GRACE
Construction Products

1. Product Name
- Bituthene® Waterproofing Systems
- Hydroduct® Drainage Composites

2. Manufacturer
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3. Product Description

BASIC USE

Bituthene® waterproofing systems and Hydroduct® drainage composites are used in positive-side waterproofing applications over concrete, masonry and wood surfaces. They are used in new construction and retrofit applications. Typical applications include foundation walls, tunnels, earth sheltered structures, and split slab construction such as plaza areas and parking decks. Interior uses include mechanical rooms, laboratories and kitchens.

COMPOSITION & MATERIALS

The Bituthene waterproofing systems consist of several waterproofing membranes and compatible accessory products and are complemented by the use of the appropriate Hydroduct drainage composite.

The Bituthene membranes are available in rolls, interwound with a disposable silicone treated release sheet. The volatile organic compound (VOC) content of all Bituthene membranes is 0 g/L.

Bituthene System 4000 Waterproofing Membrane is a factory made composite with a thickness of 0.060" (1.5 mm) consisting of 0.004" (0.1 mm) of cross-laminated polyethylene film and 0.056" (1.4 mm) of self-adhesive rubberized asphalt. It is specifically formulated for use with the Bituthene System 4000 Surface Conditioner and compatible accessory products.

Bituthene System 4000 Surface Conditioner is a water based surface conditioner specifically formulated to prepare concrete, masonry and wood surfaces for the System 4000 Waterproofing Membrane. Its VOC content is 125 g/L.

Bituthene 3000 and Bituthene Low Temperature Membranes are factory made composites with a thickness of 0.060" (1.5 mm). These products consist of 0.056" (1.4 mm) of self-adhesive rubberized asphalt and 0.004" (0.1 mm) of cross-laminated, high density polyethylene film.

Hydroduct drainage composites consist of dimpled, high impact polystyrene cores and filter fabrics designed to provide positive drainage and membrane protection. The VOC content of all Hydroduct products is 0 g/L.

Hydroduct 220 Drainage Composite is used for vertical applications over Bituthene waterproofing membranes.

Hydroduct 660 Drainage Composite is used for all horizontal applications.

Hydroduct 200 is intended for areas which are not waterproofed. Hydroduct 225 Drainage Composite incorporates a molded polyvinyl chloride core and is intended for areas requiring heat or hydrocarbon resistance.

COMPATIBILITY

Apply waterproofing membrane directly to structural surfaces. Bituthene membranes can be used over EPS wall forming systems if the additional guidelines in *Technical Letter 18, "Insulated Wall Forming Systems,"* are followed.

Bituthene membranes are compatible with aged asphalt and coal tar products.

Bituthene membranes are incompatible with creosote, pentachlorophenol, linseed oil and materials containing polysulfide polymer.

The rubberized asphalt component of Bituthene membranes is not compatible with flexible PVC or rubber sheet membranes.

Do not apply Bituthene membranes over materials containing petroleum solvents, fuels or oils. Joint sealants containing solvents must be fully cured prior to Bituthene membrane application. Refer to *Technical Letter 10, "Chemical Compatibility with Other Materials."*

Bituthene membranes are compatible with appropriate Hydroduct drainage composites.

Bituthene membranes are not compatible with certain types of prefabricated drainage systems that damage waterproofing membranes when exposed to soil pressures.

ACCESSORY MATERIALS

Architectural and Industrial Maintenance Regulations limit the VOC content in products classified as Architectural Coatings. Refer to Technical Letters on manufacturer's website for the most current list of allowable limits.

Bituthene Primer WP-3000 is a water based latex primer used to prime all concrete, masonry and wood surfaces. Its VOC content is 110 g/L.

Bituthene Primer B2 is a black, rubber based primer in solvent used to prime all concrete, masonry and wood surfaces. In addition, its patented formulation promotes the adhesion of Bituthene membranes to green concrete and damp surfaces. Its VOC content is 440 g/L.

Bituthene Deck Prep® Surface Treatment is a low viscosity, 2-component, asphalt-modified coating used to smooth and level rough decks prior to installing the Bituthene waterproofing membrane. Its VOC content is 10 g/L.

