# PART 1 - GENERAL

* 1. **SUMMARY**
		1. Provisions of Division 01 apply to this section
		2. Section Includes: Furnish labor, materials, tools, and equipment to install plumbing systems as indicated.
		3. Related Sections:
			1. Section 31 20 00: Excavation, Backfilling and Compacting for Utilities.
			2. Section 10 44 13: Fire Extinguishers and Cabinets
			3. Section 23 05 00: Basic Mechanical Requirements.
			4. Section 23 05 13: Basic Mechanical Materials and Methods.
			5. Section 23 05 48: Mechanical Sound, Vibration and Seismic Control.
			6. Section 23 05 53: Mechanical Identification.
			7. Section 23 07 00: Mechanical Insulation.
			8. Division 26: Electrical.

# SUBMITTALS

* + 1. Provide in accordance with Division 23 and Section 23 05 00: Basic Mechanical Requirements.

# QUALITY ASSURANCE

* + 1. Unless otherwise noted, provisions including amendments thereto, of the State Plumbing Code Part 5, Title 24, CCR; of the Uniform Plumbing Code, latest edition; and of the latest Plumbing Ordinances of the City of Fontana and/or County of San Bernardino are hereby made part of this section.
		2. Conform to provisions f Section 23 05 00: Basic Mechanical Requirements.
		3. Manufacturer of plumbing products shall obtain ANSI/NSF Standard 61, ef 9 certification to demonstrate compliance with the federal requirements for lead contribution to drinking water (Safe Drinking Water Act SDWA).

# PRODUCT HANDLING

* + 1. Conform to provisions of Section 23 05 13: Basic Mechanical Materials and Methods.

# PART 2 - PRODUCTS

* 1. **PIPING SYSTEMS**
		1. Materials: Refer to Section 23 05 13: Basic Mechanical Materials and Methods.
		2. Insulation for Piping: Refer to Section 23 07 00: Heating and Air Conditioning Piping Systems.
	2. **FIXTURES AND DRAINS**
		1. General: Fixtures specified shall be furnished complete with trim and fittings. Cast iron plumbing fixtures shall be acid resistant enamel, and identified by casting letters "AR" or words "acid-resistant" into metal. Fixtures shall be white unless otherwise specified. Cast iron fixtures shall be white enamel inside and on back, rim and apron, with exposed unfinished surfaces painted white. Fixtures of same general classifications shall be of same make.
		2. Finished Brass:
			1. Unless otherwise specified, finished brass of a similar type shall be of same manufacturer throughout buildings.
			2. Finished and exposed brass equipment, except floor, shower, and urinal drains shall be chromium-plated and polished. Floor, shower, and urinal drains, unless otherwise specified, shall be nickel-bronze metal.
		3. Traps, Trap Arms and Tailpieces:
			1. Fixture traps shall be cast brass, chromium-plated, and polished. **(No tubular traps).** Exceptions as follows:
1. Traps that are an integral part of fixture.
2. Traps concealed in floors, walls, and furring.
3. Traps standard for service sinks and Industrial Shop equipment.
	* + 1. Concealed traps and tailpieces may be rough brass, except as otherwise specified. Laboratory traps and tailpieces shall be flame retardant polypropylene. Furnish chromium-plated and polished cast brass wall flanges with setscrews and chromium-plated and polished brass casing on discharge side of each trap.
			2. Tailpieces shall be not lighter than 17 gauge, brass, chromium-plated, and polished. Furnish and install chromium brass plated wall flanges with set screws and chromium-plated 20 gauge brass casing on discharge side of each chrome-plated trap.
		1. Faucet and Shower Valve Handles: Faucet and shower valve handles shall be solid brass, chromium-plated and polished, and fastened to their stems by Allen type hollow head stainless steel set screws through the side of the handle extending into the stem. Handles with sharp edges or projections shall not be furnished.
		2. Fixture Supplies:
			1. Supplies for garbage disposal units and water heaters shall be unplated rigid copper water tube with threaded adaptors for connections to valves and other threaded connections. All other supplies shall be chromium-plated brass with hospital threads or shall be furnished with fittings and valves, which completely cover threads.
			2. Exposed supplies for showers shall be chromium-plated brass pipe up to header with hospital threads or shall be furnished with fittings and valves, which completely cover threads.
			3. Supplies to water closet tanks, lavatories, and drinking fountains shall be furnished with chromium-plated and polished screwed type angle compression stops with square shank stems and lock shields extending beyond stem. Instead of solid supply piping, polished chrome-plated risers of 3/8 inch outside diameter with ferrule stop end and metal nosepiece may be furnished. The installation of braided stainless or easy hookers supplies. Exception: Supplies that rise vertically from floor shall be furnished with straight type instead of angle type stops.
			4. Each supply or pipe that penetrates a finished surface and plumbing pipes passing through a countertop or part of a cabinet shall be furnished with a chromium-plated brass flange except flanges furnished by manufacturer of flush valves as an assembly.
			5. Water supplies of plumbing fixtures shall be protected against back-siphonage in event of a vacuum in piping system.
			6. Discharge outlets of supply faucets for lavatories and sinks shall clear top of overflow rim by at least one inch.
			7. Toilet and urinal flush valves shall be furnished with recognized atmospheric vacuum breakers, installed per manufacture’s instruction a minimum of 6 inches above fixture.

# ACCESS PLATES (TO CLEANOUTS, VALVES, WATER HAMMER ARRESTORS AND HOSE FAUCETS)

* + 1. Schedule Numbers:
			1. AP-1: Square, unless otherwise noted, steel, prime coated; frame, 18-gauge minimum. Door shall be 16-gauge minimum with concealed hinge or removable door, vandal-proof lock operated by Allen wrench. **(Specify for painted or stucco walls.)**

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| --- | --- |
| SMITH | Fig. 4760 AK |
| ZURN | Z-1462-VP |
| ELMDOR | DW-AKL |
| MILKOR | DW AK1 |

* + - 1. AP-2: Round type, stainless steel, vandal-proof, 5/16 inch No. 18 or 1/4 inch No. 20 flat-head machine screw into cleanout plug. Plate shall be prime coated minimum 18 gauge steel or polished chrome-plated brass, 18-8 No. 302 stainless steel, or polished nickel bronze. **(Specify for painted walls, screwed into cleanout plug.)**

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| --- | --- |
| SMITH | 4710U |
| ZURN | Z-1469-VP |
| JOSAM | 58600 |
| WADE | 8480R |

* + - 1. AP-3: Square, polished face chrome-plated bronze, aluminum alloy or brass chrome-plated brass frame with 14 gauge polished 18-8 No. 302 stainless steel or brass chrome-plated secured cover with vandal-proof screws. **(Specify for tile walls.)**

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| --- | --- |
| SMITH | 4735U |
| ZURN | Z-1460-VP |
| WADE | 8480-S |

* + - 1. AP-4: Square, floor type, cast nickel-bronze aluminum alloy or brass, with carborundum or scoriated, secured top. **(Specify for floor access to solid interceptor in Science Room, Ceramic Room, and Agriculture Room.)**

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| --- | --- |
| SMITH | 4910U |
| ZURN | Z-1461-VP |
| JOSAM | 56030 |

# BACKFLOW PREVENTION ASSEMBLIES

* + 1. Schedule Numbers:
			1. BPV-1: Pressure vacuum breakers 1/2 inch to 2 inches. **(Specify for irrigation lines to protect the potable water systems)**

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| --- | --- |
| WILKINS | 720A |
| WATTS | 800 M4QT |

* + - 1. BPV-2: Non-pressure type, atmospheric vacuum breaker.

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| --- | --- |
| CHAMPION | 262 |
| WATTS | 288A |
| WILKINS | 35 |

* + - 1. BPV-3: Reduced pressure or pressure differential type. **(Specify where potential health hazard exists and at main meter.)** Sizes 2-1/2 inches to 6 inches.

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| --- | --- |
| WILKINS | 975 or 375 (for uninterrupted service) |
| WATTS | 909 NES 009 NRS |
| FEBCO | 860, 870, 880 |

* + - 1. BPV-4: Double check valve assembly for water protection. **(Specify where no potential health hazards exist.)** Sizes 2-1/2 inches to 6 inches.

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| --- | --- |
| FEBCO | 850 |
| WILKINS | 950 or 350 |
| WATTS | 709 |

* + - 1. BPV-5: Double check valve assembly. **(Specify with non-toxic systems or where no potential health hazard exists.)** Sizes 3/4 inch to 2 inches.

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| WILKINS | 950 XL or equal |
| WATTS | 007 |

* + - 1. BPV-6: Pressure vacuum breakers with 3/4 inch hose bib. Installation per manufacturer’s recommendation.

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| --- | --- |
| WILKINS | 720A |
| WATTS | 800M3QT |

# BACKWATER SEWER VALVE ASSEMBLY

* + 1. Schedule Numbers:
			1. BSV-1: Cast iron with access cover, with line size gate valve upstream and downstream.

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| --- | --- |
| SMITH | 7022-S |
| ZURN | Z-1090 |

# CLEANOUT ASSEMBLIES

* + 1. Cleanout plug shall be line size.
		2. Schedule Numbers:
			1. CO-1: Iron body cleanout tee full line size up to 4 inches and round access plate, plugs shall be brass, countersunk with tapped boss for 5/16 inch No. 18 or 1/4 inch No. 20 screws. **(Specify for finished walls at base of waste stack, above urinal and service sink.)**

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| --- | --- |
| SMITH | 4532-U |
| ZURN | Z-1446-BP |

* + - 1. CO-2: Iron body with approved UPC plug, top and adjustable sleeve, cut-off ferrule, polished scoriated brass nickel bronze secured cover. **(Specify for finished floors inside buildings, in covered areas, and in concrete paving.)**
1. Square:

|  |  |
| --- | --- |
| SMITH | 4053L-U-RB |
| ZURN | ZN-1400-T |

1. Round:

|  |  |
| --- | --- |
| SMITH | 4033-L |
| ZURN | ZN-1400 |

* + - 1. CO-3: Secured cover, extra heavy-duty, adjustable sleeve, cut-off ferule, UPC. Brass approved type plug, scoriated tractor type cover. **(Specify for areas outside building on concrete paving.)**

|  |  |
| --- | --- |
| SMITH | 4233 |
| ZURN | ZN-1400-HD |

* + - 1. CO-4: Tapped soil tee with brass plug, full line size**. (Specify for above grade, outside building at base of exposed downspout.)**

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| --- | --- |
| SMITH | 4512 |
| ZURNZ | 1445-BP |

* + - 1. CO-5: Raised threaded head brass plug. **(Specify for YB-3.)**

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| --- | --- |
| ZURN | Z-1470-A |

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# CIRCULATING PUMPS, HOT WATER HEATING SYSTEM

* + 1. Schedule Numbers:
			1. CPH-1: Centrifugal, single stage, close coupled with adjustable cast iron base, bronze enclosed impeller, lead-free mechanical shaft seal suitable for water temperature range from 20 degrees to 300 degrees F. Screwed or flanged connections. GPM and TDH capacities as indicated.
1. BELL & GOSSETT
2. WEIMAN
3. PACIFIC
	* + 1. CPH-2: In-line mounted. Close coupled, centrifugal type with an all bronze water chamber, bronze sleeve bearings, bronze impellers, water tight shaft seal suitable for water temperature range from 20-300 degrees F. Forged steel shaft. Provided with bracket support to damper vibrations. GPM and TDH capacities as indicated.
4. BELL & GOSSETT
5. GRUNDFOS
6. TACO

# DRINKING FOUNTAINS

* + 1. Schedule Numbers:
			1. DF-1: Multiple, wall-mounted, cast aluminum with white powder coated finish, having three chrome-plated forged brass integral basin shank vandal- resistant bubbler heads, with flow/pressure regulating valves and chrome- plated solid brass adjustable push button activation, chrome-plated cast brass grid waste strainer with integral keyed locking lugs for vandal resistance. An easily serviceable 60 micron water supply strainer at inlet, mounting brackets, and vandal-resistant bottom plate shall be furnished. Complete drinking fountain with trim and brass compression fittings must have been tested and certified lead free to ANSI/NSF 61, Section 9. **(Specify for outdoor use located on High School Sanitary unit at Athletic Field.)**

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| HAWS | 1441 |

* + - 1. DF-2: Multiple, disabled accessible wall-mounted cast iron with white porcelain enamel finish, providing 2 chrome-plated forged brass integral basin shank vandal-resistant bubbler heads, with flow/pressure regulating valves and chrome-plated solid brass adjustable push button activation. Chrome- plated cast brass grid waste strainer with integral keyed locking lugs for vandal resistance. An easily serviceable 60-micron water supply strainer at inlet, mounting brackets, and vandal-resistant bottom plate shall be furnished. Complete drinking fountain with trim and brass compression fittings must have been certified lead free to ANSI/NSF 61, Section 9.

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| HAWS | 1431 |

* + - 1. DF-3: Single, disabled accessible wall-mounted recessed 18 gauge Type 304 stainless steel drinking fountain with satin finish, furnished with a single chrome-plated forged brass integral basin shank vandal-resistant bubbler head, with flow/pressure regulating valve and chrome-plated solid brass adjustable push button activation, vandal-resistant chrome-plated solid brass flat waste strainer, with an easily serviceable 60 micron water supply strainer at inlet. Complete drinking fountain with trim and brass compression fittings must have been tested and certified lead free to ANSI/NSF 61, Section 9. **(Specify for indoor use, fully disabled accessible with a 32 inches wide x 18 inches deep alcove wall cut-out below the fountain mounted at a 36-inch bubbler height. Specifically for indoor use in Middle School Library, Physical Education Building, and Administration Office.)**

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| HAWS | 2405 |

* + - 1. DF-3A: Single, wall-mounted recessed 18 gauge Type 304 stainless steel drinking fountain with satin finish, furnished with a single chrome-plated forged brass integral basin shank vandal-resistant bubbler head, with flow/pressure regulating valve and chrome-plated solid brass adjustable push button activation, vandal-resistant chrome-plated solid brass flat waste strainer, with an easily serviceable 60 micron water supply strainer at inlet. Complete drinking fountain with trim and brass compression fittings must have been tested and certified lead free to ANSI/NSF 61, Section 9. **(Specify for indoor locations where wheelchair accessibility is not required.)**

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| HAWS | 2400 |

* + - 1. DF-4: Single, wall-mounted, white vitreous china drinking fountain furnished with a single chrome-plated, forged brass integral basin shank, vandal- resistant bubbler head with flow/pressure regulating valve and chrome-plated solid brass, adjustable push button activation, vandal-resistant chrome-plated solid brass flat waste strainer, bottom plate, and easily serviceable 60-micron water supply strainer at inlet. Complete drinking fountain with trim and brass compression fittings must have been tested and certified lead free to ANSI/NSF 61, Section 9. (Specify for indoor use in Middle School Multi- Purpose Building, Agricultural Classroom and High School Administration Unit.)

