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Standard Test Method for Transverse Testing of Gray Cast Iron¹

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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 a procedure for performing transverse bending tests on separately cast cylindrical test bars of gray cast iron.

1.2 *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. Significance and Use

2.1 A transverse bending test on an unmachined test bar of gray cast iron is useful as a rapid and inexpensive means for estimating the approximate strength of the test bar, but is not a dependable substitute for a tension test on a machined specimen (Explanatory Note 1). The test yields easily measured deflection values which are useful for comparing the relative ductilities of different test bars of gray cast iron (Explanatory Note 2). The test can also be used to calculate a modulus of rupture or an apparent modulus of elasticity (Explanatory Note 3).

3. Dimensions and Form of Test Bars

3.1 The test bars shall be separate castings of essentially cylindrical shape (Explanatory Note 4), and available in three standard sizes as shown in Fig. 1 (Explanatory Note 5). They may contain a reasonable amount of pattern draft, but the diameter at the middle of the test bar shall be within the

tolerances given in Fig. 1.

3.2 Molds for the test bars shall be approximately at room temperature when poured. The test bars shall be cooled in the mold to a temperature less than 900°F (490°C), and then may be cooled in still air to room temperature.

4. Procedure

4.1 Perform the transverse test on a bar in the as-cast (unmachined) condition, loading the bar as a simple beam with the load applied midway between the supports as shown in Fig. 1. The supports and the loading fixture shall be designed to give essentially point contact with the test bar. Satisfactory contact is considered to exist when the supports and loading fixture have a cylindrical surface with a diameter of about ¼ to 1 in. (6.4 to 25.4 mm) and when this surface is positioned normal to the length of the test bar.

4.1.1 Round bars are those whose minimum and maximum diameters, at the middle of the length of the bars, differ by less than 0.025 in. (0.64 mm) for test bar A and by less than 0.050 in. (1.27 mm) for test bars B and C. Determine the reported breaking load, in pounds, for round bars by dividing the actual breaking load by a correction factor (Table 1), entering the table with the arithmetic average of the minimum diameters of the bar. The load is to be applied in line with the minimum diameter.

4.1.2 Elliptical bars are those whose minimum and maximum diameters, at the middle of the length of the bar, differ by more than 0.025 in. (0.64 mm) for test bar A or 0.050 in. (1.27 mm) for test bars B and C. For elliptical bars, apply the load in line with the minimum diameter. Determine the reported breaking load, in pounds, by dividing the actual breaking load by a correction factor (Table 1) entering the table with the minimum diameter.

¹ This method is under the jurisdiction of ASTM Committee A04 on Iron Castings and is the direct responsibility of Subcommittee A04.21 on Testing.

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