

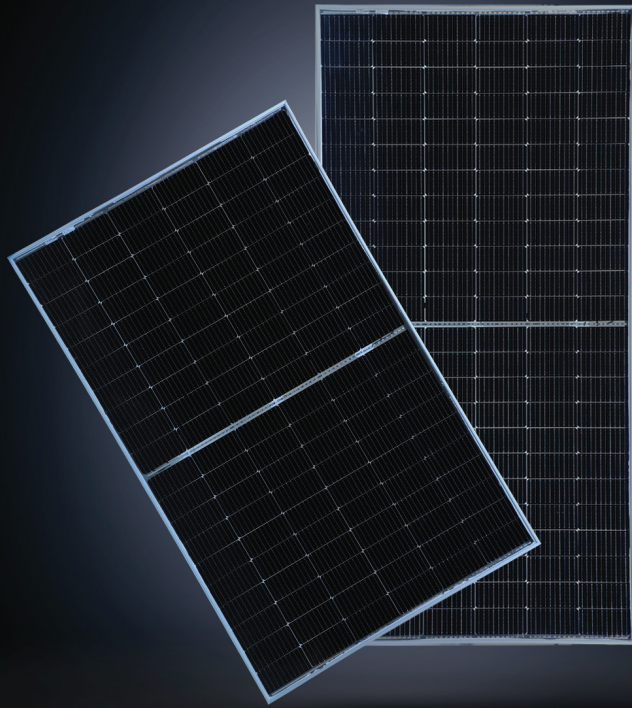


YOUR RELIABLE
PARTNER FOR
SOLAR ENERGY
SINCE 1992







SAPPHIRE | A MULTI-FACETED SOLAR SOLUTION

DESIGNED TO DELIVER MAXIMUM POWER OUTPUT



BENEFITS

-  **LOW LCOE, FASTER
PAYBACK PERIOD**
-  **30% MORE POWER
BEST IN CLASS
EFFICIENCY UPTO 21.5%**
-  **MULTI-BUS BAR
TECHNOLOGY FOR
BETTER CURRENT
COLLECTION**
-  **LOWEST GUARANTEED
FIRST YEAR AND ANNUAL
DEGRADATION**
-  **WELL-COMPOSED
COMPONENTS STRESS
TO REDUCE MICRO
CRACKS**

EMMVEE IS INDIA'S FIRST INTEGRATED SOLAR SOLUTIONS COMPANY, WITH 30 YEARS OF EXPERTISE IN DEVISING HIGHLY INNOVATIVE AND EFFICIENT SOLAR POWER SOLUTIONS, FROM SOLAR WATER HEATING SYSTEMS TO PHOTOVOLTAIC MODULES AND SOLAR WATER PUMPS.

Since our inception in 1992, we have dedicated ourselves to developing smart and innovative solar energy solutions using cutting edge technology. As always, our promise is to maintain enviable standards of excellent quality, timely delivery and reliable support to our customers as they explore and adopt environmentally friendly solar power solutions.

Today, we are proud of our robust presence in some of the most pioneering green energy projects across India and Europe. Our path-breaking photovoltaic modules have provided valuable and sustainable alternative power solutions in the field for over 15 years, and we continue to innovate with our new range of higher WP modules that combine exceptional quality and unbeatable efficiency.

Our goal is simple: to provide clean and reliable energy that saves our natural resources and reduces our carbon footprint, while ensuring that our diverse range of domestic and commercial solar power-related products and services always keep the needs of our customers at the forefront.

FEATURES



**AR COATED HIGH
TRANSMISSION
GLASS**



**MC4
COMPATIBLE
CONNECTORS**



**PID
RESISTANCE**



**ANODISED
ALUMINIUM
FRAME**



**MECHANICAL
LOAD
OF 5400 Pa**

TECHNICAL SPECIFICATION

120 CUT CELL BI-FACIAL MODULE

Electrical data at 1000W/m², 25°C and A.M1.5 (STC in accordance with IEC 60904-3)

MODEL NAME	E440HCBG120	E445HCBG120	E450HCBG120
RATED POWER AT STC	440	445	450
POWER TOLERANCE	+5W	+5W	+5W
MODULE EFFICIENCY AT STC	20.28%	20.51%	20.74%
OPEN CIRCUIT VOLTAGE - VOC(VOLTS) (±10%)	41.44	41.46	41.56
SHORT CIRCUIT CURRENT - ISC (AMPS) (±10%)	13.55	13.75	13.81
MAX POWER VOLTAGE - VPM (VOLTS)	34.21	34.28	34.31
MAX POWER CURRENT - IPM (AMPS)	12.87	12.99	13.12
AT LOW IRRADIANCE (200W/M ² , 25°C AND AM1.5) THE MODULE YIELDS AT LEAST 95% OF THE STC EFFICIENCY.			

Thermal data

TEMP. COEFFICIENT OPEN-CIRCUIT VOLTAGE	-0.28%/°C
TEMP. COEFFICIENT SHORT CIRCUIT CURRENT	0.05%/°C
TEMP. COEFFICIENT RATED POWER	-0.35%/°C
NOCT (NORMAL OPERATING CELL TEMPERATURE)	45°C ± 2°C

Mechanical data

NUMBER OF CELLS AND CELL TYPE	120 BI-FACIAL SOLAR CELLS (182mm X 91mm)
DIMENSIONS: (L X W X H)	1913 mm X 1134 mm X 35 mm
WEIGHT	26 Kg
FRONT GLASS	2 mm HIGH TRANSMISSION, SOLAR GALSS
EMBEDDING	TOP EVA, BOTTOM POE
BACK GLASS	2 mm HIGH TRANSMISSION, SOLAR GALSS
JUNCTION BOX	3 SPLIT JUNCTION BOX IP68
NUMBER OF BYPASS DIODES	3
CABLES	4mm ² SOLAR CABLES, LENGTH 500±10mm
CONNECTORS	MC4 COMPATIBLE

Permissible operating conditions

OPERATING TEMPERATURE RANGE	-40°C TO 60°C
MAX.SYSTEM VOLTAGE	1500V DC
MAXIMUM SNOW LOAD CAPACITY	5400PA
RESISTANCE AGAINST HAIL	MAX Ø24 MM WITH IMPACT SPEED OF 83KM/H
PROTECTION CLASS AGAINST ELECTRICAL SHOCK	II
MAXIMUM REVERSE CURRENT	30 A
BIFACIALITY	70 ± 5%

Warranty

PRODUCT WARRANTY	12 YEARS
PERFORMANCE WARRANTY	30 YEARS
ANNUAL DEGRADATION	1ST YEAR DEGRADATION, 2%, FROM 2ND YEAR 0.45% ANNUAL DEGRADATION AND 84.95% AT THE END OF 30 YEARS.

