DIVISION 22 – PLUMBING

22 05 00 – Common Work Results for Plumbing

1. The maximum distributed DHW temperature in any building shall be 120°F. Any additional temperature required shall be supplied by a booster heater to be part of the equipment being installed.
2. Bio-Hazard Labs – Level II, requires a sink by door.
3. Roof scuppers – secondary system pipe to daylight.
4. Pitch pockets shall **NOT** be used for roof penetrations for conduit or piping. Cones or “Witches Hats” with a stainless steel “radiator hose” style clamp (with stainless steel worm screw) shall be used. For multiple or large pipes, a “dog house” box shall be used with pipes and conduits exiting the side wall of the box.
5. Equipment shall not be hung from ceiling (i.e. remote mount cooling unit for water fountains, water filtration systems, etc.)
6. Where possible, avoid the construction of Confined Spaces. Any such confined space that must be constructed, must be approved by Owner in advance.
7. Do not use di-electric unions. Use brass bodied ball valves instead.
8. Do not use cut or rolled groove (Vic and similar type) piping on any system (heating, cooling, city water, or DHW).
9. Use flexible expansion (stainless steel hose with stainless steel braid) compensators and loops with proper anchors and guides.
10. Do not bury cold water, domestic hot water (DHW) supply and return mains in walls, these mains are to be run in hallway ceilings. Isolation valves are to be provided at take offs for each restroom, breakroom, and lab etc.
11. Do not use electric in-sink disposal units – require owner (RIT Director of Utilities) approval to be considered.
12. No piping is to be mounted tight to the roof deck.

22 05 19 – Meters and Gauges

1. All new buildings, additions and renovated buildings shall have new gas and water meters with isolation and by-pass valves.
2. All meters must be submitted to and approved by RIT FMS prior to installation.
3. Gas meters:
    a. Meters shall have a true pulse contact. (One that alternates between infinite resistance and near zero resistance)
    b. Pulse contact signal shall be no shorter than 100ms.
    c. Easy to read visual indication of cumulative gas used.
    d. Gauges with ball valves shall be installed on natural gas services at building entrance, before and after any gas regulator and at each gas appliance.
    e. Meters shall be Roots B Series.
4. Domestic water meters:
    a. Meters shall have a true pulse contact. (One that alternates between infinite resistance and near zero resistance). Pulse contact signal shall be no shorter than 100ms. Preferred manufacturer: Sensus
    b. High resistance to water impurities.
    c. Insensitive to upstream disruptive elements.
    d. Easy to read visual indication of cumulative water used.
    e. Gauges with ball valves shall be installed on water services at building entrance, before and after any water regulator.

22 05 23 – General-Duty Valves

1. Butterfly valves shall NOT be used as shutoff devices, except for flow control.
2. Use full port ball valves for shutoff devices.
3. Ball valves shall have a separate packing nut and handle retaining nut.
4. Acceptable manufacturers:
    a. Apollo
    b. Watts
    c. Milwaukee

22 05 29 – Hangers and Supports for Plumbing Piping and Equipment

1. Support vertical piping and tubing at base and at each floor. Install supports for vertical copper tubing every 10 feet. Install supports for vertical cast-iron soil piping every 15 feet. Install supports for vertical PVC piping every 48 inches.
2. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.

22 05 53 – Identification for Plumbing Piping and Equipment

1. Pipe Labels
    a. Pretension Pipe Labels; pre-coiled, semi rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
    b. Self-Adhesive Pipe Labels; printed plastic with contact-type, permanent-adhesive backing:
        i. MS-900 Self-Adhesive Pipe Markers; Marking Services, Inc.
        ii. DuraLabel
    c. Paint: Sherwin Williams or approved equal.
        i. Topcoat: B54YZ0437 – Industrial Enamel HS Safety Yellow
        ii. Topcoat: B54RZ0038 – Industrial Enamel VOC Complying Safety Red
    d. Color field lengths and letter heights:

Outside Diameter of Pipe Covering	Minimum Length of Color Field	Letter Height
Less than 1-½"	8"	½"
1-½" – 2"	8"	¾"
2-½" – 7"	12"	1-¼"
8" – 10"	24"	2-½"
Larger than 10"	32"	3-½"

    e. Content: include information of piping service using designations listed below, pipe size, and flow direction arrow.

