

CYCLONE® Mxi MODULATING

MODULATING BURNER ADVANCES THE CYCLONE TO HIGHER LEVELS OF EFFICIENCY

The full line of A. O. Smith Cyclone Mxi condensing water heaters has been designed to provide years of dependable service and feature industry leading technology. Models are available from 120,000 to 500,000 Btu/h and all deliver thermal efficiencies of 95% and higher. The unique helical coil heat exchanger limits weld joints for optimal service life while maximizing heat transfer.

Cyclone is the industry leader in high efficiency commercial water heating with over a quarter million Cyclones sold since 1996. The current Mxi modulating models adjust firing rate to the specific demand further increasing efficiency and money savings.

INTELLIGENT CONTROL SYSTEM WITH LCD DISPLAY

- Exclusive A. O. Smith designed control system
- Provides detailed water heater status information
- Precise temperature control adjustable from 90 to 180 degrees
- Built-in diagnostics
- Run history information
- Cyclone® Mxi Modulating water heaters are compatible with the iCOMM™ remote monitoring system. Call 1.888.928.3702 for information.

SUBMERGED COMBUSTION CHAMBER, WITH HELICAL HEAT EXCHANGER COIL

- Positioned in center of tank, surrounded by water to virtually eliminate radiant heat loss from chamber
- Direct spark ignition
- Spiral heat exchanger keeps hot burner gases swirling, uses centrifugal force to maximize efficiency of heat transfer to water in tank
- Spiral heat exchanger reduces lime scale from forming on water-side surfaces, which maintains energy efficiency over time

POWERED ANODES STANDARD ON ALL MODELS

- Provides long-lasting tank protection in varying water conditions
- Powered anodes are non-sacrificial
- Automatically adjusts output needed to properly protect the tank

PERMAGLAS® ULTRA COAT™ GLASS LINING

- Glass coating is applied using a liquid slush coating technique to ensure uniform coating
- Heat exchanger coil is glassed both externally and internally for optimum protection

MECHANICAL VENTING VERSATILITY

- Conventional power venting or direct venting
- Vents vertically or through a sidewall
- Front located exhaust and condensate connections allow for easy install and access
- Vents with low cost PVC Schedule 40 intake and exhaust pipe. Approved for optional CPVC Schedule 40, Polypropylene and AL29-4C stainless steel vent materials
- Direct-vent intake and exhaust pipe can terminate separately outside building or through single opening, using concentric vent assembly
- Canadian installations require ULC S636 PVC/CPVC, ULC S636 Polypropylene and AL29-4C stainless steel pipe for intake and exhaust

HIGH EFFICIENCY MODULATING PRE-MIX POWERED BURNER

- Down-fired pre-mix burner provides optimum efficiency and quiet operation
- Top-mounted burner position prevents condensation from affecting burner operation

3-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to hotwater.com.



BTH-120(A) THROUGH BTH-500(A)
MODEL SHOWN:
BTH-199(A)





Commercial Gas Water Heaters

OTHER FEATURES:

SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Easy-to-remove top cover for convenient access to serviceable parts
- 0" installation clearances on sides and rear, 1-1/2" installation clearance on top
- Handhole cleanout allows easy access to tank interior for cleaning
- 0" clearance to combustibles, approved for installation on combustible floors

CODES AND STANDARDS

- CSA certified and ASME rated T&P relief valve
- Maximum hydrostatic working pressure: 160 psi
- All models are design certified by Underwriters Laboratories (UL), Inc., to ANSI Z21.10.3 - CSA 4.3 Standards
- Meets the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition ASHRAE/IES 90.1
- Design Certified by Underwriters Laboratories to NSF standard 5 for 180°F (62°C) water
- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for low-NOx emissions
- ASME tank construction optional on 120-500 model sizes

