ACS1340 Gabions and reno mattresses

Contents

ACS1340.1 Scope

This specification covers the construction of gabions and reno mattresses.

ACS1340.2 Materials

ACS1340.2.1 Welded wire gabion and mattress baskets

Baskets for gabions and mattresses shall be manufactured from a hard-drawn steel wire formed into a bi-axial mesh grid by electrically welding the cross-wire at every intersection. The weld strength is to be 70% of the ultimate tensile strength of the wire.

The mesh openings shall be square and of a nominal dimension of 75 mm on the grid.

Diaphragms shall be fixed at 1 m centres across the gabion width for all gabions equal to or greater than 2 m in length.

Wire for gabion and reno mattresses shall:

a) Be a minimum of 4 mm thick

b) Have a minimum tensile strength between 350 and 750 N/mm^2

c) Unless otherwise specified, shall be zinc/aluminium galvanized (90% Zn/10% Al) with a minimum thickness of 275 g/m² complying with AS/NZS 4534.

Notwithstanding the above, the coating system shall provide 100-year design life in the environment in which it is to be installed. PVC coated or stainless wire is permitted where zinc/aluminium galvanized coatings will not meet this criteria. The Contractor shall submit evidence that the coating system is appropriate before materials are delivered to site.

Gabion joints shall be of a continuous type (e.g. helical fixings) with a minimum wire thickness greater than 75% of the basket wire. Coating of the jointing wire shall be equivalent to the wire basket coatings.

ACS1340.2.2 Woven wire gabions and mattresses

Woven gabions and mattresses shall not be used unless specifically required by the Drawings of Particular Specifications. Woven baskets for gabions and mattresses shall be constructed from double or treble twist woven wire mesh.

The mesh openings shall be square and of a maximum nominal dimension of 80 mm by 100 mm.

Diaphragms shall be fixed at 1 m centres across the gabion width for all gabions equal to or greater than 2 m in length.

Wire for woven gabions and mattresses shall:

a) Have a minimum wire dimension as indicated in Table 1: Minimum wire and coating requirements for woven mesh baskets

b) Have a minimum tensile strength between 350 and 750 N/mm^2

c) Unless otherwise specified, shall be coated as indicated in Table 1: Minimum wire and coating requirements for woven mesh baskets.

Table 1: Minimum wire and coating requirements for woven mesh baskets

	Minimum thickness	Coating	Minimum coating thickness
Mesh wire	2.7 mm	Zinc/aluminium galvanized (90% Zn/10% Al)	245 g/m²
Selvedge wire	3.4 mm	Zinc/aluminium galvanized (90% Zn/10% Al)	265 g/m²
Lacing wire	2.2 mm	Zinc/aluminium galvanized (90% Zn/10% Al)	245 g/m²

Notwithstanding the above, the coating system shall provide 50-year design life in the environment in which it is to be installed. PVC coated or stainless wire is permitted where zinc/aluminium galvanized coatings will not meet this criteria. The Contractor shall submit evidence that the coating system is appropriate before materials are delivered to site.

Woven wire gabions joints shall made by lacing wire or C rings at a maximum spacing of 100 mm.

ACS1340.2.3 Rock fill for gabions

Rock for gabion fill shall:

a) Meet the aesthetic requirements of the design as agreed by the Contract Administrator

b) Be hard, heavy, free draining and durable

c) Not be frost susceptible

d) Have a minimum dimension not less than 80% of the mesh opening

e) Have a maximum dimension of 200 mm.

ACS1340.2.4 Geotextiles

The subgrade shall be shaped and prepared as per the Drawings for the subsequent placing of a Bidim A64 geotextile or equal accepted by the Contract Administrator.

Geotextile material delivered to site shall be stored in a dry condition and shall remain in its protection wrapper until use. Geotextile shall be carefully handled at all times.

ACS1340.3 Tolerances

Gabions and mattresses shall be placed to the levels, dimensions and slopes shown on the Drawings. The following tolerances shall be achieved:

- Subgrade levels: ±50 mm
- Vertical position: ±50 mm
- Horizontal position: ±50 mm
- Basket dimensions ±50 mm.

