FUNDAMENTALS of FIRE SUBMITTAL REVIEW

LEARNING OBJECTIVES

- ❑Able to identify the referenced standards applicable to fire plan submittal
- ❑Able to understand basic submittal review and document review comments
- ❑Understand the section of the code applicable to fire plan submittal review and how to tell what section govern if conflicts exist

CONFLICTS STANDARD VERSUS CODE

- ❑Reference IFC 102.10
- ❑General versus specific requirement
- ❑Specific provision shall be applicable

PERMITS

- ❑Multiple permits
- ❑Emergency repairs
- ❑Annual permit
- ❑Refusal to issue permit
- ❑Time limitation
- ❑UCC provisions
- ❑Posting the permit

PERMITS

- ❑Validity of permit
- ❑Submittals
  - Form required by Fire Code Official
- ❑Information on construction drawings
- ❑Fire protection shop drawings – Chapter 9
- ❑Applicant responsibility
- ❑Approved documents

PERMITS

- ❑Phased approval
- ❑Amended construction documents
- ❑Retention of construction documents

REVOCATION

- ❑Used at location other than issued address
- ❑Conditions or activity other than scope of permitted work
- ❑Conditions and limitations set in permit have been violated
- ❑False statements, misrepresentation
- ❑Permit used by different party
- ❑Permit holder failed, refused or neglected to comply with orders/notices duly served
- ❑Permit issued in error of code, ordinance or regulation

SUBMITTALS

- ❑Permit application
- ❑Permit fees
- ❑Stamped drawings
- ❑Manufacturer data sheets

COMMON PITFALLS

- ❑Incorrect references to standard edition
- ❑Scope of permit
- ❑Lack of details in submittals
- ❑Under construction and deferred submittals code changes

TYPES OF FIRE SUBMITTALS

- ❑Fire alarm systems
- ❑Sprinkler systems
- ❑Standpipe systems
- ❑Fire pumps
- ❑Alternative Automatic Fire-Extinguishing Systems
- ❑Emergency Responder Coverage Enhancement Systems (ERCES)
- ❑Stairwell/elevator hoistway pressurization

FIRE ALARM SYSTEMS

- ❑Reference IBC/IFC Section 907
- ❑Reference NFPA 72 – National Fire Alarm and Signaling Code
- ❑Driven by occupancy classification and/or occupant loads

FIRE ALARM SYSTEMS

- ❑Types of coverage
  - Total, selective, partial
- ❑Type of fire alarm systems
  - Automatic smoke detection
  - Manual pull
  - Supervision of fire protection systems
- ❑Dedicated function fire alarm system
  - Elevator recall
  - HVAC shutdown
- ❑Temporal vs. Emergency voice alarm evacuation

FIRE ALARM SYSTEMS

- ❑Name of protected premise
- ❑Name of installer
- ❑Stamped shop drawings
- ❑Field modifications – As-built drawings
- ❑Location of protected premise
- ❑Device legend - symbols in accordance with NFPA 170
- ❑Floor plans

FIRE ALARM SYSTEMS

- ❑Walls within 15% of ceiling height
- ❑Room descriptions
- ❑System device/components
- ❑Location of fire alarm primary power D/C
- ❑Location of monitor/control interfaces to other systems
- ❑System riser locations

FIRE ALARM SYSTEMS

- ❑Type and number of system components on each circuit, each floor
- ❑Type and quantity of conductors and conduit
- ❑Ceilings over 10 in height identified
- ❑Ceiling geometries
- ❑Acoustical properties of spaces

FIRE ALARM SYSTEMS

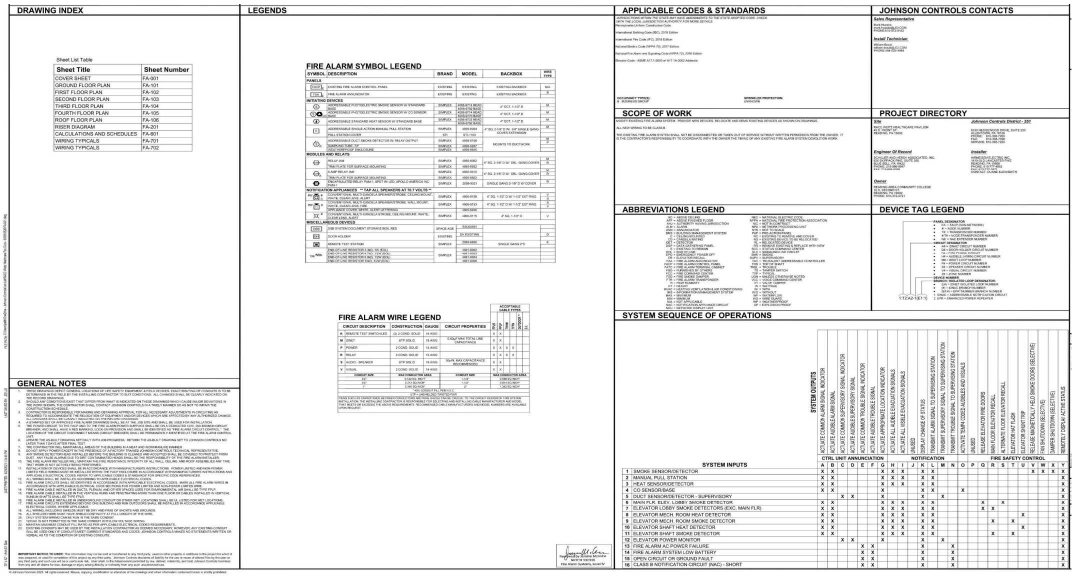
- ❑Control Unit Diagram
  - Identification of control unit
  - Location of control equipment
  - All field wiring terminals and terminal IDs
  - All circuits connected to field wiring, terminals and circuit IDs
  - Field connections to supervising station
    - Releasing equipment
    - Emergency safety control interfaces

