7 October 2019

New York City Office of Environmental Remediation
City E-Designation Program
c/o Shaminder Chawla
100 Gold Street, 2nd Floor
New York, NY 10038

Re: OER Project No. 19TMP1493M, 19EHAN346M
E-Designation E-137
451 Tenth Avenue, New York, New York
NYC Tax Block 707, Lot 31 (The "Site")
Remedial Action Work Plan (RAWP) Stipulation List
Langan Project No. 170370701

Dear Mr. Chawla:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) hereby submits a Remedial Action Plan (RAWP) Stipulation List for the Site to the New York City Office of Environmental Remediation (OER) on behalf of 451 Tenth Avenue LLC. This letter serves as an addendum to the RAWP to stipulate additional content, requirements, and procedures that will be followed during the site remediation. The contents of this list are added to the RAWP and will supersede the content in the RAWP where there is a conflict in purpose or intent. The additional requirements/procedures include the following Stipulation List below:

1. The criterion attached in **Appendix 1** will be utilized if additional petroleum-containing tanks or vessels are identified during the remedial action or subsequent redevelopment excavation activities. All petroleum spills will be reported to the New York State Department of Environmental Conservation (NYSDEC) hotline as required by applicable laws and regulations. This contingency plan is designed for heating oil tanks and other small or moderately sized storage vessels. If larger tanks, such as gasoline storage tanks are identified, OER will be notified before this criterion is utilized.

2. A pre-construction meeting is required prior to start of remedial excavation work at the site. A pre-construction meeting will be held at the site and will be attended by OER, the developer or developer representative, the consultant, excavation/general contractor, and if applicable, the soil broker.

3. A Historic Fill Transfer and Disposal Notification Form will be provided to each disposal facility and a pre-approval letter from all disposal facilities will be provided to OER prior to any soil/fill material removal from the site. The Historic Fill Transfer and Disposal Notification Form template is attached in **Appendix 2**. Documentation specified in the

RAWP - Appendix 2 - Section A2.6 "Materials Disposal Off-Site" will be provided to OER. If a different disposal facility for the soil/fill material is selected, OER will be notified immediately.

4. Monthly reports on the project's status and schedule are required to be submitted to the OER project manager after the RAWP is approved and the Notice to Proceed (NTP) is issued until the Remedial Action Report (RAR) or Remedial Closure Report (RCR) is received by OER. After excavation work is completed, monthly reports are still required and will be provided by the consultant or owner/developer for the duration of the construction period or until the RAR or RCR is received by OER. This is the remediation engineer's responsibility to provide this report. If the remediation engineer is no longer retained for continuation of the project, the project developer is required to notify OER. The monthly report template is attached in **Appendix 3**.

5. Daily reports will be provided during active excavation work. If no work is performed for an extended time period, the daily report frequency will be reduced to a weekly basis. The daily report template is attached in **Appendix 4**.

6. Each truck that transports contaminated soil off-site will be recorded on a trucking log sheet; completed logs will be attached to the RAR as an appendix. The log will document the destination of material leaving the site, the parties responsible for its transfer, and other pertinent details. The trucking log template is provided in **Appendix 5**.

7. A minimum 20-mil waterproofing/vapor barrier system will be installed beneath the structure's slab and along foundation sidewalls as part of the development. The barriers chosen for this project are Bituthene® 4000 and Preprufe® 160R, 160R Plus, 200, 300R, and 300R Plus, with ADCOR® waterstop. The waterproofing/vapor barrier system is manufactured by GCP Applied Technologies and **Appendix 6** provides manufacturer's specifications.

8. Truck route is included in **Appendix 7**.

9. Truck routing to the project site shall only occur according to the approved RAWP. The applicant, relevant applicant's consultant and contractors are responsible for maintaining proper traffic in the vicinity of the site during all field operations, truck loading/unloading, etc.

10. Dewatering will be performed in full compliance with applicable laws, rules and regulations. A dewatering permit will be obtained from the New York City Department of Environmental Protection (NYCDEP) prior to construction activities, if required.

11. A stabilized construction entrance and decontamination area will be constructed. All vehicles will be cleaned on-site to avoid any tracked materials (e.g., soils) spilling on roadways. Also, erosion controls must be installed, if necessary.

12. Applicant, relevant applicant's consultant and contractors are responsible for obtaining all permits necessary for the performance of the work, as well as, paying all associated fees

(e.g., demolition, temporary water connection, dewatering, and temporary electric connection).

13. Applicants and relevant applicant's consultant shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work. A copy of the Health and Safety Plan (HASP) must be provided to the subcontractor(s). A copy of the HASP should be available at the site at all times. All contractors performing work on this site shall implement their own HASP that, at a minimum, adheres to the Construction HASP. The contractor is responsible for their own health and safety and that of their subcontractors.

Sincerely,
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology D.P.C.

Jason J. Hayes, P.E.
Principal/Vice President

cc: C. Sullivan (OER)
G. Nicholls, S. Day, D. Palazzolo (Langan)
S. Fehmel (451 Tenth Avenue LLC)

Enclosures: Appendix 1 – Generic Procedures for Management of USTs
Appendix 2 – Historic Fill Transfer and Disposal Notification Form
Appendix 3 – Monthly Report Template
Appendix 4 – Daily Report Template
Appendix 5 – Soil Disposal and Trucking Log Sheet
Appendix 6 – Vapor Barrier Manufacturer's Specifications
Appendix 7 – Truck Route

APPENDIX 1

GENERIC PROCEDURES FOR MANAGEMENT OF UNDERGROUND STORAGE TANKS IDENTIFIED UNDER THE NYC VCP

Prior to Tank removal, the following procedures should be followed:

- Assess and evaluate health and safety considerations of the tank removal operation and perform a field tailgate meeting with all workers at the beginning of each work day.
- Remove all fluid to its lowest draw-off point.
- Drain and flush piping into the tank.
- Vacuum out the "tank bottom" consisting of water product and sludge.
- Excavate down to the top of the tank and expose the upper half.
- Remove the fill port and disconnect the fill, gauge, product, vent lines and pumps. Cap and plug open ends of lines.
- Render the tank safe and check the tank atmosphere to ensure that petroleum vapors have been satisfactorily purged from the tank.
- Temporarily plug all tank openings, complete the excavation, remove If the tank and place it in a secure location.
- Clean tank and cut to render the tank inoperable and fully ventilated.
- The cleaned tank, now scrap metal, must be transported by licensed waste transporter. Plug and cap all holes prior to transport leaving a 1/8 inch vent hole located at the top of the tank during transport.

During the tank and pipe line removal, the following field observations should be made and recorded:

- A description and photographic documentation of the tank and pipe line condition (pitting, holes, staining, leak points, evidence of repairs, etc.).
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.).
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation, with a calibrated photoionization detector (PID).

<u>Impacted Soil Excavation Methods</u>

The excavation of impacted soil will be performed following the removal of the existing tanks. Soil excavation will be performed in accordance with the procedures described under Section 5.5 of Draft DER-10 as follows:

- Documentation of the removal, including a description and photographs of the excavation.
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.).
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation, with calibrated PID.

Final excavation depth, length, and width will be determined in the field, and will depend on the horizontal and vertical extent of contaminated soils as identified through physical examination (PID response, odor, staining, etc.). Collection of verification samples will be performed to evaluate the success of the removal action as specified in this document.

The following procedure will be used for the excavation of impacted soil (as necessary and appropriate):

- Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.
- Prior to excavation, ensure that the area is clear of utility lines or other obstructions. Lay plastic sheeting on the ground next to the area to be excavated.
- Using a rubber-tired backhoe or track mounted excavator, remove overburden soils and stockpile, or dispose of, separate from the impacted soil.
- If additional UST's are discovered, the OER will be notified and the best course of action to remove the structure should be determined in the field. This may involve the continued trenching around the perimeter to minimize its disturbance.
- If contaminated soil is present (e.g., staining, odors, sheen, PID response, etc.), an attempt will be made to remove it, to the extent not limited by the site boundaries or the bedrock surface. If possible, impacted soil will be removed using the backhoe or excavator, segregated from clean soils and overburden, and staged on separated dedicated plastic sheeting or live loaded into trucks for off-site disposal. Removal of the impacted soils will continue until visibly clean material is encountered and monitoring instruments indicate that no contaminants are present.
- Excavated soils that are temporarily stockpiled on-site will be covered with tarp material while disposal options are determined. The tarp will be checked on a daily basis and replaced, repaired or adjusted as needed to provide full coverage. The sheeting will be shaped and secured in such a manner as to drain runoff and direct it toward the interior of the property.
- Once the site representative and regulatory personnel are satisfied with the removal effort (based on field observations), confirmatory analytical samples will be collected from the excavation in accordance with DER-10. If confirmatory sample results are not acceptable to NYSDEC and OER, additional excavation of impacted material may be required.

APPENDIX 2

HISTORIC FILL TRANSFER AND DISPOSAL NOTIFICATION FORM

Historic Fill & Soil Disposal Notification Form
New York City Office of Environmental Remediation

Date: _____

To operators and representatives of disposal facilities and government regulators:

The New York City Office of Environmental Remediation (OER) operates several environmental remediation regulatory programs in New York City that manage light to moderately contaminated properties that are planned for redevelopment. These projects commonly involve the removal of historical fill and soil from properties for development and other purposes. As with any environmental regulatory program, lawful transport and disposal of historic fill and soil is mandatory. It is also our highest priority.

Disposal facilities, recycling facilities and clean fill facilities (collectively, "receiving facilities") for historic fill and soil may be located in New York or neighboring states. Our research has indicated that a wide range of facility types and a complex set of regulatory requirements and obligations for a receiving facility operation exist within each jurisdiction. Receiving facilities are required to comply with applicable laws and regulations and may operate under state and local authority via permits, licenses, registrations, agreements and other legal instruments that dictate requirements for the material they can receive. Operating requirements may include adherence to applicable chemical standards, guidance levels, criteria, policy or other bases to determine the suitability for receipt of historical fill or soil at a receiving facility. Such requirements may also specify sample frequency, location, sampling method, chemical analytes, or analytical methods. Receiving facility soil/fill sampling requirements often differ from standard remedial investigation protocol performed in the original environmental study of the property.

