Practical Inspection Techniques for Automatic Sprinkler Systems

Presented by Phil Seyboldt

Building Official

Building Inspector

Fire Protection Systems Inspector

Intent of the Code

- Establish min. requirements for erection, construction … and maintenance
- Establish requirements for the protection of both life and property
- Provide safety to fire fighters and other first responders during the emergency

Existing Structures

- 2011 OBC, Section 202 (Definitions); An EXISTING STRUCTURE is a structure regulated by this code that was already erected or one for which a plan approval has been issued.

Existing Buildings (OBC 111.2)

- Upon written request from the owner of an existing building or structure, the building official shall issue a Certificate of Occupancy, provided there are not violations of law or orders of the building official pending, and it is established after inspection and investigation that the alleged occupancy of the building or structure previously existed. This code shall not require the removal, alteration or abandonment of, or prevent the continuance of, the occupancy of a lawfully existing building or structure, unless such use is deemed to endanger public safety or welfare.

Used on New or Existing Structures

- Existing Structures: (2011 OBC 111.2)
  - Must be free of conditions deemed to endanger the public safety and welfare.
  - No outstanding orders or violations of law against the structure.
  - No change in occupancy (see OBC 111.1.3) unless new occupancy has been evaluated

Change of Occupancy
(OBC 111.1.3, 3402.1 and 3408.1)

- New occupancy must comply with current version of the applicable codes.
- Existing occupancies may stay as is if the use was continued as originally approved.
- Changes in USE or OCCUPANCY require the structure to comply with current codes.
- NOTE: Changes to more hazardous storage commodities or processes constitute a change of use.(OBC: 3408.1)
- Removal of Heating Systems (13:8.3.2.6)

“Negligent Inspection Claims”

- Wallace v. Ohio Department of Commerce, Division of State Fire Marshal, 96 Ohio St.3d 266, 2002-Ohio-4210
- Ohio River Fireworks store fire July 3, 1996
- 9 people killed, 15 injured
- Ohio Supreme Court finds Department liable for not performing a good inspection – water to sprinkler was shut off.
- First time in Ohio that a governmental dept. is found liable and not protected by immunity

WHICH STANDARD?

- NFPA 13 Systems
  - **Used for all occupancies including General Storage and Rack Storage (13:8.2.1, 13:8.2.3 and 13:Chap 12)**
  - **Used for Miscellaneous Storage:**
    - **Max. of 12-feet high**
    - **Max. of 10% of the Building Area**
    - **Max of 4,000 square feet**
    - **Max of 1,000 sf per pile with at least 25-feet in between**
  - **May be either complete systems or Limited Area Systems**

WHICH STANDARD?

- NFPA 13 Systems – Chapter 12 Storage
  - **General Storage regardless of height**
  - **Rack Storage of All Commodities**
  - **Miscellaneous Storage (Specific Requirements)**
  - **Uses design densities from Area/Density Curve**
  - **Watch for problems causing the use of special standards such as aerosols.**

NFPA 25 – Inspection, Testing, Maintenance of Water-Based Systems

- Not Referenced in Chapter 34 of OBC
- Not For Initial Sprinkler Test
- Referenced in Ohio Fire Code for Testing
- System Tested Annually (5.2.1.1)
- Remove Obstructions to Spray Patterns
- Test Alarm Devices Annually

  NOTE: Check the Supervision, too!!
- Check for Hydraulic Nameplate
- Water flow detectors MUST be tested

  by flowing the water.
- Check condition of valves Annually

NFPA 13D

- Used for 1 & 2 Family Dwellings and Manufactured Homes
- Can use Steel, copper, brass or CPVC plastic piping
- May only have one control valve for both the domestic and the sprinkler piping.
- Local water flow alarm required
- Not required in bathrooms, closets, garages, pantries
- Minimum pipe size is 1-inch for steel and ¾-inch for CPVC
- All heads are quick response
- Calculated on only one or two heads flowing

NFPA 13R Residential Low-Rise

- Used in Residential Occupancies up to 4-stories or 60-feet
- Each living unit is to have its own system and control valve
- Pendant heads need to be 3-feet from any ceiling obstruction such as a ceiling light or fan
- Not required in bathrooms, pantries, garages, closets, but sprinklers ARE required on exterior balconies and decks that are under roof.
- Local water flow alarm required
- Stock of 6 spare heads (min.) required
- Fire Dept. Connection is required, and the minimum size is 1 ½-inch
- Only one control valve for both domestic and sprinkler water is permitted unless the sprinkler is supervised.

2011 OBC

- A-1, A-3 and A-4 where area exceeds 12,000 sq ft.
- A-2 where area exceeds 5,000 sq. ft.
- E groups where area exceeds 20,000 sq. ft.
- H groups all areas
- I groups all areas
- M, S or F where area exceeds 12,000 sq. ft
- All R groups (More than 4 Stories)
- R-2 groups (See Table 1021.2 for Exception – third story of R-2 occupancies with one exit)

2011 OBC

- A-1 thru A-4 when Occ. Load exceeds 300
- A-1 when fire area is on a level other than the exit discharge level
- M uses over 8,000 sf when upholstered furniture is sold or displayed
- M uses – all uses over 3-stories in height
- S-2 Public Garages – 12,000 max for cars and 5.000 sf for trucks or busses

2011 OBC

- M, S-1, F-1, ALL high-piled storage buildings must be sprinklered regardless of size (OBC 413.1)
- Residential Multi-family of Type V Construction – Sprinklers needed on exterior balconies, decks and patios per 2011 OBC 903.3.1.2.1 (supersedes NFPA 13R)
- Locking Caps on FD Connections are now OK if approved by Fire Authority

Top Reasons for Unsatisfactory Sprinkler Performance

- Water Shut Off – 35.4%
- Inadequate Coverage for Current Hazard – 13.5%
- Inadequate Maintenance – 8.4%
- Obstructions to Water Distribution – 8.4%
- Inadequate Water Supply – 9.9%
- System Designed for Partial Prot. Only – 8.1%
- Other Causes (Arson, Explosions, Building Defects, Freezing, etc. - 16.3%

Owner's Information Certification [13 – 4.3 & 22.1]

- Name and address of property
- Construction classification
- Is the installation intended for a special occupancy (I.e., aircraft, marine, automotive, tires, other occupancy with its own standard)
- Hazardous materials present (including aerosols)?
- Special accessory uses? (i.e., spray areas, laboratories, solvents, waste-handling, etc.)

Owner's Certificate (cont.)

- Intended Use of the Building, including stored materials and storage heights
- Plans of the building used for sprinkler design
- Any special knowledge of the water supply
- Types and numbers of pallets to be used (if any)

Owner's Information Certificate

Name/Address of property to be protected with sprinkler protection:

_____

_____

Name of Owner: _____

Existing or planned construction is:

❑ Fire resistive or noncombustible

❑ Wood frame or ordinary (masonry walls with wood beams)

❑ Unknown

Is the system installation intended for one of the following special occupancies:

Aircraft hangar	❑ Yes	❑ No
Fixed guideway transit system	❑ Yes	❑ No
Race track stable	❑ Yes	❑ No
Marine terminal, pier, or wharf	❑ Yes	❑ No
Airport terminal	❑ Yes	❑ No
Aircraft engine test facility	❑ Yes	❑ No
Power plant	❑ Yes	❑ No
Water-cooling tower	❑ Yes	❑ No

If the answer to any of the above is "yes," the appropriate NFPA standard should be referenced for sprinkler density/area criteria.

Indicate whether any of the following special materials are intended to be present:

Flammable or combustible liquids	❑ Yes	❑ No
Aerosol products	❑ Yes	❑ No
Nitrate film	❑ Yes	❑ No
Pyroxylin plastic	❑ Yes	❑ No
Compressed or liquefied gas cylinders	❑ Yes	❑ No
Liquid or solid oxidizers	❑ Yes	❑ No
Organic peroxide formulations	❑ Yes	❑ No
Idle pallets	❑ Yes	❑ No

If the answer to any of the above is "yes," describe type, location, arrangement, and intended maximum quantities.

_____

_____

Indicate whether the protection is intended for one of the following specialized occupancies or areas:

Spray area or mixing room	❑ Yes	❑ No
Solvent extraction	❑ Yes	❑ No
Laboratory using chemicals	❑ Yes	❑ No
Oxygen-fuel gas system for welding or cutting	❑ Yes	❑ No
Acetylene cylinder charging	❑ Yes	❑ No
Production or use of compressed or liquefied gases	❑ Yes	❑ No
Commercial cooking operation	❑ Yes	❑ No
Class A hyperbaric chamber	❑ Yes	❑ No
Cleanroom	❑ Yes	❑ No
Incinerator or waste handling system	❑ Yes	❑ No
Linen handling system	❑ Yes	❑ No
Industrial furnace	❑ Yes	❑ No
Water-cooling tower	❑ Yes	❑ No

If the answer to any of the above is "yes," describe type, location, arrangement, and intended maximum quantities.

_____

_____

Will there be any storage of products over 12 ft (3.6 m) in height?

❑ Yes ❑ No

If the answer is "yes," describe product, intended storage arrangement, and height. _____

_____

_____

_____

Will there be any storage of plastic, rubber, or similar products over 5 ft (1.5 m) high except as described above?

❑ Yes ❑ No

If the answer is "yes," describe product, intended storage arrangement, and height. _____

_____

_____

_____

I certify that I have knowledge of the intended use of the property and that the above information is correct.

