

SEMI 3D23-0721

SPECIFICATION FOR GLASS CARRIER CHARACTERISTICS FOR PANEL LEVEL PACKAGING (PLP) APPLICATIONS

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NOTICE: The section symbol (§) is used to reference a numbered section, paragraph, or header and all subordinate paragraphs, headers, and embedded material (i.e., EXCEPTIONs, lists) therein. The paragraph symbol (§) is used to reference a particular numbered paragraph and embedded material therein. When duplicated (i.e., §§ and §§§) the symbols are used to reference more than one section or paragraph, respectively.

NOTICE: Paragraphs entitled ‘NOTE:’ are not an official part of this Standard or Safety Guideline and are not intended to modify or supersede the official Standard or Safety Guideline. These have been supplied by the global technical committee to enhance the usage of the Standard or Safety Guideline.

1 Purpose

1.1 The purpose of this Specification is to establish basic physical dimensions for the glass carrier intended to be used for panel level package processing.

2 Scope

2.1 This Specification specifies physical dimensions of the glass carrier for use in panel level packaging (PLP) applications.

2.2 This Specification describes glass carrier with 510 mm × 515 mm and 600 mm × 600 mm panel sizes as specified by the relevant SEMI 3D20.

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 This Specification applies to rectangular and square shape substrates and not to round shape substrates.

3.2 This Specification does not describe glass interposer material and not any glass substrate for permanent bonding applications.

4 Referenced Standards and Documents

4.1 SEMI Standards and Safety Guidelines

SEMI 3D20 — Specification for Panel Characteristics for Panel Level Packaging (PLP) Applications

SEMI D15 — FPD Glass Substrate Waviness Measurement Method

SEMI D24 — Specification for Glass Substrates Used to Manufacture Flat Panel Displays

SEMI G83 — Specification for Bar Code Marking of Product Packages

4.2 ANSI Standards¹

ANSI/ASQ Z1.4 — Sampling Procedures and Tables for Inspection by Attributes

¹ American National Standards Institute, 25 West 43rd Street, New York, NY 10036, USA; Telephone: +1.212.642.4900, Fax: +1.212.398.0023, <http://www.ansi.org>

4.3 ASTM Standards²

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

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

5 Terminology

5.1 Abbreviations and Acronyms

5.1.1 *LRE* — long reference edge

5.1.2 *PLP* — panel level packaging

5.1.3 *SRE* — short reference edge

5.2 Definitions

5.2.1 *back surface* — the surface of a substrate upon which ID mark appears.

5.2.2 *fixed quality area* — the central area of a substrate surface, defined by a nominal edge exclusion over which the specified values of a parameter apply.

5.2.3 *front surface* — the surface of a substrate upon which integrated circuits, dies and passive components will be placed, and/or interconnects will be formed.

5.2.4 *glass carrier* — a device made of glass for holding substrates, dies and packaged integrated circuits for various processing steps in semiconductor manufacturing.

5.2.5 *long reference edge* — a long edge of a substrate and their extension on the orientation corner side.

5.2.6 *orientation corner* — the corner of a substrate which identifies the front surface and the rotational orientation.

5.2.7 *reference point, of a data matrix code symbol* — the physical center point of a cell common to a designated row and column, used to identify the physical location of the symbol on the object being marked with the symbol.

5.2.8 *short reference edge* — a short edge of a substrate and their extension on the orientation corner side.

5.2.9 *squareness* — the total variation of the position of the short sides of a substrate relative to straight lines drawn between the ends of, and perpendicular to, the long reference edge of the substrate.

5.2.10 *warp* — the gap between (a) the bottom surface of glass carrier and (b) the reference plate on which the glass carrier rests.

NOTE 1: Warp in other applications has traditionally been the TIR, or peak-to-valley of a surface (top, or bottom or median surface) of a substrate, measured with respect to a reference plane.

6 Test Methods

6.1 Measurements shall be made or certifiable to one of the SEMI or ASTM standard test methods and specified in the purchase order.

6.2 If several different standard test methods for an item are commonly used within a region, it is particularly important that the applicable method of test be identified in the purchase order.

6.3 If no method of test is specified in the purchase order and if standard test methods from different geographic regions are available, the default method shall be a method in common usage for the region of the purchaser of the panel.

6.4 If no standard test method for an item is available, the test procedure to be used must be agreed upon between supplier and customer.

² 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>

7 Ordering Information

7.1 Purchase orders for glass carrier substrates furnished to this Specification shall include the items identified in Table 2.

7.2 In addition, the purchase order must indicate the test method to be used in evaluating each of those items for which alternate test procedures exist.

7.3 Also, requirements for bulk, front, and back surface defects, such as bubbles, scratches, edge chips and indents, and surface contamination requirements together with appropriate test methodology should be included in the purchase order.

7.4 The following items must also be included in the purchase order:

7.4.1 Lot acceptance procedures,

7.4.2 Certification (if required),

7.4.3 Packing and shipping container labeling requirements.

8 Requirements

8.1 Standard specifications for glass carrier substrates are listed in Table 2. All of the parameters listed in the table shall be included in the purchase order or contract.

8.2 If other types of glass substrates are required for an application or for research purposes, these may be ordered through the use of the glass carrier specification order entry.

Table 1 General Information

ITEM		INFORMATION	Date:
1-1	Customer Name		
1-2	Purchase Order Number		
1-3	Line Number		
1-4	Item Number		
1-5	General Specification Number		
1-6	Revision Level		
1-7	Part Number/Revision		

Table 2 Standard Specifications for Glass Carrier Characteristics for PLP Applications

ITEM		SPECIFICATION	MEASUREMENT METHOD
2-1	Size (Length x Width)	☐ 510 mm $\pm$ 1.0 mm $\times$ 515 mm $\pm$ 1.0 mm ☐ 600 mm $\pm$ 1.0 mm $\times$ 600 mm $\pm$ 1.0 mm	SEMI 3D20
2-2	Thickness	☐ 1.10 mm $\pm$ 10% ☐ 1.30 mm $\pm$ 10% ☐ 1.50 mm $\pm$ 10%	
2-3	Squareness	☐ Pr/a $\leq$ 0.001 ☐ Other (specify): _____	SEMI D24
2-4	Surface Roughness	☐ $\leq$ 20 nm ☐ Other (specify): _____	SEMI D15
2-5	Total Thickness Variation (TTV)	☐ $\leq$ 30 μ m ☐ $\leq$ 60 μ m ☐ Other (specify): _____	SEMI D24
2-6	Fixed Quality Area (Edge Exclusion)	☐ 10 mm ☐ Other (specify): _____	SEMI 3D20