




## Nebraska Intergovernmental Risk Management Association

### Property Risk Control Webinar - Inspection Techniques to Prevent Property Losses

March 18, 2021

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### GOAL

We will be focusing on inspection techniques to prevent property losses at different occupancies you might encounter.

We will be discussing basic property inspection checklists and focus on specific areas during a property inspection. We will go in-depth for key areas where we sometimes can overlook crucial risks. The information that will be discussed during this presentation is an introduction that will assist you in being a more robust property inspector and risk evaluator.

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### FIRE PREVENTION

**Fire Extinguishers**

- ☐ Extinguishers located throughout the building
- ☐ Located in unobstructed areas – 3 feet clearance
- ☐ Extinguishers hung on hangers attached to walls - 3 1/2 to 5 feet above the floor.
- ☐ Inspect Gauge
  - ☐ No cracked glass
  - ☐ Fully charged: arrow in 12:00 position
  - ☐ Discharged unit: arrow in 9:00 position
- ☐ Check hose for cracks or cuts
- ☐ Check that safety pin is not missing
- ☐ Inspection tag is attached, monthly inspections are documented, and extinguisher has been inspected and certified by a fire protection equipment professional within the last year.



**HOW TO USE A FIRE EXTINGUISHER**



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## FIRE EXTINGUISHERS

**Table E.3.5 Maximum Area in Square Feet to Be Protected per Extinguisher**

Class A Rating Shown on Extinguisher	Light Hazard Occupancy	Ordinary Hazard Occupancy	Extra Hazard Occupancy
1-A	—	—	—
2-A	6,000	3,000	—
3-A	9,000	4,500	—
4-A	11,250	6,000	4,000
6-A	11,250	9,000	6,000
10-A	11,250	11,250	10,000
20-A	11,250	11,250	11,250
30-A	11,250	11,250	11,250
40-A	11,250	11,250	11,250

For SI units, 1 ft<sup>2</sup> = 0.0929 m<sup>2</sup>.  
Note: 11,250 ft<sup>2</sup> is considered a practical limit.

**Table E.3.1.1 Fire Extinguisher Size and Placement for Class B Hazards**

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers	
		ft	m
Light	5-B	50	9.14
	10-B	50	15.25
Ordinary	10-B	50	9.14
	20-B	50	15.25
Extra	40-B	50	9.14
	80-B	50	15.25

Note: The specified ratings do not imply that fires of the magnitudes indicated by these ratings will occur, but, rather, they are provided to give the operators more size and agent to handle difficult spill fires that have the potential to occur.


**Low Hazards** – A 2-A: 10-B:C rated rechargeable unit. For offices, churches, assembly halls, classrooms and hotel guest areas. Class A-B-C

**Medium Hazards** – A 3-A:40-B:C rated rechargeable unit. For light manufacturing facilities, dining areas, auto showrooms, parking garages and storage areas. Class A-B-C

**High Hazards** – A 4-A:60-B:C rated rechargeable unit. For manufacturing facilities with processes involving flammable liquids, boat and vehicle services, and woodworking processes. Class A-B-C