VENT REQUIREMENTS FOR BTH 120(A) - 250(A)

| Number of 90° Elbows Installed | 3 Inch Pipe | 4 Inch Pipe |
|--------------------------------|-----------------------|------------------------|
| | Maximum Feet (Meters) | Maximum Feet (Meters) |
| One (1) | 45 feet (13.7 meters) | 115 feet (35 meters) |
| Two (2) | 40 feet (12.2 meters) | 110 feet (33.5 meters) |
| Three (3) | 35 feet (10.7 meters) | 105 feet (32 meters) |
| Four (4) | 30 feet (9.1 meters) | 100 feet (30.5 meters) |
| Five (5) | N/A | 95 feet (29 meters) |
| Six (6) | N/A | 90 feet (27.4 meters) |

VENT REQUIREMENTS FOR BTH 300(A) - 500(A)

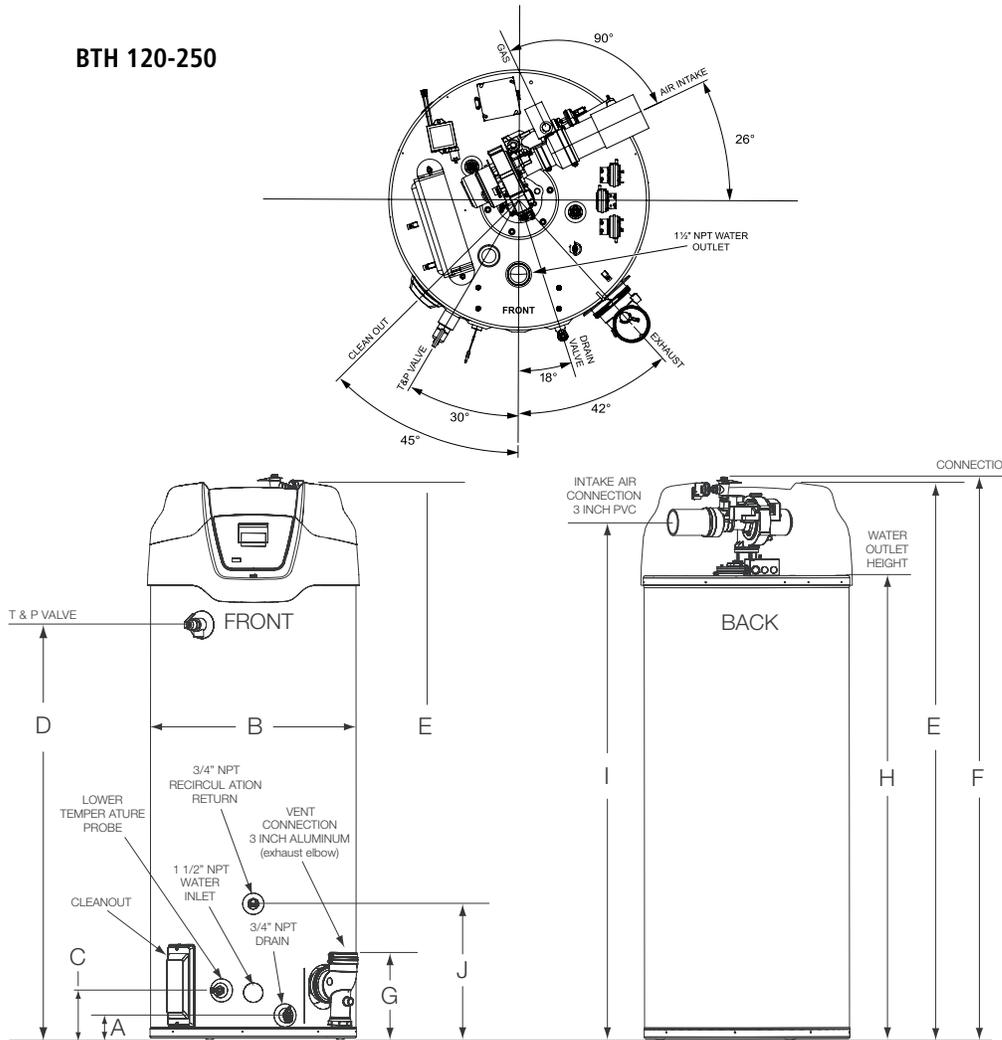
| Number of 90° Elbows Installed | 4 Inch Pipe | 6 Inch Pipe |
|--------------------------------|-----------------------|------------------------|
| | Maximum Feet (Meters) | Maximum Feet (Meters) |
| One (1) | 65 feet (19.8 meters) | 115 feet (35 meters) |
| Two (2) | 60 feet (18.2 meters) | 110 feet (33.5 meters) |
| Three (3) | 55 feet (16.8 meters) | 105 feet (32 meters) |
| Four (4) | 50 feet (15.2 meters) | 100 feet (30.5 meters) |
| Five (5) | 45 feet (13.7 meters) | 95 feet (29 meters) |
| Six (6) | 40 feet (12.2 meters) | 90 feet (27.4 meters) |