Signature of owner's representative or agent: _____

Date: _____

Name of owner's representative or agent completing certificate (print): _____

Relationship and firm of agent (print): _____

HAZARD CLASSIFICATIONS NFPA – 13 Systems

- Light Hazard
- Ordinary Hazard – Group 1
- Ordinary Hazard – Group 2
- Extra Hazard – Group 1
- Extra hazard – Group 2
- See Density Curves for Differences in Sprinkler Coverage

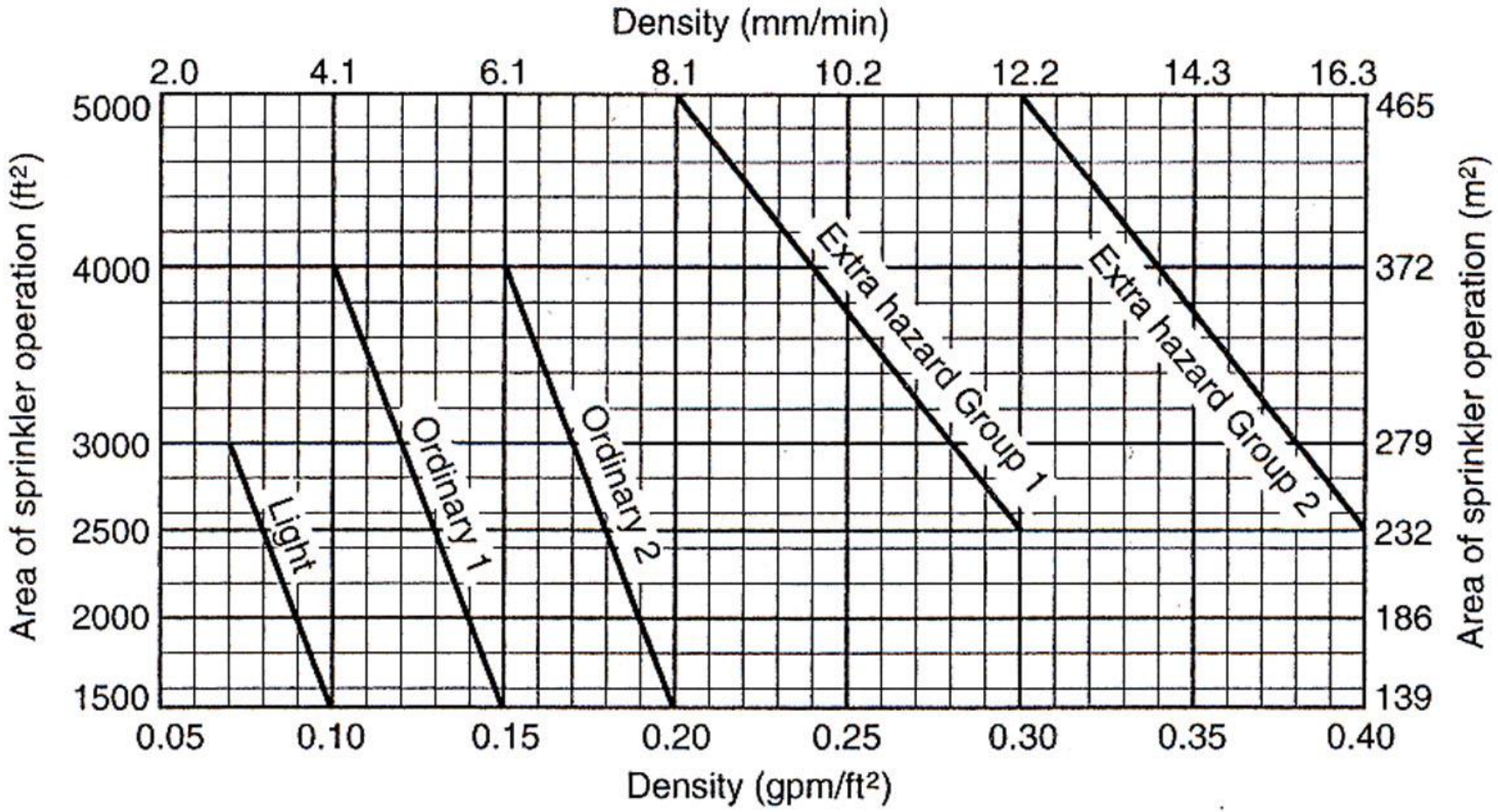


FIGURE 11.2.3.1.5 Density/Area Curves.

Commodity Classifications NFPA 13: 5.6

- Class I – Noncombustible products
- Class II – Class I products in Combustible cartons, crates or packaging
- Class III – Combustible products (wood, paper)
- Class IV – Class III products in combustible packaging or combined with some plastics

Commodity Classifications NFPA 13, Chapter 5.6

- Group A Plastics – Most Flammable (acrylics, butyl rubber, polyethylene)
- Group B Plastics – Less flammable than Group A (nylon, silicone rubber, natural non-expanded rubber)
- Group C Plastics – Least Flammable (rigid PVC, Melamine)

All Areas of the Building Must Be protected! (NFPA 13, 4.1)

- BO has authority to waive certain locations (2005:903.1.1) “water reactive hazards”
- Computer Rooms (Dry Chemical or CO2)
- Walk-In Coolers (Dry Pendant Heads)
- Exterior Overhangs & Canopies
- Electrical Closets (Some exceptions – NFPA 13: 5-13.11)
  - Must be dedicated to electrical equipment
  - Must be have 2-hour envelope inc. penetrations
  - Must be dry-type electrical gear
  - No storage of any type permitted

All Areas of the Building Must Be Protected!

- Bathrooms less than 55 sq. ft. are exempted; (The area of bathtubs and showers now included per OBC)
- Bathrooms in Nursing Homes must be protected
- Bathrooms off of a public or means-of-egress corridor must be protected.
- Exterior roofs and canopies of combustible construction must be protected. (Some exceptions)
- 4-Family and larger – Exterior patios and balconies must now be protected per OBC (Supersedes NFPA 13R)

EXAMPLES

- LIGHT HAZARD
  - Churches
  - Clubs
  - Hospitals
  - Nursing Homes
  - Office Buildings
  - Residential Systems
  - Restaurants
  - Unused Attics

EXAMPLES

- Ordinary Hazard Group 1
  - Automobile parking & Showrooms
  - Bakeries
  - Beverage/Dairy Manufacturing
  - Electronics Plants
  - Laundries
  - Restaurant Kitchen Areas

EXAMPLES

- Ordinary Hazard Group 2
  - Machine/Metal Shops
  - Paper plants & Mills
  - Repair garages
  - Printing Shops
  - Tire mfg. & storage
  - Wood machining & assembly plants
  - Loading Docks in Ordinary Hazard Group I Occupancies
  - Most Grocery Stores

EXAMPLES

- Extra Hazard Group 1
  - Aircraft hangers
  - Plywood & Particle Board mfg.
  - Saw Mills
  - Upholstering (using foam plastics)
  - Print Shops (using combustible inks)

    Furniture & Mattress Stores

EXAMPLES

- Extra Hazard Group 2
  - Asphalt saturating
  - Spraying of Combustible Liquids
  - Plastics Processing
  - Solvent Cleaning
  - Varnishing & Paint Dipping
  - Modular Building Assembly

EXAMPLES

- Class I Commodities – Non-combustible (Ordinary Hazard Group I)
  - Foods
  - Beer & Wine sales
  - Glass products
  - Metal Products
  - Dairy Products in non-wax Containers

EXAMPLES

- Class II Commodities – Non-combustible in wood cartons/crates or multiple-thickness cardboard packaging (Ordinary Hazard, Group 1 up to 8 Feet – Then Group 2)
  - Beer or Wine in wood containers
  - Packaged light bulbs
  - Glass jars in partitioned, cardboard boxes
  - Slatted Wood packaging
  - Multiple-layer cardboard box packaging

EXAMPLES

- Class III Commodities – Wood, paper, cloth, small amount of plastics (less than 30%) (Ordinary Hazard, Group 2)
  - Shoes, Jackets, Luggage
  - Books, Magazines
  - Some Mattresses
  - Doors, windows, furniture
  - Paper products in cardboard cartons
  - Most Clothing – Some synthetics are Class IV

EXAMPLES

- Class IV Commodities – Class III products with large amounts of plastics or corrugated packaging; (Ordinary Hazard Group 2 up to 10 Feet, then Extra Hazard Group 1)
  - Small Appliances
  - Computers & Typewriters
  - Cameras
  - Telephones
  - Floor Tile
  - Fiberglas Insulation

EXAMPLES

- Group A Plastics – Most Flammable (Ordinary Hazard Group 2 up to 5 Feet, Extra Hazard Group 1 up to 10 feet, then Extra Hazard Group 2)
  - Acrylics (signs, trophies, displays, accessories)
  - Butyl & Natural *Expanded* Rubber (gaskets, hoses, seals, bumpers, latex materials, tubing, bandages)
  - Polyethylene & Polypropylene (gift wraps, bags, films, mailers, shrink-wraps, packaging)
  - Highly Plasticized PVC (lawn furniture, bottles, floor tile, siding, wire insulation)
  - Disposable Diapers
  - Furniture w/foam cushions and foam mattresses

EXAMPLES

- Group B Plastics;
  - Fluoroplastics (plastic machine & pump parts, Teflon products, Kynar coatings)
  - Nylon (carpeting, power tool housings & holders, bearings & seals)
  - Silicone & Natural Rubber (hose, medical tubing, roofing, sponge rubber, tape)

EXAMPLES

- Group C Plastics – Least Flammable
  - Rigid PVC (pipe & fittings)
  - Melamine Formaldehyde (dishes, resins found in particle board & wood pulp)
  - Urea Formaldehyde (kraft paper, baking finishes and some adhesives)

