

DIVISION 15 - MECHANICAL

Section 15300 - Fire Sprinkler Systems

Introduction

This work shall be in strict accordance with all rules, regulations, by-laws and requirements of all authorities having jurisdiction including, but not limited to the latest edition adopted by the University; NFPA codes, Arizona State Fire Code, UA Department of Risk Management Services.

Part 1 - General

- Hydraulic calculations and sprinkler system shop drawings shall be prepared and signed by a recognized design professional, to be submitted to the State Fire Marshal for approval.
- Designer and Contractor to conduct water supply static and residual tests, witnessed by UA, and provide fire flow information on shop drawings and hydraulic calculations.
- Provide a "Reduced Pressure" back-flow preventer located outside the building, with a 2½" flush port installed with a 2½" male hose connection controlled by a supervised valve and installed after the preventer but before the main alarm valve assembly.
- Provide a Potter Chemical Delivery System (PCDS-B) with Potter "Pipe Shield" chemical treatment and connect to the system after the alarm valve.
- Potter Automatic Air Bleeders (PARR-B) shall be installed at the most hydraulically remote point in each zone of the system. Each automatic air bleeder shall be provided with an isolation valve to allow for maintenance. Each automatic air bleeder shall be monitored by the fire alarm system for water leakage.
- Provide a metal sign mounted on the main riser with the hydraulic calculations engraved.
- Provide an 8 ½" x 11" Map Key Plan for each floor of building, indicating the location of the following:
 - Main Control Valves
 - Fire Alarm Panel
 - Fire Dept. Connection (FDC)
 - Location of interior FDC's (wet or dry standpipes) if applicable
 - Back Flow Preventer
 - Fire Alarm Bell (24VDC)
 - Auxiliary Drain Valves
 - Inspectors Test Connections
 - Gallons per Floor / Zone
- Provide fire document box (#SSU00672 from www.1sae.com) at main control valve, complete with key plan,
- All valves shall be readily accessible for maintenance between 12 inches and 60 inches above finished floor.
- Provide a spare head box mounted next to the main control valve. Ensure there are sufficient quantity and type as required by NFPA 13 Standard for Installation of Sprinkler Systems, (latest University adopted edition). Ensure there is a head wrench and / or socket with ratchet as needed to replace any installed head in the system.
- Provide system signage and identification in accordance with NFPA 13 latest University adopted edition. Include placing signs on doors to all fire suppression equipment pumps, valves, test points, and drains.
- Provide a bound and "bookmarked" pdf copy of system "as-built" drawings for use of UA Fire Safety Dept.
- To facilitate the annual fire pump test, all fire pump installations shall include a fire pump test header (controlled by a supervised valve, with the discharge located outside in a location approved by UA). The test header shall be located as to allow the test to be performed without excessive flooding of the streets or damaging landscape.

- In buildings equipped with or to be equipped with fire pumps, provide monitoring to identify failure of jockey pump prior to start of fire pump due to loss of pressure.
- In buildings equipped with or to be equipped with pre-action sprinkler systems they shall be double interlocked and shall use a nitrogen supply (Potter NGP Series) to reduce corrosion in the piping system. And shall be installed with a nitrogen bleeder at the remote point of the pre-action system.

