

1

---

---

---

---

---

---

---

---



2

---

---

---

---

---

---

---

---



3

---

---

---

---

---

---

---

---

**What are sprinkler systems?**

April 12, 2022 WISCONSIN SAFETY COUNCIL

4

---

---

---

---

---

---

---

---

**SPRINKLER SYSTEMS**



April 12, 2022 WISCONSIN SAFETY COUNCIL

5

---

---

---

---

---

---

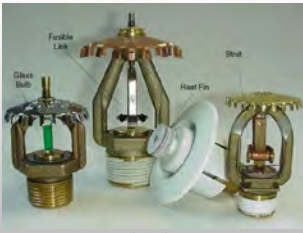
---

---

**AUTOMATIC SPRINKLERS**

**A fire suppression or control device that operates automatically when its heat-activated element is heated to its thermal rating or above, allowing water to discharge over a specified area.**

NFPA 13, Standard for the Installation of Sprinkler Systems



Johnson Controls, Inc. WISCONSIN SAFETY COUNCIL

6

---

---

---

---

---

---

---

---

AUTOMATIC SPRINKLERS

FRAME : -0000719



April 12, 2022

Wisconsin Safety Council, Inc.

WISCONSIN SAFETY COUNCIL

7

---

---

---

---

---

---

---

---

AUTOMATIC SPRINKLERS



April 12, 2022

Wisconsin Safety Council, Inc.

WISCONSIN SAFETY COUNCIL

8

---

---

---

---

---

---

---

---

COMMON TYPES OF SPRINKLER SYSTEMS

1. Wet Pipe Systems



April 12, 2022

WISCONSIN SAFETY COUNCIL

9

---

---

---

---

---

---

---

---

**COMMON TYPES OF SPRINKLER SYSTEMS**

- 1. Wet Pipe Systems**
- 2. Dry Pipe Systems**



10

---

---

---

---

---

---

---

---

**COMMON TYPES OF SPRINKLER SYSTEMS**

- 1. Wet Pipe Systems**
- 2. Dry Pipe Systems**
- 3. Preaction Systems**
  - A. Non-interlock**
  - B. Single-interlock**
  - C. Double-interlock**



11

---

---

---

---

---

---

---

---

**COMMON TYPES OF SPRINKLER SYSTEMS**

- 1. Wet Pipe Systems**
- 2. Dry Pipe Systems**
- 3. Preaction Systems**
  - A. Non-interlock**
  - B. Single-interlock**
  - C. Double-interlock**
- 4. Deluge**



12

---

---

---

---

---

---

---

---



13

---

---

---

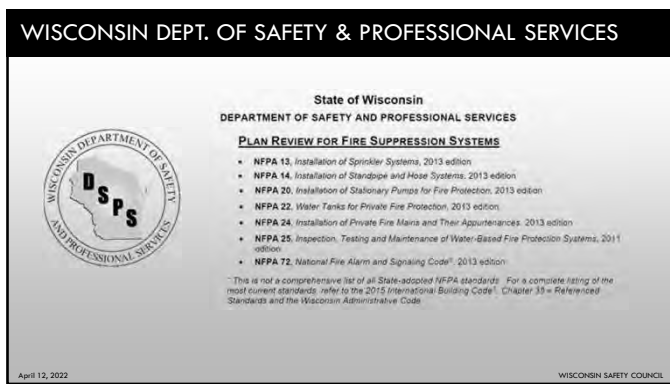
---

---

---

---

---



14

---

---

---

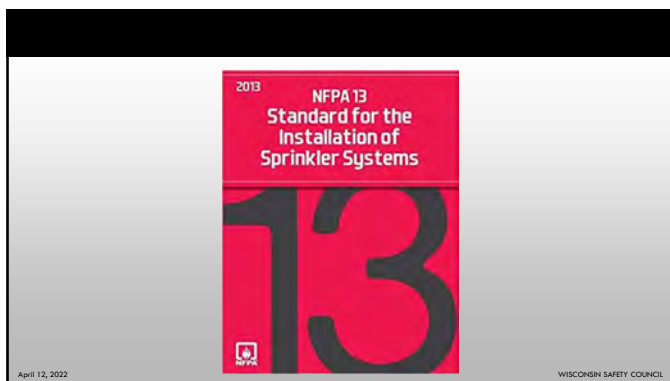
---

---

---

---

---



15

---

---

---

---

---

---

---

---

## OWNER'S INFORMATION CERTIFICATE

**OWNER'S INFORMATION CERTIFICATE**

These facilities are to be protected with automatic protection.

