INSPECTION, TESTING AND MAINTENANCE OF FIRE PROTECTION SYSTEMS AND EQUIPMENT

Fire protection systems and equipment are installed in buildings to protect employees, the public, your property and the firefighters that will respond to your emergency. Like most other types of equipment, fire protection systems and life safety equipment need periodic inspection, testing and maintenance to ensure reliability. Below, we've summarized the minimum requirements from the Minnesota State Fire Code which adopts the 2000 International Fire code with state amendments (MSFC)relating to inspection, testing and maintenance of fire protection systems and life safety equipment. People performing work on fire protection equipment must be licensed with the City of Coon Rapids. However, monthly and quarterly visual inspections of fire protection systems may be conducted and documented by the building owner or owner's representative. Non-required fire protection systems and life safety equipment must be inspected, tested and maintained just as required equipment or removed (MSFC Sec. 901.6).

Documentation
Records of fire protection system and equipment inspections, tests and maintenance that are required by the below-referenced standards must be maintained on the premises for at least one year and be made available to the code official upon request (MSFC Sec. 901.6.2).

Inspection, Testing and Maintenance Standards
Fire protection systems and equipment shall be inspected, tested and maintained in accordance with the referenced codes and standards listed below: (MSFC Table 901.6.1)
-Portable fire extinguishers – NFPA 10
-Fire alarm systems –IFC Sec. 907.20.2 and NFPA 72
-Sprinkler systems, fire pumps, standpipes and other water-based systems – NFPA 25
-Dry-chemical fire extinguishing systems –IFC 904.5.1 and NFPA 17
-Wet-chemical fire extinguishing systems –IFC 904.6.1 and NFPA 17A
-Fire-rated doors, windows and shutters – NFPA 80
-Commercial kitchen hood systems –IFC Sec. 904.11.6.4 and NFPA 96
-Emergency power supply systems – NFPA 110
-Smoke control systems –IFC 909.21.1 and MN Fire Code Amendment 910.6

Fire Alarm Systems
Fire alarm service personnel have to be qualified and experienced in inspection, testing and maintenance of fire alarm systems. Acceptable qualifications include, but not limited to: factory trained and certified, NICET, and UL certification, state or local certification. (NFPA 72- 10.2.2.5)

Inspection and Testing. Fire alarm systems must be cleaned, tested and inspected at least annually in accordance with NFPA 72, Ch. 10 or more frequently if required by the code official. **(**MSFC 907.20.2) Documentation of cleaning, testing and inspections must be kept on sight and a copy forwarded to the Coon Rapids Fire Inspection Department. The form used for this documentation must contain all of the applicable information asked for on the attached fire alarm inspection form. At least annually, clean, inspect and test alarm initiating devices, signaling devices and auxiliary functions initiated by system activation such as fire door release,

smoke dampers, air handling shutdown, etc. Smoke detector sensitivity shall be tested and be in compliance with manufacturer's specifications at time of installation and then every alternate year thereafter. Smoke detectors older than 10 years must be replaced. Automatic sprinkler system flow switches, control valve tamper switches and other components monitored by the alarm system shall be tested and inspected annually. Fire alarm transmission and receipt by an alarm monitoring company must be verified at least annually. Verify premise address and keyholder information with monitoring company. Water flow alarm signal must be distinguishable from other types of alarm signals. The secondary power source for fire alarm systems shall be tested at least annually. Inspection and testing of other fire alarm system components shall be as required by NFPA 72, Ch. 10 and as recommended by individual component manufacturers.

Firewatch

When a required fire alarm system is out of service or not functioning as designed in a building containing Residential, Assembly or Institutional occupancies, a firewatch must be provided or the building must be evacuated. A person assigned to firewatch must walk through the building at least once every 30 minutes checking for fire or smoke. A firewatch must be continued until the fire alarm system has been restored to normal operating condition or the building has been evacuated. A competent adult familiar with the building must conduct the firewatch. If a fire is discovered, call 911 and immediately evacuate the building.

Initiating and Signaling Devices.

Fire alarm initiating and signaling devices that have been damaged or contaminated shall be inspected and replaced if necessary. Devices are considered contaminated after exposure to foreign objects such as, but not limited to smoke, water and dirt. Replacement of initiating or signaling devices shall be within 24 hours of the damage or contamination. Manual pull stations in multi-family dwellings and other occupancies with children or special circumstances must have protective covers to prevent false alarms. When the fire alarm system is out of service in a non-sprinklered residential occupancy, a fire watch by building personnel is required every thirty minutes throughout the building until a fire alarm technician has made repairs and the system is entirely operational. If a fire watch is not provided, the building is considered unprotected and must be evacuated.

Definitions:

Initiating device: A manual or automatic device that, upon activation, produces an alarm that is intended to notify building occupants of a fire in the building. Initiating devices typically detect the presence of smoke, heat, flame or water flow. Signaling device: A device that produces an audible and/or visible alarm signal in response to activation of an initiating device.

Water-based Fire Extinguishing Systems

Water-based fire extinguishing systems including, but not limited to sprinkler systems, standpipe/hose systems, private fire service mains, fire pumps, water tanks, water spray fixed systems and foam-water systems shall be inspected, tested and maintained in accordance with NFPA 25. Only licensed contractors may perform work on fire extinguishing systems. Except for one and two-family residential installations, a person may not design, install, modify or inspect/test a sprinkler system unless licensed by the State of Minnesota to

perform duties as a fire protection contractor. (SS 299M.03)

Automatic Sprinkler Systems
Sprinkler systems shall be inspected, tested and maintained at least annually. Some system components are required to be inspected and maintained more frequently as noted. When a sprinkler is inoperable for any reason, excluding scheduled maintenance or inspection, a fire watch by building personnel is required every 30 minutes until the system is operational.

Documentation
Documentation of testing, maintenance and inspections must be kept on sight and a copy forwarded to the Coon Rapids Fire Inspection Department. The form used for this documentation must contain all of the applicable information asked for on the attached sprinkler system inspection form.

Annual test: Main drain, alarm devices, anti-freeze solution, verify transmission and receipt of all supervisory and alarm signals by monitoring company. Verify address and emergency contact information with monitoring company.

Annual inspection: Buildings prior to freezing weather, hangers, piping, sprinklers

Quarterly inspection: Alarm panel (clear), alarm devices, FD connections

Monthly inspection: Control valves (open, locked/secured and unobstructed), pressure gauge readings (compare pressures on hydraulic nameplate), tamper switches and low air alarms.

Foam-water sprinkler systems
Foam-water sprinkler systems shall be inspected, tested and maintained at least annually. Some system components must be inspected and maintained more frequently as noted below. (See NFPA 25 Table 11.1 for detailed inspection, testing and maintenance procedures)

-Annual test: Complete foam-water system, discharge devices, manual actuation device, proportioning system, water supply flow test, detection system, deluge/pre-action valves.
-Quarterly inspection: Foam concentrate strainer, system drainage, pipes, fittings, hangers.
-Monthly inspection: Discharge device position, proportioning system, control valves.
-Annual Maintenance: Foam concentrate samples per manufacturer.
-Monthly Maintenance: Foam concentrate pump operation.
-5-year maintenance: *see NFPA 25, Section 11.4
-10-year maintenance: * see NFPA 25, Section 11.4

Standpipe and Hose Systems
Components of standpipe and hose systems shall be visually inspected at least quarterly and be tested as specified below (See NFPA 25, Sec. 6.1 and 6.2.2 for inspection, testing and maintenance procedures) Hydrostatic (pressure) tests shall be conducted only on "wet" standpipes.

-Quarterly Test: Alarm device
-Annual Test: Main drain, hose nozzle, hose storage device
-5-year Test: Hose, pressure control valve, pressure reducing valve, hydrostatic test, flow test Wets systems only.

Fire Pumps
Fire pumps shall be inspected, tested and maintained as specified below and in accordance with pump manufacturer's recommendations (See NFPA 25, Tables 8.1 and 8.5.3 for detailed inspection, test and maintenance procedures).
-Weekly Inspection: Pump house, heating, ventilation louvers, fire pump system
-Weekly Test: Pump operation – No flow condition
-Annual Test: Pump operation – Flow condition
-Annual maintenance: Hydraulics, mechanical transmission, electrical system, motor

<u>Commercial Kitchens</u>:

Portable Fire Extinguishers
Commercial kitchens shall be equipped with a K-Class fire extinguisher.

Hood Extinguishing Systems
Commercial kitchen hood extinguishing systems shall be serviced at least every 6 months and after activation of the system. (MSFC 904.11.6.4) Inspection, testing and maintenance requirements are based on the type of system that is installed. (automatic sprinkler, drychemical, wet-chemical, foam-water, etc.) *See applicable section for specific requirements.

Exhaust hood and duct cleaning
Hoods, grease removal devices, fans and ducts shall be cleaned at intervals necessary to prevent the accumulation of grease. (MSFC 904.11.6.3) Records of current hood and duct cleaning must be maintained on the premises and made available to fire inspectors upon request.

Dry-chemical and Wet-chemical Extinguishing Systems
Dry-chemical and wet-chemical extinguishing systems shall be inspected, tested and maintained by a licensed contractor every 6 months and after an activation of the system in accordance with NFPA 17 and 17A and the manufacturer's recommendations. Additionally, on a monthly basis, the system owner must conduct a "quick check" of the following (IFC 901.6.1 and NFPA 17, Sec. 11.2 and NFPA 17A, Sec. 7.2):
-The extinguishing system is in its proper location.
-The manual actuators are unobstructed.
-The tamper indicators and seals are in tact.
-The maintenance tag or certificate is in place.
-The system shows no physical damage or condition that might prevent operation.
-The pressure gauge(s) is in operable range.
-The nozzle blow-off caps, where provided, are in tact and undamaged.
-Neither the protected equipment nor the hazard has been modified or relocated.

Portable Fire Extinguishers

Portable fire extinguishers must be inspected when initially placed in service and at approximately 30-day intervals. These periodic inspections may be conducted by the owner or employees and should include the following (MSFC 901.6.1 and NFPA 10, Chapter 6): Location, accessibility/obstructions, safety seals in place, fullness determined by weighing or hefting, damage, leakage, clogged hose or nozzle and pressure gauge reading.

Annual inspections must be documented by a dated tag attached to the extinguisher. In addition to monthly visual inspections, annual inspections of portable fire extinguishers must be conducted by a licensed contractor that is trained in portable fire extinguisher service. Every 6 years, stored-pressure fire extinguishers that require a 12-year hydrostatic test shall be emptied and subjected to applicable maintenance procedures. Non-rechargeable fire extinguishers shall not be hydrostatically tested but shall be removed from service at a maximum interval of 12 years from the date of manufacture. Each fire extinguisher shall have a tag or label secured to it that indicates the month and year the maintenance was performed and that identifies the person performing the service.

Smoke Control Systems

Definitions:

-Dedicated smoke control system: A ventilation system designed for the sole purpose of removing smoke from a building or area and not utilized for any other ventilation function.

-Non-dedicated smoke control system: A ventilation system that is utilized for multiple purposes such as heating and cooling as well as for smoke removal from a building or area.

-Control sequence: The chronological order in which the components of an engineered smoke removal system operate.

