



# دبلوم تطبيقات التحكم الأوتوماتيكي في نظم القوى الميكانيكية

MEP 599 Diploma Design Project-Fall Term 2016/2017

## Design and Calculations of Plastics Factory Fire fighting System

by Eng. Mahmoud Nabil Abd-El Aziz Hala

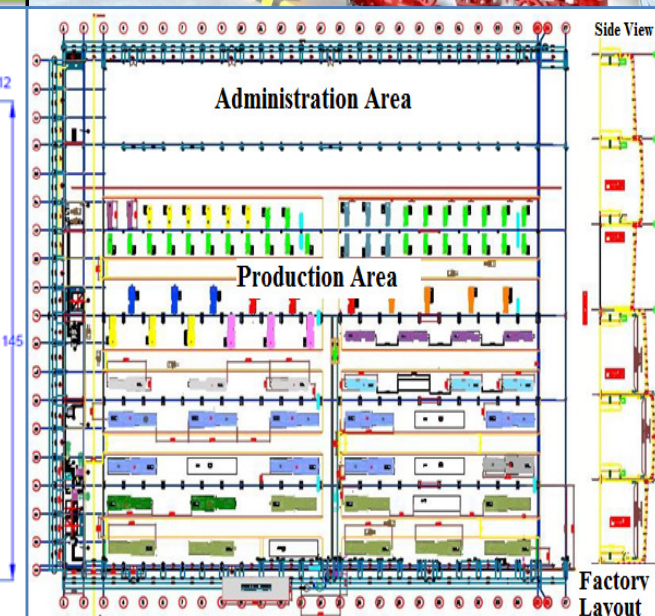
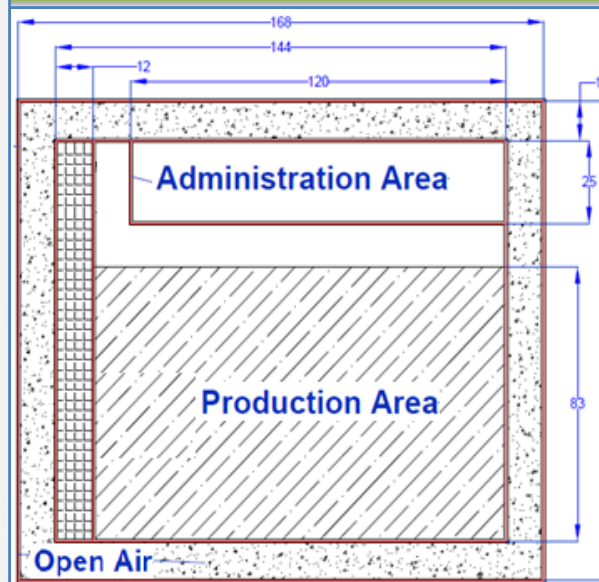
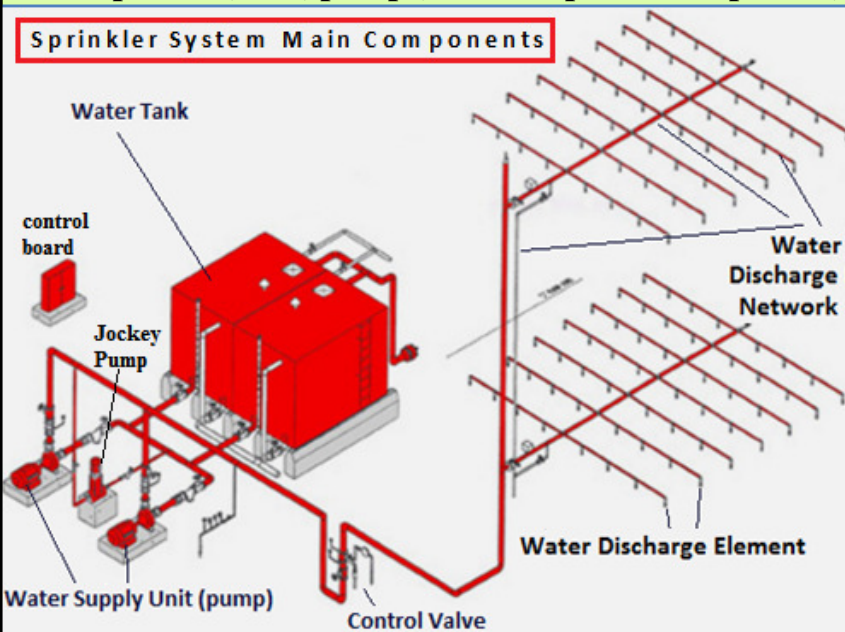
Supervised by

