**SECTION 22 05 14**

**PLUMBING SPECIALTIES**

**BASED ON DFD MASTER SPECIFICATION DATED 10/1/12**

***This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.***

**P A R T 1 - G E N E R A L**

**SCOPE**

This section includes specifications for floor drains, roof drains, cleanouts, backflow preventers, water hammer arrestors and other miscellaneous plumbing specialties.

PART 1 - GENERAL

 Scope

 Related Documents

 Reference

 Reference Standards

 Quality Assurance

 Shop Drawings

 Operation and Maintenance Data

PART 2 - PRODUCTS

 Floor Drains

 Floor Sinks

 Hub Drains

 Roof Drains

 Trench Drains

 Cleanouts

 Backwater Valves

 Subsoil Drain Tile Receivers

 Water Hammer Arrestors

 Backflow Preventers

 Wall Hydrants

 Yard Hydrants

 Hose Bibbs

 Trap Primer Valves

 Fire Hydrants

 Valve Boxes

 Manholes and Catch Basins

 Safings

 Vent Flashings

 Washing Machine Wall Boxes

 Interior Grease Interceptors

PART 3 - EXECUTION

 Installation

 Construction Verification Items

 Agency Training

**RELATED DOCUMENTS**

Section 01 91 01 or 01 91 02 – Commissioning Process

Section 22 08 00 – Commissioning of Plumbing

Section 22 11 00 - Facility Water DistributionSection 22 13 00 - Facility Sanitary SewerageSection 22 14 00 - Facility Storm DrainageSection 22 15 13 - General Service Compressed-Air PipingSection 22 50 00 - Pool and Fountain Plumbing SystemsSection 22 60 00 - Gas and Vacuum Systems for Laboratory and Healthcare FacilitiesSection 22 63 00 - Gas Systems for Laboratory and Healthcare FacilitiesSection 22 67 00 - Processed Water Systems for Laboratory and Healthcare Facilities

Section 22 05 23 - General-Duty Valves for Plumbing Piping

**REFERENCE**

Applicable provisions of Division 1 shall govern work under this section.

**REFERENCE STANDARDS**

ANSI A112.14.1 - Backwater Valves

ANSI A112.21.1 - Floor Drains.

ANSI A112.21.2 - Roof Drains.

ANSI A112.26.1/PDI WH-201 ‑ Water Hammer Arrestors.

ASSE 1001 - Pipe Applied Atmospheric Type Vacuum Breakers.

ASSE 1010 - Water Hammer Arrestors.

ASSE 1011 - Hose Connection Vacuum Breakers.

ASSE 1012 - Backflow Preventers with Intermediate Atmospheric Vent.

ASSE 1013 - Reduced Pressure Principle Backflow Preventers.

ASSE 1018 - Trap Seal Primer Valves.

ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining, Anti-Backflow Type.

**QUALITY ASSURANCE**

Substitution of Materials: Refer to Section GC - General Conditions of the Contract, Equals and Substitutions..

Plumbing products requiring approval by the State of Wisconsin Dept. of Safety and Professional Services must be approved or have pending approval at the time of shop drawing submission.

**SHOP DRAWINGS**

Include data concerning dimensions, capacities, materials of construction, ratings, certifications, weights, manufacturer's installation requirements, manufacturer's performance limitations, and appropriate identification.

# OPERATION AND MAINTENANCE DATA

All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

***Delete the following if there are no additional requirements.***

In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation:

1. ***[A/E and commissioning provider to define detailed operation and maintenance data requirements for equipment specifications added to this section.]***

**P A R T 2 - P R O D U C T S**

***Manufacturer and model number may be altered after product descriptions to further define specific product type, features, quality and size for each specific project requirement.***

**FLOOR DRAINS**

Manufacturer: Josam, Smith, Wade, Watts, Zurn.

FD‑1: 3" min. ( 2” min. for single shower drains ) enameled cast iron two piece body with double drainage flange, weep holes, reversible clamping adjustable collar, adjustable 6"x6" min. square or round polished nickel‑bronze strainer with threaded collar, bottom outlet. Zurn ZN-415-S or B.

