182284

SANYO HIP

All HIP-xxxBA3 Models

SANYO

Electrical Specifications		180W	186W	190W	195W	200W	205W
Rated Power (Pmax)[1]	W	180	186	190	195	200	205
Maximum Power Voltage (Vpm)	V	54.0	54.4	54.8	55.3	55.8	56.7
Maximum Power Current (Ipm)	A	3.33	3.42	3.47	3.53	3.59	3.62
Open Circuit Voltage (Voc)	V	66.4	67.0	67.5	68.1	68.7	68.8
Short Circuit Current (Isc)	A	3.65	3.71	3.75	3.79	3.83	3.84
Minimum Power (Pmin)	W	171.0	176.7	180.5	185.3	190.0	194.8
Max System Voltage (Vsys)	V	600	600	600	600	600	600
Series Fuse Rating	A	15	15	15	15	15	15
Temperature Coefficient (Pmax)	%/°C	-0.33	-0.30	-0.30	-0.30	-0.29	-0.29
Temperature Coefficient (Voc)	V/°C	-0.173	-0.168	-0.169	-0.170	-0.172	-0.172
Temperature Coefficient (Isc)	mA/°C	1.10	0.85	0.86	0.87	0.88	0.88
Electrical Tolerance	%	+10/-5	+10/-5	+10/-5	+10/-5	+10/-5	+10/-5
Cell Efficiency	%	17.8	18.4	18.8	19.3	19.7	20.2
Module Efficiency	%	15.3	15.8	16.1	16.5	17.0	17.4
Power per Square Foot	W	14.2	14.7	15.0	15.4	15.8	16.2

Mechanical Specifications

Internal Bypass Diodes	4 Bypass Diodes
Module Area (m^2)	12.69 Ft^2 (1.18m^2)
Weight (kg)	30.86 Lbs. (14kg)
Dimensions LxWxH (mm)	51.9x35.2x1.4in (1319x894x35mm)
Cable Length -Male/+Female (mm)	30.7/24.8in (780/630mm)
Cable Size / Connector Type	No.12 AWG / MC™ Connectors
Static Load Wind / Snow (Pa)	50PSF (2400Pa) / 39PSF (1876Pa)
Pallet Dimensions LxWxH (mm)	53x36x63in (1346x912x1600mm)
Pieces per Full Pallet / Weight (kg)	36pcs / 1111 Lbs (504kg)
Quantity per 20'/40'/53' Container	360pcs / 756pcs / 972pcs

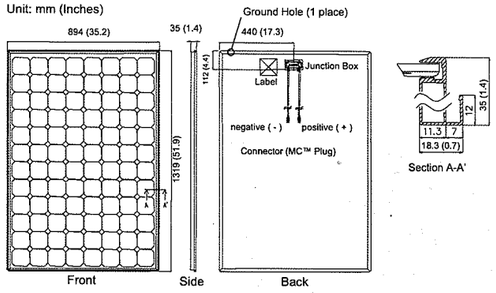
Operating Conditions & Safety Ratings

Temperature (°C)	-4°F to 104°F (-20°C to 40°C)[2]
Relative Humidity	45% to 95%
Hail Safety Impact Velocity	1" hailstone (25mm) at 52mph (23m/s)
Fire Safety Classification	Class C
Safety & Rating Certifications	UL 1703, cUL, CEC
Limited Warranties	2 Years Workmanship / 20 Years Power Output

[1]STC: Cell Temp. 25°C, AM1.5, 1000W/m^2 [2]Monthly average low and high of the site.

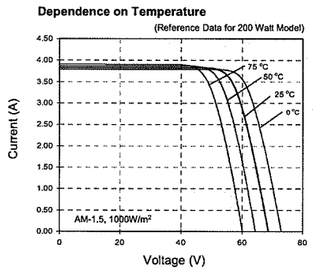
Dimensions

Unit: mm (Inches)



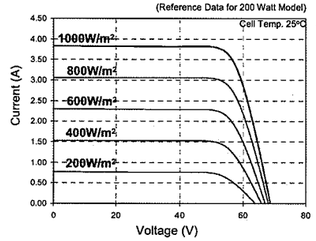
Dependence on Temperature

(Reference Data for 200 Watt Model)