**4.3\* Owner's Information:**

(1) Intended use of building

(2) A preliminary design of the building

(3) Any special environmental conditions (MIC)

**Section 1**  
Name of property: \_\_\_\_\_  
Address of protected establishment:  
City: \_\_\_\_\_  
State: \_\_\_\_\_  
Zip: \_\_\_\_\_

**Section 2**  
Name of contractor: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
State: \_\_\_\_\_  
Zip: \_\_\_\_\_

**Section 3**  
Name of architect: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
State: \_\_\_\_\_  
Zip: \_\_\_\_\_

**Section 4**  
Name of engineer: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
State: \_\_\_\_\_  
Zip: \_\_\_\_\_

ing or struc-  
installed or  
er system in-  
e layout and  
23.1(b));

materials within  
storage  
e along with  
e layout and

ading known  
sible for cor-  
rosion

This certificate is to be filled out by the owner of the building. The design and construction of the fire protection system are the responsibility of the contractor and engineer. The contractor and engineer are to be licensed professionals. The contractor and engineer shall be bonded for the full amount of the contract. The contractor and engineer shall be bonded for the full amount of the contract. The contractor and engineer shall be bonded for the full amount of the contract.

Automatic Sprinkler	Yes	No
Fire Alarm System	Yes	No
Fire Extinguisher	Yes	No
Fire Escape	Yes	No
Fire Door	Yes	No
Fire Exit	Yes	No
Fire Alarm Control Panel	Yes	No
Fire Alarm Sounder	Yes	No
Fire Alarm Receiver	Yes	No
Fire Alarm Call Point	Yes	No
Fire Alarm Manual Call Point	Yes	No
Fire Alarm Test Button	Yes	No
Fire Alarm Reset Button	Yes	No
Fire Alarm Silencing Button	Yes	No
Fire Alarm Power Supply	Yes	No
Fire Alarm Cable	Yes	No
Fire Alarm Junction Box	Yes	No
Fire Alarm End of Line Resistor	Yes	No
Fire Alarm Control Panel	Yes	No
Fire Alarm Sounder	Yes	No
Fire Alarm Receiver	Yes	No
Fire Alarm Call Point	Yes	No
Fire Alarm Manual Call Point	Yes	No
Fire Alarm Test Button	Yes	No
Fire Alarm Reset Button	Yes	No
Fire Alarm Silencing Button	Yes	No
Fire Alarm Power Supply	Yes	No
Fire Alarm Cable	Yes	No
Fire Alarm Junction Box	Yes	No
Fire Alarm End of Line Resistor	Yes	No

WISCONSIN SAFETY COUNCIL

16

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## TEST CERTIFICATES

**Contractor's Material and Test Certificate for Underground Piping**

This certificate is to be filled out by the contractor. The design and construction of the fire protection system are the responsibility of the contractor and engineer. The contractor and engineer shall be bonded for the full amount of the contract. The contractor and engineer shall be bonded for the full amount of the contract. The contractor and engineer shall be bonded for the full amount of the contract.

Name of contractor:	_____
Address:	_____
City:	_____
State:	_____
Zip:	_____
Name of engineer:	_____
Address:	_____
City:	_____
State:	_____
Zip:	_____
Name of architect:	_____
Address:	_____
City:	_____
State:	_____
Zip:	_____
Name of fire department:	_____
Address:	_____
City:	_____
State:	_____
Zip:	_____

WISCONSIN SAFETY COUNCIL

17

---

---

---

---

---

---

---

---

---

---

---


---

---

---

## STOCK OF SPARE SPRINKLERS

- NFPA 13 Section 6.2.9
  - Facilities < 300 sprinklers
    - 6 spare sprinklers
  - Facilities > 300 & ≤ 1,000 sprinklers
    - 12 spare sprinklers
  - Facilities > 1,000 sprinklers
    - 24 spare sprinklers
- NFPA 13 Section 6.2.9.6
  - One sprinkler wrench for each type of sprinkler installed
- NFPA 13 Section 6.2.7.9
  - List of sprinklers installed in the property shall be posted in the sprinkler cabinet.



