SEMI E83-0714
SPECIFICATION FOR PGV MECHANICAL DOCKING FLANGE

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1 Purpose

1.1 This Specification is intended to promote consistent interface features between person guided vehicles (PGV) and equipment with a load port.

2 Scope

2.1 This Specification defines a mechanical standard for the stationary (equipment) side of the docking flange used by PGVs. This flange is to be mounted to the floor within the volume defined by the equipment loadport standards. These standards include, but are not limited to: SEMI E64 volume at SEMI E15.1 and SEMI G82 load ports (for 300 mm) and SEMI E154 (for 450 mm wafer carriers).

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 does not define the PGV (active) side of the docking interface or carrier transfer. The PGV and the PGV side of the docking interface designs should comprehend the physical limitations of equipment to which they are being applied.

4 Referenced Standards and Documents

4.1 *SEMI Standards and Safety Guidelines*

SEMI E15 — Specification for Tool Load Port

SEMI E15.1 — Specification for 300 mm Tool Load Port

SEMI E64 — Specification for 300 mm Cart to SEMI E15.1 Docking Interface Port

SEMI E154 — Mechanical Interface Specification for 450 mm Load Port

SEMI G82 — Provisional Specification for 300 mm Load Port for Frame Cassettes in Backend Process

NOTE 1: The standard, Mechanical Interface Specification for 450 mm Load Port for Tape Frame Cassettes in Backend Process is being developed by the Japan Assembly & Packaging Technical Committee.

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

5 Terminology

5.1 *Abbreviations and Acronyms*

5.1.1 *PGV* — person guided vehicle (cart)

5.2 *Definitions*

5.2.1 *carrier* — any cassette, box, pod, or boat that contains wafers (defined as *wafer carrier* in SEMI E15).

5.2.2 *cart* — a floor based carrier transfer vehicle (as defined in SEMI E64).

5.2.3 *docking* — the act of locating a floor-based carrier transport vehicle for carrier transfer to/from equipment (as defined in SEMI E64).

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5.2.4 *facial datum plane* — [300 mm] a vertical plane that bisects the wafers and that is parallel to the front side of the carrier (where wafers are removed or inserted). On tool load ports, it is also parallel to the load face plane specified in SEMI E15 on the side of the tool where the carrier is loaded and unloaded (as defined in SEMI E57).

5.2.5 *load face plane* — [300 mm] the furthest physical vertical boundary plane from carrier centroid on the side(s) of the equipment where loading of the tool is intended (as defined in SEMI E64).

NOTE 2: The 450 mm standards include changes to the loadport plane definitions. The 450 mm definitions from SEMI E154 are included below.

5.2.6 *450 load boundary (LB)* — [450 mm] a plane parallel to the facial plane establishing the boundary between the loadport and the fab aisle (see dimension *y101*in SEMI E154).

5.2.7 *bilateral plane (BP)* — [450 mm] a vertical plane, defining x=0 of a system with three orthogonal planes (HP, BP, FP) coincident with the nominal location of the rear primary KC pin, and midway between the nominal locations of the front primary KC pins.

5.2.8 *facial plane (FP)* — [450 mm] a vertical plane, defining y=0 of a system with three orthogonal plans (HP, BP, FP), *y33* = 194 ± 0 mm (defined in SEMI E154) in front of the nominal location of the rear primary KC pin.

5.2.9 *load port* — the interface location on the equipment where carriers are loaded and unloaded. [SEMI E87]

5.2.10 *transfer* — to either load or unload. [SEMI E23]

6 Requirements

6.1 The dimensions that define the universal docking flange are listed in Table 1 and shown on Figure 1.

6.1.1 The minimum length of the docking flange is defined by 2 × *w*11. This minimum length is intended to fit under the shadow of the smallest possible width SEMI E15.1 compatible load port. The PGV and PGV docking must provide full functionality given a minimum length docking flange. No maximum length has been specified.

6.1.2 One vertical pin (labeled VP in Figure 2) is intended to be used for horizontal registration of the PGV to the docking flange. This pin is also intended as a feature for an active mechanism on the PGV to lock on to.

6.2 There are three surfaces on the flange and a vertical pin that can be used as the initial docking contacts point(s) with the PGV. These have been identified as surfaces A, B and C and pin VP as shown in Figure 2. These features are the primary load bearing features during the act of docking, no other features or surfaces shall be used as initial docking contact points.

Table 1 Dimensional Requirements

Symbol	*Value, mm (in.)*	*Tolerance (mm)*	*Type*
a11	0°	±0.25°	angle
∅d11	15.0 (0.591)	±0.2	diameter
d12	33.0 (1.299)	±0.2	distance
d13	39.0 (1.535)	±0.2	distance
d14	62.0 (2.441)	±0.2	distance
d15	80.0 (3.150)	±0.2	distance
d16	300 mm: 237.5 (9.350) 450 mm: 240 mm (9.449) for 450 mm tape frame cassette LP, see Note 1 in § 4	±2.5	distance
d17	68.0 (2.677)	minimum	distance
h11	24.0 (0.945)	±0.2	distance
h12	39.0 (1.535)	±0.2	distance
h13	40.0 (1.575)	±0.2	distance
h14	83.0 (3.268)	±0.2	distance
h15	20.0 (0.787)	maximum	distance

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