

# SOLAR GAS BACKUP

## INTEGRATED SOLAR & HIGH EFFICIENCY GAS BACKUP WATER HEATERS



SSF100 120NE and SSX100 120NE



These models are eligible for a 30% federal tax credit for the total installed costs (no cap) when installed as part of a complete commercial or residential solar thermal hot water system. State and local incentives may also apply.

The *Solar Gas Backup* blends all of the features of the Ultra Force™ high efficiency gas water heater with a storage tank optimized for solar thermal applications. The integrated space-saving design provides a single tank solution combining storage for heat captured by solar thermal collectors with 96% thermally efficient gas backup. This innovative hybrid technology takes efficiency and performance to their highest levels.

### SOLAR FEATURES

- Designed for commercial or large residential with 200-500 gallons daily hot water usage
- Solar loop side connections - supply and return from collectors
- Direct and Indirect models
- SSF direct models have open tank solar loop connections and are suitable for open loop systems or closed loop systems using an external heat exchanger
- SSX indirect models have an integrated single wall heat exchanger coil and are suitable for closed loop systems using Propylene Glycol and distilled water mixture as the heat transfer fluid
- Combine with our new two, three and four collector solar package systems that are SRCC certified OG-300 for a complete solar hot water system (package systems available October 2012)
- Compatible with our integrated standard and double wall solar pump stations
- Recirculation loop side connection
- Factory-installed lower tank temperature sensor for field supplied solar controls

### TANK FEATURES

- 100-gallon storage
- Powered anode rod - maintenance free protection against corrosion - permanent design that does not require replacement unless damaged
- Commercial grade glasslined tank provides superior protection against corrosion.

### GAS BACKUP FEATURES

- Maximum operating set point for the gas backup burner is 140°F – allows for optimum solar contribution
- Exclusive State designed control system provides detailed operational information, precise temperature control and built-in diagnostics.
- 96% thermally efficient 120,000 Btu/hr gas backup burner - available in natural gas and propane
- Top mounted, down-fired pre-mix burner provides optimum efficiency and quiet operation
- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for low NOx emissions
- Meets the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition of ASHRAE/IESNA 90.1
- Design-certified by CSA International
- iComm™ compatible for remote monitoring of the gas heat section. Call 1.888.WATER02 for more information.
- Conventional power venting or power direct venting
- Vents vertically or through sidewall
- Direct vent intake and exhaust pipe can terminate separately outside building, or through single opening, using concentric vent assembly
- Uses inexpensive PVC, CPVC, pipe for intake and exhaust
- Flexible venting – uses 3” or 4” pipe – up to 120 equivalent feet



