



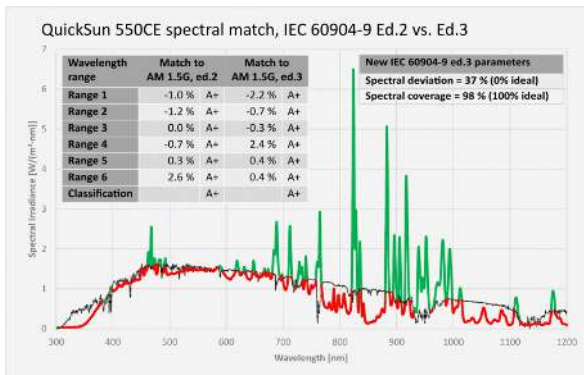
Spectrum

QuickSun[®]

Changes to spectrum specification in upcoming IEC 60904-9 Ed.3

Wavelength range	IEC 60904-9, ed.2	IEC 60904-9, ed.3
Range 1	400 -500 nm	300 -470 nm
Range 2	500 -600 nm	470 -561 nm
Range 3	600 -700 nm	561 -657 nm
Range 4	700 -800 nm	657 -772 nm
Range 5	800 -900 nm	772 -919 nm
Range 6	900 -1100 nm	919 -1200 nm

- New classification class A+, tolerance $\pm 12.5\%$.
- Wavelength specification will cover 300 – 1200 nm to accommodate advances in cell and module technology (PERC, UV transparent EVA, etc.).
- Wavelength ranges for spectral match will change. New ranges will have equal energy. Old ranges are 100 nm wide.
- New parameters to assess quality of spectrum.
- Spectral deviation SPD: difference in spectrum to AM 1.5G is compared wavelength-by-wavelength. SPD is the average deviation.
- Spectral coverage SPC: the portion of wavelengths on the whole range (300 – 1200 nm) whose output is very small (< 10%) compared to AM 1.5G.
- There will be no requirements on SPD and SPC in edition 3. The requirements will be given in future edition 4.
- Standard will give assistance in calculating spectral match related uncertainty.



Spectral match of QuickSun 550CE is class A+ according to both editions of the standard IEC 60904-9.

The new parameters on spectrum quality are calculated on the left.

The graph shows spectral deviation is green (positive deviation) and red

Technology

- Accurate flash testing of high-efficiency solar cells and modules using Capacitance Compensation (CAC)
- Spectrum
- Irradiance non-uniformity
- Ease of use
- Irradiance Decay Cell Analysis Method (IDCAM)
- Articles and seminar presentations

Contact Endeas

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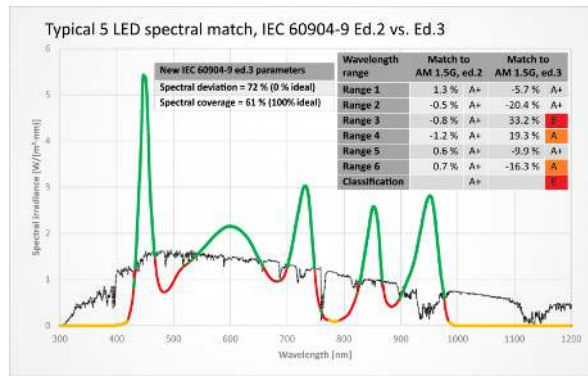
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A typical 5 LED solar simulator spectrum is matched well for edition 2 of IEC 60904-9, but for the upcoming Ed.3 the match is poor. Also, spectral coverage is poor (marked with yellow), which increases measurement uncertainty considerably if spectral response of modules vary.

Contact

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