

SECTION 15400 - PLUMBING

1.1 CODES AND STANDARDS

1. As a minimum, the design of Plumbing System shall meet the following codes and standards:
2. All applicable local, state and national codes.
3. National Electric Code (NEC)
4. American National Standard Institute (ANSI)
5. American Water Works Association (AWWA)
6. Underwriters' Laboratory (UL)

1.2 DESIGN CRITERIA

- A. Domestic Water:
 1. Minimum pressure at the most remote plumbing fixture shall be 30 psi.
 2. Maximum pressure at any plumbing fixture shall be 80 psi.
 3. Maximum velocity in piping shall be: 6fps mains, 5fps branches and 4fps for piping under constant flow.
- B. Pipe sizing shall be in accordance with the Hazen and Williams formula criteria of Copper = 130; Steel = 100 and Cast Iron = 100.
- C. Water flow requirements are to be developed in accordance with the Fixture Unit method and Hunters Curve. 75% of the total fixture units will be used as a design point for the mains and risers. Branches are to be calculated at 100% fixture unit capacity.
- D. Domestic hot water heaters shall be designed per ASHREA requirements as follows:
 1. Storage factor: 0.90
 2. Recovery factor: 0.30
 3. 6 gallons per hour per lavatory.
 4. 10 gallons per hour per shower.
 5. 20 gallons per hour per service sink.
 6. Kitchen / food service to be included when available.
- E. Plumbing Piping Design:
 1. Pitch for sanitary, waste and storm piping shall be a minimum of 1/8" per foot.
 2. Kitchen waste shall pitch at 1/4" per foot minimum.
- F. Maximum Roof Area:
 1. Coverage per roof drain shall be a maximum of 4,000 sq. ft.

2. Storm drainage will be provided at a minimum, in accordance with the following schedule. However, all areas receiving rain water will be provided with one drain at a minimum.
 - a. Roofs - 100 feet on center maximum
 - b. 50 feet from parapets maximum
 - c. Areaways.
 - d. Large Balconies (Terraces).
 - e. Air intakes (exhaust plenums).
 - f. Overflow drains shall be provided as required by code.

1.3 SCOPE OF WORK

- A. Complete sanitary drainage system shall be provided which will include drain, waste and vent piping for all plumbing fixtures and other equipment requiring drains.
- B. Complete storm drainage system shall include roof drains, overflow drains and other area drains and down spouts.
- C. Complete kitchen waste system shall include all required waste and vent stacks serving kitchens and routed through an approved grease trap and then extended into the sanitary sewer.
- D. Domestic cold water distribution system shall consist of an incoming service from the city main, domestic meters and detector check valve assemblies, one 3-pump booster system, controls, interior risers and distribution piping to each pressure reducing valve, plumbing fixture and equipment.
- E. Domestic hot water shall be produced by a central water heating system containing gas fired storage type heaters.
- F. Water Distribution System:
 1. The water flow requirements shall be based on the fixture unit method as described in paragraph 1.2 of this outline.
 2. The water main shall be provided for the building service with all required valving per City requirements.
 3. Domestic water and fire protection services shall be metered as required by local regulations. Fire Protection System shall be protected by a double detector check assembly as required by local code.

4. One (1) triplex pressure booster pump system shall be installed. The system shall include a lead pump and two equal sized pumps all controlled by Variable Speed Drives (VFD) to provide constant pressure at all times. The pump set shall be complete with Variable Speed Drive (VFD) speed controls, disconnect switches and appropriate control panel.
 5. Backflow preventers shall be provided, as required, to eliminate the possibility of cross contamination of the potable water system by non-potable systems, such as, make-up for the HVAC System and the Landscape Irrigation System. All reduced zone type backflow preventers have a drain port which shall be piped to spill over a floor drain.
 6. Provide dielectric fittings when joining two dissimilar metals.
- G. Hot Water Distribution System:
1. The terminal shall be served by a central system located in the penthouse. The system shall consist of two (2) high-efficiency gas fired heaters.
 2. Hot water returns shall be arranged to maintain hot water to the fixtures at all times and shall include all required pumps, balancing valves, check valves, etc. The hot water circulating system shall be arranged to be self balancing.
- H. Soil, Waste and Vent Systems:
1. Soil, waste and vent systems shall be complete, serving each plumbing fixture, floor drain and roof drain, etc.
 2. All sanitary and storm drains (serving spaces above ground floor) shall discharge to the sewer by gravity.
 3. Floor Drains shall be provided as follows:
 - a. In all parking areas and baggage handling areas open to the weather spaced at a maximum area of 3,000sq.ft. per drain.
 - b. Mechanical rooms.
 - c. Common area washrooms.
 - d. Trash rooms.
 - e. Loading dock.
 - f. Stairwells.
 4. Drains shall be provided in all planting areas for positive drainage.
 5. Provide clean out where change of direction occurs on all waste lines.
 6. A grease trap shall be required for all kitchen waste before they can discharge to the city sewers.