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## FIRE EXTINGUISHERS

**Table E.3.6 Quantity of Extinguishers for Class A Hazards**

Area (ft <sup>2</sup> )	Light Hazard				Ordinary Hazard					Extra Hazard				
	2-A		3-A and up		2-A		3-A		4-A and up		4-A		3-A and up	
	6000	9000	11,250	3000	4500	6000	9000	11,250	4000	6000	10,000	11,250		
10,000	2	2	1	4	5	2	1	1	5	2	1	1		
20,000	4	3	2	7	5	4	3	2	5	4	2	2		
30,000	5	4	3	10	7	5	4	3	8	5	3	3		
40,000	7	5	4	14	9	7	5	4	10	7	4	4		
50,000	9	6	5	17	12	9	6	5	13	9	5	5		
60,000	10	7	6	20	14	10	7	6	15	10	6	6		
70,000	12	8	7	24	16	12	8	7	18	12	7	7		
80,000	14	9	8	27	18	14	9	8	20	14	8	8		
90,000	15	10	8	30	20	15	10	8	23	15	8	8		
100,000	17	12	9	34	23	17	12	9	25	17	10	9		
110,000	19	13	10	37	25	19	13	10	28	19	11	10		
120,000	20	14	11	40	27	20	14	11	30	20	12	11		
130,000	22	15	12	44	29	22	15	12	33	22	13	12		
140,000	24	16	13	47	32	24	16	13	35	24	14	13		
150,000	25	17	14	50	34	25	17	14	38	25	15	14		
160,000	27	18	15	54	36	27	18	15	40	27	16	15		
170,000	29	19	16	57	38	29	19	16	43	29	17	16		
180,000	30	20	16	60	40	30	20	16	45	30	18	16		
190,000	32	22	17	64	43	32	22	17	48	32	19	17		
200,000	34	23	18	67	45	34	23	18	50	34	20	18		
210,000	35	24	19	70	47	35	24	19	53	35	21	19		
220,000	37	25	20	74	49	37	25	20	55	37	22	20		
230,000	39	26	21	77	52	39	26	21	58	39	23	21		
240,000	40	27	22	80	54	40	27	22	60	40	24	22		
250,000	42	28	23	84	56	42	28	23	63	42	25	23		
260,000	44	29	24	87	58	44	29	24	65	44	26	24		
270,000	45	30	24	90	60	45	30	24	68	45	27	24		
280,000	47	32	25	94	63	47	32	25	70	47	28	25		
290,000	48	33	26	97	65	48	33	26	73	48	29	26		
300,000	50	34	27	100	67	50	34	27	75	50	30	27		

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## FIRE PREVENTION

**Sprinkler System**

**Sprinkler risers**

- Annual inspections with inspection tags attached to main risers
- Valves
  - Sprinkler valves accessible
  - Valves not damaged or leaking
  - Valves open and locked
- Check for water leaks
- Gauges
  - Replaced in the last 5 years
  - Not damaged
- Riser must have no obstructions by 36 inches
- Nothing hanging from any exposed sprinkler pipes

**Sprinkler heads**

- Sprinkler heads have >18 inch clearance from head to storage
- No sprinkler heads damaged

**Fire Pumps**


- Not damaged (overall condition)- any leaks or damaged pipes or sprinkler heads
- Fire Pump Electric or Diesel?
- Pump inspected by a contractor in the last 12 months
- Electrical Fire Pump
  - Fire pump flowed and tested weekly – 10 min
- Diesel Fire Pump
  - Fire pump flowed and tested monthly – 30 min
  - Diesel tank % full? if not needs to be filled

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**FIRE PROTECTION VALVES**

**Outside Screw & Yoke (OS&Y)**




Stem Down = Closed  
Stem Up = Open ✓

**Inspector's Test Valve**




**Indicating Butterfly Valve (IBV)**




Indicator in same direction as pipe = Open ✓

**Non-indicating Valve (NIV)**



Handle shows direction of Open ✓

**Post Indicator Valve (PIV)**



Window shows open = Open ✓  
Window shows shut = Closed


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**FIRE PROTECTION VALVES**


**Underground Valve (UV)**

Also known as curb box valve




Use "T bar" to check if Open ✓

**Post Indicator Valve Assembly (PIVA)**




Unobstructed hole = Open ✓


**Main drain valve**



**Auxiliary valve (Dry pipe sprinklers)**



**Wall Post Indicator Valve (WPIV)**




Window shows Open = Open ✓

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**TESTING OF SPRINKLER HEADS**

SPRINKLER TYPE	TESTING INTERVAL
Sprinklers in harsh environments	Every 5 years
Extra-High temperature sprinklers	Every 5 years
Dry Sprinklers	At 10 years and every 10 years thereafter
Fast-Response Sprinklers	At 20 years and every 10 years thereafter
Standard Sprinklers	At 50 years and every 10 years thereafter
Standard Sprinklers	At 75 years and every 5 years thereafter
Standard Sprinklers	Replace if manufactured prior to 1920




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**MARSH** Property Risk Management **NRMA** **CRL**