Given the variability of data requirements for receiving facilities, the wide range of receiving facility types, and the complexity of regulatory requirements and obligations, OER is seeking to assist government regulators and facility operators and their technical representatives to achieve compliance with regulatory requirements for disposal of historic fill and soil at receiving facilities for projects we administer. Further, we seek to ensure that all of the data and information that is developed in OER's regulatory programs (for instance, site environmental history and soil chemistry) is available to government regulators and to facility managers when making decisions on suitability for disposal to a receiving facility.

This document provides formal notification from OER of the availability of environmental information regarding the physical and chemical content of historical fill and soil that is proposed for transfer to a disposal, recycling or clean fill facility from a property located at:

451 Tenth Avenue
New York, NY
OER Site No. 19TMP1493M, 19EHAN346M

The above referenced property has undergone regulated environmental investigation and is the subject of remedial action work plan under the authority of OER. All environmental data and information generated during this regulatory process is available online in OER's Document Repository listed below. Be advised that many properties are also regulated under state

environmental law, and additional data may be available from state agencies. OER reserves the right to share this information with applicable state regulators.

https://a002-epic.nyc.gov/app/workspace/9592/docrepository

Note: when logged on to above URL, select the borough for the site (listed in the address above) and scroll through the list and select the address for the site (listed above). All documents are available in PDF format.

According to New York State DER-10 Technical Guidance for Site Investigation and Remediation, historical fill is non-indigenous fill material deposited on a property to raise its topographic elevation. The origin of historical fill is unknown but it is commonly known to contain ash from wood and coal combustion, slag, clinker, construction debris, dredge spoils, incinerator residue, and demolition debris. Historic fill is a regulated solid waste in the State of New York. Prior to making a determination regarding the suitability of historic fill and/or soil from this property for disposal at this receiving facility, we strongly recommend that you review all of the data and information available for this property in our Document Repository listed above. The repository includes:

- A Phase I Environmental Site Assessment, which includes a history of use of the property;
- A Remedial Investigation Report for the property which includes:
    - Boring logs that describe physical observations of the historical fill material made by a trained environmental professional;
    - Chemical data for grab samples of historical fill collected during the remedial investigation;
- A Remedial Action Work Plan for the property.

If you have any questions, please contact Colin Sullivan at (212) 341-2082 or CSullivan@dep.nyc.gov for more information.

APPENDIX 3

MONTHLY REPORT TEMPLATE

MONTHLY STATUS REPORT

Prepared By: Enter Your Name Here

VCP Project No.:	NA	E-Number Project No.:	19TMP1493M, 19EHAN346M	Date:	01/01/2014

Project Name:	451 Tenth Avenue New York, New York

Project Updates (Since Last Report):
Provide details about the work activities performed.

Problems Encountered:
No problems encountered or provide details

Planned Activities for the Next three months:
Provide details about the future work activities.

Photo Log

Photo 1 – provide a caption	Insert Photo Here – Photo of the entire site
Photo 2 – provide a caption	Insert Photo Here – Photo of the work activities performed
Photo 3 – provide a caption	Insert Photo Here – Photo of the work activities performed

APPENDIX 4

DAILY REPORT TEMPLATE

DAILY STATUS REPORT

Prepared By: Enter Your Name Here

WEATHER	Snow		Rain		Overcast		Partly Cloudy	X	Bright Sun	
TEMP.	< 32		32-50		50-70	X	70-85		>85	

VCP Project No.:	NA	E-Number Project No.:	19TMP1493M, 19EHAN346M	Date:	01/01/2014
Project Name:	451 Tenth Avenue, New York, New York				

Consultant: Person(s) Name and Company Name	Safety Officer: Person(s) Name and Company Name
General Contractor: Person(s) Name and Company Name	Site Manager/ Supervisor: Person(s) Name and Company Name

Work Activities Performed (Since Last Report):
Provide details about the work activities performed.

Working In Grid #: A1, B1, C1

Samples Collected (Since Last Report):
No samples collected or provide details

Air Monitoring (Since Last Report):
No air monitoring performed or provide details
Prestart Conditions – PID = 0.0 ppm, Dust = 0.000
High Conditions – PID = 0.0 ppm, Dust = 0.000

Problems Encountered:
No problems encountered or provide details

Planned Activities for the Next Day/ Week:
Provide details about the work activities planned for the next day/ week.

Example:

Facility # Name/ Location Type of Waste Solid Or Liquid	Facility # Name Location Type of Waste Solid *Or* Liquid		Facility # Name Location Type of Waste Solid *Or* Liquid		Facility # Name Location Type of Waste Solid *Or* Liquid		Facility # Name Location Type of Waste Solid *Or* Liquid		# # # # # # # ABC Facility New York, NY petroleum soils Solid	
(Trucks, Cu.Yds. Or Gallons)	Trucks	Cu. Yds. *Or* Gallons	Trucks	Cu. Yds. *Or* Gallons	Trucks	Cu. Yds. *Or* Gallons	Trucks	Cu. Yds. *Or* Gallons	Trucks	Cu. Yds.
Today									5	120
Total									25	600

NYC Clean Soil Bank		Receiving Facility: Name/ Address (Approved by OER)				
Tracking No.:	16CCSB000					
Today		Trucks 5	Cu. Yds. 25	Total	Trucks 120	Cu. Yds. 600

Site Grid Map

Insert the site grid map here

LANGAN

Photo Log

Photo 1 – provide a caption	Insert Photo Here – Photo of the entire site
Photo 2 – provide a caption	Insert Photo Here – Photo of the work activities performed
Photo 3 – provide a caption	Insert Photo Here – Photo of the work activities performed

APPENDIX 5

SOIL DISPOSAL AND TRUCKING LOG SHEET

Soil Disposal and Trucking Log Sheet

Shipment Date	Manifest Number	Transporter Name/Truck Name	License Plate	On-Site Location (approx. depth)	Off-Site Disposal Facility	Material Type (Contaminated soil, native soil, C&D, etc.)	Tonnage
8/25/2013	66357	ABC Trucking/201	NJ-AP458	WC-1(0-8')	Jones Landfill	Contaminated Soil	32.90

Appendix 6

Vapor Barrier Manufacturer's Specifications

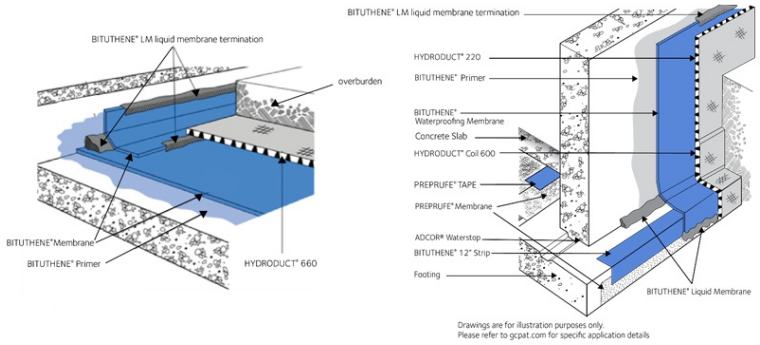
BITUTHENE® 4000 System (US version)

Membrane and Surface Conditioner System

Product Description

GCP Applied Technologies' ("GCP") BITUTHENE® 4000 system combines a robust, flexible, pre-formed membrane made of a high performance, cross laminated, HDPE carrier film with a tacky, self-adhesive rubberized asphalt compound and BITUTHENE® 4000 surface conditioner.

BITUTHENE® 4000 surface conditioner is water-based primer that is specifically formulated to promote adhesion by binding dust and concrete efflorescence to help provide a suitable surface for the BITUTHENE® 4000 waterproofing membrane. For convenience, BITUTHENE® 4000 surface conditioner is packaged inside each roll of BITUTHENE® 4000 membrane.



Product Advantages

- Provides a barrier to water, moisture and gas — physically isolating the structure from the surrounding substrate
- Excellent adhesion — Special adhesive compound engineered for use with BITUTHENE® 4000 surface conditioner
- Cross-laminated, high density polyethylene carrier film provides high tear strength, puncture and impact resistance
- Cold applied — Simple application to substrates, including low temperature applications
- Reduced inventory and handling costs due to the inclusion of primer in the packaging
- Wide application temperature range — Excellent bond at temperatures as low as 25 °F (-4 °C)
- Designed to accommodate a wide range of building configurations and details
- RIPCORD® integrated filament —Split release on demand feature allows for ease of installation in detailed areas

System Components

Membrane

BITUTHENE® 4000 membrane – Self-adhered, rubberized asphalt waterproofing membrane

Ancillary components (Data sheets for all system components are available at gcpat.com.)

- BITUTHENE® 4000 surface conditioner – Water-based latex primer adhesive with added alcohol to allow application at low temperatures
- BITUTHENE® B2 LVC adhesive primer - Low VOC, solvent-based primer to increase adhesion of the BITUTHENE® 4000 membrane to concrete surfaces
- BITUTHENE® LM liquid membrane – Two-component, elastomeric, liquid-applied detailing compound
- BITUTHENE® mastic – Rubberized, asphalt-based mastic
- BITUTHENE® Edgeguard tape – Double-sided self-adhesive tape
- HYDRODUCT® drainage composite – High impact and creep-resistant geo-composite and protection layer
- BITUTHENE® Deck Prep surface treatment – Surface leveler for application to uneven or rough concrete surfaces

Limitations of Use

- The BITUTHENE® 4000 membrane and BITUTHENE® 4000 surface conditioner are specifically designed for use as detailed in this product data sheet, and are not intended for any other use. Contact GCP Technical Support if any other use is anticipated or intended.
- The BITUTHENE® 4000 membrane is designed for waterproofing surfaces where in-service temperatures will not exceed 130°F (54°C).
- Do not use BITUTHENE® mastic to terminate the BITUTHENE® 4000 membrane to PREPRUFE® pre-applied waterproofing systems. Terminations to PREPRUFE® membranes should only be done with BITUTHENE® LM liquid membrane.

