

**SECTION 07 10 00**

**WATERPROOFING**

PART 1 GENERAL

1.01 SUMMARY OF WORK

- A. The extent and location of "Waterproofing" Work is shown in the Contract Documents.
- B. This section specifies requirements for membrane waterproofing at bottom slab and exteriors.

1.02 GOVERNING CODES, STANDARDS, AND REFERENCES

- A. ASTM C836 modified for preformed sheet: Low temperature flexibility and crack bridging,
- B. ASTM D412 (Die C): Tensile strength
- C. ASTM D412: Elongation of compound only
- D. ASTM D570: Water absorption
- E. ASTM D903: Peel strength
- F. ASTM D1876: Lap adhesion
- G. ASTM D5385: Resistance to hydrostatic head
- H. ASTM E96 (Method B): Permeance
- I. ASTM E154: Puncture resistance

1.03 SUBMITTALS

- A. Submit materials data in accordance with Section 01 33 00 - Submittals. Furnish manufacturers' technical literature, standard details, product specifications, and installation instructions for all products.
- B. Submittals shall include the following:
  - 1. Submit installation drawings.
    - a. Membrane types used and locations where each type is used.
    - b. Details of interface between different membrane types.
    - c. Typical installation details, width of overlap for sheet membranes, and minimum thickness and reinforcing for liquid-applied membranes.
    - d. Details of waterproofing at corners, terminations, expansion joints, construction joints, cracks, pipe penetrations, and form ties.
    - e. Details related to equipment, materials, and procedures for sealing concrete cracks.
  - 2. Submit a detailed field quality control procedure.
  - 3. Furnish copies of Material Safety Data Sheets before use of products.
  - 4. Provide certification and backup documentation signed by the waterproofing membrane manufacturer stating that the supplied materials meet or exceed all of the specified minimum test properties, performance requirements, and manufacturers' published list of properties.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. The waterproofing system, materials, and details shall be as recommended by the waterproofing manufacturer to perform for the life of the structure.
- B. The waterproofing membrane must meet or exceed the test properties specified for the system.
- C. The waterproof system shall be watertight. It is the Contractor's responsibility to repair any leaks.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original unopened containers.
- B. Store and handle in accordance with product manufacturer's instructions.
- C. Document lot numbers and other pertinent identifying information of all products and the locations where they are installed.

### PART 2 PRODUCTS

#### 2.01 GENERAL

- A. Provide membrane materials and accessory products that are recommended and approved by the membrane manufacturer for the specific application and prevailing temperature during installation.
- B. The use of permanent protection boards is required.
- C. Water swelling stripping is required as part of waterproofing Work. The water swelling stripping shall be flexible stripping made of rubber chemically bound with a hydrophilic polymer that swells to a minimum of 1.9 times its original volume in the presence of water and returns to the original size when dry. Provide manufacturer's recommended fasteners, adhesive, and water-swelling caulk.
- D. Acceptable Products:
  - 1. Construction Products Div./W.R.Grace and Company; Bituthene,
  - 2. Other products as acceptable by engineer

#### 2.02 SELF-ADHERING SHEET SYSTEM

- A. Self-adhering sheet: A factory-made composite sheet, at least 60 mils thick, consisting of at least 56 mils of highly adhesive rubberized asphalt or butyl rubber compound combined with a reinforcement sheet 4 mil thick of cross-laminated polyethylene or woven polypropylene; furnished with a disposable release sheet to be removed during installation.
- B. Minimum Properties
  - 1. Tensile strength, ASTM D412 (Die C): 325 psi minimum
  - 2. Elongation of compound only, ASTM D412: 300 percent minimum
  - 3. Permeance, ASTM E96 (Method B): 0.05 perm maximum
  - 4. Water absorption, 72 hours, ASTM D570: 0.1 percent maximum
  - 5. Puncture resistance, ASTM E154: 40 pounds minimum
  - 6. Resistance to hydrostatic head, ASTM D5385: 200 feet minimum
  - 7. Low temperature flexibility and crack bridging, ASTM C836 modified for preformed sheet: No failure
  - 8. Lap adhesion, ASTM D1876: 4.0 pounds minimum per inch width
  - 9. Peel strength, ASTM D903: 9.0 pounds minimum per inch width

- C. Accessory Materials
  - 1. Primer: Rubber-based primer compatible with sheet membrane and formulated to provide excellent permanent adhesion.
  - 2. Liquid membrane: Two-component, elastomeric, trowel grade material designed for use as fillet, reinforcement, flashing, and sealing material in connection with the sheet membrane.
  - 3. Mastic: Rubberized-asphalt based mastic designed for sealing over the outside of terminations, edges, and overlaps of the sheet membrane.

