

SEMI G62-0318

TEST METHOD FOR SILVER PLATING QUALITY

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1 Purpose

1.1 This Test Method describes procedures to determine silver plating quality.

2 Scope

2.1 These methods apply to silver plating on leadframes for plastic packages. Applicable plating styles:

2.1.1 *Overall Plating* — Plating covers the whole leadframe area. In some situations, the leadframe may be quoted as having overall plating, but the rails will be unplated in order to save plating costs.

2.1.2 *Ring Plating* — Only inner leads plated on top surface.

2.1.3 *Ring-Tip Plating* — Only wire bonding areas of inner leads plated.

2.1.4 *Spot Plating* — Only die pad and inner leads plated on top surface.

2.1.5 *Spot Plating (both sides)* — Die pad and inner leads are plated on both the top and bottom surfaces of the leadframe.

2.1.6 *Tip Plating* — Only die pad and wire bonding areas plated.

2.1.7 *W-Ring Plating* — Only inner leads plated on top surface and around die pad.

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 Units

3.1 This Test Method uses SI units.

4 Referenced Standards and Documents

4.1 *SEMI Standards and Safety Guidelines*

SEMI G55 — Test Method for Measurement of Silver Plating Brightness

SEMI G56 — Test Method for Measurement of Silver Plating Thickness

4.2 United States Military Standards¹

MIL-M-38510 — General Specification for Microcircuits

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

5 Terminology

5.1 Definitions

5.1.1 *area variation* — the variation between the defined and actual plated area.

NOTE 1: Oversized plating area is an area larger than the specified area. Undersized plating area is an area smaller than the specified area.

5.1.2 *attached silver particles* — small silver particles which are attached to the normal plated surface during the plating process.

5.1.3 *bleed out, back side* — plating on the back of leadframe caused by seepage of the plating solution beyond the mask.

5.1.4 *bleed out, side* — plating occurring on the sides of leadframe features.

5.1.5 *bleed out, surface* — seepage of the plating solution beyond the mask on the top surface of the leadframe increasing the plated area.

5.1.6 *bleed out, epoxy* — the separation of the resin component from the filled epoxy resin such that it creeps on the die pad beyond the outline of resin fillet.

5.1.7 *blister (metal)* — an enclosed, localized separation of the plating metallization from the base material or from another layer of plating which can be depressed with a sharp instrument.

NOTE 2: This may occur during plating or after application of heat.

5.1.8 *burnt deposit* — plated surface is too rough.

5.1.9 *contamination* — three-dimensional alien material adhering to a surface.

5.1.10 *corrosion* — electrochemical degradation of the material usually exhibited by discoloration such as rust.

5.1.11 *discoloration* — any change in the color of the metallization, as detected by the naked eye. This may occur on as plated or after application of heat.

5.1.12 *excessive plating* — plating exists outside the specified area.

5.1.13 *foreign material* — an adherent particle other than parent material of the component.

NOTE 3: Adherent denotes inability to be removed with an air or nitrogen blow-off at 20 psi.

5.1.14 *incomplete plating* — plating is missing from any part of the designated area.

5.1.15 *leadframe top surface* — the active side of the leadframe, the surface used for die attach and wire bonding.

5.1.16 *nodule (of plated particle)* — a protrusion or lump of plating material above the plated surface.

5.1.17 *plating nonuniformity* — the lack of consistency of brightness of silver as plated, or after the application of heat. These changes in the plated grain structure causes the inconsistency.

5.1.18 *peeling* — the lifting of metallization from a surface.

5.1.19 *pit (of plating)* — a hole or depression extending below the surface of the plating.

5.1.20 *scratch (on plating)* — a surface deformation which exposes underlying metallization.

5.1.21 *spot-sparing* — a stain-like discoloration occurring after the application of heat.

5.1.22 *step plating* — plateau-like plating having more than one level.

¹ United States Military Standards, Available through the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120-5099, USA; Telephone: +1.215.697.3321.