

23 50 00 – Central Heating Equipment

1. Introduction

- A. Steam Boilers at two interconnected Central Steam Plants supply steam to both Duke University and Duke Medical Center. Any boiler addition to a central plant requires a significant and thorough effort on the part of the Designer and Duke Utilities and Engineering Services (DUES) and such a project is too complex to be covered under this section.
- B. Standalone steam or hot-water boilers for satellite buildings may be selected for heating only if central steam or hot water service is not available or if project conditions otherwise prohibit connection to the steam or hot water utility systems. A full life-cycle cost analysis should be undertaken should this be a project requirement. Designers must coordinate with Duke FMD - DUES on any project requiring a boiler installation, regardless of heat input or output rating.
- C. Building heating with direct-fired furnaces or electric heat pumps is generally discouraged. Exemptions from this Standard may be granted if project economics dictate. Designers may also reference Design Standard Section 23 70 00 – Heating, Ventilation, and Air Conditioning Systems for information regarding split-system air conditioner/furnace and heat pumps.
- D. Designers should coordinate with and DUES on all phases of projects requiring installation of new boilers or furnaces.
- E. All equipment must be supported directly by structural members with adequate load-bearing capacity and material integrity, using appropriate anchoring/connection hardware. Under no circumstances may equipment be supported by connections to finish materials. For example, equipment hung from toggle bolts through plaster-on-lath, gypsum board or ACT ceilings is **not acceptable**.

2. References

- A. ASME Boiler and Pressure Vessel Code, Section I
- B. ASME Boiler and Pressure Vessel Code, Section IV
- C. ASME Building Services Piping Code, B31.9
- D. ASME Pipe and Fittings Codes, B16

3. Design Standards

- A. Minimum standards for residential and light commercial packaged-type boilers are listed below:

1. Boilers:
 - a. Natural gas should be considered the primary fuel for all direct-fired boilers. In certain situations where a backup fuel is required, No. 2 fuel oil may be considered.
 - b. All packaged boilers must have a minimum rated efficiency of 80% AFUE.
 - c. Packaged boilers should be equipped with flue-gas economizers if available in the desired size range.
- B. Furnaces:
 1. Natural gas should be considered the primary fuel for all direct-fired furnaces. In certain situations where a backup fuel is required, No. 2 fuel oil may be considered.
 2. All furnaces must have minimum rated efficiency of 95% AFUE.
4. Documentation and Review Requirements
 - A. Provide Life-Cycle Cost Analysis for boiler selection and system design.
 - B. Provide estimated energy loss calculation for all distribution piping.
5. Installation and Performance Requirements
 - A. Confirm installation responsibilities at outset of project. Installation services will be provided in-house or contracted out.
 - B. Coordinate all required tie-in points with DUES.
 - C. Coordinate all commissioning efforts with DUES.