Paper Classification

- Records Storage up to 25-feet is protected at .3 gpm/sq. ft. (Extra Hazard Group I)
- Compact Storage Modules up to 8-feet in height is Light Hazard Classification
- Heavy & Medium-Weight paper storage is Ordinary hazard Group II
- Tissue and newsprint storage is Extra Hazard Group I

Foam-Stuffed toys on wood pallets:

Group A Plastics (Ex Haz Gp 1 or 2)

Upholstered Furniture covered in plastic

Class IV Commodity or Group A Plastics
(Or Haz Gp 2 up to 10-Ft)

Telephones in styrofoam packing in corrugated boxes

Group A Plastics (Ex Haz Gp 1 or 2)

Wine in glass containers in wood boxes

Class II Commodity Or Haz Gp 1 up to 8 Ft)

Cereal Boxes in Paper boxes on pallets

Class III Commodity (Or Haz Gp 2)

Encapsulated Stationery on wood pallets

Class III Commodity

Records (paper files) in cardboard boxes

Class III Commodity

(See Limits – Probably Ex Haz Gp 1)

Computers surrounded in styrofoam in cardboard boxes

Group A Plastics (Ex Haz Gp 1 or 2)

Wax Candles in partitioned cardboard cartons

Group A Plastics

Special Situations to watch for:

- Miscellaneous Tire Storage Varies in Hazard Class (See NFPA 13:18 for reqmts)
- Storage of Plastic or Wood Idle Pallets;
- Cartons of Aerosols that may explode in a fire (See NFPA 30B)
- Rows of single or double racks with no additional sprinkler protection;
- Elevator Hoistways & Machine Rooms

Idle Pallets Should be stored outside! (13-5.6.2)

Plastic Pallets (2011 Code) 13-12.12.2

- One-Class Upgrade Required when un-reinforced polypropylene or high-density polyethylene pallets are used;
- Two-Class Upgrade required when reinforced polypropylene or high-density polyethylene pallets are used.
- Reinforced pallets have a molded symbol

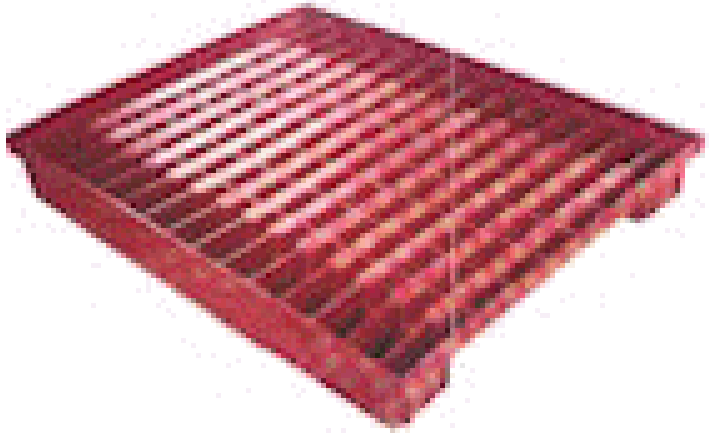
R

- NFPA-13 12.12.2 – ESFR Heads

  w/.6 gpm/sq ft coverage or high exp foam

Plastic pallets (2011 Code)

- High-Density Polyethylene



Used in Food, Auto, Rubber, Chemical & Petroleum, Publishing, Beverage & Bakery Industries

Aerosols

- NFPA 30B
- Mixed Storage Warehouses May Only Store up to 6,000 lbs. Of Aerosols
- May Require a Surrounding Fence
- Kmart Dist. Center Fire in Falls Township, Pa. (1982) - $100 million in losses; Building covered 27 acres

Elevator Hoistways & Machine Rooms

NFPA 8.15.5 (2007 Ed)

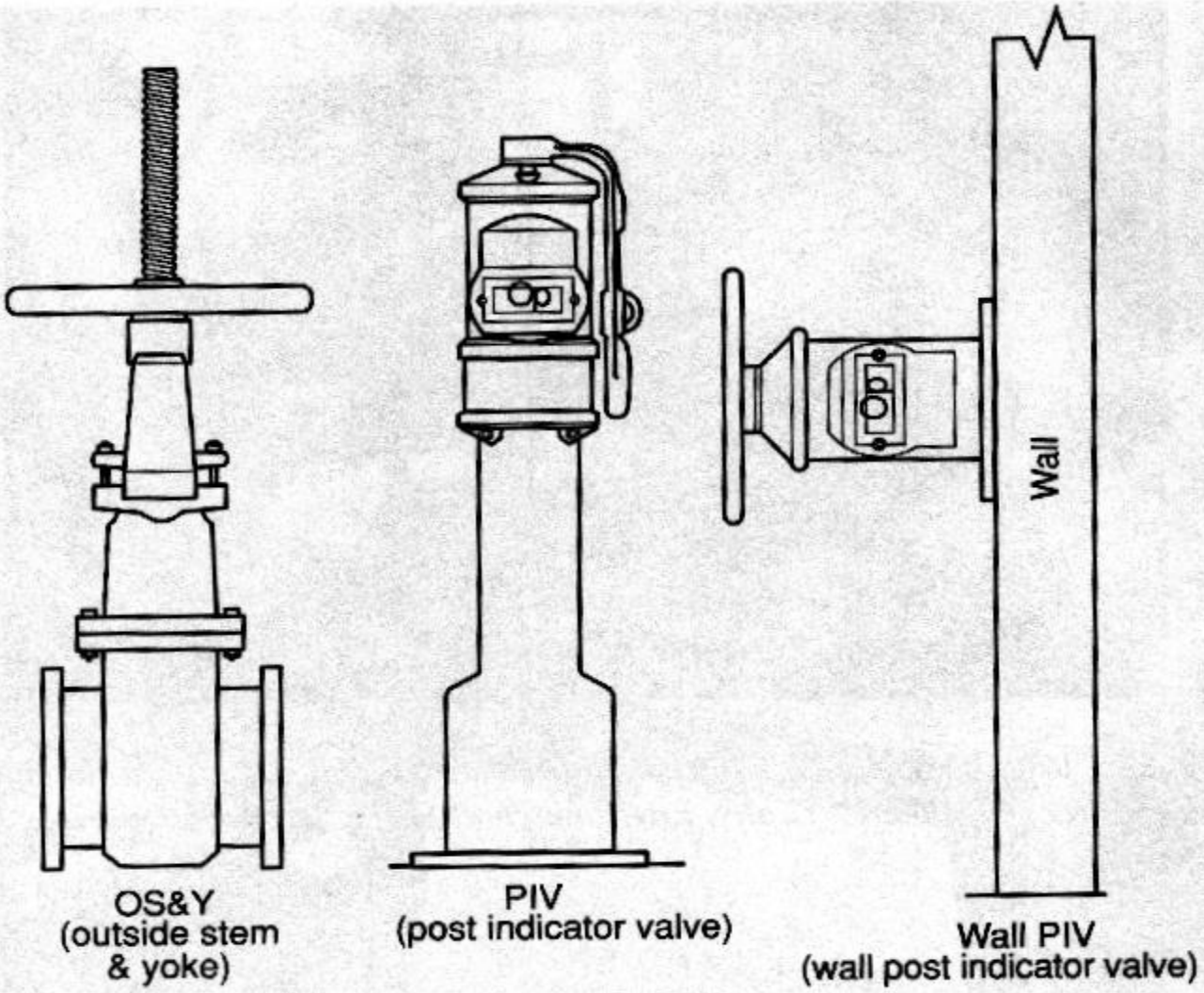
- Sidewall Sprinklers required at bottom of shaft when elevator is hydraulic (for combustible oil, trash & debris);
- Upright, pendant or sidewall sprinkler required at top of hoistway;

  Exception: Not required if hoistway is noncombustible and the passenger car is constructed in accordance with ASME A17.1 (very limited combustibility);
- Sprinkler protection in machine room still required; ASME A17.1 requires shutdown of power to elevator before water sprinkler is activated. Some sort of pre-action system may be advisable.
- Sprinklers in machine room or at top of shaft to be ordinary or intermediate temperature rating;
- Any modification to rules by local officials permitting omission of sprinklers should be carefully considered;

CONTROL VALVES

- Must be clearly identified
- Must be visible from the floor
- Must be accessible for future inspection and testing
- Must be either supervised or locked
- Any time that the main control valve is closed and re-opened the main drain must be flowed

Sprinkler Control Valves



Typical OS & Y Control Valve Assembly

New Post Indicator Valve (PIV)

Sprinkler Valves

Butterfly Valves with Hydraulic Nameplates

Hydraulic Nameplates

HYDRAULIC - SYSTEM

THIS BUILDING IS PROTECTED
BY A HYDRAULICALLY DESIGNED
AUTOMATIC SPRINKLER SYSTEM

Location: _____

NUMBER OF SPRINKLERS _____

BASIS OF DESIGN

DENSITY _____

DESIGNATED AREA OF DISCHARGE _____

SYSTEM DEMAND

GPM DISCHARGE _____

RESIDUAL PRESSURE AT THE BASE
OF THE RISER _____

NOTES: __(Occupancy Classification)_____

__(Commodity Classification)_____

BACKFLOW PREVENTION

- All NFPA-13 sprinkler systems (including limited-area systems) and standpipe systems require some type of backflow preventer
- Reduced Pressure Principal Backflow Preventers are used on most sprinkler systems
- Some systems can use a Double Check backflow Assembly
- Backflow Assemblies must be inspected annually

Backflow on NFPA 13D System

- According to the AWWA (American Water Works Association) there are 6 Classes of Sprinkler Systems

- Class I and II systems, such as NFPA 13D systems, are directly connected to the public water source, may or may not have a booster pump, but have no means of inserting foreign water to the domestic water system (ie, a FDC);

- Class I and II systems do NOT require a backflow preventer

Class III Sprinkler Systems

- Class III sprinkler systems are defined as systems that are connected directly to the domestic water main, but stand the risk of being contaminated by water being pumped from an above-ground water tank (ie, fire apparatus via the FDC).