Special note: When this information is printed from the gcpat.com global website, a footer appearing on this document may contain wording restricting its applicability to the United States. Note that the information and references in this document also apply to North, Central and South America.

Safety and Handling Information

Read and understand the product label and safety data sheet (SDS) for each system component. All users should acquaint themselves with this information prior to working with the products and follow the precautionary statements. SDSs can be obtained by contacting your local GCP representative or office, by calling GCP toll free at 1-866-333-3SBM (3726) and in some cases from our website at gcpat.com.

Storage

The BITUTHENE® 4000 membrane should be stored upright. Storage temperatures should not be below 25°F (-4°C) and should not exceed 90°F (32°C).

Installation

Technical Support, Details, and Technical Letters

The most up-to-date detail drawings and technical letters are available at gcpat.com. For complete application instructions, please refer to the current GCP Applied Technologies Contractor Handbook and Literature at www.gcpat.com. Documents in hardcopy as well as information found on websites other than www.gcpat.com may be out of date or in error. Before using this product, it is important that information be confirmed by accessing www.gcpat.com and reviewing the most recent product information, including and not limited to product data sheets and contractor manuals, technical bulletins, detail drawings and detailing recommendations. Please review all materials prior to installation of BITUTHENE® 4000 membranes. For technical assistance with detailing and problem solving, please call toll-free at (866) 333-3SBM (3726).

Temperature

- Apply BITUTHENE® 4000 membranes and BITUTHENE® surface conditioner only in dry weather and when air and surface temperatures are 25°F (-4°C) or above.
- BITUTHENE® B2 LVC adhesive primer and BITUTHENE® 4000 surface conditioner should only be applied in dry weather when the temperature is above 25°F (-4°C). See separate product information sheets and applicable application instructions.

Surface Preparation

Surfaces must 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. Concrete must be properly cured (minimum seven-days for normal weight structural concrete and 14 days for lightweight structural concrete). For horizontal applications, double the above cure times of concrete if placed over non-vented decks. Certain conditions, such as unusually wet weather or late removal of forms, may require longer dry times.

Dry weather application of BITUTHENE® 4000 membranes and BITUTHENE® 4000 surface conditioner is preferred. On vertical applications, if time is critical and damp conditions are unavoidable, BITUTHENE® B2 LVC adhesive primer may be used in place of BITUTHENE® surface conditioner. The use of BITUTHENE® B2 LVC adhesive primer may allow priming and installation of BITUTHENE® 4000 membranes on damp surfaces or green concrete. When using BITUTHENE® B2 LVC adhesive primer, priming may begin as soon as the concrete will maintain structural integrity.

Only use form release agents that will not transfer to the concrete. Remove forms as soon as possible from below horizontal slabs to prevent entrapment of excess moisture. Excess moisture may lead to blistering of the membrane.

Cure concrete with clear, resin-based curing compounds that do not contain oil, wax or pigment. See Technical Letter 5, Curing Compounds and Form Release Agents. Before application of BITUTHENE® surface conditioner and BITUTHENE® 4000 membranes, allow concrete to thoroughly dry following any rain (except with BITUTHENE® B2 LVC adhesive primer as noted above). Do not apply any products to frozen concrete.

Repair substrate defects such as spalled or poorly consolidated areas. Remove sharp protrusions and form match lines. For rough or uneven deck surfaces, use BITUTHENE® Deck Prep surface treatment as a repair and leveling agent. See BITUTHENE® Deck Prep surface treatment product information sheet for details. On masonry surfaces such as rough concrete block and brick walls, apply a parge and trowel cut mortar joints flush to the face of the concrete blocks and bricks.

Surface Conditioning

BITUTHENE® 4000 surface conditioner is ready to use, and can be applied by spray or roller. For best results, use a pump-type air sprayer with a fan tip nozzle. Apply BITUTHENE® 4000 surface conditioner to clean, dry, frost- free surfaces at a coverage rate of 300 ft^2/gal (7.4 m^2/L). Coverage should be uniform. The surface conditioner should not be applied so heavily that it puddles or runs. Do not apply conditioner directly to BITUTHENE® 4000 membranes. Allow BITUTHENE® 4000 surface conditioner to dry until the substrate returns to its original (dry) color. At low temperatures or in high humidity conditions, dry time may be extended to greater than one hour.

BITUTHENE® 4000 surface conditioner is clear when dry and may remain slightly tacky. In general, conditioning should be limited to what can be covered within 24-hours. In situations where long dry times may prevail, substrates may be conditioned up to 24-hours in advance. Substrates must be reconditioned if dirt or dust accumulates on the conditioned surface. Tools should be cleaned with water before the surface conditioner dries.

Application on Horizontal Surfaces

Note: PREPRUFE® 300R and 300R Plus pre-applied membranes are strongly recommended and are the preferred products for below slab applications or for any application where the membrane is applied before concrete is poured. See PREPRUFE® membrane waterproofing product information sheets at gcpat.com.

All horizontal surfaces to receive BITUTHENE® 4000 membranes should be sloped to drain at least 1/8 in./ft. (11 mm/m). When a minimum slope of 1/8 in. /ft. (11 mm/m) cannot be achieved, two layers of BITUTHENE® 4000 membranes or 80-mils of BITUTHENE® Deck Prep surface treatment and one layer of BITUTHENE® 4000 membranes maybe an option. Contact your local GCP representative for more details.

Apply the membranes from the low point to the high point so that laps shed water. Overlap all seams at least 2.5 in. (65 mm). Stagger all end laps. Roll the entire membrane firmly, and completely as soon as possible. Use a linoleum roller or standard water-filled garden roller less than 30 in. (760 mm) wide, weighing a minimum of 75 lbs (34 kg) when filled. Cover the face of the roller with a "conforming" material such as 1/2 in. (13 mm) plastic foam sheeting or two wraps of indoor-outdoor carpet to allow the membrane to fully contact the primed substrate. Seal all T-joints and membrane terminations with BITUTHENE® LM liquid membrane by the end of the day of membrane application.

Application on Vertical Surfaces

Apply BITUTHENE® 4000 membranes in lengths up to 8 ft (2.5 m). Overlap all seams at least 2.5 in. (65 mm). On walls higher than eight feet, apply membranes in two or more "shingled" lifts, with the upper sheet overlapping the lower by at least 2.5 in. (65 mm). Roll all membranes with a hand roller.

Terminate the membranes at grade level. Press each membrane firmly to the wall with the butt end of a hardwood tool such as a hammer handle or secure into a reglet. Failure to use heavy pressure at terminations can result in a poor seal.

All top-of-wall terminations should be sealed with BITUTHENE® LM liquid membrane or BITUTHENE® mastic. A termination bar may be used to ensure a tight seal. If the wall has been only partially covered by the end of the working day, apply a maximum ¼" bead of BITUTHENE® mastic tooled thin or BITUTHENE® LM liquid membrane along the exposed edges of the membrane at its temporary terminations to prevent vertical drainage of precipitation, which could undermining the membrane adhesion. Terminate the membranes at the base of the wall if the bottom of the interior floor slab is at least 6 in. (150 mm) above the footing.

Otherwise, use appropriate inside corner detail where the wall and footing meet. A 1/8 in. (3 mm) x 1 in. (25 mm) aluminum termination bar aligned with the top of the membrane is recommended for terminations on CMU, in earth covered decks and in earth-bermed applications where soil cannot be fully compacted. See technical letter 26 about BITUTHENE® membrane terminations for additional information.

Membrane Repairs

Patch tears and inadequately lapped seams with additional membrane. Clean any damaged membrane with a damp cloth and dry. Slit fish-mouths and repair with a patch extending 6 in. (150 mm) in all directions from the slit, and seal edges of the patch with BITUTHENE® LM liquid membrane. Inspect all membranes thoroughly before covering, and repair any damaged areas.

Drainage

HYDRODUCT® drainage composites are recommended for both active drainage and protection of the membranes. See HYDRODUCT® drainage composite product data sheet at gcpat.com.

Insulation

Always apply BITUTHENE® 4000 membranes directly to primed or conditioned structural substrates. Insulation, if used, must be applied over the membranes. Do not apply BITUTHENE® membranes over insulation or lightweight insulating concrete.

Flood Testing (Horizontal Surfaces Only)

Flood test all horizontal applications with a minimum 2 in. (51 mm) head of water for 24-hours. Mark any leaks and repair when the membrane is dry. Before flood testing, be sure the structure will withstand the dead load of the water. For highly sloped decks, segment the flood test to avoid excessively deep water near drains. Conduct the flood test 24-hours after completing the application of BITUTHENE® 4000 membranes. Immediately after flood testing is completed and all necessary repairs have been made, install HYDRODUCT® drainage composite to protect the BITUTHENE® membranes from damage by other trades.

As an alternate to flood testing, appropriate electronic leak detection may be used to check the integrity of the system.

Protection of Membrane

To prevent damage from other trades, construction materials or backfill, protect BITUTHENE® 4000 membranes immediately after application. To avoid potential blisters, place protection immediately where temperatures are above 77°F (25°C).

- On vertical applications, use HYDRODUCT® 220 drainage composite. Adhere HYDRODUCT® 220 Drainage Composite to membranes with PREPRUFE® Detail Tape. Alternative methods of protection are to use nominal 1.0 lb/ft^3 (16kg/m^3), min. 1 in. (25 mm) extruded polystyrene or min.1/4 in. (6 mm) asphaltic hardboard. Such alternatives do not provide positive drainage to the system. If 1/4 in. (6 mm) extruded polystyrene protection board is used, backfill must not contain sharp rock or aggregate over 2 in. (50 mm) in diameter or any debris that might puncture the protection board and/or the membranes. See Technical 27 Letter Protection Courses used with GCP Waterproofing Systems for additional information.
- On horizontal applications, use HYDRODUCT® 660 Drainage Composite. Alternate methods of protection are to use 1 in (25 mm) extruded polystyrene or ¼" asphaltic hardboard.

