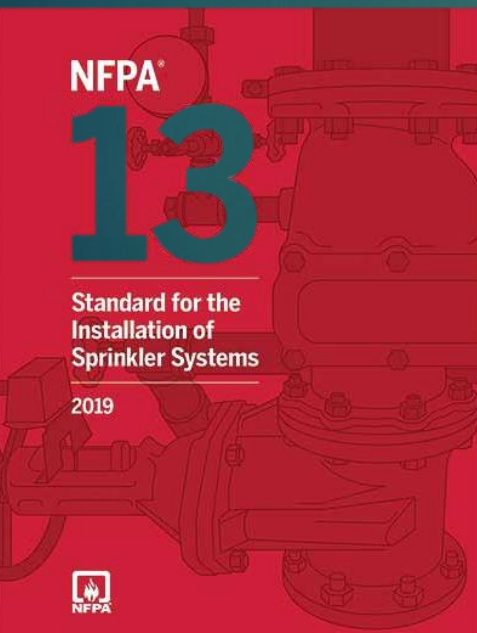




AUTOMATIC WATER SPRINKLER SYSTEM



**Naqash Kazmi (CFPS®) NFPA
CERTIFIED FIRE PROTECTION SPECIALIST(CFPS®)**

Purpose of Sprinkler System



To provide a reasonable degree of protection for life and property from fire through standardization of design, installation, and testing requirements for sprinkler systems,

Related Code



National Fire Protection Association (NFPA)

Code: NFPA-13



Classification of Occupancies.

There are Three Classifications of Occupancies

- 1.1 Light Hazard Occupancies
- 2.1 Ordinary Hazard (Group 1)
- 2.2 Ordinary Hazard (Group 2)
- 3.1 Extra Hazard (Group 1)
- 3.2. Extra Hazard (Group 2)



Light hazard occupancies (Density 0.1 GPM/sq. ft)

- Churches
- Clubs
- Educational
- Hospitals
- Institutional
- Libraries, except large stack rooms
- Museums
- Nursing or convalescent homes
- Offices, including data processing
- Residential
- Restaurant seating areas
- Theatres and auditoriums, excluding stages and prosceniums
- Unused attics



Ordinary hazard occupancies (Group 1) (Density 0.15 GPM/sq. ft):

- Automobile parking and showrooms
- Bakeries
- Beverage manufacturing
- Canneries
- Dairy products manufacturing and processing
- Electronic plants
- Glass and glass products manufacturing
- Laundries
- Restaurant service areas

Ordinary hazard occupancies (Group 2)

Density 0.2 GPM/sq. ft



- Cereal mills
- Chemical plants — ordinary
- Confectionery products
- Distilleries
- Dry cleaners
- Feed mills
- Horse stables
- Leather goods manufacturing
- Libraries — large stack room areas
- Machine shops
- Metal working
- Paper and pulp mills
- Paper process plants
- Post offices
- Printing and publishing
- Textile manufacturing
- Tire manufacturing
- Tobacco products manufacturing
- Wood machining
- Wood product assembly

Extra hazard occupancies (Group 1) (Density 0.3 GPM/sq. ft)



- Aircraft hangars (except as governed by NFPA 409, Standard on Aircraft Hangars)
- Combustible hydraulic fluid use areas
- Die casting
- Metal extruding
- Plywood and particle board manufacturing
- Printing [using inks having flash points below 100°F (38°C)]
- Rubber reclaiming, compounding, drying, milling, vulcanizing
- Textile picking, opening, blending, garneting, or carding, combining of cotton, synthetics, wool shoddy, or burlap
- Upholstering with plastic foams

Extra hazard occupancies (Group 2) (Density 0.4 GPM/sq. ft)