FIRE ALARM SYSTEMS

- Riser Diagram
  - General arrangement of system in building cross-section
  - Number of risers
  - Type & number of circuits in each circuit and riser
  - Number of conductors for each circuit

FIRE ALARM SYSTEMS

- Wiring diagrams
  - Initiating devices
  - Notification appliances
  - Remote indicators
  - Annunciators
  - Remote test stations
  - End-of-line
  - Power supervisory devices



FIRE ALARM SYSTEMS

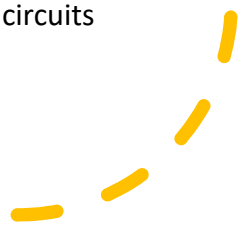
- Notification
  - Temporal vs. Emergency voice alarm evacuation
  - Public vs. private mode
  - Visual and audible notification
  - Sleeping rooms
  - Sound level over ambient
  - Projected loss through door types

FIRE ALARM SYSTEMS

- ❑Notification (continued)
  - Installed per listing
  - Wall mounted or ceiling mounted
  - Candela and dBa
  - Spacing

FIRE ALARM SYSTEMS

- ❑Calculations
  - Battery calculations
    - Alarm and nonalarm (Quiescent)
    - Temporal vs. Voice
- ❑Emergency power
- ❑Voltage drops
  - Voltage calculated for notification circuits



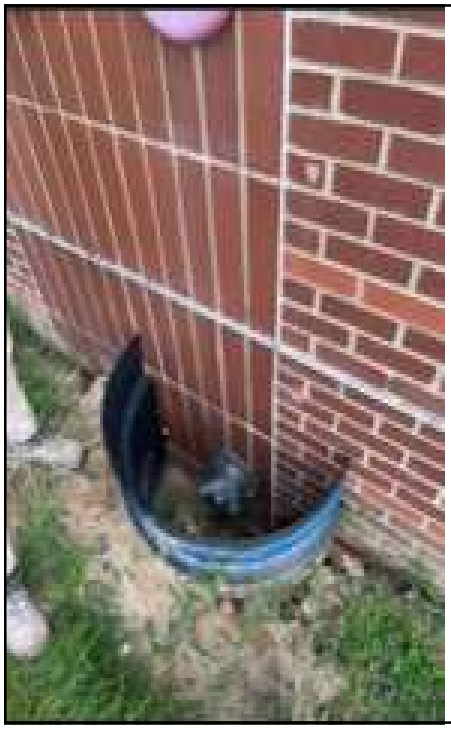
FIRE ALARM SYSTEMS

- ❑Supervision
  - Remote
  - Central Station
  - Proprietary
  - Local
- ❑ Method of communication
  - Telephone
  - Cellular
  - Internet protocol (IP)
  - Radio mesh

FIRE ALARM SYSTEMS

- ❑Other supervised functions
  - Suppression systems
  - Elevator recall
  - HVAC shutdowns
  - Door release

WHAT IF A DEFFERED SUBMITTAL IS SUBMITTED IN THE MIDDLE OF A CODE CYCLE CHANGE?



WATER BASED GENERAL

- ❑Location of FDC
- ❑Thread specification
- ❑Location

SPRINKLER SYSTEMS

- ❑Reference IBC/IFC Section 903
- ❑Reference NFPA 13, NFPA 13R or NFPA 13D
- ❑Height and Area charts specify certain types of sprinkler systems