Placing Steel

On horizontal applications when placing steel over properly protected membranes, use concrete bar supports (dobies) or chairs with plastic tips or rolled feet to prevent damage from sharp edges. Use special care when using wire mesh, especially if the mesh is curled.

Backfill

Place backfill as soon as possible. (See Protection of Membrane above) Use care during backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. Backfill should be added and compacted in 6 in. (150 mm) to 12 in. (300 mm) lifts.

Approvals

- City of Los Angeles Research Report RR 24386 Miami-Dade County Code Report NOA 18-1109.01
- U.S. Department of Housing and Urban Development (HUD) HUD Materials Release 628j
- BITUTHENE® 4000 membranes carry a Underwriters' Laboratory Class A Fire Rating (Building Materials Directory (File TFGU.R7910) when used in either of the following constructions:
  1. Limited to noncombustible decks at inclines not exceeding 1/4 in. (6 mm) to the horizontal 1 ft (0.3 m). One layer of BITUTHENE® waterproofing membrane, followed by one-layer of 1/8 in. (3 mm) protection board, encased in 2 in. (50 mm) minimum concrete monolithic pour.
  2. Limited to noncombustible decks at inclines not exceeding 1/4 in. (6 mm) to the horizontal 1 ft (0.3 m). One layer of BITUTHENE® waterproofing membrane, followed by one layer of DOW styrofoam PD insulation board [2 in. (50 mm) thick]. This is covered with one layer of 2 ft x 2 ft x 2 in. (0.6 m x 0.6 m x 50 mm) of concrete paver topping.

Physical Properties for BITUTHENE® 4000 Membrane

PROPERTY	TYPICAL VALUE	TEST METHOD
Color	Dark gray-black	
Dimensions	3 ft x 66.7 ft roll (200 ft^2)	
Thickness	60 mils (1.5 mm) nominal	ASTM D3767—method A
Flexibility, 180° bend over 1 in. (25 mm) mandrel at -25°F (-32°C)	Unaffected	ASTM D1970
Tensile strength, Membrane, die C	325 psi (2240 kPa) minimum	ASTM D412[1]
Tensile strength, film	5,000 psi (34.5 MPa) minimum	ASTM D882[1]
Elongation, ultimate failure of rubberized asphalt	300% minimum	ASTM D412[1]
Crack cycling at -25°F (-32°C), 100 cycles	Unaffected	ASTM C836
Lap shear	20 lbs (89 N)	ASTM D1002[2]
Peel strength	11 lbs/in. (1926 N/m)	ASTM D903[4]
Puncture resistance, Membrane	50 lbs (222 N) minimum	ASTM E154
Resistance to hydrostatic head	230 ft (70m) of water	ASTM D5385
Permeance	<0.1 perms	ASTM E96, section 12—water method
Water absorption	<0.1%	ASTM D570

Footnotes:

1. The test is run at a rate of 2 in. (50 mm) per minute.
2. The test is conducted at a speed of 4 in. (102 mm) per minute.
3. Individual Roll Length may vary +/- 1%
4. Test conducted with BITUTHENE® 4000 surface conditioner at minimum application temperature

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Last Updated: 2019-05-30
gcpat.com/solutions/products/bituthene-post-applied-waterproofing/bituthene-4000-membrane

PREPRUFE® 200 Membrane (US Version)

Fast, simple, pre-applied waterproofing membrane and vapor barrier that bonds to poured concrete for use below slabs or behind basement walls on confined sites

Product Description

PREPRUFE®200 Membrane is a composite sheet comprised of a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.

Using patented Advanced Bond Technology, PREPRUFE®200 Membrane provides a continuous seal that resists water ingress and migration between the membrane and the structure.

The Preprufe®200 System includes—

- PREPRUFE® 200 Membrane—robust membrane for horizontal use below concrete slabs or vertically against soil retention systems.
- PREPRUFE® CJ Tape LT—self-adhesive 8 in. (200 mm) wide strip applied to the surface of the membrane along the line of all concrete joints (application temperature range 25°F to 86°F (-4°C to +30°C)).
- PREPRUFE® CJ Tape HC—as above for use in hot climates (minimum 50°F (10°C)).
- BITUTHENE® Liquid Membrane—for sealing around penetrations, etc.

PREPRUFE®200 Membrane is applied either horizontally to smooth prepared concrete, well-rolled and compacted sand, or compacted crushed stone blinding; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes.

The specially developed PREPRUFE®adhesive layers work together to form a continuous and integral seal to the poured concrete.

Product Advantages

- Prevents water migration—PREPRUFE® 's Advanced Bond Technology™ forms a unique integral seal to concrete poured against it
- Fast and easy installation—loose laid, mechanically fastened laps
- Avoids delays—unaffected by wet or cold conditions, can even be laid during rain
- Excellent vapor barrier—typical MVER 0.11 lb/1000 ft^2/24 hr ASTM F1869-98

- Inherently waterproof, non-reactive system—
  - Cannot activate prematurely or be washed away
  - Not reliant on confining pressures or hydration
  - Unaffected by freeze/thaw, wet/dry cycling
- Chemical resistant—effective in all types of soils and waters, protects structure from salt or sulphate attack
- Self protecting—ready for immediate placement of reinforcing steel and concrete without costly protective layers

Applications

Typical applications include garages, plant rooms, utility grade basements, tunnels; vapor barrier for ground bearing floor slabs with moisture sensitive finishes, e.g. schools, hospitals, wood flooring, etc.

For more critical waterproofing applications consider PREPRUFE®300R. See separate data sheet.

Limitations

PREPRUFE®200 Membrane is intended for low, medium or intermittent water pressures.

PREPRUFE®200 Membrane can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use BITUTHENE®self-adhesive membrane or PROCOR ®fluid applied membrane to walls after removal of formwork for a fully-bonded system to all structural surfaces.

Use

PREPRUFE®200 Membrane is supplied in rolls 4 ft (1.2 m) wide, interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

Substrate Preparation

All surfaces—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). Grout around all penetrations such as utility conduits, etc. for stability.

Horizontal—The substrate must be free of loose aggregate and sharp protrusions. An angular profiled blinding is recommended rather than a sloping or rounded substrate. The surface does not need to be dry but standing water must be removed.

Vertical—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.

Membrane Installation

PREPRUFE®200 Membrane can be applied at temperatures of 25°F (-4°C) or above. Membrane installation is unaffected by wet weather.

Horizontal substrates—Place the membrane HDPE film side to the substrate with printed coated side up facing towards the concrete pour. End laps should be staggered to avoid a build up of layers.

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked lap line. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

Lap fastening—To prevent the membrane from moving and gaps opening, the laps should be fastened together at maximum 39 in. (1.0 m) on-center. Fix through the center of the lap area using 0.5 in. (12 mm) long washer-head self-tapping screws, or similar, allowing the head of the screw to bed into the adhesive compound to self seal.

It is not necessary to fix the membrane to the substrate, only to itself. Ensure the membrane lays flat and no openings occur. Additional fastening may be required at corners, details etc.

Galvanized fasteners are suitable for most applications. Stainless steel or other non-corrosive fasteners are recommend for aggressive soil conditions containing chloride or sulphate.

Alternatively, 3 in. (75 mm) strips of PREPRUFE®Tape may be used 39 in. (1.0 m) on center to prevent gaps or movement. Or, PREPRUFE®Tape may be used to seal the entire length of the overlap. Apply tape centrally over lap and roll firmly. Remove plastic liner.

Vertical substrates—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the printed coated side facing towards the concrete pour. The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or similar 2 in. (50 mm) below the top edge. Fastening should be made through the overlap area at 20 in. (0.5 m) maximum on-center so that the membrane lays flat without fishmouths. Immediately remove the plastic release liner.

Roll ends and cut edges—Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and fasten as above.

Penetrations

Use the following steps to seal around penetrations such as service pipes, piles, lightning conductors, etc.

Grout around the penetration if the penetration is not stable. Fit the membrane tight to the penetration. If the membrane is not within 0.5 in. (12 mm) of the penetration, apply PREPRUFE®Tape to cover the gap.

Wrap the penetration with PREPRUFE®Tape by positioning the tape 0.5 in. (12 mm) above the membrane.

Apply BITUTHENE®Liquid Membrane around the penetrations using a fillet to provide a watertight seal between the PREPRUFE®membrane and PREPRUFE®Tape.

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing with water if necessary.

Repair damage by placing a patch of PREPRUFE®200 Membrane over the damaged area ensuring a minimum 3 in. (75 mm) overlap. Secure the patch using screw fasteners as above.

Any areas of damaged adhesive should be covered with PREPRUFE®Tape. Remove printed plastic liner from tape.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of PREPRUFE® 200 Membrane and Tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

PREPRUFE®200 Membrane can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. PREPRUFE®200 Membrane is not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 1500 psi (10 N/mm^2) is recommended prior to stripping formwork supporting PREPRUFE®200 Membrane. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

As a guide, to reach the minimum compressive strength stated above, a structural concrete mix with an ultimate strength of 6000 psi (40 N/mm^2) will typically require a cure time of approximately 6 days at an average ambient temperature of 25°F (-4°C), or 2 days at 70°F (21°C).

