Riverside County Fire Department

Office of the Fire Marshal

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Technical Policy

Title: Private Fire Protection Water Supply Tanks and Hydrants for One- and Two-Family Dwellings		
Technical Policy: # TP 23-001	**Effective Date:** 02/02/23	**Revised Date:**
Code References: 2022 California Fire Code (CFC), Section 102.9, Section 507 & Section B103.3; 2022 California Residential Code (CRC), Section R313.2; 2022 National Fire Protection Association (NFPA) 13D; 2023 NFPA 22; 2022 NFPA 1142; and County Ordinance 787.10		

Purpose

The Riverside County Fire Department (RCFD) Office of the Fire Marshal (OFM) has prepared this policy to provide guidance to building officials, contractors, architects, business owners, consultants and the general public on local interpretations and practices that are considered to be in compliance with the California Fire Code (CFC). The purpose is to identify requirements for private fire protection water supply tanks and associated hydrants for new one- and two-family dwellings, new additions to one- and two-family dwellings, and associated new accessory buildings. The intent is to clarify aspects of the code that are vague or non-specific by addressing selected issues under normal conditions. The requirements of this policy shall not be construed as altering any existing code, law or regulation which may require fire protection features not covered or alluded to in these requirements, nor shall they waive any requirements of any code, law or regulation. The reader is cautioned that the guidance detailed in this policy may or may not apply to their specific situation, and that the OFM retains final authority to determine compliance.

Scope

This policy is applicable to new one- and two-family dwellings, new additions to one- and two-family dwellings, or new accessory building construction proposed at one- and two-family dwelling parcels. This policy identifies minimum private fire water supply requirements for one- and two-family dwellings in rural and suburban areas in which an adequate reliable water supply does not exist, and where the option is proposed by the applicant and approved by the OFM.

Requirements

Where there is a practical difficulty in complying with the below requirements, modifications may be approved on a case-by-case basis by the Fire Marshal.

1. GENERAL

A. Tank Materials and Construction

1) Acceptable materials include steel, concrete, and fiberglass reinforced plastic tanks, or as otherwise approved.
2) Foundations or footings shall furnish adequate support for the tank.
3) Tanks with a calculated capacity greater than 5,000 gallons and a height to diameter ratio greater than 2:1 require a separate permit from the applicable Building and Safety Department and could require additional agency approvals (California Building Code Section 105.2 and applicable zoning requirements).

B. Location

1) The tank shall be located a minimum of 40 feet from any structure to reduce fire exposure. Where this is impractical, fire proofing of not less than two hours or equivalent may be required as determined by the OFM.
2) If the outlet for the fire department connection will be on the tank (no remote hydrant), then in addition to the requirements in Section 3. CONNECTIONS TO THE TANK below, the outlet shall be no closer than 40 feet from the closest portion of the structure and no farther than 150 feet from all exterior portions of the structure, or 300 feet from

all exterior portions of structures with an NFPA 13D/CRC R313.2 fire sprinkler system installed.

C. Venting
   1) An air vent shall be located above the maximum water level and shall have a cross sectional area at least equal to one half the area of the discharge pipe or fill pipe, whichever is larger.

D. Sight Gauge
   1) A water level gauge shall be provided for aboveground tanks.

E. Automatic Fill
   1) An approved means shall be provided to automatically maintain the required water level in the tank.

F. Reflective Markings
   1) The tank shall have reflective markings as required by the OFM.

2. CALCULATING TANK SIZE

A. The minimum fire protection water supply calculation shall be in accordance with Chapter 4 of NFPA 1142. For one- and two-family dwelling construction, a 50% reduction in the resulting water volume for NFPA 13D/R313.2 fire sprinkler installation is permitted.

B. The minimum water supply required for any structure without exposure hazards shall not be less than 2,000 gallons; for structures with exposure hazards shall not be less than 3,000 gallons as required in NFPA 1142.

3. CONNECTIONS TO THE TANK

Refer to Figure 1 for all the required connections to the water tank. Tanks shall not be altered without written approval from the tank manufacturer. An outlet on the tank can be utilized as a Fire Department Connection if it meets the following specifications:

A. Outlet size shall be a 4 inch with male National Standard threads and shall be controlled by an independent valve.

B. Threads must be protected with a threaded metal or plastic protective cover which shall be capable of being removed by a fire hydrant wrench.

