



VENTURA COUNTY FIRE PROTECTION DISTRICT
FIRE PREVENTION BUREAU
165 DURLEY AVENUE
CAMARILLO, CALIFORNIA 93010
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FIRE PREVENTION STANDARD 14.5.2

WATER SUPPLIES COMMERCIAL/INDUSTRIAL AND RESIDENTIAL WITH A PURVEYOR

SCOPE: To identify minimum water supply requirements for fire fighting purposes for commercial, industrial or residential (with a water purveyor) projects.

This Standard provides requirements for water from fire hydrants for fire fighting purposes. If there are any conflicts between the Water Works Manual, City and County Manuals, adopted Ordinance, laws or regulations, the most restrictive shall apply.

Note: For residential water supplies without a purveyor, see Fire Prevention Standard 14.5.1.

For “U” occupancy water supplies, see Fire Prevention Standard 14.6.2.

For fire hydrant requirements, see Fire Prevention Standard 14.5.3.

For public schools, see Fire Prevention Standard 14.6.10.

DEFINITIONS

CBC: 2007 California Building Code, California Code of Regulations Title 24, Part 2

FLOOR AREA: The area included within the surrounding exterior walls of a building or portion thereof, exclusive of vent shafts and courts. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above. Ref: CBC

FIRE FLOW: The flow rate of a water supply, measured at 20 pounds per square inch (PSI) (137.9kPa) residual pressure, that is available for firefighting. When water supply tanks are approved for use, the flow rate of a water supply may be at draft.

FIRE AREA: The total floor area, in square feet, used to determine the required fire flow.

LOCAL ORDINANCE: Amendments to the Fire Code adopted by Ventura County.

NFPA 13: National Fire Protection Association, Standard for the Installation of Sprinkler Systems.

OCCUPANCY TYPE: The purpose for which a building or part thereof is used or intended to be used, as determined by Chapter 3, CBC.

SINGLE FAMILY DWELLING (SFD): One and two family dwellings, including attached or detached private garages.

TYPE OF CONSTRUCTION: Determined from Chapter 6 of the CBC.

VCFPD Fire Code

VCFPD Fire Code Appendix B105: Fire-Flow Requirements for Buildings.

WATER PURVEYOR: A public utility, a mutual water company, a governmental body, or other entity, owning and operating a water system and holding a valid permit from the State or County Health Department to purvey water. Ref: Ventura County Water Works Manual.

1. GENERAL REQUIREMENTS

A. Timing of Installation: Fire hydrants and required access roads shall be provided prior to and during the time of construction.

2. AMOUNT REQUIRED

This information is derived from the current adopted VCFPD Fire Code, local Ordinance and NFPA.

A. One- and Two-Family Dwellings.

- 1) The minimum fire-flow and duration requirements for one- and two-family dwellings and U-1 private garages shall be 1000 gallons per minute (3785.4 L/min.) for two hours. When approved the following may be applied:

Exceptions:

- a) A reduction in required fire-flow of 50 percent, as approved by the chief, is allowed when the building is provided with an approved automatic sprinkler system.
- b) Isolated residential lots and existing residential parcels in existence prior to October 7, 1980, fire-flow for buildings may be reduced to 500 gallons per minute.
- c) Buildings on residential parcels in existence prior to October 7, 1980, where there is no water purveyor or the water purveyor's current system cannot meet fire-flow or duration requirements without excessive system modifications, an on-site water storage tank may provide the fire protection water supply when the building has an approved automatic sprinkler system. The location, capacity, connections and other appurtenances of the tank shall be approved.
- d) Buildings on residential parcels created after October 7, 1980, where there is no water purveyor or the water purveyor certifies the system cannot

provide the required fire-flow or duration, the provisions of Exception c) may be utilized.

- e) Buildings classified as Group R, Division 3 Occupancies with a total fire area of 700 square feet or less are not required to provide fire-flow.

B. Buildings other than Single Family Dwellings.

- 1) The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table No. B105.1. *See Exhibit A.* Fire-flow amounts shall be rounded up to the nearest increment of 250 gallons per minute. When approved the following exceptions may be applied.

Exceptions:

