

## CHAPTER 38 – FIRE PREVENTION

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# CHAPTER 38 – FIRE PREVENTION

## A. INTRODUCTION

1. The provisions of this Chapter are intended to prevent loss of life and property to the Smithsonian Institution (SI) through an aggressive fire prevention program.
2. The Chapter establishes fire prevention requirements and measures to minimize the risk from fire.
3. This Chapter applies to all SI facilities and operations including museums, research centers or installations, storage buildings, leased spaces, as well as equipment including but not limited to piers, boats, vehicles, tanks, and containers.
4. The requirements of this Chapter shall be followed by all SI personnel and contractors.

## B. CHAPTER-SPECIFIC ROLES AND RESPONSIBILITIES

### 1. Safety Coordinators

- a. Ensure the requirements of this Chapter are applied throughout the respective museum, facility and/or operation under their purview.
- b. Ensure electric portable heaters and non-commercial cooking appliances (microwaves, toaster ovens, etc.) are inspected during the two annual facility self-inspections (Safety Coordinator and safety committee) as required by [Chapter 5, “Safety Assessments, Log of Deficiencies and Corrective Action Plans”](#), of this *Manual*, to verify appliances are in proper working condition and do not present a fire hazard.
- c. Contact Office of Safety, Health and Environmental Management (OSHEM) for technical support if questions or issues need to be resolved relating to the requirements of Attachment 1 of this Chapter.

### 2. Building Managers

- a. Ensure the requirements of this Chapter are being followed within their building or facility.
- b. Ensure that all SI personnel and contractors under their control follow the requirements of this Chapter.
- c. Immediately seek resolution or correction of issues not complying with the requirements of this Chapter.
- d. Review and approves the use of portable cooking appliances and heaters, per the requirements of this Chapter.
- e. Inspect electric portable heaters annually and maintains inspection

records.

- f. Contact Office of Safety, Health and Environmental Management (OSHEM) for technical support if questions or issues need to be resolved relating to the requirements of Attachment 1 of this Chapter.

### **3. Supervisors**

- a. Ensure that all activities under their purview are completed in accordance with the requirements of this Chapter.
- b. Ensure that all building or facility areas under their purview comply with the requirements of this Chapter.
- c. Stop work activities that do not comply with the requirements of this Chapter.
- d. Report any fire prevention related deficiencies to the Safety Coordinator

### **4. Employees**

- a. Adhere to all requirements of this Chapter.
- b. Submit required information pertaining to any heat producing appliances for approval by the Safety Coordinator and/or Building Manager prior to bringing onsite.
- c. Report any fire prevention related deficiencies to their supervisor, or the appropriate Safety Coordinator and/or Building Manager.

### **5. Security Officers**

- a. Report any fire prevention related deficiencies to the appropriate Safety Coordinator and/or Building Manager.
- b. Look for and report fire prevention hazards (e.g., electric heaters left on) during security officer tours or inspections.

### **6. Construction Project COTRs**

- a. Ensure that all requirements of this Chapter and Attachment 1 are followed by all SI staff and contractors during the course of projects under their purview.
- b. Stop construction, renovation, or repair related activities if the requirements of this Chapter or Attachment 1 are not being followed.
- c. Contact Office of Safety, Health and Environmental Management (OSHEM) for technical support if questions or issues need to be resolved relating to the requirements of this Chapter or Attachment 1.

## **C. HAZARD CONTROL**

### **1. Smoking**

- a. Smoking shall be prohibited in SI-owned and leased space and at entrances to SI-owned or leased buildings in accordance with [SI Directive 209 – Smoke-Free Environment](#).
- b. Smoking shall be prohibited in all SI-owned and leased spaces that are undergoing construction, renovation, or repair.

### **2. Exhibitory and Decorations**

- c. Decorations shall not be placed where they obstruct access to, or visibility of, exits, fire alarm equipment, or firefighting equipment.
- d. Lighted candles or other open flames are not permitted as decorations.

Exception: Special events when approved by OSHEM.

- e. Only fire-resistant artificial trees and live trees meeting the below criteria shall be permitted indoors. The requirements listed below shall be followed if live trees will be used indoors:
  - (1) Live trees must include roots and soil in a fabric bag
  - (2) Live trees shall not have lights, unless approved by OSHEM. Where lights are approved, they shall be disconnected at the receptacle during periods when no one is present.
  - (3) Live trees shall be placed at least 4 feet from stoves, radiators, or other sources of heat.
  - (4) Live trees shall be watered daily.
  - (5) Trees that have died or become dried-out must be removed immediately.
  - (6) Lighted candles shall not be used on or near live trees.

