

# Commercial Product Guide

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## A. O. Smith Water Heaters

It should come as no surprise that a company that has built its reputation on the concept of innovation, continues to lead the industry with broadest—and, yes, the most innovative selection of water heaters and hot water supply boilers in its long and storied history.

What *might* come as a surprise to some is the fact that we view this accomplishment as a mere beginning—an indication of even greater things still to come. For everyone here at A. O. Smith, it's never been just about exceeding what we had achieved in the past—it's always been about exceeding everyone's expectations for the future. Which is why you, our customers, can count on us to provide you with the perfect water heater solution for any application—day after day, year after year.

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## Cyclone™ XL

### 750,000 & 1,000,000 BTU/H High Efficiency, Condensing Water Heaters With Modulating Burner

Designed to provide years of dependable service, A. O. Smith Cyclone™ XL condensing water heaters feature industry-leading technology. Models are available from 750,000 & 1,000,000 Btu/h and all deliver thermal efficiencies of 97%. The primary and secondary heat exchangers provide optimal service life, while maximizing heat transfer.

Cyclone™ is the industry leader in high efficiency commercial water heating. Cyclone™ XL modulating models adjust firing rate to the specific demand further increasing efficiency and money savings.

#### INTELLIGENT CONTROL SYSTEM WITH TOUCH SCREEN DISPLAY AND ICOMM CONNECTIVITY ONBOARD\*

- Exclusive A. O. Smith-designed color touch display control system
- Display provides detailed water heater status information
- Precise temperature control adjustable from 90 to 180 degrees
- Built-in diagnostics
- Run history information
- Cyclone™ XL comes standard with iCOMM Wi-Fi connectivity onboard. Remotely monitor and adjust the water heater via the A. O. Smith app. No charge connectivity using Wi-Fi or Ethernet connection.
- Intelligent Demand Response (IDR) feature senses large water draws and automatically adjusts the differential setpoint. This feature increases the hot water available when it is needed the most.

#### SUBMERGED COMBUSTION CHAMBER

- Positioned in center of tank, surrounded by water to virtually eliminate radiant heat loss from chamber
- Direct spark ignition
- Primary and secondary heat exchangers are constructed from stainless steel, with large surface areas to maximize heat transfer to the water
- Hot combustion gases from the primary heat exchanger pass through a secondary heat exchanger, raising efficiencies further, before the gases are vented.
- ASME construction

#### 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 exchangers are glassed externally

#### MECHANICAL VENTING VERSATILITY

- Conventional power venting or direct venting
- Vents vertically or through a sidewall up to 100 eq. ft. (30.4m)
- 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
- Canadian installations require ULC S636 PVC/CPVC, ULC S636 Polypropylene or AL29-4C stainless steel pipe for venting

#### 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

#### 5-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to [hotwatercanada.ca](http://hotwatercanada.ca)



**BTHS-750A AND BTHS-1000A**

**MODEL SHOWN:**

**BTHS-1000A SERIES 100/101**



## OTHER FEATURES:

### SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Large volume, integrated solution extends the Cyclone™ high-efficiency, condensing water heater line to 1,000,000 BTU/H
- 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 Natural Resources Canada (NRCan)
- Design certified by Underwriters Laboratories to NSF 5 for 180°F (82°C) water
- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for ultra low-NOx emissions
- ASME tank construction standard on all models

## VENT REQUIREMENTS FOR BTHS 750A - 1000A

Number of 90° Elbows Installed	6 Inch Pipe
	Maximum Feet (Meters)
One (1)	95 feet (28.9 meters)
Two (2)	90 feet (27.4 meters)
Three (3)	85 feet (25.9 meters)
Four (4)	80 feet (24.3 meters)
Five (5)	75 feet (22.8 meters)
Six (6)	70 feet (21.3 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
BTHS-750A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (0.87 kPa)	8" W.C. (1.99 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHS-1000A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (0.87 kPa)	8" W.C. (1.99 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)

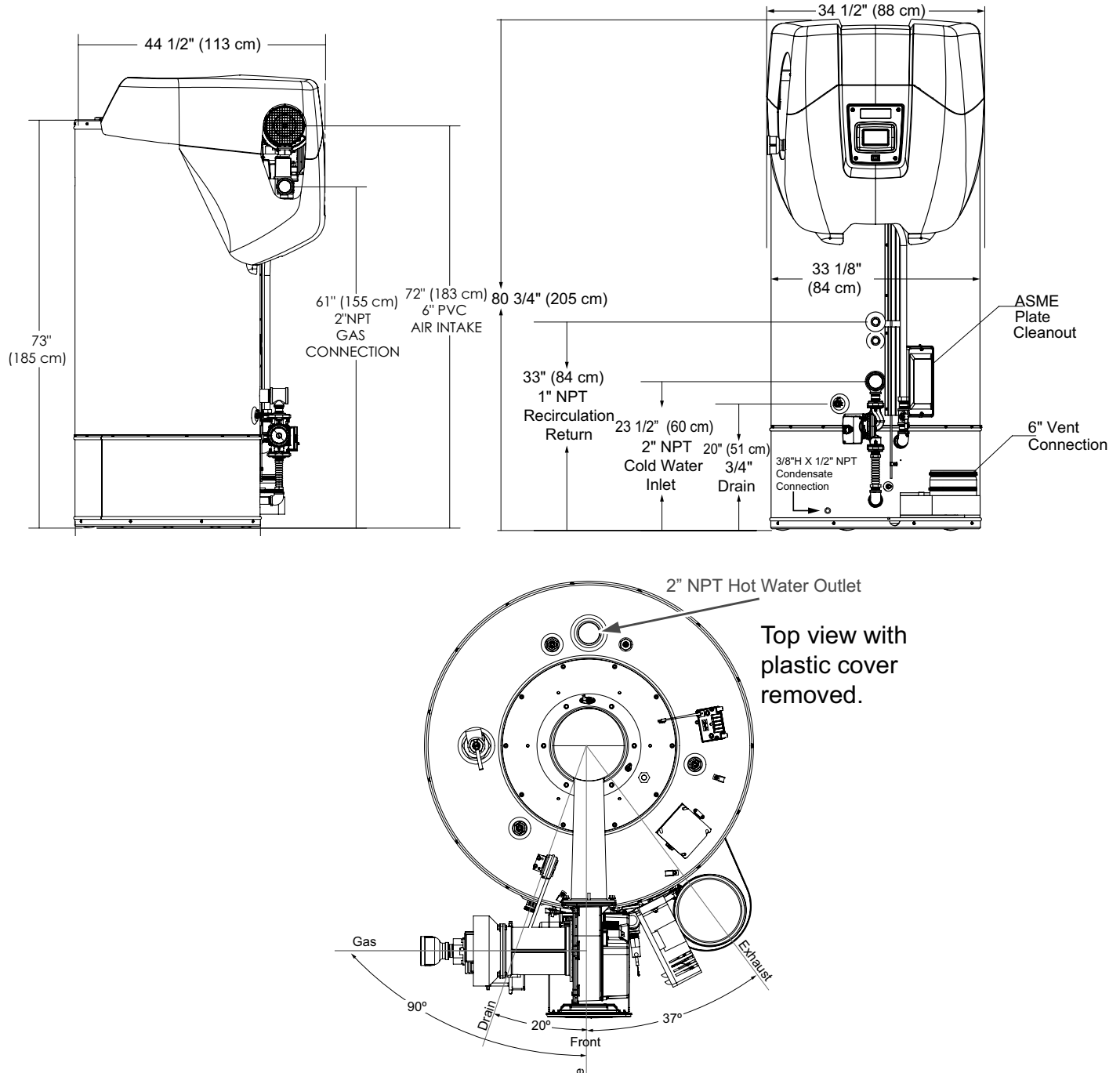
\* The manifold pressure is the factory setting and is not adjustable. A negative pressure will be seen with just the blower running without the Gas Control Valve open.

## GAS LINE CONNECTION SIZE

Model Number	Series	Natural Gas	Propane Gas
BTHS-750A	100/101	2" NPT	2" NPT
BTHS-1000A	100/101	2" NPT	2" NPT

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 size requirement.

### BTHS 750A - 1000A



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.

## RECOVERY CAPACITY

Model Number	Type of Gas	Input		Thermal Efficiency
		BTU/HR	kW	
BTHS-750A	Natural/Propane	750,000	220	97%
BTHS-1000A	Natural/Propane	1,000,000	293	97%

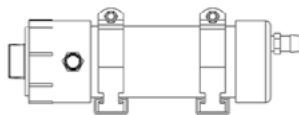
Model Number	U.S. GALLONS AND LITRES/HR AT TEMPERATURE RISE INDICATED													
	Approx. Capacity	°F	30° F	40° F	50° F	60° F	70° F	80° F	90° F	100° F	110° F	120° F	130° F	140° F
		°C	17° C	22° C	28° C	33° C	39° C	44° C	50° C	56° C	61° C	67° C	72° C	78° C
BTHS-750A	120 U.S. Gals.	GPH	2,940	2,205	1,764	1,469	1,260	1,103	979	882	802	734	678	630
	454 Liters	LPH	11,129	8,347	6,677	5,561	4,770	4,175	3,706	3,339	3,036	2,778	2,567	2,385
BTHS-1000A	120 U.S. Gals.	GPH	3,920	2,940	2,352	1,960	1,680	1,470	1,307	1,176	1,069	980	905	839
	454 Liters	LPH	14,839	11,129	8,903	7,419	6,359	5,565	4,948	4,452	4,047	3,710	3,426	3,176

Recovery capacities are based on AHRI rated thermal efficiencies.

## STORAGE CAPACITY AND WEIGHT

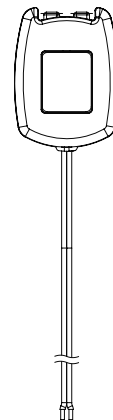
MODEL NUMBER	U.S. GALLONS	LITERS	APPROX. SHIPPING WEIGHT LB (KG)
BTHS-750A	120	454	1300 (590)
BTHS-1000A	120	454	1300 (590)

## OPTIONAL KITS



### OPTIONAL CONDENSATE NEUTRALIZATION KITS

- BTHS 750A kit 100374577
- BTHS 1000A kit 100289581



### OPTIONAL LEAK DETECTION KIT

- BTHS-750A - 1000A kit 100302557

## SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone™ XL model # \_\_\_\_\_ or equal, with minimum 97% thermal efficiency, storage capacity of 120 US gallons, an input rating of \_\_\_\_\_ BTU/h, 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. Have a modulating down-fired gas power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up, and that automatically adjusts the input based on demand. 2. Have an integrated solid-state temperature and ignition control with graphical user interface, integral diagnostics, fault history, temperature and operating status. No-charge connectivity shall be provided allowing for remote monitoring and fault notification via app. 3. Have powered anodes that are non-sacrificial and maintenance-free. 4. Have an ASME-certified steel tank with seamless glass lining applied to all water-side surfaces after the tank has been assembled and welded. 5. Have foam insulation and include a CSA-certified and ASME-rated T&P relief valve. 6. Be approved for 0" clearance to combustibles.

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; and meet the thermal efficiency and standby loss requirements of Natural Resources Canada (NRCAN) 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.

750,000 & 1,000,000 BTU/h Input: For Standard Power Venting: Water heater(s) shall be suitable for standard power venting using 6" diameter ULC S636 pipe up to 100 equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using 6" diameter ULC S636 pipe up to 100 equivalent feet of vent piping and 100 equivalent feet of intake air piping.

Operation of the water heater(s) in a closed system where no provisions for thermal expansion have been made (with a properly sized thermal expansion tank) will void the warranty.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.



### 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. The current MXi modulating models adjust firing rate to the specific demand further increasing efficiency and money savings.

#### INTELLIGENT CONTROL SYSTEM WITH TOUCH SCREEN DISPLAY AND iCOMM™ CONNECTIVITY ON-BOARD\*

- Exclusive A. O. Smith designed colour touch display control system
- Provides detailed water heater status information
- Precise temperature control adjustable from 90 to 180 degrees
- Built-in diagnostics
- Run history information
- Intelligent Demand Response (IDR) feature senses large water draws and automatically adjusts the differential set point. This feature increases the hot water available when it is needed the most.

\*Cyclone™ MXi models manufactured March 1, 2018 to present come standard with iCOMM Wi-Fi connectivity on-board. Remotely monitor and adjust the water heater via the A. O. Smith app. No charge connectivity using Wi-Fi or Ethernet connection.

#### 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, Polypropylene or AL29-4C stainless steel pipe for 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



**BTH-120(A) THROUGH BTH-500A  
MODEL SHOWN:  
BTH-199(A) SERIES 350/301**



## 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 NRCan and current edition ASHRAE/IES 90.1
- Design Certified by Underwriters Laboratories to NSF standard 5 for 180°F (82°C) water
- ASME tank construction optional on 120-250 model sizes, and standard on 300-500 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 300A - 500A

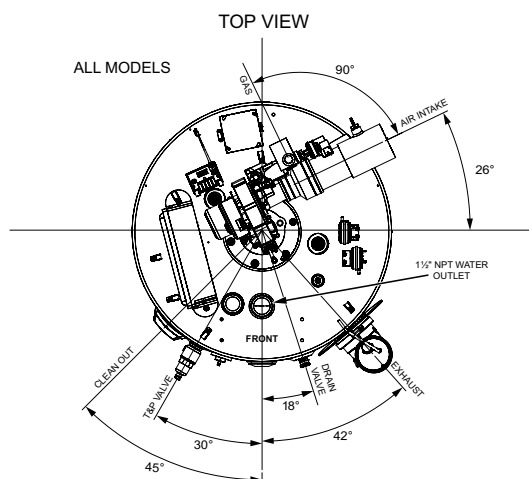
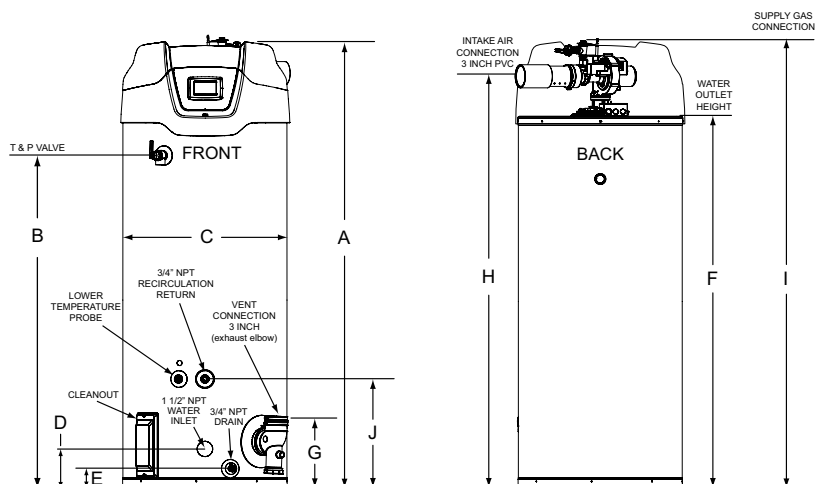
NUMBER OF 90° ELBOWS INSTALLED	4 INCH PIPE	6 INCH PIPE
	MAXIMUM FEET (METERS)	MAXIMUM FEET (METERS)
One (1)	65 feet (19.8 meters)	115 feet (35 meters)
Two (2)	60 feet (18.2 meters)	110 feet (33.5 meters)
Three (3)	55 feet (16.8 meters)	105 feet (32 meters)
Four (4)	50 feet (15.2 meters)	100 feet (30.5 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)	3.5"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)	3.5"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)	3.5"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)	3.5"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-300A	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-400A	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-500A	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. Series 350 BTH models are available with natural gas only. Propane models are series 301.

## BTH 120-250



\* Center line of water outlet on top of the water heaters is approximately 7 inches from the front edge of the water heater

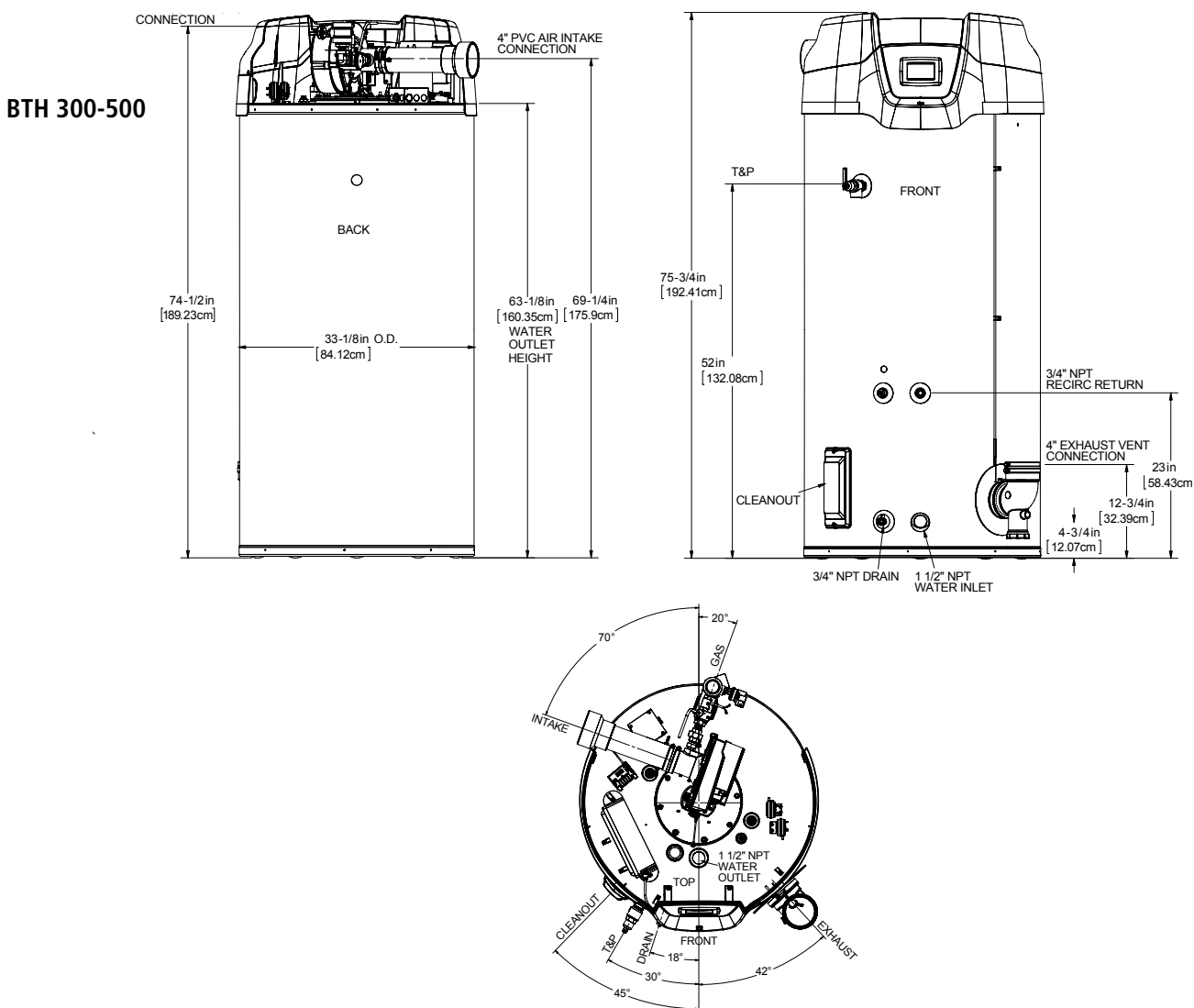
MODEL NUMBER	APPROX. CAPACITY		DIMENSIONS										LB/KG	APPROX. SHIPPING WEIGHT STD	APPROX. SHIPPING WEIGHT ASME
			A	B	C	D	E	F	G	H	I	J			
BTH-120(A)	Gallons	60	55 1/2	35	27 3/4	6 5/16	3	42 1/4	11 1/4	48 1/2	53 1/2	18 1/4	lb	460	490
	Litres	227	141	88.9	70.5	16	7.62	107.32	28.6	123.2	135.9	46.36	kg	208	220
BTH-150(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Litres	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251
BTH-199(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Litres	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251
BTH-250(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Litres	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251

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

"A" in model represents ASME construction

Series 350 BTH models are available with natural gas only. Propane models are series 301.

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



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-300A	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Litres	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387
BTH-400A	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Litres	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387
BTH-500A	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Litres	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387

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

"A" in model represents ASME construction

Series 350 BTH models are available with natural gas only. Propane models are series 301.

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



## RECOVERY CAPACITY

MODEL NUMBER	TYPE OF GAS	INPUT		THERMAL EFFICIENCY
		BTU/h	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-300A	Natural/Propane	300,000	88	96%
BTH-400A	Natural/Propane	399,900	117	95%
BTH-500A	Natural/Propane	499,900	146	95%

Series 350 BTH models are available with natural gas only. Propane models are series 301.

MODEL NUMBER	U.S. GALLONS/HR AND LITRES/HR AT TEMPERATURE RISE INDICATED													
	APPROX. CAPACITY	°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-300A	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-400A	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-500A	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	LITRES
BTH-120(A)	60	227
BTH-150(A)	100	379
BTH-199(A)	100	379
BTH-250(A)	100	379
BTH-300A	119	450.96
BTH-400A	119	450.96
BTH-500A	119	450.96

## GAS LINE CONNECTION SIZE

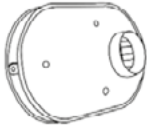
MODEL	SERIES	NATURAL GAS	PROPANE GAS
BTH-120(A)	350/301	3/4" NPT	3/4" NPT
BTH-150(A)	350/301	3/4" NPT	3/4" NPT
BTH-199(A)	350/301	3/4" NPT	3/4" NPT
BTH-250(A)	350/301	3/4" NPT	3/4" NPT
BTH-300A	350/301	1-1/2" NPT	1-1/2" NPT
BTH-400A	350/301	1-1/2" NPT	1-1/2" NPT
BTH-500A	350/301	1-1/2" NPT	1-1/2" NPT

## OPTIONAL KITS



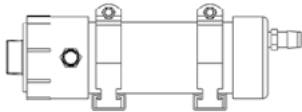
### OPTIONAL CONCENTRIC VENT KITS

- BTH-120 - 250 vent kit p/n 100111100
- BTH-300 - 500 vent kit p/n 100113124



### OPTIONAL LOW PROFILE TERMINATION VENT KITS

- 3" Flush Mount Vent Kit p/n 100187887
- 4" Flush Mount Vent Kit p/n 100187888
- 6" Flush Mount Vent Kit p/n 100187889



### OPTIONAL CONDENSATE NEUTRALIZATION KITS

- BTH-120-300 kit p/n 100289339
- BTH-400-500 kit p/n 100374577

## COMMON VENTING KITS FOR UP TO 3 WATER HEATERS (ONE KIT PER WATER HEATER REQUIRED)

KIT	DESCRIPTION
100227396	PVC Common Vent Kit, 120 – 250 Models
100223775	PVC Common Vent Kit, 300 – 500 Models
100227395	Polypropylene Common Vent Kit, 120 -250 Models
100223774	Polypropylene Common Vent Kit, 300 - 500 Models

Installations must comply with all federal, provincial 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 1 kit for each water heater.

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



### OPTIONAL LEAK DETECTION KIT\*

\*Cyclone™ MXi models manufactured March 13, 2019 and later are compatible with a leak detection kit accessory.

- BTH 120-500 kit p/n 100302557

## 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 NRCAN 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 NRCAN and current edition ASHRAE/IES 90.1.

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.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## CYCLONE™ Xi

### MODELS BTX AND BTXL 100

#### 96% THERMAL EFFICIENT POWER DIRECT VENT MODELS.

The Cyclone™ Xi is a light-duty, power direct vent, fully condensing commercial gas water heater with an internal helical heat exchanger. This helical heat exchanger helps Cyclone™ Xi achieve 96% thermal efficiency and deliver outstanding hot water output.

#### ENERGY STAR® QUALIFIED

#### ADVANCED ELECTRONIC CONTROL

- Exclusive A. O. Smith designed touch display control system.
- Precise temperature control up to 181°F.
- Built-in diagnostics and operational information.

#### CONDENSING DESIGN

- Operates at 96% thermal efficiency, which saves money on operating costs compared to a standard 80% efficient gas water heater.
- Equipped with condensate drain tee.

#### HELICAL INTERNAL HEAT EXCHANGER

- Spiral heat exchanger keeps hot combustion gases in the tank longer to lengthen the heat transfer cycle.
- Positioned in the center of the tank for more even heat distribution.
- Spiral design reduces lime scale formation on the heat exchanger to maintain high efficiency operation over time

#### POWER DIRECT VENT DESIGN

- Combined vertical and horizontal runs terminating through the roof or an outside wall. Vents using PVC, CPVC or polypropylene piping. Canadian installations require ULC S636 approved pipe for venting.
- 2" pipe, vents up to 45 equivalent feet.
- 3" pipe, vents up to 125 equivalent feet.

#### SIDE-MOUNTED HOT AND COLD RECIRCULATING TAPS

- Allows Cyclone™ Xi to be installed as part of combination space heating/water heating applications.

#### AVAILABLE IN NATURAL GAS OR PROPANE

#### TOP FIRED ULTRA-LOW NOx GAS BURNER

- Enhanced Ultra-low NOx burner complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for NOx emissions of less than 14 ng/J or 20 ppm.

#### BLUE DIAMOND® GLASS COATING

- Provides superior corrosion resistance compared to industry-standard glasslining.

#### POWERED ANODES STANDARD

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

#### MAXIMUM HYDROSTATIC WORKING PRESSURE: 150 PSI

#### STANDARDS AND CERTIFICATIONS

- Design-certified by Underwriters Laboratories according to ANSI Z21.10.3 - CSA 4.3 Standards.
- These models meet the thermal efficiency and standby loss requirements of NRCan and current edition ASHRAE/IES 90.1.
- CSA certified and ASME rated T&P relief valve.
- Approved for Canada.

#### 3-YEAR LIMITED TANK AND 1 YEAR LIMITED PARTS WARRANTY

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



BTXL 100

BTX 100

#### SERIES 300/301



ENERGY STAR



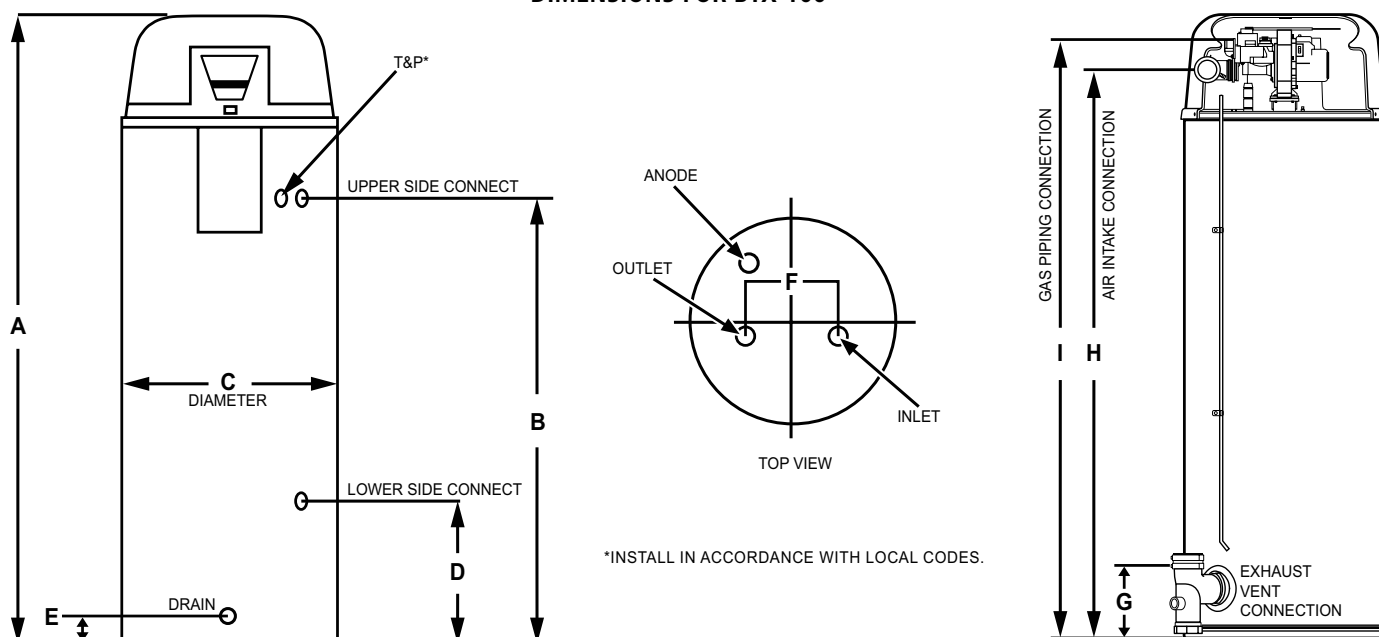
WATER QUALITY



Low Lead Content



## DIMENSIONS FOR BTX-100



## ROUGH-IN DIMENSIONS

Model Number	Approximate Capacity		Units	A	B	C	D	E	F	G	H	I
	U.S. Gals.	Liters										
BTX-100	50	189	Inches	66.75	49.25	22	15.75	3	8	8	62	65
			cm	169.5	125.09	55.88	40	7.62	20.32	20.32	157.48	165.1

Specify when ordering propane (LP) gas.

Standard model certified from sea level to 10,100 ft. elevation.

Optional Concentric Vent Kit (100111100) and Condensate Neutralization Kit (100112380).

Top Inlet and Outlet: 3/4" NPT

Side Inlet and Outlet: 3/4" NPT

Gas Inlet: 1/2" NPT

Condensate drain outlet: 1/2" NPT

Electrical Characteristics: 120V 60Hz <5 amps

The manifold pressure is factory set and is not adjustable. A negative pressure will be seen with just the blower running without the Gas Control Valve open.

All models - Maximum Supply Pressure: 14 inches W.C. (3.48kPa)

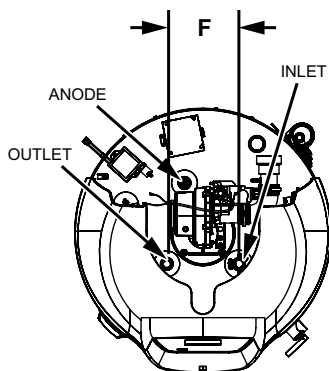
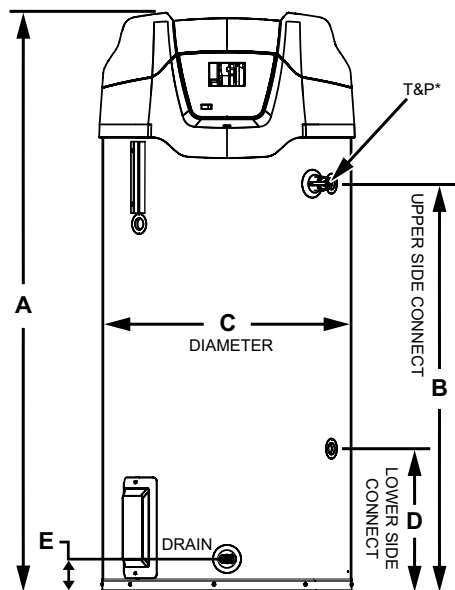
Minimum Supply Pressure for Natural Gas: 3.50" (.87kPa)

Minimum Supply Pressure for Propane Gas: 8.00" (1.99kPa)

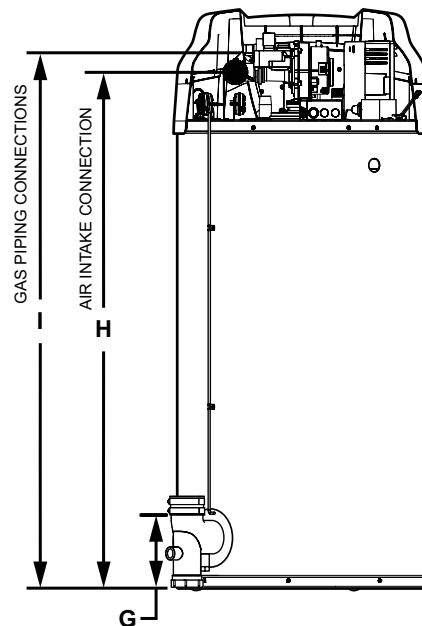
Minimum pressure must be maintained under both load and no load (dynamic and static) conditions.



### DIMENSIONS FOR BTXL-100



\*INSTALL IN ACCORDANCE WITH LOCAL CODES.



### ROUGH-IN DIMENSIONS

Model Number	Approximate Capacity		Units	A	B	C	D	E	F	G	H	I
	U.S. Gals.	Liters										
BTXL-100	75	284	Inches	65.25	45.64	27.75	16	3.71	8	7.93	57.36	58.98
			cm	165.7	115.9	70.5	40.6	9.4	20.32	20.1	145.7	149.8

Specify when ordering propane (LP) gas.

Standard model certified from sea level to 10,100 ft. elevation.

Optional Concentric Vent Kit (100111100) and Condensate Neutralization Kit (100112380).

Top Inlet and Outlet: 1" NPT

Side Inlet and Outlet: 1" NPT

Gas Inlet: 1/2" NPT

Condensate drain outlet: 1/2" NPT

Electrical Characteristics: 120V 60Hz <5 amps

The manifold pressure is factory set and is not adjustable. A negative pressure will be seen with just the blower running without the Gas Control Valve open.

All models - Maximum Supply Pressure: 14 inches W.C. (3.48kPa)

Minimum Supply Pressure for Natural Gas: 3.50" (.87kPa)

Minimum Supply Pressure for Propane Gas: 8.00" (1.99kPa)

Minimum pressure must be maintained under both load and no load (dynamic and static) conditions.



# Commercial Gas Water Heaters

## RECOVERY CAPACITIES - BTX AND BTXL

Input		Recovery Capacities													
Rating (BTU/h)	Rating (kW)	Temp Rise	F	30	40	50	60	70	80	90	100	110	120	130	140
			C	17	22	28	33	39	44	50	56	61	67	72	78
		GPH	387	291	233	194	166	145	129	115	106	97	90	83	
100,000	29.3	LPH		1465	1102	882	734	628	549	488	439	401	367	341	314

## MAXIMUM VENTING DISTANCE - BTX AND BTXL

Number of 90° Elbows	2" Maximum Pipe-ft. (m)	3" Maximum Pipe-ft. (m)
1	40 (12.19)	120 (36.57)
2	35 (10.66)	115 (35.05)
3	30 (9.14)	110 (33.52)
4	25 (7.62)	105 (32)
5	20 (6.09)	100 (30.48)
6	15 (4.57)	95 (28.95)

Note: See the Instruction Manual for the most current and detailed venting information.

### SUGGESTED SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone™ Xi model with 96% thermal efficiency with storage capacity \_\_\_\_\_; an input rating of 100,000 BTUs per hour, a recovery rating of 116 gallons per hour at 100°F rise and a maximum hydrostatic working pressure of 150 psi. Water heater(s) shall be of power direct vent design, using 2" or 3" PVC, CPVC, or polypropylene pipe for horizontal and/or vertical vent runs. Water heater(s) shall have: 1: Steel tank construction with seamless glass lining and a spiral-shaped heat exchanger placed entirely inside the tank, which shall be glasslined on the flue gas side to protect against acidic condensate. 2: Advanced electronic control with LCD touchscreen display and integral diagnostics. 3: A 3-year limited warranty against tank leaks. Water heater(s) shall meet the thermal efficiency and standby loss requirements of NRCAN and current edition of ASHRAE/IES 90.1 and be design-certified by CSA International according to ANSI Z21.10.3-CSA 4.3 standards governing storage tank water heaters.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

### CYCLONE™ HE POWER VENT

The Cyclone™ HE is a light-duty, power vent, fully condensing commercial gas water heater with an internal helical heat exchanger, similar to the design of A. O. Smith's industry-leading Cyclone™ models. This helical heat exchanger helps Cyclone™ HE achieve 94% thermal efficiency and deliver outstanding hot water output.

#### INTELLI-VENT™\* GAS CONTROL WITH SILICON NITRIDE HOT SURFACE IGNITOR

- Premium-grade hot surface ignitor eliminates standing pilot.
- Electronic circuitry provides superior system diagnostics capabilities plus extremely precise temperature control.
- Temperature control up to 181°F.

#### POWER VENT DESIGN FOR INSTALLATION VERSATILITY

- Modular blower, with 6-foot cord and standard 3-prong connector.
- Combined vertical and horizontal runs terminating through an outside wall, using Schedule 40 PVC, CPVC or polypropylene pipe: Canadian installations require ULC S636 approved pipe for venting.
  - 2" pipe allows vent runs up to 25 equivalent feet
  - 3" pipe allows vent runs up to 65 equivalent feet
  - 4" pipe allows vent runs up to 128 equivalent feet

#### HIGH OUTPUT WITH SMALL FOOTPRINT

- 22" diameter, combined with 94% efficiency, 50-gallon tank and 76,000 BTU input means Cyclone™ HE can be installed in less space than a larger 75-gallon unit, with equal or better performance.
- Total height is 71 1/8" to top of blower outlet.

#### GREEN CHOICE® GAS BURNER

- Patented eco-friendly burner design reduces NOx emissions by up to 33% and complies with Low-NOx emission requirements of less than 40 ng/J.

#### SIDE-MOUNTED TAPS FOR RECIRCULATING SYSTEMS

- Hot and cold side taps allow Cyclone™ Power Vent to be used for combination systems for water heating plus space heating, radiant floor heating or other applications requiring a recirculating hot water loop.

#### BLUE DIAMOND® GLASS COATING WITH TWO HEAVY DUTY ANODE RODS

- Provides superior corrosion resistance compared to industry standard glass lining.

#### DYNACLEAN™ DIFFUSER DIP TUBE

#### MAXIMUM HYDROSTATIC WORKING PRESSURE: 150 PSI

#### STANDARDS AND CERTIFICATIONS

- Meets UBC, CEC and ICC National Codes.
- Meets the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition of ASHRAE/IES 90.1.
- Design certified by Underwriters Laboratories Inc. under American National Standard/CSA Standard for Gas Water Heaters ANSI Z21.10.3 - CSA 4.3 (current edition).
- CSA certified and ASME rated T&P relief valve.
- Not recommended for sanitation rinse.

#### 3-YEAR LIMITED TANK AND 1-YEAR LIMITED PARTS WARRANTY

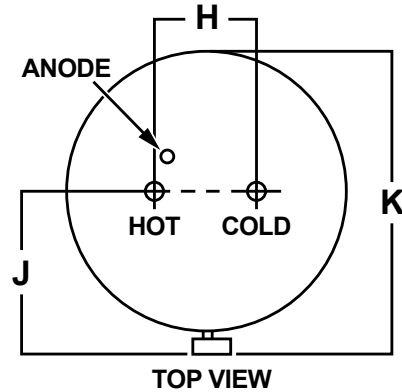
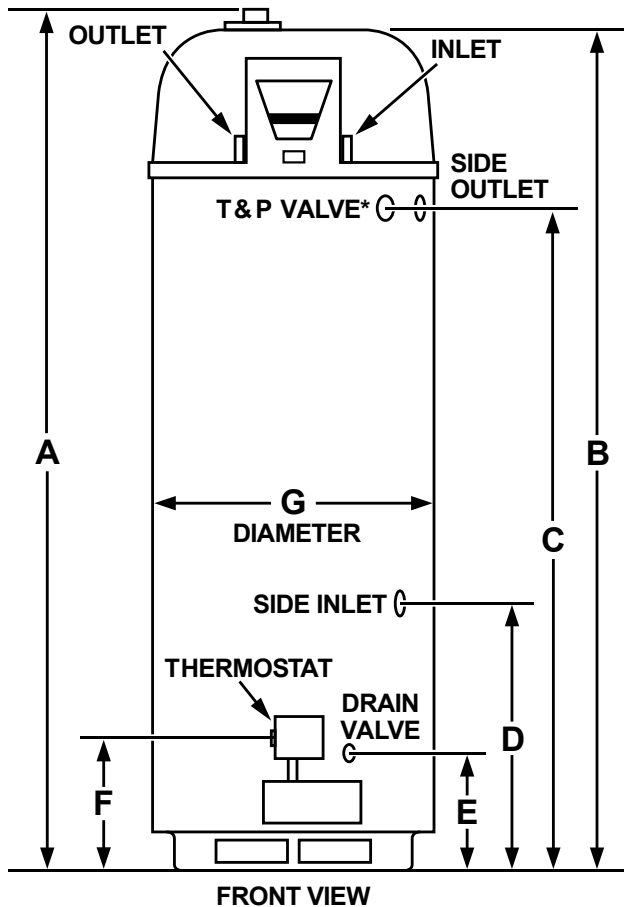
- For complete warranty information, consult written warranty or go to [hotwater.com](http://hotwater.com).

\*Intelli-Vent™ is a trademark of Emerson Electric Company



SERIES 130





\*INSTALL IN ACCORDANCE WITH LOCAL CODES

MODEL NUMBER	GALLON/LITRE CAPACITY	RECOVERY @ 90°F RISE GALLON PER HOUR	BTU/h	DIMENSIONS	A	B	C	D	E	F	G	H	J	K	APPROX. SHIPPING WEIGHT (LBS/KG)
BTX-80	50/189	95	76,000	Inches	71 1/8	68 3/4	51 7/8	20 7/8	9 1/8	12	22	8	15 3/4	27	225/102
				cm	181	175	132	53	23	30	56	20	40	68	

Available in natural gas only.

Top inlet and outlet connections: 3/4" male NPT.

Circulation loop connections: 3/4" female NPT.

Standard model certified for sea level to 5,300 ft. elevation. Order SMR K30 for elevations to 10,100 ft.

Optional Condensate Neutralizer Kit available (Part Number 100112380).

Electrical characteristics: 120 volt, 60 Hz <5 amps

MODEL NUMBER	RECOVERY CAPACITIES													
	TEMPERATURE RISE	°F	30	40	50	60	70	80	90	100	110	120	130	140
		°C	17	22	28	33	39	44	50	56	61	67	72	78
BTX-80	GPH		286	215	172	143	123	107	95	86	78	72	66	61
	LPH		1084	813	651	542	465	407	361	325	296	271	250	232

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.



## Cyclone™ LV (Large Volume)

### MODULATING BURNER & LARGE VOLUME TANK PROVIDE A HIGH EFFICIENCY, INTEGRATED SOLUTION

The full line of A. O. Smith Cyclone™ LV condensing water heaters has been designed to provide years of dependable service and feature industry leading technology. Models are available from 150,000 to 499,900 BTU/h and deliver thermal efficiencies up to 96%. 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. Cyclone™ LV modulating models adjust firing rate to the specific demand further increasing efficiency and money savings.

#### INTELLIGENT CONTROL SYSTEM WITH TOUCH SCREEN DISPLAY AND iCOMM™ CONNECTIVITY ONBOARD

- Exclusive A. O. Smith designed colour touch display control system
- Display provides detailed water heater status information
- Precise temperature control adjustable from 90 to 180 degrees
- Built-in diagnostics
- Run history information
- Cyclone™ LV comes standard with iCOMM Wi-Fi connectivity onboard. Remotely monitor and adjust the water heater via the A. O. Smith app. No charge connectivity using Wi-Fi or Ethernet connection.
- Intelligent Demand Response (IDR) feature senses large water draws and automatically adjusts the differential setpoint. This feature increases the hot water available when it is needed the most.

#### 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
- ASME Construction

#### 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

#### 5-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to [hotwater.com](http://hotwater.com).



**BTHL-150A THROUGH BTHL-500A  
MODEL SHOWN:  
BTHL-500A SERIES 300/301**



Low Lead Content



(All models except BTHL-500A)



HLW



GAS-FIRED

LISTED



**ASME**

## OTHER FEATURES:

### SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Large volume, integrated solution eliminates need for multiple 100-gallon water heaters or separate storage tank
- 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 NRCan and current edition ASHRAE/IES 90.1
- Design Certified by Underwriters Laboratories to NSF standard 5 for 180°F (62°C) water
- ASME tank construction standard on all model sizes

## VENT REQUIREMENTS FOR BTHL 150A - 250A

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 BTHL 300A - 500A

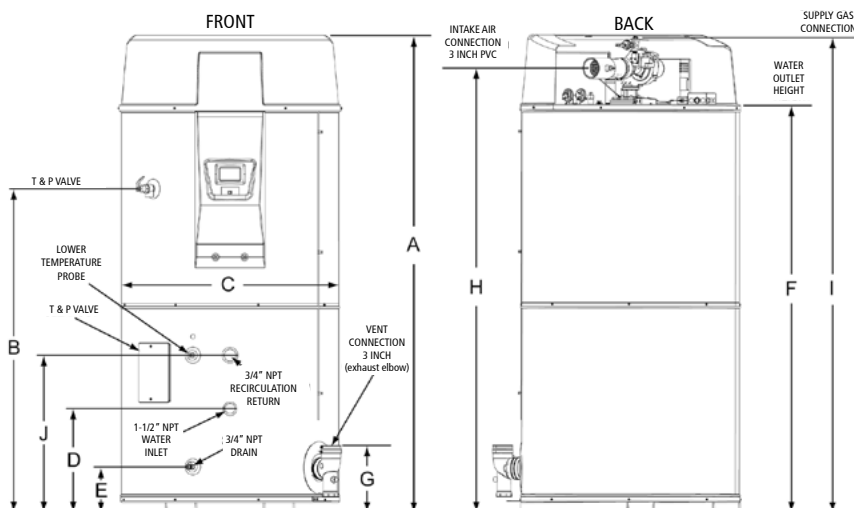
Number of 90° Elbows Installed	4 Inch Pipe	6 Inch Pipe
	Maximum Feet (Meters)	Maximum Feet (Meters)
One (1)	65 feet (19.8 meters)	115 feet (35 meters)
Two (2)	60 feet (18.2 meters)	110 feet (33.5 meters)
Three (3)	55 feet (16.8 meters)	105 feet (32 meters)
Four (4)	50 feet (15.2 meters)	100 feet (30.5 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

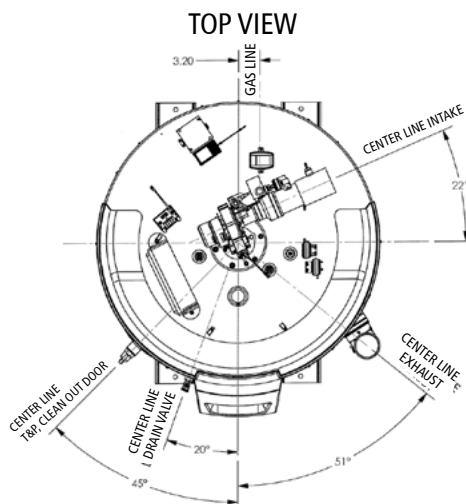
Model Number	Manifold Pressure		Minimum Supply Pressure		Maximum Supply Pressure	
	Natural Gas	Propane Gas	Natural Gas	Propane Gas	Natural Gas	Propane Gas
BTHL-150A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.10 kPa)	8.5" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-199A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.10 kPa)	8.5" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-250A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.10 kPa)	8.5" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-300A	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)
BTHL-400A	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)
BTHL-500A	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.

## BTHL 150A-250A



These designs comply with the current edition of the American National Standard for Gas Water Heaters, Volume III, ANSI Z21. 10.3 / CSA 4.3 as an automatic circulating tank water heater, and automatic storage water heaters.



\* Center line of water outlet on top of the water heaters is approximately 13 inches from the front edge of the water heater.

**Figure 5. Rough in Dimensions**

Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight
			A	B	C	D	E	F	G	H	I	J		
BTHL-150A	Gallons	250	91-1/2	62-5/8	42-1/8	20-1/2	8-1/2	78-1/8	12	85	90-1/8	30-1/2	lb	1125
	Liters	946	232,4	159	107	52	21.6	196.4	30.4	215.9	228.9	77.4	kg	510
BTHL-199A	Gallons	250	91-1/2	62-5/8	42-1/8	20-1/2	8-1/2	78-1/8	12	85	90-1/8	30-1/2	lb	1125
	Liters	946	232,4	159	107	52	21.6	196.4	30.4	215.9	228.9	77.4	kg	510
BTHL-250A	Gallons	250	91-1/2	62-5/8	42-1/8	20-1/2	8-1/2	78-1/8	12	85	90-1/8	30-1/2	lb	1125
	Liters	946	232,4	159	107	52	21.6	196.4	30.4	215.9	228.9	77.4	kg	510

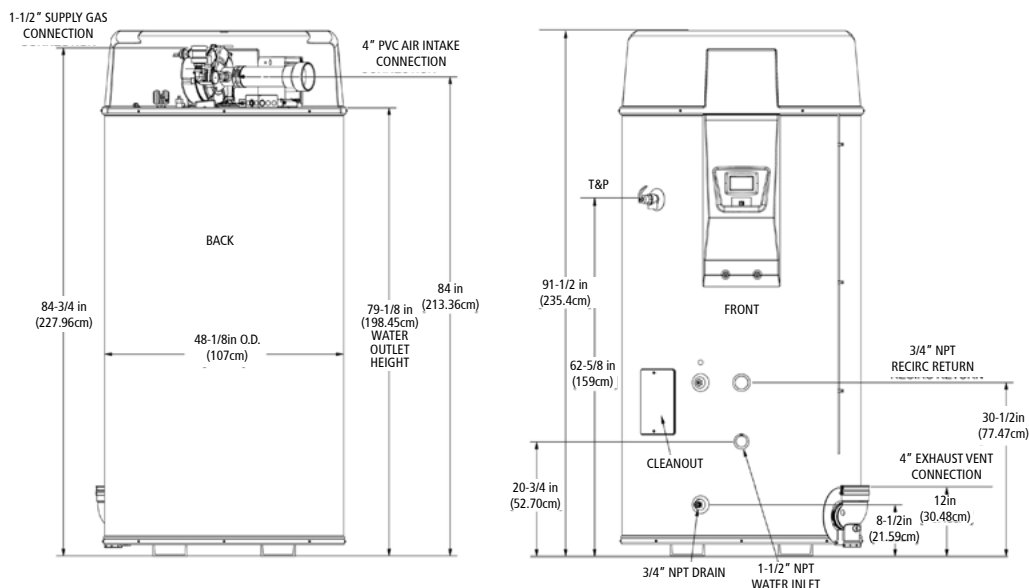
Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

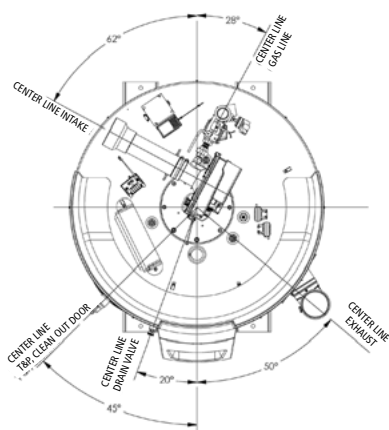
Propane gas models available

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

## BTHL 300A-500A



TOP VIEW



Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight
			A	B	C	D	E	F	G	H	I	J		
BTHL-300A	Gallons	220	91-1/2	62-5/8	42-1/8	20-3/4	8-1/2	78-1/8	12	84	89-3/4	30-1/2	lb	1420
	Liters	833	232,4	159	107	52.7	21.6	196.4	30.4	213.3	227.9	77.4	kg	644
BTHL-400A	Gallons	220	91-1/2	62-5/8	42-1/8	20-3/4	8-1/2	78-1/8	12	84	89-3/4	30-1/2	lb	1420
	Liters	833	232,4	159	107	52.7	21.6	196.4	30.4	213.3	227.9	77.4	kg	644
BTHL-500A	Gallons	220	91-1/2	62-5/8	42-1/8	20-3/4	8-1/2	78-1/8	12	84	89-3/4	30-1/2	lb	1420
	Liters	833	232,4	159	107	52.7	21.6	196.4	30.4	213.3	227.9	77.4	kg	644

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.

## RECOVERY CAPACITY

Model Number	Type of Gas	Input		Thermal Efficiency
		BTU/HR	kW	
BTHL-150A	Natural/Propane	150,000	44	96%
BTHL-199A	Natural/Propane	199,900	58	95%
BTHL-250A	Natural/Propane	250,000	73	94%
BTHL-300A	Natural/Propane	300,000	88	94%
BTHL-400A	Natural/Propane	399,900	117	93%
BTHL-500A	Natural/Propane	499,900	146	92%

Model Number	U.S. GALLONS AND LITRES/HR AT TEMPERATURE RISE INDICATED													
	Approx. Capacity	°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
BTHL-150A	250 U.S. Gals.	GPH	582	436	349	291	249	218	194	175	159	145	134	125
	946 Litres	LPH	2202	1652	1321	1101	944	826	734	661	601	551	508	472
BTHL-199A	250 U.S. Gals.	GPH	767	575	460	384	329	288	256	230	209	192	177	164
	946 Litres	LPH	2904	2178	1743	1452	1245	1089	968	871	792	726	670	622
BTHL-250A	250 U.S. Gals.	GPH	949	712	570	475	407	356	316	285	259	237	219	203
	946 Litres	LPH	9594	2695	2156	1797	1540	1348	1198	1078	980	898	829	770
BTHL-300A	220 U.S. Gals.	GPH	1139	855	684	570	488	427	380	342	311	285	263	244
	832 Litres	LPH	4313	3234	2588	2156	1848	1617	1438	1294	1176	1078	995	924
BTHL-400A	220 U.S. Gals.	GPH	1503	1127	902	751	644	563	501	451	410	376	347	322
	832 Litres	LPH	5688	4266	3413	2844	2438	2133	1896	1706	1551	1422	1313	1219
BTHL-500A	220 U.S. Gals.	GPH	1858	1394	1115	929	796	697	619	557	507	465	429	398
	832 Litres	LPH	7033	5275	4220	3517	3014	2638	2344	2110	1918	1758	1623	1507

Recovery capacities are based on AHRI rated thermal efficiencies.

## STORAGE CAPACITY

Model Number	U.S. Gallons	Liters
BTHL-150A	250	946
BTHL-199A	250	946
BTHL-250A	250	946
BTHL-300A	220	833
BTHL-400A	220	833
BTHL-500A	220	833

## GAS LINE CONNECTION SIZE

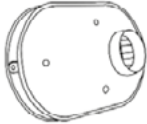
Model Number	Series	Natural Gas	Propane Gas
BTHL-150A	300/301	3/4" NPT	3/4" NPT
BTHL-199A	300/301	3/4" NPT	3/4" NPT
BTHL-250A	300/301	3/4" NPT	3/4" NPT
BTHL-300A	300/301	1-1/4" NPT	1-1/4" NPT
BTHL-400A	300/301	1-1/4" NPT	1-1/4" NPT
BTHL-500A	300/301	1-1/2" NPT	1-1/4" NPT

## OPTIONAL KITS



### OPTIONAL CONCENTRIC VENT KITS

- BTHL 150-250 vent kit p/n 100111100
- BTHL 300-500 vent kit p/n 100113124

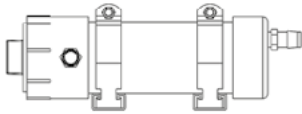


### LEAK DETECTION KIT

- BTHL 150-500 kit p/n 100302557

### OPTIONAL LOW PROFILE TERMINATION VENT KITS

- 3" Flush Mount Vent Kit p/n 100187887
- 4" Flush Mount Vent Kit p/n 100187888
- 6" Flush Mount Vent Kit p/n 100187889



### OPTIONAL CONDENSATE NEUTRALIZATION KITS

- BTHL 150-300 kit p/n 100289339
- BTHL 400-500 kit p/n 100374577

## SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone™ LV model # \_\_\_\_\_ or equal, minimum 92% 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 NRCAN 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. No charge connectivity shall be provided allowing for remote viewing and fault notification via app. 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 NRCAN and current edition ASHRAE/IES 90.1.