SPRINKLER SYSTEMS

- ❑Wet system
- ❑Dry system
- ❑Deluge System
- ❑Pre-action System

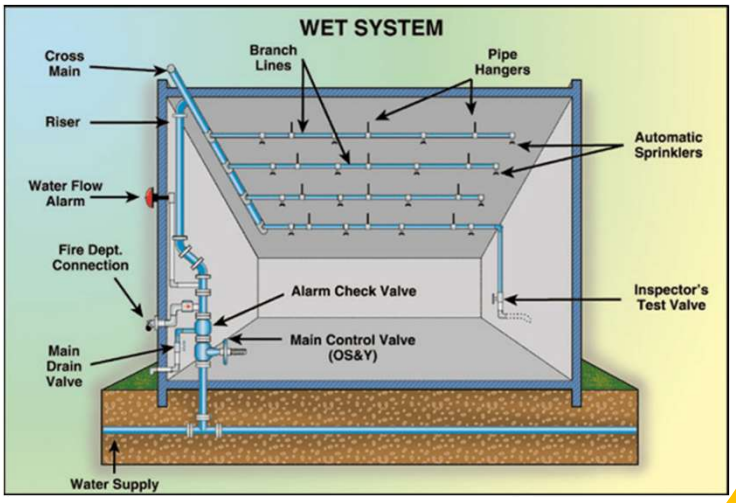
SPRINKLER SYSTEMS

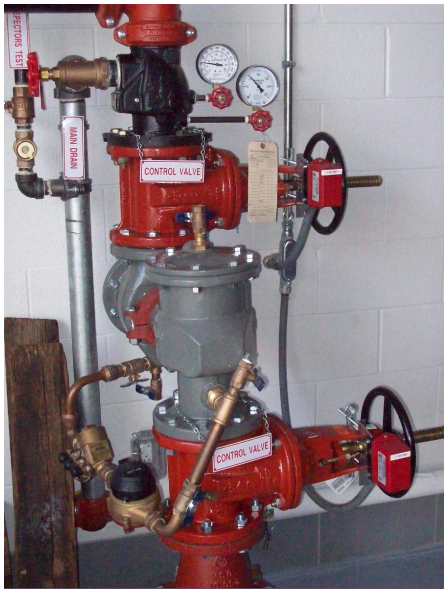
- ❑Stamped plans
- ❑Manufacturer data sheets
- ❑Riser diagrams
- ❑Hydraulic calculations

SPRINKLER SYSTEMS

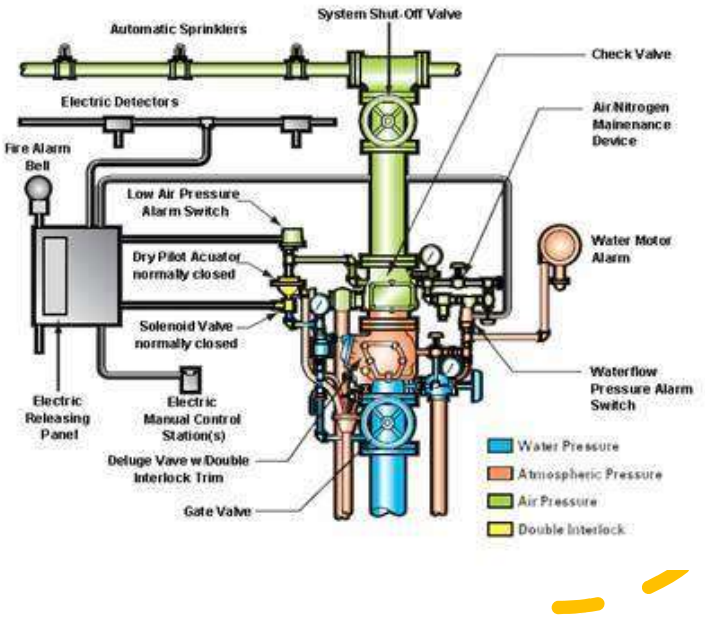
- ❑Current water flow test
- ❑Drawings
  - Exterior notification
  - FDC location
  - Signage
- ❑Type of system
- ❑Hazard classification

WET SYSTEM


WET SYSTEM
Cross Main
Branch Lines
Pipe Hangers
Riser
Automatic Sprinklers
Water Flow Alarm
Fire Dept. Connection
Alarm Check Valve
Inspector's Test Valve
Main Drain Valve
Main Control Valve (OS&Y)
Water Supply


INSPECTORS TEST
MAIN DRAIN
CONTROL VALVE
CONTROL VALVE

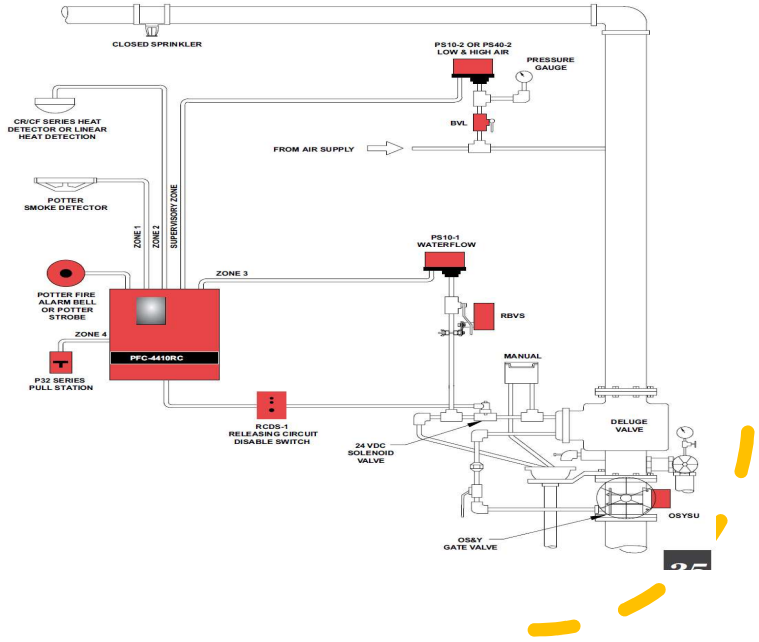
DRY SYSTEM


Automatic Sprinklers
System Shut-Off Valve
Check Valve
Electric Detectors
Air/Nitrogen Mainenance Device
Fire Alarm Bell
Low Air Pressure Alarm Switch
Water Motor Alarm
Dry Pilot Acuator normally closed
Solenoid Valve normally closed
Waterflow Pressure Alarm Switch
Electric Releasing Panel
Electric Manual Control Station(s)
Deluge Vave w/Double Interlock Trim
Gate Valve
Water Pressure
Atmospheric Pressure
Air Pressure
Double Interlock


