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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

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IEC TC 117 : SOLAR THERMAL ELECTRIC PLANTS	
SECRETARIAT: Spain	SECRETARY: Ms Lourdes González Martínez
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☒ QUALITY ASSURANCE ☐ SAFETY	

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TITLE:

Solar thermal electric plants – Part 3-6: Durability of silvered-glass reflectors – Laboratory test methods and assessment

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Solar thermal electric plants - Part 3-6: Durability of silvered-glass reflectors - Laboratory test methods and assessment

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IEC 62862-3-6 has been prepared by subcommittee PT 62862-3-6 Accelerated aging tests of silvered-glass reflectors for concentrating solar technologies, of IEC technical committee TC 117 Solar thermal electric plants. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Solar thermal electric plants - Part 3-6: Durability of silvered-glass reflectors - Laboratory test methods and assessment

1 Scope

This document specifies laboratory test methods to assess the durability of silvered float-glass reflectors with high technical performance to be used in concentrating solar technologies. The reflectors under the scope of this standard are composed by a float-glass substrate and a reflecting silver layer, which is protected by a thin copper layer and an anticorrosive paint system composed by a base and a top coating, and an optional intermediate coating.

This standard defines multiple accelerated aging tests on reflector samples of size of 10 cm × 10 cm or larger. It defines the measurement methods to determine the degradation parameters used for assessment and the acceptance criteria of the accelerated aging tests.

[Annex A](#) of this standard outlines the procedure to apply this standard to reflector types of different composition than the silvered float-glass reflectors described above.

[Annex B](#) provides information how to roughly correlate the measured degradation of selected accelerated aging tests with outdoor exposure in different environments. These correlations are strictly limited to silvered float-glass reflector types with the abovementioned layer stack, since differing coating types are likely to introduce unforeseen degradation modes, which might not be triggered under the proposed testing conditions.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60904-3:2016, *Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

IEC 62108, *Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval*

IEC TS 62862-1-1, *Solar thermal electric plants - Part 1-1: Terminology*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 4628-1, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

ISO 6270-2, *Paints and varnishes — Determination of resistance to humidity — Part 2: Condensation (in-cabinet exposure with heated water reservoir)*

ISO 9223, *Corrosion of metals and alloys — Corrosivity of atmospheres — Classification, determination and estimation*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 9488:2022, *Solar energy — Vocabulary*

ISO 16474-3, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*

EN ISO 9227:2006, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227:2006)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions consistent with ISO 9488 and IEC TS 62862-1-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1 General definitions

3.1.1

silvered-glass reflector

clear float glass, whose rear surface has been coated with a thin reflective silver deposit. The rear part of the silver layer is protected by a thin copper layer. The copper is protected by an anticorrosive paint system composed of a base and a top coating of typically 30 µm each. In some cases, there is an intermediate paint coating (also around 30 µm) between the base and top coating.

3.1.2

sample

Silvered-glass reflector specimen of 10 cm × 10 cm size or larger. For corrosion testing at least one original edge, as applied during the manufacturing process, is required. The other three edges may remain unprotected or, if required, protected with a varnish of equal or higher anticorrosive protection than the original anticorrosive paint system. Note: Tests 1-6 in Table 2 are corrosion tests, Test 7 and 8 are erosion tests and do not require any edge protection.

3.2 Optical properties

The definition of the following optical properties is based on the SolarPACES guideline [1:].

3.2.1

$\rho_{s,h}$

Near-normal solar-weighted hemispherical reflectance

3.2.2

$\Delta\rho_{s,h}$

Near-normal solar-weighted hemispherical reflectance difference caused by degradation. It is computed by subtracting the initial $\rho_{s,h}$ (before testing) and the obtained $\rho_{s,h}$ after testing.

3.2.3

$\rho_{\lambda,\varphi}$

Near-normal monochromatic specular reflectance

3.2.4

$\Delta\rho_{\lambda,\varphi}$

Near-normal monochromatic specular reflectance difference caused by degradation. It is computed by subtracting the initial $\rho_{\lambda,\varphi}$ (before testing) and the obtained $\rho_{\lambda,\varphi}$ after testing.

3.2.5

λ

Wavelength (of incident light on reflector)

3.2.6

θ_i

Incidence angle (of incident light on reflector)

3.2.7

φ

Acceptance half-angle defining the captured scattering of the reflected light intercepting the receiver or the reflectometer sensor.

3.3 Environmental parameters

3.3.1

T

Temperature (of the accelerated-aging chamber)

3.3.2

RH

Relative humidity (of the accelerated-aging chamber)

3.3.3

t

Duration (of exposure of the sample in the accelerated-aging chamber)

3.3.4

m_d

Impacting mass of MIL-STD-810 [2:] blowing dust particles per surface area on the reflector over the entire testing time

3.3.5

m_s

Impacting mass of MIL-STD-810 blowing sand particles per surface area on the reflector over the entire testing time

3.4 Corrosion parameters

3.4.1

A_c

Sum of inner corroded area of reflector surface (= localized spot corrosion), excluding edge corrosion area

3.4.2