

FuelVault™

Operating and Maintenance Manuals



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FuelVault™ Manuals

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***FuelVault™* Specification**

1.0 Delivery, Handling and Installation

- 1.1 Furnish **UL 2245 FuelVault™** precast concrete below grade fuel storage vault, or approved equal, as shown on drawings.
- 1.2 Handle and transport precast concrete fuel storage vault components with suitable equipment that will not damage or subject the product to excessive stresses.
- 1.3 Additional reinforcing, inserts, strong backs or other items shall be provided at time of installation per precast manufacturer recommendations for erection and handling stresses.
- 1.4 Install **FuelVault™** precast concrete below grade fuel storage vault, or approved equal, as shown on drawings and according to precast manufacturer recommendations.
- 1.5 Field cutting shall not be allowed, except as indicated on the drawings, without prior approval of the Engineer/Architect and precast manufacturer.

2.0 Calculations and Drawings

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

3.0 Quality Control Submittals

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

4.0 Vault Design

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

5.0 Tank Design

Product Specification

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

6.0 Concrete and Raw Materials

- 6.1 ASTM C 150 Portland Cement Type I, II or III shall be used.
- 6.2 Design strength shall be 5,000 psi minimum at 28 days.
- 6.3 Concrete aggregates shall meet ASTM C 33.
- 6.4 Maximum size of concrete aggregates shall be 3/4 inch.
- 6.5 Maximum water to cement ratio of .40 shall be permitted.
- 6.6 Silica fume additive and synthetic fiber secondary reinforcement may be used in the concrete mix.
- 6.7 Calcium Chloride shall not be used in the concrete mix.
- 6.8 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.
- 6.9 W.R. Grace WRDA-19, or approved equal meeting ASTM C 494, Type F shall be used { Air Content 5% (+/-) 1% }.
- 6.10 W.R. Grace Force 10,000 or approved equal, microsilica fume mineral admixture may be used.
- 6.11 W.R. Grace Fibers, or approved equal, polypropylene fibers may be used.
- 6.12 Precast manufacturer shall place, consolidate, finish and cure concrete in accordance with recommended practices of the American Concrete Institute.
- 6.13 Steam curing is permitted.
- 6.14 Casting forms shall be constructed of steel sufficient to maintain dimensional tolerances of the product.
- 6.15 Casting form surfaces shall be in "undamaged" condition to form an acceptable finish.
- 6.16 Slump to be 6" (+/-) 1.5"

7.0 Reinforcing Steel

- 7.1 Deformed bars shall conform to ASTM A 615 GRADE 60.
- 7.2 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.
- 7.3 Welding of reinforcing steel shall conform to American Welding Society's ANSI/AWS D1.1-92 Structural Welding Code-Reinforcing Steel.
- 7.4 Welded wire fabric shall conform to ASTM 185 or 497 (Minimum Yield 66,000 psi)

8.0 Gaskets

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

9.0 Access Covers

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

10.0 Loads

- 10.1 Unit weight of soil = 120 psf.
- 10.2 Maximum soil cover = 2'-0"; minimum soil cover = 0'-0".
- 10.3 AASHTO HS-20-44 truck loading with impact.
- 10.4 2'-0" live load surcharge.
- 10.5 39.6 psf equivalent fluid pressure-lateral soil pressure above the water table.
- 10.6 81.4 psf equivalent fluid pressure-lateral soil pressure below the water table.
- 10.7 Water table at elevation of exterior roof slab of vault.

11.0 Coatings

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

FuelVault™
Limited Warranties

FuelVault™

**OLDCASTLE PRECAST, INC.
LIMITED STRUCTURAL WARRANTY**

Oldcastle Precast, Inc. (hereinafter called “Manufacturer”) manufactures below-grade concrete FuelVaults under the tradename “FuelVault™”; which are designed to accommodate and contain tanks for the storage of Class 1 and Class 2 petroleum products (hereinafter called the “FuelVault™”).

A. Limited Structural Warranty

The Manufacturer makes the following LIMITED STRUCTURAL WARRANTY to the original purchaser (“Purchaser”) of a FuelVault™:

1. That each FuelVault™ is manufactured in accordance with the Manufacturer’s design specifications and criteria.
2. That the FuelVault™ will be free from structural defects in materials and workmanship for a period of twenty (20) years from the date of shipment to the Purchaser.

