

SECTION 15430 - PLUMBING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes plumbing specialties for the following:
 - 1. Water distribution systems.
 - 2. Soil, waste, and vent systems.
 - 3. Storm drainage systems.
- B. Related Sections include the following:
 - 1. Division 15 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, basic installation requirements, and labeling and identifying requirements; and escutcheons, dielectric fittings, sleeves, and sleeve seals that are not in this Section.
 - 2. Division 15 Section "Valves" for general-duty ball, butterfly, check, gate, and globe valves.
 - 3. Division 15 Section "Meters and Gages" for thermometers, pressure gages, fittings, and water meters.
 - 4. Division 15 Section "Meters and Gages" for thermometers, pressure gages, and fittings.
 - 5. Division 15 Section "Mechanical Identification" for labeling and identifying requirements.
 - 6. Division 15 Section "Water Distribution Piping" for water-supply piping and connections.
 - 7. Division 15 Section "Drainage and Vent Piping" for drainage and vent piping and connections.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:
 - 1. Water Distribution Piping: 125 psig (860 kPa).
 - 2. Soil, Waste, and Vent Piping: 10-foot head of water (30 kPa).
 - 3. Storm Drainage Piping: 10-foot head of water (30 kPa).
 - 4. Force-Main Piping: 100 psig (690 kPa).

1.4 SUBMITTALS

- A. Product Data: For each plumbing specialty indicated. Include rated capacities of selected equipment and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following plumbing specialty products:
1. Backflow preventers.
 2. Water regulators.
 3. Balancing valves.
 4. Water filters.
 5. Strainers.
 6. Thermostatic water mixing valves and water tempering valves.
 7. Water hammer arresters.
 8. Trap seal primer valves and systems.
 9. Drain valves.
 10. Hose bibbs, hydrants, and sanitary post hydrants.
 11. Outlet boxes and washer-supply outlets.
 12. Hose stations.
 13. Backwater valves.
 14. Cleanouts.
 15. Floor drains, open receptors, and trench drains.
 16. Air-admittance valves.
 17. Vent caps, vent terminals, and roof flashing assemblies.
 18. Roof drains.
 19. Grease interceptors, grease recovery units, oil interceptors, oil storage tanks, and solids interceptors.
 20. Sleeve penetration systems.
- B. Reports: Specified in "Field Quality Control" Article.
- C. Maintenance Data: For specialties to include in the maintenance manuals specified in Division 1. Include the following:
1. Backflow preventers.
 2. Water regulators.

3. Water filters.
4. Thermostatic water mixing valves and water tempering valves.
5. Trap seal primer valves and systems.
6. Hose stations.
7. Sanitary hydrants.
8. Backwater valves.
9. Grease interceptors, grease recovery units, oil interceptors, oil storage tanks, and solids interceptors.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, dimensional requirements, and characteristics of plumbing specialties and are based on the specific types and models indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."
- B. Provide listing/approval stamp, label, or other marking on plumbing specialties made to specified standards.
- C. Listing and Labeling: Provide electrically operated plumbing specialties specified in this Section that are listed and labeled.
 1. Terms "Listed" and "Labeled": As defined in National Electrical Code, Article 100.
 2. Listing and Labeling Agency Qualifications: "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- D. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
- E. Comply with NFPA 70, "National Electrical Code," for electrical components.
- F. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic potable-water piping components. Include marking "NSF-pw" on plastic potable-water piping and "NSF-dwv" on plastic drain, waste, and vent piping.

1.6 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 1. Water Filter Cartridges: Furnish quantity not less than 200 percent of amount of each type and size installed.
 2. Operating Key Handles: Furnish one extra key for each key-operated hose bibb and hydrant installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Backflow Preventers:
 - a. Ames Co., Inc.
 - b. B & K Industries, Inc.
 - c. Cla-Val Co.
 - d. CMB Industries; Febco Div.
 - e. Conbraco Industries, Inc.
 - f. FLOMATIC Corp.
 - g. Grinnell Corp.; Mueller Co. Marketing Group for Hersey Products Div.
 - h. IMI Cash Valve.
 - i. Sparco, Inc.
 - j. Watts Industries, Inc.; Water Products Div.
 - k. Zurn Industries, Inc.; Wilkins Div.
 - 2. Water Regulators:
 - a. Bermad, Inc.
 - b. Cashco, Inc.
 - c. Cla-Val Co.
 - d. Conbraco Industries, Inc.
 - e. FLOMATIC Corp.
 - f. G A Industries, Inc.
 - g. Honeywell Braukmann.
 - h. IMI Cash Valve.
 - i. Kaye & Mac Donald, Inc.
 - j. Keckley: O.C. Keckley Co.
 - k. Spence Engineering Co., Inc.

- I. Watts Industries, Inc.; Water Products Div.
 - m. Zurn Industries, Inc.; Wilkins Div.
- 3. Calibrated Balancing Valves:
 - a. Amtrol, Inc.
 - b. Armstrong Pumps, Inc.
 - c. Flow Design, Inc.
 - d. ITT Fluid Technology Corp.; ITT Bell & Gossett Div.
 - e. Taco, Inc.
 - f. Tour & Andersson, Inc.; Valve Div.
 - g. Watts Industries, Inc.; Water Products Div.
- 4. Memory-Stop Balancing Valves:
 - a. Crane Co.; Valve Div.
 - b. Grinnell Corp.
 - c. Hammond Valve Corp.
 - d. Milwaukee Valve Co., Inc.
 - e. Nibco, Inc.
- 5. Water Filters:
 - a. AMETEK, Inc.; Plymouth Products Div.
 - b. Campbell Manufacturing, Inc.
 - c. CONSLER Corp.
 - d. CUNO, Inc.
 - e. Eagle Spring Filtration, Inc.
 - f. Eden Equipment Co.
 - g. Filpro Corp.
 - h. Filtrine Manufacturing Co.
 - i. Harmsco Industrial Filters.
 - j. Manitowoc Co., Inc.
 - k. Memtec America Corp.; Filterite Div.

- l. Met-Pro Corp.; Keystone Filter Div.
 - m. Osmonics, Inc.; Hytrex Div.
 - n. Pall Process Filtration Co.
 - o. Pura, Inc.
 - p. Service Filtration Corp.; Filterspun Div.
 - q. Watts Industries, Inc.; Water Products Div.
 - r. Whatman, Inc.
6. Thermostatic Water Mixing Valves:
- a. Lawler Manufacturing Co., Inc.
 - b. Leonard Valve Co.
 - c. Mark Controls Corp.; Powers Process Controls.
 - d. Symmons Industries, Inc.
 - e. T & S Brass and Bronze Works, Inc.
7. Water Tempering Valves:
- a. Conbraco Industries, Inc.
 - b. Heat-Timer Corp.
 - c. Holby Valve Co., Inc.
 - d. d. Honeywell Braukmann.
 - e. e. IMI Cash Valve.
 - f. Leonard Valve Co.
 - g. Sparco, Inc.
 - h. Watts Industries, Inc.; Water Products Div.
8. Outlet Boxes:
- a. Acorn Engineering Co.
 - b. Guy Gray Manufacturing Co., Inc.
 - c. IPS Corp.
 - d. LSP-Specialty Products Co.
 - e. Oatey Co.

- f. Plastic Oddities, Inc.
 - g. Symmons Industries, Inc.
9. Washer-Supply Outlets:
- a. B & K Industries, Inc.
 - b. IMI Cash Valve.
 - c. Symmons Industries, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
10. Hose Stations:
- a. Cooney Brothers, Inc.; Hose Station Div.
 - b. Leonard Valve Co.
 - c. LYNNWOOD Industries, Inc.
 - d. Penberthy, Inc.
 - e. Strahman Valves, Inc.
 - f. T & S Brass and Bronze Works, Inc.
11. Hydrants:
- a. Enpoco, Inc.
 - b. Josam Co.
 - c. Murdock, Inc.
 - d. Smith: Jay R. Smith Mfg. Co.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Industries, Inc.; Ancon Drain Div.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Woodford Manufacturing Co.
 - i. Zurn Industries, Inc.; Hydromechanics Div.
12. Sanitary Post Hydrants:
- a. Murdock, Inc.
13. Water Hammer Arresters:
- a. Amtrol, Inc.

