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1. **Design & Performance Criteria:**

- a. Factory Mutual Global requirements shall be included in design of sprinkler systems.
- b. All products to be FM Global approved and UL listed.
- c. In new sprinkler systems and existing systems involving rebuilding of the main riser, provide means of backflow prevention and full forward flow testing capability (for flow of design capacity through the backflow prevention device) in accordance with local ordinances, adopted codes and standards, and the VT Fire and Building Safety Code.
- d. Sprinkler systems are to be zoned by floor with floor control valves (with tamper switches, flow switches, check valves, and a drain line) for each riser and each zone. All water control valves must be visible and accessible for inspection and maintenance. If a valve must be installed above a ceiling, a clear (Lexan) panel must be provided to replace ceiling tile. Avoid installing valves above hard or rated ceilings.
- e. Inspector test valve assemblies are to be located at remote ends of each zone. These assemblies will have sight glasses and hard pipe express drains to hub drains.
- f. Shutoff valves for control of fewer than five sprinkler heads shall not be installed unless required by code or Authority Having Jurisdiction.
- g. Verify that Elevator shafts are not to be sprinklered under the Vermont Elevator Rules, remove any top of shaft sprinkler heads in renovation projects, and check requirements for elevator machine room and elevator pit sprinkler protection requirements with the UVM Fire Marshal and UVM PPD Elevator Specialist.
- h. Pipe Slope: piping in wet and dry sprinkler systems shall be sloped back toward the system riser at ½" per 12" of run.
- i. Dry pipe pressurization: dry pipe systems located in unconditioned areas shall be pressurized with nitrogen and not compressed air to avoid corrosion of piping related to the presence of condensation and oxygen.

2. **Reference Standards:**

- a. To be specified by design consultant

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3. **Submittals to be reviewed by University:**

- a. Manufacturer’s product data
- b. Shop drawings
- c. Hydraulic calculations
- d. Water supply flow and pressure test data (within 12 months of design)
- e. Plans and supporting materials will be submitted to FM Global for review by the UVM Fire Marshal at all stages of project design, and FM Global plan review letters will be forwarded to the project team on receipt
- f. Record Documents
 - i. Final as built documents showing system as constructed.
 - ii. All changes shall be incorporated to the record documents.
 - iii. Operation and Maintenance manuals
 - iv. Completed and signed Contractors Material and Test Certificate(s).

4. **Products, Materials & Equipment:**

- a. Piping – No CPVC (plastic), all piping to be Schedule 40.
- b. Valves
- c. Sprinkler Heads
- d. Hangers and Supports
- e. Wet/Dry pipe alarm valves
- f. Sleeves, Plates, Escutcheons, provide guards where height is low or may be subject to physical damage.
- g. Firestopping/Smoke-proofing
- h. FD hose valves
 - i. All standpipe hose valves in Burlington shall be 2-1/2 inch “Roxbury” thread cut, confirm dimensions with the Burlington Fire Department
 - ii. Confirm valve type and thread specifications with the local fire department for all facilities outside the City of Burlington
- i. Fire Department Connections (FDC)
 - i. Fire Department Connections in the City of Burlington shall be 4-inch Stortz quick-lock type
 - ii. Confirm Fire Department Connection size and type with the local fire department for all facilities outside the City of Burlington

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- iii. Locate FDC's in consultation with and with the approval of the local fire department/AHJ and the UVM Fire Marshal
 - j. Alarm Devices (flow switches)
 - i. Basis of design/approved manufacturer: Potter
 - k. Fire Pump
 - i. Electric horizontal split casing with non-elastomeric coupling
 - ii. May allow vertical inline pumps if proper lifting structure is provided (UVM approval required)
 - l. Jockey Pump
 - m. Fire pump controller
 - n. Jockey pump controller
 - o. Fire pump transfer switch
 - p. Seismic protection
 - q. UL Listed and FM Approved Sprinkler Heads
 - i. Utilize FM data sheets 2-0, 3-26, and others as appropriate for selection
 - ii. FM Approval Guide ([website link](#))
 - iii. Basis of design/preferred manufacturer: Tyco
 - iv. Sprinkler head selection to be verified by qualified sprinkler designer, reviewed by UVM Fire Marshal, and approved by the AHJ
- 5. **Installation, Fabrication, and Construction:**
 - a. Installation requires a VT Technically Qualified Person (TQP) credential, manufacturer qualification, and all required State and/or local Authority Having Jurisdiction (AHJ) permits and inspections
 - b. Acceptance testing: Contractor to schedule rough-in and final inspections with the appropriate Authority Having Jurisdiction and the UVM Fire Marshal.
 - c. Annual testing of sprinkler systems and pumps: UVM's third-party sprinkler testing agent typically tests fire suppression systems in buildings on a yearly schedule. When scheduled tests are set to occur and the sprinkler system is under construction/modification, the sub-contractor performing the current changes will perform the annual test when their work on the system is complete.
 - i. The test shall include 100% of the building system as well as the systems of connected buildings that are integrated with the system that is under construction or modification.

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- ii. Five-year standpipe flow testing will be completed as required by NFPA 14 and based on UVM's inspection, testing, and maintenance schedule.
 - d. Testing of a sprinkler system that is still under an installing contractor's post-construction warranty will be done by UVM's third-party testing agent. The installing contractor holding such warranty must witness the test to certify the warranty is maintained. This includes 3 quarterly tests and one annual test as they fall during the post-construction warranty. The third-party agency will coordinate invitation of the installing contractor.
 - e. Adequately sized floor drain(s) will be provided in the main sprinkler riser room(s) in buildings of new construction.
 - f. All sprinkler drains will be piped to the exterior of the building, and splash blocks/durable surfaces to prevent erosion.
 - g. Contact between piping and dissimilar metals (i.e.: hangers) shall be prevented to avoid galvanic corrosion.
 - h. Unions or flanges at all equipment valves are needed to allow disconnection of equipment that may need to be disconnected for repairs.
 - i. Shutdown procedures and requirements shall be reviewed with UVM.
 - j. Valve Tags and Charts
 - i. all tags and tamper prohibiting chains and locks for water control valves
 - ii. Owner will furnish and install all valve tags, charts, identification tags, and signs for sprinkler valves
 - k. Incorporate barcode labels to conform with University barcode program.
 - l. All piping shall be installed with the seam facing up.
6. **Warranties:**
- a. Manufacturer's standard product warranty
 - b. Installer's standard one-year installation warranty