

# TOWN OF CHARLTON

## FIRE DEPARTMENT

P.O. Box 114 • Charlton City, MA 01508  
Business Telephone: (508) 248-2299 • Fax (508) 248-6190

### CISTERN & DRY-HYDRANTS

#### **1 Location and Construction**

- 1.1 Fire protection cisterns and/or natural water supplies shall be provided in; Subdivisions of six or more lots, Business Enterprise Parks and Industry General developments where there is insufficient public and/or private water supply to meet the minimum fire flows required by NFPA 1141, 1142 and reference standards of those publications.
- 1.2 Fire protection cisterns and/or natural water supplies will be arranged so that dry hydrants will be located not more than fifteen hundred (1500) feet from ninety (90) percent of the center line of lots in the subdivision, Business Enterprise Park or Industry General Developments.
- 1.3 Cisterns and their appurtenances shall be buried and/or protected, to prevent the water within them from freezing.
- 1.4 Cisterns shall be a minimum of twenty thousand (20,000) usable gallons, but not less than the minimum as determined by NFPA 1141, 1142 and reference standards of those publications.
- 1.5 A cistern and/or dry-hydrant required by this regulation shall be installed and operational prior to the issuance of an occupancy permit for the first structure in any non-residential project.
- 1.6 A cistern and/or dry-hydrant required by this regulation shall be installed and operational in a residential project prior to the issuance of the occupancy permit for the fourth (4) structure. If multiple cisterns are required, a minimum of one (1) additional cistern shall be installed and operational for each additional phase of the project as determined by the phasing plan approved by the Planning Board, prior to the Planning Boards releasing covenants for that phase.
- 1.7 Cisterns will be fiberglass, concrete with liner or other non-permeable materials.
- 1.8 Unlined concrete tanks are permitted, if the applicant can show through registered professional engineer's calculations, that a natural and continuous supply of make up water will be available to the tank, at a rate that is equivalent to the leakage and weeping rate of the tank.

- 1.9 Unlined concrete tanks are permitted, if the applicant can show through registered professional engineer's calculations that a well or other automatic fill device will provide a supply of make up water that will be available to the tank at all times, at a rate that is equivalent to the leakage and weeping rate of the tank. No cost for the maintenance and/or operation shall be born by the Town of Charlton.
- 1.10 Cisterns constructed of light weight material and/or subject to uplift and displacement due to buoyancy effects of the surrounding soil or ground water shall be anchored with corrosion resistant hold down straps and deadmen anchors.
- 1.11 All penetrations into the cistern shall be sealed and restrained to prevent infiltration of soils, silt, other contaminates and damage by movement of the perpetrating object.
- 1.12 A manway with a minimum of twenty two (22) inch clear diameter shall provide access in to the top of the tank.
- 1.13 Containment collars with a minimum of forty two (42) inches shall be used to extend the manway opening to grade and be covered with a minimum of a thirty six (36) inch cast iron manhole and cover.
- 1.14 Natural water supplies with an equivalence of twenty thousand gallons (20,000) and a flow rate seven hundred fifty (750) gallons per minute are acceptable. The applicant must provide certification from a registered professional engineer, registered hydrologist, soils conservationist or equal.
- 1.15 All fire protection water supplies shall be arraigned so the maximum lift is not over fifteen (15) feet.

## **2 Ventilation and Level Indication**

- 2.1 Buried cisterns shall be provided with a vent to atmosphere that is a minimum of twenty four (24) inches above grade, this vent shall have the capability of discharging the air that is displace by the inflow of one thousand (1000) gallons per minute of fill flow water.
- 2.2 A mechanical water level indicator shall be provided for each cistern, this indicator shall plainly show the level of the cistern as; full, empty,  $\frac{1}{4}$  full,  $\frac{1}{2}$  full and  $\frac{3}{4}$  full.
- 2.3 The water level indicator shall be no more that thirty (30) feet from the paved surface and not less than thirty six (36) inches above grade.
- 2.4 The vent and water level indicator shall be constructed at a minimum of schedule 40 PVC piping.
- 2.5 If the vent and water level indicator is constructed using PVC piping it shall be protected from mechanical damage that may be caused by; motor vehicles, mowing equipment or any other impact with it. The protection may be in the form of bollards or landscaping boulders.

### **3 Self-Filling and Refilling**

- 3.1 Any means of self-filling and/or refilling of cisterns by other than the Fire Department refill/recirculating connection, shall be provided, this may include storm water run off, natural springs or water bodies and wells and pumps.
- 3.2 Any well or pump will be maintained by the responsible party at no cost to the municipality.
- 3.3 Any means of filling/refill provided through storm water run off, natural springs or water bodies shall pass through; sediment and filtration traps and/or screens to prevent the entry of debris and sedimentation into the tank.
- 3.4 Sediment and filtration traps shall be provided with manhole or cover to facilitate the cleaning and inspection of such devices. The covers will meet the Massachusetts Highway Department standard for size and construction.
- 3.5 Cisterns filled by storm water drainage shall be connected to the storm drain with a minimum of eight (8) inch diameter schedule 40 PVC. The fill pipe will be constructed of a material consistent with good engineering practices for the depth of cover, imposed loads and potential for mechanical damage.
- 3.6 Fill pipe invert will be located four (4) inches below the invert for the discharge pipe of the storm drain it is located in. The fill pipe shall slope in the direction of the cistern and discharge through the top of the tank.
- 3.7 Overflow piping if required in other than storm water filled cisterns shall be a minimum of an eight (8) inch diameter schedule 40 PVC. The overflow pipe will be constructed of a material consistent with good engineering practices for the depth of cover, imposed loads and potential for mechanical damage.
- 3.8 The overflow pipe invert will not be lower than four (4) inches below the point of highest tank capacity. The pipe shall slope in the direction of drainage, if the pipe discharge to daylight a screen shall be provided to prevent rodent and debris from entering the discharge end of the pipe.
- 3.9 Cisterns shall be provided with a Fire Department refill/recirculating connection. The Fire Department refill/recirculating connection shall be located at a minimum of five (5) feet but not more than thirty (30) feet off the paved surface adjacent to the dry-hydrant connection.
- 3.10 The Fire Department refill/recirculating connection shall be through a two and one half (2 ½) inch male National Standard Thread (NST) clapper wye connection, each inlet will be provided with screens and a threaded cap attached by chains to the wye.
- 3.11 The Fire Department refill/recirculating connection will be thirty six (36) inches above grade and constructed of a minimum of four (4) inch of schedule 40 steel piping.

