



**Applications:** Post-Applied Foundation Wall and Horizontal Deck Fluid Applied Waterproofing - Hydrostatic and Non-hydrostatic Conditions

**Spec Version:** EproTurboSeal.FH.v1.07.20gs

**Date issued:** July, 2020

**Note:** This specification may be superseded at any time. Check [eproinc.com](http://eproinc.com) for the most up to date version of this specification.

# **SECTION 07 14 00 FLUID APPLIED WATERPROOFING**

## **TurboSeal Guide Specification**

### **Vertical Wall & Horizontal Deck**

TurboSeal is a composite waterproofing system that combines the durability of high density polyethylene with a single component, cold fluid applied, flexible, self-healing polymer rubber gel. This guide specification has been prepared according to the principles established in the Manual of Practice published by the Construction Specification Institute.

Sections highlighted in **red** throughout this guide specification are specifier notes intended to provide information about certain optional text or additional information relevant to that section. For additional questions, your local EPRO technical representative can be contacted through: EPRO Services, Inc., Wichita KS; 1.800.882.1896; [www.eproinc.com](http://www.eproinc.com).

# TURBOSEAL FLUID APPLIED WATERPROOFING SPECIFICATION

## SECTION 07 14 00 – FLUID APPLIED WATERPROOFING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions, and Division 1 specification section, apply to this section.

#### 1.2 SECTION INCLUDES

- A. The Work of this Section includes, but is not limited to, **TurboSeal** fluid applied composite waterproofing:
  - 1. Vertical Wall: The waterproofing system applied on exposed concrete foundation walls, tunnels, and vertical deck walls.
  - 2. Horizontal Deck: The waterproofing system applied on split slab concrete decks, balconies, or podium decks.

- B. Related Sections:

- 1. Section 02 24 00: Environmental Assessment
- 2. Section 02 32 00: Geotechnical Investigation
- 3. Section 03 30 00: Concrete Surface/Substrate
- 4. Section 03 10 00: Concrete Forming
- 5. Section 03 15 00: Concrete Accessories
- 6. Section 03 15 13: Waterstops
- 7. Section 03 20 00: Concrete Reinforcing
- 8. Section 03 30 00: Cast-in-Place Concrete
- 9. Section 03 40 00: Precast Concrete
- 10. Section 07 90 00: Joint Protection
- 11. Section 31 30 00: Earthwork Methods
- 12. Section 31 41 00: Shoring
- 13. Section 31 60 00: Special Foundations and Load Bearing Elements
- 14. Section 31 71 23: Tunneling by Cut and Cover
- 15. Section 33 41 00: Subdrainage

#### 1.3 REFERENCE STANDARDS

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. American Standard Testing Methods (ASTM):
  - D 1353 Standard Test Method for Nonvolatile Matter in Volatile Solvents for Use in Paint, Varnish, Lacquer, and Related Products
  - E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
  - C 836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
  - C 1522 Standard Test Method for Extensibility After Heat Aging of Cold Liquid-Applied Elastomeric Waterproofing Membranes
  - D 4833 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
  - D 56 Standard Test Method for Flash Point by Tag Closed Cup Tester
  - D 412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
  - D 751 Standard Test Methods for Coated Fabrics
  - D 794 Practice for Determining Permanent Effect of Heat on Plastics xxx
  - E 96 Standard Test Methods for Water Vapor Transmission of Materials
  - D 1876 Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
  - C 1305 Standard Test Method for Crack Bridging Ability of Liquid-Applied Waterproofing Membrane
  - C 1306 Standard Test Method for Hydrostatic Pressure Resistance of a Liquid-Applied Waterproofing Membrane
  - D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
  - D 1745 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
  - D 1434 Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
  - D 1709 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method
  - D 1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics
  - D 1777 Standard Test Method for Thickness of Textile Materials
  - D 4716 Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
  - D 71 Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)

#### 1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide a fully adhered waterproofing system that prevents the passage of water under hydrostatic or non-hydrostatic conditions and complies with the physical requirements as demonstrated by testing performed by an independent testing agency.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of waterproofing specified submit manufacturer's printed technical data, tested physical and performance properties, instructions for evaluating, preparing, and treating substrates, and installation instructions.
- B. Shop Drawings: Project specific drawings showing locations and extent of waterproofing, details for substrate joints and cracks, sheet flashing, penetrations, transitions, and termination conditions.
- C. Samples: Submit two standard size samples of the following:
  - 1. Individual components of the specified waterproofing system.
- D. Applicator Certification: Submit written confirmation at the time of bid that applicator is currently approved by the membrane manufacturer.
- E. Manufacturer's Warranty Requirements: Submit complete documentation of manufacturer's warranty requirements and sample warranty.

