UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 19 March 2007

Latest change not indicated by CHG tags
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SECTION TABLE OF CONTENTS

DIVISION 22 - PLUMBING

SECTION 22 42 00.00 40

COMMERCIAL PLUMBING FIXTURES

01/07

-- End of Section Table of Contents --

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USACE / NAVFAC / AFCESA / NASA | UFGS-22 42 00.00 40 (January 2007)

Preparing Activity: NASA | Superseding UFGS-22 41 00.00 40 (October 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 19 March 2007

Latest change not indicated by CHG tags
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SECTION 22 42 00.00 40

COMMERCIAL PLUMBING FIXTURES
01/07

****
NOTE: This specification covers the requirements for plumbing, fixtures, accessories, and the documentation required to verify acceptability of the hardware.

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).
****

PART 1 GENERAL

1.1 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the

reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z358.1	(2004) Standard for Emergency Eyewash and Shower Equipment
ANSI Z535.1	(2002) Standard for Safety Color Code

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1037	(1990) Performance Requirements for Pressurized Flushing Devices (Flushometer) for Plumbing Fixtures

ASME INTERNATIONAL (ASME)

ASME A112.19.2	(2003) Standard for Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals
ASME A112.6.3	(2001) Standard for Floor and Trench Drains

ASTM INTERNATIONAL (ASTM)

ASTM A 240/A 240M	(2004) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A 424	(2000) Standard Specification for Steel Sheet for Porcelain Enameling
ASTM B 43	(1998e1) Standard Specification for Seamless Red Brass Pipe, Standard Sizes
ASTM C 282	(1999; R 2005) Standard Test Methods for Acid Resistance of Porcelain Enamels (Citric Acid Spot Test)

INTERNATIONAL CODE COUNCIL (ICC)

ICC A117.1	(2003 R 2004) Standard for Accessible and Usable Buildings and Facilities
ICC IPC	(2003) International Plumbing Code

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-86	(2002) Guidelines for Metric Data in Standards for Valves, Flanges, Fittings and Actuators

SINGLE PLY ROOFING INDUSTRY (SPRI)

SPRI RD-1	(2005) Standard for Retrofit Roof Drains

U.S. DEPARTMENT OF ENERGY (DOE)

DOE WS-1	(2000) How to Buy a Water-Saving Faucet
DOE WS-2	(2000) How to Buy a Water-Saving Showerhead
DOE WS-3	(2000) How to Buy a Water-Saving Replacement Toilet
DOE WS-4	(2000) How to Buy a Water-Saving Replacement Urinal

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS WW-P-401	(Rev E; Am 1) Pipe and Pipe Fittings, Cast-Iron, Soil
FS WW-P-460	(1994d) Pipe Fittings; Brass or Bronze (Threaded) 125- and 250-Pound
FS WW-P-541	(1990e; Am 1) Plumbing Fixtures
FS WW-P-541/4	(2001b; Am 1) Plumbing Fixtures (Lavatories)
FS WW-P-541/5	(2001b; Am 1) Plumbing Fixtures (Sinks, Kitchen, Service, and Laundry Trays)
FS WW-P-541/7	(Rev C; Am 1) Plumbing Fixtures (Shower Bath, and Emergency Eye and Face Wash Outfits)

UNDERWRITERS LABORATORIES (UL)

UL 8730	(1998, R 2003e1) Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Electrically Operated Water Valves Including Mechanical Requirements

1.2 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept

to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Records of Existing Conditions shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

SD-02 Shop Drawings

The following drawings shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

Detail Drawings
Connection Diagrams

Installation drawings shall be submitted for plumbing fixtures in accordance with the paragraph entitled, "Installation," of this section.

SD-03 Product Data

Manufacturer's catalog data shall be submitted for the following items including all spare parts.

Plumbing Fixtures and Trim

Sanitary Drain, Waste, and Vent Fixtures

SD-04 Samples

Manufacturer's Standard Color Charts shall be submitted in accordance with paragraph entitled, "General," of this section.

SD-06 Test Reports

Test reports shall be submitted for plumbing fixtures in accordance with the paragraph entitled, "Tests," of this section.

SD-07 Certificates

Listing of Product Installation shall be submitted in accordance with paragraph entitled, "Installation," of this section.

Certificates shall be submitted for the following items showing conformance with the referenced standards contained in this section.

Plumbing Fixtures and Trim
Sanitary Drain, Waste, and Vent Fixtures

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals shall be submitted in accordance with paragraph entitled, "Operation and Maintenance," of this section.

