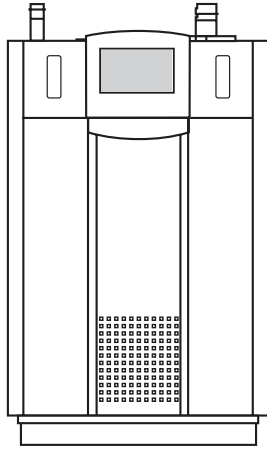


# Brute

# Hydronic Boiler

BNTH | Hydronic Boiler



Date:

Project #:

Engineer:

Prepared By:

Bid Date:

Indoor Sizes 399-850

## Submittal Data



Project Name:

Location:

Contractor:

## Standard Equipment

- Integrated PID temperature and ignition control with large color touchscreen display
- Password-protected parameters for installer use
- Test feature allows forced min or max firing
- Complete diagnostics for analog and digital inputs
- Displays holds, alerts and errors in clear text form
- Dry alarm contacts for ignition failure
- 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 - 10 ppm 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 feature
- Direct spark ignition system
- Indirect water heater priority
- Cascades with other Brutes.
- Sensor for indirect domestic water tank
- 160 psi maximum working pressure
- Stainless steel heat exchanger with welded construction (no gaskets)
- ASME "H" stamp
- 75 psi (517 kPa) ASME rated pressure relief valve
- Water flow switch
- Temperature & pressure gauge
- Drain valve
- Multiple pump control for boiler pump, system pump and indirect domestic water pump, each with delay
- Alarm output
- Accepts external 4-20mA (0-10V with optional converter) modulation signal
- Outdoor reset with customizable reset curves, domestic hot water override and warm weather shutdown
- Outdoor air temperature sensor
- On/off toggle switch
- Manual reset high limit
- Burner site glass
- Zero clearance to combustible surfaces
- 10-year limited warranty

## Boiler Data

Number of Units:

Fuel

- Natural  
 Propane

Pump Options

- Pump included  
 No pump

## Factory Mounted Options

- CSD-1 (covers FM & GAP) (500-850)
- Low water cutoff (500-850)
- High & Low gas pressure switches (500-850)
- Additional auto reset high limit
- 30 psi pressure relief valve
- 50 psi pressure relief valve
- 60 psi pressure relief valve
- 75 psi pressure relief valve (std)
- 125 psi pressure relief valve
- 150 psi pressure relief valve
- Bell for ignition failure



## Accessories for Field Mounting

- Low water cutoff
- 0 - 10V converter for modulation control
- High & Low gas pressure switches
- Boiler pump
- Concentric vent terminal, 3"
- Flush-mount terminal, 3"
- Flush-mount terminal, 4"
- Propane conversion kit
- Condensate neutralizer kit
- Variable Speed Pump Control
- BACnet gateway
- LON gateway
- Common vent kit (399-500, one required for each unit)

## Sizing Data

Model	Input		Output		Thermal Efficiency %	Comb. Efficiency %	Gas Conn. Size inches	Water Conn. Size inches	Lbs	Shipping Weight kg
	BTU/h	kW	BTU/h	kW						
<input type="checkbox"/> BNTH 399	<b>399,900</b>	117.2	<b>386,000</b>	113.1	96.5	96.5	¾ NPT	1¼ NPT	<b>364</b>	165
<input type="checkbox"/> BNTH 500	<b>500,000</b>	146.4	<b>475,000</b>	139.2	95.0	95.0	1 NPT	1½ NPT	<b>419</b>	190
<input type="checkbox"/> BNTH 600	<b>600,000</b>	175.7	<b>572,000</b>	167.6	95.3	96.0	1 NPT	1½ NPT	<b>426</b>	193
<input type="checkbox"/> BNTH 750	<b>750,000</b>	219.8	<b>724,000</b>	212.1	96.6	96.6	1½ NPT	2 NPT	<b>481</b>	218
<input type="checkbox"/> BNTH 850	<b>850,000</b>	248.9	<b>813,000</b>	238.2	95.7	95.7	1½ NPT	2 NPT	<b>503</b>	228

### NOTES:

For other boiler ratings:

Boiler Horsepower: HP =  $\frac{\text{Output}}{33,475}$

Radiation Surface: EDR sq. ft. =  $\frac{\text{Output}}{150}$

## Clearances

Appliance Surface	Suggested Service Access Clearance	
	inches	cm
Left Side	<b>1</b>	<b>2.5</b>
Right Side	<b>12</b>	<b>31</b>
Top	<b>24</b>	<b>61</b>
Back	<b>6</b>	<b>15</b>
Closet, Front	<b>1</b>	<b>2.5</b>
Alcove, Front	<b>24</b>	<b>61</b>
Vent	Per Vent Manufacturer	

Certified by CSA for zero clearance to combustible materials on all sides.

