# Fire Department Access Roadways

**2001 California Fire Code**

**902.2.1 Required access.** Fire apparatus access roads shall be provided in accordance with Sections 901 and 902.2 for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction when any portion of the facility or any portion of an exterior wall of the first story of the building is located more than 150 feet (45 720 mm) from fire apparatus access as measured by an approved route around the exterior of the building or facility. See also Section 902.3 for personnel access to buildings.

> **EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of Sections 902.2.1 and 902.2.2 may be modified by the chief.
> 2. When access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades or other similar conditions, the chief is authorized to require additional fire protection as specified in Section 1001.9.
> 3. When there are not more than two Group R, Division 3, or Group U Occupancies, the requirements of Sections 902.2.1 and 902.2.2 may be modified by the chief.
> More than one fire apparatus road shall be provided when it is determined by the chief that access by a single road might be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.
> For high-piled combustible storage, see Section 8102.6.1.
> For required access during construction, alteration or demolition of a building, see Section 8704.2.

**Specifications.**

**902.2.2.1 Dimensions.** Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm) and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

> **EXCEPTION:** Vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance when approved. Vertical clearances or widths shall be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

**902.2.2.2 Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities. ***Minimum surface designed to withstand 25 ton load.***

**902.2.2.3 Turning radius.** The turning radius of a fire apparatus access road shall be as approved. ***29'8" inside radius and 45' outside radius.***

**902.2.2.4 Dead ends.** Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with approved provisions for the turning around of fire apparatus.

**902.2.2.5 Bridges.** When a bridge is required to be used as part of a fire apparatus access road, it shall be constructed and maintained in accordance with nationally recognized standards. See

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Article 90, Standard a.1.1. The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges when required by the chief.

**902.2.2.6 Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved. ***12% grade maximum.***

# Water Supplies for Fire Protection

**903.2 Required Water Supply for Fire Protection.** An approved water supply capable of supplying the required fire flow for fire protection shall be provided to all premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction. When any portion of the facility or building protected is in excess of 150 feet (45 720 mm) from a water supply on a public street, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the chief. See Section 903.4.

**903.3 Type of Water Supply.** Water supply is allowed to consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow. In setting the requirements for fire flow, the chief may be guided by Appendix III-A.

**903.4 Fire Hydrant Systems.**

**903.4.1.1 Applicability.** Fire hydrant systems and fire hydrants shall be in accordance with Section 903.4.

**903.4.1.2 Testing and maintenance.** Fire hydrant systems shall be subject to such periodic tests as required by the chief. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, alterations and servicing shall be in accordance with approved standards.

**903.4.2 Required installations.** The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on the public street or on the site of the premises or both to be protected as required and approved. See Appendix III-B. Fire hydrants shall be accessible to the fire department apparatus by roads meeting the requirements of Section 902.2.

**903.4.3 Protection, marking and obstruction of hydrants.** Fire hydrants subject to possible vehicular damage shall be adequately protected with guard posts in accordance with Section 8001.11.3. For marking, see Section 901.4.3. For obstruction, see Section 1001.

# Division III
# FIRE PROTECTION
## APPENDIX III-A
## FIRE-FLOW REQUIREMENTS FOR BUILDINGS

(See UFC Section 903.3)

### SECTION 1 — SCOPE

The procedure determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with Appendix III-A. Appendix III-A does not apply to structures other than buildings.

### SECTION 2 — DEFINITIONS

For the purpose of Appendix III-A, certain terms are defined as follows:

**FIRE AREA** is the floor area, in square feet, used to determine the required fire flow.

**FIRE FLOW** is the flow rate of a water supply, measured at 20 psi (137.9 kPa) residual pressure, that is available for firefighting.

### SECTION 2 — MODIFICATIONS

**2.1 Decreases.** Fire-flow requirements may be modified downward by the chief for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

**2.2 Increases.** Fire flow may be modified upward by the chief where conditions indicate an unusual susceptibility to group fires or conflagrations. An upward modification shall not be more than twice that required for the building under consideration.

