SECTION 15450
PLUMBING EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Water Heaters.
   2. Circulating pumps.
   3. Sump pumps.
   4. Sewage ejectors.
   5. General use air compressors.

B. Related Sections:
   1. Section 15010 - Basic Mechanical Requirements.
   2. Section 15050 - Basic Mechanical Materials and Methods.
   3. Section 15240 - Mechanical Sound and Vibration Control.
   4. Section 15410 - Plumbing Piping.
   5. Section 15430 - Plumbing Specialties.

1.02 SYSTEM DESCRIPTION

A. Design Requirements:
   1. General:
      a. Energy conservation is an essential design consideration for all systems.
      b. Design parameters for equipment selection shall conform with ASHRAE, ASPE, ASME and IPC.
      c. Hot water generators shall have two mixing valves, one shall be set at 140 degrees, and the second shall be set at 120 degrees.
      d. There shall be an Andover compliant alarm installed after the first mixing valve set at 150 degrees, and an Andover compliant alarm installed after the second
valve set at 130 degrees. Both alarms shall be connected to the Andover alarm system.

e. Hot water supplied to any fixtures (commercial or residential) used for washing shall be limited to 120 degrees.

2. Domestic Hot Water Heat Exchanger:

   a. Design domestic hot water systems using "instantaneous" or "semi-instantaneous" steam to water heaters wherever possible.

   b. Where continuous water supply is necessary, design system with two or more hot water generators to provide stand-by operation. Design stand-by to maintain two-thirds capacity with one unit down.

   c. Specify inlet and outlet pressure gages on water, compound gages on inlet and outlet of steam valve, and linear thermometers on hot water outlet and hot water recirculating inlet.

   d. In steam supply to generator, provide in line an isolation valve, strainer, union, temperature regulating valve, union, and gate valve with a globe valve by-pass around assembly.

   e. In condensate return, provide an isolation valve, strainer, union, trap, union, test tee with test valve, check valve, and gate valve.

   f. Design generator piping with isolation valves and unions at all unit connections for removal of entire unit or tube-pull without dismantling connecting piping.

   g. Gas-fired water heaters shall have power-burners as a minimum and shall have forced draft if sharing a flue with a forced-draft boiler, in which case the water heater's positive pressure at the collar shall be specified.

   h. Include an expansion tank if DHW system has a backflow preventer.

3. Domestic Hot Water Circulating Pumps:

   a. Specify all-bronze construction.

   b. Specify aquastat control in return line near each pump if building is expected to have extended operating hours; otherwise, specify a timer.

   c. Provide one pump (isolation valves before and after with union or flanged connections).

4. Sump Pumps and Sewage Ejectors, specify:

   a. Duplex, submersible.

   b. Mechanical float switches.
c. Remote-mounted pump panels with H.O.A. switch for each pump.

d. Alternator.

e. High-water audible and visual alarms, and dry contacts if connected to remote alarm (DDC or other).

f. Two-pump run control.

g. Three phase protection for three phase motors.

h. NEMA 12 enclosure.

i. Gas-tight gasketed cover with grommeted openings for piping and wiring.

j. Gas tight manhole.

k. Vent through dedicated vent stack. Label as such throughout.

l. Quick-removal system for pumps.

m. For any pit deeper than 5 feet, require a stainless steel guide rail system.

5. General Use Air Compressor, specify:

   a. Duplex.

   b. Energy efficient motors.

   c. ASME Code and Labeled reviewer.

   d. Automatic float type receiver condensate drain with isolation valve.

   e. Refrigerated air dryer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Instantaneous or semi-instantaneous anticipating type steam-source water heater (with 10-year warranty) with feed-forward control, admiralty tubing and provided with insulation condensate cooler and supporting frame.

   Ace-Boiler with feed-forward control
   Armstrong "Flo-Rite-Temp"
   Patterson-Kelley
   Thermalflo
   Housing – Armstrong “Flo-Rite-Temp”

B. Copper-tube water heaters, fuel-fired semi-instantaneous, power burner.
Ace Boiler
Aerco
Ajax
A.O. Smith
Rite
Weil-McLain

C. Domestic hot water circulating pumps (connected to 24-hour timer), (Cartridge pumps wherever possible):

Armstrong
Bell and Gossett
Grundfos
Laing (available with built-in timer)
Taco
Housing – Grundfos

D. Sump pumps:

Weil
Zoeller

E. Sewage ejectors:

Weil Pump Company
Federal Pump Corporation

F. General-Use Air Compressor:

Ingersoll Rand
Quincy
Atlas Copco
Gardner-Denver
Worthington

PART 3 - EXECUTION

3.01 INSTALLATION

A. In general, for project specifications, remove "Design Requirements" in Part 1, subparagraph A, paragraph 1.02, "System Description" of this Design Guide and use list to expand on specific requirements of installation for each product specified.

B. Vacuum pumps and air compressors need to be installed with limit switches and alternating switches.

END OF SECTION
Model 2010

Three-Way Thermostatic Valve

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<tbody>
<tr>
<td>2010</td>
<td>2&quot; NPT</td>
</tr>
<tr>
<td>2010-1</td>
<td>1 1/2&quot; NPT</td>
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<tr>
<td>2010J24</td>
<td>1 1/2&quot; SAE O-Ring</td>
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<tr>
<td>A2010J32</td>
<td>2&quot; SAE O-Ring</td>
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<td>F2010</td>
<td>2&quot; 125# FF Flange</td>
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<tr>
<td>SF2010</td>
<td>2&quot; 150# RF Flange</td>
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<tr>
<td>SF2010X</td>
<td>2&quot; 300# RF Flange</td>
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</tbody>
</table>

Fluid Power Energy (FPE) Thermostatic Valves utilize the principle of expanding wax, which in the semi-liquid state undergoes large expansion rates within a relatively narrow temperature range. The self-contained element activates a stainless steel sleeve, which directs flow. All FPE Thermostatic Valves are factory set at predetermined temperatures: no further adjustments are necessary. A wide range of temperatures are available for water and oil temperature control applications.

When used in a diverting application, on start-up the total fluid flow is routed back to the main system. As fluid temperature rises to the control range, some fluid is diverted to the cooling system. As fluid temperature continues to increase, more flow is diverted. When the thermostat is in a fully stroked condition, all fluid flow is directed to the cooling system. FPE Thermostatic Valves may also be used in a mixing application.

In a mixing application, hot fluid enters the "B" port and colder fluid enters the "C" port. The flows mix and the thermostat adjusts to reach the desired temperature, exiting the "A" port.

Standard FPE thermostatic valve housings are made from aluminum and grey iron castings, however, ductile iron, bronze, steel and stainless steel housings are available.

Available Connections: NPT, SAE O-Ring, 125# FF Flange, 150# and 300# RF Flange.

Optional features: High over temperature element, plated element. Other options available upon request.

Fluid Power Energy, Inc.
W229 N591 Foster Court • Waukesha, WI 53186
262•548•6220 Fax 262•548•6239
www.fpevalves.com
### Model 2010

<table>
<thead>
<tr>
<th>Model number</th>
<th>Body material</th>
<th>Body size</th>
<th>Principal dimensions</th>
<th>Max. width</th>
<th>Flange drilling</th>
<th>No. of elements</th>
<th>Notes or insured equivalents</th>
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<td>*2000-1</td>
<td>A, B, C</td>
<td>0.75 in.</td>
<td>3.00 x 10 in.</td>
<td>9.24 in.</td>
<td>5-15 (15/17)</td>
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<tr>
<td>*2010</td>
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<td>0.64 in.</td>
<td>2.00 x 10 in.</td>
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<td>5-15 (15/17)</td>
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<td>*2016</td>
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<td>1.25 x 10 in.</td>
<td>9.24 in.</td>
<td>5-15 (15/17)</td>
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<td>*2016J</td>
<td>A, B, C</td>
<td>0.38 in.</td>
<td>0.75 x 10 in.</td>
<td>9.24 in.</td>
<td>5-15 (15/17)</td>
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<tr>
<td>*2010J</td>
<td>A, B, C</td>
<td>0.64 in.</td>
<td>2.00 x 10 in.</td>
<td>9.24 in.</td>
<td>5-15 (15/17)</td>
<td>A, B, C</td>
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**Notes:**
- *2010-1, 2010, 2016*
- *2010, *2016J*

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### Pressure Ratings

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<td>SPX, SPX</td>
<td>720</td>
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### Flow vs. Pressure Drop

![Flow vs. Pressure Drop Graph](graph)

**Recommended Pressure Drop:** 2 to 7 PSI

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### Application Charts

- **Diverting System**
- **Mixing System**

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**To Order**

Study Model Number, material, temperature desired, and physical dimensions. For Model coding information and contact your local representative.

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**AUGUST 2010**

**UCB STANDARDS**

15450-6
Model 1010

Three-Way Thermostatic Valve

<table>
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<th>Model</th>
<th>Size</th>
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<td>1110</td>
<td>3/4&quot; NPT</td>
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<td>1210</td>
<td>1/2&quot; NPT</td>
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<tr>
<td>1010J6</td>
<td>1/2&quot; SAE O-Ring</td>
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<tr>
<td>1010J12</td>
<td>3/4&quot; SAE O-Ring</td>
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<tr>
<td>1010J16</td>
<td>1&quot; SAE O-Ring</td>
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</tbody>
</table>

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Optional 1010 features: High over temperature element, plated element. Other options available upon request.
## Model 1010

<table>
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<th>Model Number</th>
<th>Body Material</th>
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<th>Main Pitch in Other Plane</th>
<th>Flange Details</th>
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<th>Max Screws in Holes</th>
<th>BOLT PITCH</th>
<th>Screw Material</th>
<th>Screw Size</th>
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<td>PRV</td>
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<td>&quot;1131-016&quot;</td>
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<td>&quot;NPT&quot;</td>
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<td>PRV</td>
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<td>AA 30</td>
<td>10.25</td>
<td>AA, AC, 304</td>
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<td>5/8&quot; x 1/2&quot; x 3&quot;</td>
<td>2 20.00</td>
<td>PRV</td>
<td>10</td>
<td>AA 30</td>
<td>10.25</td>
<td>AA, AC, 304</td>
<td>5/8&quot; 304</td>
</tr>
</tbody>
</table>

* (Replace " with body material type: A=Cast iron, AL=Aluminum, B=Brass, 60=Brass, B=Brass 60=Brass, SS=Stainless Steel)

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**APPLICATION CHARTS**

**DIVERTING SYSTEM**

**COOLER OR HEAT EXCHANGER**

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**MIXING SYSTEM**

**COOLER OR HEAT EXCHANGER**

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THERMOSTATIC VALVE APPLICATIONS

**Diagram 1:**
- **HEAT SOURCE**
- **EXCHANGER**
- **MIXING APPLICATION**

**Diagram 2:**
- **DIRECING APPLICATION**
- **HEAT SOURCE**
- **EXCHANGER**

**Diagram 3:**
- **COOLING WATER DIVERTING SYSTEM**
  - **FIGURE (A)**
- **COOLING WATER MIXING SYSTEM**
  - **FIGURE (B)**

**Diagram 4:**
- **LUBE OIL TEMPERATURE CONTROL DIVERTING SYSTEM**
  - **FIGURE (C)**
- **LUBE OIL TEMPERATURE CONTROL MIXING SYSTEM**
  - **FIGURE (D)**