

Gabion Basket Installation

Construction Design Standards, suggest that a 500mm trench be dug to allow for future excavations in front of the wall, this also gets below the frost layer, and provides a toe in to stop the baskets slipping, (This toe in is not normally used within the structural calculations for the standard designs). Another reason for this is that the top soil contains organic matter that may rot or compress. The majority of installations for short walls are started at ground level, it is down to the customer to make a decision on site looking at the ground conditions.

The worst material for gabion walls to sit on is soft clay, if the ground is likely to sink under baskets weight, a gabion retaining wall may not be possible.

100-200mm of hardcore (type 1) should be compacted with a vibrating plate as a footing for the gabion wall. If 200mm was put in the 500mm deep trench the baskets would start 300mm below ground.

Baskets should be bent back at 6 degrees.

The Face of a gabion wall can be flushed or stepped. On taller walls baskets are stepped back to equalize the pressure between the heel and toe of the wall.

Gabions can be cut on site to achieve your required dimensions.

The standard thickness for walls up to 3m in height is 3mm. 4mm is the architectural spec, 5mm is what we would refer to as the military spec or for use on higher walls.

For inexperienced installers a 4mm face can be added for walls 3m and below to reduce the risk of bulging.

The selection of wire diameter is not straight forward. Below photos include examples of gabion retaining walls up to 10.0m high and constructed using various wire diameters.

BS8002:1994(7.1) comments that The life of a gabion wall is not necessarily limited by the effective life of the cage or basket if the shape of the wall is such that the stone filling remains substantially stable after failure of the cage

And Small gabion walls should be designed on the same principle as a gravity mass wall, no allowance being made for the strength or mass of the wire mesh.

Type of infill stone i.e. rounded or flat and quality of construction can greatly impinge upon the requirement for the stone filling to remain substantially stable after failure of the cage and for the wall to remain a coherent mass with no allowance being made for the strength or mass of the wire. A good standard of infill stone selection and placing notably in the manner intended to ensure the satisfactory performance and serviceability of the installation.

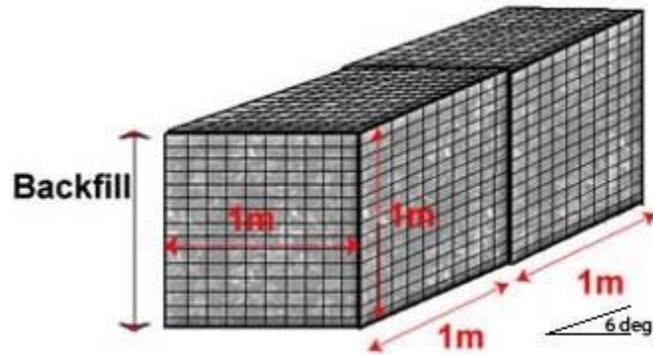
The selection of wire size is thus dependent upon:

- *Size and type of infill stone.*
- *Standard of construction.*
- *Wall height*

The use of stone and construction practice not usually associated with gabion wall construction will have an influence on the performance, serviceability and overall life of the installation.

A cost saving option is to put a false partition in the front of the basket. This way the front can be hand laid with a high quality stone like slate. the back can then be back-filled with a low quality material for example reclaimed brick. However it is worth noting that it is unlikely that the use of low quality or smaller stone behind hand laying partitions would provide the stability of the specified gabion infill stone and as such the service life of the wall is likely to be affected.