Dependence on Irradiance

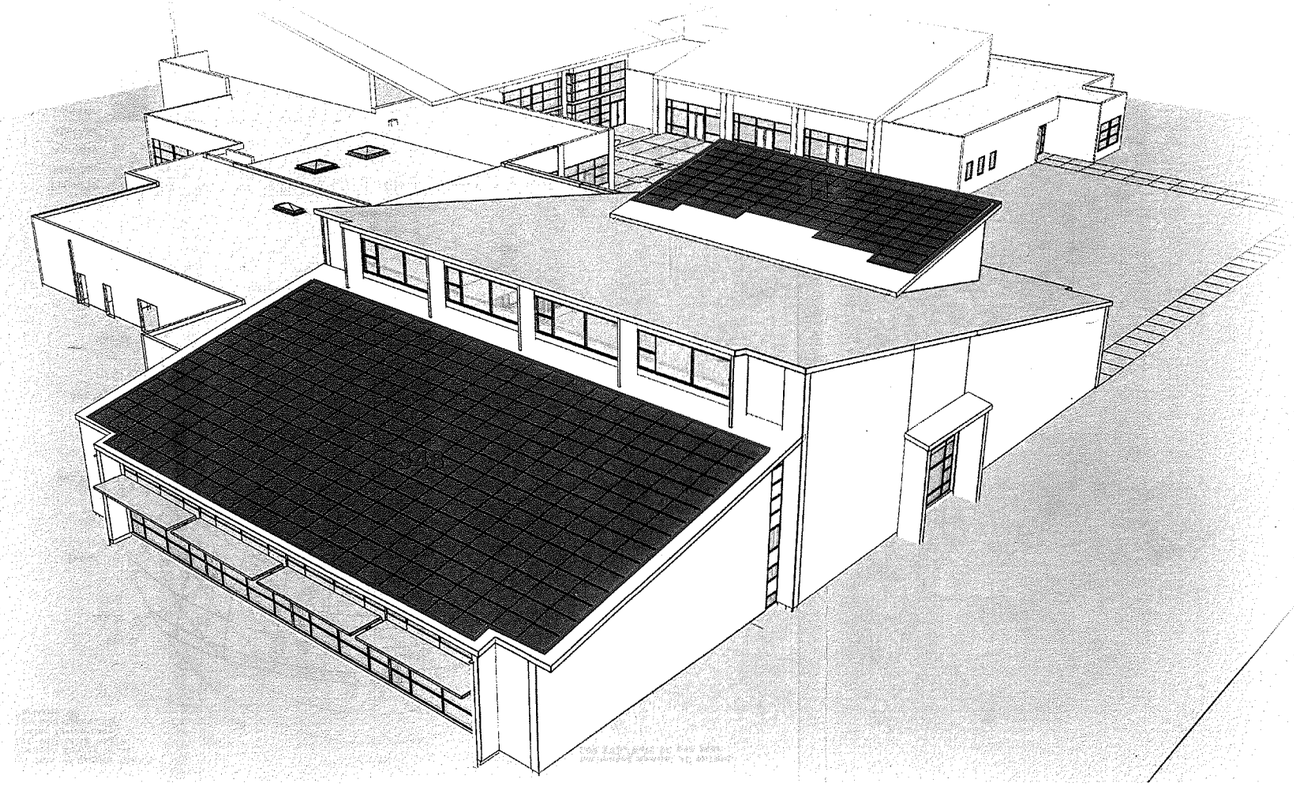
(Reference Data for 200 Watt Model)



CAUTION! Read the operating instructions carefully before use of these products.

