

# **APPLICATIONS IN COMMERCIAL INSTALLATIONS SHOPPING MALLS**

**HUSEYIN GUMRUKCU / 23.8.2017**



# **Malls: Changing people's shopping habits and social behaviors**

- **Especially last 20 years, Shopping Malls are already spreaded all around of World. As new economical attraction points and people's social collecting centers**
- **This fact is making malls very intensive environments by great human traffics**
- **And same time critically dangerous about many unwanted incidents**

# Fire is the most dangerous possible incident in malls. Examples:



**China 2013**



**Russia 2017**



**India 2016**



**Qatar 2012**



**Indonesia 2016**

**And with different sizes, reported roughly 100 more in last 10 years**

# **Fires in Malls: Threatening human safety and life. Together with reliability of property and business**

- **Reported more than 1.000 peoples' death worldwide in last 10 years of Mall Fires**
- **Billions of Dollars lost in business**

# **COMPLETE FIRE PROTECTION SYSTEMS IN SHOPPING MALLS**

**1. ARCHITECTURAL**

**2. ELECTOMECHANICAL AND AUTOMOTIONAL SYSTEMS**

**3. STABLE FIRE EXTINGUISHING SYSTEMS**

**4. SPECIFIC FIRE PROTECTION SYSTEMS**

# 1. ARCHITECTURAL

- Fire Escapes
- Staircases
- Directions Signs
- Fire Exits
- Heat and Smoke Ventilations
- Pressurizing, Smoke Exhausting and Breathing air supplies

**AIMS RAPID, HEALTHY  
AND SAFE EVACUATION**





# 2. ELECTROMECHANICAL AND AUTOMOTIONAL SYSTEMS

- **Smoke and Gas Detectors**
- **Flow Switches**
- **Complete Fire Alarm Systems**



- **Ionization type**
- **Photoelectric type**



- **Activates mechanically by waterflow.**
- **Indicates certain location of fire by sprinkler head's activation**

**PROVIDES DETECT AND INDICATE FIRE  
BESIDES FINDOUT THE LOCATION OF  
FIRE IN COMPLETE AREA**

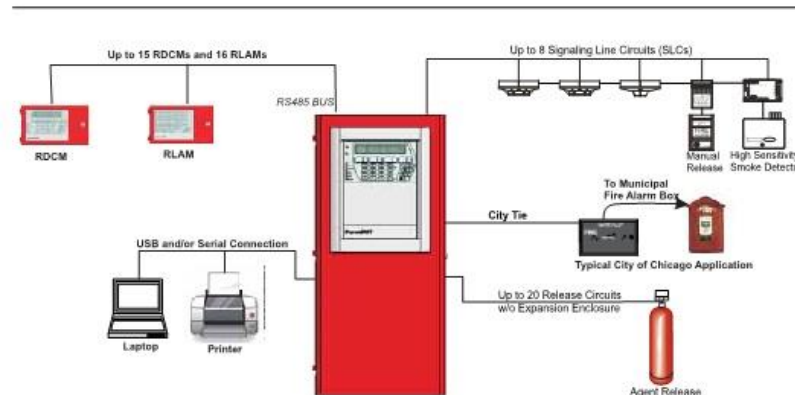


Figure 1. Typical System Configuration

- **Collects all mechanical and electronical signals in one automational panel.**
- **Activates and manage all: architectural, electomechanical, stable and specific fire sprinkler systems**