Por Favor
No colocar
Nada sobre
esta Valbula
Gracias
Please
Dont Put
NoThi
here
GENERAL

DELUGE SYSTEM

PRE-ACTION SYSTEM



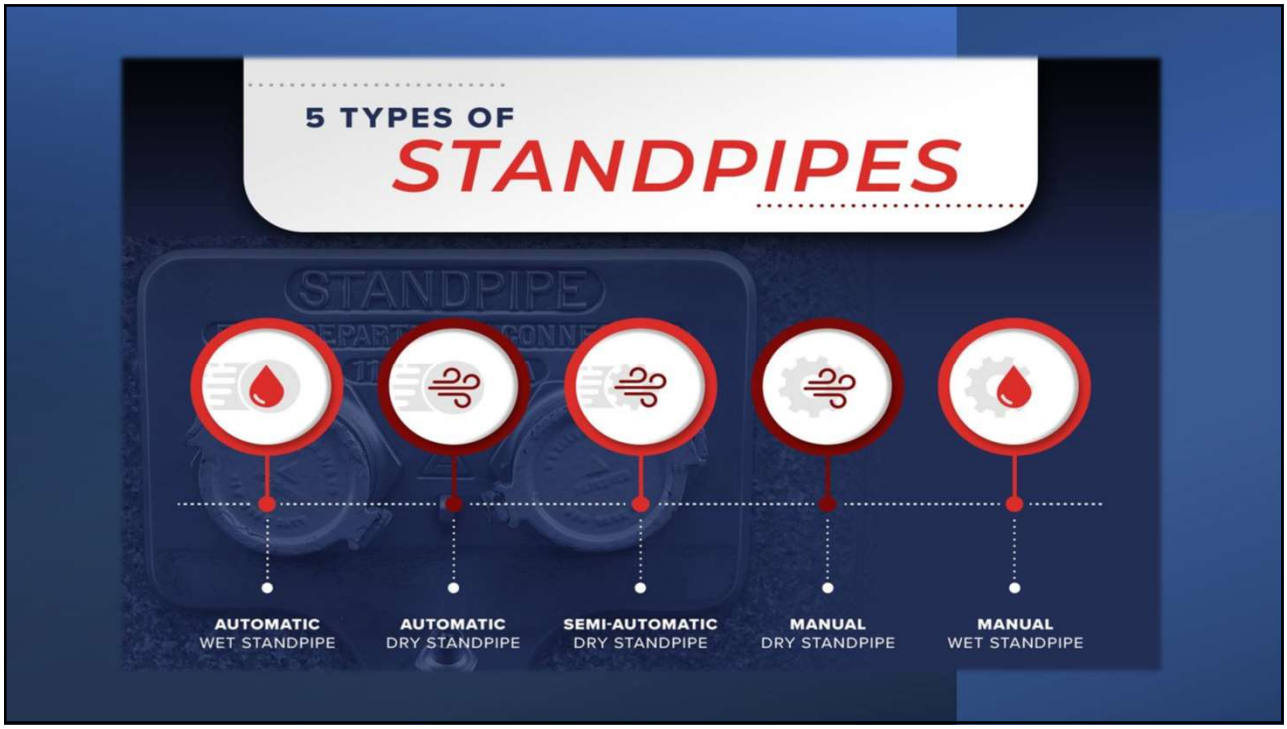
PRE-ACTION SYSTEM

STANDPIPE SYSTEMS

- ❑Reference IBC/IFC, Section 905
- ❑Reference NFPA 14 - Standard for Installation of Standpipe and Hose Systems
- ❑Reference NFPA 13 – Contain standpipe requirements in sprinkler buildings

STANDPIPE SYSTEMS

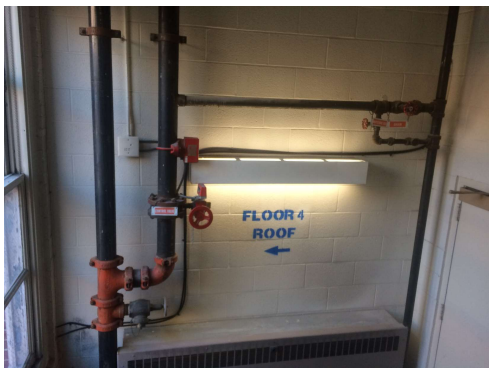
- ❑Class of standpipe
  - Class I
  - Class II (Consensus?)
  - Class III
- ❑Types of Standpipe
  - Automatic dry
  - Automatic wet
  - Manual wet
  - Manual dry
  - Semi-automatic dry



STANDPIPE SYSTEMS

- ❑Location of valves
- ❑Fire department connection proximity to fire hydrant
- ❑Pressure reducing device