## Electrical Data

Boiler	Boiler Circuit		Boiler Pump Circuit*		
	399-500	600-850	399	500	600-850
Size MBH	399-500	600-850	399	500	600-850
Voltage	120V 1PH	120V 1PH	120V 1PH	120V 1PH	120V 1PH
FLA	< 4 Amps	5 Amps	< 4 Amps	6 Amps	12 Amps
MCA	< 4 Amps	6 Amps	5 Amps	8 Amps	15 Amps
MOP	5 Amps	11 Amps	8 Amps	14 Amps	27 Amps

FLA = Full Load Amperage

MCA = Minimum Circuit Ampacity

MOP = Maximum Over-current Protection

\* Note: For any pump(s) exceeding 7.4 FLA / 120V VAC, an external pump relay / contactor must be used. Units that are purchased with pumps include the contactor if the pump exceeds this limit.

## Vent System

Size	Intake (Air)	Exhaust (Vent)	Maximum Allowable	
	Pipe	Pipe	Equivalent Length*	
399	4"	4"	100 ft	30 m
500	4"	4"	100 ft	30 m
600	4"	4"	40 ft	12 m
	6"***	6"***	100 ft**	30 m**
750	4"	4"	40 ft	12 m
	6"	6"	100 ft	30 m
850	4"	4"	40 ft	12 m
	6"	6"	100 ft	30 m

Installations in the U.S. require exhaust vent pipe that is a combination of PVC & CPVC complying with ANSI/ASTM D1785 F441, polypropylene pipe that complies with ULC S636, or stainless steel complying with UL1738. Installations in Canada require exhaust vent pipe that is certified to ULC S636.

Intake (air) pipe may be ABS, PVC, CPVC or galvanized material.

Installer must comply fully with manufacturer's installation instructions, including use of minimum exhaust length CPVC, to maintain ANSI Z21.13 safety certification.

Closet and alcove installations do not allow the use of PVC under any circumstances

\* To calculate max equivalent length, measure the linear feet of the pipe, and add 5 feet (1.5m) for each elbow used.

\*\* Allowed only if the vent pipe is no more than 20 equivalent feet longer than the air pipe.

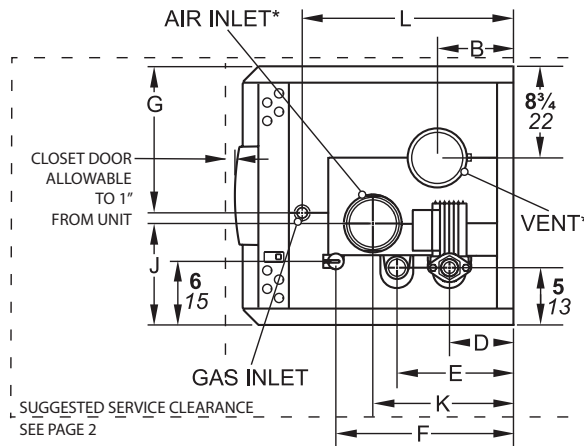
## Water Flow Requirements

Size	Temperature Rise in °F									
	20°F		30°F		40°F		50°F		60°F	
	Flow gpm	H/L feet	Flow gpm	H/L feet	Flow gpm	H/L feet	Flow gpm	H/L feet	Flow gpm	H/L feet
399	39.0	22.8	25.0	11.5	19.0	7.6	15.2	5.4	12.6	4.0
500	48.0	22.2	32.0	11.1	24.0	6.8	19.0	4.6	15.8	3.4
600	58.0	30.5	38.0	14.9	29.0	9.4	22.8	6.3	19.0	4.6
750	72.0	38.0	48.0	17.5	36.0	10.1	28.5	6.5	23.8	4.6
850	81.0	34.8	54.0	17.4	41.0	10.9	32.3	7.3	26.9	5.3

