

**SECTION 5.21.20 – FIRE-EXTINGUISHING SYSTEMS
DESIGN AND CONSTRUCTION STANDARD**

PART 1 GENERAL

1.01 Scope of Standard

- A. This standard provides general requirements of The University of Texas at Austin for fire-extinguishing systems other than water-based fire suppression systems. This document is not intended to serve as a guide specification.
- B. The design guidelines contained herein include the requirements for fire – extinguishing systems at The University of Texas at Austin. It is the intention of this document to provide a minimum standard for the installation of fire – extinguishing systems at the University so as to provide the highest level of fire safety possible.

1.02 Scope of Work

- A. Provide clean agent suppression systems when the project contains an area or room with sensitive equipment or contents, and the University requires a clean agent system to activate prior to the required water based sprinkler system.
- B. Provide wet or dry chemical suppression systems where required by the International Building Code, FM Global (FM), or University requirements. Extinguishing systems protecting cooking appliances, hoods, and branch exhaust ducts are required to be wet chemical extinguishing systems as required by the University.
- C. The work addressed in this section consists of non water based fire extinguishing, systems which will be coordinated with all of the following:
 - 1. Fire Alarm Systems
 - 2. Emergency power systems
 - 3. Central control and monitoring system.
- D. Reference Standards (Utilize latest editions available):
 - 1. NFPA 17-Dry Chemical Extinguishing Systems
 - 2. NFPA 17A-Wet Chemical Extinguishing Systems
 - 3. NFPA 2001-Standard on Clean Agent Extinguishing Systems
 - 4. UL 300- Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas

1.03 Related Work: References/Quality Assurance

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- A. FM Global (FM), International Building Code, National Fire Codes as published by the National Fire Protection Association (NFPA) and The University of Texas Fire Marshal’s requirements contain fire protection criteria and requirements for the design of all fire suppression systems. The project shall conform to the following:
 - 1. Conform to a minimum of the latest edition of NFPA 2001 for clean agent systems, NFPA 17A for wet chemical suppression systems, and NFPA 17 for dry chemical suppression systems. FM may require design in excess of NFPA requirements.
 - 2. All design shall conform to requirements of FM.

1.04 Submittals

- A. The University of Texas Project Manager shall review and distribute all submittals for approval by FM, the UT Fire Marshal, the Owner representative, and others as appropriate.
- B. 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.
- C. 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.
- D. The Contractor shall submit detailed and accurate shop drawings prepared in accordance with NFPA 17 and NFPA 17A for wet and dry chemical systems for approval of all equipment to be constructed and installed. Shop drawings shall identify all materials and list all equipment to be used. Shop drawings shall be coordinated with other trades prior to submittal.
- E. The Contractor shall submit detailed and accurate shop drawings and calculations prepared in accordance with NFPA 2001 for clean agent systems for approval of all equipment to be constructed and installed as follows:
 - 1. Submit shop drawings and flow calculations from a UL listed computer program to the authority having jurisdiction and A/E for approval. Total agent discharge time must be shown and detailed by zone.
 - 2. Include data for each piece of equipment comprising the system including cylinders, manifolds, control panel, and nozzles. Include product data and design calculations bearing stamp of approval of the University. Include calculations that verify system pressures, nozzle flow rate, orifice size, node numbers, piping pressure losses, component flow data and pipe sizes.

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3. Include manufacturer's certificate that system meets or exceeds specified requirements and NFPA 2001.
 4. Include welder's certificate of compliance with ASME SEC 9.
 5. Include manufacturer's installation instructions.
 6. Indicate detailed pipe layout, hangars and supports, components and accessories.
 7. Project Record Documents: Accurately record exact location of equipment, equipment identification markings, conduit and piping routing details and agent storage positions.
- F. No work shall be performed until the University has approved the shop drawings, calculations, and data sheets for the new system. The contractor is solely liable for any work performed prior to this approval.