- Class III systems require some type of backflow prevention, at least to the extent of inserting an air gap or a double check valve assembly.

Backflow for Remaining Types of Systems

- Class IV and V Systems involve direct connections to the public water supply piping, but also stand a more severe risk of contamination through close proximity to reservoirs or ponds as alternate water sources.

- Class VI Systems are connected directly to the public water system, but also have chemicals, such as antifreeze, added to the system. These systems require the most severe type of protection.

- All Class IV, V, or VI systems require Reduced Pressure Principle Backflow detectors.

Reduced Pressure-Principal Detector Assembly is used primarily for fire sprinkler systems and is required in type IV, V and VI systems where chemical additives are used, such as antifreeze solutions.

(Watts) Double Check Detector Assembly is used primarily on Class III fire sprinkler systems to protect from contamination from non-potable, stagnant "black" water that has been sitting in the piping for an extended period of time or from the tank of a fire truck. Double-Check Valves are always assemblies, including two spring-loaded check valves and two OS & Y control valves.

SITE WORK INSPECTION

- First Inspection – Usually conducted before sprinkler contractor is on site.
- Work must be performed by a contractor licensed to do sprinkler piping.
- FLUSH underground mains and lead-ins to system riser. (13:10-2.1)
- FLUSH remote Fire Department Connection piping.
- Remote Fire Department Connection is part of sprinkler piping and must have 200# test.
  (13:10-2.2.1Ex #6)

Fire Department Connections

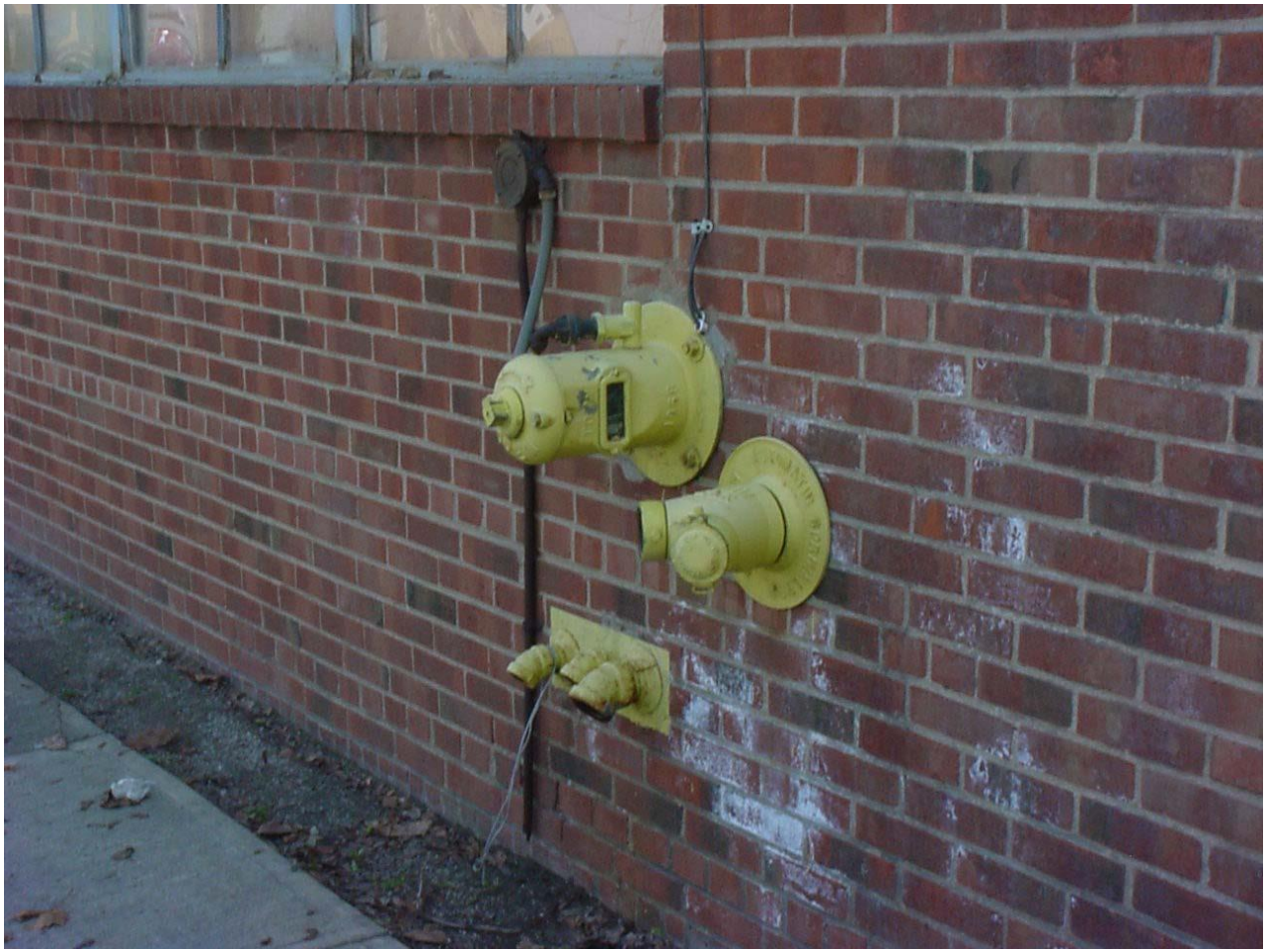
- Must be hydrostatically tested at 200# the same as the rest of the system (13; 10-2.2.3)
- Must be accessible and unobstructed
- Should only have one, or at least should be grouped
- Must have proper caps on piping
- Fire Department Couplings if applicable are still in place and rotate smoothly
- Should be located in close proximity to a hydrant
- FD has input as to where they are placed!!!

Fire Department Connections (cont.)

- Connection must be between 18-inches and 48-inches above grade
- Piping used must be a minimum of 4-inch
  (1 ½" on NFPA 13R Systems)
- The connection to the system cannot be on a branch line
- Shut-off valves are not permitted
- Must be equipped with an automatic drip valve to prevent freezing

Fire Department Connections

Fire Department Connections



Fire Department Connections

Fire Department Connections

Sprinkler Heads

- Minimum of 6 heads
  300 – 1000 12 heads
  Over 1000 24 heads

- Include Wrench

- Sprinkler Body
  Parallel to Cross Main

WALK THE PIPING;

- Hangers;
- Fittings
- Clearances
- Obstructions
- Damage
- Misc. Control Valves
- Alarms

Sprinkler Head Alignment & Position

- Upright Sprinklers Installed with frame Arms parallel to the Branch Main
- Deflectors Arranged Parallel to Ceilings, Roofs, Incline of Stairway
- Must be within 3 vertical feet of Peak of Roof or Ceiling
- Top of Storage must be Minimum of 18-Inches Below Deflector (36” for ESFR Heads)
- Distance from Wall Should Not Exceed ½ Allowable Distance Between Sprinklers

Spacing for Hangers (Table 13:9-2.2.1)

- Threaded Steel Pipe – 12’ to 15’
- Lightwall Steel Pipe – 12’
- Copper Tubing – 8’ to 15’
- CPVC Piping – 5½’ to 10’
- Ductile Iron Piping – 15’
- Polybutylene Piping (IPS or CTS) 3’ to 6’
- Generally one hanger per length of pipe;

Hanger Problems

- Watch for hanger parts hanging loose;
- Watch for hangers not secured to structure;
- Watch for armovers longer than 24”;
- Distance from last hanger to end of sprinkler not to exceed 36 inches for 1” pipe and 48 inches for 1¼” pipe
- Hangers shall be at least 3” from center of closest sprinkler head;
- Supports for risers at lowest level and on alternate levels in multi-story structures;

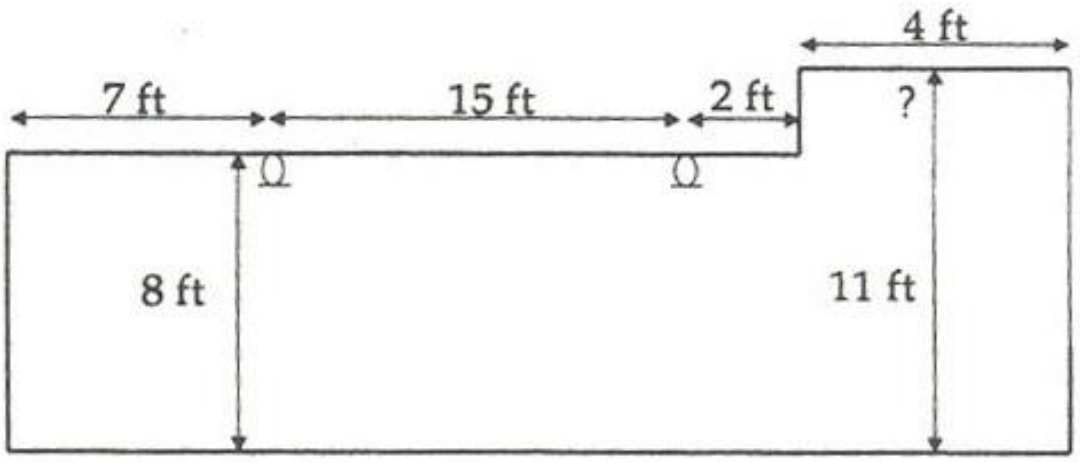

Hanger Problems

Obstructions (NFPA 13, 5-5.5)

