

## **SPECIFICATION**

### **SafeSite™ FuelVault**

#### **1.0 GENERAL DESCRIPTION AND STANDARDS**

Furnish **UL 2245 FuelVault** precast concrete below grade fuel storage vault, or approved equal, as shown on drawings and provided by: Core Engineered Solutions, Inc.

#### **1.1 Delivery, Handling and Installation**

1. Handle and transport precast concrete fuel storage vault components with suitable equipment that will not damage or subject the product to excessive stresses.
2. Additional reinforcing, inserts, strong backs or other items shall be provided at time of installation per precast manufacturer recommendations for erection and handling stresses.
3. Install precast concrete below grade fuel storage vault, or approved equal, as shown on drawings and according to precast manufacturer recommendations.
4. Field cutting shall not be allowed, except as indicated on the drawings, without prior approval of the Engineer/Architect and precast manufacturer.

#### **1.2 Calculations and Drawings**

1. Calculations for loading conditions shall be submitted as shown on shop drawings.
2. Shop drawings shall be stamped by a state registered professional engineer.

#### **1.3 Quality Control Submittals**

1. Information shall be submitted showing the precast concrete vault manufacturer has a minimum of five (5) years experience producing vaults or similar products.
2. Certificates of compliance shall be submitted including mill certificates for cement, aggregates, reinforcing steel, admixtures, gaskets and embedded items.
3. Manufacturer's concrete comprehensive strength cylinder test reports, ASTM C 31, shall be submitted.
4. Quality control personnel shall be certified to ACI concrete field testing technician, Grade 1.
5. Precast manufacturer shall prepare a minimum of three (3) standard concrete test cylinders for each casting per ASTM C 31.
6. Vault concrete test cylinder information shall be submitted by the precast manufacturer to the Engineer/Architect for review.

## **2.0 DESIGN AND CONSTRUCTION**

### **2.1 Vault Design**

1. Vault shall be factory poured, reinforced, precast concrete.
2. Vault shall consist of two-piece construction (top and base).
3. Vault walls shall consist of a minimum of 6" precast, reinforced concrete.
4. The minimum volume of the bottom shall be  $\geq$  100% of the volume of the steel fuel storage tank.
5. The precast bottom section slab and walls shall be a monolithic casting.
6. No seams or joints shall be used below the 100% liquid containment level.
7. Vault shall include all hole penetrations for piping as shown on drawings.
8. Vault shall be designed in accordance with the American Concrete Institute Building Code
9. Requirements for Reinforced Concrete (ACI 318 Latest Edition).
10. Loading shall be per ASTM C 857 "minimum structural design loading for underground precast concrete utility structures."
11. Vault shall be designed against flotation.

### **2.2 Tank Design**

1. Tank shall be an aboveground grade steel tank manufactured according to UL 142 specifications.
2. Tank shall be of the size and dimensions as shown on drawings.
3. Tank shall have continuous welds on inside and outside according to American Welding Society Standards.
4. Tank shall be pressure tested at 5 psi for 24 hours.
5. Tank shall have emergency vent as required by NFPA 30.
6. Tank openings shall be threaded.
7. Tank exterior shall be finished with a rust preventative primer.

### **2.3 Concrete and Raw Materials**

1. ASTM C 150 Portland Cement Type I, II or III shall be used.
2. Design strength shall be 5,000 psi minimum at 28 days.
3. Concrete aggregates shall meet ASTM C 33.
4. Maximum size of concrete aggregates shall be 3/4 inch.
5. Maximum water to cement ratio of .40 shall be permitted.
6. Silica fume additive and synthetic fiber secondary reinforcement may be used in the concrete mix.
7. Calcium Chloride shall not be used in the concrete mix.

8. Minimum quantities per cubic yard of concrete shall be the following: cement content = 705 lbs.; silica fume = 40 lbs.; high range water reducer = 25 oz./cwt cement; synthetic fibers = 1.5 lbs.
9. W.R. Grace WRDA-19, or approved equal meeting ASTM C 494, Type F shall be used {Air Content 5% (+1-) 1%}.
10. W.R. Grace Force 10,000 or approved equal, micro silica fume mineral admixture may be used.
11. W.R. Grace Fibers, or approved equal, polypropylene fibers may be used.
12. Precast manufacturer shall place, consolidate, finish and cure concrete in accordance with recommended practices of the American Concrete Institute.
13. Steam curing is permitted.
14. Casting forms shall be constructed of steel sufficient to maintain dimensional tolerances of the product.
15. Casting form surfaces shall be in "undamaged" condition to form an acceptable finish. Slump to be 6" (+/-) 1.5"

#### **2.4 Reinforcing Steel**

1. Deformed bars shall conform to ASTM A 615 GRADE 60.
2. Reinforcing bars to be welded shall conform to ASTM A 706 weldable Grade 60 or Grade 60 bars to be preheated as per ANSI/AWS D1.1-92 Structural Welding Code.
3. Welding of reinforcing steel shall conform to American Welding Society's ANSI/AWS D1.1-92 Structural Welding Code-Reinforcing Steel.
4. Welded wire fabric shall conform to ASTM 185 or 497 (Minimum Yield 66,000 psi)

#### **2.5 Gaskets**

1. Premolded joint filler shall be Concrete Sealant CS-440, or approved equal.
2. Premolded joint filler shall be fuel and oil resistant.
3. External joint sealer shall be Concrete Sealant CS-212 Conwrap Barrier, or approved equal, conforming to ASTM C 877.

#### **2.6 Access Covers**

1. Access covers shall be designed for AASHTO HS-20 wheel loading.
2. Access covers shall be water and air tight.
3. Access covers shall conform to the dimensions shown on the drawings and pertinent OSHA requirements.

#### **2.7 Loads**

1. Unit weight of soil = 120 psf.
2. Maximum soil cover = 2'-0"; minimum soil cover = 0'-0".
3. AASHTO HS-20-44 truck loading with impact.
4. 2'-0" live load surcharge.

5. 39.6 psf equivalent fluid pressure-lateral soil pressure above the water table.
6. 81.4 psf equivalent fluid pressure-lateral soil pressure below the water table.
7. Water table at elevation of exterior roof slab of vault.

## **2.8 Coatings**

1. Internal coating on bottom section shall be Sherwin Williams Shelcoate II meeting EPA requirements for secondary containment.
2. Interior coating on top section shall be Sherwin Williams Based Catalyzed Epoxy.

For drawings or more information contact Core Engineered Solutions at [www.core-es.com](http://www.core-es.com)  
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Rev. 06/21