- b. Enpoco, Inc.
 - c. Josam Co.
 - d. Precision Plumbing Products, Inc.
 - e. Sioux Chief Manufacturing Co., Inc.
 - f. Smith: Jay R. Smith Mfg. Co.
 - g. Sparco, Inc.
 - h. Tyler Pipe; Wade Div.
 - i. Watts Industries, Inc.; Ancon Drain Div.
 - j. Watts Industries, Inc.; Water Products Div.
 - k. Zurn Industries, Inc.; Hydromechanics Div.
14. Trap Seal Primer Valves:
- a. Enpoco, Inc.
 - b. Josam Co.
 - c. Precision Plumbing Products, Inc.
 - d. Smith: Jay R. Smith Mfg. Co.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Industries, Inc.; Ancon Drain Div.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Zurn Industries, Inc.; Hydromechanics Div.
15. Trap Seal Primer Systems:
- a. Precision Plumbing Products, Inc.
16. Backwater Valves:
- a. Enpoco, Inc.
 - b. Josam Co.
 - c. Smith: Jay R. Smith Mfg. Co.
 - d. Watts Industries, Inc.; Ancon Drain Div.
 - e. Zurn Industries, Inc.; Hydromechanics Div.
17. Air-Admittance Valves:

- a. B & K Industries, Inc.
 - b. Bristol Corp.; J & B Products Div.
 - c. Durgo: AB Durgo; c/o Enerjee, Ltd.
 - d. IMI Cash Valve.
 - e. IPS Corp.
 - f. Oatey Co.
 - g. Sioux Chief Manufacturing Co., Inc.
 - h. Studor, Inc.
- C. General: ASSE standard, backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.
- 1. 2-Inch NPS (DN50) and Smaller: Bronze body with threaded ends.
 - 2. 2-1/2-Inch NPS (DN65) and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.
 - a. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.
 - 3. Interior Components: Corrosion-resistant materials.
 - 4. Exterior Finish: Polished chrome-plate if used in chrome-plated piping system.
 - 5. Strainer on inlet, if indicated.
- D. Pipe-Applied, Atmospheric-Type Vacuum Breakers: ASSE 1001, with floating disc and atmospheric vent.
- E. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7 garden-hose threads on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.
- F. Intermediate Atmospheric-Vent Backflow Preventers: ASSE 1012, suitable for continuous pressure application. Include inlet screen and 2 independent check valves with intermediate atmospheric vent.
- G. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013, suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet; test cocks; and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves.
- 1. Pressure Loss: 12 psig (83 kPa) maximum, through middle one-third of flow range.
- H. Double-Check Backflow Prevention Assemblies: ASSE 1015, suitable for continuous pressure application. Include shutoff valves on inlet and outlet, and strainer on inlet; and test cocks with 2 positive-seating check valves.

1. Pressure Loss: 5 psig (35 kPa) maximum, through middle one-third of flow range.
- I. Antisiphon-Pressure-Type Vacuum Breakers: ASSE 1020, suitable for continuous pressure application. Include shutoff valves, spring-loaded check valve, spring-loaded floating disc, test cocks, and atmospheric vent.
 1. Pressure Loss: 5 psig (35 kPa) maximum, through middle one-third of flow range.
- J. Dual-Check-Valve-Type Backflow Preventers: ASSE 1024, suitable for continuous pressure application. Include union inlet and 2 independent check valves.
- K. Dual-Check-Valve-Type Backflow Preventers: ASSE 1032, suitable for continuous pressure application for carbonated beverage dispensers. Include stainless-steel body; primary and secondary checks; ball check; intermediate atmospheric-vent port for relieving carbon dioxide; and threaded ends, 3/8-inch NPS (DN10).
- L. Laboratory Faucet Vacuum Breakers: ASSE 1035, suitable for continuous pressure application and chrome plated; consisting of primary and secondary checks; intermediate vacuum breaker; and threaded ends, 1/4- or 3/8-inch NPS (DN8 or DN10) as required.
- M. Reduced-Pressure Detector Assembly Backflow Preventers: ASSE 1047, FM approved or UL listed, and suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet. Include test cocks; pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves; and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer.
 1. Pressure Loss: 12 psig (83 kPa) maximum, through middle one-third of flow range.
- N. Double-Check Detector Assembly Backflow Preventers: ASSE 1048, FM approved or UL listed, and suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet. Include test cocks; 2 positive-seating check valves; and bypass with displacement-type water meter, valves, and double-check backflow preventer.
 1. Pressure Loss: 5 psig (35 kPa) maximum, through middle one-third of flow range.
- O. Hose-Connection Backflow Preventers: ASSE 1052, suitable for at least 3-gpm (0.19-L/s) flow and applications with up to 10-foot head (30-kPa) back pressure. Include 2 check valves; intermediate atmospheric vent; and nonremovable, ASME B1.20.7 garden-hose thread on outlet.
- P. Back-Siphonage Backflow Vacuum Breakers: ASSE 1056, suitable for continuous pressure and backflow applications. Include shutoff valves, check valve, test cocks, and vacuum vent.

2.2 WATER REGULATORS

- A. A.General: ASSE 1003, water regulators, rated for initial working pressure of 150 psig (1035 kPa) minimum, of size, flow rate, and inlet and outlet pressures indicated. Include integral factory-installed or separate field-installed Y-pattern strainer.
 1. 2-Inch NPS (DN50) and Smaller: Bronze body with threaded ends.
 2. 2-1/2-Inch NPS (DN65) and Larger: Bronze or cast-iron body with flanged ends. Include AWWA C550 or FDA-approved interior epoxy coating for regulators with cast-iron body.
 3. Interior Components: Corrosion-resistant materials.

4. Exterior Finish: Polished chrome-plate if used in chrome-plated piping system.
- B. Single-seated, direct-operated type.
 - C. Single-seated, direct-operated, integral-bypass type.
 - D. Pilot-operated type, single- or double-seated, cast-iron-body main valve, with bronze-body pilot valve.

2.3 BALANCING VALVES

- A. Calibrated Balancing Valves: Adjustable, with 2 readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.
 1. 2-Inch NPS (DN50) and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
 2. 2-Inch NPS (DN50) and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.
 3. 2-1/2-Inch NPS (DN65) and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.
- B. Memory-Stop Balancing Valves, 2-Inch NPS (DN50) and Smaller: MSS SP-110, ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include 2-piece, ASTM B 62 bronze body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, solder-joint ends, and vinyl-covered steel handle with memory-stop device.

2.4 WATER FILTERS

- A. General: Cartridge-type assemblies suitable for potable water of size and at flow rate and pressure loss indicated. Include housing, fittings, filter cartridges, and cartridge end caps.
- B. Wall-Mounting Type: Housing head section with threaded inlet and outlet, mounting bracket, and removable lower section for 10-inch- (250-mm-) long filter cartridge.
 1. Housing Material: Stainless steel, 150-psig (1035-kPa) minimum operating pressure.
 2. Housing Material: Plastic, 125-psig (860-kPa) minimum operating pressure.
 3. Cartridge: Activated-charcoal filter media, 10 inches (250 mm), 10-micron-particulate removable rating.
 4. Cartridge: Wound- or molded-fiber filter media, 10 inches (250 mm), 10-micron-particulate removable rating.
 5. Cartridge: Pleated-polypropylene filter media, 10 inches (250 mm), 10-micron-particulate removable rating.
- C. Floor-Mounting Type: Stainless-steel housing rated at 150-psig (1035-kPa) minimum operating pressure.
 1. Base Section: Floor-mounting section with inlet and outlet connections and removable top section for one or more 10-micron-particulate removable-rating cartridges.

2. Connections, 2-Inch NPS (DN50) and Smaller: Threaded.
3. Connections, 2-1/2-Inch NPS (DN65) and Larger: Flanged.
4. Cartridge: Activated-charcoal filter media.
5. Cartridge: Wound- or molded-fiber filter media.
6. Cartridge: Pleated-polypropylene filter media.

