Guide specification in CSI Format

SECTION 071326

SELF-ADHERED SHEET MEMBRANE WATERPROOFING

PART 1 — GENERAL

1.01 SUMMARY

1. The Work of this Section includes, but is not limited to, sheet membrane waterproofing that forms an integral bond to poured concrete for the following applications:
2. Adhesively bonded HDPE sheet waterproofing with dual adhesive ZipLaps for pre-applied or blind-side waterproofing applications for installation against vertical, permanent formwork and shoring, and/or over horizontal blinding or mud slab. Basis of design is GCP Preprufe® 300R Plus LT.
3. Self-adhering composite sheet waterproofing for post-applied two sided (open excavation) walls and suspended slabs. Basis of design is GCP Bituthene® 8000.
4. Prefabricated drainage and protection composite

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

1.02 REFERENCE STANDARDS

1. The following standards and publications are applicable to the extent referenced in the text.
2. 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 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

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

**D 1434-82: *Standard Test Method for Determining Gas Permeability of Plastic Film and Sheeting***.

1.03 SUBMITTALS

1. Product Data: Submit manufacturer’s product data, installation instructions, use limitations and recommendations.
2. Samples: Submit representative samples of the following for approval:
3. Pre-Applied sheet membrane waterproofing
4. Post-Applied Sheet membrane waterproofing system
5. Prefabricated drainage and protection composite

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 for below grade applications. 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 5 years.
2. Preprufe® System Installer:
	1. Installers must have a minimum of 5 years successful track record in the waterproofing, roofing or another closely related industry or must employ qualified personnel with a minimum of 5 years experience in these industries. They must have a sound and solid reputation for quality workmanship and reliability.
	2. Installers must be fully familiar with the Preprufe System application instructions and detailing techniques and have previously completed a minimum of five (5) projects greater than 5000 square feet.
	3. Installer shall successfully complete the GCP Applied Technologies Preprufe Training School (as evidenced by a current GCP Applied Technologies Preprufe Contractor Training Certificate) before the job is bid.
	4. Installer’s crew for the job shall have a Job Foreman and at least one member with a current, personal GCP Applied Technologies Preprufe Contractor Training Certificate on site at all times during the installation for the entire duration of the Preprufe System.
	5. Installer shall secure and grant the right for GCP Applied Technologies or its representatives to inspect the job site during installation and at any reasonable time after the completion of installation and prior to final concealment of the System membrane.
	6. Installer shall request in writing within sixty (60) days of the date of completion and final inspection of the installation, that GCP Applied Technologies issue the Warranty. Installer’s request shall bear the Installer’s signature certifying proper installation.
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. The Preprufe System Warranty Applicator Project Checklist shall be utilized to ensure all requirements are completed.
5. Prior to Installer entering a binding contract for the installation of the Preprufe System:
	1. The Preprufe System Project Registration Form shall be completed with Waterproofing Installer’s and Building Owner’s signature.
	2. The Project Registration Form shall be submitted to Warranty Administrator GCP Applied Technologies Specialty Building Materials, 62 Whittemore Ave., Cambridge, MA 02140. (Fax) 617-498-4419 or (E-mail) sbmtechserv.waterproofing@gcpat.com.
	3. The project must receive GCP Applied Technologies approval and Warranty Job Number prior to the installer bidding the Preprufe System installation. Please allow at least ten (10) business days after submitting the Project Registration Form for GCP Applied Technologies to respond to the request regarding approval for project eligibility.
6. 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. As per GCP Applied Technologies Preprufe Prejob Meeting Agenda, conference shall include review of special details and, Preprufe System Awareness Training for relevant parties.
	1. The General Contractor, Owner or Owner’s Representative, Concrete/Foundation Contractor, Waterproofing Consultant, Waterproofing Installer, any trade or contractor that could negatively impact the Preprufe Waterproofing System and/or will be installing penetrations that will penetrate through the Preprufe Waterproofing System and the GCP Applied Technologies Sales Representative shall attend the Pre-Installation Conference to address any issues in the presence of the relevant parties. Each relevant party shall be properly represented at the conference by Project Manager, Superintendent and Foreman.
	2. The Preprufe System Warranty Pre-Job Checklist shall be completed by the Preprufe Installer to ensure that each relevant party understands how their work could impact the waterproofing installation. This checklist can be utilized to facilitate coordination with other trades and serve as a protocol to address any design or site anomalies.
7. Schedule Coordination: Schedule work such that membrane will not be left exposed to weather for longer than that recommended by the manufacturer.
8. Installer shall secure and grant the right for GCP Applied Technologies or its representatives to inspect the job site during installation and at any reasonable time after the completion of installation and prior to final concealment of the System membrane.
9. Contact GCP Applied Technologies for approval of inspection firm and arrange for independent inspection of installation. Owner shall be responsible for all costs associated with inspection.
	1. Successful inspection by a GCP Applied Technologies approved inspection firm with a current GCP Applied Technologies Preprufe Inspector Training Certificate and individual field inspector(s) with a current, personal GCP Applied Technologies Preprufe Inspector Training Certificate is required on all projects for critical stages for Pre-Applied Sheet Membrane Waterproofing installation as per GCP Applied Technologies Preprufe Inspection Manual, including but not limited to:
10. After substrate preparation
11. After membrane installation
12. After steel placement and
13. During concrete placement
14. Any application/operation that could compromise the integrity of the system
	1. Successful inspection by a GCP Applied Technologies approved inspection firm with a current GCP Applied Technologies Preprufe Inspector Training Certificate and individual field inspector(s) with a current, personal GCP Applied Technologies Preprufe Inspector Training Certificate is required on all projects for critical stages for Sheet Membrane Waterproofing installation as per GCP Applied Technologies Preprufe Inspection Manual, including but not limited to:
15. After substrate preparation
16. After membrane installation
17. After protection course placement and
18. During backfill placement
19. Any application/operation that could compromise the integrity of the system
20. As inspections are completed, inspector shall submit an Inspection Report to GCP Applied Technologies for each stage.
21. Once inspections are successfully completed for final System installation, inspector shall submit an Inspection Project Closeout Form to GCP Applied Technologies.
22. Installer shall request in writing within sixty (60) days of the date of System completion and final inspection of the installation, that GCP Applied Technologies issue the Warranty. Installer’s request shall bear the Installer’s signature certifying proper installation.
23. Installer shall complete a Project Closeout Form and submit to GCP Applied Technologies Specialty Building Materials Warranty Administrator with all inspection reports. GCP Applied Technologies shall provide a warranty invoice to the Installer upon receipt of a completed Project Closeout Form.
24. Subject to the provisions of the Preprufe Warranty Program, and the payment to GCP Applied Technologies of the sum of fifteen cents ($0.15 U.S.) per square foot of System installed by Installer, GCP Applied Technologies shall provide to the designated Owner a ten (10) year Watertightness Warranty. The minimum cost of a warranty is $5,000.
25. Installer shall receive a copy of the Warranty and submit a copy to the owner.

