

# Permathene Welded Mesh Gabion AL-TEN® and Stainless Steel 316L

Note: The following guide should be used when constructing gabion walls using either spiral connectors or gabion grade C-Rings\*. This guide can be used for individual gabion cages or wall construction in a modular method (eliminating end panels so that no two panels are connected directly together).

\* C-Rings require a heavy duty pneumatic gabion C-Ringer (not the same type as for fencing), available for purchase or hire from Permathene. C-Rings are not as strong as spirals but are generally used in commercial projects for aesthetic purposes and economics, being cheaper and faster.

U-Clips are light weight clips designed for low structures (under 1m tall). U-Clips require a pneumatic or hand tool plier, available for purchase or hire from Permathene. U-Clips are not discussed further in this particular guide (see gabion accessories section for more information).

## 1) SCOPE

The work shall consist of supply, construction of cages and filling with rock.

## 2) Types

Permathene Gabions shall consist of square or rectangular welded mesh constructed to form containers filled with rock. The gabion mesh supplied to site shall conform to ASTM 974-97. The weld shear strength is meet a minimum of 50% of wire tensile strength.

Al-Ten: The wire shall be mild steel coated with 280 gsm (min) Al 10%, Zn 90%. The wire shall have a tensile strength between 350-750 N/mm<sup>2</sup>.

Stainless Steel: The wire shall be stainless steel grade 316L.

## 3) MATERIALS

Al-Ten: All connections including spirals and stiffener wires shall be manufactured in Galvan coated mild steel to the same diameter as the mesh.

C rings shall be Meihotech (manufactured in Japan), Galvan coated, 3mm diameter, 45mm opening, tensile strength 1700-1900 N/mm<sup>2</sup>. The C-Rings, when closed, should have an ID of 12-18mm.

Stainless Steel: All connections, including spirals and stiffener wires shall be manufactured in Stainless Steel. C rings shall be Meihotech (manufactured in Japan), stainless steel, 3mm diameter, 45mm opening, tensile strength 1700-1900 N/mm<sup>2</sup>. The C-Rings, when closed, should have an ID of 12-18mm.

## INSTALLATION GUIDE

### 1) FOUNDATION PREPARATION

The foundation on which the gabions are to be placed shall be cut or filled and graded as required. Surface irregularities, loose material, vegetation, and all foreign matter shall be removed from foundation surface area. Gabions and bedding or specified geotextiles shall not be placed until the foundation preparation is completed, and the subgrade surfaces have been inspected and approved by the engineer or the engineer's representative. Compaction of bedding or filter material will be required per plans and specifications. The surface of the finished material shall be to grade and free of mounds, dips or windrows. Extra care should be taken with foundation preparations in order to ensure a level and smooth surface. Geotextile shall be installed in accordance with the requirements of the plans and specifications.

## 2) ASSEMBLY AND PLACEMENT

The assembly and placement of gabions shall be in accordance with the following procedures:

**Assembly.** Rotate the gabion panels into position and join the vertical edges with fasteners for gabion assembly. Where spiral fasteners are used, crimp the ends to secure the spirals in place. Where C ring type alternate fasteners are used for basket assembly, install the fasteners at a maximum spacing of 150 mm. Use the same fastening procedures to install interior diaphragms where they are required. Interior diaphragms will be required where any inside dimension exceeds 1m for gabion baskets. Diaphragms will be installed to assure that no open intervals are present that exceeds 1m.

**Placement.** Place the empty gabions on the foundation and interconnect the adjacent gabions along the top, bottom, and vertical edges using spirals or C rings.

**Modular Assembly.** Gabion cages can be built in a modular method by eliminating an end panel for each cage so no two panels need be connected together. The same method may also be used for successive courses including lid and base panels.

Interconnect each layer of gabions to the underlying layer of gabions along the front, back, and sides.

## 3) FILLING OPERATION

After adjacent empty wire gabion units are set to line and grade and common sides properly connected, they shall be placed in straight-line tension to gain a uniform alignment. Staking of the gabions may be done to maintain the established proper alignment prior to the placement of rock. No temporary stakes shall be placed through geotextile material. Connecting lacing wire and other fasteners (as allowed) shall be attached during the filling operation to preserve the strength and shape of the structure.

Internal connecting cross-tile (stiffener) wires shall be placed in each unrestrained gabion cell, including gabion cells left temporarily unrestrained. Two internal connecting wires shall be placed concurrently with rock placement, at each 300 mm interval of depth. In welded mesh gabions and depending upon depth and height of the gabion cage these crossties or stiffeners will be placed either front to back or across the corners of the gabions (at 300 mm from the corners) providing diagonal bracing. Lacing wire or preformed wire stiffeners may be used. See individual cage instruction sheets for specific instructions with regards to the size of cage.

The gabions shall be carefully filled with rock, either by machine or hand methods, ensuring alignment, avoiding bulges, and providing a compact mass that minimizes voids. At no point in the filling process may rock be mechanically placed from a height of over 1m from machine to fill area. Machine placement will require supplementing with handwork to ensure the desired results. The cells in any row shall be filled in stages so that the depth of rock placed in any one cell does not exceed the depth of rock in any adjoining cell by more than 300 mm. Along the exposed faces, the outer layer of stone shall be carefully placed and arranged by hand to ensure a neat, compact placement with a uniform appearance.

The last layer of rock shall be uniformly leveled to the top edges of the gabions. Lids shall be placed over the rock filling using only approved lid closing tools as necessary. The use of crowbars or other single point leverage bars for lid closing is prohibited due to the potential for damage to the baskets.

The gabion lid shall then be secured to the sides, ends, and diaphragms with spiral binders, approved alternate fasteners, or lacing wire wrapped with alternating single and double halfhitches in the mesh openings.

Any damage to the wire or coatings during assembly, placement and filling shall be repaired promptly in accordance with the manufacturer's recommendations or replaced with undamaged gabion baskets.



Permathene Pty Ltd  
28 Mount Erin Road, Campbelltown, [www.permathene.com.au](http://www.permathene.com.au)  
NSW 2560 Australia  
Tel: (02) 4620 7837  
Toll Free: 1-800-60-80-95