DATE	QUANTITY	DATE	CONTRACTOR	TYPE	THROWER	CLASSIFICATION	TEST
12/15/2021	12	12/15/2021	ABC	1.5	150	K-1.5	2021
12/15/2021	12	12/15/2021	ABC	1.5	150	K-1.5	2021
12/15/2021	12	12/15/2021	ABC	1.5	150	K-1.5	2021
12/15/2021	12	12/15/2021	ABC	1.5	150	K-1.5	2021

FIRE PROTECTION SYSTEMS INC.  
1234 FRED'S WAY, LYONS, WI 53152

WISCONSIN SAFETY COUNCIL

18

---

---

---

---

---

---

---

---

---

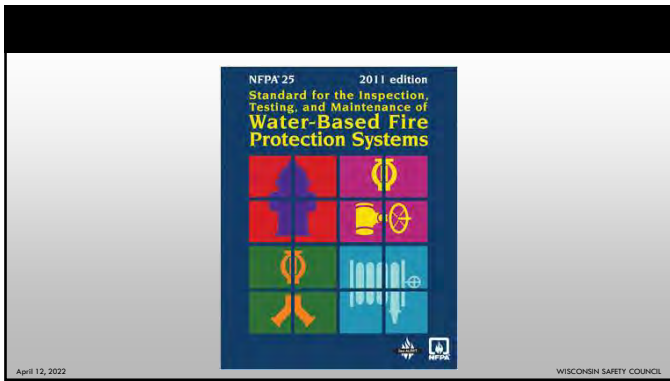
---

---

---

---

---



19

---

---

---

---

---

---

---

---

**RESPONSIBILITY**

**4.1.1\* Responsibility for Inspection, Testing, Maintenance, and Impairment.** The property owner or designated representative shall be responsible for properly maintaining a water-based fire protection system.

**4.1.1.1 Buildings.** The building owner shall ensure that all areas of the building containing water-filled piping shall be maintained at a minimum temperature of 40°F (4.4°C) and not exposed to freezing conditions.

April 12, 2022 WISCONSIN SAFETY COUNCIL

20

---

---

---

---

---

---

---

---

**RECORDS**

**4.3 Records.**

**4.3.1\*** Records shall be made for all inspections, tests, and maintenance of the system and its components and shall be made available to the authority having jurisdiction upon request.

**4.3.2** Records shall indicate the procedure performed (e.g., inspection, test, or maintenance), the organization that performed the work, the results, and the date.

**4.3.3\*** Records shall be maintained by the property owner.

**4.3.4** As-built system installation drawings, hydraulic calculations, original acceptance test records, and device manufacturer's data sheets shall be retained for the life of the system.

**4.3.5** Subsequent records shall be retained for a period of 1 year after the next inspection, test, or maintenance of that type required by the standard.

April 12, 2022 WISCONSIN SAFETY COUNCIL

21

---

---

---

---

---

---

---

---

### SPRINKLER SYSTEMS

13.4.4.3.2 be drained set of free




Table 3.1.2 Summary of Sprinkler System Inspection, Testing and Maintenance

Inspection Item	Frequency	Reference
Water supply main	Quarterly	7.3.2.1
Water supply main pressure	Quarterly	7.3.2.2
Water supply main flow	Quarterly	7.3.2.3
Water supply main pressure	Quarterly	7.3.2.4
Water supply main flow	Quarterly	7.3.2.5
Water supply main pressure	Quarterly	7.3.2.6
Water supply main flow	Quarterly	7.3.2.7

5.2.4.1<sup>18</sup> Gauges on wet pipe sprinkler systems shall be inspected monthly to ensure that they are in good condition and that normal water supply pressure is being maintained.

5.2.4.2 Gauges on dry, preaction, and deluge systems shall be inspected (week) to ensure that normal air and water pressures are being maintained.

5.2.4.3 Where air pressure supervision is connected to a constantly attended location, gauges shall be inspected (monthly).

Inspection Item	Frequency	Reference
Water supply main	Quarterly	7.3.2.1
Water supply main pressure	Quarterly	7.3.2.2
Water supply main flow	Quarterly	7.3.2.3
Water supply main pressure	Quarterly	7.3.2.4
Water supply main flow	Quarterly	7.3.2.5
Water supply main pressure	Quarterly	7.3.2.6
Water supply main flow	Quarterly	7.3.2.7

April 12, 2022 WISCONSIN SAFETY COUNCIL

22

---

---

---

---

---

---

---

---

---

---

---

---

### SPRINKLER SYSTEMS



5.2.2.1 Inspect of next

5.2.2.1 Inspect of next

5.2.2.1 Inspect of next

April 12, 2022 WISCONSIN SAFETY COUNCIL

23

---

---

---

---

---

---

---

---

---

---

---

---

### SPRINKLERS

5.2.1.1<sup>18</sup> Sprinklers shall be inspected from the floor level annually.

