SECTION 220000

PLUMBING

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 2 Specification with primarily editable text; therefore, most of the text can be edited, but there is some required text which is noted within the Section with a “Note to Specifier.” Do not revise these paragraphs without an approved Deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
   1. SUMMARY
      1. Sanitary drainage and vent piping.
      2. Storm drainage piping.
      3. Domestic water service and distribution.
      4. Natural gas service and distribution.
      5. Compressed air system and distribution.
      6. Plumbing fixtures and trim, fittings and accessories, appurtenances, fasteners, and associated supports.
      7. Plumbing specialties associated with sanitary, storm, domestic water, air, and natural gas systems.
      8. Fire sprinkler piping.
   2. SUBMITTALS
      1. Product Data: Required.
      2. Shop Drawings: Required.
   3. QUALITY ASSURANCE
      1. Approval stamp label or other marking on piping made to standards.
      2. Comply with ASME B31.9, “Building Services Piping”, for materials, products, and installation.
      3. Comply with NSF 61, “Drinking Water System Components – Health Effects”, for potable water piping and components.
   4. APPROVALS
      1. Local authority review and approval:
         1. Plumbing plans.
         2. Riser diagrams and details.
         3. Specifications.
2. PRODUCTS
   1. Piping
      1. Piping systems shall be constructed of the following materials as scheduled below, subject to approval by authorities having jurisdiction.

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**NOTE TO SPECIFIER**

**REQUIRED**: Do not revise the chart below without an approved deviation; however, items may be removed to comply with local code requirements or for building requirements for MPF Repair & Alteration or Expansion projects; verify with the facility.

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| **SYSTEMS** | **PIPE** | **FITTINGS** | **REMARKS** | |
| --- | --- | --- | --- | --- |
| Site sanitary drain (from 5 feet beyond building) | ASTM D2665 solid wall Polyvinylchloride (PVC) socket type, SDR-35 | ASTM D3311 PVC, SDR-35 socket type fittings and solvent-cemented joints. |  | |
| Soil, waste, vent & storm drainage piping, underground in building to 5 feet outside of building | Service weight cast iron, bell and spigot | Cast iron bell and spigot with compression gaskets |  | |
| ASTM D2665 solid wall PVC socket type, SDR-35 | ASTM D3311 PVC, SDR-35 socket type fittings and solvent-cemented joints. | PVC allowed only where allowed by local codes. | |
| Soil, waste, vent & storm drainage piping, above ground | Service weight cast iron, bell and spigot | Cast iron recessed drainage fittings with compression gaskets |  | | |
| Service weight cast iron, no-hub | Cast iron recessed drainage fittings with elastomeric gasket and stainless-steel clamps | Not permitted for storm piping larger than 8 inches. | | |
| Copper drainage tube, type DWV | Cast brass recessed drainage fittings, with solder joints | Use soil pipe adapter for any connection to cast iron pipes at ground level | | |
| Schedule 40 galvanized steel pipe, screwed ends | Galvanized cast iron recessed drainage fittings for waste piping; galvanized malleable iron fittings for vent piping | Permitted for use on pipes 1-1/2 inches and smaller only | | |
| Schedule 40 galvanized steel pipe cut grooved with galvanized fittings and couplings | Galvanized grooved drainage pattern fittings. | Permitted for storm piping larger than 8 inches. Couplings shall be galvanized when used with galvanized piping. All grooves cut in galvanized piping shall be properly cleaned and primed with zinc chromate. | | |
| Polyvinylchloride (PVC) bell and spigot, SDR-35 | ASTM D3311 PVC, SDR-35 socket type fittings and solvent-cemented joints. | PVC allowed only where allowed by local codes. | | |
| Acid waste & vent piping | Polypropylene flame retardant | Electric fusion coils, polypropylene coated |  | | |
| Cold water piping, underground, 2-1/2 inches and smaller | Type K soft drawn copper tubing, with 95-5 in antimony or 96-4 tin silver | Wrought copper fittings, solder joint | Fitting pressure rating as per ANSI B16.18, B16.22 | | |
| Site domestic water and fire water | Ductile Iron, Class 52, line inside of pipe and fittings with double thickness cement with seal coat. | Mechanical or push-on |  | | |
| PVC, C-900 Class 200 | Ductile Iron, cement lined with seal coat mechanical joint | May be used if acceptable to Local Authorities (Water Company and Fire Marshal) | | |
| Interior building or above ground domestic water systems, 4 inches and smaller (cold, hot & hot water systems) | Type L hard drawn copper tubing with 95-5 tin antimony solder joints | Cast bronze or wrought copper with solder joints | Fitting pressure rating as per ANSI B16.22, B16.18, 125 lb. steam and 300 lb. steam | | |
| Interior building or above ground domestic water piping, larger than 4 inches | Type L hard drawn copper tubing with 95-5 tin antimony solder joints | Soldered or cast bronze flanged fittings | Class 150, ANSI B16.24 flange |
| Schedule 40 galvanized steel pipe, threaded | Galvanized malleable iron, screwed | Fitting pressure rating: 150 lb. steam |
|  | Galvanized ductile iron, screwed or flanged | Fitting pressure rating: 125 and 300 lb. steam (screwed), 150 lb. (flanged) |
| Schedule 40 galvanized steel pipe cut grooved | Victaulic style 75 or 77 galvanized and couplings. | Fitting pressure rating 500 WWP |
| Exposed final connections to fixtures | Chromium plated brass | Chromium plated brass | Fitting pressure rating: 125 lb. steam |
| Natural gas piping below grade | Schedule 40 black steel pipe | Welded steel fittings | Pipe coating and anodes in accordance with gas company requirements. Welding to be performed by a certified welder |
| Thermoplastic gas pressure pipe | Mechanical fittings | Pipe and fitting manufacturer must be approved by gas co. |
| Relief valve discharge piping for water systems | Type L hard drawn copper tubing with 95-5 tin antimony solder joints | Cast bronze or wrought copper with solder joints, or compression fittings |  |
| Compressed air system, piping 2 inches and smaller | Type L hard drawn copper tubing with 95-5 tin antimony solder joints | Cast bronze or wrought copper with solder joints, or compression fittings | Provide dielectric unions for ferrous to non-ferrous pipe connections | | | |
| Schedule 40 black steel pipe | Screwed malleable iron fittings, or compression fittings |  | | | |
| Compressed air system, piping 2-1/2 inch and larger | Schedule 40 black steel pipe | Welded steel fittings or threaded fittings | Provide dielectric unions for ferrous to non-ferrous pipe connections | | | |
| Fire protection piping above ground inside building | Schedule 40 black steel pipe | Screwed cast iron or grooved malleable iron | Schedule 10 pipe with rolled grooved fittings and couplings may be used for piping 2-1/2 inches & larger | | | |
| Natural gas piping above ground outside building | Schedule 40 black steel pipe | Screwed malleable iron for fittings 2 inches and smaller, welded steel for fittings larger than 2 inches | Pipe painting and support in accordance with gas company requirements. Welding to be performed by a certified welder | | | |
| Natural gas piping inside building | Schedule 40 black steel pipe | Screwed malleable iron for fittings 2 inches and smaller, welded steel for fittings larger than 2 inches | Pipe painting and support in accordance with gas company requirements. Welding to be performed by a certified welder. Sleeve and vent for gas pipe in ceiling space and riser per gas company requirements | | | |

