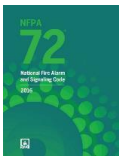




# Coordinating NFPA 25 & 72 Inspection, Testing, & Maintenance Requirements



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## Presenter Bio: John Swanson

- Certified Fire Protection Specialist (NFPA)
- Codes & Standards Specialist-NFSA
- Former Deputy State Fire Marshal (MN)
- NFPA 72 Technical Committee
- Previous member – IBC Fire Safety Committee/IFC Interpretation Committee
- Instructor/SME for International Code Council and NFPA 72
- Appointed by MN Gov. Mark Dayton to MN Board of Architecture & Engineering (2013-2017)



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## Introductions

- Please introduce yourself:
  - Current position?
  - Years of experience in your industry?



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**Learning Objectives**

- Identify and discuss the foundational requirements for ITM in the model building and fire codes.
- Discuss the roles and responsibilities of the sprinkler contractor, the alarm contractor, the authority having jurisdiction, and the building owner in coordinating ITM work.
- Identify the coordination requirements in NFPA 25.



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**Learning Objectives**

- Identify the coordination requirements in NFPA 72
- Discuss the impact of NFPA 4.
- Develop a plan for coordinating system impairments.
- Develop a plan for coordinating recordkeeping.



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**Fire & Building Code References**

MODULE 1



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### Fire Code References

- All building and fire codes used in the US list when and where sprinklers and alarms are required
- Codes also require interconnection of these systems



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### Fire Code References

- Fire and Building Codes are adopted by administrative laws
- Fire and Building Codes reference the ITM standards
- Inspection, Testing, & Maintenance standards (NFPA 25 & 72) list ITM tasks and frequencies



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### IFC Section 901

- Section 901.4.5 Prohibits the appearance of fire protection equipment but do not perform that function.



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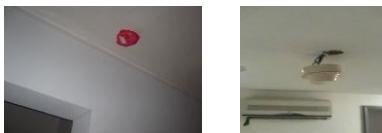
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### IFC ITM Requirements

- **901.6 Inspection, testing and maintenance.** Fire detection, alarm, and extinguishing systems...shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired fire protection systems and equipment shall be inspected, tested, and maintained or removed.



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### Fire Code References

- **901.6.1 Standards.** Fire protection systems shall be inspected, tested, and maintained in accordance with the standards listed in Table 901.6.1.

SYSTEM	STANDARD
Portable fire extinguishers	NFPA 10
Carbon dioxide fire-extinguishing system	NFPA 12
Halon 1301 fire-extinguishing systems	NFPA 12A
Dry-chemical extinguishing systems	NFPA 17
Wet-chemical extinguishing systems	NFPA 17A
Water-based fire protection systems	NFPA 25
Fire alarm systems	NFPA 72
Smoke and heat vents	NFPA 204
Water-mist systems	NFPA 750
Clean-agent extinguishing systems	NFPA 2001



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### IFC – 901.9

- When a fire alarm system is required to be monitored, notice shall be made to the fire code official when the alarm monitoring service is terminated (901.9)
  - Notice must be made in writing by the monitoring service provider being canceled



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### Fire Code Reference

- **903.5 Testing and Maintenance.** Sprinkler systems shall be tested and maintained in accordance with Section 901.



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### Fire Code Reference

- **13.3.3.2** A sprinkler system installed in accordance with this Code shall be inspected, tested, and maintained in accordance with NFPA 25.



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### Fire Code References

- **13.7.1.4.2\*** To ensure operational integrity, the fire alarm system shall have an approved maintenance and testing program complying with the applicable requirements of Sections [13.4](#) and [13.7](#). [**101**: 9.6.1.4]
- **13.7.3.1.1.2** System components shall be installed, tested, inspected, and maintained in accordance with the manufacturer's published instructions and this *Code*. [**72**: 10.3.2]



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### Fire Code References

- **13.7.3.2.4.1** Test plan documentation shall be provided in accordance with 14.2.10 of [NFPA 72](#). [72:7.6.1]
- **13.7.3.2.4.4** Periodic inspection and testing documentation shall be provided in accordance with 14.6.2 through 14.6.4 of [NFPA 72](#). [72:7.6.4]
- **13.7.3.2.4.5** Impairment documentation shall be provided in accordance with Section 10.2 of [NFPA 72](#). [72:7.6.5]



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### Fire Code References

- **907.8 Inspection, testing and maintenance.** The maintenance and testing schedules and procedures for fire alarm and fire detection systems shall be in accordance with [*this section*] and [NFPA 72](#). Records of inspection, testing, and maintenance shall be maintained.



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### Fire Code References

- **907.8.1 Maintenance required.** Whenever required for compliance with the provisions of this code, devices, equipment, systems, conditions, arrangements, levels of protection or other features shall thereafter be continuously maintained in accordance with applicable NFPA requirements or as directed by the fire code official.



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### Fire Code References

- **907.8.2 Testing.** Testing shall be performed in accordance with the schedules in **NFPA 72** or more frequently where required by the fire code official. Records of testing shall be maintained.
  - *Exception: Devices inaccessible due to safety reasons shall be tested during shutdowns, but not less than every 18 months.*



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### Fire Code References

- **903.4 Sprinkler system supervision and alarms.** All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressures and water flow switches on all sprinkler systems shall be electrically supervised by a listed fire alarm control unit.



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### Fire Code References

- **903.4.1 Monitoring.** Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved supervising station, or, when approved by the fire code official, shall sound an audible signal at a constantly attended location.



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### Fire Code References

- **903.4.2 Alarms.** An approved audible device, located on the exterior of the building in an approved location, shall be connected to each automatic sprinkler system...Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system.



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### Purpose of Inspection, Testing, & Maintenance

MODULE 2



23

### Barclay Friends nursing home fire

- November 2017
- West Chester, Pennsylvania
- 60-unit building
- 4 deaths
  - Delores Parker
  - Thomas Parker
  - Mildred Gadde
  - Theresa Malloy



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**Barclay Friends nursing home fire**



NFSA AFAA

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**Barclay Friends nursing home fire**



NFSA AFAA

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**Barclay Friends nursing home fire**



NFSA AFAA

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### Purpose of ITM

- Purpose is similar between NFPA 25 & 72
- Helps ensure reliability
- Not designed to address every possible problem

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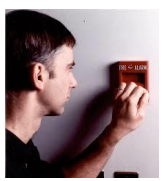
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### FA Inspection, Testing & Maintenance

Why do we test and inspect fire alarm systems?



