CHAPTER 35 - FIRE SYSTEMS INSPECTION, TESTING, AND MAINTENANCE (ITM)

CHAPTER 35 - FIRE SYSTEMS INSPECTION, TESTING AND MAINTENANCE (ITM)

A. INTRODUCTION

1. This Chapter establishes the Smithsonian Institution (SI) requirements for performing inspections, operational tests, and preventive maintenance on all fire suppression, detection and alarm systems, smoke control systems, emergency and exit lighting, fire and exit doors, and all other fire protection and life safety systems or equipment.

2. The SI relies on fire protection and life safety systems in its facilities to provide protection of life and property and to ensure the continuity of important missions established by the Smithsonian. In order to sustain this level of protection, all fire and life safety systems must be maintained to ensure high reliability through an effective inspection, testing, and preventive maintenance program.

3. Fire protection and life safety systems and equipment shall be inspected, tested, and maintained in compliance with the manufacturer's recommendations and the attached appendices.

B. CHAPTER-SPECIFIC ROLES AND RESPONSIBILITIES

1. **Building Manager**

a. The building manager shall ensure all required inspections, operational tests and preventative maintenance are performed in accordance with the requirements of this Chapter, and all records are distributed to the Safety Coordinator and the Office of Safety, Health and Environmental Management (OSHEM).

b. Ensure all fire protection and life safety systems protecting leased facilities receive the required inspections, operational tests and preventative maintenance in accordance with this Chapter, either through requirements in the lease agreement, or through contracts under SI control.

2. **Safety Coordinator**

a. Verify that all required inspections, operational tests, and preventive maintenance are performed and all records are up to date, in accordance with the ITM requirements of this Chapter, through periodic facility inspections and document review.

b. Advocate prompt repair of fire protection and life safety systems and equipment by tracking deficiencies and ensuring required actions are completed in a timely manner.

3. **Office of Facilities Management and Reliability (OFMR)**

a. Upon notification of a fire protection/life safety system deficiency, the building manager shall ensure that repairs are made promptly in order to restore the system to proper working order.

b. The building manager shall retain ITM records for the facility's fire protection and life safety equipment per the requirements of this Chapter.

c. Perform the required inspections, testing and maintenance at specified intervals per the requirements of this Chapter, for all fire protection and life safety systems and equipment under their responsibility.

d. Ensure all fire protection system alterations and additions are properly documented.

e. Coordinate all ITM work performed with facility personnel, including scheduling and system impairment.

f. Collect and retain ITM information, reports, checklists, and other required records developed during the performance of ITM work.

g. Maintain a work order program to prioritize, initiate and track the repair or replacement of all malfunctioning fire protection and life safety system components to ensure systems are promptly restored to proper working order in a timely manner.

h. Distribute ITM information including schedules, inspection reports and deficiencies to the appropriate facility manager, Safety Coordinator and OSHEM. ITM records shall be distributed within thirty days of the last recorded ITM activity for that period.

i. Annually review ITM records and produce a report per the requirements of this Chapter.

4. **Office of Protection Services (OPS)**

a. Visually inspect portable fire extinguishers each month for proper mounting and charge per Attachment 15 of this Chapter. Initial and date the inspection tag and report missing, undercharged, or defective extinguishers to the building manager and Safety Coordinator.

b. Inspect emergency exit doors weekly per Attachment 12 of this Chapter to ensure proper operation in the event of an emergency. Immediately notify the building manager and Safety Coordinator of problems that could

hinder egress and ensure they receive the required inspection reports.

5. **Smithsonian Business Ventures, FONZ, and other SI Business Operations**

   a. Provide inspection, testing, and maintenance for all kitchen exhaust ducts and hoods, and kitchen fire suppression systems, per the requirements of this Chapter. Submit all records to the building manager and Safety Coordinator within two weeks of the ITM function performed.

   b. Immediately notify the facility Safety Coordinator of any malfunction or code violation related to fire equipment within their space or affecting their operations.

   c. Cease cooking operations while kitchen fire suppression systems are impaired, and ensure the impairment process has been initiated per Chapter 36, "Fire Protection", of this *Manual.*

   d. Upon notification of a fire protection/life safety system deficiency, ensure repairs are made promptly in order to restore the system to proper working order.

C. PROGRAM COMPONENTS

1. **Training**. ITM tasks shall be performed by personnel trained/qualified in the maintenance and repair of the subject fire protection system or equipment. These personnel shall have available the manufacturer's service installation Manuals, maintenance Manuals, and service bulletins for the system or equipment being installed.

2. **Impairments**. All planned impairments of fire protection or life safety systems must be conducted in accordance with the precautions outlined in the Chapter 36, "Fire Protection", of this *Manual.*

3. **Required Inspections, Testing and Maintenance**. All fire protection/life safety systems and equipment shall be inspected, tested, and maintained in accordance with the requirements outlined in Attachments 1-17 of this Chapter.

D. RECORDS AND REPORTS

. Two types of records are essential for the long term care of fire protection/life safety systems and equipment: the original records and periodic inspection, testing, and maintenance documentation.

1. **Original Records**. As of October 2007, original records of exiting fire protection / life safety systems where available and for all new systems shall be retained for the life of the system. OFMR shall also retain a copy of

original records. Original records consist of the following:

a. Date of installation;

b. As-built drawings;

c. Operation and maintenance manuals;

d. Installer information (business address and telephone number);

e. Designation of equipment types and inventory of devices;

f. Equipment and system settings;

g. Equipment data sheets

2. **ITM Documentation**. Inspection, Testing, and Maintenance (ITM) documentation shall be retained for a minimum of 10 years for items that require annual or less frequent ITM. ITM documentation for items with frequencies greater than 1 year shall be retained for the life of the system. This documentation shall be retained by the facility manager. In addition, the OFMR units(s) responsible for ITM shall retain ITM records for all systems under its care. These records shall include all of the following information:

   a. Date;

   b. Procedure performed;

   c. Name and signature of the servicing personnel and the organization's name that performed the work;

   d. Test results;

   e. Equipment and system deficiencies

   f. Corrective actions, including parts replaced and settings or programming changes

3. **Information Management System**. OFMR shall establish and maintain an information management system for ITM documentation of all fire alarm, detection, suppression, smoke control and fire smoke damper and equipment under their care. The system shall provide the following:

   a. An electronic database with retrievable historical records for each piece of equipment, group of similar pieces of equipment, or system;

   b. Schedules for the scope and frequency of inspection and service for all equipment;

   c. A method of persistent follow-up to ensure that inspection, testing, and

maintenance services are being performed according to schedule;

d. A method of assigning priorities to equipment repair and maintenance tasks;

e. Specifications for special replacement parts and materials. A list of qualified suppliers for these items should be available by cross-reference;

4. **ITM Report** (fire alarm, detection, suppression, smoke control and fire smoke damper)

   a. OFMR shall annually review the ITM data collected for facilities and generate a report which examines trends (e.g. failure rates, system aging) and identifies specific problems. The report shall include recommendations for improving system reliability and ITM efficiency, as well as resolving building coordination issues. The report shall also examine how the previous year's recommendations were addressed.

   b. The report shall be submitted to the directors of the Office of Facilities Engineering and Operations (OFEO) and OSHEM within 30 days of the end of the year.

