# 2010
# Cistern Standards
# Old Saybrook Fire Department

## I. Applicability

A. These standards should apply to all new commercial developments and residential subdivisions that are not served by municipal water and/or not having adequate water to provide year round fire protection as determined by the Fire Department.

## II. Plans

A. Four (4) sets of plans, including manufacture literature should be submitted for each cistern to be installed for review and approval by the Old Saybrook Fire Department. The plans should include the following:

Must be signed and stamped by a CT registered professional engineer.

Cistern Design in accordance with Old Saybrook Fire Dept standards, NFPA 1142, UL and ASTM standards.

Site plan showing the location of cistern and easement for cistern maintenance and possible future removal. Easement should be a minimum of ten (10') feet on all sides. All easements should also be on file with the Old Saybrook Town Clerk.

## III. Cistern locations

A. All cisterns should to be in place and **fully operational** prior to any combustible materials being stored on site or building permits being issued. For developments that are built in phases, fire cisterns should be in place and fully operational for the phase currently under development, prior to combustible materials being stored on site.

B. The location of ALL cisterns should be reviewed and approved by the Fire Department prior to the installation of any cistern as part of an approved site or subdivision plan. Any cistern that is installed prior to the approval of the Fire Department or installed in the wrong location should be excavated, removed and installed in the proper location unless approved by the Fire Department. The work should be done by a qualified technician and the complete cost of this work should be borne by the contractor, developer and/or owner.

C. Cisterns should be located no more than 2000 feet truck travel distance from the nearest lot line of the furthermost lot, spaced every 2000 feet throughout the development. The spacing of cisterns may be increased or eliminated if the contractor, developer and/or owner installs an NFPA 13,13R or 13D compliant sprinkler system in the facility or individual houses within the development. Adjustments to the cistern spacing requirement may be made by the Fire Department on a case by case basis.

D. The contractor, developer and/or owner should be responsible for annual maintenance of all cisterns including, but not limited to snow removal, until the roadway is officially accepted by the Town of Old Saybrook. If not maintained, the Town of Old Saybrook should reserve the right to bill the contractor, developer and/or owner for maintenance or snow removal.

## IV. Vehicle Pad

A. The vehicle pad and approach should be constructed of a hard, all weather surface such as bituminous pavement or concrete..

B. The vehicle pad should be of sufficient length to permit easy access to Suction and Fill piping when the fire apparatus is set forty five (45°) degrees to the road.

C. The pitch of the shoulder and vehicle pad from the edge of the pavement to the pumper suction connection should be one percent (1 %) to six percent (6%) downgrade.

D. A no parking sign and a blue W for Water Supply should be placed at the vehicle pad.

## V. Cistern Specifications

A. All cisterns should be single wall fiberglass or precast concrete.

B. The minimum size capacity for a fire cistern should be 30,000 gallons.

C. All cisterns should be trouble free and carry a lifetime warranty of 50 years.

D. All cisterns should be capable of flowing 1000 gpm for 75% of the cistern capacity.

E. Protection from vehicular traffic should be provided for all cisterns. Bollards should be placed along the entire length of the vehicle pad. Bollards should be a minimum of steel, concrete reinforced 8" diameter. Bollard should be painted with a rust inhibitor and then painted red.

F. Both Suction and Fill piping should be supported by either the top of the tank or below the frost line.

G. All horizontal piping should be pitched towards the tank to allow for drainage.

H. All exterior piping should be painted with a rust inhibitor and then be painted red.

I. A metal hydrant marker outfitted with white reflective tape should be installed on the suction pipe.

J. The draft pipe should be supplied with an anti-vortex plate a minimum of sixteen square inches (16" x 16"). The anti-vortex plate should be attached to the bottom of the tank , a minimum of six (6") inches off of the tank floor.

K. All cisterns are to be designed so they will not float when empty. This should be shown on the plans submitted.

L. The bottom of the suction piping to the pumper connection should not exceed fourteen (14') vertical feet in distance.

M. Vent Pipe will be three (3") inch Schedule 40 Steel Pipe. The pipe will have a bug resistant screened opening and will be positioned to minimize condensation buildup. The height of the vent pipe is to be determined by approved submittal drawings.

