

SEMI PV47-0513 (Reapproved 1018) SPECIFICATION FOR ANTI-REFLECTIVE-COATED GLASS, USED IN CRYSTALLINE SILICON PHOTOVOLTAIC MODULES

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1 Purpose

1.1 The purpose of this Standard is to standardize requirements for anti-reflective-coated glass used in crystalline silicon photovoltaic modules (hereafter referred to as anti-reflective [AR] glass).

2 Scope

2.1 This Specification covers requirements, marking, packaging, transportation and storage for AR glass.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 None.

4 Referenced Standards and Documents

4.1 *EN Standards*¹

EN 1096-1 — Glass in Building – Coated Glass – Part 1: Definitions and Classification

EN 1096-2 — Glass in Building – Coated Glass – Part 2: Requirements and Test Methods for Class A, B and S Coatings

EN 12150-1 — Glass in Building. Thermally Toughened Soda Lime Silicate Safety Glass – Part 1: Definition and Description

4.2 *IEC Standard*²

IEC 60904-3 — Photovoltaic Devices – Part 3: Measurement Principles for Terrestrial Photovoltaic (PV) Solar Devices with Reference Spectral Irradiance Data

IEC 61215 — Crystalline Silicon Terrestrial Photovoltaic (PV) Modules – Design Qualification and Type Approval

4.3 *ISO Standards*³

ISO 2812-1 — Paints and Varnishes – Determination of Resistance to Liquids – Part 1: Immersion in Liquids Other Than Water

ISO 2812-2 — Paints and Varnishes – Determination of Resistance to Liquids – Part 2: Water Immersion Method

ISO 11998 — Paints and Varnishes – Determination of Wet-scrub Resistance and Cleanability of Coatings

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

¹ European Committee for Standardization, Avenue Marnix 17, B-1000 Brussels, Belgium. Telephone: +32.2.550.08.11; Fax: +32.2.550.08.19; <http://www.cen.eu>

² International Electrotechnical Commission, 3 rue de Varembe, Case Postale 131, CH-1211 Geneva 20, Switzerland; Telephone: +41.22.919.02.11, Fax: +41.22.919.03.00, <http://www.iec.ch>

³ International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland; Telephone: +41.22.749.01.11, <http://www.iso.org>

5 Terminology

5.1 Refer to the SEMI Standards Compilation of Terms (COTs) for a list of the current Abbreviations, Acronyms, Definitions, and Symbols.

5.2 Abbreviations and Acronyms

5.2.1 AR — anti-reflective

5.2.2 UV — ultraviolet

5.2.3 $T_{380-1100}$ — solar transmittance (380 nm to 1100 nm)

5.3 Definitions

5.3.1 AR Glass — glass with a decreased reflectance and an increased transmittance of sunlight, and applicable to crystalline silicon photovoltaic modules.

5.3.2 $T_{380-1100}$ — the solar transmittance is calculated by the following formula:

$$T_{380-1100} = \frac{\int_{380nm}^{1100nm} S(\lambda) \cdot T(\lambda) \cdot d\lambda}{\int_{380nm}^{1100nm} S(\lambda) \cdot d\lambda} \approx \frac{\sum_{380nm}^{1100nm} S(\lambda) \cdot T(\lambda) \cdot \Delta\lambda}{\sum_{380nm}^{1100nm} S(\lambda) \cdot \Delta\lambda} \quad (1)$$

where:

λ = Wavelength, nm;

$S(\lambda)$ = relative spectral photon irradiance in AM 1.5 (defined in IEC 60904-3), $m^{-2} \cdot s^{-1} \cdot nm^{-1}$.

$T(\lambda)$ = measured actual transmittance of the sample over the solar spectrum, %.

$\Delta\lambda$ = the wavelength interval, nm (1 nm is recommended, unless otherwise agreed to by user and supplier).

6 Ordering Information

6.1 Purchase orders for substrates furnished to this Specification shall include the following items:

6.1.1 Dimensions (side lengths and nominal thickness),

6.1.2 Single side coated or double side coated,

6.1.3 Transmittance (300 nm to 380 nm and 380 nm to 1100 nm, respectively), and

6.1.4 Test method and instrument of transmittance.

7 Requirements

7.1 Dimensions and Tolerances

7.1.1 Side Length Tolerance (sizes) — Allowable tolerances of the side length of AR glass shall comply with provisions in Table 1.

Table 1 Allowable Tolerances of the Side Length of AR Glass (Unit: mm)

Side Length (L) and Allowable Tolerances			
$L \leq 1000$	$1000 < L \leq 2000$	$2000 < L \leq 3000$	$L > 3000$
+1 -2	±3	±4	±5