



Standard Specification for Amorphous Magnetic Core Alloys, Semi-Processed Types¹

This standard is issued under the fixed designation A 901; 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 specification covers the general requirements to which flat-cast, amorphous, semi-processed, iron-base magnetic core alloys must conform.

1.2 These alloys are produced by a rapid-quenching, direct-casting process, resulting in metals with noncrystalline structure. The metallic alloys are made to meet specified maximum core-loss values and are intended primarily for commercial power frequency (50- and 60-Hz) applications in magnetic devices. Desirable core-loss and permeability characteristics are developed by further heat treatment in a magnetic field by the purchaser.² The heat treatment typically consists of heating the material to a temperature of 320 to 420°C in a dry, inert atmosphere for 5 to 10 min, although soak times of up to 2 h may be used for large transformer cores. A magnetic field may be required during annealing as designated by the producer. Exact optimum annealing conditions depend on the processing of the material and the size and shape of the device.

1.3 Some of these alloys are sensitive to mechanical stress. Care must be exercised in minimizing any stresses on the material in its final application, otherwise, its magnetic properties will be impaired significantly.

1.4 This specification is developed to aid in the purchase of transformer grade amorphous strip. It provides the chemical, physical, and magnetic parameters and procedures for quality control tests.

1.5 The values stated in customary (cgs-emu and inch-pound) units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units which are provided for information only and are not considered standard.

NOTE 1—For more information on procedures associated with this

specification, refer to the following: Practices A 34/A 34M, A 664, A 700, and B 490; Test Methods A 370 and A 773.

1.6 *This standard does not purport to address the safety concerns 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:

- A 34/A 34M Practice for Sampling and Procurement Testing of Magnetic Materials³
- A 340 Terminology of Symbols and Definitions Relating to Magnetic Testing³
- A 370 Test Methods and Definitions for Mechanical Testing of Steel Products⁴
- A 664 Practice for Identification of Standard Electrical Steel Grades in ASTM Specifications³
- A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment⁵
- A 712 Test Method for Electrical Resistivity of Soft Magnetic Alloys³
- A 773 Test Method for dc Magnetic Properties of Materials Using Ring and Permeameter Procedures with dc Electronic Hysteresigraphs³
- A 900 Test Method for Lamination Factor of Amorphous Magnetic Strip³
- B 490 Practice for Micrometer Bend Test for Ductility of Electrodeposits⁶
- C 693 Test Method for Density of Glass by Buoyancy⁷
- D 3455 Test Methods for Compatibility of Construction Materials with Electrical Insulating Oil of Petroleum Origin⁸

3. Terminology

3.1 The terms and symbols used in this specification are defined in Terminology A 340.

¹ This specification is under the jurisdiction of ASTM Committee A06 on Magnetic Properties and is the direct responsibility of Subcommittee A06.02 on Material Specifications.

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² The process of heat treatment in a magnetic field is covered by a patent held by General Electric Co. Interested parties are invited to submit information regarding the identification of acceptable alternatives to this patented item to the Committee on Standards, ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

³ Annual Book of ASTM Standards, Vol 03.04.

⁴ Annual Book of ASTM Standards, Vol 01.03.

⁵ Annual Book of ASTM Standards, Vol 01.05.

⁶ Annual Book of ASTM Standards, Vol 02.05.

⁷ Annual Book of ASTM Standards, Vol 15.02.

⁸ Annual Book of ASTM Standards, Vol 10.03.