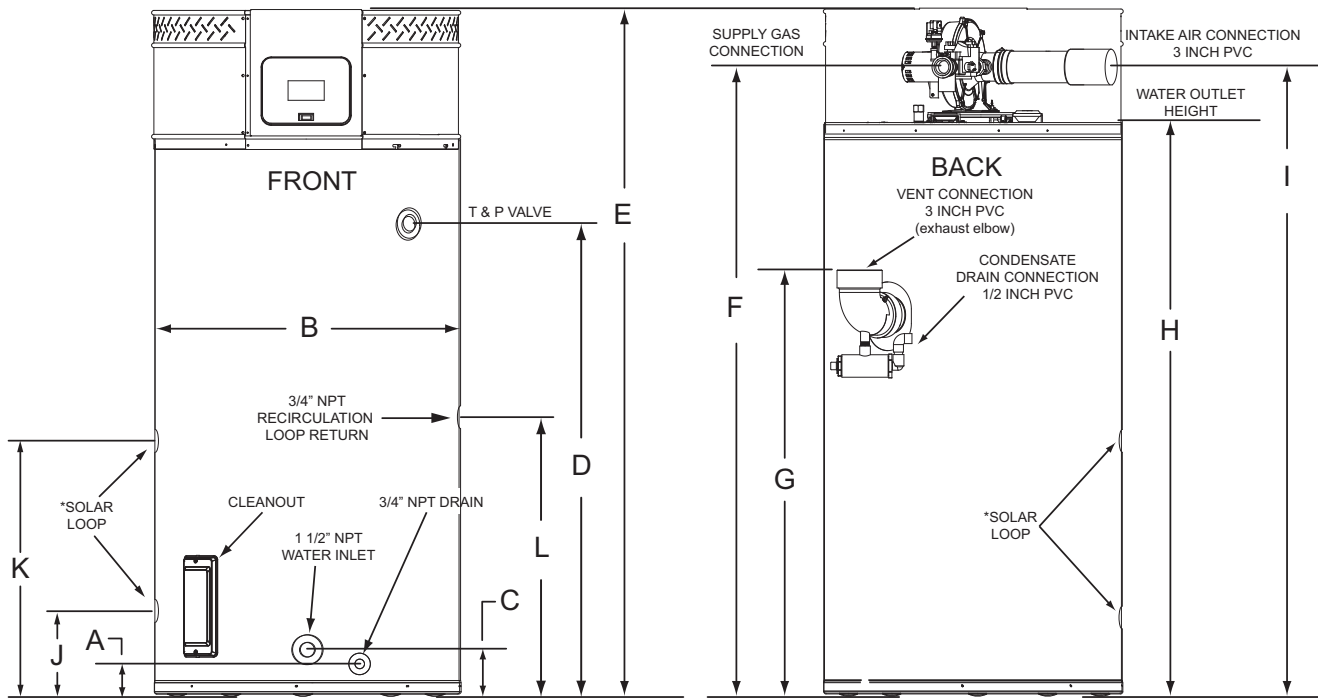
For more information on Solar Gas Backup, contact:

State Water Heaters  
500 Tennessee Waltz Parkway  
Ashland City, TN 37015  
800-365-0024 Toll-free USA  
www.statewaterheaters.com

**SOLID.STATE.**



# SOLAR GAS BACKUP



\*Solar loop connections are 1 1/2" NPT female on SSF 100 120NE models and 1" NPT female on SSX 100 120NE models. 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.

MODEL	DIMENSIONS												SHIP WEIGHT STD LBS/KG
	A	B	C	D	E	F	G	H	I	J	K	L	
	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	
SSF100 120NE	3 / 7.62	27.75 / 70.5	6.3 / 16	55.5 / 141	75.5 / 191.8	68.5 / 174	32 / 81.3	63 / 160	69 / 175.3	5.5 / 14	26.5 / 67.3	31.8 / 80.7	535 / 245
SSX100 120NE	3 / 7.62	27.75 / 70.5	6.3 / 16	55.5 / 141	75.5 / 191.8	68.5 / 174	32 / 81.3	63 / 160	69 / 175.3	5.5 / 14	26.5 / 67.3	31.8 / 80.7	568 / 258

Change "N" to "P" in model number for propane.

SSF models have open tank solar loop connections and are suitable for use in open systems or closed systems using an external heat exchanger.

SSX models have an integrated single wall heat exchanger coil in the bottom of the tank and are suitable for closed loop active systems using non-toxic Propylene Glycol and distilled water mixture as the heat transfer fluid. Glycol used must contain corrosion inhibitors.

