

**Typical Specification for HTP
Elite VWH Hot Water Supply Boiler
Models: 80 / 110 / 150 / 220 / 299 / 399**

The Elite VWH shall be an HTP model _____ having a modulation input range of _____ Btu/Hr, an output of _____ Btu/Hr, and shall operate on either Natural or LP gas. The Elite VWH shall be capable of full modulation firing down to 20% of rated input with a turndown ratio of 5:1.

The boiler shall be a high efficiency condensing unit that meets or exceeds 94% thermal efficiency, test and certify to AFUE standards, and exceed ASHRAE/103-93 minimum efficiency requirements. The boiler shall be constructed in accordance with the ANSI Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers, ANSI Z21.13b-1994, Canadian National Standard CGA-4.9-1999.26UB, UL/ULC (file #MH27745) listed and be in accordance with all codes and authorities having jurisdiction. The boiler shall bear the ASME "H" stamp for working pressure of 160psi and shall be National Board listed.

The boiler heat exchanger and combustion shell shall be constructed entirely of 316L stainless steel. The combustion shell shall be designed to collect condensation in the back of the heat exchanger section. The condensate is discharged by gravity from the rear of the boiler down to a condensate collection trap with an accessible clean out. Condensate shall be directed outside or to a drain via a minimum 3/4" plastic tube at a 1/4" per foot slope away from the boiler (larger diameter pipe may be necessary for longer lengths). If condensate is directed to a drain, a condensate neutralizer (p/n 7450-212) must be utilized. If proper boiler condensate grade is not obtainable, a condensate pump must be installed to elevate condensate to proper grade to drain.

The heat exchanger tubes shall be rolled and formed in a helical pattern in a wet base design. The heat exchanger tubes shall be watertight and welded securely to the stainless steel headers to ASME standards.

The boiler shall be a sealed combustion system operating on Natural or LP gas, with a modulating power burner and positive pressure discharge. The exhaust shall be piped with plastic PVC, CPVC schedule 40, 80 solid, non-foam core; or Category IV approved stainless steel. (**NOTE: Foam core pipe is not an approved exhaust venting material.**) Approved intake venting materials are PVC, CPVC, PVC DWV, UL listed PVC-Cellular foam, UL listed "B" vent and UL listed galvanized vent. The boiler shall be approved for both direct-horizontal venting as well as vertical venting. The exhaust shall maintain a minimum of 1/4" per foot slope toward boiler to control condensate and rainwater. All related intake/exhaust piping shall be approved for zero clearance to any combustible surface. All boilers should run at combustion efficiency no less than 96%. The combustion heat exchanger block shall be secured in a structural steel frame and powder-coated steel enclosure. All components shall be located in the front of the boiler for access of serviceability. The total combined equivalent venting length, inclusive of elbows and fittings, shall not exceed 200' in 3" or 275' in 4" pipe for boilers with 80,000, 110,000, 150,000, 220,000 Btu inputs; shall not exceed 200' in 4" pipe size or 275' in 6" for boilers of 299,000 or 399,000 Btu inputs.

The boiler shall be supplied with combination fitting on the supply (heater outlet) which incorporates many connection points for a temperature and pressure gauge, flow switch, manual reset, and low water cut-off probe. The boiler shall have connection size of 1" for the 80, 110, 150, and 220 models, 1 1/4" for the 299 model, and 1 1/2" for the 399 model.

Gas supply shall be 3/4" inside diameter for the Elite 80, 110, and 150 models, and 1" for Elite 220 and 399 models. Refer to gas piping sizing chart if larger sizes are required due to long distances and/or competing gas appliances.

The operation of the boiler shall be in an open-loop pressurized system. The boiler should be directly connected to a storage unit which shall have properly sized thermal expansion tank(s) or meet local codes. All boiler models will be supplied with an ASME rated 150psi relief valve.

The boiler requires minimum flow space. Zero clearance to combustibles. 24" service clearance in the front is

recommended.

The blower motor shall have permanently lubricated, sealed ball bearings with inherent overload protection.

The electrical system shall conform to National Electrical Code requirements. The internal control circuit shall be 24 volts AC, wire, and must be in accordance with NEC Class II requirements. The control circuit wire shall not be smaller than 18 AWG. Each wire shall end with a service loop and be securely fastened by an approved method. Each wire in the unit shall be marked or color coded for ease of service tracing. All electrically actuated components shall be easily accessible from the front of the unit without reaching over exposed high voltage components or rotating parts. The blower motor shall have thermal and short circuit protection. External line voltage and 24 volt control circuit wiring to the unit shall be routed in separate bundles.

The boiler shall include integral digital operating controls to govern all operations and energy input. The control utilizes an algorithm to fully adjust the firing rate while maintaining desired output temperatures. Controls shall be integrated solid-state temperature and spark ignition control with integral diagnostics. A service disconnect switch shall be factory installed on the exterior of the boiler. Boiler shall include factory installed control sensors on the boiler water inlet and outlet connections. The boiler shall include the 926 intelligent control system with digital LED display to show status and fault indications. The boiler shall have two RJ-45 jacks for cascade communication bus wiring using field installed CAT3 or CAT5 cables, enabling the integral 926 control to lead lag and stage up to 8 boilers.

The boiler shall be able to accept a BMS 0-10 vdc input to control boiler output temperatures.

The control shall have an adjustable differential with setting range from 5-30°F, with an operating range of 68°F-190°F. The display interface shall have a resettable ECO switch button. The control shall utilize an algorithm to fully adjust the firing rate while maintaining the desired output temperature.

The pre-mix high grade inconel burner shall be coupled to the fan, which shall have a low-voltage direct current drive motor with pulse relay counting, which controls the fan speed and combustion air volumes. The gas valve with venturi system shall provide a one-to-one ratio of controlled measured volumes of fuel to air throughout the burner.

The controller shall consist of a main circuit board with power supply transformer and provide the following functions:

- Power supply unit for voltage supply of controller
- Micro-controller for controlling and monitoring the boiler
- Analog sensor connections (temperature sensors)
- Operator interface, 2 line 20 character display interface
- Self-diagnostic controls which monitor all interlocks and provide fault information on the display.
- A computer interconnection port for clear data viewing and downloading to a PC

The manufacturer shall verify proper operation of the burner, all controls and heat exchanger prior to shipping.

The boiler shall operate at altitudes up to 4500 feet above sea level without additional parts or adjustment. Maximum unit dimensions shall be length _____ inches, width _____ inches and height _____ inches. Maximum unit weight shall be _____ pounds.

NOTE: Due to variations in CSD-1 requirements from state to state, please consult with the factory for all controls required in your jurisdiction.