

DIVISION 21 - FIRE SUPPRESSION
SECTION 21 05 00
COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 2 PRODUCTS

1.01 GENERAL REQUIREMENTS

- A. Welding Materials and Procedures: Comply with ASME BPVC-IX.
- B. Provide system pipes, fittings, sleeves, escutcheons, seals, and other related accessories.

SECTION 21 11 00
FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data:
1. Include data on pipe materials, pipe fittings, valves, and accessories.
 2. Indicate valve data and ratings.
 3. Show grooved joint couplings, fittings, valves, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.
- B. Field Quality Control Submittals: Testing activities.
- C. Project Record Documents:
1. Record actual locations of piping mains, valves, connections, fire hydrants, free-standing fire department connections, underground manholes and vaults, valve boxes, thrust restraints, and invert elevations.
 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.02 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 WATER PIPE

- A. Galvanized Steel Pipe: ASTM A53/A53M, Grade B, Type F. Provide standard weight, zinc-coated, and listed piping.
1. Fittings: Comply with ASME B16.3 Class 150, zinc-coated, threaded or ASME B16.4 Class 125, zinc-coated.
 2. Mechanically Factory Applied Protective Materials:
 - a. Clean by wire brushing and solvent cleaning.
 - b. Apply one coat of coal-tar primer and two coats of coal-tar enamel complying with AWWA C203.
 - c. Protect threaded pipe ends and fittings prior to coating.
- B. Ductile Iron Pipe: Listed, AWWA C151/A21.51.
1. Fittings: AWWA C110/A21.10, ductile iron, standard thickness.
 2. Joints: AWWA C111/A21.11, styrene-butadiene rubber (SBR) or vulcanized SBR rubber gasket with 3/4 inch diameter rods.

2.02 VALVES

- A. General:
1. Manufacturer's name and pressure rating marked on valve body.
 2. Minimum Compliance: UL (DIR) listed and labeled.
 3. Maximum Inlet Pressure: 400 psi.
 4. Maximum Service Temperature: 180 degrees F.
 5. Valve Coatings:
 - a. Internally: 4 mils, 0.004 inch epoxy, minimum.
 - b. Externally: Epoxy base then fire red enamel paint or heat-fused red epoxy paint.
- B. Corporation Stop (Cock) and Saddle:
1. Up to and Including 2 inch NPS:
 - a. Ground key type, bronze body, ASTM B61 or ASTM B62, suitable for working pressure of system.
- C. Curb (Service) Stop:
1. Up to and Including 1-1/2 inch NPS:
 - a. Ground key, round way, inverted key type, bronze body, ASTM B61 or ASTM B62, suitable for working pressure of system.
 - b. Ends: Appropriate for connection to the service piping.
 - c. Arrow cast into body of the curb (service) stop indicating flow direction.
 2. Service Box:
 - 1) Cast-iron extension box with slide- or screw-type adjustment, including flared base.
 - 2) Adapted, without full extension, to depth of cover required over pipe at location of stop.
 - 3) Cast the word "WATER" in cover and position cover flush with finished grade.
 - 4) Shut-off rod to extend 2 feet above top of deepest stop box.
- D. Detector Check with Water Meter:
1. 4 inch NPS to 10 inch NPS:
 - a. Description: Check valve, water meter, by-pass piping, and isolation valves designed to measure both low flow and high water volume usage.
 - 1) Valve Body: Comprised of epoxy coated stainless steel, ductile iron, or cast iron.
 - 2) Valve Ends: Flanged.
- E. Level Control Valves:
1. Size: 1/2 inch NPS to 8 inch NPS, threaded ends.
 2. Type: Full port globe level control valve operated by pilot-interfaced 2-position, non-modulating float.
 3. Construction:
 - a. Body: ASTM A536, ductile iron Grade 65-45-12.
 - b. Main Valve Seat Ring: ASTM B62, bronze.
 - c. Stem: Stainless steel.
 - d. Elastomers Diaphragms, Resilient Seats, and O-rings: Buna-N.
 - e. Pilot Control System: ASTM B62, bronze with stainless steel trim.
- F. Deluge Valves:
1. Size: 3 inch NPS to 8 inch NPS, Class 150 flange ends.
 2. Type: Globe valve remotely activated using electric solenoid control valve and manual emergency override.
 3. Construction:
 - a. Body: ASTM A536, ductile iron Grade 65-45-12.
 - b. Main Valve Seat Ring: ASTM B62, bronze.
 - c. Stem: Stainless steel.
 - d. Elastomers Diaphragms, Resilient Seats, and O-rings: Buna-N.
 - e. Pilot Control System: ASTM B62, bronze with stainless steel trim.
- G. Pressure Relief Valves:
- H. Pressure Reducing Valves:
1. Type: Globe valve, self-controlled using external pilot control assembly.
 2. Construction:
 - a. Body: ASTM A536, ductile iron Grade 65-45-12.
 - b. Main Valve Seat Ring: ASTM B61, bronze.
 - c. Stem: Stainless steel.
 - d. Elastomer Diaphragms, Resilient Seats, and O-rings: Buna-N.
 - e. Pilot Control System: ASTM B61, bronze with stainless steel trim.
 3. Pilot Operated Pressure Reducing Control Valves:
 - a. Size: 2-1/2 inch, NPS, flanged or grooved end-connections.
 - b. Type: Field adjustable in-line valve rated for 400 psi inlet pressure with outlet discharge field-set to system pressure.
 - c. Construction:
 - 1) Body: ASTM A536, ductile iron, grade 65-45-12.
 - 2) Internal Ferrous Materials: Coated with 4 mils, 0.004 inch of epoxy.
 - 3) External Surface Coating: 4 mils, 0.004 inch of epoxy and fire red enamel.
 - 4) Main Valve Seat Ring: ASTM B61, bronze.
 - 5) Stem: Stainless Steel.
 - 6) Elastomers for Diaphragms, Resilient Seats, and O-rings: Buna-N.
 - 7) Pilot Control: ASTM B61, bronze with stainless steel trim and pressure gages.
 4. In-line or Angle Hose Valves:
 - a. Cast bronze, 2-1/2 inch, NPS handwheel operated globe valve with grooved or threaded end connections, rated for 400 psi inlet pressure with outlet discharge field-set to hose inlet pressure.
 5. In-line or Angle Floor Control Valves:
 - a. Cast bronze, 2-1/2 inch, NPS handwheel operated globe valve with grooved or threaded end connections, rated for 400 psi maximum inlet pressure with outlet discharge field-set to system inlet pressure. Provide integral normally-open supervisory switch, cap, and chain .