## FIRE PREVENTION

- ❑ **Fire Detectors**
  - ❑ Verify system is in normal condition – no faults indicated on the main fire panel.
  - ❑ Monthly tests completed and documented
    - ❑ Control panels and equipment (power supply, fuses, LEDs, trouble signals)
    - ❑ Batteries (corrosion)
  - ❑ Tested annually by a vendor and report on file
- ❑ **Detection units**
  - ❑ No defective detectors – Smoke OR Heat detection
  - ❑ No detectors covered with tape / paint or covers
  - ❑ Properly secured
- ❑ **Manual fire alarm box** - free with no damage and not obstructed
- ❑ **Check batteries of fire alarm box** (Replace every 3 - years)
- ❑ **Fire Exits**
  - ❑ Illuminated exit signs are operational throughout building
  - ❑ Signs are tested monthly on all exit doors
  - ❑ Exits not blocked interior and exterior
  - ❑ Fire Doors
    - ❑ Roll-up exit doors are inspected to ensure they are functioning, and fusible links are in place and not dated



MARSH ► 10

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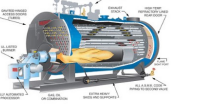
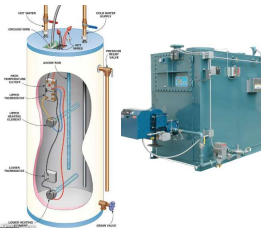
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## FIRE PREVENTION

- ❑ **Boiler Rooms**
  - ❑ Empty rooms, not to be used for storage
  - ❑ Boiler inspection tags are visible and annual inspections are current
  - ❑ Daily and monthly log sheets completed by maintenance staff
  - ❑ Visual inspection of the entire system for leaks or damage
  - ❑ Safety Shut-off valves in place
  - ❑ Gas trains in-order
- ❑ **Building Exterior**
  - ❑ No combustibles stored alongside building walls
  - ❑ Trees not overhanging roof
  - ❑ No vegetation growing up exterior wall
  - ❑ No visual damage from outside
  - ❑ No loose material – debris
  - ❑ Hail guards installed over ground equipment
- ❑ **Smoking**
  - ❑ No smoking within 25-feet of building (Check local and state code)
  - ❑ Designated smoking area with a non-combustible receptacle

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## FIRE PREVENTION

- ❑ **Electrical Inspection**
- ❑ Infrared / thermographic testing completed on electrical boxes and motors in the last 36 months

Electrical systems should be enclosed and kept clean



- ❑ Systems sealed and maintained to keep loose dirt, dust, and debris out
- ❑ Systems cleaned regularly using a vacuum (NOTE: This poses high risk for electrocution. Either contract with a professional or verify the system is de-energized by a trained electrician and all employees are trained in lock-out/tag-out.)
- ❑ Vents and fan grills cleaned regularly

Switchgears, Breakers, transformers and Motor Control Boxes

- ❑ Electrical rooms clear of any combustible materials
- ❑ Inspected regularly for signs of cracking or physical damage, arcing or overheating, and moisture
- ❑ Bolts and connectors show no signs of corrosion or overheating and are tightened to manufacturer's specifications
- ❑ Critical circuit breakers and switchgear easily accessible
- ❑ No damage for the oil filled transformer
- ❑ Transformer has been inspected in the last 24 months with oil testing

**Electrical Safety in the building**

- ❑ No exposed wires
- ❑ No loose conduits
- ❑ No electrical cords in pathways (cord protectors)
- ❑ No over loaded power cords
- ❑ No space heaters beneath desks

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## ELECTRICAL PHASE LOSS PROTECTION

**What is Phase loss:**  
 When one phase of a three-phase system is lost, a phase loss occurs. This is also called 'single phasing'. Typically, a phase loss is caused by a blown fuse, thermal overload, broken wire, worn contact or mechanical failure. A phase loss that goes undetected can rapidly result in unsafe conditions, equipment failures, and costly downtime. A voltage unbalance of 3.5% can produce a 25% or greater increase in motor temperature.

Under phase loss conditions motors, pumps, blowers, and other equipment draw excessive current on the remaining two phases which quickly overheats the motor windings. Power output is greatly reduced and starting is not possible in this condition. This can potentially leave the equipment in a 'locked rotor' state which will overheat and damage the equipment even more rapidly.