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.
2. Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
3. Protect mastic and adhesive from moisture and potential sources of ignition.
4. Store drainage and protection composite flat and off the ground. Provide cover on top and all sides.
5. Protect surface conditioner from freezing.
6. Sequence deliveries to avoid delays, but minimize on-site storage.

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.
2. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive Pre-Applied or Self-Adhered Sheet Membrane waterproofing.

1.07 warranty

1. Manufacturer’s Special Warranty
	1. Upon receipt of Project Closeout Form by Installer meeting Section 1.04.B.3 and upon receipt of Project Inspection Closeout Form by inspection firm meeting Section 1.04.I.1 of within 60 days of System installation completion and the Manufacturer’s acceptance of work, provide written Preprufe® System Watertightness Warranty in which Manufacturer will make or cause to be made repairs necessary to correct leaks to the System due to the following causes:
		1. System deterioration as a result of ordinary wear and tear and the effects thereof; and
		2. Improper workmanship during installation by the Installer.
	2. Installer has performed repairs under the terms of its warranty (if any) covering the System and/or agreement with GCP Applied Technologies (a “Contractor Agreement”) covering the System.
	3. Materials listed in Section “2.01 Materials” shall be used where design and field conditions permit or as required by Manufacturer.
	4. Warranty does not include cost of removal and subsequent replacement of any equipment, materials, or other items that limit access, cover, or otherwise conceal the System.
	5. Warranty Period: 10 years from date of System installation completion

**NOTE TO SPECIFIER: In lieu of or in addition to a Preprufe Contractor Agreement, a separate Installer’s Special Warranty can be specified:**

1. **Installer’s Warranty**
	1. **Special Installer's Warranty in addition to Watertightness Warranty**
	2. **Provide Installer Warranty, signed by Installer, covering Work of this Section**
	3. **Warranty Period: 2 years from date of System installation completion**

PART 2 — PRODUCTS

2.01 MATERIALS

1. Pre-Applied Integrally Bonded HDPE Sheet Waterproofing Membrane: Preprufe® 300R Plus Membrane by GCP Applied Technologies, a 1.2mm (0.046 in) nominal thickness composite sheet membrane consisting of 0.8 mm (0.030 in.) of high density polyethylene film, a pressure-sensitive adhesive and a trafficable weather resistant coating. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

NOTE TO SPECIFIER: Preprufe 300R and Preprufe 300LT can both be installed at temperatures 25°F (-4°C) and above. For temperatures 25°F (-4°C) to 55°F (13°C) GCP Applied Technologies Technical Bulletin #16 states the use of Preprufe LT Tape is recommended at all sidelaps when using Preprufe 300R. Alternatively, Installers may elect the use of Preprufe 300LT which does not require the use of Preprufe LT Tape at sidelaps in temperature ranges 25°F (-4°C) to 55°F (13°C). For this reason, GCP Applied Technologies suggests that both products be incorporated into the specification.