E. REFERENCES. National Fire Protection Association http://www.nfpa.org/

1. NFPA 10: Standard for Portable Fire Extinguishers
2. NFPA 12A: Standard on Halon 1301 Fire Extinguishing Systems
3. NFPA 13: Standard for the Installation of Sprinkler Systems
4. NFPA 14: Standard for the Installation of Standpipe and Hose Systems
5. NFPA 15: Standard for Water Spray Fixed Systems for Fire Protection
6. NFPA 17: Standard for Dry Chemical Extinguishing Systems
7. NFPA 17A: Standard for Wet Chemical Extinguishing Systems
8. NFPA 20: Standard for the Installation of Centrifugal Fire Pumps
9. NFPA 22: Water Tanks for Private Fire Protection
10. NFPA 24: Installation of Private Fire Service Mains and Their Appurtenances
11. NFPA 25: Standard for the Inspection, Testing and Maintenance of Water Based Fire Protection Systems
12. NFPA 33: Standard for Spray Application Using Flammable or Combustible

Materials

13. NFPA 72: National Fire Alarm Code
14. NFPA 80: Standard for Fire Doors and Other Opening Protectives
15. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems
16. NFPA 92A: Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences
17. NFPA 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
18. NFPA 101: Life Safety Code
19. NFPA 110: Standard for Emergency and Standby Power Systems
20. NFPA 780: Standard for the Installation of Lightning Protection Systems
21. NFPA 1962: Standard for the Inspection, Care, and Use of Fire Hose, Couplings, and Nozzles and the Service Testing of Fire Hose
22. NFPA 2001: Standard on Clean Agent Fire Extinguishing Systems

Attachment 1

AUTOMATIC SPRINKLER SYSTEMS

Inspections, tests, and maintenance of automatic sprinkler systems shall be performed in accordance with the manufacturer's instructions and NFPA 25 (latest edition). The following list highlights minimum requirements for the essential care of automatic sprinkler systems. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Gauges (dry/preaction /deluge systems)	Inspection	Weekly/monthly	5.2.4.2, 5.2.4.3
Control valves	Inspection	Weekly/Monthly	Table 12.1
Alarm devices	Inspection	Quarterly	5.2.6
Gauges (wet pipe systems)	Inspection	Monthly	5.2.4.1
Hydraulic nameplate	Inspection	Quarterly	5.2.7
Building & valve shed heating system	Inspection	Annually (prior to freezing weather)	5.2.5
Hanger/seismic bracing	Inspection	Annually	5.2.3
Pipe and fittings	Inspection	Annually	5.2.2
Sprinklers	Inspection	Annually	5.2.1
Spare sprinklers	Inspection	Annually	5.2.1.3
Fire department Connections	Inspection	Quarterly	Table12.1
Valves (all types)	Inspection	(see Table 12.1)	Table 12.1
Alarm Devices	Test	Quarterly/Semiannually	5.3.3
Main Drain	Test	Annually	Table 12.1
Antifreeze solution	Test	Annually	5.3.4
Gauges	Test	5 years	5.3.2
Sprinklers (extra high temperature)	Test	5 years	5.3.1.1.1.3

- Based on 2002 edition

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Sprinklers (fast response)	Test	At 20 years and every 10 years thereafter	5.3.1.1.1.2
Sprinklers	Test	50 years and every 10 years thereafter	5.3.1.1.1
Valves (all types)	Maintenance	Annually or as needed	Table 12.1
Obstruction investigation	Maintenance	5 years or as needed	13.2.1, 13.2.2
Low point drains (dry pipe systems)	Maintenance	Annually prior to freezing and as needed	12.4.4.3.3

STANDPIPE AND HOSE SYSTEMS

Inspections, tests, and maintenance on standpipe and hose systems shall be performed in accordance with the manufacturer's instructions and NFPA 25 (latest edition). The following list highlights minimum requirements for the essential care of standpipe and hose systems. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Control valves	Inspection	Weekly/monthly	Table 12.1
Pressure regulating devices	Inspection	Quarterly	Table 12.1
Piping	Inspection	Quarterly	6.2.1
Hose connections	Inspection	Quarterly	Table 12.1
Cabinet	Inspection	Annually	NFPA 1962
Hose*	Inspection	Annually	NFPA 1962
Hose storage device*	Inspection	Annually	NFPA 1962
Alarm device	Test	Quarterly	Table 12.1
Hose nozzle*	Test	Annually	NFPA 1962
Hose storage device*	Test	Annually	NFPA 1962
Hose*	Test	5 years/3 years[1]	NFPA 1962
Pressure control valve	Test	5 years	Table 12.1
Pressure reducing valve	Test	5 years	Table 12.1
Hydrostatic test	Test	5 years	6.3.2
Flow test	Test	5 years	6.3.1
Main drain test	Test	Annually	Table 12.1
Hose connections	Maintenance	Annually	Table 6.2.2
Valves (all types)	Maintenance	Annually/as needed	Table 12.1

* Hose and nozzle requirements determined by the local AHJ. Hoses not required for Smithsonian buildings within the District of Columbia.

1 Hose test required within 5 years of date of manufacture and every 3 years thereafter.

- Based on 2002 edition

Attachment 3

PRIVATE MAINS USED FOR FIRE SERVICE

Inspections, tests, and maintenance on private water supply systems used for fire service shall be performed in accordance with the manufacturer's instructions and NFPA 25 (latest edition). The following list highlights minimum requirements for the essential care of private water supply systems used for fire service. This list, however, is not meant to replace manufacturer's instructions and updated code requirements. The data is based on 2002 edition.

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Hose Houses	Inspection	Quarterly	7.2.2.7
Hydrants (dry barrel and wall)	Inspection	Annually & after each operation	7.2.2.4
Monitor nozzles	Inspection	Semiannually	7.2.2.6
Hydrants (wet barrel)	Inspection	Annually & after each operation	7.2.2.5
Mainline strainers	Inspection	Annually & after each significant flow	7.2.2.3
Piping (exposed)	Inspection	Annually	7.2.2.1
Piping (underground)	Inspection	See 7.2.2.2	7.2.2.2
Monitor nozzles	Test	Flow annually (range (and operation)	7.3.3
Hydrants	Test	Flow annually	7.3.2
Piping (exposed and underground)	Flow test	3 years[1]	7.3.1
Mainline strainers	Maintenance	Annually and after each operation	7.4.2
Hose houses	Maintenance	Annually	7.4.5
Hydrants	Maintenance	Annually	7.4.3
Monitor nozzles	Maintenance	Annually	7.4.4

1 Frequency increased from 5 years per NFPA 25, to 3 years due to lack of historical data for piping on SI property.

FIRE PUMPS

Inspections, tests, and maintenance of fire pumps and controllers shall be performed in accordance with the manufacturer's instructions and NFPA 25. The following list highlights minimum requirements for the essential care of fire pumps and controllers. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Pump house, heating ventilating louvers	Inspection (1)	Weekly	8.2.2
Fire pump system	Inspection	Weekly	8.2.2.(2)
Pump operation:			
no-flow for 30 min.	Test	Weekly	8.3.1
flow condition (normal and emergency power)*	Test	Annually	8.3.3.1
Fire Pump System	Maintenance	Annually	8.5, Table 8.5.3
Mechanical transmission	Maintenance	Annually	8.5, Table 8.5.3
Electrical system	Maintenance	Varies	8.5, Table 8.5.3
Controller, various components	Maintenance	Varies	8.5, Table 8.5.3
Motor	Maintenance	Annually	8.5, Table 8.5.3
Diesel engine system, various components	Maintenance	Varies	8.5, Table 8.5.3

*OSHEM to be notified 2 weeks prior to all annual flow tests.