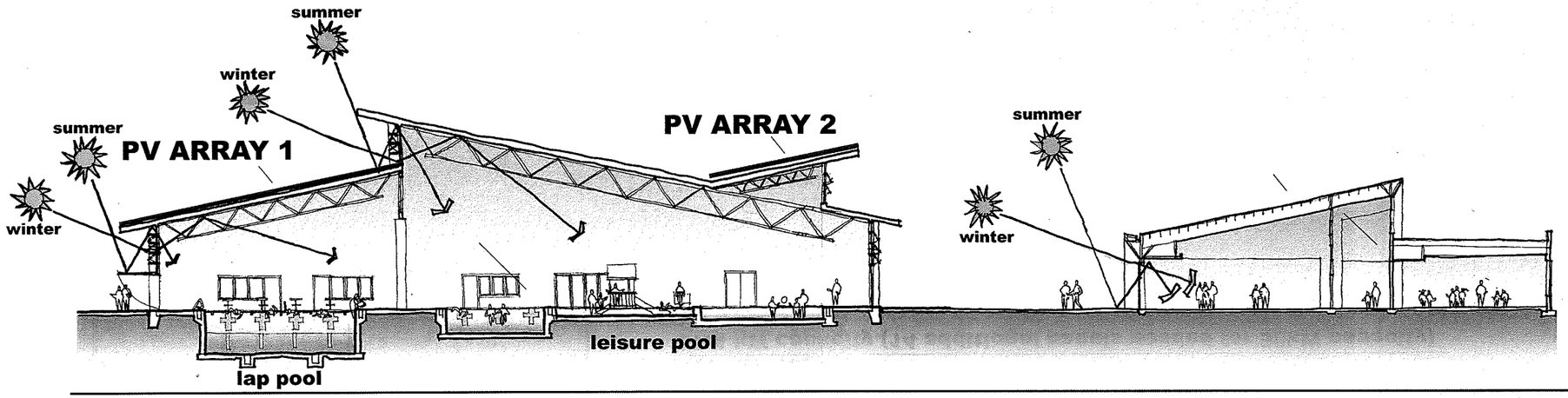
Note: Specifications and products above may change without notice. 04/01/07

Visit **www.SANYO.com** or contact an Authorized Representative for more information:



460 HIP-190

87.4 kW capacity (14 additional panels needed for 90kW capacity)



section 1 **b**

Energy Trust Shade Effect Evaluation Form

Job Name: EPCCAC
Contractor:
Date:
Array Tilt: 12°
Array Orientation: 178°
Zip Code of Site:

The sun path chart to the right is for a solar electric system located in Portland, Oregon tilted 22.5 degrees with a 180 degree azimuthal orientation. The annual AC output for a system with these characteristics is about 1.07 kWh/Watt DC per year.

For comparison, annual production capacity per Watt of an optimally oriented system (32 degree tilt and 190 degree azimuth) is 1.08 kWh/Watt DC per year.

Local Production Capacity = 1.08 kWh/Watt DC per year.

At Portland, a system oriented as in the sun path chart to the right will produce 99% of the annual electricity produced by an optimally oriented system.

Draw the horizon on the sun path chart and shade obstructed areas. To calculate the percent reduction due to shading, enter the percentage of system power output shown on the sun path chart for areas shaded by obstructions into the table on the right.

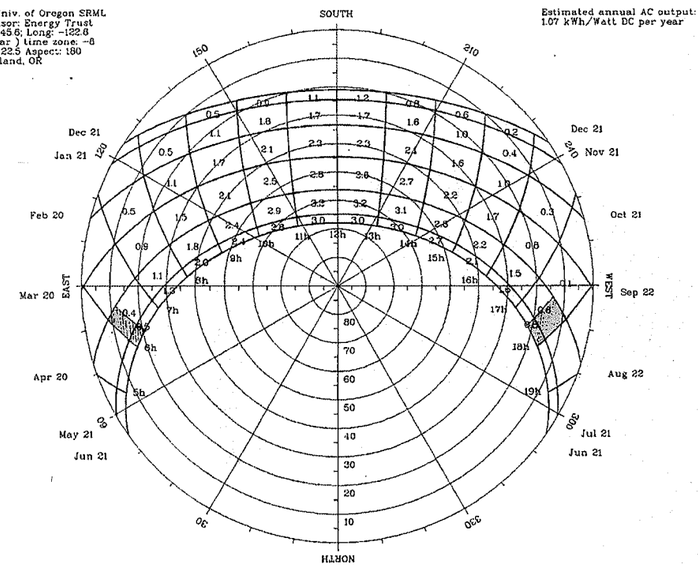
For example, assume the percentage of system power output from 7:00 to 8:00 between September 22 and October 21 is 0.4%, and 50% of that period is shaded. Enter 0.2% in the column under 7-8 and the row labeled Feb-Mar on one side and Sep-Oct on the other. Enter zero for each box where there is no shading. Note that hours are in solar time.

Sum the shading values in each column and enter the total in the bottom row. Sum the bottom row to determine the percent annual shading.

