Solar module testing: TÜV Rheinland’s worldwide network

General tasks

- Fields of activity: Product testing and certification, production monitoring, system testing and monitoring, research and development
- Testing of electrical and mechanical safety, performance, function, design, quality, energy efficiency and corrosion in solar system components (photovoltaic modules, solar thermal collectors and systems, components such as cables, connectors, sockets as well as inverters)
- Monitoring of production facilities for solar modules (quality)
- 500 manufacturers of solar modules worldwide have their products tested in TÜV Rheinland laboratories in order to obtain international market licences
- Certification of photovoltaic modules according to nationally and internationally recognised standards
  - IEC 61215: Crystalline silicon terrestrial photovoltaic (PV) modules (design qualification and type approval)
  - IEC 61646: Thin film terrestrial photovoltaic (PV) modules (design qualification and type approval)
  - IEC 61730: Photovoltaic module safety qualification
  - ANSI/UL 1703 (USA/Canada)
- Certification of solar thermal collectors and systems according to internationally recognised standards
  - EN 12975: Thermal solar systems and components – collectors
  - EN 12976: Thermal solar systems and components – factory-made systems
  - ENV 12977: Thermal solar systems and components – custom-built systems (including accumulator test)
  - ISO 9806: Test methods for solar collectors
  - ISO 9459: Solar heating – Domestic water heating systems
  - SRCC standard 100-08 (USA and Canada)
  - SABS 1210: Domestic solar water heaters (South Africa)
- Cooperation in national and international research and development projects
- Active participation in the definition of national and international specifications for the standardisation of photovoltaic systems and components as well as solar thermal collectors and systems
Bangalore (India)
- Opening on July 2010
- 1,500 m² laboratory, 500 m² external test facilities
- Five climate chambers and two sun simulators
- 15 employees
- Market leader in India
- Amount invested in building and technical facilities: €2 million
- Ministry of New and Renewable Energy (MNRE) specific tests
- Advanced Mechanical loading and Hail stone test equipments
- Support for PV and Solar Thermal Power plants

Cologne (Germany)
- The world’s most state-of-the-art test centre for photovoltaic modules (solar modules for power generation) and solar thermal collectors and systems
- 60 employees
- Laboratory tests started in Cologne in 1995, New lab June 2009 with an area of 1,800 m²
- Amount invested in new building and technical facilities: €4 million
- External test facilities in Cologne (800 m²) and Italy (3,000 m²)
  - Each one has six test stations for photovoltaic (PV) module characteristic measurements and performance test stations for thermal collectors
  - More than 20 test stations for usability tests
  - Nine test stations for thermal system tests and four solar trackers
- Six climate chambers, five sun simulators
- Two state-of-the-art test facilities for mechanical load testing (incl. the option of cyclic load testing)

Daya (Taiwan)
- Opened November 2009
- 16 employees
- Three climate chambers, two sun simulators
- 1,000 m² laboratory, 1,000 m² external test facilities
- Listed as CBTL under IECCE scheme with PV scope; ISO17025 accredited by DAkkS
- Accepted as test lab for Golden Sun Certification China

Shanghai (China)
- Opened in the end of 2007
- 55 employees
- 5 large climate chambers, 4 small climate chambers, 5 sun simulators (3 flasher, 2 steady-state solar simulator)
- 1,800 m² laboratory, 260 m² external test facilities
• Market leader in China
• Full testing capacities for PV-component testing (junction boxes, connectors)
• Pre-shipment inspection services such as Power Verification of PV-modules prior to shipment
• Listed as CBTL under IECCE scheme with PV scope; ISO17025 accredited by DAkkS
• Accepted as test lab for Golden Sun Certification China

Tempe/Phoenix (Arizona, USA)
• TÜV Rheinland PTL: A joint venture was initiated in October 2008 with the Photovoltaic Testing Laboratory of Arizona State University for technological development, testing, certification of solar modules, devices, systems, components and solar thermal technologies
• 44 employees
• Photovoltaic tests have been carried out since 1992 at the Arizona State University
• In Arizona, long-term outdoor tests under extreme conditions are carried out in addition to laboratory simulations
• The largest test centre worldwide for solar modules with a 3,700 m² laboratory and 5 hectares of outdoor test facilities
• Two sun simulators, eight climate chambers
• Outdoor test facilities with 12 solar trackers and numerous test stations
• Market leader in the USA

Yokohama (Japan)
• Global Technology Assessment Centre (GTAC) of TÜV Rheinland since spring 2007, fully comprehensive Testing and Certification laboratory for Crystalline and all Thin Film Technologies, Photovoltaic calibration, Fast Track Certification Photovoltaic components, devices, and systems.
  Approved by the Japanese Government for Feed in tariff qualification.
  Research into Photovoltaic and long term testing benchmark and extreme conditions testing available.
  - 350 m² laboratory, 350 m² outdoor facilities
  - two climate chambers, one solar simulator UV and Light soaking chambers
• Solar Energy Assessment Centre: opened June 2009
  - 750 m² laboratory, 150 m² of outdoor test facilities
  - four climate chambers, two solar simulators UV and Light soaking chambers
  - Spectral Response Equipment for calibration services
• 35 employees

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