(See next page for items in Table 8.5.3)

SUMMARY OF FIRE PUMP INSPECTION, TESTING, AND MAINTENANCE
(TABLE 8.5.3, NFPA 25)

ITEM	ACTIVITY	FREQUENCY
Pump System		
Lubricate pump bearings	Check/Change	Annually
Check pump shaft end play	Check	Annually
Check accuracy of pressure gauges and sensor gauges	Check/Change	Annually (change or recalibrate when 5% out of calibration)
Check pump coupling alignment	Check	Annually
Mechanical Transmission		
Lubricate coupling	Change	Annually
Lubricate right angle gear drive	Change	Annually
Electrical System		
Exercise isolating switch & circuit breaker	Test	Monthly
Trip circuit breaker (if provided)	Test	Annually
Operate *Manual* starting means (electrical)	Test	Semiannually
Inspect and operate emergency *Manual* starting means (without power)	Inspection/Test	Annually
Tighten electrical connections as necessary	Check	Annually
Lubricate mechanical moving parts (excluding starters and relays)	Check	Annually
Calibrate pressure switch settings	Check	Annually
Grease motor bearings	Change	Annually
Diesel Engine System		
Fuel		
Tank level (never<50%capacity)	Inspect/check	Weekly
Tank float switch	Inspect/test	Weekly
Solenoid valve operation	Inspect/test	Weekly
Strainer, filter and/or dirt leg	Clean	Quarterly
ITEM	**ACTIVITY**	**FREQUENCY**
Diesel Engine System (continued)		
Water and foreign material in tank	Clean	Quarterly
Water in system	Check/clean	Weekly

Flexible hose and connectors	Inspect	Weekly
Tank vents/overflow piping unobstructed	Inspect/replace	Annually
Piping	Inspect	Annually
Lubrication System		
Oil level	Inspect/Check	Weekly
Oil change	Replace	50 hours or Annual
Oil filter	Change	50 hours or annual
Lube oil heater	Check	Weekly
Crankcase breather	Inspect/check/test	Quarterly
Cooling System		
Cooling system level	Inspect/check	Weekly
Antifreeze protection level	Test	Semiannually
Antifreeze	Change	Annually
Adequate cooling water to heat exchanger	Check	Weekly
Rod out heat exchanger	Clean	Annually
Water pump	Inspect	Weekly
Flexible water hoses and connections	Inspect/Check	Weekly
Jacket water heater	Check	Weekly
Inspect ductwork, clean louvers	Inspect/Check/Change	Annually
Water strainer	Clean	Quarterly
Exhaust System		
Leakage	Inspect/Check	Weekly
Drain condensate trap	Check	Weekly
Insulation and fire hazards	Inspect	Quarterly
Excessive back pressure	Test	Annually

ITEM	ACTIVITY	FREQUENCY
Diesel Engine System (continued)		
Exhaust system hanger and supports	Inspect	Annually
Flexible exhaust section	Inspect	Semiannually
Battery system		
Electrolyte Level	Check	Weekly
Terminals clean and tight	Inspect/Check	Quarterly
Remove corrosion/case ext. clean and dry	Inspect/Clean	Monthly
Specific gravity or state of charge	Test	Monthly
Charger and charge rate	Inspect	Monthly
Equalize charge	Check	Monthly
Electrical system		
General inspection	Inspect	Weekly
Tighten control & power wiring connections	Check	Annually
Wire chafing where subject to movement	Inspect/Check	Quarterly
Operation of safeties and alarms	Check/Test	Semiannually
Boxes , panels, and cabinets	Clean	Semiannually
Circuit breakers or fuses	Inspect/Check	Monthly
Circuit breakers or fuses	Change	Biannually

Attachment 5

WATER STORAGE TANKS USED FOR FIRE PROTECTION

Inspections, tests, and maintenance of water storage tanks used for fire protection shall be performed in accordance with the manufacturer's instructions and NFPA 25 (latest edition). The following list highlights minimum requirements for the essential care of water storage tanks. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Condition of water in tank	Inspection	Monthly/quarterly	9.2.1
Water temperature	Inspection	Daily/weekly	9.2.4
Heating system	Inspection	Daily/weekly	9.2.6.6
Control valves	Inspection	Weekly/monthly	Table 12.1
Water level	Inspection	Monthly/quarterly	9.2.1
Air pressure	Inspection	Monthly/quarterly	9.2.2
Tank - exterior	Inspection	Quarterly	9.2.5.1
Support structure	Inspection	Quarterly	9.2.5.1
Catwalks and ladders	Inspection	Quarterly	9.2.5.1
Surrounding area	Inspection	Quarterly	9.2.5.2
Hoops and grillage	Inspection	Annually	9.2.5.4
Painted/coated surfaces	Inspection	Annually	9.2.5.5
Expansion joints	Inspection	Annually	9.2.5.3
Interior	Inspection	5 years/3 years[1]	9.2.6
Check valves	Inspection	5 years	Table 12.1
Temperature alarms	Test	Monthly	9.2.4.2, 9.2.4.3
High temp. limit switches	Test	Monthly	9.3.4
Water level alarms	Test	Semiannually	9.3.5
Level indicators	Test	5 years	9.3.1
Pressure gauges	Test	5 years	9.3.6
Water level	Maintenance	Continuous	9.4.1
Drain silt	Maintenance	Semiannually	9.4.5

Attachment 5

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Control valves	Maintenance	Annually	Table 12.1
Embankment supported rubberized fabric	Maintenance	2 years[2]	9.4.6
Check valves	Maintenance	Per manuf. instructions	12.4.2.2

1 Tanks with interior corrosion protection require inspection every 5 years. All other tanks require interiors to be inspected every 3 years.
2 Maintain ESCF tanks per manufacturer's instructions. Clean and paint exposed surfaces every 2 years.
- Data is based on 2002 edition.

VALVES AND FIRE DEPARTMENT CONNECTIONS

Inspections, tests, and maintenance on valves and fire department connections shall be performed in accordance with the manufacturer's instructions and NFPA 25 (latest edition). The following list highlights minimum requirements for the essential care of valves and fire department connections. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Control Valves			
Sealed	Inspection	Weekly	12.3.2.1
Locked	Inspection	Monthly	12.3.2.1.1
Tamper switch	Inspection	Monthly	12.3.2.1.1
Alarm Valves			
Exterior	Inspection	Monthly	12.4.1.1
Interior	Inspection	5 years	12.4.1.2
Strainers, filters, orifices	Inspection	5 years	12.4.1.2
Check Valves			
Interior	Inspection	5 years	12.4.2.1
Preaction/Deluge Valve			
Enclosure (cold weather)	Inspection	Daily/weekly	12.4.3.1
Exterior	Inspection	Monthly	12.4.3.1.6
Interior	Inspection	Annually/5 years	12.4.3.1.7
Strainers, filters, orifices	Inspection	5 years	12.4.3.1.8
Dry Pipe Valves/Quick Opening Devices			
Enclosure (cold weather)	Inspection	Daily/weekly	12.4.4.1.1
Exterior	Inspection	Monthly	12.4.4.1.4
Interior	Inspection	Annually	12.4.4.1.5
Strainers, filters. orifices	Inspection	5 years	12.4.4.1.6