5.2.1.1.2 Any sprinkler that shows signs of any of the following shall be replaced:

- 1) Leakage
- 2) Corrosion
- 3) Minor damage
- 4) Loss of fluid in the glass bulb heat responsive element
- 5) Loadings
- 6) Fouling, unless painted by the sprinkler manufacturer

FACTORY APPLIED CUSTOM PAINT CODE

All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.




Figure 1: Identification of Custom Paint for Concealed Covers

April 12, 2022 WISCONSIN SAFETY COUNCIL

24

---

---

---

---

---

---

---

---

---

---

---

---



**VALVES**

Item	Frequency	Reference
Inspection	Quarterly	12.0.0
Testing	Annually	12.1.0
Maintenance	Annually	12.2.0
Record Keeping	Annually	12.3.0
Valve Installation	Annually	12.4.0
Valve Replacement	Annually	12.5.0
Valve Repair	Annually	12.6.0
Valve Painting	Annually	12.7.0
Valve Labeling	Annually	12.8.0
Valve Marking	Annually	12.9.0
Valve Tagging	Annually	13.0.0
Valve Locking	Annually	13.1.0
Valve Sealing	Annually	13.2.0
Valve Flushing	Annually	13.3.0
Valve Draining	Annually	13.4.0
Valve Bleeding	Annually	13.5.0
Valve Lubrication	Annually	13.6.0
Valve Painting	Annually	13.7.0
Valve Labeling	Annually	13.8.0
Valve Marking	Annually	13.9.0
Valve Tagging	Annually	14.0.0
Valve Locking	Annually	14.1.0
Valve Sealing	Annually	14.2.0
Valve Flushing	Annually	14.3.0
Valve Draining	Annually	14.4.0
Valve Bleeding	Annually	14.5.0
Valve Lubrication	Annually	14.6.0
Valve Painting	Annually	14.7.0
Valve Labeling	Annually	14.8.0
Valve Marking	Annually	14.9.0
Valve Tagging	Annually	15.0.0
Valve Locking	Annually	15.1.0
Valve Sealing	Annually	15.2.0
Valve Flushing	Annually	15.3.0
Valve Draining	Annually	15.4.0
Valve Bleeding	Annually	15.5.0
Valve Lubrication	Annually	15.6.0
Valve Painting	Annually	15.7.0
Valve Labeling	Annually	15.8.0
Valve Marking	Annually	15.9.0
Valve Tagging	Annually	16.0.0
Valve Locking	Annually	16.1.0
Valve Sealing	Annually	16.2.0
Valve Flushing	Annually	16.3.0
Valve Draining	Annually	16.4.0
Valve Bleeding	Annually	16.5.0
Valve Lubrication	Annually	16.6.0
Valve Painting	Annually	16.7.0
Valve Labeling	Annually	16.8.0
Valve Marking	Annually	16.9.0
Valve Tagging	Annually	17.0.0
Valve Locking	Annually	17.1.0
Valve Sealing	Annually	17.2.0
Valve Flushing	Annually	17.3.0
Valve Draining	Annually	17.4.0
Valve Bleeding	Annually	17.5.0
Valve Lubrication	Annually	17.6.0
Valve Painting	Annually	17.7.0
Valve Labeling	Annually	17.8.0
Valve Marking	Annually	17.9.0
Valve Tagging	Annually	18.0.0
Valve Locking	Annually	18.1.0
Valve Sealing	Annually	18.2.0
Valve Flushing	Annually	18.3.0
Valve Draining	Annually	18.4.0
Valve Bleeding	Annually	18.5.0
Valve Lubrication	Annually	18.6.0
Valve Painting	Annually	18.7.0
Valve Labeling	Annually	18.8.0
Valve Marking	Annually	18.9.0
Valve Tagging	Annually	19.0.0
Valve Locking	Annually	19.1.0
Valve Sealing	Annually	19.2.0
Valve Flushing	Annually	19.3.0
Valve Draining	Annually	19.4.0
Valve Bleeding	Annually	19.5.0
Valve Lubrication	Annually	19.6.0
Valve Painting	Annually	19.7.0
Valve Labeling	Annually	19.8.0
Valve Marking	Annually	19.9.0
Valve Tagging	Annually	20.0.0

