

SECTION 5.21.00 - FIRE SUPPRESSION
DESIGN AND CONSTRUCTION STANDARD

PART 1 GENERAL

1.01 Scope of Standard

- A. The design guidelines contained herein include the requirements for systems, materials, fittings and valves utilized for fire protection systems at The University of Texas at Austin. It is the intention of this document to provide a minimum standard for fire protection materials, fittings, and valves at the University so as to provide the highest level of fire safety possible. This document is not intended to be a guide specification.

1.02 Scope of Work

- A. Reference Standards (Utilize latest editions available):
 - 1. NFPA 13-Installation of Sprinkler Systems.
 - 2. NFPA 14- Standard for the Installation of Standpipe and Hose Systems.
 - 3. NFPA 24-Installation of Private Fire Service Mains and their Appurtenances.
 - 4. NFPA 25-Standard for the Inspection, Testing, and Maintenance of Water Based Fire Protection Systems.

1.03 Related Work: References/Quality Assurance

- A. The University of Texas, FM Global (FM) standards, International Building Code, National Fire Codes as published by the National Fire Protection Association (NFPA), State Fire Marshal, and The University of Texas Fire Marshal's requirements contain fire protection criteria and requirements for the installation of all fire suppression systems. The contractor shall conform to the following:
 - 1. All materials and performance shall meet the appropriate ANSI, ASME and ASTM Codes.
 - 2. Welding Materials and Procedures shall conform to the ASME Code.
 - 3. Only welders certified in accordance with ANSI/ASME Section 9 shall be employed.
- B. Each item of equipment shall be new and listed by Underwriters Laboratories (UL) or approved by FM Global. Each major item of equipment shall bear the manufacturer's name or trademark; serial number, and UL or FM label.
- C. Submittals:

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1. The University of Texas Project Manager shall review and distribute all submittals including drawings, calculations, and material data for approval by the University of Texas, the UT Fire Marshal, the Owner representative, and others as appropriate.
- D. Refer to provisions established in the Project Specifications and in related section of Division 01 – General Requirements. All product data shall be submitted under provisions of Division 01.
- E. Manufacturer’s data sheets shall be provided for all materials and equipment for approval before purchase or installation. Data sheets shall describe the type of material, capacities, manufacturer, and part numbers of equipment and give information necessary for verifying equipment approval.

PART 2 PRODUCTS

2.01 Pipe

A. Aboveground Pipe

1. All wet sprinkler system piping shall be a minimum of schedule 40 black steel with threaded fittings for sizes 2 inches and smaller, and black schedule 40 steel with grooved fittings for sizes larger than 2 inches. All dry and preaction system piping and fittings are required to be externally and internally galvanized.
2. CPVC piping listed for use in fire sprinkler systems may be utilized where installed in accordance with the UL listing. CPVC piping may only be installed in residential and light hazard occupancies when the piping is installed and protected in accordance with the manufacturer’s listed requirements. Provide CPVC fittings that are listed with the CPVC piping being utilized.
3. Piping shall be concealed above suspended ceilings where installed, in a craftsman like manner, and shall not interfere in the complete function of other systems such as cable trays, access panels, or pedestrian passageways. Piping in all occupied areas and mechanical area passageways shall not be lower than 7’-6”. Specific written approval may be granted for unavoidable projections, but under no circumstance shall overhead piping be installed lower than 6’-8” above the floor. Piping shall not reduce the required width of any means of egress, width of stairs, or clear width of a corridor or passageway, to less than 44 inches in width. Installation of all piping shall be in coordination with piping, ducts, light fixtures, and any other work that may obstruct sprinklers. The contractor shall coordinate with all trades having materials installed above the ceiling prior to commencement of any work.

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4. Piping that is retrofit into an existing building with suspended ceilings shall be installed above the existing ceiling, unless exposed piping is approved by the University.
5. All exposed sprinkler and standpipe system pipe located in areas without suspended ceilings is required to be painted. Prepare galvanized pipe as necessary, such as priming, prior to painting pipe. Coordinate color of pipe with the University. All pipe, whether concealed or exposed, is required to be marked "Fire Sprinkler System" with markers spaced at 10 foot intervals with red letters at a minimum of 1 inch in height.

