Background Statement for SEMI Draft Document 4563A
New Standard: SPECIFICATION FOR 300 mm WAFER COIN-STACK TYPE SHIPPING CONTAINER USED FOR TEST AND PACKAGING PROCESSES

Note: This background statement is not part of the balloted item. It is provided solely to assist the recipient in reaching an informed decision based on the rationale of the activity that preceded the creation of this document.

Note: Recipients of this document are invited to submit, with their comments, notification of any relevant patented technology or copyrighted items of which they are aware and to provide supporting documentation. In this context, “patented technology” is defined as technology for which a patent has issued or has been applied for. In the latter case, only publicly available information on the contents of the patent application is to be provided.

Background Statement
With the change to larger wafer diameter and thinner wafers, the demand for lightweight and compact wafer shipping container is increasing. The demand is driven by the needs of the transportation at a reduced cost and the safety transportation without wafer damage. Corresponding to the market demands, several coin-stack types wafer shipping container have already developed and used in the industry. However, these containers have different shape and body sizes. Due to these differences, wafer transportation equipment such as wafer sorter equipment and wafer packing equipment are designed by each container types.

The purpose of this standard is to guide the development of a coin stack type wafer shipping container to the “standard” shipping container which has the same mechanical interface with wafer transportation equipment. For this purpose, the shape and the detailed dimension have not specified in this standard. This standard specifies only maximum body size which satisfies the dimension of currently available coin-stack type shipping containers. The coin stack-type container is transferred by manual handling. Guide pin was adopted as the alignment of the container with equipment so that operators easily set up the container on the equipment.

This standard also specifies the minimum requirement for a spacer used for separation of wafer and a cushion material used for wafer protection. These specifications were developed based on the requirements from vacuum pad and sensor of the equipment.

The guide for the barcode marking on the container is also attached in this standard.

If you have questions, please contact to the Wafer Shipping Container for Assembly &Packaging Task Force; Nakamura Kazuhiko (Email: hiko@mbm.nifty.com) or SEMI Staff (Hirofumi Kanno/hkanno@semi.org)

The letter ballot 4563 was issued for Cycle 4, 2010, however, it didn’t attain a 60% return by the closing date for voting. 4563A is issued for Cycle 1 with changes. PLEASE VOTE on this ballot for it to move on to the next stage of review.

The result of this ballot will be reviewed at the Japan Packaging Committee scheduled in March 11th, 2011 at SEMI Japan office.
SEMI Draft Document 4563A
New Standard: SPECIFICATION FOR 300 mm WAFER COIN-STACK TYPE SHIPPING CONTAINER USED FOR TEST AND PACKAGING PROCESSES

1 Purpose
1.1 The purpose of this document is to standardize the specifications for 300 mm wafer coin-stack type shipping container used for test and packaging processes for wafers.

2 Scope
2.1 This specification defines the dimensions of container (See ¶5.1.1) and requirements for securing the interface between container and processing equipment or wafer transportation equipment.
2.2 This document specifies the requirements for wafer spacers used for separation of wafers and for a cushion material used for wafer protection.
2.3 This document specifies the electrical characteristics and requirements for hazardous substance for the material of container.

3 Limitation
3.1 This specification does not specify the cleanliness level of container.

4 Referenced Standards and Documents
4.1 SEMI Standards
SEMI G59 — SEMI Test Method for Measurement of Ionic Contamination on Leadframe Interleafing and the Contamination Transferred from the Interleafing to the Leadframes
4.2 IEC Standards
IEC 60093 — Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials
4.3 European Community Directive
1994/62/EC — Packaging and Packaging Waste
NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Terminology
5.1 Definitions
5.1.1 coin-stack type shipping container (“container”) — a container in which wafers are horizontally stored for shipment.
5.1.2 container main body (“main body”) — bottom material on which wafers and other materials are stacked.
5.1.3 container lid (“lid”) — a material used to prevent the wafers from jumping out of main body and from being contaminated.
5.1.4 wafer spacer (“spacer”) — a material inserted between the adjacent wafers to prevent damage caused by friction.
5.1.5 cushion material (“cushion”) — an in-between material inserted main body, wafers and lid.
5.1.6 wafer retaining wall of main body (“wafer retaining wall”) — a circular wall located on main body in order to retain the wafers placed on main body.

