616-R-102 GABION REVET MATTRESS

(Revised 12-07-07)

Description

This work shall consist of open mesh wire mattresses assembled, tied, and filled with approved aggregates, and constructed in accordance with these specifications and placed in conformance with the lines, grades, and dimensions shown on the plans or as otherwise directed.

Materials

The revet mattress shall be made of hexagonal triple twist mesh with heavily galvanized steel wire.

(a) Dimensions

Wire mattress units shall be supplied as shown on the plans. All mattress units furnished by the manufacturer shall be of uniform width and subject to a tolerance of ± 3%.

(b) Fabrication

Wire mattress units shall be fabricated in such a manner that the base, sides, and ends can be assembled at the construction site into a rectangular unit of the specified size. The body of the mattress units shall be of single unit construction. The base ends and sides shall be formed of a single woven mesh unit. The top shall be a separate woven unit of the same mesh and wire specification as the body.

The mattress units shall be subdivided into compartments, 2 ft (610 mm) long, extending over their full width by the insertion of diaphragms made of the same mesh as the rest of the mattress. The diaphragms shall be factory secured in proper position at the base with a continuous spiral wire, in such manner that additional ~~typing~~ tying at this junction is not necessary.

All perimeter edges of the mesh forming the mattress unit shall be securely selvedged so that the joints formed by ~~typing~~ tying the selvedges have at least the same strength as the body of the mesh.

Lacing wire shall be supplied in sufficient quantity such that all sides, ends, and diaphragms of the body may be securely fastened as well as the top to all sides, ends, and diaphragms. The lacing wire shall be in accordance with the same specifications as the wire specified for the mesh.

The wire incorporated into the mesh constituting the body of the mattress and the lacing wire shall be made of galvanized steel wire having a nominal diameter of 0.0866 in. (22 mm). The nominal diameter of the mesh wire shall be 0.0866 in. (22 mm). The nominal diameter of the selvedge wire shall be 0.1063 in. (27 mm). A separate unit shall be fabricated for the top which shall be of the same wire quality and diameter as the body for its corresponding constituent parts.

The tensile strength of the wire shall be in the range of 60,000 to 80,000 psi (414 to 552 MPa). The minimum zinc coating of the wire shall be 0.70 oz/sft (20 g/m^2) of uncoated wire surface as determined by tests conducted in accordance with ~~Federal Specifications QQ-W-461H, Class 3~~ ASTM A 90. The maximum linear dimension of the mesh opening

shall not exceed 3 1/4 in. (86 mm) and the area of the mesh opening shall not exceed 6 in.^{2} (3870 mm^2).

(c) Elongation

The wire mesh shall permit elongation equivalent to a minimum of 10% of the length of the section under test without reducing the gauge or tensile strength of individual wire.

(d) Load Test

An uncut section of the mesh of not less than 6 ft (1830 mm) long and not less than 3 ft (920 mm) wide, after first being subjected to the elongation test described above, shall withstand a load test of 4,000 lbs/sft (200 kN/m^2) applied to an area located approximately in the center of the section under test. The details of the test are as follows.

An uncut section of mesh 6 ft (1830 mm) long, not less than 3 ft (920 mm) wide and including all selvedge bindings shall have the ends securely clamped for 3 ft (920 mm) along the width of the sample. When the width of the section under test exceeds 3 ft (920 mm), the clamps shall be placed in the middle portion of the width and the excess width shall be allowed to fall free on each side of the clamped section. The sample shall then be subjected to sufficient tension to cause 10% elongation of the sample section between the clamps as described above. The unsupported section shall be subjected to a load applied to an area of 1 sq ft (0.09 m^2) located in the approximate center of the section between the clamps and in such a direction perpendicular to the direction of the tensile force. The sample shall withstand, without rupture of the wire or opening of mesh fastening, an actual load so applied equaling or exceeding 4,000 lbs (18 kN). The ram head used in the test shall be circular with its edges beveled or rounded to prevent cutting of the wires.

(e) Single Wire Cut

The wire mesh shall be fabricated in such manner as to be non-raveling. This is defined as the ability of the mesh to resist pulling apart at the twists or connections forming the mesh when a single wire in a section of mesh is cut and the section of mesh then subjected to the load test described above.

(f) Zinc Coating and Tensile Strength

The tests shall be conducted in accordance with ~~Federal Specifications QQ-W461H, Class 3~~ ASTM A 90 and ASTM A 370.

(g) Certification

A type C certification in accordance with 916 will be required for the revet mattress.

(h) Aggregate

The wire mesh mattress shall be filled with clean, hard, riprap type stone of minimum size of 75 mm (3 in.) and maximum size of 6 in. (150 mm). Both stone measurements shall be made in the greatest dimension.

Construction Requirements

The revet mattress bases shall be supplied folded flat, placed in bundles. Lids shall be delivered in separate bundles. Single mattress bases shall be removed from the bundle, unfolded flat on the ground, and all kinks and bends flattened.

The mattress shall then be assembled individually, by erecting the sides, ends, and diaphragms, ensuring that all creases are in the correct position and the tops of all sides level, all in accordance with the manufacturer's recommendations.

The four corners of the mattress shall be laced first, after overlapping the mesh, followed by lacing the edges of the internal diaphragms to the sides.

The lacing procedure shall consist of cutting a length of lacing wire of approximately 1 1/2 times the distance to be laced. This distance shall not exceed 5 ft (1525 mm). The wire terminal shall be secured at the corner by looping and twisting, then laced with alternating single and double loops at approximately 4 to 5 in. (100 to 130 mm) intervals.

The assembled mattresses shall be carried to the project site and placed in their proper location. For structural integrity, all adjoining empty mattresses shall be laced along the perimeter of their contact surfaces in order to obtain a monolithic structure.

The mattress units shall be filled with stone to assure good alignment and to avoid bulging of the mesh with a minimum of voids between stones. After the units have been filled, the lids shall be placed so that they meet the sides and end of the mattresses. The lids shall then be secured to the sides and ends with lacing wire in the manner described above for assembling.

When a complete mattress unit cannot be installed because of space limitation, the unit shall be cut to fit in the manner shown on the plans.

Method of Measurement

Riprap quality stone required to fill the wire mesh cages that form the gabion revet mattress will be measured by the cubic yard (cubic meter) in accordance with the dimensions shown on the plans or as directed, complete in place and accepted.

Basis of Payment

The accepted quantities of riprap quality stone, measured as set out above, will be paid for at the contract unit price per cubic yard (cubic meter) for gabions. The costs of all materials, labor, and equipment necessary to complete the work including the wire mesh cages and installation hardware for gabion revet mattresses shall be included in the cost of this work.