Attachment 6

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Pressure Reducing & Relief Valves			
Sprinkler systems	Inspection	Quarterly	12.5.1.1
Hose connection	Inspection	Quarterly	12.5.2.1
Hose rack	Inspection	Quarterly	12.5.3.1
Fire pumps			
Casing relief	Inspection	Weekly	12.5.6.1, 12.5.6.1.1
Pressure relief	Inspection	Weekly	12.5.6.2, 12.5.6.2.1
Backflow Prevention Assemblies			
Reduced pressure	Inspection	Weekly/monthly	12.6.1
Reduced pressure detectors	Inspection	Weekly/monthly	12.6.1
Fire Department			
Connections	Inspection	Quarterly	12.7.1
Main Drains	Test	Annual/Quarterly	12.2.6, 12.2.6.1, 12.3.3.4
Water-Flow Alarms	Test	Quarterly	12.2.7
Control Valves			
Position	Test	Annually	12.3.3.1
Operation	Test	Annually	12.3.3.1
Supervisory	Test	Semiannually	12.3.3.5
Preaction/Deluge Valves			
Priming water	Test	Quarterly	12.4.3.2.1
Low air pressure alarm	Test	Quarterly	12.4.3.2.10
Full flow	Test	Annually	12.4.3.2.2
Dry pipe Valves/Quick Opening Devices			
Priming water	Test	Quarterly	12.4.4.2.1
Low air alarm	Test	Quarterly	12.4.4.2.6
Quick opening device	Test	Quarterly	12.4.4.2.4
Trip test	Test	Annually	12.4.4.2.2
Full flow trip test	Test	3 years	12.4.4.2.2.2

ITEM	ACTIVITY	FREQUENCY	NFPA 25
Pressure Reducing & Relief Valves			
Sprinkler systems	Test	5 years	12.5.1.2
Circulation relief	Test	Annually	12.5.6.1.2
Pressure relief valves	Test	Annually	12.5.6.2.2
Hose connections	Test	5 years	12.5.2.2
Hose racks	Test	5 years	12.5.3.2
Backflow Prev. Assemblies	Test	Annually	12.6.2
Control Valves	Maintenance	Annually	12.3.4
Preaction/Deluge Valves	Maintenance	Annually	12.4.4.3.2
Dry Pipe Valves/Quick Opening Devices	Maintenance	Annually	12.4.4.3.2

- Data is based on 2002 edition.

Attachment 7

KITCHEN VENTILATION HOODS AND FIRE SUPPRESSION SYSTEMS

Inspections, tests, and maintenance on kitchen ventilation hoods and fire suppression systems shall be performed in accordance with the manufacturer's instructions, NFPA 17 (latest edition), 17a (latest edition), 72 (latest edition), and NFPA 96 (latest edition). Regular service contracts with the equipment manufacturer or an authorized installation or maintenance company are required. The following list highlights minimum requirements for the essential care of kitchen ventilation hoods and fire suppression systems. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

Monthly and annual maintenance tags shall be attached to each fire suppression system for recording the inspector's initials, date, and confirmation on maintenance/inspections performed. Where fusible links are used, the manufacture and the installation dates for the links shall be marked on the system inspection tag. In addition, a signed and dated log of maintenance and a certificate showing date of exhaust system inspection or cleaning shall be available in the food service manager's office and the facility manager's office.

ITEM	ACTIVITY	FREQUENCY	NFPA REF.
Extinguishing system nozzles are located directly above grease producing equipment	Inspection	Monthly	17A:7.2.2 17:11.2.1.1
The *Manual* actuators are unobstructed	Inspection	Monthly	17A:7.2.2, 17:11.2.1.1
The tamper indicator's and seals are intact	Inspection	Monthly	17A:7.2.2 17:11.2.1.1
The maintenance tag or certificate in place	Inspection	Monthly	17A:7.2.2 17:11.2.1.1
No obvious physical damage or condition exists that might prevent operation.	Inspection	Monthly	17A:7.2.2 17:11.2.1.1
The pressure gauge(s) are in operable range.	Inspection	Monthly	17A:7.2.2 17:11.2.1.1
The nozzle blow-off caps are intact and undamaged.	Inspection	Monthly	17A:7.2.2. 17:11.2.1.1
Neither protected equipment nor hazard has been replaced, modified, or relocated	Inspection	Monthly	17:11.2.1.1 17A: 7.2.2
Gas and electric power shutoff are operational	Test	Semiannually	17:11.3.1.4
Water-wash hood cleaning systems are operational in conjunction with hoods protected by sprinkler systems	Test	Semiannually	96:11.2.1

ITEM	ACTIVITY	FREQUENCY	NFPA REF.
Remove grease from exhaust system	Maintenance	Quarterly/ Semiannually	96:11.3, 96:11.4
Recirculating systems operation and safety interlocks perform in accordance with mfg's instructions.	Test	Every 6 mos. or more frequently if needed.	96:13.6.5
Recirculating systems. Electrostatic Precipitators cleaned.	Maintenance	Weekly	96:13.6.3
Recirculating systems. Clean entire hood Plenum and blower section.	Maintenance	Quarterly	96:13.6.4
Fixed temperature sensing elements of the fusible alloy type.	Replace	Annually	17:11.3.2, 17A:7.3.3, 96:8.2.1.2
Clean fixed temperature sensing elements other than the fusible metal alloy type	Maintenance	Annually	17:11.3.3 17A:7.3.4
Manual release stations are operational and send a signal to the building fire alarm control panel.	Test	Semiannually	17:11.3.1.4 17A:7.3.2.3
Automatic release devices are operational and send a signal to the building fire alarm control panel.	Test	Semiannually	17:11.3.1.4 17A:7.3.2.3
Water flow, valve tamper, and low water pressure cutoffs are operational.	Test	Quarterly	72: Table 7-2.2 - 13i
Examine detectors, expellant gas containers, agent containers, releasing devices, piping, hose assemblies, nozzles, signals, and all auxiliary equipment	Maintenance	Semiannually	17:11.3.1. 17A:7.3.2.3
Verify that the agent distribution piping is not obstructed.	Test	Semiannually	17:11.3.1 17A:3.2.1
Examine dry chemical in stored pressure systems for caking	Inspection	Every 6 years	17:11.3.1
Hydrostatic pressure test on wet and dry chemical extinguishing systems (agent containers, aux. pressure containers, hose assemblies)	Test	Every 12 years	17:11.5.1 17A:7.5.1

- Data is based on NFPA 17 (2002), 17a (2002), 72 (2007), 96 (2004) edition.

Attachment 8

HALON SYSTEMS

Inspections, tests, and maintenance on HALON fire suppression systems shall be performed in accordance with the system manufacturer's instructions and NFPA 12A (latest edition). The following list highlights minimum requirements for the essential care of HALON systems. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 12A
Record pressure of container	Inspection	Semiannually	6.1.3
Check agent quantity	Inspection	Semiannually	6.1.3
Fire detection. Test devices	Test	Semiannually	A.6.1
Actuation. Simulate agent release	Test	Semiannually	A.6.1
Container & bracket	Inspection	Semiannually	A.6.1
Examine piping & nozzles.	Inspection	Semiannually	A.6.1
Auxiliary Equipment. Operate all Components such as switches, door releases, HVAC shutdown, power disconnect and alarms	Test	Semiannually	A.6.1
Container test	Test/inspection	5 years	6.2.2
on refill			6.2.3
Hose	Inspection	Annually	6.2.4
	Test	5 years	6.3.2
Room enclosure - ensure penetrations are protected	Inspection	Semiannually	6.4

Coordinate the testing of the following HALON system equipment with the fire alarm system maintenance (see Appendix 10 of this Chapter).