### PART 3 EXECUTION

#### 3.01 PREPARATION

- A. Inspect the conditions where waterproofing is to be applied, and confirm suitability for proper application and performance of the waterproofing.
- B. Concrete surfaces shall be free of water, oil, grease, curing compounds, laitance, loose particles, dirt, bituminous products, friable matter, and other such substances. Clean the surfaces by power brushing or sandblasting or as required by the membrane manufacturer's written instructions.
- C. Concrete surfaces to receive waterproofing shall have no sharp projections and no holes larger than allowed by the waterproofing system manufacturer's recommendations. Repair holes and discontinuities with liquid membrane or mastic as part of the waterproofing Work if not already repaired as part of concrete Work.
- D. Concrete walls shall have cured for not less than seven days and concrete mud mat not less than three days.
- E. Install waterproofing only when temperature and weather conditions are within the limits recommended in the product manufacturer's specifications.

#### 3.02 APPLICATION, GENERAL

- A. Bottom Slab Waterproofing
  - 1. In cases where the concrete mud mat slab is wet, delay waterproofing installation until it dries and the membrane installation meets the specified adhesion requirements.
  - 2. Apply bottom slab waterproofing no sooner than 24 hours before the precast bottom slab is scheduled to be installed over the waterproofing. After waterproofing installation, allow no traffic on the waterproofing other than minimal foot traffic necessary as part of the Work slab installation.
  - 3. Obtain the Engineer's inspection of bottom slab waterproofing before the precast bottom slab is installed.
  - 4. Extend bottom slab waterproofing a sufficient distance beyond the boundaries to provide for tie-ins to the wall waterproofing. Provide protection of such extensions to prevent damage and deterioration.
- B. Wall Waterproofing
  - 1. Apply under conditions that will ensure the specified degree of adhesion. Verify by daily cut and pull-off tests where directed by the Engineer. Repair test cuts, replace non-conforming areas, and change procedures as necessary to ensure proper application.
  - 2. Install transitions between bottom slab and wall with particular care, and obtain Engineer's inspection before these areas are covered with other construction or backfill.

- C. Install complete waterproofing system in accordance with manufacturer's installation instructions and details and the additional requirements of the Drawings and these specifications.
- D. Install water-swelling stripping and ribbon waterstops where shown or required in compliance with the manufacturer's published instructions.
- E. Seal all pipe penetrations and other special conditions.
- F. Inspect all waterproofing prior to covering with other construction, and repair all damage and defects.
- G. Prevent damage to waterproofing during placement of control density backfill.

### 3.03 APPLICATION OF SELF-ADHERING SHEET

- A. Install on prepared, primed surface. Detail corners, pipe penetrations, and other special conditions with liquid membrane material.
- B. Install double layer of self-adhering sheet (total 120 mil thickness) at all points. Install either in two separate layers or with sheets overlapping at least half of sheet width.
- C. At corners and construction joints, install an initial reinforcing strip of self-adhering membrane at least 11 inches wide, prior to the application of the full-width sheets.
- D. Seal all edges at terminations, and all seams within 12 inches of corners, with mastic.
- E. Prevent damage to waterproofing during placement of control density fill against the structure. The use of protection boards is not allowed.

### 3.04 CONCRETE CRACK SEALING

- A. If leaks appear and membrane is inaccessible, seal leak by injection of a single component, water-reactive, non-shrink polyurethane grout in the area of crack, fracture, or hole causing leak. Restore areas where grout is injected to match surrounding surfaces.

**END OF SECTION**