B. Underground Pipe:

1. Each underground pipe joint or connection shall include a compression-type joint restraint device (Mega Lug or equal). Any changes in direction of underground piping shall be provided with a thrust block or joint restraint as required per NFPA 13 and NFPA 24. Changes in direction where entering buildings shall be provided with both thrust blocks and joint restraint.
2. Underground pipe shall be installed by a fire sprinkler contractor licensed by the State of Texas to install underground fire service mains.
3. All underground pipe connecting sprinkler and standpipe systems to the campus Fire Water Distribution System (FWDS) shall be rated for the maximum churn, or no flow pressure, of the largest fire pump in the FWDS zone plus the maximum static pressure at the suction side of the FWDS fire pump. Pipe shall be hydrostatically tested at the highest static pressure rating plus 50 psi, or 200 psi, whichever is greater per NFPA 24.

SEE JOCKEY PUMP DETAIL IN APPENDICES SECTION.

2.02 Mechanical Grooved Couplings

- A. When grooved couplings are used, rolled-grooved joints are required with fittings and couplings designed for a working pressure of 300 psi. Malleable iron housing clamps: ASTM A47; UL labeled; engage and lock, designed to permit some angular deflection, contraction, and expansion (Firelock fittings acceptable).
- B. Galvanized couplings are required for galvanized pipe.
- C. "C" shaped composition sealing gasket: ASTM D2000.
- D. Steel bolts, nuts and washers: ASTM A183 heat treated with a minimum tensile strength of 110,000 psi.

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2.03 Valves

- A. Unless specified otherwise, all valves shall be UL listed or FM approved and be suitable for the maximum anticipated system pressure or a minimum of 175 psi working pressure, whichever is greater.
- B. All valves in the sprinkler system shall be UL listed butterfly type indicating valves except for the following, which shall be O.S.& Y:
 - 1. All indicating valves on the suction side of a fire pump.
 - 2. Where indicated on the contract drawings.
- C. All butterfly valves shall have a built in tamper resistant switch for supervision of the open position. The switch shall be contained within a NEMA Type 1, general purpose indoor rated housing. Either unauthorized removal of the switch housing (when the valve is open) or closing the valve, shall cause the switch contacts to change position. The switch shall have four conductors to accommodate connections to Style 4 or Style 6 signaling line circuit devices.
- D. Where OS&Y indicating valves are installed, the following shall apply:
 - 1. Valves 2-1/2 inches and larger shall be iron body with brass seats, discs, and stems. Include tamper switches listed for use with OS&Y valves.
 - 2. Valves 2 inches and smaller shall be brass body, stem, and seat. Include tamper switches listed for use with OS&Y valves.
- E. Check valves shall comply with the following:
 - 1. Check valves 2-1/2 inches and larger shall be iron body swing check with cast brass hinge, rod, and brass faced discs.
 - 2. Check valves 2 inches and smaller shall be UL listed brass body and all brass fitted.
- F. Ball valves shall be constructed of forged brass with Teflon seats and shall be provided with a vinyl-covered handle.
- G. Post Indicator Valve
 - 1. Gate valve on incoming water service shall be operable by a UL listed post indicator valve with tamper switch monitored by the associated building fire alarm panel.
- H. All valves controlling water supply for sprinklers shall be readily accessible for use by emergency and maintenance personnel.

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- I. Except for underground water supply valves located in roadway boxes, all valves controlling water supply to sprinklers shall be supervised by the fire alarm system.
- J. A control valve shall be installed at the base of each riser. Locate standpipe isolation control valves within the stair enclosure and exposed for maintenance purposes.
- K. Pressure reducing valve:
 - 1. Sprinkler systems connected to the campus FWDS or new fire pump system are required to be provided with a pressure reducing valve. The pressure reducing valve shall be installed in a location that does not reduce pressures on the building standpipe system, if provided. Refer to Appendix 6.01.30 for location of FWDS connection detail.

