Equipment specifications (D6)

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1. Introduction

D6 is a deliverable of Work Package 3 which aimed at delivering a fully-equipped, state-of-the-art laboratory for the purposes of testing PV devices to the IEC standards 61215, 61646 and 62108 whilst adhering to the requirements of ISO 17025:2005. In D6, we present a report on the set of specifications for the equipment purchases necessary for the infrastructure upgrade at UCY.

Attached are all the detailed specifications of the above mentioned equipment.

2. Equipment
Deliverable Report D6

Indoor solar simulator flash system

Specifications

Class ABA solar simulator according to IEC 60904-9

Maximum distance to panel: 8 m; max height: 2.5 m

Reference cells for c-Si provided

Calibrated electronic load and cabling for I-V measurement of modules with peak power output > 500 W

Maximum height of flash unit: 3 m

Illuminated area 2 m by 2 m minimum

Non-uniformity of irradiance ≤ 2%

Short term instability of irradiance ≤ 0.5%

Long term instability of irradiance ≤ 2%

Spectral match to AM1.5 global irradiance between 0.75 and 1.25 for intervals specified in IEC 60904-9

Minimum 5 years guarantee

Module holder provided

Data processing unit for connection to load

Intensity of illumination up to 1 kWm⁻² at module

230 V ac power operation
Photovoltaic cell tester

Specifications

Minimum illuminated area: 150 mm x 150 mm

Temperature control at cell

AM 1.5 spectrum

Intensity over illuminated area: 1000 Wm\(^{-2}\)

4-wire contact points

Minimum 5 years guarantee

NIST or other certification centre traceable lamp

Vacuum chuck for holding cell

Class A spectrum as defined in IEC 60904-9

Class A uniformity as defined in IEC 60904-9

Computer controlled electronic load over 12 W
Indoor UV solar simulator

Specifications

Enclosed UV chamber for indoor use

Temperature control, to maintain module at 60 °C ± 5 °C whilst under illumination

Integrated instrumentation for measuring UV radiation in the ranges 280 - 320 nm and 320 - 400 nm with an uncertainty of ± 15%.

UV radiation source to provide up to 250 Wm$^{-2}$ in the plane of the module in the wavelength range of 280 - 400 nm

UV irradiance uniformity of ± 15% over the module

Illuminated area 2 m by 2 m minimum

No appreciable irradiance at wavelengths below 280 nm

Integrated, adjustable resistive load for connection to module

Suitable for testing to standards IEC 61646 and IEC 61215

Minimum 5 years guarantee

Integrated module mounting
Climatic chamber for PV module testing

Specifications

Programmable temperature and humidity cycles
Mounting facilities to allow free circulation of air
Temperature accuracy within ± 2 °C
Temperature range - 40 to +110 °C
Heating and cooling temperature ramp rate: >2.5 °C/min between - 40 and +110 °C
Humidity control
Relative humidity levels ±5% accuracy
Capable of minimum 85% humidity levels
Minimum internal dimensions 2 m (l) x 2 m (w) x 2 m (h)
Option for integrated ‘Class A’ solar simulator
Walk-in option
Appropriate for thermal cycling tests, humidity-freeze tests, and damp heat tests as outlined in IEC 61215 and IEC 61646
Minimum 5 year guarantee
Installation and training
Network-ready for remote monitoring/control
Access for additional power/sensor wires
Interior lighting
Internal safety door release
Capacity minimum 10 modules @ 30 kg each
Integrated support racks for modules
Three-phase voltage 400V