1.3 GENERAL REQUIREMENTS

****
NOTE: If Section 23 00 00.00 40 HEATING, VENTILATING, AND AIR-CONDITIONING is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.
****

Section 23 00 00.00 40 HEATING, VENTILATING, AND AIR-CONDITIONING applies to this section.

Records of Existing Conditions shall be submitted consisting of the results of Contractor's survey of work area conditions and features of existing structures and facilities within and adjacent to the jobsite. Commencement of work shall constitute acceptance of existing conditions.

Detail Drawings shall be submitted for plumbing fixtures consisting of fabrication and assembly drawings for all parts of the work in sufficient detail to enable the Government to check conformity with the requirements of the contract documents.

Connection Diagrams shall be submitted for plumbing fixtures indicating the relations and connections of components and apparatus by showing the general physical layout, dimensions, and arrangements of each.

PART 2 PRODUCTS

2.1 GENERAL

Fixtures shall be of the types defined herein and of the size and capacities indicated.

Manufacturer's Standard Color Charts shall be submitted for plumbing fixtures showing the manufacturer's recommended color and finish selections.

2.2 PLUMBING FIXTURES AND TRIM

Fixtures shall be furnished with the accessories for a complete installation, such as supply fittings, angle valves, escutcheons, couplings, nuts, drain fittings, and pop-up waste fittings, even if the accessories are not specifically called out herein. Rubber compression type connections are not acceptable and brass ferrule type fittings are required.

Vitreous-china and enameled cast-iron plumbing fixtures shall be the product of the same manufacturer, and unless otherwise specified, shall be white. Manufacturer shall be a company of established reputation in the manufacture of plumbing fixtures and one that assembles the plumbing outfits and assumes responsibility for all products supplied.

Exposed traps and double-cone supply tubes for fixtures and equipment shall be connected to rough-piping at the wall, unless otherwise specified. Floor and wall plates shall be as specified herein or as covered by the outfit numbers. Exposed-to-view fixture trimmings, fittings, and fasteners shall be chromium-plated or nickel-plated brass with polished, bright surfaces.

Exposed-to-view fixture supports shall be enameled iron to match the fixture.

Supplies and wastes for lavatories shall be to wall. Sleeves are not required at penetrations.

****
NOTE: Coordinate following paragraph with Section 10 28 13 TOILET ACCESSORIES.
****

Each lavatory shall be fitted with a plunger-operated liquid-soap dispenser.

Ledge-back openings shall be located to place the faucet spout over the bowl drain.

2.2.1 Fixture Supports

****
NOTE: Select the following paragraphs as applicable to the project.

Check wall thickness. Where a floor is monolithic slab, fixture support details shall be as indicated.
****

Wall-hung fixtures shall be supported by ferrous-metal carriers. Where

specified, carriers shall be combination type with adjustable fittings. Water closets and urinals shall have supporting feet not less than 250 millimeter 10 inches long, unless construction requires shorter feet or bases.

Lavatories shall be supported from the wall by wall carriers with concealed arms.

Lavatories shall be supported by carriers with concealed adjustable arms and supporting feet not less than 250 millimeter 10 inches long.

Supporting arms of slab-type lavatories shall be concealed by secure deep-drawn, chrome-plated covers.

Supporting feet shall have not more than 1-1/2 inches of concrete topping over structural slab for effective concealment.

2.2.2 Lavatories

Lavatories and fittings shall conform to ASME A112.19.2 FS WW-P-541/4.

[Auto controls per ICC A117.1, ASSE 1037 and UL 8730.]

****
NOTE: Do not select L-S for coarse-block wall mounting.
****

Type L-S: Lavatories shall be Type V (slab type), Class 4 (wall hung), 500 by 450 millimeter 20 by 18 inches. Inside opening shall be substantially rectangular.

Type L-B: Lavatories shall be Type I (straight back), 500 by 450 millimeter 20 by 18 inches. Inside opening shall be substantially rectangular.

Type L-C: Lavatories shall be Type IV (countertop), Class 2 (oval), flat rim, beadless, self-rimming with rounded rim corner and back ledge, front overflow, oval shaped, seamless, and mirror finish. Materials shall be 1.3 millimeter 18-gage, corrosion-resistant steel conforming to ASTM A 424 ASTM A 240/A 240M, AISI Class 302, A (annealed). Approximate internal size of the lavatory shall be 400 by 300 by 150 millimeter 15-1/2 by 11-3/8 by 6 inches deep. Bowls shall be coated externally with sound deadening, nonmarring mastic.