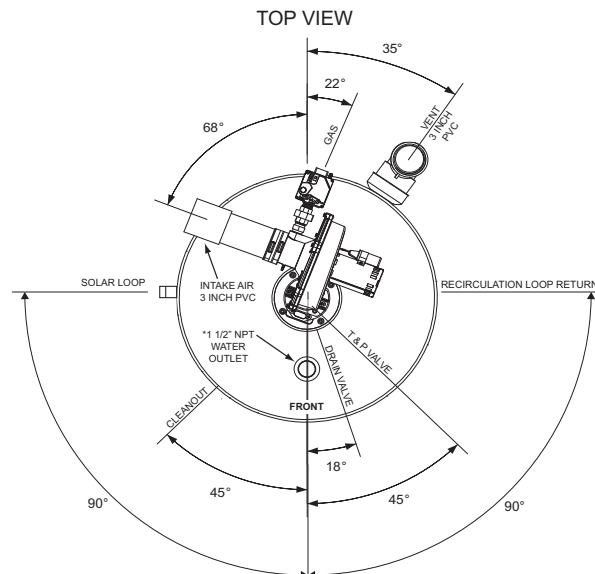
## SSX MODEL HEAT EXCHANGER COIL DATA

MODEL NUMBER	TUBE SIZE I.D. (inches)	SURFACE AREA (square feet)	COIL CAPACITY (gallons)	TUBE LENGTH (feet)
SSX100 120NE	1.63	18.8	4	43.5

Heat exchanger must only be used with a propylene glycol heat transfer fluid containing corrosion inhibitors such as Dowfrost™.

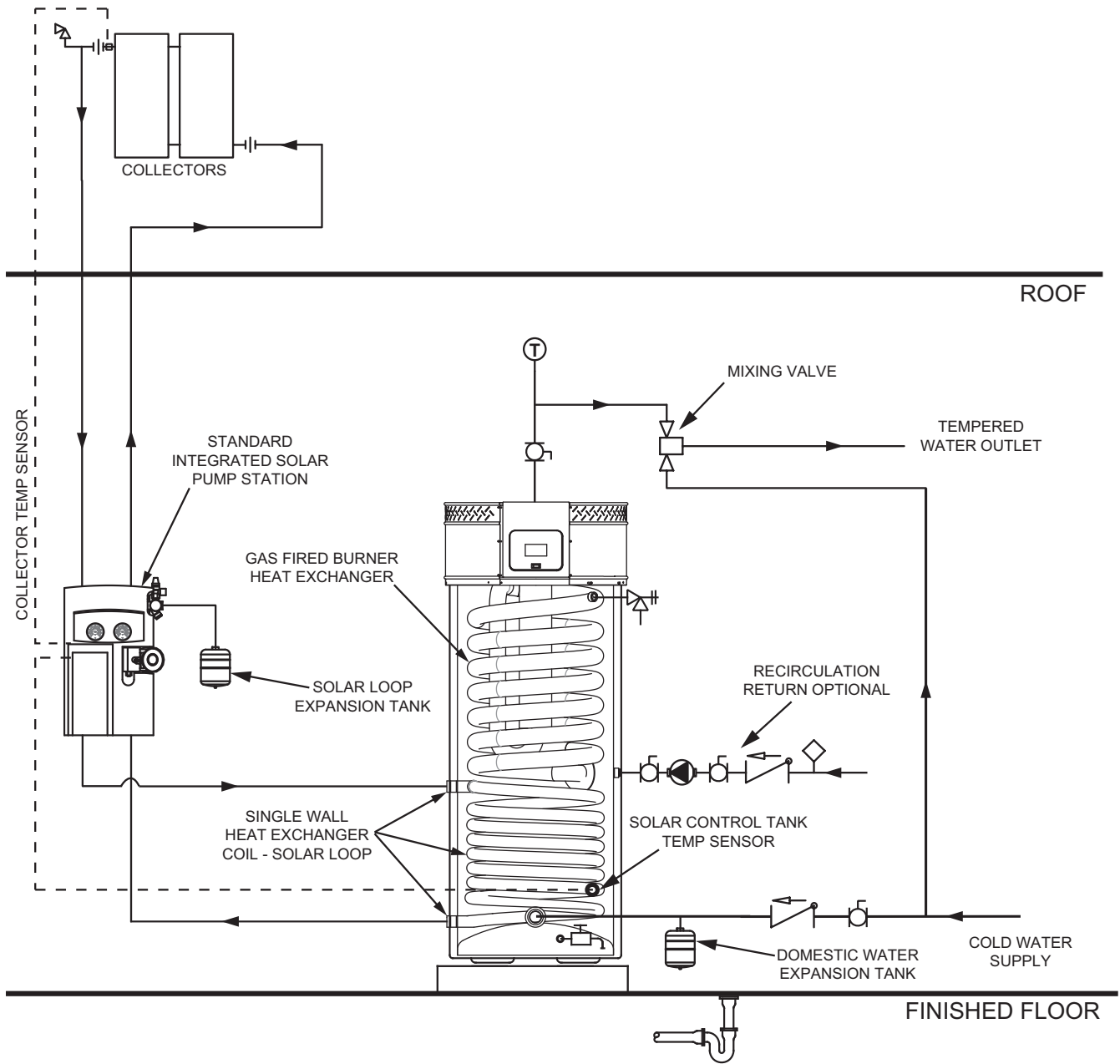
Working pressure of the internal heat exchanger coil is 150 PSI.