150K-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.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.



## Master-Fit™

### FULLY TESTED FOR SAFETY AND PERFORMANCE

- Design certified by Underwriters Laboratories for 180°F (82°C) hot water service
- Certified for use on combustible flooring
- 80% thermal efficiency

### FULLY AUTOMATIC CONTROLS WITH SAFETY SHUTOFF

- Accurate, dependable control system
- Manual reset gas shutoff device for added safety
- Maximum inlet gas pressure is 13.8" w.c. for natural gas and propane, and minimum gas pressure is 4.5" w.c. for natural gas and 11" w.c. for propane

### WATER CONNECTIONS

- For ease of installation, most models feature water connections on the top, front, and rear

### GLASS-LINED TANK

- PermaGlas® Ultra Coat™ is the proprietary liquid glass coating developed by A. O. Smith
- Applied after tank construction, the tank is mechanically maneuvered to ensure the liquid glass covers all surfaces for superior protection

### Eliminator™ SELF CLEANING DEVICE DIRECTS INCOMING COLD WATER TO SWEEP

### THE BOTTOM OF THE TANK SO SEDIMENT DOES NOT ACCUMULATE

### FOAM INSULATION SAVES FUEL AND HELPS REDUCE STANDBY HEAT LOSS

### HEAVY GAUGE STEEL JACKET WITH BAKED ENAMEL FINISH OVER A BONDERIZED UNDERCOAT

### HANDHOLE CLEANOUT ALLOWS FOR EASY CLEANING

### 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

### FACTORY-INSTALLED AND TESTED DRAFT DIVERTER

- Low-profile draft hood with automatic motorized flue damper to minimize standby losses

### CoreGard™ LONG-LIFE, STAINLESS STEEL CORE ANODE RODS

### COMPLIANCE

- All models comply with ANSI Z21.10.3 – CSA 4.3 standard, meet NRCan thermal efficiency and standby loss requirements for replacement units (only), and current edition of ASHRAE/IESNA 90.1

### OTHER FEATURES

- Equipped with gas pressure regulator and pilot filter
- Integral automatic gas shutoff system prevents excessive water temperature
- CSA Certified and ASME Rated T&P relief valve
- Maximum working pressure is 160 psi (1103 kPa) standard
- Adjustable thermostat with a 120-180°F (49°C-82°C) range

### OPTIONS

- Power vent kits for side wall venting (see back page for details)
- Meets NSF Standard 5 with optional leg kit (part number 9003425205)

### WARRANTY

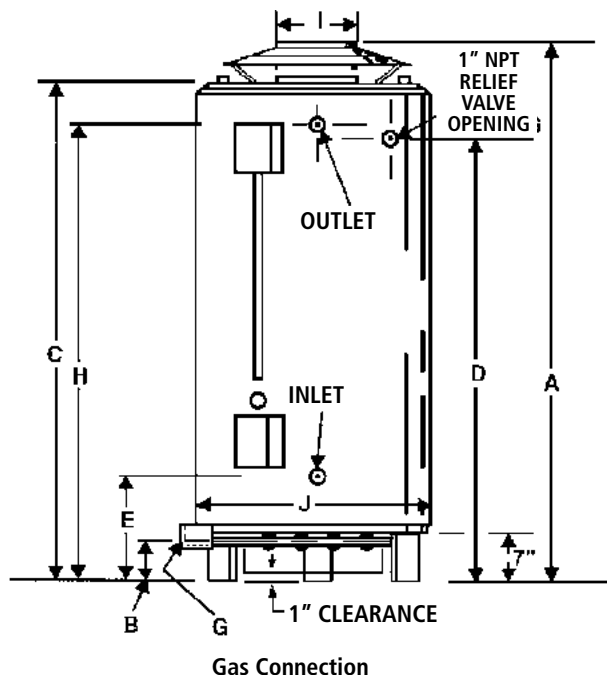
- 3 year limited tank warranty
- 1 year limited parts warranty
- For complete information, consult the written warranty or A. O. Smith

## BTRC 120-500A



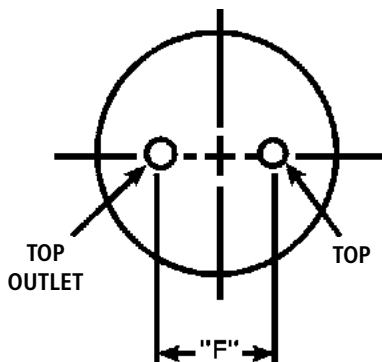
Approved to NSF Standard 5  
with Optional Leg Kit

## ROUGH-IN DIMENSIONS - SIDE VIEW Models BTRC 120-500A



MODEL	CLEARANCE TO COMBUSTIBLES		CLEARANCE TO NON-COMBUSTIBLES	
	SIDES & REAR	TOP COVER	SIDES & REAR	TOP COVER
BTRC-120	1" (2.54 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-154	1" (2.54 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-180	1" (2.54 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-197	1" (2.54 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-199	1" (2.54 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-200A	1" (2.54 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-250A	2" (5.08 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-251(A)	2" (5.08 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-275A	2" (5.08 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-305(A)	2" (5.08 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-365(A)	4" (10.16 cm)	4" (10.16 cm)	4" (10.16 cm)	12" (30.48 cm)
BTRC-400A	3" (7.62 cm)	12" (30.48 cm)	0" (0 cm)	12" (30.48 cm)
BTRC-500A	5" (12.7 cm)	24" (60.96 cm)	0" (0 cm)	12" (30.48 cm)

## Top View of BTRC



WATER CONNECTIONS IN INCHES (NPT)						
MODEL	INLET			OUTLET		
	TOP	FRONT	REAR	TOP	FRONT	REAR
BTRC-120	1.5"	1.5"	1.5"	1.5"	1.5"	1.5"
BTRC-154	1.5"	1.5"	1.5"	1.5"	1.5"	1.5"
BTRC-180	1.5"	1.5"	1.5"	1.5"	1.5"	1.5"
BTRC-197	1.5"	1.5"	1.5"	1.5"	1.5"	1.5"
BTRC-199	1.5"	1.5"	1.5"	1.5"	1.5"	1.5"
BTRC-200A	1.5"	2"	2"	1.5"	2"	2"
BTRC-250A	1.5"	2"	2"	1.5"	2"	2"
BTRC-251(A)	N/A	1.5"	1.5"	N/A	1.5"	1.5"
BTRC-275A	1.5"	2"	2"	1.5"	2"	2"
BTRC-305(A)	N/A	1.5"	2"	N/A	2"	1.5"
BTRC-365(A)	N/A	1.5"	1.5"	N/A	1.5"	1.5"
BTRC-400A	1.5"	2"	2"	1.5"	2"	2"
BTRC-500A	1.5"	1.5"	1.5"	1.5"	1.5"	1.5"

GAS PRESSURE REQUIREMENTS		
	NATURAL GAS	PROPANE GAS
Max. Supply Pressure	13.8" w.c.	13.8" w.c.
Min. Supply Pressure	4.5" w.c.	11" w.c.
Manifold Pressure	3.5" w.c.	10" w.c.

ELECTRICAL SPECIFICATIONS		
	VOLTS	AMPS
BTRC	120VAC	.7
BTRC with Power Venter	120VAC	3.0 FLA



# Commercial Gas Water Heaters

**DIMENSION TABLES FOR BTRC  
MODELS 120-500A**

MODEL	INPUT RATING		CAPACITY USG (L)	A IN (CM)	B IN (CM)	C IN (CM)	D IN (CM)	E IN (CM)	F IN (CM)	G IN	H IN (CM)	I IN (CM)	J IN (CM)	SHIPPING WEIGHT LB (KG)	
	BTU/h	kW/h												STD.	ASME
BTRC-120	120,000	35	71 (268)	69 ¾ (177)	4 ½ (11)	59 ½ (151)	50 ⅞ (129)	19 ¾ (50)	19 (48)	½	51 ⅞ (132)	5 (13)	27 ¾ (71)	512 (232)	N/A
BTRC-154	154,000	45	81 (307)	73 (185)	4 ½ (11)	66 ½ (169)	57 ⅞ (147)	19 ¾ (50)	19 (48)	½	59 (150)	6 (15)	27 ¾ (71)	552 (250)	N/A
BTRC-180	180,000	53	76 (288)	67 ½ (171)	4 ½ (12)	62 (157)	53 ⅞ (136)	20 ½ (52)	21 (53)	½	54 ⅞ (139)	6 (15)	27 ¾ (71)	576 (261)	N/A
BTRC-197	199,000	58	95 (360)	75 (191)	4 ½ (12)	70 (178)	61 ⅞ (157)	20 ½ (52)	21 (53)	½	62 ⅞ (159)	6 (15)	27 ¾ (71)	645 (293)	N/A
BTRC-199	199,000	58	76 (288)	67 ½ (171)	4 ½ (12)	62 (157)	53 ⅞ (136)	20 ½ (52)	21 (53)	½	54 ⅞ (139)	6 (15)	27 ¾ (71)	592 (269)	N/A
BTRC-200A	199,000	58	100 (379)	72 (183)	4 ½ (12)	65 ⅞ (165)	55 ⅞ (142)	19 ¾ (50)	23 (58)	½	56 ⅞ (143)	6 (15)	30 ¼ (77)	N/A	715 (324)
BTRC-250A	250,000	72	100 (379)	72 (183)	4 ½ (12)	65 ⅞ (165)	55 ⅞ (142)	19 ¾ (50)	23 (58)	½	56 ⅞ (143)	8 (20)	30 ¼ (77)	N/A	715 (324)
BTRC-251(A)	251,000	73	65 (246)	75 (191)	4 ½ (12)	65 ¾ (167)	57 ¼ (145)	20 (51)	N/A	½	58 ¾ (149)	8 (20)	27 ¾ (71)	660 (299)	661 (300)
BTRC-275A	275,000	80	100 (379)	72 (183)	4 ½ (12)	65 ⅞ (165)	55 ⅞ (142)	19 ¾ (50)	23 (58)	½	56 ⅞ (143)	8 (20)	30 ¼ (77)	N/A	721 (327)
BTRC-305(A)	305,000	89	65 (246)	75 (191)	4 ½ (12)	65 ¾ (167)	57 ¼ (145)	20 (51)	N/A	½	58 ¾ (149)	8 (20)	27 ¾ (71)	659 (299)	672 (305)
BTRC-365(A)	360,000	105	65 (246)	75 (191)	4 ½ (12)	65 ¾ (167)	57 ¼ (145)	20 (51)	N/A	¾	58 ¾ (149)	8 (20)	27 ¾ (71)	670 (304)	661 (300)
BTRC-400A	390,000	117	100 (379)	75 ½ (192)	4 ½ (12)	67 ½ (171)	58 ¼ (148)	26 ¾ (68)	23 (58)	¾	59 (150)	8 (20)	30 ¼ (77)	N/A	844 (383)
BTRC-500A	500,000	147	85 (322)	81 ½ (207)	4 ½ (12)	77 ¼ (187)	67 ½ (171)	25 ½ (65)	21 (53)	1	67 ½ (171)	8 (20)	27 ¾ (71)	N/A	824 (374)

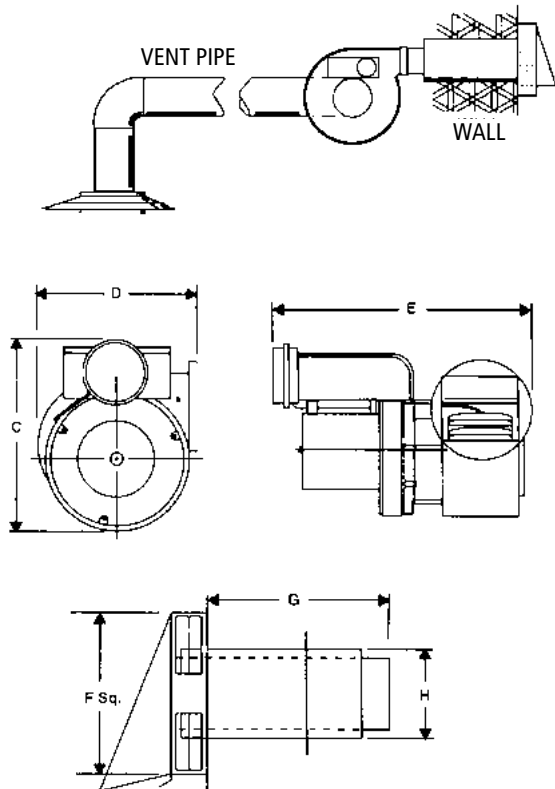
"A" suffix identifies ASME only.

"(A)" suffix identifies optional ASME model available. Contact A. O. Smith Enterprises for dimensions of ASME versions of the BTRC- 251, 305 & 365

Models available in both natural gas and propane, as well as sea level and high altitude.

MODEL	INPUT RATING		CAPACITY USG (L)	THERMAL EFFICIENCY	RECOVERY RATING CAPACITIES GPH (LPH)											
	BTU/h	kW/h			30°F (17°C)	40°F (22°C)	50°F (28°C)	60°F (33°C)	70°F (39°C)	80°F (45°C)	90°F (50°C)	100°F (56°C)	110°F (61°C)	120°F (67°C)	130°F (72°C)	140°F (78°C)
BTRC-120	120,000	35	71 (268)	80%	388 (1469)	291 (1102)	233 (882)	194 (734)	166 (628)	145 (549)	129 (488)	116 (439)	106 (401)	97 (367)	90 (341)	83 (314)
BTRC-154	154,000	45	81 (307)	80%	498 (1885)	373 (1412)	299 (1132)	249 (943)	213 (806)	187 (708)	166 (628)	149 (564)	136 (515)	124 (469)	115 (435)	107 (405)
BTRC-180	180,000	53	76 (288)	80%	579 (2192)	434 (1643)	347 (1314)	289 (1094)	248 (939)	217 (821)	193 (731)	174 (659)	158 (598)	145 (549)	134 (507)	124 (469)
BTRC-197	199,000	58	95 (360)	80%	643 (2434)	482 (1825)	386 (1461)	322 (1219)	276 (1045)	241 (912)	214 (810)	193 (731)	175 (662)	161 (609)	148 (560)	132 (500)
BTRC-199	199,000	58	76 (288)	80%	643 (2434)	482 (1825)	386 (1461)	322 (1219)	276 (1045)	241 (912)	214 (810)	193 (731)	175 (662)	161 (609)	148 (560)	132 (500)
BTRC-200A	199,000	58	100 (379)	80%	643 (2434)	482 (1825)	386 (1461)	322 (1219)	276 (1045)	241 (912)	214 (810)	193 (731)	175 (662)	161 (609)	148 (560)	132 (500)
BTRC-250A	250,000	72	100 (379)	80%	808 (3059)	606 (2294)	485 (1836)	404 (1529)	346 (1310)	303 (1147)	269 (1018)	242 (916)	220 (833)	202 (765)	186 (704)	173 (655)
BTRC-251(A)	251,000	73	65 (246)	80%	811 (3070)	608 (2301)	487 (1843)	406 (1537)	348 (1317)	304 (1151)	270 (1022)	243 (920)	221 (837)	203 (768)	187 (708)	174 (659)
BTRC-275A	275,000	80	100 (379)	80%	889 (3365)	667 (2525)	533 (2018)	444 (1681)	381 (1442)	333 (1261)	296 (1120)	267 (1011)	242 (916)	222 (840)	205 (776)	190 (719)
BTRC-305(A)	305,000	89	65 (246)	80%	986 (3732)	739 (2797)	592 (2241)	493. (1866)	423 (1601)	370 (1401)	329 (1245)	296 (1120)	269 (1018)	246 (931)	228 (863)	211 (799)
BTRC-365(A)	360,000	105	65 (246)	80%	1164 (4406)	873 (3304)	698 (2642)	582 (2203)	499 (1888)	436 (1650)	388 (1468)	349 (1321)	317 (1199)	291 (1105)	269 (1018)	249 (942)
BTRC-400A	390,000	117	100 (379)	80%	1290 (4883)	967 (3660)	774 (2930)	645 (2442)	553 (2093)	484 (1832)	430 (1628)	387 (1465)	352 (1332)	322 (1219)	298 (1128)	276 (1045)
BTRC-500A	500,000	147	85 (322)	80%	1596 (6041)	1197 (4531)	958 (3626)	798 (3021)	684 (2589)	598 (2264)	532 (2014)	479 (1813)	435 (1647)	399 (1510)	368 (1393)	342 (1295)

## POWER VENT KITS FOR BTRC



### FEATURES

**DESIGNED FOR FLEXIBILITY** - Easy to install sidewall power vent system. Use these kits where gas is the preferred choice, but conventional venting is costly. Allows conversion from electric to gas or upgrading to units with higher inputs without having to do costly venting system upgrades. Easy to install and wire. Approved for use on all A. O. Smith water heaters listed below. Allows the use of smaller diameter vent pipe than allowed with conventional venting.

**POWERFUL 115 VOLT POWER VENTER** - Allows venting up to 100 (30.48m) equivalent feet away. Each model sized for a perfect match with A. O. Smith water heaters. Power Venters have one or more of the following depending on the heater's requirements. Built in 24/115 volt relay to interface with control systems. Combination 24 volt relay and adjustable post-purge timer control in lieu of relay on some models. Installed diaphragm draft proving switch. Vibration isolation mount works with common plumber's strap and helps keep operation quiet. All controls factory mounted and wired for simple installation.

**ALUMINUM VENT HOOD** - Mounts on outside of wall. Features telescoping vent pipe connection sleeve, rust free construction, outside wall condensate shield, 1" air space provides clearance for combustibles, special heat shield protects building exterior. Mounting hardware included.

**COLOUR CODED WIRING HARNESS** - Eliminates need for electrician (check codes). Simple 24 volt connections and a 40 ft. (12.2m) low voltage cable.

MODEL	PART NUMBER	MOTOR WATT	MOTOR AMPS	MAX LENGTH OF VENT FT (M)	VENT DIAMETER SIZE IN (CM)	DIMENSIONS IN (CM)						
						C VENT ASSEMBLY HEIGHT	D VENT ASSEMBLY DEPTH	E VENT ASSEMBLY WIDTH	F VENT TERMINATION SQUARE	G	H	ROUGH IN
BTRC-120-200A	100054906	95	1.26	100 (30.48)	4 (10.1)	7 7/8 (20)	7 (17.7)	11 (27.9)	9 (22.9)	8 7/8 (22.5)	7 1/2 sq. (19.1)	8 sq. (20.3)
BTRC-250A - 500A	100054907	224	2.0	100 (30.48)	6 (15.2)	9 1/4 (23.5)	8 1/2 (21.6)	11 1/2 (29.2)	10 1/8 (25.7)	9 1/2 (24.1)	8 1/2 dia. (21.6)	9 dia (22.9)

\* Vent pipe/vent hood connection based on Class B vent pipe sizes. Calculated using total pipe length, plus 5 ft. (1.524m) for every 90° elbow and 2 1/2 ft. (0.762m) for every 45° elbow.

### 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 Underwriters Laboratories under Volume III tests for commercial heaters for delivery of 180°F (82°C) water, and meet or exceed the thermal efficiency and/or standby loss requirements of NRCan and current edition of ASHRAE/IESNA 90.1. Heaters shall have an input rating of \_\_\_\_\_ and a recovery rating of \_\_\_\_\_ GPH (LPH) at a temperature rise of 100°F (38°C) with a storage capacity of \_\_\_\_\_ gallons (liters). Heaters shall be equipped with 1 1/2" (38.1mm) water inlet and outlet openings, a 2 3/4" (69.85mm) x 3 3/4" (95.25mm) boiler-type hand hole clean out and shall have a maximum working pressure of 160 psi (1103.1 kPa). Water heater(s) shall be equipped with an integrated control system consisting of a 180°F (82°C) 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 shutoff device, a gas pressure regulator set for the type of gas supplied, coated steel burners, an approved draft hood, anodes for cathodic protection, flue damper and IID system. A CSA Certified and ASME Rated T&P 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° (760°C) to 1600°F (871°C). 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.

### TX1 COMMERCIAL INTEGRATED TANKLESS ON TANK

The TX1 condensing water heater combines tankless with a tank to deliver energy saving performance.

#### INTEGRATED ACT-199 CONDENSING TANKLESS

- Delivers 96% thermal efficiency
- Modulating burner
- Heat exchanger constructed of commercial grade copper
- Secondary heat exchanger constructed of 316 grade stainless steel
- 185°F Max Temperature
- Available in natural gas or propane

#### 119 GALLON STORAGE TANK

- PermaGlas® Ultra Coat™ liquid slush glass lining protects against corrosion
- Multiple anodes protect the tank
- Front water inlet and top water outlet
- High density foam reduces standby heat losses
- Heavy gauge steel jacket
- 160 psi working pressure

#### COMMERCIAL-GRADE COMPONENTS

- 4.1 GPM pump
- Advanced electronic control
- Factory installed T&P and pressure relief valves

#### 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 NRCan and current edition of ASHRAE/IES 90.1
- Design Certified by Underwriters Laboratories to NSF standard 5 for 180°F (62°C) water
- Complies with lead free standards

#### POWER DIRECT VENT DESIGN

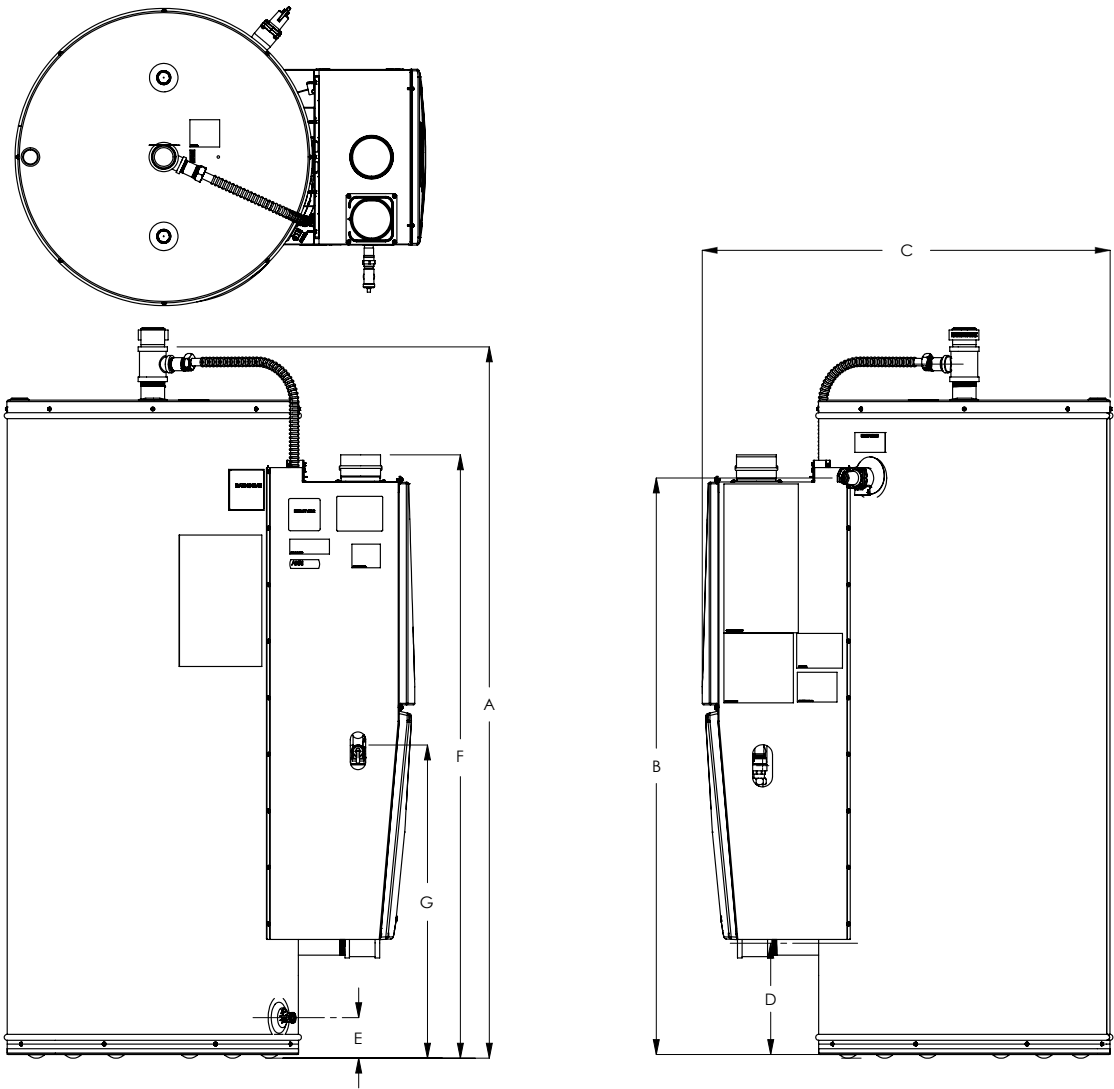
- Exhaust, 3" venting up to 70 feet or 4" venting up to 100 feet
- Provides flexible venting with ULC S636, PVC, CPVC, or polypropylene pipe for intake and exhaust (solid core only)
- Category III or IV venting can be used

#### 6 YEAR LIMITED HEAT EXCHANGER AND TANK, 5 YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to [hotwatercanada.ca](http://hotwatercanada.ca)

### ATX-199 MODEL





ATX-199

DIMENSIONS

DIMENSIONS							APPROX. SHIP WEIGHT
A	B	C	D	E	F	G	
Inches (cm)	Inches (cm)	Inches (cm)	Inches (cm)	Inches (cm)	Inches (cm)	Inches (cm)	LBS (KG)
72 (183)	59 (149)	41 (104)	12 (30)	4 (11)	61 (156)	30 (76)	520 (236)

Electrical characteristics-120V-60Hz A.C., 5.0 A  
 Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.





# Commercial Gas Water Heaters

## RECOVERY CAPACITIES

				U.S. GALLONS/HR & LITERS/HR AT TEMPERATURE RISE INDICATED												
TYPE OF GAS	INPUT		THERMAL EFFICIENCY%	°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
	BTU/h	kW		°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
Natural	199,000	58.32	96	GPH	772	579	463	386	331	289	257	232	211	193	178	165
Propane	199,000	58.32	96	LPH	2922	2192	1753	1461	1253	1094	973	878	799	731	674	625

## STORAGE CAPACITY

MODEL NUMBER	U.S. GALLONS	LITERS
ATX-199-N	119	451
ATX-199-P	119	451

## GAS PRESSURE REQUIREMENTS

MANIFOLD PRESSURE		MINIMUM SUPPLY PRESSURE		MAXIMUM SUPPLY PRESSURE	
NATURAL GAS	PROPANE GAS	NATURAL GAS	PROPANE GAS	NATURAL GAS	PROPANE GAS
2.95" W.C. (0.73 kPa)	3.3" W.C. (0.82 kPa)	4.0" W. C. (1.00 kPa)	8.0" W. C. (1.99 kPa)	10.5" W. C. (2.61 kPa)	14" W. C. (3.49 kPa)

## SUGGESTED SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith TX1 model # \_\_\_\_\_ or equal, minimum 96% thermal efficiency, a storage capacity of 119 gallons, an input rating of 199,000 BTUs per hour, a recovery rating of 232 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. Dual anodes; 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 NRCAN 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 condensing tankless with modulating burner as the heat source; 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 NRCAN and current edition of ASHRAE/IES 90.1; 3. Complies with NSF Low Lead Standard.

The heater(s) exhaust shall be vented with 3" or 4" diameter ULC S636 approved schedule 40 PVC, CPVC, polypropylene or Category III/IV vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, polypropylene, aluminum, or Category III/ IV pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent.

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.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.



# Polaris™ High-Efficiency Commercial Gas Water Heaters

Polaris™ has a high grade 444 stainless steel tank with brass connections for years of dependable, trouble-free service - no anode required. A submerged combustion chamber with spiral flue provides up to 96% thermal efficiency and ultra-low standby heat loss of approximately 1%.

## CONDENSING DESIGN

- Helical internal heat exchanger keeps hot combustion gases in the tank longer to transfer more heat into the water

## MODULATING GAS BURNER

- Maintains high efficiency operation at lower input rates

## SEALED COMBUSTION WITH WOVEN FIBRE PREMIX BURNER

- Metal fibre burner is designed for clean combustion in high-intensity blue flame mode
- Uniform combustion provides excellent heat transfer
- Manufactured of refractory steel that resists corrosion and provides excellent resistance to thermal and mechanical shock, even at extreme temperatures

## WHISPER QUIET OPERATION

- Ultra quiet blower and burner minimize noise
- Requires 120 volt 60Hz power supply and draws less than 5 Amps

## POWER DIRECT VENT USING 2" OR 3" PLASTIC PIPE

- Direct vents up to 130 equivalent feet using ULC S636 PVC or CPVC pipe either through the wall or through the roof
- Optional concentric vent kit available

## ADVANCED ELECTRONIC CONTROL

- Large touchscreen display
- Precise temperature control
- Advanced water heater status and diagnostics

## FULL SERVICEABILITY FROM THE FRONT

- Removal of two front access panels exposes all serviceable components
- Modular components are easily removed

## SIDE-MOUNTED HOT AND COLD RECIRCULATING TAPS

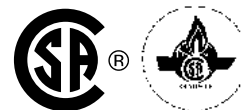
- For installations with a recirculation system or as part of a combined domestic hot water and space heating system

## AVAILABLE IN NATURAL GAS OR PROPANE

## DESIGN CERTIFIED BY CSA INTERNATIONAL TO CURRENT EDITION OF ANSI Z21.10.3/CSA 4.3

## WARRANTY

- 3 years limited tank warranty
- 1 year limited parts warranty



## PERFORMANCE

Model	Series	Capacity		Maximum Certified Altitude	Input	Recovery Rate at 90°F Temperature Rise	Thermal Efficiency	Warranty Tank/Parts
		USG	L	FT (M)	BTU/h	GPH (LPH)		Years
NATURAL GAS								
PC 34-130 N	200	34	129	7,700 (2,437)	130,000	168 (636)	96%	3/1
PC 34-150 N	200	34	129	7,700 (2,437)	150,000	190 (719)	94%	3/1
PC 50-130 N	200	50	189	7,700 (2,437)	130,000	165 (625)	95%	3/1
PC 50-150 N	200	50	189	7,700 (2,437)	150,000	190 (719)	95%	3/1
PC 50-175 N	200	50	189	7,700 (2,437)	175,000	222 (840)	96%	3/1
PC 50-199 N	200	50	189	7,700 (2,437)	199,000	253 (958)	96%	3/1

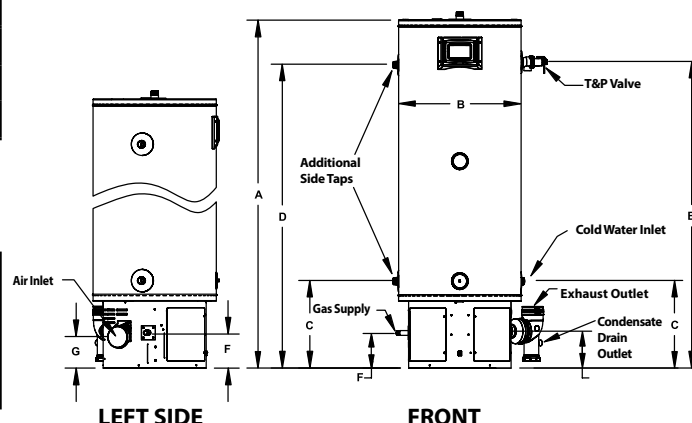
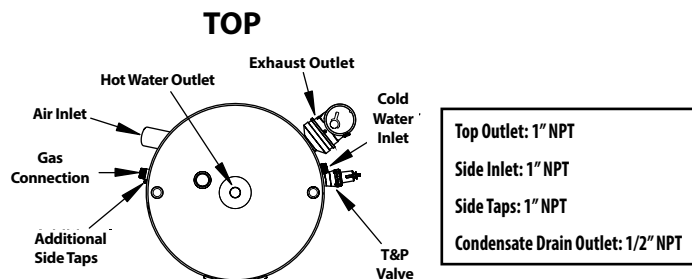
For propane models sub N with P. Natural gas models are series 200. Propane models are series 201.  
All models comply with national energy efficiency regulations. Input, output and recovery may vary depending upon air inlet and exhaust outlet installations, consult manual for details.

## DIMENSIONS & SHIPPING WEIGHT

Model	Height to Top of Tank	Tank Diameter	Height to Lower Side Connection	Height to Cold Water Inlet	Height to Upper Side Connection	Height to T&P	Height to Gas Supply	Height to Air Inlet	Water Connections	Gas Connections	Vent Diameter	Shipping Weight
	A IN (CM)	B IN (CM)	C IN (CM)	C IN (CM)	D IN (CM)	E IN (CM)	F IN (CM)	G IN (CM)	IN NPT	IN NPT	IN	LB (KG)
NATURAL GAS												
PC 34-130 N	48 ½ (123)	22 (56)	15 ¾ (40)	15 ¾ (40)	40 ½ (103)	41 (104)	6 ¾ (16)	6 ¾ (16)	1	½	2 or 3	150 (68)
PC 34-150 N	48 ½ (123)	22 (56)	15 ¾ (40)	15 ¾ (40)	40 ½ (103)	41 (104)	6 ¾ (16)	6 ¾ (16)	1	½	2 or 3	150 (68)
PC 50-130 N	62 ¾ (158)	22 (56)	15 ¾ (40)	15 ¾ (40)	54 ½ (138)	55 (140)	6 ¾ (16)	6 ¾ (16)	1	½	2 or 3	176 (80)
PC 50-150 N	63 ¾ (162)	22 (56)	15 ¾ (40)	15 ¾ (40)	55 ¾ (142)	56 ¼ (143)	6 ¾ (16)	6 ¾ (16)	1	½	2 or 3	180 (82)
PC 50-175 N	63 ¾ (162)	22 (56)	15 ¾ (40)	15 ¾ (40)	55 ¾ (142)	56 ¼ (143)	6 ¾ (16)	6 ¾ (16)	1	½	3	180 (82)
PC 50-199 N	63 ¾ (162)	22 (56)	15 ¾ (40)	15 ¾ (40)	55 ¾ (142)	56 ¼ (143)	6 ¾ (16)	6 ¾ (16)	1	½	3	180 (82)

## OPTIONAL KITS

Description	Part Number
2" Concentric vent kit	100093946
3" Concentric vent kit	100093947



For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## CONSERVATIONIST™

### FULLY AUTOMATIC CONTROLS WITH SAFETY SHUTOFF

- Accurate, dependable control system requires no electric connections. Fixed automatic gas shutoff device for added safety.
- Temperature adjustable up to 181°F

### GLASSLINED TANK

- Maximizes tank life.

### HEAVY GAUGE STEEL JACKET

- Finished with baked enamel over bonderized undercoat.

### FOAM INSULATION

- Saves fuel, helps reduce standby heat loss.

### EASY-TO-INSTALL

- Completely factory-assembled. Only gas, water and vent connections need be made. All connections are located in front and top of heaters for ease of installation and service.

### DRAFT DIVERTER

- Low profile diverter furnished as standard equipment.

### MAXIMUM WORKING PRESSURE

- 150 psi.

### MAXIMUM GAS INLET PRESSURE

- 14" W.C.

### HANDHOLE CLEANOUT

- Allows easy tank cleaning.

### BUILT-IN GAS FILTER AND INTEGRAL DIRT LEG (PROPANE ONLY)

### CATHODIC PROTECTION

- Magnesium anode protects the tank against corrosion.

### INTEGRAL AUTOMATIC GAS SHUTOFF SYSTEM PREVENTS EXCESSIVE WATER TEMPERATURE

### STANDARDS AND CERTIFICATIONS

- All models meet the thermal efficiency and standby loss requirements of NRCan and Current Edition ASHRAE/IESNA 90.1.
- CSA certified and ASME rated T&P relief valve.
- Not recommended for sanitation rinse.

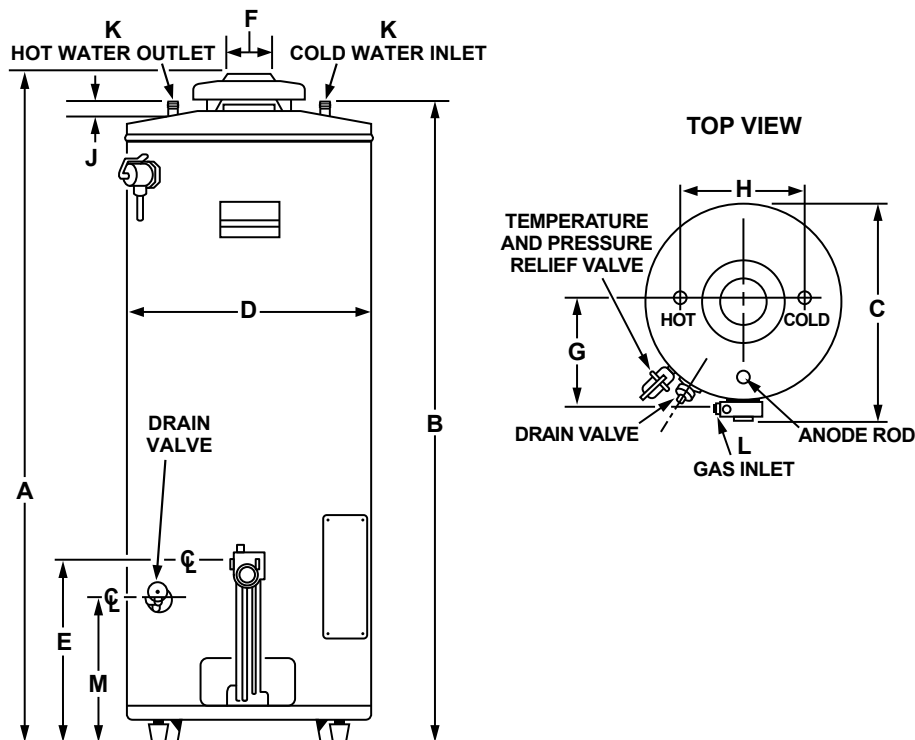
### 3-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to [hotwater.com](http://hotwater.com).



BT-80 & BT-100





MODEL NUMBER	UNITS	DIMENSIONS												APPROX. SHIPPING WEIGHT	
		A	B	C	D	E	F	G	H	J	K	L	M		
BT-80	INCHES	61-1/8	58-1/2	29-11/16	26-1/2	15-3/16	4	14-1/2	16	1-1/4	1	1/2	11-15/16	LB	275
	CM	155.25	148.6	75.4	67.3	38.6	10.2	39.4	40.6	3.2	NPT	NPT	30.3	KG	124.7
BT-100	INCHES	68-5/8	66-1/2	30-15/16	27-3/4	15-3/16	4	15-3/4	16	1-1/4	1-1/4	1/2	11-15/16	LB	350
	CM	174.3	168.9	75.6	70.5	38.6	10.2	40	40.6	3.2	NPT	NPT	30.3	KG	158.8

MODEL NUMBER	CAPACITY		INPUT RATING		TEMPERATURE RISE - GPH (LPH)											
	USG	LITRES	BTU/h	kW/hr	30°F (17°C)	40°F (22°C)	50°F (28°C)	60°F (33°C)	70°F (39°C)	80°F (45°C)	90°F (50°C)	100°F (56°C)	110°F (61°C)	120°F (67°C)	130°F (72°C)	140°F (78°C)
BT-80	74	280	75,100	22	243 (916)	182 (686)	146 (550)	121 (456)	104 (392)	91 (343)	81 (305)	73 (275)	66 (249)	61 (230)	56 (211)	52 (196)
BT-100	98	371	75,100	22	243 (916)	182 (686)	146 (550)	121 (456)	104 (392)	91 (343)	81 (305)	73 (275)	66 (249)	61 (230)	56 (211)	52 (196)

## SPECIFICATION

Water heater(s) shall be Model \_\_\_\_\_ as manufactured by A. O. Smith or an approved equal. Water heater(s) shall be of glasslined design, and gas-fired, equipped to burn \_\_\_\_\_ gas and design certified by CSA and shall be approved by the National Sanitation Foundation (with optional leg kit). Heaters must meet all applicable energy codes. Heaters shall have an input rating of \_\_\_\_\_ BTU/H and a recovery capacity of \_\_\_\_\_ GPH at a temperature rise of 100°F with a storage capacity of \_\_\_\_\_ gallons. Heater shall be equipped with a 2-3/4" x 3-3/4" boiler-type handhole cleanout and shall have a working pressure of 150 psi. Heater(s) shall be provided with an automatic gas shutoff device and safety shutoff in event pilot flame is extinguished; a gas pressure regulator set for the type of gas supplied; an approved draft diverter, and extruded anode rod rigidly supported for cathodic protection. A CSA Certified and ASME Rated T&P Relief Valve shall be furnished and installed by the manufacturer. The tank shall be foam insulated. 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 glasslined 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 three year limited warranty against corrosion and tank failure due to sediment build-up as outlined in the written warranty. Heater(s) shall be design certified by CSA for operation of the heater in a closed system where thermal expansion has not been compensated for with a properly sized expansion tank will void the warranty. Fully illustrated instruction manual and parts list to be included.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## CONSERVATIONIST™ POWER VENT

### APPROVAL RATINGS AND CERTIFICATION

- All models comply with: ANSI Z21.10.3/CSA 4.3 and current edition of ASHRAE/IES 90.1
- All models are approved for use in combined appliance applications

### CFC-FREE FOAM INSULATION

- Minimizes radiant heat loss

### DIP TUBE

- Carries inlet water deep into tank

### HOT SURFACE IGNITION

- Has a solid state ignition surface that does not flutter or blow out
- Provides increased reliability and efficiency over spark ignition systems, while eliminating the pilot and saving energy

### USER-FRIENDLY

- State-of-the-art electronic gas control provides more precise temperature control
- LED control light displays operation status and diagnostics information

### ENHANCED-FLOW BRASS DRAIN VALVE

- Solid brass, tamper resistant, enhanced-flow, ball type, drain valve
- Uses a standard female hose fitting that allows for fast and easy draining during maintenance
- Designed for easy operation, this valve includes an integral screwdriver slot that features a ¼ turn (open/close) radius, which not only permits full straight-through water flow but also a quick and positive shut off

### Blue Diamond® GLASS COATING

- Provides superior corrosion resistance compared to the industry-standard glass lining

### STANDARDS

- Design-certified by CSA International, according to ANSI Z21.10.3 - CSA 4.3 standards governing storage-type water heaters
- Meets the thermal efficiency and standby loss requirements of NRCAN and current edition of ASHRAE/IESNA 90.1

### POWERED VENTING

- Provides more venting flexibility and savings with a new quiet blower that allows for exhaust venting through the roof or sidewall with plastic pipe such as ULC S636 PVC, CPVC, and polypropylene
- Up to 125 equivalent feet of pipe make installation easy in any situation
- BTF-80 is a Category 3 (positive pressure non-condensing) appliance

### ANODES

- Tank-mounted, screw-in magnesium anodes for longer tank life

### HIGH INPUT

- 76,000 BTU input assures plenty of hot water is available by providing faster recovery rates and higher first hour draws

### BURNER

- High input, multi-port burner for improved combustion efficiency

### BUILT-IN CONDENSATE FITTING

- A condensate management coupling that attaches vent pipe to the blower is included

### INSTALLED TEMPERATURE & PRESSURE RELIEF VALVE

- Factory-installed and matched to the heater. (Specify if your local code requires a special T&P)

### MAXIMUM HYDROSTATIC WORKING PRESSURE 150 PSI

### WARRANTY

- 3 year limited tank warranty
- 1 year limited parts warranty

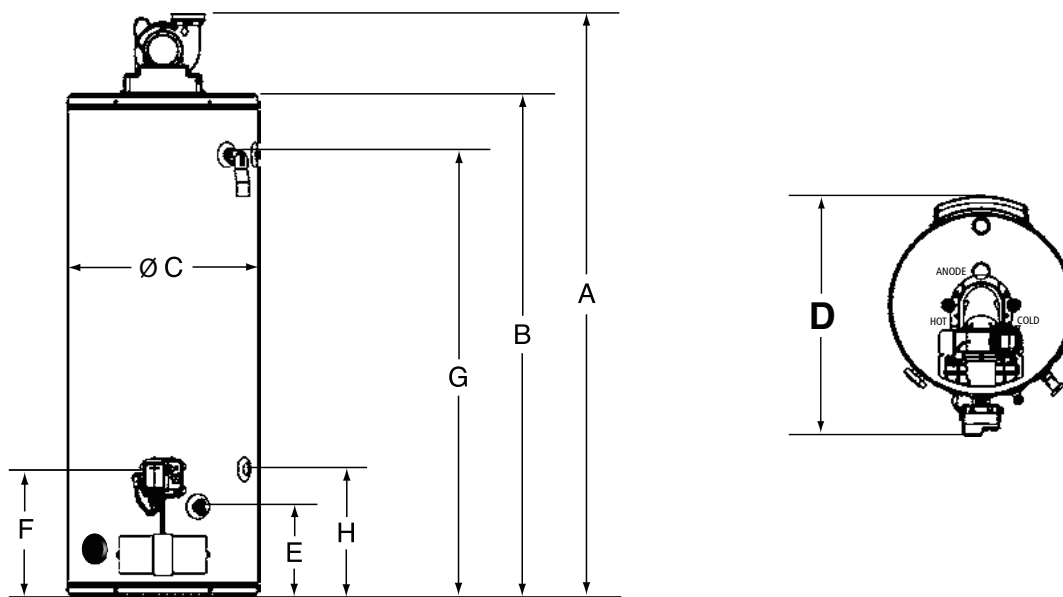
For complete warranty information, consult written warranty or contact A. O. Smith



**BTF-80  
SERIES 210/211**







## DIMENSIONS

MODEL NUMBER	A IN (CM)	B IN (CM)	C IN (CM)	D IN (CM)	E IN (CM)	F IN (CM)	G IN (CM)	H IN (CM)	WATER CONNECTIONS	GAS CONNECTION	APPROX. SHIPPING WEIGHT LB (KG)
BTF-80	70 <sup>5</sup> / <sub>8</sub> (179)	61 <sup>1</sup> / <sub>4</sub> (156)	26 (66)	33 <sup>1</sup> / <sub>8</sub> (84)	11 (28)	13 <sup>1</sup> / <sub>4</sub> (36)	53 (135)	15 <sup>1</sup> / <sub>4</sub> (39)	<sup>3</sup> / <sub>4</sub> " NPT	<sup>1</sup> / <sub>2</sub> " NPT	277 (126)

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

## RECOVERY CAPACITIES

U.S. GALLONS/h AND LITRES/h AT TEMPERATURE RISE INDICATED

MODEL NUMBER	INPUT		APPROX. CAPACITY		°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
BTF-80	BTU/h	kW	USG	L	°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
	76,000	22.3	75	280	GPH	246	185	148	123	106	92	82	74	67	62	57	52
					LPH	932	699	559	466	400	350	311	280	254	233	215	200

Available in LP (Propane) gas

Can be installed up to 10,100 feet (3,078 m) without alteration.

## SAMPLE SPECIFICATION

Water Heater(s) shall be power vent model no. \_\_\_\_\_ as manufactured by A. O. Smith or an approved equal. Heater(s) shall be internally glass-lined and gas-fired, equipped to burn \_\_\_\_\_ gas, and design-certified to the latest ANSI Standard by CSA International. Rating of \_\_\_\_\_ Gallons and an input rating of \_\_\_\_\_ BTU/h with a recovery capacity of \_\_\_\_\_ GPH at 100°F. Waters heaters must be certified for power venting applications using standard schedule 40 ULC 636 PVC, CPVC or polypropylene vent piping. The water heater shall include a 6' plug-in cord and provision for direct connection to standard electrical conduit. Blower shall include a pressure switch which will shut down power to the burner in case of vent system failure due to down drafts or vent blockage. Heater shall have a maximum working a pressure of 150 psi, and a nominal storage tank capacity of \_\_\_\_\_ gallons with a 3/4" relief valve opening. Heater(s) shall also be equipped with an automatic shut off device to shut off entire gas supply in event of excessive temperature in tank. Outer jacket shall have a baked enamel finish.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

### DURA-POWER™

Designed for use as a recovery heater having its own storage tank. Available in upright standard models (DEN) and lowboy models (DEL).

#### GLASSLINED TANK

- Thirteen sizes; 6 thru 119 gallon capacity. Tank interior is coated with glass specially designed by A. O. Smith for water heater use.

#### ELEMENTS

- Zinc plated copper sheaths for longer life. Medium watt density means lower surface temperature to minimize scale build-up and more surface to heat water. Element sizes from 1.5 to 6 KW. Maximum input 12 KW (see chart).

#### STANDARD VOLTAGES

- 120, 277 single phase and 208, 240 and 480V unbalanced three-phase delta; easily converted to single-phase at terminal block (except 208V with 5500 watt elements).
- Single element heaters are single-phase only.

#### TERMINAL BLOCK

- Factory-installed. Just bring the service to heater and connect to block. Terminal block not supplied on 120V & 277V models. (No junction box on DEL6-20)

#### CONTROLS

- Temperature control (adjustable through a range of 110° to 170°F on single element and 120° to 181°F on dual element) and manual reset high temperature cutoff per element.

#### CSA CERTIFIED AND ASME RATED T&P RELIEF VALVE

#### HEAT TRAP NIPPLES ARE FACTORY-INSTALLED ON ALL MODELS

#### SIMPLIFIED CIRCUITRY, COLOUR CODED FOR EASE OF SERVICE

#### ANODE ROD FOR MAXIMUM CORROSION PROTECTION

#### CABINET HAS BONDERIZED UNDERCOAT WITH BAKED ENAMEL FINISH

#### DRAIN VALVE (EXCLUDES DEL 6-20)

#### UL APPROVED FIELD CONVERSION PROGRAM

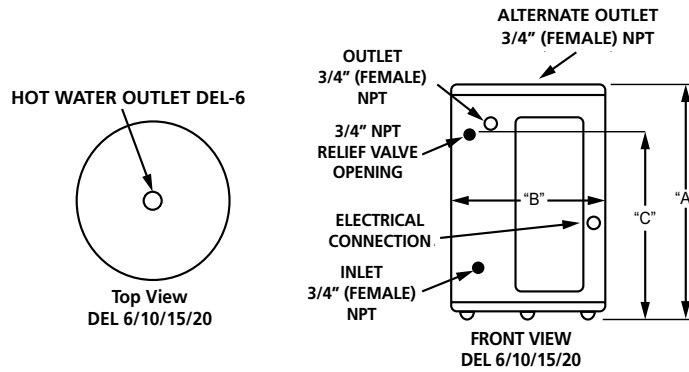
#### COMPLIANCE

- Meets the standby loss requirements of NRCAN and current edition of ASHRAE/IES 90.1.

#### LIMITED WARRANTY OUTLINE

- If the tank should leak any time during the first three years, under the terms of the warranty, A. O. Smith will furnish a replacement heater; installation, labour, handling and local delivery extra. THIS OUTLINE IS NOT A WARRANTY. For complete information consult the written warranty or A. O. Smith.