C. The outlet shall be 18 to 24 inches above the finished grade of the fire apparatus access road unless otherwise approved. Where two or more tanks are manifolded together, the connections between the tanks must be piped so that water is drawn from each tank at an equal rate.

D. The outlet shall be located 7-9 feet or 15-17 feet from the nearest fire apparatus access road edge, and with its face parallel to the road edge. This is to allow the use of a hard-suction hose from the fire department apparatus to the tank outlet. There shall be an unobstructed path from the apparatus access road to the tank outlet to accommodate the use of a hard suction-hose. A turnout shall be provided centered at the outlet so that the fire apparatus access road will be passable when the fire department apparatus is connected to the outlet. The turnout shall be a minimum of 12 feet wide and 30 feet long with a minimum 25-foot taper on each end.

4. PIPING AND REMOTE HYDRANT OUTLET REQUIREMENTS

A. The remote hydrant outlet (when installed) shall be no closer than 40 feet from the closest portion of the structure and no farther than 150 feet from all exterior portions of the structure or 300 feet from all exterior portions of structures when an NFPA 13D/CRC 313.2 fire sprinkler system is installed. This hydrant outlet shall be visible and accessible from the fire apparatus access road.

B. Each hydrant shall be identified with a sign posted three (3) feet from the hydrant outlet. The sign shall be no less than three (3) feet nor greater than five (5) feet above the finished grade, in a horizontal position and visible from the driveway. The sign shall state the following (see figure 2):

DRAFTING HYDRANT

_____Gallons

C. Remote Hydrant
1) Outlet size shall be a 4 inch with male National Standard threads.
2) Threads must be protected with a threaded metal or plastic protective cover which shall be capable of being removed by a fire hydrant wrench.
3) Hydrants shall be painted red and have a 2-inch blue reflective tape band within 6 inches of the top of the riser.
4) Hydrant outlet shall be 18 to 24 inches above the finished grade of the fire apparatus access road unless otherwise approved (see figure 2).
5) The hydrant outlet shall be located 7-9 feet from the access road edge. This is to allow the use of a hard-suction hose from the fire department apparatus to the tank outlet. There shall be an unobstructed path from the apparatus access road to the tank outlet to accommodate the use of a hard suction-hose. A turnout shall be provided centered at the outlet so that the fire apparatus access road will be passable when the fire department apparatus is connected to the outlet. The turnout shall be a minimum of 12 feet wide and 30 feet long with a minimum 25-foot taper on each end.
6) A minimum of 3 feet clear unobstructed space shall be provided around the circumference of the fire hydrant.

D. Piping
1) Size shall be 4 inch minimum from the storage tank to the hydrant.
2) All exposed piping, elbows and risers shall be corrosion resistant and suitable for the environment installed.
3) All ferrous metal pipe and fittings shall be lined.
4) The following applies to the underground installation:
   a) Steel pipe shall be coated and wrapped.
   b) Steel pipe joints shall be field coated and wrapped after assembly.
   c) After assembly, all metallic parts such as rods, nuts, bolts, washers, clamps, and other restraining devices, except thrust blocks, shall be cleaned and thoroughly coated with bitumen or other acceptable corrosion-retarding material.
5) Where above ground piping passes through an area subject to freezing, it shall be protected by a reliable means to maintain the temperature of the water in the piping between 40° F and 120° F.
6) Depth of cover shall be not less than 2 feet to prevent mechanical damage. Pipe under driveways shall be buried a minimum of 3 feet. The top of the pipe shall be buried not less than 1 foot below the frost line for the installation location.
7) Approved thrust blocks or mechanical restraints shall be provided for stability of underground piping between the tank and the draft hydrant.
8) Steel pipe shall be minimum schedule 40 and fittings schedule 80.

5. PLANS

A. Site plans showing the hydrant, piping, and tank shall be approved by the OFM prior to installation. Plans shall be scaled or dimensioned.