### **3. STABLE FIRE EXTINGUISHING SYSTEMS CODES FOR SHOPPING MALLS (NFPA)**

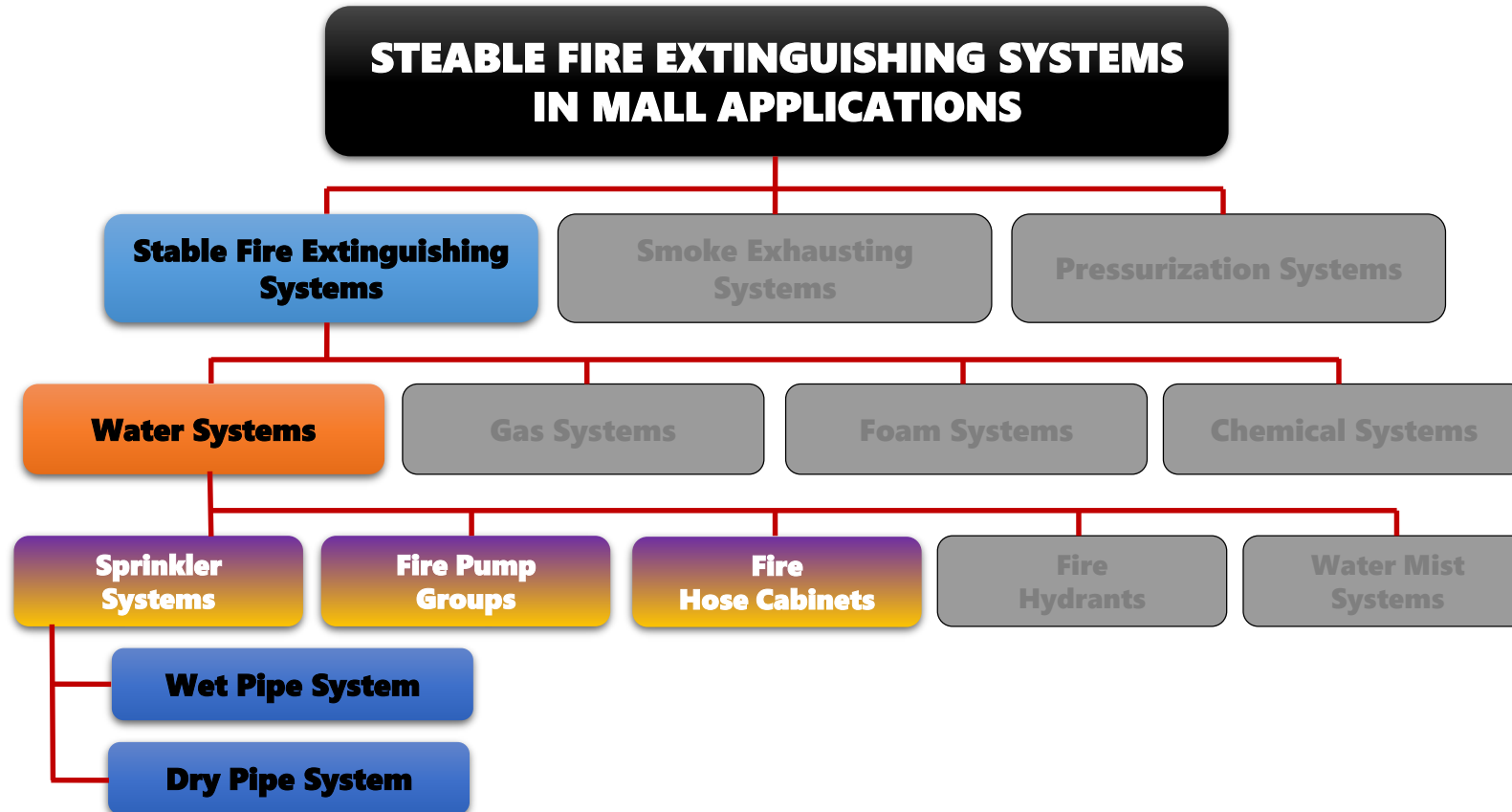
- ☐ **Non-Residential Buildings, taller than 30,50 m height**
- ☐ **Residential Buildings, taller than 51,50 m height or more than 17 floors**
- ☐ **Parking Areas, larger than 600 m<sup>2</sup>**
- ☐ **All Hotels, Motels and Guest Houses, if room qty is higher than 100 pcs or bed qty is higher than 200 pcs or if building is taller than 21,50 meters height**
- ☐ **Shopping, Trade, Office and Entertainment Facilities, larger than 2.000 m<sup>2</sup>**
- ☐ **Any Facilities Consist Easy Flammable Contents, larger than 1.000 m<sup>2</sup>**