TYPE OF STANDPIPES



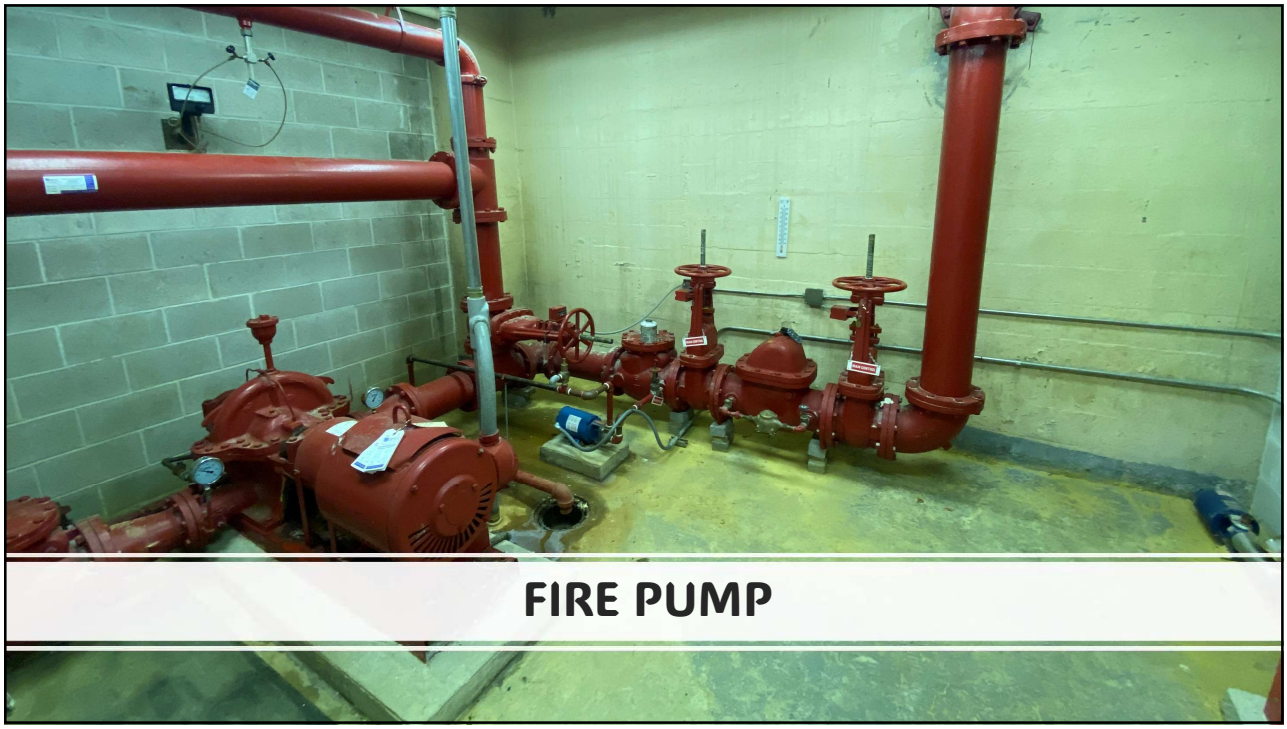
SPRINKLER SYSTEMS

- ❑Threads
- ❑Location of standpipe valves
- ❑Sprinkler vs. nonsprinklered distances

PRVs

FIRE PUMPS

- Reference IBC/IFC, Section 913
- Reference NFPA 20 – Standard for the Installation of Stationary Fire Pumps for Fire Protection



FIRE PUMP

FIRE PUMPS

- ❑Current water flow data
- ❑Underground piping plan
- ❑Required fire rating of pump room
- ❑Electrical requirements

FIRE PUMPS

- ❑Hydraulic calculations
- ❑Floor plan – Protected area
- ❑Location of pump and controller
- ❑Emergency generator

FIRE PUMPS

- ❑Fire pump details
  - Floor elevation plan
  - Cross section of pump
  - Pump bypass detail showing arrangement
  - Relief valve piping arrangement

AUTOMATIC ALTERNATIVE FIRE EXTINGUISHING SYSTEMS

- ❑Carbon Dioxide
- ❑Halon 1301
- ❑Dry Chemical
- ❑Wet Chemical
- ❑Clean Agent
- ❑Water Mist Systems

CARBON DIOXIDE

- ❑IFC 904.12.3
- ❑Design drawings
- ❑Local or total application

DRY CHEMICAL

- ❑IFC 904.5
- ❑Reference NFPA 17 - Standard for Dry Chemical Extinguishing Systems
- ❑Monitoring of discharge
- ❑Local, total flooding, hand hoseline systems
- ❑Types of hazard protection
  - Paint booths
  - Specific equipment applications

DRY CHEMICAL

- ❑Plans shall indicate:
  - Hazard to be protected
  - Physical dimensions
  - Combustible items
  - Air-handling equipment
  - Heat sources

