

SEMI HB3-1016

SPECIFICATION FOR THE MECHANICAL INTERFACE FOR 150 mm HB-LED LOAD PORT

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1 Purpose

1.1 The purpose of this Document is to define the basic interface dimensions of a load port and their arrangements on HB-LED manufacturing equipment, where HB-LED 150 mm cassettes can be loaded and unloaded. This Document defines a set of requirements and features to enable interoperability of load ports and carriers without limiting innovative solutions.

2 Scope

2.1 The interface specification in this Document intended to mate with a cassette compliant to the relevant SEMI HB-LED 150 mm cassette Standard.

2.2 Loading and unloading is assumed to take place in manual and semi-automated mode by using any kind of system or device (e.g., Human Operators or Person Guided Vehicle).

2.3 This Specification considers the ergonomic requirements of manual cassette loading as outlined in SEMI S8 and provides volume for cassette rotation devices.

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 A load port for HB-LED 150 mm cassettes has not yet been demonstrated, this Document is to address the need for prototyping and qualification on a real system. As long as this qualification is not done, this Document acts as only a design guideline.

4 Referenced Standards and Documents

4.1 *SEMI Standards and Safety Guidelines*

SEMI E63 — Specification for 300 mm Box Opener/Loader to Tool Standard (BOLTS-M) Interface

SEMI E144 — Specification for RF Air Interface between RFID Tags in Carriers and RFID Readers in Semiconductor Production and Material Handling Equipment

SEMI HB2 — Specification for 150 mm Open Plastic and Metal Wafer Cassettes Intended for Use for Manufacturing HB-LED

SEMI S8 — Safety Guideline for Ergonomics Engineering of Semiconductor Manufacturing Equipment

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

5 Terminology

5.1 *Abbreviations and Acronyms*

5.1.1 *BI* — BOLTS interface surface

5.1.2 *BP* — bilateral plane

5.1.3 *EB* — equipment boundary

5.1.4 *FP* — facial plane

5.1.5 *HB-LED* — high-brightness light-emitting diode

5.1.6 *HP* — horizontal plane

5.1.7 *LB* — load boundary

5.1.8 *LEDME* — HB-LED manufacturing equipment

5.2 Definitions

5.2.1 *150 mm HB-LED cassette* — used generally as a ‘term’ only to identify the cassette used in fabs for 150 mm HB-LED wafers.

5.2.2 *bilateral plane* — a vertical plane, defining $x=0$ of a system with three orthogonal planes (HP, BP, FP), coincident with the nominal location of the wafer center and perpendicular to the H-bar of the cassette when positioned in the equipment load position.

5.2.3 *BOLTS* — used generally as a ‘term’ only within this document to identify the interface between a load port and the LEDME.

NOTE 1: Originally, ‘BOLTS’ is an abbreviation defined in SEMI E63.

5.2.4 *BOLTS interface surface* — a physical surface on the LEDME intended to mate with a load port.

5.2.5 *cassette load position (equipment)* — location on the load port which receives the cassette and where the wafers in the cassette are horizontal and parallel with the HP of the equipment.

5.2.6 *cassette load position (operator)* — location on the load port which receives the cassette manually loaded by an operator where the wafers in the cassette are near vertical.

5.2.7 *cassette rotation device* — manual or automated device integrated into the load port which transfers the cassette between the ‘operator’ and ‘equipment’ cassette load positions.

5.2.8 *equipment boundary* — plane parallel to the facial plane establishing the boundary between the LEDME and the load port (see dimension *y100*).

NOTE 2: The EB is not defining a physical feature. It is a boundary only between the load port and the LEDME. The EB should not be confused with the ‘physical’ equipment front as defined in ¶ 6.9. The equipment front is a real physical feature, while the EB is a boundary only.

5.2.9 *facial plane* — a vertical plane, defining $y=0$ of a system with three orthogonal planes (HP, BP, FP), coincident with the nominal location of the wafer center and parallel to the H-bar of the cassette when positioned in the equipment load position.

5.2.10 *HB-LED manufacturing equipment* — equipment used in the manufacturing process to make HB-LED devices.

5.2.11 *horizontal plane* — a horizontal plane, defining $z=0$ of a system with three orthogonal planes (HP, BP, FP), coincident with the nominal location of the uppermost surface of the load port to which the H-bar end of the cassette mates when positioned in the equipment load position.

5.2.12 *horizontal spacing* — the distance from the BP of one load port to the BP of an adjacent load port on an LEDME.

5.2.13 *load boundary* — a plane parallel to the facial plane establishing the boundary between the load port and the fab aisle (see dimension *y101*).

5.2.14 *load height* — the distance from the HP to the fab floor.

5.2.15 *load port* — the interface location on an LEDME, where a 150 mm HB-LED cassette can be loaded and unloaded.

5.2.16 *nominal location* — the value a dimension would have if its tolerance were reduced to zero.

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

5.2.18 *vertical spacing* — the distance from the HP of one load port to the HP of another load port above on an LEDME.