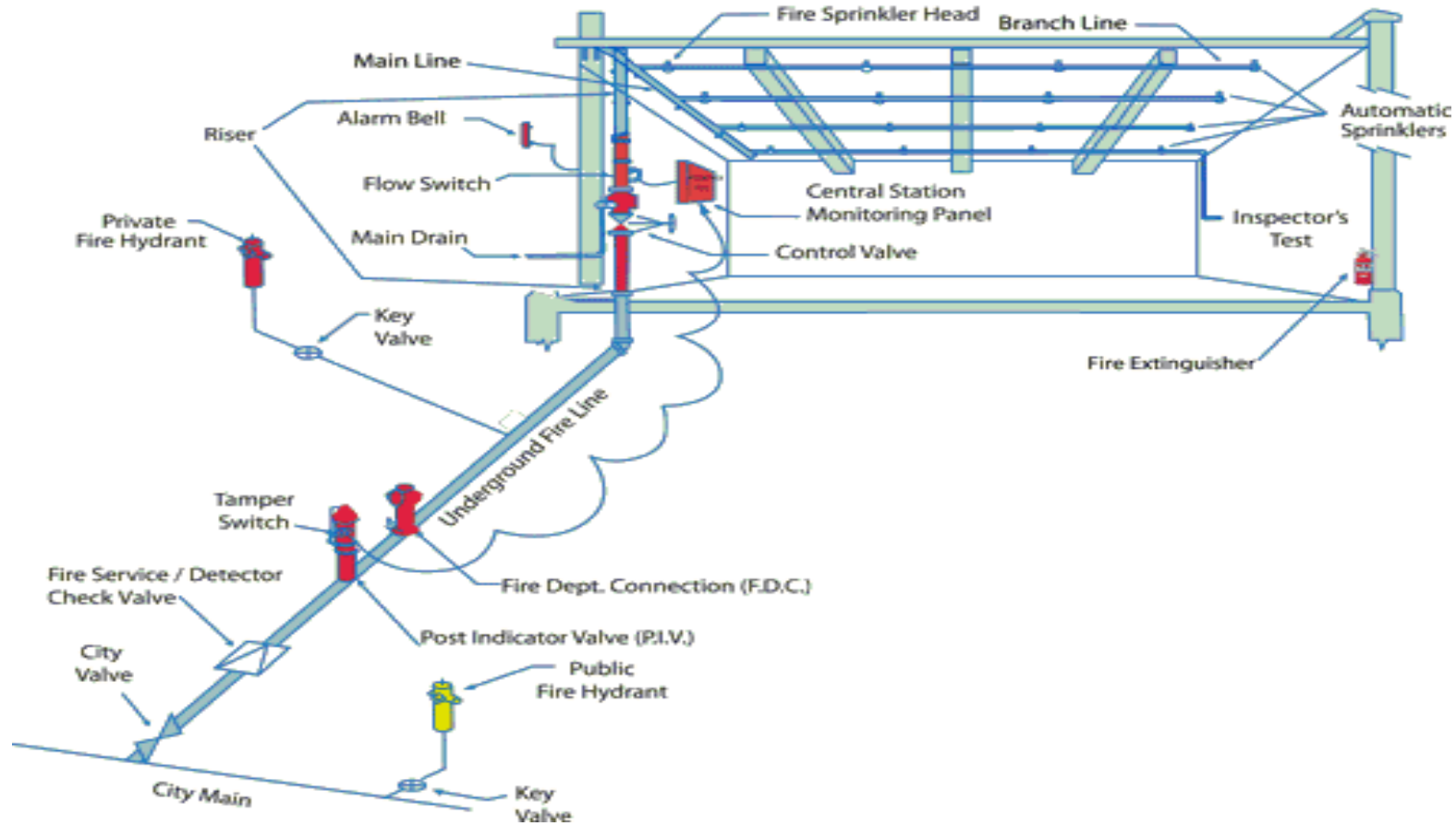
### **3. STABLE FIRE EXTINGUISHING SYSTEMS LIFE SAFETY CONSIDERATIONS**

- **No reported multiple deaths in a completely sprinkled building**
- **Life Safety is enhanced**
- **Combustion products are limited, with extinguishment in the incipient stage**
- **Controls 70% of all fires with five or fewer sprinklers activated**

