SECTION 071324

Pre-Applied Sheet Membrane Waterproofing

*PREPRUFE® 275 Waterproofing Membrane*

PART 1 — GENERAL

1.01 SUMMARY

1. The Work of this Section includes, but is not limited to, pre-applied sheet membrane waterproofing that forms an integral bond to poured concrete for the following applications:
2. Vertical Applications: Membrane applied against soil retention system prior placement of concrete or shotcrete foundation walls or placement of cast-in-place concrete walls;
3. Horizontal Applications: Membrane applied on prepared subbase prior to placement of concrete slabs.

B. Related sections include, but are not limited to, the following:

1. Section 031000 – Concrete Forming
2. Section 312000 – Earth Moving
3. Section 031500 – Concrete Accessories
4. Section 031500 – Hydrophilic Waterstop
5. Section 316200 – Driven Piles
6. Section 316400 – Caissons
7. Section 032000 – Concrete Reinforcing
8. Section 033000 – Cast-In-Place Concrete
9. Section 033713 – Shotcrete

NOTE TO SPECIFIER: For vertical applications, coordinate with concrete reinforcing section to require approved concrete reinforcing supports.

1.02 SUBMITTALS

1. Submit manufacturer’s product data, installation instructions, and membrane samples for approval.

1.03 REFERENCE STANDARDS

The following standards and publications are applicable to the extent referenced in the text.

1. ACI International (ACI):

 ACI 506.2 Specification for Shotcrete

1. American Society for Testing and Materials (ASTM):

C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

D 412 Standard Test Methods for Rubber Properties in Tension

D 570 Standard Test Method for Water Absorption of Plastics

D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds

D 1876 Standard Test Method for Peel Release of Adhesives (T-Peel)

D 3767 Standard Practice for Rubber - Measurements of Dimensions

D 5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes

E 96 Standard Test Methods for Water Vapor Transmission of Materials

E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.04 QUALITY ASSURANCE

1. Manufacturer: Sheet membrane waterproofing system shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five (5) years.
2. Installer: A firm which has at least three (3) years experience in work of the type required by this section.
3. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.
4. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
	1. Include waterproofing Installer, reinforcing steel Installer, concreting/shotcreting Installer, Installers of items penetrating waterproofing, waterproofing consultant, Owner's testing agency, Architect, sheet waterproofing manufacturer's representative, Contractor, Construction Manager, and Owner's representative.
	2. Review working conditions and substrate conditions required by sheet waterproofing manufacturer.
	3. Review project details and discuss detrimental conditions that may interfere with satisfactory installation.
5. Schedule Coordination: Schedule work such that membrane will not be left exposed to weather for longer than recommended by the manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

1. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer’s instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

1.06 PROJECT CONDITIONS

1. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.07 WARRANTY

1. Sheet Membrane Waterproofing: Provide written five year material warranty issued by the membrane manufacturer upon completion of work.

PART 2 — PRODUCTS

2.01 MATERIALS

1. Pre-Applied Integrally Bonded HDPE Sheet Waterproofing Membrane: PREPRUFE® 275 Membrane by GCP Applied Technologies, a 0.95 mm (0.038 in) nominal thickness composite sheet membrane consisting of 0.50 mm (0.020 in.) of high density polyethylene film, a pressure-sensitive adhesive and a trafficable weather resistant coating. The membrane shall be supplied in a kick-out roll orientation and shall have no release liner to reduce waste onsite. The membrane shall form an integral, adhesive, and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete and shall include dual adhesive ZipLap technology to complete side laps and secure adjacent sheets. Provide membrane with the following physical properties:

NOTE TO SPECIFIER: PREPRUFE® 275 Membrane can be installed at temperatures of 25°F (-4°C) and above. For temperatures below 40°F (4°C), GCP Applied Technologies requires the use of PREPRUFE® LT Tape at all side laps.