ACS1340.4 Construction

ACS1340.4.1 Protection of placed material

The Contractor shall obtain daily weather forecasts and if storms are predicted, every effort shall be made to complete basket placement to protect partially completed works. Additional to weather forecasts, any works in the coastal environment needs to be appropriately timed around suitable tides. Ideally, underlayer works should not be left open over a high tide period if within the coastal marine area. Where there is a possibility of storm erosion of the constructed works, particularly the exposed subgrade or underlayer construction, the Contractor shall provide all necessary temporary protection in the form of temporary placement of geotextile and ballast across the end of the construction, or other methods, as may be necessary. These temporary protection works shall be removed prior to construction commencing again.

Material eroded by wave action or other causes shall be made good before placing the subsequent layer. All material eroded and deposited on the foreshore or seabed outside the area of the Works shall be removed by the Contractor.

ACS1340.4.2 Placement of backfill and subgrade preparation

Backfill shall be placed in areas required as noted on the Drawings and as necessary to achieve correct profile of the gabion/mattress structure.

The subgrade shall be shaped and prepared as per the Drawings for the subsequent placing of the geotextile.

ACS1340.4.3 Geotextile handling and placement

Geotextile material delivered to site shall be stored in a dry condition and shall remain in its protection wrapper until use. Geotextile shall be carefully handled at all times. Damage such as rips, tears or holes shall be repaired as directed by the Contract Administrator. When patching of the geotextile is permitted, in order to repair damage, the patch shall extend a minimum of 300 mm in all directions from the damaged area, and shall be sewn in place to the manufacturer's recommendations.

All geotextile fabric sheets shall be placed loosely and flat against the prepared formation without any folds or wrinkles. All adjacent geotextile fabric sheets shall be lapped to form a continuous membrane. Laps in all directions shall be a minimum of 500 mm.

If approved by the manufacturer, the geotextile fabric may be sewn into sheets prior to placement in the works, with the size of the sheet being determined by the Contractor to suit its placement method. All sewn joints shall be to the manufacturer's recommendations, a copy of which shall be forwarded to the Contract Administrator. The Contract Administrator will inspect and accept the joints prior to the sheets being placed in the works.

The geotextile sheets shall be firmly held in place to prevent movement during the placement of overlying fill. If movement occurs prior to or during placement of fill, then the fill shall be removed, and the geotextile re-laid.

If the geotextile fabric needs to be placed underwater, the Contractor shall provide a method statement to be agreed by the Contract Administrator prior to commencing placing.

ACS1340.4.4 Formation

The formation on which baskets are to be placed shall be trimmed to a firm, level surface free of organic material. Soft spots shall be removed and filled with suitable compacted GAP65.

ACS1340.4.5 Foundation

Unless otherwise specified, baskets shall be placed on a minimum thickness of 200 mm of well compacted GAP65 on top of a geotextile layer.

ACS1340.4.6 Basket construction

Baskets shall be constructed in accordance with the manufacturer's instructions. Joints shall be made in accordance with the requirements of ACS1340.2.1 and ACS1340.2.2.

Ends of joint wires shall not be permitted to protrude outside of the baskets to avoid protrusions which may snag or cut persons or materials that may come into contact with the baskets.

ACS1340.4.7 Rock filling

All rock fill shall be packed tightly with a minimum of voids (final void ratio to be less than 0.3). Bracing wires from front face to rear face, and terminal end panels, to be spaced no further apart than 350 mm in both vertical and horizontal directions. Gabions to be filled such that the mesh base of the unit above bears down onto the rock fill of the unit below.

The Contractor shall arrange rock fill such that fair faced rocks are placed on exposed surfaces to meet the aesthetic requirements of the design. The arrangement of exposed rocks shall be agreed with the Contract Administrator.

Rock filling shall only be done with the baskets in their final position unless the baskets have been specifically designed for lifting.