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| **Typical Specification** |
| **PBXT-SPEC-03** |

**Typical** **Specification** **for Lochinvar®** **Power-Fin®** **Boiler**

***Models******2,500,000 - 5,000,000******Btu/Hr***

The **BOILER** shall be a **LOCHINVAR** **POWER‑FIN** Model **PB(N,L)\_\_\_\_\_\_\_** having an input rating of **\_\_\_\_\_\_\_\_\_** Btu/Hr, an output of **\_\_\_\_\_\_\_\_\_** Btu/Hr and shall be operated on (Natural Gas) (LP Gas).

The water containing section shall consist of a heat exchanger constructed of a "Fin Tube" design, with straight copper tubes having extruded integral fins spaced seven (7) fins per inch. These tubes shall be "rolled" securely into glass-lined, cast iron headers. There shall be no bolts, gaskets or "O" rings in the head configuration. Removable access plugs shall be provided on the heat exchanger headers for the purposes of inspection, cleaning or repair. Boiler drains shall be provided, having external access. 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 **BOILER** 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 ten (10) year limited warranty against failure caused by defective workmanship or material.

The **BOILER’S** combustion chamber shall be constructed of stainless steel and sealed for combustion employing the Lochinvar power burner concept. The single burner shall be a premix design constructed of high temperature stainless steel with a woven Fecralloy outer covering to provide modulating firing rates. The **BOILER** shall operate must be capable of firing from 20 percent up to 100 percent of rated input when supplied with 4 inches water column of inlet gas pressure for a turndown ratio of 5:1. The burner flame shall be ignited by direct spark ignition with flame monitoring via a flame sensor. A viewing port shall be provided, permitting visual observation of burner operation.

The **BOILER** shall use a combustion air blower, utilizing pulse width modulation, to draw a precise mixture of fuel and air into the combustion chamber for maximum efficiency. The combustion air blower shall operate for a pre‑purge period before burner ignition and a post‑purge period after burner operation to clear the combustion chamber. The **BOILER** shall be equipped with a replaceable combustion air filter to protect the blower and burner from contaminants and debris.

The **BOILER** shall incorporate a gas train consisting of a pre-mix gas valve to supply gas and combustion air in exact proportions to allow burner input to vary based on load. The pre-mix gas valve shall perform the functions of safety shutoff, constant pressure regulation and air/gas ratio control. Full closing of the valve seat shall occur in less than 0.8 seconds when the valve is de-energized.

The **BOILER** standard control system shall include a direct spark ignition system with full flame monitoring capability and a built-in low gas pressure regulator. A 24 VAC control circuit and components shall be used. All components shall be easily accessed and serviceable from the front and top of the unit. Standard operating controls shall utilize a return water temperature sensor, an outlet water temperature sensor and a flue temperature sensor for the Smart System control module. An adjustable immersion type, manual reset safety high limit shall be provided to limit water temperature.

The **BOILER** shall be constructed with an 18 gauge pre-painted steel jacket assembly. All inner jacket panels shall be fully gasketed and sealed. The jacket assembly shall be primed and pre-painted on both sides. All models shall be certified for installation on combustible floors without additional safety provisions. The **BOILER** shall be suitable for installation with zero clearance from combustible material on the left and right side.

The **BOILER’S** standard construction shall include a flow switch to prove water flow, temperature-pressure gauge, downstream test valve and a factory installed ASME pressure relief valve. Standard controls shall include manual reset high limit, pump control for dedicated boiler pump, system pump and DHW prioritization pump (where applied). Standard construction shall include terminal strips for supply voltage connection, pump control connection, contacts for any failure, contacts for air louvers and run time contacts. The manufacturer shall verify proper operation of the burners, all controls and the heat exchanger by connection to gas, water and venting for a full factory fire test.

The **BOILER** shall feature the “SMART TOUCH™” control which is standard and factory installed with an 8” liquid crystal touch screen display, password security, outdoor air reset, pump delay with freeze protection, pump exercise, ramp delay featuring six steps, domestic hot water prioritization with limiting capabilities and PC port connection. A secondary control that is field mounted outside or inside the appliance is not acceptable. The **BOILER** shall have alarm contacts for any failure, runtime contacts and data logging of runtime at given modulation rates, ignition attempts and ignition failures. The **BOILER** shall have a built-in “Cascade” to sequence and rotate while maintaining modulation of up to eight boilers of different Btu inputs without utilization of an external controller. The internal “Cascade” function shall be capable of lead-lag, efficiency optimization, front-end loading, and rotation of lead boiler every 24 hours. The **BOILER** shall have an optional BACnet MSTP / Modbus communication protocol with a minimum 55 readable points and an optional gateway device which will allow integration with LON or BACnet (IP) protocols.