Bituthene Liquid Membrane is a 2-component, cold applied trowel grade waterproofing material used to flash corners, form fillets and detail hard-to-reach areas. Its VOC content is 10 g/L.

Bituthene Mastic is a rubberized asphalt based mastic used to seal membrane terminations. Its VOC content is 200 g/L.

Hydroduct Tape is a 2-sided, highly aggressive adhesive tape that is specially formulated to adhere Hydroduct drainage composites or expanded or extruded polystyrene protection board to the membrane. Its VOC content is 61 g/L.

LIMITATIONS

Do not apply Bituthene membranes in areas where they will be permanently exposed to sunlight, weather or traffic.

Bituthene membranes are not recommended as pond liners or as tank liners except when installed between 2 concrete slabs.

Bituthene strips over joints in T-beam structures will not provide complete waterproofing. For these structures, 9" (225 mm) strips over properly cured and sealed joints, followed by membrane coverage over the entire surface, are required for a complete waterproofing system.

Bituthene membranes are not intended to be used as a roofing underlayment or flashing material.

Use of tile set in thinset mortar is not recommended on surfaces waterproofed with Bituthene membranes unless approved by thinset mortar manufacturer.

All Hydroduct drainage composites should be promptly covered. Do not leave drainage exposed to sunlight for more than 2 weeks. Motor vehicles, construction equipment and other trades should not be allowed directly on the drainage composites.

Protect Bituthene membranes from UV or site damage immediately after installation or 24 hour flood test. Backfilling or installation of the wearing course should be completed as soon as possible.

4. Technical Data

APPLICABLE STANDARDS

ASTM International

- ASTM C366 Standard Test Methods for Measurement of Thickness of Sandwich Cores
- ASTM C836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
- ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
- ASTM D570 Standard Test Method for Water Absorption of Plastics
- ASTM D882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D903 Standard Test Method for Peel or Stripping of Adhesive Bonds
- ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- ASTM D1876 Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
- ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- ASTM D3767 Method A - Standard Practice for Rubber-Measurement of Dimensions
- ASTM D3776 Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
- ASTM D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
- ASTM D4533 Standard Test Method for Trapezoid Tearing Strength of Geotextiles
- ASTM D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- ASTM D4716 Standard Test Method for Constant Head Hydraulic Transmissivity (In-Plane Flow) of Geotextiles and Geotextile Related Products
- ASTM D4751 Standard Test Method for Determining Apparent Opening Size of a Geotextile
- ASTM D4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
- ASTM D5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
- ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials
- ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

APPROVALS

- City of Los Angeles Research Report RR 24386
- U.S. Department of Housing and Urban Development (HUD) HUD Materials Release 628E
- Miami Dade, NOA 03-0630.04

SPECIFICATIONS

- American Railway Engineering Association Chapter 29-2-4
- Federal Construction Guide Specification FCGS-07111
- General Service Administration (GSA) GSA-PBS 07115
- National Railroad Passenger Corporation (Amtrak) Section 7.02
- AIA MASTERSPEC® Section 07100
- U.S. Army Corps of Engineers CEGS-07111
- U.S. Department of the Navy NFGS-07111
- U.S. Department of Veterans Affairs H-08-1 Section 07113

PHYSICAL PROPERTIES

Bituthene waterproofing membranes conform to the physical property and typical values listed in Tables 1 and 3. Hydroduct drainage composites conform to the physical property and typical values in Table 2.

5. Installation

SAFETY

Bituthene products must be properly handled. Vapors from the solvent based primer and mastic are harmful and flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered and is available on Material Safety Data Sheets (MSDS). All users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and MSDS before use, or contact Grace Construction Products.

STORAGE & HANDLING

Protect all materials from rain and physical damage. Do not double stack pallets of membrane on the jobsite. Provide tarpaulin cover on top and all sides, allowing for adequate ventilation. Store membrane where temperatures will not exceed 90 degrees F (32 degrees C) for extended periods. In low temperature conditions, the membrane should be stored above 40 degrees F (5 degrees C) to promote good adhesion. Store all products in a dry area away from high heat, flames or sparks. Store only as much material at point-of-use as required for each day's work.

