



Guide Specification

Model FT-A _____

BTU/Hr Input _____ Fired _____

Fulton Fuel-Fired Thermal Fluid Heat Transfer Systems

Section I. General Description

Contractor shall furnish and install a _____ fired _____ BTU/Hr. thermal fluid heat transfer system. The system shall be "Fulton" as manufactured by Fulton Thermal Corporation, Pulaski, New York.

The system shall be a complete package including a vertical fuel fired design type heater; combination expansion deaerator thermal buffer tank to allow for expansion of thermal fluid during heat up to operating temperature and to prevent oxidation of the thermal fluid during operation, even when tank is vented to atmosphere; for operating temperatures up to 600°F complete with instrumentation and controls as specified in Section III. Flanged inlet shall be located at bottom of the unit and the outlet shall be located at the top of the unit.

Section II. Heater Size and Operating Temperature

The heater net input shall not exceed _____ BTU/Hr. while producing a minimum of _____ BTU/Hr. output as measured at the thermal fluid outlet. The heater shall be supplied complete with control panel and all required safety devices for a maximum operating temperature of _____°F (standard 600°F max). It shall have a flow rate of _____ GPM and a motor voltage of _____ with a control voltage of _____.

Section III. Heater Design

The heater shall be of a vertical finned annular type and the pressure vessel shall be constructed of carbon steel ASME SA-53B, SA-106B, SA-285C and SA-516 GR 70 or equal, with a design pressure of 150 PSI (trimmed to 100 PSI) standard at 700°F. Test pressure will be per ASME Code Section VIII Division I and shall bear the ASME stamp*.

The heater shall be insulated with 4" of density packed insulating concrete and surrounded with a steel jacket. It shall be completely factory piped, wired and tested. Thermal efficiency shall be 80% or higher on fuel LHV.

The following instrumentation/controls/safety devices shall be supplied as a minimum requirement**:

- A. High temperature safety switch with interlock on the outlet of the heater for shutdown and alarm signal at terminal strip – UE
- B. Heater operation interlock with circulation pump.
- C. Low differential pressure switch to shut down the pump and heater due to a low flow condition -- U.E.
- D. Thermal fluid temperature control -Yokogawa
- E. High System Pressure Switch for Complete Shutdown (outlet) – Danfoss.
- F. Low System Pressure Switch for Complete Shutdown (inlet) – Danfoss.
- G. Expansion Tank Low Level Switch for Shutdown Square D
- H. Heater Outlet Pressure Gauge -by Fulton
- I. Heater Inlet Pressure Gauge -by Fulton
- J. Pump Supply (Vacuum) Gauge -by Fulton
- K. Flame safety relay - Honeywell (on/off)***
- L. Magnetic starters for burner and pump motors
- M. Three Position Selector Switch: Off/Pump On/Heater On
- N. Four Indicating Lights:
 - 1. Pressure & Flow
 - 2. Pilot
 - 3. Main Flame
 - 4. Alarm
- O. ASME Certified Safety Relief Valve – Kunkle Model 910
- P. Non-Fused Disconnect
- Q. Single Power Connection Switch

*Units may be built to ASME Code Section I upon request.

** Controls/instrumentation brands may be different for NEMA 4 or hazardous duty applications.

*** Modulated gas burners use a Siemens flame safety relay.

Section IV. Burner

The burner shall be manufactured and matched to the heater by the heater manufacturer to fully assure single source system responsibility. The burner shall be forced draft and shall be an integral part of the heater, but designed for easy removal and cleaning of the burner. Burner control method shall be On/Off, or modulation. Burner control shall be completely automatic, including flame supervision, fluid flow monitoring, and heater cycling.

All controls to be panel mounted and so located on the boiler as to provide ease of servicing the burner and boiler without disturbing the controls; and also located to prevent possible damage by water, fuel or heat of combustion gases. Controls connected to water or fuel shall be installed outside the main boiler control panel.

All controls shall be mounted and wired according to Underwriters' Laboratories requirements. Electric current supply 120 volts, 60 cycle single phase.

Section V. Combination Expansion/Deaerator Thermal Buffer Tank Size

The combination expansion/deaerator thermal buffer tank shall have _____gallon capacity and be supplied complete with liquid level switch. It shall be suitable for a maximum total system fluid content of _____gallons, including heater and expansion/deaerator tank capacities (based on a _____% expansion rate of the hot oil - to be verified by the client and safety controls to the correct settings).

Section VI. Combination Expansion/Deaerator Thermal Buffer Tank Design

The combination expansion/deaerator thermal buffer tank will be constructed of carbon steel. It shall be supplied with expansion tank liquid level switch and 300# ANSI flanged connections. The tank may be built to ASME Code Section VIII Division I upon request.

Section VII. Thermal Fluid Circulating Pump Size

The thermal fluid circulating pump shall be air cooled with mechanical seal design for 650°F maximum operating temperature, _____GPM at _____PSI, _____HP motor, RPM motor, complete with motor starter, _____voltage.

Section VIII. Thermal Fluid Circulating Pump Design

The thermal fluid circulating pump shall be of centrifugal design, with a mechanical seal air cooled for temperatures up to 650°F or water cooled for operating temperatures above 650°F and shall be supplied complete with motor starter for proper motor HP, voltage and cycles.

Section IX. Tests

- A. Shall include a hydrostatic test of the pressure vessel in the presence of an inspector having a National Board Commission. Inspector shall certify a Data Report which shall be delivered with the heater as evidence of ASME Code compliance. In addition to ASME symbol, the heater shall bear a National Board Registration Number.
- B. Full electrical checks will be performed including testing of all controls and circuitry.
- C. Test fire with combustion check.

Section X. Operating Manual

- A. Instructions for installation, operation, and maintenance of the heat transfer system shall be contained in a manual provided with each unit.
- B. A complete wiring diagram, corresponding to the equipment supplied, shall be part of the manual and one shall also be affixed to the inside of the heater's panel box.



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