

Western Michigan University
Facilities Management – Engineering Division

Design Guidelines for Facilities Construction:

DESIGN GUIDELINE DG21-1 Fire Suppression Systems & Equipment

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I. GENERAL

A. *General Design Criteria*

The Professionals design and specifications shall include the following guidelines and recommendations.

All spaces within new University buildings or major renovations of University facilities should be covered by at least one automatic suppression system suitable to the hazard classification, as determined by Professional Service Contractor (Professional) representatives in conjunction with the appropriate building codes, the University and the Authority Having Jurisdiction requirements. The University shall identify the “Authority Having Jurisdiction” at the beginning of the project to the Professional.

Incorporate into the design of any facility other appropriate fire suppression systems to suit the functional areas within the building, pre-action dry pipe systems, standpipes (no hoses), gas systems, chemical systems, and special systems such as kitchen systems.

Fire alarm guidelines are covered in the Fire Alarm Systems guideline DG28-2.

Fire suppression systems required for a new facility shall be designed under the direction of a person qualified and registered in Michigan to design systems of the type required.

The University tests and maintains all fire protection systems in accordance with the requirements of the NFPA.

B. Standards to follow

Fire protection system materials and components shall be Underwriter's Laboratories listed and labeled, and Factory Mutual approved for the application anticipated. The fire suppression system installer should be required to submit proof that the items furnished conform to the requirements of these agencies.

C. Codes to use

All fire suppression systems shall be designed to and conform to the appropriate current NFPA Codes and Authority Having Jurisdiction recommendations.

The International Building Code shall be utilized in determining system applications.

D. Document Review Process

Sprinkler drawings, specifications and hydraulic calculations shall be submitted to the Professional for review for conformance to the specifications and then shall be submitted to the University for approval by the University's Insurance carrier.

E. Areas of Coverage & Systems To Use

All areas of new facilities shall be sprinkled except in the following cases:

1. Electrical substation rooms shall meet the exception criteria of NFPA 13 and 70 and shall have no sprinklers or piping installed within the room.
2. Sprinkler's in elevator machine rooms, shall meet the requirements of the Michigan Elevator Code, and shall be installed with shut-off valves with tamper switches in the piping.

Outdoor loading dock areas and other unheated areas that are part of a facility shall be protected utilizing a dry pipe sprinkler system with non-galvanized pipe.

II. EQUIPMENT/SYSTEM DESIGN

A. Sprinkler Systems

Sprinkler systems shall be fully calculated to the nearest outside fire hydrant. A flow test shall be performed at the fire hydrant referenced, with in two (2) years of the date of the calculations.

1. Wet Pipe Sprinkler Systems

- Test connections shall discharge to the building exterior.

- The control valve for the Inspector's Test Connection shall be located not more than 4' above finished floor.
- Water flow alarms shall be connected to the building fire alarm system.
- Test flow connections shall be routed outside.

2. Pre-action Sprinkler System

- Where these systems are employed, the system should be stand-alone and should not rely on the building fire alarm system for operation.
- The control panel should be connected to the building fire alarm control panel as an annunciated zone, along with the trouble indication from the system.
- Provide air pressure monitoring device alarm connected to the fire alarm system.

3. Dry Pipe Sprinkler Systems

- Provide air pressure monitoring device and alarm connected to fire alarm system.
- Where these systems are employed, the system should be stand-alone and should not rely on the building fire alarm system for operation. A local control panel, with separate detection should be used.
- The control panel should be connected to the building fire alarm control panel as an annunciated zone, along with the all trouble indications from the system.
- Provide air pressure monitoring device and alarm connected to the fire alarm system.

B. Standpipe & Fire Hose

Fire hoses are not desired and should not be installed. The University has no on-site fire fighting personnel.

Wet stand pipes are preferred, for use by the fire department. These need to be coordinated with the local Fire Marshal, by way of review with University Project Manager.

All buildings requiring fire hose cabinets per code shall be equipped with dry standpipe cabinets having national standard threaded fittings. All standpipe cabinets shall be located in approved enclosures and have 1-1/2" outlets for fire department hoses.

All buildings with standpipes or sprinklers shall have fire department Siamese hose connections on the side of the building nearest the service drive or street and shall have 2-1/2" national standard thread

C. Fire Hydrants

Underground fire protection water and service piping to within 5 feet of the building, or the water meter; is provided by the City of Kalamazoo at the University's expense. The Professional should provide a suggested design, water capacity requirement and plan for the City's approval. Piping between the

pit or meter is the Professional's responsibility. The city does not use post indicator valves on building feeds. Valves and Valve boxes are acceptable.

D. Fire Pumps

Fire pumps when necessary by building design shall be designed and installed per NFPA. Pumps shall be of the horizontal split case design. See Division 21-10 Preferred Manufacturers List for pumps and controls.

E. Gas Systems

Gas fire suppression systems shall only be used when approved by the Campus Facility Engineer.

III. INSTALLATION

The Professionals specifications for the work shall include the following.

Additions or modifications to existing University fire systems, shall follow the same design and submission document procedures and criteria as new systems.

University Health & Safety personnel shall be present during any shut down or activation of sprinkler or alarm systems.

Installation and alterations of fire protection piping, equipment, specialties, and accessories, and repair and servicing of equipment shall be performed only by a qualified installer.

Fire sprinkler modification work shall be accomplished as specified in NFPA Standard 13 in all respects and meet or exceed the most stringent applicable codes. Any fire sprinkler system shall not be left inoperative overnight. At the end of each work day, the work, should be completed in such a way, utilizing caps and plugs, to allow the contractor to re-activate the system before leaving the premises.

IV. CLEANLINESS

Upon completion of any fire suppression system the system and site shall be cleaned to the University's satisfaction.

The Professional shall write the specifications to require piping end caps, etc. to maintain cleanliness of system materials in the field and as installed. This is to minimize the flushing necessary in the new system. This also applies to stored materials both before reaching the site and on site storage.

V. COMPLETION

When the contractors complete their work, they shall notify the University who will notify the Authority Having Jurisdiction.

VI. TESTING

Upon completion of the system and prior to acceptance of the installation, the contractor shall complete the tests required by NFPA Standards, in the presence

of the State Fire Marshal and University representatives, and should furnish the Professional with a certificate as required.

The following requirements shall be included in the specifications unless specific circumstances require variances. Such variances should be acknowledged in writing by University representatives.

- Inspections and Tests shall be witnessed by the Campus Facility Engineer.
- A Contractor's Material and Test Certificate for Aboveground Piping shall be completed and submitted, by the Contractor, to the University's Facility Development Project Manager.

Initial fire pump flow tests shall be conducted in the presence of Campus Facility Engineer and Health and Safety personnel.

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