

## SECTION 07 17 00

### BENTONITE WATERPROOFING

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Bentonite panels
- B. Bentonite tubes
- C. Bentonite gel
- D. Bulk bentonite
- E. Protective cover material
- F. Protection board

##### 1.02 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for bentonite waterproofing will be either by the lump-sum method or by the unit-price method as determined by the listing of the bid item for bentonite waterproofing indicated in the Bid Schedule of the Bid Form.
- B. Lump Sum: If the Bid Schedule indicates a lump sum for bentonite waterproofing, the lump-sum method of measurement and payment will be in accordance with Section 01 20 00 - Price and Payment Procedures, Article 1.03.
- C. Unit Prices: If the Bid Schedule indicates a unit price for bentonite waterproofing, the unit-price method of measurement and payment will be as follows:
  - 1. Measurement
    - a. Bentonite waterproofing will be measured for payment by the square yard or square foot complete in place. Double-layer installation will be measured separately from single-layer installation; however, overlaps in a single layer will not be measured.
    - b. Tubes, gel, bulk bentonite, protective cover sheet, protection board, fasteners, and miscellaneous accessories will not be measured separately for payment; such items will be considered incidental to the bentonite waterproofing work and included in the measurement specified above.
  - 2. Payment: Bentonite waterproofing will be paid for at the Contract unit price for the computed quantities as determined by the measurement methods specified in Article 1.02.C.1.

**1.03 SUBMITTALS**

- A. General: Refer to Section 01 33 00 - Submittal Procedures, and Section 01 33 23 - Shop Drawings, Product Data, Samples, for submittal requirements and procedures.
- B. Product Data: Submit manufacturer's product data demonstrating compliance with specification requirements. Submit manufacturer's installation instructions and details, separately for each condition of bentonite waterproofing installation.

**1.04 QUALITY ASSURANCE**

- A. Bentonite waterproofing system shall be installed by an applicator/installer skilled and experienced in the type of work involved. Applicator shall be licensed and approved by the manufacturer who furnishes the materials.
- B. The Contractor shall make necessary arrangements with the manufacturer of the bentonite materials to be installed to provide on-site consultation and inspection service to assure the correct installation of the bentonite waterproofing.
- C. The manufacturer's representative shall be present at the time any phase of the work is performed. Bentonite waterproofing shall be installed only over substrate surfaces previously approved by the manufacturer's representative.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Store bentonite materials in a dry location, off the ground, and protected from physical damage and moisture.

**1.06 ENVIRONMENTAL CONDITIONS**

- A. Do not install bentonite products in standing or running water conditions, or during rain or damp weather.

**1.07 GUARANTY**

- A. In addition to the guaranty requirements specified in General Conditions Article GC4.9, bentonite waterproofing work shall be guaranteed against leakage, defective materials, and defective installation of the completed waterproofing work. Any such defects or leakage occurring during the period of the guaranty shall be promptly and completely corrected, including all affected work, at no additional cost to the District.
- B. Said guaranty shall be in effect for a period of five years from the date of the Certificate of Substantial Completion issued by the District. The guaranty shall be signed by the bentonite waterproofing applicator or installer and countersigned by the Contractor, and shall be submitted to the Engineer as specified in Section 01 77 00 - Closeout Procedures.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Requirements: Bentonite waterproofing system shall include bentonite panels, bentonite in tube, gel, or mastic form, and dry granular bentonite, all products of a single manufacturer.
- B. Bentonite: Specially selected natural Wyoming type granular bentonite, containing a minimum 90 percent montmorillonite, graded so that 90 percent will pass a 20 mesh sieve and less than 10 percent will pass a 200 mesh sieve.
- C. Panels: Minimum one pound granular bentonite per square foot, packed into flutes of corrugated biodegradable kraft board or between layers of porous polypropylene.
- D. Tubes: Granular bentonite in 2-inch diameter water soluble tubes.
- E. Gel: Trowelable grade of bentonite that has been hydrated to maximum gel strength.
- F. Bulk Bentonite: Dry granular bentonite packaged in 50-pound bags.
- G. Protective Cover Sheet: Minimum 4 mil thick polyethylene.
- H. Protection Board: As recommended by the bentonite products' manufacturer.

