Progress Update on IEC 61853-1

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Summary of Results of Web Survey of Key Stakeholders

- PV Modelers
  - Great value in making IEC 61853-1 test data available
  - “Currently too much variability of test results exists”
- PV Test Labs
  - Generally supports encouraging or requiring IEC 61853-1
  - Standard is very new and still lots of unknowns of its value
- PV Module Manufacturers
  - Sees some value in IEC 61853-1 data, but it is not a requirement today, would support if all were required
  - Lot of variation in results between test labs
  - Market should drive performance testing required

Summary of Results of Web Survey of Key Stakeholders

- Labs are generating data but won't / can't release. (confidentiality agreements)
- System performance is not just modules, as losses from wiring and connections can be significant.
- Some banks use a 20% derate contingency.
- Soiling losses can be very significant

IEC

IEC 61853-1

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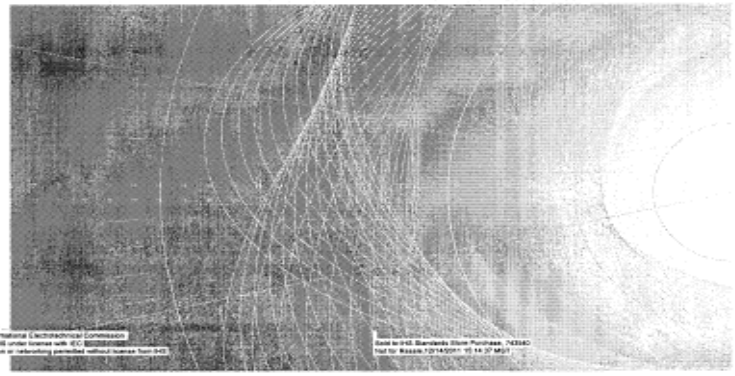
INTERNATIONAL STANDARD

NORME INTERNATIONALE

Photovoltaic (PV) module performance testing and energy rating –
Part 1: Irradiance and temperature performance measurements and power rating

Essais de performance et caractéristiques assignées d'énergie des modules photovoltaïques (PV) –
Partie 1: Mesures de performance en fonction de l'éclairement et de la température, et caractéristiques de puissance



The 23 Power Rating Conditions

P_{max}, I_{sc}, V_{oc}, and V_{max} versus Irradiance and Temperature					
Irradiance (W/m^2)	Spectrum	Module Temperature (C)			
		15	25	50	75
1100	AM1.5	NA	#1	#2	#3
1000	AM1.5	#4	#5	#6	#7
800	AM1.5	#8	#9	#10	#11
600	AM1.5	#12	#13	#14	#15
400	AM1.5	#16	#17	#18	NA
200	AM1.5	#19	#20	#21	NA
100	AM1.5	#22	#23	NA	NA

For reference: Table 2 from IEC 61853-1

Table 2 - I_{sc}, P_{max}, V_{oc}, and V_{max} versus irradiance and temperature

Irradiance	Spectrum	Module temperature			
W-m-2		15 °C	25 °C	50 °C	75 °C
1,100	AM1,5	NA			
1,000	AM1,5				
80O	AM1,5				
600	AM1,5				
400	AM1,5				NA
200	AM1,5			NA	NA
100	AM1,5			NA	NA

Proposed Updates to IEC 61853-1 Standard

Current Entire Clause 4 - Marking

Each module shall carry the following clear and indelible markings:

- name, monogram or symbol of the manufacturer;
- type or model number;
- serial number;
- polarity of terminals or leads (colour coding is permissible);
- nominal and minimum values of maximum output power at STC after preconditioning, as specified by the manufacturer for the product type (see Clause 5).

The date and place of manufacture shall be marked on the module or be traceable from the serial number.

For future production the power ratings for NOCT, LIC, HTC and LTC determined by this standard as defined in Clause 7 and Table 1 and determined via the procedure in 9.2 shall be marked on a label, or be stated in the manufacturer's literature provided with each module of this type.