PREPARATORY WORK

Surface Condition

Concrete must be smooth, monolithic and free of voids, spalled areas, loose substrate and sharp protrusions, dirt and debris, and must contain no visible coarse aggregate. Repair defects such as spalled or poorly consolidated areas. Use Bituthene Deck Prep Surface Treatment to smooth and level rough concrete decks. Remove sharp protrusions and form match lines.

Curing

Concrete must be cured a minimum of 7 days for normal structural concrete and 14 days for lightweight structural concrete. If concrete is placed over a nonvented metal deck, the required curing time is doubled. 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 can lead to blistering of the membrane. Cure concrete with clear, resin based curing compounds containing no oil, wax or pigment. Allow concrete to thoroughly dry following rain.

On masonry surfaces, apply a parge coat to rough concrete block and brick walls or trowel-cut mortar joints flush to the face of the concrete blocks.

Cure time and drying time for concrete and masonry surfaces may be reduced by using Bituthene Primer B2.

TEMPERATURE

- Apply Bituthene System 4000 Membrane only in dry weather when air and surface temperatures are above 25 degrees F (-4 degrees C)
- Apply Bituthene 3000 Membrane only in dry weather when air and surface temperatures are above 40 degrees F (5 degrees C)
- Bituthene Low Temperature Membrane can be used at temperatures above 25 degrees F (-4 degrees C) and up to 60 degrees F (16 degrees C)
- Cover the membrane immediately in temperatures above 77 degrees F (25 degrees C) to reduce potential for blistering
- Apply Bituthene System 4000 Surface Conditioner and other accessory products not listed below in dry weather above 2 degrees F (-4 degrees C)

- Apply Bituthene Primer WP-3000 in dry weather above 40 degrees F (5 degrees C)
- Do not apply products to frozen concrete

APPLICATION

Surface Conditioner

Bituthene System 4000 Surface Conditioner is supplied ready to use. Do not dilute with water or solvents. Spray surface conditioner uniformly to substrate at a rate of 300 ft^2/gal (7.5 m^2/L). Use appropriate sprayer and nozzle.

Allow surface conditioner to dry completely and thoroughly prior to membrane application. The surface conditioner is considered dry when the substrate returns to its original color. To test for dryness, rub small conditioned area by hand. Wet conditioner will ball up under the fingertips. Let dry until conditioner cannot be rubbed off. If conditioned areas are not covered that day, recondition the area if there is significant dust or dirt contamination.

Primer

Apply Bituthene Primer WP-3000 by spray or roller at a coverage rate of 500 - 600 ft^2/gal (12 - 15 m^2/L). Allow to dry 1 hour or until concrete returns to original color.

Apply Bituthene Primer B2 by lamb's wool roller at a coverage rate of 250 - 350 ft^2/gal (6 - 8 m^2/L). Allow primer to dry 1 hour or until tackfree. Dry time may be longer in cold temperatures.

Reprime areas if contaminated by dust. If the work area is dusty, apply membrane as soon as the primer is dry.

Surfaces treated with Deck Prep Surface Treatment do not require conditioning or priming. Metal does not require priming but must be clean, dry and free of loose paint, rust or other contaminants. Use Bituthene Primer B2 for damp or green substrates. Do not apply primer or surface conditioner to membrane.

Corners

The treatment of corners varies depending on the location of the corner.

At wall-to-footing inside corners:

- Option 1 - Apply membrane to within 1" (25 mm) of base of wall. Treat the inside corner by installing a 3/4" (19 mm) fillet of Bituthene Liquid Membrane. Extend liquid membrane at least 3" (75 mm) onto wall membrane
- Option 2 - Treat the inside corner by installing a 3/4" (19 mm) fillet of Bituthene Liquid Membrane. Apply 12" (300 mm) wide strip of membrane centered over fillet. Apply wall membrane over inside corner and extend 6" (150 mm) onto footing. Apply 1" (25 mm) wide troweling of Bituthene Mastic or Bituthene Liquid Membrane over all terminations and seams within 12" (300 mm) of corner

At footings where the elevation of the floor slab is 6" (150 mm) or more above the footing, treat the inside corner either by one of the above methods or terminate the membrane at the base of the wall. Seal the termination with Bituthene Mastic or Bituthene Liquid Membrane.

