

# **SPECIFICATIONS FOR UNDERGROUND WATER STORAGE TANKS FOR FIRE PROTECTION**

## **Carroll County, Maryland**

### 1. Introduction

#### 1.1. Scope

The construction of underground tanks for fire protection in accordance with Carroll County Code, Chapter 112, Fire Protection, is part of a program designed to improve the level of protection from fires in residential and commercial properties. These Specifications, along with associated documents, provides the information necessary for the construction and placement of fire protection tanks used for this purpose.

#### 1.2. Purpose

The purpose of this specification is to provide the technical information required for the construction of underground water storage tanks in accordance with Ordinance No. 04-12 and The Code of Public Local Laws and Ordinances of Carroll County Maryland, Chapter 112, Fire Protection.

### 2. Underground tanks

#### 2.1. Materials for a static water supply tank

2.1.1. Tanks shall be constructed of single-wall fiberglass per approved manufacturer's specifications.

2.1.2. The manufacturer shall provide a 30-year warranty, against defects in material for the tank system, to the purchaser of the tank and their heirs, successors, and assigns.

#### 2.2. Features

2.2.1. The tank system shall include a device for holding the tank in position against floatation (deadman). This configuration shall be part of the tank package and approved by the tank manufacturer. Installation shall be in accordance with the manufacturer's recommendations.

- 2.2.2. The tank shall include a removable access cover at grade (manhole) to allow entry for maintenance and inspection of the inside of the tank. An internal ladder shall be securely mounted to the tank. The cover shall be properly secured and locked.
- 2.2.3. A pad consisting of 4 inch thick concrete shall be placed over the tank, and shall encompass all fittings. Refer to tank drawings for concrete specifications.
- 2.2.4. Fittings
  - 2.2.4.1. One draft connection shall consist of a 6 inch diameter galvanized or ductile iron pipe. An adapter from 6 inch pipe NPT (National Pipe Taper) to 6NH (National Hydrant) male. A PVC draft pipe with an anti-vortex plate shall be installed inside the tank by the manufacturer. The draft connection allows a fire department pumper to connect and remove water from the tank at the specified rate of flow (fire flow).
  - 2.2.4.2. One combination vent/fill indicator shall consist of an 8 inch diameter PVC pipe which allows visual inspection of the tank water level, as well as providing the required amount of venting to the tank.
  - 2.2.4.3. One fill connection shall consist of a 4 inch diameter galvanized or ductile iron pipe, with a 4 inch Storz fitting to adapt to 4 inch pipe NPT (National Pipe Taper) threads. The fitting shall have an adapter angled downward at 30 degrees to reduce hose and fitting strain during filling operations.
- 2.2.5. Any features not included in this specification, as well as any special circumstances such as multiple-tank designs shall be evaluated and approved during design phase and before any construction is started.
- 2.2.6. The standard tank drawing 03-02, *Tank, Fire Suppression Water Storage, 30,000 Gallon* (Appendix 5.2) defines the requirements for a typical 30,000 gallon, 10-foot diameter tank installation. Tank sizes other than 30,000 gallons may require additional drawings to be provided to fit the requirements for a particular site. Drawing 06-02, *Tank, Fire Suppression Water Storage, 12,000 Gallon* defines the general requirements for construction of 8-foot diameter tanks, and shall be used accordingly. Supplemental drawings shall be reviewed and approved by the Fire Official prior to construction on an as needed basis.

### 2.3. Installation

- 2.3.1. Location and orientation of the tank shall be determined during site plan or preliminary subdivision plan layout, as approved by the Fire Official.

- 2.3.2. The installing contractor shall be responsible for obtaining all necessary permits for work and for scheduling required inspections.
- 2.3.3. The fittings shall be placed as follows:
  - 2.3.3.1. The draft connection shall be located 8 feet or less from the edge of the parking surface or curb line. This allows for one 10 foot section of suction sleeve to be used for drafting. The draft connection opening shall be turned facing directly toward the road surface.
  - 2.3.3.2. Total elevation from the bottom of the suction pipe to the centerline of the draft connection shall not exceed 15 feet zero inches. This dimension shall be minimized as much as possible to reduce head loss, while maintaining correct depth of cover over tank, per manufacturer's specifications.
  - 2.3.3.3. The draft connection shall be fixed at a height of 18 to 24 inches above finished grade or concrete slab, to the centerline of the fitting.
  - 2.3.3.4. The fill connection shall be fixed at a height of 18 to 24 inches above finished grade or concrete slab, to the centerline of the fitting.
- 2.3.4. Excavation shall be performed per all applicable regulations. The excavation shall be backfilled with a material per manufacturer's specifications. In designs in which the draft pipe is placed on the tank end, the tank shall have a 2 percent slope toward the draft connection end.

