

Date: Bid Date:

Project #: Location:

Project Name: Engineer:

Contractor: Prepared By:

# Brute Boiler with Pump

BNTH 080 - 285 Indoor



## Specification

Contractor shall supply and install Qty.: \_\_\_\_\_ Bradford White Model No. BNTH\_\_\_\_\_modulating boiler(s) with pump(s).

The boiler shall be a Bradford White, Brute, Model BNTH\_\_\_\_\_rated at the input and output shown on the schedule. The boiler shall modulate 20-100% of full fire. The unit(s) shall be design-certified to comply with the current edition of the Harmonized ANSI Z21.13 / CSA 4.9 Standard for Gas-Fired Low Pressure Steam and Hot Water Boilers. The unit(s) shall be designed and constructed in accordance with the ASME Boiler & Pressure Vessel Code, Section IV requirements for maximum working pressure of 30 psi (207 kPa) (models 80-210) or 160 psi (1103 kPa) (model 285), 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 boiler shall be equipped with an ASME certified pressure relief valve set at 30psi (207kPa) (models 80-210) or 75 psi (517 kPa) (model 285).

The boiler shall be listed with the U.S. Department of Energy as an Energy Star appliance. The boiler shall be listed with AHRI (Air Conditioning, Heating and Refrigeration Institute). The boiler shall have a minimum AFUE of 95%.

The water tube heat exchanger shall be stainless steel. 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 internal surfaces. The boiler shall be fully condensing design with built-in condensate drain and trap. The heat exchanger shall have a limited twelve-year warranty.

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

The boiler shall be sealed combustion, and removal of jacket panels shall not affect the combustion seal. The boiler 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. Boiler shall be certified for zero clearance to combustible surfaces.

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

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

Boiler 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 boiler 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 boiler shall meet the emissions requirements of SCAQMD 2012.

The boiler shall be designed for vertical or horizontal Category IV venting:

- Models 80-105: Up to 40 equivalent feet with 2" diameter PVC, CPVC or stainless steel vent material, or up to 100 equivalent feet, with 3" diameter PVC, CPVC or stainless steel vent material.
- Models 150-210: Up to 100 equivalent feet with 3" diameter PVC, CPVC or stainless steel vent material.
- Model 285: Up to 100 equivalent feet with 4" diameter PVC, CPVC or stainless steel vent material.

Air may be taken from the room, or ducted directly to the boiler:

- Models 80-105: Up to 40 equivalent feet with 2" diameter ABS, PVC, CPVC or galvanized pipe or up to 100 equivalent feet of 3" diameter ABS, PVC, CPVC or galvanized pipe.
- Models 150-210: Up to 100 equivalent feet of 3" diameter ABS, PVC, CPVC or galvanized pipe.
- Model 285: Up to 100 equivalent feet of 4" diameter ABS, PVC, CPVC or galvanized pipe.

The boiler 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 boiler.

Unit shall be 120VAC, single phase, less than 6 Amps (including mounted pump) for connection to a 15A breaker. The control circuit shall be 24VAC.

The boiler control shall be an integrated electronic PID temperature and ignition control with LCD and touchpad and shall control the boiler operation and firing rate. The control shall have three menu structures for user mode, set-up mode, and diagnostic model. The boiler 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.

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The control shall have the ability to control the boiler pump, system pump, and indirect domestic water pump, each with delay features. The control shall be able to cascade and lead-lag with other Brute controllers, without additional system controllers. An optional display that is full-color, high definition LCD with touch-screen shall be available, to allow for additional communication ports.

The control shall have the ability to integrate indirect domestic water heating with the boiler system. The control shall have domestic hot water priority, and shall have the ability to recognize a domestic water sensor or closure from a tank stat on the same terminals. The boiler shall be shipped with the domestic water heater sensor, as standard equipment.

The control shall have built-in outdoor reset feature with customizable reset curves, based on the outdoor temperature and desired system water temperature. The boiler shall be shipped with the outdoor reset 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.