- Ducts
- Soffits
- Stored items
- Shelving
- Overhead Doors
- Privacy Curtains

Soffit Sprinklers

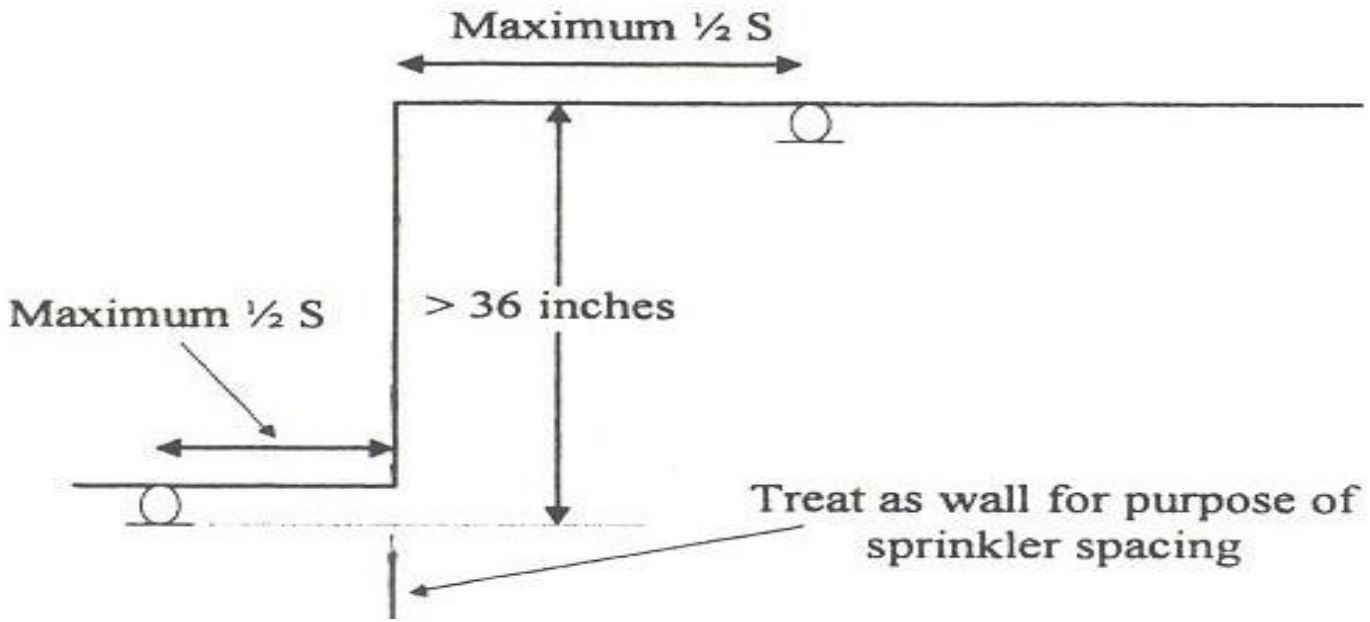
Ceiling Pockets (NFPA 13:8.6.7)



2011 Rules – No Sprinklers Required IF:

- Total Volume of a group of small pockets in a single room does not exceed 1000 Cu Ft
- Depth of pocket(s) does not exceed 36-inches
- Floor area under ceiling pocket is completely protected by heads on the lower (or higher) ceiling level
- Pocket must have non-combustible finishes

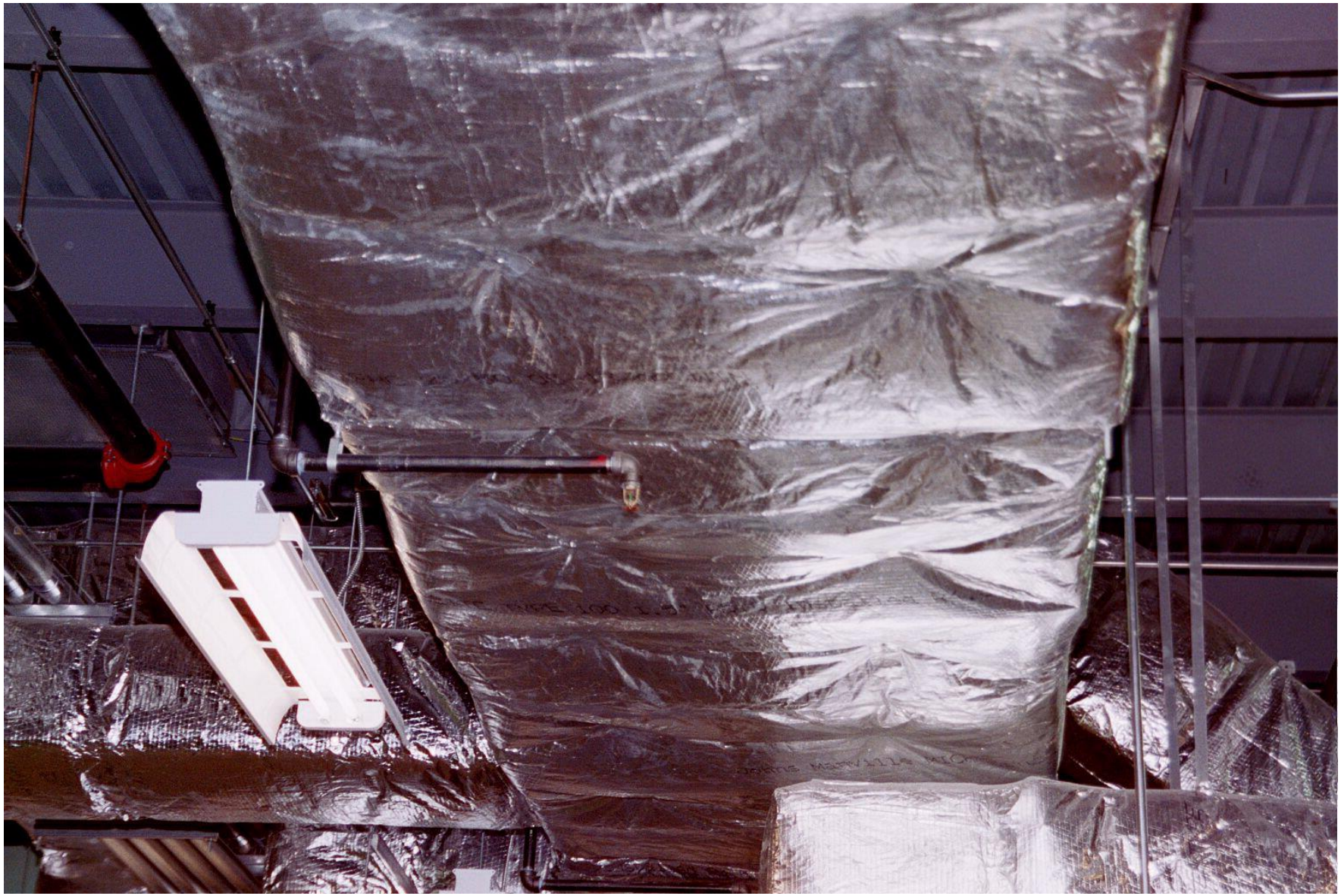
Stepped Ceilings (NFPA 13:8.8.4)



- 2010 NFPA-13 (2011 OBC) pockets deeper than 36-inches must still be sprinklered;
- The vertical surface of the stepped ceiling is treated as a wall surface for the purpose of laying out heads;

Storage/Duct Obstructions

- Fixed obstructions more than 4-feet in width require additional sprinklers supported from structure – not by the obstruction; (13: 8.5.5)
- Listed guards shall be required where subject to mechanical injury (6.2.8)
- Storage must be 18-inches below the deflector (36-inches for ESFR Heads)




NO
SMOKING

Cubical Curtains (13:8.6.5.2)

- Light-Hazard Occupancies only (Hospitals, Nursing Homes, Convalescent Homes) – supported by mesh hanging from a ceiling track

