



Standard Specification for Fully Processed Magnetic Lamination Steel¹

This standard is issued under the fixed designation A 840/A 840M; 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 cold-rolled carbon steel coils or strip used in the fully processed condition in magnetic lamination applications.

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 during mill processing, so further heat treatment by the purchaser is not necessary for most uses.

1.3 Fully processed magnetic lamination steels are flat-rolled low carbon iron alloys having 1 % maximum silicon and 0.4 % maximum 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:

A 34/A 34M Practice for Sampling and Procurement Testing of Magnetic Materials²

A 340 Terminology of Symbols and Definitions Relating to Magnetic Testing²

A 343 Test Method for Alternating-Current Magnetic Properties of Materials at Power Frequencies Using Wattmeter-Ammeter-Voltmeter Method and 25-cm Epstein Test Frame²

A 664 Practice for the Identification of Standard Electrical and Lamination-Steel Grades in ASTM Specifications²

A 700 Practices for Packaging, Marking and Loading Methods for Steel Products for Domestic Shipment³

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

Current edition approved Oct. 10, 2000. Published December 2000. Originally published as A 840 – 85. Last previous edition A 840 – 91 (1996)^{ε1}.

² Annual Book of ASTM Standards, Vol 03.04.

³ Annual Book of ASTM Standards, Vol 01.05.

A 719 Test Method for Lamination Factor of Magnetic Materials²

3. Terminology

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

4. Classification

4.1 The fully processed magnetic lamination steel types described by this specification are as 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 Name of material (fully processed magnetic lamination steel).

5.1.3 ASTM core-loss type number.

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 purchaser shall disclose as much pertinent information as possible about the intended application to enable the supplier to provide material characteristics most suitable for specific fabricating practices.

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

6. Manufacture

6.1 Melting Practice:

6.1.1 These fully processed magnetic lamination steels may be made by basic oxygen, electric furnace, or other steelmaking practices.

6.1.2 These steels typically contain less than 0.03 % carbon.

6.1.3 The addition of silicon, aluminum, manganese, and phosphorus may be used to enhance punchability and improve magnetic properties by increasing electrical resistivity. The alloy additions are usually restricted such that the density of these steels is maintained above 7.825 g/cm³ (7825 kg/m³).