B. Limitations and Disclaimers

THE LIMITED STRUCTURAL WARRANTY CONTAINED HEREIN IS SUBJECT TO THE FOLLOWING CONDITIONS AND LIMITATIONS:

1. THIS LIMITED STRUCTURAL WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ANY AND ALL OTHER WARRANTIES, WHETHER THEY ARE WRITTEN, ORAL, EXPRESSED, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO OTHER WARRANTIES, LIMITED, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THOSE CONTAINED HEREIN.
2. THIS LIMITED STRUCTURAL WARRANTY DOES NOT COVER DAMAGE TO THE FUELVAULT™ RESULTING FROM:
 - a. SHIPPING OR INSTALLATION
 - b. MISUSE OR ABUSE OF THE FUELVAULT™
 - c. ACTS OF GOD (INCLUDING, BUT NOT LIMITED TO, EARTHQUAKE, FLOOD AND SUBSIDENCE)

Limited Warranty

3. The following will void the Manufacturer's LIMITED STRUCTURAL WARRANTY:
 - a. Storage of corrosive, toxic or material other than Class 1 and Class 2 petroleum products, or other use of the FuelVault™ for purposes other than those expressed herein.
 - b. Failure to install the FuelVault™ in accordance with Manufacturer's instructions and the current most relevant provisions of the following in effect as of the date of this LIMITED STRUCTURAL WARRANTY; the Uniform Building Code; NFPA 30; NFPA 30A; and the Uniform Fire Code.
 - c. Failure to maintain and inspect the FuelVault™, tank and accessory equipment in accordance with all current codes and regulations.
 - d. If persons other than the Manufacturer's personnel or those authorized in writing by the Manufacturer perform warranty work, repairs or modifications to the FuelVault™.
 - e. Reassignment of this LIMITED STRUCTURAL WARRANTY by the original Purchaser without express written permission of the Manufacturer to do so.

C. Sole Remedy

1. All claims for damage to the FuelVault™ and/or breach of the LIMITED STRUCTURAL WARRANTY contained herein shall be made in writing to the Manufacturer of the FuelVault™ within ten (10) days of the time the breach is discovered or should have been discovered. Warranty service must be performed by the Manufacturer or the Manufacturer's authorized agent. Upon validation by the Manufacturer of any claim for breach of the LIMITED STRUCTURAL WARRANTY contained herein, the Manufacturer will, at its sole and exclusive option, either:
 - a. Repair the defective FuelVault™
 - b. Deliver a replacement FuelVault™ to the point of original delivery by the Manufacturer; or
 - c. Refund the original purchase price of the FuelVault™.
2. The provisions contained in Section "C" constitute Purchaser's sole and exclusive remedy under any claim or theory of liability, including any claim based on failure of, or defect in the FuelVault™, whether such claim, however instituted, is based upon contract, indemnity, warranty, tort (including negligence), strict liability or otherwise. The Manufacturer shall not be liable for direct, indirect, consequential damages or costs of any nature including, without limitation, labor costs of any kind relating to the removal of a failed FuelVault™ and/or installation or a replacement FuelVault™ or damages attendant thereto or claims and costs otherwise arising from, or in connection with, breach of the LIMITED STRUCTURAL WARRANTY.
3. The Manufacturer will not honor any claim under this LIMITED STRUCTURAL WARRANTY made prior to payment in full by the Purchaser for the FuelVault™.

D. Miscellaneous

1. The LIMITED STRUCTURAL WARRANTY is extended only to the Purchaser of the FuelVault™ from the Manufacturer and may not be assigned by such Purchaser to a third party without prior, written authorization of the manufacturer.
2. The Manufacturer will not be responsible for the costs of damages to the FuelVault™ or to the Purchaser's property as a result of FuelVault™ inaccessibility or warranty repair, service or replacement.
3. In the event that a dispute arises between the Manufacturer and Purchaser over a claim submitted by the Purchaser for breach of this LIMITED STRUCTURAL WARRANTY, the Manufacturer and

Purchaser agree that such dispute will be submitted to binding arbitration pursuant to the rules of the American Arbitration Association.

4. The arbitration of any dispute arising under this LIMITED STRUCTURAL WARRANTY must be commenced no longer than one (1) year from the date the breach is discovered, or should have been discovered.
5. All accessories not of Oldcastle Precast, Inc. manufacture, such as ladders, frames and covers, mechanical pipe seals, ventilation fans, motors, etc., are not warranted by Oldcastle Precast, Inc. Some of these items may be warranted by the original manufacturer.
6. The LIMITED STRUCTURAL WARRANTY contains the complete understanding of the Manufacturer and Purchaser and may be modified only in writing signed by the President of the Manufacturer.

Limited Warranty

Milton Steel, Inc. (MSI) warrants each *FuelVault*[™] steel tank against defects in material or workmanship from the date of purchase, except as set forth below, for a period of twenty (20) years and agrees to repair or replace any defective unit without charge. **Failure to install in accordance with manufacturer's specifications for installation and testing, or repairs or modifications by non-authorized persons will void this warranty.** If the *FuelVault*[™] steel tank is moved from its original installation, it must be installed in accordance with manufacturer's specifications and representative must be notified of the move and new location.

