
22 00 00 Plumbing

22 05 00 Common Work Results for Plumbing

1. The AE is responsible to follow all applicable codes and regulations in regards to Plumbing. These standards are intended to provide additional requirements for Central Michigan University. The AE is responsible to submit any deviations to the CMU Project Manager at completion of Design Development for review and approval.
2. Drain piping shall be PVC schedule 40 if temperature is less than 140 degrees Fahrenheit.
3. No mechanical vents for drains shall be allowed. (Examples of unacceptable Manufacturers are: Studer and Otey)
4. Clean-outs shall be required as per the current plumbing code. However, CMU reserves the right to reduce the minimum distance between clean-outs.
5. CMU requires a clean out on the exterior of all new construction at ground level. Clean out is to be installed with a low profile septic tank cover.
6. CMU requires all major plumbing remodels have sewer lines inspected with a camera system to the first sewer structure. Contractor to provide CMU video documentation and locate and identify areas of concern.
7. Shower valves shall be temperature compensating pressure.
8. Modular shower drains shall be 2" waste connection of the type that provides for removable strainer, affixed with screws.
 - a. PVC Schedule 40 hub connection, Sioux Chief 825, is the basis of design.
 - b. Compression gasket connection for schedule 40ABS/PVC pipe for blind installation is allowed with university approval.
9. At a minimum, new or modified domestic water piping and equipment shall be disinfected with chlorine, 50 PPM residual free chlorine for 24 hours, and flushed continuously until residue is gone. Two water samples shall be taken, 24 hours apart, the first no sooner than 24 hours after flushing. Samples to be taken from each end of new main piping and at each outlet or branch, for bacterial testing, as established by Mt. Pleasant DPW. If the tests result in unsafe conditions, the chlorination shall be repeated by the contractor. The contractor shall be responsible for all cost associated with the necessary retesting.
10. Identification & Tagging for Piping: Reference Central Michigan University PIPING IDENTIFICATION AND VALVE TAGGING STANDARD
11. The minimum design pressure for any building's domestic water is 35 psi at grade level from the City of Mt. Pleasant.
12. Trap seals are required by the university. Trap primers are not allowed.
13. AE is responsible to reference and follow the City of Mt. Pleasant standards from the main domestic water line up to the building connection. This includes any requirements for the city water meter located in the mechanical room. The City of Mt. Pleasant standards can be found online at www.mt-pleasant.org

22 10 00 Plumbing Piping and Pumps

1. Domestic Water piping shall be as follows:
 - a. Above Grade: Copper tubing ASTM B88, Type L, hard drawn
 - b. Below Grade: Copper tubing ASTM B88, Type K, hard drawn
 - c. Piping 2" and below can be:
 1. Soldered preferred.
 2. Press fittings from the following Manufacturers:
 - a. Viega
 - b. Elkhart
 3. Pex tubing must be preapproved by CMU for each application.

- d. Piping > 2" shall be soldered.
- 2. Water Booster pumps to be variable frequency drive, controlled by pressure differential and sized for 100% capacity of the building. A second pump shall be provided for standby usage and periodically operated by automatic switching. The automatic switching is to be based on hours of operation and be adjustable in the field.
 - a. Acceptable Manufacturers:
 - 1. Bell & Gosset
 - 2. Grundfos
 - b. Pressure gauges shall be installed at the inlet and outlet of each booster pump.
 - c. Variable Frequency Drive to be Yaskawa.
- 3. Hot water return piping shall be routed to the furthest point of hot water usage on each floor.
 - a. Balancing valves shall be installed at a minimum of one per floor.
 - b. A circulation pump shall be located next to the hot water heater. Acceptable Manufacturers:
 - 1. Bell & Gosset
 - 2. Grundfos
- 4. Install a flex fitting between pumps and piping so that the pump vibration will not be transmitted.
- 5. Isolation valves shall be provided on all domestic water piping, at a minimum, to isolate a bathroom group.

