

SEMI D43-1105

TEST METHOD FOR MECHANICAL VIBRATION IN AMHS FOR FPD MANUFACTURING

This standard was technically approved by the global FPD Factory Automation Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on September 8, 2005. It was available at www.semi.org in October 2005 and on CD-ROM in November 2005.

1 Purpose

1.1 In FPD manufacturing, customers have requirements concerning vibration of handling cassettes caused by the handling equipment during transportation. However, measurement methods and measurement locations are unclear. This test method clarifies the measurement methods and measurement locations.

1.2 This standard will specify measurement method and measurement points, for vibration occurring at contact points between AMHS and cassettes used for handling.

2 Scope

2.1 This standard shall be applied to measure vibration at the contact points between AMHS and cassettes used for handling.

2.2 Depending on facilities conditions on the fab line, AMHS may cause vibration in buildings, equipment, etc., but this standard is not intended to apply to the influence of vibration on manufacturing equipment caused by handling equipment, nor the effect of vibration on building structure.

2.3 The measurement method and measurement points set forth in this standard do not evaluate measurement results, nor evaluate effect on manufacturing.

2.4 This standard measures the effect given to the cassette from AMHS, and is not intended to measure cassette vibration or measure the vibration of glass within the cassette.

2.5 This standard does not cover conveyor type cassette handling, such as roller conveyor, chain conveyor, belt conveyor, etc.

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 *AMHS* — Automated Material Handling Systems

4.1.2 *FPD* — Flat Panel Display

4.2 Definitions

4.2.1 *Vibration* — Acceleration occurring in each axis (Measurement unit: G – gravity acceleration)

4.2.2 *X-Axis* — The direction in which the cassette is transported.

4.2.3 *Y-Axis* — The direction horizontal and perpendicular to the X-Axis.

4.2.4 *Z-Axis* — The direction perpendicular to the X- and Y-Axes.

5 Summary of Method

5.1 *Relation between Handling Style and Vibration* — The representative AMHS styles are shown in Figure 1.

5.1.1 Definitions of Handling Styles

5.1.1.1 Type A — Fork Method

5.1.1.1.1 A method where cassette loading is facilitated by a fork furnished on the relevant handling equipment, and all the way through handling the cassette is conveyed on top of the fork.

5.1.1.2 *Type B — Load Table Method*

5.1.1.2.1 A method where cassette transfer is performed by equipment other than the relevant handling equipment and the relevant equipment only conveys the cassette.

5.1.2 *Vibration Measurement Methods*

5.1.2.1 *Measurement locations* — Measurement locations are shown in Figures 2 and 3. Namely, the sensing points of the accelerometers are installed on the corresponding points of the equipment surface of the handling equipment.

5.1.2.2 *Measurement Period* — The measurement period begins when the cassette is being unloaded to the handling equipment, and ends when the cassette is loaded from the handling equipment.

5.1.2.3 *Measurement Values* — Acceleration measured at the same time on the X, Y, and Z axes will be used.

5.1.2.4 *Measurement Conditions*

5.1.2.4.1 If available, cassettes shall be used for measurement.

5.1.2.4.2 If cassettes are not available, a weight equivalent to the theoretical weight when glass substrates are contained in all layers, and the theoretical weight when zero substrates are contained, shall be used at the measurement points individually.

5.1.2.5 *Accelerometer Measurement Filter* — In order to extract valid components during vibration evaluation, a low-pass filter (50Hz) shall be used.