#### 1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Waterproofing applicator shall be an EPRO Authorized Applicator who is trained and approved for **TurboSeal System** application in accordance with EPRO standards and policies.

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**Specifier Note: For projects requiring the manufacturer's special no-dollar-limit labor and material E.Assurance warranty, add the following items B. and C. language to section 1.6 (reference Section 1.9 Warranty):**

- B. Special Applicator Qualifications: The waterproofing applicator must be E.Assurance Certified at the time of bid.
- C. Third Party Inspection: Owner shall make all arrangements and payments for an approved third-party inspection firm participating in the waterproofing manufacturer's Certified Inspection Program to monitor waterproofing material installation compliance with the project contract documents and manufacturer's published literature and site specific details. Inspection reports shall be submitted directly to the waterproofing system manufacturer and made available to other parties per the owners' direction.

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- D. Pre-Construction Meeting: A meeting shall be held prior to application of the waterproofing system to assure proper substrate preparation, confirm installation conditions, and any additional project specific requirements. Attendees of the meeting shall include, but are not limited to the following:
  - 1. EPRO representative
  - 2. EPRO certified applicator

3. Third party inspector [as required]
  4. General contractor
  5. Owner's representative
  6. Concrete/Shotcrete contractor
  7. Rebar contractor
  8. Project design team
  9. All appropriate related trades
- E. Field Sample: Apply waterproofing system field sample to 100 ft<sup>2</sup> (9.3 m<sup>2</sup>) of each assembly to demonstrate proper application techniques and standard of workmanship.
1. Notify waterproofing system manufacturer representative, architect, certified inspector, and other appropriate parties one week in advance of the dates and times when field sample will be prepared.
  2. If architect and certified inspector determine that field sample does not meet requirements; reapply composite membrane system until field sample is approved.
  3. Retain and maintain approved field sample during construction in an undisturbed condition as a standard for judging the completed composite membrane system. An undamaged field sample may become part of the completed work.
- F. Materials: Waterproofing system and auxiliary materials shall be single sourced from the waterproofing manufacturer.

#### 1.7 MATERIAL DELIVERY, STORAGE, AND DISPOSAL

- A. Delivery: Deliver materials to site labeled with manufacturer's name, product brand name, material type, and date of manufacture. Upon the arrival of materials to the jobsite, inspect materials to confirm material has not been damaged during transit.
- B. Storage: Proper storage of onsite materials is the responsibility of the certified applicator. Consult product data sheets to confirm storage requirements. Storage area shall be clean, dry, and protected from the elements. Protect stored materials from direct sunlight.
- C. Disposal: Remove and replace any material that cannot be properly applied in accordance with local regulations and specification section 01 74 19.

#### 1.8 PROJECT CONDITIONS

- A. Substrate Review: Substrates shall be reviewed by the certified applicator and accepted by the certified inspector prior to application. Application without signoff from certified inspector will likely result in voidance of warranty.
- B. Penetrations: All plumbing, electrical, mechanical, and structural items to be passing through the waterproofing system shall be properly spaced, positively secured in their proper positions, and appropriately protected prior to system application and throughout the construction phase. Braided grounding rods are not allowed to pass through the membrane in waterproofing applications.
- C. Clearance: Minimum clearance of 24 inches is required for application of polymer rubber gel, **TurboSeal GT**. For areas with less than 24-inch clearance, the product may be applied by hand using a brush or roller.

- D. Weather Limitations: Perform work only when existing and forecast weather conditions are within manufacturer's recommendations.
1. EPRO applicators reserve the right not to install product when application conditions might be within manufactures acceptance, but ambient conditions may limit a successful application.
  2. Minimum ambient temperature must be 0°F (-17.78°C) and rising.

## 1.9 WARRANTY

- A. General Warranty: The special warranty specified in this section shall not deprive the owner of other rights the owner may have under other provisions of the contract documents, and shall be in addition to, and run concurrent with, other warranties made by the contractor under requirements of the contract documents.
- B. Special Warranty: Submit a written warranty signed by waterproofing manufacturer agreeing to replace system materials that do not conform with manufactures published specifications or are deemed to be defective. Warranty does not include failure of waterproofing due to failure of soil substrate prepared and treated according to requirements or formation of new joints and cracks in the specially applied concrete that exceed 1/8 inch (3.175 mm) in width.
1. Warranty Period: 5 years after date of substantial completion. [Longer warranty periods are available upon request.]
  2. Coverage: Manufacturer will guarantee that the material provided is free of defect for the warranty period.

