



Designation: A 805 - 93

A8 S

## Standard Specification for Steel, Flat Wire, Carbon, Cold-Rolled<sup>1</sup>

This standard is issued under the fixed designation A 805; 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 superscripted epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification covers carbon steel flat wire in coils or cut lengths. Flat wire is classified as a cold-rolled section, rectangular in shape, 0.500 in. (12.7 mm) or less in width and under 0.250 in. (6.35 mm) in thickness.

1.2 Low-carbon steel flat wire is produced from steel compositions with a maximum carbon content of 0.25 % by cast or heat analysis.

1.3 Carbon spring steel flat wire is produced to a carbon range in which the specified or required maximum is over 0.25 % by cast or heat analysis.

1.3.1 Two types of carbon spring steel flat wire are produced:

1.3.1.1 Untempered cold-rolled carbon spring steel flat wire, produced to several desirable combinations of properties and

1.3.1.2 Hardened and tempered carbon spring steel wire.

1.4 Definite application flat wire is a product developed for a specific application and may be specified only by size and descriptive name.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products<sup>2</sup>

A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel<sup>2</sup>

A 751 Test Methods, Practices and Terminology for Chemical Analysis of Steel Products<sup>2</sup>

E 45 Practice for Determining the Inclusion Content of Steel<sup>2</sup>

E 112 Test Methods for Determining Average Grain Size<sup>2</sup>

E 140 Hardness Conversion Tables for Metals (Relationship between Brinell Hardness, Vickers Hardness, Rockwell Hardness, Rockwell Superficial Hardness, and Knoop Hardness)<sup>2</sup>

#### 2.2 Military Standards:

MIL-STD-129 Marking for Shipment and Storage<sup>4</sup>

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage<sup>4</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.19 on Sheet Steel and Strip.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 01.03.

<sup>3</sup> Annual Book of ASTM Standards, Vol 03.01.

<sup>4</sup> Available from Standardization Documents Order Desk, Attn: Section D, 700 Robinson Ave., Philadelphia, PA 19111-5094, Attn: NPODS

### 2.3 Federal Standard:

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)<sup>4</sup>

### 2.4 SAE Standard:

Recommended Practice SAE J419 Methods of Measuring Decarburization<sup>5</sup>

### 3. Terminology

#### 3.1 Descriptions of Terms Specific to This Standard:

3.1.1 *annealing*—the process of heating to and holding at a suitable temperature and then cooling at a suitable rate, for such purposes as reducing hardness, facilitating cold working, producing a desired microstructure, or obtaining desired mechanical, physical, or other properties.

3.1.1.1 *batch annealing*—annealing that is generally performed in large cylindrical bell type or large rectangular box or car-type furnaces. The product is protected from scaling and decarburization by the use of a controlled atmosphere that envelopes the charge in an inner chamber sealed to prevent the influx of air or products of combustion. The coils or bundles are heated to a temperature in the vicinity of the lower critical temperature for the grade of steel, and held at that temperature for a definite length of time; after which the steel is allowed to cool slowly to room temperature. The time of holding at the annealing temperature varies with the grade of the steel and the desired degree of softness.

3.1.1.2 *continuous or strand annealing*—annealing that consists of passing a number of individual strands of flat wire continuously through either a muffle furnace or a bath of molten lead or salt, thus heating the flat wire to the desired temperature for a definite time. The hardness obtained by this type of annealing, as measured by Rockwell hardness number, is normally somewhat higher than is secured by batch-type annealing. Other characteristics peculiar to strand-annealed steel require this type of annealing for some flat wire products.

3.1.1.3 *salt annealing*—annealing that is accomplished by immersing bundles or coils of flat wire in a molten salt bath at a desired temperature for a definite time. Following the annealing, the coils are permitted to cool slowly, after which they are immersed in hot water to remove any adhering salts.

3.1.1.4 *spheroidize annealing*—an operation consisting of prolonged heating and prolonged cooling cycles to produce a globular or spheroidal condition of the carbide for maximum softness.

3.1.2 *cold reduction*—the process of reducing the thickness of the strip at room temperature. The amount of reduction is greater than that used in skin-rolling (see 3.3).

<sup>5</sup> Available from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.