



A WORLD-CLASS
**SOLAR
PRODUCT**
MANUFACTURER

Stringent quality control is the cornerstone of Seraphim's manufacturing. Our customers have come to expect uncompromising quality in our products. To meet this expectation of high quality, we continue to invest in state-of-the-art equipment and professional training for our employees. We are proud of the quality of our products and their reliable performance even in the most extreme conditions.

Through rapid and steady development, Seraphim has expanded its solar module production capacity to 5GW. In the meantime, Seraphim devotes itself into developing the most innovative photovoltaic technology for a greener future. Since its foundation, Seraphim has been continuously providing excellent quality, high efficiency and high ROI solar products to customers worldwide.

We have earned our reputation as an industry-leading solar product manufacturer largely due to the products' excellent performance. We understand the importance of ensuring customer satisfaction. With over 20 local offices and 1500 employees globally, Seraphim is dedicated to providing efficient support and excellent customer services in all regions.

Over the years, Seraphim has established itself as a leader in solar industry, a pioneer in technical innovation, and a perfectionist in quality assurance. Seraphim has been continuously challenging itself to develop new technologies, higher efficiency products, and provide better services. Seraphim has been certified to international performance and safety standards by independent third party laboratories. Seraphim also actively participates at a local level by coaching and providing the public with economic and green solutions.

It's a bright future indeed. What we are doing is shifting the future.

WHAT WE ARE
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THE FUTURE.**

A WORLD-CLASS SOLAR MODULE MANUFACTURER

Since its foundation in 2011, Seraphim has accomplished significant achievements in growth and innovation. Seraphim's core belief is that innovation is the key driver behind growth. Our devotion towards innovation has allowed us to outpace most of our competitors. Seraphim is listed as Tier 1 solar module maker by BNEF, Top Performer by DNV GL. With a global capacity of 5GW, Seraphim has been serving worldwide customers with high-quality products and professional services. By the end of 2019, more than 8GW of Seraphim products has been widely applied in over 40 countries.



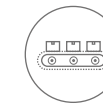
TIER1

Solar Module Maker (Listed by BNEF)



8GW+

Modules Installed Worldwide by 2019



5GW

Module Production Capacity



100+

Technology Patents



40+

Destination Countries



50+

Global Financial Partners



TOP PERFORMER

Recognized as a Top Performer by DNV GL

SMALL INNOVATIONS IN TECHNOLOGY, BIG BENEFITS FOR YOUR BUSINESS

With a full array of exciting solar energy technologies, Seraphim's strong innovation continues to help customers to meet their goals. From utilities to commercial and industrial to residential customers, we work with the unique needs of each customer, site and application to deliver the right products and services. Seraphim has been investing continuously in solar product development including laboratory equipment upgrades and adding to our R&D engineering staff. Our emphasis on product innovation has allowed us to remain at the forefront of solar technology. Seraphim's small steps combine together to make a big leap forward for our clients.



Over 100 Patents



Up to 21.7% Module Efficiency



Over 100 Global R&D Engineers



Certified In-house Laboratory by CSA, CNAS, CTC, TUV SUD, DEKRA and CGC

WORLD-CLASS R&D CENTER

As one of the world's leading manufacturers of photovoltaic products, Seraphim focuses on solar technology innovation. In 2013, we added in-house research facilities that specialize in R&D and product testing for further development, new materials testing, client customization and periodic sample testing, etc.

Located in the scenic Chinese city of Changzhou, Seraphim's laboratory covers an area of 722 square meters. Equipped with German-made electrical performance testers, a walk-in climate simulation chamber, and over 20 other instruments for PV testing and staffed with more than 80 engineers, 20 testing specialists, and 3 experienced managers, the laboratory now has complete PV R&D and testing capability.

The laboratory has been recognized as CSA and DEKRA witness laboratory, CNAS certified in-house laboratory, CTC authorized testing laboratory, TUV SUD assessed CTF laboratory and CGC approved laboratory. This allows Seraphim to shorten the certification period and accelerate the speed of new product release.

