



# NFPA 25 & NFPA 72 Overview



# NFPA 25 & NFPA 72 Overview

- Address portions of NFPA-25, NFPA-72 and related requirements of The Joint Commission.
- Not a complete review of NFPA-25, NFPA-72 and related requirement of The Joint Commission.



# Van Fitch - Bio

## Van F. Fitch

Regional Service Manager

### Industry Experience: 29 Years

- Fire Protection Operations & Sales Management: contracting, service, inspection & testing
- Fire Protection Project Management
- Fire Protection Estimating

### Certifications/Education:

- NICET Level IV - Fire Protection Engineering Technology Water-Based
- NICET Level I - Fire Protection Engineering Technology Special Hazards Suppression Systems
- B.A. from Kent State University



# Bill Nyback - Bio

## Bill Nyback

Fire Protection Consultant

### Industry Experience: 15 Years

- Fire equipment technician – service and installation - 8 years
- Fire alarm & special hazards field engineer – service and installation - 5 years
- Fire protection consultant for service and inspection, testing and maintenance – 7 years with Ahern

### Certifications/Education:

- NICET Level I - Fire Protection Engineering Technology Special Hazards Suppression Systems
- Manufacturer's Certifications from Ansul, Pyrochem, Mirocom and Rotarex



# Agenda

- NFPA 25 Overview
- NFPA 72 Overview
- Common Deficiencies – NFPA 25
- Extended-Interval Testing
- Record Retention Requirements



NFPA-25

# NFPA 25

## 2008 Edition



# What is NFPA 25?

- The standard for inspection, testing, and maintenance of water-based fire protection systems.



# NFPA 25

- Includes:
  - Underground piping
  - Fire pumps
  - Storage tanks
  - Water spray systems
  - Foam-water sprinkler systems



## Responsibility for Inspection, Testing, and Maintenance Performance

- 4.1.1 - It is the owner's responsibility to maintain their sprinkler system in good operating condition.



- Changes in occupancy, use, process, or materials
  - Evaluation is required
  - Owner's or Occupant's responsibility to arrange for evaluation – details in 4.1.6

# Responsibility for Inspection, Testing, and Maintenance Performance

- Owner or Occupant Responsibility
  - 4.1.1 – Responsibility for inspection, testing and maintenance
  - 4.1.2 – Accessibility
  - 4.1.3 – Notification of system shutdown
  - 4.1.4 – Corrections and repairs



# NFPA 25 States

- 25.4.5 – Visually inspected
- 25.4.6.1 – Tested



# What do inspections report?

- 4.4.2 – Records shall indicate the procedure performed and the results.

# Factors that Affect System Performance

- Closed Valves
- Damaged Components
- Occupancy Change
- Process and Material Changes
- Building Renovations
- Shutdown of Heating System
- Water Supply Changes

# Annual Fire Sprinkler Tests

- Inspection of the system as described in NFPA-25.
- Main drain tests.
- Forward flow testing of backflow preventer.
- Test flow alarms.
- Test all supervisory alarms.
- Exercise control valves.
- Dry-pipe system trip test.
  - Short Trip
  - 3-year full flow trip test

# Main Drain Tests

- 13.2.5.2 Main Drain Tests
  - Pass/fail criteria

# Backflow Preventer Testing

- 13.6.2.1 Backflow Preventer Testing
  - Only the flow should be measured, not the pressure. (per code)
  - Local municipalities then require the pressure test.

# Annual Fire Pump Tests

- Perform annual fire pump test in accordance with NFPA 20.



# Annual Pump Test

- 8.3.5.3 Annual Pump Test
  - The pass/fail criteria
  - The test pressure at rated flow is within 95% of the initial certified field test curve.
  - The test pressure is within 95% of the performance characteristics on the pump nameplate.

# Hydrants

- 7.3.2 – Hydrants shall be tested annually to ensure proper functioning.



# Gauges

- Wet System: The pressure gauge should be located on the system side of the backflow prevention device.
- Dry System: The pressure above the dry valve should be lower than the reading on the gauge below the valve. Typically close to a 6:1 ratio.