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**Abstract:** The project includes detailed design & calculations of wet-sprinklers fire suppression system for Plastics Factory which is a closed building structure to hold both the production & administration areas. Fire fighting system is to protect the plastic products, all production-line machines & existing people in both two areas from fire hazards & danger to life from effects of fire through the design of firefighting system, according to all the requirements of NFPA 13 & other relevant fire protection associations standards. The fire fighting system considered as a practical application of pipe line automatic control system that includes flow of water or other firefighting fluids from tanks /reservoirs to specific points to be protected from fire hazards. This Wet-Sprinklers are automatic control system which has many different types of elements & components, (i.e., pumps, fluid & power component, control elements, valves, fittings...etc).









### Sprinkler System Main Components

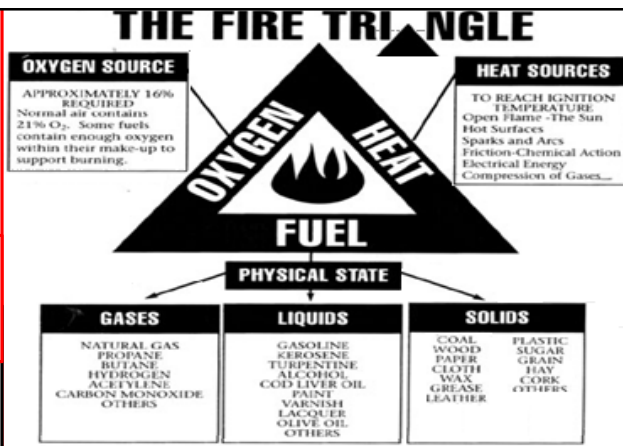
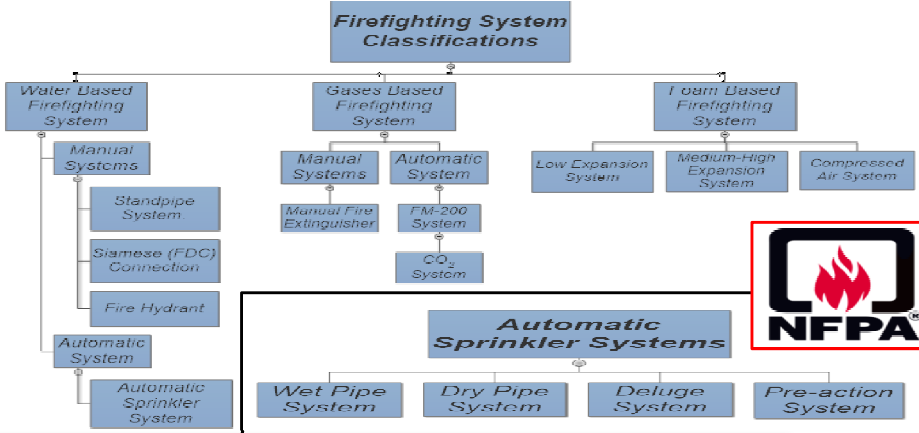