Size	Temperature Rise in °C									
	11°C		17°C		22°C		28°C		33°C	
	Flow lpm	H/L m	Flow lpm	H/L m	Flow lpm	H/L m	Flow lpm	H/L m	Flow lpm	H/L m
399	147.6	6.9	94.6	3.5	71.9	2.3	57.5	1.6	47.7	1.2
500	181.7	6.8	121.1	3.4	90.8	2.1	71.9	1.4	59.8	1.0
600	219.6	9.3	143.8	4.5	109.8	2.9	86.3	1.9	71.9	1.4
750	272.5	11.6	181.7	5.3	136.3	3.1	107.9	2.0	90.1	1.4
850	306.6	10.6	204.4	5.3	155.2	3.3	122.3	2.2	101.8	1.6

Note that pumps supplied with boilers are meant for primary-secondary piping systems, and are sized to serve the boiler and 30 feet of boiler loop piping with a typical number of fittings, for approximately 25-30°F temp rise across the boiler.

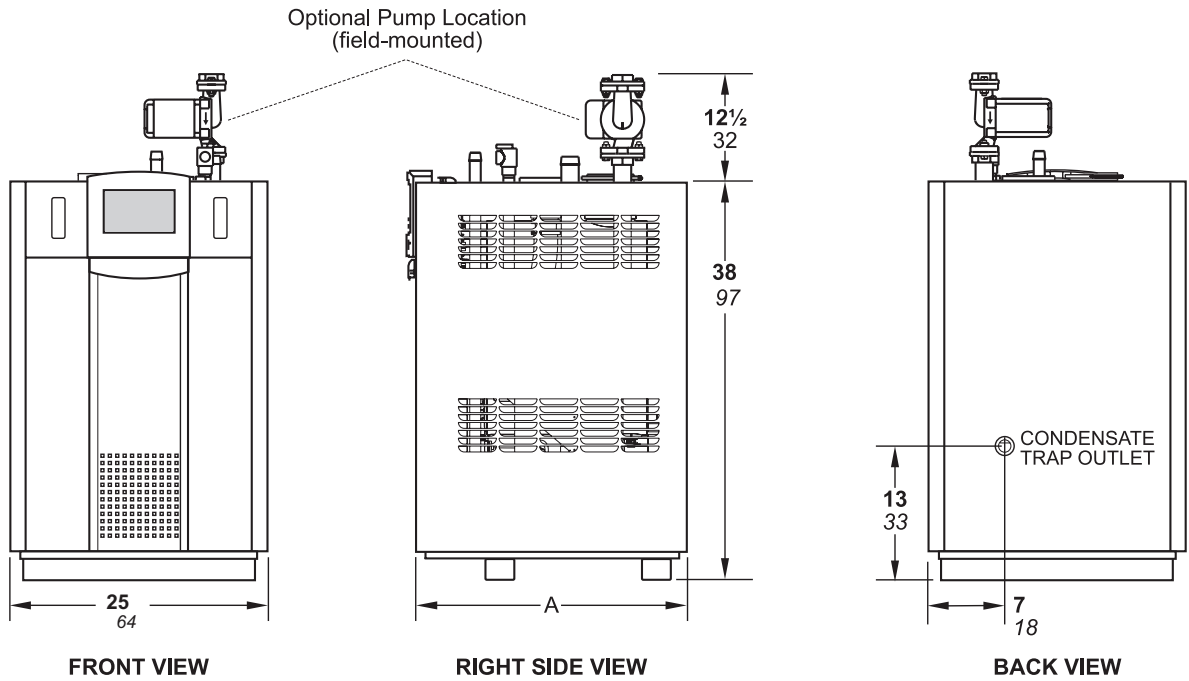
**Dimensional  
Data, Sizes  
399-500**



\*This unit is shipped with adapters for the air and vent that accept standard pipe of the proper size and type.

