Background Statement for SEMI Draft Document 5839
Revision to SEMI G82-0301E (Reapproved 0706):
Provisional Specification for 300 mm Load Port for Frame Cassettes in Backend Process

with title change to: Specification for 300 mm Load Port for Frame Cassettes in Backend Process

Notice: 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.

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Notice: Additions are indicated by underline and deletions are indicated by strikethrough.

Background
SEMI G82-0301E (Reapproved 0706) is due for 5-year review. The Japan TC Chapter of Assembly & Packaging Global Technical Committee approved the letter ballot distribution for the revision of SEMI G82-0301E (Reapproved 0706) at the meeting held on January 20, 2015. This technical ballot is intended for the revision of SEMI G82-0301E (Reapproved 0706). The following chapters are the whole document of revision of SEMI G82-0301E (Reapproved 0706).

Review and Adjudication Information

<table>
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<tr>
<th>Task Force Review</th>
<th>Committee Adjudication</th>
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<td>Packaging 5 Year Review Task Force</td>
<td>Japan TC Chapter of Assembly &amp; Packaging Global Technical Committee</td>
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Task Force Review meeting’s details are to be decided. If you need the details, please contact the task force leader or Standards staff for confirmation.

Telephone and web information will be distributed to interested parties as the meeting date approaches. If you will not be able to attend these meetings in person but would like to participate by telephone/web, please contact Standards staff.

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SEMI Draft Document 5839
Revision to SEMI G82-0301E (Reapproved 0706):
Provisional Specification for 300 mm Load Port for Frame Cassettes in Backend Process

with title change to: Provisional Specification for 300 mm Load Port for Frame Cassettes in Backend Process

1 Purpose
1.1 This specification defines dimensional requirements for the load port of frame cassette for 300 mm wafer in backend process equipment. It is intended to promote a uniform physical interface between equipment and the factory, to facilitate the use of automated frame cassette transport systems, and/or to meet ergonomic requirements for manually loaded equipment.

2 Scope
2.1 This is a provisional standard covering equipment for 300 mm frame cassette only. The provisional status is dictated by the immaturity of designs for 300 mm equipment and additional specifications which are not defined yet. These standards do not purport to address safety issues, if any, associated with their use. It is the responsibility of the user of these standards to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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 standard is not intended for use in backend except frame cassette for 300 mm wafers. This standard does not address direct loading/unloading of vacuum load locks. Requirements of such interfaces may differ from those in this document.

4 Referenced Standards
4.1 SEMI Standards and Safety Guidelines
SEMI E15 — Specification for Tool Load Port
SEMI E15.1 — Specification for 300 mm Load Port
SEMI E57 — Mechanical Specification for kinematic Couplings Used to Align and Support 300 mm Wafer Carriers
SEMI E64 — Specification for 300 mm Cart to SEMI E15.1 Docking Interface Port
SEMI G77 — Specification for Frame Cassette for 300 mm Wafers
NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Terminology
5.1 Please see SEMI G77 for definitions of the following terms used in this specification:
5.1.1 bilateral datum plane
5.1.2 conveyor rails
5.1.3 facial datum plane
5.1.4 frame cassette
5.1.5 horizontal datum plane
5.1.6 tape frame

5.2 Please see SEMI E15 for definitions of the following terms used in this specification:

5.2.1 load depth
5.2.2 load face plane
5.2.3 load height
5.2.4 load port
5.2.5 spacing
5.2.6 tool

5.3 frame cassette centroid — a datum representing the theoretical location of the center of a stack of tape frames in the frame cassette.

6 Ordering Information

6.1 The following items require communication between the tool supplier and user and shall be included in any request for quotation or purchase order:

6.1.1 If the tool has multiple load ports, provide the spacing, S, between frame cassette centroids (see SEMI E15).

6.1.2 Specify what frame cassette (e.g. optional composition, see SEMI G77) is to be accommodated by the load port (see SEMI E15).

7 Requirements

7.1 The dimensional requirements for the load port are given in Table 1 with reference to the figures of this document. Although the frame cassette transport systems shown in these figures appear similar to overhead monorails, they are intended to represent any type of transport system (AGV, PGV, conveyor, overhead track, etc.).

7.2 The dimensional requirements for the placement of the frame cassette on the load port are given in Table 1 with reference to the figures of this document.

7.3 The tape frames are to be oriented horizontally at the time they are placed on the load port.

7.3.1 The frame cassette shall be loaded and unloaded with its front parallel to and away from the load face plane (see Figure 1).

7.4 Dimension H is nominally 900 mm, fully adjustable at installation over the range of 890 to 910 mm. The precision with which the load port height must be maintained is dictated by the needs of the frame cassette delivery system.

7.5 The load port must nominally be at 900 mm, and it must be open from above to facilitate automatic frame cassette delivery from an overhead transport system. The open volume required for vertical delivery is defined by a projection of the load port area, including the area required for C1 and C2 clearances, projected upward to the top of the tool. Note that this condition need only be met when the tool is being loaded. For example, the load port may be formed by a surface that extends outward during loading to provide overhead access.