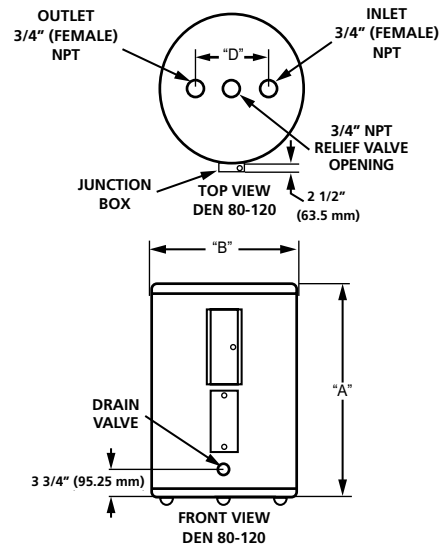
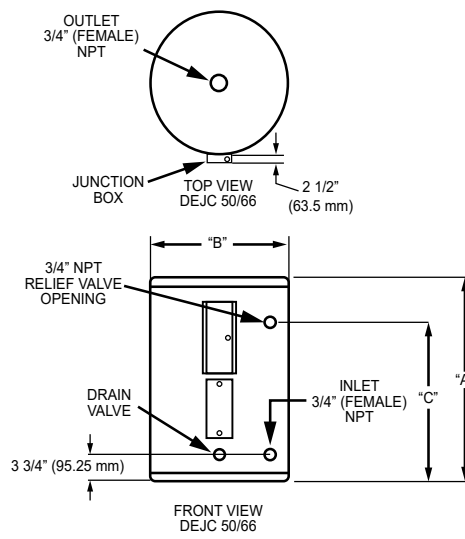
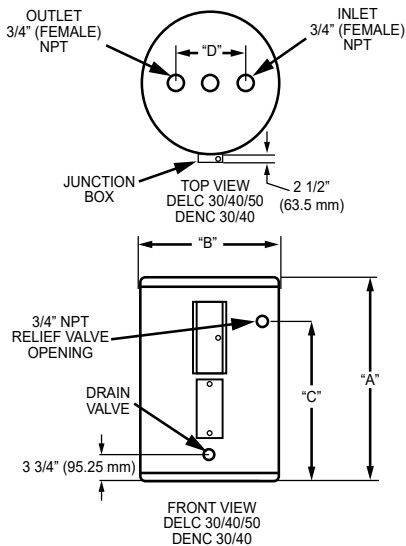


## ROUGH-IN DIMENSIONS

\*(NO SIDE OUTLET AVAILABLE FOR DEL-6 MODELS)

MODEL NUMBER	NO. OF ELEMENTS	TANK CAPACITY		STANDBY LOSS	A		B		C		D		SHIPPING WEIGHT	
		USG	L		IN	MM	IN	MM	IN	MM	IN	MM	LB	KG
DEL-6	1	6	23	N/A	15-1/2	394	14-1/4	362	11	279	N/A	N/A	35	16
DEL-10	1	10	37	N/A	18-1/4	464	18	457	12-1/2	318	N/A	N/A	54	25
DEL-15	1	13	49	49	26	660	18	457	20-1/2	521	N/A	N/A	58	26
DEL-20	1	19	74	54	22-1/4	565	21-3/4	552	15-3/8	391	N/A	N/A	73	33

\* No side outlet available on DEL-6 Model



## ROUGH-IN DIMENSIONS

MODEL NUMBER	NO. OF ELEMENTS	TANK CAPACITY		STANDBY LOSS	A		B		C		D		SHIPPING WEIGHT	
		USG	L		IN	MM	IN	MM	IN	MM	IN	MM	LB	KG
DELC-30	2	27	103	46	31-5/8	803	24	610	21-15/16	557	8	203	120	54
DELC-40	2	36	138	53	33-7/8	860	26	660	23-7/8	606	8	203	115	52
DELC-50	2	50	190	63	36	914	26-1/2	673	26-1/8	664	8	203	175	79
DENC-30	2	29	109	47	39-7/8	1013	22	559	30-7/16	773	8	203	100	45
DENC-40	2	38	145	54	49-7/8	1267	20-1/2	521	40-3/4	1035	8	203	103	47
DEJC-50	2	49	184	77	48-1/4	1226	22	559	40-5/16	1024	Side Inlets	-	127	58
DEJC-66	2	63	237	87	60-1/2	1537	22	559	52-3/4	1340	Side Inlets	-	150	68
DEN-80	2	75	284	86	59-3/8	1508	24	610	N/A	N/A	8	203	211	96
DEN-120	2	113	428	146	62-7/16	1586	29-3/8	746	N/A	N/A	8	203	326	148

## ELEMENT AVAILABILITY CHART (LIGHT-DUTY COMMERCIAL ELECTRIC)

MODELS & ELEMENTS	VOLTAGE	PHASE	WIRING	KW INPUT AVAILABLE									
6-GALLON MODELS SINGLE-ELEMENT	120V	1	-	1.5	2	2.5	3						
	208V	1	-	1.5	2	2.5	3						
	240V	1	-	1.5	2	2.5	3						
	277V	1	-	1.5	2	2.5	3						
	480V	1	-		2	2.5	3						
10-GALLON THROUGH 20-GALLON MODELS SINGLE-ELEMENT	120V	1	-	1.5	2	2.5	3						
	208V	1	-	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
	240V	1	-	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
	277V	1	-	1.5	2	2.5	3		4	4.5	5		6
	480V	1	-		2	2.5	3		4	4.5	5	5.5	6
30-GALLON THROUGH 120-GALLON MODELS DOUBLE-ELEMENT	120V	1	Interlock	1.5	2	2.5	3						
		1	Simultaneous	3	4	5	†						
	208V	1/3	Interlock	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
		1/3	Simultaneous	3	4	5	6	7	8	9	10**	11**	†
	240V	1/3	Interlock	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
		1/3	Simultaneous	3	4	5	6	7	8	9	10	11	12**
	277V	1/3	Interlock	1.5	2	2.5	3		4	4.5	5		6
		1/3	Simultaneous	3	4	5	6		8	9	10		12
	480V	1/3	Interlock		2	2.5	3		4	4.5	5	5.5	6
		1/3	Simultaneous		4	5	6		8	9	10	11	12

6 gallon model not available above 3kW  
 6/10/15/20 gallon models all A6 circuit (2 wire) only  
 † Exceeds maximum amp draw.  
 \*\* Simultaneous only in 3ph

## ELECTRIC CHARACTERISTICS

ELECTRIC CHARACTERISTICS													
NON SIMULTANEOUS AND SINGLE ELEMENT OPERATION 6 - 120 GALLON					SIMULTANEOUS DUAL ELEMENT OPERATION (SINGLE PHASE CONNECTION) 30 - 120 GALLON					SIMULTANEOUS DUAL ELEMENT OPERATION (UNBALANCED THREE PHASE CONNECTION) 30 - 120 GALLON			
ELEMENT WATTAGE	FULL LOAD CURRENT IN AMPERES (TERMINALS - L1, L2)				ELEMENT WATTAGE	FULL LOAD CURRENT IN AMPERES (TERMINALS - L1, L2)				ELEMENT WATTAGE	FULL LOAD CURRENT IN AMPERES (TERMINALS - L2 / TERMINAL L1 & L3)		
Upper/Lower	120V	208V	240V	480V	Upper/Lower	120V	208V	240V	480V	Upper/Lower	208V	240V	480V
1500	12.5	7.2	6.3	3.2	1500/1500	25.0	14.4	12.5	6.3	1500/1500	12.4/7.2	10.8/6.3	5.4/3.2
2000	16.7	9.6	8.3	4.2	2000/2000	33.4	19.2	16.6	8.3	2000/2000	16.6/9.6	14.4/8.3	7.2/4.2
2500	20.8	12.0	10.4	5.2	2500/2500	41.6	24	20.8	10.4	2500/2500	20.8/12.0	18.0/10.4	9.0/5.2
3000/3000	25.0	14.4	12.5	6.3	3000/3000	N/A	28.8	25	12.5	3000/3000	25.0/14.4	21.6/12.5	10.8/6.3
3500/3500	N/A	16.6	14.5	N/A	3500/3500	N/A	33.7	29.2	N/A	3500/3500	29.1/16.9	25.2/14.6	N/A
4000/4000	N/A	19.2	16.7	8.3	4000/4000	N/A	38.4	33.3	16.6	4000/4000	33.3/19.2	28.8/16.7	14.4/8.3
4500/4500	N/A	21.6	18.8	9.4	4500/4500	N/A	43.2	37.5	18.75	4500/4500	37.4/21.6	32.4/18.8	16.2/9.4
5000/5000	N/A	24.0	20.8	10.4	5000/5000	N/A	N/A	41.6	20.8	5000/5000	41.6/24.0	36.0/20.8	18.0/10.4
5500/5500	N/A	26.4	22.9	N/A	5500/5500	N/A	N/A	45.8	22.9	5500/5500	45.6/26.4	39.5/22.9	19.8/11.5
6000/6000	N/A	28.8	25.0	12.5	6000/6000	N/A	N/A	N/A	25	6000/6000	N/A	43.3/25.0	21.6/12.5

## RECOVERY CAPACITIES

ELEMENT WATTAGE (UPPER/ LOWER)	INPUT	U. S. GALLONS/HR AND LITRES/HR AT TEMPERATURE RISE INDICATED											
		F°	36	40	54	60	72	80	90	100	108	120	126
	KW	C°	20	22.2	30	33.3	40	44.4	50	55.5	60	66.6	70
NON-SIMULTANEOUS OPERATION													
/1500	1.5	GPH	17	15	11	10	8	8	7	6	6	5	5
		LPH	64	58	43	38	32	29	26	23	21	19	18
/2000	2	GPH	23	20	15	14	11	10	9	8	8	7	6
		LPH	85	77	57	51	43	38	34	31	28	26	24
/2500	2.5	GPH	28	25	19	17	14	13	11	10	9	8	8
		LPH	107	96	71	64	53	48	43	38	36	32	30
3000/3000	3	GPH	34	30	23	20	17	15	14	12	11	10	10
		LPH	128	115	85	77	64	58	51	46	43	38	37
3500/3500	3.5	GPH	40	36	26	24	2	18	16	14	13	12	11
		LPH	151	136	98	90	75	68	60	52	49	45	41
4000/4000	4	GPH	45	41	30	27	23	20	18	16	15	14	13
		LPH	170	153	114	102	85	77	68	61	57	51	49
4500/4500	4.5	GPH	51	46	34	30	25	23	20	18	17	15	14
		LPH	192	173	128	115	96	86	77	69	64	58	55
5000/5000	5	GPH	56	51	38	34	28	25	23	20	19	17	16
		LPH	213	192	142	128	107	96	85	77	71	64	61
5500/5500	5.5	GPH	63	56	42	37	31	28	25	22	21	18	18
		LPH	238	211	158	140	117	105	94	83	79	68	68
6000/6000	6	GPH	68	61	45	41	34	30	27	24	23	20	19
		LPH	256	230	170	153	128	115	102	92	85	77	73
SIMULTANEOUS OPERATION													
3000/3000	6	GPH	68	61	45	41	34	30	27	24	23	20	19
		LPH	256	230	170	153	128	115	102	92	85	77	73
3500/3500	7	GPH	80	72	53	48	40	36	32	28	26	24	22
		LPH	302	272	200	181	151	136	121	105	98	90	83
4000/4000	8	GPH	90	81	60	54	45	41	36	32	30	27	26
		LPH	341	307	227	205	170	153	136	123	114	102	97
4500/4500	9	GPH	101	91	68	61	51	46	41	36	34	30	29
		LPH	384	345	256	230	192	173	153	138	128	115	110
5000/5000	10	GPH	113	101	75	68	56	51	45	41	38	34	32
		LPH	426	384	284	256	213	192	170	153	142	128	122
5500/5500	11	GPH	126	113	84	75	63	56	50	45	42	37	36
		LPH	476	427	317	283	238	211	189	170	158	140	136
6000/6000	12	GPH	135	122	90	81	68	61	54	49	45	41	39
		LPH	511	460	341	307	256	230	205	184	170	153	146

Recovery capacities at 100° F rise equal: for non-simultaneous element operation = 4.1 gal. x kW of one element; for simultaneous element operation = 4.1 gal. x 2/3 kW of both elements.  
For other rises multiply element kW as previously explained by 410 and divide by temperature rise. Full load current for single phase = total watts/voltage.

## SPECIFICATION

The water heaters(s) shall be Dura-Power™ Model(s) No. \_\_\_\_\_ as manufactured by A. O. SMITH or an approved equal. Heater(s) shall be rated at \_\_\_\_\_ kW, \_\_\_\_\_ volts, \_\_\_\_\_-phase, 60 cycle AC, and listed by Underwriters' Laboratories. Models shall meet the standby loss requirements of NRCan and current edition of ASHRAE/IES 90.1. Tank(s) shall be \_\_\_\_\_ gallon capacity. Heater(s) shall have 150 psi working pressure and be equipped with extruded high density anode rod. All internal surfaces of the heater(s) exposed to water shall be glasslined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range of 1400°F to 1600°F. Electric heating elements shall be medium watt density with zinc plated copper sheath. Each element shall be controlled by an individually mounted thermostat and high temperature cutoff switch. The outer jacket shall be of backed enamel finish and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided (except on 120V & 277V {no junction box on DEL-6 thru 20}). The drain valve shall be located in the front for ease of servicing. Heater tank shall have a three year limited warranty as outlined in the written warranty. Fully illustrated instruction manual to be included.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

### GOLD SERIES COMMERCIAL ELECTRIC WATER HEATER

Designed for use as a recovery heater having its own storage tank.

Note: Not recommended for sanitizing water applications.

#### FEATURES

- Meets the standby loss requirements of NRCAN and current edition of AHRAE/IES 90.1.

#### INCOLOY IMMERSION HEATERS

- Heavy-duty medium watt density elements (three/immersion heater) have incoloy sheathing: provide excellent protection against oxidation and scaling.

#### GLASSLINED TANK

- Three sizes: 50, 80 and 119 gallon capacity. Tank interior is coated with glass specially developed by A. O. Smith for water heater use. Tanks rated at 150 psi (1034 kPa) working pressure.

#### FUSING

- Protects all elements, thermostats, and internal wiring circuits against excess current flow.

#### STANDARD VOLTAGES

- 208, 240 and 480V single-phase and three-phase delta. Convertible from three-phase to single-phase (in field) and vice versa. 277V single-phase also available.

#### TERMINAL BLOCK

- Factory installed. Just bring the electrical service to the heater and connect to block.

#### CONTROLS

- One temperature control (adjustable through a range of 120° to 181°F) and manual reset high temperature cut-off per element. Thermostat step control may be achieved by varying settings on individual temperature controls. Located behind hinged control compartment door for quick, easy access.

#### OTHER STANDARD FEATURES

- Surface mounted thermostats
- Simplified circuitry, colour coded for ease of service
- Two anode rods for maximum corrosion protection
- Cabinet has bonderized undercoat with baked enamel finish
- Bottom inlet and top outlet openings
- Brass drain valve
- CSA Certified and ASME rated T&P relief valve
- Single panel control box
- Foam insulation reduces costly heat loss.

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

- For complete warranty information, consult written warranty or go to [hotwater.com](http://hotwater.com).



MODELS  
DRE-52, 80, 120



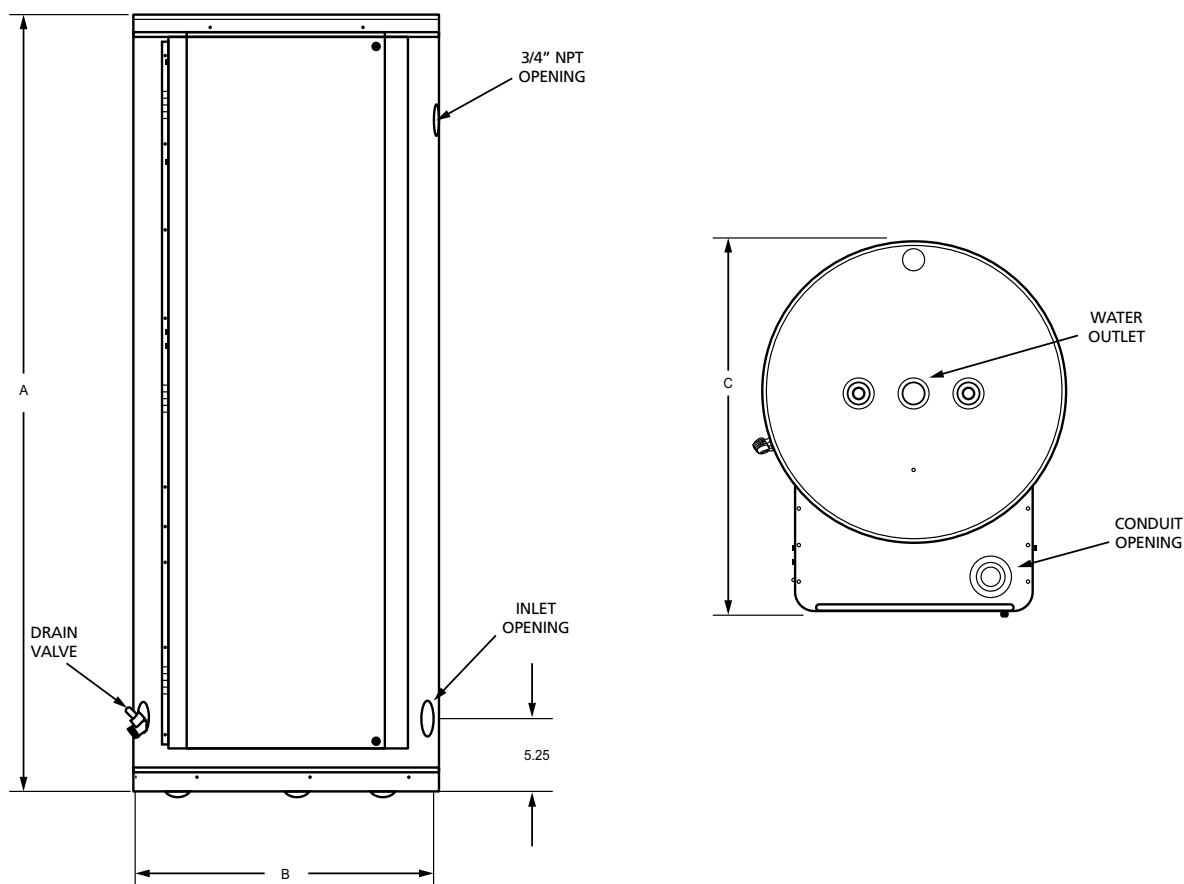
OPTIONAL





## OPTIONS

- UL and cUL listed conversion kits to adjust voltage and kW requirements in the field before and after installation
- ASME 160 psi (1103 kPa) tank construction
- International voltages – 220, 380, 400, 415, 575, and 600 volts, three phase available with Y connected elements
- MANIFOLD KITS – for multiple tank installations. Two heaters -part # 100109231, three heaters- part # 100109232 and four heaters- part # 100109233



## DIMENSIONS

MODEL NUMBER	TANK CAPACITY		DIMENSIONS						INLET/OUTLET (NPT)	APPROX. SHIPPING WEIGHT	
			A		B		C				
	USG	LITRE	INCHES	CM	INCHES	CM	INCHES	CM		INCHES	LB
DRE-52	50	179	55-3/4	142	21-3/4	55	27	69	1-1/4	265	120
DRE-80	80	286	60-1/4	153	25-1/2	65	31	79	1-1/4	280	127
DRE-120	119	426	62-1/4	158	29-1/2	75	35	89	1-1/4	390	177

For ASME Construction add "A" to the model number (example: DRE 52A 24).

## RECOVERY CAPACITIES

STANDARD KW INPUT	BTU/h	°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	45°C	50°C	56°C	61°C	67°C	72°C	78°C
6	20,478	GPH	82	62	49	41	35	31	27	25	22	21	19	18
		LPH	310	233	166	155	133	116	103	93	85	78	72	66
9	30,717	GPH	123	92	74	62	53	46	41	37	34	31	28	26
		LPH	465	349	279	233	199	174	155	140	127	116	107	100
12	40,956	GPH	164	123	98	82	70	61	55	49	45	41	38	35
		LPH	620	465	372	310	266	233	207	186	169	155	143	133
13.5	46,075	GPH	184	138	111	92	79	69	62	55	50	46	43	40
		LPH	698	523	419	349	299	262	233	209	190	174	161	150
15	51,195	GPH	205	154	123	102	88	77	68	61	56	51	47	44
		LPH	775	582	465	388	332	291	258	233	211	194	149	166
18	61,434	GPH	246	184	148	123	105	92	82	74	67	62	57	53
		LPH	930	698	558	465	399	349	310	279	254	233	215	199
24	81,912	GPH	328	246	197	164	140	123	109	98	90	82	76	70
		LPH	1241	930	744	620	532	465	414	372	338	310	286	266
27	92,151	GPH	369	276	221	185	158	138	123	111	101	92	85	79
		LPH	1396	1047	938	609	509	523	465	410	391	340	322	299
30	102,390	GPH	410	307	246	205	176	154	137	123	112	102	95	88
		LPH	1551	1163	930	775	665	582	517	465	423	388	358	332
36	122,868	GPH	492	369	295	246	211	184	164	148	134	123	113	105
		LPH	1861	1396	1117	930	798	698	620	556	508	465	429	399
40.5	138,226	GPH	554	418	332	277	237	208	185	166	151	138	128	119
		LPH	2094	1570	1256	1047	897	785	698	628	634	582	537	498
45	153,585	GPH	615	461	369	307	263	230	205	184	168	154	142	132
		LPH	2326	1745	1398	1163	997	872	755	698	634	582	537	498
54	184,302	GPH	738	554	443	359	316	277	246	221	201	185	170	158
		LPH	2791	2094	1675	1396	1196	1047	930	837	761	696	644	598

Figured at 1 kW (3413 BTU) = 4.1 Gallons at 100°F temperature rise.



# Commercial Electric Water Heaters

KW INPUT	MODEL NUMBERS TANK CAPACITY IN GALLONS			NUMBER OF ELEMENTS	ELEMENT WATTAGE	FULL LOAD CURRENT IN AMPERES							
						SINGLE PHASE				THREE PHASE			
	50	80	119			208V	240V	277V	480V	208V	240V	480V	600V
6	DRE-52-6	DRE-80-6	DRE-120-6	3	2,000	28.8	25.0	21.7	12.5	16.7	14.4	7.2	6.0
9	DRE-52-9	DRE-80-9	DRE-120-9	3	3,000	43.3	37.5	32.5	18.8	25.0	21.7	10.8	9.0
12	DRE-52-12	DRE-80-12	DRE-120-12	3	4,000	57.7	50.0	43.3	25.0	33.3	28.9	14.4	12.0
13.5	DRE-52-13.5	DRE-80-13.5	DRE-120-13.5	3	4,500	64.9	56.3	48.7	28.1	37.5	32.5	16.2	13.5
15	DRE-52-15	DRE-80-15	DRE-120-15	3	5,000	72.1	62.5	54.2	31.3	41.6	36.1	18.0	15.0
18	DRE-52-18	DRE-80-18	DRE-120-18	3*	6,000	86.5	75.0	65.0	37.5	50.0	43.3	21.7	18.0
24	DRE-52-24	DRE-80-24	DRE-120-24	6	4,000	115.4	100.0	86.6	50.0	66.6	57.7	28.9	24.0
27	DRE-52-27	DRE-80-27	DRE-120-27	6	4,500	129.8	112.5	97.5	56.3	74.9	65.0	32.5	27.0
30	DRE-52-30	DRE-80-30	DRE-120-30	6	5,000	144.2	125.0	108.3	62.5	83.3	72.2	36.1	30.0
36	DRE-52-36	DRE-80-36	DRE-120-36	6*	6,000	173.1	150.0	130.0	75.0	99.9	86.6	43.3	36.0
40.5	N/A	DRE-80-40.5	DRE-120-40.5	9	4,500	194.7	168.8	146.2	84.4	112.4	97.4	48.7	40.5
45	N/A	DRE-80-45	DRE-120-45	9	5,000	216.3	187.5	162.5	93.8	124.9	108.3	54.1	45.0
54	N/A	DRE-80-54	DRE-120-54	9	6,000	N/A	225.0	194.9	112.5	149.9	129.9	65.0	54.0

\*208 volt models may contain three (3) additional elements.

For ASME construction add "A" to the model number (example: DRE-52A-24).

## SUGGESTED SPECIFICATION

The heater(s) shall be Gold Series Commercial Electric Model Number \_\_\_\_\_ as manufactured by A. O. Smith. Heater(s) shall be rated at \_\_\_\_\_ kW, \_\_\_\_\_ volts, \_\_\_\_\_ phase, 60 cycle AC, and listed by Underwriters' Laboratories and approved to the NSF Standard 5 by UL. Tank(s) shall be \_\_\_\_\_ (50, 80 or 119) gallon capacity. Tanks shall have \_\_\_\_\_ (150 [Std] or 160 [ASME]) psi working pressure and be equipped with extruded high density anode. All internal surfaces of the heater(s) exposed to water shall be glasslined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range of 1400°F to 1600°F. Electric heating elements shall be low watt density. Each element shall be controlled by an individually mounted thermostat and high temperature cut-off switch. All internal circuits shall be fused. The outer jacket shall be of baked enamel finish and shall be provided with full size control compartment for performance of service and maintenance through hinged front panel and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided. The drain valve shall be located in the front for ease of servicing. Heater tank shall have a three year limited warranty as outlined in the written warranty. Manufacturer shall supply ASME rated temperature and pressure relief valve. Fully illustrated instruction manual to be included. Meets standby loss requirements of NRCan and current edition of ASHRAE/IES 90.1.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## DURA-POWER™ XI COMMERCIAL ELECTRIC

### ADVANCED ELECTRONIC CONTROL

- A. O. Smith's new proprietary electronic water heater control, provides precise + or - 1°F temperature control, that is ideal for industrial and food service applications where accurate hot water temperatures are needed.

### EASY-TO-READ TEXT

- Animated icons display detailed operational and diagnostic information. Fault or alert messages appear if an operational issue occurs.

### LOW WATER CUT-OFF

- Factory standard on board low water cut-off uses a remote electronic immersion type probe to prevent energizing of the elements in the event of low water condition and eliminates accidental dry firing.

### PROGRESSIVE MODULATING

- Matches number of elements to current load conditions. Rotates and lead lags element loads to provide long life and equal wear.

### ECONOMY MODE OPERATION

- Control system automatically lowers the operating set point by a programmed value during user defined time periods. Seven-day clock may be programmed for night set back and or weekend shutdown to reduce operating cost and save money.

### BMS COMPATIBLE

- Modbus/BACnet compatible with optional Gateway interface. Call 888 WATER02 for more information.

### PERMAGLAS® GLASS LINING IS STANDARD

- Exclusive process provides superior protection against corrosion in varying water conditions. Cement linings are optional.

### ASME CODE CONSTRUCTION

- All models are constructed to the requirements of ASME and are available in 125, 150 and 160 psi working pressures (125 psi working pressure - standard). Consult factory for ASME code tanks with greater or lesser working pressures and special configurations or materials.

### INCOLOY IMMERSION HEATERS

- Heavy-duty elements have incoloy sheathing: provide excellent protection against oxidation and scaling. The input ranges from 15kW to 900kW (see accompanying chart).

### FUSING

- Control and power circuit fusing to meet N.E.C.

### COMPLIANCE

- Meets the standby loss requirements of NRCan and current edition of ASHRAE/IES 90.1.

### MAGNETIC CONTACTOR(S)

- Heavy duty UL rated for 100,000 cycles.

### OTHER STANDARD FEATURES

- Colour-coded circuitry for easier servicing
- Anode rods for maximum corrosion protection
- Standard voltages include 208, 240, 380, 400, 415, 480, 600 volt single or three-phase
- International voltages available (consult factory)
- Factory-installed terminal block(s)
- Temperature and pressure relief valve

### OPTIONAL DUAL-ENERGY SOURCE CAPABILITY

- Provides emergency back up energy source or winter/summer boiler operation. Can be specified with optional water to water or steam to water heat exchangers. Both single and double-wall heat exchangers are available. Complete control packages can be factory-installed for hook-up and run capability.

### THREE YEAR LIMITED WARRANTY

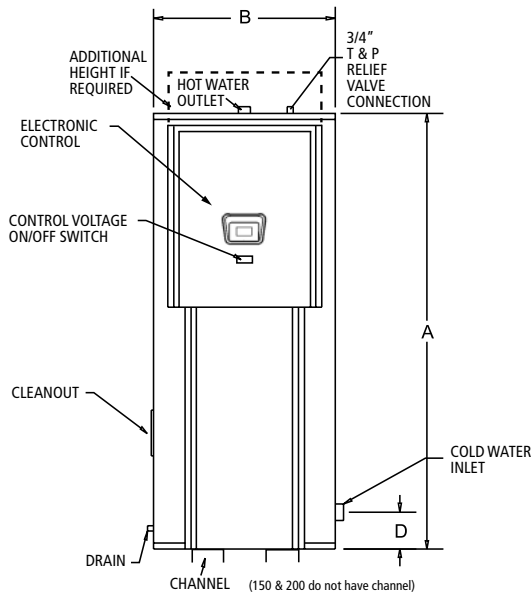
- For complete warranty information consult written warranty or go to [hotwater.com](http://hotwater.com)



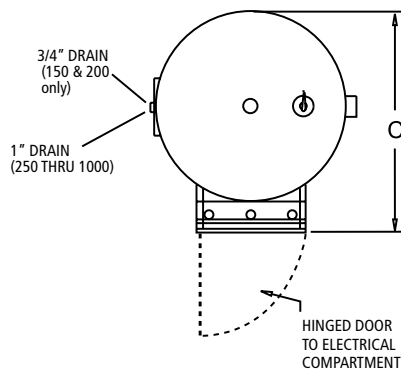
**DHE-DVE  
MODELS**



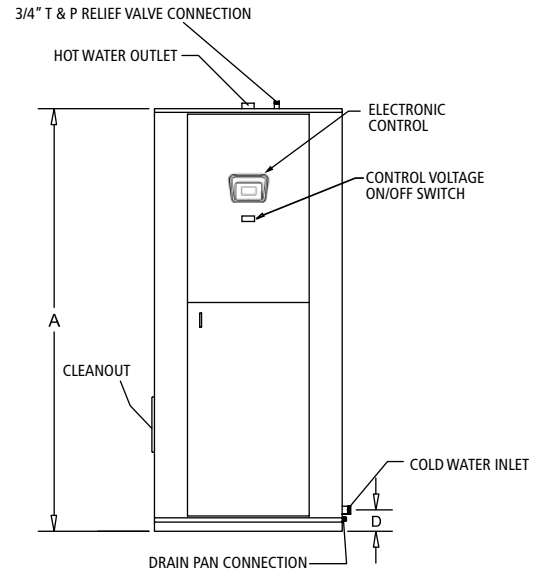
## Vertical Round Models 150-1000



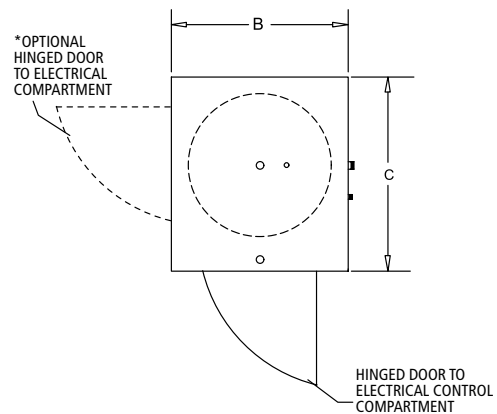
### TOP VIEW



## Vertical Square Models 1250-2500

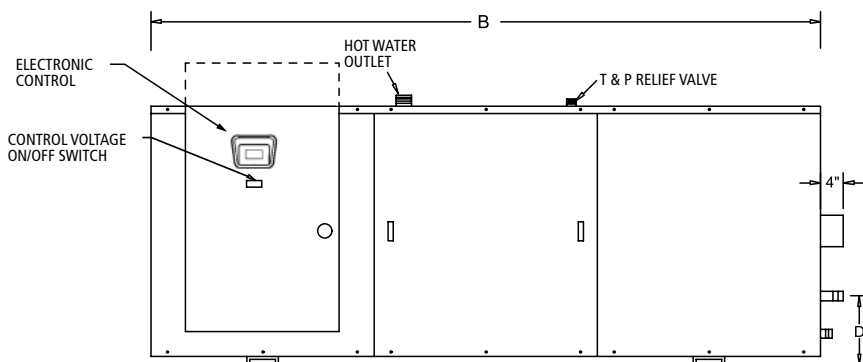


### TOP VIEW

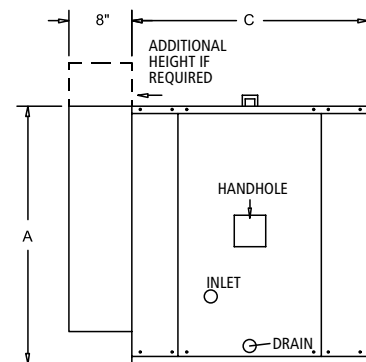


\*An oversized control panel may be required on models with inputs above 72 kW. An oversized control panel may increase the width and depth of the square jacket by up to 2".

## Horizontal Models



A & D ELEVATION FROM FINISHED FLOOR



END VIEW

EXTRA PANEL BOX MAY BE NECESSARY FOR INPUTS HIGHER THAN 72KW. CONSULT FACTORY

MODEL NUMBER	MAX. KW	TANK CAPACITY		DIMENSIONS								WATER CONNECTION		SHIPPING WEIGHT	
				A		B		C		D		INLET OPENINGS	OUTLET OPENINGS		
		USG	LITRE	INCHES	CM	INCHES	CM	INCHES	CM	INCHES	CM	IN (NPT)	IN (NPT)	LB	KG
VERTICAL ROUND ELECTRIC STORAGE HEATER															
DVE-150A	144	150	568	65-1/2	166	32	81	38-3/4	98	11-3/4	30	1-1/2	1-1/2	650	295
DVE-200A	180	200	757	78	198	32	81	38-3/4	98	11-3/4	30	1-1/2	1-1/2	750	340
DVE-250A	216	250	946	92	234	34	86	40-3/4	104	19-1/4	49	1-1/2	1-1/2	1,165	528
DVE-300A	270	300	1,136	80	203	40	102	46-3/4	119	20-3/4	53	2	2	1,350	612
DVE-400A	360	400	1,514	80	203	46	117	52-3/4	134	22-1/4	57	2	2	1,590	721
DVE-500A	396	500	1,893	92	234	46	117	52-3/4	134	22-1/4	57	2	2	1,700	771
DVE-600A	396	600	2,271	92	234	52	132	60-3/4	154	24-1/4	62	2-1/2	2-1/2	2,010	912
DVE-800A	396	750	2,839	104	264	52	132	60-3/4	154	24-1/4	62	2-1/2	2-1/2	2,450	1,111
DVE-1000A	396	950	3,596	128	325	52	132	60-3/4	154	24-1/4	62	2-1/2	2-1/2	3,160	1,433
VERTICAL SQUARE ELECTRIC STORAGE HEATER															
DVE-1250A	900	1,250	4,732	132-1/2	337	64-1/2	164	64-1/2	164	23-1/4	59	3	3	3,560	1,615
DVE-1500A	900	1,500	5,678	128-1/2	326	70-1/2	179	70-1/2	179	25-1/4	64	3	3	4,120	1,869
DVE-2000A	900	2,000	7,571	124-1/2	316	78-1/2	199	78-1/2	199	27	69	3	3	4,350	1,973
DVE-2500A	900	2,500	9,464	146-1/2	372	82-1/2	210	82-1/2	210	29	74	3	3	5,750	2,608
HORIZONTAL SQUARE ELECTRIC STORAGE HEATER															
DHE-150A	144	150	568	37	94	68-1/2	174	34-1/4	87	12	31	2	2	1,180	535
DHE-200A	180	200	757	37	94	78	198	34-1/4	87	12	31	2	2	1,370	621
DHE-250A	225	250	946	39	99	90-1/4	229	36-1/4	92	13	33	2	2	1,450	658
DHE-300A	270	300	1,136	45	114	78-1/4	199	42-1/4	107	14-3/4	37	2	2	1,530	694
DHE-400A	360	400	1,514	52	132	78-1/4	199	48-1/4	123	16	41	2	2	1,750	794
DHE-500A	450	500	1,893	52	132	90-3/4	231	48-1/4	123	16	41	2	2	1,860	844
DHE-600A	540	600	2,271	58	147	90-3/4	231	54-1/4	138	13-1/2	34	2-1/2	2	2,340	1,061
DHE-800A	720	750	2,839	58	147	102-1/4	260	54-1/4	138	13-1/2	34	2-1/2	2	2,850	1,293
DHE-1000A	900	950	3,596	58	147	126-1/4	321	54-1/4	138	13-1/2	34	2-1/2	2	3,040	1,379
DHE-1250A	900	1,250	4,732	64	163	130-1/4	331	60-1/4	153	15	38	3	3	3,750	1,701
DHE-1500A	900	1,500	5,678	70	178	126-1/4	321	66-1/4	168	16	41	3	3	4,340	1,969
DHE-2000A	900	2,000	7,571	82	208	123-1/4	313	78-1/4	199	14	36	3	3	4,580	2,077
DHE-2500A	900	2,500	9,464	82	208	144-1/4	366	78-1/4	199	16-1/2	42	3	3	6,060	2,749

For higher inputs consult the factory.



# Commercial Electric Water Heaters

KW INPUT	GPH 100°F RISE	BTU/h EQUIVALENT	MAX. NO. OF ELEMENTS	NO. OF CONTROL STEPS	KW PER ELEMENT	NO. OF CONTACTORS 240/480V	SUGGESTED MODULATING CONTROL STEPS 240/480V	AMPERAGE DRAW					
								SINGLE PHASE		THREE PHASE			
								208V	240V	208V	240V	480V	600V
15	62	51,180	1	1	15	2/1		72	63	42	36	18	15
18	74	61,416	1	1	18	2/1		87	75	50	44	22	18
30	123	102,360	2	1	15	2/1		144	125	83	72	36	29
36	148	122,832	2	1	18	4/2	4/2	174	150	100	87	44	35
45	185	153,540	3	1	15	3/2	3/2	216	188	125	108	54	44
54	221	184,248	3	1	18	6/2	3/2	260	225	150	130	65	52
60	246	204,720	4	2	15	12/6	4/3	289	250	167	144	72	58
72	295	245,664	4	2	18	8/4	4/4	Not Recommended	Not Recommended	200	174	87	70
90	369	307,080	5	2	18	6/3	3/3			250	217	109	87
108	443	368,496	6	2	18	12/4	4/4			300	260	130	104
120	492	409,440	8	3	15	8/4	4/4			333	289	144	116
135	554	460,620	9	3	15	9/6	4/4			375	325	162	130
144	590	491,328	8	3	18	16/8	4/4			400	347	174	139
162	664	552,744	9	3	18	18/6	8/6			450	389	195	156
180	738	614,160	10	4	18	20/10	8/8			500	434	217	174
216	886	736,992	12	4	18	24/8	8/8			600	519	260	208
234	959	798,408	13	5	18	26/13	8/8			650	563	282	226
252	1,033	859,824	14	5	18	28/14	8/8			700	607	304	243
270	1,107	921,240	15	5	18	30/10	12/10			750	649	325	260
288	1,181	982,656	16	6	18	32/16	12/12			800	692	347	278
306	1,255	1,044,072	17	6	18	34/17	12/12			850	736	368	295
324	1,328	1,105,488	18	6	18	36/12	12/12			900	780	390	312
342	1,402	1,166,904	19	7	18	38/19	12/12			950	822	412	330
360	1,476	1,228,320	20	7	18	40/20	12/12			1,000	865	435	347
378	1,550	1,289,736	21	7	18	42/14	14/14			1,050	909	455	364
396	1,624	1,351,152	22	8	18	44/22	15/16			1,100	952	477	381
414	1,697	1,412,568	23	8	18	46/23	16/16			1,150	995	498	399
432	1,771	1,473,984	24	8	18	48/16	16/16			1,200	1,040	520	416

For higher inputs consult the factory.





# Commercial Electric Water Heaters

## TANK LININGS OPTIONS

### CEMENT

- A special formulation of cement providing excellent corrosion protection. Available on 250 gallon and larger tanks.

## SPECIAL CONSTRUCTION OPTIONS

### "12 X 16" MANHOLE – AVAILABLE ON 250 GALLON AND ABOVE

### 150 OR 160 PSI WORKING PRESSURE

- Must be specified at time of order.

## OTHER OPTIONAL FEATURES

### TEMPERATURE AND PRESSURE RELIEF VALVES

- For working pressures other than standard; consult factory.

### HORIZONTAL OR VERTICAL

- See specifications, most gallon capacities may be obtained in vertical or horizontal construction.

### CIRCULATING PUMP PACKAGE

- Circulating pump and piping sized to turn over entire storage capacity of tank once each hour. Recommended to optimize available water at temperature in horizontal tanks particularly where low draw conditions are anticipated.

### OPTIONAL INTERNATIONAL VOLTAGES

- 380 and 415 volts three-phase.

### FACTORY-INSTALLED DIAL-TYPE PRESSURE GAUGE

### FACTORY-INSTALLED DIAL-TYPE TEMPERATURE GAUGE

## CONTROL OPTIONS

### HOT WATER GENERATING TUBE HEAT EXCHANGERS

- Custom dual energy source units with heating units and control trim and can be built to design specifications on a special order basis for steam or boiler water applications. Consult factory or Hot Water Generator specification sheets for tube bundle sizing information and control options.
- Allows for remote connection to building demand limiter or other functions.

### PILOT LIGHTS AND SWITCHES

- Denotes heating stage(s) in operation. Up to one light per contactor is available.
- A simple means of load control allows all or part of unit input to be controlled manually. Up to one switch per contactor is available.

### SAFETY DOOR INTERLOCK

- Prevents opening of control panel door when heater power supply is on. NOTE: Once door is opened heater may be energized if necessary for service diagnosis.

### SHUNT TRIP CIRCUIT BREAKER

- A safety device (circuit breaker) which disconnects power to heater in the event of over-current, high temperature or low water level, breaker must be manually reset and field installed.

## SAMPLE SPECIFICATIONS

The heater(s) shall be A. O. Smith Commercial Electric Model Number \_\_\_\_\_ or an approved equal. Heater(s) shall be rated at \_\_\_\_\_ kW, \_\_\_\_\_ V, \_\_\_\_\_ phase, 60 cycle AC. The heater shall be for (vertical/horizontal) installation with lifting lug access and channel skid base not on every tank. Vessel shall be constructed to Section IV of the ASME Code for 125 psi working pressure. Vessel shall be glass-lined with anodic protection. Entire vessel and electrical controls are to be encased in a sheet metal enclosure with baked enamel finish. Tank to be insulated with fiberglass insulation. Enclosure to have hinged locking door over electric controls. There shall be \_\_\_\_\_ individually replaceable heavy duty Incoloy sheathed heating elements each complete with prewired terminal leads. These elements will be switched by magnetic contactors which are operated by a 120V fused control circuit protected by manual reset high limit. Control circuit is activated by a master pilot switch and electronic low water cutoff. This control shall prevent the entire electrical load from being switched on instantaneously. The control shall have even load progressive sequencing which utilizes the "first on, first off" principle thereby equalizing the operating time of heating elements and contactors. Each magnetic contactor and heating element circuit will be protected by a maximum of 60 amp cartridge type fuses with a minimum of 100,000 amp interrupting capacity. The entire water heating package shall be prewired to solderless terminal lugs, factory tested, complete with a CSA Certified and ASME Rated T&P relief valve and bear the Underwriters' Laboratories label. Heater(s) shall have a 3-year limited warranty as outlined in the written warranty. Fully illustrated instruction manual included. Water heater unit(s) shall be compatible with building management systems using Modbus or BACnet with factory supplied gateway.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## CUSTOM Xi™ SERIES HEAVY DUTY COMMERCIAL ELECTRIC WATER HEATERS

### ADVANCED ELECTRONIC CONTROL

- A. O. Smith's proprietary electronic water heater control, provides precise + or – 1° temperature control, that is ideal for industrial and food service applications where exact temperatures are needed.
- The Operating Set Point is adjustable from 90°F/42°C to 190°F/88°C. The factory setting is 120°F/49°C.
- Approved for 180°F/82°C sanitizing applications.

### EASY TO UNDERSTAND

- Text and animated icons display detailed operational and diagnostic information. Fault or Alert messages appear if an operational issue occurs.

### ELEMENT SENSING

- Each element is constantly monitored and current on/off state is displayed, any element failure is reported and it's exact location is shown, eliminates a need for field testing of elements.

### LOW WATER CUT-OFF

- Factory standard on board low water cut-off uses a remote electric immersion type probe to prevent energizing of the elements in the event of low water condition and eliminates accidental dry firing.

### SEQUENCING

- Units with multiple element contactors are sequenced on with one-second delay between stages. Prevents high amp electrical loads from hitting the electric system all at once and provides a smoother operating unit. Adjustable modulating mode is optional - see options.

### NIGHT SETBACK OPERATION

- Control system automatically lowers the operating set point by a user defined value during setback periods. Seven-day clock may be programmed for night set back and or weekend shutdown to reduce operating cost and save energy.

### BUILDING MANAGEMENT SYSTEM

- BACnet or Modbus compatible with optional ICC Gateway.
- Call 1.888.WATER02 for more information.

### POWERED ANODE

- The DSE models use a unique combination of a conventional magnesium anode and a European style power anode. The powered anode is self-adjusting to water conditions, does not require maintenance unless damaged, and provides longer-lasting tank protection in hard to reach areas. This multi-anode system provides superior anodic protection to hidden surfaces of the tank not protected in convention commercial electric water heaters.

### INCOLOY IMMERSION HEATERS

- Heavy-duty elements provide excellent protection against oxidation and scaling. Input ranges from 3kW to 90kW available (see accompanying chart). Rugged, industrial grade elements.

### HEAVY FOAM INSULATED

- All models meet or exceed the thermal efficiency and/or standby loss requirements of NRCan and current edition ASHRAE/IESNA 90.1.

### GLASSLINED TANK

- A. O. Smith's PermaGlas® coating provides truly superior protection against corrosion and is permanently bonded to all inner tank surfaces at 1600°F.

### ASME TANK CONSTRUCTION

- 160 psi working pressure.

### THREE YEAR LIMITED WARRANTY

- For complete warranty information consult written warranty.



**DSE-5A thru DSE-120A  
(DSE-100A Shown)**



Features and benefits continued on the following page.

## FEATURES AND BENEFITS (CONTINUED)

### STANDARD VOLTAGES

- 208, 240 and 480 volt single and three phase. All 208 and 240 volt at 24kW and below are supplied phase convertible (single to three and vice versa). 277 volt single phase also available. Consult factory for 120 volt power circuit availability.

### TERMINAL BLOCK

- To accept copper or aluminum leads (on units with more than one contactor).

### 120 VOLT CONTROL CIRCUIT

- Powered by fused transformer.

### MAGNETIC CONTACTORS

- Heavy-duty UL rated for 100,000 cycles.

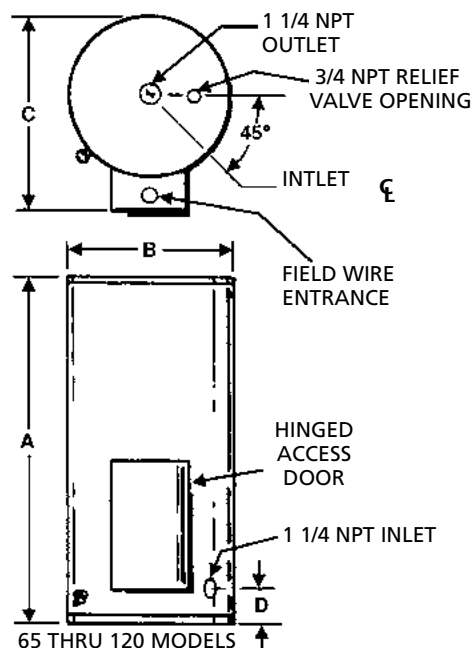
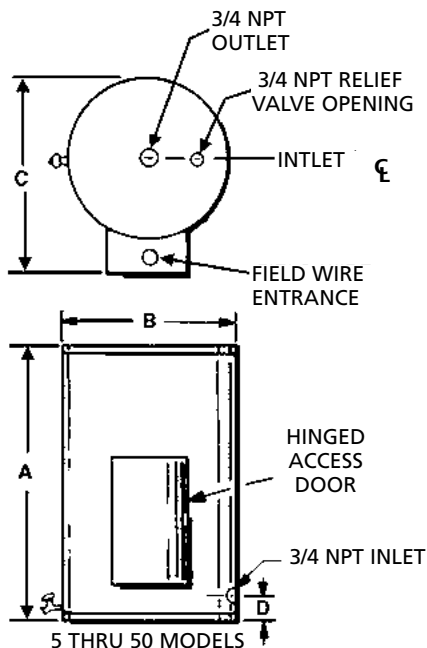
### POWER CIRCUIT FUSING

- Protects all elements, thermostats, and internal wiring circuits against excess current flow.

### SIMPLIFIED CIRCUITRY, COLOUR-CODED FOR EASE OF SERVICE

### HINGED CONTROL COMPARTMENT DOOR

### CSA CERTIFIED AND ASME RATED T&P RELIEF VALVE



## ROUGH-IN DIMENSIONS

MODEL NUMBER	TANK CAPACITY		MAXIMUM KW INPUT	DIMENSIONS								APPROX. SHIPPING WEIGHT	
				A		B		C		D			
	USG	LITRES		INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM	LB	KG
DSE-5A	5	19	3	22	559	16	406	24	610	4-1/4	108	82	37
DSE-10A	10	38	6	28-1/8	715	18	457	26	660	5-1/4	133	116	48
DSE-20A	20	76	18	31-3/4	807	22	559	28	711	5-3/4	146	145	66
DSE-30A	30	114	24	43-1/4	1,099	22	559	28	711	5-3/4	146	218	99
DSE-40A	40	151	36	54-3/4	1,391	22	559	28	711	5-3/4	146	245	111
DSE-50A	50	189	90	66-3/16	1,681	22	559	28	711	5-3/4	146	291	132
DSE-65A	65	246	90	57-1/4	1,454	26-1/2	673	32-1/2	826	11-3/8	289	344	156
DSE-80A	80	303	90	58-1/8	1,477	28	711	35	889	12-1/2	318	406	184
DSE-100A	100	379	90	70-1/4	1,784	28	711	35	889	12-1/2	318	419	190
DSE-120A	120	450	90	70-1/4	1,784	30-1/8	765	37	940	12-1/2	318	453	206

## RECOVERY CAPACITIES

GPH RECOVERIES AT LIST TEMPERATURE RISE													
STANDARD KW INPUT	BTU/h	30°F RISE	40°F RISE	50°F RISE	60°F RISE	70°F RISE	80°F RISE	90°F RISE	100°F RISE	110°F RISE	120°F RISE	130°F RISE	140°F RISE
3	10,239	41	31	24	20	17	15	13	12	11	10	10	9
6	20,478	82	62	49	41	35	31	27	25	22	21	19	18
9	30,717	123	92	74	62	53	46	41	37	34	31	28	26
12	40,956	164	123	98	82	70	61	55	49	45	41	38	35
15	51,195	205	154	123	102	88	88	68	61	56	51	47	44
18	61,434	246	184	148	123	105	92	82	74	67	62	57	53
24	81,912	328	246	197	164	140	123	109	98	90	82	76	70
30	102,390	410	308	246	205	176	154	137	123	112	103	95	88
36	122,868	492	369	295	246	211	184	164	148	134	123	113	105
45	153,585	615	461	369	307	263	230	205	184	168	154	142	132
54	184,302	738	554	443	359	316	277	246	221	201	185	170	158
60	204,780	819	615	492	410	351	307	273	246	223	205	189	176
75	255,975	1,025	768	615	512	439	384	341	307	279	256	236	219
90	307,170	1,229	922	738	615	527	461	410	369	335	307	284	263

## STANDARD kW INPUTS AND AMPERAGE

STANDARD KW RATINGS	IMMERSION HEATERS***	WATTAGE	NUMBER OF 50A CONTACTORS			FULL LOAD CURRENT IN AMPERES							
	NO. OF		208V	240V	480V	SINGLE PHASE				THREE PHASE			
						208V	240V	277V	480V	208V	240V	480V	600V
3	1	3,000	1	1	1	14.4	12.5	10.8	6.3	8.3	7.2	3.6	3.0
6	1	6,000				28.8	25.0	21.2	12.5	16.7	14.4	7.2	6.0
9	1	9,000				43.3	37.5	32.5	18.8	25.0	21.7	10.8	9.0
12	1	12,000				57.7	50.0	43.3	25.0	33.3	28.9	14.4	12.0
15	1	15,000				72.1	62.5	54.2	31.3	41.6	36.1	18.0	15.0
18	*1	18,000	2	2	1	86.5	75.0	65.0	37.5	50.0	43.3	21.7	18.0
24	2	12,000				115.4	100.0	86.6	50.0	66.6	57.7	28.9	24.0
30	2	15,000				144.2	125.0	108.3	62.5	83.3	72.2	36.1	30.0
36	*2	18,000	3	3	2	173.1	150.0	130.0	75.0	99.9	86.6	43.3	36.0
45	3	15,000				216.3	187.5	162.5	93.8	124.9	108.3	54.1	45.0
54	3	18,000				N/A	225.0	194.9	112.5	149.9	129.9	65.0	54.0
60	4	15,000	4	4	3	N/A	250.0	216.6	125.0	166.7	145.0	72.0	60.0
75	5	15,000	5	5		N/A	N/A	N/A	156.0	208.4	181.0	90.0	75.0
90	5	18,000				N/A	N/A	N/A	188.0	250.0	217.0	108.0	90.0

\* 208V models use one additional immersion heater.

\*\*\* Each immersion heater contains three electric elements.



# Commercial Electric Water Heaters

## OPTIONAL EQUIPMENT & CONSTRUCTION

**DIAL TYPE COMBINATION TEMPERATURE & PRESSURE GAUGE**  
(SHIPPED LOOSE).

### POWER CIRCUIT FUSING

- Sub-divides internal circuitry with maximum of 60 amp fuses. Supplied as standard when required by NEC and UL.

### ALARM HORN

- Horns may be furnished to warn of any condition in the heater for which sensors have been specified.

## CONTROL OPTIONS

### MODULATING CONTROL

- The first element on is the first element off.
- Not available on single element, single contactor units.

### OPTIONAL INTERNATIONAL VOLTAGES

- 380, 415, 575 and 600 volts three-phase available with Y connected elements.

## SPECIFICATION

The heater shall be a glass-lined Custom Xi™ commercial electric model No. \_\_\_\_\_ with \_\_\_\_\_ gallons storage, as manufactured by A. O. Smith. Heater should be rated at \_\_\_\_\_ kW, \_\_\_\_\_ volts, \_\_\_\_\_ phase, 50/60 cycle AC and constructed in accordance with ASME Code, shall bear appropriate symbol and be listed with the National Board as required. Heater shall be listed with Underwriters' Laboratories and classified to The National Sanitation Foundation Standard No. 5. All internal surfaces of the tank shall be glass-lined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature of 1600°F. Tank shall be cathodically protected with a combination of sacrificial and powered anodes. The entire vessel is to be enclosed in a round steel enclosure with baked enamel finish. Water heater shall have an electronic control with large LCD displaying current water heater status; provide real time element status and sensing, low water cut-off and economy mode operation. Shall have 120 volt control circuit transformer, transformer fusing, magnetic contactor(s), element fusing per N.E.C., and commercial grade incoloy elements. Temperature controls include limiting switch which will require resetting manually in the event the temperature reaches 202°F. Foam insulation shall meet the thermal efficiency and/or standby loss requirements of NRCan and current edition of ASHRAE/IES 90.1. Heater shall include a CSA Certified and ASME Rated T&P relief valve and drain valve.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## GOLD Xi SERIES COMMERCIAL ELECTRIC WATER HEATER

Designed for use as a recovery heater having its own storage tank or booster for supplying sanitizing rinse water for dish washing.

### FEATURES

- Meets the thermal efficiency and or standby loss requirements of NRCAN and current edition of ASHRAE/IES 90.1.

### ADVANCED ELECTRONIC CONTROL

- Easy to understand text and animated icons display detailed operational and diagnostic information. Fault or Alert messages appear if an operational issue occurs.
- Immersion temperature control adjustable through a range of 90°F to 190°F.

### BMS

- BACnet and Modbus compatible using optional BMS Gateway module.  
Call 888-928-3702 for information.

### ECONOMY MODE OPERATION

- Control system automatically lowers the Operating Set Point by a programmed value during user-defined time periods. Helps reduce operating costs during unoccupied or off - peak demand periods.

### LINEAR SEQUENCING

- Banks of heating elements (3 elements per bank) are energized according to adjustable (1 to 20°F) differential set points for each bank. First bank on is the last bank off. Helps reduce current surge and provides accurate water temperature control.

### INCOLOY ELEMENTS

- All models come standard with heavy duty incoloy elements.

### GLASS-LINED TANK

- Three sizes; 50, 80 and 119 gallon capacity. Tank interior is coated with glass specially developed by A. O. Smith for water heater use. Foam insulation reduces costly heat loss. Tanks rated at 150 psi (1034 kPa) working pressure.

### POWER CIRCUIT FUSING

- Protects elements and contactors from short circuits, overloading or line surges.

### STANDARD VOLTAGES

- 208, 240 and 480V single-phase and three phase delta. Convertible from three-phase to single-phase (in field) and vice versa (except 208/54 kW). 277V single-phase also available.

### TERMINAL BLOCK

- Factory installed. Allows for easy service connection to block.

### MAGNETIC CONTACTORS

- Heavy duty; UL rated 100,000 cycles.

### THREE YEAR LIMITED TANK WARRANTY

- For complete warranty information, consult written warranty or go to [hotwater.com](http://hotwater.com).

### OTHER STANDARD FEATURES

- Immersion style thermostats
- Simplified circuitry, colour coded for ease of service
- Hinged control compartment door for quick, easy access
- Two anode rods for maximum corrosion protection
- Cabinet has bonderized undercoat with baked enamel finish
- Top outlet, side inlet and relief valve openings
- Nipple and brass drain valve
- CSA certified and ASME rated T&P relief valve.