### **3. Heat Producing Appliances and Operations**

- a. All heat producing appliances (e.g., portable heaters, coffee makers, tea kettles) shall be:
  - (1) Approved, in writing, by the building manager prior to being brought into SI owned or leased facilities.
  - (2) Listed by an independent testing agency (e.g., UL) for their intended use (appliances and cords). Listing tags shall not be removed from appliances or cords.
  - (3) Kept on a noncombustible surface and maintained at least 18 inches from combustibles.
  - (4) Used in strict accordance with the manufacturer's instructions.
  - (5) Equipped with a lamp to indicate when power is turned on.

- (6) Connected to an electrical circuit with capacity sufficient to meet the additional load of the appliance, as verified by the building manager.
- (7) Plugged directly into a receptacle. Power strips and extension cords shall not be used to power heat producing appliances.
- b. All electrical cooking appliances and operations shall comply with the requirements of C.3.a above and shall meet the following:
  - (1) Equipment:
    - i. Non-commercial coffee makers and tea kettles shall be provided with a shut-off timer (of adequate amperage suitable for the device) incapable of being set to allow operation for more than 5 hours. A commercial coffee maker is permitted in lieu of using a non-commercial coffee maker with a shut-off timer.
    - ii. Cooking and warming shall be performed in existing kitchen facilities. Warming may be performed in other locations pre-approved by the Safety Coordinator.
  - (2) Operations:
    - i. Shall not be placed in rooms or areas that cannot be easily checked by OPS and SI staff.
    - ii. Heat producing appliances that create grease laden vapors (i.e. deep fryers) are not allowed for personal use within the facility.
    - iii. The use of liquefied fuel gases (e.g., LNG or propane) is prohibited indoors or within 20 feet of SI facilities. Liquefied fuel gases may be used during outdoor events with prior approval from the Safety Coordinator.
    - iv. Cooking and warming appliances (e.g., hot plates, toaster ovens) shall be inspected annually by the building manager for safe operation.
    - v. A multi-purpose portable fire extinguisher (rated 2A:40BC) must be provided within 30 feet of any heating or cooking operation. A Class K extinguisher shall be provided for any cooking operation that involves frying. Fire protection requirements for commercial kitchen operations are described in [Chapter 36, "Fire Protection"](#), of this Manual.
    - vi. Cooking and warming appliances shall be prohibited in storage rooms or other areas that contain concentrated quantities of combustible materials.
- c. Due to the fire hazards inherent to portable heaters, their use should be avoided, and Directors are encouraged to implement a policy prohibiting such appliances in their facilities wherever

possible. The use of electric portable heaters, where permitted, shall comply with all the requirements of this section.

- (1) Prior to approving electric portable heaters for an area, the building manager shall determine if adequate temperature levels can be maintained through adjustments or modifications to the building heating system, or by other means.
- (2) Fuel fired space heaters (e.g., kerosene) shall not be used inside or within 20 feet of SI facilities.
- (3) Building managers shall establish and maintain an approval, tracking and inspection program for all electric portable heaters brought into their facility. The elements of this program shall be as follows:
- (4) The building manager shall maintain a tracking sheet which records, at a minimum, the serial number, purchase date, manufacturer, model, location, and user of each portable heater. A sample tracking sheet can be found in Attachment 2 of this chapter.
  - i. The building manager shall evaluate all portable heaters and affix a label, with their signature and date of last inspection on each portable heater. A sample sheet of labels can be found in Attachment 3 of this chapter.
  - ii. Employees requesting portable heaters must complete the user agreement form found in Attachment 4 of this chapter.
  - iii. The building manager shall maintain records of all completed employee user agreement forms for as long as the individual heater is on the premises.
  - iv. The building manager shall ensure all portable heaters are inspected at least once a year to confirm they are in good working condition and are being used in compliance with the requirements of this chapter.
- (5) Electric portable heaters shall comply with the following requirements for approval:
  - i. Provided with a label by the building manager that includes the last inspection date. Attachment 3 of this chapter contains a sheet of sample labels.
  - ii. Equipped with approved tip -overprotection per UL 1278.
  - iii. Provided with an approved automatic over-heat shut-off control.
  - iv. Unplugged at the end of the workday.
  - v. A clearance of 3 feet shall be maintained between combustibles and heaters (e.g., wood, cloth, paper, carpeting).