7.6 As shown in Figure 2, the maximum allowable height of an obstruction on the load port over which the frame cassette must be lifted (before being set down on the kinematic couplings) is H1. Examples of such obstructions include alignment devices and identification tag readers as well as the kinematic couplings themselves. Below H1 above the horizontal datum plane, clearances C1 and C2 no longer apply.

7.6.1 Two exclusion volumes on the left and right side of the load port must also be kept clear so that fork lifts or conveyors may be used. Each exclusion volume extends from the load face plane to D0 beyond the facial datum plane and extends H0 below the horizontal datum plane between W1 and W2 from the bilateral datum plane.

7.6.2 The load port that advances the frame cassette from the undocked position (where the frame cassette is initially delivered to the load port) to the docked position (where the frame cassette is ready for frame extraction or insertion) must reserve an exclusion volume that is intended for (but not limited to) containing automated units that read or write to an ID tag on the rear of the frame cassette in the undocked position (where the frame cassette is
initially delivered to the load port). If no reader/writer unit is installed, the exclusion volume may be covered by a panel.

NOTE 1: This section is incomplete and requirements will be added to the standard once the requirements and dimensions have been fully defined.

7.7 Clearances C1 and C2 are defined with respect to the maximum dimensions of the frame cassette (see SEMI G77). To prevent interference with overhead transport systems on the same or adjacent load port, it is recommended that floor-based transport vehicles do not exceed clearances C1 and C2 when picking up or placing the frame cassette on the load port.

7.8 Dimension S specifies the recommended minimum spacing between frame cassette centroids. In any case, if S violates C1, then C1 takes precedence.

7.9 To add clearance for overhead frame cassette transport, no part of the tool in front of the plane defined by C2 may be higher than H2 from the floor. The volume below H2 may contain the frame cassette stored in an internal buffer by the tool.

7.10 The load port must provide the option to use the conveyor rails for frame cassette loading. At the time of frame cassette transfer, the conveyor rails must be positioned at HC3 as shown in Figure 2. When not in use, the conveyor rails must be lowered below the fork lift exclusion zone.

8 Related Documents

SEMI E1.9 — Provisional Mechanical Specification for Cassettes Used to Transport and Store 300 mm Wafers
SEMI E47.1 — Provisional Mechanical Specification for Boxes and Pods Used to Transport and Store 300 mm Wafers
SEMI E72 — Specification and Guide for 300 mm Equipment Footprint, Height, and Weight
SEMI G74 — Specification for Tape Frame for 300 mm Wafers

Table 1 Dimensional Requirements for 300 mm Load Port

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Application</th>
<th>Value, mm (in.)</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>C1</td>
<td>minimum</td>
<td>75 (3.0)</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>minimum</td>
<td>30 (1.2)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>range</td>
<td>250 +0 , 10 -0 (9.8 +0 .4 )</td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>minimum</td>
<td>110 (4.33)</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>nominal</td>
<td>900 (35.4)</td>
<td>#1</td>
</tr>
<tr>
<td>H0</td>
<td>minimum</td>
<td>15 (0.59)</td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>maximum</td>
<td>25 (1.0)</td>
<td></td>
</tr>
<tr>
<td>H2</td>
<td>maximum</td>
<td>2600 (102.4)</td>
<td></td>
</tr>
<tr>
<td>HC3</td>
<td>range</td>
<td>+2.0 , 0 -0 (1.26 +0 .0 )</td>
<td>#2</td>
</tr>
<tr>
<td>S</td>
<td>minimum</td>
<td>482 (19.0)</td>
<td>#3</td>
</tr>
<tr>
<td>W1</td>
<td>maximum</td>
<td>130 (5.12)</td>
<td></td>
</tr>
<tr>
<td>W2</td>
<td>minimum</td>
<td>205 (8.07)</td>
<td></td>
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</tbody>
</table>

#1 This value is ergonomically compatible with the proposed 13 frame cassette and may not be ergonomically compatible with the proposed 25 frame cassette. The proposed 25 frame cassette may require assisted loading. H to be fully adjustable at installation over the range of 890 to 910 mm (35 to 35.8 inches).

#2 To avoid confusion, HC3 is used instead of H3 because H3 stands for another dimension in SEMI E15.1.

#3 Frame cassette (see SEMI G77) without manual side handles

#4 Frame cassette (see SEMI G77) with manual side handles
9 Table 1 Dimensions Definition

9.1 See SEMI E15 for definitions of the following terms used in this specification:

9.1.1 C1
9.1.2 C2
9.1.3 H
9.1.4 H1
9.1.5 S

9.2 $D$ — allowable load depth to frame cassette centroid.

9.3 $D0$ — minimum rear clearance of equipment boundary below H1 from facial datum plane.

9.4 $H0$ — minimum height from the bottom of equipment boundary below H1 to horizontal datum plane.

9.5 $H2$ — maximum overhead track clearance from the floor.

9.6 $HC3$ — allowable height of conveyor rail from horizontal datum plane.

9.7 $W1$ — maximum side clearance of equipment boundary below H1 from bilateral datum plane.

9.8 $W2$ — minimum side clearance of equipment boundary below H1 from bilateral datum plane.
overhead track clearance

bilateral datum planes

frame cassette

horizontal datum plane

floor

Figure 1
Load Port Requirements
Figure 2

Trenches and Conveyor Rails

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