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### FA Inspection, Testing & Maintenance

Lack of ITM is the leading cause for fire alarm system failure



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**Chapter 14 – Inspection, Testing & Maintenance**

For a fire alarm system to be reliable, it must be:

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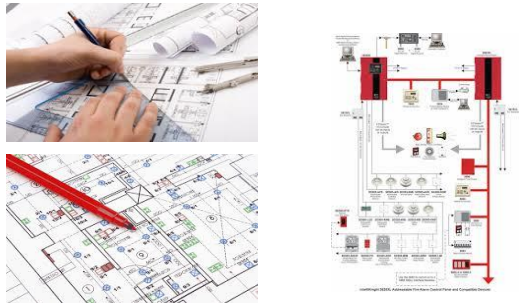
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**Properly Designed**



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**Properly Installed**



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### Properly Maintained



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### Will the System Work?

Sprinkler System Success Rate

- Public Assembly – 96%
- Educational – 93%
- Health Care – 96%
- Residential – 98%
- Store / Office – 96%
- Manufacturing – 93%
- **Storage – 79%**
- All Structures – 95%



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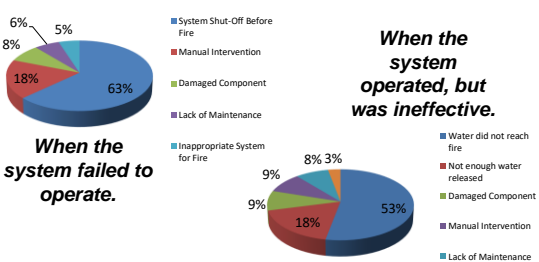
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### Will the System Work?



National Fire Protection Assoc. Sprinkler Experience in the U.S.



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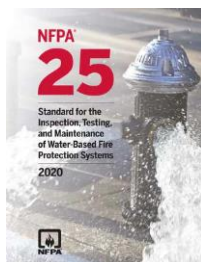
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### Purpose of NFPA 25



“...ensure a reasonable degree of protection for life and property from fire through minimum inspection, testing, and maintenance...”

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### Purpose of ITM - NFPA 72®

- **14.2.1.3\*** The purpose for periodic inspections is to assure that obvious damages or changes that might affect the system operability are visually identified.
- **14.2.1.4\*** The purpose for periodic testing is to statistically assure operational reliability.



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### Purpose of ITM - NFPA 72®

- **14.2.2.1.2** Inspection, testing, and maintenance programs shall verify the correct operation of the system.



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### Scope

- The purpose of ITM may be similar, the scope of the documents is not
- NFPA 25 focus on wear and tear
- NFPA 72 covers application, installation, location, performance, as well as ITM



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### Scope Differences

- NFPA 72 Table 14.3.1 – Visual inspection of all equipment:
  - *Ensure there are no changes that affect equipment performance. Inspect for building modifications, occupancy changes, changes in environmental conditions, device location, physical obstructions, device orientation, physical damage, and degree of cleanliness.*



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### Scope Differences

- NFPA 25 section 1.1.3.1:
  - *This standard does not require the inspector to verify the adequacy of the design of the system.*



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## Definitions

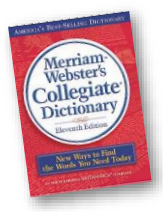
### MODULE 3



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## Key Terms

- Not all terms are defined in both standards
  - Inspection
  - Testing
  - Maintenance
  - Deficiency
  - Impairment
  - Qualified



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## Inspection – NFPA 25



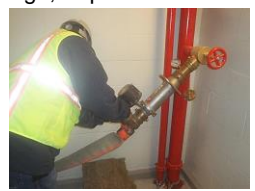
**3.3.23 Inspection.** A visual examination of a system or portion thereof to verify that it appears to be in operating condition and is free of physical damage.



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### Testing – NFPA 25

**3.3.46\* Testing.** A procedure used to determine the operational status of a component or system by conducting periodic physical checks, such as water flow tests, fire pump tests, alarm tests, and trip tests of dry pipe, deluge, or preaction valves.



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### Maintenance – NFPA 25

**3.3.25 Maintenance.** In water-based fire protection systems, work performed to keep equipment operable or to make repairs.



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### Fire Alarm Inspection



- A visual examination to detect physical damage or a change in conditions that could affect operation of the system or component.
- Not defined in NFPA 72



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### Fire Alarm Testing



- Physical manipulation of a component or system function to determine operational status.
- Not defined in NFPA 72

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### Fire Alarm Maintenance



**3.3.149 Maintenance.** Work, including, but not limited to, repair, replacement, and service, performed to ensure that equipment operates properly.

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### NFPA 72 - Deficiency

- **3.3.64 Deficiency.** A condition that interferes with the service or reliability for which the part, system, or equipment was intended.

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### NFPA 72 - Impairment

- **3.3.128\* Impairment.** An abnormal condition where a system, component, or function is out of order, and the condition can result in the system or unit not functioning when required.

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### NFPA 72 - Impairment

- **A3.3.128 Emergency Impairment.** An example of emergency impairment is physical damage to a control unit or wiring.
- **A.3.3.128 Planned Impairment.** Examples of a planned impairment include the addition of new devices or appliances or the reprogramming of system software.

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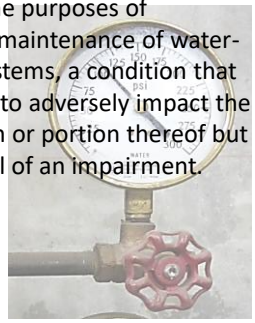
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### NFPA 25 Deficiency

**3.3.7\* Deficiency.** For the purposes of inspection, testing, and maintenance of water-based fire protection systems, a condition that will or has the potential to adversely impact the performance of a system or portion thereof but does not rise to the level of an impairment.




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### NFPA 25- Non-Critical or Critical

- Critical Deficiency
  - A deficiency that, if not corrected, can have a material effect on the ability of the fire protection system or unit to function as intended in a fire event.
- Noncritical Deficiency
  - A deficiency that does not have a material effect on the ability of the fire protection system or unit to function in a fire event, but correction is needed to meet the requirements of this standard or for the proper inspection, testing, and maintenance of the system or unit.



