4.13 Sprinkler & Standpipe Flow Rates and Required Pressures (2019)

Reference: 2019 San Francisco Building Code (SFBC), §§403, 903, 903.3.5.2 & 905; 2016 NFPA 13, §§6.1, 8.16.1.2 and 24.1, and Table 11.2.3.1.2; 2016 NFPA 14, Chapter 7

Purpose: To establish uniformity in requirements for sprinkler system and hose valve flow and pressure requirements when supplied by a fire pump.

I. **SPRINKLER SYSTEMS:**

The San Francisco Fire Department's position on sprinkler system flow and pressure requirements is contained in 2019 SFBC, §403.3 and 903.3.1.1; and 2016 NFPA 13, §§6.1, 8.16.1.2 and 16.1, and Table 11.2.3.1.2.

A. Minimum Requirements - When a sprinkler system is supplied by a fire pump that takes suction from the City main and a fire water storage tank, the sprinkler system demand (including the inside hose allowance) shall be met while taking suction from the tank with the water level at the vortex plate.

B. Maximum Static Pressure - The maximum static pressure shall be at pump churn pressure, with the fire pump taking suction from the City main.

II. **STANDPIPE:**

A. The San Francisco Fire Department's position on fire hose requirements for standpipes supplied with a fire pump is contained in of NFPA 14, Chapter 7.8 Minimum Pressure

1. The minimum pressure for a 3" hose valve shall be 100 psi at the valve outlet while flowing 250 GPM through the fire pump and valve.

2. The minimum pressure while flowing the required standpipe flow (500 GPM from the hydraulically most remote standpipe and 250 GPM from each additional standpipe, up to a maximum of 1000 GPM for a fully sprinklered building) **shall be 100 psi** at any valve outlet while flowing 250 GPM through each valve.

3. Therefore, the minimum hose valve outlet pressure at 250 GPM total standpipe flow is 100 psi, and the minimum hose valve outlet pressure at the maximum standpipe flow is **100 psi.**

4. When the standpipe is supplied by a fire pump that takes suction from the City main and a fire water storage tank, the minimum residual pressure and maximum static pressures at the hose valve outlet shall be based on the fire pump taking suction from the City main.

EXCEPTION: For buildings 200 feet or more in height, the minimum residual pressure at the hose valve outlet shall be met with the primary fire pump rated pressure only without boost pressure from the city main. For vertical-turbine type fire pumps taking suction from the fire water storage tank the city main is not physically connected to the suction side of these pumps. For other types of fire pumps with a suction pipe that is physically connected to the underground fire service and city water main, a main-size pressure-regulating valve shall be installed in the fire pump suction/discharge to provide a constant system pressure under regardless of whether suction is taken from the city water main or the fire water storage tank. Hydraulic calculations shall also be provided to demonstrate that the net positive suction head at the fire pump suction flange is never less than -3 psi with flooded suction or 0 psi when non-flooded suction with the water level at the vortex plate.

NOTE: The minimum and maximum static pressures shall be confirmed by field test.

III. **PRESSURE REDUCING VALVES:**

A. Pressure reducing valves are required when the hose valve outlet pressure exceeds 175 psi static pressure while at the maximum pump pressure, or;

B. When hose valve outlet pressure exceeds 125 to 130 psi residual while flowing 250 GPM through the fire pump and hose valve.

   1. Valves approved for this use shall be listed for use (as noted in III, A & B) as a hose valve pressure reducing valve under flow and no flow conditions.

   2. Factory set valves shall be properly labeled indicating the pressure setting and the intended floor for installation. The set pressure shall be confirmed by field test. Valves that can be field set or field adjusted shall be labeled indicating the proper setting to obtain the required outlet pressure. The set pressure shall be confirmed by field test.