PHYSICAL PROPERTIES FOR PREPRUFE® 275 MEMBRANE:

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| Property | Test Method | Typical Value |
| Color |  | White |
| Thickness | ASTM D 3767 Method A | 0.95 mm (0.038 in.) nominal |
| Lateral Water Migration Resistance | ASTM D 5385 Modified1 | Pass at 71 m (231 ft) of hydrostatic head pressure |
| Low Temperature Flexibility | ASTM D 1970 | Unaffected at -20°F (-29°C)  |
| Elongation | ASTM D 412 Modified2 | 300%  |
| Crack Cycling at -23°C (-9.4°F), 100 Cycles | ASTM C 836 | Unaffected, Pass |
| Tensile Strength, film | ASTM D 412 | 27.6 MPa (4,000 lbs/in.2) |
| Peel Adhesion to Concrete | ASTM D 903 Modified3 | 700 N/m (4.0 lbs/in.)  |
| Lap Adhesion | ASTM D 1876 Modified4 | 1225 N/m (7.0 lbs/in.)  |
| Resistance to Hydrostatic Head | ASTM D 5385 Modified5 | 55 m (180 ft)  |
| Puncture Resistance | ASTM E 154 | 600 N (135 lbs) |
| Permeance | ASTM E 96 Method B | 0.6 ng/Pa x s x m2 (0.01 perms)  |
| Water Absorption | ASTM D 570 | 0.5%  |

**Footnotes:**

Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the blind side waterproofing membrane.

Elongation of membrane is run at a rate of 50 mm (2 in.) per minute at room temperature.

Concrete is cast against the protective coating surface of the membrane and allowed to cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.

The test is conducted 15 minutes after the lap is formed as per manufacturer’s instructions and run at a rate of 50 mm (2 in.) per minute at room temperature.

Hydrostatic head tests are performed by casting concrete against the membrane with a lap. Before the concrete sets, a 3 mm (0.125 in.) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface.

2.02 Ancillary Products

1. Waterstop: ADCOR® hydrophilic waterstop or DE NEEF® Injecto® Tube groutable waterstop by GCP Applied Technologies for non-moving concrete construction joints.
2. Preformed Soil Retention Wall Tieback Cover: PREPRUFE® Tieback Cover by GCP Applied Technologies as a prefabricated detail for soil retention wall tiebacks.
3. Tape for covering cut edges, roll ends, penetrations and detailing: PREPRUFE® Tape LT (for temperatures between 25°F (-4°C) and 86°F (30°C)) and PREPRUFE® Tape HC (for use in Hot Climates, minimum 50°F (10°C)).
4. Miscellaneous Materials: accessories specified or acceptable to manufacturer of pre-applied waterproofing membrane.

PART 3 — EXECUTION

3.01 EXECUTION

1. The Installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 SUBSTRATE PREPARATION

1. It is essential to create a sound and solid substrate to eliminate movement during the concrete pour or shotcrete placement. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability.

Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment.

3.04 INSTALLATION, VERTICAL APPLICATIONS

1. Strictly comply with installation instructions in manufacturer’s published literature, including but not limited to, the following:
2. Place the membrane HDPE film side to the substrate with the green zip strip facing towards the concrete pour. End laps should be staggered to avoid a build-up of layers.
3. Leave the green and blue zip strips in position until the overlap procedure is completed and the lap is to be made.
4. Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with a red guideline. The blue zip strip on the underside of the succeeding membrane shall be positioned on top of the green zip strip on the top of the previous sheet. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap.
5. Peel back and remove both the green and blue zip strips in the overlap area to achieve an adhesive to adhesive bond, lining up leading edge of the top sheet with the red guideline.
6. For lengths of membrane greater than 8 ft. (2.4 m), fastening can be made through the selvedge within 0.5 in. (13 mm) from the leading edge of the membrane using a small low proﬁle head fastener so that the membrane lays ﬂat and allows ﬁrmly rolled overlaps.
7. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.
8. Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary.
9. Allow to dry and apply PREPRUFE® Tape LT (or HC in hot climates) centered over the lap edges and roll firmly. Apply additional PREPRUFE® Tape LT (or HC in hot climates) a minimum of 2 in. (50 mm) beyond all edges of membrane that are not sealed by the selvedge.
10. Immediately remove tinted plastic release liner from the PREPRUFE® Tape.
11. Immediately remove tinted plastic release liner from the PREPRUFE® CJ Tape.
12. Protect membrane, tape and ancillaries in accordance with manufacturer’s recommendations until placement of concrete. Inspect for damage just prior to placement of concrete and make repairs in accordance with manufacturer’s recommendations.

3.05 PROTECTION

Protect membrane in accordance with manufacturer’s recommendations until concrete or shotcrete placement. Inspect for damage just prior to concrete or shotcrete placement and make repairs in accordance with manufacturer’s recommendations.