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### NFPA 25 Impairment



**3.3.21\* Impairment.**  
 A condition where a fire protection system or unit or portion thereof is out of order, and the condition can result in the fire protection system or unit not functioning in a fire event.



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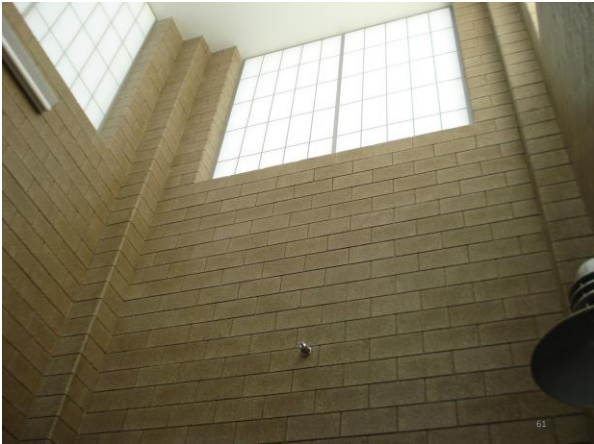
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NFPA 25 & 72 ITM Coordination Requirements



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NFPA 25 & 72 ITM Coordination Requirements



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NFPA 25 & 72 ITM Coordination Requirements



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NFPA 25 & 72 ITM Coordination Requirements



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# NFPA 25 & 72 ITM Coordination Requirements



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NFPA 25 & 72 ITM Coordination Requirements



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NFPA 25 & 72 ITM Coordination Requirements



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# NFPA 25 & 72 ITM Coordination Requirements



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NFPA 25 & 72 ITM Coordination Requirements



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### NFPA 25- Impairment

- Preplanned Impairment
  - A condition where a water-based fire protection system or a portion thereof is out of service due to work that has been planned in advance, such as revisions to the water supply or sprinkler system piping.
- Emergency Impairment
  - A condition where a water based fire protection system or portion thereof is out of order due to an unplanned occurrence, or the impairment is found while performing inspection testing or maintenance activities.



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### Qualified

- Same definition on both NFPA 25 & 72
  - *A competent and capable person or company that has met the requirements and training for a given field acceptable to the authority having jurisdiction.*



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### Roles & Responsibilities

MODULE 4



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### ITM Stakeholders

- There are 3 stakeholders in the ITM process
  - Owner
  - Contractor /Technician
  - AHJ
- Each has specific roles & responsibilities outlined by the standards




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### NFPA 1 Owner Requirements

- **13.1.2** The property owner shall be responsible for the proper testing and maintenance of the equipment and systems.
- **13.1.6** Detailed records documenting all systems and equipment testing and maintenance shall be kept by the property owner and shall be made available upon request for review by the AHJ.



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### IFC Owner Requirements (Alarms)

- **907.8.5 Maintenance, inspection and testing.** The building owner shall be responsible to maintain the fire and life safety systems in an operable condition at all times. Service personnel shall meet the qualification requirements of NFPA 72 for maintaining, inspecting, and testing such systems. A written record shall be maintained and shall be made available to the fire code official.



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**NFPA 72 - Owner Responsibilities**

- 14.2.3.1\* The property or building or system owner or the owner’s designated representative shall be responsible for inspection, testing and maintenance of the system and for alterations or additions to the system.



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**Owner Responsibilities (continued)**

- 14.2.3.2 Where the property owner is not the occupant, the property owner shall be permitted to delegate the authority and responsibility for inspecting, testing, and maintaining the fire protection systems to the occupant, management firm, or managing individual through specific provisions in the lease, written use agreement, or management contract.



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**Owner Responsibilities (continued)**

- 14.2.3.3 Inspection, testing, or maintenance shall be permitted to be done by the building or system owner or a person or organization other than the building or system owner if conducted under a written contract.



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**Owner Responsibilities (continued)**

- 14.2.3.4 Where the building or system owner has delegated any responsibilities for inspection, testing, or maintenance, a copy of the written delegation required by 14.2.3.3 shall be provided to the authority having jurisdiction upon request.



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**Owner Responsibilities (continued)**

- 14.2.3.5 Testing and maintenance of central station service systems shall be performed under the contractual arrangements specified in 26.3.3.



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**IFC Owner Requirements (Sprinklers)**

- Owner requirements aren't spelled out in the IFC, but through reference to NFPA 25



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### **NFPA 25 Owner Responsibilities**

- Chapter 4 “General Requirements”
- Section 4.1 “Responsibility of Property Owner or Designated Representative”
- Most owner requirements were combined into 4.1 in the last few cycles of NFPA 25

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### **NFPA 25 Owner Responsibilities**

- **Section 4.1** – Owner is responsible for:
  - *Inspection, Testing, & Maintenance*
  - *Maintaining temperature in the building*
  - *Providing access to important features*
  - *Notification of shutdown*
  - *Impairment handling/Appointing coordinator*
  - *Corrections and repairs*
  - *NOT making changes without evaluation*
  - *Addressing changes*
  - *Maintaining records*

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### **NFPA 25 Stakeholder Responsibilities**

- The **owner** is responsible for maintaining the system(s)
- The **contractor's** role is to provide the owner with information (facts) about the condition of the system
- The **AHJ's** role is enforcement (making sure NFPA 25 is being followed) along with some consultation

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## Technician Qualification

### MODULE 5



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#### NFPA 72 - Inspection Personnel

- **10.5.3.1\* Inspection Personnel.** Inspections shall be performed by personnel who have developed competence through training and experience acceptable to the authority having jurisdiction or meet the requirements of 10.5.3.4.



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#### NFPA 72 - Testing Personnel

- **10.5.3.2\* Testing Personnel.** Testing personnel shall have knowledge and experience of the testing requirements contained in this Code, of the equipment being tested, and of the test methods. That knowledge and experience shall be acceptable to the authority having jurisdiction or meet the requirement of 10.5.3.4.



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### **NFPA 72 - Maintenance Personnel**

- **10.5.3.3 Service Personnel.** Service personnel shall have knowledge and experience of the maintenance and servicing requirements contained in this Code, of the equipment being serviced or maintained, and of the servicing or maintenance methods. That knowledge and experience shall be acceptable to the authority having jurisdiction or meet the requirement of 10.5.3.4.