FD-1A: same as FD-1 with the addition of the trap guard diaphragm called out below.

FD‑2: 4" enameled heavy duty cast iron two piece body with double drainage flange, weep holes, heavy duty adjustable 9" round coated cast iron tractor grate strainer, with sediment bucket, bottom outlet. Zurn Z-556-Y

FD-2A: same as FD-2 with the addition of the trap guard diaphragm called out below.

FD‑3: 4" enameled heavy duty cast iron two piece body with double drainage flange, weep holes, heavy duty adjustable 9" round coated cast iron tractor grate strainer, with sediment bucket, with 6" round coated cast iron funnel, bottom outlet. Zurn Z-556-Y / Z-328.

FD-3A: same as FD3 with the addition of the trap guard diaphragm called out below.

FD‑4: 4" enameled extra heavy duty cast iron two piece body with seepage pan , weep holes, heavy duty adjustable 13” square top, secured coated cast iron tractor grate strainer, sediment bucket, bottom outlet. Zurn Z676-Y-VP.

FD-4A same as FD-4 with the addition of the trap guard diaphragm called out below.

FD-5: 3” min. scupper drain, 6” x 7” size, cast iron body, rear outlet reversible to bottom outlet, secured flush grate, with flashing clamp. Zurn Z-187-FG.

**Trap Guards**

Manufacturer: ProSet Systems Trap Guard, JR Smith Quad Close, Sure Seal or approved equal.

Flexible elastomeric PVC construction diaphragm trap guard for installation in new and existing floor drains, hub drains, and trench drains. Trap guard to prevent trap evaporation and waste backflow. Size as applicable to the drain outlet size, up to 4” size.

**FLOOR SINKS**

Manufacturer: Josam, Smith, Wade, Watts, Zurn.

FS-1: 4” deep cast iron body, 8” x 8” x 6” deep with white epoxy enameled coated interior and square slotted medium duty top grate, with aluminum interior bottom dome strainer, with anchor flange and/or seepage holes and clamping collar for above grade installation. Zurn Z-1910 (KC)

**HUB DRAINS**

Manufacturer: Josam, Smith, Wade, Watts, Zurn.

HD-1: 3“ min. cast iron hub section up 2” min. above floor level, with full-sized P-trap.

HD-1A: same as HD-1 with the addition of the trap guard diaphragm called out above.

HD-2: 3” min. enameled cast iron bottom outlet floor drain body with membrane clamp, adjustable collar and 3” high extension adapter ( less threads on inlet ). Zurn Z-415-U ( modified ). (For use on above grade installations.) .

HD-2A: same as HD-2 with the addition of the trap guard diaphragm called out above.

HD-3: same as HD-2 except with the addition of a ball float type backwater valve. Zurn Z-415-U (modified) / Z-1099 (no-hub).

**ROOF DRAINS**

Manufacturer: Josam, Smith, Wade, Watts, Zurn.

RD‑1: 4" min. bottom outlet roof drain, enameled cast iron body with flashing collar and gravel stop, cast iron dome strainer, adjustable extension, underdeck clamp, 15” diameter. Zurn ZC-100-C-EA

RD‑2: 4" min. side outlet roof drain, enameled cast iron body with flashing collar and gravel stop, cast iron dome strainer, adjustable extension, underdeck clamp, 15” diameter. Zurn ZC-100-90-C-EA.

RD‑3: 4" min. bottom outlet deck drain, enameled cast iron body with flashing collar and secured vandal-proof heavy duty polished bronze heel-proof grate, 14” x 14” square, adjustable extension, underdeck clamp. Zurn ZB-150-C-EA-VP.

**TRENCH DRAINS**

Manufacturer: Aco, Josam, Neenah, Smith, Tyler, Watts, Zurn.

TD‑1: Modular precast polymer concrete, cast iron or polyester fiberglass trench sections with presloped 4" wide radiused interior waterways, knockouts, endcaps, cast iron frame and slotted ductile iron grate, extra heavy duty rated, stainless steel grate holdowns.