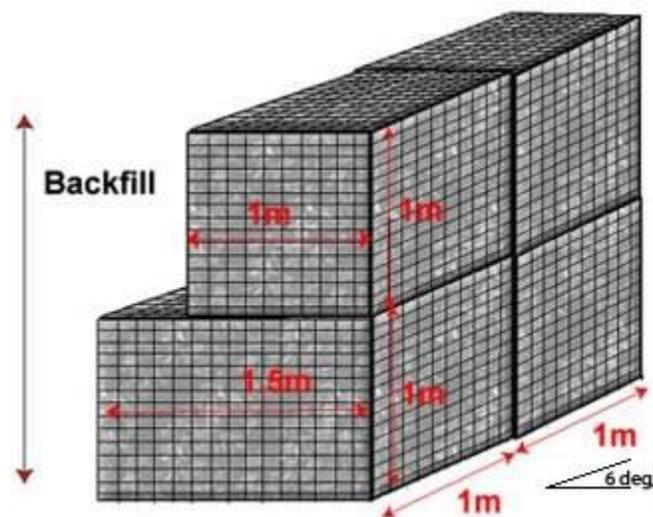
1m high wall



A 1m high wall is very simple it can be made of 1m x 1m x 1m or 2m x 1m x 1m baskets. We can also use 1/2m deep baskets this will save on the cost of fill but will reduce the strength of the wall and is recommended only in situations where the bank is fairly stable. You can also use 1m high walls for terracing a garden in steps.

It is standard to use 3mm wire thickness as the baskets have little weight exerted on them.

2m high wall



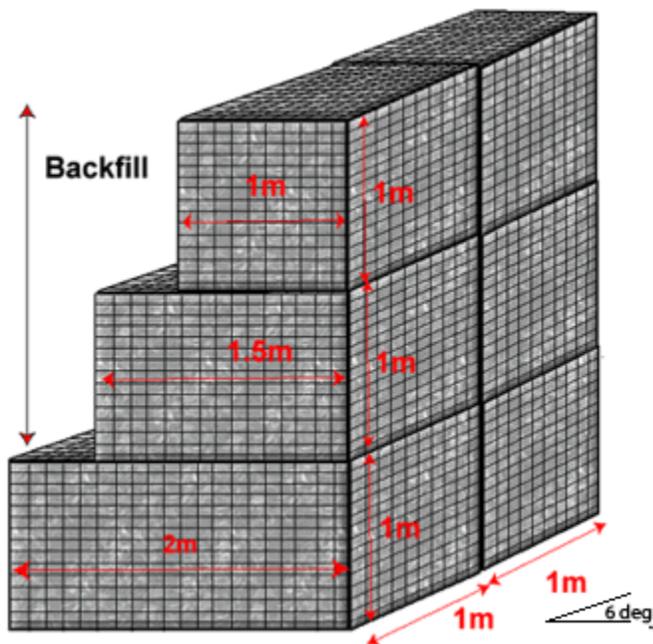
Gabion baskets are a mass retaining system thus, the higher the area that needs retaining, the heavier the wall must be. The standard design for a gabion wall is a pyramid. In general, for every 1m increase in wall height, the bottom row basket depth should be increased by half a metre.

For a 2m high wall the bottom row should be 1.5m deep and the top row should be 1m deep.

It is still standard to use 3mm wire thickness for both rows.

This can be made more stable by setting the top baskets slightly further back.

3m high wall



In this example the top 2 rows are the same as a 2m wall but with a .5m increase in the depth of the bottom row.

The bottom row is 2 metres deep middle row 1.5m deep and top row 1m deep. Normally we use 2m x 1m x 1m baskets bottom row 1.5m x 1m x 1m baskets in the middle row and 1m x 1m x 1m or preferably 2m x 1m x 1m baskets going sideways on the top row.

At this height there is quite a lot of weight exerted on the bottom row and unless the bracing ties are installed correctly there is a possibility that the face of the bottom row might bulge out. You may prefer to use 4mm thick wire on the bottom row rather than risk this. If the look of the wall is important than we would then put a 4mm thick face on the 3mm thick top row baskets. This will save on costs of having all baskets in 4mm.

Any higher than 3m you can still use the same principal of increasing the depth by .5m but it may be preferable to stagger the baskets back and getting a structural engineer to assess the stability of the site would be a preferable option.

Curved wall: Staggered effect using 1m or better .5m wide baskets

There are 2 types of curved walls inside and outside bends. When the wall curves around you when looking at it (inside bend) this can be achieved easily using standard baskets angled away from each other. The wedge shaped gaps that are left are fixed using extra panels that are cut to size and wired in on site.

Outside curves are more difficult and require the gabion to be tapered inwards. This is achieved by taking the side panels off the baskets and sitting the baskets within each other. The lids can be folded or overlapped.