PART 2 PRODUCTS

2.01 Clean Agent Systems

- A. Pipe: Black Steel Pipe: ASTM A 53 seamless or electric resistance welded. Grades A or B, with internal working pressure equal to the maximum pressure of the clean agent system being utilized. ASTM A 120 or ASTM A 53 Class "F" shall not be used.
- B. Pipe Joints and Fittings: In accordance with NFPA 2001 for clean agent system being utilized and compatible with piping. Roll groove fittings must be approved by the manufacturer for use with the clean agent system.
- C. Pipe Hangers: ASME B31.1, UL or FM approved for sprinkler systems, split clamp up to 2-1/2 inch size, riser clamps over 2-1/2 inch size, adequate for offset of discharge thrust.
- D. Escutcheons: Chrome plated pressed or stamped brass, one piece or split pattern, minimum 2-inches larger than opening.
- E. Gauges: ASME B40.1, UL 393, and UL 404, 3-1/2 inch diameter cast aluminum case, phosphor bronze bourdon tube, rotary brass movement, brass socket, front recalibration adjustment, black figures on white background, one percent midscale accuracy, scale calibrate in pounds per square inch.

2.02 Wet and Dry Chemical Extinguishing Systems

- A. Provide wet chemical extinguishing systems in accordance with NFPA 17A. Where the wet chemical extinguishing system is protecting cooking appliances, hoods, and branch exhaust ducts, the system shall comply with UL 300, *Fire*

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Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas. Utilize discharge nozzles, manual actuators, shutoff devices, pipe, and fittings in accordance with NFPA 17A and manufacturer's requirements.

- B. Provide dry chemical extinguishing systems in accordance with NFPA 17. Utilize discharge nozzles, manual actuators, shutoff devices, pipe, and fittings in accordance with NFPA 17 and manufacturer's requirements.
- C. Shut down all sources of fuel and electrical power to all cooking equipment producing heat upon system activation as required per NFPA 17 and NFPA 17A.
- D. Monitor wet and dry chemical extinguishing systems with building fire alarm system.

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

- 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 experience with sprinkler systems. Shop drawings shall be prepared and engineered. 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 Clean Agent Systems Testing

- A. Pressure test entire enclosure with test fan procedures per NFPA 2001, pressurizing protected area both under positive and negative conditions. Confirm that leakage is within system design allowance with a temperature of 70 degrees F. Provide any required follow up tests at no cost to Owner.
- B. Test distribution piping and valves, prior to nozzle installation, to 40 pounds per square inch air pressure test, shut valves and compressor. Inspect joints using

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soap water solution or halide torch or lamp. Maintain minimum test pressure for at least 10 minutes. If pressure drops more than 20 percent during test, repair leaks and retest.

- C. Upon completion of installation provide final checkout inspection by factory-trained representative of manufacturer to ascertain proper system operation. Leave system in a fully commissioned and automatic readiness state with circuitry energized and supervised.
- D. Conduct a room pressurization test in each protected space to determine the presence of openings that could affect the agent concentration level. Testing must be in accordance with NFPA 2001. If room pressurization testing indicates openings exist that would result in leaks or loss of extinguishing agent, coordinate the proper sealing of the protected space with the General Contractor. Inspect and retest the protected space as necessary until a successful room pressurization test is achieved. Submit copies of successful test results to Owner. Upon acceptance, the complete system may be placed into service.
- E. Submit original copies of tests, indicating that factory trained technical representatives of the manufacturer have inspected and tested systems and are satisfied with methods of installation, connections and operation.

3.04 Wet and Dry Chemical Extinguishing Testing

- A. Wet chemical systems shall be tested in accordance with NFPA 17A, and dry chemical system shall be tested in accordance with NFPA 17.
- B. Submit original copies of tests, indicating that factory trained technical representatives of the manufacturer have inspected and tested systems and are satisfied with methods of installation, connections and operation.

END OF STANDARD