

**Typical Specification for Lochinvar<sup>®</sup> Copper-Fin<sup>2®</sup> Commercial Heater for Pool Applications  
Models 500,000 – 2,072,000 Btu/hr**

The **POOL HEATER** shall be a **LOCHINVAR COPPER-FIN II** Model **CP(N,L)**\_\_\_\_\_ having an input rating of \_\_\_\_\_ Btu/hr, and shall be operated on (Natural Gas) (L.P. Gas).

The water containing section shall be of a "Fin Tube" design, with straight copper tubes having extruded integral fins spaced seven (7) fins per inch. The tubes shall terminate into a one piece, lined, cast iron header. There shall be no bolts, gaskets or "O" rings in the head configuration. There shall be access to the front header of the heat exchanger for the purposes of inspection, cleaning or repair. The heat exchanger shall be mounted in a stress free jacket assembly in order to provide a "free floating design" able to withstand the effects of thermal shock. The **HEATER** shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. The complete heat exchanger assembly shall carry a five (5) year warranty.

The combustion chamber shall be sealed and completely enclosed with Loch-Heat<sup>™</sup> ceramic fiberboard insulation. A burner/flame observation port shall be provided on each end of the unit. The burners shall be constructed of a high temperature stainless steel and fire on a horizontal plane. The **HEATER** shall have a multi-speed combustion air blower to precisely control the fuel/air mixture for maximum efficiency.

The **HEATER** shall be constructed with a heavy gauge galvanized steel jacket assembly, primed and pre-painted on both sides with a minimum dry film thickness of 0.70 mils. The jacket design shall allow single unit venting connection without the use of external draft hood devices.

The **HEATER** shall be certified and listed by CSA International under the latest edition of ANSI Z21.56/CSA4.7 standard. The **HEATER** shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard. The **HEATER** shall operate at thermal efficiency 85%.

The **HEATER** shall be furnished with a factory supplied pumped by-pass assembly to ensure proper operation without condensation. The by-pass assembly shall include a sealed all bronze pump suitable for outdoor installation. The by-pass assembly shall be constructed of schedule 80 CPVC piping with brass inserts and an automatic three-way valve to protect the unit against inlet water temperatures that would cause the heat exchanger to condense. Instructions for proper setup and operation of the by-pass will be supplied with the **HEATER**.

The **HEATER** shall be equipped with an Electronic Integrated Control Module with a microprocessor-based platform incorporating software customized for operation of the Lochinvar Copper-Fin II. All internal safety, operating and ignition controls shall be included in the electronic integrated control module. The electronic integrated control module shall provide on/off control of the gas supply to the burner, operation of the combustion air blower, ignition of the gas-air mixture, flame proving, control of water temperature set points, and monitoring of all safety functions. Modbus protocol (optional).

The **HEATER** shall feature the "Smart System" control with a 2-line, 16 character LCD display, password security, pump delay with freeze protection, pump exercise and PC port connection. The **HEATER** shall allow 0-10 VDC input connection for BMS control and have built-in "Cascade" to sequence and rotate while maintaining stage firing of up to eight **HEATERS** without utilization of an external controller. Supply voltage shall be 120 volt / 60 hertz / single phase.

Local communication, programming and a display of operating and alarm status conditions shall be accessible through the Smart System control panel. The Smart System control panel shall contain an on/off main power switch, a digital display of a temperature functions, the operational status of the **HEATER**, or an active alarm fault. Data points visible in the digital display include inlet water temperature, outlet water temperature, water temperature differential, percent firing rate, setpoint temperatures, setpoint differential, minimum temperature, maximum temperature and maximum reset temperature. Operational status shall be displayed for Off, Standby, Pre-purge, Ignition, Pool and/or Spa Water Heating, and Post-purge.

Fault status shall be provided for high limit, gas pressure (optional), low water, blocked drain, louver proving, and air pressure switch status.

The standard operating control system shall include redundant proven pilot Hot Surface Ignition with full flame monitoring capability. Multiple main gas valves with redundant valve seats and built in low gas pressure regulators shall be supplied as standard. Gas valves will be referenced to the combustion chamber to ensure proper air/gas mixture for efficient combustion.

Additional standard controls shall include a water pressure switch, blocked flue pressure switch, low air pressure switch for each fan, low voltage transformer for the control circuit, 7 amp circuit breaker for 24 VAC control circuit, ASME temperature and pressure relief valve and flow switch. The manufacturer shall verify proper operation of the burners, all controls and the heat exchanger by connection to water and venting for a factory fire test prior to shipping. A quality test report shall be shipped with each unit.

A 24 VAC control circuit and components shall be used. All components shall be easily accessed and serviceable. All components shall have multi-pin plug in type connectors to ease service, troubleshooting and lower removal and replacement cost.

The **HEATER** shall be approved for indoor or outdoor installation. The **HEATER** shall be approved for Sidewall, DirectAire® Vertical, DirectAire Vertical with Sidewall Air Inlet, DirectAire Horizontal, Aire-Lock™ Direct Vent and conventional venting (See mechanical detail). Venting shall be classified Category I, negative draft, non-condensing, to use type "B" double wall venting materials. Direct Vent installations require the use of AL29-4C vent materials.

The **HEATER** shall have an independent laboratory rating for Oxides of Nitrogen (NO<sub>x</sub>) of less than 20 ppm corrected to 3% O<sub>2</sub>.

Maximum unit dimensions shall be: Length \_\_\_\_\_ inches, Width \_\_\_\_\_ inches and Height \_\_\_\_\_ inches. Maximum unit weight shall be \_\_\_\_\_ pounds.

The Firing Control System shall be \_\_\_\_\_ (Options Below). Prefix "M" denotes staged Module Firing.

#### **FIRING CONTROL SYSTEMS**

**M-9 Two Stage Hot Surface Ignition** with Electronic Supervision (Standard)

**M-7 California Code**

**M-13 CSD1 / Factory Mutual / GE Gap**