



PELHAM FIRE DEPARTMENT
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FIRE CISTERN REGULATIONS

In accordance with the current NFPA 1231 and NFPA 1141 the following regulations have been established by the Pelham Fire Department regarding Cisterns:

1-1 GENERAL REQUIREMENTS

- 1-1.1 Fire Cisterns shall be located at the beginning of every new development, and then every 1000 feet beyond, as so not to allow for more than 1000 feet travel distance between the driveway travel distance from any structure on the furthestmost lot within a development, and no more than 1000 feet from one another.
- 1-1.2 The design of the fire cistern shall be trouble free for a lifetime.
- 1-1.3 The cistern capacity shall be calculated in accordance with the most recent edition of Standards 1231 and 1141 of the National Fire Protection Association (NFPA). The capacity of the cistern will be based on the size of the largest home to be constructed within the development. However, no cistern shall be smaller than 10,000 gallons water capacity.
- 1-1.4 The design of the cistern shall be submitted to the Fire Chief, Fire Inspector or designee for approval prior to construction. All plans must be signed and stamped by a Structural of Fire Protection engineer registered in the State of New Hampshire. All drawings are for estimating purposes only, and are not intended for use as design.

- 1-1.5 The entire fire cistern shall be rated for H-20 highway loading unless specifically exempted by the Fire Chief.
- 1-1.6 Each Cistern shall be sited to the particular location by a Registered Engineer and approved by the Fire Chief, Fire Inspector or designee. All appropriate easements to the Town shall be in place prior to construction. Cistern shall be sited opposite side of roadway than Utilities
- 1-1.7 Pre-cast concrete shall achieve 28 day strength of 4,000 PSIG. It should be placed with a minimum of 4" slump and vibrated in a professional manner.
- 1-1.8 The concrete shall be mixed, placed and cured without the use of calcium chloride. Winter placement and curing shall follow the accepted American Concrete Institute (ACI) codes.
- 1-1.9 All suction and fill piping shall be American Society for Testing and Material (ASTM) Schedule 40 steel.
- 1-1.10 All connections shall be clean and the appropriate sealing material used according to manufacturer's specifications so as to ensure all joints are air tight. All connections must be anchored to the cistern to resist movement.
- 1-1.11 The surface at the water access point shall be adequate to support heavy vehicles at all times of the year. Provisions shall be made so that such water suction points are visible and usable in all weather conditions, including but not limited to heavy snow.
- 1-1.12 All cisterns shall be protected by suitable barriers constructed as to protect firefighters, fire apparatus, and the dry hydrant / cistern water ports.
- 1-1.13 The base of the cistern shall be designed so as not to float (or lift from the ground whatsoever) when empty.
- 1-1.14 All tank joints shall be sealed with bitulastic material or other accepted gaskets per manufacturer's installation instructions to maintain a lifetime watertight seal.
- 1-1.15 The entire tank will be guaranteed to be water tight (leak proof) by the installer for 5 years. The installer shall be required to post a 5 year bond in the amount of \$5,000.00 per 10,000 gallons for maintenance and repair.

1-2 SUCTION CONNECTION

- 1-2.1 The suction connection shall be bronze, threaded male connection 4.5" (inches) in diameter, with National Standard Thread (NST) and provided with a suitable cap.

- 1-2.2 The suction piping system shall be 8" (inches) in diameter and capable of delivering 1,000 gallons per minute, for three quarters of the cisterns rated capacity. The end of the suction piping system shall be reduced from 8" to 5" before having the 4.5" suction connection (1-2.1) welded in place.
- 1-2.3 The suction pipe connection shall be between 24" and 36" (inches) above the level of the grade where the vehicle wheels will be located when the cistern is in use.
- 1-2.4 Suction piping shall be secured to the cistern by means of an 8 inch riser clamp that is also welded to said suction pipe and plate (refer to figure B-4.6f Detail D).
- 1-2.5 The bottom of the suction pipe to the pumper connection shall not exceed 14 feet vertical distance.
- 1-2.6 The shoulder and vehicle pad should be of a sufficient length to allow for convenient access to the suction connection when the pumper is set at 45 degrees to the road.
- 1-2.7 The pitch of shoulder and vehicle pad from edge of pavement to pumper suction connection shall be 1% to 6% downgrade.
- 1-2.8 All above tank suction piping shall be pitched slightly back towards the tank for proper drainage.
- 1-2.9 The bottom of the suction piping shall be welded to an anti-vortex plate located 6" off of the floor, measuring ¼" thickness, and 4x4 feet wide, and shall be connected at 4 corners via 1" threaded stock anchors. Each anchor shall be located a minimum distance of 6 to 10 inches from the pipe (refer to figure B-4.6g Detail E).
- 1-2.10 All horizontal suction piping shall slope slightly uphill toward the pumper connection.