Part 2 - Products

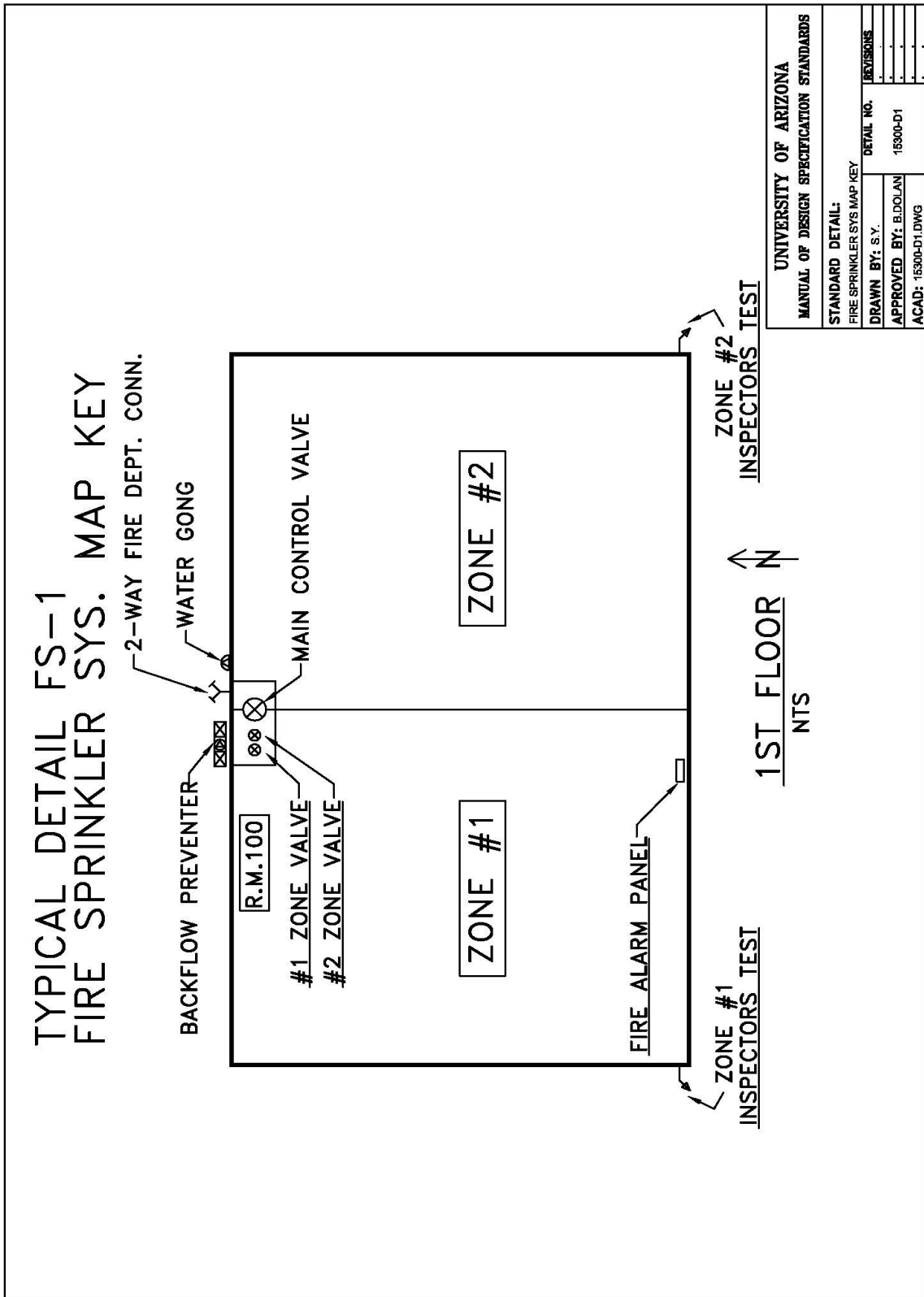
- Piping below grade shall be Cast Iron or AWWA C900
- Piping above ground shall be schedule 40 ASTM A-53 Grade A or B. or If "Pipe Shield" chemical treatment system is installed schedule 10 piping, Bull Moose, Dyna Flow, or equal may be used in the chemically treated part of the system.
- All grooved fittings shall be UL and FM approved. Victaulic 009H fittings are not to be used.
- All automatic air bleeders, chemical treatments, chemical injector systems, and nitrogen systems shall be manufactured by Potter.
- All control valves shall be gear operated butterfly type. minimum valve handle size is 5" diameter
- All non-control valves shall be ball type.
- All control valves shall have integrated tamper monitoring switches monitored by the fire alarm system.
- Provide electronic pressure monitoring of the supply and system sides of the fire sprinkler system using 24VDC ¼"NPT 4-20ma transducers that provide a range of 0-300psi with a burst rating of at least 400psi. They shall be installed in the same location as the system and supply pressure gauges. Each pressure transducer shall be monitored by the building fire alarm using a Simplex Analog Monitoring Zone Addressable Module (AMZ) part #4190-9050.
- All check valves shall be UL listed and Factory Mutual approved and shall be equipped with a removable cover assembly. Check valves shall be listed for installation in the vertical or horizontal position. Riser check valves shall be equipped with gauge connections on the system side and supply side of the valve clapper and a main drain outlet in the body of the valve above the rubber faced clapper assembly. Riser check valve trim piping to be externally galvanized. All check valves shall withstand a maximum water working pressure to 250 PSI.
- All FDC's shall be National Standard Hose thread.

