## Dimension Tables for BTN
## Models 120-400

| Model | Approx Tank Cap. (Gals.) | Type of Gas | Input Rating Btu/Hr | A | B | C | D | E | F | G | H | I | J | Approx. Ship. Wt. STD | Approx. Ship. Wt. ASME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BTN120 | 71 | nat | 120,000 | 62 3/4 | 4 1/4 | 58 1/2 | 60 7/8 | 19 5/8 | 19 | 1/2 | 61 7/8 | 6 | 27 3/4 | 400 | – |
| BTN154 | 81 | nat | 154,000 | 69 1/2 | 4 1/4 | 65 1/2 | 67 7/8 | 19 5/8 | 19 | 1/2 | 69 | 6 | 27 3/4 | 470 | – |
| BTN180 | 81 | nat | 180,000 | 69 1/2 | 4 1/4 | 65 1/2 | 67 7/8 | 19 5/8 | 19 | 1/2 | 69 | 6 | 27 3/4 | 470 | – |
| BTN199 | 81 | nat | 199,000 | 69 1/2 | 4 1/2 | 65 1/2 | 67 7/8 | 19 5/8 | 19 | 1/2 | 69 | 6 | 27 3/4 | 470 | – |
| BTN200(A) | 100 | nat | 199,000 | 72 | 4 1/2 | 70 | 61 5/8 | 20 1/2 | 21 | 1/2 | 61 1/2 | 6 | 27 3/4 | 603 | 625 |
| BTN250(A) | 100 | nat | 250,000 | 72 | 4 1/2 | 70 | 61 5/8 | 20 1/2 | 21 | 1/2 | 61 1/2 | 6 | 27 3/4 | 603 | 625 |
| BTN275(A) | 100 | nat | 275,000 | 72 | 4 1/2 | 70 | 61 5/8 | 20 1/2 | 21 | 1/2 | 61 1/2 | 6 | 27 3/4 | 603 | 625 |
| BTN310(A) | 100 | nat | 310,000 | 72 | 4 1/2 | 70 | 61 5/8 | 20 1/2 | 21 | 1/2 | 61 1/2 | 6 | 27 3/4 | 603 | 625 |
| BTN368(A) | 86 | nat | 368,000 | 76 | 4 1/2 | 70 1/4 | 62 1/2 | 22 1/2 | 21 | 3/4 | 63 | 6 | 27 3/4 | 725 | 839 |
| BTN400(A) | 86 | nat | 400,000 | 76 | 4 1/2 | 70 1/4 | 62 1/2 | 22 1/2 | 21 | 3/4 | 63 | 6 | 27 3/4 | 725 | 839 |

368,000 BTU/hr

All dimensions are in inches.

## RECOVERY CAPACITIES FOR BTN

| Model | Input Rating Btu/Hr. | Gal. | Temperature Rise - Degrees F - Gallons Per Hour | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 |
| BTN120 | 120,000 | 71 | 385 | 291 | 233 | 194 | 166 | 145 | 129 | 116 | 106 | 97 | 89 | 83 |
| BTN154 | 154,000 | 81 | 496 | 373 | 299 | 249 | 213 | 187 | 166 | 149 | 136 | 124 | 115 | 107 |
| BTN180 | 180,000 | 81 | 582 | 436 | 349 | 291 | 249 | 218 | 194 | 175 | 159 | 145 | 134 | 125 |
| BTN199 | 199,000 | 100 | 643 | 482 | 386 | 322 | 276 | 241 | 214 | 193 | 175 | 161 | 148 | 138 |
| BTN200(A) | 199,000 | 100 | 643 | 482 | 386 | 322 | 276 | 241 | 214 | 193 | 175 | 161 | 148 | 138 |
| BTN250(A) | 250,000 | 100 | 808 | 606 | 485 | 404 | 346 | 303 | 269 | 242 | 220 | 202 | 186 | 173 |
| BTN275(A) | 275,000 | 100 | 889 | 667 | 533 | 444 | 381 | 333 | 296 | 267 | 242 | 222 | 205 | 190 |
| BTN310(A) | 310,000 | 100 | 1002 | 752 | 601 | 501 | 430 | 376 | 334 | 300 | 273 | 251 | 231 | 215 |
| BTN368(A) | 368,000 | 86 | 1185 | 887 | 710 | 592 | 507 | 444 | 394 | 355 | 323 | 296 | 273 | 254 |
| BTN400(A) | 380,000 | 86 | 1231 | 948 | 758 | 630 | 540 | 473 | 420 | 378 | 344 | 315 | 291 | 270 |

