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Fire Protection Water Supply

Fire Flow

Fire Suppression Design

FIRE PROTECTION WATER SUPPLY



- International Fire Code (IFC) requires an approved water supply capable of supplying the required fire flow for fire protection.
- A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.
- The 3 basic types of water systems are:
 - Gravity
 - Direct pumping
 - Indirect Pumping – a combination of gravity and direct pumping.

- When fire hydrant systems are part of an approved water supply system they must be located on fire apparatus access roads no more than 400' from all portions of the exterior ground level.
- On-site fire hydrants shall be installed when this requirement cannot be met.
- Fire hydrants shall have unobstructed access, clear space of at least 3' around the hydrant, and physical protection if subject to impact by motor vehicles.
- If adopted, IFC Appendix C determines the location, number, and distribution of fire hydrants.

FIRE FLOW



- Fire Flow shall be determined by an approved method.
- State of Washington has amended the code to adopt IFC Appendix B as it's approved method.
- Fire Flow is defined as the flow rate of a water supply measured at 20 psi residual pressure that is available for firefighting.
- Fire Flow calculation area is defined as the floor area in sq. feet used to determine the required fire flow.
- The fire chief is authorized to: decrease, increase or determine alternative approaches for fire flow.

- Decrease fire flow requirements.
- Increase fire flow requirements.
- Determine alternative approaches for areas without water supply systems for fire flow.
 - In rural and suburban areas in which adequate and reliable water supply systems do not exist, the fire code official can utilize NFPA 1142 or International Wildland Urban Interface Code.

- One and two family dwellings less than 3,600 sq. ft. require a fire flow of at least 1,000 gallons per minute for 1 hour.
- Required fire flow for dwellings in excess of 3,600 sq. ft. shall be established as specified in table B105.1.
- A reduction of 50% of the required fire flow is allowed in dwellings equipped with an approved residential automatic sprinkler system.

- In buildings other than one and two family dwellings, fire flow shall be determined by Table B105.1.
- A reduction of up to 75% of the required fire flow is allowed in buildings equipped with an approved automatic sprinkler system.
- The resulting fire flow shall not be less than 1,500 gallons per minute for the prescribed duration as specified in Table B105.1.

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

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) ^b	FLOW DURATION (hours)
Type IA and IB ^a	Type IIA and IIIA ^a	Type IV and V-A ^a	Type IIB and IIIB ^a	Type V-B ^a		
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 Types of construction are based on the *International Building Code*.

^b Measured at 20 psi residual pressure.

FIRE SUPPRESSION DESIGN



- To be effective all sprinkler systems must have an adequate supply of water.
- The criteria for an acceptable water supply and sprinkler system design are found in NFPA 13 Standard for the Installation of Sprinkler Systems.
- There are three essential components to a fire sprinkler system:
 - Water Supply
 - Sprinkler
 - Connection between the two

- Water is the primary extinguishing agent for fire protection suppression systems.
- Having an adequate supply is critical to ensuring proper system operation.
- Knowing what is available is important to determine what additional equipment, i.e., fire pumps and/or water storage tanks, may be required.

- Four types of sprinkler systems:
 - Wet pipe
 - Dry pipe
 - Pre-action
 - Deluge

- Additional components that determine sprinkler system design:
 - Occupancy type.
 - Building construction type.
 - Type of system that is required.

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THE FIRE GUY IS DONE TALKING

ANY QUESTIONS ?