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| --- | --- |
| HAWS | 1201 |

* + - 1. DF-5: Single, disabled accessible recessed wall-mounted drinking fountain with matching cuspidor combination, dual 18 gauge Type 304 stainless steel receptors with satin finish, furnished with a single chrome-plated forged brass integral shank vandal-resistant bubbler head in the fountain, with flow/pressure regulating valve and chrome-plated solid brass adjustable push button activation, with an easily serviceable 60 micron water supply strainer at the inlet, a chrome-plated cast brass water spreader in the cuspidor, and chrome-plated solid brass flat waste strainers in both. The complete drinking fountain with trim and brass compression fittings must have been tested and certified lead free to ANSI/NSF 61, Section 9. **(Specify for indoor use in Physical Education and Gymnasium locations, fully disabled accessible with alcove wall cut-out below the fountain/cuspidor mounted at 36-inch bubbler height, use DF-3 in Girls' Gymnasium. Specify for use in High School Gymnasium Building and Middle School Physical Education Building, delete use of cuspidor in Girls' Gym.)**

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| HAWS | 2406 |

* + - 1. DF-5A: Single, recessed wall-mounted drinking fountain furnished with matching cuspidor combination, dual 18 gauge Type 304 stainless steel receptors with satin finish, furnished with a single chrome-plated forged brass integral shank vandal-resistant bubbler head in the fountain, with flow/pressure regulating valve and chrome-plated solid brass adjustable push button activation, with an easily serviceable 60-micron water supply strainer at the inlet, a chrome-plated cast brass water spreader in the cuspidor, and chrome-plated solid brass flat waste strainers in both. The complete drinking fountain with trim and brass compression fittings must have been tested and certified lead free to ANSI/NSF 61, Section 9. **(Specify for indoor use in Physical Education and Gymnasium locations where wheelchair accessibility is not required. Specify DF-3A in Girls' Gymnasium.)**

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| --- | --- |
| HAWS | 2403 |
| ELKAY | EDFP-214-C |

 Or equal.

* + - 1. DF-6: Multiple, disabled accessible wall-mounted cast aluminum fountain with white powder coated finish, furnished with two chrome-plated forged brass integral shank vandal-resistant bubbler heads, with flow/pressure regulating valves and chrome-plated solid brass adjustable push button activation, chrome-plated cast brass grid waste strainer with integral keyed locking lugs for vandal resistance. An easily serviceable 60 micron water supply strainer at inlet, integral mounting brackets, and vandal-resistant bottom plate shall be included. Complete drinking fountain with trim and brass compression fittings, tested and certified lead free to ANSI/NSF 61, Section 9. Install with 1/4 inch thick steel mounting plate inside the wall. **(Specify for outdoor handicap use at Owner’s Multi-Purpose Buildings, Elementary and High School Sanitary Unit, Middle School Physical Education Bldg.) Piping furnished with unit shall be Type L copper.**
1. Fountain:

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| HAWS | 1441 |

1. Mounting plate:

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| --- | --- |
| HAWS | 6710 |

* + - 1. DF-7: Dual height, 2 disabled accessible wall-mounted, 14 gauge Type 304 stainless steel dual height drinking fountains of one-piece construction, with 1/4 inch thick stainless steel backs, furnished with 2 chrome-plated forged brass integral basin shank, vandal-resistant bubbler heads, with flow/pressure regulating valves and chrome-plated solid brass adjustable push button activation, with chrome-plated cast brass waste strainers, bottom plates and easily serviceable 60-micron water supply strainers at inlet. Install with a 3/16 inch thick steel mounting plate inside the wall. **(Specify for fully disabled accessible for indoor severe vandalism** **locations, lowest fountain, mounted at 36 inches to 34 inches bubbler height for ages 12 and over, lowest fountain mounted at 32 inches to 31 inches bubbler height for Elementary School age, lowest fountain mounted at 30 inches to 29 inches bubbler height for Kindergarten age children.)**

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| HAWS | 1119.14, with bracket 6700.4 |

* + - 1. DF-8: Disabled accessible single bubbler white porcelain enamel cast iron wall-mounted drinking fountain; furnished with vandal-resistant lead free PCP forged brass bubbler head, PCP cast brass waste strainers, stream adjustable PCP machined brass push button operation and pressure regulating valves. Bottom cover plates, 1-1/2 inch brass trap, 60 micron water inlet strainer. ADA compliant and certified lead free to ANSI/NSF Standard 61, Section 9.
1. Fountain: HAWS 1311
2. Mounting plate: HAWS 6700
3. Installation: Furnish a 3/16 inch thick steel mounting plate No. 6700, which can also be installed with model No. 6800 concealed carrier steel struts for additional support where wall-mounted fountain may be subjected to excessive leverage.
	* + 1. DF-8A: Disabled accessible dual height white porcelain enamel cast iron wall- mounted drinking fountains; furnished with vandal-resistant lead free PCP forged brass bubbler heads, PCP cast brass waste strainers, stream adjustable PCP machined brass push button operation and pressure regulating valves. Bottom cover plates, 1-1/2 inch brass rap, 60 micron water inlet strainer. ADA compliant and certified lead free to ANSI/NSF Standard 61, Section 9.
4. Fountain: HAWS 1501
5. Mounting plate: HAWS 6715
6. Installation: Furnish a 3/16 inch thick steel mounting plate number 6715, which can also be installed with model No. 6800 concealed carrier steel struts for additional support where wall-mounted fountain may be subjected to excessive leverage.

# DRUM TRAP

* + 1. Schedule Numbers:
			1. DT-1: Extra heavy cast iron, bolted top.

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| SMITH | 8714 |
| ZURN | ZA1180 |

* + - 1. DT-2: Aluminum solid interceptor, furnish for on-floor installation.

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| SMITH | 8710-AA |
| ZURN | Z-1180 |

# DIELECTRIC UNIONS

* + 1. Schedule Numbers:
			1. DU-1: Brass union with 6-inch brass nipple.
			2. DU-2: Union-flanged.
1. WATTS 3100-IPXS, 3110-SXS, 3200-IPXIP

# EMERGENCY EYE WASH/EMERGENCY SHOWER

* + 1. Schedule Numbers:
			1. EEW-1: Recessed ADA Barrier Free combination emergency shower and fold- away eyewash flush mounted in the wall and ceiling with concealed piping:
1. Eyewash: Dual automatic pressure regulated polished chrome plated brass eyewash heads and assembly folds up flush into a wall mounted recessed stainless steel cabinet. Shower: Accessible shower activation by pull lever handle located 42 to 45 inches above the finished floor, installed inside of a wall mounted recessed stainless steel cabinet with exposed shower head. **[Required in all Science and Industrial Arts Rooms. Unit is disabled accessible when eye/face wash spray outlet is mounted with a height of 36 inches].**
	* + - 1. HAWS - Eyewash & 8355 WC.SP38 Drench Shower special order w/ 20 GPM exposed SS flow control shower head.
				2. GUARDIAN GBF 2150.
				3. Or Equal.

**NOTE TO ARCHITECT**: Recessed model of the Combined Emergency Eyewash/Emergency Shower, No. EEW-1 is recommended. If wall space and wall depth do not allow for the recessed unit, then surface mounted, No. EEW- A, may be selected. PLEASE EDIT THIS SPECIFICATION.

* + - 1. EEW-1A: Eyewash: Disabled accessible eye/face wash, with an all stainless steel enclosure and bowl, twin eye/face wash spray heads with spray head covers and built-in flow control regulation, chrome-plated brass stay open valve with stainless steel valve stem, stainless push-paddle type handle. Shower: Drench Shower with exposed stainless steel showerhead with recessed pull down level valve. **[Required in all Science and Industrial Arts Rooms. Unit is disabled accessible when eye/face wash spray outlet is mounted with a height of 36 inches].**
1. HAWS - Eyewash - 7752 WC, Drench Shower - 8165
2. CHICAGO - 9007, 9106-N5
	* + 1. EEW-2: Hand-held emergency eye/face wash. [Required in all Science Prep Rooms].

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| HAWS | 8905 |
| CHICAGO | 9310-NF |

# ELECTRIC WATER COOLERS

* + 1. Schedule Numbers:
			1. EWC-1: Floor-mounted, thermostatically controlled, capacity not less than 14 GPH at 40 degrees F.; inlet water: 80 degrees F., ambient temperature: 90 degrees F.; furnished with chrome-plated close coupled fork type pushback glass filler. Cabinet shall be not less than 20 gauge welded steel construction with enclosed base; 18-8 or equal stainless steel or chrome-plated strainer; hermetically sealed condensing unit shall be capable of handling specified capacity without overload, and motor shall be not less than 1/5 HP single phase 60 cycle 115 volts wired automatic controls. Water cooler shall comply with requirements of the governing agency or health department. **(Specify for Middle and High Schools.)**

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| --- | --- |
| HAWS | HF-14-3139 |
| ELKAY | EFA-14 |

Or equal.

* + - 1. EWC-2: Same as EWC-1 except cooler shall be rated at 8 GPH. **(Specify for Elementary Schools.)**

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| --- | --- |
| HAWS | ELKAY |
| HF-14-3139 | EFA-14 |

* + - 1. EWC-3: Wall-mounted electric chiller type UL listed for physically handicapped and complying with Title 24 with minimum capacity of 8.0 GPH certified to comply with ARI Standard 1010/73. Fountain shall be furnished with stainless steel apron and cabinet push bar operated bubbler, automatic stream regulator, brass P-trap, and hermetically sealed, air-cooled condensing unit with 115 volt, single phase 1/5 HP motor with thermal overload protection. Provide with approved 3-wire grounding cord and connector, Hubbell No. 5264 or equal.

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| HAWS | ELKAY |
| HWCA8-SS | EHFA-8 |

Or equal.

* + - 1. EWC-4: With platform pushdown glass filler. **(Specify for use in Faculty Dining Room - High School, Middle School, and Elementary School.)**

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| --- |
| HAWS |
| HWBFA8 |

* + - 1. EWC-5: Dual-height electric water cooler, same mechanical specification as EWC-3 except fully disabled accessible, with dual height stainless steel drinking fountains sharing a common waste, water supply and refrigeration.

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| --- |
| HAWS |
| HWBFA8LSS |

# FAUCETS

* + 1. Schedule Numbers:
			1. F-1: 3/4 inch hose end faucet with vacuum breaker and top wall brace, rough chrome. **(Specify for service sink.)**

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| --- |
| CHICAGO |
| 445 (less spout – 897S |

* + - 1. F-2: Chicago No. 517-GC double-jointed spout and mixing assembly for both hot and cold water 1/2 inch international pipe size female inlet shanks and integral check stops. Furnish with No. 369 handles and E-1 soft flow spout end. Exposed piping on range side shall be assembled with hospital threads or sleeves, which completely cover threads.
			2. F-3: Double faucet, rough-plated brass with vacuum breaker top brace and hose end. **(Specify for can washing installation).**
1. Elementary Schools: Wall-mounted with spout at 64 inches above finish floor.
2. Middle Schools: Mount on top of range shelf with 18 gauge stainless steel vertical backing plate with a horizontal flange fastened to range shelf. Plate shall be drilled to accommodate water supply nipples. Pipe shall be securely fastened to backing plate. Lock nuts or waste nuts may be furnished. Spout end shall be at 64 inches above finish floor.

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| --- | --- |
| KOHLER | CHICAGO |
| K-8907 | 305-VB-RCF |

* + - 1. F-4: Self-closing metering, single lavatory fitting, adjustable time cycle and chrome-plated finish. Chicago 333-669 with E12 aerator.

# FLOOR DRAINS

* + 1. Schedule Numbers:
			1. FD-1: Cast iron body, no hub with seepage pan and flat, round nickel bronze strainers not less than 5 inches diameter for 2 inches outlet bodies, 7 inches for 3 inches outlet bodies and 8 inches for 4 inches outlet bodies, with maximum of 1/2 inch square holes or slots not larger than 1/4 inch x 1-1/4 inch. **(Specify for use in locations other than tile floors.)**

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| SMITH | ZURN |
| 2005Y-A | ZN-415-B |

* + - 1. FD-2: Same as specified for FD-1, except with square tops. (Specify for use in tile floors.)

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| SMITH | ZURN |
| 2005Y-B | ZN-415-S |

* + - 1. FD-3: Area type with 8-inch diameter minimum cast iron top grate (no hub). Drain shall be vandal-proofed by securing grate to body with stainless steel Allen flat-head screws.

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| SMITH | ZURN |
| 2110-Y-U | Z-550-VP |

* + - 1. FD-4: Pavilion type with cast iron hinged top, with removable sediment bucket. Drain shall be vandal-proofed by securing grate to body with stainless steel Allen flat head screws. No hub; 4-inch drain in lunch area in lieu of clarifier.

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| SMITH | ZURN |
| 2230-Y-H-U | Z-610-H-NH-UP Z-541-NH-VP-H |

* + - 1. FD-5: Gang shower, cast iron body with 5-inch diameter nickel-bronze vandal-proof strainer. No hub.

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| SMITH | ZURN |
| 2005-Y-NB-U-(A) | ZN-415- B-VP |

* + - 1. FD-6: For indirect waste. Cast iron body with vandal-proof nickel-bronze top and funnel. No hub.

