



Designation: E 190 – 92 (Reapproved 1997)

Standard Test Method for Guided Bend Test for Ductility of Welds¹

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1. Scope

1.1 This test method covers a guided bend test for the determination of soundness and ductility of welds in ferrous and nonferrous products. Defects, not shown by X rays, may appear in the surface of a specimen when it is subjected to progressive localized overstressing. This guided bend test has been developed primarily for plates and is not intended to be substituted for other methods of bend testing.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI equivalents are in parentheses and may be approximate.

NOTE 1—For additional information see Terminology E 6, and American Welding Society Standard D 1.1.

1.3 *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:

E 6 Terminology Relating to Methods of Mechanical Testing²

2.2 AWS Standard:

D1.1 Structural Welding Code, Steel³

3. Summary of Test Method

3.1 The specimen is bent in a U-shaped die by means of a centrally applied force to the weldment in a flat specimen supported at two positions equidistant from the line of force application. The specimen is forced into the die by a plunger having the shape necessary to produce the desired contour. The convex surface of the bent specimen is examined for cracks or other open defects.

4. Significance and Use

4.1 The guided bend test as described in this test method is used to evaluate the quality of welds as a function of ductility as evidenced by their ability to resist cracking during bending.

5. Apparatus

5.1 The guided bend test jig is shown in Fig. 1 (see Explanatory Notes at end of this test method).

6. Sampling

6.1 Sampling is performed in accordance with the requirements of relevant specifications and codes.

7. Test Specimens

7.1 The types of specimens generally used for guided bend testing are rectangular ones machined from plates and pipes. The face surface of the flat specimen contains the greater width of the weld material, while the opposite side is called the root surface.

7.1.1 *Transverse Side Bend*—The weld is transverse to the longitudinal axis of the specimen which is bent so that either one of the side surfaces becomes the convex surface of the bent specimen (Fig. 2 and Fig. 3).

7.1.2 *Transverse Face Bend*—The weld is transverse to the longitudinal axis of the specimen which is bent so that the weld face surface becomes the convex surface of the bent specimen (Fig. 4).

7.1.3 *Transverse Root Bend*—The weld is transverse to the longitudinal axis of the specimen which is bent so that the weld-root surface becomes the convex surface of the bent specimen (Fig. 4).

7.1.4 *Longitudinal Face Bend*—The weld is parallel to the longitudinal axis of the specimen which is bent so that the weld-face surface becomes the convex surface of the bent specimen (Fig. 5).

7.1.5 *Longitudinal Root Bend*—The weld is parallel to the longitudinal axis of the specimen which is bent so that the weld root surface becomes the convex surface of the bent specimen (Fig. 5).

8. Procedure

8.1 Bend the guided-bend specimens in a test jig that is substantially in accordance with Fig. 1. Place transverse

¹ This test method is under the jurisdiction of ASTM Committee E-28 on Mechanical Testing and is the direct responsibility of Subcommittee E28.02 on Ductility and Flexure.

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² *Annual Book of ASTM Standards*, Vol 03.01.

³ Available from the American Welding Society, 2501 N.W. 7th St., Miami, FL 33125.