- Mesh must extend down from ceiling a minimum of 22-inches

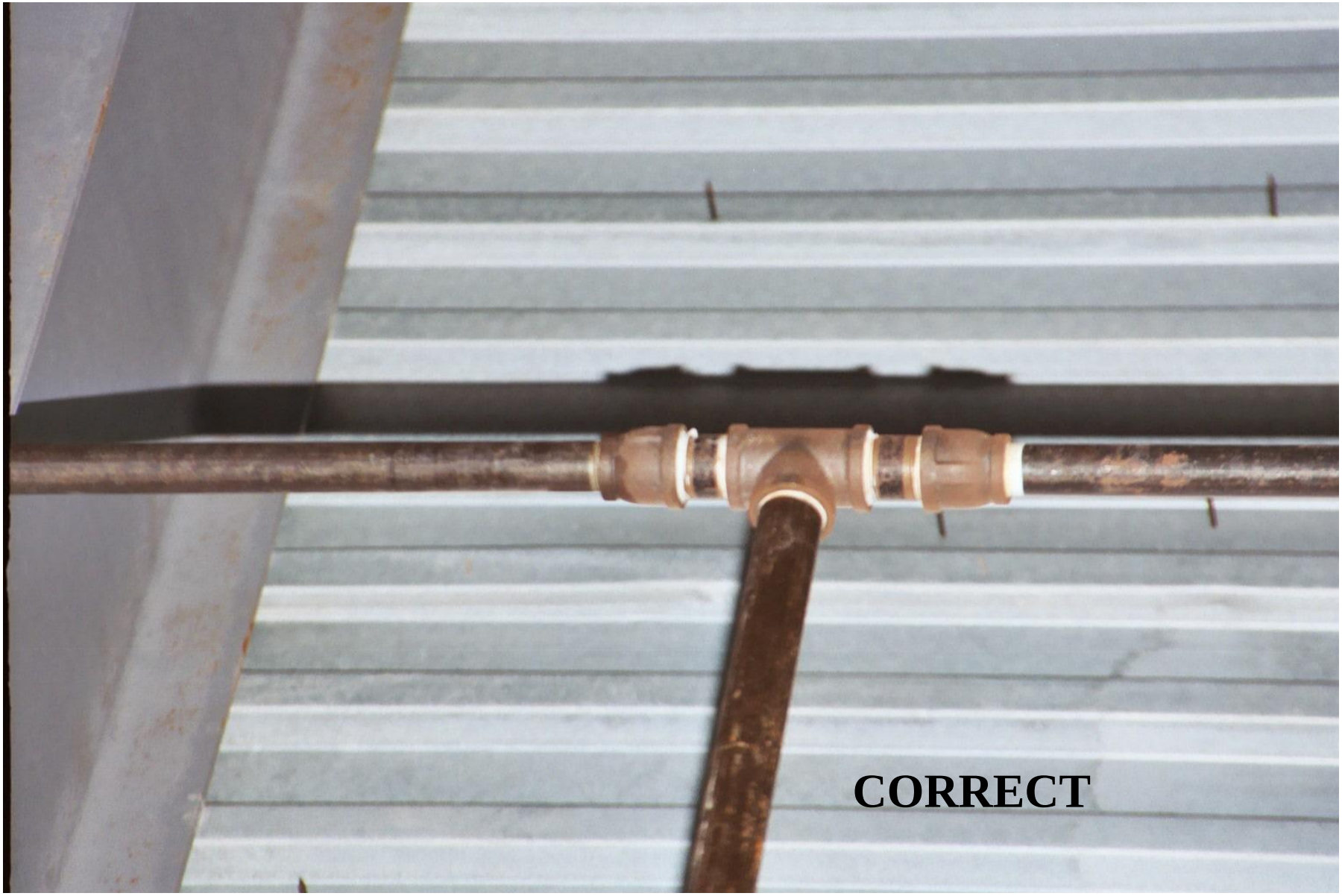
No Painting or Coating of Heads

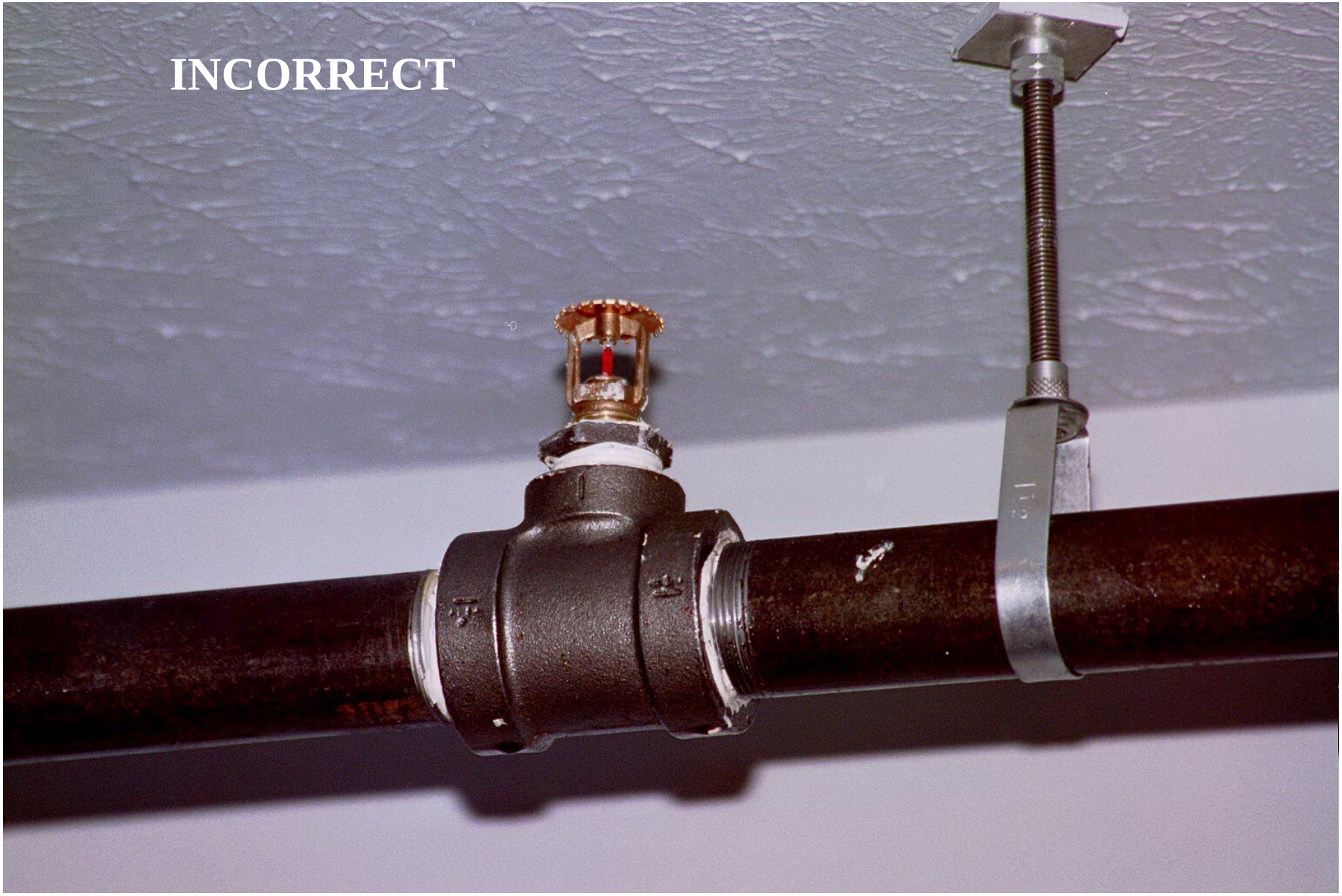
Lower the heads to the new ceiling height