DRY CHEMICAL

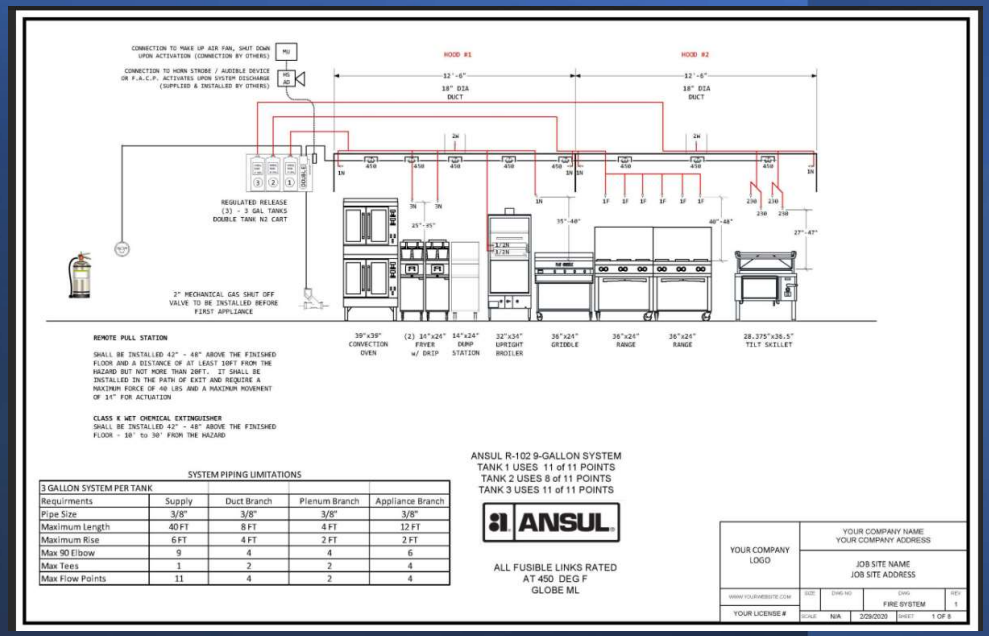
- ❑Location of agent containers
- ❑Distribution piping
- ❑Nozzle locations
- ❑Fusible link temperatures

WET CHEMICAL

- ❑IFC 904.12
- ❑Reference NFPA 17A – Standard for Wet Chemical Extinguishing Systems

WET CHEMICAL

- ❑Protection of cooking media
- ❑Specific nozzles based on classification of cooking equipment
- ❑UL 300 compliant
- ❑Work on the principles of saponification
- ❑Details on interlocks for mechanical ventilation



Requirments	Supply	Duct Branch	Plenum Branch	Appliance Branch
Pipe Size	3/8"	3/8"	3/8"	3/8"
Maximum Length	40 FT	8 FT	4 FT	12 FT
Maximum Rise	6 FT	4 FT	2 FT	2 FT
Max 90 Elbow	9	4	4	6
Max Tees	1	2	2	4
Max Flow Points	11	4	2	4

WET CHEMICAL SYSTEMS

WET CHEMICAL SYSTEMS

WET CHEMICAL

- ❑Design drawings
- ❑Pre-engineered system
- ❑Cylinder size
- ❑Piping size and location
- ❑Number of flows
- ❑Correct flow based on appliance type

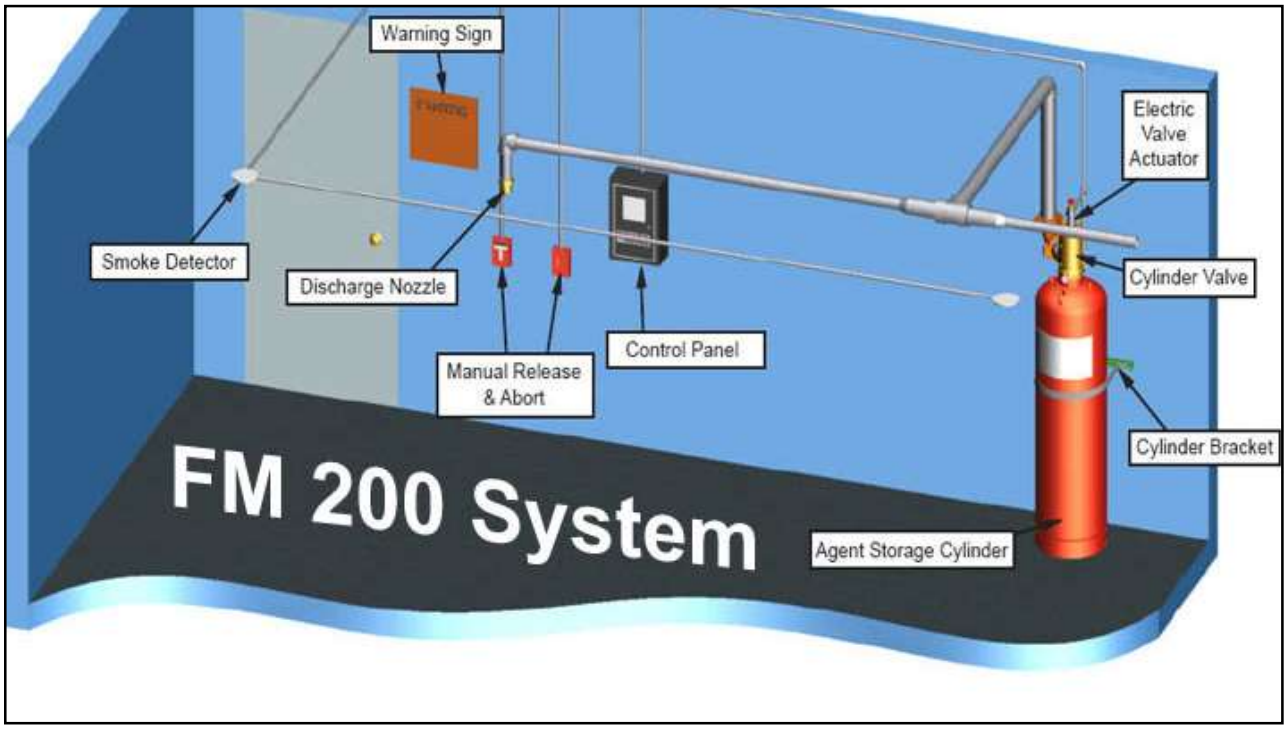
WHAT IF A DESIGNER WANTS TO USE A NEWER REFERENCED STANDARD?