- d. The use of liquefied fuel gases (liquified natural gas or propane) is prohibited inside or within 20 feet of SI facilities
  - e. High temperature drying ovens and other heat producing equipment that operates at abnormally high temperatures shall be closely monitored and shall not be left unattended. Temperature controls shall be set under the ignition temperature of the material being heated.
  - f. Lights used for drying within noncombustible cabinets, cabinets, or drying boxes, shall be protected with a wire guard to prevent direct contact with combustible materials.
  - g. Combustibles (e.g., wood, paper, carpeting) shall be maintained clear (minimum of 36 inches) from hot surfaces, including: boilers, dryers, ovens, portable heaters, gas or oil-fired burner flames, furnaces, water heaters, engine mufflers, electric lamps, and irons.
- 4. Fire Safety During Construction, Tar Kettles and Bituminous Melters**
- a. Operation of tar kettles and bituminous melters shall comply with the guidance in Attachment 1 of this chapter.
- 5. Utility Rooms (i.e., Mechanical rooms, boiler rooms, electrical closets, etc.)**
- a. General combustible materials shall not be stored within utility rooms. Storage incidental to the space, such as one month's supply of air filters in a mechanical room, is permitted.
  - b. The highest levels of housekeeping shall be maintained throughout these areas at all times.
- 6. Storage (General, Collections, Information Technology Equipment & Data, and Outside)**
- a. General
    - (1) All storage areas shall be kept clean and free of combustibles not related to the storage. The highest housekeeping standards shall be maintained throughout storage areas.
    - (2) Loose packing materials shall be stored in metal containers with hinged self-closing covers, except when loaded into packaging equipment. Packing materials that are dispensed from gravity or air driven packaging equipment shall be noncombustible or fire retardant. No more than a one-day supply of combustible packing materials shall be stored in collections processing areas.
    - (3) Combustible materials shall not be stored on top of or within 36 inches of heaters, or within 18 inches of lights or other heat producing appliances.
    - (4) Heat producing appliances, such as portable heaters and coffee pots, shall not be used within storage rooms.

- (5) Storage shall be maintained at least 18 inches below automatic sprinkler head deflectors.
  - (6) All new storage cabinets, shelving, racks, and automatic filing equipment shall be of noncombustible construction.
- b. Collection Storage
- (1) Conservation and research operations shall be conducted outside of collection storage spaces. Where such tasks must be performed on a collection item in-situ, collections staff and the safety coordinator shall first evaluate the risks and develop written standard operating procedures to minimize potential impacts to the collections.
  - (2) Collection containers, crates, padding, dust covers, plastic materials, and humidity buffering substances shall be noncombustible or fire retardant. Examples of non-compliant materials may include, but are not limited to wood, plastic shelf liners and sheeting, and expanded foam materials.
  - (3) Storage of other combustible, non-collection commodities within these areas shall be prohibited to the greatest extent possible. If combustibles must be stored within the area, they are to be stored within closed metal cabinets or in a separate fire-rated enclosure.
  - (4) Hazardous operations, such as hot work (e.g., welding, torch cutting, brazing, etc.) operations, shall not be conducted within collection storage areas, unless approved by OSHEM to ensure the appropriate safety precautions are in place. Refer to [Chapter 14, "Hot Work Management and Permit System,"](#) of this Manual, for additional hot work information.
  - (5) Storage of cellulose nitrate film and other cellulose nitrate-based materials shall be reported to OSHEM, prior to commencement of storage or upon discovery. Storage of this material shall be in accordance with NFPA 40 – Standard for the Storage and Handling of Cellulose Nitrate Film. Cellulose nitrate materials, both suspected and verified, shall be stored separately from other combustible materials, in nitrate storage vaults or NFPA 40 compliant metal cabinets located in cool, well-ventilated areas, protected by automatic sprinklers. Additional information is available in [Smithsonian Directive 502](#), which is SI's official policy for cellulose nitrate motion picture film.
- c. Information Technology (IT) Rooms and Data Storage
- (1) The quantity of records within the IT room shall be kept to the absolute minimum required for essential and efficient operation.
  - (2) Vital records shall be duplicated at least every two weeks but may necessitate daily back-up due to programmatic or mission importance. Duplicates shall be stored in a separate, protected



location so that original and duplicates will not be exposed to the same fire.

- (3) Only records that are essential to the IT equipment operations shall be permitted to be kept in the IT equipment room. If the records are mission critical or vital in nature, they shall be stored in Listed record protection equipment with a Class 150 1-hour or better fire resistance rating. All other records shall be stored in closed metal files or cabinets.
- (4) IT record storage rooms shall only be used for storage of records.
- (5) Paper stock, inks, unused recording media, and other combustibles within the IT equipment room shall be kept in totally enclosed metal cases or cabinets.
- (6) Reserve stocks of paper, inks, unused recording media, and other combustibles shall be stored outside of the IT equipment room.
- (7) The space beneath a raised floor shall kept free of storage and debris.
- (8) Raised floor panels shall always remain in place, except during maintenance and repair operations.

