

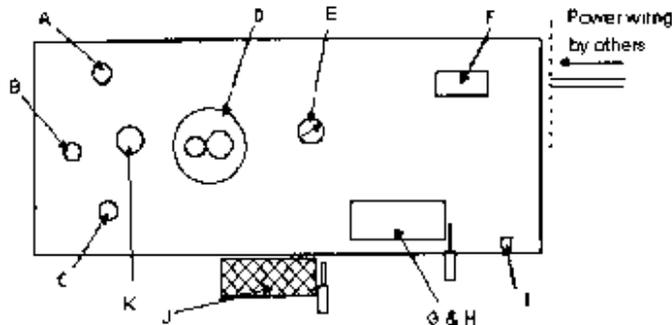
SPECIFICATION
FOR
TANKS, INSULATED ABOVE GROUND FUEL STORAGE,
VAULTED, HORIZONTAL, WITH DISPENSING UNIT

(THIS SPECIFICATION IS RELEASED FOR PROCUREMENT PURPOSES UNTIL REVISED OR RESCINDED)

I. Scope

A. General Description

1. This specification covers insulated above ground concrete vaulted horizontal fuel storage tanks which are to be supplied with a dispensing system, fill system and accessories necessary for the completed unit to meet all applicable safety and code requirements. The unit shall be pre-assembled by the supplier such that it is ready for operation once power is connected at the end user site. The accessories on the larger tank units may be installed on site if deemed necessary by the supplier (Reason : It may be impracticable to ship and unload the unit with all the accessories in place). All necessary site preparation, concrete pads, mechanical or electrical contracting shall be completed by others and is not covered in this document. Wiring providing power to the control boxes shall be provided by others. Interconnecting wiring of modules on the unit to be completed by supplier. This document does not cover all sizes and types of above ground concrete vaulted fuel storage tanks but only reflects those most commonly purchased by state agencies and public schools.
2. The following Figure shows the various major accessory components comprising the tank unit.



- | | |
|---|--|
| A | Normal relief valve and vent |
| B | Secondary containment space emergency vent |
| C | Stick gauge |
| D | Overfill valve and spill chamber |
| E | "E-F" Indicator gauge |
| F | Overfill and leak detector alarm panel |
| G | Pump control Panel |
| H | Dispenser package |

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- I . High hose retractor package
- J Alternative dispenser location for larger tanks (side mounted)
- K Emergency Vent

II. Intended use

A. The intended use for these tanks is to store any of the following fuels:

1. The primary use for these tanks is to store petroleum products including gasoline, motor oil, kerosene, or diesel fuel.
 - a) Alcohol-gasoline blend motor fuels
 - b) Ethanol blends (Gasohol .. 90% gasoline and 10% ethyl alcohol)
 - c) Methanol blends (Oxinol .. 90.5% gasoline and 9.5% oxinol composed of a mixture of 4.75% methanol and 4.75% GTBA)
 - d) Any and all combinations of alcohol blends, up to and including 85% methanol and ethanol.
 - e) Dupont EPA waiver (Gasoline with 5% methanol and a minimum of 2.5% cosolvent. The blend may contain a maximum concentration of up to 3.7 weight percent oxygen in the final fuel.
2. A secondary optional requirement is to store petroleum products, jet fuel and AV-gas.
 - a) This option will be ***defined in the IFB***

III. Classification

A. The capacity of the above ground single compartment fuel storage tanks is classified as follows:

Size Classification	Nominal Capacity (gallons)
A	500
B	1000
C	2000
D	3000
E	4000
F	5000
G	6000
H	7000
I	8000
J	9000
K	10000

IV. Applicable Standards

A. The following documents of issue in effect on the date of the Invitation for Bid shall form part of this specification.

