

SEMI E11-0697 (Withdrawn 1102) GUIDELINE FOR 125 mm, 150 mm, AND 200 mm PLASTIC AND METAL WAFER CARRIER APPLICATION

NOTICE: This document was balloted and approved for withdrawal in 2002.

1 Scope

This guideline identifies the wafer carrier details required to properly register the carrier on semiconductor process and transport tools. Specific registration coordinates for both horizontal and vertical carrier orientation are defined to improve wafer and carrier transport operations.

Automated wafer and carrier transport applications require precision placement of carriers within the various types of semiconductor process, inspection and logistic equipment. In some applications it is necessary to adequately support the carrier to avoid deformation. Operations requiring adequate wafer handling must reference the carrier to the datums defined in the SEMI Carrier Specifications.

2 Applicable Documents

2.1 SEMI Documents

SEMI E1 — Specification for 3 inch, 100 mm, 125 mm, and 150 mm Plastic and Metal Wafer Carriers

SEMI E1.4 — Standard for 125 mm Plastic and Metal Wafer Carriers, Auto Transport Usage

SEMI E1.7 — Standard for 200 mm Plastic and Metal Wafer Carriers, General Usage (Proposed)

3 Selected Definitions

horizontal orientation — Carrier position when wafers are in the horizontal plane.

vertical orientation — Carrier position when wafers are in the vertical plane.

Symbols Description:

S1 — Draft angle of both side walls of carrier for length defined by S4.

S2 — Draft angle of both carrier legs on outside surfaces only.

S3 — Height from bottom of carrier legs (Datum B) to start of side walls.

S4 — Minimum length of unobstructed side walls.

S5 — Height of carrier legs.

S6 — Angle from carrier leg to side wall.

V1 — Height from base of carrier legs (Datum B) to center of vertical alignment pin. Vertical alignment pin is a locating pin which is an equipment feature, not attached to the wafer carrier.

V2 — Diameter of vertical alignment pin.

4 Application Guides

4.1 *Centrifuge Equipment* — Wafer carriers require support during the centrifugal process operations. The following symbols represent the carrier coordinates that must be supported by the centrifuge tools to ensure adequate support: S1 through S6, A2b, D6a, D6g.

4.2 *Horizontal Carrier Registration* — Wafer carriers positioned with the “H-Bar” down on a stationary or elevator platform should reference the carrier at stable locations shown in Figure 2 to ensure dependable placement. D5b, D5c, and D6b are the recommended final detect points within the D6d and D6e envelope (including provision for D6f).

NOTE: Other features may be employed as prealignment guides, but only for coarse placement.

4.3 *Vertical Carrier Registration* — Wafer carriers positioned with the wafers in the vertical orientation should employ the “center alignment” feature shown in Figure 3. The D6a, D6g, and D9a through D9d details would be the final registration coordinates.

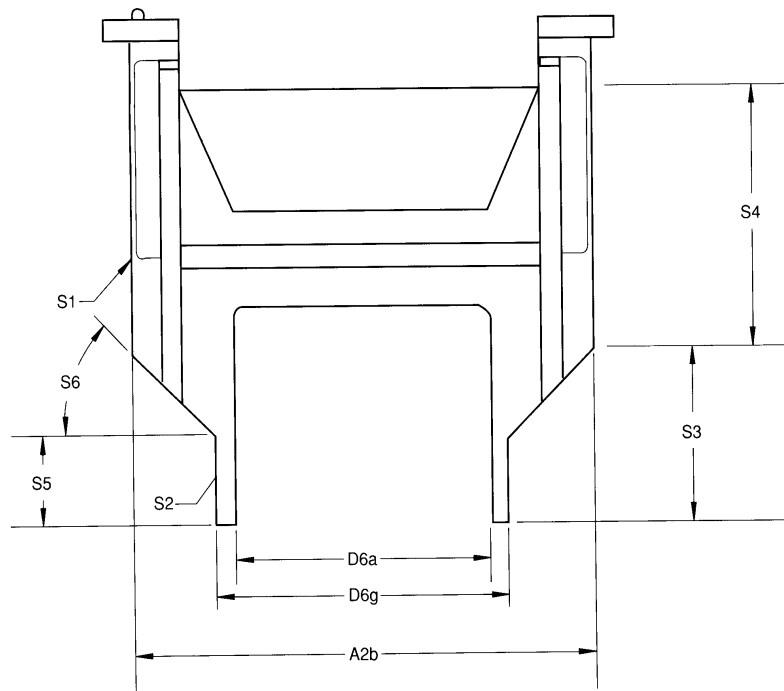
NOTE: Dimensions A1 and A2b may be used to guide the carrier to final placement.

Table 1 Carrier Dimensions for Centrifuge Equipment

Carrier Size	125 mm	150 mm	200 mm
S1	1/4°	1/4°	1/2°
S2	2°	2°	2°
S3	53.4 mm ± 1.0 mm (2.10 in. ± 0.040 in.)	60.5 mm ± 1.5 mm (2.38 in. ± 0.059 in.)	114.3 mm ± .51 mm (4.5 in. ± 0.020 in.)
S4	66.0 mm minimum (2.60 in.)	76.2 mm minimum (3.00 in.)	76.2 mm minimum (3.00 in.)
S5	25.4 mm ± 1.0 mm (1.00 in. ± 0.040 in.)	30.2 mm ± 1.27 mm (1.20 in. ± 0.050 in.)	30.0 mm ± 1 mm (1.18 in. ± 0.039 in.)
S6	45°	45°	Not Applicable
A2b	see Section 2	see Section 2	see Section 2
D6a	see Section 2	see Section 2	see Section 2
D6g	see Section 2	see Section 2	see Section 2

Table 2 Vertical Registration Dimensions

V1	3.81 mm – 0.13 mm (0.150 in. + 0.000 in. – 0.005 in.)
V2	2.38 mm ± 0.5 mm (0.094 in. ± 0.002 in.)


**Figure 1
Wafer Carrier Profile for Centrifuge**