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### **NFPA 72 – Means of Qualification**

- **10.5.3.4 Means of Qualification.** Qualified personnel shall include, but not be limited to, one or more of the following:
  - (1)\*Personnel who are factory trained and certified for the specific type and brand of system being serviced
  - (2)\*Personnel who are certified by a nationally recognized certification organization acceptable to the authority having jurisdiction



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### **NFPA 72 – Means of Qualification**

- **10.5.3.4 Means of Qualification.** Qualified personnel shall include, but not be limited to, one or more of the following:
  - (3)\*Personnel, either individually or through their affiliation with an organization that is registered, licensed, or certified by a state or local authority to perform service on systems addressed within the scope of this Code
  - (4) Personnel who are employed and qualified by an organization listed by a nationally recognized testing laboratory for the servicing of systems within the scope of this Code



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## NFPA 72

- **14.2.6.1** Testing personnel shall be qualified and experienced in the specific arrangement and operation of a suppression system(s) and a releasing function(s) and shall be cognizant of the hazards associated with inadvertent system discharge.

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109

## NFPA 25 - Qualified

- NFPA 25 only requires that ITM be performed by someone that's qualified
  - *"A competent and capable person or company that has met the requirements and training for a given field acceptable to the AHJ. [96, 2014]"*
- Different levels of ITM may require specially trained personnel
  - i.e. reading gauges vs. annual fire pump testing

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110

## Qualified vs. Licensed



STATE OF MARYLAND  
DEPARTMENT OF STATE POLICE  
OFFICE OF THE STATE FIRE MARSHAL



FIRE SPRINKLER CONTRACTOR LICENSE CLASS IID APPLICATION



DEPARTMENT OF CONSUMER AFFAIRS  
Contractors State License Board

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111

### Facility Maintenance Personnel

- Both standards allow qualified building maintenance personnel to perform certain functions



112

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### Overview of ITM Requirements

MODULE 6



113

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### Things to consider...

- Will noise levels when testing the fire alarm create any issues?
- Will out of service elevators create any issues?
- If magnetic locks are provided, will the release of this equipment create a security issue?



114

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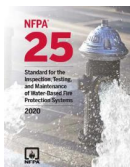
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## Organization of NFPA 25

- Chapters 1-4
  - “Administrative Chapters”
- Chapters 5-13
  - “System Chapters”
- Chapters 14 & 15
  - “Corrective Chapters”
- Chapter 16
  - Special Requirements from Other NFPA Documents (new in 2014 edition)
- Annexes A-F



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## NFPA 25 Summary Tables

- Each system chapter has “summary tables” outlining ITM frequencies
- Tables are good reference but be sure to read the sections that are referenced



116

## NFPA 25 Summary Tables

Table 5.1.1.2 Summary of Sprinkler System Inspection, Testing, and Maintenance

Item	Frequency	Reference
<b>Inspection</b>		
Gauges (dry, preaction, and deluge systems)	Weekly/monthly	5.2.4.2, 5.2.4.3, 5.2.4.4
Control valves		Table 13.1
Waterflow alarm devices	Quarterly	5.2.5
Valve supervisory alarm devices	Quarterly	5.2.5
Supervisory signal devices (except valve supervisory switches)	Quarterly	5.2.5
Gauges (wet pipe systems)	Monthly	5.2.4.1
Hydraulic nameplate	Quarterly	5.2.6
Buildings	Annually (prior to freezing weather)	4.1.1.1
Hanger/seismic bracing	Annually	5.2.3
Pipe and fittings	Annually	5.2.2
Sprinklers	Annually	5.2.1
Spare sprinklers	Annually	5.2.1.4
Information sign	Annually	5.2.6.1
Fire department connections		Table 13.1
Valves (all types)		Table 13.1
Obstruction, internal inspection of piping	5 years	14.2
<b>Test</b>		
Waterflow alarm devices		
Mechanical devices	Quarterly	5.5.3.1
Valve and pressure switch type devices	Semiannually	5.5.3.2
Valve supervisory alarm devices		Table 13.1
Supervisory signal devices (except valve		Table 13.1



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### Changes in Hazard



Light Hazard



Ordinary Hazard



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### Changes in Process



Open area



Added enclosed booth



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### Changes in Storage Commodities



Wooden pallet



Plastic pallet



120

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### Changes in Storage Method



On side on pallet



On tread on rack



121

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### Changes in Storage Method



Double row racks



Multi row racks



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### Changes in Height



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**Building Revisions**



NFSA AIAA

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**Owner Responsibilities**



NFSA AIAA

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**Storage within 18" of deflector**



NFSA AIAA

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**No Sprinklers in Corridor**



NFSA AFAA

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**Paint on Link**



NFSA AFAA

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**Loaded Sprinkler**



NFSA AFAA

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**Damaged Cover Plate**



NFSA AFAA

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**Ceiling Has dropped**



NFSA AFAA

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**Control Valve (90" above grade)**



NFSA AFAA

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**Auxiliary Drain- No Identification**



NFSA AFAA

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**Dry Barrel Hydrant**



NFSA AFAA

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**Dry Barrel Hydrant access**



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### Dry Barrel Hydrant access



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### NFPA 72 - Visual Inspections

Component	Initial Acceptance	Periodic Frequency	Method	Reference
1. All equipment	X	Annual	Visual; tests as an integral part of equipment performance. Inspect for building modifications, occupancy changes, changes in environmental conditions, device location, physical damage, loose connections, physical damage, and degree of cleanliness.	14.3.1
2. Control equipment			Visual or stream control condition.	
(a) For alarm systems connected for alarm, supervisory, and trouble signals				
(i) Panel	X	Annual		
(ii) Initiated equipment	X	Annual		
(iii) Control and I/O	X	Annual		
(iv) Primary control power supply	X	Annual		
(v) Trouble signal	X	Quarterly		
(b) For alarm systems inter-tied for alarm, supervisory, and trouble signals			Visual or stream control condition.	
(i) Panel	X	Weekly		
(ii) Initiated equipment	X	Weekly		
(iii) Control and I/O	X	Weekly		
(iv) Primary control power supply	X	Weekly		
(v) Trouble signal	X	Weekly		
3. Receiver				
4. Supervising station alarm systems — independent			Visual location, physical condition, and a stream control condition.	
(a) Digital alarm communication equipment (DACA)	X	Annual		
(b) Digital alarm communication equipment (DACA)	X	Annual		
(c) Mechanical	X	Annual		
(d) Radio alarm communication (RAC) and all other types of communication	X	Annual		

