire: finish 5 class 3 zinc coating - ASTM A-641 tested in accordance with ASTM A370-92.
- \* tensile of wire: soft temper in accordance with ASTM A-641-92
- \* weight of zinc coating of wire: shall be determined by ASTM A-90
- \* core wire for mesh: 0.85 oz/sf of zinc
- \* core wire for selvedge: 0.90 oz/sf
- \* core wire for lacing: 0.80 oz/sf
- \* grade of zinc coating of wire: high grade or special high grade in accordance with ASTM B-6, Table 1
- \* uniformity of coating: shall be determined by ASTM A-239
- \* elongation: not less than 12% in accordance with ASTM A -370-92
- \* nominal thickness of PVC coating: 0.0216 inches not less than 0.015 inches

All of the above wire diameters are subject to tolerance limit of 0.004 in accordance with ASTM A-641

### **Polyvinyl chloride coating (pvc) data:**

- A. PVC ( Poly Vinyl Chloride) Coating. The coating shall be gray in color and shall have a nominal thickness of 0.0216 inches but not less than 0.015 inches in thickness. The protective PVC plastic shall be suitable to resist deleterious effects from exposure to light, immersion in salt or polluted water and shall not show any material difference in its initial properties. The PVC compound is also resistant to attack from acids and resistant to abrasion.
- B. Initial properties of the PVC coating shall meet the following requirements:
  - B.1 Specific Gravity:  
According to ASTM D-2287 and ASTM D-792; in the range 1.30 to 1.34
  - B.2 Tensile Strength:  
According to ASTM D-412; not less than 2980 psi

**B.3 Modulus of Elasticity:**

According to ASTM D-412; not less than 2700 psi at 100% strain.

**B.4 Resistance to Abrasion:**

According to ASTM 1242; weight loss < 12% ( Method B )

**B.5 Brittleness Temperature:**

According to ASTM D-746, Procedure A ; shall be at least 8.3 degrees centigrade below the minimum temperature at which the gabions will be handled or placed but not higher than -9.4 degrees centigrade.

**B.6 Hardness:**

According to ASTM D-2240; shall be between 50 and 60 Shore D when tested.

**B.7 Creeping Corrosion:**

Maximum corrosion penetration to the wire core from a square cut end section shall not be more than 25mm when the specimen has been immersed for 2000 hours in a 50% SOLUTION HC1 (hydrochloric acid 12 Be.)

**C. Variation of the initial properties will be allowed, as specified below, when the specimen is submitted to the following accelerated aging tests:**

**C.1 Accelerated Aging Tests**

**C.1.1 Salt Spray Test:**

According to ASTM B-117  
Period of test – 3000 hours.

**C1.2 Exposure to ultraviolet rays:**

According to ASTM D – 1499 and ASTM G-23 ( Apparatus Type E ).  
Period of Test – 3000 hours at 63 degrees centigrade.

**C.1.3 Exposure to high temperatures**

Testing period: 240 hours at 105 degrees centigrade, when test in accordance with ASTM D- 1203 and ASTM D-2287.

After the above tests have been performed, the PVC compound shall exhibit the following properties.

**D. Properties after aging tests:**

**D.1 Appearance:**

The vinyl coating shall not crack , blister or split and shall not show any remarkable change in color.

**D.2 Specific Gravity:**

Shall not show change of higher than 6% of it initial value.

**D.3 Durometer Hardness:**

Shall not show change higher than 10% of its initial value.

**D.4 Tensile strength:**

Shall not show change higher than 25% of its initial value.

**D.5 Elongation:**

Shall not show a change higher than 25% of its initial value.

**D.6 Modulus of Elasticity:**

Shall not show change higher than 25% of its initial value.

**D.7 Resistance to Abrasion :**

Shall not show change higher than 10% of its initial value.

**D.8 Brittleness Temperature:**

Cold Bend Temperature - Shall not be higher than - 20 degrees centigrade.

Cold Flex Temperature - Shall not be higher than + 18 degrees centigrade.

**36" GABIONS & 18" GABIONS FOR VERTICAL STRUCTURES ON THE EXPOSED FACE**

- I) Gabions shall be filled to a depth of twelve (12) inches.
- II) For end units, two connecting wire preformed TACT Tie wires in each direction shall be tightly tied to opposite faces of the end gabion cell at a height of twelve (12) inches above the base. Internal compartments shall have internal connecting wires connecting front to back face of the gabion. Preformed TACT Ties are placed diagonal in the gabion cell.
- III) Gabions shall be filled a further depth of twelve (12) inches, and two connecting or preformed TACT Tie wires shall similarly be placed at this levels.
- VI) Gabions shall be filled to the top. Care shall be taken to insure gabion is not under filled.

All connecting wires shall be looped around two mesh openings and the ends of the wires shall be securely twisted to prevent their loosening. TACT Tie wires envelope one horizontal twist on the front face and envelopes one vertical twist on the side face.

All Terra Aqua Gabion material is manufactured according to ASTM A975-97 guidelines for Double Twisted Hexagonal Mesh Gabions.

**ASTM A975-97**

**Terra Aqua Gabions, Inc.**  
1415 North 32nd Street  
Fort Smith, Arkansas 72904  
800-736-9089