

## Division 42 | Process Heating, Cooling, and Drying Equipment

This design guideline is written to the designer of record (DOR). This guideline is written to document UA standards of work, assist the designers in ensuring UA standards are incorporated into the contract documents and provide a resource to facilitate the design process. It is the designer of record's responsibility to coordinate the criteria set forth in design guideline and in conjunction with the manufacturer requirements and use the most stringent standard.

### Section 42 10 00 – Hot Water Systems

Heat generation equipment including: BOILERS, FURNACES & WATER HEATERS

#### A. General

1. Boilers, furnaces and water heaters to be natural gas. If redundancy is needed use fuel oil or electric. Provide equipment schedule and piping schematics for installation.
2. Provide access for service of equipment in accordance with manufacturer recommendations.
3. Conform to ASHRAE 15, Safety Code for Mechanical Refrigeration, when designing a boiler installation.
4. Equipment is to have the minimum efficiency to meet the ANSI/ ASHRAE Standard 90.1 adopted by the state.
5. Conform to Alabama State Boiler and Pressure Vessel Safety Act [http://www.alalabor.state.al.us/new\\_boiler.htm](http://www.alalabor.state.al.us/new_boiler.htm). Some unique requirements are:
  - A. Contractor is required to obtain and display an installation permit.
  - B. The Owner is required to obtain an operating permit.
  - C. Regulators and boilers must be vented to the exterior.
  - D. Boiler Rooms are required to have a “kill” switch by the door.
6. Design for Cleaning/Flushing

Design system (include appropriate connections, etc.) such that, during construction, pipe cleaning and flushing can be conducted without contamination of the boiler. Design shall require provision of conical startup strainers at the boiler inlets and fine mesh pump startup strainers. Design shall incorporate temporary bypasses of heating coils to avoid fouling coils during flushing and cleaning.

#### B. Products

1. Boilers
  - A. General Notes
    - 1) Boilers shall come with low water cutoff (manual reset), dual aqua stat high limit control with manual reset, remote aqua stat, outside air reset, gas cock, gas pressure regulator, 100% flame safeguard with manual reset, pressure relief valve, full shut off valve and control panel.



- 2) Where applicable add domestic tube bundle heat exchanger.
  - 3) Outside air reset for non-condensing boilers shall be: 160°F water when outside air is 90°F, to 180°F water when outside air is 10°F.
  - 4) No aluminum heat exchangers
  - 5) Boiler treatment for new systems to match campus standard water treatment.
- B. Building Heat
- 1) Condensing Boilers (preferred basis of design) to be manufactured by:
    - a. KN Series by Hydro Therm
    - b. Knight by Lochinvar
    - c. Fusion by RBI
  - 2) Non-Condensing Copper Fin Boilers to be manufactured by:
    - a. Lochinvar
    - b. Laars Heating Systems
    - c. RBI Dominator – Horizontal Style
    - d. RBI Futura – Vertical Style
- C. Energy Plant (or where boiler capacity exceeds 100 horsepower)
- 1) Flex Tube Boilers to be:
    - a. Bryan
    - b. Clever-Brooks
    - c. Hurst
  - 2) Fire tube with independent combustion and air controls hot water and steam boilers (preferred basis of design) to be:
    - a. Clever-Brooks
    - b. Muira
    - c. Hurst
    - d. Superior
  - 3) Water Tube to be:
    - a. Clever-Brooks



- b. Muira
- c. Hurst
- d. Superior
- e. Bryan

## 2. Furnace

- A. Condensing Furnace (preferred basis of design) to be:
  - 1) Carrier
  - 2) Rheem
  - 3) Trane.
- B. Furnace shall come with control relay for air conditioning.
- C. Furnace shall come with high static pressure blower.
- D. Heat exchangers shall have a minimum of 20 year warranty.
- E. Heat exchangers to be stainless steel.

## 3. Water Heaters

- A. Hot Water Heaters for Domestic Use
  - 1) Water Heaters shall come with low water cutoff (manual reset), dual aqua stat high limit control with manual reset, remote aqua stat, outside air reset, gas cock, gas pressure regulator, 100% flame safeguard with manual reset, pressure relief valve, full shut off valve and control panel.
  - 2) Water Heaters to be (or approved equal):
    - a. RBI
    - b. Lochinvar
- B. Tank Type Water Heaters
  - 1) Residential – Standard Gas Fired High Efficiency (preferred basis of design) to be:
    - a. Lochinvar
    - b. Rheem
    - c. Ruud

- 2) Commercial – Standard Gas Fired High Efficiency (preferred basis of design) to be:
  - a. Lochinvar
  - b. Rheem
  - c. Ruud
  - d. Electric allowed only upon approval
- C. Instantaneous Water Heaters are not allowed. Use small electric tank type when necessary.
4. Components
  - A. Expansion tanks
    - 1) Must be bladder type
    - 2) No tanks larger than 320 gallons
    - 3) Have ASME stamp if required by state
  - B. Relief Valves
  - C. Backflow Prevention Valves

### **C. Execution**

1. Provide temperature, pressure gauges, and expansion tank for boilers and water heaters.
2. Provide factory start up for boilers and water heaters. If start up is in off-season, provide for return of factory technician when weather is appropriate.
  - A. Copy of the completed manufacturer's startup checklist
  - B. University of Alabama notification and witnessing of the startup
3. Provide owner training of a minimum of 4 hours for each boiler type.

- End -