GAS PRESSURE REQUIREMENTS

| Model Number | Manifold Pressure | | Minimum Supply Pressure | | Maximum Supply Pressure | |
|--------------|-------------------|----------------|-------------------------|---------------------|-------------------------|--------------------|
| | Natural Gas | Propane Gas | Natural Gas | Propane Gas | Natural Gas | Propane Gas |
| BTH-120(A) | 0"W.C. (0 kPa) | 0"W.C. (0 kPa) | 4.4"W.C. (1.10 kPa) | 8.5"W.C. (2.12 kPa) | 14"W.C. (3.49 kPa) | 14"W.C. (3.49 kPa) |
| BTH-150(A) | 0"W.C. (0 kPa) | 0"W.C. (0 kPa) | 4.4"W.C. (1.10 kPa) | 8.5"W.C. (2.12 kPa) | 14"W.C. (3.49 kPa) | 14"W.C. (3.49 kPa) |
| BTH-199(A) | 0"W.C. (0 kPa) | 0"W.C. (0 kPa) | 4.4"W.C. (1.10 kPa) | 8.5"W.C. (2.12 kPa) | 14"W.C. (3.49 kPa) | 14"W.C. (3.49 kPa) |
| BTH-250(A) | 0"W.C. (0 kPa) | 0"W.C. (0 kPa) | 4.4"W.C. (1.10 kPa) | 8.5"W.C. (2.12 kPa) | 14"W.C. (3.49 kPa) | 14"W.C. (3.49 kPa) |
| BTH-300(A) | 0"W.C. (0 kPa) | 0"W.C. (0 kPa) | 4.8"W.C. (1.19 kPa) | 8.5"W.C. (2.12 kPa) | 14"W.C. (3.49 kPa) | 14"W.C. (3.49 kPa) |
| BTH-400(A) | 0"W.C. (0 kPa) | 0"W.C. (0 kPa) | 4.8"W.C. (1.19 kPa) | 8.5"W.C. (2.12 kPa) | 14"W.C. (3.49 kPa) | 14"W.C. (3.49 kPa) |
| BTH-500(A) | 0"W.C. (0 kPa) | 0"W.C. (0 kPa) | 4.8"W.C. (1.19 kPa) | 8.5"W.C. (2.12 kPa) | 14"W.C. (3.49 kPa) | 14"W.C. (3.49 kPa) |

Depending on the installed equivalent length, and/or the number of appliances connected, the supply gas line size may need to be increased beyond the minimum required size.

