



FRESNO COUNTY FIRE

PROTECTION DISTRICT

210 South Academy Avenue
Sanger, California 93657
Telephone: (559) 493-4300
Fax: (559) 875-7451
www.fresnocountyfire.org

FIRE FLOW REQUIREMENTS RURAL SUPPLY VARIANCES FROM THE FIRE CODE

SECTION 1: STRUCTURES

Rural fire flow supply requirements may be amended from Appendix B of the California Fire Code (CFC) when there is no reliable water supply system in place to protect the subject property and scope of work. The following information is designed to provide guidelines to establishing “reasonable” fire flow and water storage values for such areas based upon the identified factors. In order to mitigate a portion of the normally required fire flow both active and passive building design components will be considered.

Active systems include automatic notification and suppression systems such as fire sprinklers and fire alarms where they would not otherwise be required by the code. Early notification of a fire condition will help responders to arrive at the earlier stages of the fire, increasing the chances of successfully saving the structure. Automatic fire suppression systems such as fire sprinklers initiate the suppression activity while fire fighters are responding to the fire. Such systems are not designed to extinguish the fire, but rather, are design to hold the fire in check, or significantly slow the growth rate. Studies performed by the California Fire Sprinkler Advisory Board during the 1990’s determined that in properly designed and operational systems, 80% of the fires were controlled by the activation of three (3) fire sprinklers. This equates to keeps the fire area to about 500 square feet of the structure when fire fighters arrive.

Passive design components are designed to resist the spread of the fire. Such systems include fire rated construction, draft stopping, higher classification of roof coverings, separation in between buildings, separation between buildings and vegetation, and separation between buildings and property lines.

CRITERIA FOR CONSIDERATION OF ALTERNATIVE FIRE FLOW REQUIREMENTS

All of the following must be met to consider alternate fire flow compliance.

- There must not be an available water supply system adjacent to the site (more than 1000 feet) capable of meeting the required fire flow.
- An automatic fire sprinkler system must be provided in accordance with NFPA 13. NFPA 13R or 13D systems may be considered when applicable to the proposed project.

Exception: Newly constructed structures with a fire area less than 5,000 square feet and not required to be protected by Automatic Fire Sprinkler system in the 2016 California Fire Code, NFPA 13, 13R, or 13D standards shall not be required to be protected by Automatic Fire Sprinkler system when using the NFPA 1142 Rural Supply Variance

- Fire access must be provided to the site and the proposed buildings on the site in accordance with the CFC.
- NOTE: See FCFPD Policy 2014-01 for low hazard agricultural buildings (F2/S2 Occupancies).

EXTREMELY LOW RISK LIMITED AREA STRUCTURES – SPECIAL CRITERIA

Certain structures are of limited size and nature that they pose virtually no risk to responders and have no other structure exposures associated with them. These are cases where the fire flow required by NFPA 1142 is within the 10,000 gallons capacity typically carried on fire service engines and water tenders. Such low hazard occupancies include but are not limited to dwellings, accessory structures, and offices (Class 7 per NFPA 1142). The footprint of the structure will vary based upon the construction materials and height of the structure. In such cases only on-site portable fire extinguishers are required. This is typically 1; 2A10BC-rated portable fire extinguisher but 2 fire extinguishers may be required.

DISCUSSION OF THRESHOLDS & EXAMPLES

The values given for fire flow are an amalgam of various factors. NFPA 1142 attempts to provide guidance for providing fire flow volumes which differ from the CFC. The general presumption of NFPA 1142 is that a municipal (reliable) water supply is not available. The fire flow values are intended to provide adequacy for structural firefighting but do not completely deal with the rate or method of water application. This decreases its values as a “stand alone” document for use by Fresno County Fire/CAL FIRE.

To provide guidance to designers seeking reasonable alternative methods of achieving adequate fire flow, the Fire Flow Matrix Table has been created. This table cross references protection requirements with response times. Clearly, the longer a fire is

burning prior to the application of suppression, the greater the amount of manpower will be required and the less likely it that such efforts will be successful. Correspondingly, the matrix requires higher values (greater water storage capacity) in areas with increased response time.

ALTERNATIVE FIRE FLOW

The required flow rate and storage capacity shall comply with the following:

Flow Rate: NFPA 1142 + Fire Sprinkler Demand

Minimum Storage: NFPA 1142 or Fire Sprinkler Demand whichever is greater.

EXAMPLE: #1

Church in the State Responsibility Area

Project information:

- Area: 4300 sq ft
- Volume: 98,000 cubic feet
- Type of Construction : V-B
- Occupancy Class: A3 / Class 6 – NFPA 1142
- Exposure Hazard: N/A

To qualify for consideration of the alternative measures this building must be equipped throughout with an automatic fire sprinkler system (criteria #2 above).

Water Storage Capacity per NFPA1142:

$$WS = (VS)(CC) / OHC$$

Therefore: $WS = (98900)(1.5) / 6 = 24,750$ gallons (approximately).

According to the “**Alternative Fire Flow**” the following values are derived:

Flow value: NFPA 1142 plus Fire Sprinkler Demand. From Table 4.6.1 this is 1000 GPM plus the fire sprinkler system demand estimate at 250 GPM for light hazard with minimum hose allowance. Therefore: $1000 + 250 = 1250$ **GPM at 20 PSI** residual pressure. (***Not to exceed CFC – 1500 GPM at 20 PSI***)

Minimum Storage: NFPA 1142 or Fire Sprinkler Demand
 $24,750$ gallons or $[0.1 \text{ GPM/SQ FT (light hazard occupancy)} \times 1500 \text{ sq ft} + 100 \text{ GPM}] \times 30 \text{ minutes} = 7500$ gallons. Therefore: $24,750$ or $7500 = 24,750$ **gallons** of water storage.

CFC REQUIREMENTS

Fire Sprinklers not required under previous editions of the CBC/CFC, may be required under 2016 CBC/CFC. We shall consider the building to be equipped with fire sprinklers for equivalency in analysis.