### SECTION 3 — FIRE AREA

**3.1 General.** The fire area shall be the total floor area of all floor levels except as modified in Section 4

**3.2 Area Separation.** Portions of buildings which are separated by one or more four-hour area separation walls constructed in accordance with the Building Code, without openings and provided with a 30-inch (762 mm) parapet, are allowed to be considered as separate fire areas.

**3.3 Type I and Type II-F.R. Construction.** The fire area of buildings constructed of Type I and Type II-F.R. construction shall be the area of the three largest successive floors.

### SECTION 4 — FIRE-FLOW REQUIREMENTS FOR BUILDINGS

**4.1 One- and Two-Family Dwellings.** The minimum fire flow and flow duration requirements for one- and two-family dwellings having a fire area which does not exceed 3,600 square feet (344.5 $m^2$) shall be 1,000 gallons per minute (3785.4 L/min.). Fire flow and flow duration for dwellings having a fire area in excess of 3,600 square feet (344.5 $m^2$) shall not be less than that specified in Table A-III-A-1.

> **EXCEPTION:** A reduction in required fire flow of 50 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system.

**4.2 Buildings other than One- and Two-Family Dwellings.** The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table A-III-A-1.

> **EXCEPTION:** A reduction in required fire flow of up to 75 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system. The resulting fire flow shall not be less than 1,500 gallons per minute (5677.5 L/min.).

TABLE A-III-A-1—MINIMUM REQUIRED FIRE FLOW AND FLOW DURATION FOR BUILDINGS

| FIRE AREA (square feet) × 0.0929 for $m^2$ | | | | | FIRE FLOW (gallons per minute)[2] × 3.785 for L/min. | FLOW DURATION (hours) |
|---|---|---|---|---|---|---|
| Type I-F.R. II-F.R.[1] | Type II One-HR. III One-HR.[1] | Type IV-H.T. V-One-HR.[1] | Type II-N III-N[1] | Type V-N[1] | | |
| 0-22,700 | 0-12,700 | 0-8,200 | 0-5,900 | 0-3,600 | 1,500 | |
| 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 | * 2 |
| 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 | |
| 83,701-97,700 | 47,101-54,900 | 30,101-35,200 | 21,801-25,900 | 13,401-15,600 | 3,250 | 3 |
| 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 | |
| 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 | 4 |
| " | " | 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 | 128,301-Greater | 85,101-Greater | 8,000 | |

[1]Types of construction are based upon the Building Code.
[2]Measured at 20 psi (137.9 kPa). See Appendix III-A, Section NO TAG.

* WHEN MORE THAN 2000 GPM IS REQUIRED, THE STRUCTURE IS REQUIRED TO BE FIRE SPRINKLERED. RMC 9.20.010

## TABLE *A–III–BB–1* NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

| FIRE-FLOW REQUIREMENT (gpm) | MINIMUM NO. OF HYDRANTS | AVERAGE SPACING BETWEEN HYDRANTS[1,2,3] (feet) | MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[4] |
|---|---|---|---|
| × 3.785 for L/min. | | × 304.8 for mm | |
| 1,750 or less | 1 | 500 | 250 |
| 2,000-2,250 | 2 | 450 | 225 |
| 2,500 | 3 | 450 | 225 |
| 3,000 | 3 | 400 | 225 |
| 3,500-4,000 | 4 | 350 | 210 |
| 4,500-5,000 | 5 | 300 | 180 |
| 5,500 | 6 | 300 | 180 |
| 6,000 | 6 | 250 | 150 |
| 6,500-7,000 | 7 | 250 | 150 |
| 7,500 or more | 8 or more[5] | 200 | 120 |

[1]Reduce by 100 feet (30 480 mm) for dead-end streets or roads.

[2]Where streets are provided with median dividers which can be crossed by firefighters pulling hose lines, or arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet (152.4 m) on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute (26 495 L/min.) and 400 feet (122 m) for higher fire-flow requirements.

[3]Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet (305 m) to provide for transportation hazards.

[4]Reduce by 50 feet (15 240 mm) for dead-end streets or roads.

[5]One hydrant for each 1,000 gallons per minute (3785 L/min.) or fraction thereof.