

DIVISION 21 – FIRE SPRINKLER SYSTEM**21 05 00 – Common Work Results for Fire Sprinkler System**

1. Submittal and Construction Process
 - a. MEP consultant to Owner will perform preliminary design to applicable codes, standards, RIT Design and Construction Guidelines, RIT insurance carrier requirements, and Town of Henrietta Fire Alarm Submittal Checklist (<http://www.henrietta.org/index.php/doccenter/building-a-fire-prevention-permit-applications/commercial-permit-applications/2740-fp104-fire-alarm-submittal-checklist-1/file>).
 - b. Contractor to provide Owner with a full set of shop drawings, specifications, materials list, product cut sheets, and any other items required as per Town of Henrietta Fire Alarm Submittal Checklist for Owner review before applying to the town for the Fire Alarm Permit.
 - c. Submittal shall comply with these guidelines and Town of Henrietta Fire Alarm Submittal Checklist in addition to all applicable codes, standards, and RIT insurance carrier requirements.
 - d. Submittal shall include a completed copy of the Town of Henrietta Fire Alarm Submittal Checklist.
 - e. Owner shall review submittal and meet with contractor to resolve any issues.
 - f. Contractor shall apply for Fire Alarm Permit after Owner approves submittal.
 - g. Contractor and Owner shall meet and review materials and installation locations before ordering and rough in. This is to ensure correct materials and mounting height compliance with these guidelines.
2. System Description
 - a. The design criteria for the Fire Protection system shall be in compliance with all applicable laws, codes, rules, regulations, standards, and RIT insurance carrier requirements. All components used in the system shall be FM approved.
 - b. Water supply control valves shall be electrically supervised for proper position. Water flow and supervision circuits shall be in accordance with the requirements of electrical specifications. All valves and test points shall have individual addresses reported on the fire panel.
 - c. Avoid providing a Fire Pump. Consult with Owner if pump is needed.
 - d. Concealed sprinkler heads shall not be used.
 - i. Our experience has shown us that after a few years, the concealed cover assembly plates become obsolete and missing plates cannot be replaced.
 - ii. Use of concealed sprinkler heads requires special written approval from Owner (Director of Electrical Maintenance).
 - e. Flexible drops will be allowed only on a case by case basis as approved by Owner (Director of Electrical Maintenance). If flexible drops are allowed, they must include ceiling system modifications (i.e. bracing) for a complete system.
 - f. Grid systems are not allowed.
 - g. In multi-story buildings, design each floor to be a separate independent zone. Provide each zone with a floor control valve assembly consisting of a control valve, tamper switches, flow switch, check valve, pressure gauge, and test/drain connection on each floor within a stairwell.
 - h. Where permanent furniture items (lab benches, library stacks, shelving, etc.) are incorporated in the building, or if partitions extend to within 18 inches of the ceiling, ensure sprinkler system design is appropriate, code compliant, and coordinates with lighting, ventilation, and other building features.
 - i. Where custom ceilings (i.e. clouds) are incorporated in the building, ensure sprinkler system design is appropriate and code compliant (heads above and below ceiling as required).
 - j. Design sprinkler system to minimize testing and maintenance, and be easily maintained.
 - k. Proposed sprinkler head locations shall be shown on architectural reflected ceiling plans and Fire Protection drawing set.
3. Fire Department Connection
 - a. Provide locking FDC Caps (Type used: Knox FDC cap 2 ½") on all Fire Department connections. Must be approved by local Fire Department.
 - b. Non-pressurized FDC shall be Schedule 40 galvanized steel pipe.
4. Main Alarm Valve Equipment
 - a. Water flow indications shall be flow switch only (Pressure Switches are not acceptable) on wet systems.
5. Alarms/Monitoring/Control
 - a. All valves which control the flow of water to water-based fire suppression systems shall be provided with tamper switches.
 - b. Provide each sprinkler/standpipe system and/or zone with a water flow switch.
 - c. All water flow and/or tamper devices shall be individually monitored by the main fire alarm system panel as a trouble or alarm point as dictated by the service using a unique addressable input module for each