2.5 THERMOSTATIC WATER MIXING VALVES

- A. General: ASSE 1017, manually adjustable, thermostatic water mixing valve with bronze body. Include check stop and union on hot- and cold-water-supply inlets, adjustable temperature setting, and capacity at pressure loss as indicated.
 1. Bimetal Thermostat, Operation and Pressure Rating: 125 psig (860 kPa) minimum.
 2. Liquid-Filled Motor, Operation and Pressure Rating: 100 psig (690 kPa) minimum.
- B. Thermostatic Water Mixing Valves: Unit, with the following:
 1. Piping, of sizes and in arrangement indicated. Include valves and unions.
 2. Piping Component Finish: Polished chrome-plate.
 3. Piping Component Finish: Satin spray.
 4. Piping Component Finish: Rough brass.
 5. Cabinet: Steel box with steel hinged door and white enameled finish.
 6. Cabinet: Stainless-steel box with stainless-steel hinged door.
 7. Cabinet Mounting: Recessed.
 8. Cabinet Mounting: Surface.
 9. Thermometer: Manufacturer's standard.
- C. Manifolded, Thermostatic Water Mixing Valve Assemblies: Factory-fabricated unit consisting of parallel arrangement of thermostatic water mixing valves.
 1. Arrangement: One large-flow, thermostatic water mixing valve with flow-control valve, pressure regulator, inlet and outlet pressure gages, and one small-flow, thermostatic water mixing valve with flow-control valve. Include outlet thermometer, factory- or field-installed inlet and outlet valves, and other indicated options.
 2. Piping, of sizes and in arrangement indicated. Include valves and unions.
 3. Piping Component Finish: Polished chrome-plate.
 4. Piping Component Finish: Satin spray.
 5. Piping Component Finish: Rough brass.

6. Cabinet: Steel box with steel hinged door and white enameled finish.
 7. Cabinet: Stainless-steel box with stainless-steel hinged door.
 8. Cabinet Mounting: Recessed.
 9. Cabinet Mounting: Surface.
- D. Hydrotherapy, Thermostatic Water Mixing Valve Assemblies: Factory-fabricated, thermostatic water mixing valve; 2 shutoff valves and 1 volume-control valve; unions; check stops; thermometer; atmospheric vacuum breaker; piping; escutcheons; and cabinet.
1. Sizes and Arrangement: As indicated.
 2. Piping Component Finish: Polished chrome-plate.
 3. Piping Component Finish: Satin spray.
 4. Piping Component Finish: Rough brass.
 5. Cabinet: Steel box with steel hinged door and white enameled finish.
 6. Cabinet: Stainless-steel box with stainless-steel hinged door.
 7. Cabinet Mounting: Recessed.
 8. Cabinet Mounting: Surface.
- E. Photographic-Process, Thermostatic Water Mixing Valve Assemblies: Factory-fabricated, thermostatic water mixing valve; volume-control valve; unions; check stops; thermometer; atmospheric vacuum breaker; piping; escutcheons; and panel enclosure.
1. Sizes and Arrangement: As indicated, with controls mounted in front of panel cover and factory- or field-installed inlet valves. Assembly can control outlet-water temperature within 0.5 deg F (0.25 deg C) throughout temperature and flow operating ranges.
 2. Panel: Steel box with white enameled finish.
 3. Panel: Stainless-steel box.
 4. Panel Mounting: Recessed.
 5. Panel Mounting: Surface.

2.6 WATER TEMPERING VALVES

- A. General: Manually adjustable, thermostatically controlled water tempering valve; bronze body; and adjustable temperature setting.
- B. System Water Tempering Valves: Piston or discs controlling both hot- and cold-water flow, capable of limited antiscald protection. Include threaded inlets and outlet, capacity at pressure loss, and temperature range or setting as indicated.
 1. Finish: Rough bronze unless chrome-plated finish is indicated.

- C. Limited-Volume, Water Tempering Valves: Solder-joint inlets and 3/4-inch NPS (DN20) maximum outlet, with minimum capacity and maximum pressure loss as indicated.

2.7 STRAINERS

- A. Strainers: Y-pattern, unless otherwise indicated, and full size of connecting piping. Include ASTM A 666, Type 304, stainless-steel screens with 3/64-inch (1.2-mm) round perforations, unless otherwise indicated.
 - 1. Pressure Rating: 125-psig (860-kPa) minimum steam working pressure, unless otherwise indicated.
 - 2. 2-Inch NPS (DN50) and Smaller: Bronze body, with female threaded ends.
 - 3. 2-1/2-Inch NPS (DN65) and Larger: Cast-iron body, with interior AWWA C550 or FDA-approved epoxy coating and flanged ends.
 - 4. Y-Pattern Strainers: Screwed screen retainer with centered blowdown.
 - a. Drain: Pipe plug.
 - b. Drain: Factory- or field-installed, hose-end drain valve.
 - 5. T-Pattern Strainers: Malleable-iron or ductile-iron body with grooved ends; access end cap with drain plug and access coupling with rubber gasket.
 - 6. Basket Strainers: Bolted flange or clamp cover, and basket with lift-out handle.
 - a. Simplex Type: Single unit, with one basket.
 - b. Duplex Type: Double unit, with bronze or stainless-steel diverter valve and 2 baskets.
 - c. Drain: Pipe plug.
 - d. Drain: Factory- or field-installed, hose-end drain valve.
- B. Drainage Basket Strainers: Non-pressure-rated, cast-iron or coated-steel body; with bolted flange or clamp cover and drain with plug.
 - 1. Basket: Bronze or stainless steel with 1/8- or 3/16-inch- (3.2- or 4.8-mm-) diameter holes and lift-out handle.
 - 2. Female threaded ends for 2-inch NPS (DN50) and smaller, and flanged ends for 2-1/2-inch NPS (DN65) and larger.

2.8 OUTLET BOXES

- A. General: Recessed-mounting outlet boxes with fittings complying with ASME A112.18.1M. Include box with faceplate, services indicated for equipment connections, and wood-blocking reinforcement.
- B. Clothes Washer Outlet Boxes: With hose connections, drain, and the following:
 - 1. Box and Faceplate: Stainless steel.

2. Box and Faceplate: Enameled or epoxy-painted steel.
3. Box and Faceplate: Plastic.
4. Shutoff Fittings: 2 hose bibbs.
5. Shutoff Fittings: Combination, single lever.
6. Supply Fittings: Two 1/2-inch NPS (DN15) gate, globe, or ball valves and 1/2-inch NPS (DN15) copper, water tubing.
7. Drain Fitting: 2-inch NPS (DN50) drainage piping P-trap with 2-inch NPS (DN50) standpipe extending from floor to outlet box and 2-inch NPS (DN50) waste.
8. Drain Fitting: 1-1/2-inch NPS (DN40) drainage piping P-trap with 1-1/2-inch NPS (DN40) standpipe extending from floor to outlet box and 1-1/2-inch NPS (DN40) waste.
9. Inlet Hoses: Two 60-inch- (1500-mm-) long, ASTM D 3571, clothes washer inlet hoses with female hose-thread couplings.
10. Drain Hose: One 48-inch- (1200-mm-) long, ASTM D 3572, clothes washer drain hose with hooked end.

C. Ice Maker Outlet Boxes: With hose connection and the following:

1. Box and Faceplate: Stainless steel.
2. Box and Faceplate: Enameled or epoxy-painted steel.
3. Box and Faceplate: Plastic.
4. Shutoff Fitting: Hose bibb.
5. Supply Fitting: 1/2-inch NPS (DN15) gate, globe, or ball valve and 1/2-inch NPS (DN15) copper, water tubing.

