



Designation: E 1820 – 99a01

## Standard Test Method for Measurement of Fracture Toughness<sup>1</sup>

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### 1. Scope

1.1 This test method covers procedures and guidelines for the determination of fracture toughness of metallic materials using the following parameters:  $K$ ,  $J$ , and CTOD ( $\delta$ ). Toughness can be measured in the  $R$ -curve format or as a point value. The fracture toughness determined in accordance with this test method is for the opening mode (Mode I) of loading.

1.2 The recommended specimens are single-edge bend, [SE(B)], compact, [C(T)], and disk-shaped compact, [DC(T)]. All specimens contain notches that are sharpened with fatigue cracks.

1.2.1 Specimen dimensional (size) requirements vary according to the fracture toughness analysis applied. The guidelines are established through consideration of material toughness, material flow strength, and the individual qualification requirements of the toughness value per values sought.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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.*

NOTE 1—Other standard methods for the determination of fracture toughness using the parameters  $K$ ,  $J$ , and CTOD are contained in Test Methods E 399, E 813, E 1152, E 1290, and E 1737. This test method was developed to provide a common method for determining all applicable toughness parameters from a single test.

### 2. Referenced Documents

2.1 *ASTM Standards:*

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee E-8 E08 on Fatigue and Fracture and is the direct responsibility of Subcommittee E08.08 on Elastic-Plastic Fracture Mechanics Technology.

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