# Gauges

- Ensure the system gauge shows normal water supply pressure
  - **5.2.4.2 - Weekly on Dry**
  - **5.2.4.1 - Monthly on Wet**



# Valves

- Must be supervised:
  - Required systems: supervision by alarm system
  - Non required systems can have a lock and chain
  - Must be indicating type & listed for service

# Fire Department Connections

- Visible & Accessible
- Couplings & Swivels Not Damaged and Rotate Smoothly
- Plugs and Caps in Place and Not Damaged
- Gaskets in Place and Not Damaged



# Fire Department Connections

- Identification Sign in Place
- Check Valve Not Leaking
- Automatic Drain Valve in Place and Operating Properly



# Waterflow Alarms

- Paddle-type waterflow alarm indicators shall be installed in wet systems only.
- IBC 901.6.1 Required automatic sprinkler systems shall be monitored by an approved supervising station.



# Low Point Drains Dry-Pipe Systems

- Must be thoroughly drained prior to cold temperatures.



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AUXILIARY DRAIN

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# Retention of Original Documents

- 4.4.4 Retention of Original Documents
  - As-built Drawings
  - Hydraulic Calculations
  - Test Papers
  - Manufacturers Data Sheets

# Placard



855 Morris Street  
 Fond du Lac, WI 54935  
 800-J F Ahern (800) 532-4376

Calculation Riser Placard for AREA/DENSITY Designed Systems.

System Design Area: **System 3 - Remote Area 1**

At: **Company A**

Contract No.: 000000 Print No.(s): **FP - 2** Dated: 5/13/14

This system, as shown on **J. F. Ahern Co.** drawing, is designed for **17** sprinklers to discharge at a density of **0.20 GPM/SqFt** over a minimum area of **1,500.00 SqFt** when supplied with water at the rate of **531.00 GPM** at a pressure of **147.00 PSI** at the base of system riser.

Occupancy Classification: **Ordinary Hazard Group 2**

Commodity Classification: **Class I - IV**

Inside Hose Stream added at base of riser: **0 GPM**

Outside Hose Stream added at source: **250 GPM**

Standard / Issue: **NFPA 13, 2007 Edition**

Antifreeze System Solution: **N/A**

Antifreeze System Capacity: **N/A Gallons; N/A% Antifreeze**

Storage Height (max.): **12'-0"**

Other Storage: **N/A**

General Information	Yes	No
High Pile	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Rack Storage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hazardous Material	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Idle Pallets	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Flammable/Combustible Liquids	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Solid Shelving	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Encapsulation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Aisle Width (min.)	<u>N/A</u>	<b>Feet</b>

### Sprinkler Head Quantity & Type:

Qty.	Make/Vendor	Model/Type	K-Factor	Temp.
17	Viking	Std. Fusible Link Pendent VK206	8.0	286° F



# Extended Interval Tests

# Dry System Leakage Test

- 13.4.4.2.9 Dry System Leakage Test – every 3 years (modified in 2008)
  - Test with air at 40 psi for 2-hours.
  - Turn off the system air source for 4-hours.

# Gauges

- 5.3.2 - Gauges shall be replaced every 5 years or calibrated.



# Sprinkler Replacement for Testing

- Fast response sprinklers shall be tested or replaced after 20 years. If tested, they must have a representative sample tested every 10 years.
- Sprinklers that are 50-years old shall be replaced or tested and retested every 10 years.
- 5.3.1.3 – Where one sprinkler fails in a representative sample test, all sprinklers must be replaced.

# 5-Year Testing – Internal Pipe Inspection

- Standard Internal Pipe Exam
  - End of one main
  - End of one branchline
- Internal Pipe Exam for ‘at-risk’ systems
  - System Valve
  - Riser
  - Cross Main
  - Branch line
- Obstruction Investigation – if certain conditions are present



# 5-Year Inspections

- All check valves internally inspected
- All gauges calibrated or replaced



# Hydrostatic Tests of Standpipes

- 6.3.2.1 Hydrostatic Tests of Dry and Manual Standpipes – 5 year
- 6.3.1.1 Flow test of Standpipes – 5 year



# Changes in the 2011 Edition



# Changes in the 2011 Edition

- Introduce the concept of classifying deficiencies to prioritize repairs.
  - Added definitions for ‘critical’ and ‘non-critical’ deficiencies.
  - New Annex E classifies common deficiencies and repairs as critical, non-critical, or impairment.

Stay Tuned!