SYMBOL	SERVICE TYPE	PIPE LABEL	BACKGROUND and LETTERING COLORS
CTYW	City Water	CITY WATER	SAFETY GREEN BACKGROUND, WHITE LETTERING
DCWR	Domestic Cold Water Return	DCWR	SAFETY GREEN BACKGROUND, WHITE LETTERING
DCWS	Domestic Cold Water Supply	DCWS	SAFETY GREEN BACKGROUND, WHITE LETTERING
DHWR	Domestic Hot Water Return	DHWR	GRAY BACKGROUND, BLACK LETTERING
DHWS	Domestic Hot Water Supply	DHWS	GRAY BACKGROUND, BLACK LETTERING
DIW	Deionized Water	DIW	SAFETY GREEN BACKGROUND, WHITE LETTERING
FP	Fire Protection Sprinkler Water	FIRE-SPRINKLER	SAFETY RED BACKGROUND, WHITE LETTERING
FDC	Fire Department Connection	FIRE-FDC	SAFETY RED BACKGROUND, WHITE LETTERING
FMD	Fire Main Drain	FIRE-FMD	SAFETY RED BACKGROUND, WHITE LETTERING
FPT	Fire Pump Test	FIRE-FPT	SAFETY RED BACKGROUND, WHITE LETTERING
NG	Natural Gas	GAS	SAFETY YELLOW BACKGROUND, BLACK LETTERING
CA	Compressed Air	COMP AIR	SAFETY BLUE BACKGROUND, WHITE LETTERING
VAC	Vacuum	VACUUM	SAFETY PURPLE BACKGROUND, WHITE LETTERING
SANW	Sanitary Waste	SANITARY WASTE	SAFETY GREEN BACKGROUND, WHITE LETTERING
INDW	Indirect Waste	INDIRECT WASTE	SAFETY GREEN BACKGROUND, WHITE LETTERING
STORM	Storm	STORM	SAFETY GREEN BACKGROUND, WHITE LETTERING
STORMS	Secondary Storm	STORM SECONDARY	SAFETY GREEN BACKGROUND, WHITE LETTERING
VENT	Vent	VENT	SAFETY GREEN BACKGROUND, WHITE LETTERING
PDISCH	Pump Discharge	PUMP DISCHARGE	SAFETY GREEN BACKGROUND, WHITE LETTERING

2. Valve Tags
    a. RIT valve tagging is limited to the main mechanical spaces. Coordinate with RIT for correct valve tag numbers.
    b. Specifications:

i. Size: 2 inch x 2 inch square with hole drilled in top center
ii. Font: HEL Medium 4L
iii. Word Size: .30 inch
iv. Contractor to provide Excel spreadsheet of valve tags and system to RIT.
1. Provide valve tag chart in electronic and physical format to owner. Valve tag chart columns shall indicate (from left to right) building number, description, type, number. Frame and place under clear glass. Provide one (1) in water service room and one (1) adjacent to hot water heating plant.

c. Provide a sign for each tagged control, sectional, and drain valve identifying the portion of the building or system served. Signs shall be permanently attached to the piping, the valve, or the nearest wall. Signs shall not be hung from the piping of valves with wires or chains.
d. Basis-of-Design: Marking Services, Inc.
e. Valve tag contents:

SYMBOL	SERVICE TYPE	VALVE TAG
DHWR	Domestic Hot Water Return	(BLDG.)-DHV-##
DHWS	Domestic Hot Water Supply	(BLDG.)-DHV-##
DCW	Domestic Cold Water	(BLDG.)-DCV-##
DIW	Deionized Water	(BLDG.)-DIV-##

22 07 19 – Plumbing Piping Insulation

1. Provide insulation on all heating hot water piping, chilled water piping, domestic hot and cold water piping, and interior roof drain piping. Engineer of record is responsible to provide type of insulation, thickness, and R value.
2. All insulated piping in exposed areas (not above a ceiling or inside a chase way) shall have a PVC jacket.
3. Minimum acceptable thickness is 30 mil for light traffic areas and 60 mil for heavy traffic areas.
4. A light traffic area is an area that is not a public space and not a mechanical room. An example would be a non-public corridor or a non-public utility room.
5. Insulation shields on horizontal piping.

22 11 16 – Domestic Water Piping

1. Gauges with ball valves shall be installed on water services at building entrance and before and after any water regulator.
2. Schedule:
   a. Aboveground New Piping shall be:
      i. ASTM B 88, type-L copper; ASME B16.22, ASTM B32 soldered joints
   b. PEX or equivalent tubing shall not be used.
   c. Do not use di-electric unions, use brass bodied full-port ball valve instead.
   d. ProPress copper may be used for 1-1/2 inch and smaller for new work and repairs only.
3. Domestic Hot Water
   a. Maximum temperature to be distributed in buildings is 120 deg. F.
   b. Use Armstrong DRV “The Brain” mixing valves.
   c. DHW storage tanks shall be maintained at 140°F to 150°F with one or more mixing valves near the tank to reduce the distribution temperature of 120°F.
   d. If supply temperature above 120°F is required at an end use device, then a booster heater shall be installed at the place of use.
   e. Exception: Commercial kitchens may be designed with multiple hot water distribution systems, each with a different distribution temperature.

