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MEMORANDUM

DATE: September 9, 2020

TO: Fire Protection Contractors

FROM: Jon Nisja, Fire Safety Supervisor

SUBJECT: Minnesota Fire Code Sprinkler Requirements

***** Please share this information with your sales, design, installation, and project management staff *****

Here is a summary of the Minnesota State Fire Code (MSFC) fire protection requirements that were effective on March 31, 2020. Some of these are not new; changes from the previous editions of the MSFC are highlighted with an asterisk (*).

- The following **fire protection standards** are adopted by reference:
 - NFPA 10 – Portable Fire Extinguishers (2017 edition*)
 - NFPA 13 – Sprinkler Systems (2016 edition*)
 - NFPA 13R – Sprinkler Systems-Multi-Residential (2016 edition*)
 - NFPA 13D – Sprinkler Systems-Residential Dwellings (2016 edition*)
 - NFPA 14 – Standpipes (2016 edition*)
 - NFPA 20 – Fire Pumps (2016 edition*)
 - NFPA 22 – Water Tanks for Private Fire Protection (2018 edition*)
 - NFPA 24 – Private Fire Service Mains (2016 edition*)
 - NFPA 25 – Inspection of Sprinklers & Standpipes (2017 edition*)
 - NFPA 72 – Fire Alarm Code (2016 edition*)
 - NFPA 2001 – Clean Agent fire Extinguishing (2015 edition*)
- **Elevator Shafts and Equipment Rooms (MSFC 903.3.1.6.2).** Most elevator shafts and equipment rooms do not need sprinkler protection. The exception is for those facilities licensed as health care and which receive Medicare / Medicaid funding. This would be primarily hospitals and nursing homes but could also include office buildings that have ambulatory care facilities (the new term for medical, surgical or similar care for less than 24 hours and where the patients are not capable of self-preservation). Examples of this would be same-day surgical centers. Rationale: Low fire loss history in elevators but health care needs additional protection since the patients often cannot escape on their own.

- **Swimming Pool Exemption (MSFC 903.3.1.6.3).** Swimming pools can continue to be exempted from sprinkler protection (however, perimeter protection is still required). Rationale: Low fire loss history with swimming pools.
- **Small Linen Closets & Pantries (MN Rules 7511.0903 subpart 4, MSFC 903.3.1.6.4 & NFPA 13 8.15.8.2).** Exempts sprinkler protection in linen closets and pantries when:
 - They are less than 12 sq. ft. in size
 - They are less than 3 ft. in the least dimension
 - They are non-combustible or limited combustible (i.e. gypsum wallboard) construction, and
 - They contain no mechanical equipment, electrical equipment, or electrical appliances.
 - Rationale: Low fire loss history with these types of small closets in residential occupancies. Intended to address closets and pantries with multiple shelves installed (obstructions to ceiling-mounted sprinklers and limited fuel load). Not intended for clothing closets where fuel load can be high.
- **Fire Department Connection (FDC) Check Valve (MN Rules 7511.0903 subpart 4, MSFC 903.3.1.6.4 & NFPA 13 8.17.2.5).** A check valve is required within 25 feet of fire department connection inlet. Rationale: Do not want long sections of “dry” pipe that, when pumped into, will discharge air rather than water.
- **Water Flow Test (MN Rules 7511.0903 subpart 4, MSFC 903.3.1.6.4 & NFPA 13 23.2.1.1).** NFPA 13 requires a water flow test within one year. The 2020 MSFC maintains the previous amendment that requires a water flow test be conducted within the past three (3) years. Rationale: freezing weather conditions for a large portion of the year in Minnesota make a water flow test within 12 months difficult to obtain.
- **Additions to Buildings with Fire Pumps (MSFC 901.6.1).** If you are adding onto an existing building with a fire pump, the pump test can be no older than one year (not the three years above). Rationale: Annual fire pump tests are required by the state fire code and relevant standards.
- **Hose Stream Modifications (MSFC 903.3.1.6.1).** This amendment has been in the MSFC for years but seems to be missed by contractors. For design and water supply purposes, the hose stream requirements do not need to be added when a well or stored water supply is used. Rationale: There is no method for the fire department to draw water from the supply (such as private water supplies, wells, tanks, etc.).
- **Vestibule Exception (MSFC 903.3.1.6.5).** Certain vestibules can continue to be exempt from sprinkler protection. To have this exemption vestibules must be 225 sq. ft. or less in size, be of non-combustible construction (metal, glass, gypsum, etc.), have glazing that allows vision into the vestibule, contain no ignition sources, and only have limited storage (5 cubic feet – basically two newspaper stands). Rationale: vestibules have low fuel loads but are common areas for sprinkler freeze-ups.
- **Safety Factor – Calculations (MSFC 903.3.9).** The 5 psi safety margin for design is maintained along with the exception from the 5 psi safety factor for NFPA 13D systems. Rationale: safety factor for sprinkler design.
- **Exterior Flow Alarm for Sprinkler Systems* (MSFC 903.4.2).** Visible and audible flow alarm required above the FDC visible from the street (or at a location approved by the AHJ). This is new in the MSFC but has been a division policy for years. Rationale: Assists FDs in locating the FDC to augment an activated sprinkler system.