* 1. Valves
     1. Domestic Water System Isolation Valves:
        1. 2 inches and smaller shall be 150 lb. WOG, two-piece ball valves with bronze body, brass ball and trim with Teflon seats and seals, solder ends.
        2. 2-1/2 inches shall be class 125 bronze gate valves with rising stem, solder ends.
        3. 3 inches and larger shall be class 125 iron body bronze mounted O. S & Y rising stem with flanged ends.
     2. Natural Gas:
        1. 2 inches and smaller shall be 300 lb. plug valves with ductile iron body and plug, non-lubricated, TFE sleeve and diaphragm, bolted bonnet, threaded ends, with hand operated lever.
        2. 2-1/2 inch and larger shall be 150 lb. plug valves with ductile iron body and plug, non-lubricated, TFE sleeve and diaphragm, bolted bonnet, raised face flanged ends with hand operated lever for sizes through 3 inches and enclosed worm gear operator for sizes 4 inches and larger.
     3. Compressed Air System Isolation Valves:
        1. 2 inches and smaller shall be 150 lb. WOG, two-piece ball valves with latch lock, bronze body, brass ball and trim with Teflon seats and seals, solder ends.
        2. 2-1/2 inch and larger shall be 150 lb. ball valves with carbon steel body, 316 stainless steel ball and stem, blow-out proof stem, reinforced TFE seats, TFE seals, lever operated, raised face flanged ends.
  2. Specialties
     1. Roof Drains: Lacquered cast iron body with sump, removable metal dome strainer, membrane flange and membrane clamp with integral gravel stop, adjustable underdeck clamp, waterproofing flange, levelling frame, adjustable extension sleeve, perforated or slotted ballast guard extension. Overflow roof drains shall additionally have 2-inch high solid clamping collar.
     2. Floor Drains: Lacquered cast-iron two-piece body with double drainage flange, weep holes, and round, adjustable nickel-bronze strainer. Provide acid resistant floor drains in Battery Room and any other rooms containing acidic chemicals.
     3. Cleanout: Lacquered cast iron, two-piece body with round scoriated cover in service areas and round cover, depressed to accept floor finish in finished floor areas.
     4. Water Hammer Arrester: PDI WH-201, precharged.
     5. Hose Bibbs:
        1. Bronze or brass, hose thread spout, chrome plated with vacuum breaker.
     6. Hydrants:
        1. Wall hydrants: Non-freeze, recessed, lockable, stainless steel box type with concealed hose connection.
        2. Post Hydrant: Non-freeze, automatic draining, backflow preventer, 3/4-inch hose nozzle, pipe casing and valve seat.
     7. Backflow Preventers:
        1. Reduced Pressure Backflow Preventers: ASSE 1013; bronze body; assembled with two gate valves, strainer, and four test cocks.
  3. Plumbing Fixtures
     1. General
        1. Water closets, urinals, flush valves, and faucets must bear WaterSense label.
        2. Water closets, urinals, flush valves, and faucets manufactures must be a WaterSense partner with US EPA.
     2. Flush Valve Water Closet:
        1. Bowl: Floor mounted vitreous China closet, siphon jet, 1.28 GPF, with elongated rim.
        2. Flush Valve: Exposed chrome plated, diaphragm type, manually operated, integral screwdriver stop, vacuum breaker.
        3. Seat: Solid molded white plastic, open front, self-sustaining stainless-steel hinge.
        4. Foot supported carrier for wall mounting water closet.
        5. ADA/U.S.P.S. Handbook RE-4 compliant where indicated.
     3. Urinal:
        1. Urinal: Vitreous China with shields, siphon jet, 0.5 GPF, integral trap, stainless steel strainer, steel supporting hanger.
        2. Flush Valve: Exposed chrome plated, diaphragm type, manually operated, integral screwdriver stop, vacuum breaker.
        3. Wall hung.
        4. ADA/U.S.P.S. Handbook RE-4 compliant where indicated.
     4. Lavatory:
        1. Basin: Vitreous China 20 x 18 minimum, with concealed arm carrier.
        2. Trim: Chrome plated supply fitting with open grid strainer, water economy vandal-resistant aerator, all brass body.
        3. Faucet: Single lever faucet with aerator with 0.5 GPM flow restrictor.
        4. Wall mounted.
        5. ADA/U.S.P.S. Handbook RE-4 compliant, where indicated, with trap and wall supply guard.
     5. Counter Sink:
        1. Bowl: Single compartment 25 x 22 x 8 inch outside dimensions, Type 302 stainless steel, 3-½ inch crumb cup and chromed brass drain, drilled ledge back.
        2. Trim: Chrome plated supply fitting with 8-inch spout, water economy vandal-resistant aerator, lever handles.
     6. Electric Water Cooler:
