

SEMI E72-1016

SPECIFICATION AND GUIDE FOR EQUIPMENT FOOTPRINT, HEIGHT, AND WEIGHT

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NOTICE: This Document was completely rewritten in 2016

1 Purpose

1.1 To help semiconductor device manufacturers plan or retrofit their fabs, this Standard provides equipment suppliers with definitions and limitations on the footprint occupied by production equipment during operation, height, weight, and the areas needed for maintenance and service.

1.2 Equipment suppliers need to know what limitations there are for equipment configurations and for moving equipment into facilities in order to design their products.

2 Scope

2.1 This Standard specifies limits on the footprint, height, and weight of production equipment for wafers of 300 mm or greater diameter. Separate limits are given for the parts of the equipment in the main fab and in the subfab. Separate limits are given also for the equipment after it is installed and for the components of the equipment as it is moved into the fab. The actual footprint may vary by equipment type.

2.2 This Standard limits the kinds of activities that may occur near the load face plane of the equipment.

2.3 This Standard is intended to set an appropriate level of specification that places minimal limits on supplier innovation while ensuring opportunities for users to be globally (though possibly not locally) efficient with equipment volumes.

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 Referenced Standards and Documents

3.1 SEMI Standards and Safety Guidelines

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

SEMI E35 — Guide to Calculate Cost of Ownership Metrics for Semiconductor Manufacturing Equipment

SEMI E140 — Guide to Calculate Cost of Ownership Metrics for Gas Delivery Systems

SEMI E154 — Mechanical Interface Specification for 450 mm Load Port

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

4 Terminology

4.1 Abbreviations and Acronyms

4.1.1 *AMHS* — automated material handling system

4.1.2 *COO* — cost of ownership

4.2 Definitions

4.2.1 *cost footprint depth, D_{cf}* — the depth of the cost footprint, which is midway between the footprint depth and easement depth, calculated as $(D_e + D_f) / 2$.

4.2.2 *cost footprint rectangle* — a rectangle with depth halfway between that of the footprint and easement rectangle and the width halfway between that of the footprint and easement rectangles.

4.2.3 *cost footprint rectangle area (A_{cf})* — the area of the cost footprint rectangle, calculated as $(D_{cf} \times W_{cf})$.

NOTE 1: The cost footprint rectangle area, A_{cf} , is the floor space metric used to calculate cost of ownership (COO) per SEMI E35 and SEMI E140.

4.2.4 *cost footprint width (W_{cf})* — the width of the cost footprint, which is midway between the footprint width and easement width, calculated as $(W_e + W_f) / 2$.

4.2.5 *depth* — the horizontal dimension perpendicular to the load face plane.

4.2.6 *easement area* — the area immediately adjacent to equipment that is required for service or maintenance access.

4.2.6.1 *Discussion* — This easement area includes safety aisles, ergonomic maintenance access space, component removal space, and room for doors to swing out, but does not extend in front of the load face plane (see Figure 1).

4.2.7 *easement depth (D_e)* — the depth of the easement rectangle.

4.2.8 *easement rectangle* — the smallest rectangle extending from the load face plane to the furthest extent of the easement areas to the rear, the left and the right sides.

4.2.9 *easement rectangle area (A_e)* — the area of the easement rectangle, calculated as $(W_e \times D_e)$.

4.2.10 *easement width (W_e)* — the width of the easement rectangle.

4.2.11 *load face plane* — the furthest physical vertical boundary plane from the cassette centroid or carrier centroid on the side (or sides) of the equipment where loading of the equipment is intended. [SEMI E156]

4.2.12 *equipment footprint* — the area covered by either the parts of the equipment in the main fab or the remote parts of the equipment in equipment support areas such as subfabs during operation.

4.2.12.1 *Discussion* — This includes any temporary projections from the equipment during loading or processing, such as carriers that stick out from the equipment or equipment load ports that protrude only when the equipment is being loaded, but not in front of the load face plane (see Figure 1).

4.2.13 *footprint depth (D_f)* — the depth of the equipment footprint.

4.2.14 *footprint rectangle* — the smallest rectangle extending from the load face plane to the rear and side extents of the equipment.

4.2.15 *footprint rectangle area (A_f)* — the area of the footprint rectangle, calculated as $(W_f \times D_f)$.

4.2.16 *footprint width (W_f)* — the width of the equipment footprint.

4.2.17 *subfab* — the area below or outside of the cleanroom production area that can be a single or multiple levels and may or may not be clean. [SEMI E76]

4.2.18 *width* — the horizontal dimension parallel to the load face plane.

5 Requirements and Recommendations

5.1 Dimensions

5.1.1 The dimensions cited in § 5 are specified in Table 1.

5.1.2 The width and depth of the footprint and easement rectangles on the main fab floor are shown in Figure 1.

5.1.2.1 The same basic approach is also used to define the footprint and easement rectangles in a subfab or other remote equipment support areas.