

DIVISION 22 – PLUMBING

22 11 16 DOMESTIC WATER PIPING

RESERVED

22 11 19 DOMESTIC WATER PIPING SPECIALTIES

A. Design Considerations

1. To facilitate landscape and other maintenance operations, exterior hose bibs shall be provided at 150 foot intervals along building perimeters, including near principal building entrances and exits. Each building face shall have at least one hose bib.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. All hose bibs shall be of the non-freeze, recessed lockable wall box type, and shall be mounted flush to the wall.

22 11 23 DOMESTIC WATER PUMPS

RESERVED

22 11 23.13 DOMESTIC WATER PACKAGED BOOSTER PUMPS

RESERVED

22 12 00 FACILITY POTABLE WATER STORAGE TANKS

RESERVED

22 13 16 SANITARY WASTE AND VENT PIPING

A. Design Considerations

1. All new building sanitary lines shall go to a manhole.
2. For design purposes, all floor drains in spaces other than mechanical equipment rooms shall be considered “infrequent use” in accordance with the National Standard Plumbing Code.
3. All floor drains in mechanical rooms and other locations shall be connected to the sanitary sewer system.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Hubless cast iron pipe is preferred above grade and should be used above grade where piping related noise may be an issue. Hubless cast iron pipe is prohibited underground or under floor slabs.
2. Cast iron hub & spigot piping is preferred to PVC under floor slabs. PVC piping is prohibited under floor slabs in facilities containing high temperature hot water equipment.

22 13 19 SANITARY WASTE PIPING SPECIALTIES

RESERVED

22 13 29 SANITARY SEWERAGE PUMPS

RESERVED

22 14 13 FACILITY STORM DRAINAGE PIPING

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Provide at least 2 roof drains per section of roof. See Uniform Construction Code for additional requirements.

22 14 29 SUMP PUMPS

RESERVED

22 15 13 GENERAL SERVICE COMPRESSED AIR PIPING

RESERVED

22 15 16 GENERAL SERVICE COMPRESSED AIR VALVES

RESERVED

22 15 19 GENERAL SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS

RESERVED

22 31 00 DOMESTIC WATER SOFTENERS

RESERVED

22 32 00 DOMESTIC WATER FILTRATION EQUIPMENT

RESERVED

22 33 00 ELECTRIC DOMESTIC WATER HEATERS

A. Design Considerations

1. Electric water heaters are permitted as an alternative to direct or indirect-fired hot water heaters to serve local low flow hot water requirements.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Electric hot water heaters shall be as manufactured by A.O. Smith or approved equal.

22 34 00 FUEL-FIRED DOMESTIC WATER HEATERS

A. Design Considerations

1. Oil fired water heaters may be required where significant hot water requirements must be met and gas service or indirect water heating is not available. Oil fired water heaters shall be used only with Rutgers's approval.

B. Special Documentation Requirements

1. Fuel burning equipment must be registered with REHS by the A/E (care of the project team leader) during design. Fuel burning equipment with a maximum rated fuel input of 1,000,000 BTU/hr or greater will require an air permit, prior to installation. REHS will submit all air permit applications. The A/E shall be responsible for preparation and follow-up correspondence with REHS and/or the DEP for all permitting required for fuel burning equipment. The A/E is responsible to supply equipment information to REHS with adequate lead-time to obtain permit (180 days prior to intended installation date.) This information includes, but is not limited to: a description of the fuel burning equipment, manufacturer name, model number and fuel type used. All documentation demonstrating conformance with Factory Mutual requirements must be submitted to FM for review\approval as required.

C. Materials and Methods of Construction

1. Oil fired water heater manufacturers shall be as approved by Rutgers.

22 35 00 DOMESTIC WATER HEAT EXCHANGERS

A. Design Considerations

1. Domestic water generally should be heated with high temperature hot water (HTHW) when central heating system is available.
2. HTHW system operating parameters vary depending upon the system under consideration.

