

Suffolk County
Department of Health Services

Division of Environmental Quality

TOXIC/HAZARDOUS MATERIAL DOUBLE-WALLED UNDERGROUND
TANK DESIGN GUIDELINES

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Toxic/Hazardous Material Double-Walled Underground Tank
Design Guidelines

1.0 GENERAL

- 1.1 All new storage facilities, used or to be used for the underground storage of toxic/hazardous materials, shall be designed and constructed in a manner which will, in the opinion of the commissioner, provide the maximum reasonable protection available against leakage or spillage from the facility due to corrosion, breakage, structural failure, or other means. Double-walled facilities are required for all toxic/hazardous material storage facilities, except those listed in the exemption section of this guideline.
- 1.2 Exemptions - storage facilities for the storage of kerosene, #2, #4 or #6 fuel oil or diesel, used solely for on-site heating or intermittent stationary power production on a residential parcel, shall be exempt from the provisions of this guideline, but must conform with the applicable sections of the Single-Walled Underground Tank Design Guidelines.
- 1.3 Approval of design by Suffolk County Department of Health Services= Environmental Engineering Bureau, is required before installation. It shall be unlawful for any person to install, use, put into service, or maintain, the existence of any new underground storage facility, or part thereof, if said new storage facility, or part thereof, does not conform with all provisions of these guidelines.

2.0 DEFINITIONS

- 2.1 Commissioner - Commissioner of Suffolk County Department of Health Services.
- 2.2 Double-walled - constructed with more than one containment layer with space between the layers sufficient to allow monitoring of any leakage into or out of the space.
- 2.3 Existing Underground Storage Facility - one for which construction actually began prior to November 1, 1982.
- 2.4 New Underground Storage Facility - one for which construction actually began after November 1, 1982.
- 2.5 Product Tight - impervious to the material which is, or could be, contained therein so as to prevent the detectable seepage of the product through the container. To be product-tight, the container shall be made of a material that is not subject to physical or chemical deterioration by the product being contained.
- 2.6 Residential Parcel - any single body of land, or single building plot, zoned for single-family residential use.
- 2.7 Substantial Modifications - the construction of any additions to an existing storage facility, or restoration, refurbishment or renovation which:
- a. increases or decreases the in-place storage capacity of the facility
 - b. alters the physical configuration

- c. impairs or affects the physical integrity of the facility, or its monitoring systems.
- 2.8 Single Walled - constructed with walls made of but one thickness of material. Laminated, coated or clad materials shall be considered as single-walled.
- 2.9 Storage Facility - tanks, pipes, vaults, buildings, yards, pavements, or fixed containers used or designated to be used, either singly or in any combination thereof, for the storage and/or transmission of toxic or hazardous materials.
- 2.10 Toxic or Hazardous Materials - any substance, solution or mixture which, because of its quality, quantity, concentration, physical, chemical or infectious characteristics, or any combination of the foregoing, presents or may present an actual, or potential, hazard to human health, or to the drinking water supply, if such substance, solution, mixture or combination thereof is discharged to the land or waters of Suffolk County. Toxic or hazardous materials shall include:
- a. Each and every substance, material, waste found listed in either or both Part 116 and Part 261, Title 40 of the Code of Federal Regulations, or Title 6, Part 371 of the New York State Codes, Rules and Regulations
 - b. Acids alkalies beyond the pH range of 4 to 10
 - c. Heavy metal sludges, mixtures and solutions, in excess of the allowable concentrations listed in Title 6, Part 703.6 of the New York State Codes, Rules and Regulations
 - d. Petroleum products, including fuels and waste oils
 - e. Organic solvents, including petroleum solvents, halogenated and nonhalogenated hydrocarbons
 - f. Any material listed in Schedule I, Part 703.6 of the Official Compilation of New York Codes, Rules and Regulations, in excess of the concentration standards thereof, except for iron, manganese, foaming agents and pH, unless otherwise provided in Article 12 of the Suffolk County Sanitary Code
 - g. Any substance not included within subdivisions *a through f* above subsequently declared to be a toxic or hazardous material by the commissioner
 - h. Any solid, or semi-solid, material which, if left to stand or if exposed to water, will leach out, or wholly or partially dissolve, forming a toxic or hazardous material, as defined in subdivisions *a through g* above
- 2.11 Toxic or hazardous wastes mean:
- a. Toxic or hazardous materials, as defined in subdivision 2.10, generated by or as the result of operations in or the existence of any manufacturing or other industrial or commercial establishment, which toxic or hazardous materials are not actually used in a final product for sale, and shall include those toxic or hazardous materials retained as byproducts of the operations within such manufacturing or other industrial or commercial establishment for the purpose of recouping salvage value
 - b. Toxic or hazardous materials generated by one in possession or control of any residential premises, for which