1 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
6 Requirements

6.1 Composition of Container — As illustrated in Figure 1, container shall be composed of main body, lid, cushions and spacers.

6.2 Dimensions of Container

6.2.1 Maximum height of Container shall be 90mm when Container is fully assembled.

6.2.2 The dimensions of main body shall be as shown in Figure 2 and Table 1.

Figure 1 Composition of Container
Figure 2 Main Body

6.2.3 A hole for positioning pin shall be provided at location shown in Figure 2 (d) so that Container can be positioned on the processing equipment by engagement with a pin of the equipment.

Table 1 Dimensions of Main Body

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Inside Diameter of Wafer Retaining Wall</td>
<td>302 – 305 mm</td>
</tr>
<tr>
<td>B2</td>
<td>Height of Wafer Retaining Wall</td>
<td>Not specified</td>
</tr>
<tr>
<td>B3</td>
<td>Outer dimension (vertical)</td>
<td>Max 328 mm (328 mm is recommended)</td>
</tr>
<tr>
<td>B4</td>
<td>Outer dimension (horizontal)</td>
<td>Max. 328 mm (328 mm is recommended)</td>
</tr>
<tr>
<td>B5</td>
<td>Width of opening space in Wafer Retaining Wall</td>
<td>75-80 mm</td>
</tr>
<tr>
<td>P1</td>
<td>Location of the hole from the center of bottom</td>
<td>87.5 mm ± 0.3 mm</td>
</tr>
<tr>
<td>P2</td>
<td>Diameter of hole for positioning pin</td>
<td>16.0 mm</td>
</tr>
</tbody>
</table>
6.2.4 The dimension of Lid shall be as shown in Figure 3 and Table 2.

(a) Side view

(b) Top view

Figure 3 Lid

Table 2 Dimensions of Container Lid

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Outer dimension (Vertical)</td>
<td>Max. 328 mm (328 mm is recommended)</td>
</tr>
<tr>
<td>L2</td>
<td>Outer dimension (horizontal)</td>
<td>Max. 328 mm (328 mm is recommended)</td>
</tr>
<tr>
<td>L3</td>
<td>Height</td>
<td>Not specified</td>
</tr>
</tbody>
</table>

6.2.5 Opening Spaces in Wafer Retaining Wall — Number of opening spaces in Wafer Retaining Wall shall be either 2 or 4. When the number is 2, they shall be positioned just in the opposite direction each other and when the number is 4, they shall be located 90 degrees apart one another.

NOTE 1: It is known that the edge part of the wafer retaining wall opening spaces tend to damage wafers caused by physical contact. However, the opening spaces are necessary for the robot arm to handle wafers and for detection of wafers.

6.2.6 It is suggested to mark the effective wafer storage height on the outer surface of wafer retaining wall.

6.3 Maximum Number of Wafers — The maximum number of wafers stored in the container shall be 25.

6.4 Materials of Main Body and Lid

6.4.1 Material Selection — Recyclable material shall be selected.

6.4.2 Surface Resistivity shall be lower than $1 \times 10^{11} \Omega$.

6.4.3 Total concentration of lead, mercury, cadmium, and chromium hexavalent in the material shall not exceed 100ppm.

6.4.4 Materials for container shall be indicated on both main body and lid.
6.5 Spacer

6.5.1 Outside dimensions — Diameter shall be 300mm±1.5/-0.5 mm

6.5.2 Material selection — Recyclable material shall be selected

6.5.3 Impurities — To be agreed on between the supplier and the user

6.5.4 Color — Black is recommended.

6.5.5 Rigidity — 30mm or larger when measured in accordance with the method specified in ¶7.2.

6.5.6 Particle generation — The test method is specified in ¶7.4. Details to be agreed on between the supplier and the user.