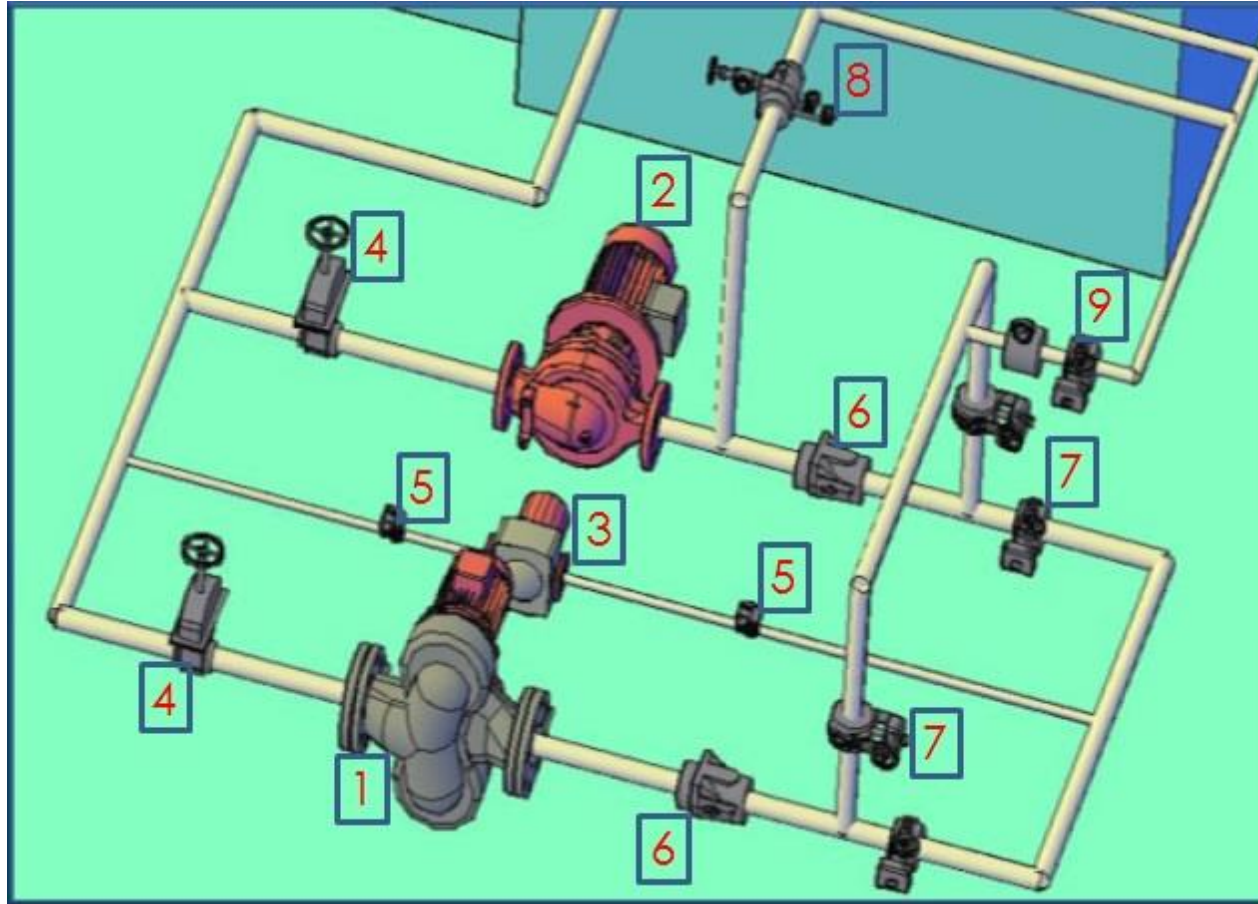
# 3. STABLE FIRE EXTINGUISHING SYSTEMS



# WATER SYSTEM COMPONENTS

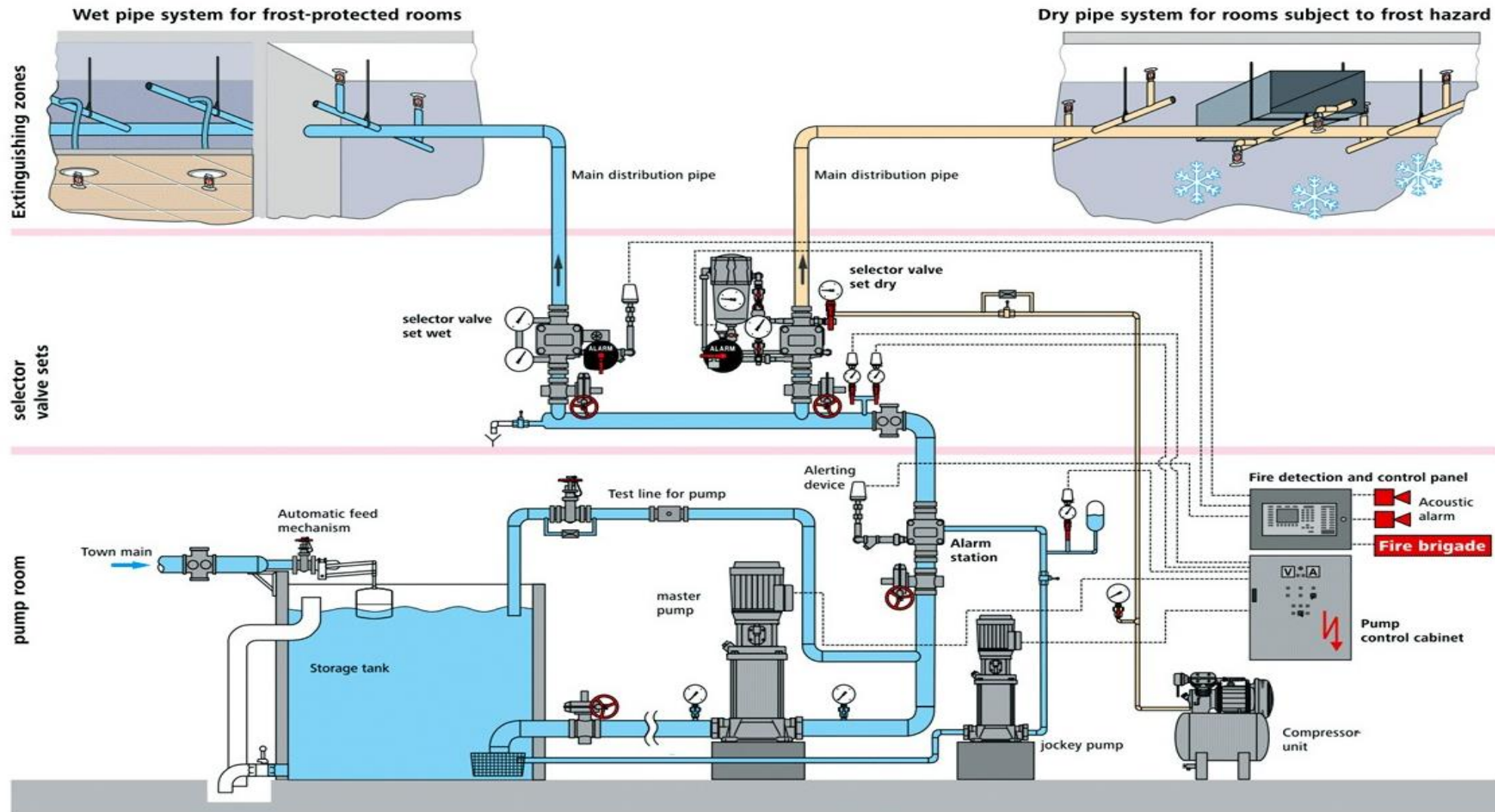


# FIRE PUMP GROUPS

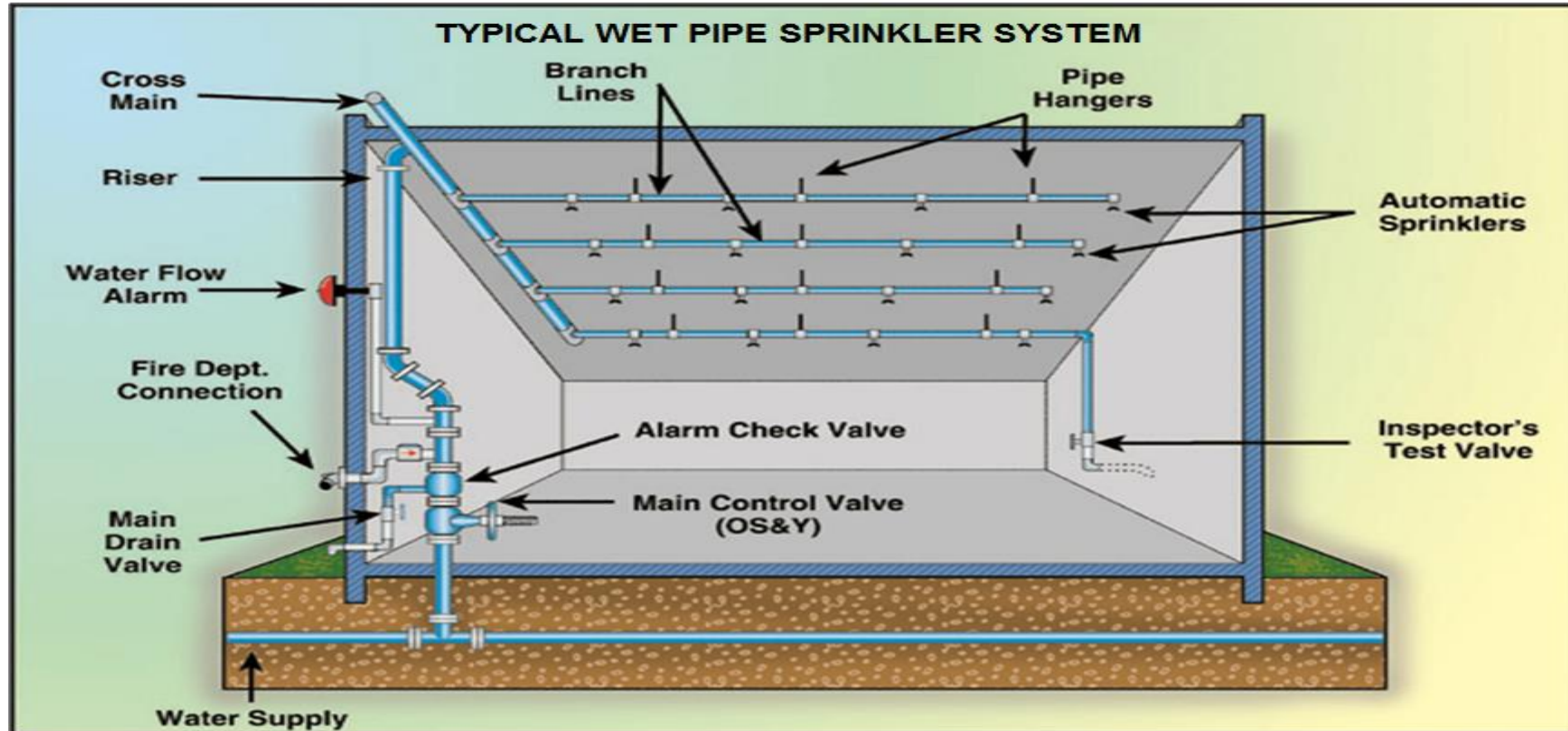


1. **Electrical Pump**
2. **Diesel Pump**
3. **Secondary Pump**