3. For the Busch and Livingston campuses, HTHW is provided from the Busch Central Heating Plant. HTHW leaves the plant at approximately 365 degrees F. and a pressure between 180 psi and 200 psi. Depending on where the building is located on the distribution system, the temperature will vary between 335 degrees F. and 360 degrees F. The pressure will vary between 160 psi and 200 psi. Heat exchangers shall be designed for a 100 degree temperature differential. More specific design parameters can be provided by Rutgers Utilities Department based upon actual building location.
4. For the College Avenue campuses, HTHW is provided from the College Avenue Central Heating Plant for a portion of the campus. HTHW leaves the plant at approximately 315 degrees F. and a pressure of approximately 110 psi. Heat exchangers shall be designed for a 75 degree F. temperature differential. Depending on where the building is located on the distribution system, temperatures and pressure will vary. More specific design parameters can be provided by Rutgers Utilities Department based upon actual building location.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Refer to Section 23 05 23 'General-Duty Valves for HVAC' and Section 23 21 13 'Hydronic Piping' for related information.
2. All heat exchangers shall comply with ASME Boiler and Pressure Vessel Code and shall be stamped with appropriate code symbols.
3. Bolted flange connections shall be provided on both the primary side and secondary side of all heat exchangers.
4. HTHW heat exchangers shall be shell and tube type with HTHW in tubes and shall be rated for 400 psi. Tubes shall be 90-10 copper-nickel. Heads shall be forged steel. Domestic water heat exchangers must conform to requirements of the National Standard Plumbing Code (i.e. double wall construction, etc).
5. HTHW control valves shall be located on the supply side of the heat exchanger.

6. HTHW heat exchangers shall have operating and high limit temperature sensing elements located in the shell near the outlet nozzle or immediately adjacent to the outlet nozzle.
7. HTHW heat exchangers shall be as manufactured by Cemline, Yula, Bell & Gossett or Armstrong.

22 40 00 PLUMBING FIXTURES

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. The A/E shall obtain the Standard Plumbing Fixture List from University Housing for the respective Housing project. Provide hose bibb in dormitory common toilet rooms where required by Housing.
2. Automatic “hands free” (automatic flushing and turn on/off) fixtures are preferred for toilet areas and are required for all ADA water closets, urinals, sinks and hand dryers. All “hands free” fixtures shall be equipped with manual override. Hard-wired automatic fixtures are preferred to battery operated. Bathroom and kitchen fixtures for projects not under the jurisdiction of University Housing, Dining Services or Athletics shall be as follows unless otherwise necessary to suit project specific requirements:
 - a. Toilets: Wall-hung, vitreous china, single flush, piston or *heavy duty* diaphragm type, maximum 1.28 GPF as manufactured by Toto, Kohler or American Standard.
 - b. Urinals: Wall-hung, vitreous china, piston or *heavy duty* diaphragm type, maximum .125 GPF as manufactured by Toto, Kohler or American Standard.
 - c. Lavatories: Wall-hung or under-mount, vitreous china, maximum 0.5 GPM as manufactured by Toto, Kohler or American Standard. Automatic faucets shall be equipped with above deck mixing valve where required to ensure access to serviceable faucet components. Pre-molded ‘Corian’ type lav/countertops for multiple lavatory applications shall be permitted subject to Rutgers’ approval.
 - d. Kitchen Sinks (Office Kitchen Areas): Drop-in, self-rimming, single compartment, stainless steel as manufactured by American Standard, Just or Kohler. Faucets for Kitchen sinks to be manual, single lever type

- with ceramic disc valving as manufactured by Moen, Kohler or American Standard.
- e. Shower control valves shall be pressure balance type, solid brass construction.
 - f. For design purposes, all floor drains in spaces other than mechanical equipment rooms shall be considered “infrequent use” in accordance with the National Standard Plumbing Code. Where practical, gravity type tailpiece trap primers for floor drains are preferred to trap primers hard-piped to the domestic water system. Deep seal traps are acceptable for floor drains in heavy use areas such as Mechanical Rooms. All floor drains serving mechanical rooms and similar areas shall be equipped with sediment bucket. Floor drains must be provided for emergency showers.
3. Plumbing fixtures for janitor’s closets shall be as follows (subject to the review/approval of Rutgers’ Department of Buildings and Grounds on a project by project basis):
 - a. Mop Sinks: Terrazzo, stainless steel or enameled cast iron with low front lip as manufactured by American Standard, Fiat or Florestone. Faucets for mop sinks shall be as manufactured by T & S Brass and Bronze Works, Inc. or equal.
 - b. Service Sinks: Wall-hung, enameled cast iron as manufactured by American Standard or Kohler.
 4. All plumbing fixtures must be tight fitting to walls and be neatly sealed at joint with silicone sealant.
 5. All piping penetrating walls shall be covered with escutcheon plates.
 6. Plumbing fixtures and fittings for laboratory furniture shall be provided by the laboratory furniture manufacturer.
 7. Provide freeze-less wall hydrants every 150’ on exteriors of new buildings. A minimum of one centrally located wall hydrant shall be provided for each building exposure. Model B65 series as made by Woodford Manufacturing, Inc. or approved equal.
 8. Provide vacuum breakers for all plumbing fixtures as required by Code and as required to prevent back-siphonage to domestic water supply.
 9. All fixtures shall be provided with ¼ turn stop valves (ball valves).