**CLEANOUTS**

Manufacturer: Josam, Smith, Wade, Watts, Zurn.

Interior Concrete Floor Areas: Enameled cast iron body with round or square adjustable scoriated polished nickel bronze cover, tapered threaded ABS closure plug. Zurn ZN-1400- / ZN-1400-T.

Interior Ceramic Tile Floor Areas: Enameled cast iron body with square adjustable scoriated nickel bronze cover, tapered threaded ABS closure plug. Zurn ZN-1400-T.

Interior Vinyl Tile Floor Areas: Enameled cast iron body with round adjustable scoriated nickel bronze cover, tapered threaded ABS closure plug. Zurn ZN-1400.

Interior Carpeted Floor Areas: Enameled cast iron body with round adjustable scoriated nickel bronze cover and secured carpet marker, tapered threaded ABS closure plug. Zurn Z-1400-CM.

Interior Finished Wall Areas: Line type cleanout tee with tapered threaded ABS cleanout plug, round polished stainless steel access cover secured with machine screw. Zurn Z-1446- ( Note: Screw shall not pass completely through the ABS plug, trim screw as necessary )

Interior Exposed Vertical Stacks: Line type cleanout tee with tapered threaded ABS closure plug. Zurn Z-1445.

Interior Horizontal Lines: Cast iron hub with tapped ferrule and tapered threaded ABS or PVC closure plug, or no-hub coupling and blind plug.

Exterior Paved Areas: Cast iron hub or plug with tapered threaded ABS or PVC closure plug, cast iron frost sleeve and cover set in 24" square by 4" min. thick reinforced concrete pad top or surrounding pavement, crowned for drainage. Neenah R-1976 with non-ferrous securing screw.

Exterior Unpaved Areas: Cast iron hub or plug with tapered threaded ABS or PVC closure plug, cast iron or PVC frost sleeve and cover set in 24” square by 4” min. thick reinforced concrete pad top. Neenah R-1976 with non-ferrous securing screw.

**BACKWATER VALVES**

Manufacturers:, Josam 67500, Smith 7012, Watts BV-200, Zurn Z1090.

Hub and spigot or No-Hub inlet and outlet cast iron body, cast iron gasketed bolted access cover, bronze valve. Flapper to hang in closed position during non-operation period.

**SUBSOIL DRAIN TILE RECEIVERS**

Manufacturers: Josam, Schier, Smith, Zurn.

Cast iron or polyethylene body with 3 inlets, single lowered outlet, minimum 6" diameter cleanout riser and cleanout top as noted above. Cover unused inlets with water tight caps. Where receiver connects directly to the storm building drain, provide accessible backwater valve.

**WATER HAMMER ARRESTORS**

Manufacturer: PPP Industries, Sioux Chief, Wade, Watts.

ANSI A112.26.1, ASSE 1010; sized in accordance with PDI WH‑201, precharged piston type constructed of hard drawn Type K copper, threaded brass adapter, brass piston with o-ring seals, FDA approved silicone lubricant, suitable for operation in temperature range 35 to 150 degrees F, maximum 250 psig working pressure, 1500 psig surge pressure. Watts series 15.

**BACKFLOW PREVENTERS**

Manufacturers: Beeco, Cla-Val, Conbraco, Febco, Watts, Wilkins.

HOSE CONNECTION VACUUM BREAKERs: ASSE 1011, brass or bronze construction, EPDM diaphragm and seat, rated for 125 psig and 180oF. Watts 8 (interior application).

LAB FAUCET VACUUM BREAKERs: ASSE 1035, brass or bronze construction, chrome plated, EPDM diaphragm and seat, stainless steel internals, rated for 125 psig and 160oF. Watts NLF9.

PIPE APPLIED ATMOSPHERIC TYPE VACUUM BREAKERs: ASSE 1001, same size as pipe, brass or bronze construction, silicone disc, rated for 125 psig and 160oF. Watts 288A.