22 11 23 – Domestic Water Pumps

1. Shall have stainless steel internal parts.
2. Acceptable models:
   a. Grundfos Magna
   b. Wilo IL series
   c. Taco 2400, 00 or VR series
3. B&G series 60 type pumps (Taco 1600) or similar style pumps shall not be used.

22 13 16 – Sanitary Waste and Vent Piping

1. Schedule:
    a. Aboveground, soil, waste, and vent piping all sizes shall be any of the following:
        i. PVC Sch. 40 Cellular Core (Foam Core)-DWV pipe; PVC socket fittings and solvent-cemented joints. If more than four (4) stories on the vertical riser, pipe to be Sch. 40 Solid Core PVC pipe, supported at each floor. If sound is an issue, use Sch. 40 solid core PVC pipe.
        ii. ASTM B306, PVC-DWV pipe; PVC socket fittings; and solvent-cemented joints
        iii. Dissimilar pipe-material couplings: shielded, non-pressure transition couplings
    b. Underslab soil, waste, and vent piping NPS 4 inches and smaller shall be Sch. 40 PVC foam core pipe, PVC socket fittings and solvent–cemented joints with tracer wire
    c. Underground sanitary laterals shall be SDR 21 PVC in 20 foot lengths.

22 14 13 – Facility Storm Drainage Piping

1. Schedule:
    a. Aboveground, storm drainage piping all sizes shall be:
        i. Sch. 40 PVC pipe; PVC socket fittings; and solvent-cemented joints
        ii. Dissimilar pipe-material couplings: shielded, non-pressure transition couplings
    b. Underground, storm drainage piping all sizes shall be:
        i. Sch. 80 PVC pipe with tracer wire; PVC socket fittings and solvent–cemented joints
        ii. Dissimilar pipe-material couplings: shielded, non-pressure transition couplings
    c. Install piping at the minimum slopes, 2 percent downward in direction of flow for piping unless otherwise noted.

22 16 23 – Natural Gas Piping

1. Do not use pro-press or similar systems for gas piping.
2. Gauges with ball valves shall be installed on natural gas services at building entrance, before and after any gas regulator, and at each gas appliance.
3. Plug valves shall not be used on gas lines, use full port ball valves instead.
4. Ball valves shall have a separate packing nut and handle retaining nut.
5. Acceptable manufacturers:
    a. Apollo
    b. Watts
    c. Milwaukee

22 42 00 – Plumbing Equipment and Fixtures

1. Equipment shall not be hung from the ceiling (i.e. remote mount cooling unit for water fountain, water filtration systems, etc.)
2. General Fixture Information
    a. Reference 01 84 00, item 2 for Restroom Types.
    b. All vitreous china to be colored white.
3. Fixture Products
    a. Water Hammer Arrestors shall be provided at sinks and flush valves. Locate above ceilings.
    b. Wall Hydrant
        i. For new construction or building exterior renovations, install frost-free automatic draining wall hydrant (Zurn Z1321-1X24 or approved equal) on the outside on each face of building (coordinate location with RIT).
    c. Hose Bibb
        i. All bathrooms shall have at least one chrome plated brass bodied hose bib.
    d. Floor Drains:
        i. Provide at least one in each toilet room.
        ii. All floor drains shall use a deep seal style trap.
        iii. Mechanical rooms shall also use deep basket.
        iv. Do not use trap primers.
        v. If trap primers are used, use external remote valve in accessible location.
    e. Pedigrid:
        i. New buildings will NOT have drain under pedigrid at door.
        ii. Use 4” deep non-rusting 316 stainless steel pan.

iii. See Division 08 for further information.

22 42 13 – Commercial Water Closets and Urinals

1. Water Closets
    a. Wall-hung with matching seat color; 1.6 gpf; 2 1/8" trap
    b. Manual flush valve
    c. Acceptable open end elongated toilet seat models:
        i. Bemis Commercial 1955SSCT
        ii. American Standard Millennium Elongated 3351.101
        iii. Church
2. Urinals
    a. Wall-hung; 2" outlet; ¾" top spud; 1.0 gpf
    b. Manual flush valve
    c. Do no use waterless urinals.
    d. Acceptable model: American Standard Washbrook FloWise Universal 6590.001
3. Manual Flush Valves
    a. Chrome finish flush valve with side handle.
    b. Use diaphragm style flush valve, 1.0 gpf for urinals, 1.6 gpf for water closets.
    c. Acceptable models include:
        i. Sloan Regal XL or Royal 111.XL
        ii. Zurn Z6000-WS1 AquaFlush 1.6gpf, Z6003PL-WS1 1.0 gpf
    d. Use Sloan EBV89A to convert to auto flush. Do not use top mount auto flush units.