At plaza deck-to-wall inside corners:

- Option 1 - Apply membrane on wall and deck to within 1" (25 mm) of corner. Treat the inside corner by installing a 3/4" (19 mm) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 3" (75 mm) onto deck membrane and 3" (75 mm) onto wall membrane. Terminate top of membrane wall flashing with Bituthene Mastic, Bituthene Liquid Membrane or termination bar
- Option 2 - Apply membrane on deck to within 1" (25 mm) of corner. Treat the inside corner by installing a 3/4" (19 mm) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 3" (75 mm) onto wall and membrane
- Option 3 - Apply membrane on deck to within 1" (25 mm) of corner. Treat the inside corner by installing a 3/4" (19 mm) fillet of Bituthene Liquid Membrane. Apply membrane flashing sheet on wall, over fillet and 6" (150 mm) onto deck membrane. Apply 1" (25 mm) wide troweling of Bituthene Mastic or Bituthene Liquid Membrane over all terminations and seams within 12" (300 mm) of corner. Terminate top of membrane wall flashing with Bituthene Mastic, Bituthene Liquid Membrane or termination bar

In planters, reflecting pools and fountains, apply membrane on wall and deck to within 1" (25 mm) of corner. Treat the inside corner by installing a 3/4" (19 mm) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 3" (75 mm) onto deck membrane and

TABLE 1 PHYSICAL PROPERTIES OF BITUTHENE MEMBRANES

Property & Test Method	Bituthene System 4000 Membrane	Bituthene 3000 Membrane	Bituthene Low Temperature Membrane
Color	Gray-black	Dark gray-black	Gray-black
Thickness, ASTM D3767, Method A	0.060" (1.5 mm) nominal	0.060" (1.5 mm) nominal	0.060" (1.5 mm) nominal
Low temperature flexibility, ASTM D1970	Unaffected at -45°F (-43°C)	Unaffected at -25°F (-32°C)	Unaffected at -45°F (-43°C)
Resistance to hydrostatic head, ASTM D5385	231' (70 m) min	200' (60 m) min	200' (61 m) min
Lap adhesion at minimum application temperature, width, ASTM D1876, Modified	5.0 lb/in (880 N/m)	4.0 lb/in (700 N/m)	5.0 lb/in (880 N/m)
Tensile strength, membrane, ASTM D412 (Die C), Modified	325 psi (2240 kPa) min	325 psi (2240 kPa) min	325 psi (2240 kPa) min
Tensile strength, film, ASTM D882, Modified	5000 psi (34.5 MPa) min	5000 psi (34.5 MPa) min	5000 psi (34.5 MPa) min
Elongation, ultimate failure of rubberized asphalt, ASTM D412, Modified	300% min	300% min	300% min
Cracking cycling, 100 cycles, ASTM D836	Unaffected at -25°F (-32°C)	Unaffected at -25°F (-32°C)	Unaffected at -25°F (-32°C)
Peel strength, width, ASTM D903, Modified	9.0 lb/in (1576 N/m)	9.0 lb/in (1576 N/m)	9.0 lb/in (1576 N/m)
Puncture resistance, membrane, ASTM E154	50 lb (222 N) min	50 lb (222 N) min	50 lb (222 N) min
Permeance, maximum, ASTM E96 Water Method	0.05 perms (2.9 ng/(Pa × s × m^2))	0.05 perms (2.9 ng/(Pa × s × m^2))	0.05 perms (2.9 ng/(Pa × s × m^2))
Water absorption, 72 hr, ASTM D570	0.1% max	0.1% max	0.1% max

3" (75 mm) onto wall membrane. Terminate top of wall membrane with Bituthene Liquid Membrane or termination bar.

For wall to wall inside corner, apply 12" (300 mm) membrane strip centered on corner. Press membrane tightly into corner to ensure full contact. Cover the treated corner with a full sheet of membrane to ensure 2-ply coverage.

For outside corners, apply 12" (300 mm) membrane strip centered on corner. Cover the treated corner with a full sheet of membrane to ensure 2-ply coverage.