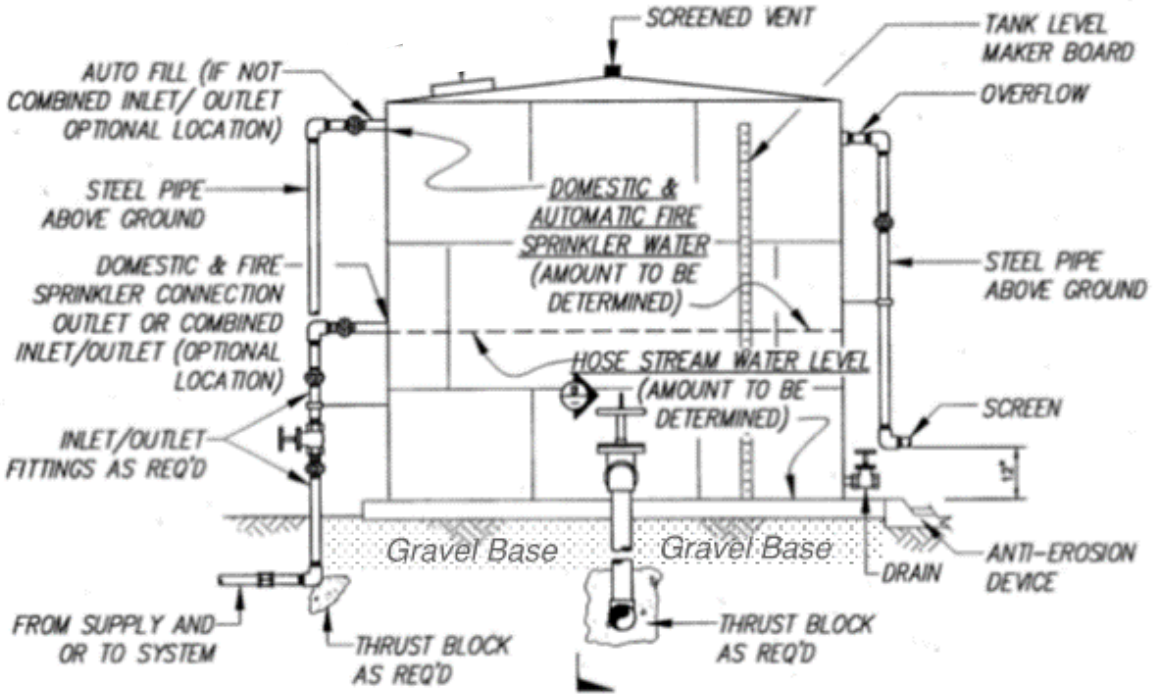
B. Electronic plans or a minimum of 2 physical plans shall be submitted to the OFM for review. Electronic plans can be submitted to the OFM via the online portal at: https://rivcoplus.org/EnerGov_Prod/SelfService#/home. Plans shall include:
1) All structures - indicate square footage, height, distance between structures, and any other pertinent data to confirm volume of structures.
2) Access roads - indicate width and percentage of grade.
3) Proposed tank size, material of construction and tank specifications/details.
4) Site plan (to scale or dimensioned) with tank location.
5) Elevation view of tank indicating point of connections to the tank.

6) Proposed outlet size and location.
7) Type, size and location of piping.
8) If the hydrant is remote from the tank, show the elevations and distance from the tank and the location of the hydrant outlet. Hydrant outlet elevation shall be at or lower than the tank connection so that the piping configuration results in positive water pressure at the hydrant outlet. Hydraulic calculations may be required by OFM to confirm.
9) Proposed auto-fill details.

6. INSPECTIONS

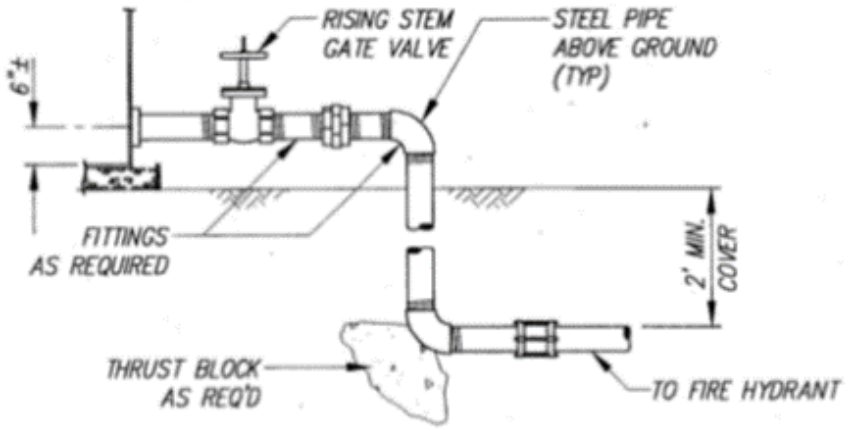
A. The following inspections shall be conducted by the RCFD OFM:
1) Any below ground piping and restraints shall have a visual inspection prior to being covered.
2) Final inspection, including testing the auto fill.