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| SMITH | ZURN |
| 3510-F11-NB5 | ZN-415-E |

* + - 1. FD-7: Drain parking garage (emergency drain) with cast iron body, flashing collar and cast iron tractor grate. No hub, vandal-proof top.

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| SMITH | ZURN |
| 2120Y-U | ZN-508-9” VP |

* + - 1. FD-8: Area drain, cast iron body, round pedestrian grate set in square frame.

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| SMITH | ZURN |
| 1470Y-U-NB | ZN-158-VP |

* + - 1. FD-9: Planter drain, cast iron body, secured bronze dome with stainless steel mesh screen.

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| --- | --- |
| SMITH WITH 2646Y | ZURN ZRB-352 with Z-1040 adaptor |

# FIRE HYDRANTS

* + 1. Schedule Numbers:
			1. FH-1: City of Fontana and/or County of San Bernardino Fire Department approved; 2-1/2 inches x 4 inches.

|  |  |
| --- | --- |
| RICH 550 | 2-1/2” X 4” |
| MUELLER | 2-1/2” X 4” |
| JAMES JONES | J-3700 |

# FIRE HOSE CABINETS

* + 1. Schedule Numbers:
			1. FHC-1 Cabinet: Semi-recessed type center break door with lock and decal "BREAK GLASS IN CASE OF FIRE" with 75-foot polyflex hose. Furnish Portable Extinguishers in each cabinet. Extinguisher shall be same as specified in Section 10 44 13: Fire Extinguishers and Cabinets.

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| --- |
| CROKER W-1500 Series |

* + - 1. FHC-2: Same as FHC-1 but surface mounted for masonry walls.

|  |
| --- |
| POTTER-ROEMER 1000 Series |

# FIRE HOSE VALVES

* + 1. Schedule Numbers:
			1. FHV-1 Valve, Fire Hose: Cast brass angle valve, UL and factory mutual approved; 1-1/2 inch size at 175 pounds; male or female ends.

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| --- | --- |
| POTTER-ROEMER | 4070 |
| POWHATTAN | 15-158 |
| UNITED | 88 |

* + - 1. FHV-2 Valve, Fire Hose: Regular weight angle valves 1-1/2 inches, 2 inches and 2-1/2 inches for 150 or higher psig working pressure, female outlet for hose rack installation. Cast brass, replaceable composition disc, rough chromium-plated body with hand wheel.

|  |  |
| --- | --- |
| POWHATTAN | 18-157 |
| UNITED | 88H |
| POTTER-ROEMER | 4065 |

# FLEXIBLE HOSES

* + 1. Schedule Numbers:
			1. FLH-1: Corrugated stainless steel metal hose (for gas use). US Flex, or equal.
			2. FLH-2: Corrugated bronze metal hose (for water use). US Flex, or equal.

# FLUSH VALVE ASSEMBLY

* + 1. Schedule Numbers:
			1. FLV-1: Flush valves shall be of the filtered diaphragm quiet flush type. Diaphragm of nominal 3 inches diameter. Valves shall be furnished so that flush will remain constant and not require any adjustment or have any adjusting device. Flush valve for urinals shall deliver 1/2 to 1 gallon at each operation at any pressure from 5 pounds to 100 pounds, with handle held in any position. Flush valve for water closet shall deliver 1.6 gallons at each operation.
1. Silencing feature at flush valve shall be in valve proper and in associated stop. Silencing feature shall allow flush valve to flush and close quietly without restricting flow of water.
2. Each flush valve shall be provided with a loose key, square shank, lock shield angle service stop connected to flush valve with a union connection and adjustable nipple. Stops shall be furnished with vandal-proof caps.
3. Provide l7 gauge pressed brass escutcheons for wall and fixture. Escutcheons shall be fastened to not turn or rattle.
4. Each flush valve shall be furnished with a vacuum breaker providing one inch opening to atmosphere, which will not leak under any degree of back pressure and will not restrict rate of flow more than 10% at 10 pounds pressure and will operate noiselessly.
5. Tailpiece shall be not lighter than 17 gauge and shall be part of flush valve assembly.
6. Exposed metal parts of flush valve assembly to be nickel and chromium- plated on a brass or copper base.

# FLOOR SINKS

* + 1. Schedule Numbers:
			1. FS-1: Round, cast iron, acid-resistant enamel body with bottom aluminum dome strainer, less grate. (Specify for use in Middle School and High School Multi-purpose Buildings and Cafeteria Buildings.)

|  |  |
| --- | --- |
| SMITH | 3400Y-10 |
| ZURN | Z-1950-1 |

* + - 1. FS-2: 6 inches to 8 inches deep, square cast iron acid-resistant enamel, bottom aluminum dome strainer with nickel bronze rim and grate top. (Specify for use in Middle School and High School Multi-purpose Buildings, High School Cafeteria and Mechanical Equipment Rooms.)

|  |  |
| --- | --- |
| SMITH | ZURN |
| 3140Y | Z-1901 |
| 3150Y | ZN-1900 |

* + - 1. FS-3: Round, cast iron body with dome bottom strainer, under deck clamp and 2-inch high water dam; no hub type. (Specify for outdoor use near cooling tower, near rooftop A/C unit, chillers, Mechanical Equipment Rooms.)

|  |  |
| --- | --- |
| SMITH | 3980Y-C |
| ZURN | Z-108-RC |

# GARBAGE DISPOSAL UNITS

* + 1. Schedule Numbers:
			1. GD-1: Domestic type. (Specify for Middle School Food Rooms).

|  |  |
| --- | --- |
| BIG GENIE | NC-45 |
| INSINKERATOR | Model 1/2 HP 77 |

* + - 1. GD-2: (Specify for commercial type for Elementary School Cafeteria kitchen). Waste King, Big Genie, or Insinkerator assemblies furnished with required components including the following:
1. Pulverator unit with 1/2 HP, 120 volt, single phase 60 cycle motor; motor to have built-in overload protection. Unit shall be supplied with water tapping into pulverator chamber or discharge of lower chamber, and with stainless steel cutting chamber.
2. Cone sink assembly, 18 inches diameter 16 gauge stainless steel, complete with stainless steel bowl cover, internal swirl and safety baffle.
3. Mounting assembly with splash-proof reversing switch assembly, 1/2 inch Jackes-Evans Type 3P solenoid valve, adjustable mixing tee for pre-rinse supply with built-in check valves, pre-rinse assembly consisting of flexible metal hose, coil spring, swivel connection hand grip valve, spray nozzle and wall brace.
4. I.S.E. SS-50
	* + 1. GD-3: (Commercial type for Middle School Cafeteria kitchens, same as GD-2, except:)
5. Pulverator unit with 3/4 HP, 208/230 or 240 volts as required, 3-phase 60 cycle motor to match electrical service available. Motor shall have built-in overload protection. Unit shall be furnished with water tapping into pulverator chamber or discharge to lower chamber and without adjustable mixing tee and pre-rinse assembly.
6. I.S.E. SS-75

# GREASE TRAPS (INTERCEPTORS)

* + 1. Schedule Numbers:
			1. GT-1: Cast iron, basket baffle assembly.

|  |  |
| --- | --- |
| ZURN | Z-1170 |
| SMITH | 8000 Series |

* + - 1. GT-2: Pre-fabricated reinforced concrete with cast iron fittings, with manholes brought to grade. Size and capacity as indicated on Drawings. Brooks, Jensen, or Procast.

# HOSE BIBS

* + 1. Schedule Numbers:
			1. HB-1: For plaster or stucco wall, furnished with box and stop, exposed trim chrome-plated, without door and with vacuum breaker. (Specify for use in swimming pool area, outside eating area and 75 feet spacing around exterior building wall.)

|  |  |
| --- | --- |
| ACORN | ZURN |
| 8141 | 1350-5-LD |
| 8102 |  |

* + - 1. HB-2: For brick and poured concrete wall, furnished with box and stop, exposed trim chrome-plated, without door and with vacuum breaker. **(Specify for use in swimming pool area, outside eating and 75 feet spacing around exterior building wall.)**

|  |  |
| --- | --- |
| ACORN | ZURN |
| 8141 | 1350-5-LD |
| 8102 |  |

* + - 1. HB-3: ASTM B 62 bronze body, rubber composition disc or renewable set, straight nose with brass die cast or enamel iron handwheel. **(Specify for use in Latch House.)**

|  |  |
| --- | --- |
| ACORN | ZURN |
| 8131RBVB | Z-1343-VB |

* + - 1. HB-4: Same as HB-3 except furnish loose key stop and lockshield. **(Specify for use at animal washdown area.)**

|  |  |
| --- | --- |
| ACORN | ZURN |
| 8131LK-RBVB | Z-1343-VB-LK |

* + - 1. HB-5: Same as HB-3 except furnish with bent nose**. (Specify for use at roof top AC Unit. Mechanical Equipment Room, Boiler Rooms, etc.)**

|  |  |
| --- | --- |
| ACORN | ZURN |
| 8126-RBVB | Z-1343-VB-LK |

* + - 1. HB-6: Same as HB-4 except furnish with bent nose. **(Specify for use in Agricultural Plot.)**

|  |  |
| --- | --- |
| ACORN | ZURN |
| 8126LK-RBVB | Z-1343-VB-LK |

* + - 1. HB-7: Renewable seat, rough chrome finish, bronze body, flanged 3/4 inch I.P.S. Female thread inlet, loose key, with vacuum breaker.

|  |  |
| --- | --- |
| CHICAGO | WOODFORD |
| No. 387-E-27 | No. 24P-CH-TK |

* + - 1. HB-8: Recessed hose box furnished with wall flange and built-in drip lip. Box shall be one piece construction; door shall have a recessed cam lock. Door shall remain up and out of the? when in fully opened position. Valve shall be replaceable loose key wheel handle and screwdriver stop. Install per manufacturer’s recommmendation. **(Specify for use in Toilet Rooms.)**

|  |  |
| --- | --- |
| ACORN | SMITH |
| 8140 | 5509 QT-SAP |
| 8104 |  |

# IRRIGATION SPRINKLER (SPECIFY FOR LATH HOUSE)

* + 1. Schedule Numbers: IS-1, THOMPSON 170, CHAMPION 17.

# LAVATORIES

* + 1. Schedule Numbers: Exposed trim shall be free from sharp edges or points. Fixture shall be furnished with other listed manufacturer specified trim. Instead of solid supply pipe, polished chrome-plated risers, 3/8 inch outside diameter with ferrule stop end and metal nosepiece may be furnished.
			1. L-1: 20 inches x 18 inches cast iron, acid-resistant enamel punched with one hole only, 4 inches or 5 inches right of center and supplied with tempered or cold water only. Furnished with hangers. Stops shall be loose key, square shank, lock shield type. **(Specify for use in Student Toilet Rooms, Typing, Math, and Industrial Art Rooms.)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | KOHLER | CHICAGO | MOEN | ZURN |
| Bowl | K-2810 |  |  |  |
| Faucet |  | 333-669 |  |  |
| Drain |  | 327A | 14526 |  |
| Supply |  |  |  | ZH-8826-LR-LK |

**Note:** 1/2-inch I.P.S. x 3/8-inch comp.; female outlet.

* + - 1. L-2: Same as L-1**, (Specify for handicap student use).**
			2. L-3: 20 inches x 18 inches cast iron, acid-resistant enamel, with center set combination faucets with lever handles and supplied with hot and cold water **(for handicap use),** complete with hangers.

|  |  |  |  |
| --- | --- | --- | --- |
|  | KOHLER | CHICAGO | MOEN |
| Bowl | K-2849 |  |  |
| Faucet | K-7404-E | 802A | 8145 |
| Drain | K-13885 |  | 14526 |
| Supply |  | 1017 |  |

**Note:** Insulate hot water and drain lines under lavatories and sinks with Armaflex wrap type insulation, 1/8 inch thick, 2 layers minimum with 50 percent overlap. **(Specify for handicapped use for L-3.)**

* + - 1. L-4: 20 inches x 18 inches cast iron, acid-resistant enamel, with center set combination faucets with cross handles supplied with hot and cold water complete with hanger. **(Specify for School Personnel, Administration Office, Cafeteria, Health Unit, etc.)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | KOHLER | CHICAGO | MOEN |
| Bowl | K-2849 |  |  |
| Faucet | K-7404 | 802A-633 | 8141 |
| Drain | K-7715 | 327A |  |
| Supply |  | 1017 |  |

* + 1. L-5: 16 inches x 14 inches (or size as indicated on Drawings), enamel cast iron, complete with combination supply and drain fitting. **(Specify for use in High School Student Store and 1959 Portable Bldg.)**

|  |  |  |
| --- | --- | --- |
|  | KOHLER | CHICAGO |
| Bowl | K-2485 |  |
| Faucet | K-8046-4A | 105-317 |
| Drain |  |  |
| Supply |  | 442-LK |

# LABORATORY GAS VALVES

* + 1. Schedule Numbers:
			1. LGV-1: Ground key stop, heavy chrome-plated, nickel and copper composition, double turret at 90 degree angle 3/8 inch international pipe size deck type, with lever handle and vandal-proof plastic index button. **(Specify for use in Middle School Science Room countertop tables.)**

|  |
| --- |
| CHICAGO |
| 982-909C |

* + - 1. LGV-2: Laboratory gas valve, same as LGV-1, except single turret. **(Specify for use in Middle School Science Room demonstration table.)**

|  |
| --- |
| CHICAGO |
| 980-909C |

* + - 1. LGV-3: Same as LGV-1, except double turret at 180 degree angle. **(Specify for use in High School Chemistry, Physiology, Biology, Physics, Modern Science and Science Room peninsula table.)**

|  |
| --- |
| CHICAGO |
| 981-909C |

* + - 1. LGV-4: Ground key stop, heavy chrome-plated, nickel and copper composition, single turret, wall-mounted, 3/8 inch international pipe size with lever handle and vandal-proof plastic index button. (Specify for use in Middle School Science Work Rooms.)

|  |  |
| --- | --- |
| CHICAGO | HAWS |
| 986-909C | 6046-6030 |

* + - 1. LGV-5: Heavy chrome-plated, single turret assembly, nickel and copper composition, 1/2 inch iron pipe size concealed angle stop with extended stem and spoke handle with vandal-proof plastic index button. **(Specify for use in High School Chemistry Room fume hood.)**

|  |
| --- |
| CHICAGO |
| 962V0G-980-E7T |
|  |
|  |

# LAUNDRY TRAYS

* + 1. Schedule Numbers:
			1. LT-1: Cast iron, acid-resistant enamel, with strainer and 1-1/2 inches tubing tailpiece, 24 inches x 21 inches x 13-1/2 inches in cabinet top, with faucet, strainer and tray**. (Specify for use in High School and Elementary Special Education DH Storage/Laundry Room.)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | CHICAGO | KOHLER | MOEN |
| Tray |  | K-6757 |  |
| Faucet | 1100 | K-7761-T | 8133 |
| Strainer |  | K-8821 | 8133W/S0007 |

* + - 1. LT-2: Cast iron, acid-resistant enamel, 24x 20 inches x 13 inches, black angle frame, with faucet strainer and tray.

|  |  |  |  |
| --- | --- | --- | --- |
|  | MOEN | KOHLER | CHICAGO |
| Tray |  | K-6757 |  |
| Faucet | 8120 |  | 445 |
| Strainer | W/S0001 |  |  |

# PIPE HANGERS

* + 1. Refer to Section 23 05 13: Basic Mechanical Materials and Methods.
		2. Schedule Numbers:
			1. PH-1: Complete with clamps, inserts, etc.

|  |  |  |
| --- | --- | --- |
| SUPERSTRUT | UNISTRUT | B-LINE |

* + - 1. PH-2: **In shower area.**
1. ACORN 7116 or 7118 series, or equal.

