Guidance for Fire Flow and Duration for State Owned, Specified State-Occupied Buildings and State Institutions

The Office of the State Fire Marshal (OSFM) is releasing this information to provide guidance for determining the required fire flow in accordance with California Fire Code (CFC) Section 507.3 and Appendix B, and fire hydrant systems in accordance with CFC Section 507.5 and Appendix C. There have been questions on the methods in determining the required fire flow, the applicability of allowed reductions, and the use of NFPA 1142-22 for Rural Firefighting Operations. All code references are California Code of Regulations (CCR) Title 24, Part 9 California Fire Code (CFC) and Part 2 California Building Code (CBC) 2025 edition unless otherwise noted.

1 2025 CFC, Section 507.3 and Appendix B

1.1 Purpose of Appendix B – Fire-Flow Requirements for Buildings:

Provides a tool for a jurisdiction to establish a policy for fire-flow requirements. The determination of required fire flow is not an exact science, but having some level of information provides a consistent way of choosing the appropriate fire flow for buildings throughout a jurisdiction.

1.2 Basic Fire Flow Requirement (2025 CFC B105.1(2))

CFC Table B105.1(2) is a reference table to both CFC Tables B105.1(1) and B105.2. The table establishes the fire-flow and duration requirements based on the fire-flow calculation area, and the construction types defined in the CBC. As the construction type becomes more combustible, the fire-flow requirements increase. The scope of Appendix B is intended for new construction rather than existing buildings. Fire-flow calculation area includes all floors and horizontal projections of a building.

1.3 REDUCTIONS (2025 CFC B105.2 AND B105.1)

All established reductions for Minimum Fire Flow - gallons per minute (gpm) or Flow Duration (hours) are located in CFC Appendix B Tables B105.1(1) (*for one- and two-family dwellings Group R3/R4*) and B105.2 (*other than Group R3/R4 Buildings)* and appropriate footnotes to each table.

CFC Table B105.2 – *(other than Group R3/R4 Buildings)* - states the minimum fire flow (gpm) can be reduced to ***"25% of the value in Table 105.1(2)"*** with an automatic sprinkler system complying with Section 903.3.1.1 (=NFPA 13 system) and 903.3.1.2 (=NFPA 13R system). Thus, 25% of the value in the table is equal to a 75% reduction in flow –

- however, a sprinkler system complying with CBC/CFC 903.3.1.1 (NFPA 13) – the reduced fire flow shall be **not less than 1,000 gpm** (*foot note a*)
- A sprinkler system complying with CBC/CFC 903.3.1.2 (NFPA 13R) – the reduced fire flow shall be **not less than 1,500 gpm** (*foot note b*).
- Non-sprinkler buildings do not have any reduction in the required flow and duration per CFC Table B105.2.
- For Buildings with Automatic Sprinkler Systems - Flow Duration = **"duration in Table B105.1(2) per Table B105.1(2) at the reduced flow rate".**

CFC Table B105.1(1) - *(for one- and two-family dwellings Group R3/R4)* – with automatic sprinkler system complying with CBC/CFC Section 903.3.1.3 (NFPA 13D) or Section 313.3 of the California Residential Code (CRC) can be reduced to **"½ value in Table B105.1(2)"** – **when 3,600 SF and greater.** Thus, ½ of the value in the table is equal to a 50% reduction in flow and the duration is 1 Hour per the table B105.1(1).

2 2025 CFC, SECTION 507.5 AND APPENDIX C

2.1 PURPOSE OF APPENDIX C – FIRE HYDRANT LOCATIONS AND DISTRIBUTION:

CFC Section 507.5.1 requires hydrants to be within 400 feet of all portions of a new buildings and facilities. If a building or facility cannot meet that criterion, on-site fire hydrants and mains are required. This appendix provides some guidance on the spacing of the on-site hydrants based on the required fire flow. The general approach is to use fire-flow requirements to determine the number and spacing of hydrants – the higher the fire-fire flow requirements, the larger the number of hydrants required and the smaller the spacing between hydrants. The spacing given in the appendix are independent of the distance to a building and are simply focused on having the correct number and spacing of hydrants **on a fire apparatus access road.**

2.2 NUMBER AND DISTRIBUTION BASED ON FIRE-FLOW REQUIREMENT (GPM) (2025 CFC TABLE C102.1)

Note is consistent with the decreases in fire flow allowed in Appendix B. CFC Table C102.1 – Fire-Flow Requirement (gpm) value is based on Appendix B Tables **with** any reductions taken. Increase in spacing is based on Footnote f and g.