- Frequencies in accordance with Table 14.3.1
- Exceptions
  - Inaccessible for safety reasons
  - Allow up to 18 months between inspections



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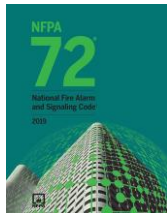
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### Visual Inspections

- Inspection, testing and maintenance begins with a visual inspection.
  - Visual inspection includes:
    - Initiating devices
    - Notification appliances
    - Control equipment



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### Visual Inspections

- Is everything correct at the panel?



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### Visual Inspections

- Initiating devices:
  - Are detectors installed in proper locations?



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### Visual Inspections

- Initiating devices:
  - Are detectors clean and appear to be in good working order?



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### Visual Inspections

- Initiating devices:
  - Are detectors installed in areas that could lead to problems?

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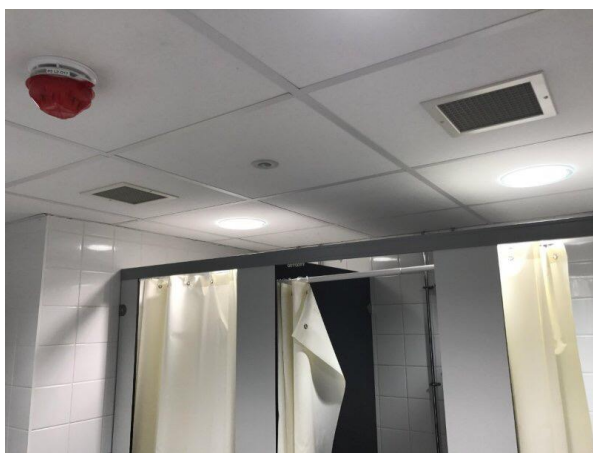
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### Visual Inspections

- Initiating devices:
  - Are manual pull stations readily accessible, unobstructed and in good working order?



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### Visual Inspections

- Initiating devices:
  - Are manual pull stations readily accessible, unobstructed and in good working order?



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### Visual Inspections

- Notification appliances:
  - Are devices properly installed?
  - Is device orientation correct?



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### Visual Inspections

- Notification appliances:
  - Are devices properly installed?



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### Visual Inspections

- Notification appliances:
  - Will you hear it?
  - Will you see it?



NFSA AIAA

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### Visual Inspections

- Notification appliances:
  - Are exterior notification appliances watertight and do they appear to be in good working order?



NFSA AIAA

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### Visual Inspections

- Visual inspection:
  - Improper installation?



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### Visual Inspections

- Did the owner(s) make any building modifications that impacts initiating devices or notification appliances?



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### Visual Inspections

- Did the occupancy change?
- If so, is there a need for additional fire alarm devices to meet audibility?



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### Visual Inspections

- Are there obstructions blocking the notification appliances or covering initiating devices?

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### NFPA 72 - Testing

- Test Methods
  - Follow methods in Table 14.4.3.2
  - Follow manufacturer’s instructions
  - Automatic testing permitted in some cases
- Test Frequencies
  - Follow frequencies in Table 14.4.3.2
  - Exceptions for inaccessible components

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### NFPA 72- Table 14.4.3.2

Table 14.4.3.2 Testing

Components	Initial Acceptance	Periodic Frequency	Method
1. All equipment	X		See Table 14.3.1.
2. Control equipment and transponder			
(a) Functions	X	Annually	Verify correct receipt of alarm, supervisory, and trouble signals (signals); operation of evacuation signals and auxiliary functions (signals); circuit supervision, including detection of open circuits and ground faults; and power supply supervision for detection of loss of ac power and disconnection of secondary batteries.
(b) Fuses	X	Annually	Verify rating and supervision.
(c) Interfaced equipment	X	Annually	Verify integrity of single or multiple circuits providing interface between two or more control units. Test interfaced equipment connections by operating or simulating operation of the equipment being supervised. Verify signals required to be transmitted to the control unit.
(d) Lamps and LEDs	X	Annually	Illuminate lamps and LEDs.
(e) Primary means power supply	X	Annually	Verify signals required to be transmitted to the control unit. Disconnect and test all secondary (auxiliary) power under maximum load, including all alarm appliances requiring simultaneous operation. Reconnect all secondary (auxiliary) power at end of test. Test redundant power supplies separately.
3. Fire alarm control unit trouble signals			
(a) Audible and visual	X	Annually	Verify operation of control unit trouble signals. Verify ring-back feature for systems using a trouble-silencing switch that requires resetting.
(b) Disconnect switches	X	Annually	If control unit has disconnect or locking switches, verify performance of intended function of each switch. Verify receipt of trouble signal when a supervised function is disconnected.
(c) Ground-fault monitoring circuit	X	Annually	If the system has a ground detection feature, verify the occurrence of ground-fault indication whenever any installation condition is grounded.
(d) Transmission of signals to off-premises location	X	Annually	Assume an initiating device and verify receipt of alarm signal at the off-premises location. Create a trouble condition and verify receipt of a trouble signal at the off-premises location. Assume a supervisory device and verify receipt of a supervisory signal at the off-premises location. If a transmission carrier is capable of operation under a single- or multiple-fault condition, assume an initiating device during each fault condition and verify receipt of an alarm signal and a



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### Acceptance Test and Completion

- FAQ-Can a magnet be used to test a smoke detector?



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### Acceptance Test and Completion

- A magnet shall not be used to test the smoke detector itself. Chapter 14 requires smoke to enter the detector chamber.
- A magnet can be used on a smoke detector to test the fire alarm system; including activating notification, elevator/recall, close fire rated doors, etc.



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**Inspection, Testing and Maintenance**

- Section 14.6.1.2-Site-Specific Software-Many of the new fire alarm systems have specific software applications that must be provided by the installing contractor.