Gabion Installation Instructions

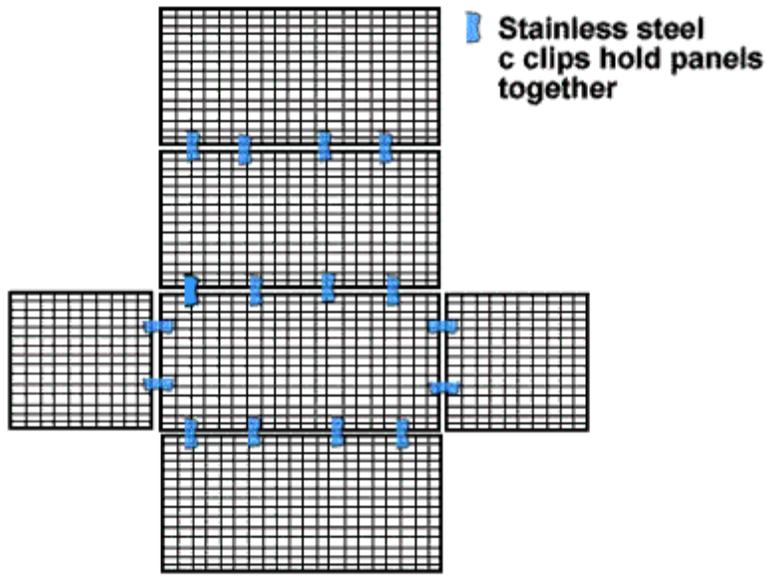
Footings/foundation:

CDM regs state that retaining walls should be started 500mm below ground. The purpose of this is to allow for future excavations see standard designs for more detailed explanation an to get below the frost layer of 450mm this also creates a toe in effect. Gabions have to be on a solid footing, all organic material needs to be removed that may decay. Best practice is for 100-200mm of type 1 to be compacted using a vibrating plate compactor. 100mm would be suitable for a 1m high wall 200mm for a 3m high wall. The compacted hardcore can be treated as part of the basket and hence part of the toe in. In general this gives a toe in of 300mm. The standard designs are robust and it is not uncommon to see gabions installed at ground level for shorter walls. Without soil reports or a structural calculation a degree of common sense on site should be taken in respect to soil conditions, risk and appearance.

Baskets should be leant back at 6 degrees.

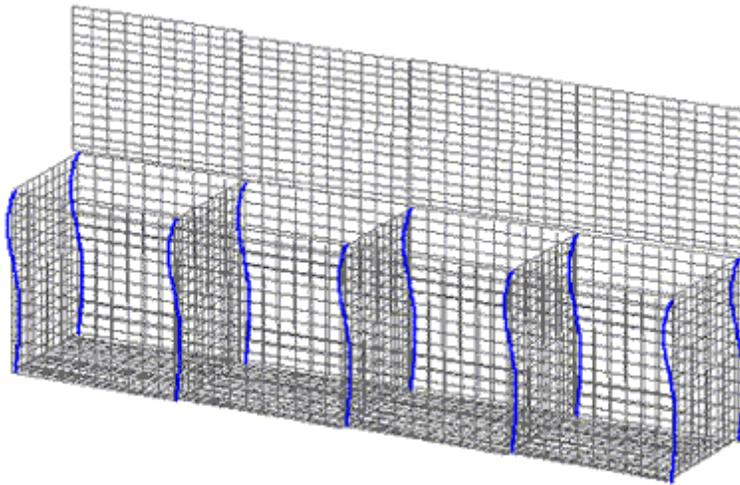
The Face of a gabion wall can be flush or stepped. On taller walls, it can be beneficial to step the baskets back to equalise the pressure between the heel and toe of the wall.

Gabions can be cut on site to the nearest full square, to achieve your required dimensions. Or we can cut them for you for an additional charge.