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Document	Name & Address
UL 142, UL 2085	Underwriters Laboratories, Inc. Pfingsten Road Northbrook, IL 60062
NFPA 30, 30A, 78	National Fire Protection Association (NFPA) 470 Atlantic Ave. Boston, MA 02210
NEMA 4	National Electrical Manufacturers Association 2101 L Street, NW Washington, DC 20037

V. Requirements

A. General

1. Supplier's responsibility
 - a) The above ground concrete vaulted horizontal fuel storage tanks shall be supplied with a dispensing system, fill system and accessories necessary for the completed unit to meet all applicable safety and code requirements. The unit shall be pre-assembled by the supplier such that it is ready for operation once power is connected at the end user site. The accessories on the larger tank units may be installed on site if deemed necessary by the supplier (Reason : It may be impracticable to ship and unload the unit with all the accessories in place). Inter-connecting wiring of modules on the unit to be completed by supplier.
2. User's responsibility
 - a) All necessary site preparation, concrete pads, mechanical or electrical contracting shall be completed by others and is not covered in this document. Wiring providing power to the control boxes shall be provided by others.
3. The tank unit shall be provided with pressure vents, fill control valve, overfill and leak detection system, Stick gauge port, normal vent, emergency vents, fill pipe with containment chamber, fuel pump package that includes dispenser and the necessary accessories. These items are defined in detail requirements paragraph below.
4. The following options will be defined in the Invitation for bid (IFB).
 - a) Dispensing system (Two types defined, Gasoline and Diesel)
 - b) Pump Type (Two types defined, Suction and Submersible)
 - c) All accessories provided shall be approved by the manufacturer for the service intended and shall not cause an ignition source to create a fire or explosion.

B. Detail Requirements, Fuel Tank and Accessories

1. Tank unit description
 - a) Tank unit shall be an insulated aboveground tank (with secondary containment) used for storing flammable liquids.
 - b) Tank unit shall be composed of a horizontal steel primary storage tank with a secondary leak containment shell. This secondary leak containment shell can be located adjacent to the primary tank and the entire sub-assembly encased in concrete or if manufactured from steel, it can be located on the outside of the concrete vault. See Figure 1.

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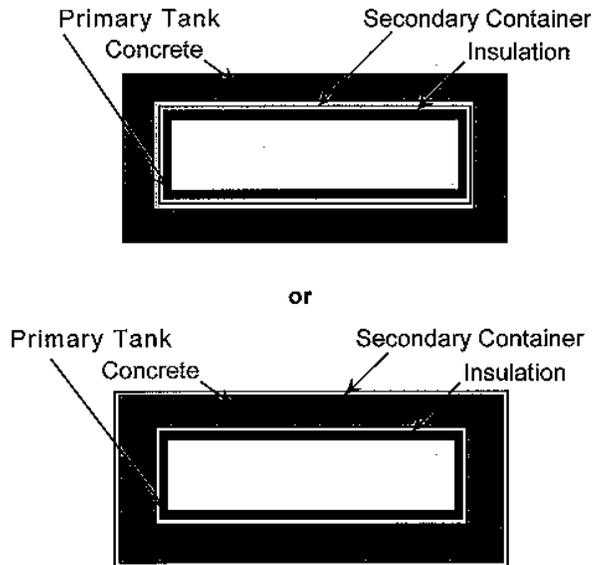


Figure 1.

- c) The primary steel tank shall be constructed according to UL Standard 142 requirements
 - d) The secondary containment shell can be manufactured from steel, or from polyethylene (encased in concrete) provided it meets the listing and fire and safety code requirements of this specification.
 - e) The concrete vault shall be a 6" monolithic (without seams) layer of factory poured fibermesh and/or rebar reinforced aggregate, with no voids or penetration, except for the top openings.
 - f) If the secondary option for storing Jet fuels is **defined in the IFB** the primary tank interior surfaces shall be protected with a special coating when specified per MIL-P-4556D. It is understood that some jet fuels require a coating and some do not.
 - g) The outer surface of the unit shall be protected with a white epoxy coating. The surface preparation prior to painting, the type of epoxy paint, the paint thickness, and the method of application should be of high commercial quality. This shall provide protection against the exposed weather elements in the State of North Carolina
 - h) The tank unit shall have support pads on the base to provide for visual inspection. These pads shall provide a 2"-6" inch (Nominal) space between the foundation pad and the underside of the tank
 - i) Provisions shall be made to enable heavy equipment to lift and move the entire unit.
2. Listings, Fire and safety code requirements.
- a) The tank system shall meet NFPA 30, 30A and 31 fire and safety code requirements.
 - b) The tank system shall be UL listed showing compliance with UL 2085 under the descriptive heading of " Insulated Secondary Containment Aboveground Tanks for Flammable Liquids, Protected Types"
 - c) The listing description further explains that the tank shall consist of a primary tank, an outer wall providing a secondary containment, and an insulating system. These tanks shall have

