

SEMI D16-0998

SPECIFICATION FOR MECHANICAL INTERFACE BETWEEN FLAT PANEL DISPLAY MATERIAL HANDLING SYSTEM AND TOOL PORT

This Standard was technically approved by the Flat Panel Display Equipment Global Technical Committee.
This edition was approved for publication by the global Audits and Reviews Subcommittee July 1998.
Available at www.semi.org in September 1998.

NOTICE: This Standard or Safety Guideline has an Inactive Status because the conditions to maintain Current Status have not been met. Inactive Standards or Safety Guidelines are available from SEMI and continue to be valid for use.

1 Purpose

1.1 This Specification defines feature requirements on and about tool ports of process tools used in manufacturing of flat panel displays. These feature requirements facilitate the interfacing of transport equipment to the tool by standardizing the feature requirements. Such standards are intended to promote cost-effective interfacing while preserving freedom of choice in material handling equipment.

2 Scope

2.1 These standards define mechanical features on or about the process tool port, and in front of or on the tool face. Although these features are intended for specific functions, they do not set design requirements for any particular functionality. The interface requirements are meant to be universal and to avoid the promotion of any particular form of transport. Therefore, they are useful for the interfacing of continuous direct WIP transports, such as conveyors, or discrete vehicles of foreseeable future design, such as AGVs, to the process tool port. The dimensions incorporated in the standard apply to single panel handling as well as substrate 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 Current display manufacturing utilizes several substrate sizes, many of them “non-standard.” This proposed interface specification includes dimensions for the substrate sizes of 550 × 650 mm, and 600 × 720 mm and anticipates the establishment of standard dimension in future substrate sizes. For these future substrate sizes, a universal dimensioning method based on substrate size may be possible.

4 Referenced Standards and Documents

4.1 SEMI Standards and Safety Guidelines

SEMI D5 — Standard Size for Flat Panel Display Substrates

SEMI D11 — Specification for Flat Panel Display Glass Substrate Cassettes

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

5 Terminology

5.1 Definitions

5.1.1 *facial datum plane* — the plane coincident with the front face of the tool and perpendicular to the horizontal and vertical datum planes.

5.1.2 *horizontal datum plane* — the plane coincident with the top surface of the floor and perpendicular to the facial datum plane of the tool.

5.1.3 *vertical datum plane* — the plane that bisects the tool port and is perpendicular to the horizontal and facial datum planes.

5.2 Functional Description of Dimensions

5.2.1 *X1* — width of exclusion zone reserved for vertical material handling devices; maximum.

5.2.2 *X2* — width of the tool port at *Z7* below tool load plane. This defines the horizontal limit of the tool port in the *x-y* plane at that level, beyond which space is reserved for transport equipment; maximum.

5.2.3 *Y1* — maximum tool port protrusion from the tool face. This dimension defines the limits of tool port attachments.

5.2.4 *Y2* — the centerline distance between substrate and tool face when the substrate is delivered to the tool port; ± 10 mm.

5.2.5 *Y3* — depth of the exclusion zone used for PGV cart alignment devices; maximum.

5.2.6 *Y4* — overhead exclusion zone for ceiling-hung material delivery systems; maximum.

5.2.7 *Y5* — maximum protrusion from tool port. May be used for mounting docking devices (mostly PGVs).

5.2.8 *Z1* — height of tool port; ± 10 mm (load plane of reference).

5.2.9 *Z2* — the lowest point on an overhead delivery system; minimum.

5.2.10 *Z3* — the maximum volume height of an overhead delivery system. This dimension extends the full width of the tool.

5.2.11 *Z4* — the height of the exclusion zone used for PGV cart alignment devices.

5.2.12 *Z5* — the maximum height of the protrusion used for docking devices.

5.2.13 *Z6* — the location for the bottom plane of the first substrate. This dimension is not specified in this Document.

5.2.14 *Z7* — height of exclusion zones used by conveyor rails and fork lifts; maximum.

6 Requirements

6.1 Dimensions and tolerances of the required features are specified in Table 1 and Figures 1A and 1B.