6.5.7 Surface resistivity shall be $1 \times 10^{12} \Omega$ or lower.

6.6 Cushion

6.6.1 Outside diameter — Diameter shall be 300mm±1.5mm.

6.6.2 Material Selection — Recyclable materials shall be selected.

6.6.3 Color — Black is recommended

6.6.4 Surface resistivity shall be $1 \times 10^{12} \Omega$ or lower.

6.7 Drop Impact Resistance

6.7.1 Container shall have no breakage in main body after it is drop-tested from 900mm in height.

7 Test Methods

7.1 Dimensions — To be measured with a measuring device, such as a slide caliper, with precision of 0.05 mm.

7.2 Rigidity of Spacer — A rectangular shaped test piece of 150mm × 50mm shall be prepared. The test piece shall be fixed at 30mm from an edge of it, being cantilever supported. The distance “X” as shown in the figure below shall be measured.

![Figure 4 Test Method for Rigidity of Spacer](image)

7.3 Impurities — To be measured in accordance with SEMI G59 Test Method for Measurement of Ionic Contamination on Leadframe Interleafing and the Contamination Transferred from the Interleafing to the Lead frames

7.4 Particle generation — The particle generation shall be measured by particle transferring to wafer. The first of all, the wafers shall be first checked to see there is no dust attached to the wafers by means of a 20X microscope. Then spacers shall be inserted into wafers and removed for microscopic inspection again.

7.5 Surface Resistivity — To be measured in accordance with IEC 60093 Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials

7.6 Harmful Materials — To be agreed on between the supplier and the user
8 Certification

8.1 When specified by the purchaser in the contract or order, a manufacturer's or supplier's certification shall be provided together with the test report at the time of shipment certifying that the Container to be shipped has been manufactured and tested in accordance with this specification.

9 Packing and Package Labeling

9.1 The products shall be packaged appropriately to prevent the products from deforming, getting moist, and being contaminated as well as being damaged during shipping.

9.2 The purchase number, quantity, gross weight, and supplier’s name shall be properly and clearly indicated on the package of products to be shipped.

9.3 Special packaging and delivery requests shall be discussed between the suppliers and the purchaser agreement between them shall be reached at time of purchase.
APPENDIX 1
BARCODE LABEL FORMAT AND LOCATION

NOTICE: The material in this appendix is an official part of SEMI (doc#) and was approved by full letter ballot procedures on (date of approval).

A1-1 Labels and Marking

A1-1.1 Label Format: It is recommended that the barcode label format to be attached to the coin-stack container include the following items. Fig A1-1 is a sample of labels.

- Product Name
- Lot No.
- Quantities (No. of Wafers)
- Quantities (No. of CHIPS)

![Barcode Label Format](image)

Figure A1-1 Barcode Label Format

A1-1.2 Location of Labels

The barcode label(s) is attached on either top or side of Lid, or on both top and side of Lid.

![Location of Barcode Label](image)

Figure A1-2 Location of Barcode Label

NOTICE: SEMI makes no warranties or representations as to the suitability of the standards set forth herein for any particular application. The determination of the suitability of the standard is solely the responsibility of the user. Users are cautioned to refer to manufacturer's instructions, product labels, product data sheets, and other relevant literature, respecting any materials or equipment mentioned herein. These standards are subject to change without notice.

By publication of this standard, Semiconductor Equipment and Materials International (SEMI) takes no position respecting the validity of any patent rights or copyrights asserted in connection with any items mentioned in this standard. Users of this standard are expressly advised that determination of any such patent rights or copyrights, and the risk of infringement of such rights are entirely their own responsibility.