

## HEAT SOURCES

The heating source should be part of the design prescribed by the engineer or project manager that best fits the design parameters. Supply temperature exiting the heat source should not exceed the maximum supply temperature required by the floor panel unless tempered by a water temperature control device that insures that the maximum floor supply temperature will not be exceeded. Maximum supply water temperatures allowed for concrete is 150°F and for gypsum poured underlayment is 140°F.

*DISCLAIMER: Manufacturers installation and operation instructions and local codes must be followed. MrPEX® does not take responsibility for heat source warranty or performance. System designer is responsible for sizing the heat source to meet actual demand.*

### Boiler Specifications

- › The system designer should consult with the boiler manufacturer or supplier on the type of piping, operating fluid temperatures, and flow conditions appropriate for the application of the boiler in radiant panel or combination systems.
- › Where the boiler manufacturer specifies a minimum return water temperature, flow rate and temperature rise, the designer will ensure the system arrangement and control method will automatically allow the system to operate at or above the manufacturer minimums for every normal operating cycle.

### Boiler Output

- › The boiler net output should be within 100% to 120% of the actual heat loss unless design factors, pipe losses or boiler ratings require exceeding this range.
- › Additional output capacity should be allowed when other heating demands such as domestic water priority systems, hot-tub, swimming pool, snow-melting, etc. are serviced from the same source.
- › Future system expansion should be considered.

### Condensing Boilers

- › A condensing boiler, in which the heat exchanger and venting system is specifically designed to operate with condensing flue gases, can be connected directly to the panel heating system without any type of boiler protection mixing device.
- › These boilers should be operated at lowest possible temperature in order to maximize their efficiency.
- › Consult with boiler manufacturer for any specific installation or application instructions.

### Non-Condensing Boilers

- › A non-condensing boiler, in which neither the heat exchanger nor the venting system is designed to handle condensed flue gases, must be properly protected from flue gas condensation.
- › Non-condensing boilers should not have an operating temperature below the minimum fluid temperature recommended by the manufacturer.
- › In many cases an appropriate mixing arrangement may be required to ensure the flue gases do not condense throughout the full operating range of the system.
- › Consult with boiler manufacturer for any specific installation or application instructions

### Dedicated Water Heaters

- › Where permitted by code, a domestic water heater may be used as a heat source for hydronic radiant heating in a closed system providing all generally accepted piping practices for closed loop hydronic heating are used. This includes the use of a properly sized relief valve, expansion tank, fill valve, air eliminator and backflow preventer where required. The required temperature and pressure relief valve for the water heater must be installed regardless of whether a lower pressure relief valve is installed. Consult with water heater manufacturer and local codes for any specific installation instructions.

- › The water heater net output should be within the range of 100% to 120% of the actual heat loss unless design factors, pipe losses or water heater ratings require exceeding this range.
- › The dedicated water heater should be clearly and permanently marked "Not For Potable Water Use".

### **Combination Of Potable Water And Hydronic Heating Systems**

- › At the present time, some combined systems are approved by the major code councils, and some are not. MrPEX® reminds its customers and installers that they must protect the potability of the domestic water supply while complying with all relevant codes. MrPEX® further suggests that homeowners/end users be informed of the advantages and disadvantages of each system currently available. Consult with water heater manufacturer and local codes for any specific installation instructions.
- › Use of water heater for a combination of potable and hydronic systems should conform to one of the following methods:
  - » Water heater and heat exchanger:
    - ▶ Hydronic radiant heating and domestic use water may be heated by the same water heater provided a heat exchanger is used to separate the domestic water from the closed side of the system used for the radiant panel system.
    - ▶ The closed radiant panel side of the system should utilize all generally accepted piping practices for closed loop hydronic heating. This includes the use of a properly sized expansion tank, pressure reducing valve, fill valve, air eliminator, pressure relief valve and backflow preventer where required.
    - ▶ Heat exchanger may be integral to the water heater or external and must meet applicable codes for the separation of potable water from other fluids.
  - » A domestic water heater may be used as a heat source for both hydronic heating and domestic potable water in an open system when all the pipe, fittings and fixtures used within both the heating system and domestic system are suitable for potable water and pressure tested to regulatory limitations for each.
  - ▶ A control device should be installed on the radiant heating portion of the system to insure that the water will be periodically circulated through the heating system to avoid stagnation during the off-season. This circulation should be at least one complete water change every seven days.
- › Additional requirements for use of a water heater in combined systems
  - » No chemical additives to the system
  - » No water heater should replace an existing boiler
  - » Anti-scald valve should be provided for proper domestic water temperature on the potable side.

*\*\*Please refer to MrPEX® Design Manual for further information*

## PUMPS

The pump used should be a wet rotor circulator type for use in hydronic applications.

Delivering the correct BTU to the designated space is sole purpose of the pump. Verify that the designed pump is in conjunction with the design parameters, looking at the pressure drop of the system, along with the desired flow needed. Keeping in mind, the viscosity of anti-freeze that is being used.

There are two different pumps that are commonly used in installations. "Fixed speed" pumps are generally less expensive to purchase but cost more to operate and will only move a specific GPM depending on the amount off head loss/pressure drop. A "variable speed" pump has the ability to deliver different GPM with the same pump due to the fact that the speed can be changed depending on the systems parameters. Variable speed pumps use less energy to operate simply because the pump runs at a lower speed still delivering the proper amount of fluid.

*DISCLAIMER: Manufacturers installation and operation instructions must be followed. MrPEX® does not take responsibility for pump warranty or performance. System designer is responsible for sizing the pump to meet actual system requirements.*

## WIRING

- › Thinking about how the system will be controlled and the type of zoning (if any), is a must, at the time of installing MrPEX® tubing.
- › Refer to design to pull correct wire to proper location.
- › MrPEX® recommends using a thermostat with a slab sensor (part #5110741). Use 18Gauge wire, 4 conductor for this thermostat, pulling wire from the thermostat to either the manifold if using actuators to zone or to the heating plant to turn on the heat source.
- › MrPEX® air sensing thermostat (part #5110740), uses 18/4 wire, pulling to either the manifold if using actuators to zone or to the heating plant to turn on the heat source.
- › If using a remote manifold, power must be located at the manifold, either a 24volt transformer, or an 18/4 wire pulled to this location from the heat source. The 18/4 wire will be used for 24volt power along with an end switch.
- › If transformer is mounted at manifold location, pull 18/4 wire to heat source for end switch.