FACILITIES & OPERATIONS
ARCHITECTURE, ENGINEERING AND CONSTRUCTION
UNIVERSITY OF MICHIGAN

Design Guideline 210000
Fire Protection

Scope

Fire protection requirements specific to the University of Michigan including design document requirements, density requirements, special requirements for dry systems, fire and jockey pump requirements, and other miscellaneous requirements.

Related Sections

U-M Design Guideline Sections:
104400 - Fire Extinguishers
283100 - Fire Detection and Alarm Systems

U-M Master Specification Sections: (A digitally accessible version is pending; please email AEC-Digital Accessibility Support if assistance is needed)
211313 - Wet Pipe Sprinkler Systems
213113 - Fire Pumps

General

All new buildings shall be protected by a hydraulically designed wet-pipe sprinkler system, designed to comply with requirements of NFPA and Factory Mutual (FM).

The University normally requires the installation of wet-pipe sprinkler systems in existing buildings undergoing major infrastructure upgrades not presently protected by fire protection systems.

In existing buildings with hydraulically designed systems, any additions, deletions and/or changes shall not compromise the integrity of the system. Water supply shall be tested and improved as required to meet requirements of NFPA , FM and City of Ann Arbor Standards. A/E shall arrange for testing by U-M Plumbing Shop through U-M Project Coordinator.

Provide a standpipe system where required by code.

Design Requirements

Design drawings (plans) shall include, at a minimum, location of :

- In-coming water supply and fire department connection(s) (Siamese)
- Fire pump and controller, jockey pump, and test header
- All risers, standpipes, zone control valves, fire department valves and fire hose cabinets
- All mains four inch diameter and larger
- Inspector test /drain, service drains

- Sprinkler head locations, sprinkler zoning (with area and criteria stated)

Design shall include fire protection system riser diagram, with at minimum:

- In-coming Water supply and Siamese connections
- Fire pump and controller, jockey pump, and test header
- All risers, standpipes, zone control valves, flow switches, fire department valves and fire hose cabinets
- Inspector test /drain

Design shall include, at minimum, calculation, selection and detail of in-coming water service, fire department connection, fire and jockey pumps, test header, stand pipe/ inspector test/ zone control valves, pipe penetrations, and special systems.

Wet Suppression Systems

Sprinkler density shall be per U-M Master specification.

Discharge from test connections be piped to building exterior or indirect drain of adequate capacity.

Provide dry pendant heads for any room operating at or below 40° F (including cold rooms, environmental rooms and freezers). For areas where piping is subject to freezing, dry sprinkler heads or dry pipe systems should be used in lieu of antifreeze systems due to antifreeze flammability concerns. Whenever possible use dry sprinkler heads instead of dry pipe systems. Wet pipe sprinkler systems shall normally be installed throughout including electrical rooms, substations, mechanical rooms, telephone closets, and computer rooms.

Dry Pipe Sprinkler Systems

Due to significant problems with microbiologically induced corrosion (MIC), the following requirements for dry pipe systems apply to U-M's Ann Arbor campus:

Piping for dry systems shall be specified as **Schedule 40** ASTM 53 **galvanized steel in all pipe sizes**, screwed galvanized cast or malleable iron fittings through 2", grooved couplings for 2-1/2" and larger pipe sizes.

Dry pipe systems shall be specified as installed with the longitudinal weld seam located above the horizontal centerline of the pipe, and with drain valves installed at all low points regardless of trapped water volume. Require that mains and branch lines be pitched at least $^{1}/_{2}$ in. per 10 ft in all locations, including in non-refrigerated areas (areas not subject to freezing).

Fire Pumps

Install automatically controlled fire pumps on all fire protection systems where hydraulic calculations indicate that the city water pressure is not adequate to supply the building sprinklers and/or standpipe systems. Fire pump size shall be based on the requirements of NFPA. Water supply to fire pumps shall meet the requirements of NFPA. When a fire pump may feed multiple buildings, special approval from the University Project Coordinator is required for issues related to fire alarm system coordination; possible multiple building conflagrations; and system sectionalizing.

Jockey Pumps

Install jockey pumps on all fire protection systems where flow is detected and monitored, even if a fire pump is not required. Jockey pump heads shall be adequate to maintain static pressure required at the top of the system. Size pump flow per NFPA.

Special Systems

Special fire suppression control systems should be located outside the area served. Supply cylinders should be stored in a room or location other than the protected room. A separate room is preferred.

Dry chemical extinguishing systems should be used in all kitchen and cooking locations where grease and oil are used.

Material Requirements

Pipe material per UM Master specifications.

Installation Requirements

Shop drawings shall be forwarded to FM, the Architect/ Engineer and the State of Michigan Bureau of Construction Codes and Fire Safety. Refer to U-M Master Specification.

Install sprinkler heads in the center of 2’x2’ ceiling tiles, and in the center of 2’x2’ area for 2’x4’ ceiling tiles.

Pressure Testing

Pressure test fire protection systems per NFPA and FM.

Pressure testing is not required for minor relocations of sprinkler heads.