Supply

DIMENSIONS (NOMINAL)	PREPRUFE® 200 MEMBRANE	PREPRUFE® CJ TAPE (LT OR HC*)	PREPRUFE® TAPE (LT OR HC*)
Thickness	0.032 in. (0.8 mm)		
Roll size	4 ft x 115 ft (1.2 m x 35 m)	8 in. x 49 ft (200 mm x 15 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	460 ft^2 (42 m^2)		
Roll weight	92 lbs (42 kg)	8.6 lbs (4 kg)	4.3 lbs (2 kg)

Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)

* LT denotes Low Temperature (between 25°F and 86°F), HC denotes Hot Climate (>50°F)

ANCILLARY PRODUCTS
BITUTHENE® Liquid Membrane (LM) 1.5 gal (5.7 liter)
Screw Fasteners (by others)
Self Tapping Washer Head Screws 0.5 in. (12 mm) long, galvanized or stainless steel as appropriate

Physical Properties

PROPERTY	TYPICAL VALUE	TEST METHOD
Color	White	
Film thickness (nominal)	0.020 in. (0.5 mm)	ASTM D3767—method A
Low temperature flexibility	Unaffected at -10°F (-23°C)	ASTM D1970
Elongation	300% min.	ASTM D412 modified[1]
Crack cycling at -10°F (-23°C)	Pass	ASTM C836
Tensile strength, film	4000 psi (27.6 MPa) min.	ASTM D412
Peel adhesion to concrete	5.0 lbs/in. (880 N/m) min.	ASTM D903 modified[2]
Resistance to hydrostatic head	30 ft (10 m)	ASTM D5385 modified[3]
Puncture resistance	135 lbs (600 N) min.	ASTM E154
Permeance	0,01 perms (0.6 ng/m^{2}Pa)	ASTM E96—method B
Water absorption	0.5% maximum	ASTM D570
Moisture vapor emission rate	0.11 lb/1000 ft^2/24 hr	ASTM F1869-98 modified

Footnotes:

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

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

3. Hydrostatic tests are performed by casting concrete against the membrane with a lap across a 0.040 in. (1 mm) formed crack.

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Last Updated: 2019-03-19

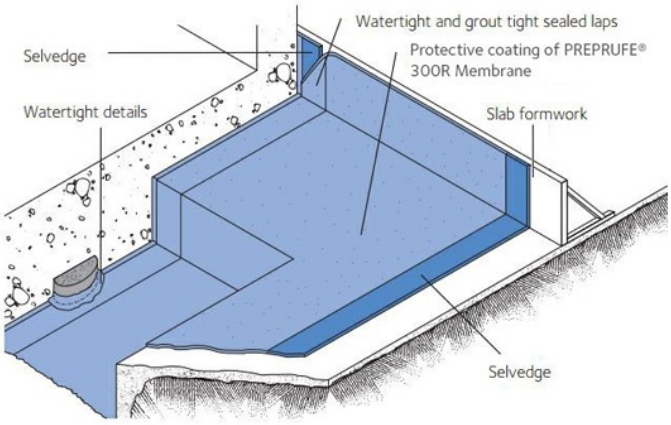
gcpat.com/solutions/products/preprufe-pre-applied-waterproofing-solutions/preprufe-200

PREPRUFE® 300R & 160R Membranes Data Sheet (US Version)

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

Product Description

GCP Applied Technologies ("GCP") PREPRUFE® 300R & 160R membranes are proprietary composite sheets comprised of a thick HDPE film, pressure sensitive adhesive and weather resistant protective coating. Designed with Advanced Bond Technology™, PREPRUFE® 300R & 160R membranes form a proprietary, integral bond to poured concrete, designed to prevent lateral migration of water while providing a robust barrier to water, moisture and gas penetration.



Drawings are for illustration purposes only.
Please refer to gcpat.com for specific application details.

Product Advantages

- Forms a continuous adhesive bond to concrete poured against it specifically designed to prevent water migration
- Continuous bond to poured concrete means PREPRUFE® 300R & 160R membranes are unaffected by ground settlement
- Can be placed directly over properly prepared compacted soil
- Does not activate prematurely during construction
- Fully adhered watertight laps and detailing
- Provides a barrier to water, moisture and gas - physically isolates the structure from the surrounding ground
- BBA Certified for all basement grades (BS 8102:2009)
- Impermeable- Perm rating less than 0.1 Perms
- Solar reflective - reduced temperature gain during construction
- Simple and quick to install – requires no priming on surfaces properly prepared following GCP surface preparation requirements

- Can be applied to permanent formwork - maximizes use of confined sites
- Allows for foot traffic immediately after application
- Ready for immediate placing of reinforcing steel
- Inherently waterproof--does not require water activation
- Waterproofing is not reliant on confining pressures or hydration
- Installed membrane is not affected by exposure to water during construction
- Waterproofing performance unaffected by wet/dry cycling
- Chemical resistance – protects structure from salt and sulfate attack, effective in most types of soils and waters

System Components:

Membrane

- PREPRUFE® 300R membrane- heavy-duty 46 mil grade can be used in horizontal applications below slabs and on rafts (i.e. mud slabs) and can be applied to vertical (blind side) substrates.
- PREPRUFE® 300R membrane is designed to accept the placing of heavy reinforcement using conventional concrete spacers
- PREPRUFE® 160R membrane 32 mil grade for blindside, zero property line applications against soil retention systems.
- PREPRUFE® 160R membrane is for vertical use only.

Ancillary Components (the most current Data Sheets for all system components are available on gcpat.com)

- PREPRUFE® Tape LT – Low temperature tape for covering cut edges, roll ends, penetrations and detailing in cold weather
- PREPRUFE® Tape HC - High temperature tape for covering cut edges, roll ends, penetrations at elevated temperatures
- PREPRUFE® CJ Tape LT – Low temperature joint tape for construction joints and detailing in cold weather conditions
- PREPRUFE® CJ Tape HC – High temperature joint tape for construction joints and detailing at elevated temperatures
- BITUTHENE® Liquid Membrane - for sealing around penetrations, etc.
- ADCOR® - waterstop for joints in concrete walls and floors
- PREPRUFE® Tieback Covers - preformed cover for soil retention wall tieback heads
- PREPRUFE® 300LT and 160LT membranes are an equal alternate for application at low temperatures. See GCPAT.com

Limitations of Use

- Approved uses only include those uses specifically detailed in this Product Data Sheet and other current Product Data Sheets that can be found at gcpat.com
- PREPRUFE® 300R & 160R membranes are not intended for any other use. Contact GCP Technical Services where any other use is anticipated or intended.
- PREPRUFE® 300R membranes are designed for in-service temperatures below 120°F (49°C)
- PREPRUFE® 160R membrane is not for use in horizontal applications
- PREPRUFE® 300R & 160R membranes should not be used with conventional twin-sided formwork. (See PREPRUFE® Technical Letter #13 Forming Systems For Use with PREPRUFE® Membranes)
- Special Note: When this information is printed from the gcpat.com global website, a footer appearing on this document will restrict its applicability to the United States. Note that the information and references in this document are hereby expanded and apply to North, Central and South America.

Safety and Handling

Users must read and understand the product label and Safety Data Sheets (SDS's) for each system component before use. All users must acquaint themselves with this information prior to working with the material. Carefully read detailed precaution statements on the product labels and SDS's before use. The most current SDS's can be obtained from the GCP web site at gcpat.com or by contacting GCP toll free at 1-866-333-3SBM (3726).

Storage

- Observe 1 year shelf life and use on a first in first out basis
- Store in dry conditions at 40°F (4.5°C)-90°F (32°C)
- Store off ground under tarps or otherwise protected from rain and ground moisture
- See PREPRUFE® Technical Letter #30 Shelf Life/Storage and Handling of GCP Waterproofing

Installation

Technical Support, Details and Technical Letters

The most up to date detail drawings and technical letters are available at gcpat.com. For complete application instructions, please refer to the current GCP Applied Technologies Contractor Handbook and Literature on (www.gcpat.com). Documents in hardcopy as well as information found on websites other than www.gcpat.com may be out of date or in error. Before using this product it is important that information be confirmed by accessing www.gcpat.com and reviewing the most recent product information, including without limitation Product Data Sheets and Contractor Manuals, Technical Bulletins, Detail Drawings and detailing recommendations. Please review all materials prior to installation of PREPRUFE® 300R & 160R membranes.

Support is also available by full-time technically trained GCP Applied Technologies field sales representatives and technical service personnel, backed by a central research and development technical services staff. For technical assistance with detailing and problem solving please call toll-free at (866) 333-3SBM (3726).

Temperature Requirements

- PREPRUFE® membranes can be applied at temperatures of 25°F (-4°C) or above. When installing PREPRUFE® products in cold or marginal weather conditions <55°F (<13°C) the use of PREPRUFE® Tape LT is required at all laps and detailing. All surfaces to receive PREPRUFE® Tape LT must be clean and dry.
- As an alternate, where temperatures are between between 25°F (-4°C) and 60°F(15.5°C) PREPRUFE® Low Temperature (LT) Membrane is can be used without taping of laps. Refer to PREPRUFE® LT Membrane data sheet and Technical Letter #16 PREPRUFE® Waterproofing membranes: Cold Weather installation for more information.

Substrate Preparation

All surfaces - 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). Grout around all penetrations such as utility conduits, etc. for stability.

Horizontal - The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. 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.

Vertical - 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" (12mm) out of alignment.

Membrane Application

PREPRUFE® 300R & 160R membranes are supplied in rolls 4 ft. (1.2m) wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of PREPRUFE®Membrane and PREPRUFE® Tape are manufactured with a disposable plastic release liner which must be removed before placing reinforcement and concrete. NOTE that the release liner must also be removed before application of any required tapes and at all surfaces where a bond between layers is to be formed.

Horizontal substrates –

PREPRUFE® 300R membrane can be applied horizontally to smooth prepared concrete or well rolled and compacted earth or crushed stone substrate. Place the PREPRUFE® 300R 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 buildup of layers. Leave plastic release liner in position until overlap procedure is completed. When completed remove release liner. When installing over carton forms, contact your local GCP representative.

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps allowing the two overlapped layers to bond together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the white protective coating. Any initial tack will quickly disappear. Notes:

- PREPRUFE® 300R membrane can be returned up the inside face of slab formwork. To attain a fully bonded system and to allow a tie in with BITUTHENE® self-adhered membrane or PROCOR® fluid-applied membrane to all vertical structural surfaces after removal of formwork.
- Rebar Chairs: See PREPRUFE® Technical Letter #15 Rebar Chairs on PREPRUFE® Membranes.

