

SEMI PV61-0115 (Reapproved 0121) SPECIFICATION FOR FRAMING TAPE FOR PHOTOVOLTAIC (PV) MODULES

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1 Purpose

1.1 The purpose of this Standard is to standardize technology standard for framing tape for photovoltaic (PV) modules.

2 Scope

2.1 This Standard is applicable to framing tape for PV modules.

2.2 This Standard specifies the purpose, scope, referenced standards, terminology, test method, requirements, label, packaging, transportation and storage for framing tape for PV modules.

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 *ASTM Standards*¹

ASTM D882 — Standard Test Method for Tensile Properties of Thin Plastic Sheeting

ASTM D1000 — Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications

4.2 *IEC Standards*²

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

4.3 *ISO Standards*³

ISO 4593 — Plastics; Film and Sheeting; Determination of Thickness by Mechanical Scanning

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

5 Terminology

5.1 *Abbreviations and Acronyms*

5.1.1 *PV* — photovoltaic

¹ ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA; Telephone: +1.610.832.9585, Fax: +1.610.832.9555, <http://www.astm.org>

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>

6 Test Methods

6.1 Pretreatment

6.1.1 Before the test, all samples should be placed in the environment that the temperature is $23 \pm 2^\circ\text{C}$, and the relative humidity is $50 \pm 10\%$ for more than 24 hours.

6.2 Dimensions

6.2.1 After removing the liner from the samples, measure the thickness according to ISO 4593:1993, and measure the width by using the tools that the measurement precision is greater than 0.5 mm.

6.3 Tape Physical Strength

6.3.1 Tensile Strength

6.3.1.1 Take the test samples and make sure the effective dimension is $(25 \pm 0.5 \text{ mm}) \times (100 \pm 1 \text{ mm})$. Make sure the two ends of the sample are clamped by tensile machine and perform the test at the speed of $300 \text{ mm} \cdot \text{min}^{-1}$, and then calculate the tensile strength according to Equation 1. Repeat the test for three samples, and calculate the average of data.

$$TS = \frac{F_{(BE)}}{A} \quad (1)$$

where:

TS = tensile strength (mPa),

$F_{(BE)}$ = the biggest force of fracture (MN), and

A = the sample area (m^2).

NOTE 1: The test direction of the sample is the same with the direction used in the normal production.

6.3.2 Elongation

6.3.2.1 Take the test samples and make sure the effective dimension is $(25 \pm 0.5 \text{ mm}) \times (100 \pm 1 \text{ mm})$. Make sure the two ends of the sample are clamped by tensile machine and do the test at the speed of 300 mm/minute and then calculate the elongation according to Equation 2. Repeat the test for three samples, and calculate the average of data.

$$E = \frac{100 \times (L - L_0)}{L_0} \quad (2)$$

where:

E = elongation percentage (%),

L = the length of the marked line of the sample (mm), and

L_0 = the original length of the marked line of the sample (mm).

NOTE 2: The direction of the sample is the same with the using of framing tape.

6.4 Adhesion Test

6.4.1 The standard test plates without scratches, burrs and other defects shall be removed the residual glue, stains, oil stains and so on with the solvent. Make sure the test plate's surface completely dry. Unless otherwise indicated, it is necessary to repeat the test for the samples, and calculate the average of data, the samples are not less than three.

6.4.2 180 Degrees Peeling

6.4.2.1 In accordance with ASTM D1000, the 180 degrees peeling test shall be done for both sides of samples, the sample is $(25 \pm 0.5 \text{ mm}) \times (250 \pm 1 \text{ mm})$.

NOTE 3: The dimensions of 304 stainless steel plate is $50 \text{ mm} \times 125 \text{ mm} \times 1.5 \text{ mm}$, and the surface roughness is $0.050 \mu\text{m} \times 0.025 \mu\text{m}$, it can be hereinafter referred to as standard test plate.

6.4.2.2 The liner shall be temporarily attached to the framing tape side that will be tested, and then the back tape (it is PET, the thickness is $50 \mu\text{m}$) shall be attached to the other side. The end length of the back tape is more than 12 mm,