

**GABIONS AND REVET MATTRESSES****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Gabions
- B. Revet Mattresses (Gabion Mattresses)

**1.02 DESCRIPTION OF WORK**

- A. Assembly and installation of gabions.
- B. Assembly and installation of revet mattresses.

**1.03 SUBMITTALS**

Comply with Division 1 - General Provisions and Covenants, as well as the following:

Upon request, submit certification that products supplied comply with identified specifications.

**1.04 SUBSTITUTIONS**

Comply with Division 1 - General Provisions and Covenants.

**1.05 DELIVERY, STORAGE, AND HANDLING**

Comply with Division 1 - General Provisions and Covenants.

**1.06 SCHEDULING AND CONFLICTS**

Comply with Division 1 - General Provisions and Covenants.

**1.07 SPECIAL REQUIREMENTS**

None.

**1.08 MEASUREMENT AND PAYMENT****A. Gabions:**

1. **Measurement:** Measurement will be the plan quantity in cubic yards for the total volume of each type of gabion installed.
2. **Payment:** Payment will be at the unit price per cubic yard for each type of gabion installed.
3. **Includes:** Unit price includes, but is not limited to, furnishing and assembling wire mesh baskets, PVC coating (if specified in the contract documents), fasteners, furnishing and placing gabion stone, engineering fabric, and anchor stakes.

**1.08 MEASUREMENT AND PAYMENT (Continued)****B. Revet Mattresses:**

1. **Measurement:** Measurement will be the plan quantity in cubic yards for the total volume of each type of revet mattress installed.
  2. **Payment:** Payment will be at the unit price per cubic yard for each type of revet mattress installed.
  3. **Includes:** Unit price includes, but is not limited to, furnishing and assembling wire mesh baskets, PVC coating (if specified in the contract documents), fasteners, furnishing and placing mattress stone, engineering fabric, and anchor stakes.
- C. Excavation:** Refer to [Section 2010](#) for measurement and payment information for Class 10, Class 12, or Class 13 Excavation.

**PART 2 - PRODUCTS****2.01 DOUBLE TWISTED WIRE BASKETS**

Utilize double twisted wire baskets unless otherwise specified in the contract documents.

**A. General:** Fabricate baskets according to ASTM A 975.

**B. Wire:**

1. **Galvanized:** Comply with ASTM A 975, Style 1 for mesh, selvedge, and lacing wire.
2. **PVC Coated:** Comply with ASTM A 975, Style 3 for mesh, selvedge, and lacing wire.
3. **Tensile Strength:** Minimum tensile strength of 60,000 psi. Maximum tensile strength as specified in ASTM A 975.

**C. Connections:**

1. **Galvanized Gabion and Revet Mattresses:** Provide metallic coated steel lacing wire or ring fasteners complying with ASTM A 975.
2. **PVC Coated Gabions and Revet Mattresses:** Provide only stainless steel ring fasteners complying with ASTM A 975.

**2.02 WELDED WIRE BASKETS**

Utilize welded wire baskets only when specified in the contract documents.

**A. General:** Fabricate baskets according to ASTM A 974.

**B. Welded Wire:**

1. **Galvanized:** Comply with ASTM A 974, Style 2 for wire, selvedge, and lacing wire.
2. **PVC Coated:**
  - a. Provide Style 2, galvanized wire fabric with a minimum nominal wire diameter of 0.120 inches for gabion baskets and 0.087 inches for revet mattresses.
  - b. Coat wire with PVC. Comply with ASTM A 974, Style 5.
3. **Tensile Strength:** Minimum tensile strength of 80,000 psi. Maximum tensile strength as specified in ASTM A 974.

**C. Connections:**

1. **Galvanized Gabions and Revet Mattresses:** Provide metallic-coated lacing wire with a nominal diameter of 0.120 inches. Comply with the requirements of ASTM A 764 as follows:
  - a. **Tensile Strength:** Class I (Finish 1 or 2).
  - b. **Coating:** Class 3, Type B or C.
2. **PVC Coated Gabions and Revet Mattresses:** Provide stainless steel lacing wire with a nominal diameter of 0.120 inches complying with ASTM A 313, Type 302, Class 1.

**2.03 GABION AND MATTRESS STONE**

Comply with [Iowa DOT Section 4130](#).

**2.04 ENGINEERING FABRIC**

Comply with [Iowa DOT Article 4196.01, B](#) for embankment erosion control.

**2.05 ANCHOR STAKES**

When anchor stakes are specified in the contract documents provide 2 inch galvanized standard weight pipe complying with ASTM A 53. Provide stakes with length as specified in the contract documents.

**2.06 GRANULAR SUBBASE**

Comply with [Iowa DOT Section 4123](#) for modified subbase.