Vertical substrates –

PREPRUFE® 300R & 160R membranes can be applied vertically to permanent formwork or adjoining structures. Concrete should then be cast directly against the adhesive side of the membrane. The membrane may be installed in any convenient length. The clear plastic release liner must be facing towards the concrete pour. Membrane must be shingle overlapped a minimum of 3" (75mm) All laps over cut edges must be taped using PREPRUFE® Tape.

Vertically placed sheets can be held in place using fasteners appropriate to the substrate. Fastening can also be made through the selvedge overlap area using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Fasteners should be placed in the selvedge approximately 0.5"(12.5mm) from the edge of the membrane. The adhesive selvedge of successive membrane sheets must completely cover any fasteners by a minimum if 1 in. (25mm). After rolling immediately remove the plastic release liner. When placing successive sheets insure the underside of each succeeding sheet is clean, dry and free from contamination before attempting to overlap. After placement roll the membrane firmly to ensure a watertight seal.

Note that PREPRUFE® 300R & 160R membranes are not recommended for use with conventional twin-sided formwork. (See PREPRUFE® Technical Letter #13 Forming Systems For Use with PREPRUFE® Membranes)

Roll ends and cut edges –

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. Allow the membrane to dry and apply PREPRUFE® Tape LT (or HC in hot climates) centered over the lap edges and roll firmly. Immediately remove plastic release liner from the tape.

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and other contaminants and allow the membrane to dry. Repair small punctures and slices (0.5 in. (12 mm) or less by applying PREPRUFE® Tape centered over the damaged area. Repair punctures and holes larger than 0.5 in. (12mm) by applying a patch of PREPRUFE® membrane. Extend the patch 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with PREPRUFE® Tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh PREPRUFE® Tape. Any areas of damaged adhesive should be covered with PREPRUFE® Tape. All PREPRUFE® Tape must be rolled firmly and the tinted release liner removed.

Slices or relief cuts can be butted or overlapped and repaired by applying PREPRUFE® Tape centered over the edge of the overlap or center of the butt joint. Where it is not possible to create a butt joint or overlap, repair with fresh membrane and PREPRUFE® Tape as detailed above.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of PREPRUFE® 300R & 160R Membrane and Tape.

Under most climatic conditions concrete should be poured within 56 days of membrane installation. Where ambient temperatures will exceed 38°C (100ºF) for more than a total of 7 days, concrete should be placed within 42 days of installation of the membrane. Concrete must be placed and compacted carefully to avoid damage to the Membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

A minimum concrete compressive strength of 3000 psi (20 N/mm^2) is recommended prior to stripping formwork supporting PREPRUFE® membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete. (see PREPRUFE® Technical Letter #17 Removal of Formwork Placed against PREPRUFE® membranes)

After removal of the formwork and prior to backfilling, all exposed PREPRUFE® Membrane must be protected from damage with an approved protective course.

Supply

DIMENSIONS (NOMINAL)	PREPRUFE® 300R MEMBRANE	PREPRUFE® 160R MEMBRANE
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)
Minimum side and end laps	3 in. (75 mm)	3 in. (75 mm)

Physical Properties

PROPERTY	TYPICAL VALUE 300R	TYPICAL VALUE 160R	TEST METHOD
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385[1]
Low Temperature Flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to Hydrostatic Head	231 ft (71 m)	231 ft (71 m)	ASTM D5385[2]
Elongation	400%	400%	ASTM D412[3]
Tensile Strength, Film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack Cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836[6]
Puncture Resistance	200 lbs (890 N)	100 lbs (445 N)	ASTM E154
Peel Adhesion to Concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903[4]
Lap Peel Adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876[5]
Permeance to Water Vapor Transmission (HDPE side exposed)	<0.1 perms (5.74 ng/(Pa x s x m^2))	<0.1 perms (5.74 ng/(Pa x s x m^2))	ASTM E96, method B
Water Absorption	0.5%	0.5%	ASTM D570

Footnotes:

1. 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 membrane.
2. Hydrostatic head tests of PREPRUFE Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block (cured min. 7 days) is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
3. Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
4. Concrete is cast against the protective coating surface of the membrane and allowed to properly cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature
5. The test is conducted 15 minutes after the lap is formed and run at a rate of 2 in. (50 mm) per minute.
6. Test conducted at – 9.4°F (-23°C)

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Last Updated: 2019-03-20
gcpat.com/solutions/products/preprufe-pre-applied-waterproofing-solutions/preprufe-300r-160r

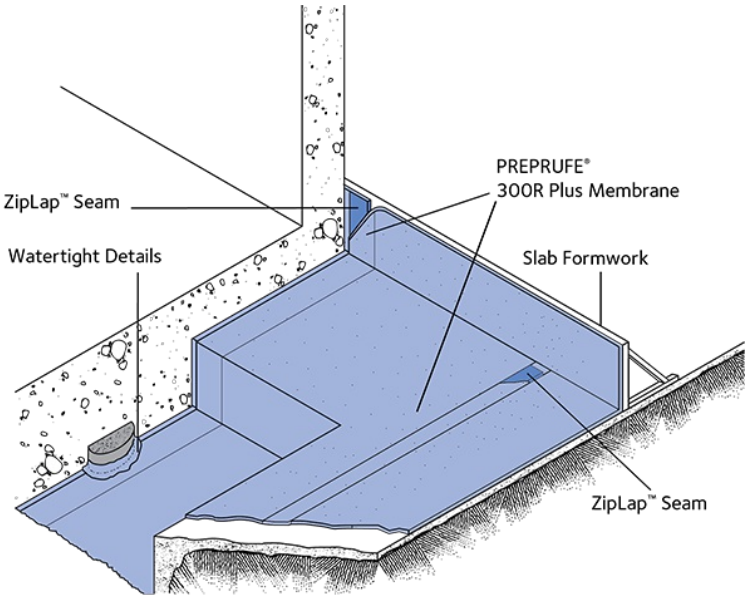
PREPRUFE® 300R Plus & 160R Plus Membranes Data Sheet (US Version)

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

Product Description

GCP Applied Technologies ("GCP") PREPRUFE®300R Plus & 160R Plus pre-applied waterproofing membranes are unique composite sheets comprised of a thick HDPE film, pressure sensitive adhesive, and weather resistant protective coating. Designed with Advanced Bond Technology™ and dual adhesive ZipLap™ seams, PREPRUFE®Plus membranes form a unique, integral bond to poured concrete. This integral bond is specifically designed to provide a robust barrier to water, moisture and gas and prevents both the ingress and lateral migration of water.

PREPRUFE®300R Plus & 160R Plus membranes are release liner free and designed for efficient, reliable installation. PREPRUFE®Plus ZipLap™ seams allow for an adhesive to adhesive bond at membrane sheet overlaps and deliver superior performance in harsh conditions without the need for specialized equipment, heat or power.



Drawings are for illustration purposes only.
Please refer to gcpat.com for specific application details.

Advantages

- The unique continuous adhesive bond to concrete poured against it prevents water migration and makes it unaffected by ground settlement beneath slabs.
- Designed with fully adhered adhesive to adhesive watertight ZipLap™ seams and easy to execute detailing.
- Provides a barrier to water, moisture and gas physically isolating the structure from the surrounding substrate.
- Easy roll/kick out installation reduces installation time and cost.
- Release liner free, expedites installation and reduces construction site waste. .Solar reflective surface results in reduced temperature gain.
- Simple and quick to install requiring no priming or fillets.
- Can be applied to permanent formwork - allows maximum use of confined sites
- Self-protecting - can be trafficked immediately after application and ready for immediate placing of reinforcement
- Membrane is unaffected by wet jobsite conditions - cannot activate prematurely
- Inherently waterproof as supplied. Passive non-reactive waterproofing system does not require water activation
- Waterproofing is not reliant on confining pressures or hydration
- Membrane unaffected by freeze/thaw, wet/dry cycling
- Chemical resistance – designed to help protect structure from salt or sulphate attack effective in most types of soils and waters,
- Resistant to methane and radon gasses. Specific independent laboratory test data available on request

System Components:

Membrane

- PREPRUFE® 300R Plus membrane — heavy-duty 46mil grade membrane designed for horizontal and vertical use. Designed for use below slabs and on rafts (i.e. mud slabs) and for vertical blind side applications. Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- PREPRUFE® 160R Plus membrane — standard 32mil grade membrane designed for vertical use in blindside, zero property line applications against soil retention systems. PREPRUFE® 160R Plus membrane is for vertical use only.

Ancillary Components (refer to the most current Data Sheets for all system components available on gcpat.com)

- PREPRUFE® Tape LT – low temperature tape for covering cut edges, roll ends, penetrations and detailing in cold weather
- PREPRUFE® Tape HC – high temperature tape for covering cut edges, roll ends, penetrations and detailing at elevated temperatures
- PREPRUFE® CJ Tape LT — low temperature joint tape for construction joints, and detailing in cold weather

- PREPRUFE® CJ Tape HC — high temperature joint tape for construction joints, and detailing in hot weather
- BITUTHENE® Liquid Membrane — for sealing around penetrations, etc.
- ADCOR® — waterstop for joints in concrete walls and floors
- PREPRUFE® Tieback Covers — preformed cover for soil retention wall tieback heads
- PREPRUFE® 300R Plus LT Plus and 160R Plus LT membranes are equal alternate membranes with reduced taping requirements for use at low temperatures; see gcpat.com
- De Neef® INJECTO® Tube groutable Waterstop for non-moving concrete construction joints and penetrations

Limitations of Use

- Approved uses only include those uses specifically detailed in this Product Data Sheet and other current Product Data Sheets that can be found at gcpat.com
- PREPRUFE® 300R Plus & 160R Plus membranes are not intended for any other use. Contact GCP Technical Services where any other use is anticipated or intended.
- PREPRUFE® 300R Plus & 160R Plus membranes are designed for in-service temperatures below 120°F (49°C)
- PREPRUFE® 160R Plus membrane should not be used in horizontal applications
- PREPRUFE® 300R Plus & 160R Plus membranes should not be used with conventional two-sided formwork. (See PREPRUFE® Technical Letter # 13 Forming Systems For Use with PREPRUFE® Membranes)
- Special Note: When this information is printed from the gcpat.com global website, a footer appearing on this document will restrict its applicability to the United States. Note that the information and references in this document are hereby expanded and apply to North, Central and South America.