**How to protect against phase loss:**  
 ▶ A three-phase monitor relay or phase-voltage monitoring device that protects against damage caused by phase loss as well as other three-phase fault conditions




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## FIRE PREVENTION

**Generators**

- ☐ Run weekly or Monthly for 30 min
- ☐ Log been updated on run time and maintenance
- ☐ Annual inspections completed by vendor with full load testing
- ☐ Generator protected against the elements
- ☐ Generator secure

**Hot Work Permit**

- ☐ Is there a current hot work permit at the building
- ☐ Copies of completed permits kept with all details completed
- ☐ Fire watch on the permit longer than 60 min
- ☐ Hot work permit complies with NFPA 518 2019

**Flammable Liquid**

- ☐ Flammable liquids stored in proper container
- ☐ Any large quantities of flammable liquids stored on site if so additional info to be provided:





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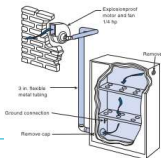

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## WHENEVER HANDLING FLAMMABLE LIQUIDS ALWAYS THINK OF THESE EIGHT BASIC TIPS:

1. Know your chemical —consult the safety data sheets (SDSs)
2. Remember it's not the liquid itself that burns, but rather, the invisible vapor
3. Maintain adequate ventilation, avoid confined areas where vapors can accumulate
4. Eliminate potential ignition sources
5. Think "covered" or "closed" for containers
6. Properly bond and ground containers when transferring
7. Keep liquids segregated by type and store according to governing codes
8. Use approved storage, transfer, use and disposal equipment, i.e., FM or UL listed

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## HOT WORK PERMIT



Print this permit at the site of any work involving open flames or the production of heat and sparks. Return all completed permits to the General Manager for retention.

**PERMIT GOOD FOR ONE SHEET ONLY**

<b>HOT WORK PERMITTED BY:</b>		<b>REQUIRED PRECAUTIONS CHECKLIST</b>	
DATE: _____		<input type="checkbox"/> Available sprinklers and extinguishers are in service. <input type="checkbox"/> Hot work equipment in good repair.	
BUILDING: _____		<b>REQUIRED NOTICES IN LT OF WORK</b>	
LOCATION: _____		<input type="checkbox"/> Flammable liquids and combustible materials removed or covered with the resistant tarp or metal shield. <input type="checkbox"/> Hot work shielded from combustibles. <input type="checkbox"/> Explosive atmosphere is area eliminated. <input type="checkbox"/> All exits and floor egresses covered.	
DESCRIPTION OF HOT WORK: _____		<b>WORK ON WALLS OR CEILING/ENCLOSED EQUIPMENT</b>	
NAME OF HOT WORK OPERATOR(S): _____		<input type="checkbox"/> Construction is noncombustible and without opening to combustibles. <input type="checkbox"/> Combustion on other side of walls covered with non-combustible material. <input type="checkbox"/> No larger holes by construction of heat into another room or area. <input type="checkbox"/> Extincted equipment placed in front of all combustibles. <input type="checkbox"/> Continuous removal of flammable liquids and vapors.	
I certify the above location has been examined, the provisions checked on the Required Precautions Checklist have been taken to prevent fire, and approval is granted for work. (Signature of local contact or designee) _____		<b>Fire Watch/Hot Work Area Monitoring</b>	
Contact person: _____ Permit: _____ Date: _____ Time: _____ I certify that I have personally checked the hot work site and that the necessary items of protection are present and that I have found them satisfactory. (Signature of local contact or designee) _____		<input type="checkbox"/> Fire watch will be provided during and continuous for 30 minutes after work, including any work break. <input type="checkbox"/> Fire watch is equipped with suitable extinguisher. <input type="checkbox"/> Fire watch is trained in use of this equipment and extinguisher. <input type="checkbox"/> Hot work area inspected 30 minutes after job is completed.	
Date & Time: _____ Source: NFPA 704, Fire Prevention During Welding, Cutting, and other Hot Work.		<b>OTHER PRECAUTIONS TAKEN</b>	
		<input type="checkbox"/> Areas ventilation to remove smoke/lager from work area. <input type="checkbox"/> Working areas to place of required. <input type="checkbox"/> Proper PPE being worn.	