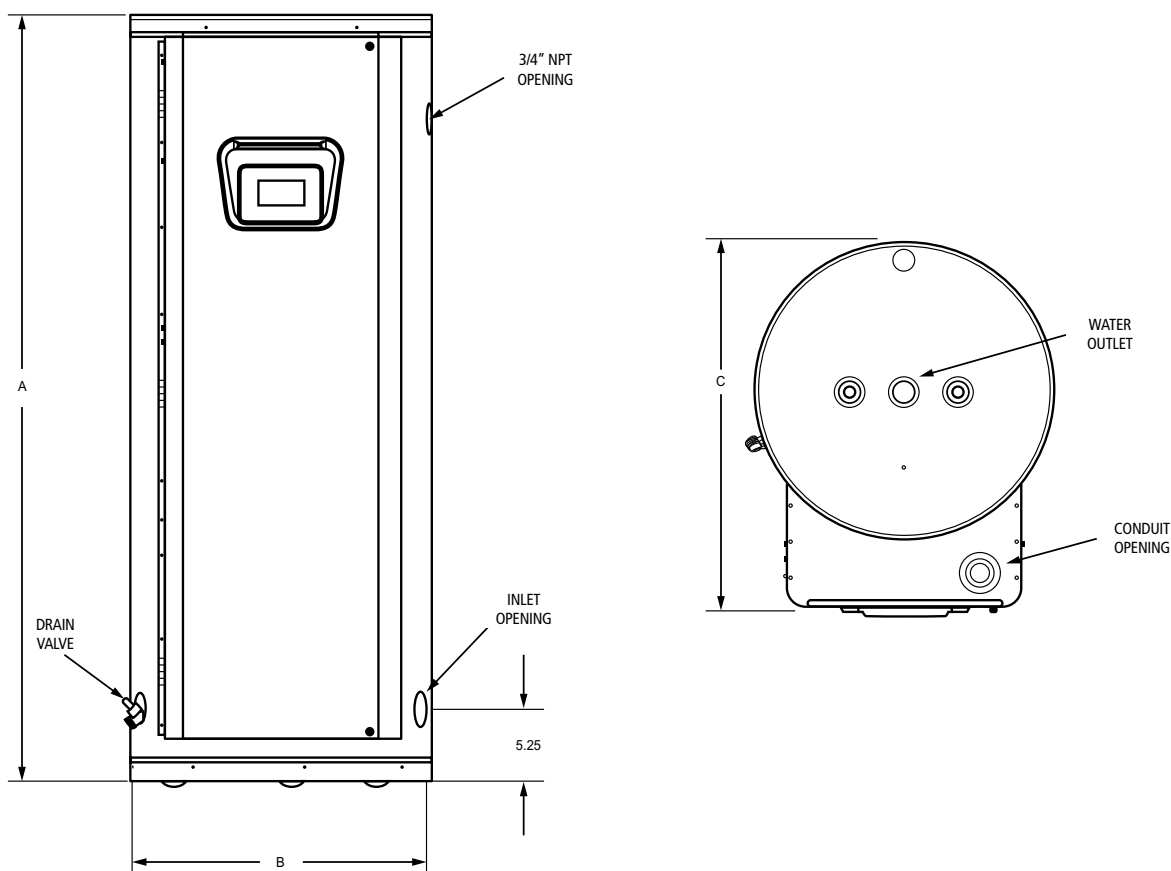


MODELS DVE-52, 80, 120



## OPTIONS:

- ASME 160 psi (1103 kPa) tank construction.
- UL Listed conversion kits to adjust voltage and kW requirement in the field before and after installation.
- Manifold kits for multiple tank installations. Two heaters - part # 100109231, three heaters - part # 100109232 and four heaters - part # 100109233.
- International voltages – 220, 380, 400, 415, 575, and 600 volts, three phase available with Y connected elements.



## ROUGH-IN DIMENSIONS

MODEL NUMBER	TANK CAPACITY		DIMENSIONS						INLET/ OUTLET (NPT)	APPROX. SHIPPING WEIGHT	
			A		B		C				
	USG	LITRE	INCHES	CM	INCHES	CM	INCHES	CM		INCHES	LB
DVE-52	50	179	55-3/4	142	21-3/4	55	27	69	1-1/4	265	120
DVE-80	80	286	60-1/4	153	25-1/2	65	31	79	1-1/4	280	127
DVE-120	119	426	62-1/4	158	29-1/2	75	35	89	1-1/4	390	177

For ASME construction add "A" to the model number (example: DVE-52A 24).



## RECOVERY CAPACITIES

STANDARD KW INPUT	BTU/h	°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	45°C	50°C	56°C	61°C	67°C	72°C	78°C
6	20,478	GPH	82	62	49	41	35	31	27	25	22	21	19	18
		LPH	310	233	166	155	133	116	103	93	85	78	72	66
9	30,717	GPH	123	92	74	62	53	46	41	37	34	31	28	26
		LPH	465	349	279	223	199	174	155	140	127	116	107	100
12	40,956	GPH	164	123	98	82	70	61	55	49	45	41	38	35
		LPH	620	465	372	310	266	233	207	186	169	155	143	133
13.5	46,075	GPH	184	138	111	92	79	69	62	55	50	46	43	40
		LPH	698	523	419	349	299	262	233	209	190	174	161	150
15	51,195	GPH	205	154	123	102	88	77	68	61	56	51	47	44
		LPH	775	582	465	388	332	291	258	233	211	194	149	166
18	61,434	GPH	246	184	148	123	105	92	82	74	67	62	57	53
		LPH	930	698	558	465	399	349	310	279	254	233	215	199
24	81,912	GPH	328	246	197	164	140	123	109	98	90	82	76	70
		LPH	1241	930	744	620	532	465	414	372	338	310	286	266
27	92,151	GPH	369	276	221	185	158	138	123	111	101	92	85	79
		LPH	1396	1047	938	609	509	523	465	410	391	340	322	299
30	102,390	GPH	410	307	246	205	176	154	137	123	112	102	95	88
		LPH	1551	1163	930	775	665	582	517	465	423	388	358	332
36	122,868	GPH	492	369	295	246	211	184	164	148	134	123	113	105
		LPH	1861	1396	1117	930	798	698	620	556	508	465	429	399
40.5	138,226	GPH	554	418	332	277	237	208	185	166	151	138	128	119
		LPH	2094	1570	1256	1047	897	785	698	628	572	522	485	450
45	153,585	GPH	615	461	369	307	263	230	205	184	168	154	142	132
		LPH	2326	1745	1398	1163	997	872	755	698	636	583	538	500
54	184,302	GPH	738	554	443	359	316	277	246	221	201	185	170	158
		LPH	2791	2094	1675	1396	1196	1047	930	837	761	696	644	598

Figured at 1 kW (3413 BTU) = 4.1 Gallons at 100°F temperature rise.

KW INPUT	MODEL NUMBERS TANK CAPACITY IN GALLONS			NUMBER OF ELEMENTS	ELEMENT WATTAGE	FULL LOAD CURRENT IN AMPERES							
						SINGLE PHASE				THREE PHASE			
	50	80	119			208V	240V	277V	480V	208V	240V	480V	600V
6	N/A	DVE-80-6	DVE-120-6	3	2,000	28.8	25	21.7	12.5	16.7	14.4	7.2	6.0
9	N/A	DVE-80-9	DVE-120-9	3	3,000	43.3	37.5	32.5	18.8	25	21.7	10.8	9.0
12	N/A	DVE-80-12	DVE-120-12	3	4,000	57.7	50	43.3	25	33.3	28.9	14.4	12.0
13.5	DVE-52-13.5	DVE-80-13.5	DVE-120-13.5	3	4,500	64.9	56.3	48.7	28.1	37.5	32.5	16.2	13.5
15	DVE-52-15	DVE-80-15	DVE-120-15	3	5,000	72.1	62.5	54.2	31.3	41.6	36.1	18	15.0
18	DVE-52-18	DVE-80-18	DVE-120-18	3*	6,000	86.5	75	65	37.5	50	43.3	21.7	18.0
24	DVE-52-24	DVE-80-24	DVE-120-24	6	4,000	115.4	100	86.6	50	66.6	57.7	28.9	24.0
27	DVE-52-27	DVE-80-27	DVE-120-27	6	4,500	129.8	112.5	97.5	56.3	74.9	65	32.5	27.0
30	DVE-52-30	DVE-80-30	DVE-120-30	6	5,000	144.2	125	108.3	62.5	83.3	72.2	36.1	30.0
36	DVE-52-36	DVE-80-36	DVE-120-36	6*	6,000	173.1	150	130	75	99.9	86.6	43.3	36.0
40.5	DVE-52-40.5	DVE-80-40.5	DVE-120-40.5	9	4,500	194.7	168.8	146.2	84.4	112.4	97.4	48.7	40.5
45	DVE-52-45	DVE-80-45	DVE-120-45	9	5,000	216.3	187.5	162.5	93.8	124.9	108.3	54.1	45.0
54	DVE-52-54	DVE-80-54	DVE-120-54	9	6,000	N/A	225	194.9	112.5	149.9	129.9	65	54.0

\*208 volt models may contain three (3) additional elements.  
For ASME construction add "A" to the model number (example: DVE - 52A 24).

## SUGGESTED SPECIFICATION

The heater(s) shall be Gold Xi Commercial Electric Model Number \_\_\_\_\_ as manufactured by A. O. Smith or equivalent. Heater(s) shall be rated at \_\_\_\_\_ kW \_\_\_\_\_ V \_\_\_\_\_ phase, 60 cycle AC as listed by Underwriters' Laboratories. All models meet National Sanitation Foundation NSF-5 requirements. Water heater shall have LCD display with built-in diagnostic and troubleshooting information. Tank(s) shall be \_\_\_\_\_ (50, 80 or 119) gallon capacity with \_\_\_\_\_ (150 [Std] or 160 [ASME]) psi working pressure and equipped with dual extruded high density anodes. 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°F to 1600°F. Internal power circuit fusing shall be provided. Element operation shall be linear sequencing through individual magnetic contactors. Control circuit shall be factory fused and include an immersion thermistor temperature probe with built in ECO control. Control cabinet and jacket shall be of baked enamel finish and shall provide full size control and element compartment for complete service and maintenance performance through front hinged compartment door, and enclose tank with foam insulation. 1 1/4" inlet and outlet connection shall be provided. The heater tank shall have a three year limited warranty and controls and accessories shall have a one year limited warranty as outlined in the written warranty. Fully illustrated instruction manual to be included. For multiple installation, factory built manifold kits for \_\_\_\_\_ (2, 3 or 4) heater installation shall be provided. Meets or exceeds the thermal efficiency and standby loss requirements of NRCan and current edition of ASHRAE/IES 90.1.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## CAHP SERIES FULLY INTEGRATED HEAT PUMP WATER HEATER

The CAHP-120 heat pump water heater is an integrated system designed specifically for the commercial market.

### FEATURES

#### ENERGY SAVING AND ENVIRONMENTALLY FRIENDLY

- Heat pump transfers heat from surrounding area into the tank
- Industry leading 4.2 COP
- Multiple operating modes maximizes efficiency while meeting specific hot water needs
- Large capacity tank enables heat pump to operate more frequently than electric elements, saving money for the end user
- Meets the standby loss requirements of NRCan and the current edition of ASHRAE 118.1
- Environmentally friendly R-134a refrigerant
- ENERGY STAR® Qualified

#### COMMERCIAL PERFORMANCE

- First hour delivery of 150 GPH (568 LPH)
- Rated heat pump power of 3.15 HP (240Vac) or 3.05 HP (208Vac)
- Electric heating element capacity of 12 kW (240Vac) or 9 kW (208Vac)
- Max water temperature of 150°F (66°C) in efficiency/Hybrid modes and 180°F (82°C) in electric mode
- Operating ambient range of 40-110°F (4-43°C)
- Low operating sound measured at 59 dB (A)
- Dual evaporator fans maximize performance and provide room cooling
- 3/4" NPT water inlet and outlet

### EASE OF OPERATION

- Integrated design and pre-charged refrigeration system makes for quick and easy install
- Large touch screen LCD display allows for mode selection, provides run information and includes troubleshooting alerts and detail
- Choose from three operating modes: Efficiency, Hybrid or Electric

### DEPENDABLE AND LONG LASTING DESIGN

- A. O. Smith-developed glass coated tank
- Tank rated at 160 PSI working pressure
- Commercial grade anode protects the tank and extends the service life
- Proven heat pump technology
- Electric elements have incoloy sheathing and provide excellent protection from oxidation and scaling

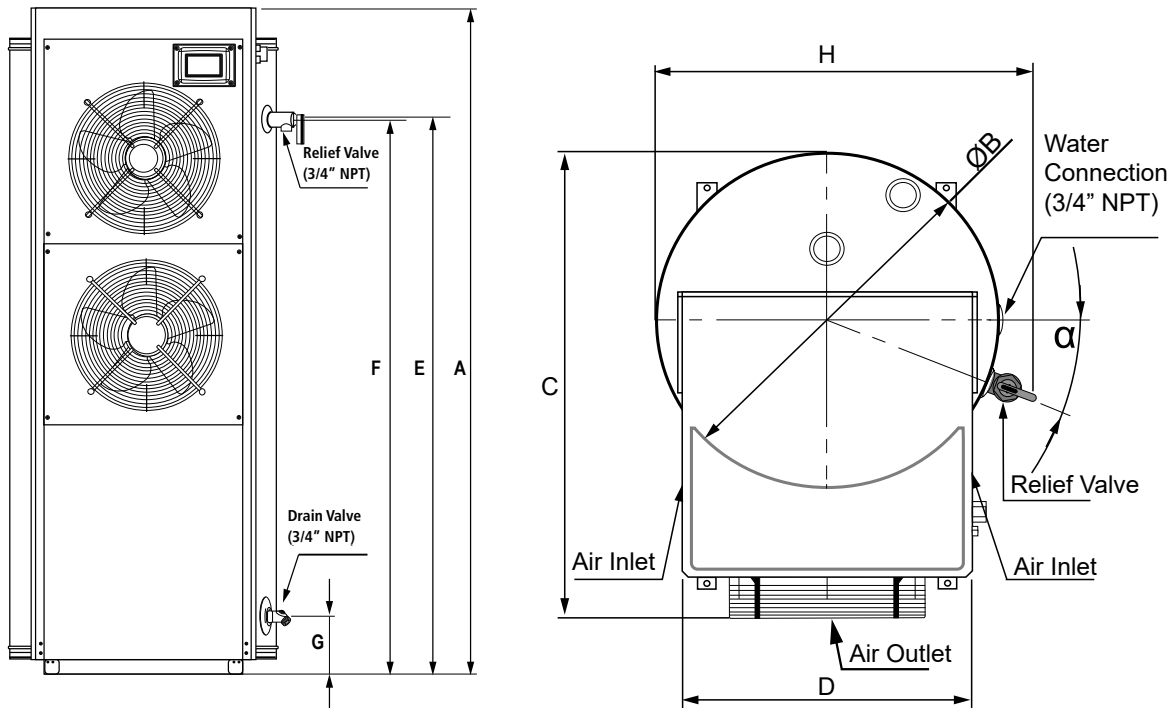
### THREE YEAR LIMITED TANK WARRANTY

- Backed by 3-year tank and 1-year parts/compressor limited warranties
- For complete warranty information, consult written warranty



**MODEL CAHP 120**





## ROUGH-IN DIMENSIONS

PHYSICAL DIMENSIONS IN (CM)								
TOTAL HEIGHT (A)	TANK DIAMETER (B)	MAXIMUM DEPTH (C)	SERVICE PANEL WIDTH (D)	RELIEF VALVE HEIGHT (E)	WATER OUTLET HEIGHT (F)	WATER INLET HEIGHT (G)	RELIEF VALVE ANGLE $\alpha$ (°)	MAXIMUM WIDTH (H)
69 ¾ (177)	28 (71)	39 ¼ (100)	23 ⅝ (60)	58 ⅞ (148)	57 ⅞ (147)	6 (15)	22	30 ⅞ (96)

## MODEL SPECIFICATIONS

MODEL NUMBER	NOMINAL CAPACITY USG (L)	COP	NUMBER OF ELEMENTS	TOTAL ELEMENT WATTAGE (BOTH ELEMENTS AT 240V)	FIRST HOUR DELIVERY IN HYBRID MODE GPH (LPH)	RECOVERY IN GPH (LPH) AT 100° F TEMPERATURE RISE	APPROX. SHIPPING WEIGHT LB (KG)
CAHP 120	119 (450)	4.2	2	12,000	150 (568)	Efficiency = 41 (155) Hybrid = 90 (341) Electric = 50 (189)	620 (281)

## RECOVERY CAPACITIES

MODE OF OPERATION	INPUT		TEMPERATURE RISE												
	BTU/h	KW	°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	45°C	50°C	56°C	61°C	67°C	72°C	78°C
EFFICIENCY	33,678	10	GPH	136	102	82	68	58	51	45	41	37	34	31	29
			LPH	515	386	309	258	221	193	172	155	140	129	119	110
HYBRID	74,624	22	GPH	302	226	181	151	129	113	101	90	82	75	70	65
			LPH	1141	856	685	571	489	428	380	342	311	285	263	245
ELECTRIC	40,946	12	GPH	165	124	99	83	71	62	55	50	45	41	38	35
			LPH	626	470	376	313	268	235	209	188	171	157	145	134

TECHNICAL CHARACTERISTICS		
MODEL TYPE	Integrated Heat Pump Water Heater	
COP	4.2	
HP RATED INPUT POWER	3.15 HP (2.35 kW)	
HP RATED HEATING OUTPUT CAPACITY	11.13 kW	
POWER SPECIFICATION	208/240Vac ~ 60Hz 1Ph	
MAXIMUM OPERATION CURRENT	67 A	
REFRIGERANT	R134a	
REFRIGERANT CHARGE QUANTITY	3.3 LB (1.5 KG)	
ELECTRICAL HEATING CAPACITY	12.0 kW	
MEASURED TANK CAPACITY	111.76 USG (423 L)	
OPERATION MODES	Efficiency, Hybrid, Electric	
MAX. WATER TEMPERATURE	EFFICIENCY/HYBRID	ELECTRIC
	150°F (66°C)	180°F (82°C)
OPERATING AMBIENT TEMPERATURE	40 - 110°F (4.4 - 43.3°C)	
UNIT OPERATION NOISE	59 dB (A)	
APPROX. HEATER WEIGHT	498 LB (226 KG)	
APPROX. SHIPPING WEIGHT	620 LB (281 KG)	

INSTALLATION KEY CONSIDERATIONS	
SERVICE CLEARANCES	A service clearance of 24 inches (61 CM) should be maintained from serviceable parts such as the T&P valve, control system components, drain valve, and anode.
AMBIENT AIR TEMPERATURE	In Efficiency Mode the ambient air temperature must be above 45°F (7°C) and below 110°F (43°C)
ROOM SIZE REQUIREMENT	Recommended to have a minimum installation space of approximately 3,200 cubic feet (91 cubic metres). Installation spaces less than the recommended could result in reduced water heater efficiency and performance. If the water heater is installed in a confined space with less than 3,200 cubic feet, provisions should be made to ensure sufficient airflow, such as installing louvered grills or fully louvered doors to ensure the most efficient operation of the water heater. Failure to do so could result in reduced heater efficiency and performance.
AMPERAGE/OVERCURRENT PROTECTION	This water heater requires a 208 or 240 VAC single phase, 100 amp power supply, at 60 Hz.
CONDENSATE DRAINING	This water heater produces condensate and must be properly drained.
DUCTING	There is not an optional ducting kit. Discharge air from the front of the water heater must be into a suitable room.
INDOOR/OUTDOOR	This water heater is approved for indoor use only.
THIS IS A PARTIAL LIST. PLEASE REFERENCE THE INSTALLATION MANUAL FOR DETAILED INSTALLATION CONSIDERATIONS.	

## SUGGESTED SPECIFICATION

The heater(s) shall be Commercial Heat Pump Model Number CAHP 120 as manufactured by A. O. Smith Water Products Company or equivalent. Heater(s) shall be rated at (specify) 12 kW @ 240V or 9 kW @ 208V, single phase, 60 cycle AC as listed by Underwriters' Laboratories. All models meet National Sanitation Foundation NSF-5 requirements. Water heater shall have LCD display with built-in diagnostic and troubleshooting information. Tank(s) shall be 119 gallon (450 litre) capacity with 160 psi working pressure and equipped with a commercial grade anode. 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°F to 1600°F. Internal power circuit fusing shall be provided. The heat pump water heater shall be capable of operating in Efficiency, Hybrid or Electric only modes. 3/4" NPT inlet and outlet water connections shall be provided. The water heater tank shall have a three year limited warranty; the compressor, refrigeration components and all other parts shall have a one year limited warranty. Fully illustrated instruction manual to be included. Meets or exceeds the efficiency and standby loss requirements of NRCan and current edition of ASHRAE 118.1.

## TANKLESS CONDENSING HIGH EFFICIENCY COMMERCIAL GAS

High-efficiency gas tankless water heaters with condensing technology featuring 96% thermal efficiency and 185°F maximum temperature setting to lower operating costs and provide the hot water output commercial applications call for.

### FEATURES:

**CONDENSING TECHNOLOGY PROVIDES UP TO 96% THERMAL EFFICIENCY**

**185°F MAXIMUM TEMPERATURE SETTING**

### DURABLE HEAT EXCHANGER

- Primary Heat Exchanger is constructed of Commercial-Grade Copper that is more resilient to erosion and is 25x better at heat transfer than stainless steel thus stabilizing outgoing water temperatures quicker
- Secondary Heat Exchanger is made of Type 316L Stainless Steel to protect against corrosion

**CONTINUOUS MAXIMUM FLOW RATES UP TO 10.0 GPM**

**AVAILABLE IN NATURAL GAS OR PROPANE (LP)**

**INCLUDES INTEGRATED TEMPERATURE CONTROLLER AND ADVANCED DIAGNOSTICS TO SIMPLIFY TROUBLESHOOTING**

**FACTORY-INSTALLED POWER CORD INCLUDED**

### EASY-LINK UP TO 4 UNITS

- With no additional parts or accessories needed

### MULTI-LINK UP TO 20 UNITS

### COMMON VENT UP TO 8 UNITS

### COMPLIES WITH LEAD FREE STANDARDS

- Safety Features:
- Air-Fuel Ratio (AFR) Sensor
- Exhaust & Water Temperature Safety Control
- Overheat Cut-Off Fuse

### INTERNAL FREEZE PROTECTION SYSTEM

### POWER DIRECT VENT DESIGN

- Exhaust, 3" venting up to 70 feet or 4" venting up to 100 feet
- Provides flexible venting with ULC S636, PVC, CPVC, or polypropylene pipe for intake and exhaust (solid core only).
- Category III or IV venting can be used

### ACCESSORIES

- Pipe Cover
- Neutralizer Kit
- Isolation Valve Kits
- Concentric Termination

### WARRANTY

- 6-year limited warranty on heat exchanger in commercial applications
- 5-year limited warranty on all parts

ACT-199





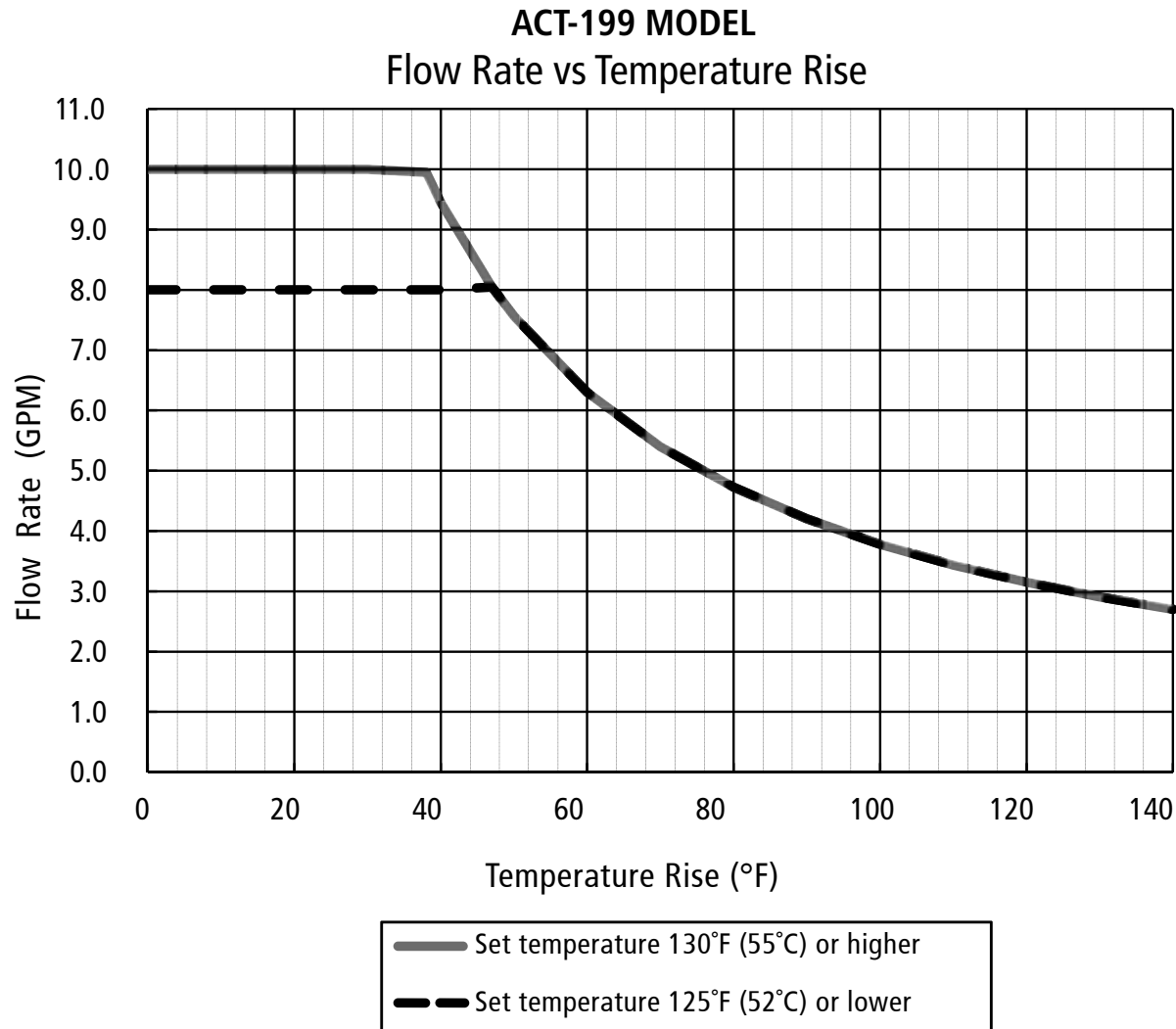
MODEL NUMBER	TYPE	GAS CONSUMPTION INPUT		INLET GAS PRESSURE		THERMAL EFFICIENCY	MAXIMUM GPM*	HOT/COLD CONNECTIONS	GAS CONNECTION	DIMENSIONS IN (CM)			APPROX SHIPPING WEIGHT LB (KG)
		MINIMUM BTU/h	MAXIMUM BTU/h	MINIMUM IN. W.C.	MAXIMUM IN. W.C.					HEIGHT	WIDTH	DEPTH	
ACT-199I-N	Natural	15,000	199,000	4.0	10.5	96%	10	¾" NPT	¾" NPT	23 ⅝ (60)	17 ¾ (45)	11 ¼ (29)	71 (32)
ACT-199I-P	Propane	13,000	199,000	8.0	14.0	96%	10	¾" NPT	¾" NPT	23 ⅝ (60)	17 ¾ (45)	11 ¼ (29)	71 (32)

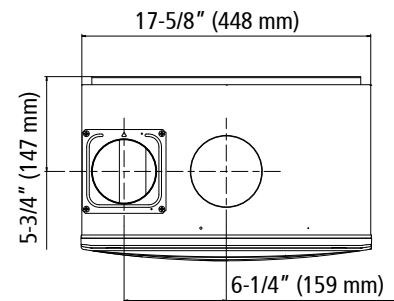
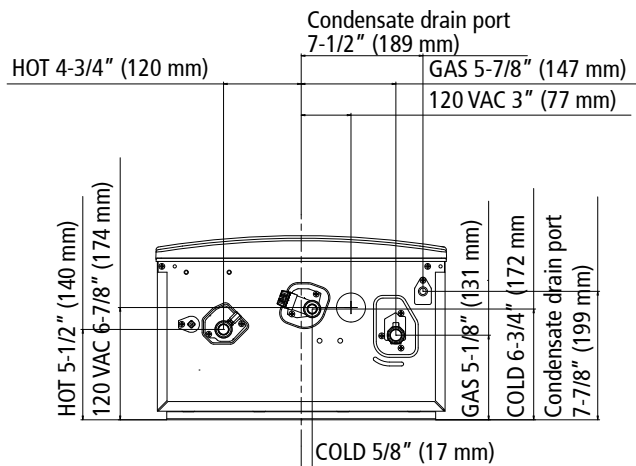
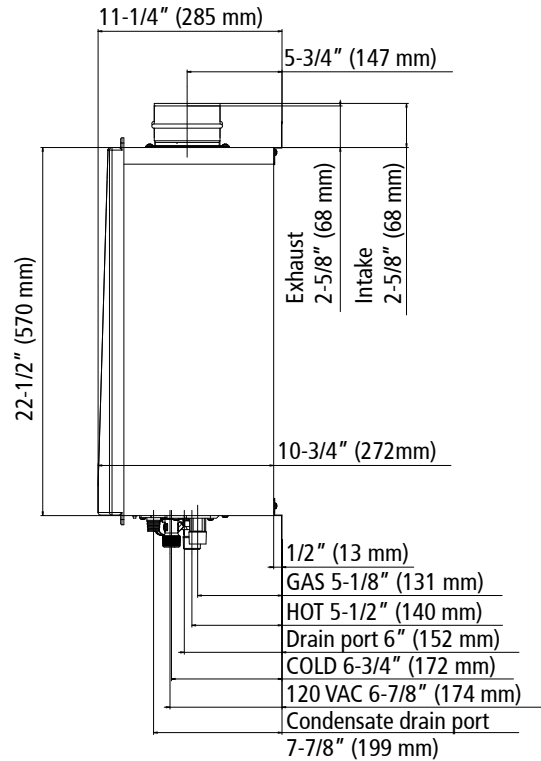
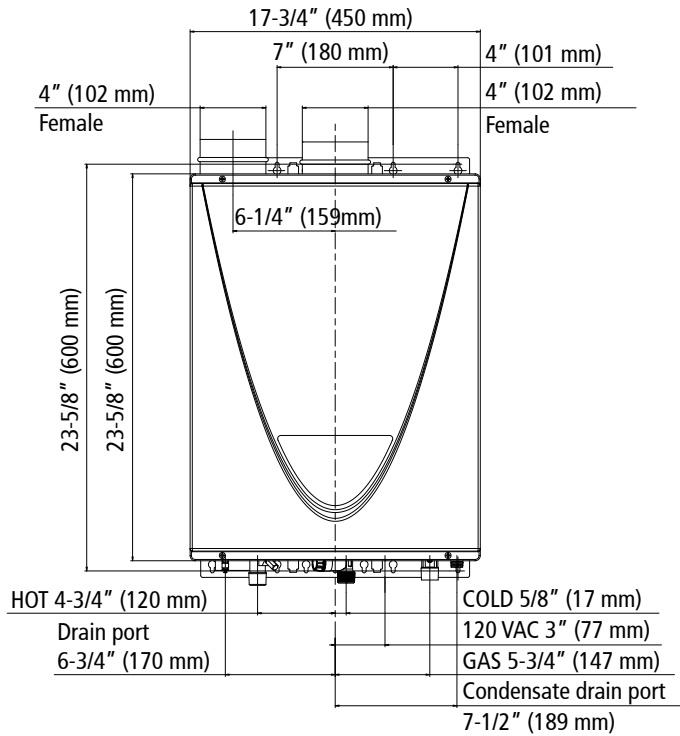
15-150 psi Water Pressure. 40 psi or above is recommended for maximum flow.

\*Current numbers based on factory testing; 0.4 GPM required for continuous fire after initial ignition.

Models are certified from sea level to 10,100 ft. elevations.

The manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligation.





## Optional Accessories

Part Number	Description
100112163	Concentric Termination Kit
100112159	Condensate Neutralizer Kit
100112691	Multi-Unit Controller
100112156	Isolation Valve Kit (with Pressure Relief Valve)
100112718	Pipe Cover
100113154	Product Preservers® Anti-Scale System
100113130	Non-return Valve for Common Vent Systems

### TANKLESS CONDENSING HIGH EFFICIENCY COMMERCIAL GAS SPECIFICATIONS

The fully modulating, on-demand, condensing gas fired commercial tankless water heater(s) shall be A. O. Smith model ACT-199, having a maximum input rating of 199,000 BTU/h and available in NG or LP. The heater shall have ¾ in. male NPT water and gas connections. The inlet gas supply pressures shall be 4.0 in. W.C. (min.) up to 10.5 in. W.C. (max.) for NG and 8.0 in. W.C. (min.) up to 14 in. W.C. (max.) for LP. The heater(s) shall incorporate an integrated temperature controller that will provide diagnostic information, fault history, and heater set temperature. The heater(s) shall operate using 120 V / 60 Hz power source. The heater(s) will incorporate a factory installed power cord.

The heater(s) exhaust shall be vented with 3" or 4" diameter ULC S636 approved schedule 40 PVC, CPVC, polypropylene or Category III/ IV vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, polypropylene, aluminum, or Category III/ IV pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent.

The water heater(s) shall use a commercial-grade copper, fin tube primary heat exchanger with quick release brass or bronze waterways. The secondary heat exchanger shall be constructed from stainless steel 316L. The heater(s) shall be controlled by an on-board solid-state printed circuit board which uses the following factory installed components: thermistors to monitor water temperature and exhaust temperature; a flow sensor to measure flow rate; a flame sensor to monitor combustion; an Air-Fuel Ratio Rod to measure and adjust air input in order to maintain optimal combustion efficiency. The heater also consists of in-line fusing and surge absorbers for electrical surge protection, an electronic spark igniter, aluminized stainless steel burners, hi-limit temperature switches to monitor water and exhaust temperatures, modulating gas valve, dual freeze protection that will automatically fire the heater and use heating blocks to protect the heat exchanger, and an overheat cutoff fuse.

The heater(s) can manifold to Easy-Link up to 4 heaters to provide additional capacity. The Easy-Link controls shall be built onto the on-board solidstate printed circuit board and does not require external controls. The linking control wire shall be supplied with the heater. The heater(s) can use a Multi-Unit controller, 100112691, to manifold 5-20 heaters. The Easy-Link and Multi-Unit Controller shall modulate the system for the most efficient performance. The Easy-Link and Multi-Unit Controller shall rotate the priority heater every 12 hours of operation time or 100 starts for balanced duty/cycle operation.

The heater(s) shall be CSA approved for sale in the United States and Canada, with a thermal efficiency of 96%, meets the energy efficiency requirements of NRCAN and current edition of ASHRAE 90.1, and shall be certified to NSF 5 Standards.

**For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.**

## TANKLESS HEAVY-DUTY COMMERCIAL MODELS

Designed specifically for heavy-duty commercial applications. Fully modulating, gas-fired, tankless water heaters with sealed combustion (optional) and power vented flue. Capable of supplying hot water for domestic hot water systems (directly or indirectly) using water storage tanks, recirculation systems, and/or combined domestic & heating applications (local codes dictate proper compliance).

### FEATURES

#### DESIGNED FOR PERFORMANCE

- Heat exchanger is constructed of commercial grade copper that is stronger than standard copper and more resilient against erosion and heat stress
- Continuous maximum flow rates up to 14.5 GPM
- Easy-link up to 4 units with no additional controller or Multi-link up to 10 units with multi-unit controller
- Available for natural gas (NG) or propane (LP)
- ASME models available

#### SAFETY FEATURES:

- Built-in freeze protection
- Manual reset hi limit (set at 194°F)
- Overheat cutoff fuse
- Inlet and outlet thermistors and mixing for constant temperature monitoring
- GFI, fuse and surge absorber
- Flame sensor

### VENTING AND COMBUSTION

- 5" Category III Stainless Steel
- Air fuel ratio rod
- Vertical or horizontal installation
- 50' equivalent max length, 5 elbows max (90° elbows = 5' equivalent length)
- Power vent design
- Electronic ignition - no pilot light
- 5" combustion air intake (with optional kit 100074538)

#### OPTIONAL ACCESSORIES

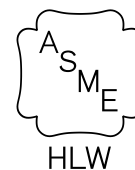
- Multi-unit controller for 5-10 units (100112192)
- Remote temperature controller (100112155)
- Direct vent conversion kit (100074538)
- Pipe cover (100112190)
- Concentric vent kit (100066841)
- Isolation valve kit including pressure relief valve (100112255)

#### WARRANTY

- 6-year limited warranty on heat exchanger in commercial applications
- 5-year limited warranty on all parts



**ATI-910-N**  
**ATI-910-P**  
**ATI-910-AN**  
**ATI-910-AP**



ANSI Z21.10.3 CSA 4.3

MODEL	FUEL TYPE	GAS CONSUMPTION INPUT		THERMAL EFFICIENCY	INLET GAS PRESSURE		GPM**	DIMENSIONS IN (CM)			VOLT	AMP	FLUE***	INTAKE	HOT/COLD GAS CONN.	UNIT WEIGHT LB (KG)
		MIN. BTU/h	MAX. BTU/h		MIN. W.C.	MAX. W.C.		HEIGHT	WIDTH	DEPTH						
ATI-910-N	Natural	15,000	380,000	80%	5.0	10.5	0.5 - 14.5	25 1/4 (64)	24 7/8 (63)	12 1/4 (31)	120	1.48	5" O.D.	5" O.D.	1" NPT	112 (51)
ATI-910-P	Propane	15,000	380,000	82%	8.0	14.0	0.5 - 14.5	25 1/4 (64)	24 7/8 (63)	12 1/4 (31)	120	1.48	5" O.D.	5" O.D.	1" NPT	112 (51)
ATI-910-AN*	Natural	15,000	380,000	80%	5.0	10.5	0.5 - 14.5	25 1/4 (64)	24 7/8 (63)	12 1/4 (31)	120	1.48	5" O.D.	5" O.D.	1" NPT	112 (51)
ATI-910-AP*	Propane	15,000	380,000	82%	8.0	14.0	0.5 - 14.5	25 1/4 (64)	24 7/8 (63)	12 1/4 (31)	120	1.48	5" O.D.	5" O.D.	1" NPT	112 (51)

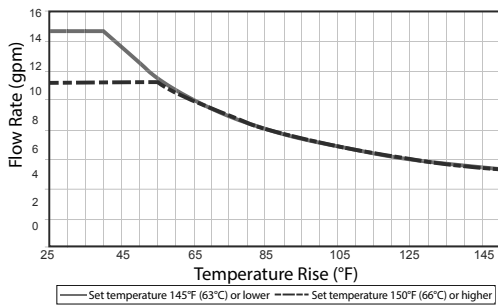
\*ASME models

\*\*Current numbers based on factory testing, 0.4 GPM required for continuous fire after initial ignition.

15 - 150 psi water pressure. Pressure only relief valve requires (Min. 380,000 BTUs. 150 PSI). Min 40 PSI or above recommended for maximum flow.

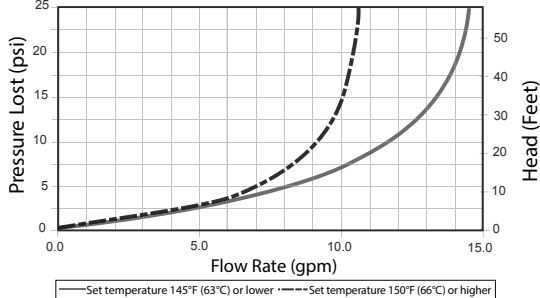
\*\*\* Category III required

Flow Rate Vs. Temperature Rise



Above shown rate is based on a single unit

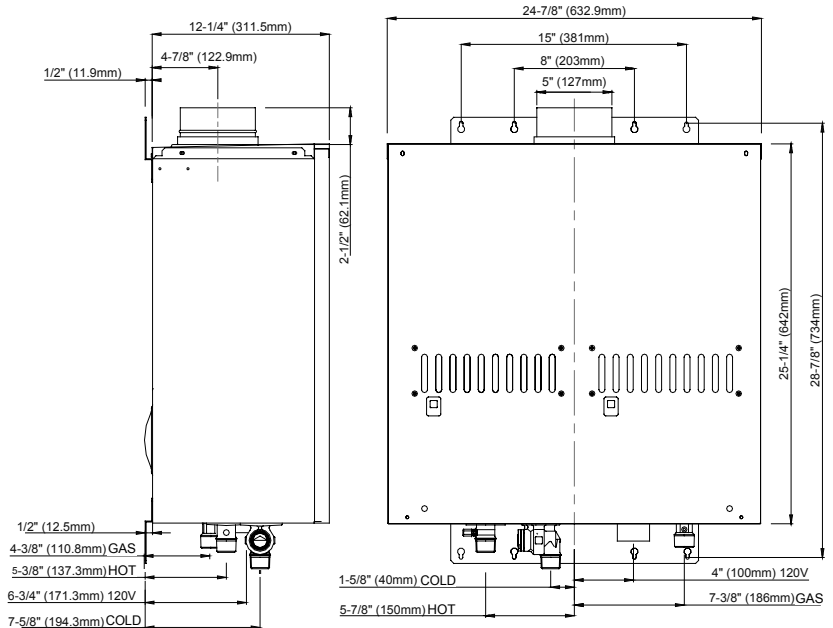
Pressure Loss



### CLEARANCES:

Top 12", Bottom 12", Front\* 12", Back 0.5", Sides 3"

\*Recommended 24" clearance from front of unit for maintenance



### SUGGESTED SPECIFICATION

Water heater(s) shall be Model \_\_\_\_\_ as manufactured by A. O. Smith. The water heater(s) shall be a copper coil integral fin and tube construction with quick release brass or bronze waterways. Heater(s) will be factory assembled and tested. The heater shall be vented with 5" stainless steel Category III vent pipe a distance not to exceed 50 (equivalent) feet terminating vertically or horizontally as prescribed. Intake air with optional direct vent kit may be of such material as ULC 5636 PVC or CPVC, galvanized B-Vent, corrugated aluminum or stainless steel or Category IV stainless steel not to exceed a total of 50 (equivalent) feet. The heater(s) shall be controlled by onboard solid state printed circuit board monitoring incoming and outgoing temperatures with factory-installed thermistors, sensing and controlling flow rate to set point temperature with control both air and gas mixture inputs to maintain thermal combustion efficiency. Unit also consists of ground fault interrupter, inline fusing, spark ignition and sensor system, aluminized stainless steel burners, air-fuel ratio rod, hi limit switch, modulating and proportional gas valves, freeze protection sensor and heating blocks and overheat cutoff fuses. The water heater(s) shall be CSA listed, and meets or exceeds the energy efficiency requirements of NRCan and current edition of ASHRAE 90.1.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## TANKLESS WALL MOUNT

A fully integrated system of tankless units that are pre-built at the factory to reduce installation time and expense while providing a clean, professional look.

### COMMERCIAL PERFORMANCE

- Uses the ACT-199 commercial condensing tankless model with 96% thermal efficiency
- 185° maximum temperature set point

### LIGHTWEIGHT

- Constructed of anodized aluminum frame
- Utilizes the industry's lightest 199,000 BTU high efficiency condensing tankless heater

### EXPANDABLE

- Multiple design and installation configurations
- Up to 796,000 BTU on a single rack system
- Able to link up to 20 heaters together with multi-link system

### REDUNDANCY

- Multiple combustion systems provide peace of mind
- Easily isolate a unit for maintenance which extends the life of the heaters

### EASY FIELD INSTALLATION

- Reduce installation costs with three simple connections (cold water, hot water, and gas)









### EASILY INTEGRATE STORAGE

- As the world's largest water heater manufacturer, we can easily integrate storage into the design

### WARRANTY

- 6 year limited heat exchanger
- 5 year limited tankless parts
- 1 year limited rack parts



MODEL NUMBER	NUMBER OF HEATERS	CONFIGURATIONS	FUEL TYPE	GAS CONSUMPTION INPUT		MAX FLOW (GPM)					
				MINIMUM BTU/h	MAXIMUM BTU/h	50°F RISE	60°F RISE	70°F RISE	80°F RISE	90°F RISE	100°F RISE
ACI-CRS-22WM-N-C	2		Natural	15,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-22WM-P-C	2		Propane	13,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-23WM-N-C	2		Natural	15,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-23WM-P-C	2		Propane	13,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-33WM-N-C	3		Natural	15,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4
ACI-CRS-33WM-P-C	3		Propane	13,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4
ACI-CRS-44WM-N-C	4		Natural	15,000	796,000	30.4	25.2	21.6	18.8	16.8	15.2
ACI-CRS-44WM-P-C	4		Propane	13,000	796,000	30.4	25.2	21.6	18.8	16.8	15.2

MODEL NUMBER	GAS MANIFOLD CONNECTION	HOT/COLD WATER MANIFOLD CONNECTION	POWER
ACI-CRS-22WM-N-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 4.5 A
ACI-CRS-22WM-P-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 4.5 A
ACI-CRS-23WM-N-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-23WM-P-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-33WM-N-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 9 A
ACI-CRS-33WM-P-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 9 A
ACI-CRS-44WM-N-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 9 A
ACI-CRS-44WM-P-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 9 A

MODEL NUMBER	DIMENSIONS IN (CM)			SHIPPING DIMENSIONS IN (CM)			APPROX. SHIPPING WEIGHT LB (KG)
	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH	HEIGHT	
ACI-CRS-22WM-N-C	46 (117)	13 (33)	57 (145)	77 (196)	26 ¼ (67)	70 (178)	240 (109)
ACI-CRS-22WM-P-C	46 (117)	13 (33)	57 (145)	77 (196)	26 ¼ (67)	70 (178)	240 (109)
ACI-CRS-23WM-N-C	66 (168)	13 (33)	57 (145)	77 (196)	26 ¼ (67)	70 (178)	250 (113)
ACI-CRS-23WM-P-C	66 (168)	13 (33)	57 (145)	77 (196)	26 ¼ (67)	70 (178)	250 (113)
ACI-CRS-33WM-N-C	66 (168)	13 (33)	57 (145)	77 (196)	26 ¼ (67)	70 (178)	350 (159)
ACI-CRS-33WM-P-C	66 (168)	13 (33)	57 (145)	77 (196)	26 ¼ (67)	70 (178)	350 (159)
ACI-CRS-44WM-N-C	87 ½ (222)	13 (33)	57 (145)	95 (241)	26 ¼ (67)	70 (178)	550 (249)
ACI-CRS-44WM-P-C	87 ½ (222)	13 (33)	57 (145)	95 (241)	26 ¼ (67)	70 (178)	550 (249)

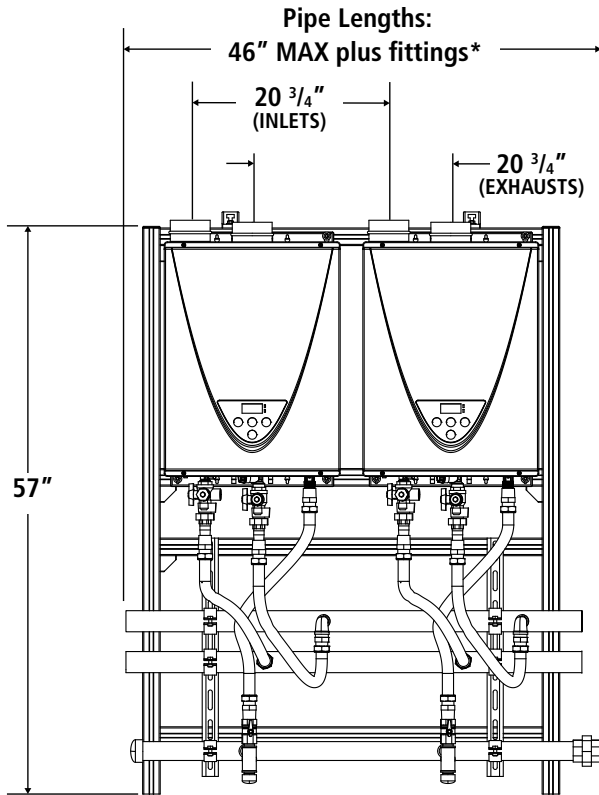
Line drawings on pages 3 to 5.

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

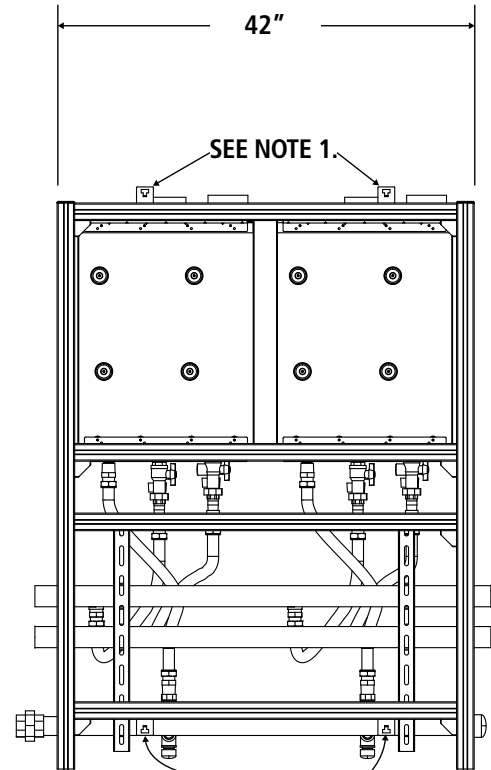
Model numbers - First number 2/3/4 = number of tankless units mounted. Second number 2/3/4 = rack size (max units that could fit on that rack).



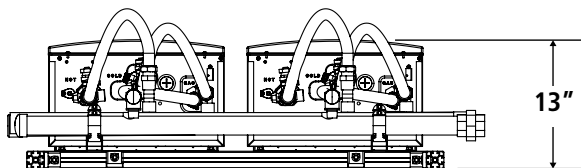
## 2 Unit Wall Mount



**Front**



**Back**



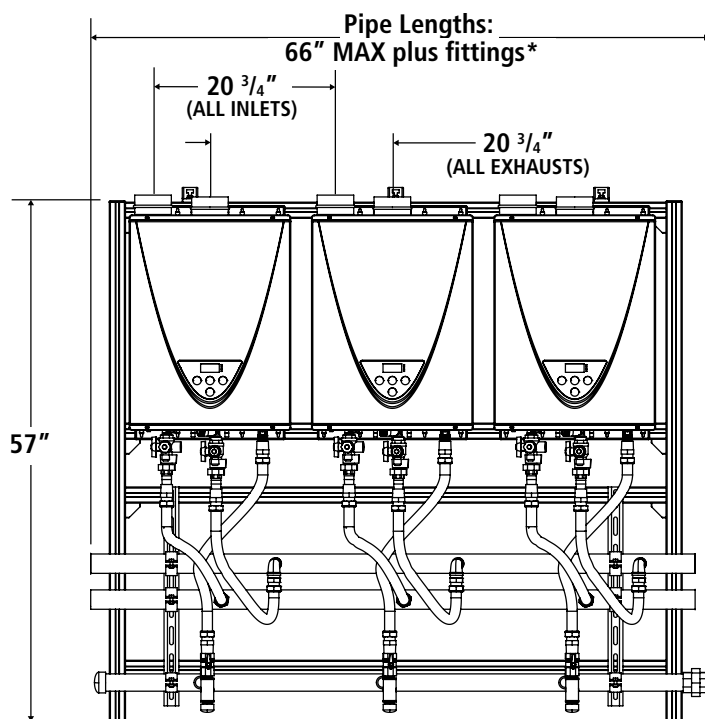
**Bottom**

**NOTES:**

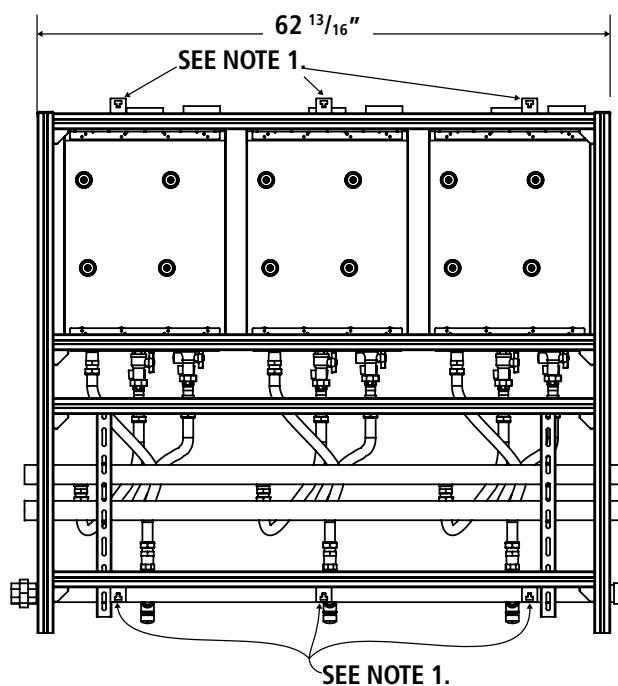
1. MOUNTING BRACKETS ADJUST HORIZONTALLY ALONG CHANNEL SLOTS.

*\*Fittings to be field supplied*

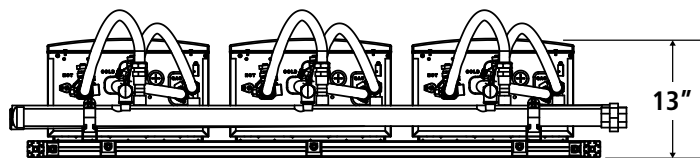
## 3 Unit Wall Mount



**Front**



**Back**



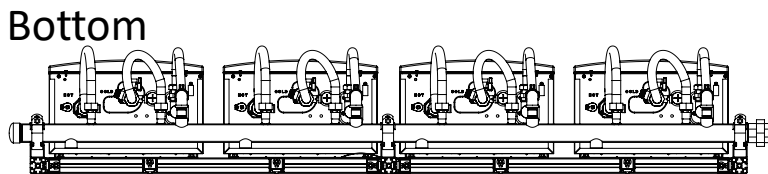
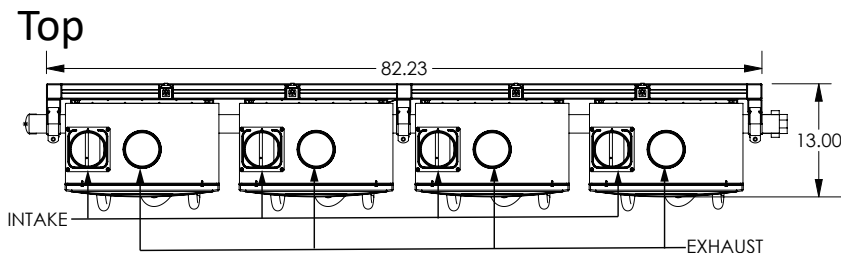
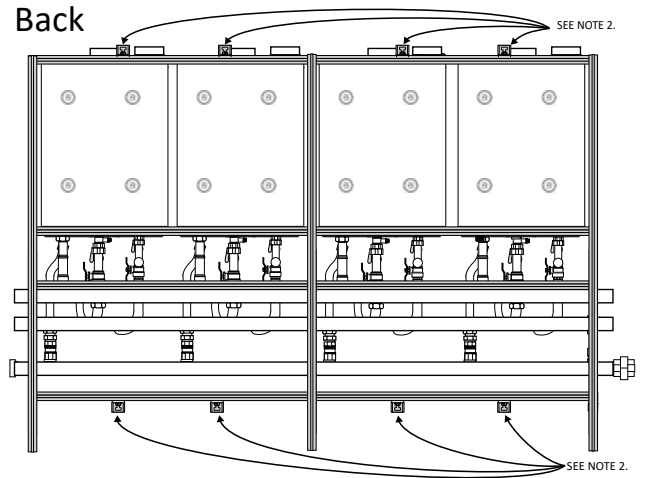
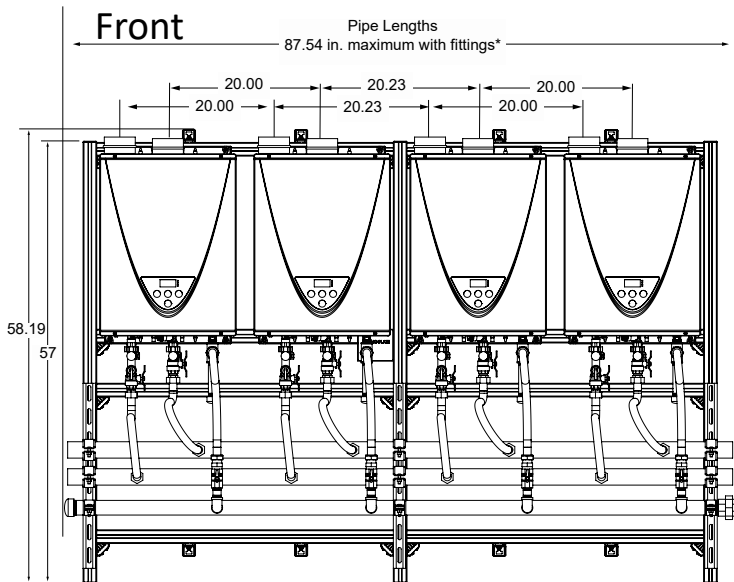
**Bottom**

**NOTES:**

1. MOUNTING BRACKETS ADJUST HORIZONTALLY ALONG CHANNEL SLOTS.

*\*Fittings to be field supplied*

### 4 Unit Wall Mount



**NOTES:**

1. MOUNTING BRACKETS ADJUST HORIZONTALLY ALONG CHANNEL SLOTS.

*\*Fittings to be field supplied*

## TANKLESS COMMERCIAL RACK SYSTEMS

The Tankless Commercial Rack System model # \_\_\_\_\_ shall be factory assembled pre-plumbed system and includes A. O. Smith ACT-199 Condensing Tankless Water Heaters. The Commercial Rack System shall include 2 inch copper water supply lines, 2 foot long ¾ inch flexible stainless steel water lines to the heaters, 1 ½ inch schedule 40 gas supply pipe with 3 foot long ¾ inch CSST flexible gas lines to the heaters, and isolation valves with 150 psi pressure relief valves for each heater. The rack shall be assembled as a wall mount design.