# P-TRAPS

* + 1. Schedule Numbers:
			1. PT-1: Cast brass complete, chrome-plated.

|  |  |
| --- | --- |
| ZURN | Z-8712-LC |

#

# PRESSURE REGULATING VALVE ASSEMBLIES

* + 1. Schedule Numbers:
			1. PRV-1: Furnish for water service, all bronze body, stainless steel seat, bronze strainer, calibrated springs, corrosion resistant, adjustable control for water service.

|  |  |
| --- | --- |
| WATTS | WILKINS |
| ACV Series | 500 XL45BR |

* + - 1. PRV-2: Furnish for air service, Japanned steel, spring loaded, brass forging body, nylon reinforced neoprene diaphragm, inlet pressure up to 250 pounds, reduced pressure 5 pounds to 60 pounds.

|  |  |
| --- | --- |
| MASON-NEILAN | SCHRADER |
| 71-1/2" | 3464, 1/2" |
|  | 3466, 3/4" |

* + - 1. PRV-3: Furnish for gas service, spring-loaded model, Buna N rubber composition or leather valve seat disc and diaphragm, inlet pressure 125 pound maximum.

|  |  |
| --- | --- |
| REPLIANCE | FISHER |
| 1813C | S-100. 166-1, S-201, 166-2 |

* + - 1. PRV-4: Furnish for gas service for (unit heaters, boilers, and similar installations). Spring-loaded model, Buna N rubber composition, or leather valve seat and diaphragm suitable for temperatures to 150 degrees F.; maximum inlet pressure one pound. Outlet pressure 4 inches to 10 inches adjustable; orifice to suit. For pilot lines and main burners.

|  |  |  |
| --- | --- | --- |
| REPLIANCE | MAXITROL | HONEYWELL |
| A3000 Series | RV | V5172 Series |

# ROOF DRAINS

* + 1. Schedule Numbers:
			1. RD-1: Low profile dura-coat cast iron body dome strainer type.

|  |  |
| --- | --- |
| SMITH | ZURN |
| 1010Y-ERC | Z-100-ERC |

* + - 1. RD-1A:

|  |  |
| --- | --- |
| SMITH | ZURN |
| 1010Y-R-C | Z100-89-RC |

* + - 1. RD-2: Cast iron body with standpipe. **(Specify for use as overflow.)**

|  |  |
| --- | --- |
| SMITH | ZURN |
| 1080Y-ERC | Z-100-89-ERC |

* + - 1. RD-2A:

|  |  |
| --- | --- |
| SMITH | ZURN |
| 1080-Y-R-C | Z100-89-RC |

# SHOWER ASSEMBLIES

* + 1. General: Shower assemblies shall be fastened to walls with 18-8 stainless steel Allen key or interrupted slot flat head machine screws with polished head of length sufficient for full thread engagement with steel plate in stud wall or minimum of 3/8 inch engagement with lead shields in concrete wall. When securing to shower racks furnish same machine screws with 18-8 stainless steel nuts and washers. Fittings valves and heads shall be recessed type to cover male pipe threads or male threads shall be hospital type plated after threading and installed with not more than one thread showing. Pipe, fittings, valves, and nozzles shall be chrome-plated with exception of headers.
		2. Schedule Numbers:
			1. SA-1: Wall-mounted shower and/or back to back shower, with built-in soap dispenser system. Housing shall be of 16 gauge, Type 304 stainless steel with exterior polished satin finish. Shower shall be factory prepared and hydrostatically tested to 150 psi at the factory. Internal piping shall be Type L copper tubing. Fittings shall be cast bronze or copper, valves shall be tempered water and not to exceed 2.0 GPM. Flange showerhead shall be lockable universal ball joint. Exposed fasteners shall be tamper resistant. Shower station shall be 18 inches from each end and 36 inches on center and 74 inches vertical height, shower assembly shall be complete with mounting brackets and stanchions. **(Specify for use in Middle Schools for Boys' and Girls' group shower; P.E. Buildings, see also SA-7 for new facility construction).)**

|  |  |  |
| --- | --- | --- |
|  | ACORN | BRADLEY |
| Wall-Mounted | A-100 Series | 1 PA |
| Back-to-Back | B-130 Series | 2PA |

* + - 1. SA-2: Double valve, vandal-proof, chrome-plated exposed type valve with chrome-plated handles and swivel discs; chrome-plated brass pipe international pipe size supplies offset as required for installation; Flange shower head, single orifice and lockable universal ball joint. **(Specify for use in Middle Schools for Male and Female Instructors P.E. Buildings)**

ACORN 521 BRADLEY

* + - 1. SA-3: Same as SA-2 except single valve. **(Specify for use in Middle Schools for Male and Female Instructors - P.E. Buildings)**

ACORN 525 BRADLEY

# SA-4: (Specify for handicap use - Special Education Schools, High School Therapy Unit, Elementary School - DH Toilet Room, OH Toilet Room.)

1. Shower control valve: Polished chrome-plated metal lever handle; Symmons 021, or equal.
2. Vacuum breaker: Chicago 892-G exposed. Vacuum breaker for concealed piping, Zurn Z-80000-EVB.
3. Wall spout: Chicago 777-37KJK wall spout with 1/2 female i.p.s. flange inlet and 1/2 inch male i.p.s. outlet, chrome-plated.
4. Hose and bar: 5-foot long reinforced white vinyl hose with 24-inch long adjusting bar with hand shower slide bracket, chrome-plated. Chicago 153-WV.
5. Hand shower: Insulated handle with central lever stop valve, bent nozzle tube; rubber bound hose spray adapted for 1/2 inch hose connection.

ACORN, BRADLEY, OR EQUAL

* + - 1. SA-5: Showerheads shall be square flanged type chrome-plated and exposed screws shall be vandal-proof showerhead shall be mounted with concealed back plate assemblies, valves vacuum breaker and nozzles shall be chrome- plated. **(Specify for handicap use - Elementary and Middle Schools in Nurse's Rooms.)**
1. Showerhead: Showerhead shall be square flanged type with lockable universal ball joint. Acorn 802-2-YY, Bradley 445 LBJ, or equal.
2. Control valve: Concealed volume control with positive shutoff valve, modify with lever handle. Acorn, Bradley, or equal.
3. Vacuum breaker: Exposed vacuum breaker assembly for concealed supply piping. Acorn, Bradley DV 892-G, or equal.
4. Diverter valve: Transfer flow between showerhead and hand held shower. Acorn 591, Bradley DV, or equal.
5. Hand-held shower: 5-foot long reinforced white vinyl hose with quick disconnect, nylon and chrome hand spray and 24-inch adjusting bar-with hand shower slide bracket. Acorn No. 151, Bradley, or equal.
6. Wall spout: Acorn, Bradley, or equal wall spout with 1/2 inch female i.p.s. flange inlet and 1/2 inch male i.p.s. outlet, chrome-plated.
	* + 1. SA-6: Showerheads shall be square flanged type chrome-plated and exposed screws shall be vandal-proof. Showerhead shall be mounted with concealed back plate assemblies; valves and nozzles shall be chrome-plated. **(Specify for handicap use - Gymnasium Buildings - Middle Schools.)**
7. Showerhead: Showerheads shall be square flanged type with lockable universal joint. Acorn-802-2-YY, Bradley 445 LBJ, or equal.
8. Control valve: Concealed volume control with positive shutoff valve, modify with lever handle, Acorn, Bradley, or equal.
9. Diverter valve: Transfer flow between showerheads.

# SA-7: (Specify for use in Middle Schools for Student Showers / fixed walls - P.E. Buildings)

1. Shower control valve: Polished push button automatic shower limiter metering valve installed concealed inside wall; polished chrome-plated with vandal proof screws for escutcheon mounting; Acorn, Bradley, or equal.
2. Shower head: Institutional showerhead with vandal resistant mounting, Acorn, Bradley, or equal.

# SA-8: (Specify for handicap - Student)

1. Shower control valve: Polished push button automatic shower limiter metering valve installed concealed inside wall; polished chrome-plated with vandal proof screws for escutcheon mounting; Acorn, Bradley, or equal.
2. Vacuum breaker: Exposed vacuum breaker for concealed piping, Acorn, Bradley or equal.
3. Wall spout: Wall spout with 1/2 female i.p.s. flange inlet and 1/2 inch male i.p.s. outlet, chrome-plated; Acorn, Bradley, or equal.
4. Hose and bar: 5-foot long, flexible, braided metal hose with 24-inch long adjusting bar with hand shower slide bracket, chrome-plated; Acorn, Bradley, or equal.
5. Hand shower: Insulated handle with central lever stop valve, bent nozzle tube; rubber bound hose spray adapted for 1/2 inch hose connection.

# SA-9: (Specify for handicap - Faculty)

1. Shower control valve: Polished pressure balancing mixing valve with single blade level handle, integral volume control and chrome plated brass escutcheon; Acorn, Bradley, or equal.
2. Vacuum breaker: Exposed vacuum breaker for concealed piping, Acorn, Bradley, or equal.
3. Wall spout: wall spout with 1/2 female i.p.s. flange inlet and 1/2 inch male i.p.s. outlet, chrome-plated; Acorn, Bradley, or equal.
4. Hose and bar: 5-foot long, flexible, braided metal hose with 24-inch long adjusting bar with hand shower slide bracket, chrome-plated; Acorn, Bradley, or equal.
5. Hand shower: Insulated handle with central lever stop valve, bent nozzle tube; rubber bound hose spray adapted for 1/2 inch hose connection.

# SERVICE SINKS

* + 1. Schedule Numbers:
			1. SS-1: Cast iron, conforming to Commercial Standard CS 77.63 for acid- resistant enamel, 22 inches x 18 inches, with blank back, outlet trap standard and rough-plated double faucet with top brace mounted above sink back, furnished with vacuum breaker and hose end.

|  |  |  |
| --- | --- | --- |
|  | KOHLER | CHICAGO |
| Sink | K-6718 |  |
| Faucet |  | 445-897SRXKCCP |
| Trap Standard | K-6673 |  |

* + - 1. SS-2: Molded stone mop basin, 36 inches x 24 inches x 10 inches, double faucet with vacuum breaker, pail hook, threaded spout and wall bracket. Also, furnished with mop hanger, bumper guard, flat strainer, hose and hose bracket. **(Specify for use in High School Support Custodial Room.)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | ACORN | KOHLER | CHICAGO |
| Sink | TRH-242410 |  |  |
| Faucet |  | K-8928 | 445-897S |
| Rim Guard | KBGS |  |  |
| Strainer | included |  |  |

# SINKS

* + 1. Cast iron sinks shall be acid resistant enamel, and shall conform to Commercial Standards CS 77.63. Units furnished in conjunction with strainer installation or faucet installation shall be brass. Exposed brass nuts shall be chrome-plated. Refer to the Fixture Supplies paragraph of this section.
		2. Schedule Numbers:
			1. S-1: Cast iron, flat rim, center outlet, single compartment, size as indicated on Drawings with crumb cup strainer and backsplash mounted double swing spout faucet, less soap dish. **(Specify for use in High School Clothing Rooms.)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | CHICAGO | KOHLER | MOEN |
| Sink |  | K-6550 |  |
| Faucet | 540-LD-DJ 18 |  | 8121 W/S0012 |
| Strainer |  | K-8801 |  |

* + - 1. S-2: Cast iron, flat rim, end outlet, single compartment, size as noted on Drawings, with crumb cup strainer and backsplash mounted double swing spout faucets. Same as S-1. **(Specify for use in Middle School Multi- purpose Buildings, Elementary School - Waiting Room)**. CECO No. 710.
			2. S-3: Same as S-1, except with flat strainer. Kohler Strainer K-8807 or American Standard 4311.023. **(Specify for use in Middle School Library Workroom and Library Unit. - High School Library Workroom and Art Class.)**
			3. S-4: Same as S-2, except with flat strainer. Kohler strainer K-8807 or American Standard 4311.023. **(Specify for use in Middle School Administration Office, Teacher Workroom, Faculty Lounge, and Attendance Office - Elementary School Small Conference Room).**
			4. S-5: Same as S-3, except with 2 single backsplash mounted swing spout faucets. Cold water to each faucet. Faucet - Chicago 332 E3. **(Specify for use in Middle School and High School Special Education Classroom.)**
1. ZURN-Z-875 F1
	* + 1. S-6: Same as S-4, except with 2 single backsplash mounted swing spout faucets. Cold water to each faucet. Faucet - Chicago 332**. (Specify for use in High School Metal Shop and Woodworking Shop.)**
2. ZURN Z-875 F1.
	* + 1. S-7: Same as S-3, except with one single backsplash mounted swing spout faucet. Cold water. Faucet Chicago 332. **(Specify for use in Middle School Art Room, Art Craft, Ceramic, Social Studies, Science Room, and Equipment Storage).**
3. ZURN Z-875 F1.
	* + 1. S-8: Same as S-4, except with one single backsplash mounted spout faucet. Cold water. Faucet - Chicago 332. **(Specify for use in High School Library and Ceramic Rooms.)**
4. ZURN 875 F1.
	* + 1. S-9: For Elementary Physical Education and for Elementary Kiln Room: Cast iron, 24 inches x 18 inches x 6 inches, with 2 single cold water CP faucets. **(Specify for use in Elementary Kiln Room and Middle School P.E. Unit.)**

|  |  |  |
| --- | --- | --- |
|  | CHICAGO | KOHLER |
| Sink |  | K-5980 |
| Faucet | 324.369 | K-7870 |
| Strainer |  | K-8801 |