Supply fittings shall conform to applicable requirements for faucets in ASME A112.19.2FS WW-P-541/4 and shall be in accordance with the recommended levels specified in DOE WS-1.

****
NOTE: Select one of the following two supply fitting selection paragraphs. Pop-up assembly should be specified only for private offices.
****

[Supply fitting shall be a 100 millimeter 4-inch centerset type with a vandalproof aerator.]

[Supply fitting shall be a 100 millimeter 4-inch centerset type with a universal joint aerator and pop-up waste assembly operator.]

Supply fitting spout angle and length over the bowl shall provide a water-free back ledge. Horizontal distance from the centerline of the spoutless aerator to the centerline of the supply piping shall be not less than 125 millimeter 4-3/8 inches, and the vertical distance between the centerline of the spout (less aerator) and the fitting base shall be not less than 70 millimeter 2-1/2 inches. Supply fittings with handles capable of being turned 360 degrees are not acceptable.

Supply piping shall be chrome-plated brass, threaded in accordance with the requirements of ASME A112.19.2 FS WW-P-541/4.

****
NOTE: Select the proper lavatory drain fittings.
****

Drain fittings shall conform to ASME A112.19.2 FS WW-P-541/4, strainer drain, unless otherwise specified, but with perforated removable strainer and 32 millimeter 1-1/4-inch tailpiece. Adjustable P-trap, with cleanout, shall be Type I.

Corrosion-resistant steel lavatories shall be equipped with corrosion-resistant steel drain fittings.

Lavatory drain fittings shall be pop-up as specified in ASME A112.19.2 FS WW-P-541/4 with vandalproof, nonremovable stopper and pop-up assembly.

2.2.3 Service Sinks

Service sinks and fittings shall conform to ASME A112.19.2 FS WW-P-541/5.

Supply fittings shall be in accordance with the recommended levels specified in DOE WS-1.

[Auto controls per ICC A117.1, ASSE 1037 and UL 8730.]

Type SS-W: Service sinks shall be single bowl, mounting trap standard with high nondrilled back, and without a finished apron. Supply fitting shall be a 250 millimeter 10-inch chrome-plated spout, Type SS-W, single, compression, with vacuum breaker and 1200 millimeter 4-foot hose with holding bracket. Supplies shall be chrome-plated brass without valves.

Waste shall be to the wall. P-trap shall be cast iron with acid-resisting enamel inside, brass clean-out plug, and strainer.

Type SS-F: Service sinks shall be single bowl, mounting floor with high nondrilled back, floor-corner mounted, curved or straight front, and enameled cast iron with rim guard. Approximate size of the sink shall be 700 by 700 millimeter 28 by 28 inches overall, 350 millimeter 13 inches back height from the floor, and 150 millimeter 6 inches deep. Supply fitting shall be single, compression, with vacuum breaker and 1200 millimeter 4-foot hose with holding bracket. Drain fitting shall be 80 millimeter 3 inches.

Type SS-T: Service sinks shall be single bowl, three-side access, floor mounted, terrazzo, with four-side cap-tiling flange, and fabricated from Class 302, annealed corrosion-resistant steel. Approximate size of the fixture shall be 900 by 600 millimeter 36 by 24 inches overall and 300 millimeter 12 inches high. Supply fitting shall be a 250 millimeter 10-inch

spout, chrome-plated, single, compression with vacuum breaker and 1200 millimeter 4-foot hose with holding bracket. Drain fitting shall be 80 millimeter 3 inches.

2.2.4 Urinals

****
NOTE: Automatic flushing and faucet controllers shall be battery operated for retrofit and electrically wired for new installation.
****

Urinals and fittings shall conform to FS WW-P-541. [Auto controls per ICC A117.1 and UL 8730. Urinals shall be wall hung.] Urinals shall be in accordance with the recommended levels specified in DOE WS-4.

[Flushing devices shall be exposed flushometer, with side oscillating handle.] [Flushing device shall be automatic motion infrared sensor [electric] [battery] automation conforming to ICC A117.1 and UL 8730.]

Type UR-W: Urinals shall be bowl type, with integral trap and extended shields, washout flush, back connected, wall hung, with flush valve.

Flush valve shall be a concealed rough-brass, large-diaphragm, wall-mounted, externally adjustable, foot-pedal-operated type, with 25 millimeter 1-inch, wheel-handle stop, 25 millimeter 1-inch inlet and outlet pipe connections, screwdriver stop and vacuum breaker. All exposed parts shall be chrome-plated, except that a 150 millimeter 6-inch diameter, 1.6 millimeter 16-gage, corrosion-resistant steel kick plate conforming to Class AISI 302, annealed, shall be provided beyond the normal escutcheon plate or integral-finish flange. An elbow flush connection for the20 millimeter 3/4-inch concealed back spud shall be provided.