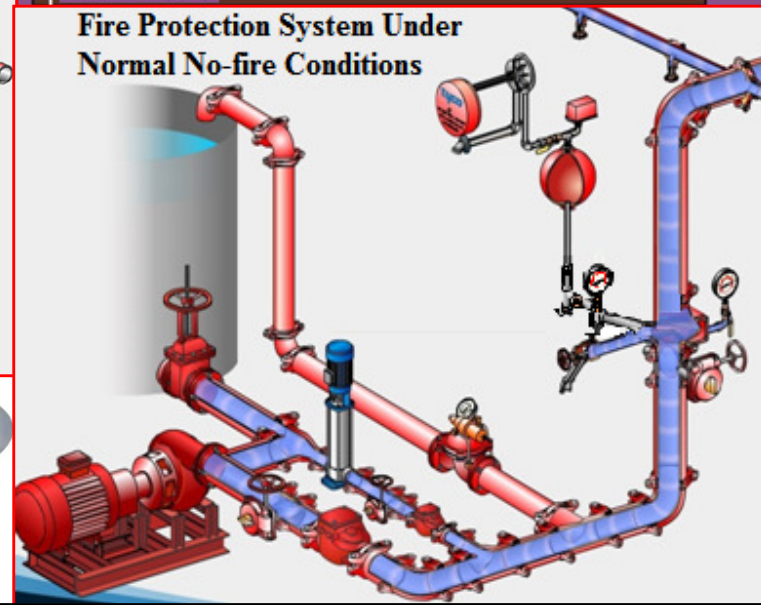
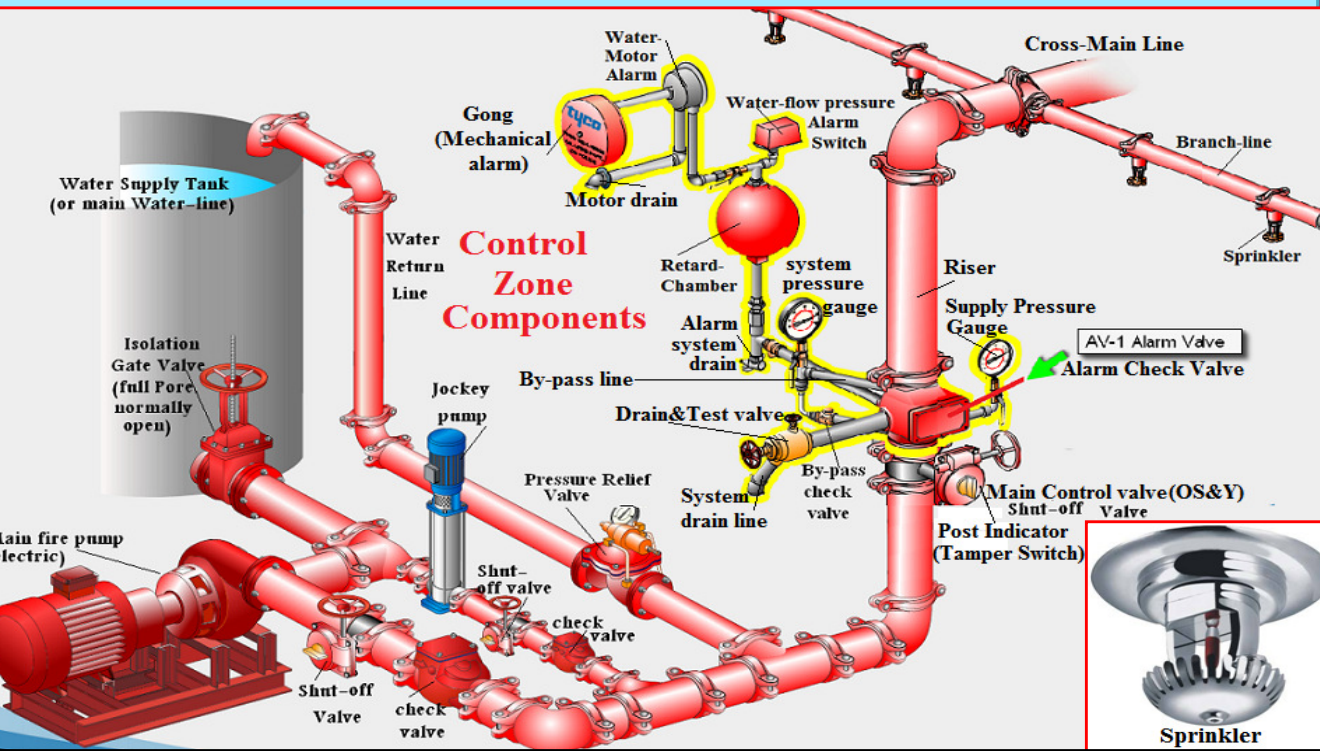
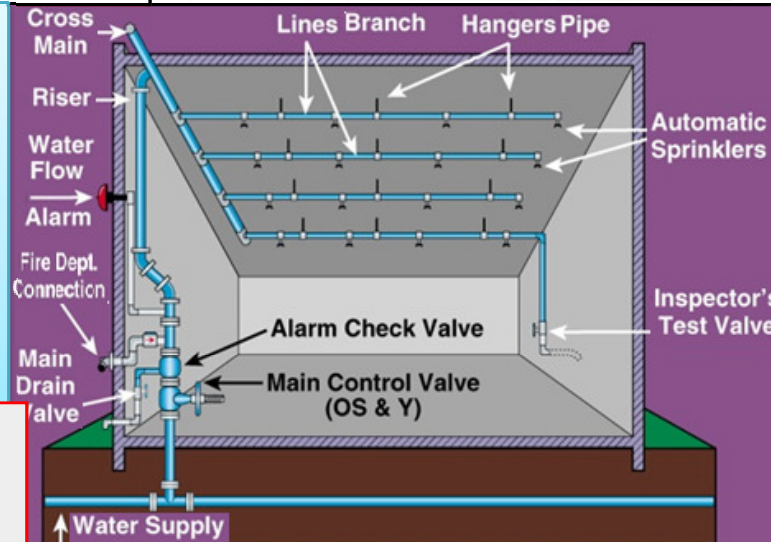
# Fire Classification