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provision for monitoring the interstitial space between the two tank walls for leakage. The tanks are evaluated for use in accordance with the latest version of Uniform Fire Code Appendix Standard A-II-F (formerly U.F.C. 79-7) titled "Protected Aboveground Tanks For Motor Vehicle Fuel Dispensing Stations Outside of Buildings" and published by the International Fire Code Institute.

- d) A copy of the pages from the UL directory, that defines the listing and the manufacturers listing number(s) [MH ***** (*)], must be provided with the bid response.
3. Emergency Vent
 - a) Tank capacities up to, and including, 2000 gallons shall be furnished with a 6" inch diameter UL listed emergency vent valve.
 - b) Tank capacities above 2000 gallons shall be furnished with a 8" inch diameter UL listed emergency vent valve.
 - c) The vent valve on all size tanks shall limit the maximum internal pressure to 2.5 psig.
 4. Tank Openings
 - a) All tank openings (interfaces with accessories) shall be threaded nipples.
 5. Fill Limiting Valve
 - a) The fill pipe shall be fitted with a gradual acting type level control valve, which reduces the flow to approximately 2 GPM and set to fully closed when the tank is 95% full. The valve size shall be 2" inch diameter for tank capacities up to 4000 gallons and 3" inches for tank capacities greater than 4000 gallons. Valves with mechanisms that snap closed are not acceptable.
 - b) A lockable fill cap shall be provided.
 6. Overfill and Leak Detection Alarm system
 - a) The tank unit shall be provided with a float type sensor installed in the tank and pre-set to signal the 90% full level fill. The overfill system shall be UL listed and meet the requirements of NFPA 30.
 - b) A leak detection device shall be installed in the interstitial space. This detector shall sense leakage of the petroleum products listed in paragraph IV. The sensor shall provide signal to the alarm panel.
 - c) An Alarm panel shall be provided in a location clearly visible to the fuel delivery operator.
 - d) The panel shall be provided with a lamp (visible in sunny daylight) for each detection signal.
 - e) The panel shall be provided with a warning horn that sounds continuously when a signal is received from either sensor.
 - f) The Alarm Panel shall be weatherproof constructed to meet NEMA 4 requirements for this type of application. It must also comply with the State of North Carolina codes and any local county or municipal codes.

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- g) Operating Features of the panel.
 - (1) If a leak or overfill is detected the sensor shall provide a signal to the panel where a identified lamp will light to show that a leak or overfill has occurred. Two lights clearly labeled are required. This same signal shall continuously sound a single common warning Horn having 80 dB output. The horn shall be silenced by manually activating a override switch. The lamp shall remain lit until the sensor causing the signal goes out of alarm .
 - (2) The panel shall also include test buttons to validate the integrity of the alarm lights and the silencing switch.
- 7. Stick Gauge and Stick Gauge Port
 - a) The tank unit shall be provided with a "stick gauge" port that has a locking flip top cap. A suitable sized impact plate shall be welded to the bottom of the tank where the stick gauge contacts the inner surface. A non corrosive calibrated stick gauge shall be provided with the tank assembly.
- 8. Tank Indicator Gauge
 - a) A direct reading "E-F" tank mounted float type indicator gauge shall be provided and located such that it is clearly visible to the fuel delivery operator during filling. This gauge shall provide an indication of the nominal amount of product in the tank. Indicator readout may be in inches, or percent tank fill, or fraction of tank fill.
- 9. Stage I Vapor Recovery Port
 - a) A 4" inch diameter adapter and cap shall be provided for vapor recovery, provides the user to have the option of a two hose or coaxial system.
- 10. Standard /Normal Relief Valve and Vent
 - a) A minimum 2" inch diameter vent shall be provided, which terminates 12 feet above grade. The normal vent pipe assembly will be shipped loose and installed by others on site. A pressure/vacuum relief valve shall limit the internal tank pressure to 1 psig and the vacuum to 1 oz psig
- 11. Secondary Container Emergency Vent
 - a) Where the interstitial space is enclosed, it shall be provided with emergency venting per NFPA 30 , 2-3.6 (1993 Edition)
- 12. Spare Openings
 - a) A 2" inch diameter capped access port shall be provided.
- 13. Fill pipe, valve with Spill containment Chamber
 - a) A minimum of 7 gallon capacity spill containment chamber with a manually operated drain valve shall be provided. The valve is to drain any spills resulting from disconnecting the fill hose. The tank fill port shall have an adapter fitting that mates with the fill hose. The adapter fitting shall have a lockable protective cap for use when tank is not being filled.