2.3 CFC TABLE C102.1 – (FOOTNOTE F)

A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic fire sprinkler system in accordance with CBC/CFC Section 903.3.1.1 (NFPA 13). Footnote is consistent with the decreases in fire flow allowed in Appendix B.

2.4 CFC TABLE C102.1 – (FOOTNOTE G)

A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic fire sprinkler system in accordance with CBC/CFC Section 903.3.1.2 (NFPA 13R). Footnote is consistent with the decreases in fire flow allowed in Appendix B.

3 2022 NFPA 1142-22

3.1 Modification for Areas without adequate water supply system (2025 CFC B103.3)

NFPA 1142-22 can be used in lieu of CFC Appendix B for Fire-Flow Requirements. Standard is to assist the AHJ to establish the minimum water supply necessary for structural fire-fighting purposes in those areas where it has been determined that there is no water or inadequate water for firefighting.

3.1.1 Non-Sprinklered Buildings / Structures – NFPA 1142-22 Chapter 4 for calculating minimum water supply and water delivery rate to the Fire Scene.

a. The minimum water supply required for any structure **without** exposure hazards shall be **not less than 2000 gal** (4.2.2)
b. The minimum water supply required for any structure **with** exposure hazards shall be **not less than 3000 gal** (4.3.2)
c. Water Delivery Rate is based on Table 4.6.1 and shall be **not less than 250 gpm** (4.6.3)

3.1.2 Sprinklered Buildings / Structures – Automatic sprinkler system demand (Hydraulically Calculated Systems), per NFPA 13 (including hose stream allowance) / 13D / 13R – CFC B105.3

Summary of Durations for sprinklered buildings in rural areas:

NFPA 13 - Table 19.2.3.1.2 (lower duration values permitted only where the sprinkler system waterflow alarm device(s) and supervisory device(s) are electrically supervised and monitored at an approved, constantly attended location – 19.2.3.1.3)

NFPA 13R – 30 minutes (9.2.1 – NFPA 13R-2025)

NFPA 13D – Water Demand Rate times 10 minutes unless permitted otherwise by 6.1.3 (7 minutes for dwelling units - 1 Story and less than 2000 SF) (6.1.2-NFPA 13D-2025)

3.1.3 If site has both non-sprinklered and sprinklered buildings / structures – compare Item #1/#2 of which tank size will be based on the largest demand.

3.1.4 If site has multiple buildings or if stored water supply is providing water for multiple structures from one source (i.e. Water tank) – Volume is based on the largest demand structure per NFPA 1142-22 or largest demand in #2 above.

3.1.5 If the stored fire water supply is a Water tank - shall be installed in accordance with NFPA 22-23 (per CFC 507.2.2) - Standard for Water Tanks for Private Fire Protection.

3.1.6 If site has multiple buildings / structures from one source (i.e. Water tank) – NFPA 22 max refill time will govern. If supply water to tank cannot meet NFPA 22 requirements – more volume could be required, and calculations will be needed – Case by Case basis and approval from OSFM.

NOTE: If the Water Supply storage tank is supplying both Fire and Domestic water - the tank is considered a Dual Purpose Tank (domestic and fire) – then NFPA 22 – 14.1.7.1.1 is required where the domestic suction height is higher than the required fire volume. "Pipe used for other than fire protection purposes shall be entirely separate from fire-service pipes and shall extend to an elevation inside the tank above that required for fire protection."