BTH 120-250



| Model Number | Approx. Capacity | | Dimensions | | | | | | | | | | lb/kg | Approx. Shipping Weight Std | Approx. Shipping Weight ASME |
|--------------|------------------|-----|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-----------------------------|------------------------------|
| | | | A | B | C | D | E | F | G | H | I | J | | | |
| BTH-120(A) | GPH | 60 | 3 | 27 3/4 | 6 5/16 | 35 | 55 1/2 | 53 1/2 | 11 1/4 | 42 1/4 | 48 1/2 | 18 1/4 | lb | 460 | 490 |
| | LPH | 227 | 7.62 | 70.5 | 16 | 88.9 | 141 | 135.9 | 28.6 | 107.32 | 123.2 | 46.36 | kg | 208 | 220 |
| BTH-150(A) | GPH | 100 | 3 | 27 3/4 | 6 5/16 | 56 3/8 | 76 1/2 | 75 1/2 | 11 1/4 | 64 | 70 | 18 1/4 | lb | 523 | 553 |
| | LPH | 379 | 7.62 | 70.5 | 16 | 143.2 | 194.9 | 191.8 | 28.6 | 162.6 | 177.8 | 46.36 | kg | 237 | 251 |
| BTH-199(A) | GPH | 100 | 3 | 27 3/4 | 6 5/16 | 56 3/8 | 76 1/2 | 75 1/2 | 11 1/4 | 64 | 70 | 18 1/4 | lb | 523 | 553 |
| | LPH | 379 | 7.62 | 70.5 | 16 | 143.2 | 194.9 | 191.8 | 28.6 | 162.6 | 177.8 | 46.36 | kg | 237 | 251 |
| BTH-250(A) | GPH | 100 | 3 | 27 3/4 | 6 5/16 | 56 3/8 | 76 1/2 | 75 1/2 | 11 1/4 | 64 | 70 | 18 1/4 | lb | 523 | 553 |
| | LPH | 379 | 7.62 | 70.5 | 16 | 143.2 | 194.9 | 191.8 | 28.6 | 162.6 | 177.8 | 46.36 | kg | 237 | 251 |

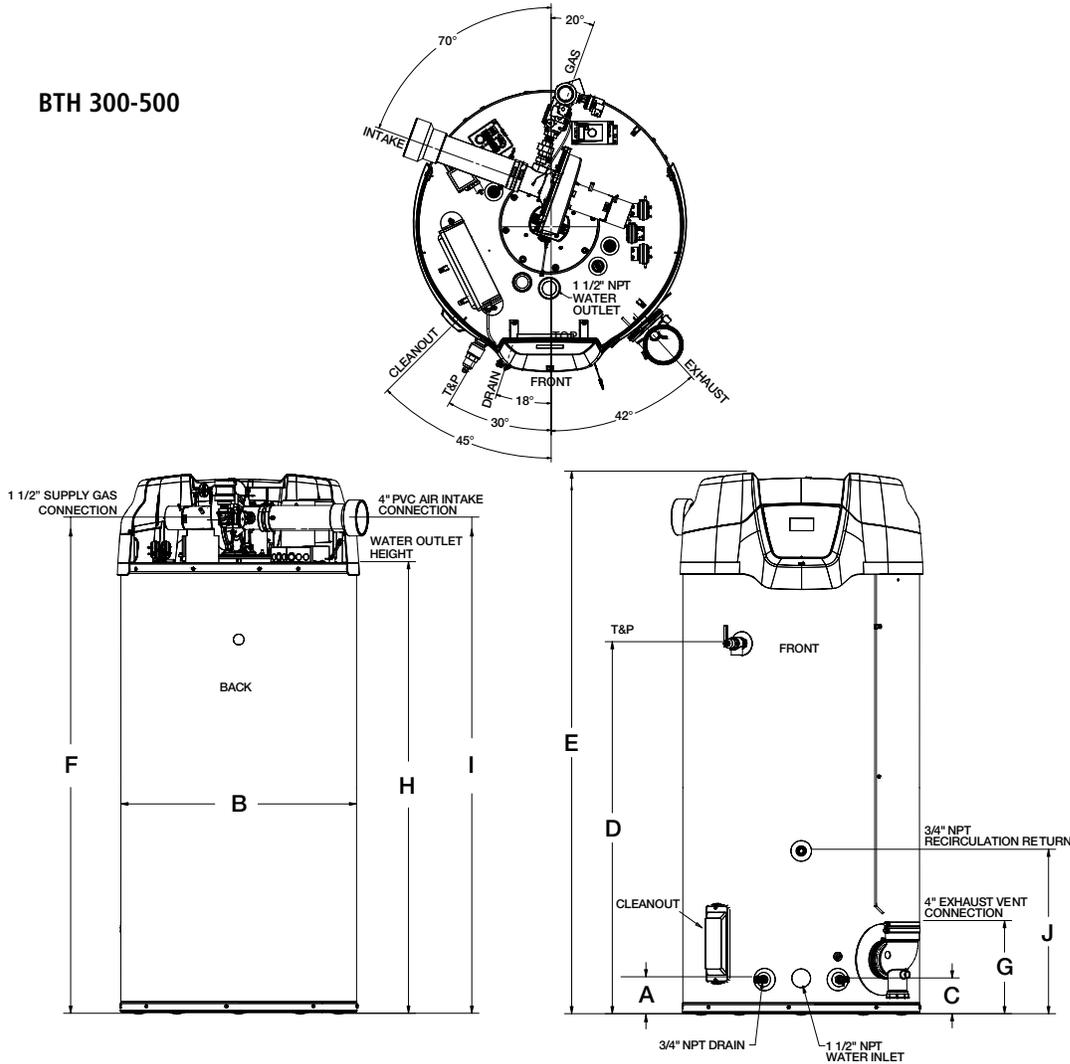
Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