- A+A+A+ Rated H.A.L.M. Sun Simulator
- VOTSCH Walk-in Climate Simulation Chamber
- ATLAS UV Test® Fluorescent / UV Instrument

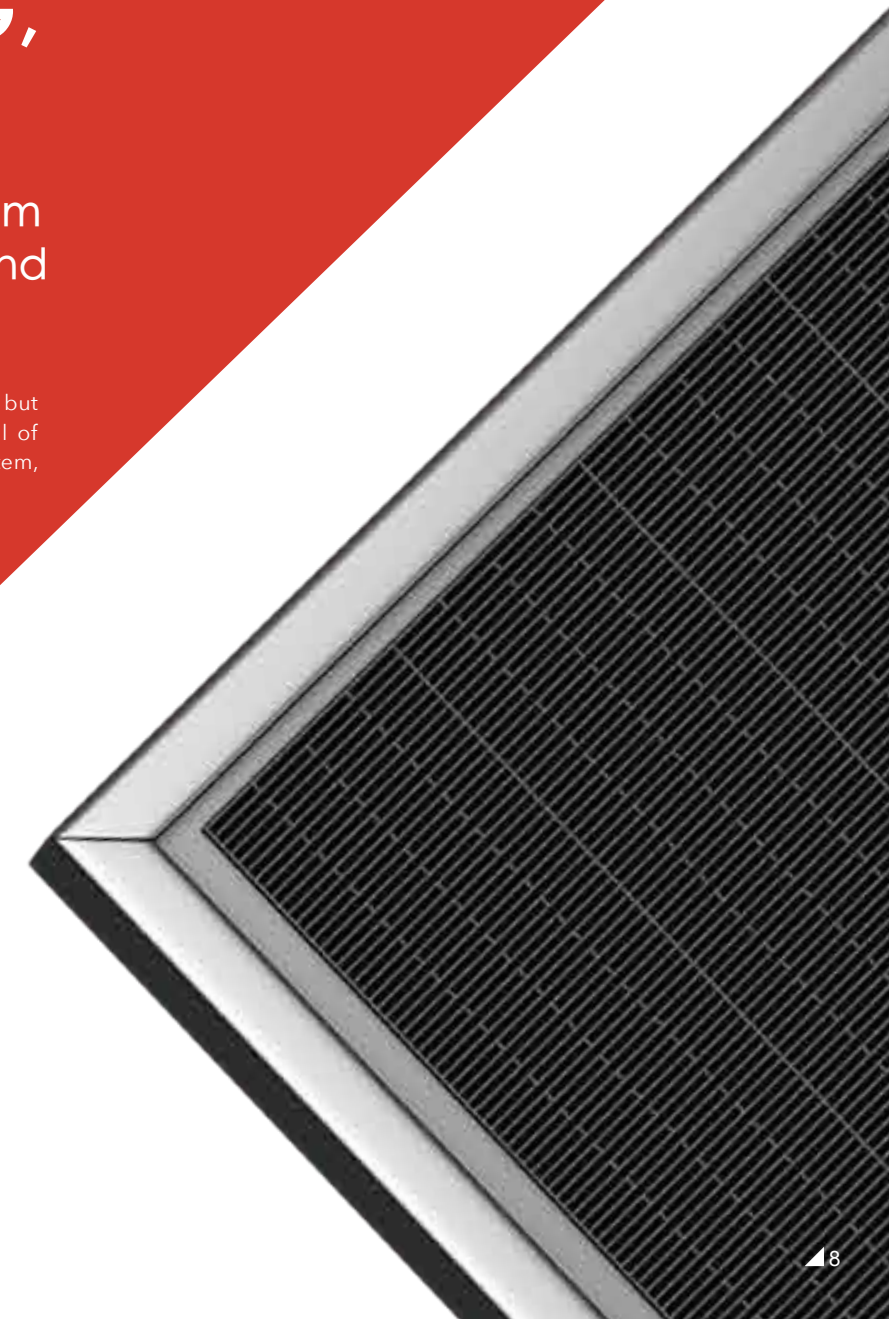




SMARTER MANUFACTURING, SMARTER CHOICE

Highly automated production lines enable Seraphim to supply modules with high quality, fast delivery and low cost.

