Designation: B886 – 12

Standard Test Method for Determination of Magnetic Saturation (Ms) of Cemented Carbides[1]

This standard is issued under the fixed designation B886; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of magnetic saturation (Ms) of cemented carbide powder materials and sintered products using magnetic saturation induction test instrumentation.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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:*[2]

A340 Terminology of Symbols and Definitions Relating to Magnetic Testing

B243 Terminology of Powder Metallurgy

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E1316 Terminology for Nondestructive Examinations

3. Terminology

3.1 *Definitions:*

3.1.1 For definition of terms used in this procedure refer to Terminology A340, Terminology B243, and Terminology E1316.

3.1.2 *dc*—direct current.

4. Summary of Test Method

4.1 A test specimen is statically positioned in the magnetic field generated by dc coils or a permanent magnet and sensing coils of the test apparatus. The specimen is magnetized to induction saturation by the field and translated linearly that the intrinsic magnetic moment of the specimen's binder phase induces a dc current to flow in the sensing coils of the test apparatus. The induced current is proportional to the amount of magnetic binder phase present in the test specimen. Measurement of the induced current permits calculation of the intrinsic magnetic saturation of the test sample.

5. Significance and Use

5.1 This test method allows the nondestructive measurement of the magnetic fraction of the binder phase in cemented carbide powder materials and sintered product, and may be used as an indirect measure of the carbon level in the material or product.

5.2 Measurement of magnetic saturation provides a comparison of the relative fraction of magnetic binder phase that is, cobalt, nickel, or iron, present in the material and can be used for acceptance of product to specification.

5.3 Measurement of magnetic saturation can be used as a measure of the quality of powder material.

6. Interferences

6.1 No direct absolute measurement of magnetic saturation can be made. The measurement is a relative comparison of standard reference materials.

6.2 Measurement of magnetic saturation is a nondestructive "bulk" measurement which is averaged over the test specimen volume. The technique cannot be used to infer anything regarding the relative distribution of the binder phase within the test sample.

6.3 Measurement of magnetic saturation is affected by test sample size and shape, especially aspect ratio, and the composition of the binder phase, that is, a mixture of ferromagnetic elements of varying intrinsic magnetic moments.

6.4 Small test samples or test samples containing relatively low concentrations of the binder phase may be immeasurable

[1] This test method is under the jurisdiction of ASTM Committee B09 on Metal Powders and Metal Powder Products and is the direct responsibility of Subcommittee B09.06 on Cemented Carbides.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.