22 40 00 Plumbing Fixtures

- 1. Urinals shall have a manual flush valve.
 - a. New construction applications are permitted to have valve with a minimum flow of .5 gpf.
 - b. Remodel or renovation applications that connect to existing cast iron sanitary lines are to be sized for a minimum of 1.0 gpf.
 - c. Acceptable Manufacturers of urinals and valves:
 - 1. Zurn
 - 2. Sloan
- 2. Water Closets shall have a manual, dual flush valve.
 - a. Single flush valves are acceptable for remodel applications where existing cast iron sanitary lines may not support reduced flow valves.
 - b. Acceptable Manufacturers of water closets and valves:
 - 1. Zurn
 - 2. Sloan
 - c. Seat heights is 18 ½" - 19" for ADA and 16" – 16 ½" for non-ADA water closets
- 3. Lavatories shall have manual valves and include a .5 gpm screen. American Standard model 7385.004 Reliant 3 is the basis of design.
 - a. Acceptable Manufacturers of lavatories and faucet valves:
 - 1. American Standard
 - 2. Sloan
 - 3. Zurn
- 4. Water fountain acceptable Manufacturers:
 - a. Elkay: base design
 - b. Bottle filling station is required for all new water fountain installations, bi-level is to be used whenever possible. The single is to be used when a double is not economically feasible. The following are the base design;
 - a. Elkay LZS8WSLK EZH20 system, Single ADA station with bottle filling station, gray.
 - b. Elkay LZSTL8WSLK, Bi-level hi-lo ADA cooler with bottle filling station, gray.

5. Lavs located in restrooms, serving classroom buildings, shall eliminate any plungers and replace the drain with a mesh cover.
6. All devices must be protected locally to prevent backflow. This includes the installation of vacuum breakers for hose bibs and service sinks.

22 30 00 Plumbing Equipment

1. Domestic water heaters shall be instantaneous and heated with steam
 - a. High Efficiency feed forward steam to liquid design.
 - b. Water heater to be located high enough to allow gravity draining of condensate.
 - c. Manual temperature gauges shall be installed at both the inlet and outlet.
 - d. Acceptable Manufacturers:
 1. RediHeat
 2. Maxitherm
 - e. If steam is not available, then a natural gas operated instantaneous heater, is a second priority. Navien is the basis of design.
 - f. Any electrical hot water heater must be preapproved by CMU.
2. Domestic water softener system shall be ion exchange with tandem resin tanks for demand water regeneration.
Acceptable Manufacturers:
 - a. Altar
 - b. Fliers
 - c. Peerless
3. Whenever practical kitchen equipment, i.e. dishwashers and kettles, should utilize steam as the source of heat.
4. Garbage disposals on sinks are not allowed on campus.

DOCUMENT CONTROL PAGE:

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Revision History:

Date	Revision	Approved By:
1.24.07	Converted to CSI 2004 format. Inserted additional information in each section regarding sizes, fitting, pressure ratings, and manufactures.	Steve Lawrence
5.18.10	Separated CMU Mechanical Specs into Division 22 Plumbing and Division 23 HVAC	Steve Lawrence
4.28.11	Section 22.10.00 1.d.2 clarified testing of grooved fittings, Section 22.40.00. 4 added bottler filler option and changed to Elkay for basis of design.	Steve Lawrence
1.22.13	Added Reference to City of Mt. Pleasant and minimum water pressure, water closet heights, hot water heater requirements	Steve Lawrence
3.22.13	Removed grooved fittings for domestic water	Steve Lawrence
9.19.17	Added shower drain specification, domestic isolation valves, modified specification for urinal valves, clarified bottle filler location, and added the Maxitherm water heater specification.	Jonathan Webb
3.26.18	Added sanitary sewer inspection and external clean out, changed from trap primers to trap seals, added Grundfos as an accepted booster and circulation pump manufacturer, and added the RediHeat domestic water heater as an accepted manufacturer.	Jonathan Webb