Part 3 - Execution

- Piping shall be installed in areas protected from freezing. Designer shall route piping to avoid sprinkler lines being subjected to freezing. If piping must be located in areas subject to freezing obtain written approval from PD&C and Risk Management Services.
- U of A Risk Management Services and Facilities Management (FM)- Fire Safety to be notified 48 hours in advance of all system tests, e.g. underground flushing, hydrostatic test, flow alarm test, fire pump test (if applicable), fire alarm/final acceptance test.
- No saddle type fittings shall be used on fire protection systems.
- System main drain and auxiliary drain(s) sizes shall be in conformance with N.F.P.A. 13 – latest university adopted edition. Auxiliary drain valves shall be installed when trapped water will be collected in accordance with NFPA 13. A plugged or capped outlet will not substitute for a required drain valve. A sprinkler head will not eliminate a required auxiliary drain valve. Drains shall be routed through an exterior wall and shall be piped in galvanized piping where it extends through the wall. The exterior drain shall terminate at a turned down galvanized 45° ell to discharge at a splash block to prevent damage to the landscape. A gang drain may be used.
- Inspector's Test Connections and main drain shall be piped to a suitable location outside of building. (Confirm location with Risk Management Services and FM-Fire Safety Dept.). Do not pipe to a floor drain,

janitor's mop sink or similar. A gang drain system may be used.

- System piping shall not be buried beneath building slabs on grade.
- If a stand pipe is required, a combination wet standpipe / fire riser is preferred. All standalone standpipes shall be wet type with the exception of parking garages which shall be dry type (Dry piping shall be above ground). Locate the fire department connection (FDC) adjacent to the sprinkler system FDC.
- In all new construction and in major renovation projects the entire system shall have a final "all heads installed" 2 hour 200 psig pressure test through the FDC. Isolate the RP Backflow device during the test.
- Check valves, sprinkler valves and flow switches and main drain valve shall be readily accessible.
- At check valves, support piping independent of valve to allow for service removal without additional pipe support.
- FDC shall be horizontal type, wall mounted to the building structure on the street side by the main entrance, at a point as close as possible to the nearest fire hydrant, and shall be mounted in an area un-obstructed by building features to include landscaping. (Minimum 5ft clear on both sides). As an alternate the FDC can be integrated with the reduced pressure backflow preventer located in a location approved by Risk Management Services and FM-Fire Safety. Inspector's test valve shall be installed at the most hydraulically remote point in each zone of the system.
- Local bell shall be powered and supervised by the fire alarm panel.
- For all installations, do not use saddle tees. Use grooved fittings or welded outlets only.
- All welding of fire suppression piping shall be done by welders qualified in accordance with the minimum requirements of ASME Section IX Welding and Brazing Qualifications. Ensure all piping:
 - Is clear of discs
 - Has smooth openings
 - Welds are free from cracks
 - Is clear of weld splatter
- Do not enclose grooved fittings within construction.
- All pendant sprinkler heads in suspended ceilings to be installed at quarter points or center of ceiling tile.
- Shop drawings shall incorporate all of the design features shown on the contract drawings. Any deviations deemed necessary by the designer shall be clearly identified on the shop drawings, ie: clouded.
- Contractor shall submit shop drawings to the Architect/ Engineer and PDC Project Manager for review and approval, prior to submittal to the University of Arizona Fire Marshal.
- All new construction and major renovation projects shall be fully sprinklered and equipped with class A fire alarm system.



UNIVERSITY OF ARIZONA	
MANUAL OF DESIGN SPECIFICATION STANDARDS	
STANDARD DETAIL: FIRE SPRINKLER SYS MAP KEY	
DRAWN BY: S.Y.	REVISIONS
APPROVED BY: B.DOLAN	DETAIL NO. 15300-D1
ACAD: 15300-D1.DWG	

End of Section 15300