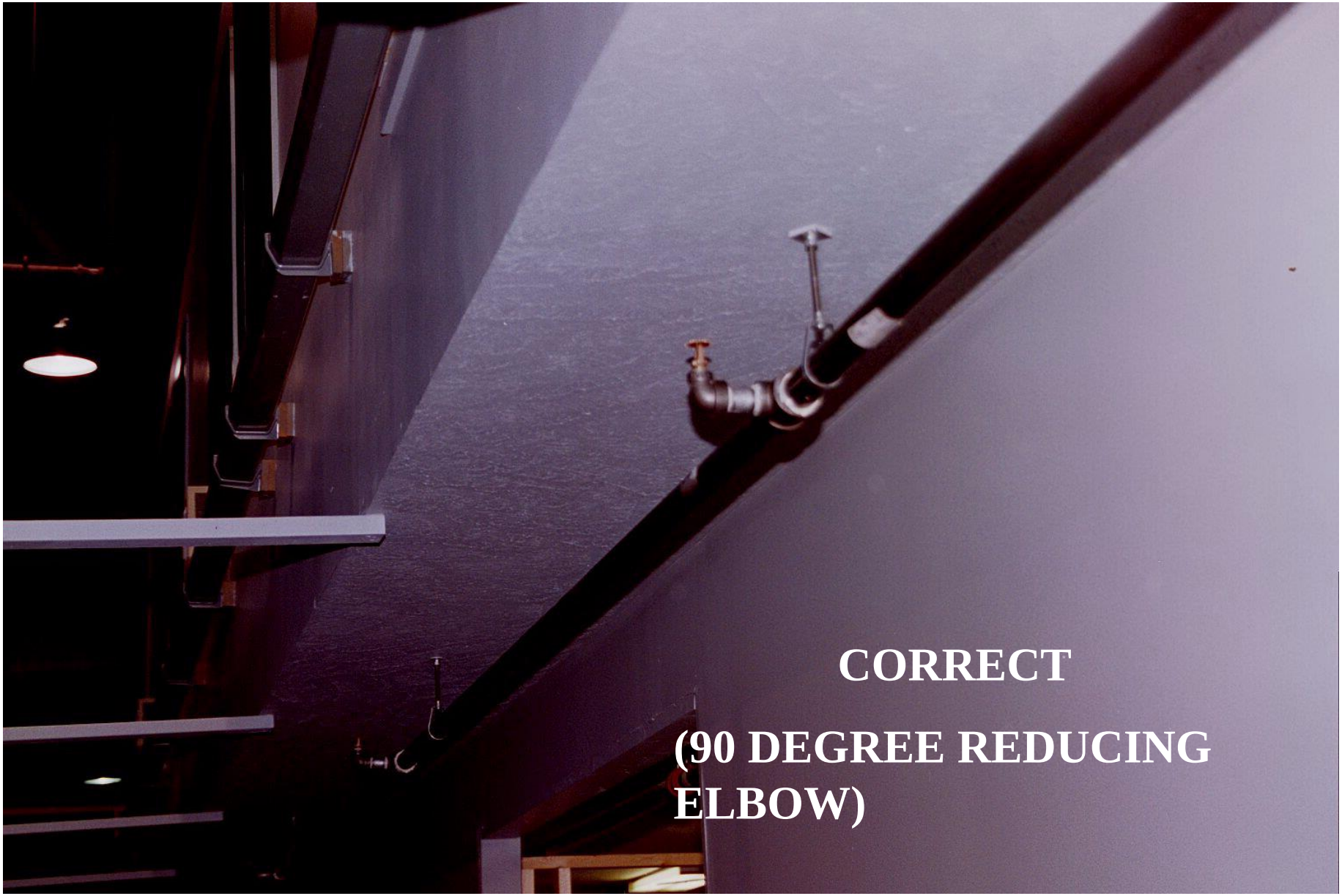
Fittings

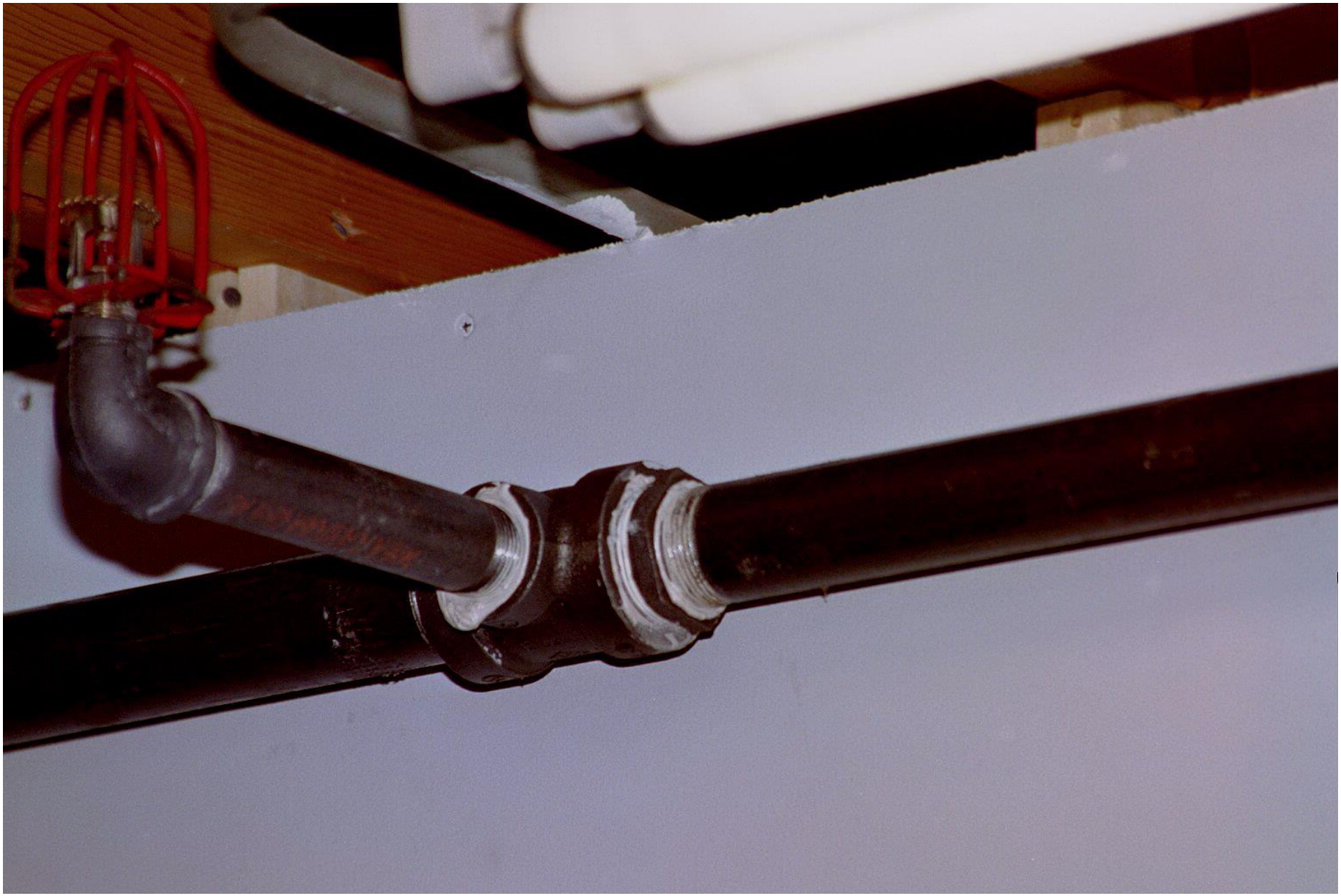
- May not mix/match different materials in single system;
- Only *listed* fittings may be used;
- Jobsite welding is severely limited and discouraged;
- No screwed unions in pipe larger than 2”;
- No bushings permitted (one-piece reducing fittings required)


INCORRECT


CORRECT


INCORRECT


CORRECT
(90 DEGREE REDUCING ELBOW)



Standpipes

- Sprinkler Standpipes are regulated in NFPA 14 (2010 Ed)
- Can provide only hose stations, or can supply water to sprinkler heads in other areas of the building
- Class I – 2 ½ inch hose connections for Fire Dept only
- Class II – 1 ½ inch hose connections for trained (civilian) personnel or Fire Dept.
- Class III – 2 ½ inch hose connections reduced to 1 ½-inch for use by either trained personnel or by Fire Dept.
- Most systems today are Class III systems
- Vast majority are wet systems; Dry systems permitted only by special permission;

This **Combined System Standpipe** has both a 2 ½ inch hose station and a feed to an adjacent floor. The feed to the adjacent floor is required to have a separate, supervised control valve and a check valve. It should also have its own water flow alarm

There are several types of standpipe systems, including:

- Most Standpipe systems are Automatic Wet Standpipes – are equipped with a permanent water supply and are capable of supplying the demand at all times.

- Combined Systems supply both hose stations and automatic sprinklers

- Manual Dry Standpipe System is a system with no permanent water supply. The system relies on the Fire Department Connection to supply the system demand.

What is going on here?

Could something have been altered?

The inspector has to take the time to figure out what he is looking at. Were the floors above the pictured landing disconnected? Were they re-fed from a different location?

* Usually found in protected stairways

* May be on every floor adjacent to hallway door

- **May be located on intermediate landings serving 2 separate floors**

Standpipe Regulations

NFPA-14

- The entire system of standpipes and/or automatic sprinklers must be interconnected so that only one Fire Department Connection is necessary;
- Fire Department Connections should be located with input from the local Fire Chief and shall be located in close proximity to a hydrant;
- Standpipe systems should be wet systems unless piping is subject to freezing;
- Class I and Class III Standpipes with hose valves only shall be at least 4-inch piping; Combined System piping shall be a minimum of 6-inch piping
- The maximum travel distance to a hose station is 130-feet in a non-sprinklered building;

SUPERVISION

- 1998 OBBC and Before (924.1)

  Groups A, B, E, H, I, M or R require supervision by Central Station system

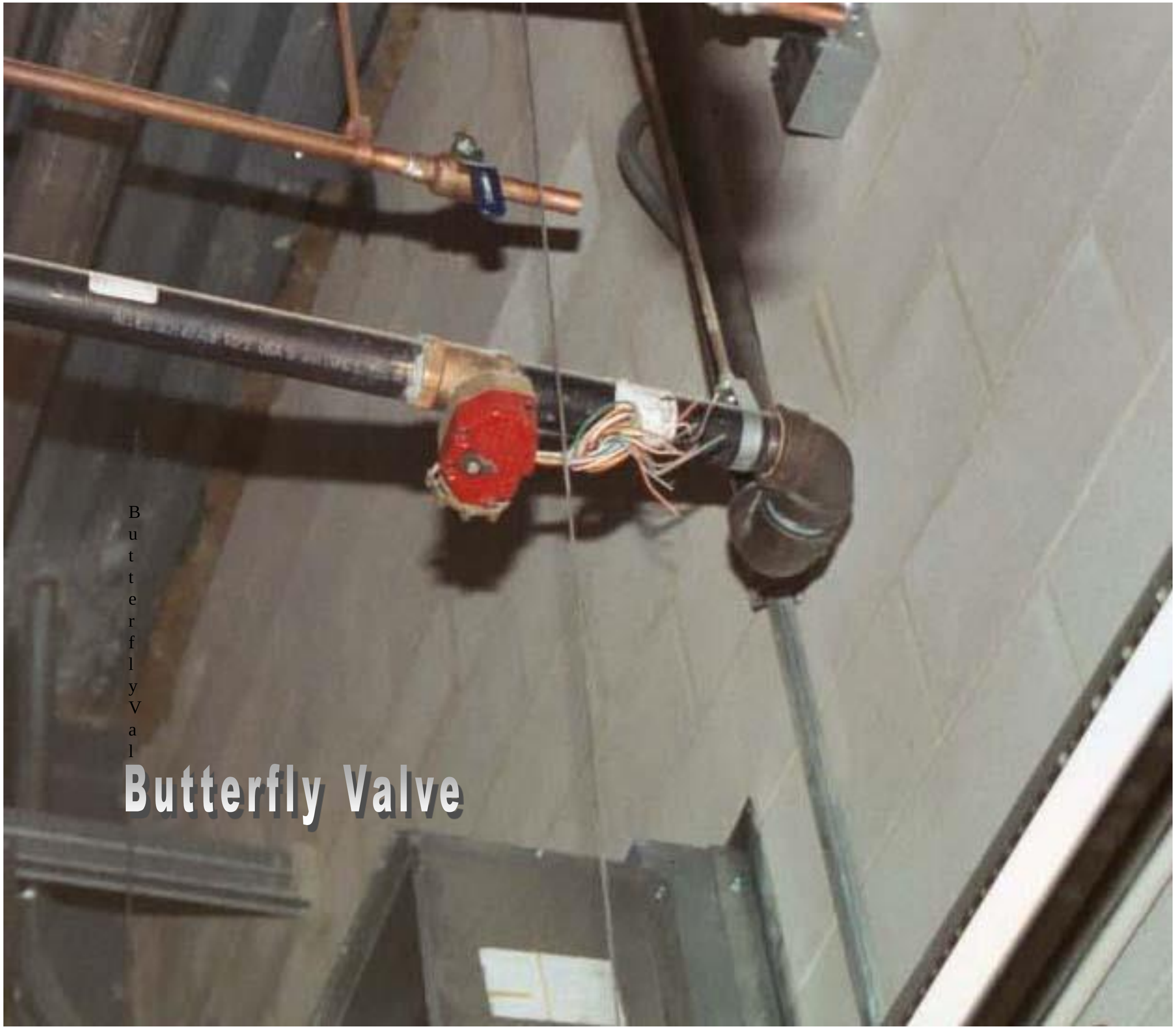
  Other groups (F & S) may have valves locked open with chain/padlock