Propane gas models available

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.

BTH 300-500



| Model Number | Approx. Capacity | | Dimensions | | | | | | | | | | lb/kg | Approx. Shipping Weight Std | Approx. Shipping Weight ASME |
|--------------|------------------|--------|------------|--------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-----------------------------|------------------------------|
| | | | A | B | C | D | E | F | G | H | I | J | | | |
| BTH-300(A) | GPH | 119 | 4 3/4 | 33 1/8 | 4 3/4 | 52 | 75 3/4 | 73 3/4 | 12 3/4 | 63 1/8 | 69 1/4 | 23 | lb | 855 | 855 |
| | LPH | 450.96 | 12.07 | 84.12 | 12.07 | 132.08 | 192.41 | 187.3 | 32.39 | 160.35 | 175.9 | 58.43 | kg | 387 | 387 |
| BTH-400(A) | GPH | 119 | 4 3/4 | 33 1/8 | 4 3/4 | 52 | 75 3/4 | 73 3/4 | 12 3/4 | 63 1/8 | 69 1/4 | 23 | lb | 855 | 855 |
| | LPH | 450.96 | 12.07 | 84.12 | 12.07 | 132.08 | 192.41 | 187.3 | 32.39 | 160.35 | 175.9 | 58.43 | kg | 387 | 387 |
| BTH-500(A) | GPH | 119 | 4 3/4 | 33 1/8 | 4 3/4 | 52 | 75 3/4 | 73 3/4 | 12 3/4 | 63 1/8 | 69 1/4 | 23 | lb | 855 | 855 |
| | LPH | 450.96 | 12.07 | 84.12 | 12.07 | 132.08 | 192.41 | 187.3 | 32.39 | 160.35 | 175.9 | 58.43 | kg | 387 | 387 |

Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

Propane gas models available

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.



Commercial Gas Water Heaters

RECOVERY CAPACITY

| Model Number | Type of Gas | Input | | Thermal Efficiency |
|--------------|-----------------|---------|-----|--------------------|
| | | BTU/HR | kW | |
| BTH-120(A) | Natural/Propane | 120,000 | 35 | 95% |
| BTH-150(A) | Natural/Propane | 150,000 | 44 | 98% |
| BTH-199(A) | Natural/Propane | 199,900 | 58 | 97% |
| BTH-250(A) | Natural/Propane | 250,000 | 73 | 96% |
| BTH-300(A) | Natural/Propane | 300,000 | 88 | 96% |
| BTH-400(A) | Natural/Propane | 399,900 | 117 | 95% |
| BTH-500(A) | Natural/Propane | 499,900 | 146 | 95% |

