

SPECIFICATION

ConVault® UL 752 and UL 2085 Listed Rectangular Protected/Secondarily Contained Aboveground Tank

1.0 GENERAL DESCRIPTION AND STANDARDS

- 1.1. Provide the rectangular ConVault® Aboveground Tank system constructed and listed in accordance with Underwriters Laboratories, Inc. (UL) Standard 2085, Aboveground Storage Tanks for Flammable and Combustible Liquids, Protected Type, Non-Metallic Secondary Containment with Vehicle Impact and Projectile Resistance. The tank system shall be listed for ballistics protection in accordance with UL Standard 752, Levels 5, 6 and 8.
- 1.2. The tank system must comply with all provisions of: 1) UFC 79-7, Appendix A-II-F, for both Vehicle Impact Protection and Projectile Resistance; 2) NFPA 30 and 30A; 3) IFC Chapter 23; and 4) IFC Chapter 57.
- 1.3. The tank system shall be tested, certified and approved for Vapor Recovery by the State of California Air Resource Board (CARB) under Executive Order VR-302-B Standing Loss Control Recovery System for New Installations of Aboveground Storage Tanks effective 11/30/09.
- 1.4. The tank system shall be warranted by the manufacturer against defects in material or workmanship for 30 years following the delivery of the tank. Warranties that limit such coverage for shorter periods and/or limit the primary tank warranty to failure solely due to non-corrosion related cracking, breakup or collapse will not be permitted. See warranty documents.
- 1.5. The manufacturer of the tank system shall provide a Buy American Act Certificate confirming compliance with the provisions of the American Recovery and Reinvestment Act of 2009.
- 1.6. The tank system shall be manufactured and labeled in strict accordance with ConVault® standards as applied by a licensee of ConVault, Inc. The tank system shall be subject to the ConVault Quality Assurance Program.
- 1.7. The tank system shall be supplied by: Core Engineered Solutions, Inc.

2.0 DESIGN AND CONSTRUCTION

- 2.1 **Tank:** The primary tank shall be rectangular in shape and listed per UL Standard 142. Steel tank thickness shall be 3/16" thick (7 gauge). Welds shall be continuous on all sides and exterior seams, conforming to the American Welding Society Standard for continuous weld. The primary steel tank shall be pressure tested at 5 psig for a minimum of 24 hours. All openings shall be from the top only.
- 2.2 **Secondary Containment and Corrosion Protection:** The tank system shall include secondary containment consisting of an impervious barrier of 30 Mil (0.76 mm) High-Density Polyethylene geomembrane enclosing the primary steel tank and insulation material to contain leaks from the primary tank and isolating the primary tank from the concrete to protect against corrosion. The secondary containment shall be impervious to corrosion, including damage or failure due to microbial infestation. Secondary containment comprised of an (unprotected) exposed outer steel jacket will not be permitted.

All steel exterior to the concrete encasement shall be anti-oxidant powder coated to inhibit corrosion and meet ASTM B117.

- 2.3 **Concrete Encasement:** A vaulted concrete enclosure shall encase and protect both the primary steel tank and the secondary containment. The concrete encasement shall be 6" thick with a minimum design strength of 4000 psi. The concrete design shall include the following for long-term durability: air entrainment, water-reducing admixture, and

steel reinforcement. Concrete placement shall be a visually verifiable monolithic (seamless) pour to ensure the absence of voids on all sides and beneath the steel tank.

The vault enclosure shall have non-corrosive concrete support legs of unitized monolithic construction raising the concrete enclosure a minimum of 3" above the ground to meet visual inspection requirements. Steel supports will not be permitted. A mid-level seam or other cold joint construction which could compromise the liquid tightness (secondary containment) and fire protection capability of the vault is not permitted.

2.4 Thermal Protection: The tank system construction shall include covering the outer surface of the primary steel tank with a minimum 1/4" inch of polystyrene foam panels and 6" thick reinforced concrete for thermal insulation to protect against temperature extremes.

2.5 Ballistics and High Explosive (HE) Blast Resistance: The tank system shall bear a UL label for the security listing under Ballistics Standard 752, Levels 5,6 and 8 (see table below), signifying bullet-resisting protection against penetration, passage of fragments of projectiles, or fragmentation of the vault enclosure to the extent that any protected material, including the secondary containment and primary tank are not damaged.