The fully modulating, on-demand, condensing gas fired tankless water heater(s) shall be A. O. Smith Tankless Water Heater model ACT-199, having a maximum input rating of 199,000 BTU/h and available in NG or LP. The heater shall have ¾ in. male NPT water and gas connections. The inlet gas supply pressures shall be 4.0 in. WC (min.) up to 10.5 in. WC (max.) for NG and 8.0 in. WC (min.) up to 14 in. WC (max.) for LP. The heater(s) shall incorporate an integrated temperature controller that will provide diagnostic information, fault history, and heater set temperature. The heater(s) shall operate using 120 V / 60 Hz power source. The heater(s) will incorporate a factory installed power cord.

The Category IV heater(s) exhaust shall be vented with 3" or 4" diameter ULC S636 approved schedule 40 PVC or CPVC or polypropylene vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, polypropylene or aluminum pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent. The heater(s) shall be able to be common vented with ULC S636 approved schedule 40 PVC pipe or polypropylene with a length not to exceed 100 ft. (equivalent) using up to 10 inch pipe. Proper sizing is provided in the heater's installation manual.

The water heater(s) shall use a commercial grade copper, fin tube primary heat exchanger with quick release brass or bronze waterways. The secondary heat exchanger shall be constructed from stainless steel 316L. The heater(s) shall be controlled by an onboard solid-state printed circuit board which uses the following factory installed components: thermistors to monitor water temperature and exhaust temperature; a flow sensor to measure flow rate; a flame sensor to monitor combustion; an air-fuel ratio rod to measure and adjust air inputs in order to maintain optimal combustion efficiency. The heater also consists of inline fusing and surge absorbers for electrical surge protection, an electronic spark igniter, aluminized stainless steel burners, hi-limit temperature switches to monitor water and exhaust temperatures, modulating gas valve, dual freeze protection that will automatically fire the heater and use heating blocks to protect the heat exchanger, and an overheat cutoff fuse.

The heaters can manifold to Easy-Link up to 4 heaters to provide additional capacity. The Easy-Link controls shall be built onto the onboard solid-state printed circuit board and does not require external controls. The linking control wire shall be supplied with the heater. The heaters can use a Multi-Unit controller, 100112691, to manifold 5-20 heaters. The Easy-Link and Multi-Unit Controller shall modulate the system for the most efficient performance. The Easy-Link and Multi-Unit Controller shall rotate the priority heater every 12 hours of operation time or 100 starts for balanced duty/cycle operation.

The heater models are design certified by CSA according to ANSI Z21.10.3 - CSA 4.3 (current edition), approved for sale in the United States and Canada, has a minimum thermal efficiency of 96%, meets the energy efficiency requirements of NRCan and current edition of ASHRAE 90.1, and shall be certified to NSF 5 Standards.

## TANKLESS FREE STANDING IN-LINE

A fully integrated system of tankless units that are pre-built at the factory to reduce installation time and expense while providing a clean, professional look.

### COMMERCIAL PERFORMANCE

- Uses the ACT-199 commercial condensing tankless model with 96% thermal efficiency
- 185° maximum temperature set point

### LIGHTWEIGHT

- Constructed of sturdy metal frame
- Utilizes the industry's lightest 199,000 BTU high efficiency condensing tankless heater

### EXPANDABLE

- Multiple design and installation configurations
- Up to 597,000 BTU on a single rack system
- Able to link up to 20 heaters together with multi-link system

### REDUNDANCY

- Multiple combustion systems provide peace of mind
- Easily isolate a unit for maintenance which extends the life of the heaters

### EASY FIELD INSTALLATION

- Reduce installation costs with three simple connections (cold water, hot water, and gas)

### EASILY INTEGRATE STORAGE

- As the world's largest water heater manufacturer, we can easily integrate storage into the design

### WARRANTY

- 6 year limited heat exchanger
- 5 year limited tankless parts
- 1 year limited rack parts





# Commercial Tankless Water Heaters

MODEL NUMBER	NUMBER OF HEATERS	CONFIGURATIONS	FUEL TYPE	GAS CONSUMPTION INPUT		MAX FLOW (GPM)					
				MINIMUM BTU/h	MAXIMUM BTU/h	50°F RISE	60°F RISE	70°F RISE	80°F RISE	90°F RISE	100°F RISE
ACI-CRS-24IL-N-C	2		Natural	15,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-24IL-P-C	2		Propane	13,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-26IL-N-C	2		Natural	15,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-26IL-P-C	2		Propane	13,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-36IL-N-C	3		Natural	15,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4
ACI-CRS-36IL-P-C	3		Propane	13,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4

MODEL NUMBER	GAS MANIFOLD CONNECTION	HOT/COLD WATER MANIFOLD CONNECTION	POWER
ACI-CRS-24IL-N-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 4.5 A
ACI-CRS-24IL-P-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 4.5 A
ACI-CRS-26IL-N-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-26IL-P-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-36IL-N-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-36IL-P-C	1 ½" Schedule 40 pipe	2" Copper tube	120 V, 60 Hz, 6.75 A

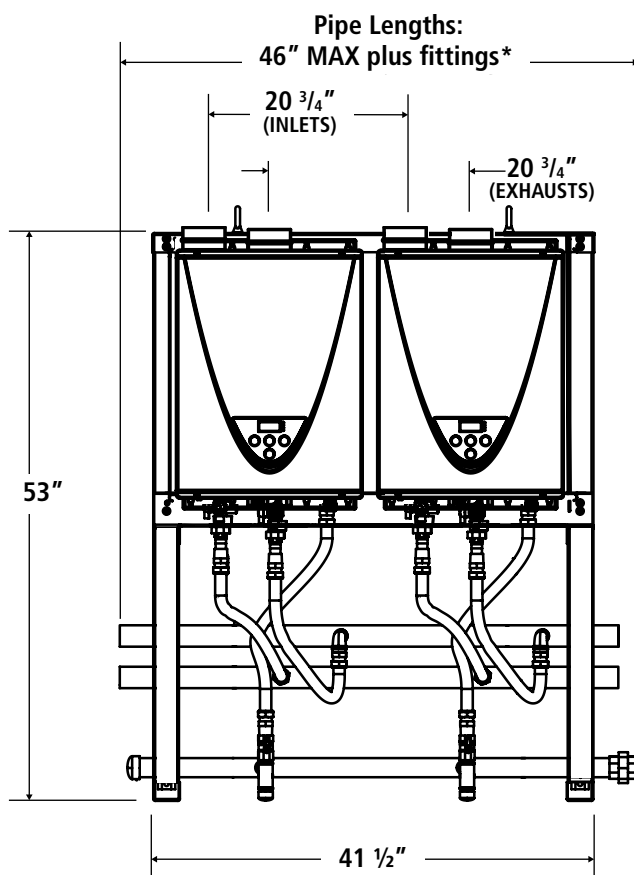
MODEL NUMBER	DIMENSIONS IN (CM)			SHIPPING DIMENSIONS IN (CM)			APPROX. SHIPPING WEIGHT LB (KG)
	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH	HEIGHT	
ACI-CRS-24IL-N-C	46 (117)	20 (51)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	330 (150)
ACI-CRS-24IL-P-C	46 (117)	20 (51)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	330 (150)
ACI-CRS-26IL-N-C	66 (168)	20 (51)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	396 (180)
ACI-CRS-26IL-P-C	66 (168)	20 (51)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	396 (180)
ACI-CRS-36IL-N-C	66 (168)	20 (51)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	448 (203)
ACI-CRS-36IL-P-C	66 (168)	20 (51)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	448 (203)

Line drawings on pages 3 and 4.

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

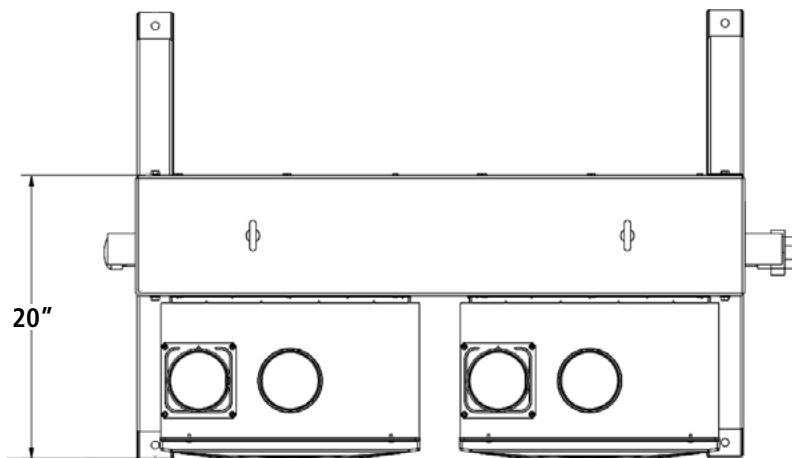
Model numbers - First number 2/3 = number of tankless units mounted. Second number 4/6 = rack size (max units that could fit on that rack).

### 2 Unit Free Standing In-Line



\*Fittings to be field supplied

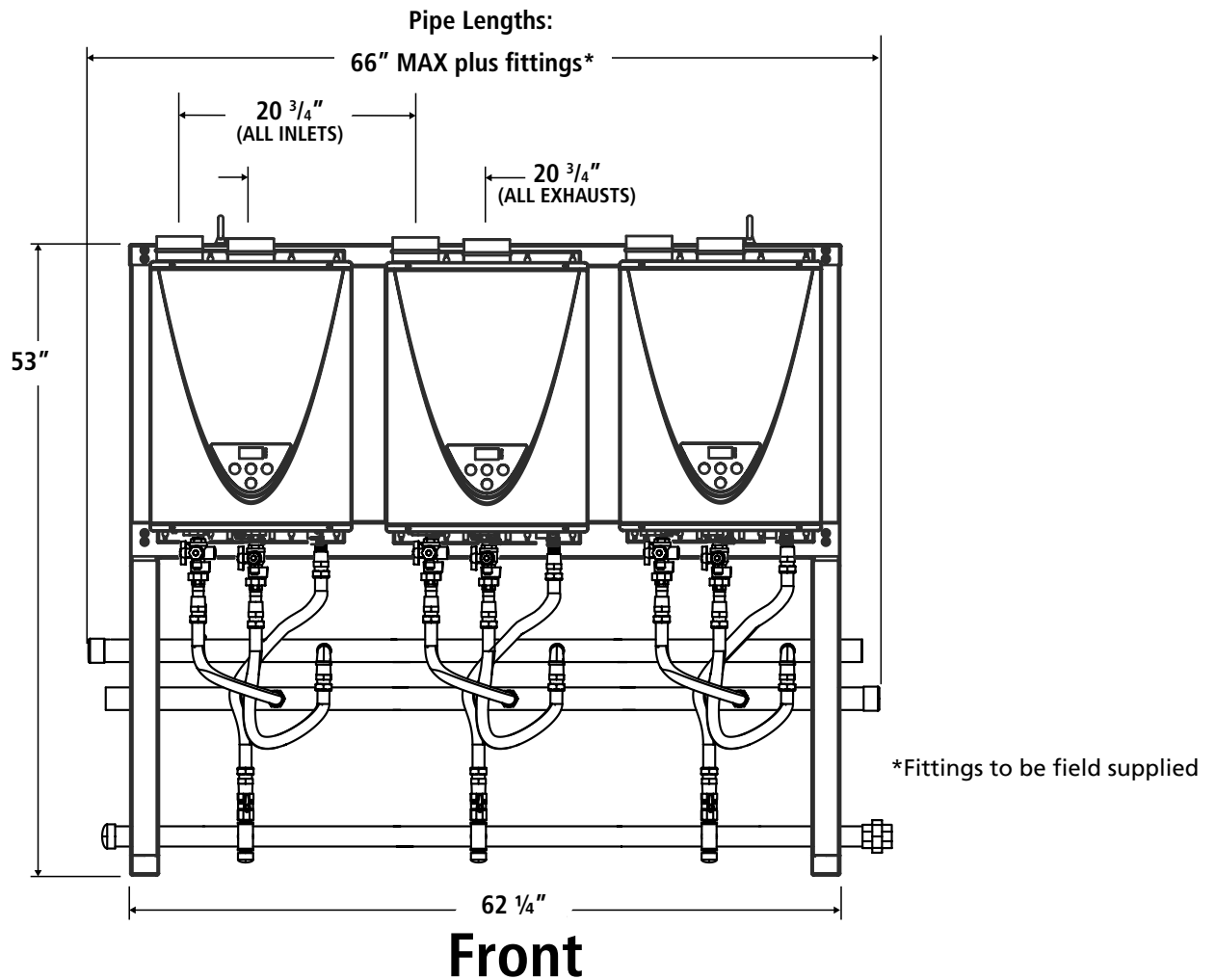
### Front



### Top



### 3 Unit Free Standing In-Line



## TANKLESS COMMERCIAL RACK SYSTEMS

The Tankless Commercial Rack System model # \_\_\_\_\_ shall be factory assembled pre-plumbed system and includes A. O. Smith ACT-199 Condensing Tankless Water Heaters. The Commercial Rack System shall include 2 inch copper water supply lines, 2 foot long  $\frac{3}{4}$  inch flexible stainless steel water lines to the heaters, 1  $\frac{1}{2}$  inch schedule 40 gas supply pipe with 3 foot long  $\frac{3}{4}$  inch CSST flexible gas lines to the heaters, and isolation valves with 150 psi pressure relief valves for each heater. The rack shall be assembled as an in-line floor standing design.

The fully modulating, on-demand, condensing gas fired tankless water heater(s) shall be A. O. Smith Tankless Water Heater model ACT-199, having a maximum input rating of 199,000 BTU/h and available in NG or LP. The heater shall have  $\frac{3}{4}$  in. male NPT water and gas connections. The inlet gas supply pressures shall be 4.0 in. WC (min.) up to 10.5 in. WC (max.) for NG and 8.0 in. WC (min.) up to 14 in. WC (max.) for LP. The heater(s) shall incorporate an integrated temperature controller that will provide diagnostic information, fault history, and heater set temperature. The heater(s) shall operate using 120 V / 60 Hz power source. The heater(s) will incorporate a factory installed power cord.

The Category IV heater(s) exhaust shall be vented with 3" or 4" diameter ULC S636 approved schedule 40 PVC or CPVC or polypropylene vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, polypropylene or aluminum pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent. The heater(s) shall be able to be common vented with ULC S636 approved schedule 40 PVC pipe or polypropylene with a length not to exceed 100 ft. (equivalent) using up to 10 inch pipe. Proper sizing is provided in the heater's installation manual.

The water heater(s) shall use a commercial grade copper, fin tube primary heat exchanger with quick release brass or bronze waterways. The secondary heat exchanger shall be constructed from stainless steel 316L. The heater(s) shall be controlled by an onboard solid-state printed circuit board which uses the following factory installed components: thermistors to monitor water temperature and exhaust temperature; a flow sensor to measure flow rate; a flame sensor to monitor combustion; an air-fuel ratio rod to measure and adjust air inputs in order to maintain optimal combustion efficiency. The heater also consists of inline fusing and surge absorbers for electrical surge protection, an electronic spark igniter, aluminized stainless steel burners, hi-limit temperature switches to monitor water and exhaust temperatures, modulating gas valve, dual freeze protection that will automatically fire the heater and use heating blocks to protect the heat exchanger, and an overheat cutoff fuse.

The heaters can manifold to Easy-Link up to 4 heaters to provide additional capacity. The Easy-Link controls shall be built onto the onboard solid-state printed circuit board and does not require external controls. The linking control wire shall be supplied with the heater. The heaters can use a Multi-Unit controller, 100112691, to manifold 5-20 heaters. The Easy-Link and Multi-Unit Controller shall modulate the system for the most efficient performance. The Easy-Link and Multi-Unit Controller shall rotate the priority heater every 12 hours of operation time or 100 starts for balanced duty/cycle operation.

The heater models are design certified by CSA according to ANSI Z21.10.3 - CSA 4.3 (current edition), approved for sale in the United States and Canada, has a minimum thermal efficiency of 96%, meets the energy efficiency requirements of NRCan and current edition of ASHRAE 90.1, and shall be certified to NSF 5 Standards.

## TANKLESS FREE STANDING BACK-TO-BACK

A fully integrated system of tankless units that are pre-built at the factory to reduce installation time and expense while providing a clean, professional look.

### COMMERCIAL PERFORMANCE

- Uses the ACT-199 commercial condensing tankless model with 96% thermal efficiency
- 185° maximum temperature set point

### LIGHTWEIGHT

- Constructed of sturdy metal frame
- Utilizes the industry's lightest 199,000 BTU high efficiency condensing tankless heater

### EXPANDABLE

- Multiple design and installation configurations
- Up to 1,194,000 BTU on a single rack system
- Able to link up to 20 heaters together with multi-link system

### REDUNDANCY

- Multiple combustion systems provide peace of mind
- Easily isolate a unit for maintenance which extends the life of the heaters

### EASY FIELD INSTALLATION

- Reduce installation costs with three simple connections (cold water, hot water and gas)

### EASILY INTEGRATE STORAGE

- As the world's largest water heater manufacturer, we can easily integrate storage into the design

### WARRANTY

- 6 year limited heat exchanger
- 5 year limited tankless parts
- 1 year limited rack parts





# Commercial Tankless Water Heaters

MODEL NUMBER	NUMBER OF HEATERS	CONFIGURATIONS	FUEL TYPE	GAS CONSUMPTION INPUT		MAX FLOW (GPM)					
				MINIMUM BTU/h	MAXIMUM BTU/h	50°F RISE	60°F RISE	70°F RISE	80°F RISE	90°F RISE	100°F RISE
ACI-CRS-24B2B-N-C	2		Natural	15,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-24B2B-P-C	2		Propane	13,000	398,000	15.2	12.6	10.8	9.4	8.4	7.6
ACI-CRS-34B2B-N-C	3		Natural	15,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4
ACI-CRS-34B2B-P-C	3		Propane	13,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4
ACI-CRS-36B2B-N-C	3		Natural	15,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4
ACI-CRS-36B2B-P-C	3		Propane	13,000	597,000	22.8	18.9	16.2	14.1	12.6	11.4
ACI-CRS-44B2B-N-C	4		Natural	15,000	796,000	30.4	25.2	21.6	18.8	16.8	15.2
ACI-CRS-44B2B-P-C	4		Propane	13,000	796,000	30.4	25.2	21.6	18.8	16.8	15.2
ACI-CRS-46B2B-N-C	4		Natural	15,000	796,000	30.4	25.2	21.6	18.8	16.8	15.2
ACI-CRS-46B2B-P-C	4		Propane	13,000	796,000	30.4	25.2	21.6	18.8	16.8	15.2
ACI-CRS-56B2B-N-C	5		Natural	15,000	995,000	38	31.5	27	23.5	21	19
ACI-CRS-56B2B-P-C	5		Propane	13,000	995,000	38	31.5	27	23.5	21	19
ACI-CRS-66B2B-N-C	6		Natural	15,000	1,194,000	45.6	37.8	32.4	28.2	25.2	22.8
ACI-CRS-66B2B-P-C	6		Propane	13,000	1,194,000	45.6	37.8	32.4	28.2	25.2	22.8

MODEL NUMBER	DIMENSIONS IN (CM)			SHIPPING DIMENSIONS IN (CM)			APPROX. SHIPPING WEIGHT LB (KG)
	LENGTH	WIDTH	HEIGHT	LENGTH	WIDTH	HEIGHT	
ACI-CRS-24B2B-N-C	46 (117)	30 ½ (77)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	330 (150)
ACI-CRS-24B2B-P-C	46 (117)	30 ½ (77)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	330 (150)
ACI-CRS-34B2B-N-C	46 (117)	30 ½ (77)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	404 (183)
ACI-CRS-34B2B-P-C	46 (117)	30 ½ (77)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	404 (183)
ACI-CRS-36B2B-N-C	66 (168)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	447 (203)
ACI-CRS-36B2B-P-C	66 (168)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	447 (203)
ACI-CRS-44B2B-N-C	46 (117)	30 ½ (77)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	481 (218)
ACI-CRS-44B2B-P-C	46 (117)	30 ½ (77)	53 (135)	49 ½ (126)	39 (99)	69 ½ (177)	481 (218)
ACI-CRS-46B2B-N-C	46 (117)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	519 (235)
ACI-CRS-46B2B-P-C	46 (117)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	519 (235)
ACI-CRS-56B2B-N-C	66 (168)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	597 (271)
ACI-CRS-56B2B-P-C	66 (168)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	597 (271)
ACI-CRS-66B2B-N-C	66 (168)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	674 (306)
ACI-CRS-66B2B-P-C	66 (168)	30 ½ (77)	53 (135)	69 ½ (177)	39 (99)	69 ½ (177)	674 (306)

MODEL NUMBER	GAS MANIFOLD CONNECTION	HOT/COLD WATER MANIFOLD CONNECTION	POWER
ACI-CRS-24B2B-N-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 4.5 A
ACI-CRS-24B2B-P-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 4.5 A
ACI-CRS-34B2B-N-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-34B2B-P-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-36B2B-N-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-36B2B-P-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 6.75 A
ACI-CRS-44B2B-N-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 9 A
ACI-CRS-44B2B-P-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 9 A
ACI-CRS-46B2B-N-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 9 A
ACI-CRS-46B2B-P-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 9 A
ACI-CRS-56B2B-N-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 11.25 A
ACI-CRS-56B2B-P-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 11.25 A
ACI-CRS-66B2B-N-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 13.5 A
ACI-CRS-66B2B-P-C	1 ½" Schedule 40 pipe	2" copper tube	120 V, 60 Hz, 13.5 A

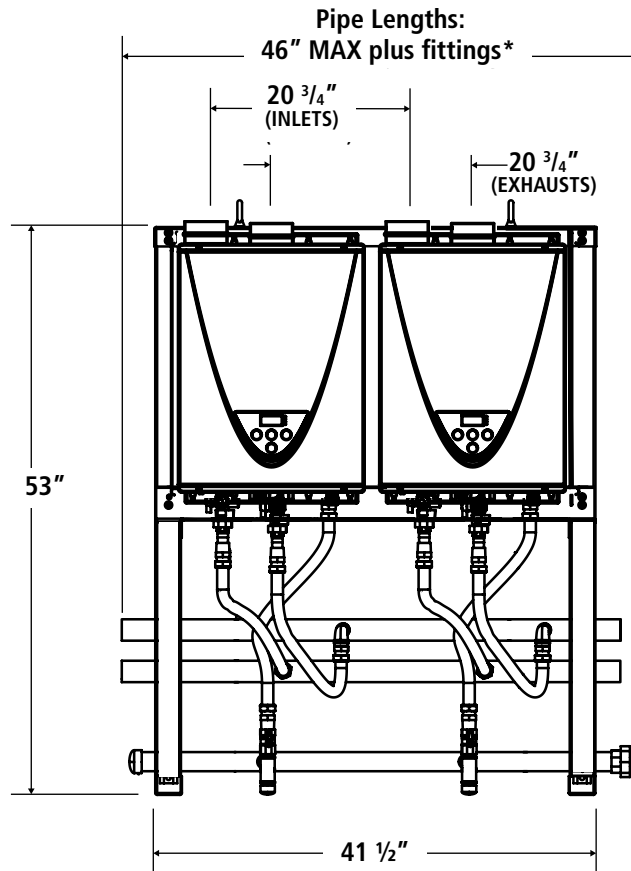
Line drawings on pages 4 and 5.

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

Model numbers - First number 2/3/4/5/6 = number of tankless units mounted.

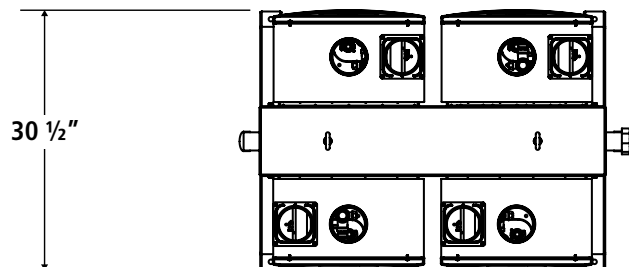
Model numbers - Second number 4/6 = rack size (max units that could fit on that rack).

### 4 Unit Free Standing Back To Back



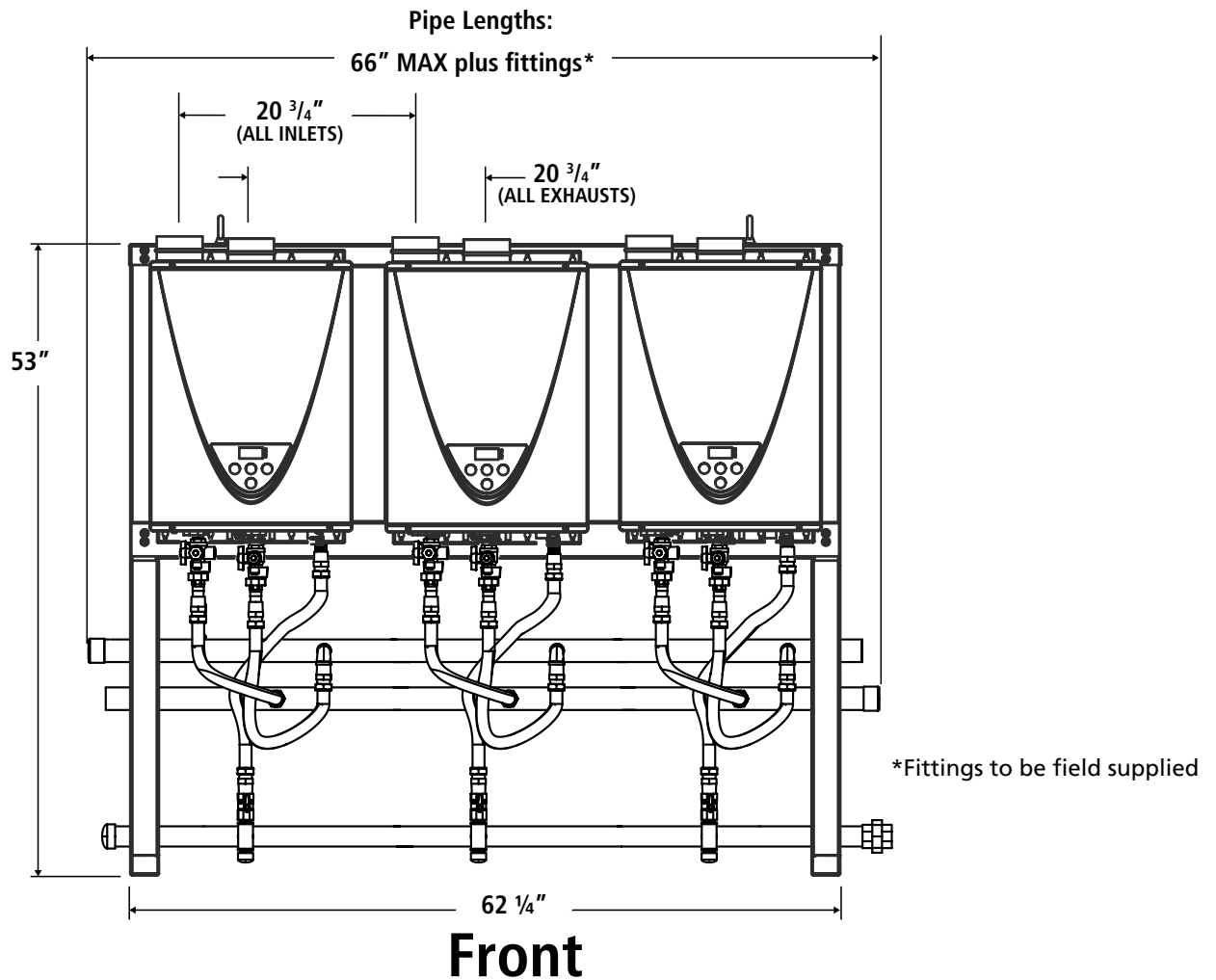
\*Fittings to be field supplied

Front



Top

### 6 Unit Free Standing Back To Back



## TANKLESS COMMERCIAL RACK SYSTEMS

The Tankless Commercial Rack System model # \_\_\_\_\_ shall be factory assembled pre-plumbed system and includes A. O. Smith ACT-199 Condensing Tankless Water Heaters. The Commercial Rack System shall include 2 inch copper water supply lines, 2 foot long  $\frac{3}{4}$  inch flexible stainless steel water lines to the heaters, 1  $\frac{1}{2}$  inch schedule 40 gas supply pipe with 3 foot long  $\frac{3}{4}$  inch CSST flexible gas lines to the heaters, and isolation valves with 150 psi pressure relief valves for each heater. The rack shall be assembled as a back-to-back design.

The fully modulating, on-demand, condensing gas fired tankless water heater(s) shall be A. O. Smith Tankless Water Heater model ACT-199, having a maximum input rating of 199,000 BTU/h and available in NG or LP. The heater shall have  $\frac{3}{4}$  in. male NPT water and gas connections. The inlet gas supply pressures shall be 4.0 in. WC (min.) up to 10.5 in. WC (max.) for NG and 8.0 in. WC (min.) up to 14 in. WC (max.) for LP. The heater(s) shall incorporate an integrated temperature controller that will provide diagnostic information, fault history, and heater set temperature. The heater(s) shall operate using 120 V / 60 Hz power source. The heater(s) will incorporate a factory installed power cord.

The Category IV heater(s) exhaust shall be vented with 3" or 4" diameter ULC S636 approved schedule 40 PVC or CPVC or polypropylene vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, polypropylene or aluminum pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent. The heater(s) shall be able to be common vented with ULC S636 approved schedule 40 PVC pipe or polypropylene with a length not to exceed 100 ft. (equivalent) using up to 10 inch pipe. Proper sizing is provided in the heater's installation manual.

The water heater(s) shall use a commercial grade copper, fin tube primary heat exchanger with quick release brass or bronze waterways. The secondary heat exchanger shall be constructed from stainless steel 316L. The heater(s) shall be controlled by an onboard solid-state printed circuit board which uses the following factory installed components: thermistors to monitor water temperature and exhaust temperature; a flow sensor to measure flow rate; a flame sensor to monitor combustion; an air-fuel ratio rod to measure and adjust air inputs in order to maintain optimal combustion efficiency. The heater also consists of inline fusing and surge absorbers for electrical surge protection, an electronic spark igniter, aluminized stainless steel burners, hi-limit temperature switches to monitor water and exhaust temperatures, modulating gas valve, dual freeze protection that will automatically fire the heater and use heating blocks to protect the heat exchanger, and an overheat cutoff fuse.

The heaters can manifold to Easy-Link up to 4 heaters to provide additional capacity. The Easy-Link controls shall be built onto the onboard solid-state printed circuit board and does not require external controls. The linking control wire shall be supplied with the heater. The heaters can use a Multi-Unit controller, 100112691, to manifold 5-20 heaters. The Easy-Link and Multi-Unit Controller shall modulate the system for the most efficient performance. The Easy-Link and Multi-Unit Controller shall rotate the priority heater every 12 hours of operation time or 100 starts for balanced duty/cycle operation.

The heater models are design certified by CSA according to ANSI Z21.10.3 - CSA 4.3 (current edition), approved for sale in the United States and Canada, has a minimum thermal efficiency of 96%, meets the energy efficiency requirements of NRCAN and current edition of ASHRAE 90.1, and shall be certified to NSF 5 Standards.



## HEAVY-DUTY LARGE VOLUME STORAGE TANKS MODEL HD CUSTOM BUILT

Large volume tanks are designed for storing potable water.

### FEATURES

#### SIZES FROM 120 TO 4,000 GALLONS

All tanks are constructed to the requirements of the ASME Code. These ASME Code tanks are available at 125 and 150 psi working pressure. Consult factory for tanks with special configurations.

#### LINING AND COATINGS

Each lining and coating has particular capabilities and limitations. Thorough investigation on the service life of steel tanks with protective coatings or linings has led to the recommendation of the following linings:

- Glass Lined — All internal surfaces exposed to water are glass lined per ASME HLW Code procedures.
- Cement Lined — Cement lining consists of a specially formulated cement applied over the interior of the vessel. Cement lined tanks are recommended when storing water at 180°F or higher.

Please consult the factory for recommendations on the uses of linings for specific applications. All tanks receive one prime coat of paint on external surface.

#### CATHODIC PROTECTION

Glass lined tanks are furnished with anodes designed for maximum protection.

#### CUSTOM TANK OPENINGS

All tanks will be supplied with the fittings located as indicated on the drawings unless specified otherwise. Custom tank opening sizes and locations can be provided to your specification.

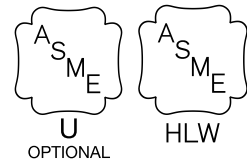
#### INSPECTION OPENINGS

- 4" x 6" handhole are available as options on diameters 36" and below.
- Two 2" ASME inspection openings are standard on tanks 36" diameter and below.
- 12" x 16" manhole is standard on tanks with 42" diameter and above and optional for tanks with a diameter of 30" & 36.

#### TANK OPTIONS

- Manholes / Handholes
- Additional / Custom Tank Openings
- Lifting Lugs
- Horizontal Tank Saddles
- Factory Jacketing and Insulation
- Tube bundles
- Cement lining or unlined

**MODELS  
HD-24-120 THROUGH  
HD-72-4000**



## STORAGE TANK SELECTION

MODEL NUMBER	TANK CAPACITY		DIMENSIONS IN (CM)			SHIPPING WEIGHT LB (KG)		
	USG	L	DIAMETER ("A")	VERTICAL HEIGHT ("B")	HORIZONTAL LENGTH ("B")	125 PSI	150 PSI	CEMENT LINED
HD*24-120A	118	447	24 (61)	64 (163)	60 (152)	368 (167)	368 (167)	-
HD*24-140A	141	534	24 (61)	76 (193)	72 (183)	428 (194)	428 (194)	-
HD*24-200A	188	712	24 (61)	100 (254)	96 (244)	556 (252)	556 (252)	-
HD*24-250A	235	890	24 (61)	124 (315)	120 (305)	684 (310)	684 (310)	-
HD*28-175A	175	662	28 (71)	65 (165)	-	353 (160)	353 (160)	-
HD*28-200A	200	757	28 (71)	76 (193)	-	488 (221)	488 (221)	-
HD*30-150A	147	556	30 (76)	52 (132)	48 (122)	400 (181)	400 (181)	695 (315)
HD*30-185A	184	697	30 (76)	64 (163)	60 (152)	468 (212)	468 (212)	812 (368)
HD*30-220A	220	833	30 (76)	76 (193)	72 (183)	548 (249)	548 (249)	958 (435)
HD*30-250A	257	973	30 (76)	87 (221)	83 (211)	628 (285)	628 (285)	1,103 (500)
HD*30-300A	294	1,113	30 (76)	100 (254)	96 (244)	701 (318)	701 (318)	1,242 (563)
HD*30-375A	367	1,389	30 (76)	124 (315)	120 (305)	868 (394)	868 (394)	1,540 (699)
HD*36-275A	265	1,003	36 (91)	64 (163)	60 (152)	577 (262)	577 (262)	995 (451)
HD*36-325A	318	1,204	36 (91)	76 (193)	72 (183)	673 (305)	673 (305)	1,173 (532)
HD*36-400A	370	1,401	36 (91)	87 (221)	83 (211)	770 (349)	770 (349)	1,343 (609)
HD*36-425A	423	1,601	36 (91)	100 (254)	96 (244)	866 (393)	866 (393)	1,513 (686)
HD*36-500A	528	1,999	36 (91)	124 (315)	120 (305)	1,058 (480)	1,058 (480)	1,861 (844)
HD*42-450A	432	1,635	42 (107)	76 (193)	72 (183)	795 (361)	909 (412)	1,385 (628)
HD*42-500A	504	1,908	42 (107)	88 (224)	84 (213)	908 (412)	1,050 (476)	1,587 (720)
HD*42-600A	576	2,180	42 (107)	100 (254)	96 (244)	1,020 (463)	1,190 (540)	1,790 (812)
HD*42-750A	720	2,726	42 (107)	124 (315)	120 (305)	1,245 (565)	1,470 (667)	2,195 (996)
HD*42-900A	864	3,271	42 (107)	148 (376)	144 (366)	1,470 (667)	1,751 (794)	2,601 (1,180)
HD*42-1000A	1,008	3,516	42 (107)	172 (437)	168 (427)	1,695 (769)	2,031 (921)	3,006 (1,363)
HD*48-500A	504	1,908	48 (122)	73 (185)	69 (175)	1,062	1,062	1,856
HD*48-700A	658	2,491	48 (122)	88 (224)	84 (213)	1,346 (611)	1,346 (611)	2,124 (963)
HD*48-750A	752	2,846	48 (122)	100 (254)	96 (244)	1,507 (684)	1,507 (684)	2,392 (1,085)
HD*48-950A	940	3,558	48 (122)	124 (315)	120 (305)	1,828 (829)	1,828 (829)	2,918 (1,324)
HD*48-1150A	1,128	4,270	48 (122)	148 (376)	144 (366)	2,150 (975)	2,150 (975)	3,444 (1,562)
HD*48-1300A	1,315	4,978	48 (122)	172 (437)	168 (427)	2,471 (1,121)	2,471 (1,121)	3,970 (1,801)
HD*54-1000A	951	3,560	54 (137)	100 (254)	96 (244)	1,721 (781)	1,972 (894)	2,729 (1,238)
HD*54-1200A	1,189	4,501	54 (137)	124 (315)	120 (305)	2,083 (945)	2,423 (1,099)	3,320 (1,506)
HD*54-1450A	1,427	5,402	54 (137)	148 (376)	144 (366)	2,451 (1,112)	2,881 (1,307)	3,919 (1,778)
HD*54-1700A	1,665	6,303	54 (137)	172 (437)	168 (427)	2,807 (1,273)	3,326 (1,509)	4,511 (2,046)
HD*54-1900A	1,903	7,204	54 (137)	196 (498)	192 (488)	3,168 (1,437)	3,777 (1,713)	5,102 (2,314)
HD*54-2150A	2,141	8,105	54 (137)	220 (559)	216 (549)	3,530 (1,601)	4,228 (1,918)	5,701 (2,586)
HD*60-1500A	1,469	5,561	60 (152)	124 (315)	120 (305)	2,784 (1,263)	3,221 (1,461)	4,177 (1,895)
HD*60-1750A	1,763	6,673	60 (152)	148 (376)	144 (366)	3,267 (1,482)	3,823 (1,734)	4,913 (2,228)
HD*60-2000A	2,056	7,783	60 (152)	172 (437)	168 (427)	3,749 (1,701)	4,425 (2,007)	5,658 (2,566)
HD*60-2400A	2,350	8,896	60 (152)	196 (498)	192 (488)	4,231 (1,919)	5,026 (2,280)	6,394 (2,900)
HD*60-2650A	2,644	10,009	60 (152)	220 (559)	216 (549)	4,713 (2,138)	5,628 (2,553)	7,130 (3,234)
HD*72-2100A	2,115	8,006	72 (183)	124 (315)	120 (305)	3,416 (1,549)	3,904 (1,771)	5,104 (2,315)
HD*72-2500A	2,538	9,607	72 (183)	148 (376)	144 (366)	3,995 (1,812)	-	5,995 (2,719)
HD*72-3000A	2,961	11,209	72 (183)	172 (437)	168 (427)	4,575 (2,075)	-	6,885 (3,123)
HD*72-3400A	3,384	12,810	72 (183)	196 (498)	192 (488)	5,154 (2,338)	-	7,767 (3,523)
HD*72-4000A	3,807	14,411	72 (183)	220 (559)	216 (549)	5,733 (2,600)	-	8,658 (3,927)

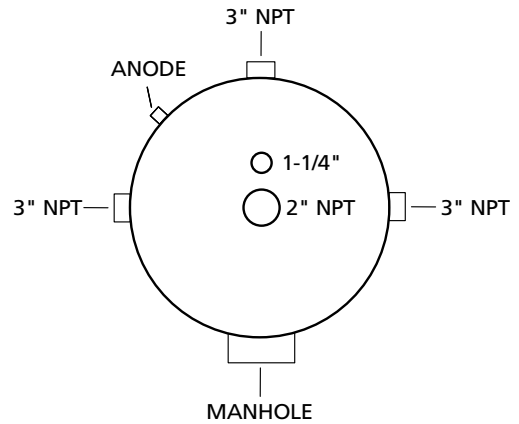
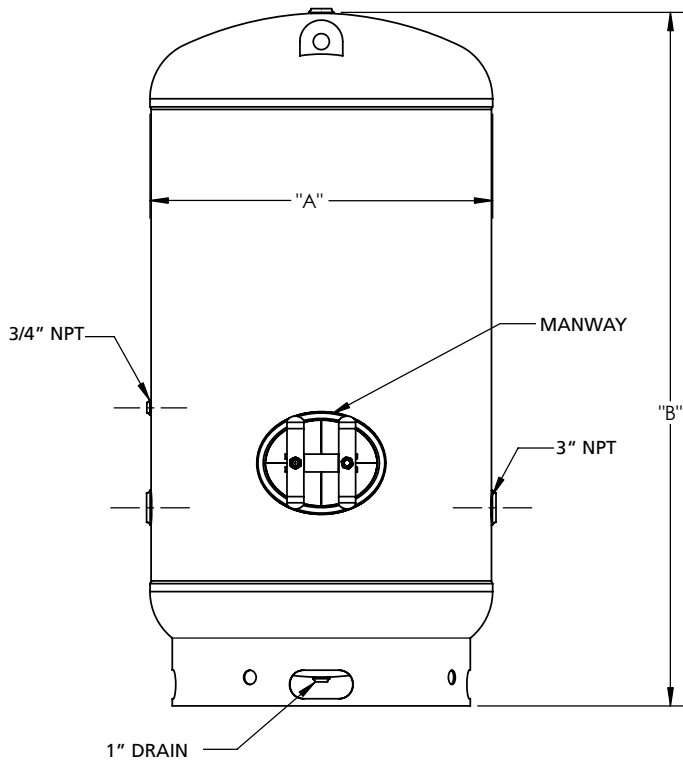
\* For H e.g. ( HDH48-1500A) or V e.g. (HDV48-1500A)

Specify Horizontal or Vertical installation H or V (after the HD)

For Jacketed models, the J will follow the orientation: HDVJ48-1500A.

For linings other than glass, use the suffix after the number and the A - HDHJ42-1000AC for Cement lined. U = Unlined.

For 150 psi ASME working pressure, insert M at the end - HDV42 - 1000AM.

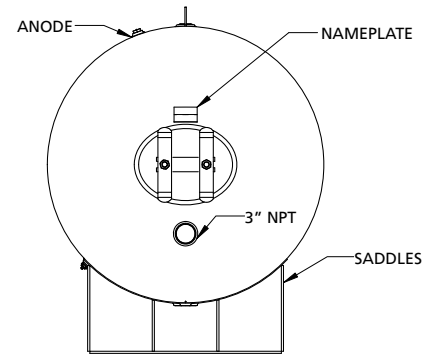
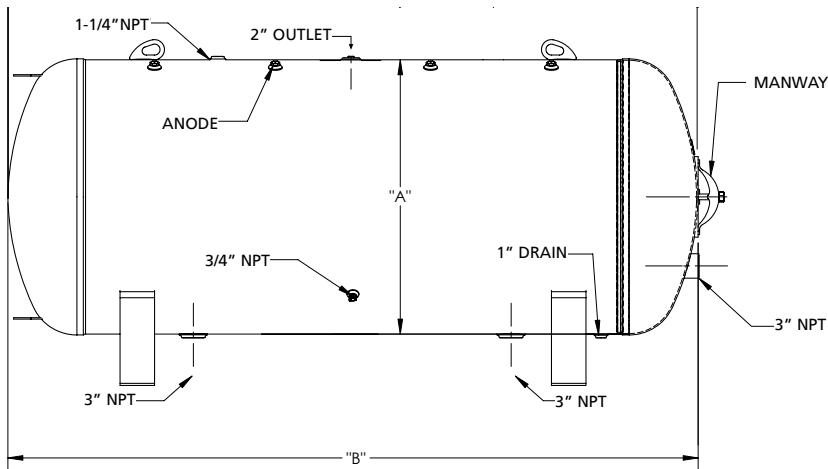


**NOTE:**

SPECIFY FOR HORIZONTAL OR VERTICAL INSTALLATION.

2 each 2" ASME inspection openings are standard on tanks 36" diameter and below.

12"x16" ASME inspection openings are standard on tanks with 42" diameter and above.

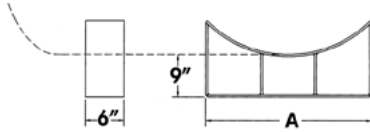


30" - 72" DIAMETER HORIZONTAL TANKS

## TANK SADDLE DIMENSIONS

**Tank Diameter**  
**30 36 42 48 54 60 72**

A 21" 25" 29" 34" 48" 52" 62"



**NOTE:** Alternate saddle heights are available.  
(Consult factory)

## TANK SADDLES

A.O. SMITH PART NO.	SADDLE DESCRIPTIONS
100170345	SADDLE, TANK, 24", 9" CLR, P-1
100170349	SADDLE, TANK, 30", 9" CLR, P-1
100170338	SADDLE, TANK, 28", 9" CLR, P-1
100170352	SADDLE, TANK, 36", 9" CLR, P-1
100170355	SADDLE, TANK, 42", 9" CLR, P-1
100170358	SADDLE, TANK, 48", 9" CLR, P-1
100170361	SADDLE, TANK, 54", 9" CLR, P-1
100170365	SADDLE, TANK, 60", 9" CLR, P-1
100170371	SADDLE, TANK, 72", 9" CLR, P-1

## FACTORY INSULATION OPTIONS

### Factory Jacketed and Insulation

- **INSULATION** — Entire tank is surrounded with insulation.
- **CABINET** — Heavy gauge painted steel.
- Adds 4" to the round jacketed and 6" to the square jacketed diameter of the tank, and 2" to the height.
- Units with length/height greater than 125" cannot be jacketed and insulated at the factory.

## SUGGESTED SPECIFICATION

### SAMPLE SPECIFICATION FOR CUSTOM-LINE STORAGE TANKS

When jacketed or insulated these models meet or exceed the thermal efficiency and standby loss requirements of ASHRAE 90.1b (current standard).

ASME storage tank to be A. O. Smith Custom-Line model \_\_\_\_\_. Capacity to be \_\_\_\_\_ gallons with a diameter of \_\_\_\_\_ inches. Tank(s) shall be constructed and stamped according to ASME specifications for \_\_\_\_\_ psi working pressure. Manhole (12" x 16"), handhole (4" x 6") or inspection openings (2'-2") shall be installed in accordance with ASME code requirements and manufacturer(s) standard practice. Tank to be constructed of (carbon steel) \_\_\_\_\_. Lining shall be glass, cement, or unlined \_\_\_\_\_. Tank(s) lined with (glass, cement or unlined) \_\_\_\_\_ lining shall be equipped with the number and size of anode rod(s) sufficient to provide adequate protection for the tank lining. Tank shall be (vertical, horizontal) \_\_\_\_\_ design and provided with \_\_\_\_\_ ring base, \_\_\_\_\_ saddles.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## UNINSULATED BARE STORAGE TANKS

A. O. Smith commercial water storage tanks are designed for use with gas/electric water heaters to provide additional storage capacity for systems with large water draws. A. O. Smith glasslined storage tanks are designed and recommended for systems with operating temperatures up to 180°F.

### PERMAGLAS® GLASSLINING

- All internal surfaces exposed to water are glasslined per ASME HLW procedures, using an NSF-approved glasslining compound
- Glass is highly resistant to effects of temperature, corrosion and electrolysis

### SIZES FROM 80 TO 2,000 GALLONS

- For horizontal installations, optional tank saddles are recommended (Tanks 500 gallon and above must be specified Horizontal or Vertical)

### CATHODIC PROTECTION

- Heavy duty anode rods provide advanced protection against corrosion

### WORKING PRESSURES

- Tanks tested at pressures assigned in accordance with working pressures shown in table on reverse side

### CUSTOM TANKS

- For our full line of custom tanks, please see the A. O. Smith Custom-Line HD storage tank spec sheet

### OPTIONS

- ASME and National Board Certification sheets - furnished upon request
- Tank saddles - two per horizontal tank

### FIVE-YEAR LIMITED TANK WARRANTY

- For complete information, consult written warranty or contact A. O. Smith

## MODELS T-80 thru T-2000



Legs to be field supplied



**CRN**  
(OPTIONAL)

## DIMENSION AND SHIPPING WEIGHTS

MODEL NUMBER	TANK CAPACITY	OVERALL DIMENSIONS IN (CM)	DIMENSIONS IN (CM)												APPROX. SHIPPING WEIGHT
	USG (L)		A	B	C	D	E	F	G	H	J	K	N	P	LB (KG)
T-80 STD	80 (303)	20 x 62-1/8 (51 x 158)	20 (51)	61-1/2 (156)	2 (5)	—	7 (18)	2 (5)	3/4 (1)	46-1/4 (117)	16 (41)	3-1/2 (9)	3-1/4 (8)	4 (10)	170 (77)
T-120 STD	119 (450)	24-1/4 x 65 (62 x 165)	24-1/4 (62)	64-3/8 (164)	2-1/2 (6)	—	7 (18)	2-1/2 (6)	3/4 (1)	34-1/2 (88)	15-1/2 (39)	10-1/2 (27)	3-1/2 (9)	4-1/8 (10)	287 (130)
T-140 ASME	140 (530)	24 x 76-1/4 (61 x 194)	24 (61)	75 (191)	2-1/2 (6)	8 (20)	12 (30)	2-1/2 (6)	3/4 (1)	27-1/2 (70)	18-1/2 (47)	12 (30)	—	4 (10)	400 (181)
T-200 ASME	200 (757)	30 x 72 (76 x 183)	30 (76)	70-3/4 (180)	2-1/2 (6)	10 (25)	13 (33)	2-1/2 (6)	3/4 (1)	28-1/2 (72)	19-1/2 (50)	13 (33)	—	4 (10)	460 (209)
T-250 ASME	250 (946)	30 x 84 (76 x 213)	30 (76)	84 (213)	2-1/2 (6)	10 (25)	13-1/4 (34)	2-1/2 (6)	3/4 (1)	28-1/2 (72)	19-1/2 (50)	13 (33)	—	4 (10)	505 (229)
T-350 ASME	350 (1,325)	36 x 88 (91 x 224)	36 (91)	86 (218)	2-1/2 (6)	14 (36)	16 (41)	2-1/2 (6)	3/4 (1)	31-1/2 (80)	20-1/4 (51)	16 (41)	—	4 (10)	670 (304)
T-400 ASME	400 (1,514)	36 x 97 (91 x 246)	36 (91)	96 (244)	2-1/2 (6)	14 (36)	16 (41)	2-1/2 (6)	3/4 (1)	31-1/2 (80)	20-1/4 (51)	16 (41)	—	4 (10)	775 (352)

Working pressure for T-80 through T-400 models is 160 psi.

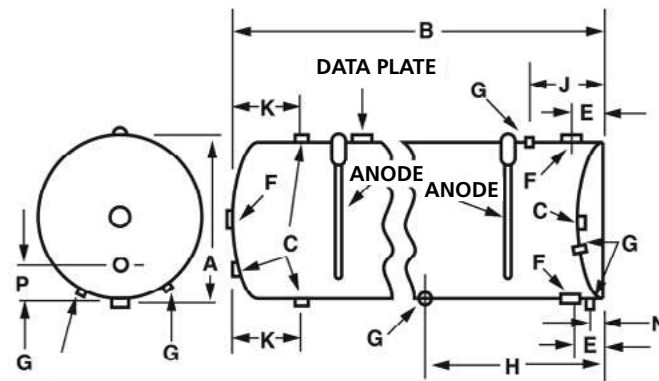


FIGURE 1 - T-80, T-120. NOTE: T-120 SHOWN.

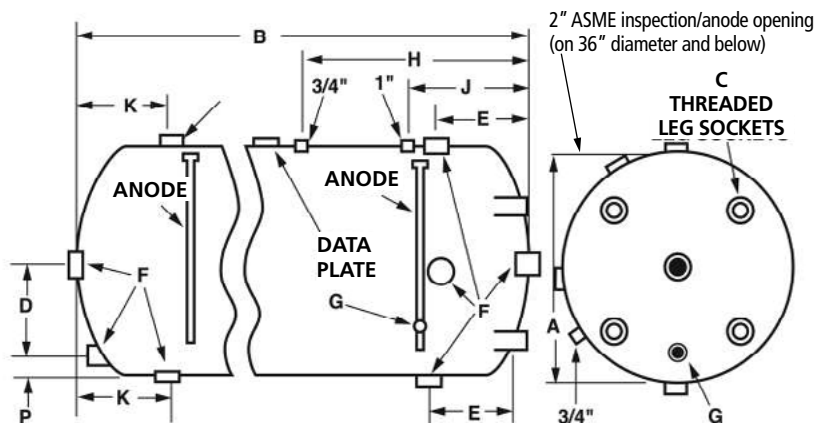


FIGURE 2 - T-140A THRU T-400A

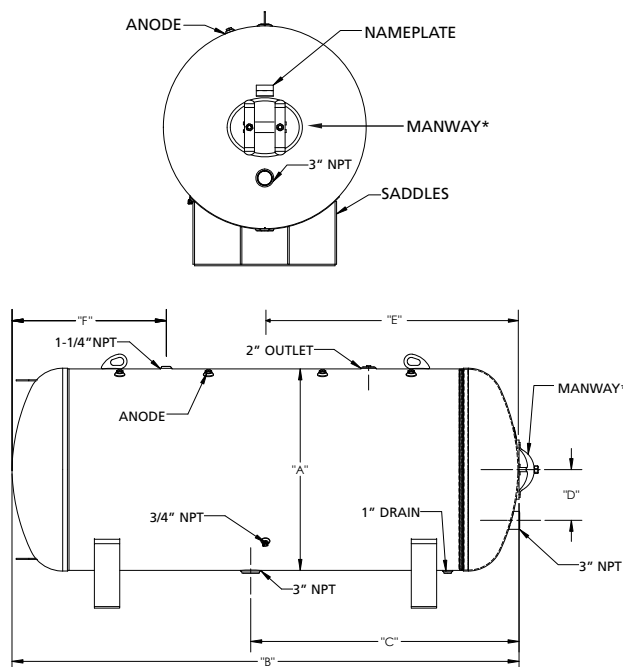
## DIMENSION AND SHIPPING WEIGHTS

MODEL NUMBER	TANK CAPACITY	DIMENSIONS IN (CM)				WEIGHT LB (KG) GLASS
	USG (L)	A	B	C	D	
TVN-500A	500 (1,893)	42 (107)	87 (221)	39-3/4 (101)	25-3/4 (65)	763 (346)
TV-500A	500 (1,893)	48 (122)	77 (196)	41-3/4 (106)	27-3/4 (70)	1,062 (482)
TV-600A	600 (2,271)	48 (122)	88 (224)	41-3/4 (106)	27-3/4 (70)	1,193 (541)
TV-700A	700 (2,650)	48 (122)	97 (246)	41-3/4 (106)	27-3/4 (70)	1,301 (590)
TV-750A	750 (2,839)	48 (122)	100 (254)	41-3/4 (106)	27-3/4 (70)	1,337 (606)
TV-1000A	1,000 (3,785)	48 (122)	124 (315)	41-3/4 (106)	27-3/4 (70)	1,623 (736)
TV-1250A	1,250 (4,732)	54 (137)	128 (325)	43-1/4 (110)	29-1/4 (74)	2,100 (953)
TV-1500A	1,500 (5,678)	60 (152)	124 (315)	44-3/4 (114)	30-3/4 (78)	2,709 (1,229)
TV-1750A	1,750 (6,624)	60 (152)	148 (376)	44-3/4 (114)	30-3/4 (78)	3,156 (1,432)
TV-2000A	2,000 (7,571)	72 (183)	121 (307)	47-1/4 (120)	33-1/4 (84)	3,397 (1,541)

Working pressure for 500 through 2000 gallon models is 125 psi.