- a) A reduction in fire-flow of up to 50 percent, as approved by the chief, is allowed when the building is provided with an approved automatic sprinkler system. The resulting fire-flow shall not be less than 1250 gallons per minute (4731.3 L/min.).
- b) In rural areas where there is no water purveyor or the water purveyor certifies the system cannot provide the required fire-flow or duration, and the building is protected by an approved automatic sprinkler system, the provisions in NFPA 13 for combined inside and outside hose lines may be utilized to determine fire-flow and duration. The location, connections and other appurtenances of tanks shall be approved. For the tank size of Light and Ordinary Group 2 hazard classifications, *See Exhibit B.*
Note: When using this option, the resulting fire flow shall be provided for every 10,000 square feet of building area or portion thereof. The fire sprinkler demand only needs to be provided once per building. Use of this option is limited to 1-2 buildings on the same property and ownership.
- c) Buildings classified as Group U, agricultural buildings used as barns, storage structures, stables, poultry buildings and other similar uses with a total fire area of 1500 square feet or less are not required to provide fire-flow.
- d) Buildings classified a Group U, agricultural buildings used as greenhouses, horticultural structures, nurseries and similar uses with a total fire area of 3000 square feet or less are not required to provide fire-flow.
- e) Buildings classified as Group U, not exempt from fire-flow requirements by Exceptions 3 or 4, shall provide a minimum fire-flow of 500 gallons per minute for a minimum two (2) hour duration. Where there is no water purveyor or the water purveyor certifies the system cannot provide the required fire-flow or duration, an on-site water storage tank shall be provided. The tank capacity, location, connections and other appurtenances of tanks shall be approved. See Fire Prevention Standard 14.6.2.
- f) Buildings with a total floor area of 700 square feet or less are not required to provide fire-flow.

C. Schools

1) Public Schools.

- a) The State Fire Marshal (SFM) requires the Division of State Architect (DSA) to request water and access requirements and approval from the local jurisdiction. See Fire Prevention Standard 14.6.10 for additional information. The minimum fire-flow and duration for public school buildings shall be as specified in Table B105.1 of the VCFPD Fire Code. Fire flow amounts shall be rounded up to the nearest increment of 250 gallons per minute.

Note: The local jurisdiction may limit the reduction in fire flow when automatic fire sprinklers are installed. This Department allows the following reduction:

- A reduction in fire-flow of up to 50 percent, as approved by the chief, is allowed when the building is provided with an approved automatic sprinkler system. The resulting fire-flow shall not be less than 1250 gallons per minute (4731.3 L/min.).

2) Private Schools.

- a) Private schools shall comply with all the requirements for commercial buildings. Local requirements are applicable to private schools.

EXHIBIT A

**TABLE B105.1
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS^a**

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) ^c	FLOW DURATION (hours)
Type IA and IB ^b	Type IIA and IIIA ^b	Type IV and V-A ^b	Type IIB and IIIB ^b	Type V-B ^b		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. The minimum required fire flow shall be allowed to be reduced by 25 percent for Group R.

b. Types of construction are based on the *California Building Code*.

c. Measured at 20 psi.

EXHIBIT B

WATER TANK SIZE WHEN USING EXCEPTION #2 OF LOCAL ORDINANCE

This exhibit applies to Light and Ordinary Group 2 hazard classifications, as determined by NFPA 13. This does not apply to one and two family dwellings. Any other uses for the project (domestic, agriculture, etc) may be added to the top of the tank and must connect above the required amount for fire sprinklers and hose demand.

Note: When using this option, the resulting fire flow shall be provided for every 10,000 square feet of building area or portion thereof. The fire sprinkler demand only needs to be provided once per building. Use of this option is limited to 1-2 buildings on the same property and ownership.

STEP 1: Classify the occupancy hazard type per NFPA 13.

LIGHT HAZARD: Office type building

ORDINARY GROUP 2: Barns, stables, storage (under 12 feet & not high hazard)

If mixed use within the building, the most hazardous classification applies.

(i.e. - barn with office: Ordinary 2

- office with garage, workshop or storage: Ordinary 2)

STEP 2: Determine duration, fire-flow and fire sprinkler demand. 20% must be added to the required fire-flow for friction loss and multiple heads operating. The total tank size is the fire-flow plus the sprinkler demand.

CALCULATION EXAMPLES

LIGHT HAZARD:

- Duration is 30 minutes
- Fire flow is 100 gpm x 30 min. = 3,000 gallons (for each 10,000 sq ft)
- Sprinkler demand is .1 gpm over the design area of 1,500 sq. ft.
x 30 min. = 4,500 gpm.
- 20% x 4,500 = 5,400 gpm
- Tank size in gallons (10,000 sq ft bldg.)
3,000 (fire flow) + 5,400 (sprinkler demand) = 8,400

ORDINARY GROUP 2:

- Duration is 60 minutes if monitored (central station)
90 minutes with no monitoring
- Fire flow is 250 gpm
250 x 60 min. = 15,000 gallons (for each 10,000 sq ft)
250 x 90 min. = 22,500 gallons (for each 10,000 sq ft)
- Sprinkler demand is .2 gpm over the design area of 1500 sq. ft.
x 60 min. = 18,000 gpm
x 90 min. = 27,000 gpm
- 20% x 18,000 = 21,600 gallons
x 27,000 = 32,400 gallons
- Tank Size in gallons (10,000 sq ft bldg.)
15,000 (fire flow) + 21,600 (sprinkler demand) = 36,600 (if monitored)
22,500 (fire flow) + 32,400 (sprinkler demand) = 54,900 (if not monitored)