



Division 231000

Facility Fuel Systems

DESIGN GUIDE

1 General

1.1 General

- A. At the end of design development, review major pipe routing and branch pipe isolation with the Mechanical Plumbing Manager (MPM).
- B. Show isolation valves for each room and branch piping in the construction documents on the floor plans.
- C. All installations shall conform to the requirements of this section, the local utility, International Fuel Gas Code and the Authority Having Jurisdiction.

1.2 Utilities-Natural Gas

- A. Gas, where available on campus, is distributed by the local utility (City of Ellensburg). The utility company will provide the gas meter and gas regulator.
- B. Coordinate facility gas requirements with the local utility in the design phase of the project.
- C. The building utility gas meter shall be coordinated to have an auxiliary contact for measuring of gas usage. Gas usage shall be reported the Division 23 BAS (230900).
- D. The gas service shall be located on the building exterior to avoid CWU owned directed buried gas piping downstream of the meter.
- E. Generators that are not attached to the building shall have their own utility meter and regulator to avoid underground piping that is owned by CWU.



1.3 Generator Fuels

- A. Generator fuels are to be determined on a project-by-project basis by Division 26. Generally smaller generators are 150 kW and less.
- B. Smaller generators are typically dual fuel. Division 23 provides a propane tank with a minimum of 90 minutes of code required fuel. The generator has connections for liquid propane and natural gas. The generator first fires on propane and switches to natural gas on low propane pressure. The generator is equipped with vaporizers for vaporizing liquid propane.
- C. Larger generators are typically oil fired with belly mounted oil tanks.

2 Materials

2.1 Utility Gas Meter and Regulator

- A. Locate on exterior of building in accordance with code requirements.
- B. Coordinate bollards for protection with Civil Engineer.

2.2 Lab/Occupied Room Emergency Shutoff Valves

- A. Stainless steel cabinet preferably recessed, manually operated quarter turn gas valve, plexiglass door, stainless steel piano hinges, quarter turn latch. Locate at ADA height near room exit. Label "gas valve"

2.3 Natural Gas Piping-Below Ground

- A. The campus standard is to not have underground piping downstream of the meter.
- B. If gas is required on site to two locations (building and generator), provide a utility meter at each location to avoid campus owned underground gas utility lines.



2.4 Natural and Propane Gas Piping-Above Ground

- A. Schedule 40 black steel. Threaded permitted with the following exceptions:
 - 1. Welded pipe required when in walls, in inaccessible areas such as shafts, in air plenums and for pipe 2 ½" and larger.

2.5 Liquid Propane (LP)

- A. Schedule 80 welded black steel.

2.6 LP Gas Tanks

- A. Above Ground steel tank, UL listed. The system shall comply with the International Fire Code. Finish shall be off-white/factory applied. Signage per code. Tanks shall be included with the project and not leased.
- B. Tank shall be equipped:
 - 1. Overfill protections for pressurized delivery to close automatically at the 90% full level.
 - 2. Dip tube for liquid withdrawal.
 - 3. Relief venting in accordance with NFPA 30.
 - 4. Anti-spill/anti-siphon valves
 - 5. Gauges
 - 6. Padlock at fill connections
 - 7. Restraint embedments

2.7 Natural Gas and Propane Gas Submeters

- A. Reserved for future content.
- B. Monitored by BAS.



3 Execution

3.1 General

- A. Gas piping shall be tested and made tight in accordance with the latest edition of the International Fuel Gas Code and any other governing local gas codes.
- B. Test in the presence of the Owner's representative. Provide copies of test to the Owner's representative and include in the O&M manual.

3.2 Metering

- A. All utility gas meters shall be specified to be included with auxiliary contacts for metering of natural gas by the BAS. Coordinate with Division 23.
- B. When submetering is required for water heaters by energy code or LEED, energy shall be directly measured at the energy source (gas, electricity, etc.)
- C. All meters shall be calibrated with calibration demonstrated to the commissioning agent.
- D. Provide service/repair and calibration for one year period with a final service visit one month prior to end of first year of project warranty.

3.3 Flanges and Unions

- A. For pipe 2" and smaller, provide unions downstream of each valve, on each port of control valves, and at each equipment or piping specialty requiring service. Valves with threaded connections that cannot be rotated shall have unions on both sides of the valve. If equipment or valve has a flanged connection that is acceptable and preferred.
- B. For pipe 2 ½" and greater, provide flanged connections on each side of valve, on each port of control valves, and at each equipment or piping specialty requiring service.
- A. Unions and flanges for serviceable equipment shall be installed in non-parallel lines to eliminate spreading of pipe assembly during servicing.



3.4 Valves

- A. Provide isolation valves to isolate each building as indicated below. Each valve shall be as close to the room or equipment that they isolate. In no cases can the valves be located on any other floor or a building but the floor they serve.
 - 1. Each building shall have an accessible main shut-off valve
 - 2. Branch isolation by floor
 - 3. Mechanical rooms
 - 4. Labs/instructional space
 - 5. Equipment
- B. Provide minimum 6" dirt leg at each vertical gas pipe drop to equipment downstream of isolation valve.
- C. All valves shall have adequate access for servicing, operation, repairs and/or replacement.
- D. Lab/instructional areas gas shut-off valve: Locate within the room adjacent to the egress door and provide identification as to service.

3.5 Pressure Regulating Valves (Gas)

- A. Vent all regulators installed indoors to the outdoors with the least amount of pipe practical

3.6 Propane Tanks

- A. Install in accordance with applicable codes.
- B. Secure tank to concrete slab with tank embedment. Restraints shall be seismically engineered.



4 Appendix

4.1 Reserved for future.