MODEL NUMBER	FLOW RATE (gallons per minute)	PRESSURE DROP THROUGH COIL (feet of H2O)
SSX100 120NE	2	0.05
	4	0.15
	6	0.25



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

**TYPICAL APPLICATION SSX-100**



**LEGEND**

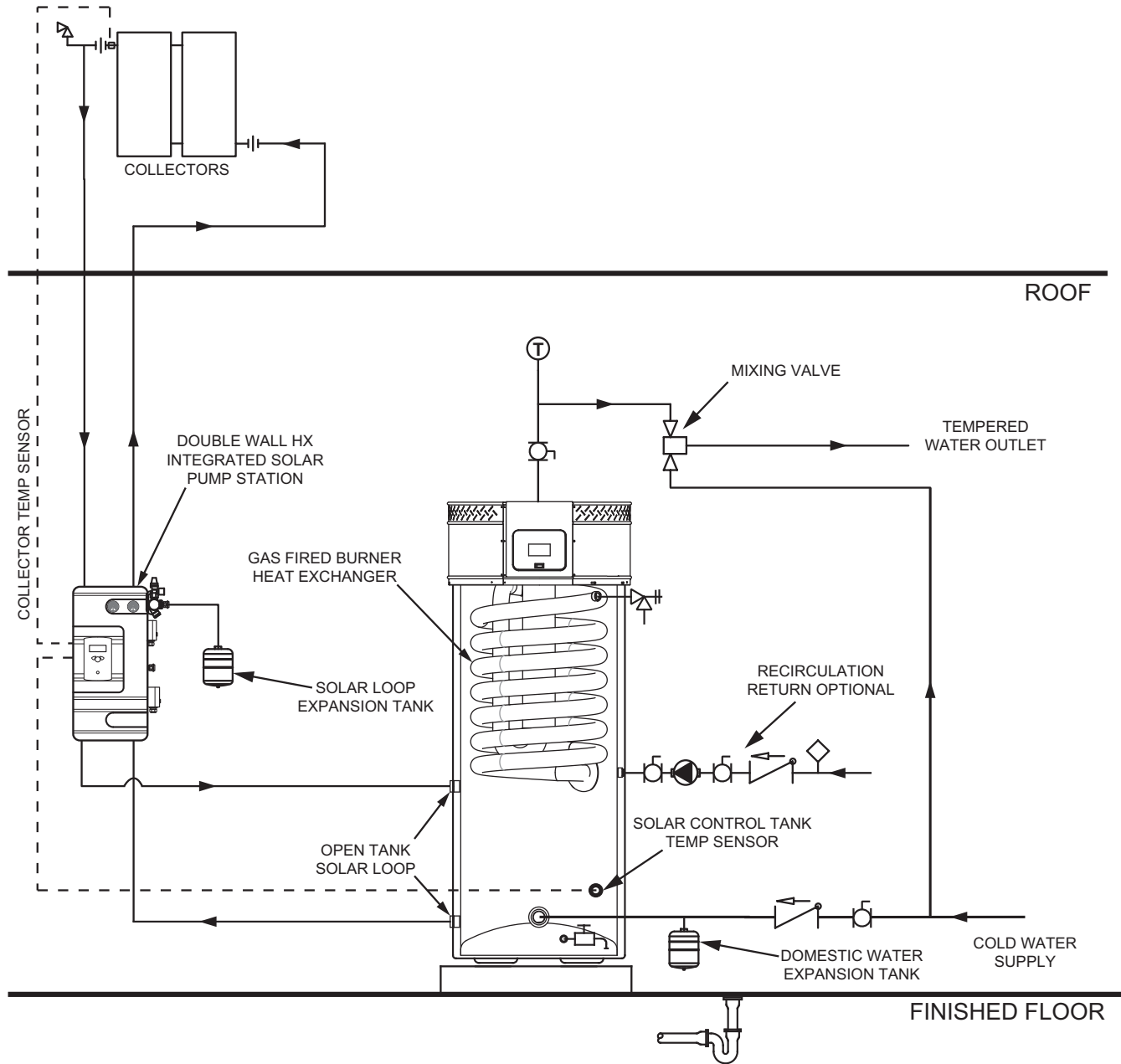
	TEMPERATURE & PRESSURE RELIEF VALVE		FULL PORT BALL VALVE (NORMALLY OPEN UNLESS OTHERWISE STATED)
	PRESSURE RELIEF VALVE		MIXING VALVE
	CIRCULATING PUMP		CHECK VALVE
	TANK OR LINE TEMPERATURE CONTROL		DRAIN
	EXPANSION TANK		TEMPERATURE GAUGE