Seraphim positions itself as a leader in the solar industry not only in leading-edge product performance, but also in manufacturing equipment, quality control, and customer service. Seraphim strives to meet all of clients' expectations by utilizing fully automated manufacturing facilities, advanced quality control system, and self-developed fully transparent quality management system.



MODULARIZED FULLY AUTOMATED PRODUCTION LINES ENABLE FAST DELIVERY AND COST SAVINGS

Seraphim's ever-improving highly automated production lines enable us to supply modules with high quality, fast delivery and low cost. To improve production reliability and efficiency, Seraphim works closely with equipment suppliers to develop customized automated production lines. As a result, we have the most automated production lines in the PV industry. Seraphim has also dedicated extensive resources to improving production efficiency and fluidity.

15%

Lower production cost

15%

Higher equipment effectiveness

24 * 7

Real-time online monitoring

100+

Patents on products and production process optimization

99.9%

Good product yield rate

35%

Higher production efficiency

REAL-TIME MONITORED AND RECORDED >>>



Seraphim employs strict manufacturing management and end-to-end quality control. With an in-house developed ERP system, we track every production step of every module component from incoming material quality control, to online production, OBA test and delivery status, etc. The ERP system implements a unique bar code for each module component. Information such as raw material suppliers, production workers, quality testing results, and production details are all accessible online through our ERP system. This data will be kept on our server for client's access. Our product monitoring system allows us to track and take responsibility for product quality. It also enables customers to log in via Internet to retrieve real-time module production data. In the long run, this enables us to track back products' records in a database, which gives us the ability to further improve product quality .

BENEFITS FOR SERAPHIM



>>> Simplify production process, improve production efficiency



>>> Enhance product quality while dramatically reduce cost



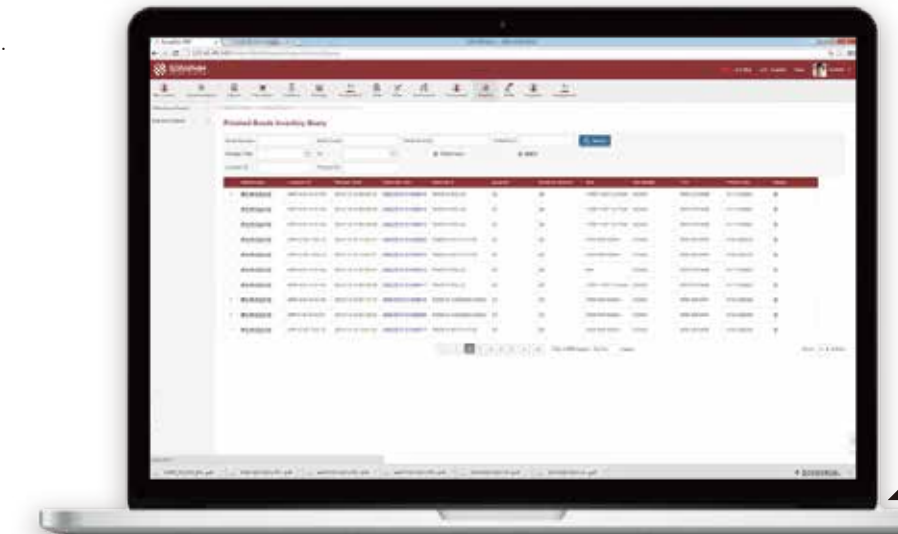
>>> Improve utilization rate of corporate resources and assets



>>> Guarantee customer trust with transparent and traceable production process

ADDED VALUE FOR CUSTOMER

- Customers can access real-time production data including BOM detail, EL report, Power, etc.
- Real-time update of the production status, delivery specifics, etc. of your order.
- A unique bar code enables you to track back all the information related to your order.
- Visual access to real-time workshop floor monitor recordings via our ERP system.