Percent Annual Shading: 1.15%

(c) Univ. of Oregon SRML
Sponsor: Energy Trust
Lat: 45.6 Long: -122.6
(Solar) time zone: -8
Tilt: 22.5 Aspect: 180
Portland, OR

Estimated annual AC output:
1.07 kWh/Watt DC per year



Period/Hr	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	Period/Hr
May-Jun		.15											.9		Jun-Jul
Apr-May		.20											.5		Jul-Aug
Mar-Apr															Aug-Sep
Feb-Mar															Sep-Oct
Jan-Feb															Oct-Nov
Dec-Jan															Nov-Dec
Sum of Hourly Shading		.15%											.7%		Sum of Hourly Shading

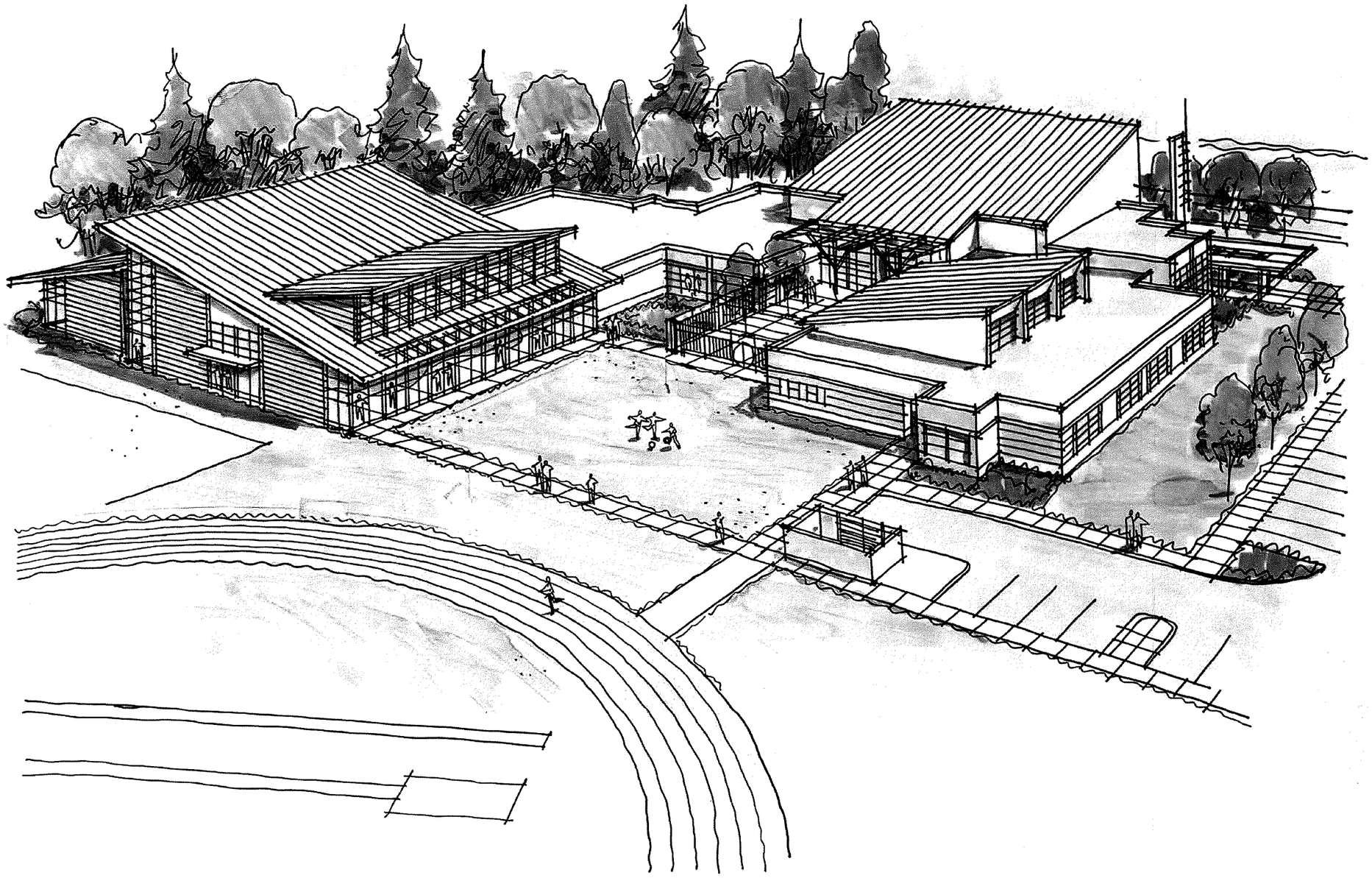
shade effect evaluation **a**

east portland community center

Solar Energy Study
06/19/2007

SERA

182284



view looking southwest

east portland community center

perspective

PORTLAND PARKS & Recreation