**SOLAR SYSTEM PACKAGES**

SOLAR SYSTEM PACKAGE MODEL	SOLAR GAS BACKUP MODEL	NUMBER OF COLLECTORS	COLLECTOR SIZE (FT)	HEAT EXCHANGER TYPE
SSC 02ACI202 LC	SSX100 120NE	2	3.5' x 7'	Single Wall Internal Coil
SSC 03ACI203 LC	SSX100 120NE	3	3.5' x 7'	Single Wall Internal Coil
SSC 04ACI204 LC	SSX100 120NE	4	3.5' x 7'	Single Wall Internal Coil

Solar system packages available October 2012

**TYPICAL APPLICATION SSF-100**



**LEGEND**

	TEMPERATURE & PRESSURE RELIEF VALVE		FULL PORT BALL VALVE (NORMALLY OPEN UNLESS OTHERWISE STATED)
	PRESSURE RELIEF VALVE		MIXING VALVE
	CIRCULATING PUMP		CHECK VALVE
	TANK OR LINE TEMPERATURE CONTROL		DRAIN
	EXPANSION TANK		TEMPERATURE GAUGE

**SOLAR SYSTEM PACKAGES**

SOLAR SYSTEM PACKAGE MODEL	SOLAR GAS BACKUP MODEL	NUMBER OF COLLECTORS	COLLECTOR SIZE (FT)	HEAT EXCHANGER TYPE
SSE 02ACE202 LC	SSF100 120NE	2	3.5' x 7'	Double Wall External Plate
SSE 03ACE203 LC	SSF100 120NE	3	3.5' x 7'	Double Wall External Plate
SSE 04ACE204 LC	SSF100 120NE	4	3.5' x 7'	Double Wall External Plate

Solar system packages available October 2012

# SOLAR GAS BACKUP

## HEAT INPUT SOLAR LOOP - SOLAR THERMAL COLLECTORS

COLLECTOR MODEL/SIZE	COLLECTOR APERTURE AREA		THERMAL PERFORMANCE (per collector)		MAXIMUM SOLAR THERMAL INPUT	
	Square Feet	Square Meters	SRCC Data Warm Climate Clear Day	SRCC Data Cool Climate Clear Day	Maximum Number CR-110-AP Collectors	Maximum kBtu/day
CR-110-AP FLAT PLATE COLLECTOR (3.5' X 7')	25.5	2.37	25.1 kBtu/day	15.5 kBtu/day	4	100.4 kBtu/day

Notes: CR-110-AP collector model specification sheet available for download on company website. Contact your local distributor or sales representative for more information. If other collectors are used in place of CR-110-AP do not exceed maximum Btu/day input above.

