

# Anvil CSI 3 Part MasterFormat Specifications

## PIPES, VALVES AND FITTINGS FOR FIRE PROTECTION SYSTEMS SECTION 21 11 00

### PART 7 GENERAL

#### 7.1 SECTION INCLUDES

##### A. Scope of work:

1. All areas as indicated on the drawings are to be protected by an automatic suppression system, of type as indicated.
2. Wet pipe.
3. Dry-pipe.
4. Wet standpipe.
5. Dry-standpipe.

B. Contractor shall be responsible for designing the distribution systems and sizing of the systems by hydraulic calculation; and shall provide the necessary engineering drawings and calculations to obtain acceptance of all authorities having jurisdiction.

#### 7.2 RELATED SECTIONS

- A. Section 07 84 13 - Penetration Firestopping Mortars.
- B. Section 08 31 16 - Access Panels and Frames.
- C. Section 23 05 00 Basic Mechanical Methods and Materials.
- D. Section 23 05 29 - Hangers and Supports .

#### 7.3 REFERENCES

- A. ASTM International (ASTM) A536 - Standard Specification for Ductile Iron Castings.
- B. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.
- C. NFPA 13 - Installation of sprinkler systems.
- D. NFPA 72 - Installation, maintenance and use of protective signaling devices.
- E. Factory Mutual (FM)
- F. Underwriters Laboratory (UL)
- G. Underwriters Laboratory of Canada (ULC)

#### 7.4 SYSTEM DESCRIPTION

- A. System components to be UL listed/FM approved and labeled.
- B. System components to be to be rated for minimum operating pressure of 175 psig.
- C. Pipe, Valves, and Fittings - Grooved products for steel and copper fire protection systems shall be used. Refer to Section 23 05 00 - Common Work Results for HVAC.
- D. Products shall be UL/ULC listed and FM approved. Materials shall be installed in accordance with current NFPA Standards, local Rating Bureau and/or local Fire Marshall requirements.
- E. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies. Refer to Section 23 05 29 - Hangers and Supports.

#### 7.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. [ Product Data ]: Manufacturer's data sheets on each product to be used, including:
  1. Preparation instructions and recommendations.
  2. Installation methods.
- C. Certifications:
  1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.
- D. Shop Drawings:
  1. Submit shop drawings and [ Product Data ] grouped to include complete submittals of related systems, products, and

accessories in a single submittal.

E. Closeout Submittals:

1. Warranty: Warranty documents.
2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

## 7.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Fire Protection Contractor shall be licensed by the State in which the project is located authorized to furnish and install fire protection systems.
2. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.

- B. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, and establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

## 7.7 DEFINITION

A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to applicable requirements of NFPA 13 and ASTM A53, ASTM A135 or ASTM A795.

B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.

E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.

F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.

G. "FPC" means the Fire Protection Contractor.

## 7.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## 7.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 7.10 WARRANTY

A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.

B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

# PART 8 PRODUCTS

## 8.1 MANUFACTURERS

A. Acceptable Manufacturer: Anvil International, which is located at: 2 Holland Way; Exeter, NH 03833; Tel: 603-418-2800; Email: [bgunnell@anvilintl.com](mailto:bgunnell@anvilintl.com); Web: [www.anvilintl.com](http://www.anvilintl.com)

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

## 8.2 MANUFACTURED UNITS

A. Grooved Butterfly Valve: Gruvlok Figure AN-7722-3A, 2 to 10 inches. 300 PSI (2.1 MPa) rated UL/FM approved grooved-end with two (2) switches; one is a supervisory switch and the other is an auxiliary switch. Tamper resistant screws shall be provided to attach the cover of the actuator.

B. Check Valves: Gruvlok Figure 78FP, 2 to 12 inches: 300 PSI (2.1 MPa) rated, UL/ULC listed and FM approved grooved-end.

C. Couplings for Fire Protections Systems - Gruvlok UL/ULC listed and/or FM approved. Figure 7000 (Flexible)/Anvil SPF C3,C1 and 7400 (Rigidlok)/Anvil SPF C4 Grade "E" EPDM Type A, "C" Style Pre-Lubed Gaskets, Type "E" EPDM, or Flush Gap Gasket.