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HIGH QUALITY PRODUCTS COME FROM STRINGENT QUALITY CONTROL SYSTEM

Stringent quality control is the cornerstone of Seraphim's manufacturing. Our customers have come to expect uncompromising quality in our products. To meet this expectation of high quality, we continue to invest in state-of-the-art equipment and professional training for our employees. We are proud of our product quality and their reliable performance even in the most extreme conditions.

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QUALITY MANAGEMENT SYSTEM

Seraphim has received certifications for Quality Management System (ISO 9001:2015), Environment Management System (ISO 14001:2015) and Occupational Health and Safety Management System (ISO 45001:2018) from both DNV GL and GZCC.





Beyond ISO9001, Seraphim also applied for the national "GB T19580 2012 Criteria for Performance Excellence". This regulates not only product quality, but also production waste, environmental burden, management foresight, etc., which are the necessities for an "excellent" company.



MATERIAL CONTROL

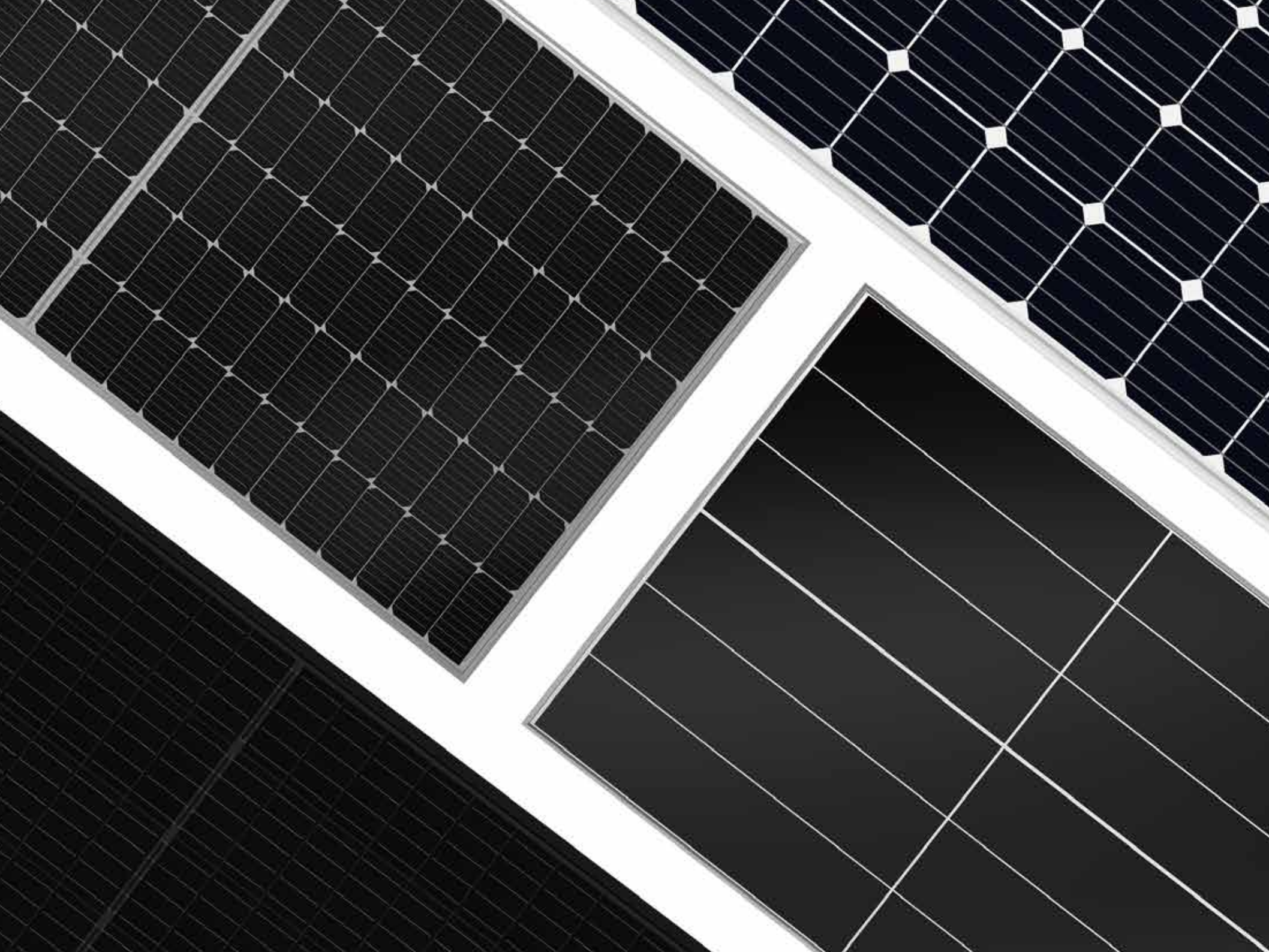
-  Stringent Supplier Management
-  Automatic Material Filtration and Sorting
-  Spot Check Every Feedstock Batch
-  Proper Storage at Fixed Temperature and Humidity
-  **SQE** Supplier Quality Engineering
-  **IQA** Incoming-material Quality Assurance