## Know How To Handle It

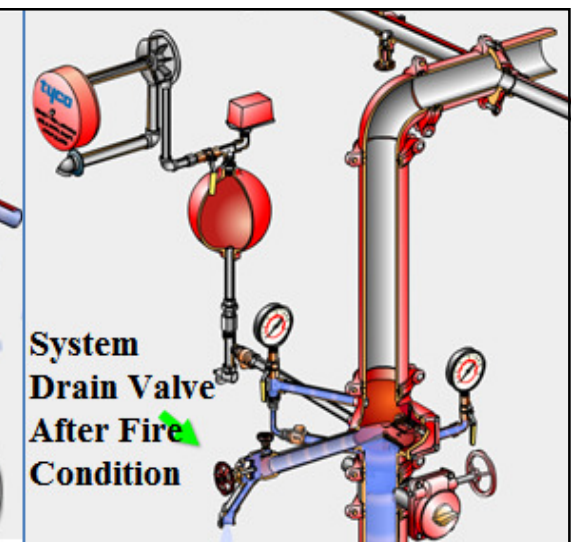
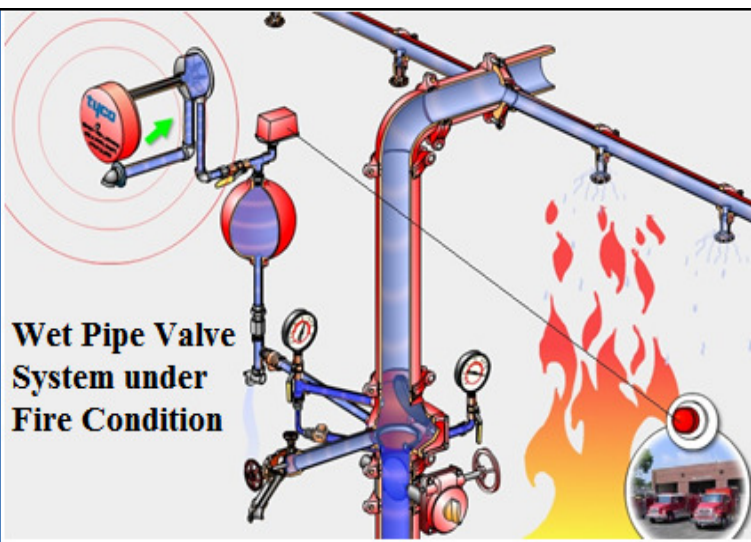
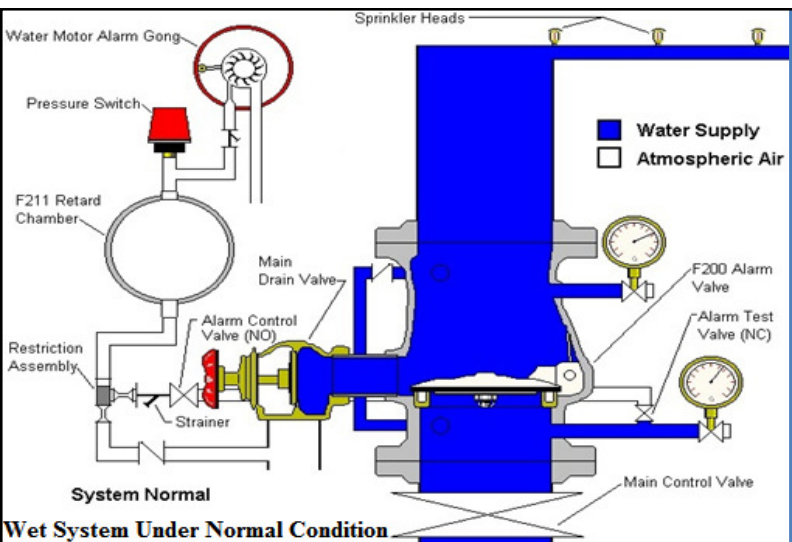
Class of Fire	Type of Fire	Picture Symbol	Extinguisher
<b>A</b>	Wood, paper, textiles, etc		Water Foam Spray ABC Dry Powder Class F Wet Chemical
<b>B</b>	Flammable Liquids		Foam Spray ABC Dry Powder
<b>C</b>	Flammable Gases		ABC Dry Powder
<b>D</b>	Metal		Class D Powder
<b>F</b>	Cooking Oil and Fat fires		Class F Wet Chemical
	Electrical		ABC Dry Powder Carbon Dioxide