4. **OS&Y Gate Valve**
5. **Ball Valve**
6. **Non-Return Valve**
7. **Butterfly Valve With Damper Switch**
8. **Relief Valve**
9. **Flow Meter**

# HYBRID: WET AND DRY SYSTEMS TOGETHER



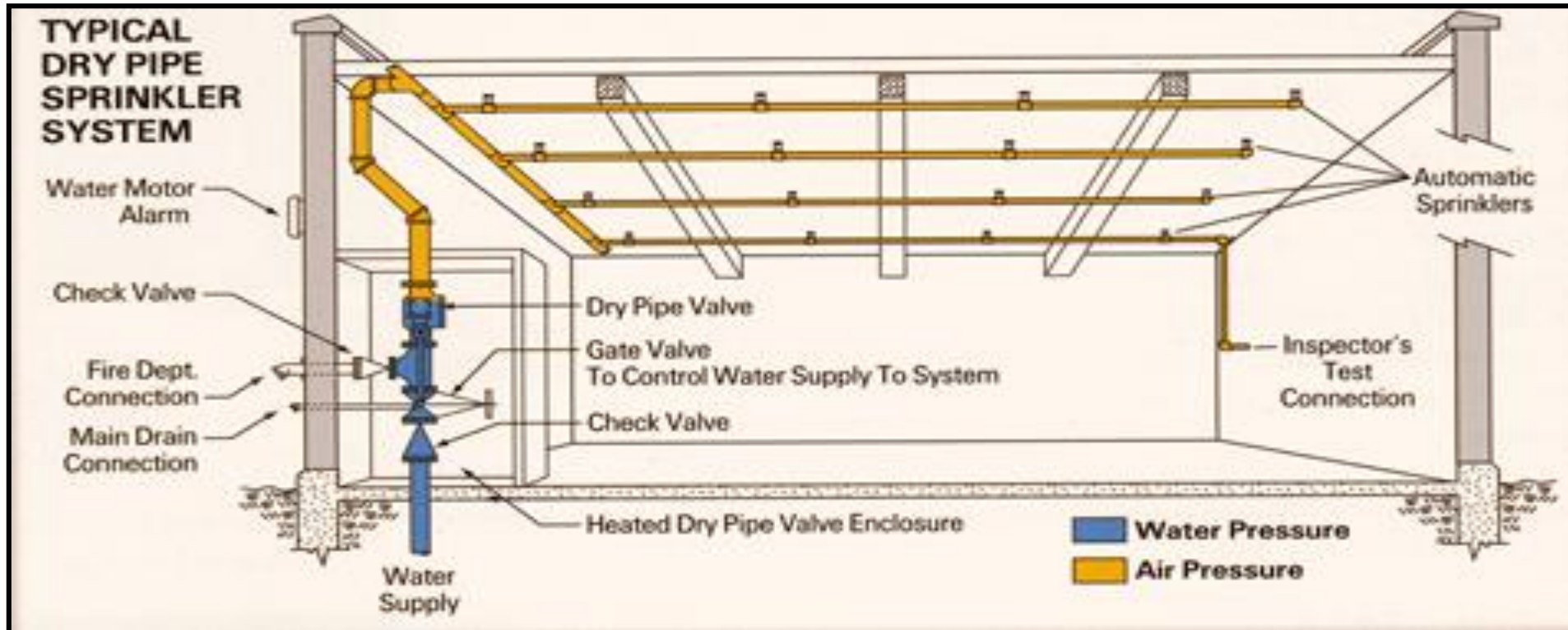
# TYPICAL WET PIPE SPRINKLER SYSTEM



**An opening sprinkler head triggers the system**



# TYPICAL DRY PIPE SPRINKLER SYSTEM



**Pipes in protected space are filled with air or inert gas; an opening sprinkler head, triggers the system by releasing the air or gas, which allows water to flow into the pipes and then out through the open sprinkler head**