PRODUCTION CONTROL

-  300+ Quality Check Points
-  3 * EL Tests
-  In-process Quality Control
-  A+A+A+ Rated H.A.L.M. Sun Simulator

AFTER PRODUCTION

-  Open Box Audit (OBA) Test



PROVEN HIGHER MODULE EFFICIENCY AND OUTPUT

Seraphim passed the strictest accelerated stress testing and characterization under DNV GL PVEL, LLC's (DNV GL) Product Qualification Program (PQP). The PQP is a comprehensive evaluation of environmental sensitivities and degradation mechanisms of PV module designs.

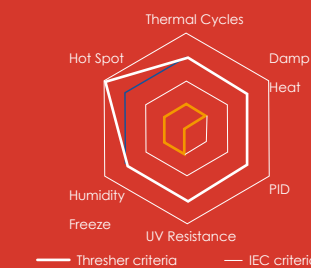
In addition, Seraphim's module products have received the China Quality Certification Center's ("CQC") Top Runner Program level-one energy efficiency certification.



THREE TIMES MORE THAN INDUSTRY STANDARDS IEC61215 AND IEC61730

Thresher test (300% the IEC standards) includes a series of tests for thermal cycling, damp heat, PID, UV, humidity freeze and hot spot. It is designed to test whether or not modules can maintain their power output during adverse conditions throughout their lifetime.

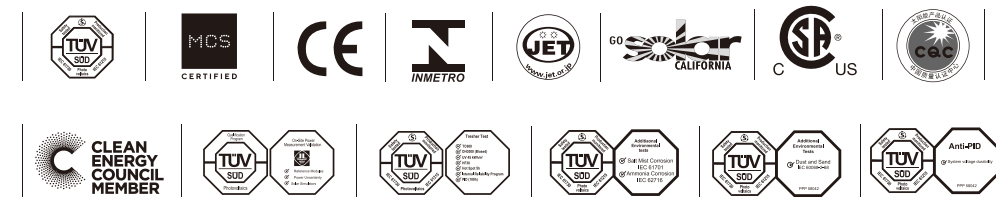
Project	Condition	IEC Criteria	Thresher Criteria
Thermal Cycles	-40~80 C	200 cycles	600 cycles
Damp Heat	85 C 85%RH	1000h	3000h
PID	—	—	96h
UV Resistance	—	15 kW/m ²	45 kW/m ²
Humidity Freeze	-40 C ~ 80 C 85%RH	10 cycles	30 cycles
Hot Spot	60kwh/m ²	5h	20h



RELIABLE AND HIGH EFFICIENT MODULES GUARANTEE PROFITS

Seraphim specializes in module production. All of our products have been certified by professional third party testing bodies. But that's not enough. We apply stricter standards to make sure they remain functional even under the most extreme conditions.

