



Geosynthetics

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ROCKBOX - Woven Mesh Gabions – Installation Guidelines

Description

Geosynthetics **ROCKBOX** gabions are manufactured from 2.7mm galvanised wire, woven in a hexagonal 80mm x 100mm double twist. Supplied 'flat-packed' complete with lacing (tying) wire.

Delivery

Gabions are delivered in a collapsed and compressed structure. They are strapped together in a folded, form on pallets to make it easier for transporting. The lacing wire is delivered in coils.

Assembly

Unfold and remove each gabion onto a flat hard surface (*Fig 1*) and remove any unwanted shipping folds, for easy removal, place the fold over a 2" x 4" board and simply walk along the sides. Form an open box by lifting the sides, ends and diaphragms vertically. The back and the front panels of the gabion are then to be connected to the end panels and centre diaphragms. Raise into a vertical position the end panels and the diaphragms. The edges of the gabion and the diaphragms are then joined together by using lacing wire (the bottom of the base course of units should be tied even though it has the assembly clips). The lacing wire procedure is to cut a sufficient amount of wire; it is recommended that the maximum length to be laced in each operation is 1m. This requires about 1.4m of wire. First double loop and/or twist the lacing wire to the wire mesh. Then continue lacing double and single loops alternatively through every mesh opening. Pull each loop tightly and finally secure the end of the lacing wire to the wire mesh with a loop and/or twist. It is normally recommended to use pliers whilst assembling the gabions and lacing the mesh together. Raise the diaphragms into a vertical position and tie them to the side panels in the same manner.

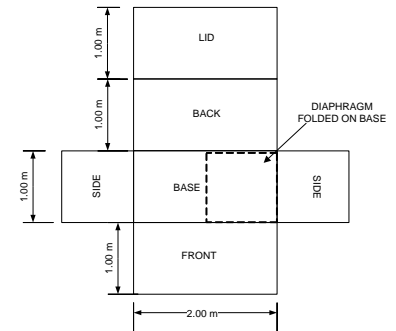


Fig 1. *(2m x 1m x 1m unit shown below) not to scale.

Fastening Procedure

With the use of lacing wire, cut off a piece of wire approximately 1.5 times the length of the edge to be tied. In the case of a longer edge several lengths of wire must be used. Tie wires should be secured around the selvedge wire, where present, by looping and twisting the lacing wire around itself. Proceed by alternatively tying double and single loops. Double loops should have spaces of no more than 6". The baskets should be pulled tightly together during the tying operation. Looping and twisting the wire around itself to secure the end of the lacing wire. Pliers must be used to make tight joints when using lacing wire.

Foundation Preparation

The foundations on which a gabion can be placed should be level to the design gradient and the elevations are to be graded as shown on the project construction drawings. It should be compacted, smooth and free of surface irregularities and loose materials. We recommend a min 150mm (200mm ideally) compacted structural stone foundation (MOT type1 would be suitable type of material); the foundation required is subject to ground conditions on site; if there are any reservations a calculation should be done to ascertain the situation. Any geotextiles required to be installed behind gabion structures should to comply with the requirements for subsurface drainage applications and project specific specifications; our standard details show Fibertex F-32 or Ekotex 12 geotextile.

Installation and Filling

Once the foundation is prepared and the gabions are assembled, place them in the desired location to form the structure. Before filling the baskets with rock, the layer of gabions needs to be joined together and aligned. All connections must be carried out as described in the assembly operations prior to the fill operation commencing. Rocks for gabions may be produced by any suitable quarrying method, and by the use of any device that yields the required sizes within the gradation limits chosen. The rocks used should be hard; angular to round, durable and of such quality that they will not disintegrate with water or weather throughout the life of the structure (igneous is preferable to sedimentary). The size of the gabion rocks shall range between 4 – 8 inches, stone grade 6G. All units should be joined securely to any neighbouring gabions on the same layer before the filling commences. During the filling operation there may be a need to use manual stone placement to minimise any voids. The exposed faces of the vertical structures may be carefully hand placed for a neat, flat and aesthetically pleasing appearance.