April 12, 2022

WISCONSIN SAFETY COUNCIL

25

---

---

---

---

---

---

---

---

---

---

**ANTIFREEZE SYSTEMS**

April 12, 2022

WISCONSIN SAFETY COUNCIL

26

---

---

---

---

---

---

---

---

---

---

**HYDRANTS**

Item	Frequency	Reference
Inspection	Quarterly	12.0.0
Testing	Annually	12.1.0
Maintenance	Annually	12.2.0
Record Keeping	Annually	12.3.0
Valve Installation	Annually	12.4.0
Valve Replacement	Annually	12.5.0
Valve Repair	Annually	12.6.0
Valve Painting	Annually	12.7.0
Valve Labeling	Annually	12.8.0
Valve Marking	Annually	12.9.0
Valve Tagging	Annually	13.0.0
Valve Locking	Annually	13.1.0
Valve Sealing	Annually	13.2.0
Valve Flushing	Annually	13.3.0
Valve Draining	Annually	13.4.0
Valve Bleeding	Annually	13.5.0
Valve Lubrication	Annually	13.6.0
Valve Painting	Annually	13.7.0
Valve Labeling	Annually	13.8.0
Valve Marking	Annually	13.9.0
Valve Tagging	Annually	14.0.0
Valve Locking	Annually	14.1.0
Valve Sealing	Annually	14.2.0
Valve Flushing	Annually	14.3.0
Valve Draining	Annually	14.4.0
Valve Bleeding	Annually	14.5.0
Valve Lubrication	Annually	14.6.0
Valve Painting	Annually	14.7.0
Valve Labeling	Annually	14.8.0
Valve Marking	Annually	14.9.0
Valve Tagging	Annually	15.0.0
Valve Locking	Annually	15.1.0
Valve Sealing	Annually	15.2.0
Valve Flushing	Annually	15.3.0
Valve Draining	Annually	15.4.0
Valve Bleeding	Annually	15.5.0
Valve Lubrication	Annually	15.6.0
Valve Painting	Annually	15.7.0
Valve Labeling	Annually	15.8.0
Valve Marking	Annually	15.9.0
Valve Tagging	Annually	16.0.0
Valve Locking	Annually	16.1.0
Valve Sealing	Annually	16.2.0
Valve Flushing	Annually	16.3.0
Valve Draining	Annually	16.4.0
Valve Bleeding	Annually	16.5.0
Valve Lubrication	Annually	16.6.0
Valve Painting	Annually	16.7.0
Valve Labeling	Annually	16.8.0
Valve Marking	Annually	16.9.0
Valve Tagging	Annually	17.0.0
Valve Locking	Annually	17.1.0
Valve Sealing	Annually	17.2.0
Valve Flushing	Annually	17.3.0
Valve Draining	Annually	17.4.0
Valve Bleeding	Annually	17.5.0
Valve Lubrication	Annually	17.6.0
Valve Painting	Annually	17.7.0
Valve Labeling	Annually	17.8.0
Valve Marking	Annually	17.9.0
Valve Tagging	Annually	18.0.0
Valve Locking	Annually	18.1.0
Valve Sealing	Annually	18.2.0
Valve Flushing	Annually	18.3.0
Valve Draining	Annually	18.4.0
Valve Bleeding	Annually	18.5.0
Valve Lubrication	Annually	18.6.0
Valve Painting	Annually	18.7.0
Valve Labeling	Annually	18.8.0
Valve Marking	Annually	18.9.0
Valve Tagging	Annually	19.0.0
Valve Locking	Annually	19.1.0
Valve Sealing	Annually	19.2.0
Valve Flushing	Annually	19.3.0
Valve Draining	Annually	19.4.0
Valve Bleeding	Annually	19.5.0
Valve Lubrication	Annually	19.6.0
Valve Painting	Annually	19.7.0
Valve Labeling	Annually	19.8.0
Valve Marking	Annually	19.9.0
Valve Tagging	Annually	20.0.0

April 12, 2022

WISCONSIN SAFETY COUNCIL

27

---

---

---

---

---

---

---

---

---

---

FIRE PUMPS

Table 8.1.1.2 Summary of Fire Pump Inspections, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Visual/audible, including operating buttons	Monthly	8.3.2.1
Fire pump control	Monthly	8.3.2.2
Test		
Manual operation		8.3.1
Control cabinet fire alarm	Monthly	8.3.2.3
Fire pump alarm for pressure	Monthly	8.3.2.4
Fire protection		8.3.3
Fire pump alarm signals	Annually	8.3.3.3
Maintenance		
Hydraulic	Annually	8.3
Mechanical components	Annually	8.3.2
Electrical system	Annually	8.3.2
Control cabinet, various components	Annually	8.3.2
Motor	Annually	8.3.2
Control cabinet, various components	Annually	8.3.2