## SUGGESTED SPECIFICATION

Water Heater(s) shall be Model _____ as manufactured by A. O. SMITH, or equal. Water heater(s) shall be of glass-lined design, and gas-fired, equipped to burn _____ gas and design certified by the Underwriter Laboratory under Volume 16 tests for commercial heaters for delivery of 180°F water, and meeting requirements of ASHRAE/IES 90.1b-1992. Heaters shall have an input rating of _____ and a recovery rating of _____ GPH at a temperature rise of 100°F with a storage capacity of _____ gallons. Heaters shall be equipped with 1 1/2" water inlet and outlet openings (BTN 200, 250, 275, 310 rear openings are 2"), a 2 3/4" x 3 3/4" boiler-type handhole cleanout and shall have a maximum working pressure of 150 psi. Water heater(s) shall be equipped with an integrated control system consisting of a 180°F adjustable thermostat with upper and lower sensing bulbs, which average the water temperatures at the top and bottom of the tank for maximum water temperature control. Heater(s) shall be provided with a manual reset gas shut off device, a gas pressure regulator set for the type of gas supplied, tested and bumpers, an approved draft diverter, anodes for cathodic protection, flue damper and ID system. A.G.A. pressure and temperature relief valve shall be furnished and installed by the factory. The heater shall be insulated with foam insulation or equal. The outer jacket shall have a baked enamel finish over a bonderized undercoating. All internal surfaces of the heater(s) exposed to water shall be glass-lined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range of 1400° to 1600°F. Heater tank shall have a 3 year limited warranty against corrosion or sediment buildup as outlined in the written warranty. Fully illustrated instruction manual to be included.

A.O. Smith Water Products Co., Inc.
On Line www.hotwater.com

For Technical Information and Automated Fax Service, Phone: 800-527-1953

A.O. Smith
Water Products Company
Ashland City, TN
A Division of A.O. Smith Corporation
A.O. Smith Corporation reserves the right to make product changes or improvements at any time without notice.

A101.3

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WATER HEATER INSTALLED 2003

# A.O. SMITH

# MasterFit®
## LOW NOx COMMERCIAL GAS TANK-TYPE WATER HEATERS
## BTN 120-400(A)

***APPROVAL RATINGS AND CERTIFICATION***
**All models comply with ANSI Z21.10.3 CGA4.3**
**All models comply with ASHRAE/IES 90.1 b-1992.**
**All models comply with AHRAE/IES 1999.**
**C.E.C. California Energy Commission**
**All models comply with Texas and So. California SCAQMD Rule 1146.2**

***FEATURES***
**Eighty plus percentage thermal efficiency affords lower operating costs on most models.**

**INDUCED DRAFT BUILT-IN BLOWER** - The blower is built into the top cover, factory mounted and wired. Ideal for installations where negative pressure is present in the building. Blower proves draft prior to ignition. No draftbood or barometric damper required.

**METAL VENTING** - Rated Category I Appliance. Uses standard metal single wall or double wall type "B" vent. Can be commonly vented with other Category I appliances. Vent connects directly to the blower outlet. Perfect choice for retrofit and upgrade installations.

**WATER CONNECTIONS** - For ease of installation, all BTNs feature water connections on the top, front, and rear.

**GLASS LINED TANK** - Permaglas® Ultracoat is the proprietary ceramic coating developed by A.O. Smith's ceramic engineers specifically for this heater. It is applied after the complete tank has been assembled to give a seamless barrier against hot water corrosion. The maximum working pressure is 160 psi.

**INSTALLED COST SAVINGS** - When multiple BTN units are exclusively used in a vent manifold, use the National Flue Gas Code Table 11 Fan Sizing Charts to determine vent diameter and specifications. The BTN with its internal induced draft blower enables safe use of smaller vent diameters. This feature can save hundreds of dollars in installation costs.

**FULLY AUTOMATIC DIGITAL CONTROLS WITH SAFETY SHUTOFF** - Accurate, dependable control system. Manual reset gas shutoff device for added safety. Maximum inlet gas pressure is 14" W.C. Minimum gas pressure is 5.0" W.C. Natural Gas, 11" W.C. Propane.