Dimensions shown in **inches**  
*cm.*

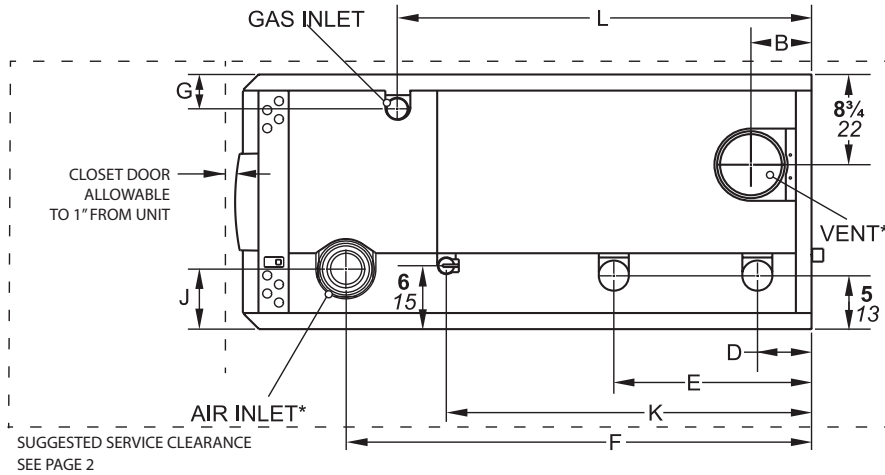
**TOP VIEW**



BNTH Size	A in	B in	D in	E in	F in	G in	J in	K in	L in	Ø AIR INLET* in	Ø VENT* in
399	31 1/2	5 1/4	4 1/4	14 1/2	21 1/2	19 1/4	8 3/4	18 1/2	25	4	4
500	37 3/4	5 1/4	4 1/4	15	26	20 1/2	5 3/4	20	27 1/4	4	4
	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>
399	80	13	11	37	55	49	21	47	64	11	11
500	96	13	11	38	66	52	15	51	69	11	11

Dimensions are nominal.

**Dimensional  
Data, Sizes  
600-850**

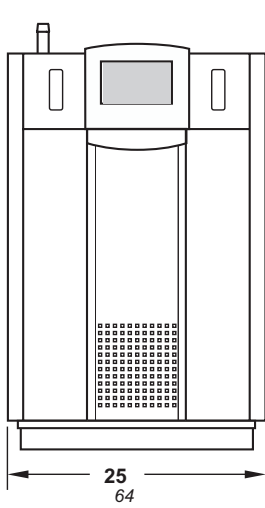


**TOP VIEW**

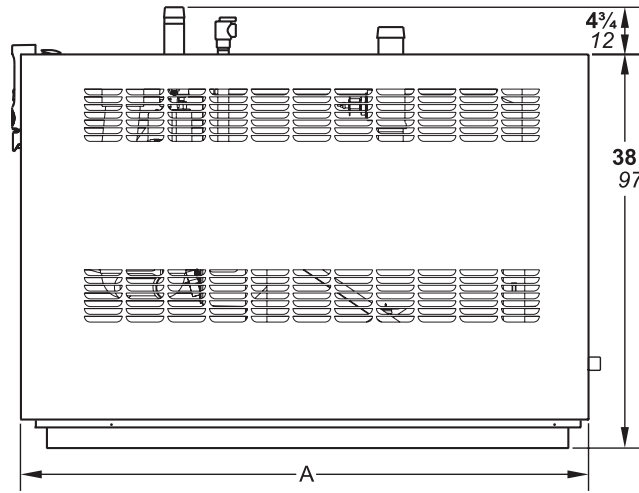
\*This unit is shipped with adapters for the air and vent that accept standard pipe of the proper size and type.

Dimensions shown in **inches**  
*cm.*

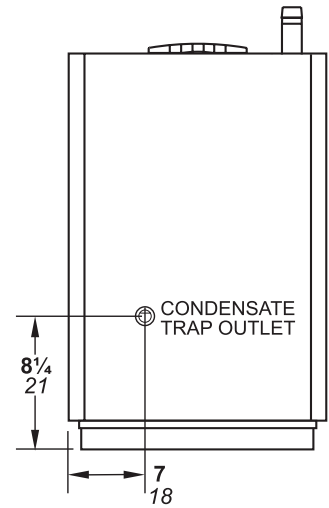
Optional pump is shipped loose and is not shown.