Safety and Handling

Users must read and understand the product label and Safety Data Sheets (SDS's) for each system component before use. All users should acquaint themselves with this information prior to working with the material. Carefully read detailed precaution statements on the product labels and SDS's before use. The most current SDS's can be obtained from the GCP web site at gcpat.com or by contacting GCP toll free at 1-866-333-3SBM (3726).

Storage

- Observe 1 year shelf life and use on a first in first out basis
- Store in dry conditions between 40°F (4.5°C)-90°F (32°C)
- Store off ground under tarps or otherwise protected from rain and ground moisture
- See PREPRUFE® Technical Letter #30 Shelf Life/Storage and Handling of GCP Waterproofing

Installation

Technical Support, Details and Technical Letters

The most up to date detail drawings and technical letters are available at gcpat.com. For complete application instructions, please refer to the current GCP Applied Technologies Contractor Handbook and Literature on (www.gcpat.com). Documents in hardcopy as well as information found on websites other than www.gcpat.com may be out of date or in error. Before using this product it is important that information be confirmed by accessing www.gcpat.com and reviewing the most recent product information, including without limitation Product Data Sheets, Contractor Manuals, Technical Bulletins, Detail Drawings and detailing recommendations. Please review all materials prior to installation of PREPRUFE®300R Plus & 160R Plus membranes. .

Support is also available by full-time technically trained GCP Applied Technologies field sales representatives and technical service personnel, backed by a central research and development technical services staff. For technical assistance with detailing and problem solving please call toll-free at (866) 333-3SBM (3726).

Temperature Requirements

- PREPRUFE® 160R plus and 300R Plus membranes can be applied at temperatures of 25°F (-4°C) or above. When installing PREPRUFE® Plus membranes in cold or marginal weather conditions <40°F (<4°C) the use of PREPRUFE® Tape LT is required at all laps and detailing. All surfaces to receive PREPRUFE® Tape LT must be clean and dry and the release liner must be removed immediately after application.
- As an alternate, where temperatures are between 25°F (-4°C) and 60°F(15.5°C) PREPRUFE® 160R plus (LT) and 300R Plus(LT) Low Temperature Membranes can be used without taping of laps. Refer to PREPRUFE® LT Membrane data sheet and Technical Letter #16 PREPRUFE® Waterproofing membranes: Cold Weather installation for more information.
- PREPRUFE® 300R Plus & 160R Plus membranes are designed for in-service temperatures below 120°F (49°C)

Substrate Preparation

All surfaces - 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). Grout around all penetrations such as utility conduits, etc. for stability.

Horizontal - The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. 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.

Vertical - 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. HYDRODUCT®200 or 220 drainage sheet can be used to bridge voids, gaps and out of alignment up to 50mm prior to PREPRUFE®membrane installation.

Membrane Application

PREPRUFE®300R Plus and 160R Plus membranes have colored zip strips at the top and bottom of the seam area on the edge of the roll. Both zip strips cover an aggressive adhesive. Once the green zip strip on the top of the membrane and the blue zip strip on the bottom of the membrane are removed, a strong adhesive to adhesive bond is achieved in the overlap area. This PREPRUFE®ZipLap™ provides an enhanced sealing of the overlaps in harsh conditions combined with a fast and easy way of execution without specialized equipment, heat or power.

Horizontal substrates – (PREPRUFE®300R Plus membrane only)
PREPRUFE®300R Plus membrane can be applied in horizontal applications to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate. Kick out or roll out 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 buildup of layers. Leave green and blue zip strips on the membrane until overlap procedure is completed. When completed remove release liner. When installing over carton forms, contact your local GCP representative.

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the green zip strip. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the green and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.

- PREPRUFE® 300R Plus membrane can be returned up the inside face of slab formwork. To attain a fully bonded system and to allow a tie in with BITUTHENE® self-adhered membrane or PROCOR® fluid-applied membrane to all vertical structural surfaces after removal of formwork.
- Rebar Chairs: See PREPRUFE® Technical Letter #15 Rebar Chairs on PREPRUFE® Membranes.
- PREPRUFE® 160R Plus membrane may not be used in horizontal applications.

Vertical substrates –

PREPRUFE®300R Plus & 160R Plus membranes can be applied vertically to permanent formwork or adjoining structures. Mechanically fasten the membrane vertically using fasteners appropriate for the substrate with the green zip strip facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge within 0.5 in. 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. Accurately position each succeeding sheet to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the green zip strip.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the green and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Roll firmly to ensure a watertight seal.

Note that PREPRUFE®300R & 160R membranes should not be used with conventional two-sided formwork. (See PREPRUFE®Technical Letter # 13 Forming Systems For Use with PREPRUFE®Membranes)

Roll ends and cut edges –

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. Allow surface to dry and apply PREPRUFE®Tape LT (or HC in hot climates) centered over the lap edges and roll firmly. Immediately remove tinted plastic release liner from the tape.

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and other contaminants and allow the membrane to dry. Repair small punctures and slices (0.5 in. (12 mm) or less by applying PREPRUFE® Tape centered over the damaged area. Repair punctures and holes larger than 0.5 in. (12mm) by applying a patch of PREPRUFE® membrane. Extend the patch 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with PREPRUFE®Tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh PREPRUFE®Tape. Any areas of damaged adhesive should be covered with PREPRUFE®Tape. All PREPRUFE®Tape must be rolled firmly and the tinted release liner removed.

Slices or relief cuts can be butted or overlapped and repaired by applying PREPRUFE®Tape centered over the edge of the overlap or center of the butt joint. Where it is not possible to create a butt joint or overlap, repair with fresh membrane and PREPRUFE®Tape as detailed above.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of PREPRUFE®300R & 160R Membrane and Tape.

Under most climatic conditions concrete should be poured within 56 days of membrane installation. Where ambient temperatures will exceed 38°C (100°F) for more than a total of 7 days, concrete should be placed within 42 days of installation of the membrane. Concrete must be placed and compacted carefully to avoid damage to the Membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

A minimum concrete compressive strength of 3000 psi (20 N/mm2) is required prior to stripping formwork supporting PREPRUFE®membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete. (see PREPRUFE®Technical Letter #17 Removal of Formwork Placed against PREPRUFE®membranes)

After removal of the formwork and prior to backfilling, all exposed PREPRUFE®membrane must be protected from damage with an approved protective course

Supply

DIMENSIONS (NOMINAL)	PREPRUFE® 300R PLUS MEMBRANE	PREPRUFE® 160R PLUS MEMBRANE
Roll size Note#1	3 ft. 10 in. x 102 ft. (1.17m x 31.15m)	3 ft. 10 in. x 120 ft. (1.17m x 36.6m)
Roll weight	108 lbs (49 kg)	92 lbs (42 kg)
Note: when calculating coverage account for the Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)
Minimum side/end laps		

Note#1 Individual roll length may vary +/-1%

Physical Properties

PROPERTY	TYPICAL VALUE PREPRUFE® 300R PLUS	TYPICAL VALUE PREPRUFE® 160R PLUS	TEST METHOD
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385[1]
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385[2]
Elongation	400%	400%	ASTM D412[3]
Tensile strength, film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836[4]
Puncture resistance	200 lbs (890 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903[5]
Lap peel adhesion	8 lbs/in. (1408 N/m)	8 lbs/in. (1408 N/m)	ASTM D1876[6]

Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa x s x m^2))	0.01 perms (0.6 ng/(Pa x s x m^2))	ASTM E96, method B

Footnotes:

1. 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 membrane.
2. Hydrostatic head tests of PREPRUFE ®Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
3. Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
4. Concrete is cast against the PREPRUFE ®membrane and allowed to cure (7 days minimum).
5. Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
6. The test is conducted 15 minutes after the lap is formed and run at a rate of 2 in. (50 mm) per minute at 72°F (22°C).

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gcpat.com/solutions/products/preprufe-pre-applied-waterproofing-solutions/preprufe-300r-plus-160r-plus

ADCOR® ES (US version)

Engineered swell hydrophilic waterstop strip

Product Description

ADCOR®ES is a specially engineered, swellable, conformable synthetic waterstop strip that expands when in contact with water. The engineered swell design of ADCOR®ES minimizes the potential for concrete spalling and cracking versus traditional hydrophilic waterstops. When fully encapsulated by poured concrete, the expansive forces form a seal against concrete faces. The seal resists hydrostatic pressure, stopping water from entering sub-structures. ADCOR®ES is a unique product that has been specifically developed to provide better performance than bentonite or conventional swellable rubber waterstops. Superior performance arises from:

- Controlled, reproducible, volumetric expansion
- Cohesive strength maintained after volumetric expansion and during wet-dry cycling
- Malleable and plastic, enabling easy application to a variety of concrete profiles.

Product Advantages

- Engineered swell reduces risk of concrete spalling
- Conformable — can be installed onto a variety of irregular substrates
- Controlled expansion reduces the need for product replacement due to premature expansion
- Retains cohesive strength at both original and expanded volume
- No need for protective steel mesh
- Volumetric expansion min 100%
- Simple overlap jointing on site
- Reproducible swell after wet-dry cycling
- Contains no sodium bentonite

Applications

- Horizontal and vertical construction joints in concrete structures
- Casting new concrete against existing
- Pipe penetrations through floors and walls

System Components

ADCOR® ES

1.0 in. x 1⁄2 in. (25.4 mm x 12.7 mm) waterstop strip, supplied in 16 ft (4.9 m) rolls.