## **PART 3 - EXECUTION**

### **3.01 GENERAL INSTALLATION REQUIREMENTS**

- A. Protect bentonite from premature hydration at all times. Where bentonite is installed directly against earth or wood lagging, place a layer of protective cover sheet under the bentonite. Where backfill or concrete is not placed against bentonite immediately after the bentonite is installed, cover the bentonite with protective cover sheet until backfill is placed. As an alternative to the foregoing, bentonite panels that have been coated with a water-repellent resin on the exposed face may be used.
- B. When the presence of salt in the groundwater is indicated, use only bentonite that is certified by the manufacturer for use under salt water conditions without freshwater pre-hydration. Obtain groundwater samples and have them tested by the manufacturer if necessary to obtain this certification.
- C. Apply two or more layers of bentonite panels wherever the indicated hydrostatic head exceeds the manufacturer's rated depth for single-layer installation. Comply with the manufacturer's special requirements for installation at such depths. When installing double layers, do not overlap joints; butt panels together and stagger joints in the two layers a minimum of 12 inches.

### **3.02 INSTALLATION ON FREE-STANDING WALLS**

- A. Preparation:
1. Concrete surfaces shall be free of large voids and projections (such as mortar fins) extending more than 1/16 inch from the surface. Grind off such projections. Fill voids with cement mortar or bentonite gel.
  2. On concrete block masonry surfaces, apply a 1/2 inch thick parge coat of sand-cement and allow to cure three days before applying bentonite.
  3. Do not commence installation until preparation is complete and has been inspected and approved by the manufacturer's representative.
- B. Attach panels with 3/4 inch or 1 inch masonry washer-head nails. Lap adjoining panels a minimum of 1-1/2 inches. Stagger vertical joints in succeeding courses.
- C. When cutting, trimming, and folding, follow manufacturer's instructions to prevent loss of bentonite granules.
- D. Cut panels to fit around pipes and penetrations. Trowel a fillet of gel around the penetration and a minimum of 2 inches up the penetration just prior to backfilling.
- E. Provide protection board when the backfill contains sharp stones (such as crushed rock) or any stones larger than 2 inches.
- F. Refer to Section 31 00 00 - Earthwork, and Article 3.01.A above regarding backfill requirements. Exercise care to avoid damage to bentonite waterproofing by backfilling operations.

### **3.03 INSTALLATION UNDER SLABS AND FOOTINGS**

- A. Place a layer of protection sheet over the substrate to prevent premature hydration of bentonite, or use panels having a water-resistant coating.
- B. Overlap panels a minimum of 1-1/2 inches and nail into soil or staple together. Stagger joints in succeeding courses.
- C. Where slabs are poured in sections, necessitating the use of side forms with stakes, install panels to extend a minimum of 6 inches beyond the outside of the form. Drive the form stakes through the extended panels. When the stakes are removed, fill the holes with dry bentonite granules, and overlap the stake holes with the next panel. Do not allow polyethylene sheeting, where used, to extend between overlapped panels.
- D. Do not extend panels over pile caps or piles, except as specifically indicated.
- E. Comply with manufacturer's instructions for extension of panels up the outer sides of slabs and footings.

**3.04 INSTALLATION AGAINST SIDES OF SUPPORTIVE EXCAVATION**

- A. When bentonite panels are installed directly against the inside surface of soldier piles and lagging, diaphragm walls, or other support system to be left in place, prepare the surface by filling voids greater than 1/2 inch with cement mortar, or place a suitable geotextile over the entire surface.
- B. If water is present on the surface of the excavation support, place protective cover sheet over the surface or use panels having a water-resistant coating.
- C. Overlap panels a minimum of 1-1/2 inches and nail in place. Stagger joints in succeeding layers. Do not extend panels beyond finish grade.

**3.05 FIELD QUALITY CONTROL**

- A. Verify that bentonite waterproofing is free from defects or damage before backfilling or concealing the waterproofing with subsequent construction and finishes. Damaged or defective waterproofing shall be corrected.

**END OF SECTION 07 17 00**