- I. Gravity (Swing) Check Valve, Flanged End:
1. 2-1/2 inch NPS to 10 inch NPS:
 - a. Construction:
 - 1) Body: Cast iron complying with ASTM A126, Class B.
 - 2) Disc: ASTM A126 cast iron, ASTM A536 ductile iron, or ASTM B584 cast brass.
 - 3) Replaceable seats and discs.
 - 4) Maximum Working Pressure: 175 psi.
- J. Gravity (Swing) Check Valve, Grooved End:
1. 2-1/2 inch NPS to 6 inch NPS:
 - a. Construction:
 - 1) Body: ASTM A48/A48M gray iron, ASTM A126 cast iron, or ASTM A536 cast iron.
 - 2) Coatings (as applicable): Rust inhibiting orange enamel paint on exterior and interior surfaces.
 - 3) Clapper:
 - (a) Material: Constructed of stainless steel or ductile iron.
 - (b) Facing: EPDM.
 - 4) Seat: Constructed of stainless steel, brass, or bronze.
 - 5) Spring: Stainless steel.
 - 6) Hinge Pin: Stainless steel.
 - 7) Maximum Working Pressure: 250 psi.
- K. Detector Check Valve, Flanged End:
1. 4 inch NPS to 10 inch NPS:
 - a. Construction:
 - 1) Body: Constructed of heavy steel, 300 series stainless steel, or ASTM A536 ductile iron to AWWA C550, as applicable.
 - 2) Coating: Fusion bonded epoxy in accordance with AWWA C550.
 - 3) Spring and Linkage: Stainless steel.
 - 4) Removable Clapper Seat Ring: Bronze.
 - 5) Seat: ASTM B63 bronze.
 - 6) Maximum Working Pressure: 175 psi.
- L. Double Check Detector Valve Assembly, Flanged End:
1. 2-1/2 inch NPS to 10 inch NPS:
 - a. Construction:
 - 1) Body: 300 Series stainless steel or ASTM A536 Grade 65-45-12 ductile iron.
 - 2) Two independently operating, spring-loaded, check valves.
 - 3) Two OSY resilient seated gate valves.
 - 4) Bypass Assembly:
 - (a) Bypass Line: Hydraulically sized to accurately measure low flow.
 - (b) Double check including shut-off valves, and required cocks.
 - (c) Meter with ____ gal readout.
 - 5) Cam-Check:
 - (a) Internally loaded, providing positive, drip-tight closure against reverse flow.
 - (b) Stainless steel cam arm and spring, rubber-faced disc, and replaceable, thermoplastic seat.
 - 6) Valve Cover:
 - (a) Provides access to all internal parts.
 - (b) Held in place through the use of a single grooved style two-bolt coupling.
- M. Reduced-Pressure Zone (RPZ) Device, Flanged End:
1. 2-1/2 inch NPS to 10 inch NPS:
 - a. Construction:
 - 1) Main Valve Body: ASTM A536 Grade 65-45-12 ductile iron, 300 Series stainless steel, or 304 Series stainless steel.
 - 2) Relief Valve Body: ASTM A536 Grade 65-45-12 ductile iron, 300 Series stainless steel, or 304 Series stainless steel.
 - 3) Coating (As Applicable): Fusion epoxy internal and external, AWWA C550.
 - 4) Shutoff Valves: NRS resilient wedge gate valve, AWWA C509.
 - 5) Check Seats: Stainless steel.
 - 6) Disc Holder: Stainless steel.
 - 7) Elastomer Disc: Silicone, PPE/polystyrene, EPDM, or Buna-N.
 - 8) Spring: Stainless steel.
 - 9) Inlet/Outlet Flow:
 - (1) Inlet:
 - (i) Orientation: Horizontal.
 - (2) Flow Direction: Up.
 - (b) Outlet:
 - (i) Orientation: Vertical.
 - (2) Flow Direction: Horizontal.
- N. Atmospheric Vacuum Breaker, Threaded End:
1. 1 inch NPS to 2 inch NPS:
 - a. Construction:
 - 1) Valve Body and Cover: ASTM A126 Class B cast iron or ASTM A536 65-45-12 ductile iron
 - 2) Float, Guide Shafts, and Bushings: Fabricate with Type 316 stainless steel or polymer based materials.

