



Standard Practice for Ultrasonic C-Scan Bond Evaluation of Sputtering Target-Backing Plate Assemblies¹

This standard is issued under the fixed designation F1512; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice describes a method for ultrasonic mapping of the soundness of a bond joining a sputtering target to its supporting backing plate. The results of the examination may be used in predicting the target-backing plate assembly's suitability for use. Accept/reject standards are not specified; these are subject to agreement between target supplier and user, depending upon the application requirements.

1.2 This standard is intended to be used with Practice **E1001**.

1.3 The method reveals unbonded areas 0.125 in. (3 mm) in diameter and larger. The technique permits, for example, unambiguous quantitative measurement of the voided area in solder bonds.

1.3.1 This technique may also show regions in which bond integrity is marginally degraded by imperfect adhesion, for example, areas in which oxide inclusion has inhibited the development of full bond strength. Evaluation of indications of degraded bond areas may vary in rigor from purely subjective to semiquantitative. Target supplier and user must agree upon the means used to display and grade partially bonded areas.

1.4 This practice is applicable to assemblies having planar bonds in which the design provides at least one flat plane parallel to the bond that may be used as the entry/exit surface for ultrasonic excitation.

1.5 Only the immersion pulse-echo method is covered.

1.6 Evaluation by this method is intended to be nondestructive. For target assemblies that would be degraded by immersion in demineralized water, for example, for porous target materials, the test should be considered a destructive one.

1.7 This practice is applicable to bonding methods that use a filler material to join the target and backing plate. These include solder, epoxy, and braze bonds.

1.8 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical

conversions to SI units that are provided for information only and are not considered standard.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

E127 Practice for Fabricating and Checking Aluminum Alloy Ultrasonic Standard Reference Blocks

E428 Practice for Fabrication and Control of Metal, Other than Aluminum, Reference Blocks Used in Ultrasonic Testing

E1001 Practice for Detection and Evaluation of Discontinuities by the Immersed Pulse-Echo Ultrasonic Method Using Longitudinal Waves

E1316 Terminology for Nondestructive Examinations

2.2 *American Society for Nondestructive Testing Standard: ASNT Recommended Practice SNT-TC-1A for Personnel Qualification and Certification in Nondestructive Testing*³

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this practice see Practice **E1001** and Terminology **E1316**.

4. Summary of Practice

4.1 This practice describes a preferred means of applying Practice **E1001** to obtain a two dimensional map of the flaws in a sputtering target-backing plate bond. The target-backing plate assembly is immersed in demineralized water, used as a couplant, and the target-backing plate joint is scanned ultrasonically.

¹ This practice is under the jurisdiction of ASTM Committee **F01** on Electronics and is the direct responsibility of Subcommittee **F01.17** on Sputter Metallization.

Current edition approved June 1, 2011. Published June 2011. Originally approved in 1994. Last previous edition approved in 2003 as F1512–94 (2003). DOI: 10.1520/F1512-94R11.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Society for Nondestructive Testing (ASNT), P.O. Box 28518, 1711 Arlingate Ln., Columbus, OH 43228-0518, <http://www.asnt.org>.