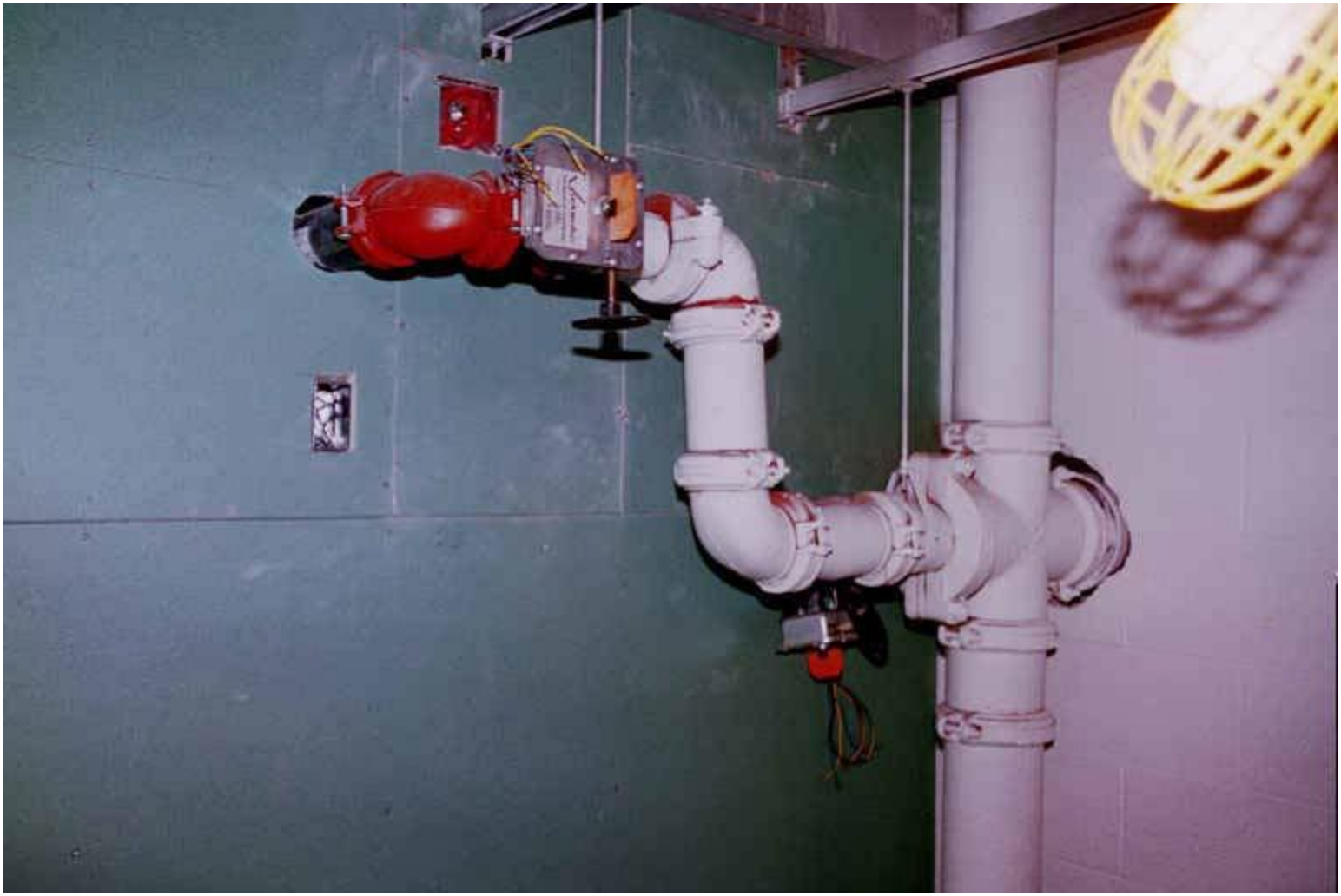
- 2002 OBC and Later (903.4)– All Groups must be supervised by Central Station system (limited area systems and residential systems are excepted)

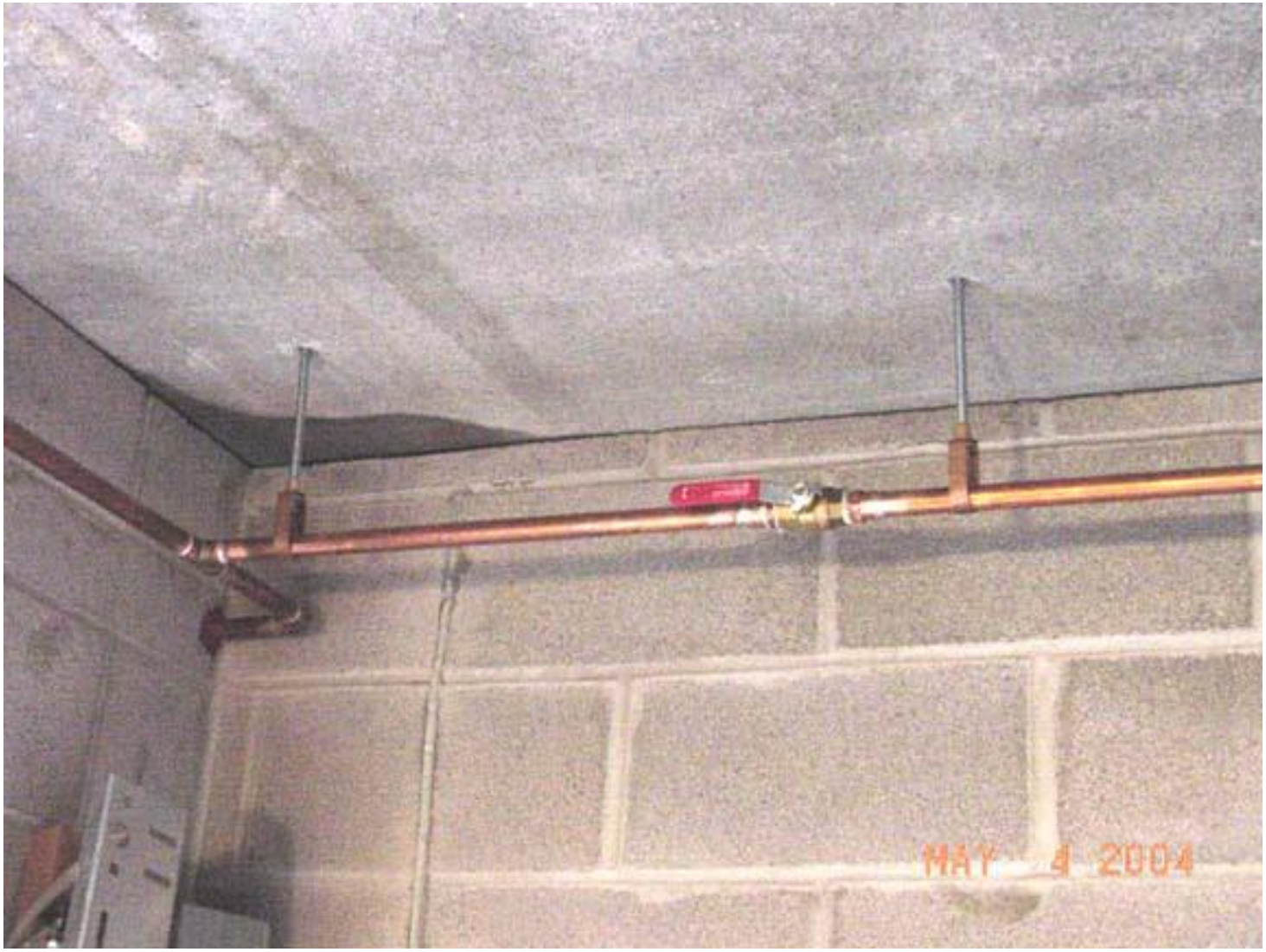
- Supervision must be tested for final approval of the system.

ButterflyVal

Butterfly Valve







Ball valve – Very difficult to supervise or lock in the “on” position

Inspector's Test:

- Must be 1-inch pipe
- Must have restrictor in pipe
- Must be labeled
- Must be on end of system on Dry Systems

NFPA-72 ALARM TEST

- Must be tested for sprinkler system to be finalized
- Central Station report must be part of the test. (72; 7-1.6)
- Must report alarms separate from supervisory problems
- Must have redundant reporting methods

(72; 5-5.2 or 5-5.3)

- All Supervisory switches on control valves should be tested to see if they send a supervisory (trouble) signal and also to make sure the switch clears when turned back to its normal mode

- All alarm valves must be checked, including alarm check valves, dry pipe valves and water flow alarms. Remember to insert a restrictor in the inspector's test for water flow check.

- (NFPA 13:8.17.1)Water flow alarm is required on any systems with more than 20 heads.

- (OBC 903.4) There are a few other exceptions to requirement for alarm valves, such as alarm valves for kitchen hoods or paint spray booths where the control valve can be locked in the "ON" position.

FLOW THE WATER!

For a copy of the Handout

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