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Specifier Note: Additional upgraded warranty options, E.Series L&M and E.Assurance NDL, are available by contacting the manufacturer. These warranties may have additional requirements and approval must be granted in accordance with the manufacturer's warranty requirements.

Insert the following language in 1.9 B for additional Special Warranty options:

3. Labor and Material (E.Series L&M): Manufacturer will provide non-prorated coverage for the warranty term, agreeing to repair or replace material that does not meet requirements or remain watertight.

OR

4. No-Dollar-Limit Labor and Material Warranty (E.Assurance NDL): Manufacturer will provide a non-prorated, no-dollar-limit coverage for the warranty term, agreeing to repair or replace material that does not meet requirements or remain watertight.

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## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: EPRO Services, Inc. (EPRO), P.O. Box 347; Derby, KS 67037; Tel: (800) 882-1896; Email: [info@eproinc.com](mailto:info@eproinc.com); Web: [www.eproinc.com](http://www.eproinc.com)

### 2.2 MATERIALS

- A. Fluid applied waterproofing membrane:

1. **TurboSeal GT** is a component to the **TurboSeal** composite polymer rubber gel waterproofing system. Provide system with the following physical properties:

PROPERTIES	TEST METHOD	VALUE
Solids Content	ASTM D 1353	75%
Resistance to Decay	ASTM E 154	0% moisture permeation and weight change
Hardness*	ASTM C 836	80
Extensibility After Heat Aging	ASTM C 1522	¼" no cracking / pass
Puncture Resistance*	ASTM D 4833	125 lbf
Flash Point	ASTM D 56	>200°F
Tensile Strength MD*	ASTM D 412	3891 PSI
Elongation %	ASTM C 1135	390%
Deflection, HDPE	ASTM E 154	3.2 in.
Hydrostatic Pressure Resistance*	ASTM D 751	169 ± 3 lbs/in <sup>2</sup>
Adhesion to Concrete	ASTM D 412	Rating of 1 (Excellent)
Crack Bridging Flexibility	ASTM C 836	No cracks
Moisture Permeability	ASTM E 96	0.005 perms (0.915 ng/(Pa x s x m <sup>2</sup> ))

\*Results based on composite system with GFG16 HDPE protection sheet.

## B. Protection Sheet

1. **GFG20X** is a 31 mil thick high density polyethylene reinforced protection sheet with geotextile backing for horizontal waterproofing applications. Provide protection sheet with the following physical properties:

PROPERTIES	TEST METHOD	VALUE
Peel Adhesion to Concrete (geotextile)	ASTM D 903	8 lbs/in
Tensile Strength	ASTM D 882	136 lbf/in
Elongation	ASTM D 882	MD 789.1 / TD 857.1
Vapor Barrier Classification	ASTM D 1745	Class A
Life Expectancy	ASTM E 154	Indefinite
Chemical Resistance	ASTM E 154	Unaffected
Radon Transmission Rate	ASTM D 1434	0.062
Water Vapor Permeation	ASTM E 96	0.007 grain/hr. ft. in <sup>2</sup> Hg
Dart Impact Strength	ASTM D 1709	11.48 lbs

2. **GFG16** is a 16 mil thick high density polyethylene protection sheet for horizontal and vertical waterproofing applications. Provide protection sheet with the following physical characteristics:

PROPERTIES	TEST METHOD	VALUE
Tensile Strength	ASTM D 882	83.75 lbf/in
Vapor Barrier Classification	ASTM D 1745	Class A
Life Expectancy	ASTM E 154	Indefinite
Chemical Resistance	ASTM E 154	Unaffected
Dart Impact Strength	ASTM D 1709	3960 grams
Water Vapor Permeation	ASTM E 96	0.007 grain/ hr ft in <sup>2</sup> Hg

## C. Waterstops

1. **e.stop gu** is a gunnable urethane modified hydrophilic detailing sealant for application around penetrations.

