



## Standard Test Method for Plane-Strain Fracture Toughness of Metallic Materials<sup>1</sup>

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*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This test method covers the determination of the plane-strain fracture toughness ( $K_{Ic}$ ) of metallic materials by tests using a variety of fatigue-cracked specimens having a thickness of 0.063 in. (1.6 mm) or greater.<sup>2</sup> The details of the various specimen and test configurations are shown in Annex A1-Annex A7 and Annex A9.

NOTE 1—Plane-strain fracture toughness tests of thinner materials that are sufficiently brittle (see 7.1) can be made with other types of specimens (1).<sup>3</sup> There is no standard test method for testing such thin materials.

1.2 This test method also covers the determination of the specimen strength ratio  $R_{sx}$  where  $x$  refers to the specific specimen configuration being tested. This strength ratio is a function of the maximum load the specimen can sustain, its initial dimensions and the yield strength of the material.

1.3 Measured values of plane-strain fracture toughness stated in inch-pound units are to be regarded as standard.

1.4 This test method is divided into two main parts. The first part gives general information concerning the recommendations and requirements for  $K_{Ic}$  testing. The second part is composed of annexes that give the displacement gage design, fatigue cracking procedures, and special requirements for the various specimen configurations covered by this method. In addition, an annex is provided for the specific procedures to be followed in rapid-load plane-strain fracture toughness tests.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee E-8 on Fatigue and Fracture and is the direct responsibility of Subcommittee E08.07 on Linear-Elastic Fracture.

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<sup>2</sup> For additional information relating to the fracture toughness testing of aluminum alloys, see Method B 645.

<sup>3</sup> The boldface numbers in parentheses refer to the list of references at the end of this test method.

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