The control shall monitor flue gas temperature and shall stop the boiler from firing if temperature is excessive.

The control shall have a display button that allows a user to choose one of six menus, including: Login; Display Setup; Quick Start; Advanced Setup; Test' Diagnostics. The display button shall be active at all times, regardless of what menu the control is showing. Login shall allow an installer to adjust password-protected parameters.

A Display Setup menu shall allow the user to adjust the LCD contrast, and to customize the display's homescreen. The user shall be able to choose five of the following parameters to display on the homescreen – system setpoint, operating temperature, outlet temperature, outlet temperature, inlet temperature, outdoor temperature, boiler temperature rise (delta T), lead-lag operating temperature, lead-lag system setpoint, fan speed, flame signal, firing rate, domestic water temperature, stack temperature, and 4-20mA input level. The homescreen shall also indicate the boiler name, what firing state the boiler is in, if there is a demand on the boiler, if the system is in password-level status, and shall show any holds, alerts, or lockouts that are present. The homescreen shall be accessible at any time by pressing a homescreen button on the display.

A Quick Start menu shall present only the select few parameters that are needed for a simple, single boiler installation.

The Advanced Setup menu shall give the installer access to all adjustable parameters, for more complex installations, including; all lead-lag set up parameters, boiler high limit, boiler temperature setpoint and on/off differentials, domestic water temperature setpoint and on/off differentials, domestic water priority time, boiler stack temperature limit, pump delay and exercise values for all pumps controlled, PID parameters, outdoor reset selection, low boiler setpoint temperature (for outdoor reset operation), boiler temperature at high outdoor temperature (for outdoor reset operation), boiler setpoint at low outdoor temperature (for outdoor reset operation), warm weather shutdown, automatic remote signal detection, anti-short-cycle feature adjustment, and °F or °C display.

The control shall have a Test menu that allows the user to force the boiler into minimum or maximum firing rate for 10 minutes, for set-up purposes. The test menu shall also allow the burner to be turned on or off, and the pumps to be set to on or auto, for testing purposes. The control shall show a count-down timer, enabling the user to see how much time is left for the test segment.

A Diagnostics menu shall allow the user to see analog inputs, digital inputs, and the history of alerts and lockouts. Analog inputs shall include – outlet temperature, inlet temperature, temperature rise (delta T), domestic water temperature, stack temperature, outdoor temperature, fan speed, flame signal, firing rate, 4-20mA input level, and system sensor temperature. Digital inputs shall include – main valve state, alarm status, demand status, safety chain status, and interlock status. The control shall display information about holds, alerts, and errors in both text form, and with codes numbers for further analysis.

*Standard features shall include:*

- High condensing efficiency
- Modulation down to 20% of full fire (5:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Low NOx system exceeds the most stringent regulations for air quality -10ppm NOx
- Horizontal or vertical direct vent
- Horizontal vent and air terminals
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- Built-in condensate trap
- Vent temperature cutoff
- Indirect water heater priority (sensor included)
- ASME heat exchanger
- Stainless steel heat exchanger with welded construction
- ASME "H" stamp
- Circulating pump with flanges and wiring harness for field mounting
- 30 psi (207 kPa) ASME rated pressure relief valve (285 has 75 psi)
- Temperature and pressure gauge
- Drain valve
- Multiple pump control for boiler pump, system pump and indirect domestic water pump, each with delay.
- Electronic PID modulating control
- Direct spark ignition
- Large user-interface and display
- Alarm output
- Accepts external (4-20mA or 0-10VDC) modulation signal
- Outdoor reset (sensor included)
- On/Off toggle switch
- Manual reset high limit
- Burner site glass
- Flue gas temperature cutoff
- Zero clearance to combustible surfaces
- 12-year limited warranty



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[www.BradfordWhite.com](http://www.BradfordWhite.com)

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