

SECTION 02294**GABIONS****02294.01 GENERAL****A. Description**

Gabion installation shall include, but not necessarily be limited to, protecting slopes and channels with stone filled wire baskets constructed to the lines and grades shown on the Plans in accordance with the Contract Documents or as directed by the Engineer.

B. Related Work Included Elsewhere

Excavation; Sections 02210, 02220, and 02230.

C. Quality Assurance

1. The Engineer will inspect all materials and work to ensure compliance with the Contract Documents.
2. Criteria for visual inspection of stone shall be as specified in Section 02291.01.

D. Submittals

1. Shop Drawings

Shop drawings shall be submitted as specified in the "General Provisions" for all wire baskets and filter fabric furnished. Shop drawings shall include general product information and assembly, handling, installation recommendations and for the filter a tabulation of its physical properties. The Contractor shall also submit his stone sources.

2. Certificates of Compliance

Certificates of compliance shall be submitted as specified in the "General Provisions" for all wire baskets stating that the baskets meet the materials requirements specified in Section 02294.02.

02294.02 MATERIALS**A. Materials Furnished by the County**

The County will not furnish any materials for gabion installation.

B. Contractor's Options

Not applicable.

C. Detailed Materials Requirements

1. Stone for Gabions

a. Stone for gabions shall be hard, durable, angular in shape, resistant to weathering and to water action; free from over burden, spoil, shale, slate, organic material, and flat and elongated pieces.

b. Size

<u>Basket Thickness (inches)</u>	<u>Size of Individual Stone Particles (inches)</u>
6	3-5
9	4-7
12	4-7
18	4-7
36	4-12

Size of particles will be determined visually.

c. Quality Requirements

<u>Test and Method</u>	<u>Specification Limits</u>
Apparent Specific Gravity AASHTO T 85, min	2.50
Absorption, AASHTO T 85, % max	3.0
Sodium Sulfate Soundness 5 Cycles, 2 1/2 to 1 1/2 inch Aggregate, AASHTO T 104, % max loss	12

2. Wire for Gabions

a. The wire for fabricating gabion baskets and tie, lacing, and connectings shall be steel having a minimum tensile strength of 60,000 pounds per square inch when tested in accordance with ASTM A 370. The fabric wire shall have minimum of 10% elongation when tested in accordance with MSMT 508. Individual gabion baskets and wires for slope and channel protection shall be as shown on the Plans, or "Special Provisions". Minimum wire sizes shall be:

<u>Use</u>	<u>U.S. Steel, Wire Gauge No.</u>
Fabric Mesh	11
Edge and selvedge	9
Lacing and tie	14

b. Zinc or Galvanized Coated

Fabric, tie, lacing, and connecting wire shall be zinc or galvanized coated with not less than 0.8 ounces per square foot when tested in accordance with AASHTO T 65.

c. Polyvinyl Chloride (PVC) Coated

PVC coating for fabric, ties, lacing, and connecting wires when shown on the Plans or required by the Special Provisions shall meet the chemical and temperature resistance requirements of MSMT 508. The color shall match throughout the project and shall be green or gray. Coating thickness shall be a minimum of 0.015 inches.

3. Filter Fabric

Filter fabric shall be as specified in Section 02295.02.

4. Filter Blanket

Filter blanket shall be as specified in Section 02295.02.

02294.03 EXECUTION

A. Excavation

Excavation, including cutoff walls, shall be made in reasonably close conformity with the lines and grades shown on the Plans. The subgrade shall be smooth, firm, and free from protruding objects or voids that would affect the proper placement of the wire baskets or damage the filter cloth when one is specified.

B. Filter Fabric

When filter fabric is specified, it shall be carefully and loosely placed on the prepared subgrade and held in place by methods acceptable to the Engineer. Adjacent strips shall be overlapped by a minimum of 8 inches. Care shall be exercised in placing, stretching, and holding the empty basket units in good alignment in order to avoid damage to the fabric. If the filter fabric should be torn or damaged, it shall be replaced or repaired at the Contractor's expense.

C. Filter Blanket

The filter fabric shall be covered with a 6-inch deep filter blanket which shall be consolidated to the satisfaction of the Engineer before setting the wire gabion baskets.

D. Wire Gabion Baskets**a. Fabrication**

Wire baskets units shall be fabricated to the nominal dimensions shown on the Plans in such a manner that the base, sides, top diaphragms and ends can be assembled at the work site into a fully enclosed rectangular unit. Basket units shall be subdivided into compartments not longer than 1 1/2 times the basket width by equally spaced diaphragms made of the same fabric mesh as the basket.

The maximum dimensions of the mesh opening shall not exceed 4 1/2 inches and the total area of the mesh opening shall not exceed 12.5 sq. inches. The fabric mesh shall be furnished so as to be non-raveling (resist pull apart of twists or connections when a single wire in the mesh is cut). The fabric shall have a minimum of 4000 pounds load bearing resistance when stretched to a minimum of 10% elongation when tested in accordance with MSMT 508.

All perimeter edges of the mesh shall be securely selvaged so that the joints formed by tying the selve are at least as strong as the body mesh.

Connecting wire shall be supplied in sufficient quantity to fasten all edges of the basket unit, its internal partitions and top and make connections to adjacent basket units.

b. Placement

The placement of the wire gabion basket units shall begin with the cutoff walls. The empty wire basket units shall be set on the prepared subgrade and the vertical ends bound together with wire ties at spacings that are adequate to permit stretching of the units to remove kinks. Stretching methods shall be optional with the Contractor. The use of stakes, pins, or other acceptable methods shall be used to insure a good alignment of the empty wire basket units.

E. Stone

The empty basket units shall be filled carefully with stone placed by hand or machine to assure good alignment with a minimum of voids between stones and to avoid bulging of mesh. The maximum height from which the stone may be dropped into the units shall be 36 inches. The stone shall be so placed as to provide a minimum of two courses. Care shall be taken in placing the top layer of stone to assure a uniform surface thus avoiding any bulging of the lid mesh. After a basket unit has been filled, its lid shall be bent over until it meets the ends of the unit. The lid shall then be secured to the sides and ends with wire ties. When a complete basket unit cannot be installed on slopes or channels because of space limitations, the basket unit shall be cut to fit in the manner approved by the Engineer.

F. Backfill

Any excavation voids existing along the edges of the completed gabions shall be backfilled to the satisfaction of the Engineer.

02294.04 METHOD OF MEASUREMENT

Measurement for gabions, including cutoff walls, will be made of the volume of stone filled wire baskets acceptably placed.

02294.05 BASIS OF PAYMENT

Payment for gabions, including cutoff walls, will be made at the unit price bid per cubic yard. The prices bid shall include all excavation, furnishing and placing filter cloth and filter blanket when specified, disposal of surplus materials, backfill, gabion baskets and stone as well as all labor, materials, equipment, tools, and incidentals necessary to complete the work.