PRODUCT CERTIFICATES





DIVERSIFIED SOLAR MODULES MEET DIFFERENT NEEDS

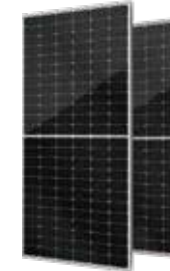
Seraphim is market-oriented to offer a rich module portfolio to meet the diversified needs of customers, including the world's first certified high efficiency module using shingled technology. We have successfully developed multiple products by integrating large silicon wafers with bifacial-cell and multi-busbar technologies. With years of R&D investment, Seraphim continues to iterate on products to maintain its competitive advantage.

SII SERIES



- Less mismatch loss
- Less internal power loss
- Higher yield due to better shade tolerance
- Reduced BOS and installation cost
- Reduced hot-spot effect

SIII SERIES



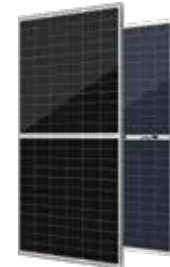
- Up to 20% module efficiency
- Better performance under weak electricity
- Less mismatch and parallel design reduces shading impact
- Superior temperature coefficient characteristic
- Effectively reduce hot-spot effects
- Significantly reduce LCOE and BOS cost

SII SHINGLED SERIES



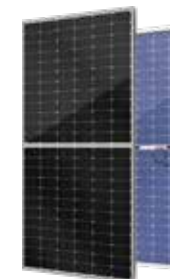
- Up to 20.81% module efficiency
- Using 158.75mm cells, power up to 440W
- Significantly reduce hot-spot effects
- Better performance under shade
- 12% BOS and installation cost saving

SII BIFACIAL SERIES



- 10-30% more energy generation
- Dual glass structure reduces micro-cracks, snail trails, and UV aging
- PID-free, superior stability and durability
- Less mismatch and parallel design reduces shading impact
- Ideal for high-reflective area

SIII BIFACIAL SERIES



- Using reflected light, 10-30% more energy generation
- Fire resistance Grade A
- Better performance under weak electricity
- Less mismatch and parallel design reduces shading impact
- Dual glass structure reduces micro-cracks, snail trails, and UV aging
- Significantly reduce LCOE and BOS cost

MINI SHINGLED MODULE



- Ribbon-free, lower current and internal resistance
- Higher efficiency, higher output
- Beautiful design, perfect visual enjoyment
- Significantly reduced hot-spot effect
- Flexible design options

SEAMLESS SERVICES LET YOU ENJOY THE SUNSHINE

Seraphim provides full range of services even before an order is placed. You can enjoy caring and professional technology consultation, fully transparent ERP, as well as local offices and online instant response system. This seamless service chain will allow you to worry less and enjoy the sunshine.



Tailor-made Evaluations and Recommendations

Experienced sales and technical staff provide professional consultation



Marketing Support

Co-marketing to enhance your brand awareness



Local Offices

Global network insures rapid on-site support



Customized Service

Customized service to meet your unique needs



Technology Support

Professional technical team helps maximize the benefits of your projects



24 * 7 Real-time Monitoring

You are able to observe production process via our ERP system online



PV Policy Consultation

Experienced team of analysts provides up-to-date analysis and forecast



Financing Service

Professional bankability support and assistance



48-hour Response

Timely response warranty calls

SHIFTING THE FUTURE

Our approach to corporate citizenship is driven by understanding the role we play in solving the world's energy problems. We believe we can build a sustainable business by helping protect and nurture valuable resources on which we all depend.

At Seraphim, we not only care about energy problems, but also the future of all mankind. By providing clean and affordable solar energy, we are helping maintain the best environment for future generations. As the old saying goes, "We do not inherit the Earth from our ancestors, we borrow it from our children".

In 2013, Seraphim donated 8kW off-grid solar PV systems to two Tibetan primary schools. Located in a remote area of the Tibet Plateau, the two village primary schools not only lack transportation infrastructure, but are also inaccessible to the national grid. These off-grid systems help meeting the basic electricity needs of the two schools. Since then, Seraphim teamed up with the Tibet Care Associations to continuously offer our help. In 2018, Seraphim and "iHEARu Charity Fund" reached a long-term partnership which primarily targets the "Cognitive Center" project for hearing-impaired children.

"Shifting the Future" and make positive change to the world is our unchanging mission.



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