materials= disposal is intended, and which waste is not domestic wastewater without the admixture of nonsewage wastewater from any industrial process

c. all toxic and hazardous wastes are toxic and hazardous materials

2.12 Underground - when referring to tanks, means 10 percent or more below the final ground elevation.

3.0 SUBMITTALS

3.1 A Permit to Construct, issued by the Environmental Engineering Bureau, is required prior to installation of a new storage facility or substantial modification to an existing or new storage facility.

3.2 Submittal requirements - submittals must include the following:

3.2.1 An Application for a Permit to Construct a Toxic/Hazardous Storage Facility, signed by the owner or owner=s representative.

3.2.2 A completed Toxic/Hazardous Materials Registration Form

3.2.3 An environmental assessment short form

3.2.4 A filing fee, as indicated in aFee Schedule for Services Related to Article 12 Suffolk County Sanitary Code Toxic and Hazardous Materials Storage and Handling Controls@ (nonprofit organizations and municipalities are fee exempt)

3.2.5 An Application for Underground Storage Facility

3.2.6 Plans prepared and signed by a registered professional engineer or architect, licensed in New York State, submitted in quadruplicate

3.3 Plan Requirements - each plan submittal for construction approval must include the following:

3.3.1 Key map highlighting the site location

3.3.2 Site plan of suitable scale illustrating the following:

- a. existing and proposed buildings (tank set back per town code)
- b. property lines (tank set back per town code)
- c. all existing and proposed tank locations
- d. water supply wells (must be a minimum of 50 feet from nearest edge of any tank)
- e. sanitary disposal system (must be minimum of 20 feet from nearest edge of any tank)

- f. potable water supply piping (must be minimum of seven feet from nearest edge of any tank)
- g. storm water drywells (must be minimum of 20 feet from nearest edge of any tank)
- h. north arrow
- i. any surface waters within 200 feet of property line
- j. location of soil borings and observation wells
- k. piping
- l. overflow and leak alarm panels

3.3.3 Title block listing the following:

- a. facility name and address
- b. architect/engineer name, address, phone number, signature, seal
- c. Suffolk County Tax Map Numbers (District/Section/Block/Lot)
- d. scale of drawing
- e. 3" x 5" block for Suffolk County Department of Health Services= approval stamp

3.3.4 Construction drawings shall illustrate all proposed tankage and piping, including partial plan view, cross section of installation and necessary details.

The following items must be included in the partial plan view:

- a. dimensions of concrete pad
- b. location of man ways
- c. distance between adjacent tanks

The following items must be included in the cross-section detail:

- a. elevations, including finished grade, burial depth and excavation depth
- b. depth and material of bedding
- c. distance between tank and excavation walls
- d. backfill material
- e. leak detection systems
- f. tank, manways and piping
- g. manway frame and cover
- h. concrete slab thickness and reinforcement
- i. anchoring and strapping

The following items must be included in the details:

- a. piping within manway

- b. type of manway extension
- c. location of alarm sensor probes
- d. dispenser connection piping
- e. cross section of test boring

3.4 Design Requirements - the following information must be illustrated on the design drawing, or be included within the design specifications:

3.4.1 Compatibility:

- a. Storage facility must be impervious to the material which is, or could be, contained within. A signed statement from the tank manufacturer certifying compatibility of the tank with the stored materials is required for all nonpetroleum applications.