FIGURE 1
TANK INSTALLATION GUIDELINE FOR RESIDENTIAL AND MINOR ACCESSORY USE BUILDINGS



A - FIRE HYDRANT TANK OUTLET

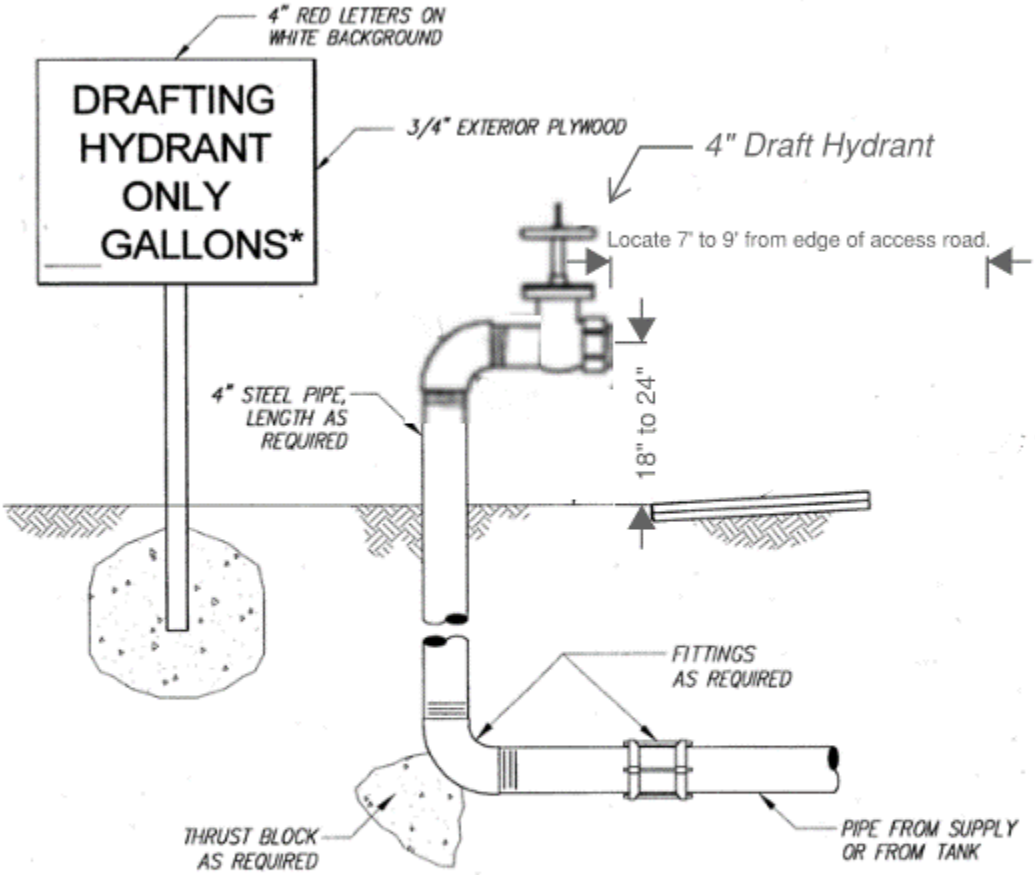
NOTES: 1. CERTAIN ITEMS MAY BE ROTATED FOR CLARITY. NOT TO SCALE
2. WATER TANKS 5000 GALLONS AND GREATER REQUIRE BUILDING PERMITS AND COULD REQUIRE ADDITIONAL AGENCY APPROVALS.



B - FIRE HYDRANT TANK OUTLET

NOT TO SCALE

FIGURE 2



NOTES:
1. SIGN FOR DRAFTING HYDRANT REQUIRED IF RESIDUAL PRESSURE AT DESIGN FLOW IS LESS THAN 20 PSI
2. AMOUNT OF WATER RESERVED FOR HOSE STREAM. EXAMPLE: 5,000 GALLONS

B - TYPICAL DRAFT FIRE HYDRANT INSTALLATION

NOT TO SCALE

FIGURE 3

THE INTERCONNECTION OF FIRE WATER TANKS SHALL BE DESIGNED TO ALLOW EQUAL FLOW OF WATER FROM EACH TANK.