Control equipment
Secondary power supply (and UPS if necessary)
Batteries
Transient suppressors
Remote annunciators
Initiation devices
Alarm notification appliances
Special hazard equipment (Abort switches, Cross zone (matrix) detection circuits, Release solenoid circuit)
Transmission and receiving equipment - off premises
Interface equipment (HVAC shutdown)
Alarm verification (special procedures)

- Data is based on 2004 edition

CLEAN AGENT FIRE EXTINGUISHING SYSTEMS

Inspections, tests, and maintenance of clean agent fire extinguishing systems shall be performed in accordance with the system manufacturer's instructions and NFPA 2001 (latest edition). The following list highlights minimum requirements for the essential care of gaseous suppression systems, however, this list is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 2001
Record pressure of container	Inspection	Semiannually	6.1.3
Check quantity of agent	Test	Semiannually	6.1.3
Test fire detection devices	Test	Semiannually	12A.6.1
Simulate agent release	Test	Semiannually	12A.6.1
Container & bracket inspection	Inspection	Semiannually	12A.6.1
Examine piping & nozzles.	Inspection	Semiannually	12A.6.1
Auxiliary Equipment. Operate all components such as switches, door releases, HVAC, and alarms	Test	Semiannually	12A.6.1
Container test	Test/inspection	5 years	6.2.2
on refill			6.2.1
Hose	Inspection	Annually	6.3.1
	Test	5 years	6.3.2.1
Room enclosure - ensure penetrations are protected.	Inspection	Semiannually	6.4

Coordinate the testing of the following clean agent system equipment with the fire alarm system maintenance (see Appendix 10 of this Chapter).

Control equipment
Secondary power supply (and UPS if necessary)
Batteries
Transient suppressors
Remote annunciators
Initiation devices
Alarm notification appliances
Special hazard equipment (Abort switches, Cross zone (matrix) detection circuits, Release solenoid circuit)
Transmission and receiving equipment - off premises
Interface equipment (HVAC shutdown)
Alarm verification (special procedures)

- Data is based on 2004 edition

Attachment 9

FIRE DETECTION AND ALARM SYSTEMS

Inspections, tests, and maintenance on fire detection and alarm systems shall be performed in accordance with the manufacturer's instructions and NFPA 72 (latest edition). The following list highlights minimum requirements for the essential care of fire alarm systems. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA 72, TABLE 10.3.1 Item #
Alarm Notification Appliances	Inspection	Semiannually	13
Batteries (Fire Alarm Systems)			
Lead-acid type	Inspection	Monthly	3
Nickel-cadmium type	Inspection	Semiannually	3
Primary type (Dry cell)	Inspection	Monthly	3
Sealed-lead acid type	Inspection	Semiannually	3
Control Equipment (FA systems monitored for alarm, supervisory, trouble signals)			
Fuses	Inspection	Annually	1
Interfaced equipment	Inspection	Annually	1
Lamps and LEDs	Inspection	Annually	1
Primary (main) power supply	Inspection	Annually	1
Control panel trouble signals	Inspection	Semiannually	5
Emergency voice/Alarm communications equipment	Inspection	Semiannually	7
Fiber optic cable connections	Inspection	Annually	6
Initiation devices			
Air sampling	Inspection	Semiannually	9
Duct detectors	Inspection	Semiannually	9
Electromechanical releasing dev.	Inspection	Semiannually	9
Extinguishing systems switches	Inspection	Semiannually	9
Fire alarm boxes	Inspection	Semiannually	9
Heat detectors	Inspection	Semiannually	9
Radiant energy fire detectors	Inspection	Quarterly	9
Smoke detectors	Inspection	Semiannually	9
Supervisory signal devices	Inspection	Quarterly	9
Waterflow devices	Inspection	Quarterly	9

ITEM	ACTIVITY	FREQUENCY	NFPA 72 TABLE 10.3.1, Item #
Interface equipment	Inspection	Semiannually	12
Remote annunciators	Inspection	Semiannually	8
Special procedures	Inspection	Semiannually	16
Transient suppressors	Inspection	Semiannually	4
Supervising Station FA Systems-Transmitters			
DACT	Inspection	Semiannually	15
DART	Inspection	Semiannually	15
McCulloh	Inspection	Semiannually	15
RAT - signal receipt	Inspection	Semiannually	15
Supervising Station FA Systems-Receivers			
DACR	Inspection	Monthly	17
DARR	Inspection	Semiannually	17
McCulloh	Inspection	Semiannually	17
Two-way RF	Inspection	Semiannually	17
PASSR	Inspection	Semiannually	17
RARS	Inspection	Semiannually	17
Private Microwave	Inspection	Semiannually	17

ITEM	ACTIVITY	FREQUENCY	NFPA 72 TABLE 10.4.4 Item #
Alarm notification appliances			19
Audible devices	Test	Annually	
Audible textual appliances	Test	Annually	
Visible devices	Test	Annually	
Batteries (Fire Alarm Systems)			
Lead-acid type			6a
Charger test (replace as needed)	Test	Annually	
Discharge test (30 min.)	Test	Semiannually	
Load voltage test	Test	Semiannually	
Specific gravity	Test	Semiannually	
Nickel-cadmium type			6b
Charger test (replace as needed)	Test	Annually	
Discharge test (30 min.)	Test	Annually	
Load voltage test	Test	Semiannually	
Primary type (dry cell)			6c
Age test	Test	Monthly	
Sealed lead-acid type			6d
Charger test (replace w/in 5 yrs.)	Test	Annually	
Replace battery	Replace	Every 5 years	
Discharge test (30 min)	Test	Annually	
Load voltage test	Test	Semiannually	

Control Equipment (connected to supervising station)			1
Functions	Test	Annually	
Fuses	Test	Annually	
Interfaced equipment	Test	Annually	
Lamps and LEDs	Test	Annually	
Primary (main) power supply	Test	Annually	
Transponders	Test	Annually	
Control Equipment (not connected to supervising station)			2
Functions	Test	Quarterly	
Fuses	Test	Quarterly	
Interfaced equipment	Test	Quarterly	
Lamps and LEDs	Test	Quarterly	
Primary (main) power supply	Test	Quarterly	
Transponders	Test	Quarterly	
Engine Driven Generator	Test	Monthly	3
Control unit trouble signals	Test	Annually	9

ITEM	**ACTIVITY**	**FREQUENCY**	**NFPA 72 TABLE 10.4.4, Item #**
Emergency voice/Alarm communications equipment	Test	Semi-annually[1]	12
Fiber optic cable power	Test	Annually	8
Initiation devices			15
Duct detectors	Test	Annually	
Electromech. releasing devices	Test	Annually	
Extinguishing systems switches	Test	Annually	
Fire-gas and other detectors	Test	Annually	
heat detectors	Test	Annually	
fire alarm boxes	Test	Annually	
radiant energy fire detectors	Test	Semiannually	
smoke detectors - functional	Test	Annually	
smoke detectors - sensitivity (see 10.4.3.2)	Test	Biannually	
single & multi-station smoke alarms (also see 10.4.4)	Test	Annually	
single and multi-station heat alarms	Test	Annually	
supervisory signal devices	Test	Quarterly	
waterflow devices	Test	Quarterly[2]	
valve tamper switches	Test	Semiannually	
Interface equipment	Test	Annually	18
Off-premises transmission equip.	Test	Quarterly	22
Remote annunciators	Test	Annually	14

Special hazard equipment	Test	Annually	19
Special procedures	Test	Annually	24
Supervising station fire alarm systems – Transmitters			23
DACT	Test	Quarterly[3]	
DART	Test	Quarterly[3]	
McCulloh	Test	Quarterly[3]	
RAT	Test	Quarterly[3]	
Supervising station fire alarm systems – Receivers			25
DACR	Test	Monthly	
DARR	Test	Monthly	
McCulloh	Test	Monthly	
Two-way RF multiplex	Test	Monthly	

ITEM	**ACTIVITY**	**FREQUENCY**	**NFPA 72 TABLE 10.4.4 Item #**
Supervising station fire alarm systems – Receivers (continued)			25
RASSR	Test	Monthly	
RARSR	Test	Monthly	
Private microwave	Test	Monthly	

1 Due to frequency of construction and system modifications which occur in the museums, testing was increased from annually to semi-annually for voice/alarm communications equipment.
2 Testing frequency adjusted to match NFPA 25 requirements for waterflow devices.
3 Testing frequency increased to quarterly due to history of trouble contacts being disconnected.