3.4.2 Tank Construction:

- a. Tanks must be noncorrodible and of double-wall construction. Acceptable tank construction includes fiber reinforced plastic, cathodically protected coated steel tanks, or a single-walled tank within a vault
- b. All new fiber reinforced plastic tanks for storage of flammable or combustible liquids must meet or exceed the design manufacturing standards of UL #1316 and carry the UL label
- c. All new cathodically protected, coated steel tanks used for storage of flammable or combustible liquids must meet, or exceed, the design manufacturing standards of UL #58 and Steel Tank Institute Standard STI-P3, and carry the UL label and STI-P3 label
- d. Tanks storing materials other than those specified in UL 58 or UL 1316 will be considered on an individual basis
- e. Two manways with a minimum diameter of 20" must be provided whenever tank fabrication permits. On tank sizes where fabrication of two manways is impossible, one manway will be acceptable
- f. Each tank must have an impact plate under each opening

3.4.3 Noncorrodible Steel Tank Design:

- a. All tanks must be electrically isolated from any metallic appurtenances using nonconductive bushings
- b. A Protection Prover test station must be accessible at grade for each separate cathodically protected portion of the installation
- c. Cathodic protection system must utilize zinc anodes
- d. The product tank wall for tanks of 4,000 gallon capacity or less must be constructed a minimum seven gauge steel
- e. The product tank wall for tanks in excess of 4,000 gallons must be constructed in accordance with UL #58 minimum gauge requirements

- f. The tank secondary containment wall must be constructed of a minimum seven gauge steel
- g. The annular space must be factory filled with an inert gas.

3.4.4 Vaults

- a. Structures used for secondary containment must be liquid-tight
- b. Access into the vault must be provided at or above grade, and the manway frame and cover must be liquid-tight
- c. Vaults must be vented to the atmosphere
- d. Concrete design must conform with Section 3.4.11 of these guidelines
- e. The interior surfaces of the vault must have a smooth troweled finish and be protected with a coating system compatible with the material being stored
- f. The vault bottom must be sloped to a small sump. This sump must contain a leak detection probe and be easily accessible for leakage pumpout
- g. Vault must bear on undisturbed soil or soil compacted to a minimum 90% Proctor Density
- h. Vault bottom must be structurally designed to support the primary tank and contents when full. The primary tank may not sit directly on the vault bottom. Saddles, as per the tank manufacturer's specifications, must be provided. The primary tank must be designed for free-standing service on saddles, not designed for direct burial
- i. The primary tank must conform with the appropriate sections of Suffolk County Department of Health Services' Single-Walled Underground Tank Design Standards.

3.4.5 Bedding and Backfill

- a. Tanks must be installed per tank manufacturer's written specifications
- b. Allowable bedding and backfill material shall include: washed, naturally rounded pea gravel ranging from 1/8" to 3/4" diameter; washed stone crushing meeting ASTM C-33 ranging from 1/8" to 2" diameter; or clean, washed sand having a particle size not exceeding 1/8" diameter and less than 8% by weight passing through #200 sieve
- c. When using sand, bedding and backfill must be compacted to at least 90% Standard Proctor Density. Dry mechanical tamping in lifts requires compaction by a licensed soils engineer. Water tamping methods must be performed in accordance with the tank manufacturer's written specifications
- d. Bedding and backfill material are to be the same

- e. Backfill material must be continuous to grade or underside of concrete slab
- f. When using two different backfill materials, filter fabric must be installed between the layers to prevent migration. A change in backfill material may not take place below 75% of the tank height
- g. When the storage facility can be affected by tidal groundwater fluctuation and the backfill material is pea gravel or crushed stone, filter fabric must line the excavation to prevent particle migration