N. Fill Pipe will be four (4") inch Schedule 40 Steel Pipe. The fill pipe will terminate above the tank with a four (4") inch Storz connection with cap. The pipe should be thirty six (36") inches above grade.

O. The suction pipe will be six (6") inch Schedule 40 Steel Pipe. Above the tank the pipe will remain vertical until a ninety (90°) degree long sweep establishes a horizontal direction. The height of the suction pipe above the cistern is to be 36" above finished grade. The pipe will then be reduced to a final four and a half (4 ½") inch National Hose male thread and must be capped. Inside the cistern the suction pipe will extend to six (6") inches of the floor of the cistern. The taper of the pipe should not allow air bubbles to form.

P. The elevations of all cistern piping are based on the finished grade of the approach and vehicle pad which must be shown on the submitted plans.

**1. Precast Reinforced Concrete Cisterns**

All precast reinforced cisterns should be waterproofed in accordance with manufacturer's specifications and these requirements.

The entire cistern should be rated for highway loading.

Surface Loads: Tank should withstand surface H-20 axle loads when properly installed according to manufacturer's installation instructions.

**2. Single Wall Fiberglass Cisterns**

All single wall fiberglass cisterns should be installed in accordance with manufacturer's specifications and these regulations.

The entire cistern should be rated for highway loading.

## VI. Backfill of Tanks

A. All construction, backfill and grading material should be in accordance with proper construction practices and acceptable to the Fire Department.

B. Bedding for the cistern should consist of a minimum of twelve (12") inches of 3/4 inch to 1 1/2 inch crushed, washed stone, compacted. No fill can be used under the stone.

C. All backfill material must be screened gravel with stones not larger than 1 1/2 inches and must be compacted to ninety five(95%) percent in accordance with ASTM D 1557, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.*

D. All tanks will be backfilled with a one (1') foot blanket of clean sand around all sides the top of the cistern.

E. Backfill over the tank must have one of the following characteristics:

Minimum four feet (4') of fill.

The top and highest two feet (2') of sides of the cistern should be insulated with vermin-resistant foam insulation and two (2') feet of fill.

All backfill should extend ten feet (10') beyond the edge of the cistern, and have a maximum of 3:1 slope, loamed and seeded.

## VII. Inspections

A. All inspections should be performed by the Town of Old Saybrook Building Official, Town of Old Saybrook Fire Marshal and the Old Saybrook Fire Dept.

B. Inspections should include the following:

Rough excavation

Tie down or strapping inspection

Backfill Inspection

Random compaction test

Finish inspection

Leakage test

Fire Department Conditional Acceptance Test

## VIII. Testing

A. After backfilling of the tank and manway, and miscellaneous piping is installed, the fire cistern tank should be leakage tested. The tank must be filled with potable water to within 1 inch of the top cover of the manway. The installer may allow the filled tank to sit for one (1) day prior to commencement of the test. The test duration will be seven (7) calendar days. The tank level measurements will be made and recorded by the inspectors. The installer must provide the specified lock and key for use by the Inspectors and the Old Saybrook Fire Department to secure the manway cover. The test is a zero leakage test. If after the seven day test leakage is verified, the tank and or components must be repaired to stop the leak. Any repairs made must be in accordance with manufacturer's specifications and acceptable to the Fire Department. Any repairs made to the tank must be done with prior written recommendation by the tank's manufacturer.

B. The Fire Department should conduct a final Conditional Acceptance Test of the cistern which will consist of a fire apparatus pump pulling and maintaining a draft from the cistern for two (2) cycles of five (5) minutes each.

C. Refilling of the tank with potable water is the responsibility of the contractor, developer and/or owner. Tank should remain filled once tested and accepted.

D. Once the final Conditional Acceptance Test has been successfully completed the Fire Department will conditionally accept the cistern. This conditional acceptance should remain in place until the roadway is accepted by the Town of Old Saybrook.

E. The contractor, developer and/or owner should be responsible for annual maintenance of all cisterns including, but not limited to snow removal, until the roadway is officially accepted by the Town of Old Saybrook. If not maintained, the Town of Old Saybrook should reserve the right to bill the developer, contractor and/or owner for maintenance or snow removal.