D. Grooved Fittings for Fire Protection Piping Systems: Gruvlok Fire-Rite/Anvil SPF short pattern fittings, 90 degree elbows and tees in 2 to 8 inches or Gruvlok/Anvil SPF standard pattern fittings, 2 to 12 inches. Cast ductile conforms to ASTM A-536 Ductile Iron to Grade 65-45-12. Fittings are painted to industry specification and are available galvanized. Fire-Rite fittings are UL/ULC listed and FM approved.

E. All hangers, supports and structural attachments shall be manufactured by Anvil International and installed in accordance with NFPA 13.

#### F. Sway Brace - Seismic

1. All bracing, structural attachments, sway brace components, supports and hangers shall be UL/ULC Listed (UL 203A:2009) and/or FM Approved. (FM 1950:2010).

2. All bracing components shall be manufactured by Anvil International. Use of other manufacturer's components with Anvil's bracing components will result in a non-compliant seismic bracing assembly.

- a) Anvil Fig. 770 Q Brace Clamp
- b) Anvil Fig 776 Brace Clamp
- c) Anvil Fig 775 Lateral/Longitudinal Brace Clamp
- d) Anvil Fig. 778 Bar Joist and Beam Attachment
- e) Anvil Fig. 772 Adjustable Steel Beam Attachment
- f) Anvil Fig 779 Multi-Connector Adapter
- g) Anvil Fig. 771 Sway Brace Fitting
- h) Anvil Fig. 773 Surge Restrainer
- i) Anvil Fig. 777 Swivel Joint Connector

3. Sway Bracing shall be designed and installed in accordance with NFPA 13 Section 9.3.5, Sway Brace Design.

4. Branch line restraints shall be designed and installed in accordance with NFPA 13 Section 9.3.6.

5. Refer to Anvil's "Seismic Sway Brace for Fire Sprinkler Systems Manual" for OSHPD pre-approved sway brace designs. This is available at: <http://www.anvilintl.com/literature/catalogs.aspx>

6. Seismic Bracing may be designed by utilizing Anvil's Seismic Fire Protection Design Tool **Seis Brace**™. Visit [www.seisbrace.com](http://www.seisbrace.com)

#### G. Expansion Compensation Loop:

1. A flexible pipe loop that absorbs and compensates for multi-plane movements simultaneously while reduce piping stress.
2. Anvil Star Tri-Flex Loop as manufactured by Anvil Star Fire Products Div. of Anvil International, or pre-approved equal.
  - a. Model ANVL2 (+/-2 inches movement).
  - b. Model ANVL4 (+/-4 inches movement).
  - c. Model ANVL8 (+/-8 inches movement).
3. Construction shall be 3 equal length sections of annular corrugated stainless steel close-pitch hose with stainless steel over braid that will absorb or compensate for pipe movements in all 6 degrees of freedom (3 coordinate axes, plus rotation about those axes) simultaneously.
  - a. The corrugated metal hose, braid(s), and a stainless steel ring-ferrule/band (material gauge not less than .048 inch shall be integrally seal-welded using a 100 percent circumferential, full penetration TIG welds. End fittings shall be selected per application. Fittings shall be attached using a 100 percent circumferential TIG weld.
  - b. Design for pressure testing to 1.5 times their maximum rated working pressure and a minimum 4:1 (burst to working) safety factor.

- c. Individually leak tested by the manufacturer using air-under-water or hydrostatic pressure.
  - d. In fire protection systems provide pipe loop that is Factory Mutual tested and approved for use in fire protection piping systems. Sizes 2 inches to 3 inches ID shall be FM Approved for 300 psi (2.1 MPa) working pressure at ambient temperature, and sizes 4 inches to 12 inches ID shall be FM Approved for 175 psi (1.2 MPa) working pressure at ambient temperature.
4. Warranty: Provide a 3-year product warranty when installed in accordance with all specifications and installation instructions as described in the Anvil Star Tri-Flex Loop Installation and Maintenance Instructions.
5. Refer to Anvil's Seismic Expansion Loop Sizing program at [www.anvilintl.com/Product/TriFlexLoop.aspx](http://www.anvilintl.com/Product/TriFlexLoop.aspx) to design the seismic loop.

### 8.3 SPRINKLER HEADS

- A. Manufacturer:
  - 1. Viking, Central, Reliable or equal.
  - 2. Type: Refer to schedule on drawings for head type required for different building areas.

