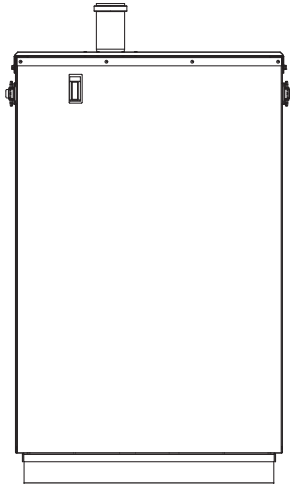


# Brute®



Date:

Project #:

Engineer:

Prepared By:

Bid Date:

# Volume Water Heater

BNTV | Volume Water Heater

**Outdoor Sizes 150-850**

## Submittal Data



Project Name:

Location:

Contractor:

## Standard Equipment

- Meets ANSI Z21.10.3-2013, section 5.24 wind test and section 5.30 rain test
- Electronic PID modulating 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 - less than 10ppm NOx
- Built-in condensate trap
- Vent temperature cutoff feature
- Direct spark ignition system
- Sensor for domestic water tank
- 160 psi maximum working pressure
- Stainless steel heat exchanger with welded construction (no gaskets)
- ASME "H" stamp
- Meets NSF/ANSI-372 Low Lead Content Certification (BNTV)
- 125 psi (861 kPa) ASME rated pressure relief valve
- Water flow switch (399-850 only)
- Temperature & pressure gauge
- Drain valve
- Integrated PID temperature and ignition controls
- Alarm output
- Accepts external 4-20mA (0-10V with optional convertor) modulation signal
- On/off toggle switch
- Manual reset high limit
- Burner site glass
- Zero clearance to combustible surfaces
- Built-in cascade function for up to eight Brutes.
- 8 year limited warranty

## Heater Data

Number of Units:

Fuel

- Natural  
 Propane

- Pump included (150-600 only)  
 No pump

## Factory Mounted Options

- ASME "HLW" Stamp (285-850 only)       Additional auto reset high limit       Bell for ignition failure
- CSD-1 (covers FM & GAP) (500-850 only)       60 psi pressure relief valve
- Low water cutoff (500-850 only)       75 psi pressure relief valve
- High & Low gas pressure switches (500-850)       125 psi pressure relief valve (std)
- 150 psi pressure relief valve



## Accessories for Field Mounting

|                                                                   |                                                       |                                                     |
|-------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|
| <input type="checkbox"/> Water flow switch (285 only)             | <input type="checkbox"/> Boiler pump (285-600)        | <input type="checkbox"/> Propane conversion kit     |
| <input type="checkbox"/> Low water cutoff                         | <input type="checkbox"/> Concentric vent terminal, 2" | <input type="checkbox"/> Condensate neutralizer kit |
| <input type="checkbox"/> 0 - 10V convertor for modulation control | <input type="checkbox"/> Concentric vent terminal, 3" | <input type="checkbox"/> BACnet gateway             |
| <input type="checkbox"/> High & Low gas pressure switches         | <input type="checkbox"/> Flush-mount terminal, 3"     | <input type="checkbox"/> LON gateway                |
|                                                                   | <input type="checkbox"/> Flush-mount terminal, 4"     |                                                     |

## Sizing Data

| Model                             | Input   |       | Output  |       | Gas Conn. Size inches | Water Conn. Size inches | Shipping Weight |     |
|-----------------------------------|---------|-------|---------|-------|-----------------------|-------------------------|-----------------|-----|
|                                   | BTU/h   | kW    | BTU/h   | kW    |                       |                         | lbs             | kg  |
| <input type="checkbox"/> BNTV 150 | 150,000 | 44.0  | 142,500 | 41.7  | ½ NPT                 | 1¼ NPT                  | 228             | 103 |
| <input type="checkbox"/> BNTV 199 | 199,000 | 58.3  | 193,030 | 56.5  | ½ NPT                 | 1¼ NPT                  | 270             | 123 |
| <input type="checkbox"/> BNTV 285 | 285,000 | 83.5  | 270,750 | 79.3  | ¾ NPT                 | 2 NPT                   | 299             | 136 |
| <input type="checkbox"/> BNTV 399 | 399,000 | 116.9 | 383,040 | 112.2 | ¾ NPT                 | 2 NPT                   | 364             | 165 |
| <input type="checkbox"/> BNTV 500 | 500,000 | 146.5 | 480,000 | 140.6 | 1 NPT                 | 2 NPT                   | 419             | 190 |
| <input type="checkbox"/> BNTV 600 | 600,000 | 175.8 | 582,000 | 170.4 | 1 NPT                 | 2 NPT                   | 426             | 193 |
| <input type="checkbox"/> BNTV 750 | 750,000 | 219.8 | 705,000 | 206.4 | 1½ NPT                | 2 NPT                   | 481             | 218 |
| <input type="checkbox"/> BNTV 850 | 850,000 | 249.1 | 816,000 | 238.9 | 1½ NPT                | 2 NPT                   | 503             | 228 |