- **Standpipe Modifications* (MSFC 905.3).** There were numerous changes to the standpipe requirements in the 2020 MSFC:
 - Definition changes – Combines Class I & III standpipe definitions into Class I which requires both 2 ½-inch and 1 ½-inch connections for fire department use. This can be accomplished with two separate connections (one 2 ½-inch and a separate 1 ½-inch connection) or with the use of a 2 ½-inch connection and 2 ½-inch by 1 ½-inch reducer coupling. Class II standpipes continue to be 1 ½-inch connection primarily for occupant use. Class III standpipes were deleted as they are now Class I
 - In non-high-rise sprinkler-protected buildings, the following sections apply
 - Class I standpipes are sized to meet the pressure and flow for the sprinkler system
 - Standpipe size is a minimum of 4 inches
 - Standpipe system flow and pressure of 100 psi at 250 gpm at the two most remote hose connections. The calculations are performed between the standpipe hose connection and the fire department apparatus that is connected to the FDC
 - Maximum design pressure of 150 psi for standpipes supported by fire department apparatus
 - The sprinkler demand, including inside and outside hose streams specified in NFPA 13, Table 11.2.3.1.2, to be provided from the municipal supply and not from fire departments pumping into the FDC
 - Rationale: Standpipe requirements in sprinkler-protected buildings were unrealistic and onerous; this gives credit for sprinkler effectiveness and recognizes less need for manual firefighting with standpipes.
- **Small Hose Connections – Apartment Buildings (MSFC 905.3.10).** Small hose (or convenience hose) connections – rather than “true” standpipes – are required for larger apartment buildings (three stories in height and 200 ft. from point of FD access). These are mainly for apartment buildings that are three stories in height that would not otherwise have standpipes due to height:
 - These are intended for fire department overhaul / mop-up purposes; as such they should be supplied separately from the sprinkler system protecting the area (which is often shutdown during an incident to minimize water damage)
 - They are required to be at least 1 ½-inch size, have metal piping and valves, and signage
 - They are only to be supplied from wet-pipe sprinkler systems
 - Rationale: Recognizes the effectiveness of sprinklers in apartment buildings while still allowing FDs to use small hose connections for overhaul / mop-up operations without deploying a fire truck-supplied hose line in the building.
- **Townhouse Garage Sprinklers (MSFC 903.3.1.6.6).** For NFPA 13D systems in garages attached to a townhouse, a sprinkler is required within 5 feet of the door separating the garage from the house. Rationale: Garage fires are a common area of origin; this protects against those garage fires and limits spread into the residence.
- **Ambulatory Care Facilities (MSFC 903.2.2).** Fire sprinkler protection is required for the entire story where most ambulatory care facilities are located (4 or more patients on main level or a patient on any level above the main level). If ambulatory care facility is located above the main level, sprinklers need to be provided on that level as well as

all floors down to the main level. Rationale: Often the patients in these facilities are rendered incapable of evacuating due to incapacitation or anesthesia.

