

Brute

Water Heater with Pump

BNTV 150 - 500 Indoor



Specification

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

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 20-100% 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 Boiler & 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 unit(s) shall be constructed to comply with the efficiency requirements of the latest edition of ASHRAE Standard 90.1. The water heater shall have minimum thermal efficiencies of:

Size	150	199	285	399	500
Thermal Efficiency	95%	97%	95%	96%	96%

The heater shall be equipped with an ASME certified pressure relief valve set at 125psi (861kPa). 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 heater shall meet the standards of US Public Law 111-380, Reduction of Lead in Drinking Water Act (CA AB-1953, VT S152, LA Act 362 and MD HB 372) and NSF/ANSI-61 requirements.

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. Heat exchanger shall be accessible for visual inspection and cleaning of all surfaces of the flue side of the heat exchanger. 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, and removal of jacket panels shall not affect the combustion seal. 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 shall be certified for zero clearance to combustible surfaces.

All water, gas, vent and air connections shall be on the top of the heater, and the top jacket panels shall be split, such that they are removable without disconnecting the water, gas, vent or air pipes.

The heater shall be shipped with a pump that has conduit, wiring and terminals wired to the pump. The heater shall have a flanged inlet water connection that allows the pump to be connected directly to the top of the heater in the field. The pump shall be capable of serving the heater's heat exchanger and 30 feet of piping that is the same size as the heater's water connections, with a normal number of pipe fittings.

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 3" diameter PVC, CPVC 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 3" diameter ABS, PVC, CPVC or galvanized pipe. The heater shall be shipped with PVC sidewall vent and air terminals, for use with horizontal systems. The first section of CPVC vent pipe shall be shipped with each heater.

Unit shall be 120VAC, single phase, 7 Amps (including pump) for connection to a 15A breaker. The control circuit shall be 24VAC.

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.

When a display or control is field-replaced, the device shall have the ability to read parameter setpoints from the original set-up, so the system does not have to be re-programmed.

The control shall have the ability to control the heater pump with delay features. The control shall be able to cascade and lead-lag with other Brute controllers, without additional system controllers.

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

The control shall have the ability to recognize a domestic water sensor or closure from a tank stat on the same terminals. The heater shall be shipped with the domestic water heater sensor, as standard equipment.

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 control shall have dry alarm contacts for ignition failure.

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.

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The control shall be able to cascade and lead-lag with other Brute controllers, for a total of eight Brute heaters, without additional system controllers.

The heaters 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.

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.

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:

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

The control shall graphically depict the firing rate of each burner in system, if the controller is the master of other Brute 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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| • Electronic PID modulating control with large color touchscreen display | • Low NOx system exceeds the most stringent regulations for air quality - less than 10ppm NOx | • Water flow switch (399-850 only) |
| • Password-protected parameters for installer use | • Horizontal or vertical direct vent | • Temperature & pressure gauge |
| • Test feature allows forced min or max firing | • Horizontal vent and air terminals | • Drain valve |
| • Complete diagnostics for analog and digital inputs | • Vent and air pipe lengths of up to 100 equivalent feet (each) | • Integrated PID temperature and ignition controls |
| • Displays holds, alerts and errors in clear text form | • Built-in condensate trap | • Alarm output |
| • Dray alarm contacts for ignition failure | • Vent temperature cutoff feature | • Accepts external 4-20mA (0-10V with optional convertor) modulation signal |
| • High condensing efficiency | • Direct spark ignition system | • On/off toggle switch |
| • Modulation down to 20% of full fire (5:1 turndown) | • Sensor for domestic water tank | • Manual reset high limit |
| • Sealed combustion chamber | • 160 psi maximum working pressure | • Burner site glass |
| • Pre-mix stainless steel burner | • Stainless steel heat exchanger with welded construction (no gaskets) | • Zero clearance to combustible surfaces |
| | • ASME "H" stamp | • Built-in cascade function for multiple units, up to 8 total. |
| | • 125 psi (861 kPa) ASME rated pressure relief valve | • 8 year limited heat exchanger warranty |



200 Lafayette St.
Middleville, MI 49333
Warranty: (800) 531-2111

www.BradfordWhite.com

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