## Clearances

| Appliance Surface | Suggested Service Access Clearance |     |
|-------------------|------------------------------------|-----|
|                   | inches                             | cm  |
| Left Side         | 12                                 | 31  |
| Right Side        | 12                                 | 31  |
| Top (for flue)    | 48                                 | 122 |
| Back              | 12                                 | 31  |
| Closet, Front     | 1                                  | 2.5 |
| Alcove, Front     | 24                                 | 61  |
| Vent              | Per Vent Manufacturer              |     |

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

## Vent System

| Size | Intake (Air) | Exhaust (Vent) | Maximum Allowable  |        |
|------|--------------|----------------|--------------------|--------|
|      | Pipe         | Pipe           | Equivalent Length* |        |
| 150  | 3"           | 3"             | 100 ft             | 30 m   |
| 199  | 3"           | 3"             | 100 ft             | 30 m   |
| 285  | 3"           | 3"             | 20 ft              | 6.1 m  |
|      | 4"           | 4"             | 100 ft             | 30 m   |
| 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.

## Electrical Data

| Heater Size MBH | Heater Circuit |          | Heater Pump Circuit |          |          |
|-----------------|----------------|----------|---------------------|----------|----------|
|                 | 150-500        | 600-850  | 150                 | 199-500  | 600      |
| 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.

## Recovery Data

| Size | GPH Delivered                   |             |             |             |             |             |              |              |              |
|------|---------------------------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
|      | REQUIRED WATER TEMPERATURE RISE |             |             |             |             |             |              |              |              |
|      | 40°F<br>GPH                     | 50°F<br>GPH | 60°F<br>GPH | 70°F<br>GPH | 80°F<br>GPH | 90°F<br>GPH | 100°F<br>GPH | 120°F<br>GPH | 140°F<br>GPH |
| 150  | 431                             | 345         | 287         | 246         | 215         | 191         | 172          | 144          | 123          |
| 199  | 579                             | 463         | 386         | 331         | 290         | 257         | 232          | 193          | 166          |
| 285  | 818                             | 654         | 545         | 467         | 409         | 363         | 327          | 273          | 234          |
| 399  | 1153                            | 923         | 769         | 659         | 577         | 513         | 461          | 384          | 329          |
| 500  | 1451                            | 1161        | 967         | 829         | 726         | 645         | 580          | 484          | 415          |
| 600  | 1729                            | 1383        | 1152        | 988         | 864         | 768         | 691          | 576          | 494          |
| 750  | 2170                            | 1736        | 1447        | 1240        | 1085        | 964         | 868          | 723          | 620          |
| 850  | 2434                            | 1947        | 1622        | 1391        | 1217        | 1082        | 973          | 811          | 695          |

| Size | L/h Delivered                   |             |             |             |             |             |             |             |             |
|------|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|      | REQUIRED WATER TEMPERATURE RISE |             |             |             |             |             |             |             |             |
|      | 22°C<br>L/h                     | 28°C<br>L/h | 33°C<br>L/h | 39°C<br>L/h | 44°C<br>L/h | 50°C<br>L/h | 56°C<br>L/h | 67°C<br>L/h | 78°C<br>L/h |
| 150  | 1629                            | 1303        | 1086        | 931         | 814         | 724         | 651         | 543         | 465         |
| 199  | 2190                            | 1752        | 1460        | 1251        | 1095        | 973         | 876         | 730         | 626         |
| 285  | 3091                            | 2473        | 2061        | 1766        | 1545        | 1374        | 1236        | 1030        | 883         |
| 399  | 4359                            | 3487        | 2906        | 2491        | 2181        | 1937        | 1744        | 1453        | 1245        |
| 500  | 5485                            | 4388        | 3657        | 3134        | 2743        | 2438        | 2194        | 1828        | 1567        |
| 600  | 6536                            | 5288        | 4355        | 3735        | 3266        | 2903        | 2612        | 2177        | 1867        |
| 750  | 8203                            | 6562        | 5470        | 4687        | 4101        | 3644        | 3281        | 2733        | 2344        |
| 850  | 9201                            | 7360        | 6131        | 5258        | 4600        | 4090        | 3678        | 3066        | 2627        |

## Water Flow Requirements

|     | Flow | H/L  | Temp Rise |
|-----|------|------|-----------|
|     | gpm  | feet | F         |
| 150 | 15   | 26   | 19        |
| 199 | 22   | 20   | 17        |
| 285 | 30   | 22   | 18        |
| 399 | 45   | 28   | 17        |
| 500 | 52   | 26   | 18        |
| 600 | 52   | 26   | 22        |
| 750 | 60   | 27   | 24        |
| 850 | 67   | 25   | 24        |

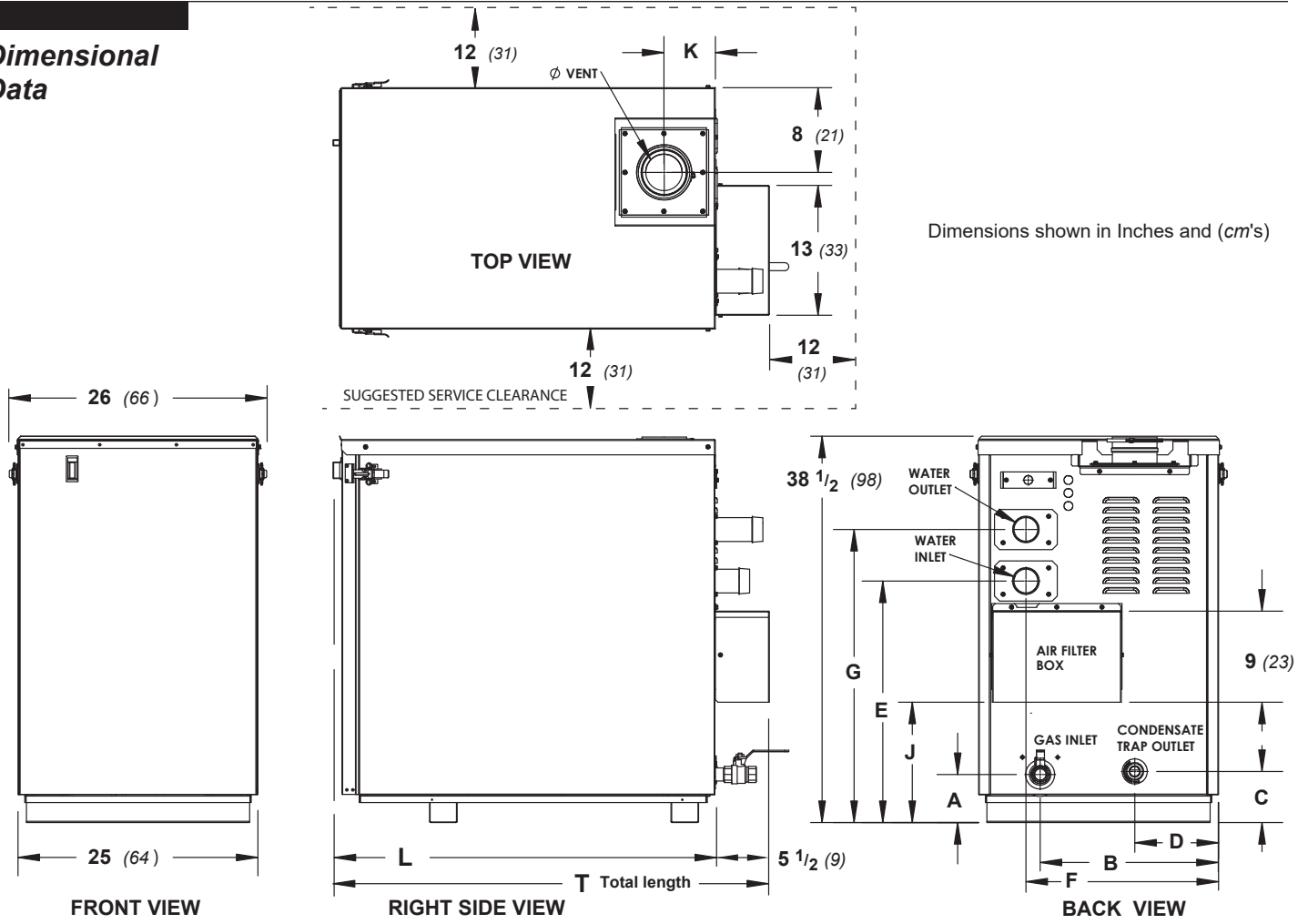
|     | Flow  | H/L | Temp Rise |
|-----|-------|-----|-----------|
|     | lpm   | m   | C         |
| 150 | 56.8  | 7.9 | 10        |
| 199 | 83.3  | 6.1 | 9         |
| 285 | 113.6 | 6.7 | 10        |
| 399 | 170.3 | 8.5 | 9         |
| 500 | 196.8 | 7.9 | 10        |
| 600 | 196.8 | 7.9 | 12        |
| 750 | 227.1 | 8.2 | 13        |
| 850 | 253.6 | 7.6 | 13        |