Piping connection between the flush valve and urinal shall be 25 millimeter 1 inch, Schedule 40, red-brass pipe conforming to ASTM B 43, with fittings conforming to FS WW-P-460 and MSS SP-86. Fittings shall be brazed type wherever possible.

2.2.5 Wash Sinks

****
NOTE: Automatic flushing and faucet controllers shall be batter operated for retrofit and electrically wired for new installation.
****

Wash sinks and fittings shall conform to ASTM A 424 ASTM A 240/A 240M.

Automatic faucet fittings shall conform to ICC A117.1, ASSE 1037 and UL 8730.

****
NOTE: The following sinks are suitable for photographic dark rooms and similar service.
****

Type WS-SS: Wash sinks shall be single bowl, flat iron, beadless, self-rimming, ledge back, rounded-rim corner, with 65 millimeter 2-1/2-inch (maximum) bowl-bottom radius, seamless, and a mirror finish. Material shall be 1.3 millimeter 18-gage, corrosion-resistant steel conforming to

Class AISI 316, annealed. Approximate size of the sink shall be 600 by 500 millimeter 24 by 20 inches overall, 530 by 430 millimeter 21 by 17 inches inside bowl, and 165 millimeter 6-1/2 inches deep. Bowl shall be coated with sound-deadening, nonmarring mastic. Edge-back punchings shall be compatible with supply fitting. Location shall center the spout length over the bowl opening.

Bowl and waste fitting shall be suitable for front overflow.

Supply fitting shall conform to ASME A112.19.2 FS WW-P-541/4 and shall be in accordance with the recommended levels specified in DOE WS-1.

[Supply fitting shall be a gooseneck type with universal-joint aerator and single hole, deck mounted, and heavy-duty lever.]

[Supply fitting shall be single-hole, deck-mounted type, with a 300 millimeter 12-inch swing spout, universal-joint aerator, and [heavy-duty lever.] [automatic control action [electric] [battery] operated motion sensor activation per ICC A117.1, ASSE 1037 and UL 8730.]]

[Supply fitting shall have a spray attachment with 1200 millimeter 48-inch hose.]

[Supply fitting shall have spray and wash-brush attachments, each with a 1200 millimeter 48-inch hose.]

Liquid soap dispenser shall be chrome-plated brass or plastic with not less than 90 millimeter 3-1/2-inch spout-to-shank dimension and not less than a 350 milliliter 12-ounce plastic soap container which shall be refillable upon removing a pushbutton cap or head assembly.

[Waste fitting shall be a flat strainer with drain plug fabricated from AISI 300 series corrosion-resistant steel.]

[Waste fitting shall be a cup strainer with drain plug fabricated from AISI 300 series corrosion-resistant steel.]

[Waste fitting shall be pop-up type with ledge-back-mounted operator fabricated from AISI 300 series corrosion-resistant steel.]

P-traps shall be 40 millimeter 1-1/2-inch corrosion-resistant steel or heavy-duty cast brass or cast bronze, adjustable, with cleanout.

2.2.6 Water Closets

****
NOTE: Automatic flushing and faucet controllers shall be batter operated for retrofit and electrically wired for new installation.
****

Water closets shall conform to ASME A112.19.2.

Water closets shall be in accordance with the recommended levels specified DOE WS-3.

Type WC-Q: Water closets shall be office and industrial, elongated bowl with flush valve, syphon-jet, wall outlet, and constructed for quiet operation. Seat shall be elongated open front, solid molded high-impact

polystyrene, with check hinge, and without a cover. Flush valve shall be exposed, with vacuum breaker and screwdriver stop, constructed for quiet operation.

Type WC-FQ: Water closets shall be office and industrial, elongated bowl with flush valve, syphon-jet, wall outlet. Seat shall be elongated open-front, solid molded high-impact polystyrene, white, with check hinge, and without a cover. [Flush valve shall be exposed flushometer with vacuum breaker and screwdriver stop.] [automatic flush device shall be [electric] [battery] motion sensor activation per ICC A117.1, ASSE 1037 and UL 8730.]

[Women's room outfit shall be identical to [Type WC-Q] [Type WC-FQ], except that the seat shall be open front with cover. A bumper shall be provided on the flush valve.]

