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Standard Specification for Nonoriented Electrical Steel, Semiprocessed Types¹

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1. Scope

1.1 This specification covers the detailed requirements to which flat-rolled, nonoriented semiprocessed electrical steel shall conform.

1.2 This steel is produced to specified maximum core-loss values and is intended primarily for commercial power frequency (50- and 60-Hz) applications in magnetic devices. Desirable core-loss and permeability characteristics are developed through heat treatment by the user.

1.3 These nonoriented, semiprocessed electrical steels are low carbon, silicon-iron or silicon-aluminum-iron alloys containing up to about 2.5 % silicon and less than 1 % aluminum.

1.4 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.

2. Referenced Documents

2.1 *ASTM Standards*:²

A34/A34M Practice for Sampling and Procurement Testing of Magnetic Materials

A340 Terminology of Symbols and Definitions Relating to Magnetic Testing

A343/A343M Test Method for Alternating-Current Magnetic Properties of Materials at Power Frequencies Using Wattmeter-Ammeter-Voltmeter Method and 25-cm Epstein Test Frame

A664 Practice for Identification of Standard Electrical Steel Grades in ASTM Specifications

A700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment

A719/A719M Test Method for Lamination Factor of Magnetic Materials

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 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.

A720/A720M Test Method for Ductility of Nonoriented Electrical Steel

A971 Test Method for Measuring Edge Taper and Crown of Flat-Rolled Electrical Steel Coils

A976 Classification of Insulating Coatings for Electrical Steels by Composition, Relative Insulating Ability and Application

3. Terminology

3.1 The terms and symbols used in this specification are defined in Terminology A340.

4. Classification

4.1 The nonoriented electrical steel types described by this specification are shown in Table 1.

5. Ordering Information

5.1 Orders for material under this specification shall include as much of the following information as necessary to describe the desired material adequately:

5.1.1 ASTM specification number.

5.1.2 Core-loss type number.

5.1.3 Surface coating type.

5.1.4 Thickness, width, and length (if in cut lengths instead of coils).

5.1.5 Total weight of ordered item.

5.1.6 Limitations in coil size or lift weights.

5.1.7 *End Use*—The user shall disclose as much pertinent information as possible about the intended application to enable the producer to provide material characteristics most suitable for specific fabricating practices.

5.1.8 Special requirements or exceptions to the provisions of this specification.

6. Materials and Manufacture

6.1 *Typical Melting and Casting*:

6.1.1 These semiprocessed electrical steels may be made by basic-oxygen, electric furnace, or other steelmaking practice(s).

6.1.2 These electrical steels are characterized by low carbon, usually less than 0.030 %. The principal alloying element is commonly silicon, but aluminum up to about 0.8 % is sometimes used instead of, or in addition to, silicon, depending on mill processing practice for the desired magnetic

grade.