1-3 FILLER CONNECTION

- 1-3.1 The filler pipe shall be 4" (inches) in diameter.
- 1-3.2 The filler connection shall be a clappered Siamese, having 2 (two) 2 & ½" National Standard Thread connectors with suitable covers attached to a 90 degree downward sweep elbow. The filler connection shall be supported vertically to the cistern.
- 1-3.3 Filler piping shall be anchored to the top of the cistern by means of a 24 inch by 24 inch, ¼ inch thick steel plate which will be lag-bolted to the cistern at all four corners. (refer to figure B-4.6d Detail B).
- 1-3.4 The filler pipe Siamese connection shall be 36" (inches) above the final grade.

1-4 VENT PIPE

- 1-4.1 The vent pipe shall be 8" (inches) in diameter.
- 1-4.2 The vent pipe shall terminate not less than 36" (inches) above the final grade, with the opening to the pipe facing downward.
- 1-4.3 Vent piping shall have screen covers installed to prevent access by wildlife.
- 1-4.4 The entire cistern shall be completely piped and inspected prior to any backfilling being accomplished.
- 1-4.5 All PVC piping shall be connected / assembled with PVC Cement glue to ensure stability.
- 1-4.6 After backfilling, the cistern shall be protected by steel, concrete filled pipe bollards no less than 8" (inches) in diameter set in the ground below the frost line, protecting all exposed piping from potential vehicular damage.
- 1-4.7 Vent piping shall be anchored to the top of the cistern by means of a 24 inch by 24 inch, ¼ inch thick steel plate which will be lag-bolted to the cistern at all four corners. (refer to figure B-4.6c Detail A).

1-5 Water Level Indicators

- 1-5.1 A water level float shall be installed so the water level of the cistern can be monitored from the roadway.

1-6 BACKFILLING

- 1-6.1 Backfilling over the tank shall be 4 feet of fill; or
- 1-6.2 The top and highest 2 feet of the cistern shall be insulated with vermin resistant foam insulation, and 2 feet of fill.
- 1-6.3 All cisterns shall be equipped with a 32" (inch) water tight manhole with a blank cover that will accept a padlock as specified by the chief. Access must be provided to all sections of the tank.
- 1-6.4 The installer is responsible for maintaining full water capacity of the cistern until it is accepted by the Chief of the Fire Department, Fire Inspector, or designee.
- 1-6.5 All backfill material shall be screened gravel with no stones greater than 1 & ½ inches and shall be compacted to 95% ASTM 1557.
- 1-6.6 Bedding for the cistern shall consist of a minimum of 12 inch of ¾ inch to 1 & ½ inch crushed, washed stone, compacted. No fill shall be used under stone.
- 1-6.7 The finish grade of the cistern groundcover shall also be that of the roadway.

1-6.8 The installer is responsible to supply and install reflective identification signs that are placed on posts at each water point identifying the site for fire department emergency use as directed by the Chief of the Fire Department, Fire Inspector, or Fire Chiefs' designee.

1-7 ACKNOWLEDGEMENTS

1.7.1 THE ENTIRE CISTERN INSTALLATION SHALL BE COMPLETED AND INSPECTED BY THE FIRE CHIEF, FIRE INSPECTOR, OR DESIGNEE PRIOR TO AUTHORIZING ANY BACKFILLING PROCEDURES OR FILLING WITH WATER. FAILURE TO COMPLY WITH THESE RULES SHALL REQUIRE THE DEVELOPER TO COMPLETELY EMPTY AND EXPOSE A MINIMUM OF TWO SIDES OF THE CISTERN FOR INSPECTION AT HIS/HER EXPENSE.

1.7.2 NO CERTIFICATES OF OCCUPANCY SHALL BE ISSUED UNTIL THE CISTERN IS INSTALLED, TESTED, AND ACCEPTED BY THE PELHAM FIRE CHIEF OR FIRE INSPECTOR.