## GAS BACKUP RECOVERY CAPACITY

MODEL	TYPE OF GAS	INPUT		THERMAL EFFICIENCY	U.S. GALLONS/HR AND LITRES/HR AT TEMPERATURE RISE INDICATED													
					APPROX. CAPACITY	F°	30F°	40F°	50F°	60F°	70F°	80F°	90F°	100F°	110F°	120F°	130F°	140F°
						C°	17C°	22C°	28C°	33C°	39C°	44C°	50C°	56C°	61C°	67C°	72C°	78C°
SSF100 120NE / SSX100 120NE	NATURAL/ PROPANE	120,000	35	96%	60 U.S. Gal	GPH	461	345	276	230	197	173	154	138	126	115	106	99
					227 Litres	LPH	1744	1308	1046	872	747	654	581	523	476	436	402	374

Change "N" to "P" in model number for propane.  
 Recovery capacities are based on heater performance at 96% thermal efficiency.  
 Maximum gas supply pressure: 10.5" W.C. natural gas 14" W.C. propane.  
 Electrical requirements: 120 VAC/60Hz, Blower 2.2 Amps FL, Igniter 4.0 Amps.

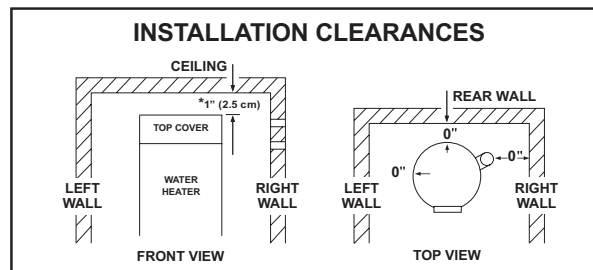
## Maximum Equivalent Vent Lengths SSF100 120NE / SSX100 120NE

*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 (35.0 meters)
Two (2)	40 feet (12.2 meters)	110 feet (33.5 meters)
Three (3)	35 feet (10.7 meters)	105 feet (32.0 meters)
Four (4)	30 feet (9.1 meters)	100 feet (30.5 meters)
Five (5)	-----	95 feet (29.0 meters)
Six (6)	-----	90 feet (27.4 meters)

\* Maximum number of 90° elbows allowed for the vent (exhaust) pipe is four (4) when installing 3 inch pipe and six (6) when installing 4 inch pipe. Maximum number of 90° elbows allowed for intake air pipe is four (4) when installing 3 inch pipe and six (6) when installing 4 inch pipe. Two (2) 45° elbows equal one (1) 90° elbow.

MINIMUM SUPPLY GAS LINE SIZE		
MODEL	NATURAL GAS	PROPANE GAS
SSF100 120NE / SSX100 120NE	3/4" NPT	3/4" NPT

Change "N" to "P" in model number for propane.



\*Minimum clearance to remove top cover



## OTHER FEATURES

### SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Reduced footprint, ease of service, protection from water damage in case of flooding
- 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, 4" alcove installation clearance in front Handhole Cleanout of unit
- Handhole cleanout allows easy access to tank interior for cleaning
- 0" clearance to combustibles, approved for installation on combustible floors

### LIMITED WARRANTY

- Three year tank warranty standard (5 year tank warranty optional)
- One year parts warranty
- For complete warranty details, consult written warranty shipped with heater