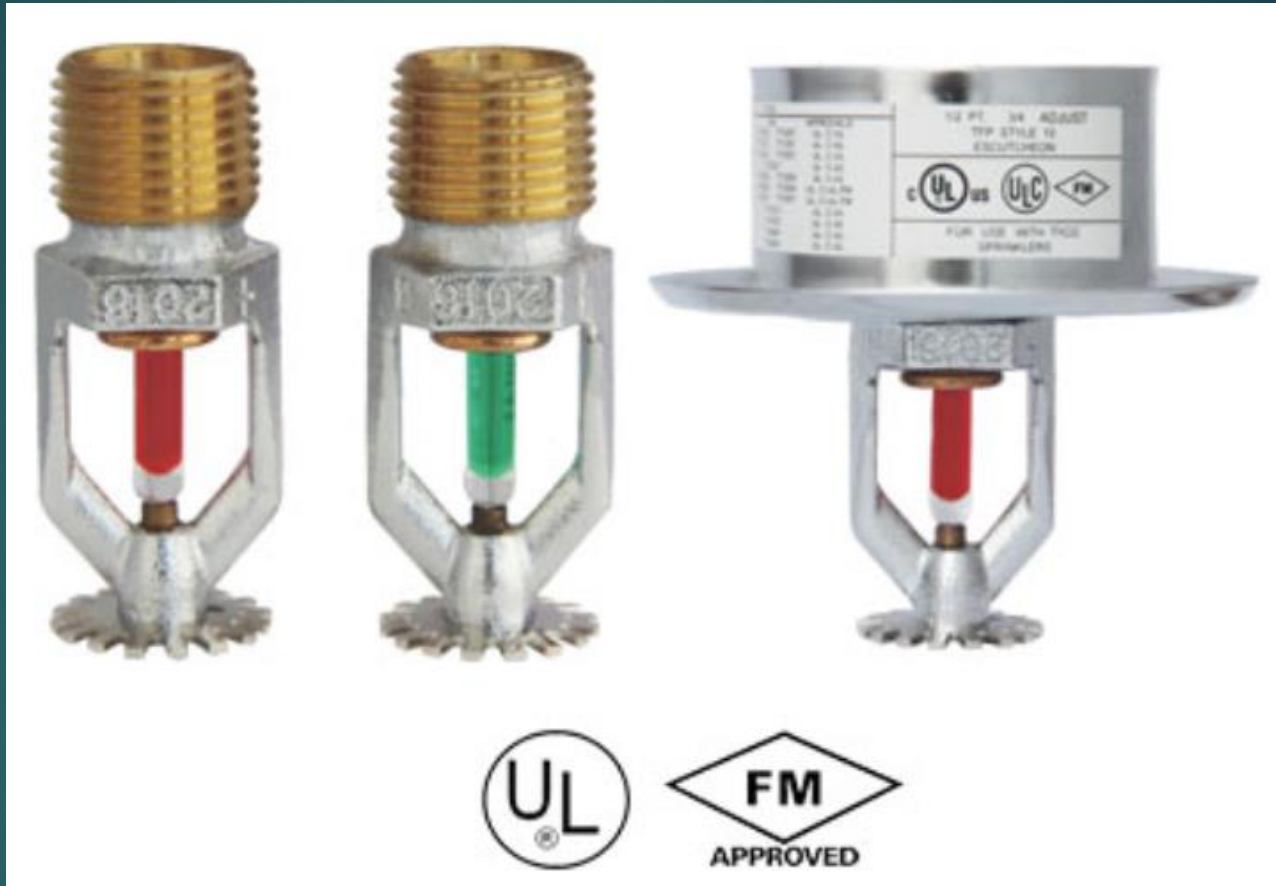
- Flammable liquids spraying
- Flow coating
- Manufactured home or modular building assemblies (where finished enclosure is present and has combustible interiors)
- Open oil quenching
- Plastics processing
- Solvent cleaning
- Varnish and paint dipping



Type of Sprinklers

- Pendent Type
- Up-Right Type
- Horizontal Sidewall Type
- Vertical Sidewall Type

Pendent Type



FEATURES



Response: Standard / Quick

Coverage: Produce a hemispherical water distribution pattern below the deflector.

Installation: Pendant installed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (Ref. NFPA 13).



FEATURES



Response: Standard / Quick

Coverage: Water discharge is directed primarily outward and downward in a quarter spherical pattern, a portion of the spray is also directed towards the back wall.

Installation: Designed for installation along a wall or the side of a beam just beneath a smooth ceiling. Installed 4" to 12" Below ceiling. (Ref. NFPA 13)

Upright Sprinkler



FEATURES



Response: Standard / Quick

Coverage: Produce a hemispherical water distribution pattern below the deflector.