PHYSICAL PROPERTIES FOR PREPRUFE 300R Plus (or 300R Plus LT) MEMBRANE:

|  |  |  |
| --- | --- | --- |
| **Property** | **Test Method** | **Typical Value** |
| Color |  | White |
| Thickness | ASTM D 3767 Method A | 1.2 mm (0.046 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 -29°C (-20°F) |
| Elongation | ASTM D 412 Modified2 | 500%  |
| 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 | 880 N/m (5.0 lbs/in.)  |
| Lap Adhesion | ASTM D 1876 Modified4 | 880 N/m (5.0 lbs/in.)  |
| Resistance to Hydrostatic Head | ASTM D 5385 Modified5 | 71 m (231 ft)  |
| Puncture Resistance | ASTM E 154 | 990 N (221 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%  |
| Methane permeance  | ASTM D 1434 | <40 ml/day.m2.atm |
| VOC permeance | ASTM F 739 open loop | Not Detectable |

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. A hydrostatic head pressure of 71 m (231 ft) of water is the limit of the apparatus.

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

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.

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 up to a head of 71 m (231 ft) of water which is the limit of the apparatus.

1. Post applied self adhering sheet waterproofing: Bituthene® 8000 Membrane by GCP Applied Technologies; a self-adhesive, cold-applied composite sheet consisting of a thickness of 1.4 mm (0.056 in.) of rubberized asphalt and 0.12 mm (0.0047 in.) of Composite, high density polyethylene film specially formulated for use 25F and rising. Provide rubberized asphalt membrane covered with a release sheet which is removed during installation. Membrane has pre-marked overlaps to ensure side laps as recommended and to avoid site measurement. No special adhesive or heat shall be required to form laps.

PHYSICAL PROPERTIES FOR BITUTHENE 8000 MEMBRANE:

|  |  |  |
| --- | --- | --- |
| Property | Test Method | Typical Value |
| Color |  | Light gray |
| Thickness | ASTM D 3767 Method A | 1.5 mm (0.060 in.) nominal |
| Flexibility, 180° bend over 25 mm (1 in.) mandrel at -43°C (-45°F) | ASTM D 1970 | Unaffected |
| Tensile Strength, Film | ASTM D 412 Modified1 | 38 MPa (5,500 lbs/in.2) minimum |
| Elongation, Ultimate Failure of Rubberized Asphalt | ASTM D 412 Modified1 | 300% minimum |
| Property | Test Method | Typical Value |
| Crack Cycling at -32°C (-25°F), 100 Cycles | ASTM C 836 | Unaffected |
| Lap shear | ASTM D 1002 1 | 30 lbf (133N) |
| Peel Strength | ASTM D 903 Modified3 | 12 lbf (2,100N/m) |
| Puncture Resistance, Membrane | ASTM E 154 | 250 N (63 lbs) minimum |
| Resistance to Hydrostatic Head | ASTM D 5385 | 71 m (231 ft) of water |
| Permeance | ASTM E 96, Section 12 – Water Method | <0.03 perms |
| Water Absorption | ASTM D 570 | <0.05% maximum |
| Methane permeability (membrane & overlaps) | ASTM D 1434 | <10ml/day.m2.atm |