2. **BentoTak** is a self-adhesive hydrophilic bentonite waterstop strip for application in non-moving joints and around penetrations with the following physical properties:

PROPERTIES	TEST METHOD	VALUE
Specific Gravity @25C	ASTM D 71	1.403
Flash Point	ASTM D 93 Pensky-Martens	482 F (250 C)
Hydrostatic Pressure Resistance		> 160 ft head, No Flow

D. Seaming and Detailing Materials

1. **DuroTape** is a single-sided 35 mil thick specialty adhesive tape with high density polyethylene backing for adhering end lap seams, side lap seams, and detailing.
2. **e.poly** is a woven polyester fabric for reinforcing joints, cracks, and penetrations.

E. Prefabricated Drainage:

1. **e.drain: e.drain** features a lightweight three-dimensional, highly flexible high density polyethylene (HDPE) core and a polypropylene geotextile filter fabric. The filter fabric is bonded to the dimples of the HDPE core.

PROPERTIES	TEST METHOD	VALUE
<b>DIMPLED CORE</b>		
Core		HDPE
Core Material Thickness		30 Mil
Color		Black/Brown
Dimple Height	ASTM D 1777	.31 inch
Compressive Strength	ASTM D 6364	5,200 lbs./ft <sup>2</sup>
Flow rate	ASTM D 4716	5.1 gal/min/ft
<b>FILTER FABRIC</b>		
Grab Tensile	ASTM D 4632	130 lbs
CBR Puncture Resistance	ASTM D 6241	40 lbs
Apparent Operating Size	ASTM D 4751	70 sieve size (.0212 mm)
Water Flow Rate	ASTM D 4491	55 gpm/ ft <sup>2</sup>
UV Resistance	ASTM D 4355	70% (500 hrs)



2. **e.drain 6000:** *e.drain 6000* features a lightweight three-dimensional, high-compressive strength polypropylene core and bonded non-woven geotextile fabric. The bonded filter fabric allows water to pass freely into the molded drain while preventing soil particles from entering and clogging the core structure.

PROPERTIES	TEST METHOD	VALUE
<b>DIMPLED CORE</b>		
Core Material		Polypropylene
Color		Black
Dimple Height	ASTM D 1777	0.4" (10.16 mm)
Compressive Strength	ASTM D 6364	16,500 psf (790 kN/m <sup>2</sup> )
Flow rate	ASTM D 4716	21 gal/min/ft
<b>FILTER FABRIC</b>		
Grab Tensile	ASTM D 4632	100 lbs
CBR Puncture resistance	ASTM D 6241	250 lbs
Apparent Operating Size	ASTM D 4751	70 sieve size (.0212 mm)
Water Flow Rate	ASTM D 4491	140 gpm/ft <sup>2</sup> (5704 l/min/m <sup>2</sup> )
UV Resistance	ASTM D 4355	70% (500 hrs)
Dimensions: 6' x 5'		
Weight: 63 pounds		

3. **e.drain 12ds:** *e.drain 12ds* features a lightweight three-dimensional, highly flexible polypropylene core and a non-woven geotextile filter fabric. The filter fabric is bonded to the dimples of the polypropylene core to prevent clogging within the drain.

PROPERTIES	TEST METHOD	VALUE
<b>DIMPLED CORE</b>		
Core Material		Polypropylene
Color		Black
Compressive strength	ASTM D 1621	9,500 PSF (455 kN/m <sup>2</sup> )
Thickness	ASTM D 1777	1 Inch
Flow rate	ASTM D 4716	30 gpm/ft of width
<b>FILTER FABRIC</b>		
CBR puncture	ASTM D 6241	250 lbs
Grab tensile strength	ASTM D 4632	100 lbs
AOS	ASTM D 4751	70 U.S. sieve
Permittivity	ASTM D 4491	2.0 sec <sup>-1</sup>
Flow rate	ASTM D 4491	140 gpm/ft <sup>2</sup>
UV resistance	ASTM D 4355	70% (500 hrs)
Dimensions: 165' x 12" x 1"		
Weight: 65 pounds		

## 2.3 AUXILIARY MATERIALS

- A. General: All auxiliary materials shall be provided by the specified waterproofing manufacturer. Auxiliary materials used in lieu of, or in addition to, the manufacturer's materials must be approved in writing by EPRO prior to installation.
1. Detailing Material: **PM Sealant** an STPE moisture cure detailing sealant.
  2. Backer Rod: Closed-cell polyethylene foam
  3. Termination Bar: 1-inch (25 mm) aluminum or stainless steel with fastener holes minimum 12-inch (25 mm) on-center.
  4. Fastener: **e.fastener** or approved alternate.