# Changes in the 2011 Edition

- 3-Year Air Tests now required for preaction systems as well as dry systems.
- Electric fire pumps can once again be operated monthly instead of weekly (diesel pumps remain weekly).
- Any heat tape or tracing on fire sprinkler systems must now be inspected per manufacturer's requirements.

# Comparisons

NFPA-25, 2011 Edition (WI)

NFPA-25, 1998 Edition (The Joint Commission)



# Differences between TJC and State of WI

- The state of Wisconsin has adopted the 2011 edition of NFPA-25.
- The Joint Commission utilizes the 1998 Edition of NFPA-25.



# Differences between TJC and State of WI

- Some major differences between the 1998 Edition and the 2011 Edition of NFPA-25:
  - 1998 has no testing requirements for dry sprinklers; 2011 requires 10-year sample testing.
  - 1998 doesn't address testing of manual standpipes.
  - 1998 requires weekly testing of electrical fire pumps; 2011 requires monthly testing of electrical fire pumps.

# Differences between TJC and State of WI

- Some major differences between the 1998 Edition and the 2011 Edition of NFPA-25:
  - 1998 requires quarterly water flow alarm testing; 2011 allows electric flow switches to be tested semiannually.
  - 1998 doesn't require 5-year interval inspections of system piping and preaction valves; 2011 does.
  - 1998 doesn't require 3-year air tests of dry and preaction systems; 2011 does.



NFPA-72

# NFPA 72



# Fire Alarm Inspection & Test

- Inspections and tests are required by NFPA 72, *National Fire Alarm and Signaling Code*
  - Adopted by other codes
  - Required by law
  - Referenced in Joint Commission EC 02.03.05, 1999 Edition of NFPA 72



# Equivalency

- Inspection, testing, and maintenance programs shall satisfy the requirements of this Code and conform to the equipment manufacturer's published instructions.
- Inspection, testing, and maintenance programs shall verify correct operation of the system.

# Qualifications

- NFPA 72 requires inspection, testing, and maintenance personnel to be “qualified and experienced”.



# Responsibilities

- Who is responsible to ensure that inspections, tests, and maintenance are carried out?
  - The property owner, or
  - The system owner, or
  - The building owner, or
  - Their designated representative
- Delegations must be in writing
- Must provide a copy for the AHJ when requested

# Required Documentation

- Record (as-built) drawings
- Calculations
- Operations and Maintenance (OM) Manual
- Sequence of Operations
- Matrix of Operation
- Record of Completion
- NFPA 72
- Previous Inspection and Test Report

# Types of Inspections

- Initial/Acceptance
- Re-Acceptance
- Periodic



# Initial/Acceptance Inspections

- Conducted when system is installed
- Involve a 100% inspection
- Used to verify code compliance and functionality



# Re-Acceptance Inspections

- Conducted when the system changes
  - Addition of new devices or equipment
  - Deletion of devices or equipment
  - Modifications made to system hardware or wiring
  - Changes made to site specific software
  - Inspect changes to system

# Periodic Inspections

- Conducted even if the system does not change.
- NFPA 72, requires visual and testing frequencies of inspection
  - Frequency Can Include:
    - Weekly
    - Monthly
    - Quarterly
    - Semi-Annually
    - Annually

# Fire Alarm Test Methods

- NFPA 72, 1999 contains the methods of testing each component in Table 7-2.2
  - Component Examples:
    - Initiating Devices
      - Smoke, Heat, Duct-Smoke detectors, manual pull stations, etc.
    - Alarm Notification Appliances
    - Batteries

# Fire Alarm Test Methods

- Testing involves a physical manipulation of the component or equipment.
- Test: “An examination or trial, as to prove the value or find out the nature of something”.
  - Use a checklist
  - Use drawings

# Fire Alarm Test Methods

- Fire Alarm Control Panel
  - Fuses
  - Interfaced equipment
  - Lamps & LED
  - Primary/secondary
  - Power supply
  - Control Functions
  - Annunciators



# Fire Alarm Test Methods

- Battery and Charging Equipment
  - Test battery charger annually
  - 30 minute battery discharge test
    - Annually
  - Load voltage battery
    - Semi-Annually
  - Other testing required depending on battery type listed in Table 7-3.2

# Fire Alarm Test Methods

- Initiating Device – Heat Detectors
  - Restorable
    - Detectors should be tested with a heat source per the manufacturer recommendations
    - Annual Testing
  - Non-Restorable
    - After 15 years of installation, all devices should be replaced or two detectors per 100 shall be laboratory tested

