

**Typical Specification for Heat Transfer
MOD CON VWH Hot Water Supply Boiler**
Models: 300,000, 500,000 AND 850,000 Btu/Hr

Guide Specification Sheet
MOD-CON VWH
HOT WATER SUPPLY BOILER

The **BOILER** shall be a **Heat Transfer** Model _____ having a modulating input rating of _____ Btu/Hr, an output of _____ Btu / Hr and shall be operated on Natural Gas or L.P. Gas. The **BOILER** shall be capable of full modulation firing down to 20% of rated input with a turn down ratio of 5:1.

The boiler shall be high efficiency condensing units that meet or exceed an efficiency of 94% Thermal Efficiency tested and certified to AFUE standards, and exceed ASHRAE /103-93 minimum efficiency requirements. The boiler shall be constructed in accordance with 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 160 psi 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 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"/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 7350P-611) must be utilized. If boiler condensate proper grade is not obtainable, a condensate pump must be installed to elevate condensate to proper grade to drain.

The Heat Exchanger Tubes containing water shall be rolled and formed in a helical pattern in a wet base design The heat exchanger tubes shall be water tight and welded securely to the stainless steel headers to ASME standards.

The boiler shall be a sealed combustion system of natural or liquid propane gas-fueled with a modulating power burner and positive pressure discharge. The exhaust shall be piped with a Minimum 4" Plastic PVC, CPVC schedule 40, 80 solid, Non Foam Core; or Category IV approved Stainless Steel . The approved intake venting material 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"/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 block shall be secured in a structural steel frame and powder coated steel enclosure. All components shall be located in the front of the heater for access of serviceability. The boiler's total combined equivalent venting length, inclusive of elbows and fittings, shall not exceed 200' in 4" or 275' in 6" pipe for boilers 300,000 and 500,000 BTU inputs; shall not exceed 200' in 6" pipe size or 275' in 8" for boilers of 850,000 BTU inputs.

The boiler shall have a Supply and Return of 1-1/2" for Mod Con 300 and 2" for the Mod Con 500 and 850.

Gas supply shall be a 1.25" inside diameter for the Mod Con 300, 1-1/2" for the Mod Con 500 and 2" for the Mod Con 850 built with a CSD-1 compliant gas train. Refer gas piping sizing chart if larger sizes are required due to long distances and other gas competing gas appliances.

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

The boilers shall require minimum floor space. Zero clearance from combustibles, and 24" service clearance in the front is recommended.

The boilers are capable of directly stacking one like boiler on top of another, utilizing built-in flanges to securely couple the boilers together.

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

ELECTRICAL SYSTEM

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.

CONTROL

The heating unit shall include integral digital operating controls to govern all operations and energy input. The Mod Con 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 connections inlet and outlet. The boiler shall include the 926 Intelligent Control system with digital LED display to show status and fault indication. The boiler shall have two RJ-45 jacks for cascade communication bus wiring using field installed CAT3 or CAT 5 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 degree F, with an operating range of 68° F -190° F. The display interface shall have a reset-able 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 through-out the burner.

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

- Power supply unit for voltage supply of controller.
- Micro-controller for controlling and monitoring the boiler unit
- Analog sensor connections (temperature sensors)
- Operator interface, mounted remotely including LED display and push buttons
- Control shall include Self-diagnostic controls which monitor all interlocks and provide fault information provided on the display. In addition, a computer inter-connection port for clear data viewing and downloading to a PC.

The boiler shall be factory assembled and fire tested to determine the correct operating parameters such as combustion tests and pressure testing.

The **BOILER** shall operate at altitudes above 4,500 feet sea level without requiring additional parts or adjustments.

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

Note: Due to the variations in CSD-1 requirements from state to state. You must follow state and local codes where required.