

EnerWorks Solar High Performance Residential Appliance



PRODUCT DESCRIPTION

- Modular: 1 to 4 collectors
- Optimized for system performance in wide range of climates
- Closed-loop, flat-plate, low-flow system with freeze-protection
- Self-contained, pre-engineered design for fast and easy installation
- Sleek, low-profile collector resembles large skylight
- Incorporates numerous unique and patented safety features
- Certified by the Solar Rating and Certification Corporation (SRCC) and the Canadian Standards Association (CSA International)
- Reliable components selected from worldwide suppliers ensure many years of trouble-free operation
- Designed and assembled in North America with tightly-controlled manufacturing, testing and quality processes

KEY FEATURES AND BENEFITS

- Depending on geographic location, produces 50% to over 80% of annual water heating need for households with 1 to 6 people
- Patented passive stagnation damper prevents collectors from overheating
- Safe and reliable operation in wide range of climates
- Externally-mounted Energy Pack is used with standard electric-style storage tank
- Patented anti-fouling valve enables automatic heat exchanger cleaning (back-flushing) that ensures optimum performance and minimal maintenance
- Precision, medical-grade gear pump is capable of very cold start-ups
- Small 3/8" (9.5 mm) diameter, insulated copper tubing is flexible for easy routing and a minimum of connections
- One-piece tubing in collectors eliminates possibility of internal leaks
- No water pump necessary; natural convection allows simple and reliable thermosiphon flow
- All appliance 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 ft² (2.874 m²); aperture area: 28.97 ft² (2.691 m²)
- 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 [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® coated, mill-painted steel frame, neutral dark brown satin finish
- Connections: push-fittings require no special preparation for tube ends, no sweating of heat transfer lines
- Hot-dip galvanized mounting brackets have "hook" and eyelet for safe handling on any roof installation
- Pressure drop 68.56 in H₂O (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/(m²·°C)

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

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

Energy Pack

- Brazed-plate heat exchanger, 20 plates, 4.45 ft² (0.414 m²), 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 as well as minimum and maximum temperatures, hours of operation, 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

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