22 45 00 EMERGENCY PLUMBING FIXTURES

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Eyewash units shall be installed at or near sinks within the hazardous operations space. Such spaces include biological laboratories, wet laboratories, areas where dust is generated, darkrooms, mechanical rooms and other areas where liquid chemicals are used or handled. Handheld hose type units providing a soft spray of 3-7 gpm tempered water at a pressure of 30 pounds per square inch are recommended. These may be bench mounted or on the side of the bench or wall, and should be readily accessible and located in a high visibility area near the main door. Wall-mounted units, pedestal-mounted units, eye\face wash units, combination safety shower\eyewash units must be provided with a soft spray of 3-7 gpm at 30 pounds per square inch of pressure.

2. All eyewash units must flush both eyes simultaneously, the flow must remain on without the use of the operator's hands, the unit must remain activated until intentionally cut off and the nozzles must be protected from airborne contaminants.

3. A sign must be posted to identify the location of the eyewash unit and the area behind or around the eyewash unit must be painted with a bright color. Eyewash units for non-ADA compliant units should be installed between 2'-9" and 3'-9" from the floor. For ADA compliant stations, for dimensions ICC ANSI A117.1 standards for drinking fountains shall be followed. However, the appliances shall be eyewash units.

4. Safety showers are to be installed in a conspicuous location, such as a well-traveled aisle, doorway or corridor. They must be within the room or space they serve or within 25 feet of the main room door. Safety showers in corridors can serve several laboratories or rooms. Safety showers must be installed in locations that are accessible at all times. Safety showers must have floor drain.

5. Safety showers are to be installed so that the center of the shower head is at least 25" from the nearest wall, bench or furnishing and at a safe distance away from electrical equipment or outlets. The base of the shower must be between

6'-10" and 8' above the floor. The shower head should be a deluge-type head, and should be made of plated brass or plastic. The safety shower unit should be capable of providing a flow of 30-50 gallons of water per minute at 30 pounds per square inch of pressure.

6. Safety shower activating valves are to be operated by pulling either a chain, a cord attached to the valve lever, an 8" diameter ring or a triangle connected by a chain or a cord to the lever. The lowest portion of the ring, triangle or cord should be located no more than 48" from the floor for frontal approach and no more than 54" from the floor for a side approach, and should be run within 1"-2" of a wall or bench. Safety shower activating valves are to be quick-opening, self-closing globe valves. A shut-off valve accessible from a 6 foot ladder is to be installed for each shower head.

7. A sign must be posted to identify the location of the safety shower, and the area behind or around the safety shower must be painted with a bright color. Exterior safety shower and water supply lines must be protected from freezing.

8. Installation and operation of safety shower and eyewash units must comply with the most recent edition of ANSI Z358.1-standard.

9. The contractor must test each emergency eyewash and safety shower unit prior to building occupancy to confirm compliance with these paragraphs. The test results shall be posted on tags affixed to each unit that includes: the test date, the flow rate, the initials of the person conducting the testing, and whether or not the unit meets these design criteria (pass or fail). In addition, the contractor shall provide the building owner with a list that identifies the type and location of all emergency plumbing fixtures installed in the building.

22 47 00 DRINKING FOUNTAINS AND WATER COOLERS

A. Design Considerations

RESERVED

B. Special Documentation Requirements

1. Provide "lead free" materials certification from drinking fountain manufacturer prior to installation.

C. Materials and Methods of Construction

1. Drinking fountains and water coolers shall be as manufactured by Elkay or approved equal. Unless otherwise approved by Rutgers project manager, all water coolers must be equipped with a bottle cooler.

22 61 13 COMPRESSED AIR PIPING FOR LABORATORY AND HEALTH CARE FACILITIES

RESERVED

22 61 19 COMPRESSED AIR EQUIPMENT FOR LABORATORY AND HEALTHCARE FACILITIES

RESERVED

22 62 13 VACUUM PIPING FOR LABORATORY AND HEALTH CARE FACILITIES

RESERVED

22 63 13 GAS PIPING FOR LABORATORY AND HEALTH CARE FACILITIES

RESERVED

22 66 00 CHEMICAL WASTE SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES

RESERVED

22 66 83 CHEMICAL WASTE TANKS

RESERVED

22 67 13 PROCESSED WATER PIPING FOR LABORATORY AND HEALTHCARE FACILITIES

RESERVED