

Silk[®] Rhino All Black



n-type

TECHNOLOGY
INSIDE

450 W 22.52 %

Maximum power

Maximum efficiency

KEY BENEFITS AND FEATURES



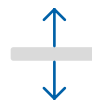
Power from **440 to 450 Watt**



96 G12R **n-type** half-cut cells



High Hail resistance, up to 50 mm hailstones diameter at 111 km/h



Increased **glass thickness**



Up to **7800 Pa snow load** resistance thanks to **two extra aluminum bars**



1762 x 1134 x 30 mm

Performance guarantee

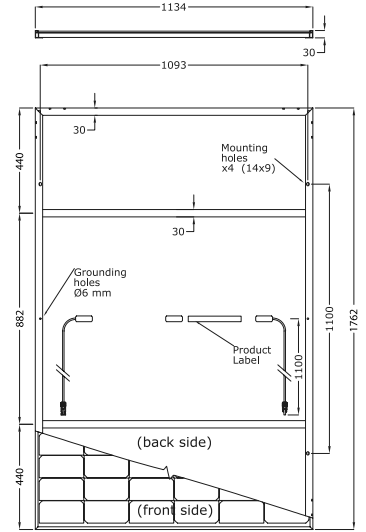
- **25-years** performance warranty with max power decrease from 2nd year **0.4%/year**
- **99%** at the end of first year
- **92%** at the end of 20th year
- **89%** at the end of 25th year

Product guarantees

- **15-year** product warranty
- Third-party product **liability** insurance
- All FuturaSun's modules are designed and guaranteed by the **Italian** headquarters

Mechanical Specifications

Dimensions	1762 x 1134 x 30 mm
Weight	26.6 kg
Glass	High transmission, Low iron, Tempered, ARC, Thickness 4 mm
Cells	96 monocrystalline half-cut MBB n-type cells 182 x 105 mm
Frame	Black anodized aluminium frame with mounting and drainage holes
Junction boxes	Certified according to IEC 62790, IP 68 approved, 3 bypass diodes
Cables	Solar cable, length 1100 mm or customized assembled with 4mm ² compatible connectors
Backsheet	Composite Multilayer film - black
Maximum reverse current (I _r)	25 A
Maximum system voltage	1000 V (1500 V on request)
Mechanical load (snow)	Design load: 7800 Pa, (11700 Pa including safety factor 1.5)
Mechanical load (wind)	Design load: 5400 Pa, (8100 Pa including safety factor 1.5)



Note: dimensions in mm, tolerance +/- 2 mm

Electrical data - STC*

		FU 440 M	FU 445 M	FU 450 M
Sorting tolerance	W		0/+5	
Module power (P _{max})	W	440	445	450
Open circuit voltage (V _{oc})	V	35.14	35.30	35.47
Short circuit current (I _{sc})	A	15.85	15.91	15.97
Maximum power voltage (V _{mpp})	V	29.62	29.81	30.01
Maximum power current (I _{mpp})	A	14.86	14.93	15.00
Module efficiency	%	22.02	22.27	22.52

Electrical data - NOCT**

		FU 440 M	FU 445 M	FU 450 M
Module power (P _{max})	W	331	334.60	338.40
Open circuit voltage (V _{oc})	V	33.40	33.56	33.72
Short circuit current (I _{sc})	A	12.80	12.84	12.90
Maximum power voltage (V _{mpp})	V	27.58	27.75	27.89
Maximum power current (I _{mpp})	A	12.00	12.06	12.12

Temperature ratings

Temperature coefficient I _{sc}	%/°C	0.045
Temperature coefficient V _{oc}	%/°C	-0.25
Temperature coefficient P _{max}	%/°C	-0.29
NOCT**	°C	45 ± 2
Operating temperature	°C	from -40 to +85

Certifications

Factory	ISO 9001 - 14001 - 45001
Product	IEC EN 61730, IEC EN 61215, Fire Class C, HW5 hail resistance class

Packaging

Quantity / Pallet	36 pcs
Container 40' HC	936 pcs / 26 pallets

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*Standard Test Conditions STC: 1000 W/m² - AM 1.5 - 25 °C - tolerance: P_{max} (±3%), V_{oc} (±4%), I_{sc} (±5%)
 **Nominal Operating Cell Temperature NOCT: 800 W/m² - T=45 °C - AM 1.5

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