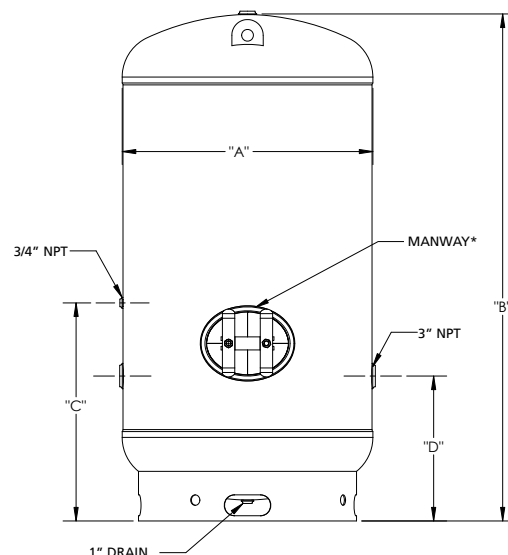
MODEL NUMBER	TANK CAPACITY	DIMENSIONS IN (CM)						WEIGHT LB (KG) GLASS
	USG (L)	A	B	C	D	E	F	
THN-500A	500 (1,893)	42 (107)	83 (211)	47-1/2 (121)	12 (30)	39-1/2 (100)	27-1/4 (69)	763 (346)
TH-500A	500 (1,893)	48 (122)	73 (185)	40-1/2 (103)	12 (30)	34-1/2 (88)	26-3/4 (68)	1,062 (482)
TH-600A	600 (2,271)	48 (122)	84 (213)	48 (122)	12 (30)	42 (107)	28-1/2 (72)	1,193 (541)
TH-700A	700 (2,650)	48 (122)	93 (236)	52-1/2 (133)	12 (30)	43-1/2 (110)	30-3/4 (78)	1,301 (590)
TH-750A	750 (2,839)	48 (122)	96 (244)	54 (137)	12 (30)	46 (117)	30-3/4 (78)	1,337 (606)
TH-1000A	1,000 (3,785)	48 (122)	120 (305)	66 (168)	12 (30)	35-1/2 (90)	36-1/2 (93)	1,623 (736)

Working pressure for 500 through 1000 gallon models is 125 psi.



**FIGURE 3 THN-500A, TH500A THRU TH-1000A**

\* Standard 12" x 16" manway on tanks 500 USG or greater.



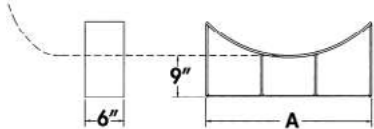
**FIGURE 4 - TVN-500A, TV-500A THRU T-2000A**

## OPTIONAL TANK SADDLES FOR HORIZONTAL TANK INSTALLATIONS

### TANK SADDLE DIMENSIONS

**Tank Diameter**  
**30 36 42 48 54 60 72**

A 21" 25" 29" 34" 48" 52" 62"



**NOTE:** Alternate saddle heights are available.  
(Consult factory)

### TANK SADDLES

A.O. SMITH PART NO.	SADDLE DESCRIPTIONS
100170345	SADDLE, TANK, 24", 9" CLR, P-1
100170349	SADDLE, TANK, 30", 9" CLR, P-1
100170338	SADDLE, TANK, 28", 9" CLR, P-1
100170352	SADDLE, TANK, 36", 9" CLR, P-1
100170355	SADDLE, TANK, 42", 9" CLR, P-1
100170358	SADDLE, TANK, 48", 9" CLR, P-1
100170361	SADDLE, TANK, 54", 9" CLR, P-1
100170365	SADDLE, TANK, 60", 9" CLR, P-1
100170371	SADDLE, TANK, 72", 9" CLR, P-1

### SUGGESTED SPECIFICATION

Glasslined storage tank(s) shall be A. O. Smith glasslined storage tank(s) or equal. Tank(s) shall be \_\_\_\_" x \_\_\_\_" and have a nominal capacity of \_\_\_\_\_ gallons. Tank(s) shall have threaded openings as shown on drawings. Exterior of tank(s) shall be thoroughly cleaned and painted. Interior of tank(s) shall be glasslined with an alkaline borosilicate composition which has been fused to the steel base by firing at a temperature of 1600°F. Cathodic protection shall be provided. The storage tank(s) shall have a working pressure of \_\_\_\_ psi. The storage tank shall have a five-year limited warranty as outlined in the written warranty.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.



## FACTORY JACKETED AND INSULATED STORAGE TANKS

These A. O. Smith storage tanks are designed for storing potable water. Fitting locations are designed to meet the needs of normal installations plus those for the A. O. Smith Cer-Temp 80™ piping methods.

### FEATURES

A. O. Smith storage tanks are ideal for use with gas-fired copper heat exchanger equipment for storage of any potable water at temperatures up to 180°F.

**GLASS LINED TANK** - Alkaline borosilicate composition permanently fused to steel by firing at a temperature of 1600°F, providing years of corrosion protection and dependable use.

**HEAVY GAUGE STEEL JACKET** - With baked enamel finish.

**THREADED OPENINGS** - All tanks furnished with threaded openings for thermometer, relief valve, 2" recirculation lines, tankstat, and drain valve.

**INSULATION** - Storage Tanks meet or exceed R12.5 minimum thermal insulation requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1

#### **TJ-80S, TJ-80A, TJV-120M and TJV-120A**

- Fits through 30" door
- Magnesium anode for anti-corrosion protection

#### **TJ-80A**

- 80 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi ASME standard working pressure

#### **TJV-120A**

- 119 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi ASME standard working pressure

#### **TJ-80S**

- 80 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi working pressure

#### **TJV-120M**

- 119 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi working pressure

#### **TJV-200-M - 175 GALLONS**

- 160 psi ASME standard working pressure
- 2" foam insulation
- Handhole cleanout (Standard)
- Fits through 33" door
- Storage is downsized to 180 gallons for a 32" x 77" envelope for space restrictive installations. Model TJV-200 is available with 200 gallons of storage.
- Magnesium anodes for extra corrosion protection

#### **5 YEAR WARRANTY**

If the tank should leak any time during the first 5 years, under the terms of the warranty, A. O. Smith will repair or replace the tank. Installation, labor, handling and local delivery are extra. For complete information, consult the written warranty.

## MODELS TJ-80S, TJ-80A TJV-120A, TJV-120M & TJV-200M

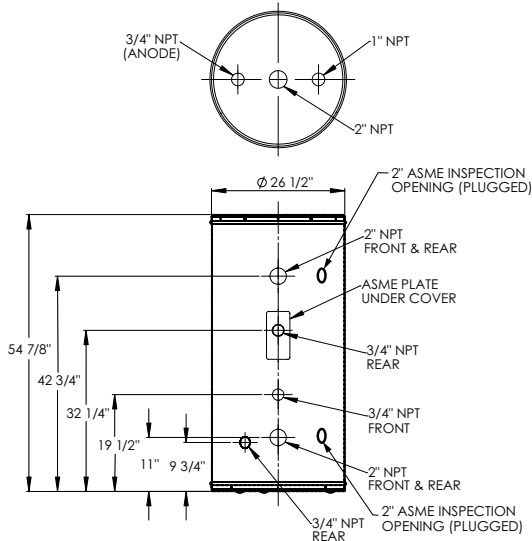


**ASME**  
(FOR SELECT MODELS)

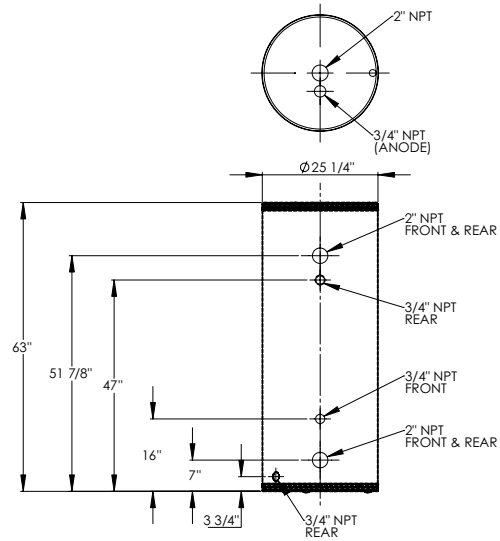
### SUGGESTED SPECIFICATION

Storage tank shall be A. O. SMITH glasslined storage tank. Tank shall be \_\_\_\_\_ " x \_\_\_\_\_ " and have a nominal capacity of \_\_\_\_\_ gallons. Tank(s) shall have threaded openings as shown on drawings. Interior of tank(s) shall be glasslined with an alkaline borosilicate composition which has been fused to the steel by firing at a temperature of 1600°F. Glass coating shall be continuous over the entire inner surface of the tank. Outer jacket shall have a baked enamel finish. Meets minimum thermal insulation requirements of the U.S. Department of Energy and current edition of ASHRAE/IESNA 90.1. Cathodic protection shall be provided. Tank shall have a working pressure of \_\_\_\_\_ psi. Tank shall have a five year limited warranty as outlined in the written warranty.

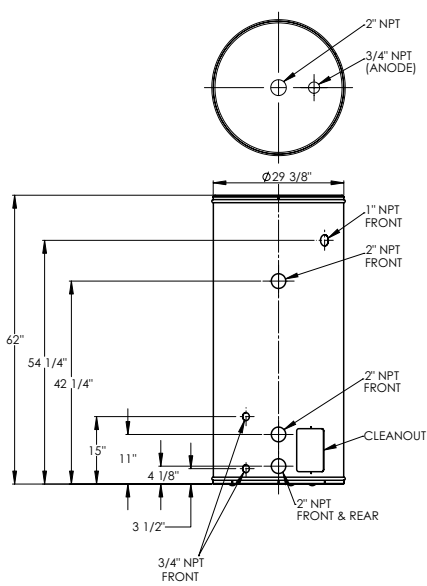
**TJ-80A**



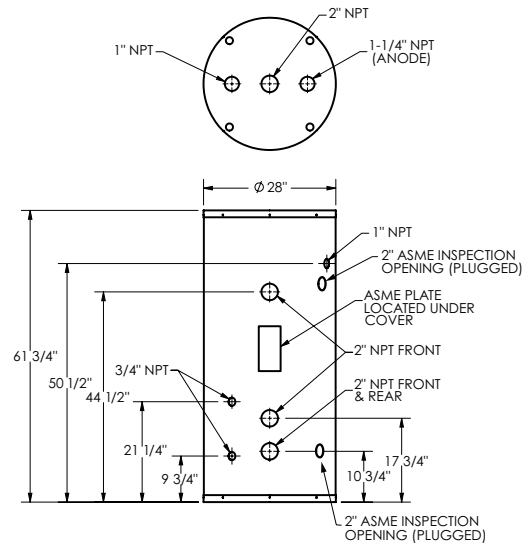
**TJ-80S**



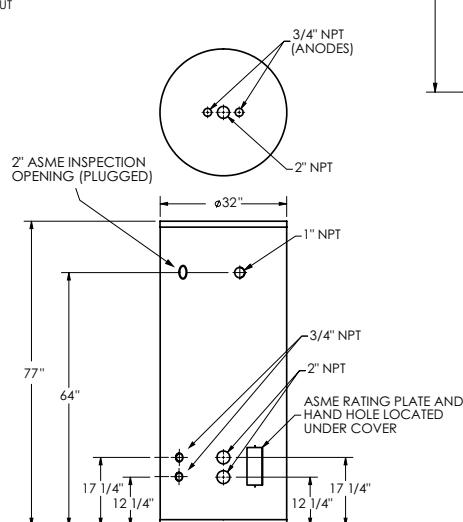
**TJV-120M**



**TJV-120A**



**TJV-200M**



For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## FACTORY JACKETED AND INSULATED STORAGE TANKS

Large volume tanks are designed for storing potable water.

### FEATURES

**STANDARD SIZES** - From 140 to 2,500 gallons - A. O. Smith stocks vertical factory jacketed and insulated tanks from 140 gallons up to 1,000 gallons for fast delivery and retrofit applications. All stock tanks are glasslined with standard tank openings as shown on following pages. For custom or larger capacities, see our custom line tanks or consult your factory representatives.

**ASME CODE CONSTRUCTION** - All tanks are constructed to the requirements of the ASME. ASME code tanks are available in 125, 150 or 160 psi working pressures (125 psi working pressure standard on tanks 500 gallons and above, 160 psi standard on tanks below 500 gallons). Consult factory for tanks with greater or lesser working pressures, with special configurations. Please check the tables below for specific working pressures - standard and optional.

**INSULATION** - Entire tank is insulated to meet ASHRAE 90.1 (current edition). Depth of insulation cavity requires use of remote bulb-type tank temperature control and thermometer. Storage tanks meet R12.5 minimum thermal insulation requirements of NRCan and current edition of ASHRAE/IESNA 90.1.

**CABINET** - Heavy gauge steel with high quality paint.

**LININGS AND COATINGS** - Thorough investigation on the service life of steel tanks with protective coatings or linings has led to the recommendations of the following lining:

- Glasslined - These are normally stocked tanks for water storage up to 180°F, with glass lining to prevent corrosion and addition of rust to water. The glass lining was developed over many years of ceramic research for a wide variety of conditions.

**CATHODIC PROTECTION** - Tanks are furnished with anodes designed for maximum protection.

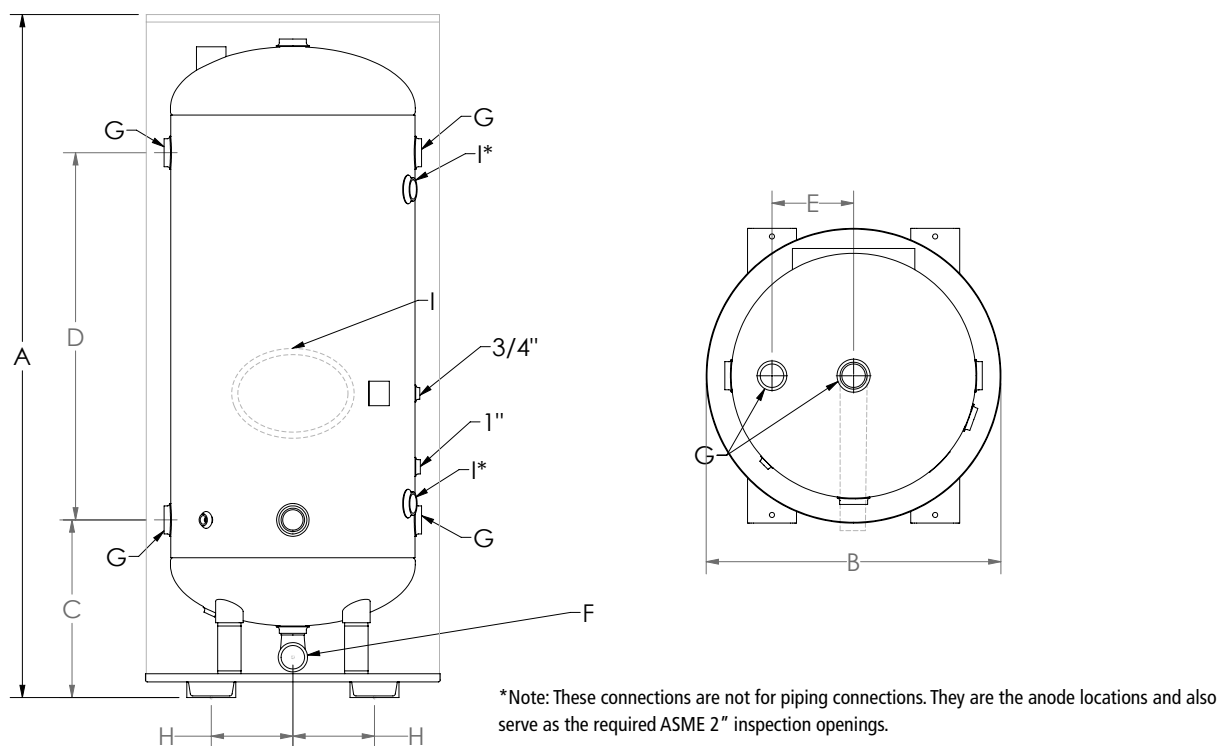
**OPTIONS & ACCESSORIES** - For optional accessories, linings, pressure ratings, connections etc. please see our custom line tanks or consult your factory representative



CRN



## STORAGE TANK SELECTION TJV-140 THRU TJV-400 FIGURE 1.



- Other tanks to 72" diameter and 4000 gallon are available on special order.
- All openings Female Pipe Thread except as noted.
- "F" opening Male Pipe Thread.

MODEL NUMBER	DIMENSIONS IN (CM)								TANK CAPACITY	"1" ASME INSPECTION OPENINGS
	A	B	C	D	E	F	G	H	USG (L)	
<b>TJV-140A</b>	87 (221)	30 (76)	21-1/2 (55)	51 (130)	8 (20)	1-1/2	2-1/2	6-3/8 (16)	140 (530)	2"
<b>TJV-200A</b>	83 (211)	36 (91)	22 (56)	45 (114)	10 (25)	1-1/2	2-1/2	7-3/4 (20)	200 (757)	2"
<b>TJV-250A</b>	96 (244)	36 (91)	22 (56)	58 (147)	10 (25)	1-1/2	2-1/2	7-3/4 (20)	250 (946)	2"
<b>TJV-350A</b>	97 (246)	42 (107)	24-1/2 (62)	54 (137)	14 (36)	1-1/2	2-1/2	9-1/2 (25)	350 (1,325)	2"
<b>TJV-400A</b>	105 (267)	42 (107)	24-1/2 (62)	61 (155)	14 (36)	1-1/2	2-1/2	9-1/2 (25)	400 (1,514)	2"

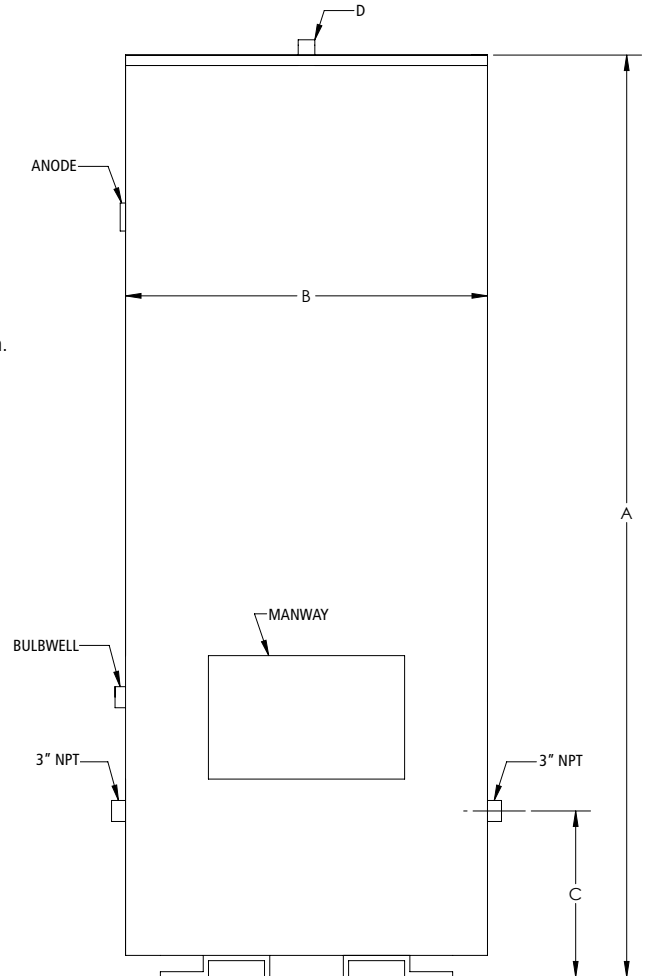
Working pressure 160 psi.

## DIMENSIONS AND SPECIFICATIONS FOR VERTICAL TANKS

### VERTICAL ROUND JACKETED ASME

MODEL NUMBER	DIMENSIONS IN (CM)				TANK CAPACITY
	A	B	C	D	USG (L)
TJVT-500A	91 (231)	46 (117)	20-7/8 (53)	2"	500 (1,893)
TJV-600A	88 (224)	52 (132)	22-7/8 (58)	2"	600 (2,271)
TJV-700A	97 (246)	52 (132)	22-7/8 (58)	2"	700 (2,650)
TJV-750A	100 (254)	52 (132)	22-7/8 (58)	2"	750 (2,839)
TJV-1000A	124 (315)	52 (132)	22-7/8 (58)	2"	1000 (3,785)

Working pressure 125 psi standard on all models 500 gallons and above. 150 psi is an available option.

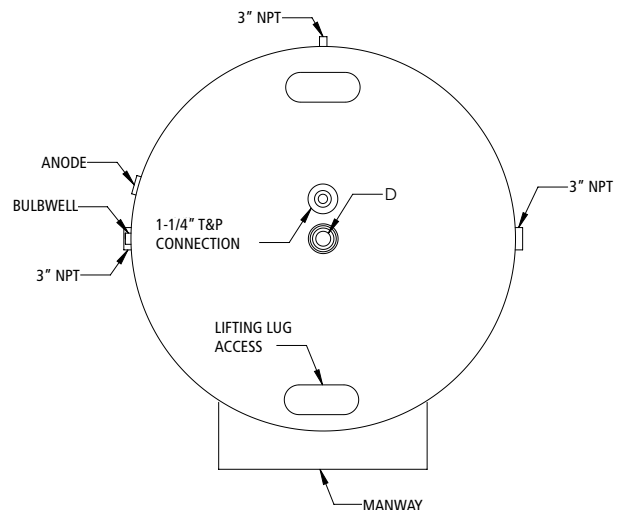


### VERTICAL SQUARE JACKETED ASME

MODEL NUMBER	DIMENSIONS IN (CM)				TANK CAPACITY
	A	B	C	D	USG (L)
TJV-1250A	133 (338)	60 (152)	24-3/8 (62)	3"	1,250 (4,732)
TJV-1500A	129 (328)	66 (168)	25-7/8 (66)	3"	1,500 (5,678)
TJV-1750A	153 (389)	66 (168)	25-7/8 (66)	3"	1,750 (6,624)
TJV-2000A	126 (320)	78 (198)	28-3/8 (72)	3"	2,000 (7,571)
TJV-2500A	146-1/2 (372)	78 (198)	28-3/8 (72)	3"	2,500 (9,464)

**NOTE:** Tanks with a capacity of 500 USG or greater come standard with a 12" x 16" manway.

- All openings Female Pipe Thread except as noted.



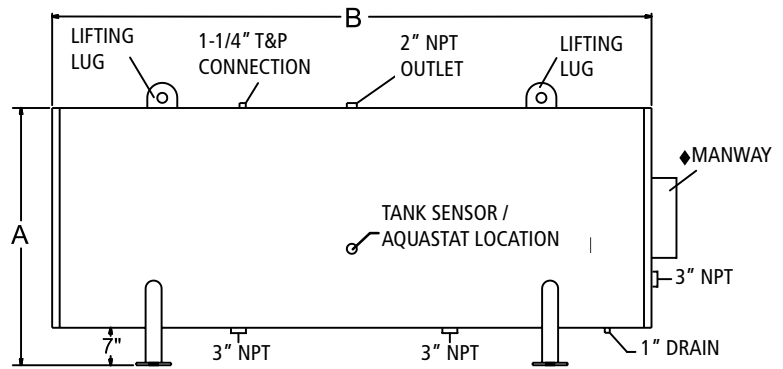
### CAUTION

All openings are shipped open and unused. Openings must be plugged or capped at time of installation except as noted.

## DIMENSIONS AND SPECIFICATIONS FOR HORIZONTAL TANKS

### HORIZONTAL ROUND JACKETED ASME TANKS

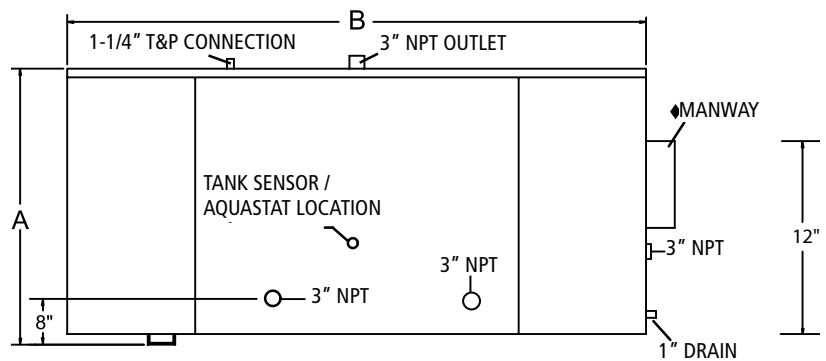
MODEL NUMBER	DIMENSIONS IN (CM)		DIAMETER	TANK CAPACITY
	A	B		USG (L)
TJH-250A	41 (104)	87 (221)	34 (86)	250 (946)
TJH-300A	47 (119)	76 (193)	40 (102)	300 (1,136)
TJH-400A	53 (135)	76 (193)	46 (117)	400 (1,514)
TJHT-500A	53 (135)	87 (221)	46 (117)	500 (1,893)
TJH-600A	59 (150)	88 (224)	52 (132)	600 (2,271)
TJH-700A	59 (150)	97 (246)	52 (132)	700 (2,650)
TJH-750A	59 (150)	100 (254)	52 (132)	750 (2,839)
TJH-1000A	59 (150)	124 (315)	52 (132)	1,000 (3,785)



Tanks with a capacity of 500 USG or greater come standard with a 12" x 16" manway.

### HORIZONTAL SQUARE JACKETED ASME TANKS

MODEL NUMBER	DIMENSIONS IN (CM)		DEPTH	TANK CAPACITY
	A	B		USG (L)
TJH-1250A	68-1/2 (174)	134 (340)	60-1/4 (153)	1,250 (4,732)
TJH-1500A	74-1/2 (189)	127 (323)	66-1/4 (168)	1,500 (5,678)
TJH-2000A	86-1/2 (220)	127 (323)	78-1/4 (199)	2,000 (7,571)
TJH-2500A	86-1/2 (220)	144 (366)	78-1/4 (199)	2,500 (9,464)



Tanks with a capacity of 500 USG or greater come standard with a 12" x 16" manway.

### LIMITED WARRANTY OUTLINES

**GLASSLINED:** If the tank should leak anytime during the first five years, under the terms of the warranty, A. O. Smith will repair or replace the tank; installation, labor and handling extra.

**NOTE:** THIS OUTLINE IS NOT A WARRANTY. For complete information, consult the written warranty or A. O. Smith. Warranty does not apply to product installed outside of the United States of America or its territorial possessions and Canada.

### SAMPLE SPECIFICATION FOR FACTORY JACKETED AND INSULATED STORAGE TANKS

When jacketed or insulated these models meet R12.5 minimum thermal insulation requirements of NRCan and current edition of ASHRAE/IESNA 90.1. ASME storage tank to be A. O. Smith Custom-Line model \_\_\_\_\_. Capacity to be \_\_\_\_\_ gallons with a diameter of \_\_\_\_\_ inches. Tank(s) shall be constructed and stamped according to ASME specification for \_\_\_\_\_ psi working pressure. Manway (12 x 16), handhole (4 x 6) or inspection openings (2 - 2") shall be installed in accordance with ASME code requirements and manufacturer(s) standard practice. Tank to be constructed of (carbon steel) \_\_\_\_\_. Lining shall be (glass) \_\_\_\_\_. Tank(s) lined with (glass) \_\_\_\_\_ lining shall be equipped with the number and size of magnesium anode rod(s) sufficient to provide adequate protection for the tank lining. Tank shall be (vertical, horizontal) \_\_\_\_\_ design and provided with \_\_\_\_\_ ring base, (or \_\_\_\_\_ Saddles.)

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## BARE BUFFER TANKS

A. O. Smith Chilled Water Buffer Tanks are designed to create volume in a chilled water system when the system and associated piping can not provide the chiller with the volume required for efficient operation. To meet this criteria, A. O. Smith's Chilled Water Buffer Tank is an ASME certified vessel and is available in various custom configurations and tank sizes.

Chiller manufacturers recommend a specific volume of water per ton of chiller capacity to maintain water temperature stability. These recommendations range from 3 to 5 gallons of system volume per ton of chiller capacity when used in a comfort cooling application, to system volumes of 6 to 10 gallons per ton when used in a process cooling application where temperature stability is critical.

Selecting the right tank is easy. After determining how much additional volume the tank will provide, select the size and configuration of the system connections that will best connect the tank to the chilled water system.

### STANDARD FEATURES:

- Vertical Internal Baffle to encourage proper mixing of fluid
- 125 psi Working Pressure
- ASME Sec VIII, U-Stamped Vessel
- Flange or NPT Connections
- Lifting Lugs
- Red Oxide Paint

### OPTIONAL EQUIPMENT:

- 12" x 16" Manway (300 gallons and above)
- 4" x 6" Hand Hole
- Automatic Air Vent
- Temperature and Pressure Gauge
- 150 or 160 psi Working Pressure
- Custom connection locations

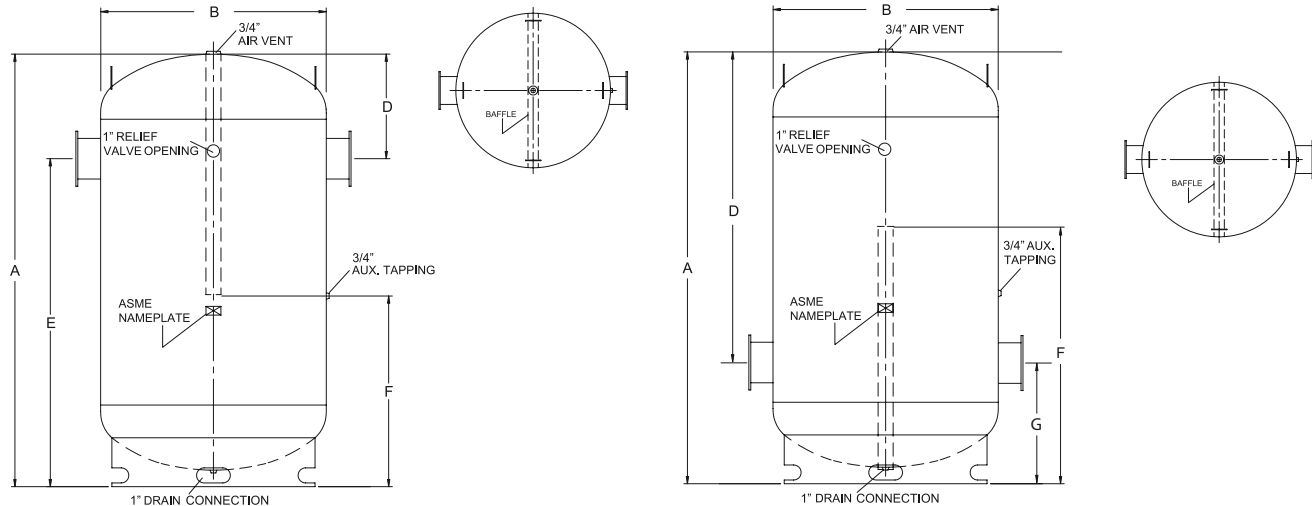
### 5-YEAR LIMITED WARRANTY



## WARNING

Use this vessel only in chilled water systems. DO NOT use in potable water systems. The installer must comply with all plumbing codes. DO NOT operate above the temperature or pressure specified on the rating plate. Failure to comply may result in personal injury, property damage, or death.

**Figure 1 Buffer tank dimensions, refer to table below**



## DIMENSIONS AND SPECIFICATIONS

CHILLED WATER BUFFER TANK W/ UPPER OR LOWER CONNECTIONS								
MODEL NUMBER	CAPACITY USG (L)	A IN (CM)	B IN (CM)	D IN (CM)	E IN (CM)	F IN (CM)	G IN (CM)	WEIGHT LB (KG)
ACV*-120	120 (454)	56 (142)	28 (71)	20 (51)	36 (91)	19 (48)	24 (61)	298 (135)
ACV*-200	200 (757)	86 (218)	28 (71)	20 (51)	66 (168)	29 (74)	24 (61)	430 (195)
ACV*-325	318 (1,204)	76 (193)	36 (91)	23 (58)	53 (135)	25 (64)	27 (69)	533 (242)
ACV*-450	432 (1,635)	76 (193)	42 (107)	25 (64)	52 (132)	25 (64)	29 (74)	818 (371)
ACV*-500	500 (1,893)	87 (221)	42 (107)	25 (64)	62 (157)	29 (74)	29 (74)	930 (422)
ACV*-750	750 (2,839)	100 (254)	48 (122)	27 (69)	73 (185)	33 (84)	31 (79)	1,430 (649)
ACV*-1000	1,000 (3,785)	124 (315)	48 (122)	27 (69)	97 (246)	41 (104)	31 (79)	1,733 (786)

\*ACV120 for Lower, ACVU for Upper and ACV4 for Lower and Upper Connections

## OPTIONAL CONNECTIONS

FLANGED CONNECTIONS	BOLT PATTERN
3" NPT	
3" Bolt Flanged	
4" Bolt Flanged	
5" Bolt Flanged	
6" Bolt Flanged	325 - 1,000 only
8" Bolt Flanged	
10" Bolt Flanged	
EXTRA TAPPINGS	
1", 1-1/4", 1-1/2", 2", 2-1/2", 3", 4"	

OPTION CODE:	
ACVU-120-3NTM —	M = 150 psi; 6 = 160 psi
	T = T&P Gauge; S = Seismic; Z = T&P Gauge + Seismic*
	N = NPT; B = Bolting Flange
	Number = inch size
	4 = 4 Connections (Upper and Lower); 3 = 3 Connections**; L = Lower Connections; U = Upper Connections; C = Custom Offset Connections**

\*Seismic offered on ACV-325 models and up.

\*\* Submittal is required for ordering.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.



## JACKETED BUFFER TANK HYDRAULIC SEPARATOR

### STANDARD EQUIPMENT

- ASME Sec. VIII U Stamp
- 125psi (Working Pressure)
- Automatic Air Vent
- 5 Year Limited Warranty
- Pre-painted Jacket
- 2" HCFC Free Foam Insulation

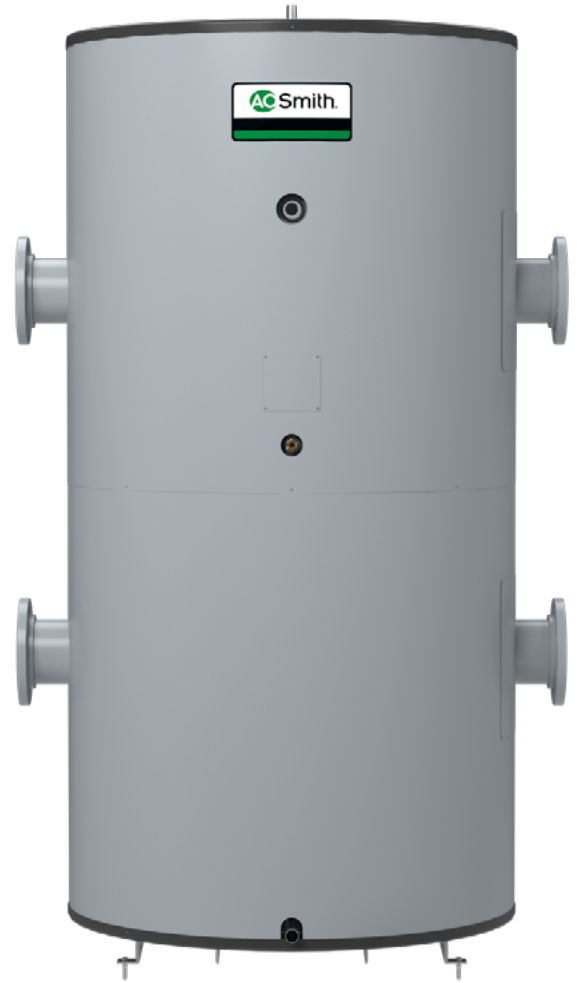
### OPTIONAL EQUIPMENT

- Temperature Gauge
- Pressure Gauge
- Internal Baffle (Only for 2 Upper or 2 Lower Connections)
- 4" x 6" handhole cleanout opening
- 12" x 16" manway opening (300 gallons and larger) [1,364 litres]
- Extra Tappings
- Flange or NPT Connections
- Lifting Lugs

### OUTSTANDING STANDARD FEATURES:

- Available in Seven Tank Sizes
- ASME Sec VIII Certified
- U Stamped
- Automatic Air Vent
- Custom Connection Locations

### 5- YEAR LIMITED WARRANTY



ABV120 - ABV1000



## WHAT IS A BUFFER TANK/HYDRAULIC SEPARATOR?

A Buffer Tank/Hydraulic Separator is designed to maximize the runtime and limit the on/off cycling of a boiler while separating the boiler flow from the system flow. In applications where the minimum system load is less than the minimum output of the boiler there is a high propensity for the boiler to excessively cycle on and off due to the fact that the boiler is delivering more BTU's than the system is requiring. In this case the Buffer Tank is designed to act as a battery for BTU's. The system demand is met by using BTU's that are already stored in the tank and thus delaying the boiler from initiating a heating cycle until a minimum run time can be accomplished.

The Hydraulic Separator aspect of the tank is designed to de-couple the hydronic heating system flow from the boiler flow by acting as a "separator" so that the two independent flows do not affect one another. When the system flow is less than the minimum required boiler flow there will likely be erratic system delivery temperatures and excessive boiler cycling. These adverse affects can cause premature component failure, and in most cases, boiler efficiency will be adversely affected.

## WHEN SHOULD A BUFFER TANK/HYDRAULIC SEPARATOR BE APPLIED?

A Buffer Tank/Hydraulic Separator can be applied to keep the boiler from short cycling in situations where the smallest building demand is less than the minimum rated output of the boiler and/or in situations where system flow is less than the flow required by the boiler.

For example, assume that during a warm spring day there is only a fractional demand for heat where the actual demand is 50,000 BTU/Hr., but the boiler cannot deliver less than 150,000 BTU/Hr at its lowest output. On days that meet this criteria the boiler will cycle excessively because more BTU's are being produced than the distribution system can transfer to the building. A properly sized buffer tank in this situation will limit the number of boiler "on/off" cycles and increase the comfort level of the building by delivering a more constant temperature.

Additionally, during these days of fractional demand the system flow may be less than the boiler flow due to system pumps slowing because the demand is less than the design load. In this case the Hydraulic Separator acts as a decoupling device and the decreased system flow will not affect the operation of the boilers. By effectively separating the system flow from the boiler flow, a more constant delivery temperature, as well as longer boiler operational cycles, can be achieved. Reducing boiler on/off cycles will increase boiler efficiency and reduce maintenance costs.

## HOW IS A BUFFER TANK/HYDRAULIC SEPARATOR SIZED?

A Buffer Tank/Hydraulic Separator is sized to provide a minimum runtime for the boiler plant. Use the equation below to find the properly sized tank for your specific application. Tank connection diameters should be sized to meet the maximum flow requirements of the application.

$$\text{BUFFER TANK CAPACITY} = \frac{\text{DESIRED RUN TIME X (MINIMUM BOILER OUTPUT - MINIMUM SYSTEM LOAD)}}{\text{SYSTEM } \Delta T \times 8.33 \times 60}$$

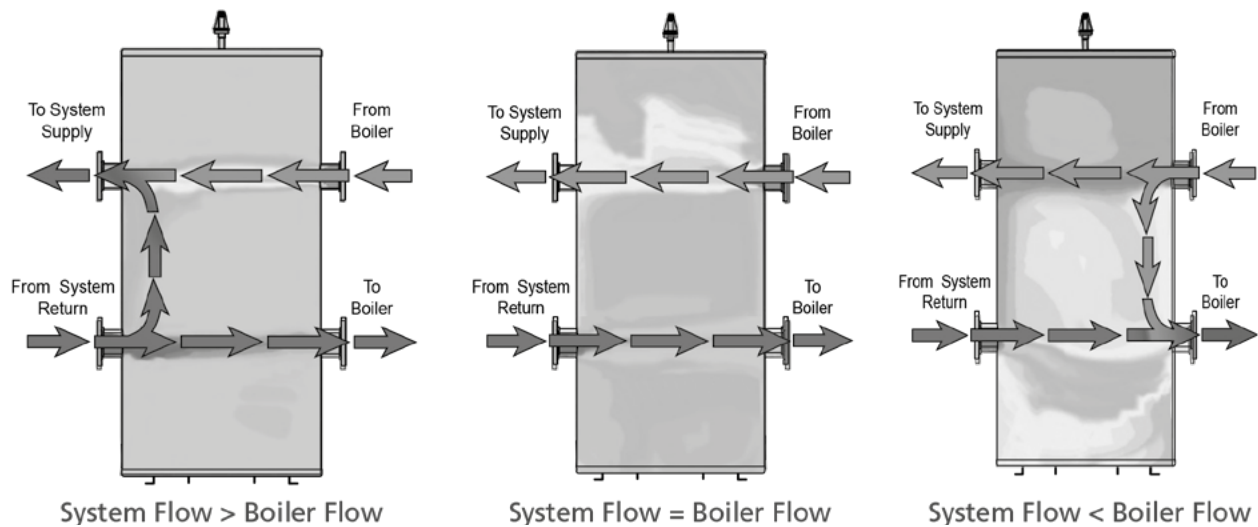
- Desired Runtime- The Minimum period of time that the boiler should run before cycling off.  
- A. O. Smith recommends a minimum boiler runtime of no less than 10 minutes.
- Minimum Boiler Output- The amount of BTU's that will be delivered at the minimum firing rate of the smallest boiler in the plant.
- Minimum System Load- The absolute smallest heat demand of the building.
- System Delta T- The difference between the system supply temperature and system return temperature.
- 8.33- The weight of one gallon of water.
- 60- The number of minutes in 1 hour

## WHAT WILL THE LEAVING WATER TEMPERATURE BE FROM THE BUFFER TANK/HYDRAULIC SEPARATOR?

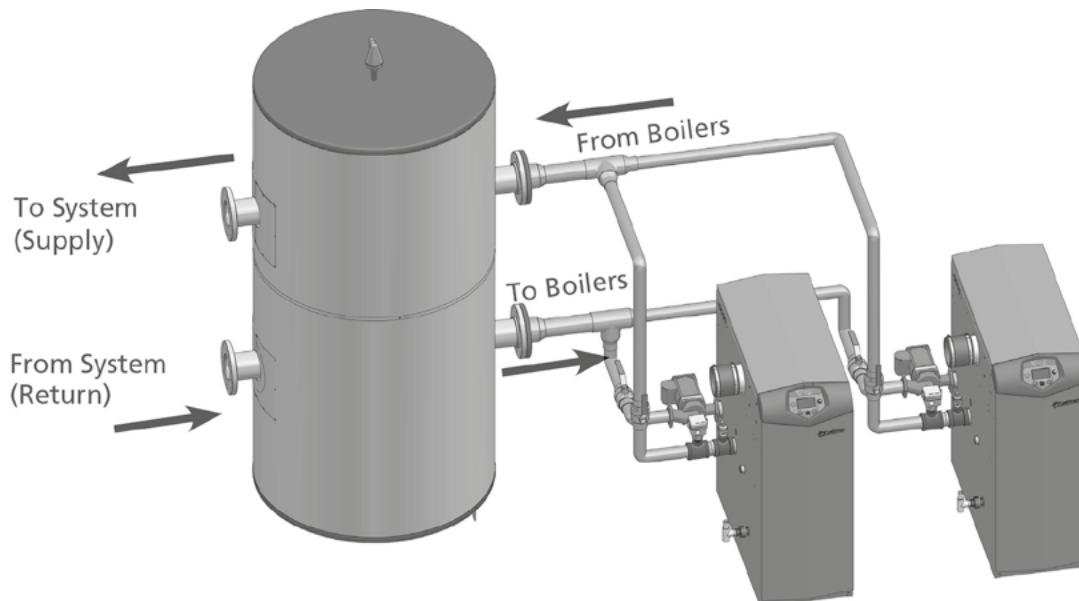
At times when the system flow is greater than the boiler flow the system supply temperature can be less than the boiler supply temperature due to the mixing of the temperatures in the tank. The exact system supply temperature can be found by using the formula in Figure 1 (right). This can be helpful when calculating system supply temperatures during high load periods.

## WHAT HAPPENS INSIDE THE BUFFER TANK/HYDRAULIC SEPARATOR?

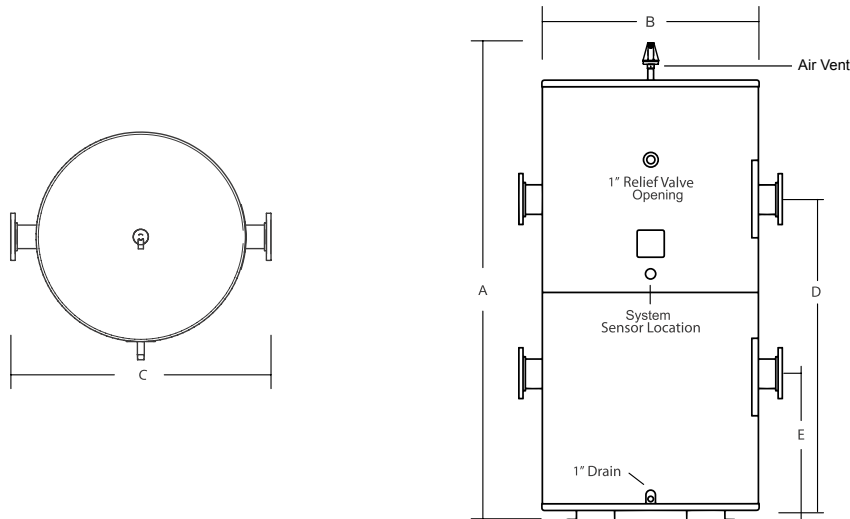
Depending on the relationship between the system flow and boiler flow, the buffer tank may react in different ways. Find your specific situation in the diagrams below and see the associated flow and thermal distribution patterns inside the Buffer Tank/Hydraulic Separator. As the diagrams show, the design allows for the boiler flow and system flow to work together to maximize boiler efficiency and overall system performance.



## TYPICAL PIPING ARRANGEMENT FOR BUFFER TANK/HYDRAULIC SEPARATOR IN HYDRONIC SYSTEMS



## BUFFER TANK / HYDRAULIC SEPARATOR DIMENSIONS AND SPECIFICATIONS



HYDRAULIC SEPARATOR BUFFER TANK W/ UPPER OR LOWER CONNECTIONS							
MODEL NUMBER	CAPACITY USG (L)	A IN (CM)	B IN (CM)	C IN (CM)	D IN (CM)	E IN (CM)	WEIGHT LB (KG)
ABV_-120	120 (454)	64-1/2 (164)	32 (81)	32 (81)	43-3/4 (111)	19-3/4 (50)	500 (227)
ABV_-200	200 (757)	94-1/2 (240)	32 (81)	32 (81)	73-3/4 (187)	19-3/4 (50)	900 (408)
ABV_-325	318 (1,204)	85 (216)	40 (102)	50 (127)	57-1/2 (146)	26-1/2 (67)	1,290 (585)
ABV_-450	432 (1,635)	85 (216)	46 (117)	56 (142)	55 (140)	29 (74)	1,626 (738)
ABV_-500	500 (1,893)	96 (244)	46 (117)	56 (142)	66 (168)	29 (74)	1,765 (801)
ABV_-750	750 (2,839)	109 (277)	52 (132)	62 (157)	77 (196)	31 (79)	2,330 (1,057)
ABV_-1000	1,000 (3,785)	133 (338)	52 (132)	62 (157)	101 (257)	31 (79)	3,010 (1,365)

Notes: Custom Sizes and Configurations are Available, consult Factory for details.

Additional Recirculation & Supply/Return Connections Sizes Available, consult Factory for details.

Automatic Air vent will add 5" to total tank height.

\_ Select connection location: 4 = 2 Upper and Lower Connections; 2 Lower Connections; 2 Upper Connections.

### OPTIONAL CONNECTIONS

FLANGED CONNECTIONS	BOLT PATTERN
76.2 mm (3") NPT	
76.2 mm (3") Bolt Flanged	
101.6 mm (4") Bolt Flanged	
127 mm (5") Bolt Flanged	325 - 1,000 only
152.4 mm (6") Bolt Flanged	
203.2 mm (8") Bolt Flanged	
254 mm (10") Bolt Flanged	
EXTRA TAPPINGS	
25.4, 31.75, 38.1, 50.8, 63.5, 76.2, 101.6 mm (1", 1¼", 1½", 2", 2½", 3, 4")	

OPTION CODE:	
ABVU-120-3NTM	M = 150 psi; 6 = 160 psi
	T = T&P Gauge; S = Seismic; Z = T&P Gauge + Seismic*
	N = NPT; B = Bolting Flange
	Number = inch size
	4 = 4 Connections (Upper and Lower); 3 = 3 Connections**; L = Lower Connections; U = Upper Connections; C = Custom Offset Connections**

\*Seismic offered on ABV-325 models and up.

\*\*Submittal is required for ordering.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

### STEAM / HOT WATER MODELS HWG

#### FEATURES

A. O. Smith hot water generators are available for operation with steam or boiler water as the energy source. They are completely assembled with components sized, piped and checked at the factory before shipment. Generators are available in space saving vertical or horizontal models.

#### CUSTOM UNIT AVAILABILITY

- Custom units built to order, with tank capacities up to 4,000 gallons, with special control trim, and with special heating units can be built to design specifications on special order basis. Standard units listed in this brochure cover most standard orders.

#### PERMAGLAS® GLASSLINING

- All internal surfaces exposed to water are glasslined per ASME HLW procedures, using an NSF-approved glasslining compound.
- Glass is highly resistant to effects of temperature, corrosion and electrolysis.
- Optional Cement or Epoxy lined tanks are available.

#### INSULATION AND JACKETING

- The HWG systems meet or exceed the thermal efficiency and or standby loss requirements of NRC and current edition ASHRAE/IESNA 90.1.

#### CODE LISTING

- The standard system will employ an ASME "HLW" code glasslined storage tank fitted with an ASME "U" code 3/4" diameter copper tube heat exchanger.

#### INTEGRAL PUMP

- The standard HWG system will employ a circulator pump. The standard heat exchanger sizing tables are also based on using integral circulators.

#### HWG OPTIONS (STEAM OR WATER BOILER UNITS)

- Low water cut-off, 12x16 vessel manway, 4x6 vessel hand hole.

#### STEAM UNITS

- Standard steam trim consists of temperature control valve, 1 steam trap on condensate line, inlet and auxiliary strainers.

#### OPTIONAL STEAM TRIM

- Includes electric operated valve.
- Pressure gauge with siphon, vacuum breaker and air vent.

#### BOILER UNITS

- Standard boiler water trim includes temperature control valve.

#### OPTIONAL BOILER TRIM

- Electric high limit safety system, three-way controls with bypass.
- ASME rating - standard HWG consists of ASME HLW Code storage tank rated 125 psi working pressure with U Code heat exchanger, temperature & pressure relief valve, temperature & pressure gauge in tank, drain valve and lifting lugs.
- Pressure gauge with siphon, vacuum breaker and air vent.
- Boiler water temperature gauge.

#### CATHODIC PROTECTION

- Standard HWG systems employing glass or optional epoxy lined tanks are fitted with anodes as corrosion protection.

#### LIMITED WARRANTY OUTLINES GLASS-LINED, CEMENT, EPOXY

- If the tank should leak any time during the first five years, under the terms of the warranty, A. O. Smith will repair or replace the tank.
- Installation, labour, handling and local delivery extra.
- The coil has a one year limited warranty.

#### NOTE: THIS OUTLINE IS NOT A WARRANTY.

For complete information, consult the written warranty or A. O. Smith.

#### HWG MODELS

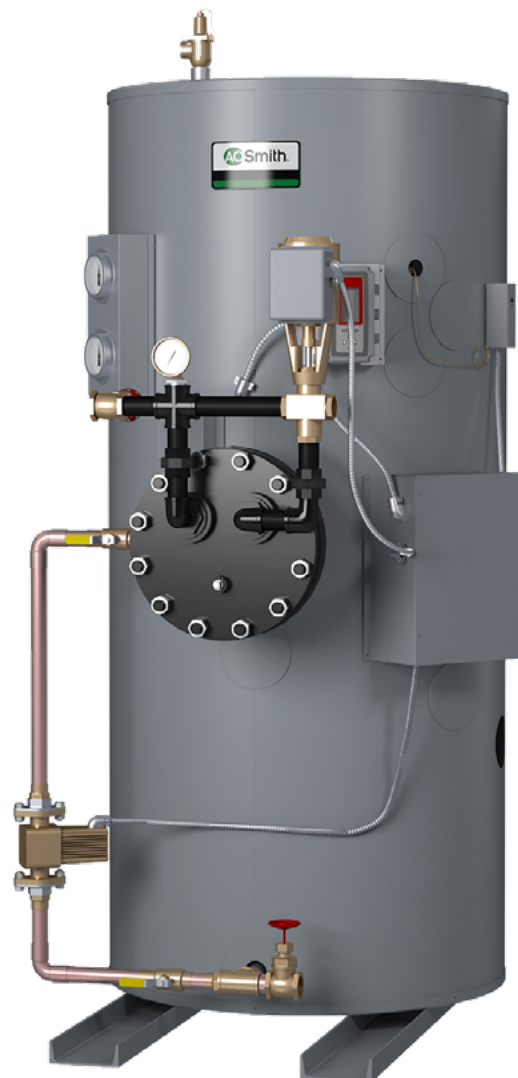
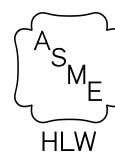
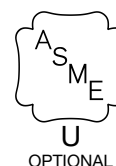


Image includes the optional electronic control package. Actual HWG appearance could vary.



## TO SPECIFY HWG SERIES PACKAGE WATER HEATER:

1. Calculate storage capacity in gallons required, and determine if vertical or horizontal installation applies.
2. Decide what type of heating medium will be used; steam or boiler water.
  - If STEAM - Determine pressure in coil.
  - If BOILER WATER - Determine available boiler water temperature.
3. From the recovery table, obtain the required GPH capacity and temperature rise. Selecting heating coil size.
4. Decide whether single or double wall coil is required.

