

# EnerWorks Space-Saver™ Residential Solar Water Heating Appliance



## PRODUCT DESCRIPTION

- Solar storage and electric auxiliary combined in one tank minimizes system footprint
- Electric auxiliary required only when solar energy is not able to meet demand
- Storage available in two sizes: 80 and 120 USG (302 and 454 L)
- Low-flow system allows thermal stratification in solar tank, maintaining hot water at the top of the tank, ready for use, and keeping cold water at the bottom
- Thermal stratification prevents erratic element cycling
- Modular 1- or 2-collector appliances
- Optimized for performance in wide range of climates
- Complete, self-contained, pre-engineered design for fast and easy installation
- Visually-appealing, low-profile collector resembles large skylight
- Includes numerous product safety features
- Certification by the Solar Rating and Certification Corporation (SRCC) pending
- Reliable components selected from worldwide suppliers ensure years of trouble-free operation
- Designed and assembled in North America with tightly-controlled manufacturing, testing and quality processes

## KEY FEATURES AND BENEFITS

- Combined solar and auxiliary electric hot water in one tank reduces required space
- Anti-scald valve protects against high-temperature water
- Depending on geographic location, produces 50% to over 80% of annual water-heating needs of households with 1 to 6 people
- Patented passive stagnation device prevents collectors from overheating and damage to heat-transfer fluid
- Safe and reliable operation throughout North America
- Patented anti-fouling valve enables automatic heat exchanger cleaning (back-flushing) that ensures optimum performance and minimal maintenance
- Medical-grade, precision gear pump capable of very cold start-ups
- Small 3/8" (9.5 mm) diameter, insulated copper tubing is flexible for easy routing and connected with push-fittings for fast installation
- One-piece tubing in collector eliminates possibility of internal leaks
- No water pump is necessary; natural convection allows simple and reliable thermosiphon flow
- All system components, except collectors, storage tank and piping in one self-contained unit
- Programmable digital controller for automatic operation displays temperatures, hours of operation and allows approximate calculation of energy delivered

## PRODUCT TECHNICAL SPECIFICATIONS

### Collector

- Flat-plate type; overall dimensions: 46.25" (1175 mm) wide x 96.25" (2445 mm) long x 3.25" (83 mm) thick
- Passive overheat protection prevents temperature exceeding 257°F (125°C) – US Patent 7,143,762 B2
- Gross surface area: 30.94 ft<sup>2</sup> (2.874 m<sup>2</sup>); net aperture area: 28.97 ft<sup>2</sup> (2.691 m<sup>2</sup>)
- Dry weight 110 lb (50 kg), fluid content 0.32 US gallons (1.2 L); maximum operating pressure 50 psi (446 kPa)
- Glazing: low-iron, tempered glass, 91% solar transmissivity, 1/8" (3.2 mm) thick; textured to minimize reflection
- Copper serpentine tube [0.393" (10 mm) OD x 0.354" (9 mm) ID] laser-stitched (cold-welded) to one-piece [0.020" (0.5 mm)-thick] aluminum absorber
- Absorber: Miro-Therm® high-performance selective coating: 94% ± 2% absorptance, 5% ± 2% emittance
- Mineral fiber back insulation: 1.17" (30 mm) thick, fire and high-temperature resistant, not affected by moisture
- Galvalume® galvanized steel, coated, mill-painted steel frame, neutral dark brown satin finish
- Connections: push-fittings require no special preparation for tube ends; connections are covered
- Hot-dip galvanized mounting brackets have "hook" and eyelet for safe handling on any roof installation
- Pressure drop 68.56 in H<sub>2</sub>O (17.1 kPa) at nominal 0.32 gpm (1.2 L/min)

### Efficiency equation, by the inlet temperature method (ASHRAE 93-2003) in SI units:

$$\eta = 0.7166 - 4.014 (T_i - T_a) / I - 0.0187 (T_i - T_a)^2 / I$$

Linear Y-Intercept is 0.7256; Slope is -5.1127 W/(m<sup>2</sup>·°C)

Incident Angle Modifier (IAM), for 0° ≤ θ ≤ 60°

$$\text{Quadratic fit } K_{a\tau} = 1.0 + 0.0566(1/\cos \theta) - 0.2167(1/\cos \theta)^2$$

### Energy Pack

- Brazed-plate heat exchanger, 20 plates, 4.45 ft<sup>2</sup> (0.414 m<sup>2</sup>), 316 Stainless steel with pure copper brazing
- Heat exchanger anti-fouling protection by automatic back-flushing – US Patent 6,827,091
- Magnetically-coupled gear pump has 303 Stainless steel housing, Peek® gears and Teflon® seals
- 1/125 HP (6 W) output AC motor, 1,450 RPM, 110 V/1Phase/60 Hz, 23 W power input
- Custom digital programmable differential temperature controller, 2 W power input; displays instant ΔT, and minimum and maximum temperatures, hours of operation, and ΔT x Hrs for energy estimates
- 0.528 US gallons (2 L) nominal bladder type expansion tank, 100-micron glycol filter
- 50 PSI (446 kPa) tamper-proof pressure relief valve
- Charge ports via 1/8" (3.2 mm) Parker male quick-connects
- 2" (50.8 mm) dial pressure gauge, 0–60 psi range

### Storage Tank –

#### Rheem Solaraide or Ruud Solar Servant Tanks

- Single-element, 4,500 Watt water-heater, specially designed and equipped for installation with residential solar systems
- Appliance feed and return fittings located at front of tank for convenient installation
- Appliance feed designed to prevent scale and sediment from entering and circulating through appliance
- Cold-water inlet brings cold water to bottom of tank, preventing mixing with heated water
- Available in 80 and 120 USG (302 and 454 L)
- 240-volt AC, single-phase, non-simultaneous wiring and 4,500 Watt high-efficiency heating element

Heat-Transfer Fluid: Solution of 50% Propylene-Glycol USP/EP by volume with distilled water, non-toxic, no additives

Closed-loop piping: 3/8" (9.5 mm) refrigeration-grade soft copper tubes, Armaflex® A/P thermal insulation or equivalent