2.03 FIRE DEPARTMENT CONNECTIONS:

- A. Free-Standing Inlet:
1. Construction:
 - a. Type: Free standing type, ASTM B584 poured brass alloy.
 - b. Inlets: Two-way, 2-1/2 inch NPS female inlets, thread size compatible with fire department hardware.
 - c. Rated Working Pressure: 175 psi.
 - d. Double clapper-valves, rocker-lug caps and chain, and cast-in function-identifying lettering.
 - e. Finish: Polished brass.
 - f. Label: Sprinkler - Fire Department Connection.

2.04 POLYETHYLENE JACKETING (ENCASEMENT)

- A. Comply with AWWA C105/A21.5 or ASTM A674.
- B. Jackets: Double layer, half lapped, 10 mil polyethylene tape.
- C. Type: Provide tubular based on the application.
- D. Color: Manufacturer's standard color.

2.05 ACCESSORIES

- A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.
- B. Water Valve Boxes:
1. Construction:
 - a. ASTM A48/A48M, Type A, cast-iron, slide-type or screw-type boxes.
 - b. Designed to minimize stress on water valve imposed by loads on box lid.
 - c. Letter "W" casted into lid, 1/2 inch in height, raised 3/32 inch.
 - d. Material: Uncoated cast iron.
- C. Supervisory Switches: See Section 21 13 00 for waterflow and supervisory switches.
- D. Tracer Wire:
1. Provide magnetic, detectable conductor with clear plastic covering and imprinted with "Water Service" in large letters.
 2. Conductor to be of sufficient length to be continuous over each separate run of nonmetallic pipe.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General Requirements:
1. Location of Water Lines:
 - a. Do not install water line closer horizontally than 10 feet from any sewer line.
 - b. Water Piping Crossing Sewer Piping:
 - 1) Crossing Under:
 - (a) Where water lines cross under gravity sewer lines, encase sewer line fully in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber gasketed joints and no joint is located within 3 feet horizontally of the crossing.
 - 2) Crossing Over:
 - (a) Provide a separation of at least 18 inches between the bottom of the water piping and the top of the sewer piping.
 - c. Do not install water lines in the same trench with gas lines, fuel lines, or electric wiring.
 - d. Do not install copper tubing in the same trench with ferrous piping materials.
 2. Sleeving:
 - a. Sleeve water piping where piping is required to be installed within 3 feet of existing structures.
 - b. Provide ductile iron or Schedule 40 steel sleeves.
 - c. Fill annular space between pipe and sleeves with mastic.