2.2.7 Shower Fittings

Shower fittings shall conform to ASME A112.19.2 FS WW-P-541/7 with concealed piping and pressure-balancing mixing valve. Shower head shall be Type I, Class 2 (adjustable). Showerheads shall be in accordance with the recommended levels specified in DOE WS-2.

2.2.8 Emergency Shower and Eyewash

Emergency shower shall conform to ANSI Z358.1 and markings identifying emergency shower shall conform to ANSI Z535.1.

2.3 SANITARY DRAIN, WASTE, AND VENT FIXTURES

Sanitary drain, waste, and vent fixtures shall be Type GCS-DWV, of galvanized carbon steel.

2.3.1 Floor Drains

[Floor drains shall be complete with traps.]

Floor drains located in slabs on earth shall have hub outlets; those in slabs not on earth shall have threaded outlets or hub outlets, as required to match piping used.

[Floor drains shall have bottom outlets.]

[Floor drains shall have integral seepage pans and weep holes.]

Floor drains fitted with membrane or metal pan waterproofing shall have clamping collar assemblies.

****
NOTE: Grates should not be required on hopper drains in inaccessible locations. Indicate these on the drawings.
****

[Hopper drains shall be provided with grates.]

Ferrous floor drain surfaces, except the top of grates, shall be given a heavy coating of coal-tar enamel. Coating shall be applied either at the factory or in the field before installation and before rusting has occurred.

Hopper drain strainers and hoppers, where indicated, shall be coated with acid-resistant enamel in conformance with FS WW-P-541, ASME A112.19.2 and ASTM C 282.

****
NOTE: Check air handling unit floor drains.
****

Trap primers shall be all bronze with nonferrous trim floor. Drains shall be fitted with cast-iron primer adapters.

****
NOTE: Select FD-1 for toilet rooms, locker rooms, and similar duty.
****

FD-1: Floor drains shall conform to ASME A112.6.3, shower-drain type with nonferrous sediment bucket, and to the requirements specified herein. Adjustable collar, strainer, and fasteners shall be nickel-bronze; exposed-to-view surfaces shall be satin polished. Strainer holes shall be square and strainer diameter shall be nominal 125 millimeter 5 inches. Strainer and body shall be capable of sustaining a platen load of not less than 9 kilonewton 2,000 pounds with not more than a 1.6 millimeter 1/16-inch, nonpermanent deflection when load is applied within 5 seconds. Strainer free area shall be not less than 4500 square millimeter 7 square inches.

****
NOTE: Select FD-2 for general finished floors all areas including shower rooms and janitor closets.

Verify that the specified 5-inch 125 millimeter size is adequate: 6-inch 150 millimeter size may be required.

FD-2 is same as FD-1, except without sediment basket for lower flow restriction. If FD-1 and FD-2 drains are required, the following paragraph should be rewritten as follows: FD-2 floor drain shall be identical to FD-1 except that sediment basket shall be omitted.
****

FD-2: Floor drains shall conform to ASME A112.6.3, shower-drain type, and to the requirements specified herein. Adjustable collar, strainer, and fasteners shall be nickel-bronze; exposed-to-view surfaces shall be satin polished. Strainer holes shall be square and strainer diameter shall be nominal 125 millimeter 5 inches. Strainer and body shall be capable of sustaining platen load of 9 kilonewton 2,000 pounds at 1.6 millimeter 1/16 inch maximum nonpermanent deflection when load is applied within 5 seconds. Strainer free area shall be not less than 4500 square millimeter 7 square inches.

****
NOTE: FD-3 is similar to FD-1, without sediment basket, and with extended rim strainer for open sight waste.

A nominal 9-inch 225 millimeter diameter strainer extended rim is approximately 1-5/8 inches 41

millimeter deep.
****

FD-3: Floor drains shall conform to ASME A112.6.3, shower-drain type, and to the requirements specified herein. Adjustable extended collar or rim, strainer, and fasteners shall be nickel-bronze; exposed-to-view surfaces shall be satin polished. Strainer diameter shall be a nominal 175 millimeter 7 inches. Rim depth to the strainer shall be approximately 20 millimeter 3/4 inch, and the free area shall be approximately 8400 square millimeter 13 square inches.

****
NOTE: FD-4 same as FD-1 except without sediment basket and with funnel type strainer for open sight waste.
****

FD-4: Floor drains shall conform to ASME A112.6.3, shower-drain type, and to the requirements specified herein. Adjustable collar or rim, strainer, and fasteners shall be nickel-bronze; exposed-to-view surfaces shall be satin polished. Strainer diameter shall be a nominal 175 millimeter 7 inches with an approximately 90 millimeter 3-1/2-inch high, 100 millimeter 4-inch top opening funnel. Free area shall be approximately 2900 square millimeter 4-1/2 square inches.

