
SECTION 22 30 00

PLUMBING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Backflow Preventers
 2. Water Regulators
 3. Thermostatic Mixing Valves
 4. Clothes Washer Drain & Supply
 5. Hydrants
 6. Trap Primer Valves
 7. Drain Valves
 8. Backwater Valves
 9. Floor Drains
 10. Roof Drains
 11. Grease Interceptors
 12. Oil Interceptors
 13. Lint Interceptors
 14. Miscellaneous Piping Specialties

1.2 REFERENCES

- A. [The American Society of Mechanical Engineers \(ASME\)](#) Publications:
1. A112.1.2 "Air Gaps in Plumbing Systems (For Plumbing Fixtures and Water-Connected Receptors)"
 2. A112.14.1 "Backwater Valves"
 3. A112.3.1 "Grate Openings"
 4. A112.21.1M "Floor Drains"
 5. A112.21.2M "Roof Drains"
 6. A112.21.3M "Hydrants for Utility and Maintenance Use"
 7. B1.20.7 "Hose Coupling Screw Threads, Inch"
 8. B31.9 "Building Services Piping"
- B. [American Society of Sanitary Engineering \(ASSE\)](#) Publications:
1. 1001 "Performance Requirements for Atmospheric Type Vacuum Breakers"
 2. 1003 "Performance Requirements for Water Pressure Reducing Valves"
 3. 1010 "Performance Requirements for Water Hammer Arresters"
 4. 1011 "Performance Requirements for Hose Connection Vacuum Breakers"
 5. 1012 "Performance Requirements for Backflow Preventer with Intermediate Atmospheric Vent"

6. 1013 "Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers"
 7. 1015 "Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies"
 8. 1017 "Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems"
 9. 1018 "Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied"
 10. 1019 "Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type"
 11. 1020 "Performance Requirements for Pressure Vacuum Breaker Assembly"
- C. [ASTM International \(ASTM\)](#) Publications: (Former American Society for Testing and Materials)
1. A48 "Standard Specification for Gray Iron Castings"
 2. A74 "Standard Specification for Cast Iron Soil Pipe and Fittings"
 3. B62 "Standard Specification for Composition Bronze or Ounce Metal Castings"
 4. C564 "Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings"
- D. [American Water Works Association \(AWWA\)](#) Publications:
1. C550 "Standard for Protective Interior Coatings for Valves and Hydrants"
- E. [Food and Drug Administration \(FDA\)](#) Publications:
- F. [National Fire Protection Association \(NFPA\)](#) Publications:
1. 70 "National Electric Code"
- G. [Plumbing & Drainage Institute \(PDA\)](#) Publications:
1. G101 "Testing and Rating Procedure for Grease Interceptors"
 2. WH 201 "Water Hammer Arresters Standard"
- H. [Underwriter's Laboratories, Inc. \(UL\)](#) Standards:
1. 486A "Standard For Wire Connectors and Soldering Lugs for Use With Copper Conductors"
 2. 486B "Standard for Wire Connectors for Use With Aluminum Conductors"
- 1.3 QUALITY ASSURANCE
- A. Provide listing/approval stamp, label, or other marking on plumbing specialties made to specified standards.
- B. 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.
- C. Comply with [ASME](#) B31.9, "Building Services Piping," for materials, products, and installation.

- D. Comply with [NFPA 70](#), "National Electrical Code," for electrical components.

1.4 EXTRA MATERIALS

- A. Deliver extra materials to Owner at end of project as follows:
1. Two (2) guestroom lav faucets.
 2. Two (2) guestroom shower/tub faucets.
 3. Two (2) guestroom toilet tank replacement kits.
 4. Five (5) guestroom lav faucet replacement cartridges.
 5. Five (5) guestroom shower/tub valve replacement cartridges.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturers:
1. Backflow Preventers:
 - a. [Watts Water Technologies, Inc.](#) (978-688-1811)
 - b. [Zurn Industries, Inc.](#); Wilkins Div. (805-238-7100)
 2. Water Regulators:
 - a. [Conbraco Industries, Inc.](#) (704-847-9191)
 - b. [Watts Water Technologies, Inc.](#) (978-688-1811)
 - c. [Zurn Industries, Inc.](#); Wilkins Div. (805-238-7100)
 3. Thermostatic Water Mixing Valves:
 - a. [Armstrong](#) (269-279-3158 – Ryan Bloss)
 4. Clothes Washer Drain & Supply
 - a. [Acorn Engineering Co.](#) (800-488-8999)
 - b. [Guy Gray Manufacturing Co., Inc.](#), [IPS Corporation](#) (800-421-2677)
 - c. [Symmons Industries, Inc.](#) (617-848-2250)
 5. Hydrants:
 - a. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 - b. [Woodford Manufacturing Co.](#) (719-574-0600)
 - c. [Zurn Industries, Inc.](#); Hydromechanics Div. (814-455-0921)
 6. Water Hammer Arresters:
 - a. [Precision Plumbing Products, Inc.](#) (503-256-4010)
 - b. [Sioux Chief Manufacturing Co., Inc.](#) (816-779-6104)
 - c. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 7. Trap Primer Valves:
 - a. [Precision Plumbing Products, Inc.](#) (503-256-4010)
 - b. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 - c. [Watts Water Technologies, Inc.](#) (978-688-1811))
 - d. [Zurn Industries, Inc.](#); Hydromechanics Div. (814-455-0921)
 8. Backwater Valves:

- a. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
- b. [Watts Water Technologies, Inc.](#) (978-688-1811)
- c. [Zurn Industries, Inc.](#); Hydromechanics Div.(814-455-0921)
- 9. Floor Drains
 - a. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 - b. [Josam Co.](#) (800-365-6726)
 - c. [Zurn Industries, Inc.](#) (814-455-0921)
- 10. Roof Drains
 - a. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 - b. [Josam Co.](#) (800-365-6726)
 - c. [Zurn Industries, Inc.](#) (814-455-0921)
- 11. Grease Interceptors
 - a. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 - b. [Josam Co.](#) (800-365-6726)
 - c. [Zurn Industries, Inc.](#); Jonespec Div. (814-455-0921)
- 12. Oil Interceptors
 - a. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 - b. [Josam Co.](#) (800-365-6726)
 - c. [Zurn Industries, Inc.](#) (814-455-0921)
- 13. Lint Interceptors
 - a. [Jay R. Smith Mfg. Co., Division of Smith Industries](#) (334-277-8520)
 - b. [Josam Co.](#) (800-365-6726)
 - c. [Zurn Industries, Inc.](#) (814-455-0921)

2.2 BACKFLOW PREVENTERS

- A. General: [ASSE](#) standard, backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.
 - 1. Body: Bronze, with flanged ends.
 - 2. 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: Rough Brass.
 - 5. Strainer on inlet.
 - 6. Test Kit with Plastic Case: Per manufacturer's recommendation.
- B. Pipe-Applied, Atmospheric-Type Vacuum Breakers: [ASSE](#) 1001, with floating disc and atmospheric vent.
- C. 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.
- D. Intermediate Atmospheric-Vent Backflow Preventers: [ASSE](#) 1012, suitable for continuous pressure application. Include inlet screen and 2 independent check valves with intermediate atmospheric vent.

- E. 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: 10 psig maximum, through middle one-third of flow range.
- F. 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 maximum, through middle one-third of flow range.
- G. 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 maximum, through middle one-third of flow range.

2.3 WATER REGULATORS

- A. General: [ASSE](#) 1003, water regulators, rated for initial working pressure of 150 psig 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: Standard
 - 5. Single-seated, direct-operated type.
- B. Single-seated, direct-operated, integral-bypass type.
- C. Pilot-operated type, single- or double-seated, cast-iron-body main valve, with bronze-body pilot valve

2.4 THERMOSTATIC MIXING VALVES

- A. Per plans.

2.5 CLOTHES WASHER DRAIN & SUPPLY

- A. General: Recessed-mounting outlet boxes with fittings complying with [ASME](#) A112.18.1. 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: Plastic.
 - 2. Shutoff Fittings: 2 hose bibbs.

3. Supply Fittings: Two 1/2-inch NPS (DN15) gate, globe, or ball valves and 1/2-inch NPS (DN15) copper, water tubing.
4. 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.

2.6 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. Finish: Nickel bronze.
- B. Wall Hydrants: [ASME](#) A112.21.3M or [ASSE](#) 1019, nonfreeze, automatic draining, anti-back flow 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: Recessed
 2. Finish: Nickel bronze.

2.7 TRAP PRIMER VALVES

- A. Trap Seal Primer Valves: [ASSE](#) 1018, water-supply-fed type, with the following characteristics:
 1. 125-psig 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. Finished: Rough bronze.

2.8 DRAIN VALVES

- A. Hose-End Drain Valves: MSS SP-110, 3/4-inch NPS (DN20) ball valve, rated for 400-psig minimum CWP. Include 2-piece, [ASTM](#) B62 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](#) B62 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. Stop-and-Waste Drain Valves: MSS SP-110, ball valve, rated for 200-psig minimum CWP or MSS SP-80, Class 125, gate valve; [ASTM](#) B62 bronze body, with 1/8-inch NPS (DN6) side drain outlet and cap.

2.9 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. Open-Position Check Valve: Factory assembled or field modified to hang open unless subject to backflow condition.
 - 2. Extension: [ASTM](#) A74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor, instead of cover.