### 8.4 PIPING

- A. Steel Piping:
  - 1. Steel pipe for fire sprinkler systems shall conform to the applicable requirements of NFPA 13, ASTM A 53, ASTM A 135 or ASTM A795.
- B. Copper Piping:
  - 1. Refer to Section 23 05 00 - Common Work Results for HVAC. Installation shall be in accordance with NFPA 13.

### 8.5 ACCESS PANELS

- A. Provide access panels as required by Section 08 31 16 - Access Panels and Frames.

### 8.6 FIRESTOPPING MATERIALS

- A. Provide fire stopping assemblies as required by Section 07 84 13 - Penetration Firestopping Mortars.

### 8.7 EQUIPMENT SUPPORTS

- A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05 12 16 - Fabricated Fireproofed Steel Columns.

### 8.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- A. Provide templates to ensure accurate location of anchor bolts.

## PART 9 EXECUTION

### 9.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Contractor shall verify and obtain fire flow test data required for design.

### 9.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.
- D. Provide sleeves for piping penetrating floor and masonry walls.
- E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.
- F. All patching shall match adjacent surfaces.
- G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.
- H. Openings through existing concrete shall be core-drilled or saw cut.

### 9.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide access panels for access to equipment, valves, or other specialties installed behind wall or above ceiling surfaces.
- C. Lay-in acoustical tee bar ceilings and snap-in removable metal pan ceilings shall be considered adequate for access.
- D. Fire Protection Contractor shall sublet installation work to subcontractors specifically skilled in the construction of the

surfaces involved.

- E. Contractor shall confer with the other Project Contractors with respect to access panel locations and shall, wherever practicable, group devices in such a manner so as to eliminate as many panels as possible.
- F. Contractor shall remove all markings and labels from access panels.
- G. Cutting or drilling thru structural beams or joists is not permitted.
- H. Provide all openings and set all sleeves in cooperation with Contractors whose work is affected thereby.
- I. Caulk opening between pipe and sleeve with fire barrier sealant.
- J. In event holes must be provided through reinforced concrete, they shall be carefully drilled so as to avoid spalling and unnecessary damage of weakening of any structural member; chopping or breaking out will not be permitted.
- K. Obtain Architect's approval before providing openings through concrete or masonry in place and then proceed as directed.
- L. Contractor shall be responsible for damage to finished work resulting from cutting or drilling required because of neglect of Contractor to provide accurate and sufficient information.
- M. Penetrations through fire and/or smoke rated construction shall be sealed to maintain the rating of the construction in which they occur.
- N. Comply with the manufacturer's requirements for proper installation of fire stop materials to obtain the required fire and/or smoke rating.

#### 9.4 COMPENSATION LOOPS

- A. Compensation loops shall be prepared for shipment using a cut-to-length metal shipping bar, tacked securely between the elbows of the two parallel legs, to maintain the manufactured length during shipping. Shipping bar must be removed prior to system start-up.
- B. Compensation loop hanger assembly kit shall be used to support and hang the loop. The FM Approved and UL Listed Seismic Wire/Cable assemblies conform to the requirements of the ASCE (American Society of Civil Engineers) guidelines for structural applications of wire rope, in that the cable is pre-stretched and the permanent end fittings maintain the break strength of the cable with a safety factor of two.

#### 9.5 SPRINKLER HEADS

- A. Locate sprinkler heads, main piping and valves as indicated on the drawings.
- B. Install sprinkler heads to coordinate with all lights, grilles and any other obstructions in ceiling.
- C. Center sprinkler heads in ceiling tile and provide piping offsets as required.
- D. Where ceiling is to be painted or sprayed, apply paper cover over sprinkler heads to ensure the head and escutcheons do not get coated. Remove protective paper cover after painting or spraying is completed.
- E. Provide mountable metal box of spare heads with proper wrench for head replacement.

#### 9.6 TESTS AND INSPECTIONS

- A. Contractor shall be responsible for testing and certification of systems and ordering inspections as required by authorities having jurisdiction.
- B. All tests shall be conducted in the presence of and to the satisfaction of the Owner or an authorized representative.
- C. Inspections shall be made by the Owner's authorized representative and inspectors having jurisdiction.

#### 9.7 PROTECTION

- A. After all tests have been made and the systems pronounced to be satisfactory, the Contractor shall go over all work and clean equipment, fixtures, and related appurtenances and piping, and leave them clean and in complete working order at final completion of the project.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION