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 a BAS-compliant alarm installed after the first mixing valve, set at 150 degrees, and a BAS-compliant alarm installed after the second valve, set at 130 degrees. Both alarms shall be connected to the BAS 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 full 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 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:

   Storm sump pumps inside buildings shall have water-tight lids

   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, sub-paragraph 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

2010  2" NPT
2010-1  1 1/2" NPT
2010J24  1 1/2" SAE O-Ring
A2010J32  2" SAE O-Ring
F2010  2" 125# FF Flange
SF2010  2" 150# RF Flange
SF2010X  2" 300# RF Flange

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.
### Model 2010

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>MATERIAL</th>
<th>PIPE SIZE</th>
<th>PRINCIPAL DIMENSIONS (DIM.A &amp; B IN INCHES)</th>
<th>MAX WIDTH IN OTHER PLANE</th>
<th>FLANGE DRILLING</th>
<th>NO. OF HOLES</th>
<th>NO. OF ELEMENTS</th>
<th>APPROX SHIP WEIGHT</th>
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<tr>
<td>2010-1</td>
<td>A, B, C</td>
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<td>D, 3/8&quot;</td>
<td>2 1/2&quot;</td>
<td>2 1/2&quot;</td>
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<td>0.75&quot;</td>
<td>1 1/2&quot;</td>
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<tr>
<td>2010</td>
<td>A, B, C</td>
<td>3&quot; NPT</td>
<td>D, 3/8&quot;</td>
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<td>D, 3/8&quot;</td>
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<td>0.75&quot;</td>
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* (Replace * with body material type: P = Cast Iron, B = Bronze, D = Ductile, S = Steel, SS = Stainless Steel)

### Flow vs. Pressure Drop

- Recommended Pressure Drop is 2 to 7 PSI

### Application Charts

- ** Diverting System
- ** Mixing System

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**To Order**

Seven Mode Number, nominal, connection dimensions, and body materials. For Model coding information, visit our website or contact your territory representative.
Model 1010
Three-Way Thermostatic Valve

1010  1" NPT
1110  3/4" NPT
1210  1/2" NPT
1010J8  1/2" SAE O-Ring
1010J12  3/4" SAE O-Ring
1010J16  1" SAE O-Ring

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

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

FLUID POWER ENERGY, INC.
W229 N591 Foster Court  Waukesha, W. 53186
262-548-6220  Fax 262-548-6239
www.fpeavalves.com
Model 1010

<table>
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<tr>
<th>Model Number</th>
<th>Body Material</th>
<th>ANSI Size</th>
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<th>Maximum Blow-Off</th>
<th>Flange Details</th>
<th>Specifications</th>
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<td>1 - 16</td>
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<td>1 - 16</td>
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<td>750 psi</td>
<td>5 to 7</td>
<td>NA</td>
<td>1 - 16</td>
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</table>

* (Replace * with body material type: A-Alloy, AL-Aluminum, B-Bronze, O-Steel, BS-Stainless Steel)

For part sizes not shown consult factory.

All models:

Flow vs. Pressure Drop

Recommended Pressure Drop is 2 to 7 PSI

APPLICATION CHARTS

DIVERTING SYSTEM

MIXING SYSTEM

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

To Order
Specify Model Number, material, temperature, and housing material. For Model chugging information, visit our website or contact your local representative.
THERMOSTATIC VALVE APPLICATIONS

**Diagram 1:**
- **HEAT SOURCE** → **A** → **B** → **C** → **EXCHANGER**
- **MIXING APPLICATION**

**Diagram 2:**
- **HEAT SOURCE** → **A** → **B** → **Exchanger**
- **DIVERGING APPLICATION**

**Diagram 3:**
- **ENGINE** → **A** → **B** → **C** → **CONTROL VALVE** → **COOLER** → **EXCHANGER**
- **CYLINDRING WATER DIVERTING SYSTEM**

**Diagram 4:**
- **ENGINE** → **A** → **B** → **C** → **CONTROL VALVE** → **COOLER** → **EXCHANGER**
- **CYLINDRING WATER MIXING SYSTEM**

**Diagram 5:**
- **ENGINE** → **A** → **B** → **C** → **CONTROL VALVE** → **COOLER** → **EXCHANGER**
- **LUBE OIL TEMPERATURE CONTROL DIVERGING SYSTEM**

**Diagram 6:**
- **ENGINE** → **A** → **B** → **C** → **CONTROL VALVE** → **COOLER** → **EXCHANGER**
- **LUBE OIL TEMPERATURE CONTROL MIXING SYSTEM**
FLUID POWER ENERGY, INC.
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