# Fire Alarm Test Methods

- Initiating Device – Smoke Detectors
  - Types of Smoke Detectors
    - Photoelectric, Ionization
  - Functional Testing
    - Tested with smoke entry into sensing chamber
    - Test with smoke or listed aerosol approved by the manufacturer
    - Annual Testing

# Fire Alarm Test Methods

- Initiating Device – Smoke Detectors
  - Sensitivity Testing Frequency
    - Shall be checked 1 year after installation and every alternate year
    - After the second required calibration test has indicated that the testing values are within acceptable range, the test can be extended to a maximum of 5 years
      - If extended, records of detector caused nuisance alarms need to be kept
      - If zones or areas where nuisance alarms have increased over the previous year calibration is to be performed

# Fire Alarm Test Methods

- Initiating Device – Smoke Detectors
- Sensitivity Testing Methods
  - Calibrated test method
  - Manufacturers calibrated sensitivity test instrument
  - Listed Control Equipment
  - Smoke detector/control unit arraignment to annunciate a signal when outside accepted values

# Fire Alarm Test Methods

- Initiating Device – Duct Smoke Detectors
  - Test & inspected to ensure the device will sample the airstream
  - Test in accordance with manufactures recommendations



# Fire Alarm Test Methods

- Alarm Notification Appliances
  - Types Of Notification Appliances
    - Bells
    - Horns
    - Speakers
    - Lights
    - Textural Displays
    - Combination



# Fire Alarm Test Methods

- Alarm Notification Appliances
  - Audible & Audible Textural (Speakers, Voice Messaging)
    - Sound pressure level shall be measured and recorded
    - Annually
  - Visual
    - Tested in accordance with manufacturers instructions
    - Annually

# Fire Alarm Test Methods

- Fire Alarm Signal Transmission Equipment
  - Digital Alarm Communicator Transmitter (DACT)
    - Follow manufacturer's instructions
    - Verify connection to 2 separate means of communication, per NFPA 72
    - Verify line seizure capability
    - Test loss of communications means and verify trouble signal is transmitted to supervising station within 4 minutes

# Fire Alarm Test Methods

- Sequence of Operation Testing
  - Elevator recall and shutdown
  - HVAC shutdown
  - Stair pressurization
  - Smoke door releasing
  - Door unlocking devices
  - Damper control
  - Smoke evacuation

# Impairments & Deficiencies

- Systems must be returned to service after testing is completed.
- Notify AHJ when any system is down for more than 4 hours.
- Fire watches may be required
- Verbally notify owner in writing of ANY deficiencies and follow up in writing within 24 hours



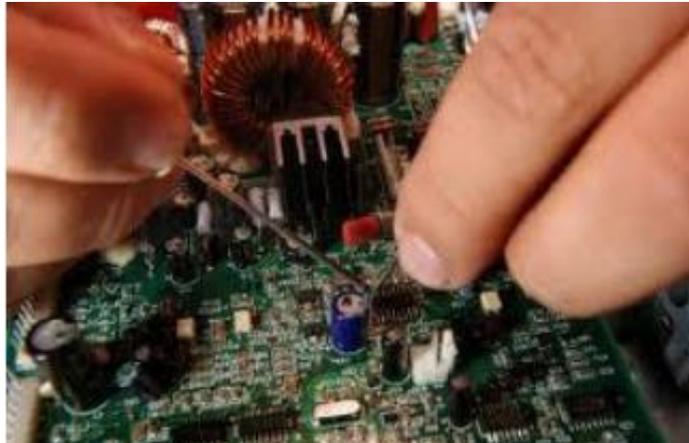
# Maintenance

- Follow manufacturer's requirements
- Environment may warrant more frequent maintenance



# Maintenance

- Field repairs to boards and other equipment is generally not permitted by the manufacturer.
- Only factory repairs are permitted.
- What is required if a panel needs to be replaced?