**FRONT VIEW**



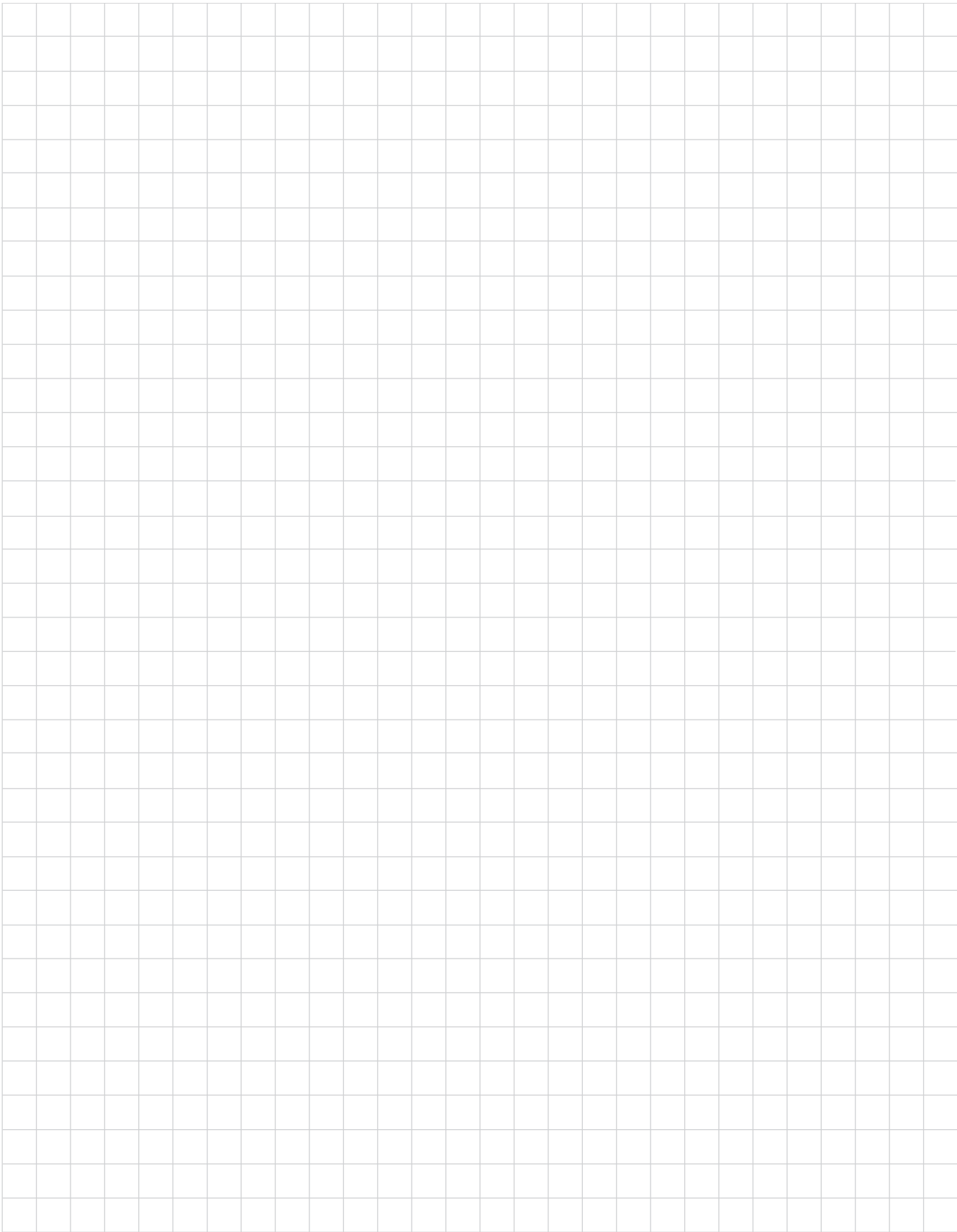
**RIGHT SIDE VIEW**



**BACK VIEW**

BNTH	A	B	D	E	F	G	J	K	L	AIR Ø INLET*	Ø VENT*
Size	in	in	in	in	in	in	in	in	in	in	in
600	37 <sup>3</sup> / <sub>4</sub>	5	4 <sup>1</sup> / <sub>4</sub>	15	20	3	5 <sup>3</sup> / <sub>4</sub>	26	29 <sup>3</sup> / <sub>4</sub>	4	4
750	51	6	5 <sup>1</sup> / <sub>4</sub>	19	40 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>4</sub>	30 <sup>1</sup> / <sub>2</sub>	35 <sup>1</sup> / <sub>2</sub>	4	6
850	55 <sup>1</sup> / <sub>4</sub>	6	5 <sup>1</sup> / <sub>4</sub>	19	44 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	5 <sup>3</sup> / <sub>4</sub>	35	39 <sup>3</sup> / <sub>4</sub>	4	6
	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cm</i>	<i>cc</i>	<i>cm</i>
600	96	13	11	38	51	8	15	66	76	11	11
750	130	13	13	48	103	8	15	77	90	11	17
850	140	13	13	48	113	9	15	89	101	11	17

Dimensions are nominal.



*Bradford White Corporation reserves the right to change specifications, components, features, or to discontinue products without notice.*



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