Notes:

1. Pumps that are shipped with heaters are sized for 30 feet of full-sized piping and a typical number of fittings, intended to serve a heater with a tank that is within 15 feet.

2. Maximum water hardness of 10 grains per gallon allowed.

# Dimensional Data



| SIZE | A       |      | B       |    | C      |      | D       |      | E       |    |
|------|---------|------|---------|----|--------|------|---------|------|---------|----|
|      | in      | cm   | in      | cm | in     | cm   | in      | cm   | in      | cm |
| 150  | 6-1/4"  | 16   | 11"     | 28 | 13"    | 33   | 17-1/4" | 43.8 | 23-1/2" | 60 |
| 199  | 6-1/4"  | 16   | 11"     | 28 | 13"    | 33   | 17-1/4" | 43.8 | 23-1/2" | 60 |
| 285  | 6"      | 15.5 | 11"     | 28 | 5"     | 13   | 17-1/4" | 43.8 | 24"     | 61 |
| 399  | 8"      | 15.5 | 19-1/2" | 50 | 7-3/4" | 20   | 17-1/4" | 43.8 | 24"     | 61 |
| 500  | 5"      | 13   | 17-3/4" | 45 | 5"     | 13   | 8-1/4"  | 21   | 24"     | 61 |
| 600  | 33-1/2" | 85   | 3.0"    | 8  | 5"     | 13   | 8-1/4"  | 21   | 24"     | 61 |
| 750  | 32-3/4" | 83.2 | 3.0"    | 8  | 5-1/4" | 13.4 | 17-1/4" | 43.8 | 24"     | 61 |
| 850  | 32-3/4" | 83.2 | 3.0"    | 8  | 5-1/4" | 13.4 | 17-1/4" | 43.8 | 24"     | 61 |

The 'BACK VIEW' shown is of a 500 MBH model. All other units will be similar, yet different.

All models are shipped with adapters for the air and vent that accept standard pipe of the proper size and type.

| SIZE | F   |      | G       |    | J       |      | K      |      | L (Length) |       | T (Total Length) |       | VENT Ø |     |
|------|-----|------|---------|----|---------|------|--------|------|------------|-------|------------------|-------|--------|-----|
|      | in  | cm   | in      | cm | in      | cm   | in     | cm   | in         | cm    | in               | cm    | in     | cm  |
| 150  | 18" | 45.7 | 27"     | 69 | 23-1/2" | 60   | 5-1/4" | 13   | 20"        | 60    | 25-1/2"          | 65    | 3      | 7.6 |
| 199  | 18" | 45.7 | 27"     | 69 | 24-1/2" | 60   | 5-1/4" | 13   | 27"        | 68.6  | 32-1/2"          | 82.5  | 3      | 7.6 |
| 285  | 19" | 48   | 28-1/4" | 72 | 12"     | 30.5 | 7-1/4" | 18.4 | 27"        | 68.6  | 32-1/2"          | 82.5  | 4      | 11  |
| 399  | 19" | 48   | 28-1/4" | 72 | 12"     | 30.5 | 6"     | 15.2 | 31-1/4"    | 80.5  | 37-3/4"          | 96    | 4      | 11  |
| 500  | 19" | 48   | 29-1/4" | 74 | 12"     | 30.5 | 5.5"   | 14   | 38"        | 96.5  | 43-1/2"          | 110.5 | 4      | 11  |
| 600  | 19" | 48   | 29-1/4" | 74 | 12"     | 30.5 | 5-3/4" | 14.6 | 38"        | 96.5  | 43-1/2"          | 110.5 | 4      | 11  |
| 750  | 19" | 48   | 29-1/4" | 74 | 12"     | 30.5 | 5-3/4" | 14.6 | 51-1/4"    | 130   | 57-3/4"          | 146.7 | 6      | 17  |
| 850  | 19" | 48   | 29-1/4" | 74 | 12"     | 30.5 | 5-3/4" | 14.6 | 55-3/4"    | 141.5 | 61-1/4"          | 155.5 | 6      | 17  |

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



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