| Model Number | Approx. Capacity | U.S. GALLONS/HR AND LITRES/HR AT TEMPERATURE RISE INDICATED | | | | | | | | | | | | |
|--------------|------------------|---|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| | | °F | 30°F | 40°F | 50°F | 60°F | 70°F | 80°F | 90°F | 100°F | 110°F | 120°F | 130°F | 140°F |
| | | °C | 17°C | 22°C | 28°C | 33°C | 39°C | 44°C | 50°C | 56°C | 61°C | 67°C | 72°C | 78°C |
| BTH-120(A) | 60 U.S. Gals. | GPH | 461 | 345 | 276 | 230 | 197 | 173 | 154 | 138 | 126 | 115 | 106 | 99 |
| | 227 Litres | LPH | 1743 | 1308 | 1046 | 872 | 747 | 654 | 581 | 523 | 475 | 436 | 402 | 374 |
| BTH-150(A) | 100 U.S. Gals. | GPH | 594 | 445 | 356 | 297 | 255 | 223 | 198 | 178 | 162 | 148 | 137 | 127 |
| | 379 Litres | LPH | 2248 | 1686 | 1349 | 1124 | 963 | 843 | 749 | 674 | 613 | 562 | 519 | 482 |
| BTH-199(A) | 100 U.S. Gals. | GPH | 783 | 588 | 470 | 392 | 336 | 294 | 261 | 235 | 214 | 196 | 181 | 168 |
| | 379 Litres | LPH | 2965 | 2224 | 1779 | 1483 | 1271 | 1112 | 988 | 890 | 809 | 741 | 684 | 635 |
| BTH-250(A) | 100 U.S. Gals. | GPH | 970 | 727 | 582 | 485 | 416 | 364 | 323 | 291 | 264 | 242 | 224 | 208 |
| | 379 Litres | LPH | 3670 | 2753 | 2202 | 1835 | 1573 | 1376 | 1223 | 1101 | 1001 | 918 | 847 | 786 |
| BTH-300(A) | 119 U.S. Gals. | GPH | 1164 | 873 | 698 | 582 | 499 | 436 | 388 | 349 | 317 | 291 | 269 | 249 |
| | 450.96 Litres | LPH | 4405 | 3304 | 2643 | 2202 | 1888 | 1652 | 1468 | 1321 | 1201 | 1101 | 1017 | 944 |
| BTH-400(A) | 119 U.S. Gals. | GPH | 1535 | 1151 | 921 | 767 | 658 | 576 | 512 | 460 | 419 | 384 | 354 | 329 |
| | 450.96 Litres | LPH | 5810 | 4358 | 3486 | 2905 | 2490 | 2179 | 1937 | 1743 | 1585 | 1453 | 1341 | 1245 |
| BTH-500(A) | 119 U.S. Gals. | GPH | 1919 | 1439 | 1151 | 959 | 822 | 720 | 640 | 576 | 523 | 480 | 443 | 411 |
| | 450.96 Litres | LPH | 7263 | 5448 | 4358 | 3632 | 3113 | 2724 | 2421 | 2179 | 1981 | 1816 | 1676 | 1556 |

Recovery capacities are based on AHRI rated thermal efficiencies.
For ASME Construction add an "A" to the end of the model number ex: BTH-120A.

STORAGE CAPACITY

| Model Number | U.S. Gallons | Liters |
|--------------|--------------|--------|
| BTH 120 | 60 | 227 |
| BTH 150 | 100 | 379 |
| BTH 199 | 100 | 379 |
| BTH 250 | 100 | 379 |
| BTH 300 | 119 | 450.96 |
| BTH 400 | 119 | 450.96 |
| BTH 500 | 119 | 450.96 |

GAS LINE CONNECTION SIZE

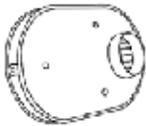
| Model | Series | Natural Gas | Propane Gas |
|---------|---------|-------------|-------------|
| BTH 120 | 200/201 | 3/4" NPT | 3/4" NPT |
| BTH 150 | 200/201 | 3/4" NPT | 3/4" NPT |
| BTH 199 | 200/201 | 3/4" NPT | 3/4" NPT |
| BTH 250 | 200/201 | 3/4" NPT | 3/4" NPT |
| BTH 300 | 200/201 | 1-1/2" NPT | 1-1/2" NPT |
| BTH 400 | 200/201 | 1-1/2" NPT | 1-1/2" NPT |
| BTH 500 | 200/201 | 1-1/2" NPT | 1-1/2" NPT |

