

SPECIFICATION FOR TERRE BOX™ WITH TERRE HILL WATERTIGHT  
JOINT SEAL SYSTEM (**US Patent No. US 7,828,496 B1**)  
TERRE HILL STORMWATER SYSTEMS'  
A Division of Terre Hill Concrete Products  
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This specification is available at [www.terrestorm.com](http://www.terrestorm.com)

PART 1-GENERAL

1.1 DESCRIPTION

- A.** Concrete : 5,000 PSI at 28 days; with ASTM C-33 # 57 or # 67 coarse aggregate; self compacting; air entrained precast concrete
- B.** Deformed steel conforms to ASTM A-615 Grade 60. Welded wire fabric conforms to ASTM A-185, deformed welded wire fabric or equal size may be substituted for smooth welded wire fabric and shall conform to ASTM A-497.
- C.** Post-tensioning strands shall be ½” diameter, ASTM A-416 Grade 270, 7 wire, low relaxation strand. Each strand shall be stressed to 28,900 lbs. on first pass, cable shall be stressed to 30% of full load; second pass 100%.
- D.** All precast concrete box section joints shall have closed cell neoprene gasket material around the entire interior and exterior perimeter of each joint
- E.** The precast concrete box sections shall be post tensioned, causing the closed cell neoprene gasket material to form a 10 psi joint seal.
- F.** After post tensioning, all joints between precast concrete box sections shall be filled in the field by Terre Hill Stormwater Systems using the patented Terre Hill Stormwater Systems Watertight Joint Seal System (**US Patent No. US 7,828,496 B1**). All joints shall be filled with pressure injected non shrinking, expandable grout through a series of preformed joint grout seal ducts at locations specified in the plans..
- G.** Precast concrete box underground storage tanks shall be as designed, engineered, manufactured and installed by Terre Hill Concrete Products, to meet: 1) designed storage capacity requirements, 2) water

tightness performance capability equal to ASTM C-990, section 10, 3) water tightness performance equivalency of proposed product substitution shall require third party verification of not less than 2 prior existing underground precast concrete box installations that meet ASTM C-990, section 10 "Performance Requirement For Joints" standard, 4) proposed product substitution shall require equivalent 4 year labor and material warranty, and 4) HS-25 loading requirements. Contact Terre Hill Stormwater Systems : PO Box 10, 485 Weaverland Valley Road, Terre Hill, PA 17581 717 445 3111 fax 717 445 0242 Toll Free (800 242 1509)

## 1.2 SUBMITTALS

- A.** Shop drawings shall be submitted as described in Division 1 – General Requirements.
- B.** Certifications by a Professional Engineer shall be submitted that the Terre Box™ with the Terre Hill Watertight Joint Seal System (US Patent No. US 7,828,496 B1) shall conform to the specifications.

## 1.3 REFERENCES

- A-48 Specification for Gray Iron Castings Class 35 B
- A-416 Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete Grade 270
- A-615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- C-32 Specification for Sewer and Manhole Brick
- C-33 Standard Specification for Concrete Aggregates
- C-270 Specification for Mortar for Unit Masonry
- C-478 Specification for Precast Reinforced Concrete Manhole Sections
- C-913 Standard Specification for Precast Concrete Water and Wastewater Structures
- C-990 Section 10, Performance Requirements for Concrete Joints
- C-1433 Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains and Sewers
- US Patent No. US 7,828,496 B1 "Watertight Joint Seal for Concrete

## Structures”

- Federal Specifications ( FS ): FS-SS-S-210 Sealing Compound , Preformed Plastic for Expansion Joints and Pipe Joints
- Pipe openings shall be sized to accept pipes of the specified sizes and shall be sealed with hydraulic cement conforming to ASTM C 595M.
- The Terre Arch™ structure shall be designed for HS-25 traffic loading, and existing soil pressure, ground water pressure and buoyancy
- The access cover shall be designed for HS-25 traffic loading and shall provide a minimum of 27 1/2 inches clear opening. Manhole frame and cover shall be East Jordan or Quirin manufactured from gray iron conforming to ASTM A-48 Class 35B. The cover shall contain the Terre Hill Stormwater Systems logo as approved by Terre Hill Stormwater Systems.

