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Global Solar Cell Quantum Efficiency Measurement System Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Solar Cell Quantum Efficiency Measurement System market size is expected to reach $ 538 million by 2032, rising at a market growth of 7.3% CAGR during the forecast period (2026-2032).

The Solar Cell Quantum Efficiency Measurement System is a testing instrument used to measure various parameters of solar cells, such as spectral response, quantum efficiency, reflectivity, and short-circuit current density. It is an important testing device for solar cell structural analysis and electrical performance parameter calibration. The solar cell quantum efficiency calibration system mainly includes: a light source, a chopper, a monochromator/filter wheel, a bias light source, a lock-in amplifier, a preamplifier, a control system, and data recording and processing software. The measurement principle of the solar cell quantum efficiency tester is to irradiate the solar cell with adjustable intensity bias light to simulate its different operating states, while simultaneously measuring the short-circuit current generated by the solar cell under monochromatic light irradiation at different wavelengths, thereby obtaining the spectral response of the solar cell. The metrological characteristics of the Solar Cell Quantum Efficiency Measurement System include: monochromatic light spot non-uniformity, bias light spot non-uniformity, bias light spectral matching degree, relative spectral response measurement indication error, spectral response measurement repeatability, short-circuit current measurement indication error, reflectivity measurement indication error, wavelength indication error, spectral bandwidth, temperature control platform indication error, stability, and uniformity. The calibration of the solar cell quantum efficiency measurement system covers a wavelength range of (280~1600) nm, including testing equipment for measuring the quantum efficiency of monocrystalline silicon, polycrystalline silicon, thin-film, and multi-junction solar cells. The solar cell quantum

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efficiency measurement system is a professional testing device used in the photovoltaic industry to measure key performance parameters of solar cells, such as quantum efficiency (QE), external quantum efficiency (EQE), internal quantum efficiency (IQE), and spectral response. This tester measures the output current of the solar cell under monochromatic light illumination at different wavelengths, enabling precise evaluation of photoelectric conversion efficiency and the impact of material and structural design on performance. It is an indispensable instrument for R&D institutions, production lines, and quality control. Quantum efficiency test results are crucial for photovoltaic material optimization, process improvement, and product consistency assurance. In 2025, the global production of Solar Cell Quantum Efficiency Measurement Systems is estimated at approximately 6,500 units, with a unit price of approximately US$49,000 and a gross profit margin of approximately 34%.

With the continued expansion of the global photovoltaic industry and the acceleration of energy transition, the market for solar cell quantum efficiency testers has ushered in a period of rapid development. Photovoltaic technology is increasingly evolving towards higher efficiency and lower costs, and various new solar cell materials such as PERC, TOPCon, heterojunctions, and perovskite/tandem layers are emerging, placing higher demands on performance testing such as quantum efficiency and spectral response. Quantum efficiency testers can accurately reveal the response characteristics of solar cells under different wavelengths of light, providing crucial technical support for R&D institutions and photovoltaic manufacturers to improve efficiency and yield. Global carbon neutrality and renewable energy policies are driving steady growth in photovoltaic installations, thereby driving widespread demand for high-precision testing equipment. Despite the broad market prospects, the solar cell quantum efficiency tester industry also faces multiple challenges. First, the technology for this equipment is highly complex, with key components such as monochromatic light sources, spectral calibration systems, and high-precision current detection relying on imports or high-end suppliers, limiting the competitiveness of some domestic brands. Second, global supply chain instability and changes in trade policies can create uncertainty in equipment prices and delivery cycles. Furthermore, industry customers' demands for equipment performance and service responsiveness are continuously increasing, putting significant pressure on small and medium-sized manufacturers and requiring them to continuously increase R&D investment to maintain their technological advantages. In the downstream market, the demand for solar cell quantum efficiency testers is showing a diversified trend. Research institutions and universities continue to conduct research on new photovoltaic materials and structures, resulting in a stable demand for high-precision quantum efficiency instruments. Photovoltaic cell manufacturers regard quantum efficiency testing as a crucial link in production line quality control and yield

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improvement. Under the background of intelligent manufacturing, automated, high-throughput testing equipment is gradually becoming mainstream, driving the upgrade of traditional manual or semi-automatic equipment to intelligent systems. With the continued expansion of global photovoltaic installations and the industrialization of new high-efficiency photovoltaic technologies, the market demand for solar cell quantum efficiency testers will maintain steady growth.

This report studies the global Solar Cell Quantum Efficiency Measurement System demand, key companies, and key regions.

This report is a detailed and comprehensive analysis of the world market for Solar Cell Quantum Efficiency Measurement System, and provides market size (US$ million) and Year-over-Year (YoY) growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Solar Cell Quantum Efficiency Measurement System that contribute to its increasing demand across many markets.

Highlights and key features of the study
Global Solar Cell Quantum Efficiency Measurement System total market, 2021-2032, (USD Million)
Global Solar Cell Quantum Efficiency Measurement System total market by region & country, CAGR, 2021-2032, (USD Million)
U.S. VS China: Solar Cell Quantum Efficiency Measurement System total market, key domestic companies, and share, (USD Million)
Global Solar Cell Quantum Efficiency Measurement System revenue by player, revenue and market share 2021-2026, (USD Million)
Global Solar Cell Quantum Efficiency Measurement System total market by Type, CAGR, 2021-2032, (USD Million)
Global Solar Cell Quantum Efficiency Measurement System total market by Application, CAGR, 2021-2032, (USD Million)

This report profiles major players in the global Solar Cell Quantum Efficiency Measurement System market based on the following parameters - company overview, revenue, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Tau Science, Labsphere, Newport Corporation, JASCO Corporation, Hamamatsu Photonics, Bentham Instruments, Abet Technologies, EnliTech, Zolix, Beijing SOFN Instruments Co., Ltd., etc.

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This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the world Solar Cell Quantum Efficiency Measurement System market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), by player, by regions, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Solar Cell Quantum Efficiency Measurement System Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global Solar Cell Quantum Efficiency Measurement System Market, Segmentation by Type:

Wavelength Range 300~1100 nm

Wavelength Range 300~1800 nm

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Wavelength Range 300~2500 nm

Others

Global Solar Cell Quantum Efficiency Measurement System Market, Segmentation by Light Source:

Single Light Source

Dual Light Source

Global Solar Cell Quantum Efficiency Measurement System Market, Segmentation by Sales:

Direct Selling

Distribution

Global Solar Cell Quantum Efficiency Measurement System Market, Segmentation by Application:

Colleges and Universities

Graduate School

Enterprise

Companies Profiled:

Tau Science

Labsphere

Newport Corporation

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JASCO Corporation

Hamamatsu Photonics

Bentham Instruments

Abet Technologies

EnliTech

Zolix

Beijing SOFN Instruments Co., Ltd.

Oriental Spectra Co., Ltd.

BeiJing RayLight Technology Co.,Ltd.

Millennial Solar LLC

Key Questions Answered

1. How big is the global Solar Cell Quantum Efficiency Measurement System market?
2. What is the demand of the global Solar Cell Quantum Efficiency Measurement System market?
3. What is the year over year growth of the global Solar Cell Quantum Efficiency Measurement System market?
4. What is the total value of the global Solar Cell Quantum Efficiency Measurement System market?
5. Who are the Major Players in the global Solar Cell Quantum Efficiency Measurement System market?
6. What are the growth factors driving the market demand?

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Upstream (Raw Materials)

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