OPTIONAL KITS



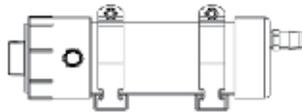
OPTIONAL CONCENTRIC VENT KITS

- BTH-120 - 250 vent kit p/n 9006328005
- BTH-300 - 500 vent kit p/n 9008841005



OPTIONAL LOW PROFILE TERMINATION VENT KITS

- 3" Flush Mount Vent Kit p/n 9008933005
- 4" Flush Mount Vent Kit p/n 9008934005
- 6" Flush Mount Vent Kit p/n 9008935005



OPTIONAL CONDENSATE NEUTRALIZATION KITS

- BTH-120-199 kit p/n 9007959005
- BTH-250-500 kit p/n 9007960005

SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone Mxi model # _____ or equal, minimum 95% thermal efficiency, a storage capacity of _____ gallons, an input rating of _____ BTUs per hour, a recovery rating of _____ gallons per hour (gph) at 100°F rise and a maximum hydrostatic working pressure of 160 psi. Water heater(s) shall: 1. Modulating gas burner that automatically adjusts the input based on demand. 2. Powered anodes that are non sacrificial and maintenance free. 3. Have seamless glass-lined steel tank construction, with glass lining applied to all water-side surfaces after the tank has been assembled and welded; 4. Meets the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IES 90.1; 5. Have foam insulation and a CSA Certified and ASME rated T&P relief valve; 6. Have a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up; 7. Be approved for 0" clearance to combustibles.

The control shall be an integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have digital temperature readout. 1. All models are design certified by Underwriters Laboratories (UL), Inc., according to ANSI Z21.10.3 - CSA 4.3 standards governing storage type water heaters; 2. Meet the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition ASHRAE/IES 90.1. Complies with SCAQMD Rule 1146.2 and other air quality management districts with similar requirements for low NOx emissions.

120K-250K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for power venting using a (3" or 4") _____ diameter PVC pipe for a total distance of (50 ft or 120 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (3" or 4") _____ diameter PVC pipe for a total distance of (50 ft or 120 ft.) _____ equivalent feet of vent piping and (50 ft. or 120 ft.) _____ equivalent feet of intake air piping.

300K - 500K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for standard power venting using a (4" or 6") _____ diameter PVC pipe for a total distance of (70 ft. or 120 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (4" or 6") _____ diameter PVC pipe for a total distance of (70 ft or 120 ft.) _____ equivalent feet of vent piping and (70 ft. or 120 ft.) _____ equivalent feet of intake air piping.

Operation of the water heater(s) in a closed system where thermal expansion has not been compensated for (with a properly sized thermal expansion tank) will void the warranty.

Water heater should incorporate the iCOMM™ system for remote monitoring, leak detection and fault alert.

COMMON VENTING KITS FOR UP TO 2 WATER HEATERS (ONE KIT PER WATER HEATER REQUIRED)

| Kit | Description |
|------------|---|
| 9009152005 | PVC Common Vent Kit, 120 – 250 Models |
| 9009227005 | PVC Common Vent Kit, 300 – 500 Models |
| 9009132005 | Polypropylene Common Vent Kit, 120 -250 Models |
| 9009226005 | Polypropylene Common Vent Kit, 300 - 500 Models |

Installations must comply with all national, state and local codes.

See kit instructions and corresponding water heater manual for detailed installation instructions and additional information.

50 Feet maximum equivalent length of straight pipe common vent and elbows

NOTE: Order 2 kits for every 2 heater installation.

See the Common Vent Kit manual or spec sheet for detailed information.