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**NFPA 25- Frequency**

- The presence of supervision affects the frequency of many inspections/tests in NFPA 25



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**Common System Components**

- Waterflow Devices
- Valve Supervisory Switches
- Both standards address ITM of these, but frequencies may vary.



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### NFPA 72 - Water Flow Devices

- Inspection
  - Quarterly
- Testing
  - Semiannually
- Water shall be flowed through an inspector's test connection indicating the flow of water equal to that from a single sprinkler of the smallest orifice size in the system [wet pipe], or an alarm test bypass connection for dry-pipe, pre-action, or deluge systems in accordance with
- NFPA 25.



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### NFPA 25 - Water Flow Devices

- Inspection
  - Quarterly
- Testing
  - Semiannually
- Water shall be flowed through an inspector's test connection indicating the flow of water equal to that from a single sprinkler of the smallest orifice size in the system [wet pipe], or an alarm test bypass connection [dry pipe].



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### NFPA 72 - Valve Supervisory Switch

- Inspection
  - Quarterly
- Testing
  - Semi-annually
- Operate valve and verify signal receipt to be within the first two revolutions of the wheel or within one-fifth of the travel distance.



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### NFPA 25 - Valve Supervisory Switch

- Inspection
  - Quarterly
- Testing
  - Semi-annually
  - Operate valve and verify signal receipt to be within the first two revolutions of the wheel or within one-fifth of the travel distance.



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### Other Common System Components

- Water level switches
- Temperature switches
- Fire pump controllers
- Air pressure switches



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## Coordination Requirements from NFPA 72 & 25

MODULE 7



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### Coordination

- The ITM of many systems require coordination of trades
  - Deluge
  - Preaction
  - Others



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### Coordination

- Some states regulate scope of work between trades

The 2014 Florida Statutes

Title XXXIII Chapter 633 View Entire Chapter  
INSURANCE FIRE PREVENTION AND CONTROL

633.336 Contracting without certificate prohibited; violations; penalty.—

(1) It is unlawful for any organization or individual to engage in the business of layout, fabrication, installation, inspection, alteration, repair, or service of a fire protection system, other than a preengineered system, act in the capacity of a fire protection contractor, or advertise itself as being a fire protection contractor without having been duly certified and holding a valid and existing certificate, except as hereinafter provided. The holder of a certificate used to qualify an organization must be a full-time employee of the qualified organization or business. A certificateholder who is employed by more than one fire protection contractor during the same time is deemed not to be a full-time employee of either contractor. The State Fire Marshal shall revoke, for a period determined by the State Fire Marshal, the certificate of a certificateholder who allows the use of the certificate to qualify a company of which the certificateholder is not a full-time employee. A contractor who maintains more than one place of business must employ a certificateholder at each location. This subsection does not prohibit an employee acting on behalf of governmental entities from inspecting and enforcing fire safety codes, provided such employee is certified under s. 633.216.

(2) A fire protection contractor certified under this chapter may not:

(a) Enter into a written or oral agreement to authorize, or otherwise knowingly allow, a contractor who is not certified under this chapter to engage in the business of, or act in the capacity of, a fire protection contractor.



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### NFPA 25

- **1.1.1 Coordination with NFPA 72 Testing Requirements.** This standard does not address all of the inspection, testing, and maintenance of the electrical components of the automatic fire detection equipment used to activate preaction and deluge systems that are addressed by NFPA 72, National Fire Alarm and Signaling Code.



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## NFPA 25

- **1.1.1.1** The inspection, testing, and maintenance required by this standard and NFPA 72, National Fire Alarm and Signaling Code, shall be coordinated so that the system operates as intended.
- **1.1.1.2\*** All inspections, testing, and maintenance required by NFPA 72 shall conform to NFPA 72, and all inspections, testing, and maintenance required by this standard shall conform to this standard.



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### Example Coordination Issues

- Deluge Valves – NFPA 25
    - **13.4.4.2.1** Deluge valve flow tests shall incorporate full functionality of the system as a unit, including automatic and manual activation.
- \*\*\*Note- 2020 Edition reinstated the 2014 Edition requirement for Preaction Valves**
- **13.4.3.2.4\*** Preaction valve flow tests shall incorporate full functionality of the system as a unit, including automatic and manual activation



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### Example Coordination Issues

- Deluge & Preaction Valves – NFPA 72
  - **14.2.6.4** Suppression systems shall be secured from inadvertent actuation, including disconnection of releasing solenoids or electric actuators, closing of valves, other actions, or combinations thereof, for the specific system, for the duration of the fire alarm system testing.
  - **14.2.6.5** Testing shall include verification that the releasing circuits and components energized or actuated by the fire alarm system are electrically monitored for integrity and operate as intended on alarm.



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**Returning to Service**

- NFPA 72
  - 14.2.6.6 Suppression systems and releasing components shall be returned to their functional operating condition upon completion of system testing.
- NFPA 25
  - 4.6.3 Fire protection system components shall be restored to full operational condition following testing, including reinstallation of plugs and caps for auxiliary drains and test valves.



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**-NFPA 25- Valve Status Test(s)**

- System Riser valves
  - 13.3.3.4\* A valve status test shall be conducted any time the control valve is closed and reopened at system riser.
- Other valves
  - 13.3.1.2.1 When the valve is returned to service, a valve status test (either main or sectional drain, as appropriate) shall be conducted to determine that the valve is not closed.



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**Notification**

- Both standards require notification of system shutdown
  - Before and after
- NFPA 72 - 14.2.4
- NFPA 25 - 4.1.4
- Document these notifications in reports



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## Impairment Handling

### MODULE 8



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### NFPA 72 Impairment Handling

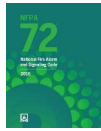
- 10.20.1 The system owner or their designated representative shall be notified when a system or part thereof is impaired. Impairments to systems shall include out-of-service events.
- 10.20.2 A record shall be maintained by the system owner or designated representative for a period of 1 year from the date the impairment is corrected



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### NFPA 72 Impairment Handling (cont)

- 10.21.3 The supervising station shall report to the authority having jurisdiction any fire alarm system for which required monitoring has been terminated.
- 10.21.4 The service provider shall report to the authority having jurisdiction any fire alarm system that is out of service more than 8 hours.