### EXAMPLE INSTALLATION REQUIREMENTS:

Vertical, 140 gallons, Steam @ 5 PSI, 80 GPH Recovery, 40 - 140°F temperature rise.

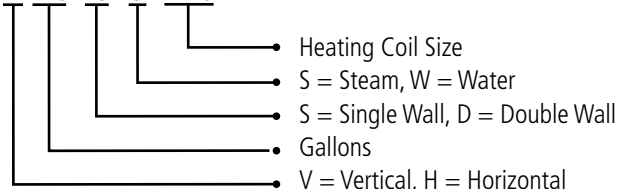
### TO DETERMINE THE HWG SERIES MODEL:

Storage Tank ..... 140 Gallons, Vertical

Coil Size ..... 418 (from RECOVERY CHART)

## MODEL TO SPECIFY:

HWG - V 140 ES S 4-18



ESS = Single Wall Steam  
EDS = Double Wall Steam  
ESW = Single Wall Water  
EDW = Double Wall Water

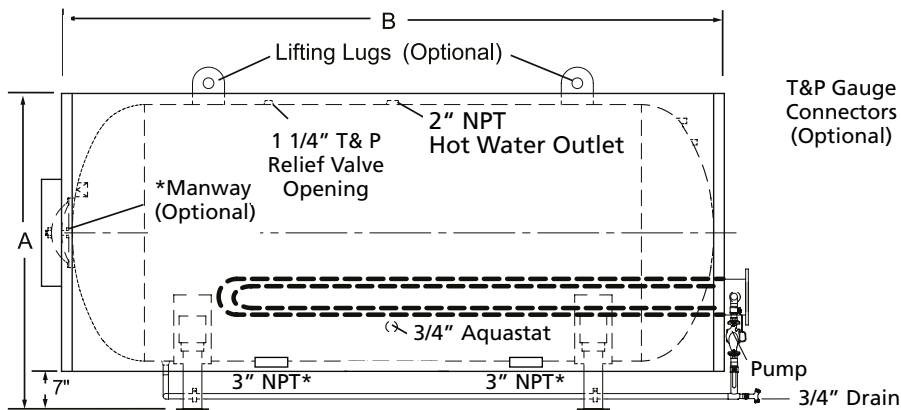
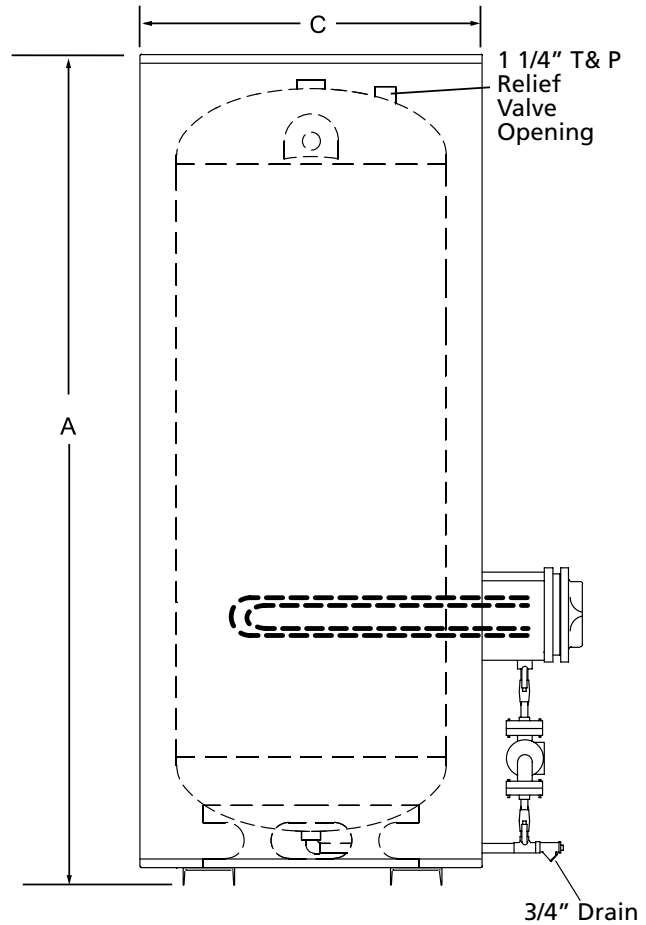
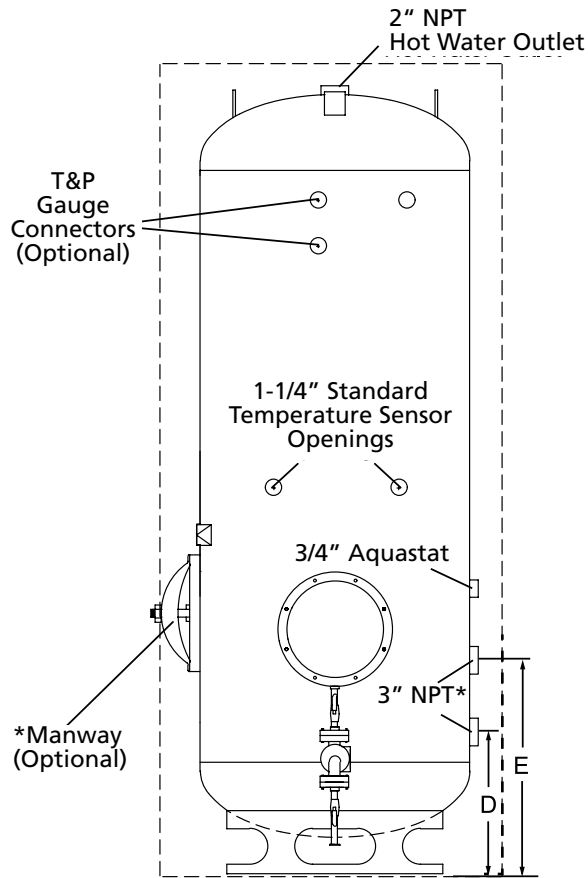
### VERTICAL TANKS ROUND JACKETED

MODEL NUMBER	A IN (CM)	C IN (CM)	D IN (CM)	TANK CAPACITY USG (L)
HWGV-120A	63 (160)	28 (71)	10 (25)	120 (454)
HWGV-200A	77-1/4 (196)	32 (81)	11-1/4 (29)	200 (757)
HWGV-250A	91 (231)	34 (86)	18 (46)	257 (973)
HWGV-318A	80 (203)	40 (102)	19-1/2 (50)	318 (1,204)
HWGV-400A	80 (203)	46 (117)	21 (53)	432 (1,635)
HWGV-500A	92 (234)	46 (117)	21 (53)	504 (1,908)
HWGV-650A	92 (234)	52 (132)	23-1/2 (60)	650 (2,461)
HWGV-750A	104 (264)	52 (132)	23-1/2 (60)	752 (2,847)
HWGV-1000A	128 (325)	52 (132)	23-1/2 (60)	940 (3,558)

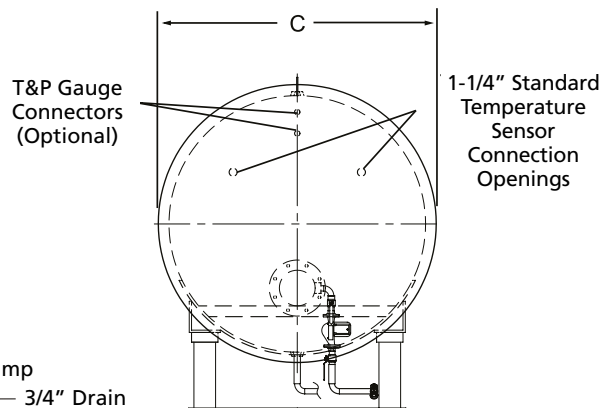
NOTE: Consult factory for design parameters outside this chart.

### HORIZONTAL TANKS ROUND JACKETED

MODEL NUMBER	A IN (CM)	B IN (CM)	C IN (CM)	TANK CAPACITY USG (L)
HWGH-250A	41 (104)	87 (221)	34 (86)	250 (946)
HWGH-300A	47 (119)	76 (193)	40 (102)	300 (1,136)
HWGH-400A	53 (135)	76 (193)	46 (117)	400 (1,514)
HWGH-500A	53 (135)	88 (224)	46 (117)	500 (1,893)
HWGH-600A	59 (150)	88 (224)	52 (132)	600 (2,271)
HWGH-700A	59 (150)	100 (254)	52 (132)	700 (2,650)
HWGH-1000A	59 (150)	124 (315)	52 (132)	1000 (3,785)



\*2" on 120; 2-1/2" on 200 Gal.



## BOILER WATER TABLE - RECOVERY SYSTEM

The listings are for boiler water temperatures and temperature rises that are most commonly used in the industry.

MODEL NUMBER	180°F BOILER WATER						200°F BOILER WATER						210°F BOILER WATER					
	GPH @ 40- 120°F	GPM BW	GPH @ 40- 140°F	GPM BW	GPH @ 40- 160°F	GPM BW	GPH @ 40- 120°F	GPM BW	GPH @ 40- 140°F	GPM BW	GPH @ 40- 160°F	GPM BW	GPH @ 40- 120°F	GPM BW	GPH @ 40- 140°F	GPM BW	GPH @ 40- 160°F	GPM BW
<b>FOUR INCH DIAMETERS</b>																		
418	73	4	48	4	27	2	93	6	57	4	43	4	101	6	72	6	51	5
424	98	6	64	5	36	3	124	8	76	6	58	5	135	9	96	8	68	6
430	123	8	80	6	45	4	155	10	96	8	72	7	168	11	120	10	85	8
436	147	9	96	8	54	5	186	12	115	9	87	8	202	18	192	16	136	13
448	197	13	128	10	72	7	248	16	153	12	116	11	270	18	192	16	136	13
<b>SIX INCH DIAMETERS</b>																		
618	166	11	108	9	61	6	209	13	129	10	98	9	227	15	162	13	115	11
624	212	14	138	11	78	7	267	17	165	13	125	12	291	19	207	17	147	14
630	261	17	170	14	96	9	329	21	204	17	154	15	358	23	255	21	181	18
636	304	20	198	16	112	11	384	25	237	19	180	18	417	27	297	24	211	21
648	403	26	262	21	149	14	508	33	314	26	238	23	552	36	393	32	280	28
660	498	33	324	27	184	18	628	41	388	32	294	29	683	45	486	40	346	34
<b>EIGHT INCH DIAMETERS</b>																		
824	429	28	279	23	159	15	541	36	334	27	253	25	588	39	418	34	298	29
830	543	36	353	29	201	20	684	45	423	35	321	32	744	49	529	44	377	37
836	657	43	427	35	243	24	828	55	512	42	388	38	900	60	640	53	456	45
842	770	51	500	41	285	28	970	64	600	50	455	45	1055	70	750	62	535	53
848	862	57	560	46	319	31	1086	72	672	56	509	50	1181	78	840	70	599	59
860	1008	67	655	54	373	37	1270	84	786	65	596	59	1382	92	982	81	700	70
<b>TEN INCH DIAMETERS</b>																		
1030	1062	70	690	57	393	39	1338	89	828	69	627	62	1455	97	1035	86	738	73
1036	1262	84	820	68	467	46	1590	106	984	82	746	74	1730	115	1230	102	877	87
1042	1487	99	966	80	550	55	1874	124	1159	96	879	87	2038	135	1449	120	1033	103
1048	1724	114	1120	93	638	63	2172	144	1344	112	1019	101	2363	157	1680	140	1198	119
1060	2152	143	1398	116	796	79	2712	180	1677	139	1272	127	2949	196	2097	174	1495	149
1072	2571	171	1670	139	951	95	3239	215	2004	167	1519	151	3523	234	2505	208	1786	178
<b>TWELVE INCH DIAMETERS</b>																		
1236	1749	116	1136	94	647	64	2203	146	1363	113	1033	103	2396	159	1704	142	1215	121
1242	2060	137	1338	111	762	76	2595	173	1605	133	1217	121	2823	188	2007	167	1431	143
1248	2371	158	1540	128	877	87	2987	199	1848	154	1401	140	3249	216	2310	192	1647	164
1254	2682	178	1742	145	992	99	3379	225	2090	174	1585	158	3675	245	2613	217	1863	186
1260	2993	199	1944	162	1108	110	3771	251	2332	194	1769	176	4101	273	2916	243	2080	208
1272	3615	241	2348	195	1338	133	4555	303	2817	234	2136	213	4954	330	3522	293	2512	251
<b>FOURTEEN INCH DIAMETERS</b>																		
1436	2363	157	1535	127	874	87	2977	138	1842	153	1396	139	3238	215	2302	191	1642	164
1442	2767	184	1797	149	1024	102	3486	232	2156	179	1635	163	3791	252	2695	224	1922	192
1448	3172	211	2060	171	1174	117	3996	266	2472	206	1874	187	4346	289	3090	257	2204	220
1454	3588	239	2330	194	1328	132	4520	301	2796	233	2120	237	4916	327	3495	291	2493	249
1460	4011	267	2605	217	1484	148	5053	336	3126	260	2370	237	5496	366	3907	325	2787	278
1472	4804	320	3120	260	1778	177	6052	403	3744	312	2839	283	6583	438	4680	390	3338	333



## STEAM TABLE - RECOVERY SYSTEMS

The listings are for steam pressures and temperature rises that are most commonly used in the industry.

MODEL NUMBER	5 PSI STEAM						15 PSI STEAM					
	GPH @ 40-120°F	PPH STEAM	GPH @ 40-140°F	PPH STEAM	GPH @ 40-160°F	PPH STEAM	GPH @ 40-120°F	PPH STEAM	GPH @ 40-140°F	PPH STEAM	GPH @ 40-160°F	PPH STEAM
<b>FOUR INCH DIAMETERS</b>												
418	152	105	119	102	91	95	171	119	139	121	109	114
424	202	140	158	137	122	126	229	159	186	162	145	152
430	253	175	198	171	152	158	286	199	232	203	182	191
436	304	210	238	205	183	190	343	239	279	243	218	229
448	405	280	317	274	244	253	458	319	372	325	291	305
<b>SIX INCH DIAMETERS</b>												
618	342	236	267	231	206	213	386	269	314	274	246	257
624	437	302	342	295	263	273	494	344	401	350	314	329
630	538	372	421	364	324	336	608	424	494	431	387	405
636	627	433	491	424	378	391	708	494	576	502	451	472
648	830	573	649	561	500	518	937	655	762	665	597	625
660	1027	709	803	693	618	641	1159	809	942	822	738	773
<b>EIGHT INCH DIAMETERS</b>												
824	884	611	691	597	532	552	998	697	811	708	636	666
830	1119	773	875	756	674	698	1263	882	1027	896	804	842
836	1353	935	1058	914	815	845	1528	1067	1242	1084	973	1019
842	1585	1095	1240	1070	955	989	1790	1249	1455	1269	1140	1193
848	1775	1226	1388	1199	1069	1108	2004	1399	1629	1422	1276	1337
860	2076	1434	1624	1402	1251	1296	2344	1637	1906	1663	1493	
<b>TEN INCH DIAMETERS</b>												
1030	2187	1511	1711	1477	1317	1365	2470	1724	2007	1752	1573	1647
1036	2599	1795	2033	1756	1566	1623	2935	2049	2386	2082	1869	1957
1042	3062	2115	2395	2069	1845	1912	3458	2414	2811	2453	2202	2306
1048	3550	2453	2777	2398	2139	2217	4009	2799	3259	2844	2553	2674
1060	4431	3061	3467	2994	2670	2767	5004	3494	4068	3550	3187	3338
1072	5293	3657	4141	3576	3189	3305	5978	4174	4859	4241	3807	3987
<b>TWELVE INCH DIAMETERS</b>												
1236	3601	2488	2817	2433	2169	2248	4066	2839	3305	2884	2590	2712
1242	4241	2930	3318	2865	2555	2648	4790	3344	3893	3397	3050	3194
1248	4881	3372	3819	3298	2941	3048	5513	3849	4481	3910	3511	3677
1254	5522	3815	4320	3731	3327	3448	6236	4354	5069	4423	3971	4159
1260	6162	4257	4821	4163	3713	3848	6959	4858	5657	4936	4432	4641
1272	7443	5142	5823	5029	4484	4647	8405	5868	6832	5962	5353	5606
<b>FOURTEEN INCH DIAMETERS</b>												
1436	4865	3362	3806	3287	2931	3038	5495	3836	4466	3898	3499	3665
1442	5696	3935	4456	3848	3432	3557	6433	4491	5229	4563	4097	4290
1448	6530	4511	5108	4412	3934	4077	7374	5148	5994	5231	4696	4918
1454	7386	5103	5778	4990	4450	4612	8341	5823	6780	5917	5312	5563
1460	8257	5705	6460	5579	4975	5156	9325	6511	7580	6615	5939	6220
1472	9890	6833	7737	6682	5959	6176	11169	7798	9079	7923	7113	7449

## STEAM TABLE - RECOVERY SYSTEMS

The listings are for steam pressures and temperature rises that are most commonly used in the industry.

MODEL NUMBER	25 PSI STEAM						50 PSI STEAM					
	GPH @ 40-120°F	PPH STEAM	GPH @ 40-140°F	PPH STEAM	GPH @ 40-160°F	PPH STEAM	GPH @ 40-120°F	PPH STEAM	GPH @ 40-140°F	PPH STEAM	GPH @ 40-160°F	PPH STEAM
<b>FOUR INCH DIAMETERS</b>												
418	188	132	156	137	121	128	213	153	187	167	145	156
424	250	176	208	183	162	171	284	204	249	223	193	208
430	313	220	260	228	203	214	356	255	312	279	242	260
436	376	265	312	274	243	257	427	306	374	335	290	312
448	501	353	416	366	325	343	569	408	499	447	387	416
<b>SIX INCH DIAMETERS</b>												
618	423	298	351	309	274	289	480	344	421	377	327	351
624	540	381	448	394	350	370	614	440	538	482	418	449
630	666	466	552	486	431	456	756	542	663	594	515	553
636	776	546	643	566	502	531	881	631	772	691	599	645
648	1027	723	851	749	665	703	1165	835	1021	915	793	853
660	1270	894	1053	927	822	869	1441	1033	1263	1132	981	1055
<b>EIGHT INCH DIAMETERS</b>												
824	1093	770	906	798	708	748	1241	889	1088	974	845	908
830	1383	974	1147	1010	896	947	1570	1125	1376	1233	1069	1150
836	1673	1179	1387	1121	1084	1146	1900	1362	1665	1492	1293	1391
842	1960	1380	1625	1430	1270	1341	2225	1594	1950	1747	1515	1628
848	2195	1546	1820	1602	1422	1502	2492	1786	2184	1956	1696	1824
860	2567	1808	2128	1874	1663	1757	2914	2089	2554	2288	1984	2133
<b>TEN INCH DIAMETERS</b>												
1030	2704	1905	2242	1974	1752	1851	3070	2200	2691	2411	2090	2247
1036	3214	2264	2665	2346	2082	2200	3649	2615	3198	2865	2484	2671
1042	3786	2667	3139	2764	2453	2592	4298	3081	3767	3375	2926	3147
1048	4390	3092	3640	3205	2844	3005	4984	3572	4368	3913	3393	3648
1060	5480	3860	4543	4000	3550	3752	6221	4459	5452	4885	4235	4554
1072	6546	4611	5427	4779	4241	4482	7431	5327	6513	5835	5060	5440
<b>TWELVE INCH DIAMETERS</b>												
1236	4453	3136	3692	3250	2885	3048	5055	3623	4430	3969	3442	3700
1242	5244	3695	4348	3829	3398	3591	5954	4267	5218	4675	4054	4358
1248	6036	4252	5005	4407	3911	4133	6853	4912	6006	5381	4666	5017
1254	6828	4810	5661	4985	4424	4675	7751	5556	6793	6087	5278	5675
1260	7620	5368	6318	5563	4937	5217	8650	6200	7581	6793	5890	6333
1272	9204	6483	7631	6719	5963	6301	10448	7489	9157	8204	7114	7649
<b>FOURTEEN INCH DIAMETERS</b>												
1436	6017	4238	4988	4392	3898	4119	6830	4896	5956	5363	4651	5000
1442	7044	4962	5840	5142	4564	4822	7996	5731	7008	6279	5444	5854
1448	8075	5688	6695	5895	5232	5528	9167	6570	8034	7198	6241	6711
1454	9133	6434	7572	6667	5918	6253	10368	7432	9087	8141	7059	7590
1460	10211	7193	8466	7454	6616	6991	11592	8309	10159	9102	7893	8486
1472	12230	8615	10140	8928	7924	8373	13884	9951	12168	10902	9453	10164

## SUGGESTED SPECIFICATION - WATER TO WATER

The hot water heater generator package shall be A. O. Smith model no. HWG \_\_\_\_\_ (V) or (H), (ESW) or (EDW), with \_\_\_\_\_ heating coil. The jacketed, insulated storage tank shall be constructed and stamped according to ASME specifications for (125) psi working pressure. The unit shall be designed to recover \_\_\_\_\_ GPH for a temperature of \_\_\_\_\_ degrees F to \_\_\_\_\_ degrees F when supplied with \_\_\_\_\_ GPM boiler water entering temperature regulator at \_\_\_\_\_ degrees F. The heating coil shall be constructed and stamped according to section VIII of ASME code. The tube bundles shall be constructed of 3/4" O.D. 20 GA. deoxidized drawn copper tubing. The unit shall be controlled by one of three means: On-Off Valve \_\_\_\_\_, Three Way Modulating Valve \_\_\_\_\_. The unit will be completely factory assembled and furnished with the following standard components.

A storage tank \_\_\_\_\_" dia. x \_\_\_\_\_" long with \_\_\_\_\_ gallon capacity. Tank shall be insulated to meet the R12.5 minimum thermal insulation requirements of NRCan and current edition of ASHRAE/IESNA 90.1. Tank shall be jacketed with heavy gauge steel with a prepaint. Tank shall be built to ASME section IV lined. Heating coil built to Section VIII of ASME code. A temperature regulator to be self actuated, direct acting. A bronze integral circulator pump with copper soldered recirculation line and (2) bronze ball valves. A drain valve and assembly. Optional Jacket mounted temperature and pressure gauges, and a full length channel base and lifting lugs.

### OPTIONAL EQUIPMENT IS AS FOLLOWS:

#### STORAGE TANK

Tank shall have 150 psi or 160 psi operating pressure, an ASME section VIII construction, a 4"x6" handhole, 12"x16" manhole, a cement or epoxy lining.

#### WATER TO WATER SECTION

Section shall have a self actuated or pneumatic operated temperature regulator and a bypass loop in boiler water line for temperature regulator isolation.

## SUGGESTED SPECIFICATION - STEAM TO WATER

The hot water heater generator package shall be A. O. Smith model no. HWG \_\_\_\_\_ (V) or (H), (ESW), (EDW), (ESS) or (EDS) with \_\_\_\_\_ heating coil. The jacketed, insulated storage tank shall be constructed and stamped according to ASME specifications for (125) psi working pressure. The unit shall be designed to recover \_\_\_\_\_ GPH for a temperature rise of \_\_\_\_\_ degrees F to \_\_\_\_\_ degrees F when supplied with \_\_\_\_\_ psi steam to the temperature regulator. The heating coil shall be constructed and stamped according to section VIII of ASME code. The tube bundles shall be constructed of 3/4" O.D. 20 GA. deoxidized drawn copper tubing. The unit will be completely factory assembled and furnished with the following standard components.

A storage tank \_\_\_\_\_" dia. x \_\_\_\_\_" long with \_\_\_\_\_ gallon capacity. Tank shall be insulated to meet the R12.5 minimum thermal insulation requirements of NRCan and current edition of ASHRAE/IESNA 90.1. Tank shall be jacketed with heavy gauge steel with a prepaint. Tank shall be built to ASME section IV, glasslined. Heating coil built to Section VIII of ASME code. A temperature regulator to be self actuated, direct acting. Main Steam trap, main "Y" strainer and associated black steel pipe. A bronze integral circulator pump with copper soldered recirculation line and (2) bronze ball valves. A drain valve and assembly. Optional Jacket mounted temperature and pressure gauge. Full length channel base and lifting lugs. Air vent and vacuum breaker.

### OPTIONAL EQUIPMENT IS AS FOLLOWS:

#### STORAGE TANK

Tank shall have 150 psi or 160 psi operating pressure, an ASME section VIII construction, a 4"x6" handhole, 12"x16" manhole, a cement or epoxy lining.

## BURKAY® HOT WATER SUPPLY BOILER

### FEATURES

#### ALL NON-FERROUS WATERWAYS

- All castings are made of Bronze or Brass
- All water tubes are made from copper
- Brazed joints or flare union construction make the boiler immune to the effects of thermal shock and thermal cycling
- A great boiler for domestic hot water supply

#### EFFICIENT COPPER COIL COMBUSTION CHAMBER

- The combustion chamber is a heat exchanger formed from a two passage coil of tightly wound continuous copper tube
- Water circulating through this coil surrounds the main burner and captures the radiant heat
- A wrap of insulation on the outside of the coil retains the heat captured by the circulating water

#### COPPER HEAT EXCHANGER

- Directly above the coil and the main burner is a compact, horizontal, copper fin tube heat exchanger
- The flue gases must pass through this efficient heat exchanger before leaving the boiler
- This unique Burkay coil and heat exchanger design provide maximum heat transfer and proven field durability

#### BURKAY® BURNER MAXIMIZES EFFICIENCY

- The patented Burkay burner uses primary air injection at up to 72 individual orifices plus secondary entrainment of air
- Approved for installation on combustible floors as shipped from factory.

#### GAS VALVES

- Slow opening redundant gas valves ensure smooth light-off without flame roll-out or pilot outage

#### THERMAL BALANCER

- Patented pump delay system that allows boiler and pump to run simultaneously but delays pump shut off at end of heating cycle to remove usable heat from the heat exchanger and reduce the scale forming tendencies of motionless hot water

#### AUTOMATIC SAFETY CONTROLS AND ELECTRONIC IGNITION

- Proven pilot ignition system provides flame failure response in under one (1) second
- Redundant high limit controls and gas valves assure safe shutoff in the event of overheating or flame failure
- Requires 120V 60Hz, maximum inlet gas pressure of 14" WC and activation of boiler by external temperature control

#### WORKING PRESSURE

- ASME approved, hydrostatically tested and certified for 160 psi
- Ships with ASME 125 psi relief valve

#### COMPLIANCE

- These models meet the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition ASHRAE/IESNA 90.1.

#### LIMITED WARRANTY OUTLINE

- Consult written warranty or contact your A. O. Smith sales representative

**HW-300  
through  
HW-670**

HW - INDOOR INSTALLATION ONLY



**TABLE 1. DIMENSIONS AND CAPACITY DATA**

DIMENSIONS IN INCHES		MODELS				
		HW-300	HW-399	HW-420	HW-520	HW-670
<b>A</b>	Overall height	65 (1651)	57-1/8 (1451)	57-1/8 (1451)	68-5/16 (1735)	68-5/16 (1735)
<b>B</b>	Height to Top of Jacket	43-1/4 (1099)	45-1/8 (1146)	45-1/8 (1146)	56-1/4 (1429)	56-1/4 (1429)
<b>C</b>	Floor to Center Line Water Outlet	36 (914)	38-3/4 (984)	38-3/4 (984)	46 (1168)	46 (1168)
<b>D</b>	Diameter of Jacket	25-1/4 (641)	27 (686)	27 (686)	27 (686)	27 (686)
<b>E</b>	Floor to Center Line Water Inlet	12 (305)	12 (305)	12 (305) 1	2 (305)	12 (305)
<b>F</b>	Draft Diverter Outlet Diameter	8 (203)	10 (254)	10 (254)	10 (254)	12 (305)
<b>G</b>	Floor to Center Line Gas Inlet	16-1/2 (419)	16-3/4 (425)	16-3/4 (425)	8 (457)	18 (457)
<b>H</b>	Overall Depth	29-5/8 (753)	31-1/2 (800)	31-1/2 (800)	36-1/2 (927)	36-1/2 (927)
<b>J</b>	Support Height	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)
<b>K</b>	Width of Control String (approx.)	14 (356)	14 (356)	14 (356)	11 (279)	11 (279)
<b>L</b>	Pipe Size of Water Inlet (NPT)	1-1/4	1-1/2	1-1/2	2	2
<b>M</b>	Pipe Size of Water Outlet (NPT)	1-1/4	1-1/2	1-1/2	2	2
<b>N</b>	Pipe Size of Gas Inlet (NPT)	3/4	3/4	1	1	1
<b>P</b>	Control String Plus 1/2 Jacket Diameter (approx.)	26-5/8 (676)	27-1/2 (699)	27-1/2 (699)	24-1/2 (622)	24-1/2 (622)
<b>S</b>	Horizontal Length between Water Inlet & Outlet	5-3/8 (137)	5-1/2 (140)	5-1/2 (140)	5-3/4 (146)	5-3/4 (146)
<b>T</b>	Control String from Jacket	5 (127)	5 (127)	5 (127)	7 (178)	7 (178)
Approximate shipping weight lbs. (Kilograms)		250 (113)	301 (137)	301 (137)	381 (173)	381 (173)

**NOTE:** All dimensions in inches (millimeters) except pipe size which is NPT

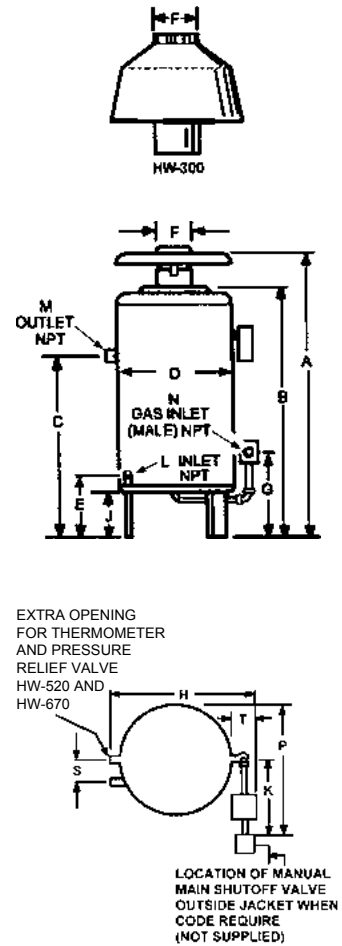
**TABLE 2. FLOW, HEAD AND TEMPERATURE RISE**

BTU INPUT/OUTPUT			TEMPERATURE RISE AND PRESSURE DROP					
			20°F RISE		30°F RISE		40°F RISE	
MODELS	INPUT RATING BTU/HR NATURAL & PROPANE (LP) GAS	OUTPUT RATING BTU/HR NATURAL & PROPANE (LP) GAS	GPM	PD-FT HEAD	GPM	PD-FT HEAD	GPM	PD-FT HEAD
HW 300	300,000	240,000	24	8	16	3	12	2
HW 399	399,000	319,200	32	16	21	7	16	5
HW 420	420,000	336,000	34	18	22	8	21	5.5
HW 520	520,000	416,000	42	12	28	5	26	4
HW 670 Nat	660,000	528,000	53	22	35	10	26	5.5
HW 670 Prop	670,000	536,000	54	22	36	10	27	5.5

**TABLE 3. RECOVERY CAPACITIES**

MODELS	TYPE OF GAS	INPUT		°F	20	40	50	60	70	80
		BTU/HR	kW		(11)	(22)	(28)	(33)	(39)	(44)
HW 300	Natural	300,000	88	GPH	1,455	727	582	485	416	364
	Propane			LPH	5,506	2,753	2,202	1,835	1,573	1,377
HW 399	Natural	399,000	117	GPH	1,935	967	774	645	553	484
	Propane			LPH	7,323	3,662	2,929	2,441	2,092	1,831
HW 420	Natural	420,000	123	GPH	2,036	1,018	815	679	582	509
	Propane			LPH	7,708	3,854	3,083	2,569	2,202	1,927
HW 520	Natural	520,000	152	GPH	2,521	1,261	1,008	840	720	630
	Propane			LPH	9,544	4,772	3,818	3,181	2,727	2,386
HW 670	Natural	660,000	193	GPH	3,200	1,600	1,280	1,067	914	800
				LPH	12,113	6,057	4,845	4,038	3,461	3,028
HW 670	Propane	670,000	196	GPH	3,248	1,624	1,299	1,083	928	812
				LPH	12,297	6,148	4,919	4,099	3,513	3,074

**FIGURE 1. DIMENSIONS**



## Suggested Specification

Hot Water Supply Boiler for domestic hot water purposes shall be Model(s) No. \_\_\_\_\_ as manufactured by A. O. Smith or an approved equal. Boiler(s) shall be gas-fired, and design certified by an ANSI approved/accredited independent rating laboratory, capable of supplying \_\_\_\_\_ gph at 100°F temperature rise equipped to burn \_\_\_\_\_ gas, with input rating of \_\_\_\_\_ BTU/hr. and bearing the ASME code symbol. Boiler(s) shall be up flow type having all non-ferrous waterways, and employing a copper finned heat exchanger and a tightly wound copper coil combustion chamber with 160 psi working pressure rating. Boiler(s) shall be equipped with an electric gas valve of the step-opening type, an adjustable limit control which will break the electric circuit on temperature rise, intermittent ignition with one (1) second shutdown in the event of pilot flame failure, a gas pressure regulator properly set for the gas to be supplied, and a coil limit switch for shut off in event of excessive water temperature, a certified draft diverter and a fully illustrated instruction manual. Certified for installation on combustible flooring. Outer jacket shall be of baked enamel finish. The coil, heat exchanger and burner shall have a five year limited warranty as outlined in the written warranty.

For Technical Information call 888-599-2837. A. O. Smith Enterprises Ltd. reserves the right to make product changes or improvements without prior notice.

## BURKAY® GENESIS™

### 85% EFFICIENT, ULTRA-LOW NO<sub>x</sub> HOT WATER SUPPLY BOILER

A. O. Smith Genesis™ Water Heaters offer everything you could ask for in a non-condensing hot water supply boiler. They provide a near condensing 85% thermal efficiency, outstanding venting flexibility, space-saving stackable design and a clean burning fan assisted combustion system with low NO<sub>x</sub> emissions that meet the most stringent standards.

#### ELECTRONIC CONTROL WITH PRECISE TEMPERATURE MANAGEMENT

- Controls every electrical water heater function, including pump operation and main burner ignition, delivers precise temperature management, with  $\pm 1^\circ$  accuracy.
- Display panel shows current operating status and fault readings
- Display also shows temperature setpoints, outlet temperature, current inlet/outlet differential (DT) and tank temperature.
- Included remote temperature sensor when mounted in the storage tank allows the tank temperature to be set and monitored at the water heater.

#### STAGE GAS FIRING SYSTEM

- Prevents short cycling and ensures smooth operation, saves fuel and extends product life.
- Delivers maximum output when demand is high, reduced firing rates during off peak times.

#### ULTRA-LOW NO<sub>x</sub> OPERATION

- Meets SCAQMD Rule 1146.2 air quality standards.

#### COPPER FINNED-TUBE HEAT EXCHANGER

- Gasketless glasslined headers and copper-finned tubes with extruded integral fins deliver exceptional heat transfer.
- Copper is lightweight for easier handling and immune to thermal shock.

#### SPACE-SAVING DESIGN

- Optional stack rack allows one unit to be stacked on top of another, doubling output within the footprint of a single unit.
- If floor space is limited, the Genesis hot water supply boiler can be installed outdoors with an optional outdoor Vent Cap.

#### MEETS ASHRAE/IES 90.1-2004

#### MULTIPLE VENTING OPTIONS

- All Genesis models can vent vertically in Category I with double wall "B" vent or horizontally in Category IV with AL29-4C stainless steel vent material.

#### FACTORY START-UP INCLUDED

- Required for activating warranty and assuring maximum operating performance. Contact your local sales representative or factory to arrange a FREE Certified Start-Up.

#### 5-YEAR LIMITED HEAT EXCHANGER WARRANTY

- For complete warranty information, consult written warranty or contact A. O. Smith.

### GWH-400 THRU GWH-2100



## GENESIS™ DIMENSIONS AND SPECIFICATIONS

MODEL NUMBER	INPUT MBH	GPH @ 40°F RISE	GPH @ 80°F RISE	GPH @ 100°F RISE	GPH @ 140°F RISE	DIMENSIONS IN INCHES											APPROX. SHIPPING WEIGHT (LBS)
						A	B	C	D	E	F	G	H	J	K	L	
GWH-400N	399	1,028	510	412	294	31-1/2	7	37-5/8	8-7/8	12-1/2	7	3-1/4	29-3/4	6-3/8	12-5/8	22-1/4	454
GWH-500N	500	1,288	638	515	368	31-1/2	7	45-3/8	8-7/8	12-1/2	7	3-1/4	29-3/4	6-3/8	12-5/8	22-1/4	467
GWH-650N	650	1,674	829	670	478	31-1/2	8-1/2	56-3/4	8-7/8	12-1/2	8-1/2	3-1/4	29-3/4	6-3/8	12-5/8	22-1/4	551
GWH-750N	750	1,932	957	773	552	31-1/2	8-1/2	64	8-7/8	12-1/2	8-1/2	3-1/4	29-3/4	6-3/8	12-5/8	22-1/4	611
GWH-1000N	990	2,550	1,276	1,020	729	36	8-3/4	48-1/2	5-7/8	15-7/8	22-1/2	8-1/2	33-3/4	8-3/4	19-7/8	33	843
GWH-1250N	1,260	3,245	1,594	1,298	927	36	9-3/4	58-3/4	5-7/8	15-7/8	22-1/2	9-3/4	33-3/4	8-3/4	19-7/8	33	939
GWH-1450N	1,440	3,709	1,849	1,484	1,060	36	10-1/2	68-7/8	5-7/8	15-7/8	22-1/2	10-1/4	33-3/4	8-3/4	19-7/8	33	1,035
GWH-1800N	1,800	4,636	2,318	1,855	1,325	36	11	82-3/8	5-7/8	15-7/8	22-1/2	10-7/8	33-3/4	8-3/4	19-7/8	33	1,168
GWH-2100N	2,070	5,332	2,679	2,133	1,523	36	11	92-5/8	5-7/8	15-7/8	22-1/2	10-7/8	33-3/4	8-3/4	19-7/8	33	1,285

Pump and flanges are shipped loose for field installation.

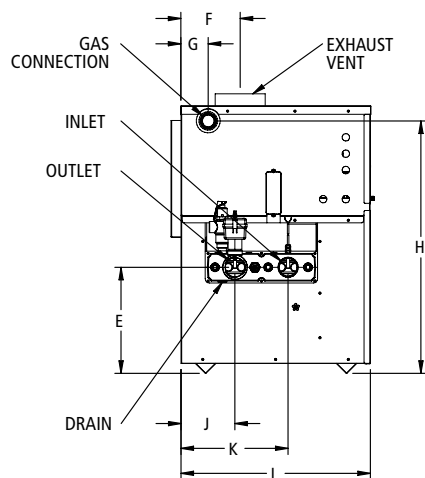
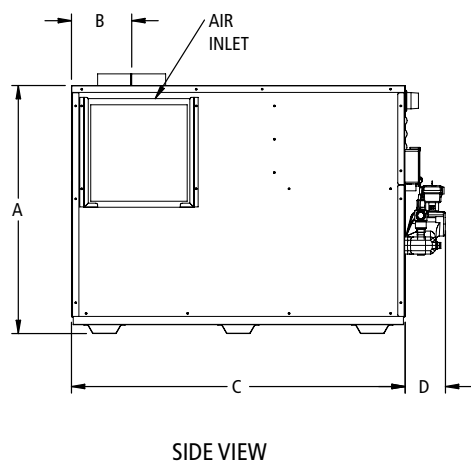
Gas connect pipe size is 1/4" for models GWH-400 to GWH-750 and is 2" for models GWH-1000 to GWH-2100.

Water connections for models GWH-400 to GWH-750 are 2" NPT on 6-1/2" centers.

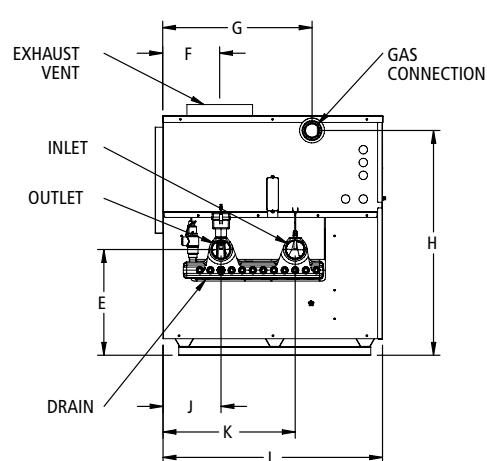
Water connections for models GWH-1000 to GWH-2100 are 2-1/2" NPT on 11-1/4" centers.

Performance data is based on manufacturer test results.

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



GWH-400 THRU GWH-750



GWH-1000 THRU GWH-2100



### OTHER GENESIS™ FEATURES

- Stage Firing – 2 Stages
- Sealed Combustion Chamber
- Stainless Steel Burners
- Low NOx Operation
- All Bronze Circulating Pump (Shipped Loose)
- On/Off Switch
- Adjustable High Limit w/ Manual Reset
- Pump Delay
- ASME Copper Finned Tube Heat Exchanger Certified "H" Stamped 160 PSI Working Pressure
- ASME Temperature & Pressure Relief Valve 125#
- Temperature and Pressure Gauge
- Factory mounted Flow Switch
- Contacts for Air Louvers
- Contacts on any Failure

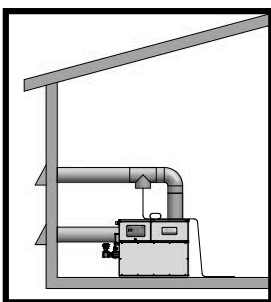
### GENESIS™ OPTIONS

- Cupro-Nickel Heat Exchanger
- Low Water Cut-Off w/ Manual Reset & Test
- High & Low Gas Pressure Switches w/ Manual Reset
- Stack Rack
- Combustible Floor Shield (400 – 750)

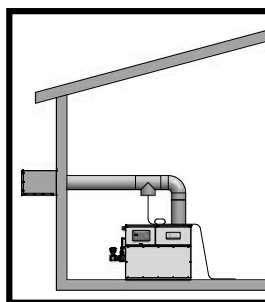
### SEQUENCING PANEL – Can manage 1 to 4 two stage hot water supply boilers

- Includes remote Tank sensor and sensor well
- Controls each stage of multiple stage fired hot water supply boiler(s) to meet system demand
- Provides Cascade/Lead-Lag operation when multiple units are connected

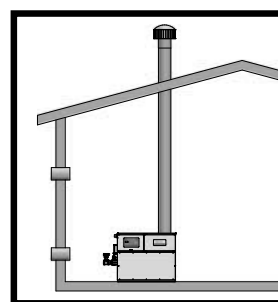
DIRECT VENT



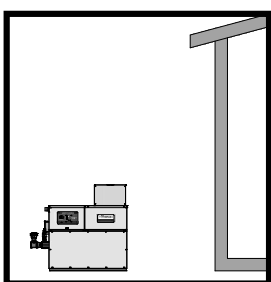
SIDEWALL



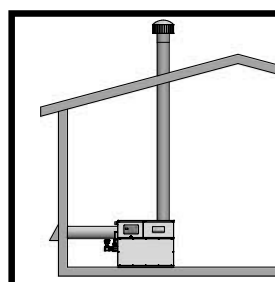
CONVENTIONAL



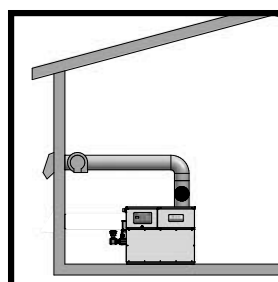
OUTDOOR



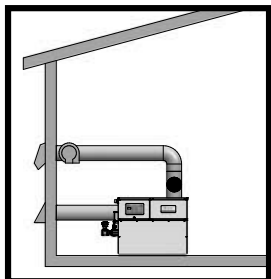
DUCTED AIR  
w/SIDEWALL INLET



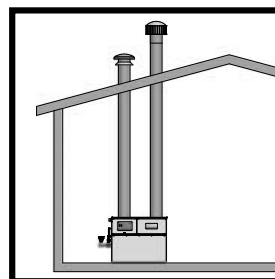
POWERED  
SIDEWALL



POWERED SIDEWALL  
w/DUCTED INTAKE



DIRECT VENT  
VERTICAL



INLET GAS PRESSURE				
MODEL	NATURAL		LP	
	MAX. W.C.	MIN. W.C.	MAX. W.C.	MIN. W.C.
400-1200	14.0	4.5	14.0	8.0

Do not exceed the maximum Inlet Pressure. Minimum inlet pressure is for the purpose of input adjustment.

### MULTIPLE VENTING OPTIONS

The Genesis models offer eight venting options to meet the most challenging installation requirements. The Genesis can vent vertically in Category I with double wall "B" vent or horizontally in Category IV with AL29-4C stainless steel vent material.

Note: For the most current Genesis venting distances/information, consult the Genesis Product Manual, available through your local A. O. Smith representative, or online at [www.hotwater.com](http://www.hotwater.com).

MODEL NUMBER	AMP DRAW DATA			
	CONTROLS	BLOWER	PUMP FLA*	APPROX. TOTAL AMP'S @ 120 VAC
GWH-400N	3.6	2.7	5.8	12.1
GWH-500N	3.6	2.7	5.8	12.1
GWH-650N	5.4	3.4	5.8	14.6
GWH-750N	5.4	3.4	5.8	14.6
GWH-1000N	7.3	3.2	7.4	17.9
GWH-1250N	7.3	3.2	7.4	17.9
GWH-1450N	7.3	6.7	7.4	21.4
GWH-1800N	7.3	6.7	7.4	21.4
GWH-2100N	7.3	6.7	7.4	21.4

MODEL NUMBER	VENT OUTLET SIZE	COMBUSTION AIR INLET	MAXIMUM EQUIVALENT FEET OF PIPE				
			SIDEWALL	POWERED SIDEWALL	POWERED SIDEWALL w/DUCTED AIR	DIRECT VENT	DUCTED AIR w/ SIDEWALL INTAKE
GWH-400N	6"	6"	50'	50'	50'/50'	50'/50'	50'
GWH-500N	6"	6"	50'	50'	50'/50'	50'/50'	50'
GWH-650N	8"	8"	50'	50'	50'/50'	50'/50'	50'
GWH-750N	8"	8"	50'	50'	50'/50'	50'/50'	50'
GWH-1000N	10"	10"	50'	100'	100'/100'	50'/50'	50'
GWH-1250N	12"	12"	50'	100'	100'/100'	50'/50'	50'
GWH-1450N	12"	12"	50'	100'	100'/100'	50'/50'	50'
GWH-1800N	14"	12"	50'	100'	100'/100'	50'/50'	50'
GWH-2100N	14"	12"	50'	100'	100'/100'	50'/50'	50'

Note: 90 degree ells = 5' of pipe, 45 degree ells = 2 1/2' feet of pipe



## SPECIFICATION

The hot water supply boiler shall be an A. O. Smith model GWH \_\_\_\_\_ with an input rate of \_\_\_\_\_ BTU/h, recovery capacity of \_\_\_\_\_ gallons per hour at a 100°F rise and shall be operated on (Natural Gas)(LP Gas). The hot water supply boiler shall operate at a minimum of 85% thermal efficiency.

The hot water supply boiler shall be certified and listed by CSA International under the latest edition of the harmonized ANSI Z21.13 test standard for the U.S. and Canada and comply with the energy efficiency requirements of NRCan and the latest edition of the ASHRAE 90.1 standard.

The water containing section shall be a "fin tube" design with straight copper tubes having extruded integral fins spaced seven (7) fins per inch. The tubes shall terminate into a one piece, glass-lined, cast-iron header. There shall be no bolts, gaskets, or o-rings in the head configuration. There shall be access to the front header of the heat exchanger for the purposes of inspection, cleaning, or repair. The heat exchanger shall be mounted in a stress-free jacket assembly to provide a "free floating design" able to withstand the effects of thermal shock. The hot water supply boiler shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. The complete heat exchanger assembly shall carry a five (5) year limited warranty.

The combustion chamber shall be sealed and completely enclosed with ceramic fiberboard insulation. A burner/flame observation port shall be provided at both ends of the chamber. The burners shall be of premix design and be constructed of high-temperature stainless steel and fire on a horizontal plane.

The hot water supply boiler shall be constructed with a heavy gauge galvanized steel jacket assembly, primed and pre-painted on both sides with a minimum dry film thickness of 0.70 mil.

The hot water supply boiler shall be equipped with a factory-supplied circulating pump of sufficient capacity to ensure scale-free heating performance and shall provide pump delay. Supply electrical service shall be 120V, 60Hz, 1PH.

The standard control system shall include redundant proven pilot hot surface ignition with full flame monitoring capability. Multiple main gas valves with redundant valve seats and built-in low gas pressure regulators shall be supplied as standard. Additional standard controls shall include a flow switch, low air/blocked flue pressure switch for each fan, low-voltage transformer for the control circuit, 7 A circuit breaker and an ASME temperature and pressure relief valve. The manufacturer shall verify proper operation of the burners, all controls, and the heat exchanger by connection to water and venting for a factory test prior to shipping.

The hot water supply boiler shall be approved for indoor installation. Multiple venting options shall be available. Vertical venting systems shall be classified Category I, negative draft, non-condensing, to use type B double-wall venting materials. Horizontal or direct vent installations require the use of AL29-4C vent materials.

A factory-authorized certified start-up shall be performed before placing the hot water supply boiler into operation.



## WATER HEATERS

### FEATURES

The VF™ Water Heater series delivers an exceptionally high thermal efficiency by combining an advanced modulating venturi-mixing gas/air ratio system with a vertical multi-pass copper heat exchanger for outstanding efficiency of up to 87% and low NOx emissions that meet the most stringent standards.

The VF™ Water Heater is capable of firing from 100% to 25% or a 4:1 turndown ratio of rated input based on the current system demand. The VF's modulating capability is virtually limitless, and the water heater's output is based strictly on the current system demand and the required BTUs needed to maintain the desired system set point temperature.

#### ADVANCED HIGH EFFICIENCY, LOW NOx COMBUSTION TECHNOLOGY

- Venturi-mixing gas/air ratio system - Works with variable speed blower to precisely mix gas and air throughout firing range.
- 4:1 Turndown - Fully modulating capability prevents energy-stealing short cycling and provides smooth system operation with higher overall system efficiencies

#### LOW NOx OPERATION

- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for low NOx emissions

#### ADVANCED MODULATING CONTROL

- Includes remote tank temperature sensor to install in the storage tanks – allows the tank temperature to be set at the water heater
- Modulates the burner to maintain the desired tank temperature within +/-1 degree
- Infinite burner firing rate, modulates between 25% and 100% fire
- Building Management System (BMS) Integration with 0 - 10 VDC Input allows BMS to control water heater firing rate

#### ALL BRONZE FACTORY SIZED PUMP STANDARD

- Integrally pump control maximizes overall system efficiency by eliminating standby heat loss and converts residual heat into usable hot water
- Factory-sized for proper flow between the water heater and storage tank
- Allows 50 equivalent feet of piping between the water heater and tank

#### HIGH EFFICIENCY COPPER FIN TUBE HEAT EXCHANGER

- Vertical heat exchanger design encircles the burner with a combustion chamber that is a 360° wall of copper fin tubes
- Rust-resistant operation - All internal heat exchanger non-copper surfaces are glasslined with A. O. Smith's proprietary porcelain glass coating
- Impervious to thermal shock
- Heavy-Duty gasketless heat exchanger design

#### COMPACT, LOW-PROFILE DESIGN

- Zero clearance on sides vertical heat exchanger design allows small footprint and units that can fit through doors into elevators
- Ideal for multiple water heater installations and side by side installation

#### FLEXIBLE VENTING SOLUTIONS

- Multiple Category II and IV direct and sidewall venting options
- Common Venting possible with engineered vent systems

#### FACTORY START-UP INCLUDED

- Required for activating warranty and assuring maximum operating performance. Contact your local sales representative or Authorized Start-Up Agent to arrange a FREE Certified Start-Up.

## VWH-500 through VWH-2000



### CATEGORY II and IV LISTED

- Requires AL29-4C gas tight rust resistant venting material

### PROFESSIONAL START-UP SERVICE INCLUDED

- Assures optimum performance for each installation

### MEETS THE THERMAL EFFICIENCY AND STANDBY LOSS REQUIREMENTS OF THE U. S. DEPARTMENT OF ENERGY AND CURRENT EDITION ASHRAE/IESNA 90.1

### 5-YEAR LIMITED HEAT EXCHANGER WARRANTY

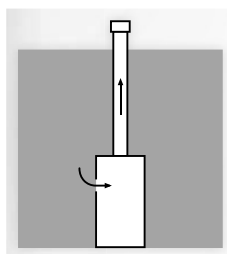
- For complete information, consult written warranty or contact A. O. Smith

### OTHER VF™ WATER HEATER FEATURES:

- ASME CERTIFIED "HLW" STAMPED 160# W.P.
- ASME RATED PRESSURE RELIEF VALVE, 125 PSI.
- FACTORY MOUNTED FLOW SWITCH
- CONTACTS FOR 0-10 VDC BMS EXTERNAL CONTROL
- CONTACTS FOR ALARM OR ANY FAILURE
- DIGITAL INLET/OUTLET TEMPERATURE READOUT
- MANUAL RESET HI-LIMIT
- ALL BRONZE FACTORY SUPPLIED PUMP

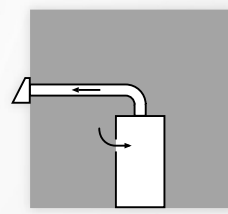
### VF™ OPTIONS:

- SEQUENCING PANEL - Can manage 1 to 4 modulating units
  - Includes remote Tank sensor and sensor well
  - Uses the 0-10Vdc to control the water heater's firing rate
  - Modulates the water heater(s) firing rate to meet system demand
  - Provides Cascade/Lead-Lag operation when multiple units are connected
- ALARM BELL
- LOW WATER CUTOFF W/MANUAL RESET AND TEST
- PROPANE (LP) GAS
- VENT KITS:
  - Horizontal Exhaust Cap
  - Horizontal Air Intake Cap
  - Horizontal Direct Vent Kit
  - Category II Conversion Kit (Required for Common Venting)
- International Voltage (230V 50Hz)



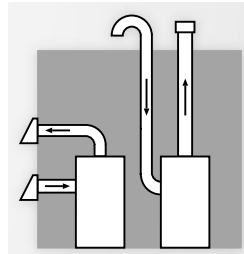
#### Vertical Venting

Using Category IV vent materials



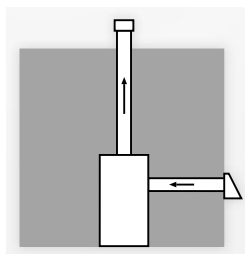
#### Sidewall Venting\*

Horizontal venting up to 50 equivalent feet using Category IV vent materials.



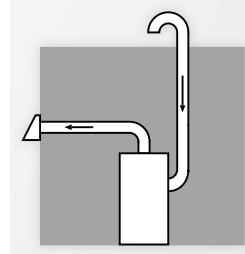
#### Direct Venting\*

Horizontal or vertical venting up to 50 equivalent feet. Draws combustion air up to 50 feet from the same pressure zone using Category IV vent materials.