* + - 1. S-10: (For all-purpose room) cast iron 24 inches x 18 inches x
			6-3/4 inches. Faucet with lever handles.

|  |  |  |
| --- | --- | --- |
|  | CHICAGO | KOHLER |
| Sink |  | K-6551 |
| Faucet | 1100 | K-7825,(K-16010-04) |
| Strainer |  | K-8801 |

* + - 1. S-11: **(For woodworking rooms)** cast iron, 18 inches x 12 inches x 6 inches. Faucet with lever handles.

|  |  |  |
| --- | --- | --- |
|  | CHICAGO | KOHLER |
| Sink |  | K-6550 |
| Faucet | 324.369 | K-7870 |
| Strainer |  | K-8801 |

* + - 1. S-12: **(For utility)** unit, size as indicated on Drawing, with vandal-proof drink bubbler mounted on right hand side of backsplash. (Specify for use in School Utility Unit.)

|  |  |  |  |
| --- | --- | --- | --- |
|  | HAWS | KOHLER | CHICAGO |
| Sink |  | K-6550 |  |
| Faucet |  | K-8906 | 445-897S |
| Strainer |  | K-8801 |  |
| Bubbler | 5057LF |  |  |

* + - 1. S-13: **For Elementary Classrooms:** 24 inches x 16 inches x 5 inches, cast iron, with pantry faucet mounted on center line, on left side and drinking bubbler mounted on right near front. HAWS 4110ADA Kohler - 5990 **(Specify for Use in Elementary and Kindergarten Classrooms.)**
			2. S-14: Same as S-13, except faucet on right and bubbler on left. HAWS 4110 5510.5054. **(Specify for Use in Elementary and Kindergarten Classrooms.)**
			3. S-15: Cast iron 32 inches x 21 inches, double compartment ledge, with double faucets, garbage disposal unit in locations indicated, and crumb cup strainers in all other locations; division tees to be furnished on two part waste connected to garbage disposals. **(Specify for use in School Food Living** **Room, Daily Living, Dining, Homemaking and Multi-Purpose Rooms, High School Food Living Room, Dining and Multi-Purpose Rooms.)**

|  |  |  |
| --- | --- | --- |
|  | KOHLER | CHICAGO |
| Sink | K-5950 |  |
| Faucet | K-15171 | 2300-8 |
| Strainer | K-8801 |  |

* + - 1. S-16: For boiler room, cast iron, 30 inches x 20 inches, single compartment roll rim with back, faucet hose spout with vacuum breaker, and with exposed wall brace.

|  |  |  |  |
| --- | --- | --- | --- |
|  | CHICAGO | MOEN | KOHLER |
| Sink |  |  | K-5980 |
| Faucet | 445-less spout 897S | 8124 |  |
| Strainer |  |  | 8801 |

* + - 1. S-17: Clinic service sink, vitreous china, wall hung, blowout action, flush valve, faucet, rim guard and carrier fitting. **(Specify for use in High School and Elementary School Special Education DH Toilet Room.)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | KOHLER | J.R.SMITH | CHICAGO |
| Sink | K-12867 |  |  |
| Faucet | K-7309-5A |  | 815 |
| Valve | Sloan 117 |  |  |
| Carrier |  | 0914 |  |

* + - 1. S-18: Oval vitreous china countertop lavatory, frame and front overflow. Cold water only. (Specify for use for Elementary School. Multi-Purpose Workroom, and Middle School, First Aid Room.)

|  |  |  |  |
| --- | --- | --- | --- |
|  | KOHLER | MOEN | CHICAGO |
| Sink | K-2211 |  |  |
| Faucet | K-7715 | 8100 W/S0001 | 350 |
| Strainer | K-7715 |  |  |

* + - 1. S-19: Same as S-18, except with hot and cold water. Faucet, Chicago 895. (Specify for use in Elementary School Multi-Purpose and Faculty Dining).

|  |
| --- |
| MOEN |
| 8957 |

* + - 1. S-20: Same as S-18, except with cold water. Faucet, Chicago 730. (Specify for use in Pre-school Toilet Room.)

|  |
| --- |
| MOEN |
| 8881 |

# SILL COCK

* + 1. Schedule Numbers:
			1. SC-1 Sill Cock: Renewable seat, rough nickel finish, bronze body ASTM B 62, square shank, loose key, brass lock shields.

|  |
| --- |
| CHICAGO |
| 387LEF |

# SEWAGE EJECTORS

* + 1. Schedule Numbers:
			1. SE-1: Duplex, (unless otherwise indicated) screenless sewage ejector with 2 pumps and motors mounted on coverplate and coverplate shall be gas tight; furnished with automatic alternator, high water alarm, micro switch liquid level controller starters, fused disconnect switches and factory wired. Sump pit concrete is as specified in a related section.
1. WEIL PUMP CO.
2. PACIFIC PUMP CO.
3. MC COOK PUMP CO.
4. HYDROMATIC PUMP
	* + 1. Motors: Drip-proof with electrical characteristics as scheduled on Drawings.
			2. Controls: Weil Model 8230, or equal, mercury float switches, UL listed, 2 switches for high water alarms with cover mounting brackets. Control panels shall be NEMA 1, UL listed, and each contain following:
5. Two cross-the-line magnetic starters.
6. Two fusible disconnect switches.
7. Two HOA switches.
8. Two running lights.
9. One 480/220 volt control circuit transformer.
10. One high water alarm relay.
11. One alternator.
12. One NEMA 1, 4-inch diameter alarm bell for mounting on control panel.
	* + 1. Basin Covers: Heavy steel covers, sizes as scheduled on drawings. Covers shall be duplex type with openings for pumps, manholes, and vent openings. Parts shall be gas-tight.

# SERVICE STOP GAS VALVES

* + 1. Schedule Numbers:
			1. SGV-1: Bronze, 1/2 inch to 2 inches, inclusive, with flat or square head. **(Specify for use for ranges, convection ovens, skillets, unit heaters, wall heaters, water heaters, etc.)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CRANE | HEALEY | AMERICAN | LEE BRASS | Mc DONALD |
| 270 or272 | 23S or 23F | 85 CBK or 86C 26010-10-2-1 | 807-35 or807-39 | 10596, flat, 10604,square |

* + - 1. SGV-2: Black, iron body equipped with bronze plug and washer, 1/2 inch to 2 inches inclusive, with flat or square head, No. 125 class. **(Specify for outdoor use; gas meter headers, in yard boxes, A/C units on roof, gas regulators, tunnels and boiler rooms or equipment rooms.)**

|  |  |  |
| --- | --- | --- |
| CRANE | HEALEY | Mc DONALD |
| 1228 | 901 | 10687 B, 10685 B |

* + - 1. SGV-3: Lubricated, 2-1/2 inches and larger, flanged type. **(Specify for indoor-outdoor use at gas meter headers, gas regulators, rooftop units, boiler rooms, equipment rooms.)**
1. NORDSTROM 143
	* + 1. SGV-4: Bronze 1/2 inch to 2 inches with lever handle. **(Specify for use in Science, Home Economics, Chemistry, Physics, Biology, Physiology, and Modern Science work rooms behind access panel.)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CRANE | HEALEY | AMERICAN | LEE BRASS | Mc DONALD |
| 298 | 23L | 88C | 807-37 | 10598 |

* + - 1. SGV-5: Concealed, log lighter type, for Boys' Gymnasium drinking fountain **(cuspidor shut-off).**
1. PRICE-PFISTER LL

# SUMP PUMP

* + 1. Schedule Numbers:
			1. SP-1: Duplex, **(unless otherwise indicated)** vertical suspended centrifugal open type impeller and motor mounted cover plated, furnished complete with high water alarm, automatic alternator, float switch, enamel control panel, with starters, disconnect switches, pilot lights, factory wired, sump pit shall be concrete **(or fiberglass)** as specified in a related section.
1. WEIL PUMP CO. (1600 Series)
2. PACIFIC PUMPING CO.
3. ZOELLER
4. Mc COOK PUMP CO.
5. HYDROMATIC PUMP

# SINK TRIM

* + 1. Sinks specified herein shall be furnished with strainer and tailpiece unless otherwise noted. Supplies shall be 3/8 inch outside diameter. Provide the following:
			1. ST-1, **Elementary School Classroom Sinks**: Trap cast brass, chrome; and stops.
1. CHICAGO 1017

# ST-2: For use in Nurse's Work Rooms.

|  |  |  |
| --- | --- | --- |
|  | KOHLER | CHICAGO |
| Faucet | K-7825-K(K-16010-4) | 1100 |
| Strainer | K-8801 |  |
| Stops |  | 1017 |
| Trap |  | Z-8712-LC |

* + - 1. ST-3: For use in Cafeteria Kitchen Sinks; 2 faucets required, less soap dish.

|  |  |  |  |
| --- | --- | --- | --- |
|  | AMERICAN STANDARD | KOHLER | CHICAGO |
| Faucet |  | K-7856 | 540-LD |
| Strainer |  |  |  |
| Stops |  |  | 1771 |
| Trap | Cast brass chromium-plated and polished. |  |  |

* + - 1. ST-4: For use in Industrial Craft Rooms.

|  |  |  |  |
| --- | --- | --- | --- |
|  | KOHLER | MOEN | CHICAGO |
| Faucet | K-7856(Less soap dish) | 8120 | 540-LD |

**Note:** Stops and traps are same as ST-3.

* + - 1. ST-5: **For use in Photography Rooms**; 2 faucets required.

|  |  |  |
| --- | --- | --- |
|  | CHICAGO | ENFIELD |
| Faucet | 50-GN2A-E3 |  |
| Strainer |  | W311 |
| Stops | 1771 |  |
| Trap | Cast brass chromium-plated and polished. | W321 |

# ST-6: For use in Photography Print Rooms.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | AMERICAN STANDARD | MOEN | KOHLER | CHICAGO |
| Faucet |  | 8.713 |  | 445-L8 |
| Stop |  |  |  | 1771 |
| Strainer |  |  | K-8801 |  |
| Trap | Cast brass chromium-plated and polished. |  |  |  |

* + - 1. ST-7: **For use in Photography Negative Rooms**. Nozzle and vacuum breaker assembly; CHICAGO No. 445GN1B-VB-E7, hot and cold combination water faucet with serrated nozzle. Stops and trays as specified for ST-8. ZURN No. Z-841T16M.

# ST-8: For use in Graphic Arts Rooms.

|  |  |  |  |
| --- | --- | --- | --- |
|  | CHICAGO | MOEN | ENFIELD |
| Faucet | 445GNIB-VB-E7 with nozzle VP | 8120 |  |
| Stop | 441-LK |  |  |
| Tailpiece |  |  | W311 |
| Strainer |  |  | W321 |

* + - 1. ST-9: **For use in Drafting Rooms**.

|  |  |  |
| --- | --- | --- |
|  | CHICAGO | ENFIELD |
| Faucet | 332 |  |
| Tailpiece |  | W311 |
| Strainer |  | W321 |

* + - 1. ST-10: **For use in Arts/Crafts Rooms**.

|  |  |  |  |
| --- | --- | --- | --- |
|  | AMERICAN STANDARD | KOHLER | CHICAGO |
| Faucet |  |  | 332-E1 |
| Stop |  |  | 1771 |
| Strainer |  | K-8807 |  |
| Tailpiece | Cast brass chromium-plated and polished. |  |  |

# ST-11, Kitchen, Pantry and Cook's Tables: Use in Middle and High School Kitchens.

|  |  |  |  |
| --- | --- | --- | --- |
|  | AMERICAN STANDARD | KOHLER | CHICAGO |
| Faucet |  | K-7825 | 1100 |
| Stop |  |  | 1017 |
| Trap | Cast brass chromium-plated and polished. |  |  |

* + - 1. **ST-12: For fiberglass sinks, utilizing both hot and cold water supplies. Both hot and cold water to faucet shall be domestic water and not industrial water.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | CHICAGO | ENFIELD | KOHLER |
| Faucet | 540-LD-L12 |  | K-7856 |
| Tailpiece |  | W311 |  |
| Strainer |  | W321 |  |

* + - 1. ST-13, Peninsula Units: **For use in Modern Science, Chemistry and Biology Rooms.** Laboratory type with hose end.
1. Provide two 2-way gas cocks.

|  |
| --- |
| CHICAGO |
| 981-909C |
|  |

1. Provide 2 cold water pantry faucets.

|  |
| --- |
| CHICAGO |
| 927 |

1. Provide one sink tailpiece, one inch Duriron 5588 with 1 inch x 2 inch brass unit 2 inches C.N.I. cast iron screw pipe with finished end, neoprene gasket and Durham P-trap.
	* + 1. ST-14, Potting Table: **For use in Lath House**.

|  |  |  |
| --- | --- | --- |
|  | HAWS | CHICAGO |
| Drinking fountain | 5017LF |  |
| Spout |  | L5-VB without riser |
| Valve |  | 349 sink fitting with |
|  |  | 369 handle |

* + - 1. ST-15: For Agriculture Classroom demonstration tables.
1. Provide one 2-way gas cock.

|  |
| --- |
| CHICAGO |
| 981-909C |

1. Provide one cold water faucet.

|  |
| --- |
| CHICAGO |
| 927 |

1. Provide one drain.
	1. KOHLER K-8820
		* 1. ST-16, Island Type Workstations: **Use in Chemistry, Biology and Science Classrooms.**
2. Provide four 2-way gas cocks.

|  |
| --- |
| CHICAGO |
| 981-909C |

1. Provide 4 cold water pantry faucets.

|  |
| --- |
| CHICAGO |
| 927 |

1. Provide one sink tailpiece, one inch Duriron 5588 with 1 inch x 2 inch brass unit C.N.I cast iron screw pipe with finished end, neoprene gasket, and Durham P-trap.

