

# N-TYPE BIFACIAL GLASS-GLASS SERIES

Up to 450 watt  
**WST-NFX54-B1 Full Black**



#### Zero busbar technology

Reduces shading area while increasing module power by 0.3%.



#### High-Density Module Technology

Utilizing stacked soldering technology to improve module conversion efficiency.



#### PID & LID Resistant

To reduce power degradation and ensure long-term sustained performance.



#### Aesthetic glass

The module's glass surface is coated with a dual-layer film to maintain light transmittance, resulting in a darker and more visually appealing module.

**30** years product warranty

**30** years linear performance

**-1 %** 1st-year degradation

**-0.40 %** annual power degradation

**>87.4 %** of linear performance after 30 years



*Power to Perform*

[www.winaico.com](http://www.winaico.com)

## MECHANICAL DATA

Cell	Monocrystalline, N-type, bifacial
Quantity and wiring of cells	108 (6 strings x 18 cells)
Dimensions	1,762 x 1,134 x 35 mm
Weight	25 kg (55.12 lbs)
Front-side glass	2.0 mm, semi-tempered solar glass with anti-reflective coating
Back-side glass	2.0 mm, semi-tempered solar glass, partially black printed
Frame	Black anodised aluminium
Junction box	IP68, 3 bypass diodes
Connector type	Stäubli MC4-EVO2A IP68
Cable length (IEC/UL)	Cable 2 x 1,200 mm / 4 mm <sup>2</sup>
Fire safety class (UL 790)	A
Protection class (IEC 61140)	II

## OPERATING CONDITION

Operating temperature	-40 °C to +85 °C / -40 °F to +185 °F
Maximum system voltage IEC/UL	1,500 V / 1,500 V
Maximum series fuse	30 A
Maximum design load (push/pull)	3,600 Pa / 1,600 Pa
Maximum test load (push/pull)	5,400 Pa / 2,400 Pa
Nominal module operating temperature NMOT	42 ± 2 °C
Temperature coefficient of $P_{MAX}$	-0.29%/°C
Temperature coefficient of $V_{OC}$	-0.25%/°C
Temperature coefficient of $I_{SC}$	0.043%/°C

## ELECTRICAL DATA

Module type		WST-NFX54-B1 Full Black			
Electrical data		STC <sup>1</sup>	NMOT <sup>2</sup>	BNP <sup>3</sup>	
Nominal performance	$P_{MAX}$	450	338	490	Wp
Voltage at maximum performance	$V_{MP}$	33.39	31.43	32.94	V
Current at maximum performance	$I_{MP}$	13.48	10.77	14.88	A
Open circuit voltage	$V_{OC}$	39.40	37.42	39.20	V
Short circuit current	$I_{SC}$	14.28	11.53	15.70	A
BSI: 1000 W/m <sup>2</sup> front / 300 W/m <sup>2</sup> rear irradiance	$I_{SC}$		17.45		A
Module efficiency			22.5		%
Bifacial gain <sup>4</sup>	10 % Pmpp		459 (+45)		W
*Depending on irradiance conditions	15 % Pmpp		518 (+68)		W
	20 % Pmpp		540 (+90)		W
Power tolerance			0~+5		W

## PRODUCT AND QUALITY CERTIFICATES

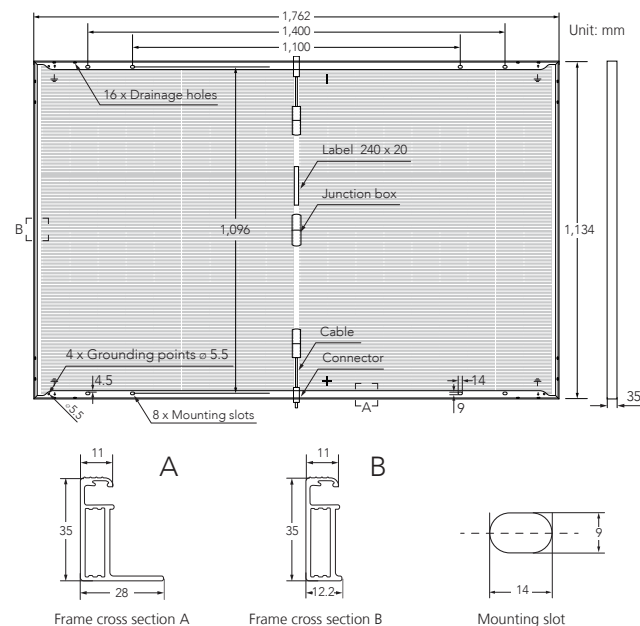
IEC 61215: 2021, IEC 61730: 2023  
 IEC 61701 Salt Mist Resistance (in progress)  
 IEC 62716 Ammonia Resistance (in progress)  
 IEC 61215-2 Hail Storm Resistance (in progress)  
 UL 790 Fire Resistance

ISO 9001 Quality Management System  
 ISO 50001 Occupational Health and Safety Management System  
 ISO 14001 Environment Management System

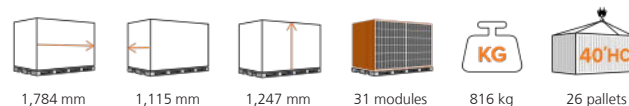


- Electrical data applies under standard test conditions (STC): solar radiation 1,000 W/m<sup>2</sup> with light spectrum AM 1.5, with cell temperature 25 °C. Measurement tolerance of  $P_{max}$ : ±3%;  $V_{oc}$ : ±3%;  $I_{sc}$ : ±4% at STC.
- Electrical data applies under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20 °C, wind speed 1 m/s.

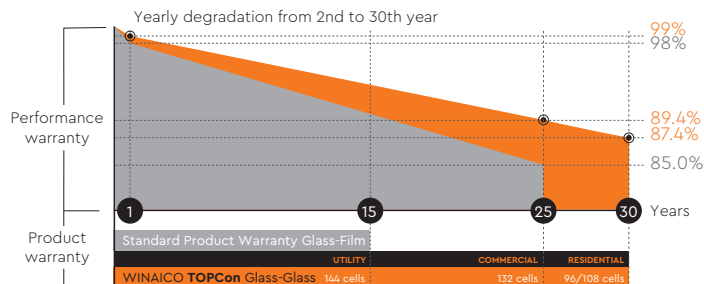
## DIMENSIONS



## PACKAGING



## WINAICO PERFORMANCE GUARANTEE



30 year product guarantee.  
 Linear performance guarantee for 30 years.  
 No more than 0.4% degradation per year from 2nd year to 30th year.

- BNP1: The front side 1,000 W/m<sup>2</sup> solar irradiance and rear 135 W/m<sup>2</sup>.
- The additional power gain from the rear side depends on the irradiance conditions at the installation site and the mounting situation.



WINAICO Deutschland GmbH  
 Tel. + 49 7933 700 300  
 Fax + 49 7933 700 3010  
 germany@winaico.com · www.winaico.com  
 Industriestrasse 68, 97993 Creglingen, GERMANY