D. Dialysis Equipment Outlet Boxes: With hose connection, drain, and the following:

1. Box and Faceplate: Stainless steel.
2. Box and Faceplate: Plastic.
3. Shutoff Fitting: Hose bibb.
4. Shutoff Fitting: Plastic hose valve.
5. Supply Fitting: 1/2-inch NPS (DN15) gate, globe, or ball valve and 1/2-inch NPS (DN15) water tubing.
6. Drain Fitting: 2-inch NPS (DN50) drainage piping P-trap with 2-inch NPS (DN50) standpipe extending to outlet box and 2-inch NPS (DN50) waste.
7. Drain Fitting: 1-1/2-inch NPS (DN40) drainage piping P-trap with 1-1/2-inch NPS (DN40) standpipe extending to outlet box and 1-1/2-inch NPS (DN40) waste.

- E. Reinforcement: 2-by-4-inch- or 2-by-6-inch- (38-by-89-mm- or 38-by-140-mm-), fire-retardant-treated-wood blocking between studs.

2.9 WASHER-SUPPLY OUTLETS

- A. Description: Surface-mounting, washer-supply outlet fittings complying with ASME A112.18.1M and reinforcement. Include the following:
 - 1. Shutoff Fitting: Combination, single lever.
 - 2. Supply Fittings: Two 1/2-inch NPS (DN15) gate, globe, or ball valves and 1/2-inch NPS (DN15) copper, water tubing.
 - 3. Reinforcement: 2-by-4-inch- or 2-by-6-inch- (38-by-89-mm- or 38-by-140-mm-), fire-retardant-treated-wood blocking between studs.

2.10 HOSE STATIONS

- A. General: Assembly with fitting complying with ASME A112.18.1M and hose-connection outlet with threads complying with ASME B1.20.7.
- B. Mixing-Valve Hose Station: Hot- and cold-water mixing valve with shutoff and check valves on inlets, hose with nozzle, and the following:
- C. Mixing-Valve Hose Station: Steam and cold-water mixing valve with shutoff and check valves on inlets, hose with nozzle, and the following:
 - 1. Cabinet: Stainless-steel enclosure with exposed valve handles, hose connection, and hose rack. Include manufacturer's standard thermometer in front.
 - 2. Hose-Rack Material: Stainless steel.
 - 3. Body Material: Bronze.
 - 4. Body Material: Bronze with stainless-steel wetted parts.
 - 5. Body Finish: Rough brass.
 - 6. Body Finish: Rough brass or chrome plate.
 - 7. Installation: Wall mounting. Include reinforcement.
 - 8. Installation: Floor mounting on stainless-steel pedestal.
 - 9. Supply Fittings: Two 1/2-inch NPS (DN15) gate, globe, or ball valves and check valves and 1/2-inch NPS (DN15) copper, water tubing. Omit check valves if check stops are included with fitting.
 - 10. Supply Fittings: Two 3/4-inch NPS (DN20) gate, globe, or ball valves and check valves and 3/4-inch NPS (DN20) copper, water tubing. Omit check valves if check stops are included with fitting.
 - 11. Hose: Manufacturer's standard for service fluid, temperature, and pressure; 50 feet (15 m) long.

12. Hose: Manufacturer's standard for service fluid, temperature, and pressure; 25 feet (7.5 m) long.
 13. Nozzle: Manufacturer's standard.
- D. Single-Valve Hose Station: Hot-water valve with shutoff valve on inlet, hose with nozzle, and the following:
- E. Single-Valve Hose Station: Cold-water valve with shutoff valve on inlet, hose with nozzle, and the following:
1. Cabinet: Stainless-steel enclosure with exposed valve handles, hose connection, and hose rack. Include manufacturer's standard thermometer in front.
 2. Hose-Rack Material: Stainless steel.
 3. Body Material: Bronze.
 4. Body Material: Bronze with stainless-steel wetted parts.
 5. Body Finish: Rough brass.
 6. Body Finish: Rough brass or chrome plate.
 7. Installation: Wall mounting. Include reinforcement.
 8. Installation: Floor mounting on stainless-steel pedestal.
 9. Supply Fitting: 1/2-inch NPS (DN15) gate, globe, or ball valve and check valve and 1/2-inch NPS (DN15) copper, water tubing. Omit check valve if check stop is included with fitting.
 10. Supply Fitting: 3/4-inch NPS (DN20) gate, globe, or ball valve and check valve and 3/4-inch NPS (DN20) copper, water tubing. Omit check valve if check stop is included with fitting.
 11. Hose: Manufacturer's standard for service fluid, temperature, and pressure; 50 feet (15 m) long.
 12. Hose: Manufacturer's standard for service fluid, temperature, and pressure; 25 feet (7.5 m) long.
 13. Nozzle: Manufacturer's standard.
- F. Reinforcement: 2-by-4-inch- or 2-by-6-inch- (38-by-89-mm- or 38-by-140-mm-), fire-retardant-treated-wood blocking between studs.
- 2.11 HYDRANTS
- A. Wall Hydrants: ASME A112.21.3M, nonfreeze, key operation. Provide one operating key.
1. Inlet: 3/4- or 1-inch NPS (DN20 or DN25) threaded or solder joint.

2. Outlet: ASME B1.20.7 garden-hose threads, and integral or field-installed, nonremovable, drainable, hose-connection vacuum breaker with ASME B1.20.7 garden-hose threads on outlet.
 3. Type: Projecting.
 4. Type: Recessed.
 5. Finish: Rough bronze.
 6. Finish: Polished bronze.
 7. Finish: Nickel bronze.
- B. Wall Hydrants: ASME A112.21.3M or ASSE 1019, nonfreeze, automatic draining, antibackflow type, key operation, with 3/4- or 1-inch NPS (DN20 or DN25) threaded or solder-joint inlet, and ASME B1.20.7 garden-hose threads on outlet. Include operating key for each hydrant.
1. Type: Projecting.
 2. Type: Recessed.
 3. Finish: Rough bronze.
 4. Finish: Polished bronze.
 5. Finish: Nickel bronze.
- C. Wall Hydrants: ASME A112.21.3M, projecting, automatic draining, antibackflow type, key operation. Include operating key for each hydrant.
1. Inlet: 3/4- or 1-inch NPS (DN20 or DN25) threaded or solder joint.
 2. Outlet: ASME B1.20.7 garden-hose threads.
 3. Finish: Rough bronze.
 4. Finish: Polished bronze.
 5. Finish: Nickel bronze.
- D. Post Hydrants: ASME A112.21.3M, nonfreeze, bronze casing, cast-iron or cast-aluminum casing guard, key operation. Include operating key for each hydrant.
1. Inlet: 3/4- or 1-inch NPS (DN20 or DN25) threaded.
 2. Outlet: Integral or field-installed, nonremovable, drainable, hose-connection vacuum breaker with ASME B1.20.7 garden-hose threads on outlet and tapped drain port in valve housing.
 3. Length: As required for installing inlet valve below frost line.

2.12 SANITARY POST HYDRANTS

- A. Description: Nonfreeze, post hydrant with nondraining chamber for storing water trapped downstream from inlet valve.
 - 1. Inlet: 1-inch NPS (DN25) threaded.
 - 2. Outlet: Integral or field-installed, nonremovable, drainable, hose-connection vacuum breaker with ASME B1.20.7 garden-hose threads on outlet. Include brass or bronze casing and other parts in contact with water, and handle or key operation. Include operating key for each hydrant.
 - 3. Length: As required for installing storage chamber below frost line. Use of draining-type post hydrant for this application is prohibited.

2.13 TRAP SEAL PRIMER VALVES

- A. Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:
 - 1. 125-psig (860-kPa) minimum working pressure.
 - 2. Bronze body with atmospheric-vented drain chamber.
 - 3. Inlet and Outlet Connections: 1/2-inch NPS (DN15) threaded, union, or solder joint.
 - 4. Gravity Drain Outlet Connection: 1/2-inch NPS (DN15) threaded or solder joint.
 - 5. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.
- B. Trap Seal Primer System: Factory-fabricated, automatic-operation assembly for wall mounting with the following:
 - 1. Piping: 3/4-inch NPS, ASTM B 88, Type L (DN20, ASTM B 88M, Type B); copper, water tubing inlet and manifold with number of 1/2-inch NPS (DN15) outlets as indicated.
 - 2. Cabinet: Steel box with stainless-steel cover.
 - 3. Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120-V, ac power.
 - 4. Water Hammer Arrester: ASSE 1010.
 - 5. Vacuum Breaker: ASSE 1001.