To avoid local deformation the cells should be filled in stages. At $\frac{1}{3}$ depth of fill and again at $\frac{2}{3}$ depth of fill cross bracing wires should be placed from the front to back of the gabions (1 per linear metre) as shown in Fig 2. (For 0.5m high units this only needs to be done once at $\frac{1}{2}$ height). The ends of the cross bracing ties should span 5 meshes in the centre of the external faces (fig 4). At no time shall any cell be filled to a depth that exceeds $\frac{1}{3}$ higher than the adjoining cell. To minimize the amount of voids use well-graded stone and also avoid excessively large stones and this will give a compact stone fill. Loose or over tightened cross bracing wires will cause bulging of the face to occur. Timbers or scaffold tubes can be temporarily wired to the unit faces externally to act as a shuttering to prevent bulging and be removed when filling is complete. In the case that more than one layer of gabions needed, in order that individual units become one with the structure, the next layer of gabions must be connected to the layer underneath after that layer has been securely closed.

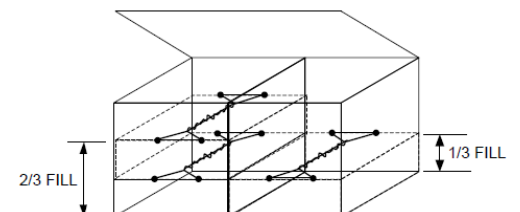


Fig2: cross bracing wires. 1 per linear metre. Spanning 5 mesh spaces.
(Note: At $\frac{1}{3}$ & $\frac{2}{3}$ height in 1m high units)

Note: If a run of units is not filled to each level in one go, then always step down the filling at the end otherwise distortion will occur. This also allows further units to be connected later. (*Fig 3*).



Fig3:

Closing

To allow the structure to settle, level off the fill with a surcharge 1 – 1.5 inches above the top of the mesh. The top edge of the diaphragm must be exposed. Fold the lid and edges of the panels to be connected down. The lids should be tightly laced along all edges to the sides and diaphragms in the same manner as described in the assembling units. All end wires should be turned in to prevent sharp protrusions.

Images for reference;

