# SEMI E181.2-0424
# SPECIFICATION FOR PANEL FOUP FOR 510 TO 515 MM PANEL SIZE AND 6 SLOTS

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**NOTICE:** Paragraphs entitled 'NOTE:' are not an official part of this Standard or Safety Guideline and are not intended to modify or supersede the official Standard or Safety Guideline. These have been supplied by the global technical committee to enhance the usage of the Standard or Safety Guideline.

## 1 Purpose

1.1 This Specification is part of a suite of Standards to establish basic physical dimensions for the Panel FOUP intended to be used to transport and store panels.

## 2 Scope

2.1 This Standard specifies the dimensions that are specific to the combination of 6-slots Panel FOUP for 510 mm × 515 mm panel. Common dimensions are defined in the Primary Standard.

**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 None.

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

## 4 Terminology

4.1 *Abbreviations and Acronyms*

4.1.1 *BP* — bilateral plane

4.1.2 *CL* — centerline

4.1.3 *EE* — end effector

4.1.4 *FOUP* — front-opening unified pod

4.1.5 *FP* — facial plane

4.1.6 *HP* — horizontal plane

4.1.7 *KC* — kinematic coupling

4.1.8 *KCP* — kinematic coupling pin

4.1.9 *OHT* — overhead hoist transport

4.1.10 *PLP* — panel level packaging

4.1.11 *RFID* — radio frequency identification

4.1.12 *TIR* — total indicator runout

4.2 *Definitions*

4.2.1 *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 KCPs.



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4.2.2 *centerline (CL)* — a horizontal line centered vertically on the Panel FOUP door used as the reference for *z* dimensions of door features.

4.2.3 *facial plane (FP)* — a vertical plane, defining *y=0* of a system with three orthogonal planes (HP, BP, FP), *y33=194 ± 0* mm in front of the nominal location of the rear primary KCP.

4.2.4 *front (of Panel FOUP)* — the part of the Panel FOUP closest to the door.

4.2.5 *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.

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

4.2.7 *nominal panel seating plane* — a horizontal plane that bisects the panel pickup volume.

4.2.8 *origin* — the intersection of the BP and FP.

4.2.9 *panel deflection* — change in panel shape (TIR) due to gravity while the panel is resting on the Panel FOUP panel supports with the Panel FOUP door open.

4.2.10 *Panel FOUP* — used generally as a 'term' only within this Standard to identify the front-opening carrier used in fabs for panels.

NOTE 1: Unless otherwise specified, the word 'carrier' used herein shall mean Panel FOUP.

4.2.11 *panel* — the rectangular base material to implement panel level packaging processes.

4.2.12 *panel seating plane* — the bottom surface of an ideally rigid flat disk that meets the diameter specification for 515 mm × 510 mm and 600 mm × 600 mm panels, with negligible droop due to gravity, as it rests on the panel supports.

4.2.13 *panel substrate* — the rectangular starting material (often epoxy or glass) that can be used to implement panel level packaging processes.

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

4.2.15 *process carrier* — a device or material, usually Si, ceramic, glass, or metal, that provides temporary mechanical support to hold one or more panels during processing.

4.2.16 *rear (of Panel FOUP)* — the part of the Panel FOUP farthest from its door.

## 5 Requirements for Panel FOUP

5.1 Individual specifications for the 510 mm × 515 mm panel and 6 slots are listed in Figure 1 and Figure 2, and Table 1 and Table 2.



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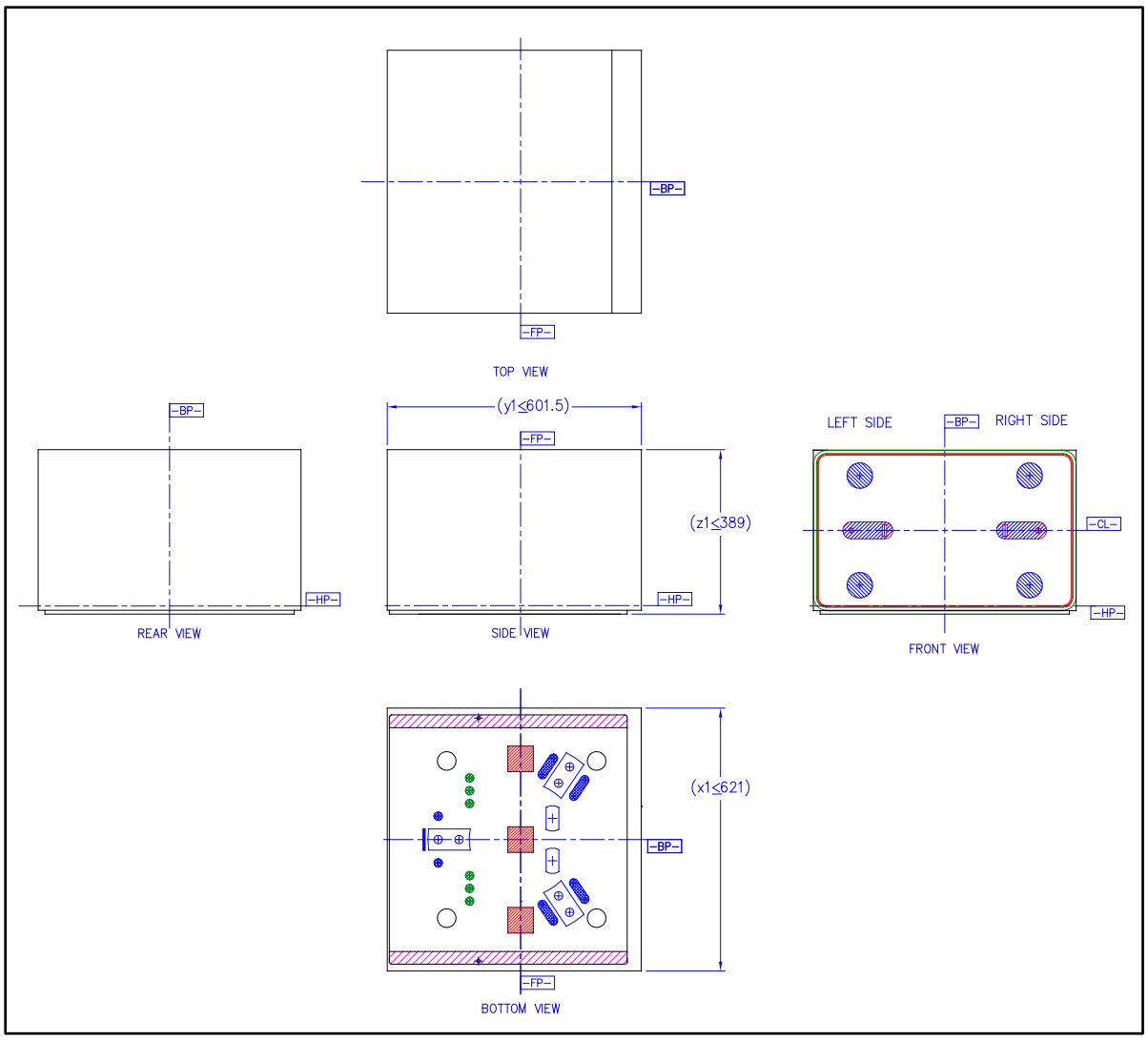


**Figure 1**
**Overall Views of Panel FOUP**



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