#### 2.4. Testing and acceptance

- 2.4.1. The tank shall be operable with a rate of flow (fire flow) of 1000 gallons per minute (GPM) minimum using a fire department pumper operating under normal conditions.
- 2.4.2. A pressure test shall be performed prior to installation of the tank, per manufacturer's specifications.
- 2.4.3. A pressure test shall be performed after the tank is installed and covered at a maximum pressure of 5 psi (pounds per square inch) and held for a time period as determined by the Fire Official, or per manufacturer's specifications.
- 2.4.4. An operational test shall be performed when construction is completed, in accordance with the approved procedures. The test shall be conducted by the fire department and the installer. When testing has been completed, the installer shall refill the tank to full capacity as required. Once accepted, further use of the tank shall be limited to firefighting operations and routine testing. The fire department shall be responsible for subsequent refilling to full capacity within 12 hours after using water from the tank.

2.4.5. Final approval will be made per notification in writing by the Fire Official.

2.5. Accessibility and surrounding features

2.5.1. A pulloff shall be constructed per Appendix 5.1, Drawing 03-01, *Pulloff, Tank Access*, unless otherwise specified. The requirements for each site will be evaluated and approved by the Fire Official prior to start of work. Details shall be indicated on the site or subdivision plan as applicable.

2.5.2. No obstructions shall impede access to tank fittings. The facility shall remain accessible on a year-round basis.

2.5.2.1. Landscaping, brush, and trees shall be trimmed away from fittings. Overhanging branches shall be trimmed away at a minimum of 12 feet overhead. Grass and weeds shall be cut as needed.

2.5.2.2. Snow shall be plowed from the access way as required to maintain access at all times.

2.5.3. Protective devices shall be used as applicable to prevent damage to the fittings and to provide safety to operators. These include, but are not limited to the following:

- a. Bollards
- b. Guard rails
- c. Fencing
- d. Walkways
- e. Curbs
- f. Any other barriers/devices as determined by the Fire Official

2.5.4. A reflective sign shall be posted which clearly indicates tank full capacity and identification (ID) number. An identification number shall be assigned by the county and posted at the site.

2.5.5. An approved NO PARKING sign shall be provided and attached to a metal post.

2.5.6. All fittings above grade shall be painted with exterior-grade enamel. Color shall be yellow unless otherwise specified.

2.6. Inspections shall be performed by the Local Fire Department and documented as appropriate according to the following schedule:

2.6.1. Monthly inspections shall consist of a visual check to confirm that the water level is full and to determine if any damage has occurred.

- 2.6.2. Semi-annual inspections will be same as the monthly inspection and a detailed inspection of all parts.
  - 2.6.3. Annual inspections shall include all of the above, with the addition of an operational test to be conducted by the local fire company.
  - 2.6.4. Repair orders shall be submitted in writing to the Fire Official.
3. Definitions: For applicable definitions, see Section 112-4 of the Carroll County Code.
4. References
- 4.1. Published standards
    - 4.1.1. NFPA 1963 - Standard for Fire Hose Screw Threads
    - 4.1.2. NFPA 1142 - Standard for Water Supplies for Suburban and Rural Fire Protection
    - 4.1.3. NFPA 1141 - Standard for Fire Protection in Planned Building Groups
  - 4.2. Other referenced documents
    - 4.2.1. The Code of Public Local Laws and Ordinances of Carroll County Maryland, Chapter 112.
    - 4.2.2. Underground Tanks & Dry Fire Hydrants Maintenance and Inspection, Chief Greg Dods / Regional Fire Protection Committee, 2003.
5. Appendix
- 5.1. Drawing 03-01, *Pulloff, Tank Access.*
  - 5.2. Drawing 03-02, *Tank, Fire Suppression Water Storage, 30,000 Gallon.*
  - 5.3. Drawing 06-02, *Tank, Fire Suppression Water Storage, 12,000 Gallon.*
  - 5.4. Maintenance and inspection procedures (item 4.2.2).