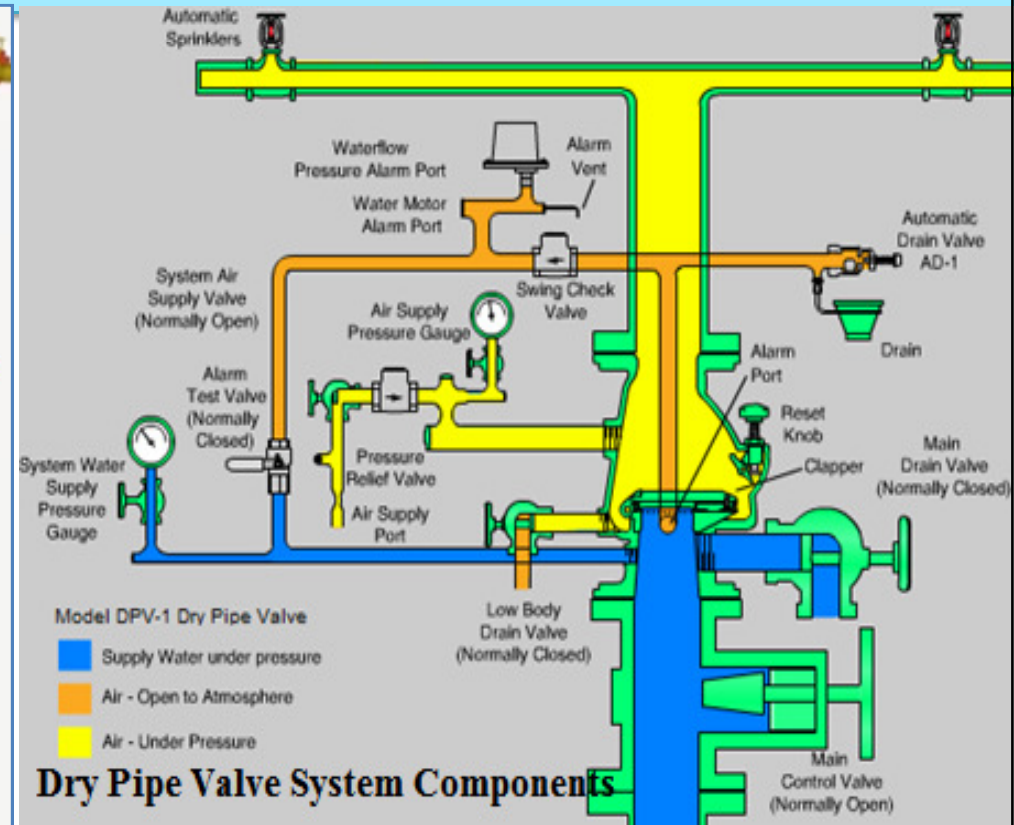
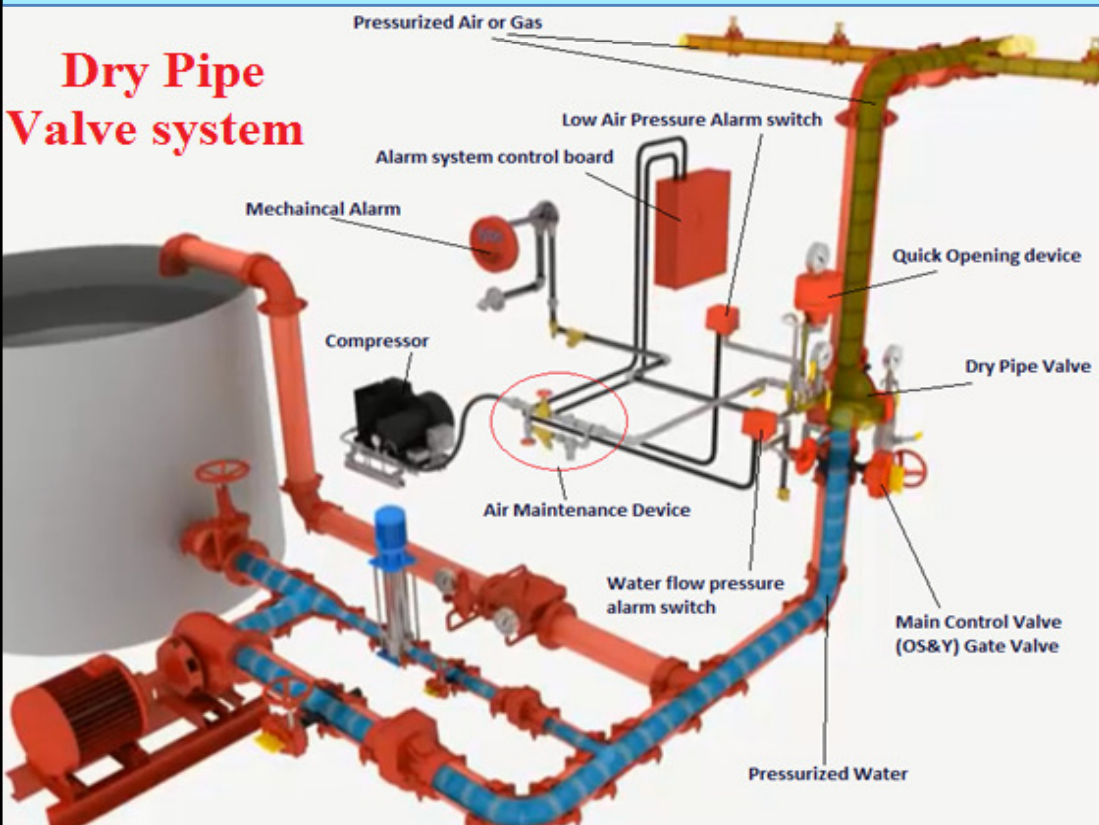
**Wet sprinkler system:** Water is used as the most commonly used fire fighting agent, mainly as it is widely available & inexpensive. It has very desirable good fire fighting characteristics such as high specific heat & high latent heat of vaporization. The wet pipe system is by far the simplest & most common type of sprinkler system. It consists of a network of piping containing water under a high pressure. The Automatic sprinklers are activated by the internal heat responsive elements/detectors connected to the piping such that each sprinkler protects an assigned floor area, usually an area specified by manufacturer. Application of heat to any sprinkler will cause that single sprinkler to operate, permitting water to discharge over its area of protection.



