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Standard Specification for Steel Wire, Deformed, for Prestressed Concrete Railroad Ties¹

This standard is issued under the fixed designation A 864/A 864M; 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 uncoated, direct-drawn deformed wire for prestressed concrete tendons used in railroad ties.

1.2 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

2. Referenced Documents

2.1 ASTM Standards:

A 370 Methods and Definitions for Mechanical Testing of Steel Products²

A 421 Specification for Uncoated Stress-Relieved Steel Wire for Prestressed Concrete²

2.2 U.S. Military Standards:

MIL-STD-129 Marking for Shipment and Storage³

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage³

2.3 U.S. Federal Standard:

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)³

3. Terminology

3.1 Descriptions of Terms Specific to This Standard:

3.1.1 *deformed steel wire for railroad ties*—as used within the scope and intent of this specification, shall mean a deformed, uncoated, direct-drawn steel wire intended for use as reinforcement in prestressed concrete railroad ties, the wire surface having deformations that: reduce longitudinal movement of the wire in such construction, and conform to the provisions of Section 7.

3.1.2 *direct-drawn wire*—as used within the scope and intent of this specification, shall mean a wire cold drawn from hot-rolled rod with no required prior or subsequent thermal treatment and having an internal coil diameter approximately the same as the wire-drawing capstan.

4. Ordering Information

4.1 Orders for direct-drawn deformed wire under this specification should include the following information:

4.1.1 Quantity (weight) [mass],

4.1.2 Name of material (deformed steel wire for prestressed concrete railroad ties),

4.1.3 Nominal diameter,

4.1.4 Packaging,

4.1.5 ASTM designation and year of issue, and

4.1.6 Special requirements, if any.

NOTE 1—A typical ordering description is as follows: 50 000 lb [23 000 kg] deformed steel wire for prestressed concrete railroad ties, 0.195-in. [5.0-mm] diameter wire in approximately 1600-lb [730-kg] coils to ASTM A 864 - — [A 864M - —].

5. Materials and Manufacture

5.1 The steel shall be made by the basic-oxygen, open-hearth or electric-furnace process.

5.2 The base metal shall be carbon steel of such quality that when drawn to a suitable wire size, shall have the properties and characteristics prescribed in this specification.

6. Mechanical Property Requirements

6.1 *General*—Deformed wire shall be supplied in coils after direct drawing and deforming to the specified mechanical properties in Table 1. Nominal diameters of wire not specifically itemized in this specification may be employed, providing that the breaking strength is defined and they conform otherwise to the requirements of this specification.

6.2 *Breaking Strength*—The breaking strength of the direct-drawn deformed wire shall conform to the requirements of Table 1. The tension test shall be made in accordance with Methods and Definitions A 370; Supplement IV.

6.3 *Load at 1 % Elongation*—The load at 1 % elongation

TABLE 1 Properties of Direct-Drawn Deformed Wire

Nominal Diameter, in. [mm]	Breaking Strength, min, lbf [kN]	Load at 1 % Elongation, min ^a , lbf [kN]	Nominal Cross-Sectional Area ^b , in. ² [mm ²]
0.195 [5.0]	6850 [30.5]	5140 [22.9]	0.030 [19.27]

^a The load at 1 % elongation is to be at least 75 % of the minimum specified breaking strength.

^b The nominal cross-sectional area is based on the nominal diameter. The actual area in square inches [square millimetres] may be calculated by dividing the weight [mass] per linear inch [millimetre] of the specimen in pounds [kilograms] by 0.2836 (weight of 1 in.³ of steel), [7.850 $\times 10^{-6}$ kg/mm³, (mass of 1 mm³ of steel)]. Due to the deformations, the actual cross-sectional area will vary from the nominal cross-sectional area. The degree of variation is dependent on the shape and character of the deformations.

¹ 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 A01.05 on Steel Reinforcement.

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² Annual Book of ASTM Standards, Vol 01.04.

³ Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.