3.4.6 Manways

- a. All manways must be accessible at grade (concrete knockout panels are not acceptable)
- b. All piping must enter the tank through the manway
- c. All manways containing product piping must be liquid-tight
- d. Manway covers must be attached to the manway flange in a manner allowing easy accessibility into the tank. This may be accomplished via a double-bolt circle, or installing the manway cover after the manway shell has been installed on the tank flange. Manway bolts must be permanently fastened to the tank manway flange
- e. Flexible connectors must be used when making piping connections to manway
- f. Manway housing must be corrosion resistant. Steel housings must be cathodically protected and coated, both internally and externally. Internal coating systems must be compatible with the material being stored
- g. Manway housing must be protected from load transfer (i.e., traffic, concrete slab contact, etc.)
- h. Manhole covers at grade for liquid-tight manways must be liquid-tight
- i. Manhole covers must have liquid-tight insert covers when used on manways containing piping that requires routine hookup
- j. Manhole covers must be capable of withstanding H₂O traffic loading, or pipe stanchions may be provided to prevent traffic loading
- k. All manhole covers must be color coded as per Section 5.0 of these standards

3.4.7 Tank Leak Detection

- a. All storage facilities must be monitored for tank and piping leakage as per the following:
- b. Leak detection of the tank annular space and secondary piping in the form of audible and visual indication is required on all underground tanks and piping. Leak detection alarm systems must comply with Suffolk County Department of Health Services= Leak Detection Alarm System Requirements for Underground Toxic/Hazardous Material Storage Tanks. Submittals must include proposed manufacturer, model number and location of probes and alarm panel. Field substitution is prohibited without prior written approval from the Environmental Engineering

Bureau.

- c. All leak detection sensors must be accessible at grade
- d. The leak-detection annunciation must be audible and visual to the storage facility operator

3.4.8 Overfill Detection

- a. All storage facilities must have a positive means of preventing overfill
- b. Overfill detection, in the form of audible and visual indication, is required on all underground tanks. Overfill alarm systems must comply with Suffolk County Department of Health Services= ALevel Alarm System Requirements for Overfill Protection of Toxic/Hazardous Material Storage Tanks.@ Submittals must include proposed manufacturer, model number and location of probes and alarm panel. Overfill probe must be rigidly mounted. Field substitution is prohibited without prior written approval from the Environmental Engineering Bureau.
- c. **Vent line ball check valves are prohibited**
- d. The overfill annunciation must be audible at the fill location

3.4.9 Fill Spill containment and Detection

- a. All storage facilities must be equipped with fill spill containment and detection
- b. Fill spill detection, in the form of audible and visual indication, is required for all fill systems on underground tanks. Spill containment volume must be equivalent to the volume provided by a liquid-tight manway sump or manway extension. Direct fill systems must be within the liquid--tight manway. Remote fill systems require a fill box which directs spillage into secondary containment piping leading to a liquid-tight manway. Submittals must include proposed manufacturer, model number and location of probes and alarm panel. Spill detection probe must be rigidly mounted a maximum of two inches above sump bottom. Field substitution is prohibited without prior written approval from the Environmental Engineering Bureau.
- c. The spill detection annunciation must be audible and visual to the storage facility operator.

3.4.10 Piping

- a. All piping must be corrosion resistant and compatible with the product being conveyed. All piping must be designed, constructed and installed in a manner which allows pressure testing of each individual storage tank system without the need for excavation (i.e., no manifolding of vent lines, and no siphoning of tanks)
- b. All black steel and galvanized steel product piping, in contact with the soil, must be coated or wrapped with a corrosion protective system and cathodically protected. Protection Prover test station must be brought to grade
- c. Secondary containment piping and/or containment trenches must be sloped a minimum 1/8" per foot to the secondary containment piping leak detection sensor