Ballistics Tests

UL 752 Ratings Table				
Protection Level	# of Shots	Distance	Grain	Ammunition
Level 5	1	15	150	7.62 mm rifle lead core full metal copper jacket, military ball (.308 caliber)
Level 6	5	15	124	9.00mm full metal copper jacket with lead core
Level 8	5	15	150	7.62mm rifle lead core full metal copper jacket, military ball (.308 caliber)

The tank system shall meet Department of Defense Uniform Facilities Criteria UFC 4-023-07 (Design to Resist Direct Fire Weapons Effects) guidelines for a "High" threat level parameter.

The tank system shall have been tested and passed the requirements to meet the following Ratings for Bullet Resistant Materials at a National Institute of Justice (NIJ) / National Law Enforcement and Corrections Technology Center (NLECTC) approved laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP):

Additional Rating Systems Table			
Rating System and Level	# of Shots	Grain	Ammunition
UL 752; Level 9	1	166	Armor piercing .30 caliber rifle steel core lead point filler full metal jacket
National Institute of Justice (NIJ); Level 4	1	166	.30-06 armor piercing
State Department SD-STD-02.01; SD-Rifle AP, .30, 30-06	3	165	(Part 1) .30-06 caliber M2 AP
ASTM F-1233; .30-06 Armor Piercing Rifle	3	165	.30-06 M2 AP

Blast Effects Analysis (BEA)

The tank system design shall have been subjected to a Blast Effects Analysis (BEA) assessing resistance and performance under the following blast threat scenarios per the FEMA 426 - Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings:

Blast Resistance Table

Blast Scenario	Weight of Explosive Device	Standoff Distance
Man-portable improvised explosive device (MPIED)	50 pound	5 feet
Vehicle-borne improvised explosive device (VBIED)	500 pound	20 feet
Vapor cloud explosion (VCE)	10 psi	NA

The BEA shall conclude that the tank system will resist the explosion loads and remain intact, without failure of the primary tank or movement of the tank exceeding 2". Tank designs that do not protect the primary tank AND secondary containment by providing both Ballistics and Blast Effect resistance as specified in this Section 2.5 will not be permitted.

- 2.6 Fire Resistance:** The tank system shall be designed and tested to provide 2 hour fire protection for the primary tank as per UL 2085 2-hour furnace fire test and 2 hour simulated pool fire test. The average maximum rise in temperature of the primary tank during the test shall not exceed 260° F and the maximum temperature of any single point on the primary tank shall not exceed 400° F. No steel members shall penetrate the walls or floor of the concrete encasement to assure isolation from pool fire heat.
- 2.7 Leak Monitoring:** A thru-tank leak detection monitoring tube terminating between the primary tank and the secondary containment shall be provided to monitor any leaks from the primary tank.
- 2.8 Spill/Overfill Containment:** The tank system shall include a UL listed 7 gallon spill/overfill container manufactured as an integral part of the primary tank, surrounding the fill pipe, and protected by 2 hour fire rating of the enclosure. The spill/overfill container shall include a stick port and normally closed drain valve to release spilled product into the main tank. Exterior steel shall be anti-oxidant powder coated to inhibit rust
- 2.9 Overfill Protection:** Overfill protection shall be provided by the following methods: a) direct reading level gauge visible from fill pipe access; b) valve rated for pressurized delivery located within fill pipe to close automatically at 95% full level; and c) high level alarm.
- 2.10 Exterior Finish:** The tank system exterior shall be a low maintenance architectural coating or exposed aggregate concrete finish. Models with fiber clad or painted steel exterior tanks will not be accepted.

3.0 EXECUTION

- 3.1** The tank system shall be installed in strict accordance with the manufacturer's recommendations, industry standards, and applicable fire and environmental codes. All state and local permits shall be obtained prior to installation.
- 3.2** The tank system shall be handled, lifted, stored and installed in accordance with the manufacturer's instructions on a reinforced concrete base slab designed to support the fully loaded tank. Protective bollards shall be installed where required by state and local codes. Tanks shall be marked on all sides with warning signs and product identification as required by applicable codes.
- 3.3** The tank system shall be grounded in accordance with NFPA 780 and all electrical work shall be in accordance with applicable codes.
- 3.4** Any proposed equal alternatives to this specification must be submitted for review and approval prior to bid opening. If the proposed alternative is deemed to present a better solution, review expenses will be waived. If the proposed alternative is denied or deemed to be equal, all expenses incurred for such review are to be paid for by the bidder prior to submittal of bid.

For drawings or more information contact Core Engineered Solutions at: www.core-es.com
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