Joints

Properly seal all joints with waterstop, joint filler and sealant as required. Bituthene membranes are not intended to function as the primary joint seal. Allow sealant to fully cure. Prestrip all slabs and wall cracks over 1/16" (1.6 mm) wide and all construction and control joints with 9" (225 mm) wide membrane.

Drains

At drains, apply a collar of membrane which extends 6" (150 mm) beyond the drain opening. Apply full coverage of membrane over the collar. Cut out the drain opening so the membrane extends under the clamping ring. Place a bead of Bituthene Mastic or Bituthene Liquid Membrane between the membrane and clamping ring. An alternate method is to apply Bituthene Liquid Membrane 0.090" (2.3 mm) thick so that it extends under the clamping ring and overlaps the deck membrane at least 3" (75 mm). Install clamping ring after Bituthene Liquid Membrane has cured.

Application to Horizontal Surfaces

Apply membrane from the low point to the high point so that laps shed water. Overlap all seams at least 2 1/2" (64 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" (762 mm) wide, weighing a minimum of 75 lb (34 kg) when filled. Cover the face of the roller with a resilient material such as a 1/2" (13 mm) plastic foam or 2 wraps of indoor/outdoor carpet to allow the membrane to fully contact the primed substrate.

Seal all T-joints and membrane terminations with Bituthene Mastic or Bituthene Liquid Membrane at the end of the day.

For required testing of horizontal applications, see Flood Testing.

Application to Vertical Surfaces

Apply membrane in lengths up to 8' (2 m). Overlap all seams 2 1/2" (64 mm) minimum. On higher walls, apply membrane in 2 or more sections with the upper overlapping the lower by at least 2 1/2" (64 mm). Roll membrane with a hand roller.

Terminate the membrane at grade level. Press the membrane firmly to the wall with the butt end of a hardwood tool such as a hammer handle, or secure into a reglet. A termination bar may be used to secure the top termination. Failure to use heavy pressure at terminations can result in a poor seal.

Terminate the membrane at the base of the wall if the bottom of the interior floor slab is at least 6" (150 mm) above the footing. Otherwise, use appropriate inside corner detail where the wall and footing meet. Seal all laps within 12" (300 mm) of all corners with a troweling of mastic. Apply a troweled bead of Bituthene Mastic or Bituthene Liquid Membrane to all vertical and horizontal terminations at the end of each workday.

Protrusions and Penetrations

Apply membrane to within 1" (25 mm) of the base of the protrusion. Apply Liquid Membrane 0.090" (2.3 mm) thick around the protrusion. Extend Bituthene Liquid Membrane over the sheet membrane at least 3" (75 mm) and up the protrusion to just below the finished height of the wearing course (for horizontal applications) or for a minimum of 6" (150 mm) for vertical applications.

FLOOD TESTING

Flood test all horizontal applications with a minimum 2" (50 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 well-sloped decks, segment the flood test to avoid deep water near drains.

Conduct the flood test 1 day after completing the application of Bituthene waterproofing system. Immediately after flood test is completed, and all necessary repairs made, install Hydroduct 660 Drainage Composite to protect the Bituthene membrane from traffic and other trades.

MEMBRANE REPAIR

Patch tears and inadequately lapped seams with membrane. Slit fishmouths and repair with a patch extending 6" (150 mm) in all directions