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**NFPA 72 Impairment Handling (cont)**

- 10.20.5 Where required, mitigating measures acceptable to the authority having jurisdiction shall be implemented for the period that the system is impaired.
- 10.20.6 The system owner or owner’s designated representative shall be notified when an impairment period ends.



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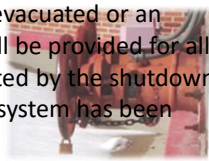
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**IFC Impairment Requirements**

- **901.7 Systems out of service.** Where a required fire protection system is out of service, the fire department and the fire code official shall be notified immediately and, where required by the code official, the building shall be either evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shutdown until the fire protection system has been returned to service.



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**IFC Impairment Requirements**

- **901.7.1 Impairment coordinator.** The building owner shall assign an impairment coordinator to comply with the requirements of this section. In the absence of a specific designee, the owner shall be considered the impairment coordinator.



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### IFC Impairment Requirements

- Rest of IFC Section 901.7 matches the requirements from NFPA 25
- Impairment handling is a requirement assigned to the owner



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### NFPA 25 – Impairment Handling

- Chapter 15
  - Impairment Coordinator
  - Impairment Tags
  - Notifications
  - Restoring systems to service



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### NFPA 25 – Impairment Handling

- 15.5.2 requires certain steps for impairments lasting more than 10 hours in a 24-hour period
  - Evacuation
  - Approved fire watch
  - Temporary water supply
  - Approved program to eliminate ignition sources



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**NFPA 72 – Impairment Handling**

- **14.2.2.2.2** System deficiencies shall be corrected.
- **14.2.2.2.3** If a deficiency is not corrected at the conclusion of system inspection, testing, or maintenance, the system owner or the owner’s designated representative shall be informed of the impairment in writing within 24 hours.

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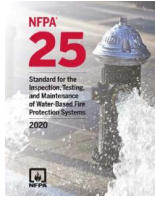
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**NFPA 25 – Impairment Handling**

- NFPA 25 requires correction and repair, but does not establish a time frame




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**Report Requirements**

MODULE 9



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### Test Plan

- NFPA 72®
  - 7.6.1 Test plan documentation shall be provided in accordance with 14.2.10.
  - 7.6.2 Acceptance testing documentation shall be provided in accordance with 14.6.1.
  - 7.6.3 Reacceptance testing documentation shall be provided in accordance with 14.6.1.
  - 7.6.4 Periodic inspection and testing documentation shall be provided in accordance with 14.6.2 through 14.6.4
  - 7.6.5 Impairment documentation shall be provided in accordance with 10.20.



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### NFPA 72 – Record Requirements

- 14.6.2.1 Records shall be retained until the next test and for 1 year thereafter.
- 14.6.2.2 For systems with restorable fixed-temperature, spot type heat detectors tested over multiple years, records shall be retained for the 5 years of testing and for 1 year thereafter.
- 14.6.2.3 The records shall be on a medium that will survive the retention period. Paper or electronic media shall be permitted.
- 14.6.2.4\* A record of all inspections, testing, and maintenance shall be provided in accordance with 7.8.2.



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### NFPA 72 - Ch. 7 - ITM Records

**SYSTEM RECORD OF INSPECTION AND TESTING**

The form is to be completed by the system inspector and listing contractor at the time of a system test. It shall be prepared in readily retrievable form as required by applicable codes and standards. Attach additional sheets, data, or photographs as necessary to provide a complete record.

Inspector/Test Start Date/Time \_\_\_\_\_ Inspector/Test Completion Date/Time \_\_\_\_\_  
Supplemental Form(s) Attached \_\_\_\_\_ (yes/no)

**1. PROPERTY INFORMATION**

Name of property \_\_\_\_\_  
 Address \_\_\_\_\_  
 Description of property \_\_\_\_\_  
 Name of property representative \_\_\_\_\_  
 Address \_\_\_\_\_  
 Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

**2. TESTING AND MONITORING INFORMATION**

Testing organization \_\_\_\_\_  
 Address \_\_\_\_\_  
 Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_  
 Manufacturing organization \_\_\_\_\_  
 Address \_\_\_\_\_  
 Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_  
 Account number \_\_\_\_\_ Phone Test 1 \_\_\_\_\_ Phone Test 2 \_\_\_\_\_  
 Means of notification \_\_\_\_\_  
 Facility to which alarm are transmitted \_\_\_\_\_ Phone \_\_\_\_\_

**3. DOCUMENTATION**

Check location of the required record documents and also specify software \_\_\_\_\_

**4. DESCRIPTION OF SYSTEM OR SERVICE**

4.1 Control Unit \_\_\_\_\_  
 Manufacturer \_\_\_\_\_ Model number \_\_\_\_\_



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### NFPA 25 Documentation

- ITM reports are the primary source of information about the condition of the system
- Other documentation is also required



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### NFPA 25 Documentation

- ITM Reports must contain
  1. *The procedure/activity performed*
  2. *The organization that performed the activity*
  3. *The required frequency of the activity*
  4. *The results and date*
  5. *The name and contact info of the qualified contractor or owner, including lead person for the activity*

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### NFPA 25 Documentation

- ITM records:
  - *Shall be maintained by the owner*
  - *As-built drawings, hydraulic calculations, original acceptance test records, and manufacturers cut-sheets shall be retained for the life of the system*
  - *Subsequent records shall be retained for a period of 1 year after the next inspection, test or maintenance of that type*

**ORIGINAL + CURRENT CYCLE + LAST CYCLE**

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## Inspection Report

### SYSTEM RECORD OF INSPECTION AND TESTING

*This form is to be completed by the system inspection and testing contractor at the time of a system test. It shall be permitted to modify this form as needed to provide a more complete and/or clear record. Insert N/A in all unused lines.*

*Attach additional sheets, data, or calculations as necessary to provide a complete record.*

Inspection/Test Start Date/Time: \_\_\_\_\_ Inspection/Test Completion Date/Time: \_\_\_\_\_

Supplemental Form(s) Attached: \_\_\_\_\_ (yes/no)

**1. PROPERTY INFORMATION**

Name of property: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Description of property: \_\_\_\_\_  
 Name of property representative: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_