- Data is based on 2007 edition

EMERGENCY GENERATOR AND EMERGENCY LIGHTING

Inspections, tests, and maintenance on the emergency generator and emergency lighting shall be performed in accordance with the manufacturer's instructions, NFPA 101 (latest edition), and NFPA 110 (2005). The following list highlights minimum testing requirements for emergency generators and emergency lighting. An emergency power supply system maintenance schedule is also attached. This schedule, however, is not meant to replace manufacturer's instructions and updated code requirements.

The continuing reliability and integrity of emergency electrical service is dependent on an established program of routine maintenance and operational testing. Consideration must be given to providing a temporary alternative source whenever the emergency generator is out of service.

One set of the instruction *Manual*s shall be kept in a secure, convenient location near the equipment. Another set shall be kept at the facility manager office.

EMERGENCY POWER SUPPLY SYSTEM TESTING

ITEM	ACTIVITY	FREQUENCY	NFPA REFERENCE
Emergency lighting for 30 second duration. (Lighting on generator circuit and battery powered.)	Test	Monthly	101:7.9.3.1
Emergency lighting for 1½ hour duration (Lighting on generator circuit and battery powered.)*	Test	Annual	101:7.9.3.1
Emergency generator Test under load for 30 minutes (>30% nameplate kW rating or other methods per NFPA 110 8.4.2.) check transfer of emergency power to fire protection/life safety equipment (fire alarm system, fire pump, smoke management systems)	Test	Monthly	110:8.4.1 & 8.4.2 101:7.9.2.4
Transfer switch	Test	Monthly	110:8.4.6
Circuit breakers rated > 600 volts			110:8.4.7.1
Exercised every 6 months	Test	every 6 months	
Tested under simulated load	Test	Biannually	

*Notify OSHEM 2 weeks prior to the emergency lighting test.

EMERGENCY POWER SUPPLY SYSTEM MAINTENANCE SCHEDULE
(per NFPA 110, A.8.3.1 (a))

TYPE	ACTIVITY	FREQUENCY
Fuel		
Main supply tank level	Check	Weekly
Day tank level	Inspect/check	Weekly
Day tank float switch	Inspect/test	Weekly
Supply or transfer pump operation	Inspect/test	Weekly
Solenoid valve operation	Inspect/test	Weekly
Strainer, filter and/or dirt leg	Clean	Quarterly
Water in system	Check/clean	Weekly
Flexible hose and connectors	Inspect	Weekly
Tank vents/overflow pipe blocked	Inspect/replace	Annually
Piping	Inspect	Annually
Fuel in main tank (when used)	Filter/Biocide[1]	Biannually[1]
Lubrication System		
Oil level	Inspect/Check	Weekly
Oil change	Replace	1st of 50 hrs. run or annually
Oil filter	Change	1st of 50 hrs run or annually
Lube oil heater	Check	Weekly
Crankcase breather	Inspect/clean/replace	Quarterly
Cooling system		
Level	Inspect/check	Weekly
Antifreeze protection level	Test	Semiannually
Antifreeze	Test PH/contaminates[2]	Annually
Adequate cooling water to heat exchanger	Check	Weekly
Rod out heat exchanger	Clean	Annually
Adequate fresh air through radiator	Check	Weekly
Clean exterior of radiator	Clean	Annually
Fan and alternator belts	Inspect/Check	Monthly
Water pump	Inspect	Weekly
Flexible water hoses and connections	Inspect/Check	Weekly
Jacket water heater	Check	Weekly
Inspect ductwork, clean louvers	Inspect/Check/Change	Annually
Louver motor and controls	Inspect/Clean/Test	Annually

1 Replacing fuel changed to “filter/biocide” and frequency changed from annually to biannually per OFMR High Voltage Shop experience with fuel maintenance.
2 Antifreeze tested for proper PH and for contaminates. Solution changed if necessary.

EMERGENCY POWER SUPPLY SYSTEM MAINTENANCE SCHEDULE
(per NFPA 110, A8.3.1 (a))

TYPE	ACTIVITY	FREQUENCY
Exhaust System		
Leakage	Inspect/Check	Weekly
Drain condensate trap	Check	Weekly
Insulation and fire hazards	Inspect	Quarterly
Excessive back pressure	Test	Annually
Exhaust system hanger and supports	Inspect	Annually
Flexible exhaust section	Inspect	Semiannually
Battery System		
Electrolyte Level	Check	Weekly
Terminals clean and tight	Inspect/Check	Quarterly
Remove corrosion/case ext. clean and dry	Inspect/Clean	Monthly
Specific gravity or state of charge	Test	Monthly
Charger and charge rate	Inspect	Monthly
Equalize charge	Check	Monthly
Electrical System		
General inspection	Inspect	Weekly
Tighten control & power wiring connections	Check	Annually
Wire chafing if subject to movement	Inspect/Check	Quarterly
Operation of safeties and alarms	Check/Test	Semiannually
Boxes , panels, and cabinets	Clean	Semiannually
Circuit breakers, fuses (Do not break mfg's seals or perform internal inspection)	Inspect/Check/Clean	Monthly
Transfer switch main contacts	Inspect/Clean	Annually
Calibration of voltage-sensing relays/devices	Check/Test	Annually
Wire insulation breakdown –	Test	Every 5 years/500 hrs
Prime mover		
General inspection	Inspect	Weekly
Service air cleaner	Inpect/Vacuum/Gauge[3]	Semiannually/as needed[3]
Governor oil level and linkage	Inspect/Check	Monthly
Governor oil	Change	Annually
Ignition system- plugs, coil, cap, rotor, secondary wire insulation	Inspect/Check/Replace/ Clean/Test	Annually

3 Based on current OFMR High Voltage Shop operations/experience.

EMERGENCY POWER SUPPLY SYSTEM MAINTENANCE SCHEDULE
(per NFPA 110, A8.3.1 (a))

TYPE	ACTIVITY	FREQUENCY
Choke setting and carburetor adjustment	Check	Semiannually
Injector pump and injectors for flow rate, pressure, and/or spray pattern	Test	Annually
Test EPS for 4 hours, at min. 80% of nameplate rating	Test	Every 3 years
Valve clearance	Test	Every 3 yrs or 500 hours
Torque bolts	Test	Every 3 yrs or 500 hours
Generator		
Brush length, appearance free to move in holder	Inspect/Check/Clean	Semiannually
Commutator and slip rings	Inspect/Clean	Annually
Rotor and stator	Inspect/Clean	Annually
Bearings	Inspect/Replace	Annually
Bearing grease	Check/Replace	Annually
Exciter	Inspect/Check/Clean	Annually
Voltage regulator	Inspect/Check/Clean	Annually
Measure and record resistance readings of windings with insulation tester.	Test	Annually
General condition of EPSS -		
Unusual condition of vibration , leakage, noise, temperature or deterioration.	Inspect/Clean	Weekly
Service room or housekeeping	Inspect/Clean	Weekly
Restore system to automatic operation condition.	Inspect	Weekly

- Data is based on 2006 edition

FIRE DOORS AND EMERGENCY EXITS

Inspections, tests, and maintenance shall be performed on fire doors and emergency exits in accordance with the manufacturer's instructions, NFPA 101 (latest edition), and NFPA 80 (latest edition). The following list highlights minimum requirements for the essential care of fire doors and emergency exits. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

Emergency exits must be maintained to avoid the numerous deaths caused in fires where exits were either blocked or the hardware was inoperable. In addition, fire doors have no value unless properly maintained and closed or able to close automatically at the time of a fire.