# FIRE DEPARTMENT CONNECTIONS

- **allows FD to pump supplemental water**
- **shall be visible and recognizable**
- **located and arranged so that hose lines can be attached without interference**
- **min size of fittings 2 ½" (DN 65)**
- **shall not be less than 18" (46 cm) or more than 48" (120 cm) above grade**
- **have a sign with at least 1" letters that read "AUTO SPRINKLER"**



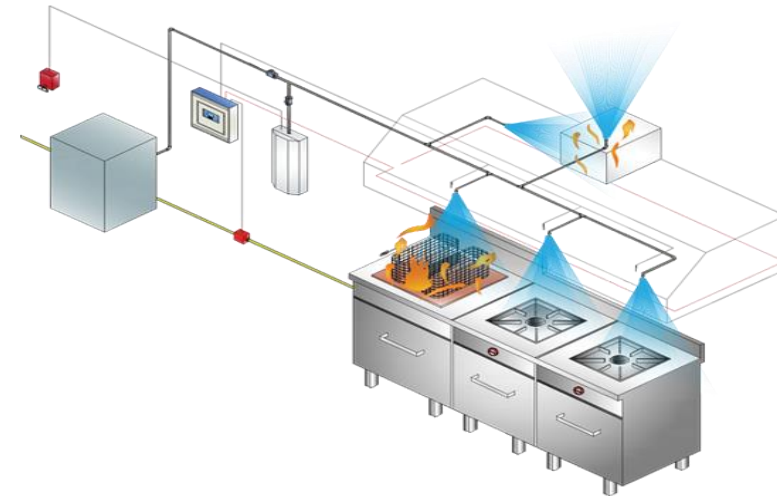
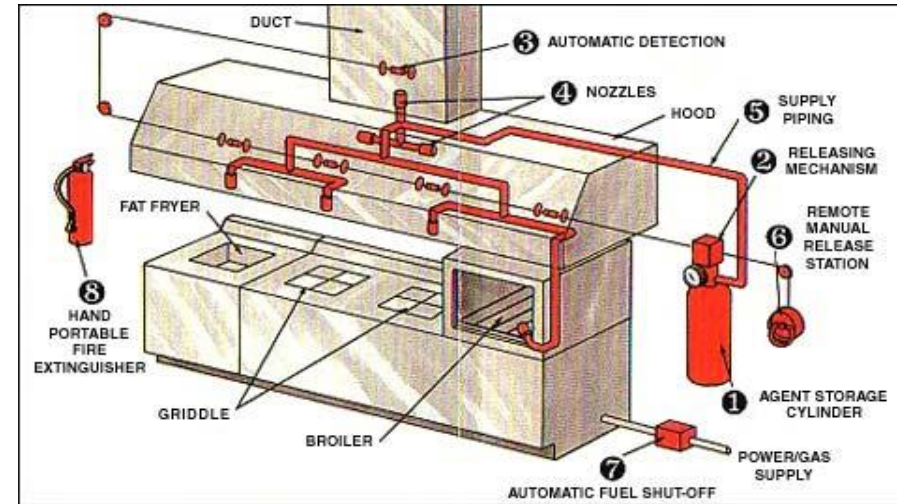
# FIRE HOSE CABINETS

- **Necessary to use in;**
- **High buildings**
- **Non-Residential buildings bigger than 1.000 m<sup>2</sup>**
- **All buildings bigger than 2.000 m<sup>2</sup>**
- **Fire Hose Cabinets should be installed in every floors or the areas seperated with fire walls and not more far than 30 meters from each other**



# 4. SPECIFIC FIRE PROTECTION SYSTEMS: KITCHEN FIRE SUPPRESSION SYSTEMS

- **Food Courts** are one of the most common fire starting source in mall fires
- An intelligent Kitchen fire suppression system must be required
- System should be interfaced with Complete Fire Alarm System that in case of fire, provides safe evacuation



# KEY POINTS: PARKING AREAS



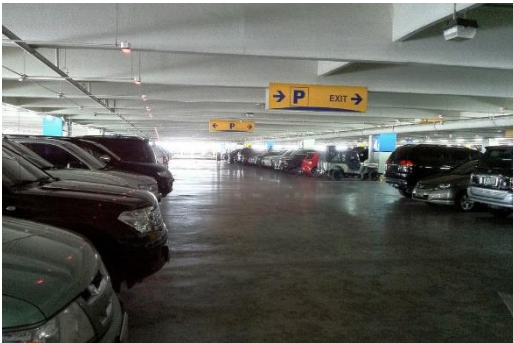
## FULL-OPEN, OUTER PARKING AREAS

- Should be considered **low hazard**
- Should be equipped with hydrants according codes



