

22 34 00 – Fuel Fired Domestic Water Heaters

DIVISION 22 - Plumbing



STATEMENT OF PURPOSE & BACKGROUND

- Scope:
 - Selection and installation of complete domestic gas fired hot water heating system.
- Statement of goals:
 - Provide a high quality water heating system with:
 - Adequate heating rate
 - Sufficient stored volume
 - Appropriate level of energy efficiency
 - A safe, code-compliant installation
 - An innocuous, easily serviceable installation
- Revision history of section:
 - 10/11/2011 (date of adoption)
 - 01/29/2020
 - 10/28/2022

SELECTION AND APPLICATION CRITERIA

| Application | Selection | Notes |
|--|---|------------------|
| Intermittent, moderate water use, average size school | High efficiency, condensing; conventional glass lined vertical steel tank; 100 gallon storage; 200,000 Btu/hour heat input; bottom burner; cathodic protection; electronic ignition; non-continuous pilot; automatic flue damper; design per ANSI Z-21.10.3 | > 80% efficiency |
| Continuous, higher flow rate, larger school | High efficiency; condensing; conventional glass lined vertical steel tank; storage volume & heat input per site requirements; top or side burner; cathodic protection; digitally controlled combustion system; direct vented; design per ANSI Z-21.10.3 | > 90% efficiency |
| | | |

OUTLINE SPECIFICATION

- Part 1 General
 - Design criteria:
 - Justification for added cost for a high-efficiency heater: A 5-year payback justifies. 10-year payback less certain. Payback calc.: Typical 1000person school; use rate 2 gallons of 120° F hot water heated from 55°F per day per person; 185 school days per year; fuel cost 1 cent per 1000 Btu; difference in heater thermal efficiency (including standby loss) 98% vs. 80%. Operating cost difference: \$459/year [= (1/.8-1/.98)*(0.75 gallon/day person)*(120°F-55°F) *(1000person) *(185day/year) *(8.33lb/gallon)*(1Btu/lb °F)*(\$0.01/1000Btu)]. For extra cost of \$3000 the payback would be \$3000 / (\$459/year) = 6.5 years.

- Venting considerations: High efficiency heaters can be direct vented through a sidewall, which can be beneficial where venting an ordinary heater through a roof would be difficult. Sometimes sidewall venting is not an advantage. Vent ports can diminish the visual appeal of a facade. In winter, combustion product condensate can accumulate and freeze near a port and the mist is often perceived as unpleasant. The ports of some units are noisy. High efficiency heaters cannot be vented with readily available metallic duct.
- Part 2 Products
 - Acceptable Manufacturer(s):
 - Bradford White
 - Typical model number: Bradford White “Energy Saver” series EF-60T-199E-3N for typical elementary school
 - For typical kitchen use: Bradford White EF-100T-250E-3N. The maximum size for a kitchen or general high school in this series is model number 120T-300E-3N.
 - For greater capacity, use Bradford White “Brute” model and storage tank when necessary or required.
 - Laars
 - U.H.E. Ultra High Efficiency
 - Equivalent manufacturers **approved, in writing, in advance, by the Architect/Engineer and Owner**, may be substituted in accordance with the provisions of the Contract.
- Part 3 Execution
 - Per Consultant and per manufacturer specification.
 - Avoid placement in corrosive atmospheres, e.g. pool tunnels.
 - Careful consideration required for placement of sidewall vent ports for high efficiency heaters.
 - Serviceability: Locate heater to allow easy access.

End of Section