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Device Type	Location	Floor	Zone/Point	Pass/Fail	Comments
SD	FACE ROOM	1		N/A	
SD	HALL BY DATA ROOM	1		N/A	
SD	LOUNGE	1		N/A	
SD	BY ROOM 101	1		N/A	
SD	HALL BY LOBBY	1		N/A	
SD	FIRE RISER ROOM	1		N/A	
PS	SPRINKLER RISER ROOM	1		N/A	
SD	HALL BY RISER ROOM	1		N/A	
PS	FITNESS ROOM	1		N/A	
SD	FITNESS ROOM	1		N/A	
SD	CLINIC	1		N/A	
SD	MECHANICAL ROOM 180	1		N/A	
SD	HEALTH OFFICE	1		N/A	
SD	STORAGE ROOM 179	1		N/A	
SD	HALL BY CLINIC	1		N/A	
SD	STORAGE 175	1		N/A	
SD	MECHANICAL ROOM 189	1		N/A	
SD	ELEVATOR 1 EQUIP ROOM	1		N/A	
HD	ELEVATOR 2 EQUIP ROOM	1		N/A	
SD	GARDEN LOUNGE	1		N/A	
PS	GARDEN LOUNGE	1		N/A	
SD	HALL BY ROOM 117	1		N/A	
SD	HALL BY ROOM 118	1		N/A	
SD	BY ROOM 120	1		N/A	
SD	HALL BY ROOM 121	1		N/A	
SD	HALL BY ROOM 122	1		N/A	
SD	HALL BY ROOM 124	1		N/A	
SD	HALL BY ROOM 125	1		N/A	
SD	HALL BY ROOM 126	1		N/A	
SD	STAR 2 FLOOR 1	1		N/A	
PS	STAR 2 EBT	1		N/A	
SD	BISTRO CENTER	1		N/A	
SD	BISTRO EAST	1		N/A	
SD	BISTRO BAR	1		N/A	
SD	MAIN DINING CENTER	1		N/A	
SD	MAIN DINING EAST	1		N/A	
SD	EAST DINING ROOM	1		N/A	
PS	EAST DINING ROOM	1		N/A	
PS	MAIN DINING ROOM	1		N/A	
SD	MAIN DINING WEST	1		N/A	
SD	PRIVATE DINING	1		N/A	
SD	HALL BY WORK ROOM	1		N/A	
SD	BUSINESS DIRECTOR OFFICE	1		N/A	

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## Inspection Report

EC 02.03.05 EP 02 Six-month testing of tamper switches and vane-type and pressure-type water-flow devices. Quarterly testing of mechanical water-flow devices.					
Devices	Tested This Quarter	Pass	Fail	Tested YTD (2018)	Total Quantity
Tamper Switch	21	21	0	21	21
Waterflow Switch	17	17	0	17	17
EC 02.03.05 EP 03 Annual testing of duct detectors, heat detectors, manual fire alarm boxes, and smoke detectors					
Devices	Tested This Quarter	Pass	Fail	Tested YTD (2018)	Total Quantity
Duct Detector	31	31	0	31	31
Heat Detector	20	20	0	20	20
Pull Station	62	62	0	62	62
Smoke Detector	265	265	0	265	265
EC 02.03.05 EP 04 Annual test of visual and audible fire alarms, including speakers and door-releasing devices					
Devices	Tested This Quarter	Pass	Fail	Tested YTD (2018)	Total Quantity
Horn	15	15	0	15	15
Horn/Strobe	171	171	0	171	171
Indicating Device	24	24	0	24	24
Releasing Device	180	180	0	180	180
Strobe	64	64	0	64	64
EC 02.03.05 EP 05 Annual test of fire alarm equipment for notifying off-site fire responders					
Devices	Tested This Quarter	Pass	Fail	Tested YTD (2018)	Total Quantity
Communication Line	2	2	0	2	2
Communicator	1	1	0	1	1
Monitoring	6	6	0	6	6



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**Activity**

Horizontal lines for notes



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**Scenario**

The new owner of an approximately 10 year old occupancy has asked you to put together an inspection, testing and maintenance program for their property.

The facility is a typical, mixed-use, mostly retail "strip mall". The building is protected throughout with a wet pipe sprinkler system with a fire pump. In addition, there is a small pre-action system protecting one of the spaces which is leased by a medical records storage company. The property also has a dedicated function fire alarm system monitoring the fire sprinkler and fire pump systems. Some of the individual spaces have their own fire alarm systems, but they are not part of this program.

Horizontal lines for notes



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**ITM Program**

- Outline of inspections/tests and frequencies.
- Coordination requirements.
- Owner tasks.

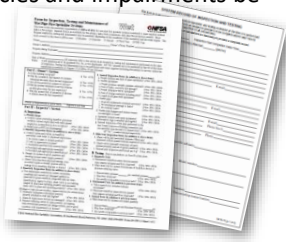
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### Additional Questions

- What reports can the owner expect?
- How would deficiencies and impairments be handled?



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### Role & Impact of NFPA 4

MODULE 10



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### NFPA 4



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## NFPA 4

- Chap 1 – Administration
- Chap 2 – Referenced Publications
- Chap 3 – Definitions
- Chap 4 – General Requirements
- Chap 5 – Test Methods
- Chap 6 – Test Frequencies
- Chap 7 – Documentation



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## NFPA 4 Scope

- 1.1.1 The standard shall provide the minimum requirements for testing of integrated fire protection and life safety systems where such testing is required by the design documents, commissioning plan, governing laws, codes, regulations, or standards.
- 1.1.2 This standard shall not provide requirements for testing of individual systems.
- 1.1.3 The requirements of this standard shall apply to new and existing systems.



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## NFPA 4 Application

- 1.3 Application
  - 1.3.1 This standard shall apply to integrated passive and active fire protection and life safety equipment and systems.
  - 1.3.2 Integrated systems testing shall verify and document the following
    - Performance in accordance with applicable codes and standards
    - Sequence of operation
    - Performance in accordance with manufacturer's published instructions
    - Accuracy of record documents



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### NFPA 4 Definitions

- Integrated System
  - A combination of systems that are required to operate together as a whole to achieve overall fire protection and life safety objectives.
- Integrated Testing Agent (ITa)
  - A person or entity identified by the owner, who plans, schedules, documents, coordinates and implements the integrated testing of the fire protection and life safety systems and their associated subsystems.



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### Questions?



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