*Footnotes:*

1. *The test is run at a rate of 50 mm (2 in.) per minute.*
2. *The test is conducted 15 minutes after the lap is formed and run at a rate of 50 mm (2 in.) per minute at -4°C (25°F).*
3. *The 180° peel strength is run at a rate of 300 mm (12 in.) per minute and tested with Bituthene Primer B2 LVC.*
4. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, trowel grade or low viscosity. Bituthene LM by GCP Applied Technologies
5. Preformed covers for soil retention heads: Preprufe Tieback Covers by GCP Applied Technologies Construction Products as prefabricated tieback head and soil anchor covers.
6. Tape for covering cut edges, roll ends, penetrations and detailing: Preprufe Tape LT (for temperatures between 25°F (-4°C) and 95°F (+35°C)) and Preprufe Tape HC (for use in Hot Climates, > 95°F (35°C))
7. Optional: Tape to be located at all construction joints in the concrete on top of the pre-applied sheet waterproofing membrane: Preprufe CJ Tape LT (for temperatures between 25°F (-4°C) and 95°F (35°C)) and Preprufe CJ Tape HC (for use in Hot Climates, > 95°F (35°C))
8. Prefabricated Drainage and Protection Composite for Vertical Applications: Hydroduct® 220 Drainage Composite by GCP Applied Technologies Construction Products. Drainage Composite shall be designed to promote positive drainage while serving as a protection course.
9. Prefabricated Drainage and Protection Composite for Horizontal Applications: Hydroduct® 660 Drainage Composite by GCP Applied Technologies Construction Products. Drainage Composite shall be designed to promote positive drainage while serving as a protection course.
10. Waterstops:
	* 1. Adcor 500 swellable waterstops. By GCP Applied Technologies
		2. De Neef SWELLSEAL WA hydrophilic gun-grade by GCP Applied Technologies Construction Products for non-moving concrete construction joints and penetrations.
		3. De Neef INJECTO® Tube groutable waterstop by GCP Applied Technologies Construction Products for non-moving concrete construction joints and penetrations.
11. Miscellaneous Materials: Surface conditioner, mastic, liquid membrane, tape and accessories specified or acceptable to manufacturer of Pre-Applied and Self-Adhered Sheet Membrane Waterproofing.

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. Refer to manufacturer’s literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of sheet membrane waterproofing.
2. Substrates to receive Pre-Applied Sheet Membrane Waterproofing
3. It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm).
4. Grout around all penetrations such as mechanical, electrical, plumbing, etc. to create a sound and solid substrate, and eliminate movement during the concrete pour.
5. The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates.
6. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.
7. When installing over soil retention system, Hydroduct Drainage Composite or plywood may be required to provide a suitable substrate.
8. Substrates to receive Self-Adhered Sheet Membrane Waterproofing
9. Do not proceed with installation until concrete has properly cured and dried.
10. Fill form tie rod holes with concrete and finish flush with surrounding surface.
11. Repair bugholes over 13 mm (0.5 in.) in length and 6 mm (0.25 in.) deep and finish flush with surrounding surface.
12. Remove scaling to sound, unaffected concrete and repair exposed area.
13. Grind irregular construction joints to suitable flush surface.
14. Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

3.03 INSTALLATION

1. Strictly comply with installation instructions in manufacturer’s published literature.
2. If required, install prefabricated drainage and protection composite for horizontal applications per manufacturer’s requirements.
3. Application of Pre-Applied Sheet Membrane waterproofing for concrete slab
4. Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build-up of layers.
5. Leave the plastic release liner on the field of the membrane until overlap procedure is completed.
6. Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with a blue guideline. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap.
7. Peel back the clear plastic release liner in the overlap area to expose the adhesive in the selvedge area and adhere underside of successive sheet onto the adhesive, lining up leading edge with blue guideline. Achieve an adhesive bond at the overlap.
8. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.
9. Completely remove the plastic liner in the field of the membrane to expose the protective coating.
10. 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.
11. 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. beyond all edges of membrane that are not sealed by the selvedge.
12. Immediately remove tinted plastic release liner from the Preprufe Tape.
13. Center Preprufe CJ Tape LT (or HC in hot climates) at all concrete construction joints and adhere the Preprufe CJ Tape to the top of pre-applied waterproofing membrane.
14. Immediately remove tinted plastic release liner from the Preprufe CJ Tape.
15. 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.
16. Application of Self-Adhered Sheet Membrane Waterproofing for concrete walls
17. Apply Bituthene Primer B2 LVC at rate recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of surface conditioner.
18. Delay application of membrane until surface conditioner is completely dry. Dry time will vary with weather conditions.
19. Install membrane in accordance with manufacturer’s installation instructions and details.
20. Seal daily terminations with troweled bead of mastic.
21. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.
22. Install prefabricated drainage and protection composite for vertical applications per manufacturer’s requirements.

END OF SECTION

**gcpat.com | North America Customer Service: 1-877-423-6491**

The information here is based on data and knowledge considered to be true and accurate, but without warranty. Our conditions of sale apply to all goods supplied by us. No statement, recommendation, or suggestion is intended for any use that would infringe any patent, copyright, or other third party right.

GCP and PREPRUFE are trademarks, which may be registered in the United States and/or other countries, of GCP Applied Technologies Inc. This trademark list has been compiled using available published information as of the publication date and may not accurately reflect current trademark ownership or status.

© Copyright 2022 GCP Applied Technologies Inc. All rights reserved.

GCP Applied Technologies Inc., 2325 Lakeview Pkwy, Suite 450, Alpharetta, GA 30009 USA. In Canada, GCP Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S March 2022\_Iltaz

