

SEMI G95-0314

MECHANICAL INTERFACE SPECIFICATION FOR 450 mm LOAD PORT FOR TAPE FRAME CASSETTES IN THE BACKEND PROCESS

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1 Purpose

1.1 This Standard is to define the mechanical interface of a load port in semiconductor manufacturing equipment, where the 450 mm tape frame cassette (450 TFC) can be loaded and unloaded. By this definition, it enables interoperability of load ports and carriers and it aims to promote the automation using 450 TFC.

2 Scope

2.1 The interface specification of this Standard is driven by and intended to mate with a carrier compliant to the 450 mm tape frame cassette (450 TFC) and it applies to 450 TFC.

2.2 This Standard is intended to specify only the mechanical interface between 450 TFC and the load port.

2.3 Loading and unloading of 450 TFC is assumed to be done by semi-automated (PGV) or automated (AGV or OHT) handling.

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 intend to address manual loading or unloading of 450 TFC.

3.2 Since this 450 TFC is not supposed to have doors (like the FOUP), this Standard does not intend to define the BOLTS interface.

3.3 Since the increased scaling of the 300 mm methods (KC and KCP interface) have not yet been demonstrated with the actual equipment, the users of this Standard need sufficient prototyping and data gathering.

4 Referenced Standards and Documents

4.1 SEMI Standards and Safety Guidelines

SEMI G88 — Specification for Tape Frame for 450 mm Wafer

SEMI G92 — Specification for Tape Frame Cassette for 450 mm Wafer

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

5 Terminology

5.1 Abbreviations and Acronyms

5.1.1 450 TFC — tape frame cassette for 450 mm wafer

5.1.2 AGV — automated guided vehicle

5.1.3 BP — bilateral plane

5.1.4 EB — equipment boundary

5.1.5 EB_{UPPER} — equipment boundary above z1

5.1.6 FP — facial plane

5.1.7 HP — horizontal plane

- 5.1.8 *KC* — kinematic coupling
- 5.1.9 *KCP* — kinematic coupling pin
- 5.1.10 *LB* — load boundary
- 5.1.11 *OHT* — overhead hoist transport
- 5.1.12 *PGV* — person guided vehicle
- 5.1.13 *SME* — semiconductor manufacturing equipment
- 5.1.14 *TFRB* — tape frame release bar

5.2 Definitions

5.2.1 *450 equipment boundary (EB)* — the plane parallel to the FP which defines the boundary between the load port and the SME (see dimension *y1*).

5.2.2 *upper 450 equipment boundary (EB_{UPPER})* — the plane parallel to the FP and above *z1* which defines the boundary between the SME and the overhead transport vehicle (see dimension *y7*).

NOTE 1: The 450 EB and 450 EB_{UPPER} do not define physical features. They are only boundaries between the load port and the SME. The equipment front is a real physical feature, while the EB and EB_{UPPER} are only boundaries.

5.2.3 *450 load boundary (LB)* — a plane parallel to the boundary between the load port and the fab aisle (see dimension *y2*).

5.2.4 *450 load height* — the distance from the horizontal plane to the fab floor.

5.2.5 *450 load port* — the interface location on a semiconductor manufacturing equipment, where a 450 TFC can be loaded and unloaded.

5.2.6 *450 spacing* — individual spacing of load ports on semiconductor manufacturing equipment in the case where it has more than two load ports. It defines individual spacing of the bilateral planes.

5.2.7 *450 TFC* — used generally as a ‘term’ only to identify the tape frame cassette used in fabs for 450 mm wafers.

5.2.8 *bilateral plane (BP)* — 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 KCP, and midway between the nominal locations of the front primary KCP.

5.2.9 *facial plane (FP)* — a vertical plane, defining $y = 0$ of a system with three orthogonal planes (HP, BP, FP).

5.2.10 *front (of carrier)* — the side that is facing to the equipment and allows the tape frame input and extraction.

5.2.11 *horizontal plane (HP)* — a horizontal plane, defining $z = 0$ of a system with three orthogonal planes (HP, BP, FP), coincident with the nominal location of the uppermost points (tips) of the three KCPs.

5.2.12 *plane* — a theoretical surface which has infinite width and length, zero thickness and zero curvature.

5.2.13 *rear (of carrier)* — the furthest side from the equipment.

5.2.14 *tape frame* — the frame which uses the wafer tape and retains the wafer. It is used in dicing and die-bonding processes, as well as shipping and handling during these processes (see SEMI G88).

5.2.15 *tape frame cassette* — a carrier that holds one or more tape frames.

5.2.16 *TFRB* — a bar to release the tape frames. It unlocks automatically when the 450 TFC is placed on the load port of the equipment.

5.2.17 *wafer tape* — an adhesive plastic tape which retains the wafer or separated die.

6 Requirements

6.1 *Dimension* — The dimension requirements for 450 TFC load port are shown in Figures 1 and 2, and listed in Table 1.