Installation: Upright installed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (Ref. NFPA 13).



Types of Sprinkler System

► WET PIPE

is most commonly used type. In this type water is always filled in pipes under pressure.



Types of Sprinkler System

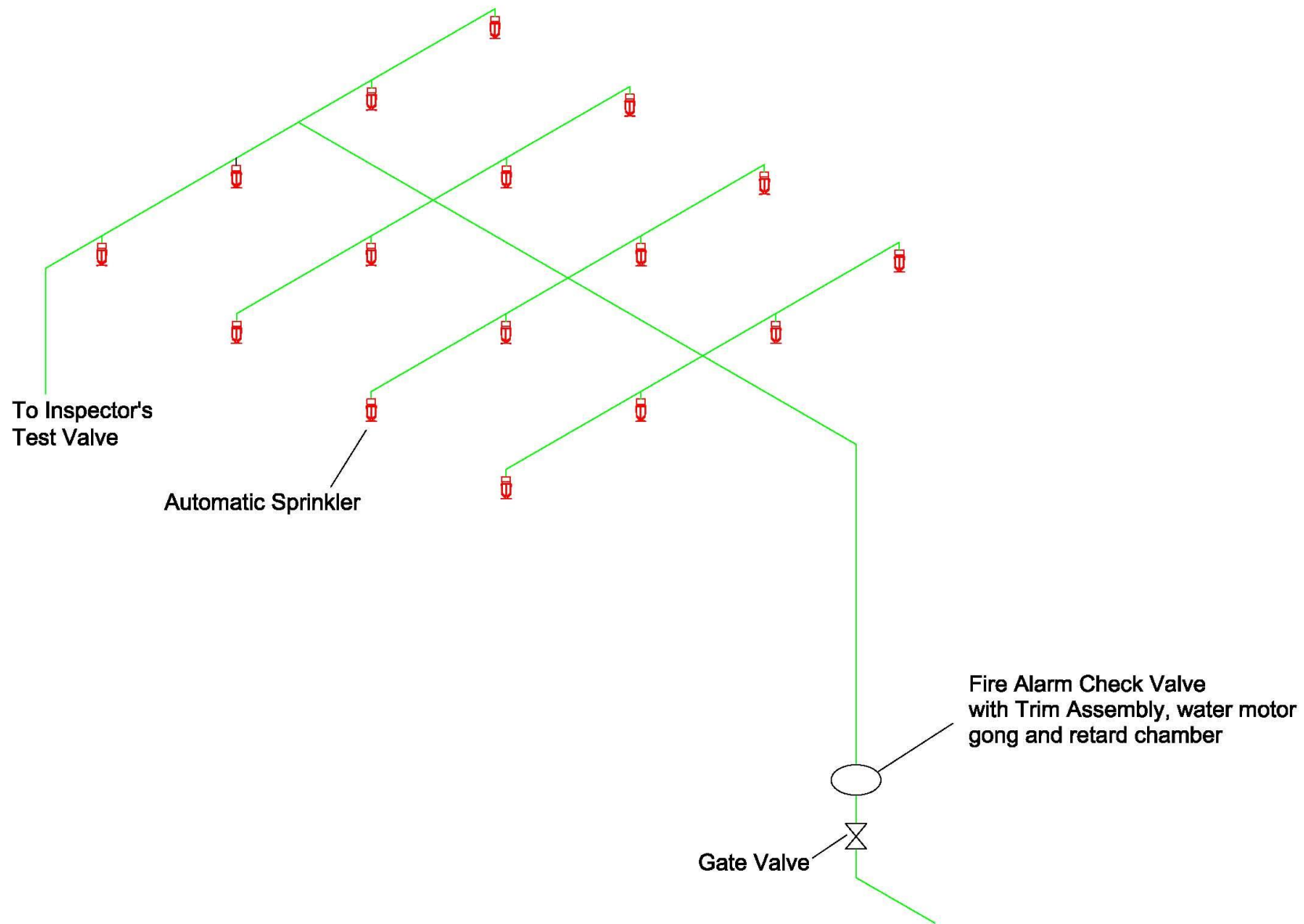
► DRY PIPE

Pipes are filled with compressed air or nitrogen; the opening of the sprinkler head permits water to flow into the system. This is most commonly installed in unheated buildings or installations in roof or attic areas where freezing condition exist.