- d. Hose connections to liquid lines will differ from fitting connections on vapor recovery and gauge lines to prevent mistaken hookup
- e. Stage II vapor recovery piping is required to be a minimum of 2" in diameter and must be installed on all new and substantially modified gasoline storage tanks. This piping must convey vapor from the dispenser back to the tank being dispensed and sloped toward the tank
- f. Underground product and secondary containment piping connected to the product dispenser and sump must utilize a corrosion resistant flexible connector
- g. A liquid-tight basin must be installed beneath the product dispenser and connected to secondary containment piping allowing conveyance of any dispenser leakage through the containment piping
- h. A designated gauge port or free bung must be provided on one manway of all storage tanks. This port must be clearly marked on the drawing submittal and on the manway plate. This port must be on the tank centerline and be used for all internal tank diameter measurements. This port may not contain a drop tube and must extend up to the underside of the manway cover at grade. This manway cover must have a removable insert cover for easy access
- i. All flammable/combustible tanks must be equipped with a drop tube in the fill line extending to within 6" of the tank bottom
- j. All dispensers under pressure from a remote pumping system must be equipped with a shear valve located in the supply line at the inlet of the dispenser. This valve must close automatically in the event that the dispenser is accidentally dislodged from the inlet pipe.

3.4.11 Concrete

- a. All concrete must be a minimum 3,000 psi mix
- b. All concrete must be reinforced
- c. All concrete must be air entrained
- d. All concrete must be moist cured for a minimum of seven days
- e. Concrete slabs must bear on compacted base
- f. Concrete slabs at grade must be pitched away from manways and fill boxes
- g. All concrete dimensions and reinforcement must be clearly shown on plan submittal

3.14.12 Anchoring

- a. Anchoring must be provided to safeguard against empty tank buoyance and lateral movement due to groundwater conditions (i.e., groundwater within the excavation, tidal fluctuations) and/or flood waters
- b. In areas where the groundwater is less than 20 feet below grade, as illustrated by USGS or Suffolk County Groundwater Contour Map, at least one permanent site-well must be installed to confirm actual site groundwater elevation. The well must be located down gradient of the groundwater flow in relation to the storage facility. The well must be installed prior to startup of storage facility installation. The data collected must be presented when submitting the proposed installation plans. The well screens are to be SCH.40 PVC, and have a slot size of 0.020 inches.

Each observation well shall be brought to grade and all covers at grade must be liquid-tight and permanently labeled monitoring well. A minimum of 18" square by 4" thick concrete slab must be installed around the access cover.

- c. Bottom restraints, or overburden designs, must conform with tank manufacturer's written specifications.
- d. Buoyance calculations must be submitted with the proposed plans when groundwater is within the limits of the excavation or the site is located within a flood plain, as defined by the Federal Emergency Management Agency.
- e. Bottom restraints, or overburden designs, must be sufficient to overcome the empty tank buoyance forces and provide a 1.2 safety factor.
- f. All anchoring hardware (i.e., straps, turnbuckles, anchor bolts, wire rope clips, etc.) must be corrosion resistant. Galvanized steel is not considered corrosion resistant when installed underground.

4.0 LABEL REQUIREMENTS

- 4.1 All new underground tanks must bear two permanent stencils, labels, or plates ~ one visibly located within the manway, and one on the tank shell, which contain the following information:
 - a. tank manufacturer's statement: "This tank conforms with 6NYCRR, Part 614"
 - b. the standard of design by which the tank was manufactured
 - c. the year in which the tank was manufactured
 - d. a unique identification number ~ i.e., UL, STI-P3
 - e. the dimensions, design, working capacity and model number
 - f. the name of the tank manufacturer

5.0 COLOR CODING

- 5.1 The fill and vapor recovery ports of all underground petroleum storage tanks must be permanently color coded using the color and symbol code of the American Petroleum Institute.
- 5.2 The colors to be used are as follows:

High leaded gasoline	Red
Middle leaded gasoline	Blue
Low leaded gasoline	White
High unleaded gasoline	Red w/white cross
Middle unleaded gasoline	Blue w/white cross
Low unleaded gasoline	White w/black cross
Vapor recovery	Orange
Diesel	Yellow
#2 fuel oil	Green
Kerosene	Brown
Waste oil	Purple

Motor oil Silver

- 5.3 A border must be painted around fuel products containing extenders (such as alcohols). The border must be black around a white symbol and white around all other colors.
- 5.4 A circle symbol must be used for gasoline products and vapor recovery ports. A hexagon must be used for all other distillates.