14. Remote Dispenser Package

- a) Either a Gasoline or Diesel package is required. ***To be defined in the IFB.***
- b) Gasoline Pump and Dispenser package (*If applicable*)
 - (1) The package shall comprise of the following items as a minimum
 - (a) Pump - Pump shall provide a discharge rate of 10 gpm (minimum) at the nozzle and be UL listed for the intended use as defined in paragraph IV.
 - (b) The Dispenser package shall operate with 110 Volts / 60Hz power input.
 - (c) Either a suction or submersible pump is acceptable. ***Type to be defined in the IFB.***
 - (d) Shut-off Valve - The shut-off (blocking) valve shall be a ball type valve.
 - (e) Emergency Shut-off valve (***Optional to be defined in the IFB***) - The emergency shut-off valve shall be located underneath the dispensing unit in the supply line from the tank. It shall be mounted rigidly to the dispenser brackets such that if an impact dislodges the dispenser, the valve automatically closes. The valve shall include a fusible link which automatically closes the valve if the temperature reaches 165 degrees Fahrenheit
 - (f) Dispenser - The dispenser shall be UL listed, with a single hose, single product, un-lighted type. The operation of the dispenser shall only require removing the nozzle and flipping one lever, which automatically resets the output register and starts the pump.
 - (g) The metering components shall be housed within a cabinet approximately 14" W x 12"D x 10"H .The register shall have a resettable read out plus a totalizer readout. Read out design can be either a mechanical wheel type or electronic using LCD or equivalent in function.
 - (h) The pumping system shall include a metering system that can be manually calibrated in US gallons. Re-calibration of the metering device shall be performed by following a simple procedure that requires turning of a "calibration" screw.
 - (i) Unless defined otherwise in the IFB the dispenser shall be mounted on top or on a vertical side of the tank unit. The height of the register shall be 5 feet above ground level (tank mounting pad). If the tank height
 - (j) Precludes the register from being mounted on top surface then the register shall be mounted on the side.
 - (k) A high hose retractor package shall be provided. The dispensing breakaway and whip hose shall be 3/4" inches diameter, at least 12 feet long. An automatic nozzle with locking device shall be provided. The nozzle shall be connected to the hose via a non-corrosive double swivel joint.
 - (l) All exposed attaching brackets shall be galvanized, epoxy painted or a suitable surface coating to protect against the exposed weather elements.
 - (m) Solenoid Valve with by-pass Relief Valve - A solenoid valve shall be provided in the delivery piping located at the top of the tank unit. This valve shall be controlled by the pump control electrical circuitry such that the valve is open when the pump is on, and is closed to prevent siphoning when the pump is off. A valve shall be provided to relieve system pressure which develops between the closed solenoid valve and the delivery nozzle during hot weather, or high sun loading.

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- (2) Diesel Pump and Dispenser package (*If applicable*)
 - (a) The diesel pump and dispenser package is same as described for the gasoline package, except as follows:
 - (b) All system components shall be designed to provide a minimum delivery rate of 15 GPM at the nozzle.
 - (c) Hose and nozzle shall be 1" inch diameter .

