**Section 604.1225 Appurtenances**

a) Valves

1) Each pump must have an isolation valve on the inlet and discharge side of the pump to permit satisfactory operation, maintenance and repair of the equipment.

2) Each pump must have a positive acting check valve on the discharge side between the pump and the shutoff valve.

3) Surge relief valves or slow acting check valves must be designed to minimize hydraulic transients.

b) Piping must:

1) be designed to minimize friction losses;

2) have watertight joints;

3) be protected against surge or water hammer and provided with suitable restraints where necessary; and

4) be designed such that each pump has an individual suction line or the lines must be so manifolded that they will ensure similar hydraulic and operating conditions.

c) Gauges and Meters

1) Each pump must have the following gauges and meters:

A) a standard pressure gauge on its discharge line;

B) a compound gauge on its suction line; and

C) a meter for measuring the flow rate.

2) The station must have the following:

A) a flow rate indicator and totalizing meter; and

B) a method of recording the total water pumped.

d) Water Seals

1) Water seals must not be supplied with water of a lesser sanitary quality than that of the water being pumped.

2) The seal must:

A) when pumps are sealed with potable water and are pumping water of lesser sanitary quality, be provided with either an approved reduced pressure principle backflow preventer or a break tank open to atmospheric pressure; and

B) when a break tank is provided, have an air gap as defined in 35 Ill. Adm. Code 601.105 between the feeder line and the flood rim of the tank.

e) Controls

1) Pumps, their prime movers and accessories, must be controlled in such a manner that they will operate at rated capacity without overload.

2) Provisions must be made to prevent energizing the motor in the event of a backspin cycle.

3) Electrical controls must be located above grade.

4) Equipment must be provided or other arrangements made to prevent surge pressures from activating controls that switch on pumps or activate other equipment outside the normal design cycle of operation.

f) Lubrication

1) When automatic pre-lubrication of pump bearings is necessary and an auxiliary power supply is provided, design must assure that pre-lubrication is provided when auxiliary power is in use, or that bearings can be lubricated manually before the pump is started.

2) All lubricants that come into contact with the potable water must comply with Section 604.105(f).