

SOLAR COLLECTOR
CERTIFICATION AND RATING



CERTIFIED SOLAR COLLECTOR

SUPPLIER: **Free Hot Water**
2146 Bering Drive
San Jose, CA 95131 USA

MODEL: FHW-FC4220

COLLECTOR TYPE: Free Hot Water Glazed Flat-Plate

CERTIFICATION#: 2010086A

COLLECTOR THERMAL PERFORMANCE RATING

Megajoules Per Panel Per Day				Thousands of BTU Per Panel Per Day			
CATEGORY (Ti-Ta)	CLEAR DAY	MILDLY CLOUDY	CLOUDY DAY	CATEGORY (Ti-Ta)	CLEAR DAY	MILDLY CLOUDY	CLOUDY DAY
A (-5 °C)	30.2	22.9	15.6	A (-9 °F)	28.7	21.7	14.8
B (5 °C)	27.2	19.9	12.6	B (9 °F)	25.8	18.9	12.0
C (20 °C)	22.7	15.6	8.4	C (36 °F)	21.5	14.7	8.0
D (50 °C)	14.1	7.7	1.9	D (90 °F)	13.4	7.3	1.8
E (80 °C)	6.4	1.4	0.0	E (144 °F)	6.1	1.3	0.0

A- Pool Heating (Warm Climate) B- Pool Heating (Cool Climate) C- Water Heating (Warm Climate) D- Water Heating (Cool Climate) E- Air Conditioning

Original Certification Date: 03-NOV-10

COLLECTOR SPECIFICATIONS

Gross Area: 2.031 m² 21.86 ft²

Dry Weight: 27.0 kg 60. lb

Test Pressure: 1500. KPa 218. psg

Net Aperture Area: 1.89 m² 20.30 ft²

Fluid Capacity: 2.2 liter 0.6 gal

COLLECTOR MATERIALS

Frame: Aluminum

Cover (Outer): Solar Glass

Cover (Inner):

Pressure Drop

Flow		ΔP	
ml/s	gpm	Pa	in H ₂ O
20.00	0.32	39.91	0.16
50.00	0.79	152.4	0.6
80.00	1.27	328.04	1.32

Absorber Material: Tube - Aluminum / Plate - Aluminum

Absorber Coating: Selective

Insulation Side:

Insulation Back: Polyurethane Foam

TECHNICAL INFORMATION

Efficiency Equation [NOTE: Based on gross area and (P)=Ti-Ta] Y INTERCEPT SLOPE

S I UNITS: $\eta = 0.666 - 3.71930 (P)/I - 0.01019 (P)^2/I$ **0.670** **-4.404 W/m².°C**

I P UNITS: $\eta = 0.666 - 0.65515 (P)/I - 0.00100 (P)^2/I$ **0.670** **-0.776 Btu/hr.ft².°F**

Incident Angle Modifier [(S)=1/cosθ - 1, 0°<θ<=60°]

Kα = 1 0.031 (S) -0.203 (S)²

Kα = 1 -0.13 (S) Linear Fit

Model Tested: 2009076A

Test Fluid: Water

Test Flow Rate: 21.7 ml/s.m² 0.0319 gpm/ft²

REMARKS: