



Standard Specification for Thin-Gauge Nonoriented Electrical Steel Fully Processed Types¹

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1. Scope

1.1 This specification covers the detailed requirements to which flat-rolled thin-gauge nonoriented fully processed electrical steel shall conform. Nominal thicknesses included in this specification are 0.004 in. (0.10 mm) to 0.012 in. (0.30 mm).

1.1.1 Refer to Specification [A677](#) for properties of flat-rolled nonoriented fully processed electrical steel in nominal thicknesses of 0.014 in. (0.36 mm) to 0.025 in. (0.64 mm).

1.1.2 Refer to Specification [A876](#) for properties of flat-rolled grain-oriented fully processed electrical steel.

1.1.3 Thin-gauge nonoriented electrical steels with a high silicon content (typically 6½ %) manufactured using silicon vapor-deposition or similar processes are not included in this specification.

1.2 The steel covered in this specification is produced to specified maximum core loss values and is intended primarily for use in rotating electrical machinery and other electromagnetic devices operating at moderate to elevated frequencies (100 Hz and greater). Desirable core loss and permeability characteristics are developed during mill processing; however, lamination manufacturing processes may adversely affect these mill-produced properties. Additional stress-relief heat treatment by the user may therefore be helpful in remediating these properties in the manufactured laminations. Stress-relief annealing is discussed further in [Appendix X2](#).

1.3 These thin-gauge nonoriented fully processed electrical steels are low-carbon, silicon-iron, or silicon-aluminum-iron alloys typically containing 2.5 to 3.5 % silicon and a small amount of 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.

1.5 *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

- [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
- [A348/A348M](#) Test Method for Alternating Current Magnetic Properties of Materials Using the Wattmeter-Ammeter-Voltmeter Method, 100 to 10 000 Hz and 25-cm Epstein Frame
- [A664](#) Practice for Identification of Standard Electrical Steel Grades in ASTM Specifications
- [A677](#) Specification for Nonoriented Electrical Steel Fully Processed Types
- [A700](#) Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment
- [A717/A717M](#) Test Method for Surface Insulation Resistivity of Single-Strip Specimens
- [A719/A719M](#) Test Method for Lamination Factor of Magnetic Materials
- [A876](#) Specification for Flat-Rolled, Grain-Oriented, Silicon-Iron, Electrical Steel, Fully Processed Types
- [A927/A927M](#) Test Method for Alternating-Current Magnetic Properties of Toroidal Core Specimens Using the Voltmeter-Ammeter-Wattmeter Method
- [A937/A937M](#) Test Method for Determining Interlaminar Resistance of Insulating Coatings Using Two Adjacent Test Surfaces
- [A971/A971M](#) Test Method for Measuring Edge Taper and Crown of Flat-Rolled Electrical Steel Coils

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.