- monitoring point.
 - d. Provide an electronic strobe and horn (mounted 6 feet AFF on outside of building above FDC) in lieu of a water motor gong for exterior audible alarm for fire sprinkler systems. Strobe shall only be active to indicate water flow, not general Alarm. (All Notification Appliances placed outside shall be Weather Proof and in a STI-1229-HAZ weather proof enclosure.)
 - e. Do not use a water motor gong for exterior audible alarm for fire sprinkler systems.
 - f. For wet or dry systems, do not use any type of control panel, all switches and device shall be wired to the Fire Alarm Control Panel (FACP).
6. Sprinkler cabinets and spare sprinklers
- a. A wall mounted cabinet for spare sprinkler heads and sprinkler wrench shall be provided. A sprinkler wrench compatible for each type of sprinkler head used shall be provided in the sprinkler cabinet. Spare sprinkler heads of each type used shall be provided in the cabinet.
 - b. Provide a stock of 12 spare sprinklers of each type used in the project. If more than 300 heads of a type are used, supply 24 spares.
 - c. Provide 24 escutcheon plates, trims, and caps for each type used. If more than 300 heads of a type are used, supply 15% spare escutcheon plates trims and caps.
 - d. Residence housing applications require a higher percentage of spares, discuss with FMS Fire Tech before bid time.
7. Test and Drain
- a. Combine test and drain valves, sight glass, and interchangeable restricting orifice, sized for smallest orifice sprinkler zone.
 - b. Locate Test and Drain valves in easily accessible mechanical space or public areas and no more than 6 feet AFF.

21 05 53 – Identification for Fire Sprinkler Piping and Equipment

1. Valve labeling
 - a. Before installation begins the contractor shall provide a numerical list of all valves with a description of each valves operation and function.
 - b. RIT will then assign all valves in the project an RIT specific equipment label and provide this information back to the contractor.
 - c. The contractor shall update all drawings with the RIT supplied valve labels.
 - d. The contractor shall submit an updated set of drawings back to RIT for approval.
2. Control, drain and sectional valves shall be provided with permanently marked identification signs. The signs shall be permanently mounted on the piping or wall at the valve, or on the valve, but shall not be hung on the valve with wires or chains which permits easy removal of sign.
3. All Valves should be numbered accordingly with number tags being affixed to the valve body not the operating handle.

Valve #2301
 Dry Sys Control Valve
 ADD:034-025 PAV-1

4. Installation contractor shall provide an index sheet showing a complete listing of all tagged numbers followed by an associated description for each valve. See example below.

<u>DOUBLE-INTERLOCK SPRINKLER SYSTEM</u>				
Building	Address / Pre-Action	Description	Type	Number
05	034-025 PAV-1	A-475 PAV-1 DRY SYSTEM CONTROL VALVE (Butterfly)	SYSTEM VALVE	2301
05	034-025 PAV-1	A-475 PAV-1 DRY SYSTEM LOW AIR TEST VALVE	TEST VALVE	2302
05	034-024 PAV-1	RM 3464 ABOVE CEILING PAV-1 DRY SYS TEST VALVE	TEST VALVE	2303
05	011-005 PAV-2	A-561 PAV-2 DRY SYSTEM CONTROL VALVE (Butterfly)	SYSTEM VALVE	2304