FuelVault[™] steel tanks are designed under current laws and regulations for storage of gasoline, diesel, methanol, ethanol, motor oils and other petroleum-based products. *FuelVault*[™] steel tanks are not designed for the storage of corrosives, toxic materials or chemicals. This *Limited Warranty* is not valid unless and until the warranty validation card is fully completed by the ultimate purchaser and returned to the Representative / MSI within thirty (30) days after the date of installation or ninety (90) days after the Licensee's shipment as reflected on the warranty validation card, whichever comes first. To continue this warranty in effect, the user has a duty to conduct visual inspections at least weekly, to check for leaks and to maintain the *FuelVault*[™] steel tank in accordance with its operating and maintenance manuals. In the event leaks are determined, MSI must be contacted within two (2) working days. This warranty is limited to the tank only and does not include paint, signs and decals, air vents, pump and/or pump components. **This warranty is limited to replacement or repair of the *FuelVault*[™] steel tank at the option of MSI and excludes any other or further remedial measures. No responsibility or liability is assumed for any special, incidental or consequential damages.**

You may obtain warranty service by MSI. To perform warranty service, the *FuelVault*[™] steel tank must be accessible by forklift or crane. MSI will not be liable for any costs or damages resulting from lack of accessibility.

There are no warranties which extend beyond the face hereof:

* Tanks storing Methanol and Ethanol are limited to a one (1) year warranty since no control can be maintained over the quality of the fuels added to the tank.

** *FuelVault*[™] steel tanks may be pressurized up to 5 psig for testing purposes only, provided, however, that after flammable liquids have been placed in the tank, the tank shall not be pressurized. If any additional testing is required, please contact MSI for instructions prior to testing.

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A. General

The FuelVault™ storage tank is a steel storage tank stored below ground in a 6 inch thick reinforced concrete vault. Since the tank contains flammable or combustible liquids, it is therefore prudent that general common sense is exercised in operating the fuel storage system. Dispensing of fuel from the FuelVault™ storage tank to other equipment, automobiles, generators, etc., requires connection of accessories to the tank. This makes it important to establish and use safe practices to check the accessories and their piping connections to be free from any leak and other hazardous condition.

- **NOTE: it is very important that you familiarize yourself with the fuel dispensing equipment and accessories and follow their manufacturer's operating instructions to their full extent. Equipment manufacturer's operating instructions, guidelines, and recommendations take precedence to the instructions contained in the FuelVault™ operating manual. Use the following list as your order priority:**
 1. Local jurisdiction codes, rules and regulations.
 2. Applicable state codes, rules and regulations.
 3. Applicable regional and national codes, rules and requirements.
 4. Manufacturer's recommended installation, and operating procedures.
 5. FuelVault™ operating manual.

B. Filling the Tank

- **NOTE: filling of tanks should be carried out under continuous and close supervision.**

Tank filling nipple is a threaded 4 or 6 inch pipe located inside the spill containment manhole. The filling nipple is located lower than the containment top to catch any potential spills.

- **NOTE: Dual-Compartment tanks must be carefully labeled to prevent cross-filling the individual tanks; for example, a double 500 Gallon tank should be labeled as diesel and gasoline to insure the operator or the fill truck driver can easily identify each compartment.**
- **NOTE: FuelVaults are usually equipped with a GRAVITY FILL OVERFILL PREVENTION VALVE. This means that the truck that will fill the tank will be using the "gravity drop" filling method. If your jobber plans on using a PUMPER TRUCK with your FuelVault, the GRAVITY FILL VALVE MUST BE REPLACED WITH AN OVERFILL PREVENTION VALVE RATED FOR USE WITH A PRESSURIZED FILLING SYSTEM. FAILURE TO USE AN OVERFILL PREVENTION VALVE RATED FOR PRESSURE DELIVERY WILL RESULT IN DAMAGE TO THE STEEL TANK.**

C. General Protection

Smoking is prohibited within fifty (50) feet of all storage and dispensing devices. Signs, which prohibit smoking, must be conspicuously posted.

Portable fire extinguishers must be provided for the suppression of fires in accordance with NFPA 10 and UFC for high hazard area. Additional fire control equipment might be required, if, in the opinion of the fire official, an unusual fire exposure hazard exists.