Proposed Clause 4 - Marking (additions in red and deletions struckthrough)

Each module shall carry the following clear and indelible markings:

- name, monogram or symbol of the manufacturer;
- type or model number;
- serial number;
- polarity of terminals or leads (colour coding is permissible);
- nominal and minimum values of maximum output power at STC after preconditioning, as specified by the manufacturer for the product type (see Clause 5).

The date and place of manufacture shall be marked on the module or be traceable from the serial number.

For future production **the following determined by this standard** shall be marked on a label or be stated in the manufacturer's literature provided with each module of this type:

- the power ratings for NOCT, LIC, HTC and LTC ~~determined by this standard~~ as defined in Clause 7 and Table 1 and determined via the procedure in 9.2;
- **a table of each of the parameters I_{sc}, P_{max}, V_{oc}, and V_{max} as defined in Table 2 and determined via the procedure in Clause 8 and 9.**
- **module thermal coefficients α_1, β_1, γ_1.**

Proposed Clause 6 - Report (additions in red and deletions struckthrough)

Current Entire Clause 6 - Report

Following completion of the procedure, a certified report of the performance tests, with measured power characteristics shall be prepared by the test agency in accordance with the procedures of ISO/IEC 17025. Each certificate or test report shall include at least the following information:

a) a title;

b) name and address of the test laboratory and location where the calibration or tests were carried out;

c) unique identification of the certification or report and of each page;

d) name and address of client, where appropriate;

e) description and identification of the item calibrated or tested;

f) characterization and condition of the calibration or test item;

g) date of receipt of test item and date(s) of calibration or test, where appropriate;

h) identification of calibration or test method used;

i) reference to sampling procedure, where relevant;

j) any deviations from, additions to or exclusions from the calibration or test method, and any other information relevant to a specific calibration or test, such as environmental conditions;

k) a statement as to whether the simplified method in section 8 was used to complete the matrix. If the simplified method was used, the test report should give the values of relative temperature coefficients for maximum power and open circuit voltage for the two different irradiances used to validate the use of the simplified method;

l) measurements, examinations and derived results, including as a minimum table 2 for I_{sc}, P_{max}, V_{oc}, and V_{max} and module thermal coefficients α_1, β_1, the average power and the values for each of the three test modules at all reference power conditions (defined in section 7) and the temperature coefficient of module power (W) at themaximum power point (γ_1);

m) a statement of the estimated uncertainty of the calibration or test result (where relevant);

n) a statement as to whether the measured STC power agrees with the manufacturer's rated power range within the test laboratories measurement uncertainty;

o) a signature and title, or equivalent identification of the person(s) accepting responsibility for the content of the certificate or report, and the date of issue;

p) where relevant, a statement to the effect that the results relate only to the items calibrated or tested;

q) a statement that the certificate or report shall not be reproduced except in full, without the written approval of the laboratory.

Proposed Updates to IEC 61853-1 Standard

- For future production the following determined by this standard shall be marked on a label or be stated in the manufacturer's literature provided with each module of this type:
- the power ratings for NOCT, LIC, HTC and LTC ~~determined by this standard~~ as defined in Clause 7 and Table 1 and determined via the procedure in 9.2;
- a table of each of the parameters I_{sc}, P_{max}, V_{oc}, and V_{max} as defined in Table 2 and determined via the procedure in Clause 8 and 9.
- module thermal coefficients α_1, β_1, γ_1.

Proposed Clause 6 - Report (additions in red and deletions struckthrough)

- Following completion of the procedure, a certified report of the performance tests, with measured power characteristics shall be prepared by the test agency in accordance with the procedures of ISO/IEC 17025. **While this module is available from the manufacturer the full certificate or test report shall be provided by the manufacturer upon request.** Each certificate or test report shall include at least the following information:
- *a) through q) unchanged from current standard*

Finally In Summary

- Data generated by the Nameplate & Datasheet Std. is useful
- Data generated by IEC 61853-1 can be **very useful** if easily available for performance models and system designers
- An amendment to IEC 61853-1 is being prepared and should be available for the next TC 82 meeting.

And Now

I Thank you for your attention

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