**PART 3 - EXECUTION****3.01 SUBGRADE PREPARATION AND BEDDING**

- A. When applicable, cut and reshape the area behind a proposed gabion wall as specified in the contract documents to allow for placement of the wall.
- B. Excavate the subgrade area to the required elevation and smooth as necessary for proper placement of the gabions or mattresses.
- C. Prepare a firm unyielding subgrade foundation. In fill areas, construct and compact subgrade to no less than 95% of maximum Standard Proctor Density according to ASTM D 698.
- D. If unsuitable foundation materials exist, remove and replace with suitable materials and compact to no less than 95% of maximum Standard Proctor Density according to ASTM D 698.
- E. If specified in the contract documents, place and compact granular subbase materials to the dimensions specified in the contract documents.

**3.02 ENGINEERING FABRIC**

- A. Install engineering fabric under the proposed gabion or mattress installation.
- B. Extend fabric behind gabion walls to the top of the wall.
- C. Overlap adjacent sections of engineering fabric a minimum of 3 inches, with the upstream strip on top.

**3.03 CONNECTIONS**

Make all connections with lacing wire or approved fasteners.

**A. Lacing Wire:**

- 1. Loop or twist lacing wire to secure it to the wire mesh or fabric.
- 2. Proceed to lace with alternating double and single loops through every mesh or fabric opening, approximately every 3 to 4 inches, pulling each loop tight.
- 3. Secure end of lacing wire to the wire mesh or fabric by twisting or looping.

**B. Fasteners:** Install fasteners according to manufacturer's specified spacing.

**3.04 GABION ASSEMBLY AND INSTALLATION**

- A. Refer to the contract documents for special details of gabion wall installation including height, slope of wall, gabion setback, special backfill materials, and tieback requirements. Construct these features as specified in the contract documents.
- B. Unfold baskets and flatten all kinks and bends. Erect the sides, ends, and diaphragms, ensuring all panels are in the correct position and the tops of all sides are aligned.
- C. Connect the four corners of the gabion first, followed by connecting the diaphragms to the outside walls.

**3.04 GABION ASSEMBLY AND INSTALLATION (Continued)**

- D. Install and secure gabion baskets together.
1. After initial assembly, move baskets into their final position.
  2. Join empty baskets together along the vertical and top edges.
- E. Fill gabion baskets with gabion stone.
1. When PVC coated baskets are specified, take care not to damage PVC coating during stone placement.
  2. Fill baskets in lifts not exceeding 1 foot each.
  3. Manually orient stones after placement of each lift.
  4. Machine placement of stone will be allowed. However, considerable handwork is required to provide maximum density without bulges, a compact and dense exposed face, and maximum aggregate contact with the lid and other baskets to be placed in the structure.
  5. For gabions 3 feet high, install internal connecting wires after placement of each lift. Internal connecting wires are not required on gabions with a height of 18 inches or less.
    - a. Connect each exposed cell face to the opposite face or diaphragm with internal connecting wires.
    - b. Install two connecting wires on each exposed face, in each cell, in between each lift.
    - c. Locate wires with equal horizontal spacing approximately 1 foot apart.
    - d. Install wires by looping each end around two mesh or fabric openings, then wrapping wire tightly around itself for at least four full turns, locking the end of the wire in place by lacing it under the previous lap.
    - e. A 3 foot high cell with one exposed face requires four connecting wires. A 3 foot high end cell with two exposed faces requires eight connecting wires.
  6. Fill adjacent cells consecutively. Do not allow stone fill in one cell to be more than 1 foot higher than an adjacent cell.
  7. Overfill gabions 1 to 2 inches to allow for settlement.
- F. Attach gabion lids.
1. Pull edges of lids tight until lid meets the perimeter edge of the gabion.
  2. Install lacing wire or fasteners at edges and diaphragms to connect lid.
- G. Place and compact backfill behind gabion walls to the same level as the filled gabions as gabions are installed.
- H. If structure requires more than one layer, connect the upper empty baskets to the top of the completed lower gabions along the front and back edges of the baskets.

**3.05 REVET MATTRESS ASSEMBLY AND INSTALLATION**

- A. Assemble revet mattresses in their final location. Unroll mattress and flatten all kinks and bends.
- B. Erect the sides, ends, and diaphragms, ensuring that all panels are in the correct position and the tops of all sides are aligned.

**3.05 REVET MATTRESS ASSEMBLY AND INSTALLATION (Continued)**

- C. Connect the four corners of the mattress first followed by connecting the diaphragms to the outside walls.
- D. Join adjacent empty mattresses together along the vertical and top edges.
- E. If anchor stakes are specified in the contract documents, install stakes at required spacing. Drive stakes into ground so the top of the stake is flush with the top of the mattress. Tie anchor stakes to baskets at the top and base of the mattress.
- F. Fill revet mattresses with mattress stone.
  - 1. When PVC coated baskets are specified, take care not to damage PVC coating during stone placement.
  - 2. Machine placement of stone will be allowed. However, handwork is required to provide maximum density without bulges or voids.
  - 3. Fill mattresses in stages as required to prevent bulges between adjacent cells.
  - 4. Overfill mattresses 1 to 2 inches to allow for natural settlement of stone.
- G. Attach mattress lids.
  - 1. Pull edges of lids tight until lid meets the perimeter edge of the mattress.
  - 2. Install lacing wire or fasteners at edges and diaphragms to connect lid.

END OF SECTION