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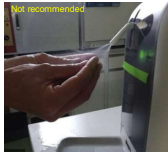
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## ALCOHOL-BASED HAND RUB (ABHR)



NFPA 101 8.7.3.3\* Alcohol-Based Hand-Rub Dispensers shall be permitted provided they meet all of the following criteria:

- The maximum individual dispenser fluid capacity shall be as follows:
  - 0.32 gal for dispensers in corridors and areas open to corridors
  - 0.53 gal for dispensers in rooms or suites of rooms separated from corridors
- Where aerosol containers are used, the maximum capacity of the aerosol dispenser shall be 18 oz and shall be **limited to Level 1 aerosols**.
- Dispensers shall be separated from each other by horizontal spacing of not less than 48 in.
- Not more than an aggregate 10 gal of alcohol-based hand rub solution or 1135 oz of Level 1 aerosols, or a combination of liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gal or 1135 oz shall be in use outside of a storage cabinet in a single smoke compartment or fire compartment or story, whichever is less in area.
- Storage of quantities greater than 5 gal in a single smoke compartment or fire compartment or story, whichever is less in area.

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LIQUID	°F		Class
	F.P.	B.P.	
Diesel Fuel #2	100-130	300	Class II
Gasoline	-45	200-230	Class IB
Motor Oil	450	>500	Class IIIB
Isoamyl Acetate	77	288	Class IC
Ethyl Ether	-49	94	Class IA
Formalin	133	214	Class II
Mixture 98% Motor Oil and 2% Gasoline			Class IB

**Class of Liquid**

Class III B  
288°F (142°C)

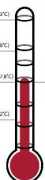
Class III A  
142°F (62°C)

Class II  
100°F (38°C)

Class IC  
77°F (25°C)

Class IB  
Boiling Point at or above 100°F (38°C)

Class IA  
Boiling Point less than 100°F (38°C)



**Definition**

Combustible

Flammable

Flashpoint Temperature

MARSH # 18

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**ROOF INSPECTION**

Due to varying degrees of roof pitches, conducting inspections on roofs can be dangerous. Recommend being trained on and using fall prevention and protection, contracting for preventive maintenance inspections of roofs with an experienced professional, or the use of a drone to photograph/document roof condition.

### Types of Flashing

Check the areas with a red oval.

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**HAIL DAMAGE**

FM Global - Hailstorm hazard map for the contiguous United States ( $p=0.7g/cm$ )

MARSH # 20

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**WIND ZONES**

### United States Wind Zones Map

Design wind speeds (1-second gust) consistent with ASCE 7-10

MARSH # 21

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Property Risk Management  




### ROOF INSPECTION

- ☐ Year of roof, build or reroofed: \_\_\_\_\_
- ☐ Type of Roof: \_\_\_\_\_
- ☐ Roof Surfacing: \_\_\_\_\_
- ☐ Parapets around roof and how high: \_\_\_\_\_ FT
- ☐ Name of person who is responsible for the roof maintenance? \_\_\_\_\_
- ☐ Roof have hail impact rating: \_\_\_\_\_

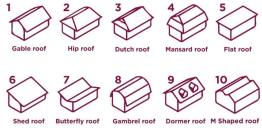
Visual Interior inspections of roof decking


- ☐ Check ceilings for any sign of water leaks or damage
- ☐ Discoloration of interior walls
- ☐ No loose roof panels
- ☐ No daylight seen from below

**ROOFING MATERIALS**




**Types of roofs**






EPDM



PVC



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Property Risk Management  



### ROOF INSPECTION

- ☐ Roof inspected at least monthly
- ☐ Access to rooftop safe and secured
- ☐ Rooftop equipment securely fastened
- ☐ Missing screws on equipment housing or strapping
- ☐ Satellite dishes secured by concrete blocks
- ☐ No loose flashing, shingles or parts gutter systems around edges of rooftop
- ☐ Gutters clear of all obstructions and no loose or disconnected parts
- ☐ Debris removed from roof surface after storm
- ☐ No storage of materials on the roof surface
- ☐ No sign of hail damage
- ☐ Hail guards installed to protect roof-mounted HVAC equipment
- ☐ Any skylights on roof; Rated for hail impact: \_\_\_\_\_
- ☐ No standing water on the roof surface (Note: Water should be gone within 48 hours of most recent water event)
- ☐ Snow not permitted to accumulate
- ☐ Discoloration of the roof surface
- ☐ No sign of cracks or areas for water penetration
- ☐ No cracks or gaps in caulked areas
- ☐ Photos of roof taken