## 1.4 MANUFACTURERS

- A.** The products furnished by named manufacturers are specified as a standard of quality and performance.
- B.** The manufacture of the concrete structure shall be performed at a precast production facility certified by the National Precast Concrete Association (NPCA).
- C.** The manufacturer of the Terre Box™ with the Terre Hill Watertight Joint Seal System (US Patent No. US 7,828,496 B1) shall be licensed to produce and or sell the entire device or any components thereof by Terre Hill Concrete Products of Terre Hill Pennsylvania 717-445-3100.

## PART 2- PRODUCTS

### 2.1 MATERIALS AND DESIGN

- A.** The Terre Box™ with Terre Hill Watertight Joint Seal System (US Patent No. US 7,828,496 B1) structure shall be designed for HS-25 traffic loading, and existing soil pressure, ground water pressure and buoyancy. The materials and structural design shall be per ASTM C-478, C-1433 and C-913. The concrete shall have a minimum compressive strength of 5000 psi.

- B.** The access cover shall be designed for HS-25 traffic loading and shall provide a minimum of 27 1/2 inches clear opening. Manhole frame and cover shall be East Jordan or Quirin manufactured from gray iron conforming to ASTM A48 Class 35B. The cover shall contain the Terre Hill Stormwater Systems logo as approved by Terre Hill Stormwater Systems.
- C.** Butyl mastic sealant for joints shall conform to ASTM C-990 and FS-SS-S-210 Sealing Compound , Preformed Plastic for Expansion Joints and Pipe J
- D.** Pipe openings shall be sized to accept pipes of the specified sizes and shall be sealed with hydraulic cement conforming to ASTM C-595M.

## PART 3-INSTALLATION

### 3.1 WORK

A. This section includes directions for the installation of Terre Box™ with Terre Hill Watertight Joint Seal System (US Patent No. US 7,828,496 B1)

#### 1. SUBMITTALS

- A. Manufacturer's product data on Terre Box™ shall contain:
  - 1. Dimensions of Terre Box™
  - 2. Volumes-Capacities-Dimensions of Terre Box™
- B. Shop drawings showing materials of construction by ASTM reference and grade.
- C. Box culverts shall be post tensioned using an electric motor driven hydraulic post tension jack providing a minimum of 28 Kips on each post tensioning cable
- D. All post tensioning cables shall be encased in a protective sheath containing lithium grease
- E. All post tensioning cable ducts shall be grouted after post tensioning is completed
- F. After post tensioning is completed grout shall be pressure injected into the entire annular space of each joint
- G. Grout shall consist of 1 bag of # 2 Portland cement; 5 gallons of water and Interplast additive

equal to 1% by weight of cement.

### 3.2 PRODUCTS

#### 1. GENERAL

- A. Precast concrete Terre Box™ with Terre Hill Watertight Joint Seal System (US Patent No. US 7,828,496 B1) shall be used where specified on drawings or required by owner, engineer or governing body

#### 2. PRECAST CONCRETE TERRE BOX™

- A. Precast concrete Terre Box™ shall be manufactured in a NPCA certified plant.
- B. Terre Box™ shall conform to the shapes and dimensions shown on the drawings and as specified by Terre Hill Stormwater Systems
- C. Design loads shall consist of dead load, live load, impact load and loads due to soil pressure ground water table and pressure and any other load on the Terre Box™. Live loads shall be HS-25.
- D. The access cover shall be designed for HS-25 traffic loading and shall provide a minimum of 27 1/2 inches clear opening. Manhole frame and cover shall be East Jordan or Quirin manufactured from gray iron conforming to ASTM 48 Class 35B.

### 3.3 EXCAVATION / INSTALLATION

#### 1. EARTHWORK

- A. The Contractor shall prepare excavation large enough to accommodate the Terre Box™ and to permit grouting, sealing, backfilling of 8 inch cover and 12 inch around perimeter of the installation. Additional installation specifications may be necessary, depending on soil and site conditions

### 3.4 INSTALLATION

- A. Openings or “knockouts” in precast concrete Terre Box™ and distribution structure shall be located as shown on the drawings and shall be sized sufficiently to permit passage of the largest dimension of pipe and/or flange.