d. Pallet and Outside Storage

- (1) All unnecessary wooden pallets shall be removed from the building.
- (2) Empty wood pallets and combustible materials stored outside a building shall be a minimum of 25 feet from the facility.
- (3) If pallets must be stored on the interior of a facility, they shall be stacked no higher than 6 feet.
- (4) Each pallet pile of no more than four stacks shall be separated from other pallet piles by a minimum clear space of 8 feet or by 25 feet of other storage.
- (5) Proposed pallet storage configurations shall be submitted to OSHEM for review and approval.
- (6) Trash dumpsters shall have metal covers that are kept closed when the dumpster is not in use shall be located no less than 15 feet away from buildings or other structures.

e. Storage of Hazardous Materials

- (1) Flammable and combustible liquids shall be separated from regular combustible storage and must be stored in accordance with NFPA 30 – Flammable and Combustible Liquids Code. The provisions of [Chapter 19, “Chemical Handling and Storage”](#), of this Manual, must also be met.
- (2) Quantities of stored flammable and combustible liquids greater than 10 gallons shall be kept in safety cans, liquid storage cabinets, or

within flammable liquid storage areas. Exception: Flammable liquid quantities stored in dedicated laboratory units may exceed the quantities listed, provided they are maintained in accordance with [Chapter 26, "Laboratory Safety Plans](#), "of this Manual and NFPA 45 – Fire Protection for Laboratories Using Chemicals.

- (3) Each flammable liquid storage cabinet shall be labeled with the unit's capacity and indicating the cabinet is listed or approved. Cabinets shall not be loaded beyond the limit established by the manufacturer.
- (4) The total quantity of flammable and combustible liquids in any single space shall not exceed that permitted by NFPA 30.
- (5) Storage cabinets shall not be vented unless approved by OSHEM. Vent openings shall be sealed with metal bungs supplied with the cabinet or as specified by the cabinet manufacturer.
- (6) Flammable liquids shall be kept in closed containers when not in use.
- (7) All containers (tanks and drums) which contain a flammable liquid that meet the criteria of NFPA 30 shall be grounded. The ground shall be physically applied or shall be inherently present by the nature of the installation.
- (8) All flammable liquid transfer from metal container to metal container shall include bonding between the containers and grounding from some point in the system.
- (9) Transfer of liquids from drum shall be performed with a listed or approved pump or by an approved self-closing safety faucet. Additionally, drums being used to draw flammable liquids shall be provided with safety vents. Safety faucets with built-in vents are permissible. (Listed and approved equipment will typically bear the mark of a recognized testing laboratory (e.g., [UL](#), [FM](#), [SWRI](#)).
- (10) An approved drip can shall be provided beneath faucets to catch spills during transfer operations. Drip cans must be emptied on a regular basis.
- (11) Diking, remote impounding, spill and spread control, or some other means to contain the largest credible flammable/combustible liquids spill shall be provided for storage and dispensing of such commodities.
- (12) The transfer of flammable or combustible liquids from container to container shall be performed in a dedicated flammable liquid storage area. The area shall be well ventilated, shall prevent flammable vapor / air mixture accumulation, and shall be free of ignition sources.
- (13) A drum of flammable or combustible liquid shall be moved only with an approved drum cradle or other approved device.
- (14) Use of portable radios, cell phones, lamps, heaters, computers, and other electrical devices shall be prohibited inside liquid storage

rooms, unless the device is approved for use in a hazard location, as defined by NFPA 70 – National Electrical Code.

- (15) Explosive materials and oxidizers (e.g., fertilizers, pesticides, sanitizers, etc.) shall be stored outdoors (if possible) and stored separately from combustible materials. If stored in buildings, these materials shall be kept within metal cabinets, away from other materials, and in well-ventilated one-hour fire-rated rooms. In all storage locations, the storage area or room shall be marked as to the hazard of contents. The storage of any potentially explosive material shall be reported to OSHEM for review and approval.

## **D. RECORDS AND REPORTS**

Fire hazards identified during self-inspections shall be documented and maintained by the Safety Coordinator with the facility self-inspection documentation. This documentation shall be readily available for audit by the OSHEM METR inspection team.

## **E. REFERENCES**

1. National Fire Protection Association (NFPA 30) – Flammable and Combustible Liquids Code
2. NFPA 40-Standard for the Storage and Handling of Cellulose Nitrate Film
3. NFPA 45- Standard on Fire Protection for Laboratories Using Chemicals
4. NFPA 58 – Liquefied Petroleum Gas Code
5. NFPA 75 – Standard for the Protection of Information Technology Equipment
6. NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations
7. NFPA 303 – Fire Protection Standard for Marinas and Boatyards
8. NFPA 306 – Standard for the Control of Gas Hazards on Vessels
9. Applicable SI Standards