The **BOILER** shall be equipped with two terminal strips for electrical connection. A low voltage connection board with 30 data points for safety and operating controls, i.e., Alarm Contacts, Runtime Contacts, Louver Proving Switch, Tank Thermostat, Remote Enable/Disable, System Supply Sensor, Outdoor Sensor, Tank Sensor, Modbus Building Management System signal and Cascade control circuit. A high voltage terminal strip shall be provided for Supply voltage. Supply voltage shall be 240V/1PH/60Hz (PB2500 – PB3000), 208V/3PH/60Hz (PB3500 – PB4000) and 480V/3PH/60Hz (PB5000). Optional transformers are available for 208V/3PH/60Hz, 480V/3PH/60Hz and 600V/3PH/60Hz. The high voltage terminal strip plus integral relays are provided for independent pump control of the System pump, the Boiler pump and the Domestic Hot Water pump.

The **BOILER** shall be installed and vented with a (select one):

**(a) Direct Vent** **system with horizontal sidewall termination** of both the exhaust vent and combustion air. The flue shall be Category IV approved AL29-4C Stainless Steel sealed vent material terminating at the sidewall with the manufacturer’s specified vent termination. A separate pipe shall supply combustion air directly to the boiler from the outside. The air inlet pipe must be sealed and may be other materials listed in the Installation manual. The boiler’s total combined air intake length shall not exceed 100 equivalent feet. The boiler’s total combined exhaust venting length shall not exceed 100 equivalent feet. The air inlet must terminate on the same sidewall as the exhaust.

**(b) Direct Vent** **system with vertical roof top termination** of both the exhaust vent and combustion air. The flue shall be Category IV approved AL29-4C Stainless Steel sealed vent material terminating at the rooftop with the manufacturer’s specified vent termination. A separate pipe shall supply combustion air directly to the boiler from the outside. The air inlet pipe must be sealed and may be other materials listed in the Installation manual. The boiler’s total combined air intake length shall not exceed 100 equivalent feet. The boiler’s total combined exhaust venting length shall not exceed 100 equivalent feet. The air inlet must terminate on the rooftop with the exhaust.

**(c) Vent** **system with Vertical rooftop or Horizontal sidewall exhaust** with the combustion air intake in different pressure zones. The flue shall be Category IV approved AL29-4C Stainless Steel sealed vent material terminating at the rooftop or sidewall with the manufacturer’s specified vent termination. A separate pipe shall supply combustion air directly to the boiler from the outside in a different pressure zone from that of the exhaust vent. The air inlet pipe must be sealed and may be other materials listed in the Installation manual. The boiler’s total combined air intake length shall not exceed 100 equivalent feet. The boiler’s total combined exhaust venting length shall not exceed 100 equivalent feet.

**(d) Vertical rooftop or Horizontal sidewall exhaust** with the combustion air drawn from the equipment room. The flue shall be Category IV approved AL29-4C Stainless Steel sealed vent material. The boiler’s total exhaust venting length shall not exceed 100 equivalent feet. Combustion air draw from the equipment room shall be supplied with properly sized combustion and ventilation air openings based on NFPA requirements.

**(e) Common Vented** with multiple Power Fin boilers. The flue shall be Category IV approved PVC, CPVC, PP or Stainless Steel sealed vent material. The exhaust and air intake venting must use the exact diameter, length, placement, and terminations as specified by the designer.

**(f) Outdoor Installation** for the Power Fin boilers. The flue shall be Category IV approved AL29-4C Stainless Steel sealed vent material. The exhaust and air intake venting must use the exact diameter, length, placement, and terminations as specified by the designer.

The **BOILER** shall operate at altitudes up to 4,500 feet above sea level without additional parts or adjustments. High altitude operation shall be certified at a minimum of 4,500 feet above sea level by a 3rd party organization.

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. The **BOILER** shall operate at 87% AHRI thermal efficiency. The **BOILER** shall be certified for Oxides of Nitrogen (NOx) of less than 30 ppm corrected to 3% O2 by an independent laboratory.

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).

**M9 5:1 Modulating Firing with Hot Surface Ignition and Electronic Supervision (CAT II & IV)**

**M13 GE GAP (FM/IRI/CSD-1)**

**Note: Due to the large discrepancy in CSD-1 interpretations from state to state, please confirm to the factory all controls required in your jurisdiction.**

**OPTIONAL STATE CODE CONSTRUCTION**

The **BOILER** shall be constructed in accordance with \_\_\_\_\_\_ state requirements. (Options Below)

**M7 California Code**

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