- d. Install water pipe and sleeve without damaging structures or causing settlement or movement of foundations or footings.
3. Pipe Laying and Jointing:
- a. Remove fins and burrs from pipe and fittings.
 - b. Prior to placing in position, clean pipe, fittings, valves, and accessories, and maintain in clean condition.
 - c. Dropping or dumping of piping, fittings, valves, or any other water line material into trenches is not permitted.
 - d. Cut pipe in a neat, workmanlike manner accurately to length established at the site and work into place without forcing or springing.
 - e. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material.
 - f. Wedging or blocking between bells and spigots will not be permitted.
 - g. Install bell-and-spigot pipe with the bell end pointing in the direction of laying.
 - h. Grade the pipeline in straight lines avoiding the formation of dips and low points.
 - i. Support piping at proper elevation and grade.
 - j. Secure firm, uniform support.
 - k. Wood support blocking will not be permitted.
 - l. Install pipe so that the full length of each pipe section and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings.
 - m. Provide anchors and supports where indicated and necessary for fastening work into place.
 - n. Provide proper provisions for expansion and contraction of pipelines.
 - o. Keep trenches free of water until joints have been properly made.
 - p. Close open ends of piping temporarily with wood blocks or bulkheads at the end of each workday.
 - q. Do not install pipe during unacceptable trench conditions or inclement weather.
 - r. Minimum Depth of Pipe Cover: Not less than 2-1/2 feet.
4. Tracer Wire:
- a. Install continuous length of tracer wire for the full length of each run of nonmetallic pipe.
 - b. Attach wire to top of pipe securely to prevent displacement during installation.
5. Connections to Existing Water Lines:
- a. Ensure minimal interruption of service on the existing line.
 - b. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.
6. Penetrations:
- a. Provide ductile-iron or Schedule 40 steel for pipes passing through walls of valve pits and structures.
 - b. Fill annular space between sleeves and walls with rich cement mortar.
 - c. Fill annular space between pipe and sleeves with mastic.
7. Flanged Pipe: Install only above grade or with the flanges in valve pits.