General:

Smoke control systems shall be maintained in accordance with the manufacturer's instructions and MSFC, Sec. 909.21.1– 909.21.5 as summarized below. An approved maintenance and operational testing program shall be initiated immediately after the smoke control system has passed the acceptance tests. Mechanical smoke-exhaust systems shall be operated and tested at least annually by a licensed mechanical contractor. Documentation of proper operation (as designed) for each component throughout the engineered the smoke removal system shall be recorded. *Example*: *Water flow switch activation/alarm signal sent to monitoring company, delay timer begins for louvers, hatches and exhaust fans, make-up air louvers open, hatches open, exhaust fans start up.* Operational testing of smoke control systems shall include all equipment such as initiating devices, fans, dampers, controls, doors and windows. Tests shall be performed on primary and standby power conditions. Dedicated smoke control systems shall be operated, including each control sequence, semiannually. Non-dedicated smoke control systems shall be operated, including each control sequence, annually. Written records of testing and maintenance shall be maintained on the premises. The records shall include dates of all maintenance activity and identification of the servicing personnel.

Elevators

Newly installed elevators and elevators that have been altered, renovated or been involved in an accident must be inspected and approved by a State of Minnesota Elevator Inspector.

The inspection and approval process include verification of operability of electrical shunt trip device, smoke detector and fire service over-ride feature. All existing elevators must be periodically inspected and tested at 1-year, 3-year or 5-year intervals as established in ASME code for existing elevators ASME A17.1-1996. The ASME inspection and testing requirements are based on the type of elevator. Elevators must be maintained in a safe operating condition at all times (MN Rules 1307.0090)

Exit Signs

Required exit doors must be marked by approved exit signs. (MSFC 1003.2.10) Exit signs must be readily visible from any direction of egress travel. Illuminated exit signs ensure easy identification of exits and must be illuminated at all times that the building is occupied. Exit signs may be internally or externally illuminated. Lighted exit signs must be equipped with a secondary power source that will provide continued illumination for at least 90 minutes in the event of a power outage.

Means of Egress Illumination

The power supply for means of egress illumination shall normally be provided by the premise's electric supply. In the event of power supply failure, an emergency system shall automatically illuminate all of the following areas:

1. Exit access corridors, passageways and aisles in rooms and spaces which require two or more means of egress.
2. Exit access corridors and exit stairways located in buildings required to have two or more exits.
3. The portion of the exterior exit discharge immediately adjacent to exit discharge doorways in buildings required to have two or more exits.

Emergency Power Supply Systems

An emergency power supply system (EPSS) provides an alternate source of electrical power to buildings, facilities and equipment in the event that the primary power source fails. When an emergency power supply system is required by code, it shall comply with the following: This section applies to two types of EPSS: (1) emergency/standby power systems regulated by NFPA 110 (most often natural gas or diesel-fueled generators); (2) stored electrical energy/standby power systems, regulated by NFPA 111 (most often large battery banks). Routine maintenance and operational testing is required and shall be based on all of the following: manufacturer's recommendations, instruction manuals, the applicable NFPA standard and the authority having jurisdiction. A written schedule for routine maintenance and operational testing of the EPSS shall be established immediately after the EPSS has passed acceptance tests. After completion of repairs that impact operational reliability of the system, the system must be tested. The operational test shall be initiated at an automatic transfer switch and shall include testing of each EPSS component on which maintenance or repair has been performed, including the transfer of each automatic and manual transfer switch to the alternate power source, for a period of not less than 30 minutes. The monthly test of a transfer switch shall consist of electrically operating the transfer switch from the standard position to the alternate position and then a return to the standard position. The maintenance and operational testing programs shall be overseen by a person knowledgeable in the operation in the equipment being tested and maintained.

Fire Doors, Fire Windows and Fire Shutters

Opening protection, such as fire doors, windows, shutters and associated hardware must be maintained in an operative condition in accordance with MSFC, Sec. 703 and NFPA 80 and be kept closed and latched or arranged for automatic closing. Fire doors, shutters, and windows and associated hardware must be operable at all times Where a fire door or window opening is no longer in use, the opening shall be filled with construction equivalent to that of the wall. All horizontal and vertical sliding and rolling fire doors and shutters shall be inspected and tested annually to verify proper operation and full closure. Records shall be maintained on site. Fusible links or other heat-actuated devices and release mechanisms shall not be painted. Door openings and surrounding areas shall be kept clear of anything that could obstruct or interfere with the free operation of the door.