Anti-Siphon Pressure TYPE VACUUM BREAKERs: ASSE 1020, same size as pipe, brass or bronze construction, silicone disc, plastic seat, stainless steel spring, inlet and outlet ball shutoff valves, test port ball valves, rated for 150 psig and 110oF. Watts 800M4QT

HIGH HAZARD ANTI-SIPHON, ANTI-SPILL VACUUM BREAKERS: ASSE 1056, same size as pipe, brass or bronze construction, silicone rubber discs, stainless steel springs, inlet and outlet ball shutoff valves, with test cocks, anti-spill design, rated for 150 psig and 180 deg. F max.. Watts 008QT.

dual check with Atmospheric Vent for CO2 POST MIX vending machines: 3/8”, stainless steel body and parts, dual check with third ball check outlet, rated for 150 psig and 140oF. Watts 9BD.

Intermediate Atmospheric Vented Backflow Preventers: ASSE 1012, same size as pipe, with intermediate atmospheric vent between independent check valves, bronze body with union ends, stainless steel springs, rated for 175 psig and 210oF. Watts 9DM.

Reduced Pressure ZONE Backflow Preventers: ASSE 1013 \_" reduced pressure zone backflow assembly complete with inlet strainer, inlet and outlet ball or non-rising stem gate isolation valves. Size for maximum pressure drop of \_\_ psig at \_\_ GPM. Constructed of bronze or epoxy coated cast iron body with bronze and plastic internal parts, stainless steel springs, non-threaded vent outlet, 4 test cocks, rated for 175 psig and 210oF, with air gap apparatus on drain. Watts series 919-S-QT-AG, Wilkins #975 or approved equal.

***Locate vented backflow preventers where relief discharge spillage is not a hazard or problem. Where continuous pressure backflow preventers are subject to inlet pressure fluctuations, add check valve upstream to avoid nuisance relief discharges.***

**WALL HYDRANTS**

Manufacturer: Josam, Smith, Wade, Watts, Woodford, Zurn.

WH-1: Freezeproof automatic draining wall hydrant with exposed chrome plated bronze wall plate, 3/4" inlet, 3/4" hose thread ASSE 1019-93 backflow preventer outlet, copper or bronze casing, loose key operator. Woodford model 65 series

WH-2: Freezeproof automatic draining wall hydrant in flush mounted cast brass wall box with locking door, 3/4” inlet, 3/4” hose thread ASSE 1019-93 backflow preventer outlet, loose key operator, polished brass finish. Woodford model B65, RB65, B67 or RB67 series.

**YARD HYDRANTS**

Manufacturer: Woodford, or approved equal.

YH-1: Freezeproof / Pollution-proof post-type, with below-ground reservoir yard hydrant with locking handle, 1" inlet, 3/4" hose thread, ASSE 1052 backflow preventer outlet, 1-1/4" galvanized steel casing pipe, schedule 80 PVC pipe reservoir, teflon packing, flow-finder flow plunger. Woodford Model S3-BFP or S4-BFP.

**HOSE BIBBS**

HB-1: Bronze or brass construction hose faucet/valve, cast iron handwheel, replaceable disc, hose thread spout, with ASSE 1011 backflow preventer outlet, 3/4” size. Watts model SC-8-3.

**TRAP PRIMER VALVES**

Manufacturers: Ancon, PPP Industries, Smith, Watts.

Bronze body, O-ring seals, integral threaded outlet vacuum breaker, adjustable, in conformance with ANSI/ASSE 1018. PPP model P-1/P-2.

***Do not use trap primer valves unless absolutely necessary, use trap guard diaphragms if possible***

**FIRE HYDRANTS**

Manufacturer: Clow, Kennedy, Mueller, Waterous.

FHY: AWWA C502 dry barrel hydrant with cast or ductile iron body and standpipe, two field replaceable 2-1/2" hose nozzles and chained caps, one field replaceable pumper nozzle and chained cap, 5-1/4" compression valve, O-ring seals, sealed oil reservoir, breakaway safety flange and stem coupling, automatic bronze drain valve, red finish, 6’-0” min. bury depth. Verify thread requirements with the local fire department or authority having jurisdiction.

**VALVE BOXES**

Manufacturer: C.P. Test Service, Mueller, Tyler.

