

Rolling Element Bearing Hardness Test

1. SCOPE:

This method outlines the standard procedure for testing the hardness of bearing components. Bearings covered by this test method shall be any rolling element bearing used in airframe control.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 ISO Publications: Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 3290 Metal Balls

2.1.2 ASTM Publications: Available from ASTM, 100 Barr Harbor, West Conshohocken, PA 10036-2959.

ASTM E 3 Standard Methods of Preparation of Metallographic Specimens

ASTM E 18 Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

ASTM E 140 Standard Hardness Conversion Tables for Metals, (Relationship Between Brinell Hardness, Vickers Hardness, Rockwell Hardness, Rockwell Superficial Hardness, and Knoop Hardness)

ASTM E 384 Standard Test Method for Microhardness of Materials

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2.2 Definitions:

Case Hardness: The hardness measured on the surface of a case hardened part.

Core Hardness: The hardness measured at a point below the total case depth which represents hardness of the product not affected by the case hardening operation.

Effective Case Depth: The perpendicular distance below the surface of the part, at which the specified level of hardness is reached.

Total Case Depth: The perpendicular distance below the surface at which no further decrease in hardness is observed.

2.3 Order of Precedence:

Text of standards and specifications that reference this test method takes precedence over the text of this document.

3. GENERAL REQUIREMENTS:

3.1 Measuring Hardness:

3.1.1 Hardness Tester: The hardness tester shall be capable of both Rockwell Hardness and Rockwell Superficial Hardness tests. Otherwise obtain a separate tester for each type of hardness test. Operation and standardization of the Rockwell Hardness and Rockwell Superficial Hardness tester shall be in accordance with ASTM E 18. Conversions between hardness scales may be made using the tables given in ASTM E 140. All cylindrical specimens tested must be corrected using Tables 6, 7, 13, and 14 from ASTM E 18.

3.1.2 Microhardness Tester: The microhardness tester shall have a precision x-y stage accurate to 0.0005 inch in both axes. Operation and standardization of the microhardness tester shall be in accordance with ASTM E 384. Conversions between hardness scales may be made using the tables given in ASTM E 140.

3.1.3 Metallographic Equipment: Standard metallographic mounting, grinding and polishing equipment shall be available.

3.2 Test Bearings:

Where applicable, bearings shall be disassembled by sectioning the inner and outer rings. The hardness of the inner ring raceway, outer ring raceway and of three rolling elements shall be tested. Hardness of the rod end body or riveted flanges of bellcrank bearings shall be tested also.