**FOAM INSULATION** - Saves fuel, helps reduce standby heat loss.

**JACKET** - Heavy gauge steel finished with a baked enamel finish over a bonderized undercoat.

**EASY CLEANING** - Handhole clean-out allows access for easy cleaning.

**FULLY TESTED FOR SAFETY AND PERFORMANCE** - Design certified by the Underwriters Laboratory for 180°F hot water service. Meets rigid requirements of the National Sanitation Foundation when equipped with optional leg kit. Certified for use on combustible flooring.

**INTERMITTENT IGNITION DEVICE** - Eliminates standing pilot. Provides flame failure response in less than one second. Power ON/OFF switch.

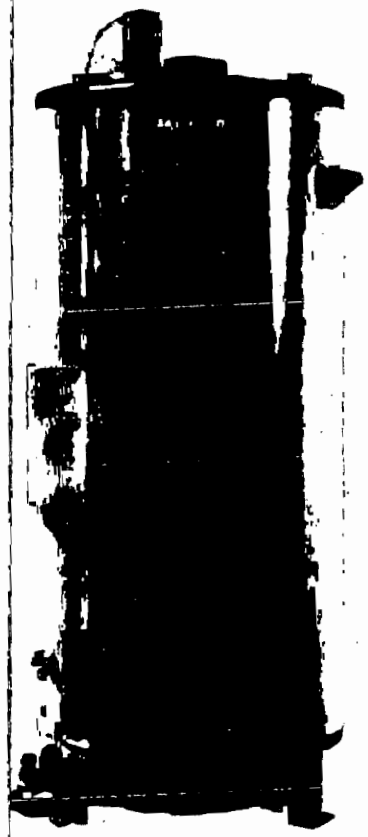
**EASY TO INSTALL** - Completely factory-assembled. Only gas, water, vent and electric connections need be made. Provided with drain valve.

**ANODES** - CorroGuard™ long-life, stainless steel bare anode rods.

**PLUG KITS** - Pipe nipples and caps are included to plug unused water connections.

***OTHER FEATURES***
- Equipped with gas pressure regulator and pilot filter • Integral automatic gas shutoff system prevents excessive water temperature • A.G.A. rated temperature and pressure relief valve factory-installed • Maximum working pressure is 160 psi standard • Cathodic protection • Adjustable thermostat with a 120-180°F range.

**OPTIONS**
- Manifold kits for multiple heater installations.
- Meets NSF Standard 5 with optional leg kit.



c UL us  ASME on selected models.

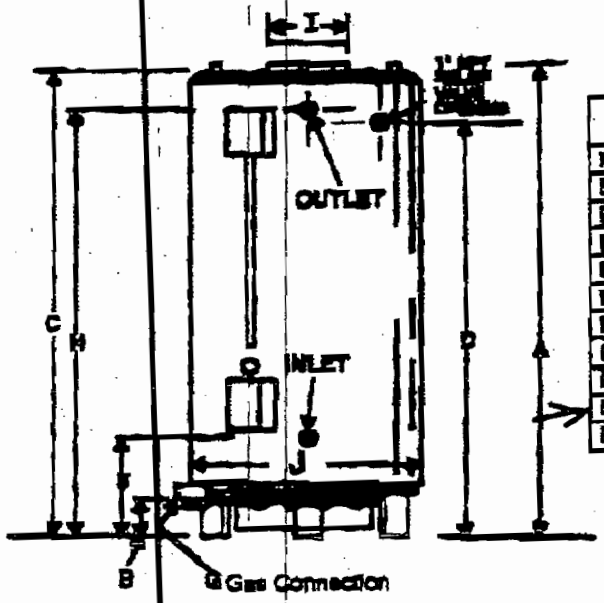
Approved to NSF Standard 5 with Optional Leg Kit

**LIMITED WARRANTY OUTLINE**

If the tank should leak any time during the first three years, under the terms of the limited warranty, A.O. Smith will furnish a replacement heater. Installation, labor, handling and local delivery are extra. **THIS OUTLINE IS NOT A WARRANTY.** For complete information, consult the written warranty or A.O. Smith Water Products Company.

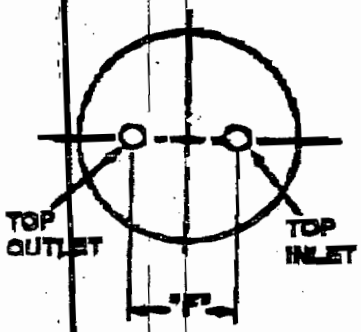
Warranty applies only to products installed within the United States of America, its territorial possessions and Canada.