        1. Cooler: Bi-level handicap wall mounted ADA/U.S.P.S. Handbook RE-4 compliant cooler, lead-free, with stainless steel top, vinyl on steel body, bubbler, stream regulator, mounting bracket.
        2. Capacity: 8.0 gph of 50-degree F water with inlet at 80-degree F and room temperature of 90-degree F.
        3. Refrigerant shall be R-134a.
     7. Mop Basin:
        1. Receptor: 36 x 24 x 12-inch precast terrazzo, floor mounted.
        2. Trim: Exposed wall type supply with lever handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with caps and adjustable wall flanges, 30 inches of ¾ inch diameter plain end reinforced rubber hose, hose clamp, mop hanger.
        3. Drain: 3-inch cast iron “P” trap with strainer and cleanout.
     8. Service Sink:
        1. Sink: Enameled cast iron, 22 x 18-inches, plain back, rim guard, wall hanger.
        2. Trim: Service sink faucet, vacuum breaker, adjustable wall brace, pail hook, integral stops, 3/4-inch hose thread on spout.
     9. Emergency Shower Eyewash:
        1. Combination drench shower and eye/face wash unit meeting ANSI Standards and OSHA rules and regulations including emergency sign.
        2. Shower head: ABS green plastic shower head, instant action, stay open.
        3. Eye/face wash: Stainless steel receptor, floor mounted with twin feather flow chrome plated brass heads, push flag operated, stay open, manually closed.
        4. Supply: Tempered water thru thermostatic mixing valve.
     10. Disposer:
         1. Shock absorbing mounting, all stainless-steel cutting action, replaceable hammers and rind kicker, two-position stopper, lifetime lubrication, overload protection, 115 VAC, 5 year warranty.
     11. Thermostatic Mixing Valves:
         1. Cabinet mounted with check stops; adjustable thermostat factory set for 98F.
  4. Equipment
     1. Water Storage Heaters:
        1. Factory-assembled and wired, electric or gas fired, vertical storage type.
        2. Welded steel ASME labeled pressure vessel; glass lined, with automatic immersion water thermostat, flanged or screw-in nichrome elements.
        3. Heavy gauge shelf for wall mounting.
     2. Point-of-Use Water Heaters:
        1. Wall mounted, instant flow, stainless steel heating coil, flow switch activated, UL listed.
     3. Compressed Air System:
        1. Compressors shall be factory assembled and tested, packaged, single or two stage with intercooler and aftercooler, heavy-duty asymmetrical rotary screw. Bearings shall be separate for radial and thrust loads. Cooling lubrication system shall be unit-mounted, air-cooled exchange package. Compressors shall include microprocessor-based control modules for starting, capacity control and safety control of units. Control panel shall include air receiver pressure gage, discharge line pressure gage, air filter maintenance indicator, hourmeter, compressor discharge air and coolant temperature gage, control transformer, start- stop switches and numbered wiring terminal strip. Motor starter shall be factory mounted on compressor package and wired to motor and control panel. Compressors shall be housed in manufacturer’s standard sound attenuating cabinets and shall limit sound levels to 80 dBA at 3 feet from equipment.
        2. Refrigerated air dryers shall be self-contained mechanical refrigeration type complete with heat exchanger, refrigeration compressor, automatic controls, moisture removal trap, and internal wiring and piping. Heat exchangers shall consist of air to air and refrigerant to air coils. Heat exchangers shall be provided with automatic control system to bypass refrigeration system on low- or no-load condition. Each dryer shall be provided with air inlet temperature gage, on/off switch, high temperature light, air outlet temperature gage and air outlet pressure gage. Provide one-micron coalescing filter upstream of each refrigerated dryer.
     4. Central Stationary Vacuum Cleaning System
        1. Exhauster shall be multistage centrifugal type with motor drives sized to the minimum determined capacity in ICFM at the required vacuum pressure in inches of mercury and constructed of cast iron (not fabricated) heads and section.
        2. Separator shall be constructed of carbon steel and be suitable for operation at 12 inches of mercury and a storage volume of not less than 10 cubic feet. Bag cleaning shall be done with compressed air automatically controlled by an adjustable timer.
        3. Bleed system a shall be modulating type which will automatically allow atmospheric air into the main tubing header in order to prevent the exhauster from going into surge and also maintain the necessary conveying velocity.

