

Typical Specification for Lochinvar[®] Knight Heating Boiler
Models 80,000 - 285,000 Btu/Hr

The **BOILER** shall be a **LOCHINVAR KNIGHT** Model **KB(N,L)** 211 having a modulating input rating of 42,000 Btu/Hr, an output of 210,000 Btu/Hr and shall be operated on (Natural Gas) (L.P. Gas). The **BOILER** shall be capable of full modulation, firing down to 20% of rated input with a turndown ratio of 5:1.

The **BOILER** shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. There shall be no banding material, bolts, gaskets or "O" rings in the header configuration. The 316L stainless steel combustion chamber shall be designed to drain condensation to the bottom of the heat exchanger assembly. A built-in trap shall allow condensation to drain from the heat exchanger assembly. The complete heat exchanger assembly shall carry a twelve (12) year limited warranty.

The **BOILER** shall be certified and listed by C.S.A. International under the latest edition of the harmonized ANSI Z21.13 test standard for the U.S. and Canada. The **BOILER** shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard and the minimum efficiency requirements of the latest edition of the ASHRAE 103 Standard. The **BOILER** shall meet U.S. Environmental Protection Agency and Department of Energy guidelines for "Energy Star" efficiency. The **BOILER** shall operate at a minimum of 95% Annual Fuel Utilization Efficiency. The **BOILER** shall be certified for indoor installation. The **BOILER's** AFUE shall be verified through third party testing by the Hydronics Institute Division of AHRI and listed in the AHRI Certification Directory.

The **BOILER** shall be constructed with a heavy gauge steel jacket assembly, primed and pre-painted on both sides. The combustion chamber shall be sealed and completely enclosed, independent of the outer jacket assembly, so that integrity of the outer jacket does not affect a proper seal. A burner/flame observation port shall be provided. The burner shall be a premix design and constructed of high temperature stainless steel with a woven metal fiber outer covering to provide modulating firing rates. The **BOILER** shall be supplied with a gas valve designed with negative pressure regulation and be equipped with a variable speed blower system, to precisely control the fuel/air mixture to provide modulating boiler firing rates for maximum efficiency. The **BOILER** shall operate in a safe condition at a derated output with gas supply pressures as low as 4 inches of water column. The **BOILER** shall be equipped with leveling legs.

The **BOILER** shall utilize a 24 VAC control circuit and components. The control system shall have an electronic display for boiler set-up, boiler status, and boiler diagnostics. All components shall be easily accessed and serviceable from the front and top of the jacket. The **BOILER** shall be equipped with; a temperature/pressure gauge, high limit temperature control certified to UL353, ASME certified pressure relief valve, outlet water temperature sensor, return water temperature sensor, a UL 353 certified flue temperature sensor, outdoor air sensor, low water flow protection and built-in adjustable freeze protection.

The **BOILER** shall feature the "Smart System" control with a Multi-Colored Graphic LCD display with Navigation Dial and Soft Keys for, password security, three loop temperature setpoints with individual outdoor air reset curves, pump delay with adjustable freeze protection, pump exercise, domestic hot water prioritization with DHW modulation limiting and USB PC port connection. The **BOILER** shall be capable of controlling a variable speed boiler pump to keep a constant Delta T at all modulation rates. The **BOILER** shall have the capability to accept a 0-10 VDC input connection for BMS control of modulation or setpoint, enable/disable of the boiler, variable system pump signal and a 0-10VDC output of boiler modulation rate. The Boiler shall have a built-in "Cascade" with sequencing options for "lead lag" or "efficiency optimized" modulation logic, with both capable of rotation while maintaining modulation of up to eight boilers without utilization of an external controller. The Boiler shall be capable of communicating with Copper-Fin II, Crest and Knight Boilers of different inputs in a hybrid system to maximize efficiency and turndown without the need for a third party control. Supply voltage shall be 120 volt / 60 hertz / single phase.

The **BOILER** shall be equipped with two terminal strips for electrical connection. A low voltage connection board with 42 data points for safety and operating controls, i.e., Auxiliary Relay, Auxiliary Proving Switch, Alarm