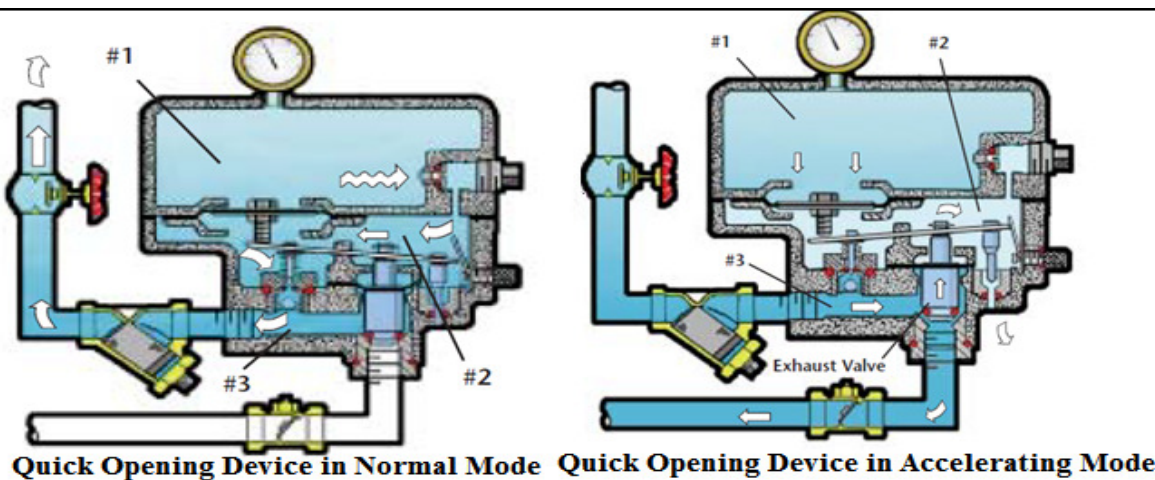




**Dry pipe sprinkler system:** it has sprinklers attached to piping system containing pressurized air or nitrogen, release of which (as from opening of a sprinkler) permits water pressure to open a dry pipe valve, and water flows into piping system & out opened sprinklers. When Sprinklers heads activities under fire conditions, air is exhausted through open head, allowing pressure drops & differential dry pipe valve to open and water to be admitted to piping. System has compressor to keep pressure level & Air maintenance devices and two pressure gauges one in the side of gas and other in the side of water . Pressure of gas shall be accordance of dry pipe valve datasheet.







Automatic Fire Sprinkler Bulb Operating Temperatures					
Sprinkler Color Coding					
57°C	68°C	79°C	93°C	141°C	182°C
135°F	155°F	175°F	200°F	286°F	360°F