1. execution
   1. INSTALLATION
      1. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
      2. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
         1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
         2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
         3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
      3. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
      4. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
      5. Install wall-mounting fixtures with tubular waste piping attached to supports.
      6. Install fixtures level and plumb according to roughing-in drawings.
      7. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
      8. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
      9. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
      10. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
      11. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
      12. Install toilet seats on water closets.
      13. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
      14. Install shower flow-control fittings with specified maximum flow rates in shower arms.
      15. Install traps on fixture outlets.
          1. Exception: Omit trap on fixtures with integral traps.
          2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
      16. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
      17. Install escutcheons at piping wall and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 23 Section "Common Work for HVAC."
      18. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 7 Section "Joint Sealants."
      19. Provide dielectric connections wherever joining dissimilar metals.
      20. Install water hammer arrestors complete with accessible isolation valve.
      21. Install each plumbing fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons.
      22. Compressed air system:
          1. Provide valves, crossovers, and bypasses for shut-off and isolation of system components (compressors, dryers, filters, and receivers) such that servicing of any one component will not shutdown operation.
          2. Locate receivers between compressors and dryers.
          3. Where appropriate, mount air compressors, dryers, receivers, and oil separators on 4-inch high concrete housekeeping pad.
          4. Pipe auto drains from compressors, dryers, filters, and receivers into drainage system.
   2. CONNECTIONS
      1. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
      2. Ground equipment according to Division 26 Section "Grounding and Bonding."
      3. Connect wiring according to Division 26 Section "Conductors and Cables."
   3. FIELD QUALITY CONTROL
      1. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
      2. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
      3. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
      4. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
      5. Install fresh batteries in sensor-operated mechanisms.
   4. PROTECTION
      1. Provide protective covering for installed fixtures and fittings.
      2. Do not allow use of plumbing fixtures for temporary facilities.

#### END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022