****
NOTE: FD-5 is area type, flat floor drain, select for general purpose ground floor and equipment room drain duty.

In 4-inch 100 millimeter size, FD-5 requires 11-inch 275 millimeter strainer diameter which is not recommended since the basic strainer design is relatively weak. FD-6 is recommended where same diameter heavier-duty strainer is necessary. Refer to load ratings for duty requirements.

Check areas subject to automatic sprinkler discharge.
****

FD-5: Floor drains shall conform to ASME A112.6.3, area-drain type, and to the requirements specified herein. Strainer and body shall be capable of sustaining a platen load of not less than 18 kilonewton 4,000 pounds, applied within 2 seconds, before failure. Cracking of the strainer or body shall be considered as failure. Strainer free area shall be not less than 9000 square millimeter 14 square inches.

****
NOTE: Select for same type and strainer size duty as FD-5. FD-6 is identical to FD-5 except that strainer construction is deep flanged tractor-type and nominally twice as strong.
****

FD-6: Floor drains shall conform to ASME A112.6.3, area-drain type, and the requirements specified herein. Strainer shall be deep flanged, tractor type. Strainer and body shall be capable of sustaining a platen load of not less than 36 kilonewton 8,000 pounds, applied within 3 seconds, before failure. Cracking of the strainer or body shall be considered as failure.

Strainer free area shall be not less than 11000 square millimeter 17 square inches.

****
NOTE: Select FD-7 for heavy duty, typical in garages and equipment and materials handling areas.

Ductile iron optional. Allowable ductile iron rating for the same deflection as sustained at failure of the cast iron strainer may be increased approximately to 14,000 pounds 62 kilonewton.
****

FD-7: Floor drains shall conform to ASME A112.6.3, area-drain type, and the requirements specified herein. Strainer diameter shall be a nominal 250 millimeter 10 inches with a free area not less than 16500 square millimeter 26 square inches. Strainer and body shall be capable of sustaining a platen load of not less than 45 kilonewton 10,200 pounds, applied within 3.8 seconds, before failure. Cracking of the strainer or body shall be considered as failure. An identical pattern ductile-iron strainer may be provided in lieu of cast iron when so specified.

****
NOTE: Select FD-8 for depressed areaway drains with domed strainer.
****

FD-8: Areaway drains shall conform to ASME A112.6.3, area-drain type, plain pattern, bottom outlet, except that strainer shall be domed.

****
NOTE: Select FD-9 for depressed areaway drains.
****

FD-9: Areaway drains shall conform to ASME A112.6.3, area-drain type, plain pattern, with bottom outlet.

****
NOTE: Select FD-10 hopper type for equipment rooms.
****

FD-10: Floor drains shall be cast iron, double-drainage pattern, hopper type, conforming to requirements specified herein, and shall have a dome type strainer in the bottom of the body.

[Hopper drains shall be round with nominal 300 millimeter 12-inch diameter.]

[Hopper drains shall be square with nominal 300 millimeter 12-inch sides.]

[Hopper drains shall be either round with nominal 300 millimeter 12-inch diameter, or square with nominal 300 millimeter 12-inch sides.]

[Interior drain surfaces shall be coated with acid-resistant enamel.]

2.3.2 Interceptors

****
NOTE: Show details on drawings or specify herein.
****

Interceptors shall conform to requirements indicated.

2.3.3 Trench Drains

****
NOTE: Show details on drawings or specify herein.
****

Trench drains shall conform to requirements indicated.

2.3.4 Roof Drains

****
NOTE: Drawings should show or note location of leader expansion joint, i.e., whether an integral with sump type or line type. Drawings shall indicate sizes and show how piping shall be anchored.
****

Type RD-A: Roof drains shall be heavy pattern, all cast-iron construction with integral clamping surfaces not less than 50 millimeter 2 inches wide, which includes a clamping ring and gravel guard where necessary. Beehive- or dome-shaped strainer diameter shall be approximately 300 millimeter 12 inches and height shall be not less than 125 millimeter 5 inches. Open area of the strainer shall be not less than twice the area of the nominal drain outlet. Drain body and bolting shall be corrosion-protected with manufacturer's standard enamel and electrodeposited coating.