D. Fuel Dispensing

- **Important Note: Any pump described as “remote” must be approved by the Authorities Having Jurisdiction in advance of the installation of the pump. Specific operating instructions must be obtained from the manufacturer of such pump, and followed implicitly and exclusive of any FuelVault™ directives.**
- **NOTE: The majority of the FuelVault™ tanks that are used for dispensing are equipped with a GasBoy pump. However, your tank may have been supplied with a different pump make. Familiarize yourself with the make of the pump supplied with your tank. Make sure you get the manufacturer’s operating manual. Learn how to operate the pump. Make sure your operating personnel know how to operate it as well.**
- **NOTE: Do not overfill or top off fuel port.**

E. Overfill Protection

The U.S. EPA directives require overfill protection to be provided by two or more of the following methods:

- Direct reading level gauge at the tank visible from the fill-pipe access.
- Valve located within fill-pipe to close automatically at a specified fill level.
- Audible high level alarm activated by a float-switch at a specified fill level.
- **NOTE: Check your tank and make sure which overfill protection you have received on your tank and familiarize yourself and your operating personnel with the accessories provided and their operation.**
- **NOTE: FuelVaults are usually equipped with a GRAVITY FILL OVERFILL PREVENTION VALVE. This means that the truck that will fill the tank will be using the “gravity drop” filling method. If your jobber plans on using a PUMPER TRUCK with your FuelVault, the GRAVITY FILL VALVE MUST BE REPLACED WITH AN OVERFILL PREVENTION VALVE RATED FOR USE WITH A PRESSURIZED FILLING SYSTEM. FAILURE TO USE AN OVERFILL PREVENTION VALVE RATED FOR PRESSURE DELIVERY WILL RESULT IN DAMAGE TO THE STEEL TANK.**

F. Venting

1. Atmospheric Vent:

FuelVault™ tanks are provided with a 2 inch vent line for venting into the atmosphere in case of a pressure build-up inside the tank. Make sure vent cap is not obstructed to allow free flow of vapors from the vent. Obstruction of the 2-inch vent line cap may lead to pressure build-up inside the tank and cause the emergency vent system to open.

2. Primary Tank Emergency Vent:

FuelVault™ tanks are provided with emergency pressure relief devices to automatically relieve the pressure of the primary tank before it reaches a maximum of 2.5 psig.

G. Spill Containment

FuelVault™ tanks are usually provided with 5 Gallon spill containment manhole which is cast into the top of the vault, surrounding the tank fill-pipe. The containment will catch occasional spills. A hand-pump valve is provided to remove product that has been overfilled into the containment manhole.

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A. FuelVault™ Preventative Maintenance

The owner/operator is required to inspect the tank visually on a regular basis. Visual inspection is the primary form of maintenance required. The inspection and maintenance should include the following:

1. Check for small cracks in the vault walls. Fill and repair the small cracks.
2. Inspect the vault sump for any signs of water intrusion into the vault. If water is found, inspect all vault manholes for tight seal and inspect sides of vault for water leakage. If gasket in manhole is damaged, contact representative for replacement. If the vault sides are leaking water, please contact your representative for inspection.
3. Inspect the vault sump for any signs of petroleum product leakage from the primary steel tank into the vault containment. If noticed, please contact your representative immediately.
4. Inspect all decals and signs and replace if not readable. Extra decals can be purchased through your local distributor. All decals must be on the tank before filling it.
5. Inspect the steel tank including its pipe nipples and manways for any sign of rust, deterioration or corrosion. Remove any deteriorated or chipped off paint; sand, clean and paint with a good quality rust-inhibitive primer in accordance with the paint manufacturer's instructions.
6. Confirm with your local fuel supplier the need to utilize additives for seasonal variances or to reduce corrosion of the inner steel tank due to local fuel impurities/intermittent moisture. Your local fuel supplier should be able to provide this guidance.
7. Preventive maintenance can be less expensive compared to the cost of system shutdown and repairs. In the long run preventive maintenance will save you money.

B. Bacteria Monitoring and Control

Bacterial infection on fuel tanks and lines, originating from the fuel, chemically alter fuel to produce water, sludge and acids. Water and acids are corrosive and can cause severe corrosion in the tank, especially in the diesel fuel storage and at the bottom part of the tank. Also, microbial growth can cause fuel filter plugging, injection failing, system deposits, and corrosion of tanks and lines. You should arrange to have your fuel analyzed for microbial growth and to eradicate the infestation, if any. This program will prevent corrosion of your tank and piping and fuel filter plugging. Contact your fuel supplier for the locations and service of research labs that can test the fuel system and help you control bacterial infection. Also ask your fuel supplier for the frequency of such tests needed to control bacterial infection. Bacteria cannot grow if there is no water in the fuel. Monitoring and controlling of water accumulation in the tank will also prevent bacterial growth.

C. Water Monitoring and Control Inside Steel Tank

You may get water in the fuel through condensation of water vapor from the air. Water is heavier than fuel and therefore it settles at the bottom of the tank and causes corrosion. You should regularly monitor the tank and make sure that there is no water accumulated at the tank bottom. If there is water at the tank bottom, you should pump it out with small hand held pump called “Thief Pump”. If you do not monitor and pump out the water from the tank bottom, the useful life of your tank may be reduced dramatically.

- **NOTE: Water and bacteria monitoring and control are essential to preventing internal corrosion of steel tanks. Lack of such control measures by the owner and operator may invalidate the FuelVault™ Limited Warranty.**