2.14 DRAIN VALVES

- A. Hose-End Drain Valves: MSS SP-110, 3/4-inch NPS (DN20) ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include 2-piece, ASTM B 62 bronze body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, and vinyl-covered steel handle.
 - 1. Inlet: Threaded or solder joint.
 - 2. Outlet: Short-threaded nipple with ASME B1.20.7 garden-hose thread and cap.

3. Hose-End Drain Valve Option: MSS SP-80, gate valve, Class 125, ASTM B 62 body, with 3/4-inch NPS (DN20) threaded or solder-joint inlet and ASME B1.20.7 garden-hose threads on outlet and cap. Hose bibbs are prohibited for this application.
4. Fire-Hose-End Drain Valve Option: UL 668, 1-1/2-inch NPS (DN40), bronze body, 90-degree angle or straightway-pattern hose valve, rated for 175-psig (1200-kPa) minimum working pressure.
 - a. Male Outlet Threads: NFPA 1963 and local fire department standards. Include attached chain and cap.
 - 1) Option: 2-1/2-inch NPS (DN65) valves with 2-1/2-by-1-1/2-inch NPS (DN65 by DN40) adapter and attached chain and cap may be provided instead of 1-1/2-inch NPS (DN40) valves.
- B. Stop-and-Waste Drain Valves: MSS SP-110, ball valve, rated for 200-psig (1380-kPa) minimum CWP or MSS SP-80, Class 125, gate valve; ASTM B 62 bronze body, with 1/8-inch NPS (DN6) side drain outlet and cap.

2.15 BACKWATER VALVES

- A. Horizontal Backwater Valves: ASME A112.14.1, cast-iron body, with removable bronze swing-check valve and threaded or bolted cover.
 1. Closed-Position Check Valve: Factory assembled or field modified to hang closed unless subject to backflow condition.
 2. Open-Position Check Valve: Factory assembled or field modified to hang open unless subject to backflow condition.
 3. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor, instead of cover.
- B. Drain Outlet Backwater Valves: Cast-iron or bronze body, with removable ball float, threaded inlet, and threaded or spigot outlet.

2.16 MISCELLANEOUS PIPING SPECIALTIES

- A. Water Hammer Arresters: ASME A112.26.1M, ASSE 1010, or PDI-WH 201, bellows or piston type with pressurized cushioning chamber. Sizes are based on water-supply fixture units, ASME A112.26.1M sizes A through F and PDI-WH 201 sizes A through F.
- B. Hose Bibbs: Bronze body, with renewable composition disc, 1/2- or 3/4-inch NPS (DN15 or DN20) threaded or solder-joint inlet. Provide ASME B1.20.7 garden-hose threads on outlet and integral or field-installed, nonremovable, drainable, hose-connection vacuum breaker.
 1. Finish: Rough brass.
 2. Finish: Chrome or nickel plated.
 3. Operation: Wheel handle.
 4. Operation: Operating-key (handle) type. Include operating key.

- C. Air-Admittance Valves: Plastic housing with mechanical-operation sealing diaphragm, designed to admit air into drainage and vent piping and to prevent transmission of sewer gas into building.
 - 1. Stack Vent Valve: ASSE 1050, designed for installation as terminal on soil, waste, and vent stacks, instead of stack vent extending through roof, in 2- to 4-inch NPS (DN50 to DN100).
 - 2. Fixture Vent Valve: ASSE 1051, designed for installation on waste piping, instead of vent connection, for single fixture, in 1-1/4- to 2-inch NPS (DN32 to DN50).
- D. Open Drains: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section of length to provide depth indicated; and where indicated, increaser fitting of size indicated, joined with ASTM C 564 rubber gaskets. Size P-trap as indicated.
- E. Deep-Seal Traps: Cast iron or bronze, with inlet and outlet matching connected piping, cleanout where indicated, and trap seal primer valve connection where indicated.
 - 1. 2-Inch NPS (DN50): 4-inch- (100-mm-) minimum water seal.
 - 2. 2-1/2 Inch NPS (DN65) and Larger: 5-inch- (125-mm-) minimum water seal.
- F. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.
- G. Air-Gap Fittings: ASME A112.1.2, cast iron or cast bronze, with fixed air gap, inlet for drain pipe or tube, and threaded or spigot outlet.
- H. Stack Flashing Fittings: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
- I. Vent Caps: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and set-screws to secure to vent pipe.
- J. Vent Terminals: Commercially manufactured, shop-fabricated or field-fabricated, frost-proof assembly constructed of galvanized steel, copper, or lead-coated copper. Size to provide 1-inch (25-mm) enclosed air space between outside of pipe and inside of flashing collar extension, with counterflashing, as indicated.
- K. Expansion Joints: ASME A112.21.2M, assembly with cast-iron body with bronze sleeve, packing gland, and packing, of size and end types corresponding to connected piping.
- L. Downspout Boots: ASTM A 48, gray-iron casting, with 4-inch NPS (DN100) outlet; shop-applied bituminous coating; and inlet size indicated.
- M. Downspout Boots: ASTM A 74, Service class, hub-and-spigot, cast-iron soil pipe.
- N. Downspout Nozzles: Cast-bronze body with threaded inlet for pipe size indicated, and cast-bronze wall flange with mounting holes.
 - 1. Finish: Polished bronze.
 - 2. Finish: Nickel bronze.

2.17 SLEEVE PENETRATION SYSTEMS

- A. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.
 - 1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
 - 2. Stack Fitting: ASTM A 48, cast-iron, hubless-pattern, wye-branch stack fitting with neoprene O-ring at base and cast-iron plug in thermal-release harness in branch. Include PVC protective cap for plug.
 - a. Special Coating: Include corrosion-resistant interior coating on fittings for plastic chemical waste and vent stacks.

2.18 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
 - 1. General Use: 4 lb/sq. ft. or 0.0625-inch thickness (20 kg/sq. m or 1.6-mm thickness).
 - 2. Vent Pipe Flashing: 3 lb/sq. ft. or 0.0469-inch thickness (15 kg/sq. m or 1.2-mm thickness).
 - 3. Burning: 6 lb/sq. ft. or 0.0937-inch thickness (30 kg/sq. m or 2.4-mm thickness).
- B. Copper Sheet: ASTM B 152 (ASTM B 152M), of the following minimum weights and thicknesses, unless otherwise indicated:
 - 1. General Applications: 12 oz./sq. ft. (3.7 kg/sq. m or 0.41-mm thickness).
 - 2. Vent Pipe Flashing: 8 oz./sq. ft. (2.5 kg/sq. m or 0.27-mm thickness).
- C. Zinc-Coated Steel Sheet: ASTM A 653 (ASTM A 653M), with 0.20 percent copper content and 0.04-inch (1.016-mm) minimum thickness, unless otherwise indicated. Include G90 (Z275) hot-dip galvanized, mill-phosphatized finish for painting if indicated.
- D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1-mm) minimum thickness.
- E. Fasteners: Metal compatible with material and substrate being fastened.
- F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- G. Solder: ASTM B 32, lead-free alloy.
- H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 PLUMBING SPECIALTY INSTALLATION

- A. General: Install plumbing specialty components, connections, and devices according to manufacturer's written instructions.

- B. Install backflow preventers of type, size, and capacity indicated, at each water-supply connection to mechanical equipment and systems, and to other equipment and water systems as indicated. Comply with authorities having jurisdiction. Locate backflow preventers in same room as connected equipment. Install air-gap fitting on units with atmospheric-vent connection and pipe relief outlet drain to nearest floor drain. Do not install bypass around backflow preventer.
- C. Install pressure regulators with inlet and outlet shutoff valves and balance valve bypass. Install pressure gages on inlet and outlet.
- D. Install strainers on supply side of each control valve, pressure regulator, and solenoid valve, and where indicated.
- E. Install hose bibbs with integral or field-installed vacuum breaker.
- F. Install wall hydrants with integral or field-installed vacuum breaker.
- G. Install trap seal primer valves with valve outlet piping pitched down toward drain trap a minimum of one percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- H. Install backwater valves in building drain piping as indicated. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.
- I. Install expansion joints on vertical risers, stacks, and conductors as indicated.
- J. Install cleanouts in aboveground piping and building drain piping as indicated, and where not indicated, according to the following:
 1. Size same as drainage piping up to 4-inch NPS (DN100). Use 4-inch NPS (DN100) for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet (15 m) for piping 4-inch NPS (DN100) and smaller and 100 feet (30 m) for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- K. Install cleanout deck plates, of types indicated, with top flush with finished floor, for floor cleanouts for piping below floors.
- L. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.
- M. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.
- N. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.
- O. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch (25-mm) clearance between vent pipe and roof substrate.
- P. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor or as indicated. Size outlets as indicated.