2.10 FLOOR DRAINS

- A. Floor Drains:
 - 1. Comply with [ASME](#) A112.21.1M and [ASME](#) A112.3.1.
 - 2. Refer to Plumbing Fixture Matrix

2.11 ROOF DRAINS

- A. Roof Drains:
 - 1. Comply with [ASME](#) A112.21.2M and [ASME](#) A112.3.1.
 - 2. Refer to Plumbing Fixture Matrix on plans.

2.12 GREASE INTERCEPTORS

- A. Comply with [PDI](#)-G101.
- B. See Schedule on plans.

2.13 LINT INTERCEPTORS

- A. Body Material: Cast iron or steel.

2.14 MISCELLANEOUS PIPING SPECIALTIES

- A. Water Hammer Arresters: [ASSE](#) 1010, or [PDI](#)-WH 201, bellows or piston type with pressurized cushioning chamber. Sizes are based on water-supply fixture units.
- B. Interior 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. Operation: Wheel handle.
- C. Roof Flashing Assemblies: Coordinate with Division 07 Sections for roofing systems.
- D. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.

- E. 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.
- F. 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.
- G. 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.
- H. 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 enclosed air space between outside of pipe and inside of flashing collar extension, with counter flashing, as indicated.
- I. 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.
- J. Downspout Boots: [ASTM](#) A48, gray-iron casting, with 4-inch NPS (DN100) outlet; shop-applied bituminous coating; and inlet size indicated.
- K. Downspout Boots: [ASTM](#) A74, Service class, hub-and-spigot, cast-iron soil pipe

PART 3 - EXECUTION

3.1 PLUMBING SPECIALTY INSTALLATION

- A. General:
 - 1. Install plumbing specialty components, connections, and devices according to manufacturer's written instructions
 - 2. Install expansion joints on vertical risers, stacks, and conductors as shown on risers.
 - 3. 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.
 - 4. Fasten recessed, wall-mounting plumbing specialties to reinforcement built into walls.
 - 5. Secure supplies to supports or substrate.
 - 6. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
 - 7. Locate drainage piping as close as possible to bottom of floor slab supporting fixtures and drains.
 - 8. 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.
 - 9. Include wood-blocking reinforcement for recessed and wall-mounting plumbing specialties.
- B. Backflow Preventers:
 - 1. 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. Pressure Regulators:

1. Install pressure regulators with inlet and outlet shutoff valves and balance valve bypass. Install pressure gages on inlet and outlet.

D. Hose Bibbs:

1. Install hose bibbs with integral or field-installed vacuum breaker.

E. Wall Hydrants:

1. Install wall hydrants with integral or field-installed vacuum breaker.

F. Valves:

1. Install trap seal primer valves in accessible locations 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. Identify device locations on record drawings.
2. 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.
3. Install individual stop valve in each water supply to plumbing specialties. Use ball valve.
4. Install water-supply stop valves in accessible locations.

G. Cleanouts:

1. Install cleanouts in aboveground piping and building drain piping as indicated, and where not indicated, according to the following:
 - a. 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.
 - b. Locate at each change in direction of piping greater than 45 degrees.
 - c. Locate at minimum intervals of 50 feet for piping 4-inch NPS (DN100) and smaller and 100 feet for larger piping.
 - d. Locate at base of each vertical soil and waste stack.
2. Install cleanout deck plates, of types indicated, with top flush with finished floor, for floor cleanouts for piping below floors.
3. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed walls.

H. Flashings and Vent Caps

1. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.
2. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions

I. Floor Drains:

1. 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.
 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to one (1) percent slope, but not less than 1/4-inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to one (1) percent slope.
 - c. Radius, 60 Inches or Larger: Equivalent to one (1) percent slope, but not greater than 1-inch total depression.
 3. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
 4. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 5. Position floor drains for easy access and maintenance.
- J. Roof Drains:
1. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions. Size outlets as indicated.
 2. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
 3. Position roof drains for easy access and maintenance.
- K. Interceptors:
1. Install interceptors, including trapping, venting, and flow control fitting, according to authorities having jurisdiction and with clear space for servicing.
 - a. Above-Floor Installation: Set unit with bottom resting on floor, unless otherwise indicated.
 - b. Flush with Floor Installation: Set unit and extension if required, with cover flush with finished floor.
 - c. Recessed Floor Installation: Set unit in receiver housing having bottom or cradle supports, with receiver housing cover flush with finished floor.
 - d. Install clean out immediately downstream from interceptors not having integral cleanout on outlet.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 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 22 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. Provide 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 26 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.

3.3 FLASHING INSTALLATION

- A. Fabricate flashing manufactured from single piece unless large pans, sumps, or other drainage shapes are required.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counter flashing or commercially made flashing fittings, according to Division 07 Sections for type of roofing.
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.
- G. 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.
- D. Adjust operation and correct deficiencies discovered during commissioning.

3.6 DEMONSTRATION

- 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.

3.7 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.

END OF SECTION