### INSTALLATION CONSIDERATIONS

1. Condensate Drain – This is a condensing water heater and should be located near a drain to permit proper disposal of condensate.
2. Vent Termination – Exhaust gases of this water heater are less than 140°F. In cold climates water vapor in flue gases will condense into a cloud of vapor where the vent exits the building. This vapor can gradually discolor exterior building surfaces when terminated through a side wall. The vent termination should be located where this is not a concern or through the roof to avoid the potential problem. Always locate vent termination above the maximum snowline, and do not locate vent termination above a walkway.
3. Air Intake – In cold climates, air intake should be located at least four feet from the vent termination of the water heater and any other appliance vents that discharge moisture-laden air (such as clothes dryers). This will help prevent freeze-over of the intake screen. Air intake should be located above the maximum snowline.
4. Noise – Vent terminal should be located away from bedroom windows or other areas where blower noise will be objectionable.
5. Optional Concentric Vent Kit - Helps to minimize unsightly wall/roof penetrations. Vent kit p/n 9006328005

### SAMPLE SPECIFICATION

Water heater shall be State Water Heater model # \_\_\_\_\_ or equal and shall be an integrated solar thermal \_\_\_\_\_ (direct/indirect) water heater with a gas fired backup burner to maintain system temperature during periods when solar energy is not available. The water heater shall have a water storage capacity of 100 gallons. The water heater shall be fitted with a dedicated recirculation loop connection in the mid portion of the storage tank for applications with hot water building recirculation to maximize solar energy gain in the lower portion of the tank.

Direct models shall have two open tank solar loop connections in the lower portion of the tank for connection to a solar thermal collector array. Direct models will be compatible with open loop solar thermal water heating systems or closed loop solar thermal systems with external heat exchangers.

Indirect models shall have an integrated single wall coil type heat exchanger with two solar loop connections in the lower portion of the tank for connection to a solar thermal collector array. Indirect models will be compatible with closed loop solar thermal systems using heat transfer fluid containing a mixture of distilled/demineralized water and propylene glycol with corrosion inhibitors.

The gas fired backup burner shall be fueled by \_\_\_\_\_ (Natural/Propane) gas and be 96% thermally efficient with an input rating of 120,000 BTUs per hour, a recovery rating of 138 gallons per hour (gph) at 100°F rise and a maximum hydrostatic working pressure of 160 PSI. Water heater(s) shall: 1. Have seamless glasslined steel tank construction, with glasslining applied to all domestic water-side surfaces after the tank has been assembled and welded; 2. Meets the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1 3. Have foam insulation and a CSA Certified and ASME rated T&P relief valve; 4. Have a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up; 5. Be approved for 0" clearance to combustibles.

Heater shall be supplied with maintenance-free powered anode.

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.

The water heater(s) shall be: 1. Design certified by CSA; 2. Meets the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition ASHRAE/IESNA 90.1.; 3. Comply with SCAQMD Rule 1146.2 and other air quality management districts with similar requirements for low NOx emissions.

For conventional-vent specification: The water heater(s) shall be suitable for venting in 3" PVC pipe for a total equivalent distance of 50 ft and 4" PVC pipe for a total equivalent distance of 120 ft.

For sealed-combustion direct vent specification: The water heater(s) shall be suitable for venting with (3" or 4") \_\_\_\_\_ diameter PVC pipe for a total equivalent distance of (50 ft or 120 ft) \_\_\_\_\_ feet. [Alternative venting: the heater(s) shall be suitable for sealed combustion direct venting using a (3" or 4") \_\_\_\_\_ diameter PVC exhaust pipe for a total distance of (50 ft or 120 ft) \_\_\_\_\_ equivalent feet of vent and (50 ft or 120 ft) \_\_\_\_\_ equivalent feet of intake.]

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

Water heater should incorporate the iCOMM™ system for remote monitoring of the gas fired backup burner, leak detection and fault alert.

**For complete information on limited warranties, consult written warranty or contact the State Customer Care Center at 1-800-365-0024.**

State Industries, Inc., reserves the right to make product changes or improvements without prior notice.

For more information on Solar Gas Backup, contact:

State Water Heaters  
500 Tennessee Waltz Parkway  
Ashland City, TN 37015  
800-365-0024 Toll-free USA  
www.statewaterheaters.com

**SOLID.STATE.**