- Q. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
1. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
 2. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to one percent slope.
 3. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.
- R. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- S. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
- T. Position floor drains for easy access and maintenance.
- U. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions. Size outlets as indicated.
- V. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
- W. Position roof drains for easy access and maintenance.
- X. Install interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing.
1. Above-Floor Installation: Set unit with bottom resting on floor, unless otherwise indicated.
 2. Flush with Floor Installation: Set unit and extension if required, with cover flush with finished floor.
 3. Recessed Floor Installation: Set unit in receiver housing having bottom or cradle supports, with receiver housing cover flush with finished floor.
 4. Pit Installation: Set unit in pit as indicated.
 5. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.
- Y. Fasten wall-hanging plumbing specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.
- Z. Fasten recessed, wall-mounting plumbing specialties to reinforcement built into walls.
- AA. Secure supplies to supports or substrate.
- BB. Install individual stop valve in each water supply to plumbing specialties. Use ball, gate, or globe valve if specific valve is not indicated.
- CC. Install water-supply stop valves in accessible locations.

- DD. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- EE. Locate drainage piping as close as possible to bottom of floor slab supporting fixtures and drains.
- FF. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.
- GG. Include wood-blocking reinforcement for recessed and wall-mounting plumbing specialties.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties. The following are specific connection requirements:
 - 1. Install piping connections between plumbing specialties and piping specified in other Division 15 Sections.
 - 2. Install piping connections indicated between appliances and equipment specified in other Sections; connect directly to plumbing piping systems.
 - 3. Install piping connections indicated as indirect wastes from appliances and equipment specified in other Sections, to spill over receptors connected to plumbing piping systems.
- B. Install hoses between plumbing specialties and appliances as required for connections.
- C. Arrange for electric-power connections to plumbing specialties and devices that require power. Electric power is specified in Division 16 Sections.
- D. Supply Runouts to Plumbing Specialties: Install hot- and cold-water-supply piping of sizes indicated, but not smaller than required by authorities having jurisdiction.
- E. Drainage Runouts to Plumbing Specialties: Install drainage and vent piping, with approved trap, of sizes indicated, but not smaller than required by authorities having jurisdiction.
- F. Interceptor Connections: Connect piping, flow-control fittings, and accessories as indicated.
 - 1. Grease Interceptors: Connect inlet and outlet to unit, and flow-control fitting and vent to unit inlet piping. Install valve on outlet of automatic drawoff-type unit.
 - 2. Grease Recovery Units: Connect inlet, outlet, and vent piping; controls; electric power; and factory-furnished accessories.
 - 3. Oil Interceptors: Connect inlet, outlet, vent, and gravity drawoff piping to unit; flow-control fitting and vent to unit inlet piping; and gravity drawoff and suction piping to oil storage tank.
 - 4. Solids Interceptors: Connect inlet and outlet.
- G. Ground electric-powered plumbing specialties.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- H. Arrange for electric-power connections to plumbing specialties and devices that require power. Electric power, wiring, and disconnect switches are specified in Division 16 Sections.

3.3 FLASHING INSTALLATION

- A. Fabricate flashing manufactured from single piece unless large pans, sumps, or other drainage shapes are required.
- B. Burn joints of lead sheets where required.
- C. Solder joints of copper sheets where required.
- D. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (2500 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.
- E. Set flashing on floors and roofs in solid coating of bituminous cement.
- F. Secure flashing into sleeve and specialty clamping ring or device.
- G. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 7 Section "Sheet Metal Flashing and Trim."
- H. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having caulking recess.
- I. Fabricate and install flashing and pans, sumps, and other drainage shapes as indicated. Install drain connection if indicated.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Provide services of factory-authorized service representative to supervise the field assembly of components and installation of grease recovery units, including piping and electrical connections, and to report results in writing.
1. Test and adjust plumbing specialty controls and safeties. Replace damaged and malfunctioning controls and components.

3.5 COMMISSIONING

- A. Before startup, perform the following checks:
1. System tests are complete.

2. Damaged and defective specialties and accessories have been replaced or repaired.
 3. Clear space is provided for servicing specialties.
- B. Before operating systems, perform the following steps:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open general-duty valves to fully open position.
 3. Remove and clean strainers.
 4. Verify that drainage and vent piping are clear of obstructions. Flush with water until clear.
- C. Startup Procedures: Follow manufacturer's written instructions. If no procedures are prescribed by manufacturer, proceed as follows:
1. Energize circuits for electrically operated units. Start and run units through complete sequence of operations.
- D. Adjust operation and correct deficiencies discovered during commissioning.

3.6 DDEMONSTRATION

- A. Startup Services: Engage a factory-authorized service representative to perform startup services and train Owner's maintenance personnel as specified below:
1. Train Owner's maintenance personnel on procedures and schedules related to startup of and servicing interceptors.
 2. Train Owner's maintenance personnel on procedures and schedules related to startup of and servicing grease recovery units.
 3. Review data in the maintenance manuals. Refer to Division 1 Section "Contract Closeout."
 4. Review data in the maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
 5. Schedule training with Owner with at least 7 days' advance notice.

3.7 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

3.8 CLEANOUT SCHEDULE

- A. Cleanout CO-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:
1. Applicable Standard: [ASME A112.36.2M.] [ASME A112.3.1.] <INSERT OTHER>

2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - b. <INSERT PRODUCT NAME; >Josam Co.
 - c. <INSERT PRODUCT NAME; >Josam Co., Blucher-Josam Div.
 - d. <INSERT PRODUCT NAME; >LSP-Specialty Products Co.
 - e. <INSERT PRODUCT NAME; >Sioux Chief Manufacturing Co., Inc.
 - f. <INSERT PRODUCT NAME; >Smith: Jay R. Smith Mfg. Co.
 - g. <INSERT PRODUCT NAME; >Tyler Pipe, Wade Div.
 - h. <INSERT PRODUCT NAME; >Watts Industries, Inc., Ancon Drain Div.
 - i. <INSERT PRODUCT NAME; >Zurn Industries, Inc., Hydromechanics Div.
4. Application: [Floor cleanout.] [Wall cleanout.] [For installation in exposed piping.] <INSERT OTHER>
5. Body or Ferrule Material: [Cast iron.] [Plastic.] [Stainless steel.] <INSERT OTHER>
6. Clamping Device: [Required.] [Not required.]
7. Outlet Connection: [Threaded.] [Inside caulk.] [Spigot.]
8. Closure: [Brass plug with straight threads and gasket.] [Brass plug with tapered threads.] [Plastic plug.] <INSERT OTHER>
9. Adjustable Housing Material: [Cast iron] [Plastic] with [threads.] [Set screws or other device.] <INSERT OTHER>
10. Frame and Cover Material and Finish: [Painted cast iron.] [Nickel-brass, copper alloy.] [Polished brass.] [Rough brass.] [Stainless steel.] <INSERT OTHER>
11. Frame and Cover Shape: [Round.] [Square.] <INSERT OTHER OR DELETE IF NOT APPLICABLE>
12. Top Loading Classification: [Light Duty.] [Medium Duty.] [Heavy Duty.] [Extra Heavy-Duty.] [Special Duty.] <DELETE IF NOT APPLICABLE>