# Warranty

- Most manufacturer warranties extend to 12 months
- Warranties usually start on the day of acceptance
- Warranties may be extended by contract



# Service Contracts

- Some jurisdictions require maintenance contracts
- Systems that are not properly maintained will usually suffer from early failures



# Records

- Record of Completion (NFPA 72)
  - New systems
  - Changes to system
- Record of Inspection, Test, and Maintenance (NFPA 72)
  - All inspections and tests
- Other records
  - As-built (record) drawings
  - Operations and Maintenance (OM) manuals
  - Site specific software
  - Building permit

# Records

- For software-based systems, a copy of the site-specific software shall be provided to the system owner or owner's designated representative.
- A copy of the site-specific software shall be stored on-site in non-volatile, non-erasable, non-rewritable memory.
- The system owner shall be responsible for maintaining these records for the life of the system for examination by any authority having jurisdiction. Paper or electronic media shall be permitted.

# Extended Interval Tests

## Fire Alarm

# Fire Alarm Extended Interval Examples

- Battery Replacement
  - Replaced in accordance with the alarm equipment manufacturers
    - Generally 3-5 years
- Smoke Detector Sensitivity Testing
  - 1 year after installation and every other year
    - After second required test, extended to a maximum of 5 years
- Non-Restorable Heat Detectors
  - After 15 years of installation, all devices should be replaced or two detectors per 100 shall be laboratory tested



# Tests

- Replace all detectors after 15 years or test statistical sample (2 per 100)

# Categorical Waivers

- Extinguishing Requirements
  - Allows for the reduction in the testing frequencies for sprinkler system vane-type and pressure switch type water flow alarm devices to semi-annual, and electric motor-driven pump assemblies to monthly. NFPA 25-2011, 5.3 and 8.3 and all other applicable NFPA 25-1998 (as referenced in section 9.7.5 of the NFPA 101-2000)
    - The semi-monthly water flow test first appeared in NFPA 25-2002
- See ASHE website for more information



Awareness

# Common Deficiencies

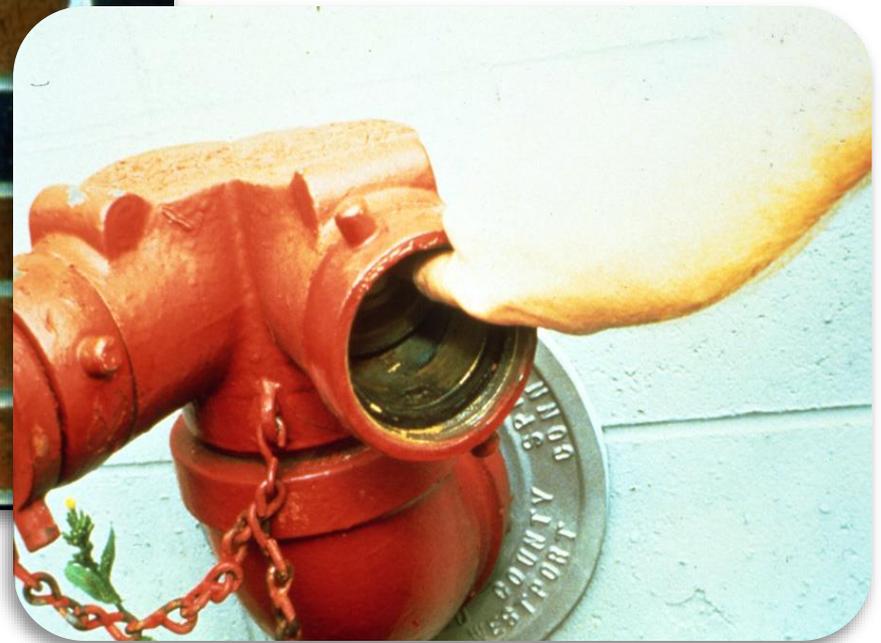


# Corrections and Repairs

- 4.1.4 – The owner is responsible to promptly repair or correct deficiencies, damaged parts, or impairments found while performing the inspection, testing, or maintenance requirements of this standard.\*

\*With regards to recalled products (A.4.1.4), entrance into a program for scheduled replacement is an acceptable remedy.