CLEAN AGENT

- IFC 904.10
- Reference 2001 – Standard on Clean Agent Fire Extinguishing Systems
- Typical - FM 200, Novec 1230
- Inert gas (Inergen & CO2)

CLEAN AGENT

- Flooding or local application
- Type of hazard protected and agent quantity
- Type of agent
- Design concentration for extinguishment
- Calculations
- Discharge time – Safety factor


Warning Sign
Electric Valve Actuator
Smoke Detector
Discharge Nozzle
Cylinder Valve
Control Panel
Manual Release & Abort
Cylinder Bracket
FM 200 System
Agent Storage Cylinder


CLEAN AGENT

CLEAN AGENT

- ❑Protected area or room properly sealed using approved method
- ❑Forced-air ventilation shutdown

CLEAN AGENT

- ❑Location of storage containers accessible
- ❑Container storage securing method
- ❑Manifolded agent containers
- ❑Piping materials compatible with environment
- ❑Nozzle listing
  - Area coverage
  - Height limits
  - Design pressures

CLEAN AGENT

- ❑Operating devices, control devices and alarms
  - Devices listed for use
  - Detail location of emergency release manual pull release
  - Manual pull device
  - Warning and instructional signage locations
  - Alarms and indicators for system operational provided
  - Audible and visual predischarge alarm provided

WATER MIST SYSTEMS

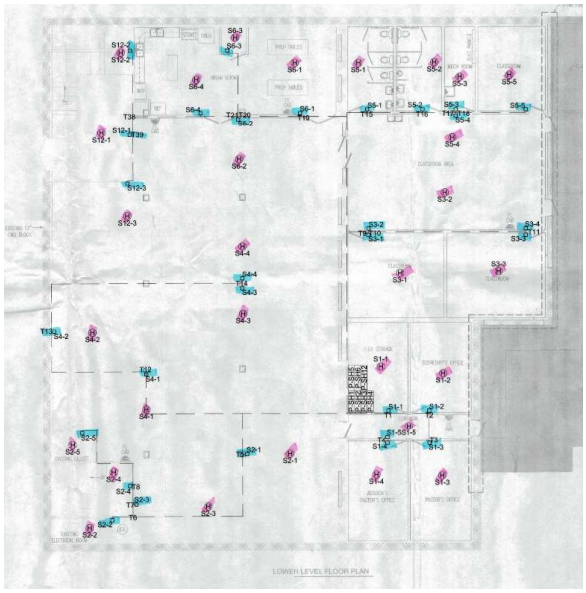
- IFC 904.11
- Reference NFPA 750 - Standard on Water Mist Fire Protection Systems
- Protects the building contents
- Limits the temperature in the fire room
- Limits the thermal energy in the upper layer

WATER MIST SYSTEMS

- Different types of heads
  - Smartscan versus room filling
- Smartscan for large areas
- Room filling for large rooms
- Works with heat detection
  - Smartscan performs IR scan

WATER MIST SYSTEMS

- ❑Uses 1.5 gallons per minute
- ❑20-foot operating radius
- ❑NFPA 750 – Application evaluation
- ❑Pre-Engineered systems – cannot be extrapolated