## ROUGH-IN DIMENSIONS
## SIDE VIEW OF BTN
### Models 120-400




| | Clearance to Combustibles | | Clearance to Non-Combustibles | |
|---|---|---|---|---|
| Model | Sides & Rear | Top Cover | Sides & Rear | Top Cover |
| BTN120 | 1" | 12" | 0" | 12" |
| BTN154 | 1" | 12" | 0" | 12" |
| BTN180 | 1" | 12" | 0" | 12" |
| BTN199 | 1" | 12" | 0" | 12" |
| BTN200(A) | 1" | 12" | 0" | 12" |
| BTN250(A) | 2" | 12" | 0" | 12" |
| BTN275(A) | 2" | 12" | 0" | 12" |
| BTN310(A) | 2" | 12" | 0" | 12" |
| BTN365(A) | 3" | 12" | 0" | 12" |
| BTN400(A) | 3" | 12" | 0" | 12" |

### Top View of BTN




| Water Connections in Inches | | | | | | |
|---|---|---|---|---|---|---|
| | Inlet | | | Outlet | | |
| Models | Top | Front | Back | Top | Front | Back |
| BTN120 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |
| BTN154 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |
| BTN180 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |
| BTN199 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |
| BTN200(A) | 1 1/2 | 1 1/2 | 2 | 1 1/2 | 1 1/2 | 2 |
| BTN250(A) | 1 1/2 | 1 1/2 | 2 | 1 1/2 | 1 1/2 | 2 |
| BTN275(A) | 1 1/2 | 1 1/2 | 2 | 1 1/2 | 1 1/2 | 2 |
| BTN310(A) | 1 1/2 | 1 1/2 | 2 | 1 1/2 | 1 1/2 | 2 |
| BTN365(A) | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |
| BTN400(A) | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |

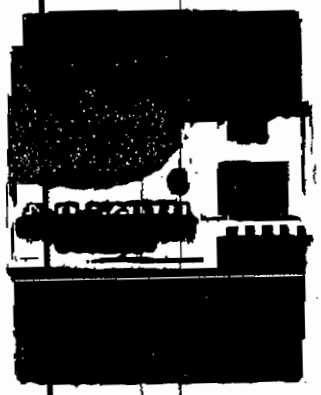
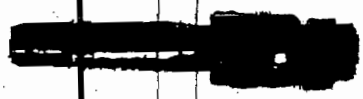
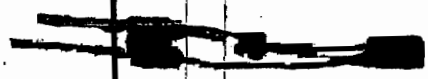
| Gas Pressure Requirements | | |
|---|---|---|
| | Natural Gas | Propane Gas |
| Max. Supply Pressure | 14" w.c. | 14" w.c. |
| Min. Supply Pressure | 6.0" w.c. | 11" w.c. |
| Manifold Pressure | 3.5" w.c. | 10" w.c. |

| Electrical Specifications | | |
|---|---|---|
| | Volts | Amps |
| BTN | 120VAC | 8.0 |

A101.2

## BTN DIA-SCAN™ CONTROLS

The A.O. Smith BTN models feature true self diagnostic controls in a digital solid state design. These advanced control aid in both the installation and maintenance of the BTN water heater. The White Rogers Silicon Nitride Hot Surface Ignitor ensures rugged reliability and years of trouble free operation.

| | |
|---|---|
|  <br>Digital Temperature Control | **Digital Temperature Control**<br>• Accuracy to within ± 2° F<br>• Power On/Standby Indicator<br>• ECO Open Indicator<br>• Reset Status Indicator<br>• Heating-Mode Indicator |
| <br>Solid State Ignition Control | **Solid State Ignition Control**<br>• Power On/Standby Indicator<br>• Gas Valve Circuit Monitor<br>• Reverse Polarity Indicator<br>• Improper Grounding Error Indicator<br>• Lock Out Condition Indicator with Auto Retry<br>• Low Gas Pressure & Blower Prover Indicator<br>• Weak Flame Sense Indicator<br>• Combustion Operation Indicator<br>• Call for Heat Indicator |
|  <br>Solid State Temperature Probe | |
|  <br>Silicon Nitride Hot Surface Ignitor | **Silicon Nitride Hot Surface Ignitor**<br>• Rugged<br>• Dependable<br>• Separate Flame Prover Rod<br>• Quick connect terminals<br>• Adaptive learning technology extends ignitor life |

A101.1