# Fire Department Connections





# FDC Obstruction?





MAY 13 2005

# Sprinklers

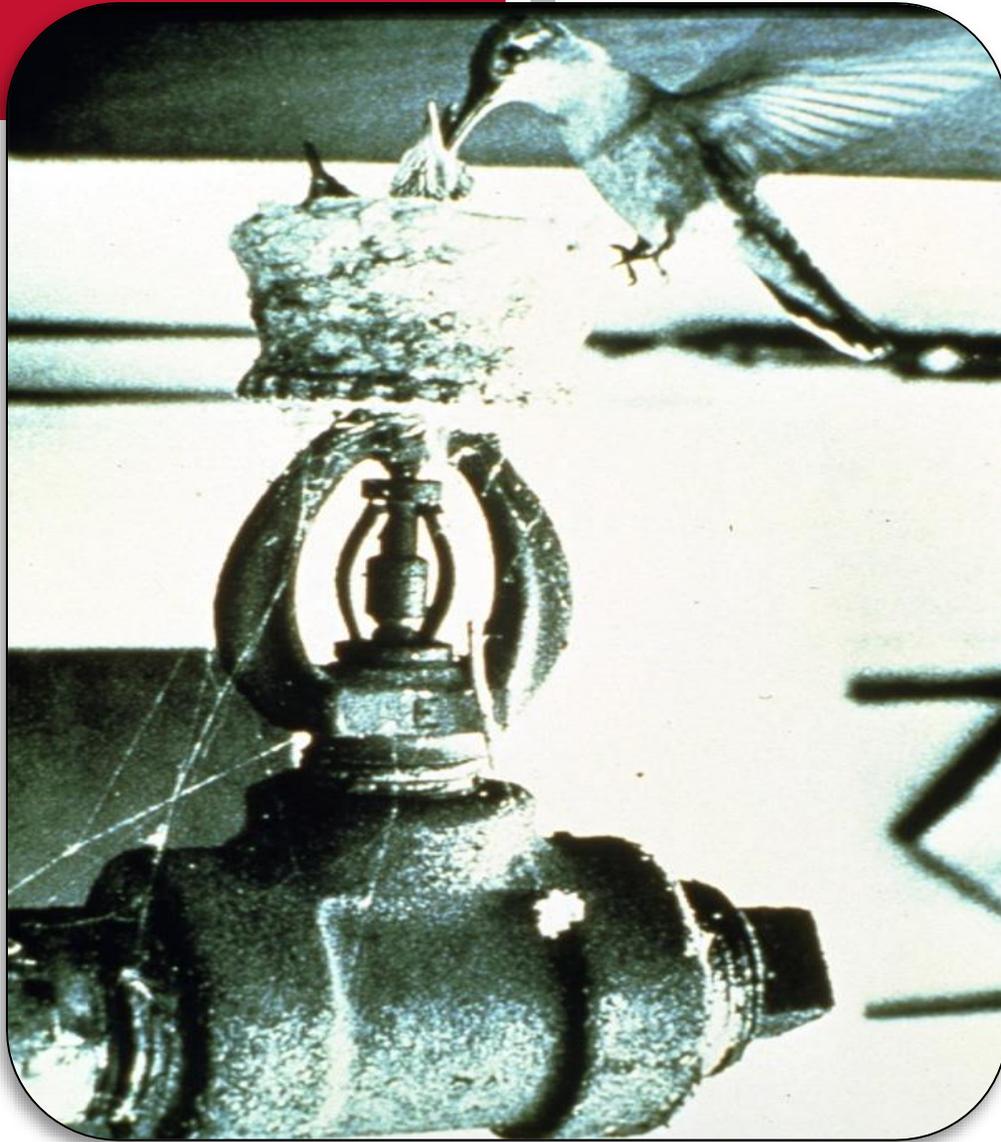
- Spare sprinklers and wrenches missing
- Over 50 years old-standard spray sprinklers
- Over 20 years old-fast or quick response sprinklers
- Over 10 years old-dry pendent sprinklers

# Old Style Sprinkler



# Sprinkler Physical Damage

- Sprinklers free of corrosion, paint, etc.
- Piping free of mechanical damage
- No external loads on piping
- Hangers not damaged or loose



# Painted Sprinklers

- Sprinkler heads can only be factory painted
- Ensure sprinklers are free of paint
  - Replace when painted
  - Ensure they are not still taped or covered

# Common Deficiencies

- Signage / Placards
  - Missing zone charts
  - Missing low-point drain maps
  - Missing hydraulic calculation placards



# Placard



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### Sprinkler Head Quantity & Type:

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## No Forward-Flow Test Connections for Backflow Prevention Devices

# Common Deficiencies

Control Valves Not Secured





# Common Deficiencies

## Pipe Obstructions & Corrosion









# Questions?