****
NOTE: Delete or modify the following paragraph as required by project conditions.
****

Roof drains shall have an integral expansion joint of proper size to receive the leader pipe. Expansion joint shall be heavy cast bronze, sleeve type, constructed to form a watertight, flexible joint. Metal of the sleeve shall have a nominal thickness of not less than 3.4 millimeter 0.134 inch. Packing shall be of lubricated non-asbestos fiber materials, soft lead, or other similar, durable material, and shall not be located in the flow line of the drainage. Bronze wing nuts and bolts or other nonferrous metal devices shall be provided for tightening or replacing the packing without disturbing the leader-pipe connection to the drain. Roof integrity shall be protected by inline expansion joints and piping configuration indicated.

****
NOTE: Controlled runoff roof drains shall be carefully selected to ensure that roof live loads are not exceeded.
****

Type RD-CR: Roof drains shall be heavy pattern, cast-iron-body construction in compliance with SPRI RD-1, with integral clamping surfaces not less than 50 millimeter 2 inches wide, including clamping ring and dome-shaped strainer with weir and gravel guard where necessary. Strainer shall be aluminum construction. Weir shall provide controlled runoff at adjustable flow rates proportional to the head. Drain body and bolting shall be corrosion protected with the manufacturer's standard enamel and

electrodeposited coating.

Roof drains shall prevent water accumulation on the roof from exceeding 75 millimeter 3 inches or 750 pascal 15.6 pounds per square foot load.

Roof drains shall have an integral expansion joint of proper size to receive the leader pipe. Expansion joint shall be heavy cast bronze, sleeve type, constructed to form a watertight, flexible joint. Metal of the sleeve shall have a nominal thickness of not less than 3.4 millimeter 0.134 inch. Packing shall be of lubricated non-asbestos fiber materials, soft lead, or other similar durable material, and shall not be located in the flow line of the drainage. Bronze wingnuts and bolts or other nonferrous metal devices shall be provided for tightening or replacing the packing without disturbing the leader-pipe connection to the drain. Roof integrity shall be protected by inline expansion joints and the piping configuration indicated.

Weir shall be factory adjusted and locked into the maximum flow position.

2.3.5 Drainage System Expansion Joints

****
NOTE: Select the following paragraph if required by project conditions other than integral with roof drain.

Drawings shall show or note location of expansion joints in conductors, leaders, stacks, vent lines, soil lines and wherever required to absorb building movements.

Drawings shall also show piping configuration and how piping shall be anchored.
****

Expansion joints shall be heavy cast-bronze sleeve type, constructed to form a watertight flexible joint. Metal of the sleeve shall have a nominal thickness of not less than 3.4 millimeter 0.134 inch. Packing shall be of lubricated non-asbestos fiber materials, soft lead, or other similar durable material and shall not be located in the flow line of the drainage. Bronze wingnuts and bolts or other nonferrous metal devices shall be provided for tightening or replacing the packing without disturbing the leader-pipe connection to drain.

2.3.6 Cleanouts

****
NOTE: An effort should be made to eliminate cleanouts in above grade slabs. Cleanouts should be located within piping below the floor, in walls, in cleanout access spaces and typically, on the toilet room side rather than in a corridor or lobby. In specific places, where wall boxes are not desirable because of aesthetics and cost considerations, drawings should read: exposed cleanout acceptable.
****

Cleanouts shall be gastight and watertight and sized to provide quick and easy access for plug removal and rodding tools. Cleanouts shall be

aesthetically located with respect to tile patterns, masonry bond, and alignment.

Cleanouts in ceramic tile, resilient tile flooring, and finished walls shall be rectangular.

No cleanout plug shall terminate in or above a finished floor or wall surface, except in stack bases and where indicated.

****
NOTE: Coordinate with drawings.
****

Access to foundation tile drainage lines in floors shall be as indicated.

Cleanouts shall have cast-brass raised-head plugs. Not less than two tools for each size and type plug shall be delivered to the Contracting Officer.

Cleanout plugs under pressure, and where specified, shall be lead gasketed.

Cleanouts in aboveground floors shall have integral seepage pans and weep holes.

Cleanouts fitted with membrane or metal-pan waterproofing shall have integral seepage pans and weep holes and clamping collar assemblies.

Cleanouts set outside of the building and cleanouts in building floors shall have adjustable housings.

Cast-iron bodies shall be coated with manufacturer's standard material.

****
NOTE: Select CO-1 for: yard cleanouts set in concrete; driveways, concrete floors in machine shops, equipment rooms, garages, heavy vehicular traffic areas.
****

Type CO-1: Cleanouts shall have a cast-iron body and a setscrew adjustable housing with deep-set tractor-type, cast-iron, scoriated cover. Construction shall be heavy duty and suitable for AASHTO H-10 loading.

