



STAINLESS STEEL CONSTRUCTION SPECIFICATION
WIRE MESH GABIONS AND MATTRESSES

1. SCOPE

The work shall consist of furnishing; assembling and installing rock filled stainless steel wire mesh gabion baskets and mattresses.

2. TYPES

Gabions shall consist of rectangular or square wire mesh formed containers filled with rock. Gabions will conform to the following:

Welded wire mesh with a uniform square or rectangular pattern and a resistance weld at each intersection as prescribed in ASTM A974. The welded wire connections shall conform to the requirements of ASTM A185, including wire smaller than W1.2 (0.124 in.) except that the welded connections shall have minimum average shear strength of 70% and minimum shear strength or 60% of the minimum ultimate tensile strength of the wire. The wire shall be 316 stainless steel wire manufactured to ASTM A580 by Modular Gabion Systems, Houston, Texas. The wire shall have a minimum tensile strength of 90,000 psi.

Gabions. Gabions shall be furnished as baskets or mattresses. Baskets and mattresses shall be fabricated within a dimension tolerance of plus or minus 5%.

Baskets. Baskets have a height of 12 inches or greater.

Mattresses. Mattresses have a thickness of 12 inches and less.

3. MATERIALS

Gabions shall be fabricated, assembled and installed in accordance with the nominal wire sizes and dimensions found in Tables 1 and 2, using the following materials.

TABLE 1 (Minimum Requirements)
GABION BASKETS – Height 12, 18, or 36 Inches, Length as Specified

Type of Wire	Mesh Size Inches	Wire Diameter Inches
Lacing Wire	n/a	0.086
Welded Mesh	3 x 3	0.105
Spiral Binder	n/a	0.105

TABLE 2 (Minimum Requirements)*
 GABION MATTRESSES – Height 6, 9, or 12 Inches: Length as Specified

Type of Wire	Mesh Size Inches	AWG	Wire Diameter Inches
Lacing Wire	n/a	13-1/2	0.086
Welded Mesh	1 – 1/2 X 3	13-1/2	0.086
Spiral Binder	n/a	13-1/2	0.086

Spiral binders are the standard fastener for welded-mesh gabion baskets and mattresses, and shall be formed from wire meeting the same quality requirements as specified for the gabion baskets and mattresses.

Standard fasteners must provide a minimum strength of 1,400 lbs. per lineal foot for gabion baskets and 600 lbs. per lineal foot for gabion mattresses. All fasteners shall meet all of the closing requirements of the gabion manufacturer.

Rock shall conform to the quality requirements as follows and at least 85 percent of the rock particles, by weight, shall be within the predominant rock size range. Recycled concrete may be used in lieu of the specified aggregate at the engineer's discretion.

Gabion Basket or Mattress Height	Predominant Rock Size Inches	Minimum Rock Dimension Inches	Maximum Rock Dimension Inches
12, 18, or 36 Inch Basket	4 to 8	4	8
6, 9, or 12 Inch Mattress	3 to 5	3	5

At least 30 days prior to delivery to the site, the Contractor shall inform the engineer in writing of the source from which the rock will be obtained, and include the test data and other information by which the material was determined by the Contractor to meet the specification. The Contractor shall provide the engineer free access to the source for the purpose of obtaining samples for testing and source approval.

Bedding or filter material, when specified, shall meet the gradation shown on the plans. Geotextile, when specified shall conform to the requirements specified in the plans or the manufacturer's recommendation.

3. FOUNDATION PREPARATION

The foundation on which the gabions are to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. Surface irregularities, loose material, vegetation, and all foreign matter shall be removed from foundation surface area. When fill is required, it shall consist of materials conforming to the specified requirements. 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.

4. 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 lacing wire is used, wrap the wire with alternating single and double half hitches at intervals between four to five (4-5) inches. Where spiral fasteners are used, crimp the ends to secure the spirals in place. Use the same fastening procedures to install interior diaphragms where they are required.

Interior diaphragms will be required where any inside dimension exceeds three (3) feet for gabion baskets thicker than twelve (12) inches. Diaphragms will be installed to assure that no open intervals are present that exceeds three (3) feet. For baskets 12 or less rectangular cells are allowed with dimensions 36 inches in one direction and not to exceed 72 inches in the perpendicular direction.

Placement. Place the empty gabions on the foundation and interconnect the adjacent gabions along the top, bottom, and vertical edges using lacing wire or spirals. Wrap the wire with alternating single and double half hitches at intervals of four to six (4-6) inches. Spirals are wound through the mesh openings on 3-inch centers at the connecting edges then each end of the spiral is crimped to secure it in place. Lacing wire may be used as needed to supplement the interconnecting of welded mesh gabions, and the closing of lids.

Interconnect each layer of gabions to the underlying layer of gabions along the front, back, and sides. Stagger the vertical joints between the gabions of adjacent rows and layers by at least one-half of a cell length.

5. 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. Pre-formed stiffeners or connecting lacing wire shall be attached during the filling operation to preserve the strength and shape of the structure.

Internal connecting crosstie wires shall be placed in each unrestrained gabion cell greater than 18 inches in height, including gabion cells left temporarily unrestrained. Two internal connecting wires shall be placed concurrently with rock placement, at each 12-inch interval of depth.

In welded mesh gabions these crossties or stiffeners can be placed across the corners of the gabions (at 12 inches from the corners) providing diagonal bracing. Lacing wire or preformed wire stiffeners may be used.

The gabions shall be carefully filled with rock, either by machine or hand placed 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 36 inches from machine to fill area. Machine placement will require supplementing with handwork to ensure the desired results. The interior compartments 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 12 inches. 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 or lacing wire using the prescribed method of tying.

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

7. MEASUREMENT AND PAYMENT

Method 1. For items of work for which specific unit prices are established in the contract; the volume of rock will be measured within the neat lines of the gabion structure and computed to the nearest cubic yard. Payment for gabions will be made at the contract unit price, and includes the wire mesh and rock. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to completion of the work.

Method 2. For items of work, for which specific unit prices are established in the contract, the volume of the gabions will be measured within the neat lines of the gabion structure and computed to the nearest cubic yard. Payment for the gabions will be made at the contract unit price, and includes the wire mesh, rock and specified bedding material or geotextile. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.

Method 3. For items of work for which specific unit prices are established in the contract, the surface area will be measured within the neat lines of the gabion mattress structure and computed to the nearest square yard. Payment for the gabion mattress will be made at the contract unit price, and includes the wire mesh and rock. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.

Method 4. For items of work, for which specific unit prices are established in the contract, the surface area will be measured within the neat lines of the gabion mattress structure and computed to the nearest square yard. Payment for the gabion mattress will be made at the contract unit price, and include the wire mesh, rock and specified bedding material and geotextile. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.