- **Sprinkler Tamper Alarms (MSFC 903.4).** Sprinkler tamper alarms and monitoring are now required for all systems having more than 6 sprinklers (7 or more). There are some exceptions:
 - NFPA 13D systems
 - NFPA 13R systems with common supply with no separate sprinkler shut-off
 - Control valves for kitchen hoods, paint spray booths, and dip tanks when valves are locked or sealed in the open position
 - Valves in the fuel supply to diesel fire pumps when they are locked or sealed in the open position
 - Dry-pipe, preaction, or deluge system trim valve pressure switches when they are locked or sealed in the open position
 - Rationale: closed valves are the major cause of sprinkler system failure (2/3 of wet-pipe system failures and 4/5 of dry-pipe system failures).
- **Educational (School) Occupancies (MSFC 903.2.3).** The threshold for providing sprinkler protection is 12,000 sq. ft. or 300 occupants*. Rationale: Consistency with 12,000 sq. ft. threshold and 300 occupant load in many other occupancies.
- **Residential Sprinkler Thresholds (MSFC 903.2.8).** The following size thresholds were established for residential sprinklers in these occupancies:
 - Motels / Hotels – 4,500 sq. ft. or more
 - Resorts – 9,250 sq. ft. or more
 - Apartment Buildings – 4,500 sq. ft. or more
 - Townhouses (3 or more attached single family dwellings) – all (regardless of size)
 - Residential Care & Assisted Living – all (regardless of size)
 - Residential Hospice Facilities – all (regardless of size)
- **Apartment (NFPA 13R) Balcony Protection (MSFC 903.3.1.2.1).** NFPA 13R systems protecting apartment balconies and decks need sprinkler protection based on the size, height, and construction of the building. Rationale: Protect larger apartment buildings that lack attic sprinkler protection from exterior fires that often start on balconies or decks.
- **Storage (Group S-1) Occupancies and Sprinkler Protection (MSFC 903.2.9).** Sprinklers are required when storage occupancies are:
 - Single story buildings exceeding 12,000 sq. ft. in size
 - Four or more stories in height
 - Multiple stories and more than 24,000 sq. ft. in size
 - Used for the storage of commercial vehicles and more than 5,000 sq. ft. in size
 - Contain 2,500 or more sq. ft. of upholstered furniture or mattresses*
 - The upholstered furniture or mattress threshold does not apply to single story self-service or mini-storage facilities*
 - Rationale: Burning upholstered furniture and mattresses give off high rates of heat release which can cause premature building collapse.
- **NFPA 13R and Attic Protection* (MSFC 903.3.1.2.3):** Sprinklers are required where:
 - The attic is intended or used for living purposes
 - There is fuel-fired equipment in the attic (can be localized protection with a single sprinkler but freezing issues must be considered)

- The building is of wood frame construction (Types II, IV, or V) and the roof assembly is more than 55 feet above the level of fire department vehicle access, one of the following is required:
 - Provide sprinkler protection in the attic
 - Construct the attic with non-combustible materials (e.g. steel studs and members rather than wood)
 - Construct the attic using fire-retardant treated wood
 - Fill the attic with non-combustible insulation
- If the facility houses people under custodial care requiring assistance (verbal or physical) to respond to an emergency or evacuate the building, the attic must be protected with one of the following methods:
 - Provide sprinkler protection
 - Provide attic heat protection tied to the building's fire alarm system
 - Construct the attic with non-combustible materials (e.g. steel studs and members rather than wood)
 - Construct the attic using fire-retardant treated wood
 - Fill the attic with non-combustible insulation
- Examples of the types of buildings above would include:
 - Some assisted living facilities (housing people under custodial care)
 - Memory care
 - Residents with physical or mental limitations
 - Drug and alcohol treatment facilities

Thank you for your time and consideration. If you have any questions or need additional information, please feel free to contact us at fire.code@state.mn.us or fm.fire.sprinklers@state.mn.us.