5. Shot Pins: Minimum 1-inch (25 mm) galvanized steel pins with ¾ inch (19 mm) aluminum washer.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Comply with project documents, manufacturer's product information, including product application and installation guidelines, pre-job punch list, as well as, manufacturer's shipping and storage recommendations.
- B. The general contractor shall engage the certified waterproofing contractor and certified inspector to ensure surfaces are prepared in accordance with manufacturer's instructions. Unless explicitly stated in the contract documents, the waterproofing contractor is not responsible for surface preparation.
- C. Examine all substrates, areas, and conditions under which the composite membrane system will be installed, applicator and inspector must be present. Do not proceed with installation until unsatisfactory conditions have been corrected and surface preparation requirements have been met. If conditions exist that are not addressed in this section notify inspector and contact EPRO for additional clarification.
  1. Verify that concrete has cured and aged for a minimum seven days after pour or stripping of forms.
  2. Verify that substrate is visibly dry and free of ponded water, frost, or snow.

### **3.2 SUBSTRATE PREPARATION**

- A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, relatively smooth, dust-free, and dry substrate for waterproofing application.
- B. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from the substrate.
- C. Patch all holes and voids and smooth out any surface misalignments and remove and patch all concrete form ties.

### **3.3 APPLICATION HORIZONTAL AND VERTICAL**

- A. General: The composite membrane system shall be installed to the positive side vertical wall or slab under strict accordance with the manufacturer's guideline and project specifications. Complete all detailing before installing the membrane over the field of the substrate.

#### **3.3.2 TREATMENT OF CRACKS, JOINTS, CORNERS, AND REPAIRED AREAS**

- A. Treat, rout, and fill cracks larger than 1/8 inch with hydraulic cement or rapid set grout.
- B. The following areas shall receive a reinforcement detail of **TurboSeal GT** and **e.poly**:
  1. All cracks less than 1/8 inch.
  2. All previously repaired cracks.
  3. All cold joints.
  4. All corners.

- C. Corners: A reinforcement detail shall be applied to all transitions including all inside and outside corners, and all transitions from a horizontal to vertical planes.
- D. Reinforcement Detail: Apply a 90 mil (2.3 mm) coat of **TurboSeal GT** at detail area extending 3-inches (75 mm) beyond detail area. Adhere **e.poly** reinforcing fabric into the **TurboSeal GT**.

### 3.3.3 SEALING OF PENETRATIONS

- A. Standard Pipe Penetrations: Prepare membrane penetrations so they are free of any material that prohibits the material to bond directly to the penetration surface: foam, insulation, protective coatings, etc.

1. Install **e.stop gu** around the penetration.
2. Install a penetration detail target patch of **TurboSeal GT** and **e.poly** around the penetration.
3. Penetration detail target patch: Apply a 90 mil (2.3 mm) coat of **TurboSeal GT** around the penetration extending a minimum 4 inches (100 mm) up vertically onto the penetration and a minimum 4 inches (100 mm) horizontally out around the base of the penetration. Adhere **e.poly** reinforcing fabric into the **TurboSeal GT**.

- B. Membrane Application

1. Apply **TurboSeal GT** at a rate to provide a continuous, monolithic coat of 90 mil (2.3 mm) minimum thickness.
2. Apply **TurboSeal GT** in and around penetrations and cavities to ensure the formation of a monolithic seal around all penetrations.
3. Apply an additional 90 mil (2.3 mm) coat of **TurboSeal GT** at all penetration and detail areas.
4. Verify the applied thickness of **TurboSeal GT** every 1000 ft<sup>2</sup> (93 m<sup>2</sup>).

- C. Protection Layer Application:

1. Embed protection sheet into the membrane immediately after membrane application.
2. Overlap adjoining sheet edges a minimum of 6-inches (150 mm) to ensure complete coverage.
3. Apply 2-inch (50 mm) wide 30 mil (0.75 mm) minimum thickness tack coat of **TurboSeal GT** within overlap seam edge along bottom sheet edge.
4. Tape all seams with **DuroTape** centered along seam ensuring a continuously adhered seam. Roll all seams.
5. The completed composite waterproofing assembly must be protected from damage resultant from follow on trades and environmental exposure.

### 3.4 TERMINATION AT TOP OF GRADE

- A. Terminate the waterproofing system at top of grade with a termination bar. Fasten the termination bar every 12-inches (300 mm) on-center and seal the top of termination bar with a bead of **PM Sealant**.