ITEM	ACTIVITY	FREQUENCY	NFPA REF.
Fire Doors:			
Door hardware is operating properly	Inspection	Annually	80:5.2.4 & 5.2.5
Door does not have punctures or broken seams.	Inspection	Annually	80:5.2.4 & 5.2.5
Self-closer is intact and allows door to latch closed.	Inspection	Annually	80:5.2.4 & 5.2.5
On sliding doors, chains and cables operate smoothly over all pulleys and guides.	Inspection	Annually	80:5.2.4 & 5.2.5
Doors have not been modified e.g., by the installation of louvers.	Inspection	Annually	80:5.2.4 & 5.2.5
Coordinators are securely attached and adjusted properly.	Inspection	Annually	80:5.2.4 & 5.2.5
Door openings are kept clear of obstructions.	Inspection	Semi-annually[1]	80:5.2.13
Clearances around the door do not exceed NFPA 80 requirements	Inspection	Annually	80:5.2.4 & 5.2.5
Tinclad and Kalamein doors	Inspection	Annually	80:5.2.10
Doors are kept closed or arranged for automatic closing	Inspection	Semi-annually[1]	80:5.2.14
Confirm proper operation of doors with hold open devices and self-closers (Latches, guides and rollers must be checked.)	Test	Annually	80:5.2.6
Test all horizontal, sliding, and rolling fire doors	Test	Annually	80:5.2.14
Lubricate guides and bearings.	Maintenance	Annually	80:5.2.12

Emergency exit doors (perimeter exits and doors with delayed egress hardware):			
Not obstructed	Inspect	Weekly	101:4.5.3.2
Hardware operating properly	Test	Weekly	101:7.2.1.4
Measure door opening force. (Force gauge used to ensure door can be opened within NFPA 101 limits.)	Test	Quarterly	101:7.2.1.4
Stairwell doors (interior):			
Not obstructed	Inspect	Quarterly	101:4.5.3.2
Hardware operating properly	Test	Quarterly	101:7.2.1.4
Measure door opening force. (Force gauge used to ensure door can be opened within NFPA 101 limits.)	Test	Annually	101:7.2.1.4

1 To be completed during each annual Safety Coordinator and safety committee inspection

- Data is based on NFPA 101 (2007), 80 (2007) edition.

LIFE SAFETY AND FIREFIGHTERS SERVICE ON ELEVATORS

Elevators shall be subject to routine and periodic tests as specified in ASME/ANSI A17.1, the manufacturer's instructions, and NFPA 101 (latest edition). The following list represents minimum requirements for the safe operation of elevators during a fire. A more complete list is found in ASME/ANSI A17.1, however, this list is not meant to replace manufacturer's instructions.

ITEM	ACTIVITY	FREQUENCIES	REFERENCE
Phase I recall and a minimum of 1 floor operation on Phase II	Test	Monthly	ASME A17.1:1206.7 NFPA 101:7.4.8
Emergency lighting in the elevator car	Test	Monthly (In coordination with emergency lighting test	NFPA 101: 5.9.3 ASME A17.1:2147.1.3

(Elevator power shunt by heat detectors are to be tested in accordance with the interfaced equipment per NFPA 72.)

- Data is based on 2006 edition

Attachment 14

HVAC AND SMOKE MANAGEMENT SYSTEMS

Inspections, tests, and maintenance on HVAC and smoke management systems shall be performed in accordance with the manufacturer's instructions, NFPA 101 (latest edition), 90A (latest edition), and 92A (latest edition). The following list highlights minimum requirements for the essential care of HVAC and smoke management systems. This list, however, is not meant to replace manufacturer's instructions and updated code requirements.

ITEM	ACTIVITY	FREQUENCY	NFPA
HVAC GENERAL			
Fire dampers, fire/smoke dampers			
Operate all dampers to verify they fully close and latch (if provided).	Inspect/Test	Every 4 years	90A:3-4.7
Lubricate moving parts as necessary.	Maintenance	Every 4 years	90A:3-4.7
Filters (replace or clean when resistance to airflow increases to no more than two times the original resistance or reaches mfg. recommended value for replacement)	Test/ Maintenance	Per manufacturer's requirements	90A:B-3.1
Electrical equip. of automatic filters (check motors & relays).	Inspect/Test	Semiannually	90A:B-3.5
Examine fan controls and activate to assure operable condition.	Test	Annually	90A:B-8
Clean and lubricate fans and motors	Maintenance	Quarterly	90A:B-7.1
Check belt alignment	Inspect	Quarterly	90A:B-7.1
Determine the amount of dust and waste material in ducts, plenums, ceiling cavities, and raised floors. Clean if necessary.	Inspect/ Maintenance	Quarterly or as required	90A:B-4.1 90A:B-5.2
Inspect cooling and heating coils.	Inspect/	Quarterly or	90A:B-4.3
Clean if necessary	Maintenance	as required	
Inspect apparatus casing and air-handling unit plenums. Clean if necessary.	Inspect/ Maintenance	Monthly or as required	90A:B-5.1

ITEM	ACTIVITY	FREQUENCY	NFPA
DEDICATED SMOKE CONTROL & EVACUATION SYSTEMS			
Operate smoke-control system for each control sequence to verify that all system parts and controls are operational. *	Test	Semiannually[1]	92A:4-4.3.1
Operate the smoke control system to.....			
Test			
Annually.....			92A:4-4.3.1
verify airflow quantities and pressure differentials across smoke barriers, at make-up air supplies and at smoke exhaust equipment are within design tolerances . Tests conducted under normal power and standby power, if applicable.*			
Activate smoke dampers by smoke detectors and all other inputs per system design. Replace electromechanical squibs.	Test	Annually	72:Table 7-3.2
NON-DEDICATED SMOKE CONTROL & EVACUATION SYSTEMS			
Operate smoke-control system for each control sequence to verify that all system parts and controls are operational. *	Test	Semiannually[1]	92A:4-4.3.1
Operate the smoke control system to.....			
Test			
Annually.....			92A:4-4.3.1
verify airflow quantities and pressure differentials across smoke barriers, at make-up air supplies and at smoke exhaust equipment are within design tolerances . Tests conducted under normal power and standby power, if applicable. *			
Activate smoke dampers by smoke detectors and all other inputs per system design. Replace electromechanical squibs.	Test	Annually	72:Table 7-3.2
STAIR PRESSURIZATION SYSTEMS			
Operate the stair pressurization system for each control sequence to verify that all system parts and controls are operational.*	Test	Semiannually[1]	101:31-1.3.10 90A:4-4.1

Operate stair pressurization system to.....
Test .....
Annually.....92A:4-4.3.1
verify pressure differentials and forces to operate stair doors are within design tolerances. Tests conducted under normal power and standby power. *

1 Frequency for operational testing for dedicated and non-dedicated smoke control systems increased from annually to semiannually due to their complexity, including dependency on multiple building systems.

* Notify OSHEM 2 weeks prior to these tests.

- Data is based on NFPA 101 (2006), 90A (2002) edition

PORTABLE FIRE EXTINGUISHERS

Inspections, tests, and maintenance shall be performed on portable fire extinguishers in accordance with the manufacturer's instructions and NFPA 10 (latest edition). The following list highlights minimum requirements for the essential care of portable fire extinguishers. This list, however, is not meant to replace manufacturer's instructions and updated code requirements. Monthly inspections are to be performed. Maintenance and testing shall be performed under a regular service contract with an authorized portable fire extinguisher maintenance company.