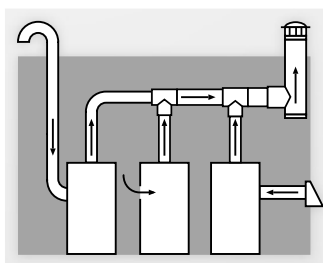
#### Ducted Air Vertical\*

Vertical venting up to 50 equivalent feet. Draws combustion air up to 50 feet from a different pressure zone using Category IV vent materials.



#### Ducted Air Horizontal\*

Vents horizontally up to 50 equivalent feet and draws combustion air up to 50 feet from a different pressure zone using Category IV vent materials.



#### Common Venting\*

Vents multiple units horizontally through one vent termination and draws combustion air from the room, roof or sidewall. Category IV to II conversion kit required.

\*Requires factory-supplied vent.

See Specification Chart for specific venting sizes based on venting materials category type.

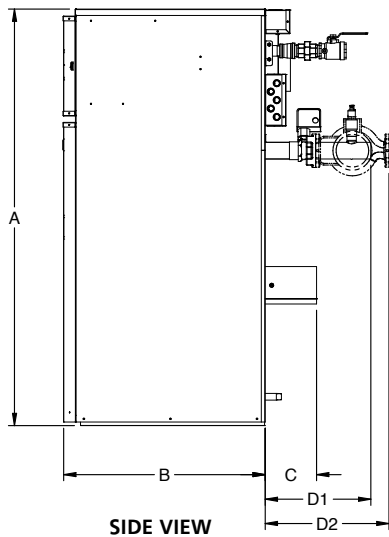
INLET GAS PRESSURE				
MODEL	NATURAL		LP	
	Max. W.C.	Min W.C.	Max. W.C.	Min W.C.
500-1000	14.0	4.0	13.0	11.0
1500-200	14.0	4.0	14.0	8.0

Maximum inlet gas pressure must not exceed the value specified. Minimum value listed is for the purposes of input adjustment.

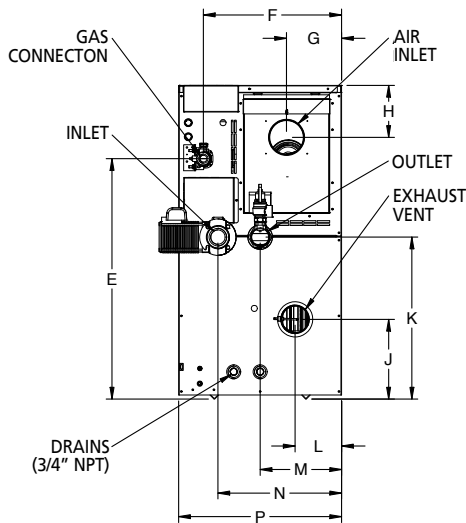
AMP DRAW DATA			
Model	Blower & Controls	Pump FLA*	Approximate Total Amps @ 120 VAC
500	6.7	8.8	15.5
750	6.7	8.8	15.5
1000	6.7	8.8	15.5
1500	6.5	8.8	15.3
2000	6.5	8.8	15.3

\*Standard Pump Supplied with Water Heaters

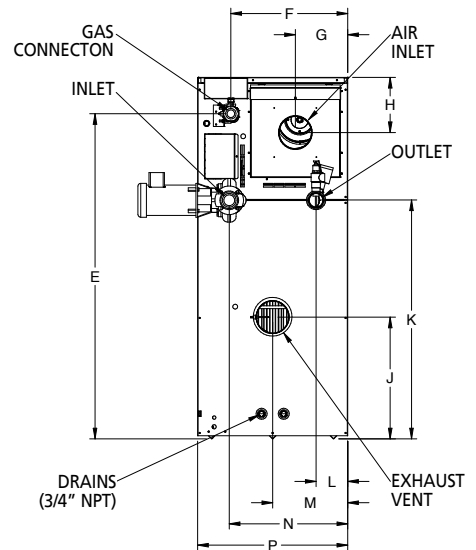
### VF™ Water Heater Dimensions and Specifications



\*Pump shipped loose



**REAR VIEW**  
(VWH0500N-VWH1000N)



**REAR VIEW**  
(VWH1500N-VWH2000N)

Model Number	A	B	C	D1	D2	E	F	G	H	J	K	L	M	N	P
VWH0500N	44-1/2"	30-3/8"	6"	12-1/2"	15-1/8"	34-1/8"	19-5/8"	7-3/4"	7-3/8"	11-3/8"	23"	6-1/2"	11-1/2"	17-1/2"	23-1/8"
VWH0750N	52-1/8"	30-3/8"	6"	12-1/2"	15-1/8"	41-3/4"	19-5/8"	7-3/4"	7-3/8"	11-3/8"	30-1/2"	6-1/2"	11-1/2"	17-1/2"	23-1/8"
VWH1000N	59-1/4"	30-3/8"	6"	12-1/2"	15-1/8"	48-7/8"	19-5/8"	7-3/4"	7-3/8"	11-3/8"	37-5/8"	6-1/2"	11-1/2"	17-1/2"	23-1/8"
VWH1500N	65-3/8"	31-5/8"	8"	16-1/2"	19-3/8"	58-3/4"	21-1/8"	9-1/2"	10"	22"	43-1/4"	5-3/4"	13-1/2"	21-3/8"	27-1/8"
VWH2000N	76-5/8"	31-5/8"	8"	16-1/2"	19-3/8"	70"	21-1/8"	9-1/2"	10"	27-3/8"	54-3/8"	5-3/4"	13-1/2"	21-3/8"	27-1/8"

Model Number	BTU/Hr Input	GPH @ 40°F Rise	GPH @ 100°F Rise	GPH @ 140°F Rise	Gas Connection	Combustion Air Inlet	Vent Size Category II	Vent Size Category IV	Approximate Shipping Weight (lbs.)
VWH0500N	500,000	1318	527	377	1"	5"	7"	4"	573
VWH0750N	750,000	1977	791	565	1-1/4"	5"	9"	5"	622
VWH1000N	999,999	2636	1054	753	1-1/4"	6"	10"	6"	662
VWH1500N	1,500,000	3955	1582	1130	1-1/2"	6"	8"	6"	1,118
VWH2000N	2,000,000	5273	2109	1506	1-1/2"	8"	10"	8"	1,187

Change 'N' to 'L' for LP gas model

No deration on LP models

GPH calculations based on firing rate of 100%

All water connections are 2-1/2"

## Specifications

The WATER HEATER(S) shall be A. O. Smith VF™ Water Heater model number VWH\_\_\_\_\_ having an input rating of \_\_\_\_\_ Btu/Hr, a recovery capacity of \_\_\_\_\_ gallons per hour and shall be operated on Natural Gas (LP Gas).

The water containing section shall consist of a heat exchanger constructed of a "Fin Tube" design, with straight copper tubes having extruded integral fins spaced seven (7) fins per inch. These tubes shall be "rolled" securely into glass-lined, cast iron headers. Removable access plugs shall be provided on the heat exchanger headers for the purposes of inspection, cleaning or repair. Water Heater drains shall be provided, having external access. The heat exchanger shall be mounted in a stress free jacket assembly in order to provide a "free floating design" able to withstand the effects of thermal shock. The WATER HEATER shall bear the ASME "HLW" stamp for 160 psi working pressure and shall be National Board listed. The complete heat exchanger assembly shall carry a five (5) year limited warranty against failure caused by defective workmanship or material.

The WATER HEATER(S) combustion chamber shall be constructed of stainless steel and sealed for leak proof operation. The burner surface shall be constructed of heavy-duty ceramic material and fire in a vertical plane within the combustion chamber. The burner shall employ a special perforated flame injection tube extending the entire length of the heat exchanger. The burner shall fire in a full 360-degree pattern resulting in uniform heat transfer upon every inch of heating surface. A viewing port shall be provided, permitting visual observation of burner operation.

The WATER HEATER(S) must be capable of firing at a complete blue flame with maximum gas and air input, as well as firing infrared when gas and air are reduced. The burner must be capable of firing from 25 percent up to 100 percent of rated input when supplied with 4 inches water column of inlet gas pressure for a turndown ratio of 4:1.

The WATER HEATER(S) shall use a combustion air blower, utilizing pulse width modulation, to draw a precise mixture of fuel and air into the combustion chamber for maximum efficiency. The combustion air blower shall operate for a pre-purge period before burner ignition and a post-purge period after burner operation to clear the combustion chamber. The WATER HEATER shall be equipped with a replaceable combustion air filter to protect the blower and burner from contaminants and debris.

The WATER HEATER shall incorporate a gas train consisting of a pre-mix gas valve to supply gas and combustion air in exact proportions to allow burner input to vary based on load. The pre-mix gas valve shall perform the functions of safety shutoff, constant pressure regulation and air/gas ratio control. Full closing of the valve seat shall occur in less than 0.8 seconds when the valve is de-energized.

The WATER HEATER shall be constructed with an 18 gauge pre-painted steel jacket assembly. The interior of the combustion chamber and flue collector shall be stainless steel. All inner jacket panels shall be fully gasketed and sealed. The jacket assembly shall be primed and pre-painted on both sides. All models shall be certified for installation on combustible floors without additional safety provisions. The WATER HEATER shall be suitable for installation with zero clearance from combustible material on the left and right side.

The WATER HEATER'S standard construction shall include an air pressure switch to prove combustion air flow, a flow switch to prove water flow, downstream test valve and a factory installed ASME temperature and pressure relief valve. Standard controls shall include manual reset high limit, pump control for dedicated water heater pump. Standard construction shall include terminal strips for supply voltage connection, pump control connections, contacts for any failure, contacts for air louvers and run time contacts. The manufacturer shall verify proper operation of the burners, all controls and the heat exchanger by connection to gas, water and venting for a full factory fire test.

The WATER HEATER(S) shall be equipped with an Electronic Integrated Control Module with a microprocessor-based platform incorporating software customized for operation of the water heater. All internal safety, operating and ignition controls shall be included in the electronic integrated control module. The electronic integrated control module shall provide on/off control of the gas supply to the burner, operation of the combustion air blower, ignition of the gas-air mixture, flame proving, control of water temperature set points, and monitoring of all safety functions.

The WATER HEATER(S) shall allow 0-10 VDC input connection for BMS control. Supply voltage shall be 120 volt / 60 hertz / single phase.

The WATER HEATER(S) standard control system shall include an electronically proven Hot Surface Ignition system with full flame monitoring capability and a built-in low gas pressure regulator. A 24 VAC control circuit and components shall be used. All components shall be easily accessed and serviceable from the front and top of the unit. Standard operating controls shall utilize a return water temperature sensor, an outlet water temperature sensor and a flue temperature sensor. An adjustable immersion type, manual reset safety high limit shall be provided to limit water temperature.

The WATER HEATER(S) shall be designed to allow installation of multiple venting options of Category II or IV configurations. All flue and air inlet pipe shall be provided by the installing contractor. The vent and combustion air intake terminals shall be supplied by A. O. Smith.

The WATER HEATER(S) shall be supplied with a circulating pump of sufficient capacity to ensure scale-free heater performance. The pump shall be all bronze and provided for operation on 120 volt, 60 hertz, 1 phase power supply (unless otherwise specified).

The WATER HEATER(S) shall be certified and listed by C.S.A. International under the latest edition of the harmonized ANSI Z21.13 test standard for the U.S. and Canada. The WATER HEATER(S) shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard. The WATER HEATER(S) shall operate at up to 87% thermal efficiency. The WATER HEATER(S) shall be certified for Oxides of Nitrogen (NOx) of less than 10 ppm corrected to 3% O<sub>2</sub> by an independent laboratory.

### XP PLUS

The A. O. Smith high efficiency condensing XP<sup>PLUS</sup> water heater features the latest heat exchanger technology to deliver 98% Thermal Efficiency. The XP<sup>PLUS</sup> now comes in models with 1.25, 1.50, 2.0, 3.0 and 4.0 million BTU/hr input rates to cover a wide range of heavy duty commercial and industrial applications.

The XP<sup>PLUS</sup> features an advanced control system with colour touchscreen display. The control allows for Modbus or BACnet communication.

The XP<sup>PLUS</sup> is designed to match with an A. O. Smith storage tank for long life and high performance. Optional custom skid systems are available which provide a factory assembled and tested system specifically for your job.

#### STAINLESS STEEL CONDENSING HEAT EXCHANGER

- Advanced 316L stainless steel condensing design. This new design heats water at a high 98% thermal efficiency and features a slide out door for improved accessibility and maintenance flexibility.
- Advanced NEG/REG combustion system achieves 5:1 turndown. The gas/air mixture is precisely controlled across the entire turndown range to produce ideal combustion and accurate heat transfer. The turndown ratio matches the heat demand to prevent short cycling or temperature overshoot.

#### ADVANCED ELECTRONIC CONTROL

- Large touch screen user interface.
- The latest in energy saving algorithms.
- Includes remote tank temperature control to adjust tank temperature at the water heater – modulates the water heater to maintain tank set point temperature within +/-1 degree.
- Water heater output control features 5:1 turndown ratio.

#### ALL-BRONZE FACTORY SUPPLIED PUMP

- Designed to be wired and controlled by the water heater control.
- Factory-sized for proper flow between water heater and storage tank.
- Allows 50 equivalent feet of piping between water heater and tank.

Please note: The XP<sup>PLUS</sup> water heater models PWH1250-2000 are ANSI Z21.10.3 compliant and ASME certified with "HLW" stamp. Models PWH3000-4000 are ANSI Z21.13 compliant and ASME certified with "H" stamp

#### DIRECT VENT FLEXIBILITY

- Direct vent up to 150 equivalent feet of pipe. Note: PWH3000 is available up to 100 equivalent feet only.
- Sidewall or vertical.
- Approved for either PVC, CPVC, Polypropylene or AL29-4C stainless steel vent pipe.

#### FACTORY START-UP INCLUDED

- Required for activating warranty and assuring maximum operating performance. Contact your local sales representative or Authorized Start-Up Agent to arrange a FREE certified start-up.

#### MEETS THE THERMAL EFFICIENCY REQUIREMENTS OF NRCAN AND CURRENT EDITION ASHRAE/IES 90.1

#### 98% THERMAL EFFICIENCY (AHRI CERTIFIED)

#### 5-YEAR HEAT EXCHANGER LIMITED WARRANTY

- For complete information, consult written warranty or contact A. O. Smith.



### OTHER XP<sup>PLUS</sup> FEATURES:

- 98% thermal efficiency
- Modulating burner with 5:1 turndown
- Direct spark ignition
- Sealed combustion
- Low gas pressure operation
- Vertical and horizontal vent termination
- Category IV venting up to 150 feet
- PVC, CPVC, Polypropylene or AL29-4C vent material
- ASME stainless steel heat exchanger
- Gasketless design
- 160 psi working pressure
- On/Off switch
- Adjustable high limit with manual reset
- High and low gas pressure switches
- Flow switch
- Inlet and outlet temperature switches
- Temperature and pressure ASME relief valve
- Zero clearance to combustible material
- Approved for combustible floor material
- 1 year limited warranty on parts
- 5 year limited warranty (see warranty for details)

### STANDARD BRONZE PUMPS

- PWH1250 1 HP, 120V, 1 Phase
- PWH1500 1 HP, 120V, 1 Phase
- PWH2000 2 HP, 208V, 3 Phase
- PWH3000 5 HP, 208V, 3 Phase
- PWH4000 5 HP, 480V, 3 Phase

### XP<sup>PLUS</sup> OPTIONS:

- LP gas field conversion kits
- Condensate neutralization kit
- Vent termination kits
- Skid mounted systems
- Alarm bell
- Modbus or BACnet MSTP communications



### Recovery Capacities

MODEL NUMBER	BTU/hr INPUT	WATER FLOW	TEMPERATURE RISE								
			°F	40	60	70	80	90	100	120	140
			°C	22	33	39	44	50	56	67	78
PWH-1250NP	1,250,000	GPH		3,712	2,475	2,121	1,933	1,650	1,485	1,237	1,061
		LPH		14,051	9,369	8,029	7,317	6,246	5,621	4,683	4,016
PWH-1500NP	1,500,000	GPH		4,455	2,970	2,545	2,227	1,980	1,782	1,485	1,273
		LPH		16,864	11,243	9,634	8,430	7,495	6,746	5,621	4,819
PWH-2000NP	1,999,999	GPH		5,939	3,960	3,394	2,970	2,640	2,376	1,980	1,697
		LPH		22,482	14,990	12,848	11,243	9,993	8,994	7,495	6,424
PWH-3000NP	3,000,000	GPH		8,909	5,939	5,091	4,455	3,960	3,564	2,970	2,545
		LPH		33,724	22,482	19,272	16,864	14,990	13,491	11,243	9,634
PWH-4000NP	4,000,000	GPH		11,879	7,919	6,788	5,939	5,279	4,752	3,960	3,394
		LPH		44,967	29,977	25,695	22,482	19,983	17,988	14,990	12,848

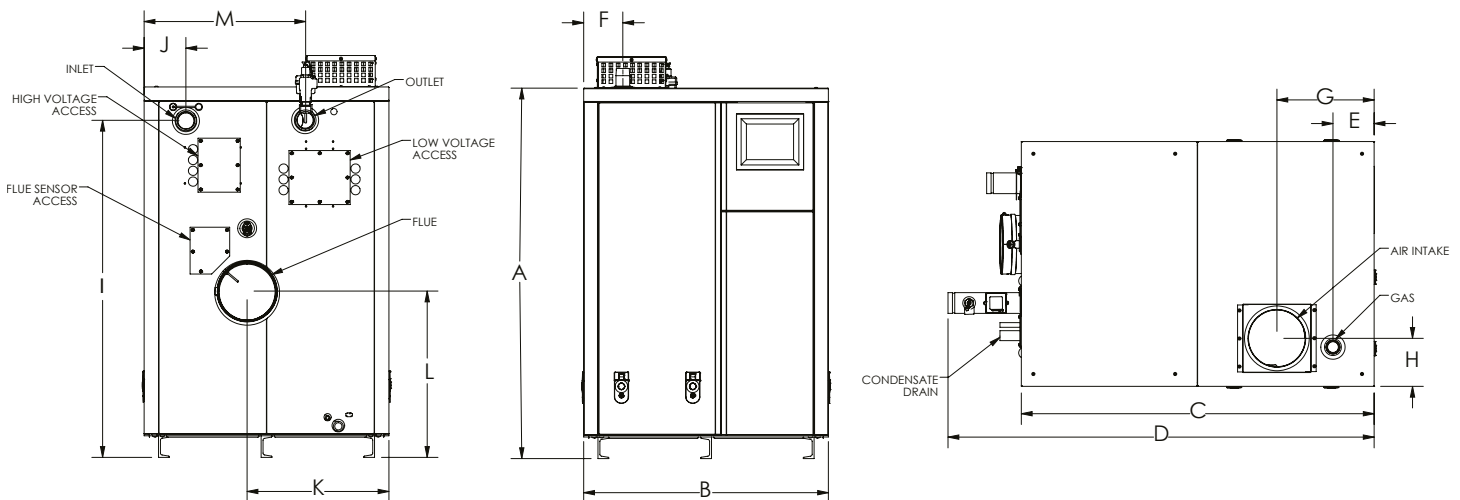


### Rough In Dimensions

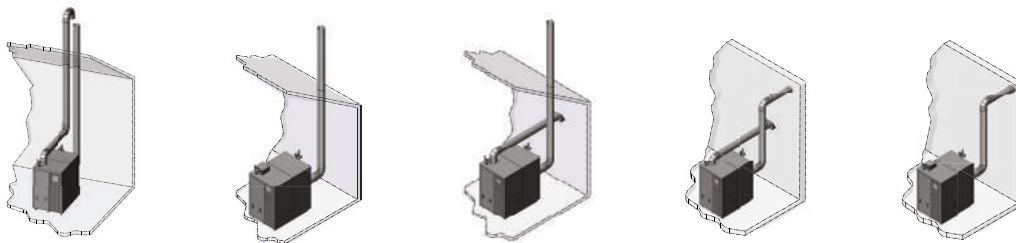
DIMENSIONS AND SPECIFICATIONS								
MODEL NUMBER	BTU/hr INPUT	THERMAL EFFICIENCY	GPH (LPH) 100°F RISE	GAS CONN.	WATER CONN.	AIR INLET	VENT SIZE	SHIPPING WEIGHT LB (KG)
PWH-1250NP	1,250,000	98%	1,485 (5,621)	1-1/2"	2-1/2"	6" OR 8"	6" OR 8"	1,519 (689)
PWH-1500NP	1,500,000	98%	1,782 (6,746)	1-1/2"	2-1/2"	6" OR 8"	6" OR 8"	1,672 (758)
PWH-2000NP	1,999,999	98%	2,376 (8,994)	1-1/2"	2-1/2"	8"	8"	1,931 (876)
PWH-3000NP	3,000,000	98%	3,564 (13,491)	2"	4"	10"	10"	3,147 (1,427)
PWH-4000NP	4,000,000	98%	4,752 (17,988)	2-1/2"	4"	12"	12"	3,694 (1,676)

DIMENSIONS AND SPECIFICATIONS IN (CM)													
MODEL NUMBER	A	B	C	D	E	F	G	H	I	J	K	L	M
PWH-1250NP	51-1/2 (131)	34 (86)	49 (124)	59 (150)	5-1/2 (14)	5-1/2 (14)	13-1/2 (34)	6-3/4 (17)	46-3/4 (119)	5-3/4 (15)	19-3/4 (50)	23 (58)	22-1/2 (57)
PWH-1500NP	51-1/2 (131)	34 (86)	52-3/4 (134)	62-3/4 (159)	4-1/2 (11)	4-1/2 (11)	13-1/2 (34)	6-3/4 (17)	46-3/4 (119)	5-3/4 (15)	19-3/4 (50)	23 (58)	22-1/2 (57)
PWH-2000NP	51-1/2 (131)	34 (86)	65-1/2 (166)	75-1/2 (192)	7 (18)	5-3/4 (15)	14-3/4 (37)	7-1/4 (18)	46-3/4 (119)	6-3/4 (17)	18-3/4 (48)	23 (58)	23-1/2 (60)
PWH-3000NP	67-1/4 (171)	48-1/4 (123)	79-3/4 (203)	93-3/4 (238)	4-3/4 (12)	6-3/4 (17)	17-3/4 (45)	8-3/4 (22)	60-1/4 (153)	8-1/2 (22)	25-1/2 (65)	29-1/2 (75)	40 (102)
PWH-4000NP	67-1/4 (171)	48-1/4 (123)	96 (244)	110 (279)	5 (13)	7-1/2 (19)	17-3/4 (45)	8-3/4 (22)	60-1/4 (153)	8-1/2 (22)	25-1/2 (65)	29-1/2 (75)	40 (102)

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



### VERSATILE MULTI-VENTING CONFIGURATIONS



Direct or sidewall vent up to 150 feet with PVC, CPVC, Polypropylene or Stainless Steel. For detailed venting instructions review the XP PLUS water heater instruction manual at [www.hotwatercanada.ca](http://www.hotwatercanada.ca)





# Specialty Gas

## Automatic Circulating Water Heaters

### Specification Summary

	PWH-1250NP	PWH-1500NP	PWH-2000NP	PWH-3000NP	PWH-4000NP
<b>WATER</b>					
GALLON CAPACITY	11	13	17	25	41
HEATING SURFACE (SQ. FT.)	100.2	119.8	153.2	300.7	402.9
WATER CONNECTIONS	2-1/2"	2-1/2"	2-1/2"	4"	4"
DRAIN	3/4"	3/4"	3/4"	3/4"	3/4"
WATER FLOW RATE (GPM)	112	115	145	270	290
HEAD LOSS (FT. OF HD.)	23	22	27	24	19
MAX. WORKING PRESSURE (PSI)	160	160	160	160	160
MAX. WATER HARDNESS (GRAINS)	15	15	15	15	15
GPH (LPH) @ 70°F RISE	2,121 (8,029)	2,545 (9,634)	3,394 (12,848)	5,091 (19,272)	6,788 (25,695)
GPH (LPH) @ 100°F RISE	1,485 (5,621)	1,782 (6,746)	2,376 (8,994)	3,564 (13,491)	4,752 (17,988)
GPH (LPH) @ 140°F RISE	1,061 (4,016)	1,273 (4,819)	1,697 (6,424)	2,545 (9,634)	3,394 (12,848)
# OF RELIEF VALVES	1	1	1	1	1
RELIEF VALVE SIZE	3/4"	3/4"	1"	2"	2"
RELIEF VALVE RATING (MBH)	1,912,000	1,912,000	2,155,000	6,379,000	6,379,000
RELIEF VALVE PRESSURE RATING (PSI)	150	150	150	150	150
RELIEF VALVE TEMPERATURE RATING (°F)	210	210	210	210	210
<b>GAS</b>					
INLET CONNECTION	1-1/2"	1-1/2"	1-1/2"	2"	2-1/2"
MAX. INLET PRESSURE, NAT	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, NAT	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.
MAX. INLET PRESSURE, LP	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, LP	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.
BTU/HR INPUT	1,250,000	1,500,000	1,999,999	3,000,000	4,000,000
<b>ELECTRICAL</b>					
VOLTAGE & PHASE / HEATER	120V / 1ø	120V / 1ø	208V / 3ø	208V / 3ø	480V / 3ø
AMPS / HEATER	9.9	7.8	1.3	2	2.3
VOLTAGE & PHASE / PUMP	120V / 1ø	120V / 1ø	208V / 3ø	208V / 3ø	480V / 3ø
AMPS / PUMP	11.2	11.2	9.6	13.4	6.1
TOTAL AMPS / HEATER & PUMP	21.1	19	10.9	15.4	8.4
VOLTAGE / CONTROL	24	24	24	24	24
# OF ELECTRICAL CONNECTIONS	1	1	1	1	1
<b>DIMENSIONS</b>					
HEIGHT IN (CM)	51-1/2 (131)	51-1/2 (131)	51-1/2 (131)	67-1/4 (171)	67-1/4 (171)
WIDTH IN (CM)	34 (86)	34 (86)	34 (86)	48-1/4 (123)	48-1/4 (123)
DEPTH IN (CM)	59 (150)	62-3/4 (159)	75-1/2 (192)	93-3/4 (238)	110 (279)
<b>SERVICE CLEARANCES</b>					
FRONT	36"	36"	36"	36"	36"
BACK	24"	24"	24"	24"	24"
RIGHT SIDE	24"	24"	24"	24"	24"
LEFT SIDE	24"	24"	24"	24"	24"
TOP	0"	0"	0"	0"	0"
<b>DIRECT VENTING</b>					
SIZE	6" or 8"	6" or 8"	8"	10"	12"
VENT CATEGORY	IV	IV	IV	IV	IV
VENT MATERIAL (all models)	PVC / CPVC / Polypropylene / Stainless Steel				

### PWH SUGGESTED SPECIFICATION

The gas-fired automatic circulating water heater(s) shall be A. O. Smith XP<sup>PLUS</sup> model PWH\_\_\_\_\_ having an input rating of \_\_\_\_\_ BTU/hr and capable of supplying no less than \_\_\_\_\_ GPH at a 100°F temperature rise when fired with (Natural/Propane) gas. 1) The water heater shall be capable of full modulation with a turndown ration of 5:1. 2) The water heater shall bear the ASME ("HLW stamp models 1250-2000, "H" stamp models 3000-4000) stamp and shall be National Board registered (CRN in Canada) for 160 PSI working pressure. 3) The water heater(s) shall be equipped with a factory-installed 150# PSIG ASME Pressure Relief Valve. 4) The water heater(s) shall be design-tested and certified to the ANSI Z21.10.3-CSA 4.3 Standards CSA International for models 1250-2000 and ANSI Z21.13 for models 3000-4000. 5) The water heater shall operate up to 98% thermal efficiency at full fire as certified with AHRI. 6) The water heater shall be certified for indoor installation and be approved for installation on combustible floors.

The stainless steel combustion chamber shall be designed to drain condensation to the bottom of the heat exchanger assembly. A built-in trap shall allow condensation to drain from the heat exchanger assembly. The complete heat exchanger assembly shall carry a five (5) year limited warranty.

Water Heater Pump: 1) The automatic circulating water heater(s) shall be supplied with a factory-sized and wired all bronze circulating pump(s). 2) The pump shall be interfaced with and managed by the water heater's control and cycled as needed for most efficient operation.

The burner shall be a premix design and constructed of high temperature stainless steel to provide modulating firing rates. The water heater shall be supplied with a gas valve designed with negative pressure regulation and be equipped with a variable speed blower system, to precisely control the fuel/air mixture to provide modulating water heater firing rates for maximum efficiency. The water heater shall operate in a safe condition at a derated output with gas supply pressures as low as 4 inches of water column.

The water heater shall utilize a 24 VAC control circuit and components. The control system shall have an electronic display for water heater set-up, water heater status, and water heater diagnostics. All components shall be easily accessed and serviceable from the front of the jacket. The water heater shall be equipped with; a high limit temperature control certified to UL353, ASME certified pressure relief valve, outlet water temperature sensor, inlet water temperature sensor, a UL 353 certified flue temperature sensor, low water flow protection and built-in freeze protection. The manufacturer shall verify proper operation of the burner, all controls and the heat exchanger by connection to water and venting for a factory fire test prior to shipping.

The water heater shall have a a Multi-Coloured Graphic LCD touch screen display, password security, pump delay with freeze protection, and pump exercise. The water heater shall feature night setback for the domestic hot water tank and shall be capable of controlling a building recirculation pump while utilizing the night setback schedule for the building recirculation pump. The water heater shall have the capability to accept a 0-10 VDC input connection for BMS control of modulation or setpoint and enable/disable of the water heater, and a 0-10VDC output of water heater modulation rate. The water heater shall have a built-in cascading sequencer with modulation logic options of "lead lag" or "efficiency optimized". Both modulation logic options should be capable of rotation while maintaining modulation of up to eight water heaters without utilization of an external controller. Supply voltage for the PWH1250 and PWH1500 water heater shall be 120 volt / 60 hertz / single phase. Supply voltage for the PWH2000 and PWH3000 water heater shall be 208 volt / 60 hertz / three phase. Supply voltage for the PWH4000 water heater shall be 480 volt / 60 hertz / three phase.

### PWH SUGGESTED SPECIFICATION

The water heater shall be installed and vented with a (select one):

- (a) Direct Vent Sidewall system with a horizontal sidewall termination of both the vent and combustion air. The flue shall be PVC, CPVC, Polypropylene or Stainless Steel sealed vent material terminating at the sidewall with the manufacturers specified vent termination. A separate pipe shall supply combustion air directly to the water heater from the outside. The air inlet pipe may be PVC, CPVC, ABS, Galvanized, Dryer Vent, Polypropylene or Stainless Steel sealed pipe. The air inlet must terminate on the same sidewall with the manufacturer's specified air inlet cap. The water heater's total combined air intake length shall not exceed 100 equivalent feet. The water heater's total combined exhaust venting length shall not exceed 100 equivalent feet. Foam Core pipe is not an approved material for exhaust piping.
- (b) Direct Vent Vertical system with a vertical roof top termination of both the vent and combustion air. The flue shall be PVC, CPVC, Polypropylene or Stainless Steel sealed vent material terminating at the roof top with the manufacturers specified vent termination. A separate pipe shall supply combustion air directly to the water heater from the outside. The air inlet pipe may be PVC, CPVC, ABS, Galvanized, Dryer Vent, Polypropylene or Stainless Steel sealed pipe. The air inlet must terminate on the roof top with the manufacturer's specified air inlet cap. The water heater's total combined air intake length shall not exceed 150 equivalent feet. The water heater's total combined exhaust venting length shall not exceed 150 equivalent feet. Foam Core pipe is not an approved material for exhaust piping.
- (c) Sidewall Vent with Room Air system with a horizontal sidewall termination of the vent with the combustion air drawn from the interior of the building. The flue shall be PVC, CPVC, Polypropylene or Stainless Steel sealed vent material terminating at the sidewall with the manufacturers specified vent termination. The water heater's total combined exhaust venting length shall not exceed 100 equivalent feet. Foam Core pipe is not an approved material for exhaust piping.
- (d) Vertical Vent with Room Air system with a vertical rooftop termination of the vent with the combustion air drawn from the interior of the building. The flue shall be PVC, CPVC, Polypropylene or Stainless Steel sealed vent material terminating at the rooftop with the manufacturers specified vent termination. The water heater's total combined exhaust venting length shall not exceed 150 equivalent feet. Foam Core pipe is not an approved material for exhaust piping.
- (e) Vertical Vent with Sidewall Air system with a vertical rooftop termination of the vent with the combustion air being drawn horizontally from a sidewall. The flue shall be PVC, CPVC, Polypropylene or Stainless Steel sealed vent material terminating at the roof top with the manufacturers specified vent termination. A separate pipe shall supply combustion air directly to the water heater from the outside. The air inlet may be PVC, CPVC, ABS, Galvanized, Dryer Vent, Polypropylene or Stainless Steel sealed pipe. The air inlet must terminate on a sidewall using the manufacturers specified air inlet cap. The water heater's total combined air intake length shall not exceed 150 equivalent feet. The water heater's total combined exhaust venting length shall not exceed 100 equivalent feet. Foam Core pipe is not an approved material for exhaust piping.

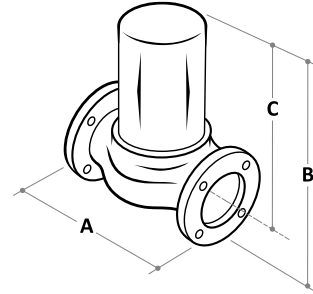
Standards: 1) The water heater shall built to and meet the ASME – CSD-1 code requirements as factory standard.

Factory Start-Up: 1) The water heater manufacturer shall furnish, at no additional charge, the complete certified factory start-up that is required for activating the warranty.

## XP<sup>PLUS</sup>

THE TABLE BELOW LISTS STANDARD AND UPSIZED PUMP PART NUMBERS FOR EACH XP<sup>PLUS</sup> MODEL.

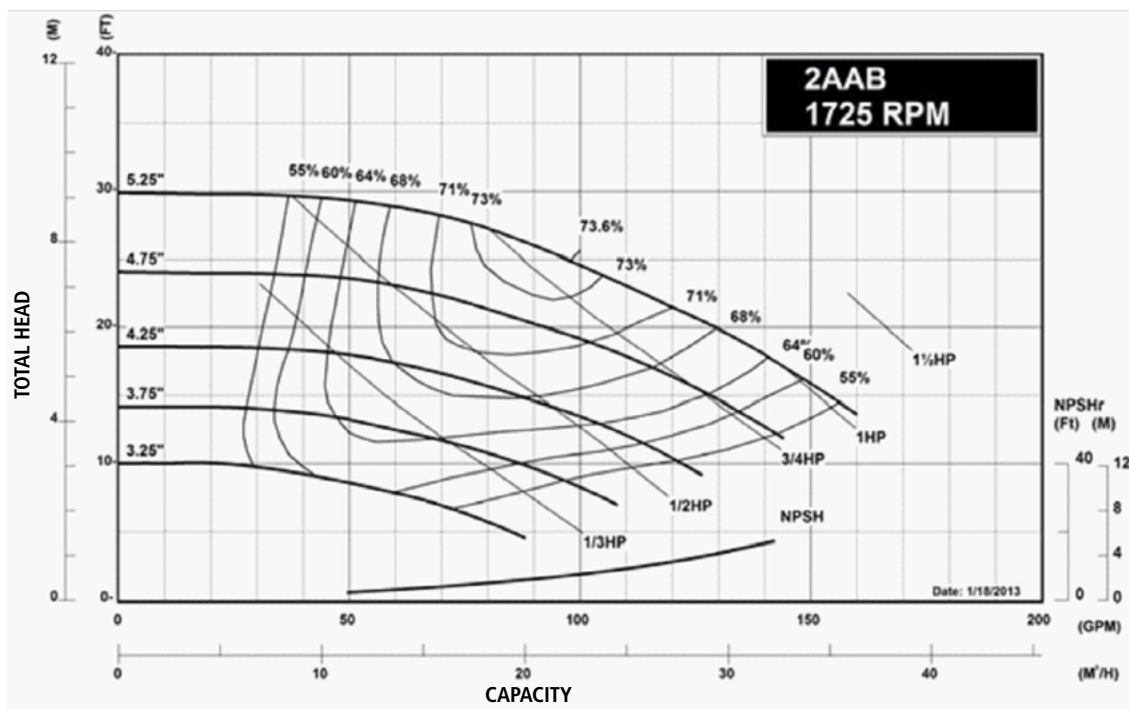
- Standard pumps are for applications with 5-12 GPG Water Hardness
- Upsized pumps are for applications with 12-15 GPG Water Hardness
- Water softening is required for applications above 15 GPG Water Hardness



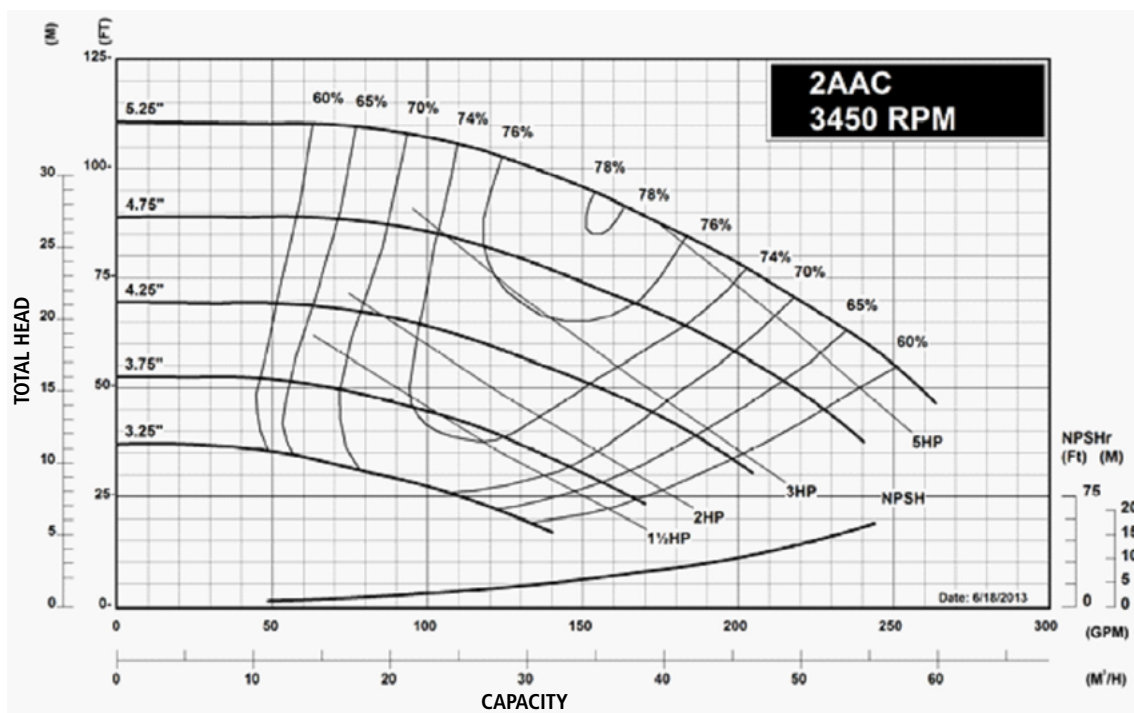
MODEL NUMBER	PUMP PT NOS. STANDARD UPSIZED	HP	FLOW RATE (GPM)	HEAD LOSS (FT/HD)	TEMP. RISE (°F)	PUMP MATERIAL	FLANGE SIZE INLET/ OUTLET	WIDTH A"	DEPTH B"	C/L FLANGE TO END C"
PWH-1250	100307593	1	112	23	22°	BRONZE	2-1/2"	11.5	18.25	14.81
	100307590	2	145	35	17°	BRONZE	2-1/2"	11.5	18.25	14.81
PWH-1500	100307593	1	115	22	26°	BRONZE	2-1/2"	11.5	18.25	14.81
	100307590	3	148	31	20°	BRONZE	2-1/2"	11.5	18.25	14.81
PWH-2000	100307592	2	145	27	27°	BRONZE	2-1/2"	11.5	19.25	14.81
	100307589	3	180	39	22°	BRONZE	2-1/2"	11.5	19.25	14.81
PWH-3000	100307591	5	270	24	22°	BRONZE	4"	12	21.81	17.37
	N/A	-	-	-	-	-	-	-	-	-
PWH-4000	100307591	5	290	19	27°	BRONZE	4"	12	21.81	17.37
	Consult Factory	-	-	-	-	-	-	-	-	-

NOTICE: Pump sizing and flow requirements are based on 45 ft. of piping, (4) 90° elbows, (2) unions, and (2) ball valves.

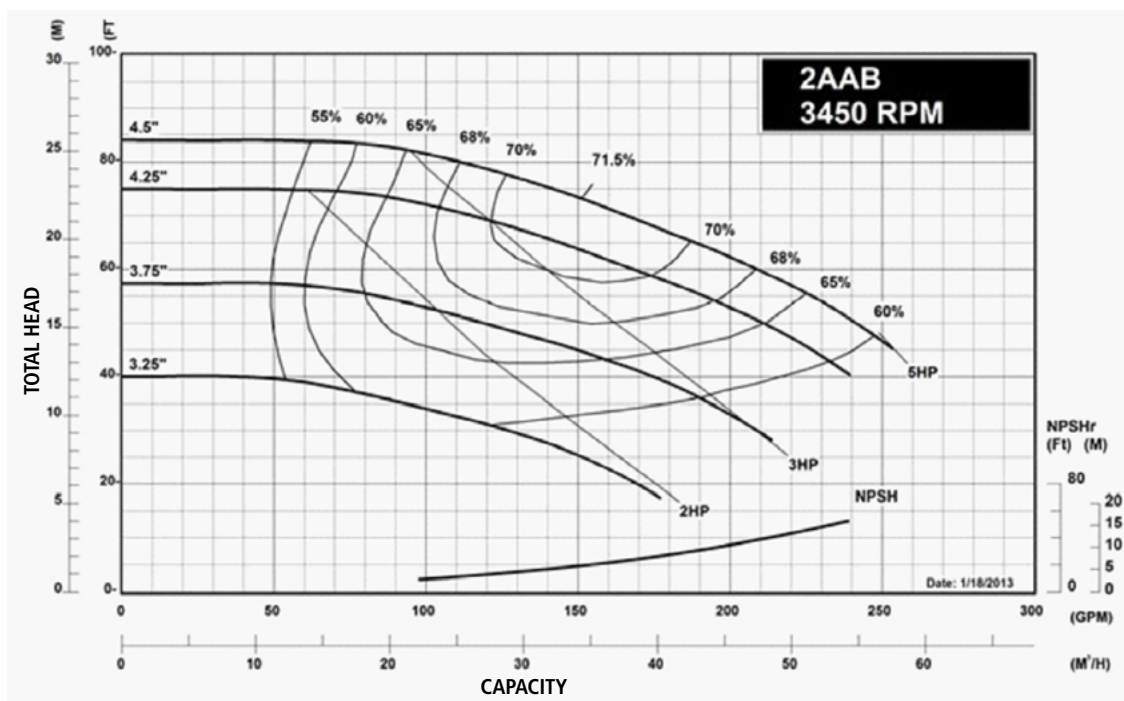
PART NUMBER	STD PUMP FOR MODELS:
100307593	PWH-1250
	PWH-1500
VOLTAGE – AMP DRAW	
120V – 11.2 A	



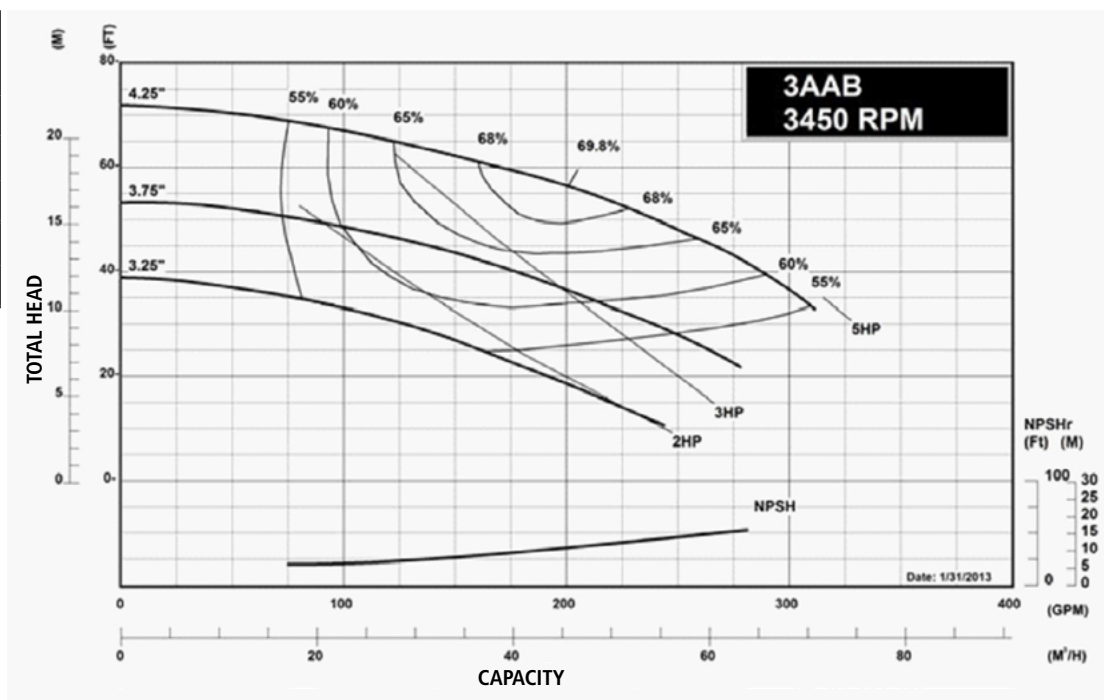
PART NUMBER	UPSIZED PUMP FOR MODELS:
100307590 (3.75" IMPELLER)	PWH-1250
	PWH-1500
VOLTAGE – AMP DRAW	
120V – 10.7 A	



PART NUMBER	STD PUMP FOR MODELS:
100307592 (3.25" IMPELLER)	PWH-2000
PART NUMBER	UPSIZED PUMP FOR MODELS:
100307589 (3.75" IMPELLER)	PWH-2000
VOLTAGE – AMP DRAW	
208V – 9.6 A	



PART NUMBER	STD PUMP FOR MODELS:
100307591	PWH-3000
	PWH-4000
VOLTAGE – AMP DRAW	
208V – 13.4 A	
460V – 6.1 A	



### BUILDING MANAGEMENT SYSTEM BACnet AND MODBUS INTERFACE

Introducing the BMS gateway for control of A. O. Smith Water Heaters

**CONNECT YOUR A. O. SMITH WATER HEATER TO YOUR BUILDING MANAGEMENT SYSTEM USING THE NEW MILLENNIUM CONTROL FROM ICC (INDUSTRIAL CONTROL COMMUNICATIONS, INC.)**

- Works with Cyclone (BTH, BTHL, BTHS, BTX-100, BTXL-100), McBee DVE, DSE/DVE/DHE
- Use the ICC Control to enable/disable the water heater (when used with building management system)
- Change Temperature Set points and differentials
- Two models with four different configurations to connect to BACnet and Modbus
- Ethernet and Serial RS-485 versions available
- 2 wire or 4 wire RS-485 Network
- Power can be supplied via the USB cable, as a 7-24 VDC input on the main terminal Block, or via IEEE 802.3af Power over Ethernet (PoE on ETH-1000 only)
- Configure protocols, network characteristics, and client/server object definitions
- Graphically interact with the internal database in real-time via USB connection
- Automatically discover and configure IP settings Ethernet gateways connected to the current subnet
- Update Firmware

Kit Part #	Connection Type
100316044	Serial
100316045	Ethernet (IP)

- One unit needed per water heater



#### MODELS

**ETH-1000  
ETHERNET CONNECTION**

**MIRIUS  
SERIAL RS-485 CONNECTION**





### iCOMM CONNECTIVITY

The iCOMM connectivity service allows users to view and manage their water heater operation remotely. Detailed information on current status, usage history, set points and other key parameters is available within the iCOMM function on the A. O. Smith app. Fault and alert information is communicated via text message and/or e-mail providing valuable information needed to restore the unit to proper operation.

iCOMM now can be maintained and managed from the convenience of the A. O. Smith app available for iPhone and Android. Get real time information delivered to your phone directly from your water heater. There are no subscription or app fees related to the iCOMM connectivity service.

#### iCOMM SYSTEM REQUIREMENTS

- Compatible with Cyclone™ MXi BTH 120-500 models with touch display (March 2018 production to present)
- The latest revision of the A. O. Smith app (available iOS and Android)
- Access to building internet via Wi-Fi or Ethernet connection

#### iCOMM BENEFITS

- Remote control and convenience
- Peace of mind monitoring and notifications
- Water heater fleet management

#### iCOMM FEATURES

- Remote monitoring via Wi-Fi or Ethernet cable. Once the unit is registered to iCOMM on the app, registered users can view current water heater status and all pertinent information available from the convenience of their phone.
- Automated service notifications in the event of any of thirty-six alarm or fault conditions. Registered users are notified by text message and or e-mail.
- Appliance run time shows the total on time, cycle count and burner on time.
- Custom notification settings allow for alerts when tank temperatures are above or below user parameters.
- Users can view one or multiple water heaters assigned to their log-in.



### CYCLONE™ MXi/LV COMMON VENTING KIT

#### BENEFITS

- Fewer wall penetrations than standard single-unit venting
- Reduced install cost with easy to install non-powered kits
- Flexibility of using PVC or polypropylene vent material

#### SPECIFICATIONS

- Approved for use with 120, 150, 199, 250, 300, 400 and 500 Cyclone™ models and BTHL 150, 199, 250, 300, 400 and 500 models
- Approved for side wall (horizontal) vent applications only
- 50 Feet maximum equivalent length of straight pipe common vent and elbows
- Direct vent configuration only

- Maximum of three water heaters can be common vented
- One kit per water heater required, choose from PVC or polypropylene
- Kits include backflow preventer plus intake and exhaust adapters. Piping and termination field supplied.
- Each wall penetration requires a 7" hole through the structure
- Common vent kits are UL listed



## COMMON VENT KITS (ONE KIT PER WATER HEATER REQUIRED)

Part Numbers	Description
100227396	PVC Common Vent Kit, 120 – 250 Models
100223775	PVC Common Vent Kit, 300 – 500 Models
100227395	Polypropylene Common Vent Kit, 120 -250 Models
100223774	Polypropylene Common Vent Kit, 300 - 500 Models

Installations must comply with all federal, provincial and local codes.

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

### CONDENSATE NEUTRALIZING KITS

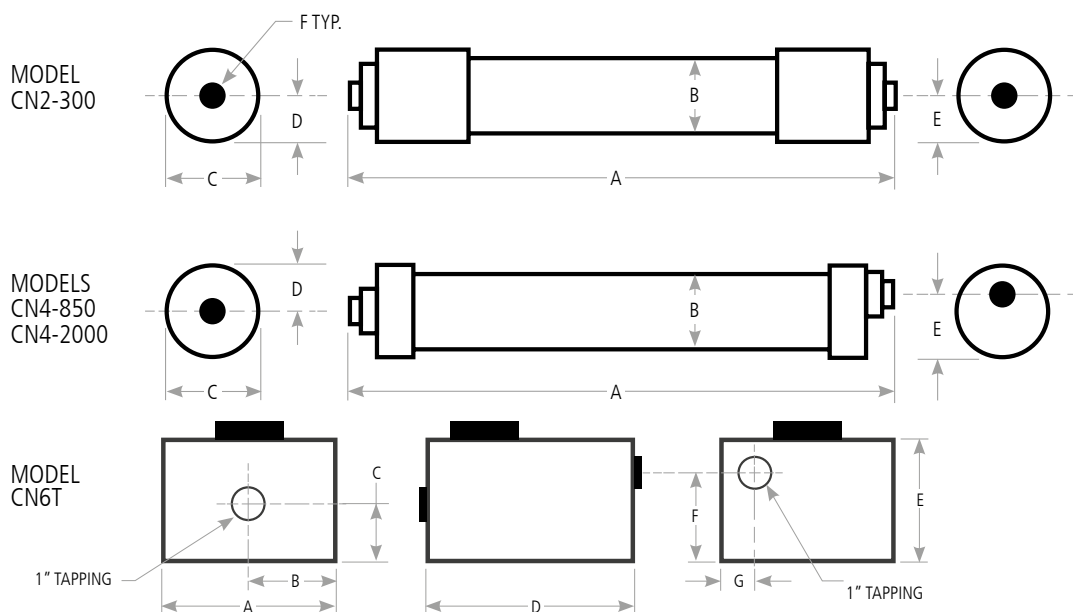
Condensate neutralizers are designed to raise the pH level of the condensate discharged by high-efficiency boilers and water heaters.

#### STANDARD FEATURES

- Clear tube for visual inspection
- Integrated unions with o-rings
- Calcite and magnesium oxide media
- Includes PVC adapters
- Includes mounting brackets

#### PREVENTS POSSIBLE DAMAGE TO:

- Cast Iron Soil Pipe
- ABS Pipe
- Septic Tanks
- Plants
- Waste Water Treatment Plants
- Other Waste Water Equipment and Components



RATINGS AND DIMENSIONS IN (CM)

MODEL	BTU/h INPUT CAPACITY	A	B	C	D	E	F	G
CN2-300	75,000 to 300,000	18 ¾ (48)	2 ⅜ (6)	2 ¾ (7)	1 (3)	1 (3)	½" FNPT	-
CN4-850	400,000 to 850,000	16 ¾ (43)	4 (10)	4 ¼ (11)	2 (5)	3 ⅝ (9)	½" FNPT	-
CN4-2000	1M to 2M	27 ¾ (70)	4 (10)	4 ¼ (11)	2 (5)	3 ⅝ (9)	½" FNPT	-
CN6T	2.5M to 6M	12 (30)	6 ⅝ (17)	3 ¾ (10)	15 (38)	8 (20)	5 ¾ (15)	2 ⅝ (7)

All dimensions +/- 1/8"  
Recharge kits sold separately



For 150 years, A. O. Smith has built a reputation for innovation and this continues to lead with our most complete line of products yet. With the trademark blend of innovative technology and energy-efficient solutions, our comprehensive line is the natural source for everything from the smallest light commercial installation all the way up to the largest multi-structure complex.

We offer over 500 different commercial models, including gas-fired, oil-fired and electric configurations, ranging in capacities from 5 gallons to 4,000 gallons, with input range from 50,000 BTU to the equivalent of 2,500,000 BTU.

Through an inspired blend of innovation, efficiency and 150 years of expertise, A. O. Smith continues to set the industry standard for performance and quality of water heaters and storage tanks.



## Knowledgeable People at Your Service

To better serve our customers, A. O. Smith has over 200 manufacturer's representatives covering Canada and the United States. In addition, we have more than 400 factory-authorized service technicians to provide reliable, immediate warranty services. We also maintain a well-staffed Customer Care and Technical Support facility in Fergus, Ontario that can provide information on A. O. Smith products, sizing, competitive analysis, etc.

## A. O. Smith has facilities located worldwide.

Plants are located in strategic locations throughout North America, providing timely shipments to wholesalers. In addition, manufacturing plants are also located in Nanjing, China, to supply the ever-increasing demand for water heaters to the expanding Far East. Juarez, Mexico; Fergus and Stratford, Ontario; Veldhoven, The Netherlands and Istanbul, Turkey round out the facilities worldwide and demonstrate A. O. Smith's global reach!







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*A. O. Smith reserves the right to make product changes  
or improvements at any time without notice.*