

### List of methods managed within the ESTI fixed and the flexible scope of accreditation

List N°: 4.0	Replaces List N°: 3.9	Prepared: L. Mercado	Approved: E. Dunlop
Valid from: 11/07/2022	Valid since: 11/05/2022	Signature: e-signed	Signature: e-signed

CALIBRATION FIELD	CALIBRATION OBJECTS	QUANTITY	RANGE	REFERENCE to STANDARDS	CMC	INTERNAL METHOD	Version in Flex. Scope*	Validation
SOT-12 Solar irradiance	Primary PV reference cell	Current	Up to 1 A	IEC 60904-4:2019	0.52%	M44		
						M45		
SOT-12 Solar irradiance	PV device	Current Voltage Power Efficiency	up to 40 A up to 400 V up to 1200W up to 100 %	IEC 60904-1:2006 IEC 60904-1-1:2017 IEC TS 60904-1-2:2019 IEC 60904-2:2015 IEC 60904-3: 2019 IEC 61853-1:2011 IEC 60891:2009	0.48% 0.08% 0.85% 0.85%	M07		
						M41	i	Reference to IEC TR 63228:2019[Ed. 1.0] and steady-state and settling definitions added. Details about the settling criteria added
						M46		
						M51		
						M55		
						M56		
						M59		
						M60		
						M63		
						M64	Method not in Flexible Scope	
M65								

CALIBRATION FIELD	CALIBRATION OBJECTS	QUANTITY	RANGE	REFERENCE to STANDARDS	CMC	INTERNAL METHOD	Version in Flex. Scope*	Validation
SOT-12 Solar irradiance	PV device	Spectral responsivity and spectral mismatch	up to 2 A/W  up to 1.5	IEC 60904-3:2019 IEC 60904-7: 2019 IEC 60904-8:2014 IEC 60904-8-1:2017	2.50%  0.40%	M04		
						M42		
						M50		

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		factor				M60		

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CALIBRATION FIELD	CALIBRATION OBJECTS	QUANTITY	RANGE	REFERENCE to STANDARDS	CMC	INTERNAL METHOD	Version in Flex. scope	Validation
SOT-12 Solar irradiance	PV device	Temperature coefficient of: - Current - Voltage - Power	up to $\pm 5\%/^{\circ}\text{C}$ up to $\pm 5\%/^{\circ}\text{C}$ up to $\pm 5\%/^{\circ}\text{C}$	IEC 60891:2009	0.0049%/ $^{\circ}\text{C}$ 0.0049%/ $^{\circ}\text{C}$ 0.0080%/ $^{\circ}\text{C}$	M52		
						M59		
						M60		
						M61		
						M62		
						M65		
SOT-12 Solar irradiance	PV device	Linearity of Current vs Irradiance	up to $\pm 100\%$	IEC 60904-10:2020	0.16%	M58	Method not in Flexible Scope	
SOT-12 Solar irradiance	Bifacial PV device	Bifaciality coefficient: – $\varphi$ Isc – $\varphi$ Voc – $\varphi$ Pmax - BiFi <sub>rel</sub>  - P <sub>maxBiFi100</sub> - P <sub>maxBiFi200</sub>	up to 100% up to 100% up to 100% up to $\pm 1\%/(\text{Wm}^{-2})$  up to 1200 W up to 1200 W	IEC TS 60904-1-2: 2019	0.88% 0.14% 1.36% 0.0066%/( $\text{Wm}^{-2}$ )  1.15% 1.66%	M64	Method not in Flexible Scope	

(\*) Flexible scope: The laboratory has flexibility to perform calibration including methods which are equivalent to those which are already covered by the fixed accreditation scope and to adopt new revisions and amendments of them, without varying measurand, measurement range and uncertainty.

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Table of changes:

V2.0 amd1	Internal Method (row 5): added M62
V2.1	Flexible scope (Row 4) added M42_e
V2.2	Flexible scope (Row 2 and 3) added M55_d
V2.3	Flexible scope (Row 2 and 3) added M56_b
V2.4	Flexible scope (Row 2 and 3) added M46_h
V2.5	Flexible scope removed M42_e, M46_h, M55_d, M56_b, UC04_i, UC42_h
V2.6	Flexible scope (Row1) added M44_d; (Row 2&3) added M14_d, M46_i, M55_e, M56_c; Fixed and Flexible scope (Row6) added Line for linearity vs Current and M58_a; Fixed and Flexible scope (Row 2&3) added M63_a and M64_a.
V.2.7	Flexible scope removed: M41_d, M46_i, M55_e, M58_a, M63_a, M64_a-rev1 (Methods approved by Accredia during the reaccreditation audit on 24-25/07/2019); Flexible scope (Row 2 and 3) added M56_d (Updated reference for IEC 60904-3 ed.4; added alternative measurement of I-V curve).
v.2.8	Flexible scope added for M45_g, M41_d-amd1, M56_d, M04_L, M42_f, M50_d, M52_d, M61_c, M62_b
v.2.9	Flexible scope added for M55_f, M62_c, M63_b
V3.0	Flexible scope removed: M04_L, M41_d-amd1, M42_f, M45_g, M50_d, M52_d, M56_d, M61_c (Methods, approved by Accredia during the surveillance audit on 16/10/2020)
v3.1	Flexible scope added M07_L-rev1 (Row 2 and 3, updated references).
V3.2	Flexible scope added: M41_f (Row 2 and 3, Added Section on measurements of devices with inherent slow response (e.g. Perovskite Solar Cells) M65_a (Rows 2, 3, and 5, new solar simulator standard measurements). M21 removed (Row 5, Substituted by M65). M60 added (Rows 2, 3, 4 and 5, approved by Accredia during the reaccreditation audit on 24-25/07/2019)
V3.3	Corrigendum in track of changes V2.7: citation of the version of M64 approved by ACCREDIA during the reaccreditation audit (M64_a-rev1)
V3.4	Flexible scope added: M52_e (Row 5, Updated reference to standard IEC 60904-10:2020 [Ed 3.0]) M61_d (Row 5, Updated reference to standard IEC 60904-10:2020 [Ed 3.0]) M62_d (Row 5, Updated reference to standard IEC 60904-10:2020 [Ed 3.0]) M63_c (Rows 2 and 3, Updated reference to standard IEC 60904-10:2020 [Ed 3.0])

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V3.5	<p>Flexible scope added: M44_e-rev1 (Row 1, Updated reference to standards IEC 60904-3:2019 [Ed 4.0] and IEC 60904-4:2019 [Ed 2.0])</p> <p>M46_i-rev1 (Rows 1 and 2, Updated reference to standards IEC 60904-3:2019 [Ed 4.0] and IEC 60904-7:2019 [Ed 4.0])</p> <p>M55_f-rev1 (Rows 2 and 3, Updated reference to standard IEC 60904-3:2019 [Ed 4.0])</p> <p>M56_e (Rows 2 and 3, Corrected UCs based on original input parameter for spatial non-uniformity)</p> <p>M60_a-rev2 (Rows 2, 3, 4 and 5, Updated reference to standards IEC 60904-3:2019 [Ed 4.0] and IEC 60904-7:2019 [Ed 4.0])</p> <p>M65_a-rev1 (Rows 2, 3 and 5, Modification of scope for clarification on the traceability of operating instruction; general editing)</p> <p>M59_b (Rows 2, 3 and 4, Reviewed with minor changes, updated reference to standard IEC 60904-3:2019 [Ed 4.0])</p> <p>M63_d (Rows 2 and 3, Updated UCs)</p>
V3.6	Flexible scope added: M41_g (Row 2 and 3, general update, changed title)
V3.7	Flexible scope added: M59_b-rev1 (Rows 2, 3 and 4, Editorial changes)
V3.8	Flexible scope added: M51_d (Rows 2 and 3. Equations 1 and 2 modified; better description of the process. Annex moved to NTF, revised UC calculation.)
V3.9	<p>Flexible scope methods approved by ACCREDIA during surveillance audit 2022: M07_L-rev1, M44_e-rev1, M46_i-rev1, M51_d, M52_e, M55_f-rev1, M56_e, M59_b-rev1, M60_a-rev2, M61_d, M62_d, M63_d and M65_a-rev1</p> <p>Methods under Fixed Scope approved by ACCREDIA: Row 6, M58 - Updated standard IEC 60904-10:2020 Row 7, M64 – Updated CMC of <math>BiFi_{rel}</math>, <math>P_{maxBiFi100}</math> and <math>P_{maxBiFi200}</math></p> <p>Editorial revision of reference to standards. Removal of ASTM standards; removed (cell, module) description where appropriate.</p>
V4.0	Flexible scope added: M41_i (Row 2. Reference to IEC TR 63228:2019[Ed. 1.0] and steady-state and settling definitions added. Details about the settling criteria added).