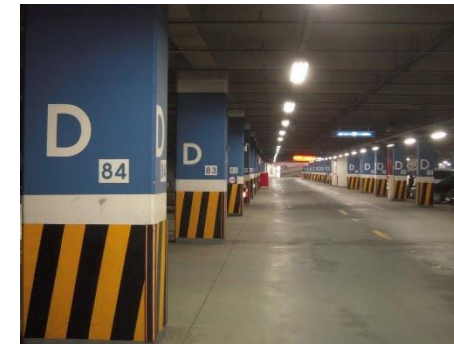
## HALF-OPEN, OUTER PARKING AREAS (MULTIFLOOR)

- Should be considered **medium hazard**
- Should be equipped with dry pipe sprinkler systems, fire cabinets and hydrants according codes



## INTERNAL PARKING AREAS (SINGLE FLOOR)

- Should be considered **medium hazard**
- Should be equipped with wet or dry pipe sprinkler systems and fire cabinets according codes
- Evacuation system must be well planned and applied



## INTERNAL PARKING AREAS (MULTI FLOOR)

- Should be considered **high hazard**
- Should be equipped with wet or dry pipe sprinkler systems and fire cabinets according codes
- Evacuation system must be well planned and applied



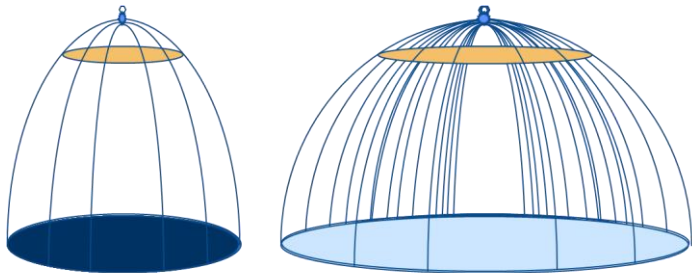
# KEY POINTS: HIGHER CEILING HEIGHTS



**Modern Architect is  
designing higher and higher  
ceiling heights**

**That is providing more  
beautiful and comfortable  
environments**

**But That is a blind point for  
fire protection applications**



Standard Spray

Extended Coverage

## OUT OF STANDARD SPRINKLER APPLICATIONS



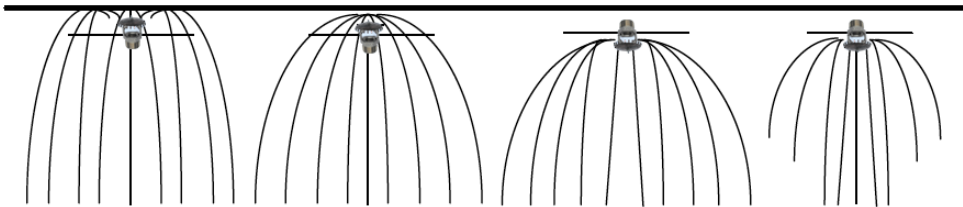
Extra Large  
Orifice



Extended  
Coverage



ESFR



Traditional Upright  
Sprays up - wets ceiling first

Modern Upright  
Sprays up, but water falls radially down

Standard Pendant  
Sprays down; water falls down

Early Suppression  
Fast Response  
Similar to Standard pendant  
but most water is localized  
directly below - used where  
fire source grows quickly.

# KEY POINTS: COMPLICATED ARCHITECTS



**Another issue of shopping malls architect is to be complicated**

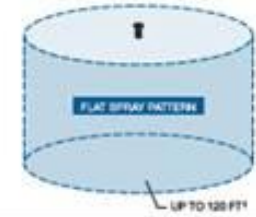
**Especially in Project stage, stable fire extinguishing systems designs must be considered according complicated architect**



## Sprinkler Spray Patterns



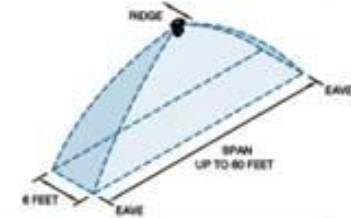
AP -Attic Plus



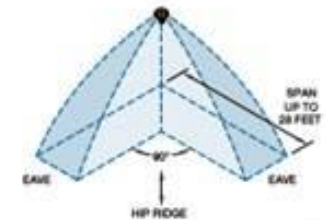
UP TO 120 FEET



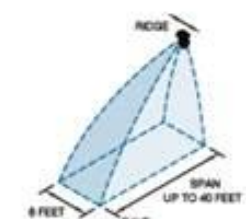
BB -Back to Back



HIP



SD -Single Direction



**THANK YOU FOR YOUR  
PARTICIPATION**

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