C. Tank Unit Identification and Information Signs

1. Signs shall be provided that show the information described below as a minimum. Additional signs may be necessary to meet local county and municipal codes.
 - a) Manufacturers name.
 - b) UL listing labels.
 - c) Date of tank manufacture.
 - d) Type of product stored in tank, including the API color coded symbol for the product
 - e) Working capacity and tank model number
 - f) Decals per NFPA 704
2. Rustproof signs shall be fastened to the tank with suitable rustproof brackets and fasteners. Signs must be removable for repainting the tank.

VI. Drawings and Manufacturer's Information.

- A. Each bidder must furnish, with his bid proposal, sketches, drawings, catalog information, ul listing information, and manufacturer's specifications describing the tanks offered. drawings must illustrate size and number of fittings, manholes, diameter and length of each size tank.

VII. Warranty

- A. The contractor warrants to the owner that all fuel storage tanks furnished under this specification shall be new, and of good material and workmanship, and agrees to replace promptly any part or parts which by reason of defective material or workmanship shall fail under normal use, free of negligence or accident, for a minimum of 'n' months from date put in operation. The actual number of months ('n') shall be defined in the ifb showing a value for the tank unit and a value for the accessories. Such replacement shall include all parts, labor, and transportation costs to the location where equipment is out of service, free of any charge to the state.

VIII. Service, Parts and Manuals

A. Information to be provided after contract award and prior to delivery.

1. Drawing of tank unit foundation pad providing sizes, footings and rebar requirements.
 - a) Drawing showing the electrical power connections for the applicable accessories including grounding to meet code.

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2. Information to be provided with unit when delivered.
 - a) Shop drawings of the tank. Drawings shall include all critical dimensions and show locations of all fittings and accessories.
 - b) Operating and parts break-down manual(s) for applicable accessories.
 - c) Chart showing actual capacity of tank . Calibration shall show the low level, mid level, 80% fill level, 90% fill level in inches for each specific tank..

IX. Code Requirements and Approval Procedures

A. Volume I, General Construction, of the North Carolina State Building Code

1. Important Note to the user/ purchaser: This type of project is divided into two phases. One being the storage tank and dispensing hardware supply, the other being the site work. The hardware supply is covered by this specification. The site work is the responsibility of the using agency (ie; design layout, foundation concrete pads, protection barriers). We wish to alert the user that the completed facility must meet the State Building Code plus any special insurance-related design requirements. The following must be adhered to for the project to be in compliance with the above Code and any insurance requirements.
2. Prior to each individual purchase, the State Agency must submit a site plan to the Department of Insurance for review and approval.
3. These specifications do not relieve the designer/bidder from the final responsibility for any non-compliance or omissions relating to the provisions of the Code.
4. Authorization to proceed with project bidding is to be obtained from the State Construction Office.
5. The Department of Insurance must be informed of any subsequent Addenda, Change orders, or other actions which may have any significant impact on this project's design.
6. Address

Department of Insurance
PO Box 26387
Raleigh NC 27611
Phone: (919)733-3901

X. Delivery

1. Delivery of tank units furnished under this specification shall be in accordance with the terms and conditions of the invitation for bids.
2. The contractor shall be responsible for any packaging, packing, or protection required to insure safe delivery in an undamaged condition
3. Tanks over 3,000 gallon capacity shall be delivered on a low-boy type trailer not to exceed 35" in deck height.
4. Proposed delivery dates, schedules and other such information shall be submitted by the contractor at any time upon request by the division of purchase and contract.
5. The manufacturer shall notify the purchaser's office by telephone at least 24 hours prior to delivery of each tank, so arrangements may be made for receiving the tanks.

XI. Ordering Data (for procurement use only)

A. Purchasers should exercise any desired option offered herein and should state the following in the requisition and Invitation for Bid.

1. Title, number, and date of this specification
2. Size of tank(s) desired.
3. If Tanks are to be used to store Jet Fuels, or AV-Gas
4. Type of Dispensing system (Gasoline or Diesel)
5. Type of pump supplied with dispensing system (Suction or Submersible)
6. If emergency shut-off valve is required (Paragraph V. B. 14. ii. 3)
7. If vertical rung ladder or step stair ladder is required on larger tanks.
8. Warranty requirements (Paragraph VII)
9. Approval procedures (paragraph IX)