Two-piece cast iron adjustable height casing with cast iron frame, cast iron cover and bottom bearing flange. Size for full burial depth of valve. 2" minimum internal diameter for valves sizes through 2", 4" minimum internal diameter for valve sizes 2-1/2" through 3" and 5-1/4" minimum diameter for 4" and larger valves. Cast name of service on cover top. On plastic pipelines, provide cast iron foot piece matched to valve box bottom or concrete bearing pad for support of valve.

**MANHOLES AND CATCH BASINS**

Precast reinforced concrete manhole sections, 48" diameter minimum manholes, 36" diameter minimum catch basins, ASTM C478. Construct base of 6" thick precast reinforced concrete or 8" thick cast in place concrete. Construct top of precast reinforced concrete eccentric cone and adjusting rings or 6" thick reinforced concrete slab with concentric opening.

Seal between sections with rubber ring gaskets, ASTM C443, or plastic preformed gasket material. Seal pipe penetrations with flexible watertight rubber gasketed seals.

Steps to be constructed of cast iron or polypropylene coated steel reinforcing rod.

Frame and cover or grate to be cast iron, ASTM A48, Class 35B, of style indicated, with minimum 24" diameter manhole opening, 20" diameter catch basin opening and pickhole. Provide gasketed self-sealing covers on sanitary manholes.

**SAFINGS**

Manufacturers: Noble, Oatey.

Chlorinated polyethylene sheeting, 40 mils thick, ASTM D4068, joined with CPE solvent; or 3 lb./sq. ft. sheet lead.

**VENT FLASHINGS**

Manufacturers: Semco, Oatey.

Formed 3 lb./sq. ft. lead flashing with minimum base size of 15"x17".

Single Ply Membrane Roofs: Flashing boot of material compatible with roofing membrane with base flange for adhering to membrane and stainless steel drawband for securing to vent pipe.

***Where roofing is new, roof installer typically provides vent flashings. Coordinate with architectural specifications. Where an existing roof is being altered, check with the Owner for roof warranties which require patching to be done by original roof installer.***

**WASHING MACHINE WALL BOXES**

Choose one of the following types of wash machine boxes to match the type of project. If a project is expected to experience heavy usage or vandalism choose the stainless steel heavy duty construction box, for more low profile projects choose the painted steel type.

Manufacturers: Acorn, Bradley or approved equal.

AWC-1: Type 304 satin finish stainless steel construction recessed supply and waste outlet box for automatic washer connections. With wall flange, anchor clips, cartridge type wheel handle operated valves, screwdriver stops, ¾" hose outlets, 2" waste outlet, with vacuum breakers, 8-5/8" x 8-5/8' x 3-5/8" D. Acorn Mdl. #8186.

***Or***

Manufacturers: Guy Gray, Oatey.

AWC-1: Epoxy paint coated steel recessed wall box with face flange, overflow lip, fastening tabs, 1/2" hot and cold bronze washing machine ¼ turn shutoff valves rated for 125 psi and 180 degrees F, long shank valve fittings for replacement of valves within box, 2" drain outlet fitting. Oatey no 38934.

**P A R T 3 - E X E C U T I O N**

**INSTALLATION**

Coordinate location and setting of plumbing specialties with adjacent construction. Install in accordance with manufacturers recommendations.

Set floor drains, roof drains, trench drains and cleanouts level and plumb adjusted to finished floor elevation, roof elevation or finished wall location. Locate where serviceable. Allow minimum of 18" clearance around cleanouts for rodding. Lubricate threaded cleanout plugs with graphite and oil, teflon tape or waterproof grease. Install trap primer connections where indicated. Provide deep seal traps on floor drains and hub drains installed in mechanical rooms, penthouses or rooms with excessive positive or negative pressure.

Floor drains and hub drains installed in public restrooms, locker rooms, seldom used rooms, and areas with minute drainage flow shall have installations of combination trap evaporation/backflow preventer diaphragm installations.

Set backwater valves on undisturbed soil or compacted granular backfill, level and plumb with top adjusted to finished floor elevation. Test and adjust valve for proper operation. Allow minimum 18" clearance for servicing.