- 3.12 Piping for the refill/recirculating shall be constructed using welded connections, all welds shall be cleaned and painted.
- 3.13 The Fire Department refill/recirculating connection shall be capable of withstanding the forces applied by dual four (4) inch hoses and adaptors, flowing one thousand (1000) gallon per minute, without damage to the piping, tank or other system appurtenances.
- 3.14 The Fire Department refill/recirculating connection shall be baffled or diverted as necessary to prevent simultaneous suction and refill operations from causing cavitation to the Fire Department pumping apparatus.

#### **4 Dry-Hydrant Connections**

- 4.1 The dry-hydrant connection shall be constructed of a minimum of six (6) inch schedule 40 welded steel piping with either a 90-degree long sweeps or 45-degree elbows, all welds shall be cleaned and painted.
- 4.2 The dry-hydrant connection and piping shall be capable of withstanding the forces applied by six (6) inch suction hose and adaptors flowing one thousand (1000) gallon per minute, without damage to the piping, tank or other system appurtenances.
- 4.3 The fire department connection will be 4 ½" NPT male threads with cover & screen assembly. The cover shall be connected to the piping with a chain; the screen shall be commercially manufactured and field replaceable.
- 4.4 The center of the drafting port shall be twenty to twenty four (20 to 24) inches above grade level where the apparatus will park.
- 4.5 The dry-hydrant shall be located between five (5) and eight (8) feet from the edge of the pavement.
- 4.6 The inlet of the suction piping shall be provided with an anti-vortex plate assembly.
- 4.7 Dry-hydrants installed in natural water sources shall have a Mainstream Dry Hydrants, Inc., part number; HS62 or HS82, PVC screen assembly or equal.
- 4.8 Hydrants subject to head pressure shall be dry barrel type hydrants, manufactured and installed in accordance with the National Water Works Association guidelines for pressure hydrants.
- 4.9 Pressure hydrants shall be equipped with one (1) steamer port with 4 ½" NPT male threads and two (2) ports, with 2 ½" NPT male threads with cover & screen assembly. The covers shall be connected to the piping with a chain; the screen shall be commercially manufactured and field replaceable.
- 4.10 For pressure hydrants the operating stem shall turn counter clockwise.

## **5 Piping**

- 5.1 Horizontal piping at or below the base of the tank or natural water level are permitted to be schedule 40 PVC with glued joints. Any transition to steel will be made at or below the base of the tank or natural water level.
- 5.2 Horizontal piping for drafting will be a minimum of six (6) inch diameter for a distance of up to one hundred (100) feet from the water source to the base of the hydrant riser.
- 5.3 Horizontal piping for drafting will be a minimum of eight (8) inch diameter for a distance over one hundred (100) feet from the water source to the base of the hydrant riser.
- 5.4 Horizontal piping for filling/refill may be constructed with schedule 40 PVC if prior approval is granted by the Fire Department.

## **6 Protection**

- 6.1 Two (2) bollards will be installed in locations to prevent mechanical damage to the dry-hydrant assembly, allowing sufficient working room to make or break connection to the dry-hydrant.
- 6.2 Two (2) bollards will be installed in locations to prevent mechanical damage to the refill/recirculating connection if that connection may be subject to mechanical damage. There shall be sufficient working room to make a break connection to the refill/recirculating connection.
- 6.3 Bollards will be a minimum of six (6) inch diameter steel concrete filled tubes eight (8) feet in length, a minimum of forty two (42) inches will project above grade.
- 6.4 The bollards will be set in a minimum of twelve (12) diameter concrete base.

## **7 Signage and painting**

- 7.1 A permanent weather proof sign signifying “Charlton Fire Department Cistern, No Parking, and list gallons of water held”. Lettering on the sign shall be reflective, a minimum of four (4) inches in height and of contrasting colors to the back ground, shall be install six (6) feet above grade adjacent to the dry-hydrant connection.
- 7.2 A permanent weather proof sign shall be posted on the level indicating gauge or within thirty (30) feet of the water level indicator stating “If this gauge is indicates  $\frac{3}{4}$  or less contact the Fire Department” The sign shall have a minimum of two (2) inch high letters.
- 7.3 All steel piping above grade will be primed and painted bright red.
- 7.4 Reflective conspicuity tape shall be applied to the top eight (8) inches of all bollards.
- 7.5 Reflective conspicuity tape shall be applied near the top of the water level indicator.

## **8 Inspections**

8.1 The fire department or authorized representative will make the following inspections.

8.2 Prior to backfill, all underground piping and tank.

8.3 Operational test prior to acceptance of the system.

Note: those items underlined were added January 30, 2007