

SEMI G86-0217 (Reapproved 1122) TEST METHOD FOR MEASUREMENT OF CHIP (DIE) STRENGTH BY MEAN OF 3-POINT BENDING

This Standard was technically approved by the Assembly & Packaging Global Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on June 30, 2022. Available at www.semiviews.org and www.semi.org in November 2022; originally published March 2003; previously published February 2017.

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1 Purpose

1.1 This Test Method defines a procedure for the evaluation of die strength by the mean of 3-point bending method.

2 Scope

2.1 This Test Method applies only for 3-point bending method, and other methods will be defined by the separate documents.

2.2 This Test Method is used to measure die strength for dies from processed wafers.

2.3 Wafer thinning technology becomes popular to meet the demand for thin packages, so the die strength data is critical for the die quality and certification. This Standard is one of the documents, which describe the Die Strength Evaluation Method, Measurement Data Summary Technique and Data Usage for Test Report.

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 ISO® Standards¹

ISO 468 — Surface Roughness – Parameters, Their Values and General Rules for Specifying Requirements

ISO/DIS 6508-1 — Metallic Materials – Rockwell Hardness Test – Part 1: Test Method

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

4 Terminology

4.1 Definitions

4.1.1 *deflection* δ — distance over which the top or bottom surface of the test specimen at midspan deviates from its original position during flexure.

NOTE 1: It is expressed in millimeters (mm).

4.1.2 *flexural stress* σ_f — nominal stress of the outer surface of the test specimen at midspan.

NOTE 2: It is calculated from the relationship given in § 8.1, Equation 1 in § 9.1, and is expressed in megapascals (Mpa).

¹ International Organization for Standardization, ISO Central Secretariat, Chemin de Blandonnet 8, CP 401-1214 Vernier, Geneva, Switzerland; Telephone: +41.22.749.01.11, Fax: +41.22.733.34.30, <http://www.iso.org>. ISO trademark is owned by International Organization for Standardization.

4.1.3 *flexural stress at break* σ_B — flexural stress at break of the test specimen.

NOTE 3: It is expressed in megapascals (Mpa).

4.1.4 *loading edge* — edge to apply the force to test specimen.

4.1.5 *speed of testing* v — rate of loading edge movement.

NOTE 4: It is expressed in millimeters per minute (mm/min).

4.1.6 *supports* — two supports to support the test specimen during flexural test.

5 Summary of Method

5.1 This Test Method is based on 3-point bending test and calculating the flexural stress at break.

6 Test Apparatus

6.1 Test Machine

6.1.1 The machine shall be capable of maintaining the test speed with the tolerance of ± 0.05 mm/min.

6.1.2 The machine shall be capable of measuring and recording the test force in newtons (N).

6.1.3 The error in the indicated force shall not exceed 1% of the actual value.

6.2 Supports and Loading Edge

6.2.1 Two supports and a central loading edge shall be arranged as shown in Figure 1.

6.2.2 The radius of the supports and the loading edge shall be $0.3 \text{ mm} \pm 0.02 \text{ mm}$.

6.2.3 The width of supports B_1 and loading edge B_2 shall be longer than the width of test specimen b .

6.2.4 Two supports shall be parallel to X direction within ± 0.03 mm and to Z direction within ± 0.02 mm. And two supports to the loading edge shall be parallel to X direction within ± 0.03 mm and to Z direction within ± 0.02 mm (refer to Figure 2).

6.2.5 The tip of the supports and loading edge shall be hardened more than HRC60 specified in ISO/DIS 6508-1.

6.2.6 The tip of the supports and loading edge shall have the roughness less than $1.6 \mu\text{m} \cdot \text{Ra}$ specified in ISO 468.

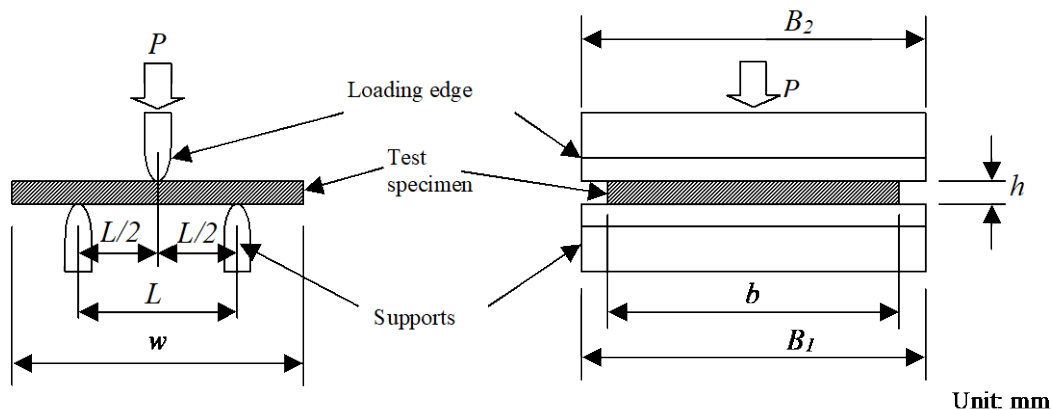


Figure 1
Position of Test Specimen at Start of Test