

# SEMI G67-0996 (Reapproved 1104)

## TEST METHOD FOR THE MEASUREMENT OF PARTICLE GENERATION FROM SHEET MATERIALS

This test method was technically reapproved by the Global Assembly & Packaging Committee and is the direct responsibility of the Japanese Packaging Committee. Current edition approved by the Japanese Regional Standards Committee on July 23, 2004. Initially available at [www.semi.org](http://www.semi.org) September 2004; to be published November 2004. Originally published September 1996.

### 1 Purpose

1.1 This test method describes a procedure to measure particles on sheet materials.

### 2 Scope

2.1 The method described may be used for the measurement of particles on items such as:

- Leadframe Interleaves,
- Cleanroom Paper, and
- Packing Material.

2.2 The procedures may be used by the material manufacturer for quality control or by a customer at incoming inspection.

**NOTICE:** This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

### 3 Referenced Standards

3.1 None.

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

### 4 Terminology

4.1 None.

### 5 Summary of Method

5.1 The method is based on measuring a background particle count in a clean enclosure and then measuring the increased particle count when items under test are submitted to handling operations likely to generate particles.

### 6 Interference

6.1 Care must be taken to avoid contaminating the clean bench when sheet materials are placed inside. All external packaging material shall be removed and the

internal packaging shall be cleaned by appropriate means prior to placing inside the bench.

6.2 A method of cutting the specimens to size, if performed, must not add to, or detract from, the contamination levels on the sheet materials.

6.3 Care must be taken to avoid contaminating the specimens from the human body and clothes when the sheet materials are prepared for the test method.

### 7 Equipment

7.1 *Particle Counter and Recorder*

7.2 *Clean Bench with Full Gloves and a Dust Particle Measurement Port* — See Figure 1.

7.2.1 Air flow speed in the clean bench should be 0.6 m/sec.

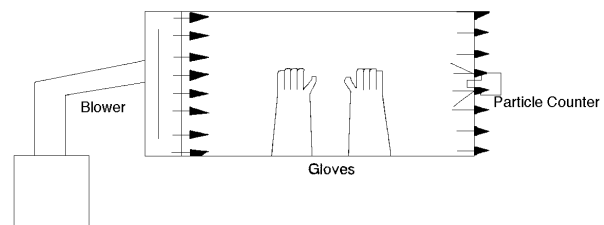


**Figure 1**  
**Clean Bench Configuration**

### 8 Sampling

8.1 Sampling plans shall be agreed between user and supplier.

### 9 Test Specimen

9.1 Specimen size shall be agreed between user and supplier. It is recommended that a 152.4 mm × 203.2 mm (6 × 8 inches) test piece be used.

### 10 Equipment Set-Up

10.1 The particle counter shall be set up with the probe in the clean bench. Calibrate the counter in accordance with the equipment manufacturer's instructions.

10.2 Allow the clean bench to come to equilibrium and perform a background particle count.

NOTE 1: Between each test, allow the clean bench to return to a stable background particle count before proceeding with the next test.

NOTE 2: After several thousand particles have been measured, the clean bench must be cleaned before making the next measurement.

## 11 Test Procedure

11.1 Place the items to be tested in the clean bench and allow the clean bench to return to a stable background level for particle count.

### 11.2 Crumpling Test

11.2.1 Crumple a test specimen in gloved hands at the rate of one (1) crumple every fifteen (15) seconds and record the maximum particle count.

11.2.2 Record the maximum particle count and the initial background count.

### 11.3 Friction Test

11.3.1 Place two sheets of the material to be tested face to face and rub together three (3) times in ten (10) seconds.

11.3.2 Record the maximum particle count and the initial background count.

### 11.4 Tearing and Crumpling Test

11.4.1 Tear a sheet into five (5) pieces at the rate of one (1) tear every five (5) seconds. Crumple the pieces in gloved hands at the rate of one (1) crumple every fifteen (15) seconds.

11.4.2 Record the maximum particle count and the initial background count.

## 12 Calculations and Reporting Results

12.1 For each measurement and test method type, calculate the particle count on the material under test as follows:

- Particle Count (no./m<sup>3</sup>) = (Measured Count from each test) - (Background Count)

12.2 Average the results for each test type.

## 13 Report

The test report shall include the following items:

- Material Designation under Test,
- Manufacturer,
- Shipping Lot Number,

- Test Date,
- Test Conditions — temperature, humidity in the clean bench,
- Particle Counter Sensitivity,
- Test Time, and
- Results for Each Test Type in particles/m<sup>3</sup>.

NOTE 3: If the test is performed by the manufacturer, some of these items may be replaced by in-house requirements such as manufacturer lot number.

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