# Where applicable, use Haws 8900 series emergency eye/face spray. Refer to schedule for EEW-2.

* 1. **STOP VALVES**
		1. Schedule Numbers: Stops shall be loose key type, 1/2 inch IPS inlet and outlet chrome-plated brass casting, except as noted.
			1. STV-1, Angle: CHICAGO 442-LK, CRANE 8.5113.
			2. STV-2, Partition: CHICAGO 1771.
			3. STV-3, Straight Type, with Loose Key: CHICAGO 45-LK (1/2 inch) or CRANE 8-5111.

# THERMOSTATIC MIXING VALVE ASSEMBLIES (TMVA)

* + 1. General: Valve bodies shall be cast brass or bronze valve assembly provided with holding bracket and shall be installed on wall bracket. Valve shall be rough brass or bronze satin sprayed finish unless otherwise noted. Assembly shall include a 3-5/8 inch diameter dial thermometer, color-coded with white face and black letters. The temperature range between 100 degrees F. and l50 degrees F. shall be background in red or red line enclosed. Valve complete with fail safe feature, square shank loose key stops, checks and strainers on both hot and cold water inlets and shutoff valve on outlet. Valves shall be sized on a 45 psig (maximum) pressure drop at the following flow rates:
			1. TMVA-1: 5 TO 15 GPM.
			2. TMVA-2: 25 GPM.
			3. TMVA-3: 40 GPM.
			4. TMVA-4: 60 GPM.
			5. TMVA-5: 80 GPM
			6. TMVA-6: 100 GPM.
			7. TMVA-7: 125 GPM.
			8. TMVA-8: 200 GPM
		2. Manufacturers:

|  |  |  |  |
| --- | --- | --- | --- |
| POWERS | T & S | LEONARD | LAWLER |
| Type 430 Series | Ultra-Safe | Type TM | 4000 Series 802, 805, 66 |

# TRAP PRIMERS

* + 1. ATP-1: Automatic, trap primer, cast bronze with access panel. Manufactured by Smith, Josam, or equal. **(Installed in accessible location.)**

|  |  |
| --- | --- |
| SMITH | PPP |
| 2699 | P2-500 |

# URINALS

* + 1. Schedule Numbers:
			1. U-1: Vitreous china, wall-hung, washout, and flush valve at 1/8 gallons per flush. Escutcheons for flush valves shall be 17 gauge or heavier chrome- plated brass or cast brass chrome-plated.

Fixture: ZURN Z5798 ECOVANTAGE TOP SPUD URINAL OR EQUAL

* + - 1. U-2: Vitreous china, wall-hung, siphon jet action with flush valve at 1/8 gallons per flush. (For handicap use).

 Fixture: ZURN Z5798 ECOVANTAGE TOP SPUD URINAL OR EQUAL

# WATER CLOSETS

* + 1. General: Water closets shall be vitreous china with Polyvinyl chloride bolt caps.
		2. Schedule Numbers:
			1. WC-1**: For Elementary student use, also for handicapped use**, floor- mounted, 15-inch high bowl with flush valve at 1.6 gallons per flush and open front fire retardant white seats, less covers.
1. Bowl:

|  |
| --- |
| KOHLER |
| K-4350 |

1. FLV-1, manual flush valve:

|  |  |
| --- | --- |
| SLOAN | 111-0 |
| Or equal |

1. Seat: OLSONITE 97
	* + 1. WC-2: **For middle and high school students and adult use**, floor- mounted, 15-inch high bowl with flush valve at 1.6 gallons per flush and open front fire retardant white seats.
2. Bowl: KOHLER K-4350
3. FLV-1, manual flush valve:

|  |  |
| --- | --- |
| SLOAN | 111-0 |
| Or equal |

1. Seat: OLSONITE 97
	* + 1. WC-3: Wall-hung, flush valve and white open front fire-retardant seats, less cover. **(Use when floor-mounted water closet piping interferes with footing and when invert elevation is too critical to make connection.)** **1.6 gallons per flush. (Also for handicap use; adjustable carrier to have top of bowl 14 inches above floor when for Elementary handicap student use).**
2. Bowl:
	* + 1. KOHLER - K-4330
3. FLV-1, manual flush valve:

|  |  |
| --- | --- |
| SLOAN | 111-0 |
| Or equal |

1. Seat: OLSONITE 97
	* + 1. WC-4: **For middle and high school students and adult use**, floor- mounted, 17-inch high bowl with flush valve at 1.6 gallons per flush. **(For handicapped use.)**
2. Bowl:
	1. KOHLER K-4368
3. FLV-1, manual flush valve:

|  |  |
| --- | --- |
| SLOAN | 111-0 |
| Or equal |

1. Seat: OLSONITE 97
	* + 1. WC-5: **For Kindergarten student use**, floor-mounted, 10 inches high, with flush valves and open front fire-retardant white seats.
2. Bowl:

|  |
| --- |
| KOHLER |
| K-4321 |

1. FLV-1, manual flush valve:
	1. SLOAN 111 or equal
2. Seat:
	1. OLSONITE 126CC-SS/FR
	2. BEMIS BB955C
		* 1. WC-6: **For private use (handicap)**, floor-mounted, 15-inch high bowl, flush tank, 1.6 gallons per flush and open front fire retardant seat.
3. Bowl:

|  |
| --- |
| KOHLER |
| K-3422EB |

1. Manual flush valve SLOAN III or equal
2. Seat:
	1. OLSONITE - L210-SS/FR
	2. BENEKE - SL
		1. Flush valve for handicap installation shall be mounted on wide side of toilet room, not more than 44 inches above floor.

# WATER TEMPERATURE CONTROLLERS

* + 1. Schedule Numbers:
			1. WTC-1: Remote bulb type, plain steel case, baked enamel finish, glass fronted cover, mercury to mercury switch. 80 degrees F. to 240 degrees F. range of not more than 10 degrees F. differential.
1. MERCOID DA-4-35
2. HONEYWELL T675A1540
	* + 1. WTC-2: Immersion type, black hard steel case, separate well type, outside adjustment, temperature range 40 degrees to 180 degrees F. range of not more than 10 degrees F. differential.
3. HONEYWELL T-6031D1007
4. PENN A19ABC-11

# DOMESTIC WATER HEATERS

* + 1. DWH-1:
			1. Storage type water heaters shall be provided with a 5 year unconditional guarantee on tank heater and working parts. Complete guarantee for each heater shall be delivered to the Architect.
			2. Heater shall be furnished complete with baked enamel jacket, double density insulation, heating device, energy saver thermostat, drain valve, and appurtenances necessary for satisfactory operation. Proper label of approval and manufacturer name, model number, size in gallons, and rated capacity shall be permanently secured to jacket.
			3. Heater shall be furnished with a combination pressure temperature relief valve, installed in water heater tank.
			4. Heaters, gas and electric, shall be certified by the California Energy Commission.
			5. Floor-mounted heaters shall be on legs that are part of heater. Each heater shall be securely strapped to structure (with 2 straps per UPC).
			6. Electric water heaters shall be UL tested, approved and listed. Heaters shall be furnished complete with baked enamel jacket, glass fiber insulation, heating element, double break snap acting thermostat, drain valve and appurtenances required for operation. Electric heaters shall be factory wired ready for connection to electrical source. Install a gate valve on inlet side and union on both inlet and outlet sides of heaters and combination pressure- temperature relief valve on discharge side. Flexible water piping connectors shall not be used.
			7. Water heaters shall be of sizes indicated on Drawings and shall be furnished with equipment necessary to provide a complete and satisfactory piece of equipment.
			8. Submit a complete list of boiler controls and appurtenances with wiring diagram, giving manufacturer's name, model number and, when applicable, size of each piece of equipment or appurtenance to be installed.
			9. Pilot lines, gas valves, relays and their wiring shall be located outside boiler jacket to protect them from ambient temperature within. Flame safeguard relay shall be mounted on a control panel attached to wall at location indicated or as directed. All other controls and manual operators shall be so located as to be readily accessible when the boiler is in the installed position.
			10. Wiring of water pump control circuit and line voltage supply to control panel is part of the Work of Division 16. All other wiring in connection with boilers is a part of the Work of this section. Wiring between boiler and wall-mounted control panel shall be installed 7 feet or more above floor level.
			11. Gas-fired, storage type, size as indicated on Drawings, with approved draft diverter and energy cut-off devices. Gas supply connections supplying less than 100,000 BTUs shall be with UL listed corrugated flexible appliance connector. Connections supplying 100,000 BTUs and over shall be solid pipe. Heater shall be seismically secured with an approved restraint. Space maker E-50, E-100.
1. AMERICAN, STATE, LOCHINVAR RHEEM, or A.O. SMITH.
	* 1. DWH-2: Commercial, high recovery, greater than 80 percent thermal efficiency.
		2. DWH-3 Water Heater, Package Water Tube, Gas-Fired Type:
			1. Complete packaged unit furnished with heater, burner, precast firebox, insulation, steel jacket enamel both sides, trim and control factory wired. This gas-fired water tube heater shall be constructed in accordance with the ASME Code for 125 psi working pressure and bear appropriate seal. Heater shall be AGA approved and stamped for natural gas at 80 percent efficiency.
			2. Heater shall be of inclined or straight tube design for high velocity water flow with not greater than one inch outside diameter hard drawn copper tubes of minimum 13 gauge thickness. Heater head plates shall be removable, to provide full access to boiler tubes.
			3. Complete heater shall be fire tested at the factory under design load conditions with results certified by an approved testing agency satisfactory to the Architect.
			4. Heater shall be complete with accessories and appurtenances including AGA approved draft diverter, safety, relief valve or valves SRV-4 lever handle gas cock on main gas line FGV-8, gas pressure regulator PRV-4 set for 4-inch water column, automatic 24 volt gas valve FGV-1, a lever handle gas cock FGV-8 and pressure regulator PRV-4 set for 4-inch water column on pilot line; safety pilot assembly BTPA-1 or BTPA-2 **(heaters over 150,000 BTU per hour)**, operating temperature controller OTC-1; high limit temperature controller HTC-1; control transformer Cont-1; 2 thermometers
			T-1. (Refer to Section 22 05 00, Common Work Results for HVAC, for above accessories.)

|  |  |  |  |
| --- | --- | --- | --- |
| ACE BUELER | RAYPACK | A.O. SMITH | LOCHINVAR |

* + 1. DWH-4: Electrical, storage type, 6, or 12 gallon size as indicated on Drawings. Tank shall be constructed of galvanized copper-bearing steel and shall be tested at 300 lb. hydraulic pressure. Heater shall be factory wired ready for connection to electrical source. Snap acting thermostat shall be double pole type. Heater label shall be labeled UL approval and electric input rating. Heater shall be seismically secured and shall not be floor-mounted.

|  |  |  |
| --- | --- | --- |
| ACE BUELER | A.O. SMITH | LOCHINVAR |
|  | ELJF - 6 | JRC006-E |
|  |  | JRC012-E |

# WATER HAMMER ARRESTORS

* + 1. WHA-1:
			1. Lavatory Headers, Wash Sinks, Wash Fountains, Kitchen Sinks and Service Sinks:
1. Dole: 3/4 inch.
2. PPP: 3/4 inch.
	* + 1. Urinal Headers: **a** Dole: one inch. **b** PPP: one inch.
			2. Water Closet Headers:
3. Dole: one inch.
4. PPP: one inch.

# WATER TANKS, HOT - UNFIRED

* + 1. Schedule Numbers:
			1. WT-1, Unfired Hot Water Storage Tanks: All welded 1/2 inch thick hot rolled carbon steel plate construction conforming to requirements of ASME Code for Unfired Pressure Vessels **(Section VIII of ASME Boiler and Pressure Vessel Code)**. Tank designed for a working pressure of 125 psig and temperature of 150 degrees F.; tested and coded stamped. Connections shall be 3,000 psi welded extra heavy couplings. Flanged coupling may be furnished on 3 inches or larger connections.

|  |  |  |  |
| --- | --- | --- | --- |
| ACE BUEHLER | RAYPAK | A.O. SMITH | LOCHINVAR |

* + - 1. WT-2, Steam-Heated Hot Water Storage Tanks: Same as WT-1, but with addition of heating elements. Heating elements of seamless drawn copper tubing **(3/4 inch OD or 1-1/4 inches OD).**

|  |  |  |
| --- | --- | --- |
| ACE BUEHLER | RAYPAK | A.O. SMITH |

* + - 1. WT-1L: Same as WT-1, but thickness as required by ASME Code for size specified; furnished with not less than 5/8 inch silicon material lining. Lining shall extend into openings so no ferrous metal remains uncovered. Lining shall be guaranteed in writing for a period of 5 years.
			2. WT-2L: Same as WT-2, except lining same as for WT-1L.