ADCOR® ES Adhesive

A butyl based adhesive for securing ADCOR®ES to concrete, steel and plastic substrates. Supplied in 29 fl oz (0.85 L) tubes.

Design

GCP recommends the use of waterstops in all construction joints, subject to hydrostatic pressure. Waterstop networks must be continuous through all joints and penetrations if they are to be effective. Contact GCP regarding specific applications where movement is expected.

Installation

1. Concrete surfaces must be clean and free of all contaminants. Remove all debris and loose concrete.
2. On irregular concrete faces, apply a 1⁄2 in. (12 mm) bead of ADCOR® ES Adhesive as bedding for ADCOR® ES. Estimated coverage rate of ADCOR® ES Adhesive is 30 linear feet per tube on porous concrete or irregular surfaces when applied at a 1⁄2 in. (12 mm) bead.
3. Secure ADCOR® ES using masonry nails 1 1⁄2–2 in. (40 mm– 50 mm) long with a washer 3⁄4 in. (20 mm) in diameter. Hilti EM6-20-12 FP8 shot fired fixings with 1⁄4 in. (6 mm) nuts and 3⁄4 in. (20 mm) diameter washers may also be used. Fixings should be spaced at a maximum of 12 in. (300 mm) centers with a minimum spacing that ensures proper contact to substrate.
4. For pipe penetrations, ADCOR® ES Adhesive must be applied to dry substrates only. Apply a 1⁄2 in. bead of ADCOR® ES Adhesive and tool with a brush or trowel. Wait until surface is dry to touch, then press ADCOR® ES firmly into place. Estimated coverage rate of ADCOR® ES Adhesive is 60 linear feet per tube on smooth concrete or pipe surfaces when applied at a 1⁄2 in. (12 mm) bead.
5. ADCOR® ES joints should overlap a minimum of 4 in. (100 mm), ensuring full contact between jointed pieces.
6. ADCOR® ES can be bent around corners; however, on complex geometry, use ADCOR® ES Adhesive to fill any gaps.
7. Any damaged sections should be removed and repaired with a new section of ADCOR® ES.
8. Keep ADCOR® ES dry prior to pouring concrete.

Concrete Placement

1. Normal weight structural concrete should be placed carefully to avoid damage to the waterstop.
2. ADCOR® ES should be encapsulated with a 3 in. (76.2 mm) concrete cover minimum.

Health & Safety

ADCOR® ES

There is no legal requirement for a SDS (Safety Data Sheets) for ADCOR®ES. For health and safety questions on this product, please contact GCP.

ADCOR® ES Adhesive

Read the product label and SDS (Safety Data Sheets) before use. Users must comply with all risk and safety phrases.

Storage & Handling

ADCOR®ES should be stored in its original unopened packaging until ready for installation and kept dry prior to pouring concrete. Dispose of any materials in accordance with the requirements of local authorities having jurisdiction.

Limitations

Not suitable for use in movement joints.

Not suitable for use with pre-cast concrete components.

Physical Properties

PROPERTY	TYPICAL VALUE
Color	Green
Size	1.0 in. x 1/2 in. x 16 ft (25.4 mm x 12.7 mm x 4.9 m) rolls
Packaging	6 rolls per case
Hydrostatic Head Resistance	231 ft (70m)
Adhesion to Concrete using ADCOR® ES Adhesive	Excellent

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate, and is offered for consideration, investigation and verification by the user, but we do not warrant the results to be obtained. Please read all statements, recommendations, and suggestions in conjunction with our conditions of sale, which 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.

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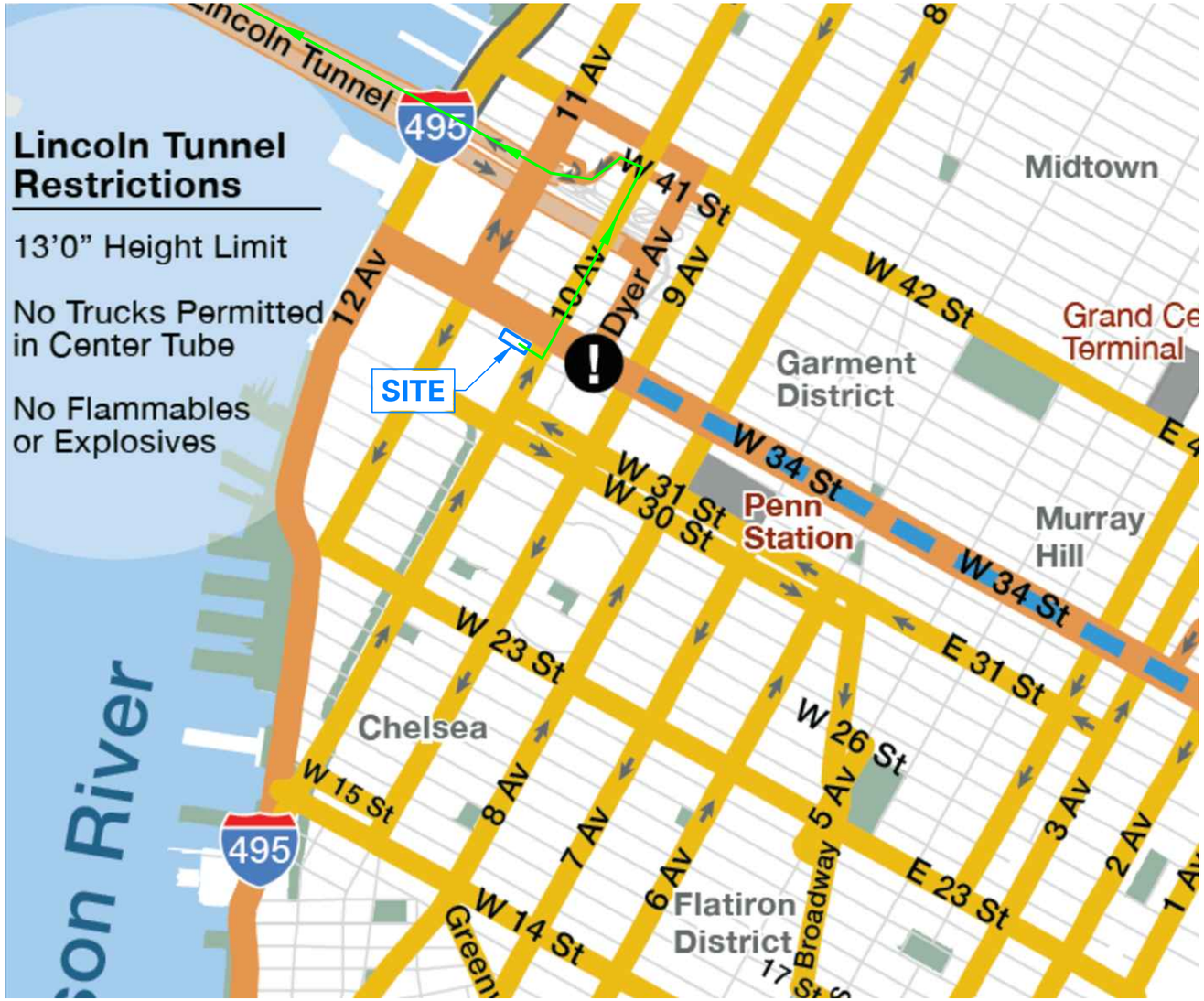
Last Updated: 2019-03-12

gcpat.com/solutions/products/adcor-hydrophilic-waterstop/adcor-es

Appendix 7

Truck Route



SCALE: 1"=1,500'

1500 0 500 1000 1500

SCALE IN FEET

AERIAL SCALE: 1"=150'

150 0 75 150

SCALE IN FEET

LEGEND:

- APPROXIMATE SITE BOUNDARY
- TRUCK ROUTE
- 34TH STREET RESTRICTIONS - ALL THROUGH TRUCKS ARE PROHIBITED ON 34TH STREET BETWEEN QUEENS MIDTOWN TUNNEL AND DYER AVENUE BETWEEN 11AM AND 6PM

Local Truck Route
Trucks with an origin or destination for the purpose of delivery, loading or servicing within the respective Borough, shall only operate on designated local routes, except that an operator may operate on a non-designated street for the purpose of arriving at his/her destination. This shall be accomplished by leaving a designated truck route at the intersection that is nearest to their destination, proceeding by the most direct route, and then returning to the nearest designated truck route by the most direct route. If the operator has additional destinations in the same general area, he/she may proceed by the most direct route to his/her next destination without returning to a designated truck route, provided that the operator's next destination does not require that he/she cross a designated truck route.

Through Truck Route
Trucks having neither an origin nor a destination within the respective Borough shall restrict the operation of such vehicles to those street segments designated as Through Truck Routes.

Through Truck Route on Expressway

Through Truck Route on Tunnel

Exception 53' Trailers Allowed
For definition see information on reverse side.

Industrial Business Zones (IBZ)

Parks and Open Spaces

29A **Highway Exit**

Commercial Vehicles Prohibited

Low Vertical Clearance Area

GENERAL NOTES:

1. BASE MAP IS REFERENCED FROM THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION COMMERCIAL TRUCK ROUTE MAP FOR 2015.
2. AERIAL BASE MAP REFERENCED FROM GOOGLE MAPS, TAKEN ON 11/15/2016.

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Project	451 TENTH AVENUE BLOCK No. 707, LOT No. 31 NEW YORK NEW YORK
Figure Title	TRUCK ROUTE MAP
Project No.	170370701
Date	7/23/2019
Drawn By	DP
Checked By	JR
Appendix	7
Sheet	1 of 1

Filename: \\langan.com\data\NYC\data7\170370701\Cadd Data - 170370701\SheetFiles\Environmental\HazRawp\Figure 7 - Truck Route Map.dwg Date: 10/4/2019 Time: 09:48 User: dpalazzolo Style Table: Langan.stb Layout: ANSIB-BL