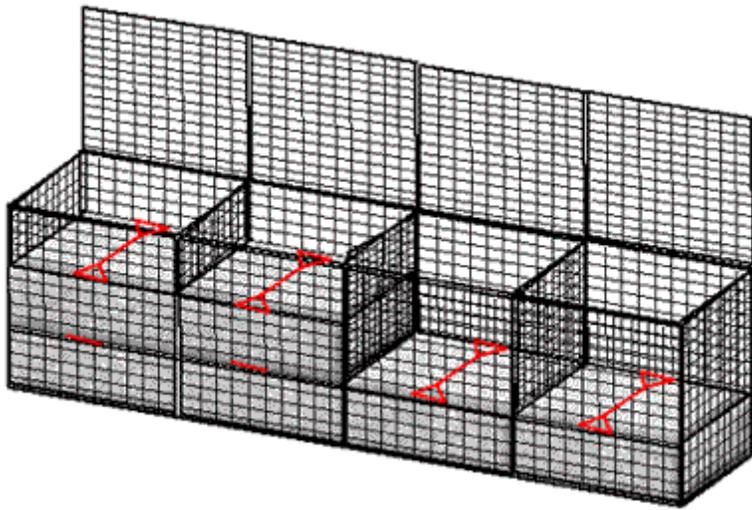
All gabions come Flat packed we attach all the panels together with stainless steel clips. the example to the left is a 2m x 1m x 1m.

There is also a partition in the middle of this basket which is clipped in as well.



Using the lacing wire supplied lace the corners of the baskets tying the ends off with a pair of pliers. There is no need to lace the sides already clipped. Next lace the formed baskets together as shown with the blue lines on the diagram. There is an easier way if time is of the essence. You can purchase helicoils, which are long springs that you wind down the corners of the baskets. These springs attach the front and side panel of a basket and its adjacent panel in one go. They are a much faster way of assembling and attaching the baskets to each other and will substantially reduce your installation costs if using a contractor. You only need 2 springs per basket and 2 extra for the end of a run (in the case of 1m cubes). You don't need lacing wire for the sides when you use this method. The springs are more obvious than the lacing wire.

2.2mm Galvanizing wire is supplied with the baskets (included in the cost) Helicoil springs are a faster way to install the basket and can be used on the corners to join the baskets and attached them to the adjacent basket at the same time.



When filling the baskets it is necessary to insert a brace in the middle of the basket. This is important to stop the face bulging when filling. The higher the wall the more important this is as the more force exerted on the face. 1/3rd fill the basket and then create a windless which are the red ties in the diagram to the left. Make a loop from the back to the front of the basket and join the ends with pliers. For ease purchase and use the pre-made braces instead. Put a sturdy flat stone in this loop and turn in circle creating a tourniquet effect which pulls the front tight. Fill on top of this which will hold the stone in place. Repeat 2/3rds of the way up. Finally lace the lids down with the lacing wire provided. Remember to attach all higher rows to the lower ones as well.

Gabion Filling

Choosing the correct stone fill is very important as gabions are a mass retaining system. The fill should be 100-200mm and angular. The use of rounded stone for decorative purposes is not recommend for walls where the baskets are stacked. If you wish to use a rounded stone we would advise increasing the face thickness to 4 or 5mm to prevent deformation of the front. The stone should be laid flat and attention taken to avoid voids. The gabions can be machine filled but again attention must be taken to avoid voids by hand picking at regular intervals.

The Face of the gabion wall can be flush or Stepped. On taller walls baskets are stepped back to equalize the pressure between the heel and toe of the wall. For the best finish the fronts of the baskets should be fair faced by hand.

Gabions are normally machine filled in layers, the stone is picked to eliminate any voids. The faces are hand laid to give the appearance of a dry stone wall. This can be more easily achieved using the hand laying partitions option, which is an extra panel to make a narrow filling compartment at the front.

You can use a building rubble such as crushed concrete or brick at the rear of your basket, but this should be crushed to 100-200mm. Mobile Crushers can be hired for this purpose to be used on site.

The rock fill should be tightly packed, minimizing voids, If possible the fronts should be hand-packed. Using the lacing wire all corners and the lid should be joined making a continual seam. Bracing wire should be used to create a windlass 1/3 and 2/3rds up on a 1m high basket and half way up on a .5m high basket The baskets should be filled to a level where the lid bears down on the rock fill.

Rows should be laced to the row below them with lacing wire.