# WASH SINKS

* + 1. Wash sinks shall be cast iron white acid-resistant enamel and shall conform to Commercial Standard CS 77-56. Omit bubbler and bubbler hole for toilet room installations.
			1. WS-2: 48 inches x 18 inches with 2 double faucets and a drinking bubbler mounted on right-hand side of backsplash, complete with hangers. **(Specify for use in High School Arts/Crafts and Middle School Arts/Crafts and Ceramic.)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | KOHLER | HAWS | CHICAGO |
| Sink | K-3202 |  |  |
| Strainer | K-8820 |  |  |
| Faucet | K-8892 |  | 225-261 |
| Drinking Bubbler |  | 5057 |  |

# YARD BOXES

* + 1. Schedule Numbers:
			1. YB-1, Yard Boxes: 14 inches x 19 inches x 12 inches, cast concrete, with cast iron traffic cover marked **"GAS SHUT-OFF" (for use over gas stops).**

|  |  |
| --- | --- |
| BROOKS 36-HF with 3T | EISEL |

* + - 1. YB-2: Same as YB-1, marked **"WATER" (for use over water valves).**

|  |  |
| --- | --- |
| BROOKS 36-HF with 3T | EISEL |

* + - 1. YB-3: Same as YB-1, marked **"SEWER CLEANOUT.”**

|  |  |
| --- | --- |
| BROOKS 36-HF with 3T | EISEL |

# FIXTURE CONNECTIONS

* + 1. Branches to individual fixtures shall be of the following sizes unless larger sizes are indicated on Drawings:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixture | Copper, Cold(Inches) | Copper, Hot(Inches) | Trap and Connections(Inches) | Soil/Waste(Inches) | Vent(Inches) |
| WC Flush Valve | 1 | N/A | 4 | 4 | 2 |
| Lavatories | 1/2 | 1/2 | 1-1/2 by1-1/4 | 2 | 1-1/2 |
| Service Sink | 1/2 | 1/2 | 2 | 2 | 1-1/2 |
| Kitchen Sink | 1/2 | 1/2 | 1-1/2 by1-1/4 | 2 | 1-1/2 |
| Classroom Sink | 1/2 | 1/2 | 1-1/2 by1-1/2 | 2 | 1-1/2 |
| Wash Sink | 3/4 | 1/2 | 1-1/2 by1-1/2 | 2 | 1-1/2 |
| Multiple Drinking Fountains | 1/2 | N/A | 1-1/2 by1-1/2 | 2 | 1-1/2 |
| Single Drinking Fountains | 1/2 | N/A | 1-1/2 | 2 | 1-1/2 |
| Individual Showers | 1/2 | 1/2 | 2 | 2 | 2 |
| Standard Urinals, Wall-Hung Flush Valve | 3/4 | N/A | N/A | 2 | 1-1/2 |
| Access Compliant Urinals, Wall-Hung Flush Valve | 1 | N/A | N/A | 2 | 1-1/2 |
| Hose Bibbs | 3/4 minimum | N/A | N/A | N/A | N/A |

1. Hose racks shall be furnished 2-inch supply lines. Reduce to 1-1/2 inches at rack valve.
2. Water headers serving water closets shall be copper water tube, with following size throughout length:
	1. 1-1/2 inches for 2 flush valves.
	2. 2 inches for 3 to 9 flush valves.
3. Water headers serving urinals shall be of following size throughout length:
	1. One inch for 1 or 2 flush valves.
	2. 1-1/4 inches for 3 flush valves.
	3. 1-1/2 inches for 4 to 8 flush valves.
4. Water headers serving showers shall be same as listed above for urinals.
5. Water headers serving lavatories shall be of following size throughout length:
	1. 1/2 inch for 2 lavatories.
	2. 3/4 inch for 3 and 4 lavatories.
	3. One inch for 5 and 6 lavatories.

# HEIGHT OF FIXTURES

* + 1. **Shower head heights shown are from tip of showerhead to finish floor**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Fixture | Adult and High | Middle | Elementary | Kindergarten |
| Water Closets | 15" | 15" | 15" | 10" |
| Lavatories | 32" | 32" | 30" | 25" |
| Drinking Fountains | 42" | 40" | 32" | 25" |
| Wash Sinks | 30" | 30" | 28" | 24" |
| Urinals, Wall-Hung | 24" | 21" | 18" | 16" |
| Shower Heads |  |  |  |  |
| Male(Student and Instructor) | 78” | 78" |  |  |
| Female(Student and Instructor) | 78" Middle and High Schools |  |  |  |
| Shower valves | (use manufacturer standard/ADA compliant) |  |  |  |

* + 1. Fixture heights for physically handicapped.
			1. A = Adult Dimensions (Age 12 and over).
			2. E = Elementary Dimensions (Suggested).
			3. K = Kindergarten and Pre-school Dimensions (Suggested).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Adult | Elementary | Kindergarten |
| Toilets, center line from wall | 18” – 19” | 15” | 12” |
| Toilets, seat height (dim to top of seat) | 17” - 19” | 15” | 10”-12” |
| Lavatories, sink top height | 34” max. | 29” | 24” |
| Lavatories, sink knee clearance | 29” | 24” | 19” |
| Urinals, lip height | 17” max. | 15” | 13” |
| Urinals, flush handle height | 44” max. | 36” | 28” |
| Drinking fountains, bubble hgt. | 36” max. | 31” | 24” |
| Drinking fountains, knee clearance | 27” min | 24” | 22” |

# PART 3 - EXECUTION

* 1. **EXAMINATION**
		1. Examine areas and conditions under which Work of this section will be performed. Correct conditions detrimental to proper and timely completion of Work. Do not proceed until unsatisfactory conditions have been corrected.

# INSTALLATION

* + 1. General:
			1. Unless otherwise specified, plumbing fixtures, equipment and appliances that require connections to plumbing line shall be connected. This shall include fixtures specified or indicated as furnished by others, furnished by Owner, or specified in another section. Install supplies, stops, valves, traps, wall flanges, or pipe casing for connection of this equipment.
			2. Install equipment as indicated on reviewed Shop Drawings.
			3. Avoid interference with Work of other trades. Do not deviate from Drawings without review of the Architect.
		2. Examination: Check each piece of equipment in system for defects verifying that parts are properly furnished and installed.
		3. For piping Work, refer to Section 23 05 13: Basic Mechanical Materials and Methods.
		4. Plumbing Fixture and Equipment Installation:
			1. Unless otherwise indicated, fixtures shall be installed with 5/16 inch brass bolts or screws of sufficient length to securely fasten fixture to backing, wall, or closet ring.
			2. Fixtures installed against concrete or masonry walls shall have their hangers fastened with the 5/16 inch bolts, Philip Shield type anchors, or 2 unit cinch anchors. Wood or plastic plugs are not permitted.
			3. Fixtures installed against wood or metal stud walls shall have their hangers fastened to metal backing plates with 5/16 inch brass bolts screwed into plate. Lavatories shall be hung with not less than four 5/16 inch brass bolts or not less than five 1/4 inch brass bolts. Each sink hanger shall be hung with not less than four 5/16 inch brass bolt or not less than five 1/4 inch brass bolts.
			4. Pan type drinking fountains shall be hung with 5/16 inch cadmium plated bolts with a bolt in each bolt opening in hanger. Hangers for pan type drinking fountains shall provide 2 inches (plus or minus 1/4 inch) between pan and wall. Spaces due to irregularities between fixtures and tile walls shall be neatly filled with white cement or silicone filler.
			5. Backing for hanging of plumbing fixtures and equipment shall be installed in supporting wall at time rough piping is installed. Backing for stud walls shall be steel plate 1/4 inch thick, not less than 4 inches wide. Steel plate shall be attached to stud at each end of plate and to each stud it crosses. Plate shall be attached to metal studs by bolting with two 1/4 inch U-bolts per stud with bolts through plate and around stud flange or by welding with a 1/8 inch fillet weld full width of stud flange, top and bottom of plate. At wood studs, plate shall be carefully recessed flush with face of stud and attached to each stud with 2 No. 14 flat-head wood screws, 2 inches in length into pre-drilled 1/8 inch holes. Backing for stud walls supporting wall-hung closets shall be as detailed.
			6. Rough-in for fixtures, equipment and appliances shall be as indicated on Drawings and as specified, including those items indicated as furnished by others, furnished by Owner, or future capacity. When connections to equipment from capped or plugged lines are required, caps or plugs shall be removed at time equipment is set and stops or valves installed and connections provided as specified.
			7. Piping shall be stubbed out to exact location of fixtures and stubs shall be installed symmetrical with fixtures. Hot and cold water supplies for center set faucets on lavatories shall be installed on 8-inch centers, unless otherwise specified or required.
			8. Kitchen equipment requiring backflow protection with hot and cold water connections shall be installed with approved backflow prevention assemblies; BPV-3 and drain into floor sink with air gap.
		5. Cleanouts in Drain, Waste, Vent and Sewer Lines:
			1. Cleanouts shall be installed at locations stated in the California Plumbing Code and at following locations:
1. At locations above first floor as stated.
2. At each sink.
3. At each urinal above the flush valve.
4. Above overflow level of pot sinks.
5. In vertical line at base of each downspout connected to an underground storm drain system.
6. At upper end of a horizontal vent line when any part of horizontal line is below overflow level of fixture it serves.
7. Not to exceed 100-foot intervals in sewer and waste lines exterior of building.
8. At property lines.
9. Where indicated on Drawings.
	* + 1. Cleanouts shall be extended to grade as follows:
10. Not to exceed 100-foot intervals in straight runs of pipe outside buildings.
11. At changes of direction greater than 22-1/2 degrees.
12. At property lines.
13. Where cleanouts occur under concrete.
14. Where marked for future connections.
	* + 1. Cleanouts in building shall be extended to floor level or above floor level or above floor level in walls or furring when cleanouts are not accessible or where clearance is less than 18 inches.
			2. Cleanouts in finished areas in building shall be concealed except that cleanouts above service sinks in janitor's rooms or closet, and cleanouts above service sinks or in exposed piping in boiler or heater equipment rooms, may be exposed. Cleanouts for urinals shall be installed above urinal and shall terminate behind an access plate.
			3. Cleanouts in floors of covered areas and those extended to grade in concrete areas shall be floor level type with extensions body brass plugs and detachable nickel-bronze or aluminum alloy scoriated.
			4. Concealed cleanouts in vertical lines shall be service weight soil cleanout tees with brass plugs and round cover plates unless otherwise specified or indicated. A snug fitting sleeve of galvanized sheet metal shall be placed around hub of tee and shall extend to flush with finished soil, or cleanout shall be extended to finished wall.
			5. Cleanouts extended from below floor to a wall or furring or on horizontal lines above floor that terminate at a wall or furring shall be iron body type with brass plugs and round cover plates.
			6. Cover plates over cleanouts in painted walls shall be steel, bonderized and prime coated. Cover plates cover cleanouts in tile walls shall be chromium- plated brass or nickel bronze. Plates shall be attached to cleanout plugs with 5/16 inch No. 18 or 1/4 inch No. 20 stainless steel vandal-proof type screws. Plates shall be one inch larger in diameter than fitting opening.
			7. Cleanouts at bases of downspouts shall be tapped soil tees with brass plugs as hereinafter specified, full size of line.
			8. Cleanouts extended to grade in exterior sewer lines other than floors or concrete areas shall be a cleanout assembly with secured top, extra heavy- duty, adjustable sleeve, cut-off ferrule, countersunk threaded brass plug and scoriated tractor type cover.
			9. All other cleanouts shall be iron body type.
			10. Cleanout extensions shall be no-hub cast iron soil pipe. Exterior cleanouts, those in concrete excepted, shall terminate in a 14 inch x 6 inch thick concrete block with cleanout assembly and top of block flush with finish grade.
			11. Fittings in lines utilized as cleanouts shall be approved soil fittings including no-hub pipe. Tees and crosses in vent headers excepted.
			12. Pipe joint compound shall not be installed on cleanout plug. After lines are tested and approved, each cleanout plug shall be removed, greased, and replaced.

# EXCAVATION, TRENCHING AND BACKFILLING

* + 1. Perform trenching, excavation, and backfilling required for Work of this section as specified herein and in Section 31 20 00: Excavating, Backfilling, and Compacting for Utilities.

# SERVICE CONNECTIONS

* + 1. Determine exact location of required water, drain, and sewer connections and provide proper connections.
		2. Potable water lines shall be purged completely before connecting to sources of water for the Project. Determine quality of water supply before connection.

# WATER HAMMER ARRESTORS

* + 1. Install water hammer arrestors indicated on Drawings and in following locations **(only non-ferrous arrestors may be installed in copper water system):**
			1. Water lines to service sinks, kitchen sinks, wash fountains, clothes, washers, laboratories with medical type faucets and on wash sinks having 3 or more stations, as close to fixture as possible.
			2. Between last 2 fixtures when 3 or more fixtures, other than those listed in 1 above, are served by a common header.
		2. When possible, arrestor shall be installed in wall or furring. When arrestor is installed in wall or furring, furnish an access plate large enough to permit removal of arrestor. Access plate shall be a minimum of 2 inches larger in each direction than arrestor.
		3. Fixture water lines shall be provided with dampening devices. When water hammer arrestors do not provide such service, provide air chambers at fixture supplies. This shall be an 18-inch long vertical piece of capped pipe one size larger than branch to a fixture. Instead of individual air chambers, header air chambers may be furnished where headers serve 2 fixtures. These shall be located at each end of header and shall be a 36-inch length of vertical pipe, capped, not less than one pipe size larger than header.

# CONDENSATE DRAINS FROM AIR CONDITIONING UNITS

* + 1. Connect drain piping from drain pan of air conditioning unit to dry well or floor sink. When coil or unit housing is shock or vibration isolated, connection shall be furnished through a flexible connector not less than 10 inches long. Drain line shall pitch to flow out at not less than one inch in 8 feet. Drain line size shall be per UPC **(3/4 inch up to 3 ton only).** The drain line shall not be reduced smaller than the unit outlet connection
		2. Condensate drain piping installed within building whether in air conditioned space or not shall be insulated. Refer to Section 23 07 00: Mechanical Insulation, for type of material required.
		3. Condensate Trap:
			1. A condensate trap shall be installed for each air conditioning coil. The trap shall be assembled from 2 brass unions: one between the A/C unit and the inlet of the trap, and one at the outlet of the trap that connects to the main drain.
			2. Trap configuration shall be per manufacturer's recommendations based on total unit casting static pressure (simulated plugged filter condition), but not less than 3 inch water seal.
			3. Running trap design is not permitted.
			4. Secondary drain shall be trapped. Requirements are the same as for primary trap.
		4. Condensate trap shall be checked at equipment operational tests for proper water drainage flow from air conditioning unit. Cooling condensate pan shall be filled with water, filters covered with plastic (plugged filter simulated), unit panels replaced, and unit motor running at design condition. Pan shall drain without hesitation to bottom of inlet connection. Tests are made prior to installation of ceiling.
		5. Secondary Overflow Drain:
			1. Drain pan installed underneath air conditioning units in concealed ceiling space or units that incorporate dam fitting shall be furnished with secondary drain piped to outside planter area with outflow location clearly visible.
			2. If outside building location is not available or feasible, secondary drains will be piped to a classroom sink**, if sink is not available pipe to a room corner away from cabinets, computers and desks.**
			3. Secondary vertical pipe that penetrates through suspended ceiling shall be furnished with a coupling or threaded adapter so ceiling tile can be removed without damage.