### 3.5 DRAINAGE COURSE / INSULATION / PAVER PLACEMENT

A. General

1. Contractor shall examine the deck area to be covered with subsequent topping materials in order to ensure that all deck areas have received the membrane, the membrane is free of damage, it is properly protected, and all flashing has been properly installed, before placing the insulation.
2. The drainage course (if required), insulation (if required), and other subsequent topping materials shall be installed as each section is completed.

B. Prefabricated Drainage Course Placement (as required)

1. Install drainage course on horizontal and vertical surfaces in accordance with the manufacturer's recommendations.
2. Layout and position drainage course and allow to lay flat. Cut and fit drainage course to perimeter and penetrations.
3. Bond all geotextile overlap edges to adjacent drainage course geotextile with an acceptable adhesive to ensure geotextile integrity.
4. Place subsequent topping materials as soon as possible.

C. Insulation Placement (as required)

1. Loose lay (horizontal applications) in a staggered manner and tightly butt together all insulation boards. The maximum acceptable opening between insulation boards is 3/8-inch (9mm). Insulation shall be installed within 3/4-inch (18 mm) of all projections, penetrations, etc. When multi-layer insulation applications are involved the bottom layer of insulation shall be the thickest layer and shall be a minimum of 2-inch thick (50 mm). All layers shall be installed unadhered to each other and all joints staggered in relation to underlying layers.
2. For vertical, multi-layer applications, the second layer of insulation board shall be spot adhered to the protection layer with an appropriate adhesive.

D. Architectural Finish Paver Placement (as required)

1. Install architectural finish pavers on tabs or pedestals in accordance with manufacturer's recommendations and architectural layout.

### 3.6 WATERSTOP INSTALLATION

A. Strictly comply with installation guidelines in manufacturer's published literature, including but not limited to, the following:

1. Apply **BentoTak** at all cold joints, construction joints, steel penetrations, and steel beams.
2. Properly prepare the surface to ensure complete contact to substrate, remove all debris that may prevent the adhesive bond. Wire brush steel surfaces to remove rust and remove any contaminants that would prevent **BentoTak** from adhering to surface. Do not install in ponding water if concrete pour is greater than 7 days from installation.
3. Apply a continuous strip of **BentoTak** no less than 1.25-inch (32 mm) from outside concrete face molding the butting ends of the strips together without overlap.
4. Apply a continuous 3/8-inch (9 mm) minimum bead of **e.stop gu** around the circumference of all PVC penetrations, detail areas, or to irregular concrete substrates.

5. Inspect for damage just prior to concrete pour and repair as needed.

### 3.7 FIELD QUALITY CONTROL

- A. Strictly comply with installation guidelines in manufacturer's published literature, including but not limited to, the following:
  1. Conduct a visual inspection after the **TurboSeal GT** waterproofing system has been installed. Note any visual deficiencies and mark for repair.
  2. Inspect all protection sheet seams for complete and continuous adhesion. Note any deficiencies and mark for repair.

### 3.8 PROTECTION AND CLEANING

- A. Strictly comply with installation guidelines in manufacturer's published literature, including but not limited to, the following:
  1. Protect the waterproofing system in accordance with manufacturer's recommendations until the placement of concrete.
  2. Do not allow heavy equipment or machinery on top of unprotected waterproofing system.
  3. Inspect for damage just prior to placement of concrete and make repairs in accordance with manufacturer's written guidelines and recommendations.
  4. Take care in the placement of overburden. Do not damage with earth-moving equipment.
  5. Repair areas as needed following manufacturer's written guidelines.
  6. Do not leave the waterproofing system exposed for longer than 60 days prior to subsequent topping materials.

### 3.9 REPAIRS

- A. Strictly comply with manufacturer's written guidelines for repair, including but not limited to, the following:
  1. Inspect damaged areas to determine which system components have been damaged.
  2. For punctures in the waterproofing system protection sheet smaller than 1/4-inch (12 mm) in diameter, apply a **DuroTape** patch over the damaged area.
  3. For areas where more than two punctures exist in any 1 square foot area of the waterproofing system protection sheet, regardless of size, apply an appropriately sized patch of protection sheet and minimum 90 mil (2.3 mm) thick layer of **TurboSeal GT** that extends 6-inches (150 mm) beyond the damaged area.
  4. For damages or punctures larger than 1/4-inch (12 mm) in diameter, apply an appropriately sized patch of protection sheet and minimum 90 mil (2.3 mm) thick layer of **TurboSeal GT** that extends 6-inches (150 mm) beyond the damaged area.
  5. Apply the remaining layers as specified.

End of Section