21 08 00 – Commissioning

1. Prior to Final Acceptance, instruct the FMS Fire System Techs in the proper operation, maintenance, testing, inspection, and emergency procedures for all systems provided.
2. Warranty shall be for One (1) Year and include 4 hour response time 24 Hours per Day, by the installing Fire Protection contractor, including Weekends and Holidays.
3. Provide on one sheet a system schematic drawing (with RIT valve numbers) of the sprinkler system showing all valves and auxiliary equipment. Drawings shall be mounted on wall behind or near main sprinkler supply with a piece of Plexi-glass protecting it.
4. A digital copy of the as-built drawings in AutoCAD and PDF format is to be provided to Owner. As-built drawings to be in black and white only. Drawings shall include but not be limited to
 - a. The incoming fire service(s) into the building from a point 5 feet outside the building,
 - b. The main sprinkler standpipe system riser assemblies and related devices and equipment at the point where the fire services enter the building,
 - c. Main sprinkler/standpipe manifold piping,
 - d. Sprinkler standpipe riser locations and routing,
 - e. All sprinkler/standpipe system control valve assemblies at each floor of the stairwell(s),
 - f. Test and Drain risers and connections,
 - g. Fire hose valve and or hose valve cabinet locations,
 - h. Sprinkler system design criteria, including at a minimum:
 - i. Type of system,
 - ii. Zone or area description,
 - iii. Design density (gpm/Sq. Ft.)
 - iv. Design area (Sq. Ft.)
 - v. Type of sprinkler,
 - vi. Maximum sprinkler spacing (Sq. Ft.)
 - vii. Sprinkler head locations shall be shown on architectural reflected ceiling plans added to the Fire Protection plans.
 - i. All valves shall have numbered tags on them.

21 13 13 – Wet-Pipe Sprinkler System

1. Piping and valves
 - a. All piping shall be installed to permit drainage of the system through a main drain valve. Main drain valve shall be a ball valve. Where a change in piping direction prevents drainage of the system, Low Point auxiliary drains shall be provided. The auxiliary drain assembly shall consist of a lockable ball valve, nipple and cap or plug. Pipe drain to an accessible location.
 - b. Use only Schedule 40 steel pipe for threaded and rolled groove piping on wet systems.
 - i. Do not use cut grooved piping
 - c. All Control/Sectional valves under 6 inches shall be Butterfly valves with monitoring contacts.
 - d. All pressure switches shall have a vented ball valve installed on the line before the switch (See FIGURE 1 at the end of this document).
 - e. A double check valve shall be provided where sprinkler system connects to public water supply.
 - f. Install chains and break-a-way locks (see Owner for lock information) on ALL valves.
 - g. Install piping with ball valve inside building at base of any/all roof hydrants for draining hydrants.
 - h. Locate ball valve within 72 inches AFF and before connecting to system drain.
2. Installation
 - a. Piping shall not pass directly over electric panel boards, switchboards, motor control centers, or similar electric equipment. However, protection for these spaces shall be provided.
 - b. All discharge water shall discharge either outside of the building onto a splash block where no damage will occur to building or site, or into a sump pit that will handle full flow for at least 4 minutes. Locate test stations in areas where testing does not affect occupants or program, and discharged water does not pool or freeze forming a hazard to pedestrians or vehicle operators.
 - c. A 2" full port ball valve shall be at the discharge end of the drain line allowing the drain to be charged to prevent water motion when tampering occurs. A sight glass shall be installed just after the valve and before the drain line leaves the building.
 - d. Provide an accessible pressure gauge near the topmost outlet of each standpipe.
 - e. The Main Drain shall be 2" for drain tests.
 - f. No Valves or flow switches shall be above ceilings except for Low Point Drain valves. Use a red with white lettering label on ceiling grid to indicate Low Point Drain valves concealed by ceiling.
3. Systems in Elevator Shafts

- a. Discharge water for this system can be put into the elevator sump pit with a test and drain valve at the bottom of the sprinkler system to test and then drain the water from the sprinkler system when the solenoid is closed.
- b. In elevator shafts where sprinklers may freeze, the sprinkler line to the shaft shall have a normally closed solenoid valve controlled by the fire panel so that no water may enter the sprinkler system in the elevator shaft until the elevator shunt trip has been activated.