8.3.1.2 Motor-driven fire pumps shall be operated monthly.

8.3.2.4 Fire pump shall run a minimum of 30 minutes.

8.3.2.7 Qualified operating personnel shall be in attendance whenever the pump is in operation.



28

---

---

---

---

---

---

---

---

---

---

---

FIRE PUMPS



29

---

---

---

---

---

---

---

---

---

---

---

FIRE ALARM SYSTEMS



30

---

---

---

---

---

---

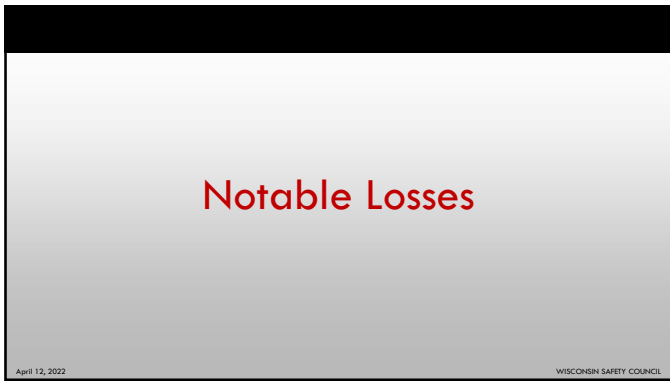
---

---

---

---

---



31

---

---

---

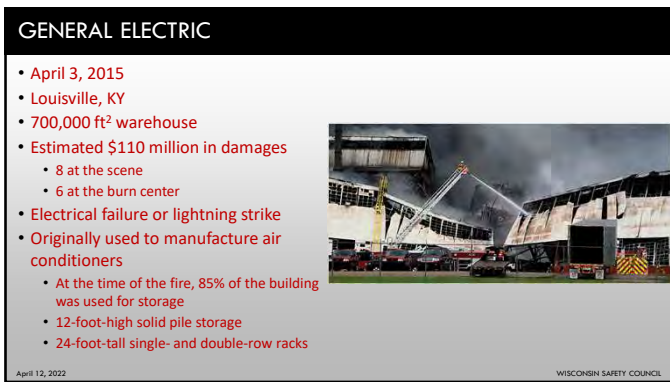
---

---

---

---

---



32

---

---

---

---

---

---

---

---



33

---

---

---

---

---

---

---

---

### GENERAL ELECTRIC



- GE had an onsite water supply
  - In earlier reports, FM Global previously noted several fire pumps and hydrants were not working properly
  - Only 1 of 8 fire pumps operated correctly during the fire
- Local fire service unaware of facility updates
  - GE maintained self-inspection status
  - AP-6 building had never been inspected by a fire service agency prior to this fire event
- GE had been working on a plan to upgrade sprinklers, alarms, piping & fire pumps

April 12, 2022

WISCONSIN SAFETY COUNCIL

34

---

---

---

---

---

---

---

---

### CHEMTOOL INCORPORATED

- June 14, 2021
- Rockton, IL
- 5-day evacuation for residents within 1 mile
- Scissors lift accident – “sufficient mechanical force to cause the release of mineral oil”
- 2 firefighters suffered minor injuries



April 12, 2022

WISCONSIN SAFETY COUNCIL

35

---

---

---

---

---

---

---

---

### FINAL REMINDER



April 12, 2022

WISCONSIN SAFETY COUNCIL

36

---

---

---

---

---

---

---

---



37

---

---

---

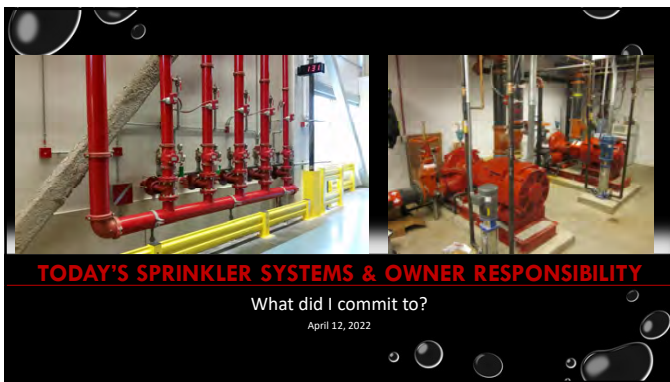
---

---

---

---

---



38

---

---

---

---

---

---

---

---