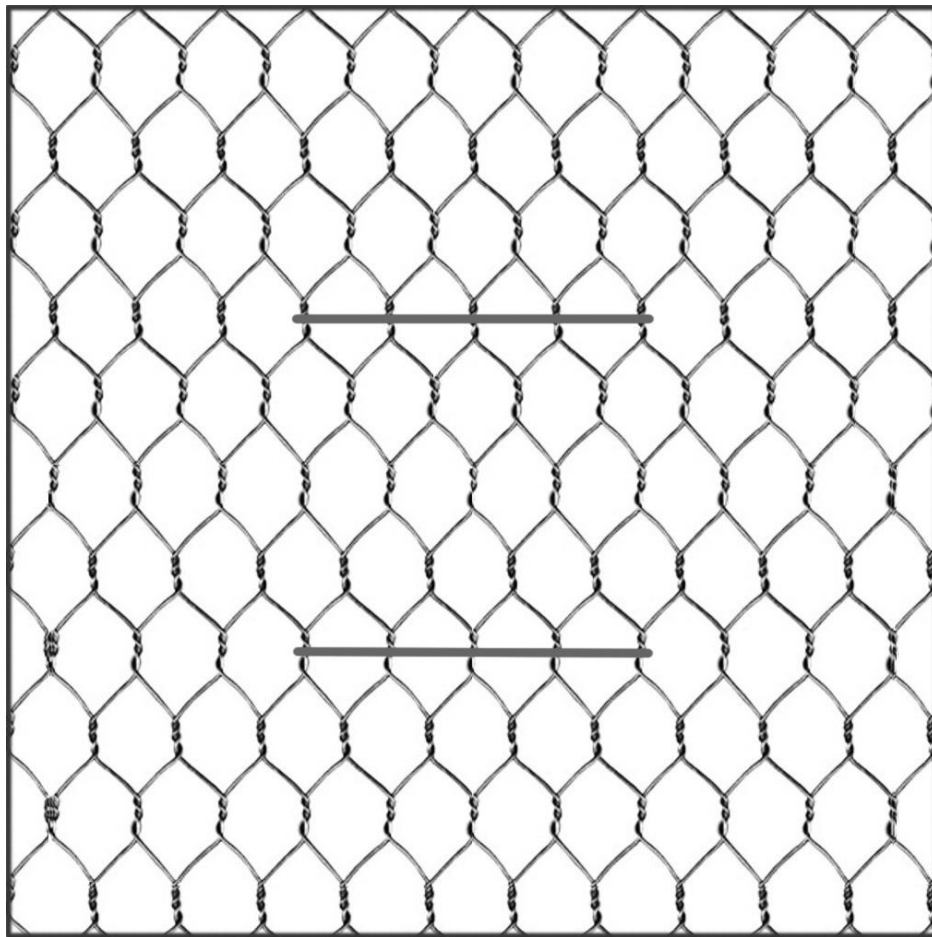
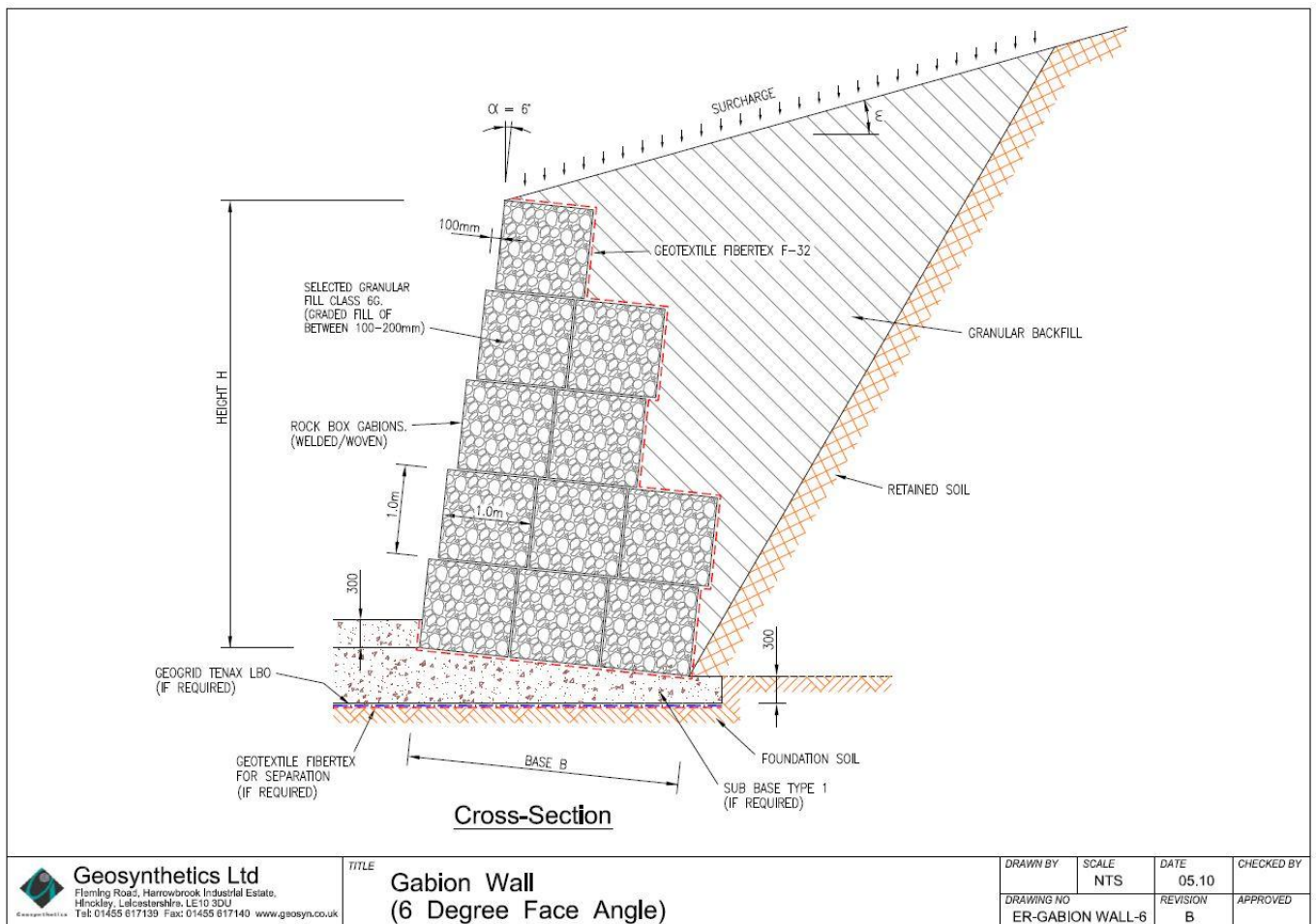


Fig 4. Approximate positioning of the cross bracing wires on a 1m x 1m face.



Construction Detail showing typical arrangement of a RockBox Gabion gravity retaining wall installation: