

SEMI PV50-0114 (Reapproved 1220) SPECIFICATION FOR IMPURITIES IN POLYETHYLENE PACKAGING MATERIALS FOR POLYSILICON FEEDSTOCK

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1 Purpose

1.1 This Specification is intended for the quality and the testing method of polyethylene (PE) bags. The quality of PE bags is critical as poor quality PE bags may contaminate polysilicon and cause contamination during transportation. Forming an industry-consensus standard will minimize contamination, control the associated costs and improve communication between supplier and user.

2 Scope

2.1 This Standard will cover the quality criteria and the associated test method for impurities contained in PE bags used for polysilicon feedstock packaging. The size and the metal impurities (Al, Zn, Na, Ca, K, Ni, etc.) on both surface and in the body of the bag are defined in this Document.

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 Standards¹

ASTM E122 — Standard Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

4.2 ANSI/ASQ Standards²

ASQ Z1.4-1993 — Sampling Procedures and Tables for Inspection by Attributes

4.3 ISO Standards³

ISO 291:1997 — Plastics – Standard Atmospheres for Conditioning and Testing

ISO 527 — Plastics – Determination of Tensile Properties

ISO 8296 — Plastics – Film and Sheeting – Determination of Wetting Tension

ISO 14782 — Plastics – Determination of Haze for Transparent Materials

ISO 15105 — Plastics – Film and Sheeting – Determination of Gas-Transmission Rate

ISO 15106 — Plastics – Film and Sheeting – Determination of Water Vapor Transmission Rate

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

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 American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203, USA; Telephone: +1.414.272.8575, Fax: +1.414.272.1734, <http://www.asq.org>

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 Abbreviations and Acronyms

5.1.1 *ICP-MS* — inductively coupled plasma mass spectrometry

5.1.2 *PE* — polyethylene

6 Test Methods

6.1 *Appearance* — By eye-measurement.

6.2 *Dimensions* — By tape measure or flexible rule, etc.

6.3 *Physical Properties* — It shall be in accordance with ISO 527, ISO 15105, ISO 15106, ISO 14782, and ISO 8296.

6.4 *Surface Impurities Contamination* — In accordance with Appendix 1.

6.5 *Bulk Impurities Contamination* — In accordance with Appendix 2.

7 Requirements

7.1 *Appearance* — Films shall be visibly free of flaws, wrinkles, stains, foreign matter or any marks that impair its serviceability.

7.2 The splicing of two films in a roll shall be prominently marked in order to provide a visible indication from the side of the roll. The interested parties shall agree upon the method of marking the splice.

7.3 Dimensions

7.3.1 General

7.3.1.1 For any individual film selected at random from any delivery, the dimension listed in §§ 7.3.2 to 7.3.5, including their nominal values, shall be agreed upon among interested parties.

7.3.2 Width

7.3.2.1 The tolerance of width of the films shall be within 4 mm.

7.3.2.2 An example of film width with corresponding tolerance is given in Table 1.

Table 1 Example of Film Width and Tolerance

<i>Width mm</i>	<i>Tolerance mm</i>
500 + 40n ^{#1}	+4 0

#1 n: integer, 0, 1, 2, ... In width steps of 40 mm.

7.3.3 Length of Film in Roll

7.3.3.1 The tolerance of film length in a roll shall be within +10% of the nominal value.

7.3.3.2 Examples of film length and corresponding tolerance in a roll are shown in Table 2.

Table 2 Examples of Film Length in Roll and Their Tolerance

<i>Length of Film</i>		<i>Tolerance of Length of Film m</i>
<i>Nominal Length m</i>	<i>Length in Roll km</i>	
4000	4	+40 0
6000	6	+60 0
8000	8	+80 0
>8000	>8	1% of nominal length

7.3.4 Inside Diameter of Core of Roll

7.3.4.1 The inside diameter tolerance of a core of a roll shall be within +20 mm of the nominal value.

7.3.4.2 Examples of inside diameter of core in a roll, and corresponding tolerance are given in Table 3.

Table 3 Examples of Inside Diameter of A Core in A Roll and Their Tolerances

<i>Inside Diameter of Core mm</i>	<i>Tolerance on Inside Diameter of Core mm</i>
76	+2 0
152	+2 0

7.3.5 Thickness

7.3.5.1 The thickness tolerance shall be within $\pm 10\%$ of the nominal value.

7.3.5.2 Examples of thickness and corresponding tolerance are given in Table 4.

Table 4 Examples of Thickness and Their Tolerance

<i>Thickness</i>		<i>Tolerance μm</i>
<i>Nominal No.</i>	<i>Thickness μm</i>	
12	12	± 1.2
16	16	± 1.6
25	25	± 2.5

7.4 Physical Properties

7.4.1 Films shall meet the requirements for physical properties listed in Table 5.