B. Special Requirements:

1. Ductile Iron Piping:
 - a. Unless otherwise specified, install pipe and fittings in accordance with paragraph "General Requirements".
 - b. Jointing:
 - 1) Make flanged joints with the gaskets, bolts, and nuts specified for this type joint.
 - (a) Make flanged joints up tight; avoid undue strain on flanges, fittings, valves, and other accessories and equipment.
 - (b) Use full size bolts for the bolt holes; use of undersized bolts to make up for misalignment of bolt holes or for any other purpose will not be permitted.
 - (c) Do not allow adjoining flange faces to be out of parallel to such a degree that the flanged joint cannot be made watertight without over-straining the flange.
 - (d) When flanged pipe or fitting has dimensions that do not allow the making of a proper flanged joint as specified, replace it by one of proper dimensions.
 - (e) Use set-screwed flanges to make flanged joints where conditions prevent the use of full length, flanged pipe and assemble in accordance with the recommendations of the set-screwed flange manufacturer.
 - 2) Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer.
 - 3) Make grooved and shouldered type joints with the couplings previously specified for this type joint connecting pipe with the grooved or shouldered ends specified for this type joint; assemble in accordance with the recommendations of the coupling manufacturer.
 - (a) Groove pipe in the field only with approved grooved cutting equipment designed especially for the purpose and produced by a manufacturer of grooved joint couplings; secure approval for field-cut grooves before assembling the joint.
 - c. Allowable Deflection:
 - 1) Maximum Allowable Deflection: As stated in AWWA C600.
 - 2) If the alignment requires deflection in excess of the above limitations, furnish special blends or a sufficient number of shorter pipe lengths to provide angular deflections within the limit set forth.
 - d. Pipe Anchorage:
 - 1) Provide concrete thrust blocks (reaction backing), for pipe anchorage except where metal harness is indicated.
 - 2) Thrust blocks to comply with the requirements of AWWA C600 for thrust restraint, except that size and positioning of thrust blocks to be as indicated.
 - 3) Use concrete, ASTM C94/C94M, having a minimum compressive strength of 2,500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2-1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.
 - 4) Provide metal harness in accordance with the requirements of AWWA C600 for thrust restraint, using tie rods and clamps as indicated in NFPA 13, except as otherwise indicated.
 - e. Exterior Protection: Completely encase buried ductile iron pipelines with polyethylene tube or sheet, using Class A polyethylene film, in accordance with AWWA C105/A21.5.
2. Steel Piping:
- a. Jointing:
 - 1) Welded: Make welded joints in accordance with AWWA C206 and install in accordance with AWWA M11.
 - 2) Flanged:
 - (a) Make flanged joints up tight; avoid undue strain on flanges, fittings, valves, and other equipment and accessories.
 - (b) Use full-size bolts for the bolt holes; use of undersized bolts due to misalignment of bolt holes or for any other purpose will not be allowed.
 - (c) Do not allow adjoining flange faces to be out of parallel to such a degree that the flanged joint cannot be made water-tight without straining the flange.
 - (d) When flanged pipe or fitting has dimensions that do not allow the making of a proper flanged joint as specified, replace it with one of correct dimensions.
 - 3) Grooved:
 - (a) Make grooved type joints with the couplings specified for this type joint connecting pipe with roll-grooved ends or pipe with welded-on cut-grooved adapters, each with dimensions as previously specified for this type of joint.
 - (b) Groove pipe ends in the field only with approved groove rolling equipment and groove adapters in the field only with approved groove cutting equipment; use only groove rolling and groove cutting equipment designed especially for the purpose and produced by a manufacturer of grooved joint couplings.
 - (c) Obtain approval for field-cut grooves prior to assembling the joint.
 - b. Allowable Offsets:
 - 1) For pipe with bell-and-spigot rubber-gasket joints, 5 degrees maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets; unless a lesser amount is recommended by the manufacturer.
 - 2) Form short-radius curves and closures by short lengths of pipe or fabricated specials specified.
 - c. Pipe Anchorage:
 - 1) Provide concrete thrust blocks (reaction backing) for pipe anchorage, except where metal harness is indicated.
 - 2) Thrust blocks to be in accordance with the recommendations for thrust restraint in AWWA M11, except that size and positioning of thrust blocks are to be as indicated.
 - 3) Use ASTM C94/C94M concrete having a minimum compressive strength of 2500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2-1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.
 - 4) Metal Harness:
 - (a) Provide in accordance with the recommendations for joint harnesses in AWWA M11, except as otherwise indicated.
 - (b) Fabricated by the pipe manufacturer and furnished with the pipe.

C. Valves:

1. Set valves on solid bedding.
2. Center and plumb valve box over valve.
3. Set box cover flush with finished grade.

D. Free-Standing Fire Department Connections:

1. Install in accordance with NFPA 13 and the Local Authority Having Jurisdiction.
2. Fire Department Connection to Main: Install ball drip valves at each check valve.

E. Outdoor Enclosures:

1. Insulated with Electric Heat Source:
 - a. Install in accordance with manufacturer's recommendations.
 - b. Anchor enclosure to flat, concrete base.
 - c. Concrete Base Height: 2 inches.
 - d. Connect drain connection where required and route to suitable termination point.

3.02 SERVICE CONNECTIONS

- A. Provide fire water service to Local Authority Having Jurisdiction requirements with reduced pressure backflow preventer and water meter with by-pass valves and sand strainer.
- B. Provide 18 gauge, 0.0478 inch galvanized sheet metal sleeve surrounding service main to 6 inches above floor and 6 feet minimum below grade. Size for 2 inches minimum of glass fiber insulation stuffing.



FOR PERMIT &
CONSTRUCTION

Revision Schedule	
Rev. #	Description
Date	

NEW Arcare Medical Office Building 2709 Massard Rd FT. SMITH, AR 72903	Arcare 117 S. 2ND ST. AUGUSTA, AR 72006
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DATE 06-15-2026	DRAWN BY CO
PROJECT # 2517	CHECKED BY JT

SHEET F001 FIRE PROTECTION SPECIFICATIONS

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