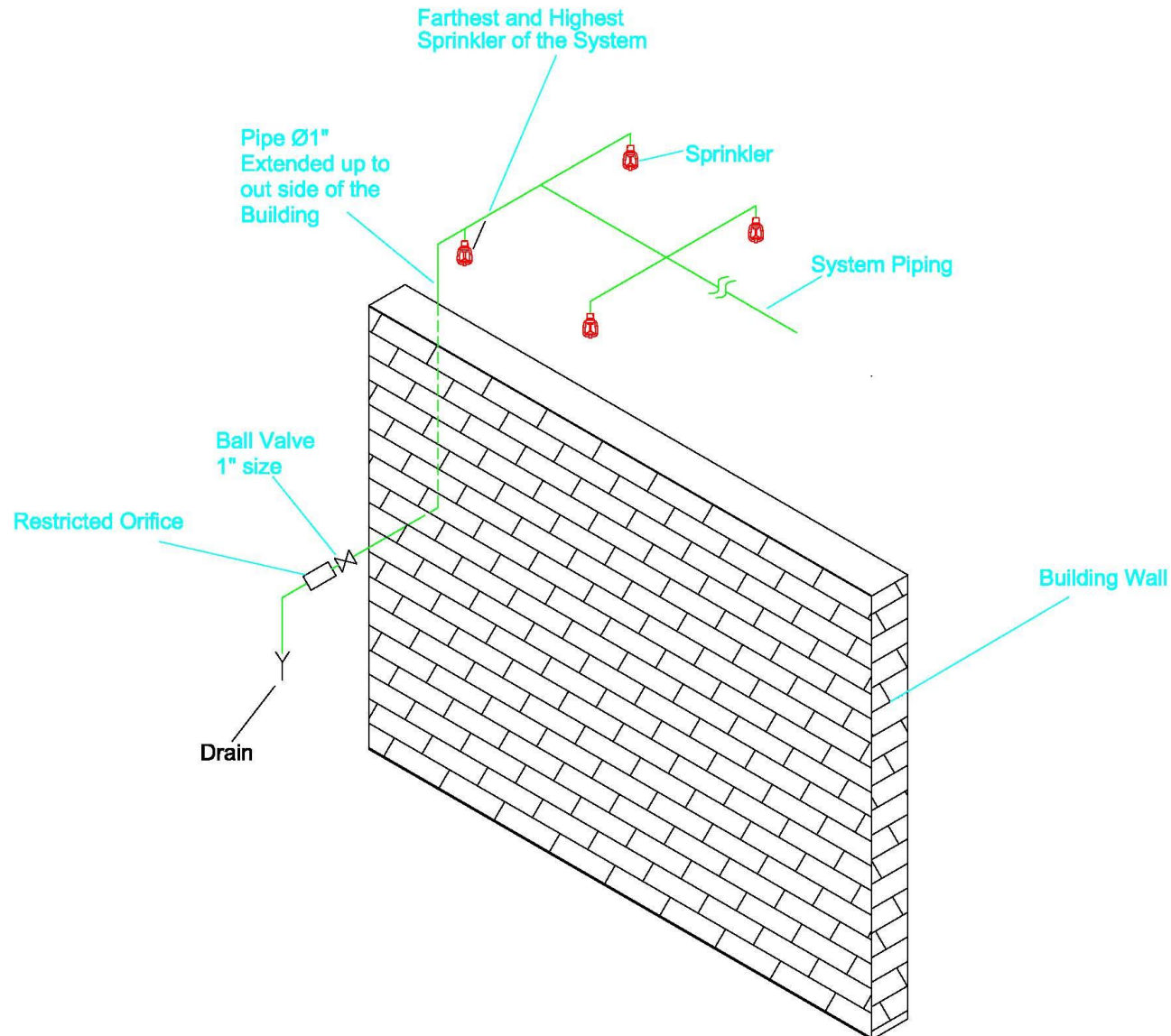
SYSTEM COMPONENTS



- Sprinklers
- Piping
- Fire Alarm Check Valve
- Water Motor Gong
- Retard Chamber
- Cut of Valves
- Inspector's Test Valve