TABLE 2 PHYSICAL PROPERTIES OF HYDRODUCT DRAINAGE COMPOSITES

Property & Test Method	Hydroduct 220	Hydroduct 660	Hydroduct 200	Hydroduct 225
Drain core				
Thickness, ASTM C366-B	0.433" (11 mm)	0.433" (11 mm)	0.433" (11 mm)	0.433" (11 mm)
Compressive strength, ASTM D1621 (modified)	15,000 psf (732 kN/m^2)	21,000 psf (1025 kN/m^2)	15,000 psf (732 kN/m^2)	21,000 psf (1025 kN/m^2)
Flow, 1.0 gradient, 37.9 kPa load, ASTM D4716	16 gal/min/ft (0.003 L/min/m)	16 gal/min/ft (0.003 L/min/m)	16 gal/min/ft (0.003 L/min/m)	16 gal/min/ft (0.003 L/min/m)
Filter fabric				
Apparent opening size, ASTM D4751	100 US sieve (150 micron)	100 US sieve (150 micron)	100 US sieve (150 micron)	40 US sieve (380 micron)
Permittivity, ASTM D4491	150 gal/min/ft^2 (6110 L/min/m^2)	80 gal/min/ft^2 (3250 L/min/m^2)	150 gal/min/ft^2 (6110 L/min/m^2)	100 gal/min/ft^2 (4074 L/min/m^2)
Tensile strength, ASTM D4632	110 lb (485 N)	230 lb (1020 N)	110 lb (485 N)	290 lb (1291 N)
Weight, ASTM D3776	4.0 oz/yd^2 (136 N/m^2)	8.0 oz/yd^2 (270 g/m^2)	4.0 oz/yd^2 (136 g/m^2)	6.0 oz/yd^2 (203 g/m^2)
Mullen Burst, ASTM D3786	215 psi (1480 kPa)	690 psi (4753 kPa)	215 psi (1430 kPa)	480 psi (3304 kPa)
Puncture, ASTM D4833	65 lb (285 N)	162 lb (720 N)	65 lb (285 N)	105 lb (720 N)

from the slit and seal edges of the patch with Bituthene Mastic. Inspect the membrane thoroughly before covering and make any repairs.

PROTECTION

Protection of Membrane

Protect Bituthene membranes to avoid damage from other trades' construction materials or backfill. Place protection immediately in temperatures above 77 degrees F (25 degrees C) to reduce potential for blistering.

On horizontal applications, use Hydroduct 660 Drainage Composite for protection. Adhere as necessary to membrane with Hydroduct Tape.

Alternate methods are to use 1/8" or 1/4" (3 or 6 mm) asphaltic hardboard. When reinforced concrete slabs are placed over the membrane, use Hydroduct 660 Drainage Composite or 1/4" (6 mm) hardboard or 2 layers of 1/8" (3 mm) hardboard.

On vertical applications, use Hydroduct 220 Drainage Composite. Adhere Hydroduct 220 to membrane with Hydroduct Tape. Alternative protection methods are to use 1" (25 mm) expanded polystyrene or 1/4" (6 mm) extruded polystyrene that has a minimum compressive strength of 10 lb/in^2 (69 kN/m^2).

If 1/4" (6 mm) extruded polystyrene protection board is used, backfill should not contain sharp rock or aggregate over 2" (50 mm) in diameter. Adhere polystyrene protection board with Hydroduct Tape or compatible adhesive.

Cover any exposed Bituthene membrane with weather resistant flashing such as copper, aluminum or neoprene. Install Hydroduct 660 Drainage Composite or alternate protection the same day the membrane is applied or immediately after a 24 hour flood test. No waiting before backfill or application of wearing course is necessary.

Placement of Backfill

Use care during backfill operation to avoid damage to waterproofing and drainage system. Follow generally accepted practice for backfill and compaction. Backfill should be added in 6" - 12" (150 - 300 mm) lifts. For bermed areas that cannot be fully compacted, a termination bar is recommended across the top termination of the membrane.

In general, backfill or the final wearing course should be placed as soon as possible after installation of the membrane.

Placement of Reinforcing Steel

When placing reinforcing steel over properly protected membrane, 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.

6. Availability & Cost

AVAILABILITY

A network of distributors carries Bituthene waterproofing systems and Hydroduct drainage composite products for delivery to project sites.

COST

Bituthene waterproofing systems and Hydroduct drainage composites are competitively priced. For specific information, contact a local distributor or a Grace Construction Products representative.

7. Warranty

Five year material warranties covering Bituthene and Hydroduct products are available upon request. Contact the manufacturer for further information.

8. Maintenance

None required, if installed in accordance with manufacturer's recommendations.

9. Technical Services

Support is provided by full-time, technically trained Grace representatives and technical service personnel, backed by a central research and development staff.

10. Filing Systems

- Reed First Source®
- Additional product information is available from the manufacturer.