

# Rheos Pump-Mounted Water Heater

Model RHCV 1200-2400 Indoor/Outdoor

## Specification

Date: Bid Date:  
Project #: Location:  
Project Name: Engineer:  
Contractor: Prepared By:

Contractor shall supply and install Qty.: Laars Model No. RHCV\_ water heater(s).

The water heater shall be a Laars Rheos Model RHCV\_\_\_\_, modulating, sealed combustion, Category IV (condensing) water heater with a modulating input and output rate as shown on the schedule, with a recovery rate of \_\_\_\_\_gph (\_\_\_\_L/hr) for a 100°F (56°C) water temperature rise. The water heater shall have a combustion efficiency of 87%.

The water heater shall be design certified to comply with the current edition of the Harmonized ANSI Z21.10.3 / CSA 4.3 Standard for Gas-Fired Water Heaters. The water heater shall be designed and constructed in accordance with the ASME Boiler & Pressure Vessel Code, Section IV requirements for 160 psi (1103 kPa) working pressure.

The water heater shall be capable of normal operation and full input with supply gas pressure as low as 4" w.c. Water heater shall automatically compensate for large fluctuations of gas supply pressure between 4" w.c. and 13" w.c.

The water tube heat exchanger shall be a vertical round design, with 7/8" (22mm) inner diameter integral finned copper tubes. The tubes shall be rolled directly into lined ASME headers rated for 160 psi (1103 kPa) working pressure. All waterways shall be non-ferrous. The heat exchangers shall be a low water volume design. All gaskets shall be non-metallic, and separated from the combustion chamber by at least 3.5" (89mm) to eliminate deterioration from heat. Headers shall have covers permitting visual inspection and cleaning of all internal surfaces.

The piping side header shall have threaded nipples to facilitate maintenance and permit removal of complete heat exchanger for service or replacement.

The heat exchanger shall be removable from the unit, without excessive disassembly of the heater's combustion chamber.

The water heater shall use a proven hot surface ignition with a 15 second pre-purge cycle to clear the venturi assembly and combustion chamber. The water heater shall start in low fire, and remain in low fire for 15-seconds at the start of each cycle. The water heater shall be 120V, single phase, 20A.

The burner shall be cylindrical type with woven metal fiber to provide a cleaner, more complete fuel combustion and low Nox emission, not exceeding 10 PPM.

The water heater shall come complete with an inline mounted pump sized to provide the correct water heater flow rate for the heater and 30 ft. (9.1 m) of full sized piping. Each unit shall be furnished with an EM<sup>2</sup> energy management monitor relay and pump timer. The timer shall be a high quality solid state electronic device. The device shall be user adjustable from 0.1 to 10 minutes for continued pump circulation after the call for heat has been satisfied, to remove residual heat from the unit.

The combustion chamber jacket shall be compact, utilizing a lightweight alumina-silica insulation tile board rated to 2200°F (1204°C). The outer jacket shall be a unitized shell finished with acrylic thermo-set paint baked at a temperature not less than 325°F (163°C).

The frame shall be constructed of 2" x 2" x 11 gauge box steel. The flue collector shall be constructed of 10 gauge steel for strength and durability. The jacket shall have access panels on each side of the heater, to facilitate inspection and service of internal components.

The water heater shall have a forced draft design that is capable of precisely mixing the air and gas to achieve a minimum 90% steady-state combustion efficiency. The heater shall employ a pre-mix fan that is approved for use with flammable gas and air mixtures. The air intake will use single-wall galvanized steel pipe, 24 gauge minimum, to a maximum of 50 linear feet with a maximum of 5 elbows. The heater shall be designed for vertical venting or for horizontal direct venting applications using stainless steel vent. Venting applications will use type AL29-4C stainless steel pipe to a maximum of 50 linear feet with a maximum of 5 elbows. The venting configuration for direct combustion air and/or direct exhaust shall be installed using the Laars optional vent connector(s.)

The water heater gas train shall be for modulating firing and shall consist of a safety gas valve and a gas-air ratio control valve that precisely controls the air and gas mixture, and enables the heater to modulate, to closely match heat load conditions.

The water heater shall be provided with an integral, washable combustion air filter. The air filter shall provide 83% arrestance to protect the burner and blower from debris. The air filter shall be constructed out of open cell polyurethane foam. The air filter shall be mounted in the heater, and shall be intended for permanent use in the unit, (not only for the construction phase of the project).

The heater shall be built with a selector switch which enables the user to choose between the unit's mounted modulation control and a labeled terminal strip for connection to an external 0-10VDC control source (such as a building automation system or multiple heater control). The water heater shall have dry alarm contacts for ignition failure, and shall have the following diagnostic lights: Amber light to indicate power on; Amber light to indicate a call for heat; Amber light to indicate that the unit is in pre-purge; Green light to indicate that the main gas valve has been energized; Red light to indicate ignition failure.

The water heater shall include, as standard equipment, the following controls and trim:

- Pump, mounted and wired
- Flow Switch
- Electronic Low Water Cut-Off complete with test light and manual reset button
- Manual reset high limit
- High gas pressure switch
- Low gas pressure switch
- Air pressure switch
- Pump time delay
- Selector switch for internal or external (0-10VDC) control
- Low-fire start time delay
- 75 psi (517 kPa) ASME rated Pressure relief valve
- Temperature and pressure gauge