Install subsoil drain tile receivers where indicated. Adjust receiver height to drain tile inlet and outlet elevations and cleanout to finished floor elevation. Secure subsoil drain tile with mechanical or solvent weld connections. Backfill with granular material.

Install water hammer arrestors where indicated and at quick closing valve installations.

Install backflow preventers in accordance with Wis. Dept. of Safety and Professional Services requirements maintaining minimum clearance distances for servicing and testing. Provide indirect waste piping with air gap installation from relief opening to above hub drain or floor drain.

Install lab faucet vacuum breakers with Loctite 242 “blue” on threads.

Where backflow preventers requiring Dept. of Safety and Professional Services registration are installed, provide initial registration, testing and report filing required by Dept. of Safety and Professional Services. List the name and address of the building that the backflow preventer installations occur in.

Mount wall hydrants recessed in exterior wall construction with valve plug extended beyond interior side of building insulation. Slope to drain to exterior. Install so discharge is 18” min. above finished grade. Set wall box in grout or caulk and fill exterior wall penetration with insulation.

Mount yard hydrants with discharge 27" min. above finished grade. Set base of hydrant in 1 cu. yd. of granular backfill material for free drainage. Crown finished grade materials for drainage away from hydrant.

Mount hose bibbs securely fastened to wall where indicated. Provide water hammer arrestor in line to hose bibb.

Set fire hydrants level and plumb. Secure hydrant base and back with poured concrete thrust blocking providing thrust restraint and support of hydrant independent of piping. Provide 1 cu. yd. of granular backfill material around drain valve openings for free drainage. Provide isolation valve and valve box at each hydrant. Where hydrant is located in paved area or near traffic, provide 6" diameter by 8' long Schedule 40 painted steel pipe bollards filled with concrete around hydrant.

Set valve boxes level and plumb centered over valve. Set bottom flange on undisturbed soil or compacted granular backfill. Where plastic piping is used, provide cast iron or concrete bearing pad below valve. Adjust top section to finished grade level.

Excavate for manholes and catch basins setting precast bases on granular backfill and pouring cast in place bases on undisturbed soil. Seal joints between base, sections, collars and castings with gasketing material for tightly packed waterproof seals. Adjust casting to match finished grade. Form interior shelves with concrete grout for smooth flowlines conforming to the shape and slope of the sewer. Place piping into manholes providing full support of piping on exterior bedding and insuring pipe seals are properly installed and waterproof. Valve manholes and other manholes intended to remain dry must be made waterproof and are subject to infiltration testing. Where an entering sewer is 2 feet or more above the springline of a leaving sewer, provide outside drop connection encased in concrete. Where existing pipe penetrations are being removed or capped, fill opening with non-shrink Portland cement grout plug. Backfill and compact soil around manhole or catch basin.

Install safing at floor drains above grade. Extend 12" beyond drains in all directions. Cover entire floor in showers and extend 6" up in walls above curbs and to a height of 6' (3" wide each direction) in corners. Install on concrete floor that is smooth and free of debris. Seal all joints and connect to drain body clamp. Safing is subject to standing water leak test. Install safing at all built-up shower installations. (Note: spray-on and brush applied liquid safing is not acceptable).

Flash vent penetrations through roof. Turn down top of lead flashing into vent pipe. Tighten drawband of membrane boot to vent pipe. Adhere base flashing to deck or membrane. Provide waterproof patch around penetration on existing roofs.

Install washing machine boxes in wall construction, secured to structure, directly behind proposed washing machine location. Provide water hammer arrestors in supply piping. Mount box a min. of 36” above floor.

# CONSTRUCTION VERIFICATION ITEMS

 Contractor is responsible for utilizing the construction verification checklists supplied under specification Section 2208 00 in accordance with the procedures defined for construction verification in Section 01 91 01 or 01 91 02.

# AGENCY TRAINING

All training provided for agency shall comply with the format, general content requirements and submission guidelines specified under Section 01 91 01 or 01 91 02.

END OF SECTION