2.04 Piping Accessories

- A. All hanger components other than all thread shall be UL listed or FM approved. No sprinkler piping is to be supported from any mechanical or electrical devices and/or equipment (ducts, lights, etc.). Hanger assemblies installed outside, or otherwise exposed to weather, shall be externally galvanized.
- B. Provide sleeves where pipes penetrate beams, floors, or walls and install prior to construction of walls or pouring of concrete. Install sleeves flush with all surfaces.
- C. Sleeves for underground pipe shall have mechanical rubber seals and be watertight.
- D. Floor, wall and ceiling plates shall be pressed steel or cast iron split plates, chromium plated.
- E. Pressure gauges shall be UL listed or FM approved for fire service.

2.05 Identification Tags

- A. Identification signs shall be porcelain enameled 18 gauge and shall be affixed securely by brass chain to all valves. The signs shall be red in color.
- B. Provide an approved laminated valve chart in frame and plexiglass cover showing location and use of each valve. The chart shall be secured in a visible location acceptable to the University near the system riser.
- C. The main drain sign shall be labeled "MAIN DRAIN". Riser drains shall be labeled "RISER DRAIN" or "DRAIN".
- D. Auxiliary drain signs shall be labeled "AUXILIARY DRAIN".

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- E. Inspector's test connection signs shall be labeled "INSPECTOR'S TEST".
- F. All water supply control valves shall have a standard sign identifying the portion of the system controlled, noting that the valve shall be kept open, and leaving a blank space for notification information.
- G. All isolation valves shall be marked on identification tag whether valve is to be “normally open” (NO) or “normally closed” (NC).

2.06 Drains and Test Piping

- A. All portions of the system shall be equipped with drains of the size specified in NFPA 13. Design sprinkler system that will drain to the riser. All drains, including auxiliary drains, shall be piped to the sanitary sewer system and not to exterior of building.
- B. Every waterflow switch shall have an inspector's test connection located downstream and piped to the sanitary sewer system.

2.07 Backflow Preventer

- A. A double check backflow prevention assembly shall be installed prior to any sprinkler or standpipe system connected to the City of Austin water distribution system, including connection of pressure maintenance pumps to the building's domestic water line utilized to fill sprinkler system piping. Backflow preventers are not required for fire sprinkler and standpipe piping connected directly to the campus FWDS.

2.08 Fire Sprinkler Standard:

- A. A remote express drain line is required for all buildings with floor control assemblies in addition to the main / inspectors test drain. This drain line shall be installed in the remote stairwell from the supply standpipe. The drain line shall be piped to a sanitary sewer.

PART 3 EXECUTION

3.01 Guarantee

- A. The Contractor shall guarantee and service all workmanship and materials to be as represented by him, and shall repair or replace, at no additional cost to the Owner, any part thereof, which may become defective within the period of one (1) year after the date of final acceptance by the Engineer, ordinary wear and tear excepted. Contractor shall be responsible for, and pay for, any damages caused by, or resulting from defects in his work.

3.02 Qualifications

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- A. System design and installation shall be supervised by a licensed NICET Level III sprinkler system technician or fire protection engineer with not less than five (5) years of experience with sprinkler systems. Accurate As-Built drawings shall be required in the form of three hard copies and two copies on CD in the specified format. The signature of the RME or engineer constitutes an affidavit that the statements, representations, and information presented in the submittal constitute a complete operational system conforming to applicable state laws and recognized good engineering practices. All field installation work shall be continuously supervised by a NICET Level II or III sprinkler system technician.

3.03 System Acceptance Testing and Commissioning

- A. Perform acceptance tests according to NFPA 13. Provide copies of test reports to the UT Fire Marshal, A&E Services, and other interested parties as tests are completed. Provide a complete set including all test results to the Owner at the completion of the project and a copy in each O&M Manual.

END OF STANDARD