

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

Brute

Volume Water Heater

Models BNTV 1000 & 1200
Indoor/Outdoor



Specification

Contractor shall supply and install Qty.: _____ Bradford White Model No. BNTV _____ modulating water heater(s).

The heater shall be a Bradford White, Brute, Model BNTV _____ rated at _____ BTU/hr input and _____ BTU/hr output. The heater shall modulate 10-100% of full fire. The unit(s) shall be design-certified to comply with the current edition of the Harmonized ANSI Z21.10.3 / CSA 4.3 Standard for Gas Water Heaters. The unit(s) shall be designed and constructed in accordance with the ASME Heater & Pressure Vessel Code, Section IV requirements for 160 psi (1103 kPa) maximum working pressure, and shall bear the ASME "H" Stamp and be listed by the National Board.

The heater shall be listed with AHRI (Air Conditioning, Heating and Refrigeration Institute). The heater shall have a minimum thermal efficiency of 95.0%.

The unit(s) shall be constructed to comply with the efficiency requirements of the latest edition of ASHRAE Standard 90.1.

The heater shall be certified for placement indoors and outdoors, where freezing conditions do not exist.

The heater shall be equipped with an ASME certified pressure relief valve set at 125psi (861 kPa). Optional pressure relief valves with settings of 30psi (207kPa), 50psi (345 kPa), 60psi (413 kPa), 75psi (517 kPa) or 150psi (1034 kPa) shall be available.

The water tube heat exchanger shall be stainless steel, rated for 160 psi (1103 kPa) working pressure. The heat exchanger shall be a low water volume design, welded construction, with no gaskets, o-rings or bolts in the header. The heater shall be fully condensing design with built-in condensate drain and trap. The heat exchanger shall have a limited five-year warranty.

Each heater shall be fully test fired, (with water, gas, and venting connected), and all safety components tested, at the factory.

The heater shall be sealed combustion. The heater jacket shall be a unitized shell finished with acrylic thermo-set paint baked at not less than 325°F (163°C). The frame shall be constructed of galvanized steel for strength and protection. Chamber shall include a sight glass for viewing flame. Heater sides and back shall be certified for zero clearance to combustible surfaces.

Heater shall operate on 4-13" w.c. gas pressure, and shall need no component changes to operate at high altitude, up to 10,000 feet.

The heater shall use a premix burner with a stainless steel woven metal fiber wrap, and a negative pressure gas valve to burn cleanly, with NOx emissions not exceeding 10ppm. The heater shall meet the emissions requirements of SCAQMD 2012.

The heater shall be designed for vertical or horizontal Category IV venting, up to 100 equivalent feet, with 6" diameter PVC, CPVC, polypropylene or stainless steel vent material.

Air may be taken from the room, or ducted directly to the heater using up to 100 equivalent feet of 6" diameter of ABS, PVC, CPVC or galvanized pipe.

The heater shall be a trio heat exchanger design, with two controls and two burners. One control shall be designated as the primary control, and shall operate the other control on the heater, such that the user only makes changes to one control on the heater.

The heater control shall be an integrated electronic PID temperature and ignition control with large touchscreen and color display and shall control the heater operation and firing rate. The heater display shall be visible without the removal of any jacket panels or control panels.

The control shall have the ability to control the domestic water pump, with a time delay and exercise feature.

The control shall easily allow the user to force the heater into minimum or maximum firing rate, for setup and diagnostic purposes, and shall have a cleaning mode that allows the user to wipe the screen without activating any functions from the touchscreen.

The control shall have dry alarm contacts for ignition failure. The control shall monitor flue gas temperature and shall stop the heater from firing if temperature is excessive.

Allowable control adjustments shall include: heater temperature setpoint; domestic water temperature setpoint; automatic high limit: °F or °C display; DHW setpoint for time of day input; DHW PID gain parameters; manual firing rate control; pump delay time; pump exercise interval; automatic remote signal detection; anti-shortcycle feature enable/disable.

The control shall have installer-level password, and verification feature to ensure that safety-related parameters are not altered by mistake.

The control shall be able to cascade and lead-lag with other Brute (models 1000 & 1200) controllers, for a total of four Brutes (models 1000 & 1200), without additional system controllers.

The burners shall be controlled to keep each one in the lowest firing rate possible, based on system demand, to maximize efficiency. For example, in multiple heater systems, the master control shall choose to bring on all heaters at low firing rates, instead of one heater at a high rate, to meet the system needs.

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A control that is chosen as master in a system with multiple controllers shall display an icon of each of the controls that it is controlling. The color of the icon shall indicate if the control is in normal operation, in lockout, in standby mode, in a hold state, or if there is a communication error. In addition to adjustable parameters, the master display shall also be able to show information about the following for each heater it is monitoring:

- domestic hot water
- burner control
- demand and modulation
- inlet temperature
- fan
- domestic water pump
- flame detection
- statistics
- stack limit

The control shall graphically depict the firing rate of each burner in the heater, and/or each burner in the system, if the controller is the master of other BNTV heaters in a multiple heater system.

The control shall have the ability to accept a 4-20mA or 0-10VDC input connection from an external control or building automation system, to modulate the flame.

The controller shall be able to send information through a modbus connection, including (but not limited to) inlet and outlet water temperatures, stack temperature, DHW temperature, status of sensors, fan speed, setpoints, remote control input, burner status, lockout codes, alarm reasons, domestic water pump status.

Control diagnostics shall include, at a minimum, the following: ignition failure, grounded flame rod, safety chain interrupt, heater high limit exceeded, domestic water high limit exceeded, temperature rise limit exceeded, stack limit exceeded, pressure sensor fault, combustion pressure fault, blocked air intake, sensor errors (open or shorted), 24VAC voltage low or high, modulation fault, pump fault, AC input phases reversed, and fan speed proving rate failure.

The control shall have a clock with a battery backup and will allow the user to access the burner run time, and cycle counts for the burner and DHW pump.

The control shall differentiate between a lockout, a hold, or an alert. If an issue occurs, the system will display a brief description of the issue on the control screen. The user shall be able to tap the display to be presented with a more detailed explanation of the issue.

Standard features shall include:

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| • High condensing efficiency | • Vent temperature cutoff feature | • Large user-interface and color display |
| • Modulation down to 10% of full fire (10:1 turndown) | • Direct spark ignition system | • Alarm output |
| • Sealed combustion chamber | • Sensor for domestic water tank | • Accepts external 4-20mA modulation control (0-10V with optional converter) |
| • Pre-mix stainless steel burner | • Stainless steel heat exchanger with welded construction (no gaskets) | • Built-in cascade function for up to four Brutes (models 1000 & 1200). |
| • Low NOx system exceeds the most stringent regulations for air quality - less than 10ppm NOx | • 160 psi maximum working pressure | • On/off toggle switch |
| • Horizontal or vertical direct vent | • ASME "H" stamp | • Manual reset high limit |
| • Horizontal vent and air terminals | • 125 psi (861 kPa) ASME rated pressure relief valve | • Burner site glass |
| • Vent and air pipe lengths of up to 100 equivalent feet (each) | • Temperature & pressure gauge | • Zero clearance to combustible surfaces |
| • Built-in condensate trap | • Drain valve | • 5-Year limited warranty |
| | • Water flow switch | |
| | • Electronic PID modulating control | |



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