****
NOTE: Select CO-2 for: heavy duty service in laboratories, test rooms, and similar areas with finished concrete floors.
****

Type CO-2: Cleanouts shall have a cast-iron body and setscrew adjustable housing with deep set, tractor-type, polished nickel-brass or nickel-bronze, scoriated cover. Construction shall be heavy duty and suitable for AASHTO H-10 loading.

****
NOTE: Select CO-3 for: building floor areas subject to wheeled traffic loads not as heavy as CO-2 service. Usual selection would be laboratories, test rooms, and similar spaces with finished concrete or with tiled floors.

****

Type CO-3: Cleanouts shall have a cast-iron body and adjustable housing with polished nickel-brass or nickel-bronze heavy-duty frame, and scoriated, secured cover. Cover thickness shall be not less than 10 millimeter 3/8 inch.

****
NOTE: Select CO-4 for resilient flooring materials.
****

Type CO-4: Cleanouts shall have a cast-iron body and adjustable housing with cover recessed to a depth to accommodate specified resilient flooring material. Surfaces and fasteners exposed to view shall be constructed of polished nickel-bronze or approved nickel-brass.

****
NOTE: Select CO-5 for terrazzo finished floors.

Check to verify that specified and proposed epoxy and polyester terrazzo materials will adhere to nickel-bronze and nickel-brass materials.
****

Type CO-5: Cleanouts shall have cast-iron body and adjustable housing with 20 millimeter 3/4-inch minimum recessed anchor cover. Surfaces and fasteners exposed to view shall be constructed of nickel bronze or approved nickel brass. Cover shall be fitted with a lifting screw.

****
NOTE: Select CO-6 for exposed horizontal or vertical drainage lines or in concealed spaces in conjunction with wall access doors.
****

Type CO-6: Cleanouts shall have cast-iron cleanout tees with lead-gasketed plugs.

2.3.7 P-Traps

P-traps shall be extra-heavy cast iron conforming to FS WW-P-401.

PART 3 EXECUTION

3.1 INSTALLATION

Listing of Product Installation shall be submitted for plumbing fixtures identifying at least five units, similar to those proposed for use, that have been in successful service for a minimum of five years. The list shall include purchaser, address of installation, service organization, and date of installation.

Materials, equipment, and fixtures shall be installed as indicated and specified and in accordance with the manufacturer's recommendations.

Installation of plumbing fixtures shall conform to the published or written instructions of the manufacturer for the specific project application, except as otherwise specified herein.

Fixtures shall be clean and free of deleterious material before being installed. Before connecting to water, waste, vent or trap service, the fixture lines shall be blown out with compressed air. During the progress of construction, open ends of fixtures shall be protected at all times to prevent the admission of foreign matter.

3.2 TESTS

The floor drain body and its standard specification strainer shall be tested in compression, while loaded with a 530 kilonewton 120,000-pound capacity hydraulic machine, by means of a 65 millimeter 2-1/2-inch square, 25 millimeter 1-inch thick platen placed at the geometric center of the strainer. Deflection measurements from the bottom of the platen shall be taken using a deflection gage graduated in .03 millimeter 0.001-inch increments. Cast-iron strainers shall be loaded as rapidly as possible; load-to-failure shall be applied within 2 to 2.5 seconds, and maximum deflection at failure by cracking shall be noted. Ductile-iron and nonferrous strainer permanent deformation shall constitute failure. These strainers shall be loaded to a deflection of 1.6 millimeter 1/16 inch without permanent deformation and to a deflection of 3.2 millimeter 1/8 inch at which or before which, permanent deformation will occur.

Leak tests shall be conducted in accordance with ICC IPC, except as otherwise provided herein. Tests shall be hydrostatic, unless otherwise specified. Only potable water shall be used for testing. Government will supply the test water, but the Contractor shall be responsible for approved disposal of contaminated water.

Duration of the test will be determined by the Contracting Officer, who may also terminate the test at any point after it has been determined by the Contracting Office that fixtures are watertight.

Record of testing shall be maintained by the Contractor and shall be submitted to the Contracting Officer upon acceptance of the equipment by the Government.

3.3 OPERATION AND MAINTENANCE

Contractor shall submit [6] [_____] copies of the Operation and Maintenance Manuals 30 calendar days prior to testing of plumbing fixtures. Data shall be updated and resubmitted for final approval by the Contracting Officer no later than 30 calendar days prior to contract completion.

-- End of Section --