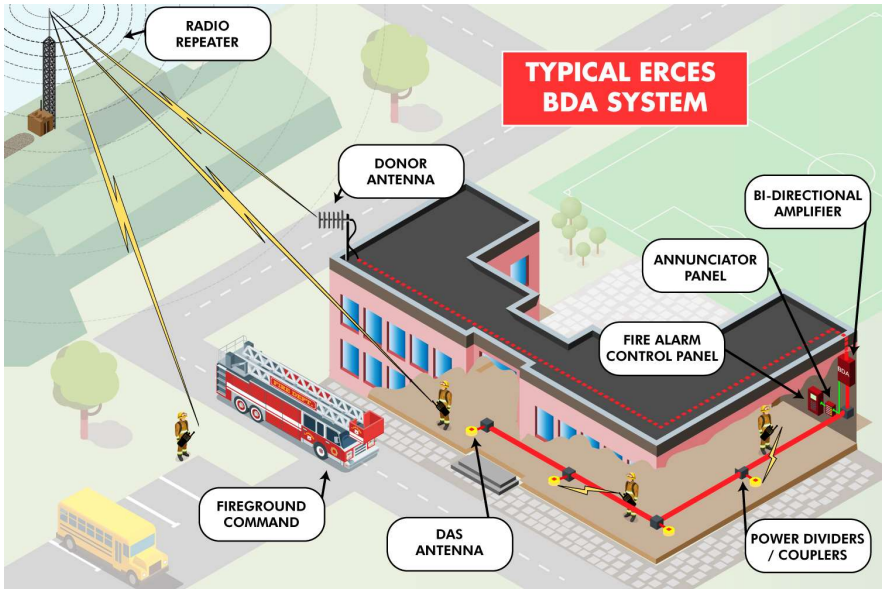
WATER MIST SYSTEMS

EMERGENCY RESPONDER COVERAGE ENHANCEMENT SYSTEMS

- ❑Reference IBC Sections 403.4.5. and 918
- ❑Reference IFC Section 510
- ❑Reference NFPA 1221 - Standard for the installation, maintenance, and Use of Emergency Services Communications Systems
- ❑Reference NFPA 1225 – Standard for Emergency Services Communications
- ❑UL 2524 – Standard for In-building 2-Way Emergency Radio Communication Enhancement Systems

EMERGENCY RESPONDER COVERAGE ENHANCEMENT SYSTEMS

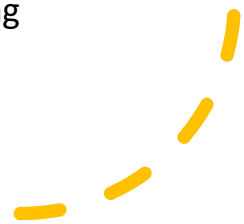
- IFC 510.1 Exceptions
  - A wired communication reference 907.2.1.2.2. installed and maintained instead of ERCES
  - FCO determines it is not required
  - If the required system is detrimental – manual or automatically activated ERCES



ERCES

EMERGENCY RESPONDER COVERAGE ENHANCEMENT SYSTEMS

- ❑Baseline Testing
  - Qualified Testing Contractor
  - Radio Frequencies
  - Process for testing
- ❑Permit for system installation
  - Qualified Installer
  - Process for acceptance testing



EMERGENCY RESPONDER COVERAGE ENHANCEMENT SYSTEMS

- ❑Installation and operation manuals
- ❑Documentation Effective Radiated Power (ERP)
- ❑Design drawings
  - Riser diagram
  - Donor antenna, amplifier & distributed Antenna System (DAS)
  - Location of Emergency Power Off (EPO)
  - All points of interconnection

EMERGENCY RESPONDER COVERAGE ENHANCEMENT SYSTEMS

- ❑Class A or Class B
  - Propagation delay
  - Uplink noise
  - Oscillation prevention
  - FDMA / TDMA
- ❑Designed in what edition of NFPA 72, 1221/1225, IFC & 47 C.F.R. § 90.219
  - Installation and operation manuals

SMOKE CONTROL SYSTEMS

- ❑Reference IBC/IFC, Section 909
- ❑American Society of Heating, Refrigerating and Air-Condition Engineers' (ASHRAE) Handbook of Smoke Control Engineering
- ❑Generally accepted and well-established principles of engineering relevant to the design
- ❑Special Inspection requirements

SMOKE CONTROL SYSTEMS

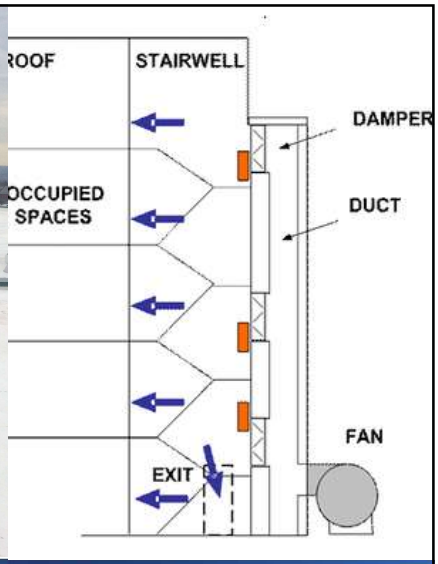
- ❑Maintain tenable environment for evacuation and relocation of building occupants
- ❑Requirement – 1.5 egress time or 20 minutes
- ❑Methods-pressurization, exhaust and opposed airflow

SMOKE CONTROL SYSTEMS

- ❑Design Professional
- ❑Dedicated system
- ❑Active smoke control
- ❑Passive smoke control
- ❑Standby power

SMOKE CONTROL SYSTEMS

- Factors to be considered:
  - Buoyancy
  - Expansion of gases
  - Wind
  - Geometry of the space / communication spaces
  - Heat release rate
  - Production / distribution of smoke



SMOKE CONTROL SYSTEMS

SMOKE CONTROL SYSTEMS

REFERENCED STANDARDS

- ❑Chapter 35
- ❑Referenced NFPA standards

SUMMARY TIPS

- ❑Permit language
- ❑Cursory review of submittal documents
- ❑Submittal packet for systems submittals
- ❑Contractor information