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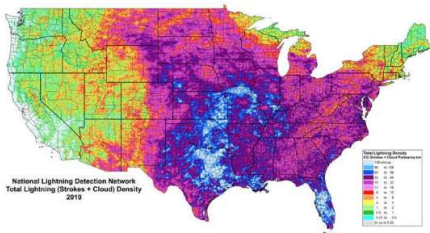
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### LIGHTNING STRIKE

**U.S. Total Lightning Density in 2019**  
222,988,888 Events Detected



National Lightning Detection Network  
Total Lightning (Flashes + Cloud) Density  
2019



ANNUAL LIGHTNING REPORT 2019  
© Vaisala 2020

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Property Risk Management

### LIGHTNING PROTECTION

Lightning protection systems should be inspected annually, as well as after major storms, when work is performed on the protected structure (e.g., roof renovations, electrical or HVAC system updates), and when equipment is installed or serviced (e.g., satellite dishes, security cameras, telephone lines, television cables). Inspections may be conducted with a lightning protection company, preferably ULT certified.

- ☐ Are buildings equipped with lightning protection systems (lightning rods, conductors, bonding, shielding, and grounding)
- ☐ Lightning protection inspected in the last 18 months
- ☐ Are surge protection devices used at all electrical outlets?
  - ☐ All components are in good condition
  - ☐ No part of the system has been weakened by corrosion or vibration
  - ☐ All down conductors and grounding electrodes are intact (not severed)
  - ☐ All conductors and components are fastened securely to their mounting surfaces and are protected against accidental mechanical displacement
  - ☐ There have been no additions or alterations to the protected structure that would reconfiguration or expansion of the lightning protection system
  - ☐ There have been no equipment installations that require bonding
  - ☐ There is no visual indication of damage to surge suppression devices

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### EARTHQUAKE MAP

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Property Risk Management

### Vermin/Pest Control

- ☐ Bait stations and traps installed
- ☐ At least bi-weekly monitoring of traps and bait stations
- ☐ Good sanitation procedures in place
- ☐ Food storage measures in place
- ☐ Visual inspection of interior and exterior for evidence of damage or debris
- ☐ No cracks/holes at building for points of entry including windows
- ☐ No exterior debris around buildings
- ☐ Trash properly disposed

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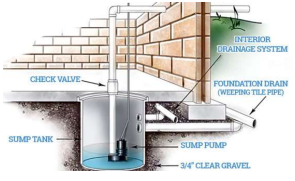


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## WATER DAMAGE

- ❑ Doors and windows should be properly sealed and have no cracks or holes
- ❑ Any cracks that form in walls and floors should be sealed as soon as possible
- ❑ Exterior drains should be kept clear and free of debris
- ❑ Sump pumps should have a backup power supply

**Plumbing**

- ❑ Pipes should have enough insulation to keep them from freezing in colder temperatures
- ❑ Buildings should be kept at a minimum of 55° during winter months
- ❑ During especially cold spells, all faucets should be kept at a slow drip to prevent water from freezing
- ❑ Water heater inspected and flushed by licensed plumber every 1 to 2 years
- ❑ Pipes show no signs of corrosion, rust or leaks

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**MARSH** Property Risk Management **NRMA** **CRL**

## VACANT BUILDINGS

- ❑ Check building Security
  - ❑ Locks and windows are in working order and are not compromised
    - ❑ Exterior shows no sign of breaches
  - ❑ Visual inspections for signs of vandalism/forced entry
  - ❑ "No Trespassing" posted and visible
- ❑ Roof hatches are properly secured
- ❑ Burglar alarm system in working order
- ❑ Automatic sprinkler system is functional and inspections are up to date
  - ❑ Sprinkler valves open and locked
  - ❑ Has local AHJ been notified if system is not in operation
- ❑ Fire alarms are functioning and inspections are up to date
- ❑ Standpipe system is operational
- ❑ Fire Department Connection is free of obstructions
- ❑ Hydrants been opened in the last 18 months and accessible
- ❑ Exterior lights in working order, system on a dawn timer or photocell
- ❑ Roof inspection for sitting water, debris, loose/missing shingles, etc.
  - ❑ Winter: any heavy snow accumulation and ice on the roof or overhangs
- ❑ Plumbing inspected for signs of water leaks or corrosion
- ❑ Inspect for signs of pests/vermin




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[Any questions or queries contact](#)

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