3.9 FLOOR-DRAIN SCHEDULE

- A. Floor Drain FD-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:
 1. Applicable Standard: [ASME A112.21.1M.] [ASME A112.21.1M floor drain with ASME A112.14.1 backwater valve.] [ASME A112.3.1.] <INSERT OTHER>

2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - b. <INSERT PRODUCT NAME; >Josam Co.
 - c. <INSERT PRODUCT NAME; >Josam Co., Blucher-Josam Div.
 - d. <INSERT PRODUCT NAME; >Sioux Chief Manufacturing Co., Inc.
 - e. <INSERT PRODUCT NAME; >Smith: Jay R. Smith Mfg. Co.
 - f. <INSERT PRODUCT NAME; >Tyler Pipe, Wade Div.
 - g. <INSERT PRODUCT NAME; >Watts Industries, Inc., Ancon Drain Div.
 - h. <INSERT PRODUCT NAME; >Zurn Industries, Inc., Hydromechanics Div.
4. Body Material: [Cast iron.] [Stainless steel.] <INSERT OTHER>
5. Seepage Flange: [Required.] [Not required.] [Anchor flange.]
6. Clamping Device: [Required.] [Not required.]
7. Outlet: [Bottom.] [Side.] <INSERT OTHER>
8. Sediment Bucket: [Required.] [Not required.] <INSERT DESCRIPTION>
9. Top or Strainer Material: [Cast iron.] [Stainless steel.] [Brass.] <INSERT OTHER>
10. Top of Body and Strainer Finish: [Nickel brass.] [Polished brass.] [Rough brass.] [Stainless steel.] <INSERT OTHER>
11. Top Shape: [Round.] [Square.] <INSERT OTHER>
12. Dimensions of Top or Strainer: <INSERT DIMENSIONS AND DESCRIBE BODY, SUMP, AND GRATE IF REQUIRED>
13. Top Loading Classification: [Light Duty.] [Medium Duty.] [Heavy Duty.] [Extra Heavy-Duty.] [Special Duty.]
14. Funnel: [Required.] [Not required.]
15. Funnel Dimensions: [Not required.] <INSERT DIMENSIONS>
16. Inlet Fitting: [Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.] [Not required.]
17. Trap Material: [Cast iron.] [Bronze.] [Copper.] [Not required.] <INSERT OTHER>
18. Trap Pattern: [Standard P-trap.] [Deep-seal P-trap.] [Not required.] <INSERT OTHER>

19. Trap Features: [Cleanout.] [Trap seal primer valve drain connection.] [Cleanout and trap seal primer valve drain connection.] [Not required.] <INSERT OTHER>

3.10 PLASTIC FLOOR-DRAIN SCHEDULE

- A. Plastic Floor Drain PFD-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:

1. Applicable Standard: [ASME A112.21.1M, except material and top loading classification.] <INSERT OTHER>
2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >B & K Industries, Inc.
 - b. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - c. <INSERT PRODUCT NAME; >IPS Corp.
 - d. <INSERT PRODUCT NAME; >LSP-Specialty Products Co.
 - e. <INSERT PRODUCT NAME; >Plastic Oddities, Inc.
 - f. <INSERT PRODUCT NAME; >Sioux Chief Manufacturing Co., Inc.
 - g. <INSERT PRODUCT NAME; >Sloane: R & G Sloane Co.
 - h. <INSERT PRODUCT NAME; >Town & Country Plastics, Inc.
4. Material: [ABS plastic.] [PVC plastic.] [ABS or PVC plastic.] <INSERT OTHER>
5. Seepage Flange: [Required.] [Not required.]
6. Clamping Device: [Required.] [Not required.]
7. Outlet: [Bottom.] [Side.] <INSERT OTHER>
8. Sediment Bucket: [Required.] [Not required.] <INSERT DESCRIPTION>
9. Top or Strainer Material: [Plastic.] [Brass.] [Stainless steel.] <INSERT OTHER>
10. Top of Body and Strainer Finish: [Nickel brass.] [Polished brass.] [Rough brass.] [Stainless steel.] <INSERT OTHER>
11. Top Shape: [Round.] [Square.] <INSERT OTHER>
12. Dimensions of Top or Strainer: <INSERT DIMENSIONS AND DESCRIBE BODY, SUMP, AND GRATE IF REQUIRED>
13. Shape: [Round.] [Square.] <SELECT APPLICABLE SHAPE OR DELETE>
14. Trap Material: [Cast iron.] [Plastic drainage piping.] [Not required.] <INSERT OTHER>

15. Trap Pattern: [Standard P-trap.] [Not required.] <INSERT OTHER>

3.11 ROOF-DRAIN SCHEDULE

A. Roof Drain RD-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:

1. Applicable Standard: [ASME A112.21.2M.] [ASME A112.3.1.] <INSERT OTHER>
2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - b. <INSERT PRODUCT NAME; >Josam Co.
 - c. <INSERT PRODUCT NAME; >Josam Co., Blucher-Josam Div.
 - d. <INSERT PRODUCT NAME; >Marathon Roofing Products, Inc.
 - e. <INSERT PRODUCT NAME; >Portals Plus, Inc.
 - f. <INSERT PRODUCT NAME; >Sioux Chief Manufacturing Co., Inc.
 - g. <INSERT PRODUCT NAME; >Smith: Jay R. Smith Mfg. Co.
 - h. <INSERT PRODUCT NAME; >Thunderbird Products, Inc.
 - i. <INSERT PRODUCT NAME; >Tyler Pipe, Wade Div.
 - j. <INSERT PRODUCT NAME; >U-Flow Drain Systems, Inc.
 - k. <INSERT PRODUCT NAME; >Watts Industries, Inc., Ancon Drain Div.
 - l. <INSERT PRODUCT NAME; >Zurn Industries, Inc., Hydromechanics Div.
4. Body Material: [Cast iron.] [Stainless steel.] [Copper.] <INSERT OTHER>
5. Dimensions of Body: <INSERT DIMENSIONS AND DESCRIBE BODY AND SUMP IF REQUIRED>
6. Combination Flashing Ring and Gravel Stop: [Required.] [Not required.] <INSERT OTHER>
7. Outlet: [Bottom.] [Side.] [Angle.] <INSERT OTHER>
8. Dome Material: [Cast iron.] [Aluminum.] [Stainless steel.] <INSERT OTHER>
9. Extension Collars: [Required.] [Not required.]
10. Underdeck Clamp: [Required.] [Not required.]
11. Sump Receiver: [Required.] [Not required.]

3.12 PLASTIC ROOF-DRAIN SCHEDULE

- A. Plastic Roof Drain PRD-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:
1. Applicable Standard: [ASME A112.21.2M, except material.] <INSERT OTHER>
 2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - b. <INSERT PRODUCT NAME; >LSP-Specialty Products Co.
 - c. <INSERT PRODUCT NAME; >Marathon Roofing Products, Inc.
 - d. <INSERT PRODUCT NAME; >Plastic Oddities, Inc.
 - e. <INSERT PRODUCT NAME; >Portals Plus, Inc.
 - f. <INSERT PRODUCT NAME; >Sioux Chief Manufacturing Co., Inc.
 - g. <INSERT PRODUCT NAME; >Sloane: R & G Sloane Co.
 - h. <INSERT PRODUCT NAME; >Town & Country Plastics, Inc.
 - i. <INSERT PRODUCT NAME; >U-Flow Drain Systems, Inc.
 4. Body Material: [ABS plastic.] [PVC plastic.] [ABS or PVC plastic.] <INSERT OTHER>
 5. Dimensions of Body: <INSERT DIMENSIONS AND DESCRIBE BODY AND SUMP IF REQUIRED>
 6. Combination Flashing Ring and Gravel Stop: [Required.] [Not required.] <INSERT OTHER>
 7. Outlet: [Bottom.] [Side.] <INSERT OTHER>
 8. Dome Material: [ABS plastic.] [PVC plastic.] [ABS or PVC plastic.] <INSERT OTHER>
 9. Underdeck Clamp: [Required.] [Not required.]