21 13 16 – Dry-Pipe Sprinkler System

1. All dry systems shall be nitrogen charged using a compressor and molecular sieve.
2. All dry valves requiring manual reset must be externally reset-able.
3. Schedule 40 steel pipe must be used on dry systems.
 - a. Do not use cut grooved piping
4. Install a tee with a ½ inch ball valve and female hose quick disconnect and a shut off ball valve on compressor air line for adjusting cut-in/cut-out pressure.
5. All dry systems shall use a vented ball (Bleeder Valve: Potter: BLV Stock # 1000018) valve installed before pressure switch (used to test pressure switch). See appendix 1 at the end of the document.
6. Air compressors shall be located in non-sensitive areas such that nearby occupants are not disturbed by noise and vibration caused by a compressor.
7. No remote air compressors: use tankless user mount compressor.

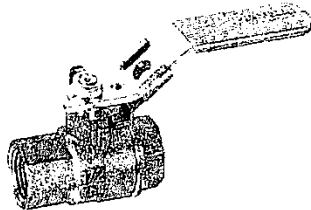
21 30 00 – Fire Pumps

1. Installation
 - a. Use horizontal electrically driven pump, not vertical type.
 - b. Do not use diesel driven pumps.
 - c. Use pilot operated pressure reducing valves (PRV).
 - d. Use the simplest control panels, minimize the use of electronic touch screen controls.
 - e. Fire pumps shall be located in non-sensitive areas such that nearby occupants are not disturbed by noise and vibration caused by a fire pump, location to be approved by Owner
 - f. MEP design consultant shall ensure there is enough normal electrical power and generator provided power for a fire pump installation.
2. Tests
 - a. RIT FMS Fire System Techs shall witness flushing, pump testing, coverage inspections, and all other inspections and tests.
 - b. Give the owner's representative advance notice of final test. All final testing shall be with RIT FMS Fire System Techs.

Appendix 1 – Dry Pipe Sprinkler Valve



BVL LEVER TYPE BLEEDER VALVE



Valve Body: Bronze
Handle: Zinc plated steel
Maximum Pressure: 300 PSI (20.7BAR)
Connections: 1/2" NPT
Exhaust Orifice: .125" (3mm)

Stock number - 1000018

General Information

The Model BVL, lever type bleeder valve, is for use as a test valve for pressure operated devices on wet pipe sprinkler systems that have excess pressure, or dry pipe sprinkler systems.

The BVL should be installed in-line with the pressure device. It provides a convenient means for removal or testing the pressure actuated device without affecting the pressure in the system. Closing the valve (moving the valve handle perpendicular to the 1/2" pipeline) shuts off the water or air from the supply and opens a small orifice (pin-hole) to exhaust the pressure between the valve and the pressure device. This should provide a low pressure actuation of the pressure device, testing its operation.

Installation

The BVL should be installed in-line to the alarm or supervisory device with the "PD" (Potter Device) stamp, or with the arrow pointing toward the alarm or supervisory device that is to be tested.

CAUTION

The BVL should be installed so the exhaust orifice is pointed in a safe direction.

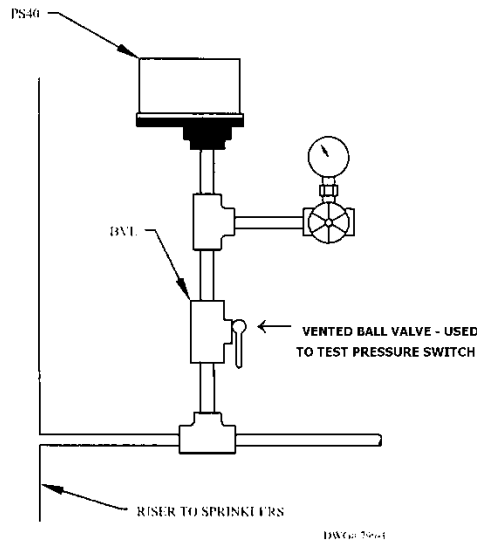


FIGURE 1

END OF DIVISION 21