- I. Materials:
 - 1. All suspended sanitary, storm and vent piping 3" and larger shall be service weight cast iron, hub and spigot, poured lead joints or no hub with heavy duty casketed couplings 2 ½" and smaller shall be galvanized Schedule 40 steel or type "M" copper tube.
 - 2. All domestic water piping and fittings 4" and larger shall be galvanized steel. 3" and smaller - Type L copper tube.
- J. The following shall receive 1" fiberglass pipe insulation.
 - 1. All domestic cold water, hot water and hot water return piping.
 - 2. All roof drain bodies, elbow and horizontal storm piping.
 - 3. All horizontal waste piping with 1" acoustical wrap.
- K. All shut-off valves 2" and smaller shall be ball valves and 2½" and larger shall be butterfly valves.

1.4 PLUMBING FIXTURES

- A. General:
 - 1. All equipment, fixtures, faucets, etc., shall be of proven quality and have Chicago representative that can readily supply replacement parts. Fixtures shall be of color selected by Owner.
 - 2. See Interior Design documents for description for plumbing fixtures and schedule.
- B. Fixtures that are wall hung or abut a wall or other surfaces shall have the abutting edges, surfaces, etc., factory ground true and square.
- C. Exposed Pipes: All water supplied to fixtures which are exposed to view (excepting from flush valves to fixture spud and/or otherwise specified) including waste pipe from traps through the walls, shall be of I.P.S. brass pipe with cast brass screw banded fittings, all of which shall be polished chromium plated. The excepted flush valve pipe shall be of heavy gauge seamless brass tubing which shall also be chromium plated.
 - 1. Supplies and Stops: All lavatories and sinks shall be provided with chrome plated, stops either of the straight or angle type as required by type of fixture and chrome plated flexible supplies. Loose key stops shall be provided for all common area and public fixtures.
- D. Wall Flanges: All water supplies and waste, where they enter wall or pipe spaces, shall be finished with one-piece brass polished chromium plated wall flanges.
- E. Fixture Trim Finish: All exposed metal fixture trim shall be polished chromium plated finish.

- F. Flow Controls: Unless included with fixture trim, chrome plated flow control unit shall be provided in the supplies to all sinks and lavatories.
- G. Lavatory Waste and Trap: Public lavatory shall have cast grid drain.
- H. Water Closet Seats: Each water closet, unless otherwise specified, shall be provided with an anti-microbial, plastic, white, elongated open front seat, less cover and combination self-sustaining and check hinge.
- I. Fixture Supports: All wall hung fixtures shall be supported by means of chair carriers as hereinafter specified.
 - 1. Water Closets: All wall hung water closets shall be supported by means of a chair carrier with stub feet and of type and design required for the fixture and the building construction.
- J. Lavatories: All wall hung lavatories shall be supported by means of a chair carrier with stub feet, extruded system for thin wall construction.
- K. Hose Bibbs:
 - 1. Hose bibbs shall be provided at a minimum, in accordance with the following schedule:
 - a. Truck dock.
 - b. Mechanical equipment rooms.
 - c. Fan rooms.
 - d. Garage - minimum one per level and 300 feet on center.
 - e. One minimum on each exterior face of the building. However, maximum spacing will not exceed 200 feet.
- L. Sub Soil Drainage System: Sub-Soil Drainage system shall be provided, including perforated PVC drain pipe with synthetic filter fabric, rod-out basins, cleanouts, settling basins and sump pump basin as required. Rod-Out basins shall be provided at a minimum at each corner of the building. Cleanouts shall be provided at a maximum spacing of 100'-0" on center.

1.5 LEEDS CERTIFICATION

- 1. This project will be designed to achieve LEED Certification.
- 2. All elements regarding equipment efficiencies or heat reclaim must be specifically adhered to.
- 3. All adhesives or painting materials utilized on the project must be non-toxic.
- 4. Materials must be purchased within a 500 mile radius.
- 5. All scap generated on the project must be separated for recycling per the General Contractor's predetermined program.

6. After the initial equipment commissioning process has been completed, a detailed commissioning process will occur with a third party commissioning agent.
7. All contractors will be required to prepare and submit all supporting documentation to the Owner's LEED's Facilitator for final application.

END OF PLUMBING