22 42 16 – Commercial Lavatories and Sinks

1. General
    a. All fixtures shall have an individual water quarter turn valve with handle on each supply line.
    b. Install an additional isolation ball valve on common supply to gang lavatory sinks within two feet of the first sink.
    c. Do not use compression fittings on water stop valves.
    d. Do not use flexible supply lines to fixtures; use soft copper or chromed brass.
2. Wall-Hung Lavatories
    a. Vitreous china, 3 hole with 4 inch spread
    b. P-trap shall be 17 gauge, 1 ½-inch diameter, chromed, as manufactured by Dearborn Brass.
    c. Acceptable model: American Standard Lucerne 0355.012
3. Undermount Lavatory for Solid-Surface Countertops
    a. Consult with Design Manager on locations.
    b. Acceptable model: American Standard 0496.221; color "Linen"
    c. Install faucets 2-1/2" from edge of counter cutout to center of faucet. Any exceptions shall be reviewed with and approved in writing by the Design Manager.
4. Countertop Sinks
    a. Undermount basis of design: Elkay ECTRU21179TFCC
    b. Spray heads will not be accepted.
5. Mop Sinks
    a. Size: 36" x 36"

22 42 23 – Commercial Showers

1. Showers shall be built-enclosures unless otherwise approved by Planning & Design.
2. Acceptable models
    a. Moen Thermostatic Shower Valve-ExactTemp
    b. Moen Shower Head 6300 series E-Z clean

22 42 39 – Commercial Faucets

1. Student / Staff Use Only
    a. Single-user restrooms and bathrooms; dressing rooms
        i. Manually-operated, metered, user-adjustable
        ii. Acceptable model: Chicago 3600-E2805AB
    b. Multi-user restrooms and bathrooms
        i. Manually-operated, metered, single-temperature

ii. Acceptable model: Chicago 3520-4E2805ABCP
c. Kitchenette and breakrooms
i. 8 inch fixed centers
ii. Provide with hot and cold water 2 inch wing handles, 8 inch L-swing spout, 1.5 gpm aerator
iii. Acceptable models:
1. Chicago Faucets 1100-E35ABCP
2. Elkay LKD2439C
2. High-profile / Public-facing
a. Single-user restrooms and bathrooms; dressing rooms
i. Automatic user-adjustable
ii. Acceptable model: Chicago E80-A11A-47ABCPT
b. Multi-user restrooms and bathrooms
i. Automatic single-temperature
ii. Acceptable model: Chicago E80-A11A-41ABCPT

22 45 16 – Emergency Plumbing Fixtures

1. Preferred models of emergency eyewashes / shower stations:
a. Water Saver model# EW805, Guardian G1849, or approved equal.
b. Haws model# 8320-8325 or approved equal.
c. Drench-hose units with the bi-ocular fitting are not suitable for emergency eyewashes.
2. All emergency eyewash / safety showers must meet the requirements of ANSI Z358.1, including the following,
a. General Requirements
i. Required where employees can be exposed to hazardous materials and chemicals.
ii. Must be installed in well-lit areas and identified with visible sign.
iii. Water temperature must be 60-100 degrees Fahrenheit.
iv. Travel to the unit must be within 10 seconds and unobstructed by doors, etc.
v. Placement must avoid electrical panels, outlets, or other electrical equipment.
vi. Units must be capable of delivering a minimum of 15 minutes of flushing fluid.
vii. Eyewash units shall be capable of being activated in 1 second or less.
viii. Stay open ball valves must be used to accommodate for hands-free rinsing.
b. Eye Wash Stations
i. Minimum flow for plumbed and portable Eyewash units is .4 GPM at 30 PSI.
ii. Flushing fluid must be provided to both eyes simultaneously.
iii. Dust caps or dust covers must be installed to protect the unit from contaminates.
iv. Spray heads must be positioned between 33" and 45" from the floor and at least 6" from the wall or nearest obstruction.
c. Safety Showers
i. Minimum flow for Safety Showers is 20 GPM at 30 PSI.
ii. Safety Shower pull-rod must be installed no more than 69" from the floor.
iii. Safety Shower spray head must be positioned between 82"-96" from the floor.
iv. Spray-pattern must be 20" in diameter at 60" above the floor.
v. Center of spray pattern must be at least 16" away from any obstruction.
vi. Provide floor drain in new construction.
d. Combination Units
i. Must meet both criteria for Safety Showers & Eyewash.
ii. Provide floor drain.

22 47 13 – Drinking Fountains

1. General
a. Bottle filling stations shall not have filter.
2. Products
a. Elkay EZS8WSLK (Bottle Filling Station with Single ADA Cooler, Non-Filtered, Refrigerated)
b. Elkay EZSTL8WSLK (Bottle Filling Station and Versatile Bi-Level ADA Cooler, Non-Filtered, Refrigerated)

END OF DIVISION 22