# CONDENSATE DRAINS FROM WINDOW TYPE HEAT PUMP AND EXTERIOR WALL MOUNT HEAT PUMP UNIT

* + 1. Whether indicated on Drawings or not, window units and wall mount units without built in bottom drain pan for evaporator and condenser coils shall be provided with galvanized steel condensate pan at the bottom of the unit with drain line that drains into drywell. Install copper 1/2 inch diameter pipe for window type air conditioners and 3/4 inch diameter pipe for exterior wall-mounted heat pump units.

# MAKE-UP WATER SYSTEMS

* + 1. Provide and connect make-up water systems for equipment in other sections.

# GREASE TRAPS

* + 1. Grease traps shall be installed only when required by municipal authority. Grease traps shall be separately vented; fixtures connected to grease traps shall be trapped and vented. When grease traps are installed in concrete boxes, fill spaces between grease traps and concrete boxes with sand and place 2 inches of concrete seal over sand. Concrete seals shall pitch toward grease traps with inner edges flush with top of grease traps. Position openings for ease of cleanout.

# GAS SERVICE

* + 1. Above Grade Service: Pipe shall be steel, hammered, free of dirt and scale, and blown out with oil-free air or nitrogen to a clean, dry condition. Piping shall not be installed in or through a ventilation duct or plenum.
		2. Underground Service, Plastic Pipe: Refer to Section 23 05 13: Basic Mechanical Materials and Methods.
			1. Where connected steel pipe passes directly into a structure, double swing or double-offset joint shall be furnished. Pipe shall pass into structure above grade and through a sleeve with a minimum one inch clearance. Provide anodeless steel riser to grade.
			2. Pipes shall be joined to one another and to polyethylene fittings by thermal butt fusion, socket fusion or saddle fusion in accordance with procedures recommended by pipe manufacturer.
			3. Plastic pipe shall be installed not less than 30 inches below grade. Risers to grade shall be prefabricated anodeless type for installation with polyethylene pipe.
			4. Plastic pipe shall not be installed in or under a building or structure. Pipe shall be installed under bituminous surfacing or compacted soil area, free from large stones. Pipe may be installed under sidewalks or driveways, as long as no joint occurs. Pipe installed under paved covered areas wider than 40 feet shall be installed in ventilated conduits extending 2 feet past paving.
			5. Pipe shall be installed on 6 inches of deep sand bed. After required pressure- leak test, pipe shall be covered with sand not less than 6 inches thick.
			6. Piping shall not support weight of valves, metal fittings or other items. Pipe shall be installed strain free.
			7. Plastic pipe fittings shall not be stored or left exposed to sunlight. Pipe in open trenches shall be shielded. Sand envelope may be placed around pipe, with exception of joints with inspection by IOR. Mechanical protection for pipe shall be provided when necessary to leave pipe exposed overnight.
			8. Manufacturer shall provide on-site fusion training services to the installer.

# CLEANING - PLUMBING PIPING SYSTEMS AND FIXTURES

* + 1. Plumbing lines and fixtures shall be flushed to remove dirt and foreign material until water runs clear and no foreign substance or odor is present. Strainers and screens on faucets shall be removed during this cleaning operation.
		2. After satisfactory cleaning of strainer and screen replacements has been witnessed by the Project Inspector, post and maintain signs stating**: "CAUTION - Water at this construction Project has not yet been certified for human consumption."** Signs shall be furnished with letters at least 1/2 inch in height, and shall be conspicuously posted at entrances to the Project site. Signs shall be paneled, black and yellow, in conformance with OSHA Section 1910.1455.

# DISINFECTING DOMESTIC WATER PIPING SYSTEM

* + 1. When hot and cold water piping, including fixtures, hot water generator, etc., has been installed and tested, sterilize the system as follows:
		2. Sterilization Procedure:
			1. As witnessed by the Project Inspector, inject solution of liquid chlorine or sodium hypochloride and water containing not less than 50 PPM of free chlorine into a system in a manner to ensure that entire system is completely filled with solution. During this procedure, operate valves and test outlets for residual chlorine. Continue injection until outlets indicate at least 59 PPM of free chlorine.
			2. After injection, isolate system and retain solution for a period of not less than 8 hours. Test for residual chlorine after retention. If tests indicate less than 50 PPM of residual chlorine, repeat entire procedure. Tests are to be witnessed by the Project Inspector. After satisfactory sterilization has been provided, flush entire system until chlorine has been removed or until chlorine content is no greater than in existing supply.

# VALVES ON PLUMBING SYSTEM

* + 1. Furnish and install gates, globes, angles, and check valves on plumbing Work at following locations whether indicated or not:
			1. Immediately adjacent to each water meter, there shall be in addition to any valve furnished by utility company, a strainer assembly or pressure reducing valve assembly within 50 feet of meter and said assembly shall be furnished with a valve on inlet side.
			2. A gate valve on each water line at a point where it enters building. Valves shall be accessible from outside building and shall be installed in a yard box, unless otherwise indicated on Drawings. On 2-1/2 inch size or larger omit valve handle and furnish 2-inch operating unit.
			3. A gate valve to control water lines to each group of fixtures. A group of fixtures shall be considered to be 3 or more fixtures of which are in same room. These valves shall be accessible from room in which fixtures are installed and shall be located at approximately 3 feet, but not more than 7 feet, from floor. Valves shall control only fixtures in room in which they are installed.
			4. A gate valve on each building branch line, which serves 2 or more fixtures when these fixtures are not provided with a group control valve as specified above.
			5. A partition stop on supply to a drinking fountain and on each concealed fixture supply. Partition stop shall be located below fixture, one foot above floor, unless otherwise specified.
			6. A loose key partition stops adjacent to and controlling water to each sill cock and hose bib except as follows:
				1. A sill cock immediately below an exterior drinking fountain may be controlled by same partition stop as drinking fountain.
				2. Stops will not be required for individual hose bibs when these hose bibs are on a branch line serving only hose bibs and the branch line is furnished with a shut-off valve.
			7. A loose key angle stop on each exposed fixture supply, unless otherwise specified, and for each flush valve.
			8. A gate valve at each location where a water line is connected to a piece of equipment other than mentioned above.
			9. A check valve on each hot water return line where it connects to a hot water storage tank or water heater.
			10. Exposed stops on plumbing fixture supplies, exposed shower valves, and exposed part of concealed valves or stops shall be chromium-plated and polished, unless otherwise specified.
			11. Handles, hand wheels (including dishwasher fill valve handles) and operating nuts shall be furnished of steel, brass, or cast iron and shall be removable. Unless specified to be of loose key type, handles shall be securely fastened to their stems. On exposed outdoor valves, omit operating handles and provide operating nuts.
			12. Provide a handle or key for each 5, or fractions thereof, loose key valves, bibs, or stops and deliver it to the Project Inspector.
			13. At multi-story buildings, provide gate valves for both hot and cold water concealed in access panel at each floor level.

# VALVES - GAS SERVICE

* + 1. A gas shut-off stop shall be installed on each gas line entering a building immediately outside point it enters the building. Unless otherwise specified or indicated, shut-off stops for lines entering a permanent building or structure shall be installed in a vertical riser above grade. Gas shut-off for portable type buildings shall be installed in yard boxes regardless of line size, unless otherwise indicated. In addition to locations specified, gas stops shall be installed at the following locations:
			1. A gas service stop on any line connected to gas main or header at master assembly.
			2. A gas service stop on each outlet, in addition to any gas stop furnished with equipment. Service to laboratory gas cocks shall be furnished with a special precision check valve, located downstream from gas stop servicing room outlet at each laboratory cock. Unless otherwise specified 1/8 inch bore shall be provided for each outlet cock. A plugged tee shall be located immediately downstream of check valve.
			3. A gas service stop on each gas line serving 2 or more gas outlets in same room. Service stop shall be installed not more than 7 feet above floor, in room that it serves.
			4. Provide a gas stop on inlet side of each gas pressure regulating valve. Gas stops may be furnished with equipment.
			5. Gas stops at not more than 1000-foot intervals on each gas main.
			6. At multi-story building, provide gas stop concealed in access panel at each floor.
		2. Gas stops, 2-1/2 inches and larger, shall be semi-steel lubricated plug valves and shall be furnished with operating wrench, one for each valve. Gas stops, 1/2 inch to 2 inches inclusive, installed outside building, in crawl spaces under a building, in tunnels, boiler rooms or equipment rooms shall be an iron stop with brass plug. All other gas stops shall be all brass for not less than 125 psi steam pressure. Service stops in classrooms and locations accessible to students shall be of square-head or flat-head type. Service stop for gas-fired equipment in locations not accessible to students shall be supplied with handles.
		3. When a service stop adjacent to gas-fired equipment is indicated in the Contract Documents it shall be furnished and installed as part of the Work of this section.
		4. When electrical wall switches are specified for controlling gas outlets at Laboratory Classrooms, provide main shut-off gas valve with time clocks situated in supervised locations.

# ELECTROLYSIS PREVENTION

* + 1. Brass nipples, 6 inches, with recognized brass unions; flanges shall be furnished and installed at locations described herein. Flanges shall be installed with complete insulating component consisting of gasket bolt sleeves and bolt washers. Dielectric insulators shall be installed at following locations:
			1. Where special applications indicated on Drawings require an insulation flange or brass union, with 6-inch brass nipple to be installed in a condensate line, or steam line, flange insulation shall be of a high temperature type, suitable for continuous operation at temperatures up to 220 degrees F. for condensate and 400 degrees F. for steam.
			2. Where steel or cast iron in ground connects to copper or brass piping above ground, transition from steel or cast iron pipe to copper or brass pipe shall be provided in an accessible location.
			3. Underground dielectric connections shall be furnished in accessible yard boxes.
			4. Above-ground dielectric connections shall be exposed; or if in finished rooms shall be located in accessible access boxes.

# UNDERGROUND PIPE MARKERS

* + 1. Pipe markers shall be furnished according to Section 23 05 33: Mechanical Identification.

# HOT WATER CIRCULATING PUMPS

* + 1. Floor-mounted pumps shall be provided with a 4-inch high concrete base with 1/2 inch reinforcing bars at 12-inch centers each way and doweled into concrete floor.
		2. Piping shall be supported from building structure so as to prevent any strain on pump casing.
		3. In-line pumps, unless otherwise specified, shall be centrifugal type with non- overloading characteristics and shall not overload motor above its horsepower rating under operating conditions with ratings based on continuous operation.
		4. Centrifugal water pumps shall be rated according to Hydraulic Institute Test Code for Centrifugal Pumps. Pumps shall be furnished with bronze water chamber, bronze impeller and mechanical seal. Rotating parts shall be statically and dynamically balanced.
		5. Flanged connections shall be provided on pumps with discharge connections larger than 2 inches. Smaller sizes may be threaded connections.
		6. Hot water circulating pump shall be arranged so that pump can be automatically turned off when hot water system is not in operation.

# WATER TEMPERATURE CONTROLLERS

* + 1. Furnish and install a water temperature controller in hot water line adjacent to, and for control of, circulating pumps on hot water return lines when said pump is indicated on Drawings or herein specified. Bulb of temperature controller shall be installed so as to be directly in path of flowing water and so as not to obstruct flow of water.
		2. Furnish and install a water temperature controller in hot water storage tanks for control of circulating pump on hot water circulating line when said pump is indicated on Drawings or specified herein.

# COMPRESSED AIR SYSTEMS

* + 1. Compressed air systems including compressors, air line filters, receivers, piping and appurtenances shall be installed as indicated and specified.
		2. Component parts of compressor unit shall be installed on a base firmly attached to receiver; motor and compressor shall be properly aligned auxiliary equipment and controls specified, furnished with necessary controls, automatic moisture eliminator fittings, piping, conduits and wiring properly installed and connected in a professional manner. Lubricant shall be furnished to fill until ready for operation. Safety valves shall be installed to permit normal operation and properly protect equipment. Thermal units shall be installed in motor starter to trip at 125 percent of motor nameplate rating. Pressure switches shall be installed to cut in and cut out of settings indicated.
		3. Compressor shall be installed on vibration dampers and flexible connections installed in piping to isolate vibration. Dampers shall be furnished with transmissibility of less than 10 percent for grade installation and less than 5 percent for above grade floor installation.
		4. Furnished compressed air system shall comply with safety orders of Industrial Accident Commission of the State of California, and electrical units shall be listed as UL approved. Piping between first downstream moisture eliminator and receiver shall pitch down to receiver and shall be not less than one pipe size larger than pipe leaving eliminator. Provide drip points at each building with piping pitching down to them. Drip leg at each drip point and moisture eliminator shall be not less than 6 inches long, capped 1-1/2 inch pipe with drain petcock. Upon completion of compressed air piping installation and prior to testing of pipe and final connection to compressed air receivers, systems shall be blown out to a clean, dry condition.

# DEPTH OF SEWER LINES

* + 1. Minimum depth of below grade sewer lines shall be 24 inches to the centerline of the pipe. Sewer lines shall slope 1/4 inch per foot minimum, unless otherwise indicated. Minimum depth at the Owner property line shall be 6 feet, unless otherwise required.

# BACKFLOW PREVENTION DEVICES

* + 1. Backflow Devices: Installation of backflow devices shall be tested and certified by the project’s lab of record, before Substantial Completion. Tests shall be performed in the presence of the Project Inspector. Test reports shall be turned over to the Project Inspector for mailing to the proper agency.

# CLEAN UP

* + 1. Remove rubbish, debris, and waste materials and legally dispose off the Project site.

# PROTECTION

* + 1. Protect the Work of this section until Substantial Completion.

# END OF SECTION