Inspection records shall be kept on a tag or label attached to the fire extinguisher or in an electronic system (e.g., bar coding) that provides a permanent record. Inspections are to be recorded on the tag attached to the portable fire extinguisher. The date the inspection was performed and the initials of the person performing the inspection shall be recorded. Maintenance records shall be kept on a tag or securely attached to the shell of the extinguisher that indicate the month and year the maintenance was performed. The facility manager shall keep a written inventory of all extinguishers, including the following information: location, type, and last service date.

Extinguishers requiring maintenance are to be replaced immediately with a spare extinguisher of the same type and at least equal rating. Portable extinguishers that require maintenance should first be evaluated for use in training.

ITEM	ACTIVITY	FREQUENCY	NFPA 10
Located in designated place. (Report out-of-place extinguishers to the building mgr.)	Inspection	Monthly	4-3.2
No obstruction to access or visibility. (Report obstructions to the building mgr.)	Inspection	Monthly	4-3.2
Safety seals and tamper indicators not broken or missing. (Replace any extinguisher that has a broken or missing tamper indicator.)	Inspection	Monthly	4-3.2
Fullness determined by weighing for extinguishers without pressure gauge (Replace extinguishers with a weight loss of 10% or more.)	Inspection	Monthly	4-3.2
Pressure gauge reading or indicator in the operable range or position. (Replace any extinguisher on which the gage indicates "recharge".)	Inspection	Monthly	4-3.2

ITEM	ACTIVITY	FREQUENCY	NFPA 10
Examine for obvious physical damage, corrosion, leakage, or clogged nozzle. (Replace if physically damaged.)	Inspection	Monthly	4-3.2 5-1.2

Conductivity test on CO_2 extinguisher hose assemblies has been performed within past year by a service company.	Inspection	Annually	4-4.1.2
Thorough external examination examination of the extinguisher's three basic elements: mechanical parts, extinguishing agent, expelling means	Inspection	Annually	4-4.2
Remove tamper seal of rechargeable fire extinguishers by operating the pull pin or locking device. Replace seal.	Test	Annually	4-4.2.1
CO2 fire extinguishers to be hydro-statically tested.	Test	Every 5 years	5-2
Stored pressure fire extinguishers (dry chemical, halon, water) emptied and subjected to the applicable maintenance procedures. Non-rechargeable extinguishers to replaced.	Inspection	Every 6 years	4-4.3
Hydrostatically test dry chemical and HALON extinguishers. *	Test	Every 12 years	5-2

* Halon extinguishers requiring maintenance are to be taken to a service company to permit recovery of the Halon. Halon extinguishers are to be replaced with another extinguisher having a suitable suppressant.

- Data is based on 2007 edition

LIGHTNING PROTECTION SYSTEMS

Inspections, tests, and maintenance shall be performed in accordance with the manufacturer's instructions and NFPA 780 (latest edition). The following list highlights minimum requirements for the essential care of lightning protection systems, however, this list is not meant to replace manufacturer's instructions and updated code requirements. Many system components tend to lose their effectiveness over the years because of corrosion factors, roof repairs, weather related damage, and damage caused by lightning strikes. The physical, as well as the electrical characteristics, of the lightning protection system must be maintained to prevent building damage.

ITEM	ACTIVITY	FREQUENCY	NFPA 780
Inspection of surge suppression devices on communication and power lines entering the building	Inspection	Semiannually	Appendix D
System is in good repair. Inspection of all conductors and system components	Inspection	Annually, after lightning discharge, after roof repair	Appendix D
No loose connections	Inspection	Annually and after lightning discharge, After roof repair	Appendix D
No part of the system has been weakened by lightning discharge, corrosion or vibration	Inspection	Annually and after lightning discharge, after roof repair	Appendix D
Down conductors and ground terminals are intact	Inspection	Annually and after lightning discharge	Appendix D
Conductors and system components are securely fastened to their mounting surfaces	Inspection	Annually and after lightning discharge	Appendix D
Additions and alterations are protected.	Inspection	Annually	Appendix D
There has been no visual damage to surge suppression devices	Inspection	Annually and after lightning discharge	Appendix D
Ground resistance tests of the ground termination system and its individual ground electrodes if adequate disconnecting means have been provided Electrical resistance of ground terminals (5 ohms or less)*	Test	Every 3 years	Appendix D
Continuity tests to determine if	Test	Every 3 years	Appendix D

suitable equipotential bonding has been established for any new interior services or construction since last inspection.			
Electrical resistance of lightning protection system (5 ohms or less)	Test	Every 3 years	Appendix D
Testing of surge suppression devices to determine effectiveness compared with similar new devices	Maintenance	Every 3 years	Appendix D
Refastening/tightening of all components, conductors, clamps, and splicers	Maintenance	Annually	Appendix B

* These test results should be compared with previous or original results or current accepted values, or both, for the soil conditions involved.

- Data is based on 2004 edition

PAINT SPRAY BOOTHS

Inspections and maintenance of paint spray booth areas shall be performed in accordance with NFPA 33 (2007). The following list highlights minimum requirements for safe paint spray operations.

ITEM	ACTIVITY	FREQUENCIES	NFPA 33
High pressure hose	Inspection	Monthly	8-2
Keep spray areas free of combustible deposits. Remove accumulation of combustible residue on booths, ducts, duct discharge points, sprinkler heads	Inspection/ Maintenance	Varies (dependent on frequency of spraying)	A-8
Inspect overspray collector filters Replace/clean filters prior to Excessive airflow restriction	Inspection/ Maintenance	After each period of use	8-4
Metal waste cans with lids are being used for rags and waste	Inspection	Monthly	A-8
Electric motors and fan..... Inspection/ ..... Semiannually ..... bearings are not overheating	Maintenance		A-8
Fan blades are in alignment	Inspection/ Maintenance	Semiannually	A-8
Electric wiring is properly fused	Inspection	Semiannually	A-8
Guards and globes on electric fixtures are in place	Inspection	Semiannually	A-8
Housekeeping	Inspection	Semiannually	A-8
Operating instructions visible	Inspection	Semiannually	A-8

NICET Certification

It is recommended that all personnel performing ITM on fire alarm and fire suppression systems be certified by the National Institute for Certification in Engineering Technologies (NICET) as follows:

(1) ITM on fire alarm systems is to be performed by technicians NICET certified for fire alarm systems as follows:

(a) NICET Level III or IV - Technicians working independently and lead technician on a working team.

(b) NICET Level II - Technicians working under daily supervision of a technician certified as NICET Level III or higher.

(c) NICET Level I – Technicians working under continuous supervision of a technician certified as NICET Level III or higher.

(2) ITM on water-based fire suppression systems is to be performed by technicians NICET certified for water-based fire suppression systems as follows:

(a) NICET Level III or IV - Technicians working independently and lead technician on a working team.

(b) NICET Level II - Technicians working under daily supervision of a technician certified as NICET Level III or higher.

(c) NICET Level I – Technicians working under continuous supervision of a technician certified as NICET Level III or higher.

(3) ITM on special hazard suppression systems is to be performed by technicians NICET certified for special hazards as follows:

(a) NICET Level III or IV - Technicians working independently and lead technician on a working team.

(b) NICET Level II - Technicians working under daily supervision of a technician certified as NICET Level III or higher.

(c) NICET Level I – Technicians working under continuous supervision of a technician certified as NICET Level III or higher.

b. It is recommended that all personnel performing ITM on pre-engineered suppression systems be certified by the manufacturer of the system.

c. Certified by state or local authority; and

d. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of specific life safety systems.

e. Certain local jurisdictions may require varying level of continuing education to maintain recognized journeyman/craftsman-level qualifications. Contact their Safety Coordinator for guidance on local qualification requirements.