3.13 GREASE-INTERCEPTOR SCHEDULE

- A. Grease Interceptor GI-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:
1. Applicable Standard: [PDI-G101.] <INSERT OTHER>
 2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 3. Products: Subject to compliance with requirements, provide one of the following:

- a. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - b. <INSERT PRODUCT NAME; >Josam Co.
 - c. <INSERT PRODUCT NAME; >Rockford Sanitary Systems, Inc.
 - d. <INSERT PRODUCT NAME; >Schier Products Co.
 - e. <INSERT PRODUCT NAME; >Scienco Systems Inc.
 - f. <INSERT PRODUCT NAME; >Smith: Jay R. Smith Mfg. Co.
 - g. <INSERT PRODUCT NAME; >Town & Country Plastics, Inc.
 - h. <INSERT PRODUCT NAME; >Tyler Pipe, Wade Div.
 - i. <INSERT PRODUCT NAME; >Watts Industries, Inc., Ancon Drain Div.
 - j. <INSERT PRODUCT NAME; >Ulscan Mechanical Sales, Ltd., MIFAB Div.
 - k. <INSERT PRODUCT NAME; >Zurn Industries, Inc., Hydromechanics Div.
4. Body Material: [Cast iron.] [Cast iron or steel.] [Fiberglass.] [Plastic.] <INSERT OTHER>
 5. Interior Coating: [Corrosion-resistant enamel.] [Not required.] <INSERT OTHER>
 6. Exterior Coating: [Corrosion-resistant enamel.] [Not required.] <INSERT OTHER>
 7. Body Dimensions: <INSERT DIMENSIONS>
 8. Body Extension: [Required.] [Not required.]
 9. Flow Rate: <INSERT INTERCEPTOR DESIGN RATE>
 10. Grease Retention Capacity: <INSERT CAPACITY>
 11. Inlet and Outlet Size: <INSERT SIZE>
 12. End Connections: [Threaded.] [Hub.] [Flanged.]
 13. Cleanout: [Integral.] [Integral or field installed on outlet.]
 14. Mounting: [Above floor.] [Recessed in acid-resistant, coated steel frame and cradle.] [Recessed, flush with floor.] <INSERT OTHER>
 15. Flow-Control Fitting: [Required.] [Not required.]
 16. Operation: [Manual cleaning.] [Automatic recovery.] [Semiautomatic, manual drawoff.] <INSERT OTHER>

3.14 GREASE RECOVERY UNIT SCHEDULE

- A. Grease Recovery Unit GRU-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:

1. Applicable Standard: [PDI-G101, except grease retention capacity.] <INSERT OTHER>
2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >G K & L, Inc.
 - b. <INSERT PRODUCT NAME; >International G R D, Inc.
 - c. <INSERT PRODUCT NAME; >Lowe Engineering Co.
 - d. <INSERT PRODUCT NAME; >Thermaco, Inc.
 - e. <INSERT PRODUCT NAME; >Zurn Industries, Inc., Hydromechanics Div.
4. Body Material: [Stainless steel.] [Steel.] <INSERT OTHER>
5. Interior Separation Device: [Baffles.] [Screens.] <INSERT OTHER>
6. Heater: [Required.] [Not required.]
7. Interior Coating: [Not required.] <INSERT DESCRIPTION IF REQUIRED>
8. Exterior Coating: [Not required.] <INSERT DESCRIPTION IF REQUIRED>
9. Unit Dimensions: <INSERT DIMENSIONS>
10. Flow Rate: <INSERT UNIT DESIGN RATE>
11. Basket Material: [Stainless steel.] <INSERT OTHER>
12. Inlet and Outlet Size: <INSERT SIZE>
13. End Connections: [Threaded.] [Hub.] [Flanged.]
14. Cleanout: [Integral.] [Integral or field installed on outlet.]
15. Mounting: [Above floor.] <INSERT OTHER>
16. Flow-Control Fitting: [Required.] [Not required.]
17. Operation: [Automatic recovery.] <INSERT OTHER>
18. Power Requirement: [120 V, ac.] <INSERT OTHER>

3.15 OIL-INTERCEPTOR SCHEDULE

- A. Oil Interceptor OI-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:
 1. Applicable Standard: <INSERT IF KNOWN OR DELETE SUBPARA>

2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - b. <INSERT PRODUCT NAME; >Great Lakes Environmental, Inc.
 - c. <INSERT PRODUCT NAME; >Josam Co.
 - d. <INSERT PRODUCT NAME; >Rockford Sanitary Systems, Inc.
 - e. <INSERT PRODUCT NAME; >Schier Products Co.
 - f. <INSERT PRODUCT NAME; >Smith: Jay R. Smith Mfg. Co.
 - g. <INSERT PRODUCT NAME; >Town & Country Plastics, Inc.
 - h. <INSERT PRODUCT NAME; >Tyler Pipe, Wade Div.
 - i. <INSERT PRODUCT NAME; >Ulscan Mechanical Sales, Ltd., MIFAB Div.
 - j. <INSERT PRODUCT NAME; >Watts Industries, Inc., Ancon Drain Div.
 - k. <INSERT PRODUCT NAME; >Zurn Industries, Inc., Hydromechanics Div.
4. Body Material: [Cast iron or steel.] [Fiberglass.] [Plastic.] <INSERT OTHER>
5. Interior Coating: [Corrosion-resistant enamel.] [Not required.] <INSERT OTHER>
6. Exterior Coating: [Corrosion-resistant enamel.] [Not required.] <INSERT OTHER>
7. Body Dimensions: <INSERT DIMENSIONS>
8. Flow Rate: <INSERT INTERCEPTOR DESIGN RATE>
9. Inlet and Outlet Size: <INSERT SIZE>
10. End Connections: [Threaded.] [Hub.] [Flanged.]
11. Cleanout: [Integral.] [Integral or field installed on outlet.]
12. Mounting: [Above floor.] [Recessed in acid-resistant, coated steel frame and cradle.] [Recessed, flush with floor.] <INSERT OTHER>
13. Flow-Control Fitting: [Required.] [Not required.]
14. Descriptive Type or Function: <DESCRIBE OR DELETE SUBPARA>
15. Oil Storage Tank: [Coordinate with Division 2 Section "Oil Distribution Systems."] <INSERT OTHER>

3.16 SOLIDS-INTERCEPTOR SCHEDULE

- A. Solids Interceptor SI-[#]: Where plumbing specialties of this designation are indicated, provide products complying with the following:
1. Applicable Standard: <INSERT IF KNOWN OR DELETE SUBPARA>
 2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. <INSERT PRODUCT NAME; >Enpoco, Inc.
 - b. <INSERT PRODUCT NAME; >Josam Co.
 - c. <INSERT PRODUCT NAME; >Rockford Sanitary Systems, Inc.
 - d. <INSERT PRODUCT NAME; >Schier Products Co.
 - e. <INSERT PRODUCT NAME; >Smith: Jay R. Smith Mfg. Co.
 - f. <INSERT PRODUCT NAME; >Town & Country Plastics, Inc.
 - g. <INSERT PRODUCT NAME; >Tyler Pipe, Wade Div.
 - h. <INSERT PRODUCT NAME; >Ulscan Mechanical Sales, Ltd., MIFAB Div.
 - i. <INSERT PRODUCT NAME; >Watts Industries, Inc., Ancon Drain Div.
 - j. <INSERT PRODUCT NAME; >Zurn Industries, Inc., Hydromechanics Div.
 4. Body Material: [Cast iron or steel.] [Stainless steel.] [Bronze.] [Fiberglass.] <INSERT OTHER>
 5. Interior Separation Device: [Baffles.] [Screens.] <INSERT OTHER>
 6. Interior Coating: [Corrosion-resistant enamel.] [Not required.] <INSERT OTHER>
 7. Exterior Coating: [Corrosion-resistant enamel.] [Not required.] <INSERT OTHER>
 8. Body Dimensions: <INSERT DIMENSIONS>
 9. Flow Rate: [Not required.] <INSERT OTHER>
 10. Inlet and Outlet Size: <INSERT SIZE>
 11. End Connections: [Threaded.] <INSERT OTHER>
 12. Mounting: [Inline.] [Above floor.] <INSERT OTHER>

END OF SECTION 15430