Inspector's Test Valve

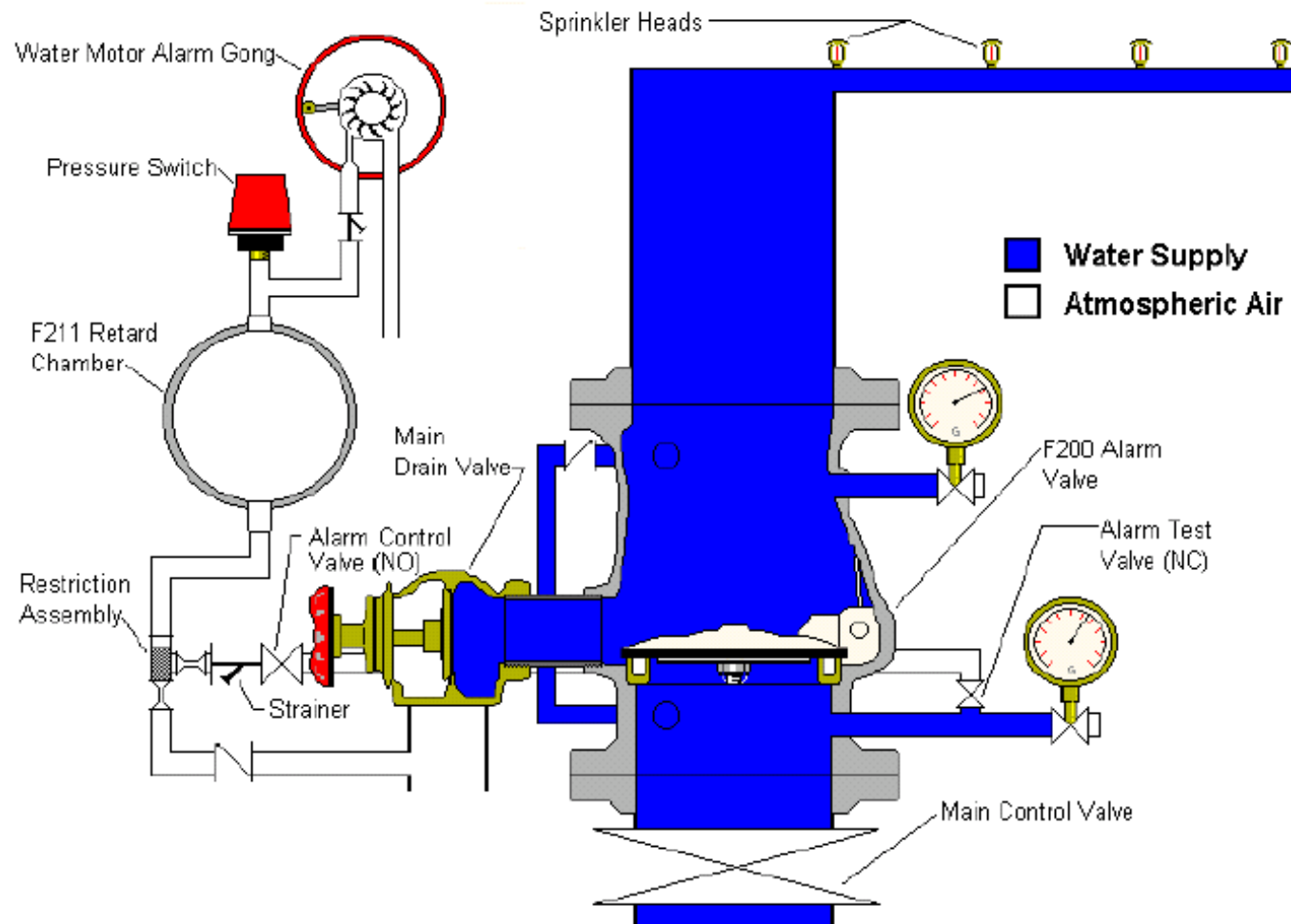


Operation of Sprinkler

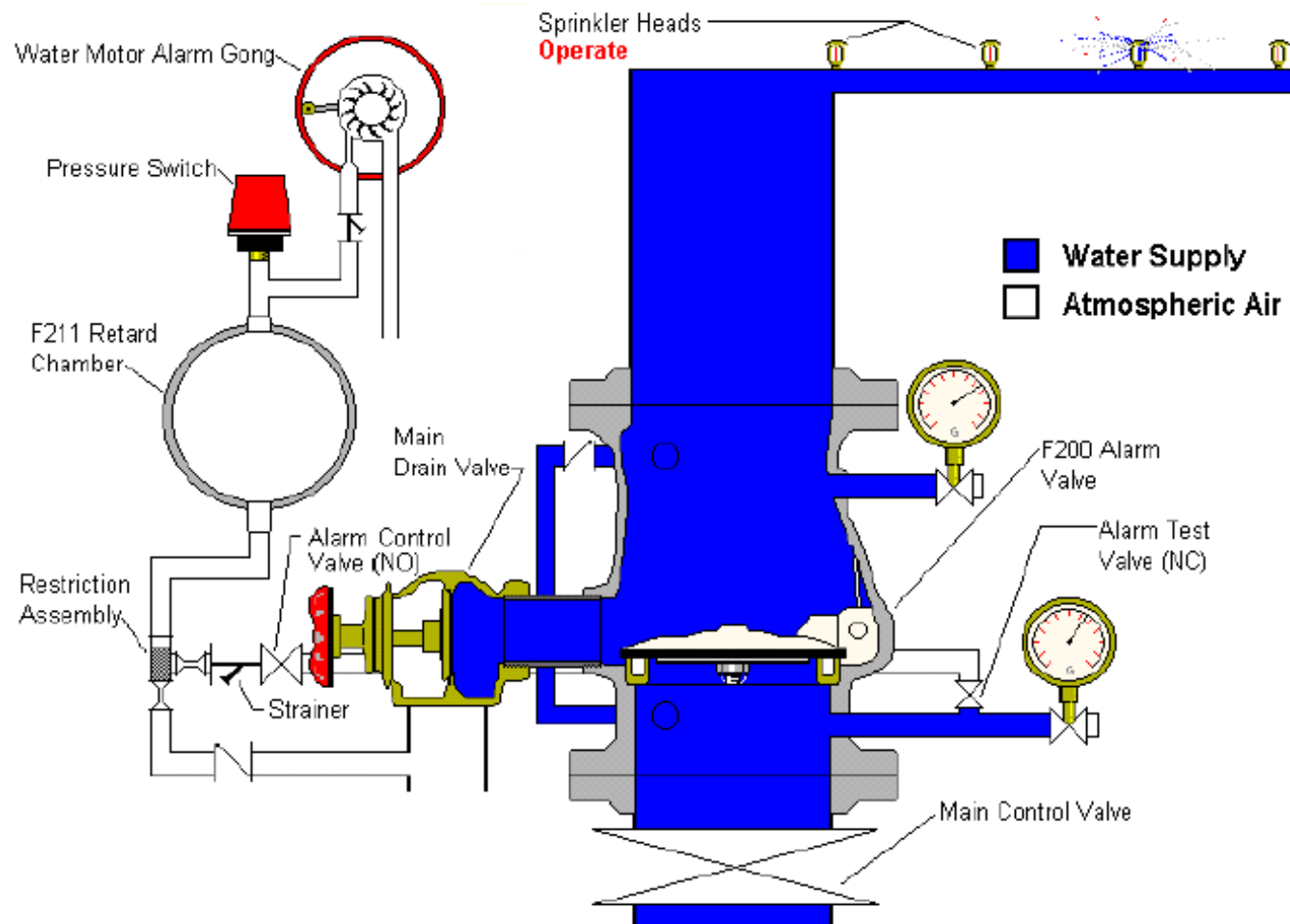




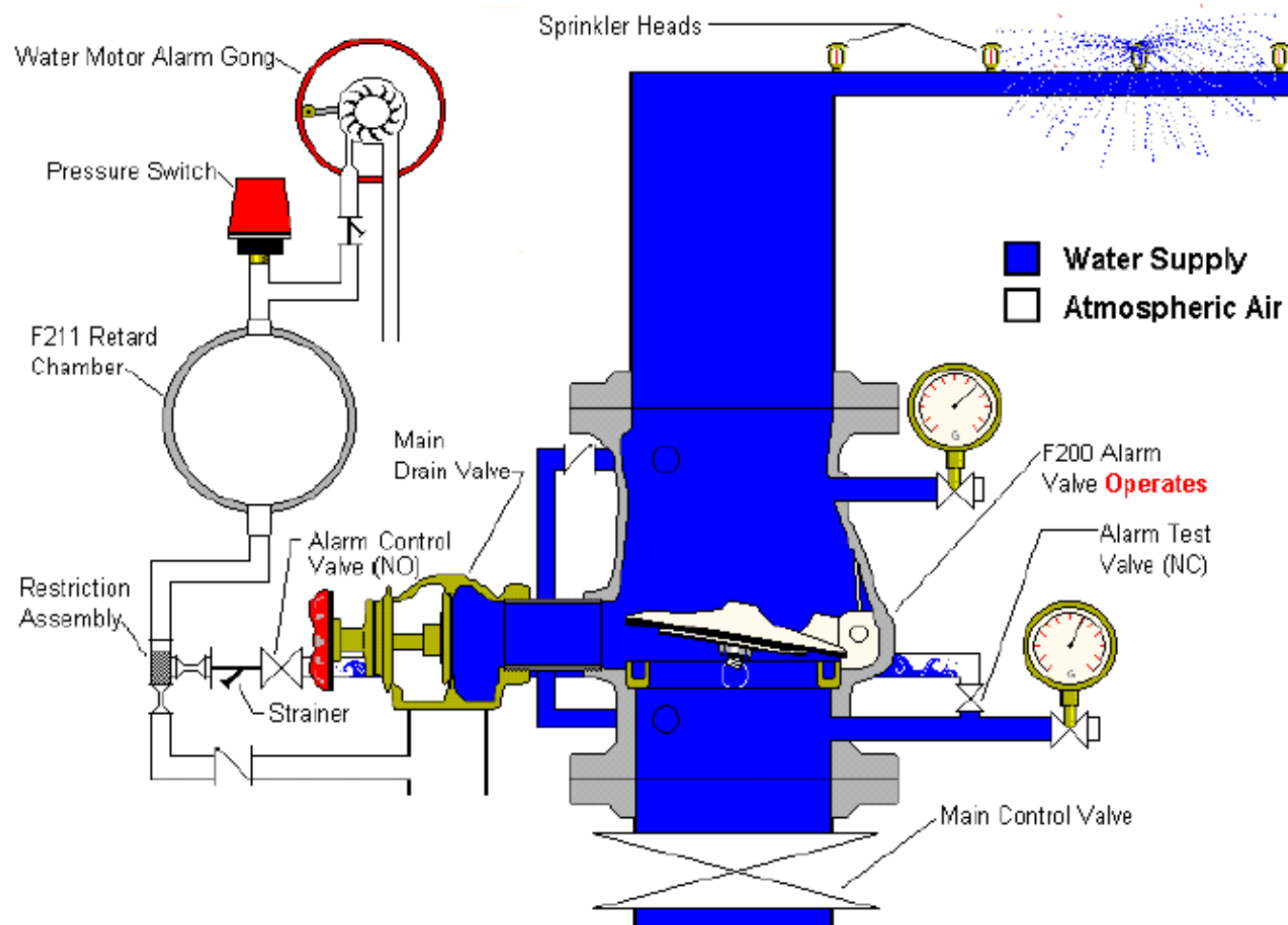
OPERATION OF FIRE ALARM CHECK VALVE



(1) System Normal



(2) Sprinkler Head Operates



(3) Valve Operates and Water Floods Trim

Color Coding of Sprinkler Bulbs



- Orange 57 °C
- Red 68 °C
- Yellow 79 °C
- Green 93 °C
- Blue 141 °C
- Mauve 182 °C
- Black 227 °C
- Black 260 °C



Requirement of Water Supply Duration

- **Light Hazard**

30 minutes backup

- **Ordinary Hazard**

60~90 minutes backup

- **Extra Hazard**

90~120 minutes backup



K-Factor

One PSI = Flow of water

$$Q = 29.37 \times d^2 \times \sqrt{P}$$

Q = Flow in US GPM

d = Internal diameter of nozzle

P = Pressure in PSI



THANK YOU

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