

INTERNATIONAL STANDARD

**Solar thermal electric plants -
Part 3-5: Laboratory reflectance measurement of solar reflectors**

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CONTENTS

FOREWORD	2
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
3.1 Solar definitions	4
3.2 Collector components	4
3.3 Angle definitions	5
3.4 Optical properties	5
3.5 Figures and tables	9
4 Preparation of measurement	10
4.1 Sampling	10
4.2 Sample preparation	11
4.3 Reference coupons	11
4.4 Instrumentation	11
5 Measurement method	12
5.1 General	12
5.2 Spectral near-normal sun-conic near-specular reflectance	12
5.3 Spectral near-normal hemispherical reflectance	13
6 Weighting calculation	13
6.1 General	13
6.2 Solar-weighted reflectance	13
6.3 UV-weighted reflectance	13
6.4 Calculation equation	14
7 Uncertainty of the measurement	14
8 Reporting	15
8.1 General	15
8.2 General information	15
8.3 Methodology	15
8.4 Results	16
8.4.1 Uncertainty	16
8.4.2 Standard method	16
8.4.3 Simplified method	16
8.4.4 Indirect method	17
8.5 Conclusions	17
Annex A (informative) Simplified method for reflectors with high specularity	18
Annex B (informative) Indirect method	19
Bibliography	20
Figure 1 – Angles of incidence, divergence, reflection and acceptance	9
Table 1 – Different cases related to reflectance nomenclature.	9
Table 2 – Range and weight of the different UV classes, calculated with the full data set from IEC 60904-3	14
Table 3 – Wavelength range, depending on the type of the desired average	14

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Solar thermal electric plants - Part 3-5: Laboratory reflectance measurement of solar reflectors

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IEC 62862-3-5 has been prepared by 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
117/253/FDIS	117/255/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.

A list of all parts in the IEC 62862 series, published under the general title *Solar thermal electric plants*, can be found on the IEC website.

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.

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- withdrawn, or
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1 Scope

This document specifies laboratory methods to measure **reflectance** of all types of reflectors for use in concentrating solar thermal (CST) plants.

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

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

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO 4628-2:2016, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 2: Assessment of degree of blistering*

ISO 9488:2022, *Solar energy — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9488:2022, IEC TS 62862-1-1 and the following 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 Solar definitions

3.1.1

direct solar radiation

G_b

solar radiation incident on a given plane, and originating from a small solid angle centred on the sun's disk

[SOURCE: ISO 9488:2022 [1], 3.2.17.]

3.2 Collector components

3.2.1

reflector

optical device made of several materials, suitably chosen and arranged to make a surface with proper **reflectance** (3.4.1) features

Note 1 to entry: The term "mirror" is typically used as a synonym of reflector.

3.3 Angle definitions

3.3.1

angle of incidence

incidence angle

incident angle

θ_i

angle between the line connecting the center of the light source (solar disc or the light source of the measurement equipment) to a point on an irradiated surface, and the normal to that surface at the same point

Note 1 to entry: Unit: the non-SI unit is degrees.

Note 2 to entry: SEE: [Figure 1](#).

[SOURCE: IEC TS 62862-1-1:2018 [2], 3.2.3, modified - The subscript "i" is added to the symbol and the type of light source is broadened.]

3.3.2

divergent angle

angle of divergence

φ_i

half-apex angle of the cone that encloses the bundle of light rays illuminating a specific point on the [reflector \(3.2.1\)](#)

Note 1 to entry: Unit: the non-SI unit is mrad.

Note 2 to entry: SEE: [Figure 1](#).

3.3.3

angle of reflection

reflection angle

θ_r

angle between the normal to the irradiated surface at a given point and the reflected ray

Note 1 to entry: SEE: [Figure 1](#).

Note 2 to entry: For specular reflection, the incidence ray, normal and reflected ray lie in the same plane, and the angle of reflection equals the [angle of incidence \(3.3.1\)](#) ($\theta_r = \theta_i$).

Note 3 to entry: Owing to the divergence of solar radiation and surface irregularities, the reflected radiation can be distributed within a cone centered around the specular reflection direction.

3.3.4

angle of acceptance

acceptance angle

φ

half-apex angle of the cone containing the rays reflected at a given point of the [reflector \(3.2.1\)](#) and intercepted by the receiving surface (detector of measurement device or receiver of CST system)

Note 1 to entry: Unit: the non-SI unit is mrad.

Note 2 to entry: SEE: [Figure 1](#).

Note 3 to entry: This angle depends on the geometry (size, distance, etc.) of the [reflector \(3.2.1\)](#) and the receiving surface.

3.4 Optical properties

3.4.1

reflectance

$\rho(P_\lambda, P_{\theta_i}, P_{\varphi_i}, P_\varphi, P_{Ts})$

ratio of the radiant flux reflected from a surface to that of the incident radiation