



Designation: A 185/A 185M – 05a

Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete¹

This standard is issued under the fixed designation A 185/A 185M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers welded wire reinforcement to be used for the reinforcement of concrete.

NOTE 1—Welded wire for concrete reinforcement has been described by various terms: welded wire fabric, WWF, fabric, and mesh. The wire reinforcement industry prefers the term “welded wire reinforcement” (WWR) as being more representative of the range of products being manufactured. Therefore, the term “welded wire fabric” has been replaced with the term “welded wire reinforcement” in this specification and in related specifications.

1.2 The values stated in inch-pound or SI units are to be regarded as standard. Within the text the inch-pound 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 may result in nonconformance with the specification.

2. Referenced Documents

2.1 ASTM Standards:²

A 82/A 82M Specification for Steel Wire, Plain, for Concrete Reinforcement

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

2.2 Military Standards:

MIL-STD-129 Marking for Shipment and Storage³

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

2.3 Federal Standard:

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

¹ This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.05 on Steel Reinforcement.

Current edition approved June 1, 2005. Published July 2005. Originally approved in 1936. Last previous edition approved in 2005 as A 185 – 05.

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.

³ Available from Standardization Documents, Order Desk, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *convoluted wire*—when wire for welded wire reinforcement is formed into a sinusoidal wave shape, it is commonly referred to as convoluted wire. The wire is used in the manufacture of cages for certain applications of concrete pipe reinforcing.

3.1.2 *welded wire reinforcement*—as used within the scope and intent of this specification, designates a material composed of cold-drawn steel wire, as-drawn or galvanized, fabricated into sheets or rolls by the process of electric resistance welding. The finished material shall consist essentially of a series of longitudinal and transverse wires arranged substantially at right angles to each other, and welded together at points of intersection.

4. Ordering Information

4.1 It shall be the responsibility of the purchaser to specify all requirements that are necessary for the manufacture and delivery of the welded wire reinforcement under this specification. Such requirements to be considered include, but are not limited to, the following:

4.1.1 Quantity (mass [weight] or square area),

4.1.2 Name of material (welded wire reinforcement for concrete),

4.1.3 Wire spacings and sizes,

4.1.4 Minimum yield strength if Supplement S 1 of Specification A 82/A 82M applies.

4.1.5 Yield strength measurement. The purchaser shall have the options described in Specification A 82/A 82M Section 11.3

4.1.6 Exclusion of oversteeling, if required (see 8.4.2),

4.1.7 Length and width of sheets or rolls,

4.1.8 Packaging (see Section 15),

4.1.9 Request for outside inspection (if not requested, 15.1 applies), and

4.1.10 ASTM designation and year of issue.

NOTE 2—A typical ordering description is as follows: 100 × 300 – MW100 × MW40 2450 mm × 6 m [4 × 12 – W15 × W6 96 in. × 20 ft.] in secured bundles of flat sheets, to ASTM A 185– _____.

*A Summary of Changes section appears at the end of this standard.



5. Materials

5.1 The wire used in the manufacture of welded wire reinforcement shall conform to Specification A 82/A 82M and its Supplement S1 if so ordered.

5.2 Welded wire reinforcement shall be furnished either in flat sheets, or in rolls, as specified by the purchaser.

6. Manufacture

6.1 The wires shall be assembled by automatic machines or by other suitable mechanical means that will assure accurate spacing and alignment of all wires of the finished welded wire reinforcement.

6.2 Longitudinal and transverse wires shall be securely connected at every intersection by a process of electrical-resistance welding which employs the principle of fusion combined with pressure.

6.3 Wire of proper yield strength and quality when fabricated in the manner herein required shall result in a strong, serviceable mat-type product having substantially square or rectangular openings. It shall be fabricated and finished in a workmanlike manner and shall conform to this specification.

NOTE 3—A variation of manufacturing includes the application of one or more longitudinal convoluted wires at one edge of welded wire reinforcement for concrete pipe reinforcing cages. This shape allows the cage ends to be expanded to a larger diameter to accommodate the bell-shaped ends of concrete pipe.

7. Mechanical Property Requirements Mechanical Property Requirements

7.1 Tensile—Wire for the production of welded wire reinforcement is described in Specification A 82/A 82M. Tensile tests shall be made on wire cut from the welded wire reinforcement and tested either across or between the welds; no less than 50 % shall be across welds. Tensile tests across a weld shall have the welded intersection located approximately at the center of the wire being tested and the cross wire forming the welded intersection shall extend approximately 25 mm [1 in.] beyond each side of the welded intersection.

NOTE 4—Tensile, reduction of area, and bend testing are normally done at the time the wire is drawn. The manufacturer’s finished product shall meet the requirements of this specification and Specification A 82/A 82M.

7.2 Reduction of Area—The ruptured section of the tensile specimen shall be measured to determine this property. In the case of a specimen which has been tested across a weld, the measurement shall be made only when rupture has occurred at a sufficient distance from the center of a weld to permit an accurate measurement of the fractured section. The wire shall meet the minimum reduction of area requirements of Specification A 82/A 82M.

7.3 Bend Test—The wire shall withstand the bend test as described in Specification A 82/A 82M and shall be performed on a specimen taken from between the welds.

7.4 Weld Shear Strength—The weld shear strength between longitudinal and transverse wires shall be tested as described in Section 10. The minimum average shear value in Newtons shall be not less than 241 multiplied by the nominal area of the larger wire in square millimetres [or in pounds-force shall not be less than 35 000 multiplied by the nominal area of the larger

wire in square inches]. Typical examples of the 40 % or more wire size differential area are as follows:

Larger	Smaller
Size No. MW129 [W 20]	Size No. MW52 [W 8]
Size No. MW97 [W 15]	Size No. MW39 [W 6]
Size No. MW65 [W 10]	Size No. MW26 [W 4]

7.4.1 Welded wire reinforcement having a relationship of longitudinal and transverse wires other than those covered in 7.4 shall not be subject to the weld shear requirement.

7.4.2 Weld-shear tests for determination of conformance to the requirements of 7.4 shall be conducted using a weld tester as described in Section 10.

7.4.3 Four welds selected at random from the specimen described in 10.2 shall be tested for weld shear strength. The transverse wire of each test specimen shall extend approximately 25 mm [1 in.] on each side of the longitudinal wire. The longitudinal wire of each test specimen shall be of such length below the transverse wire so as to be adequately engaged by the grips of the testing machine. It shall be of such length above the transverse wire that its end shall be above the center line of the upper bearing of the weld tester.

7.4.4 The material shall be deemed to conform to the requirements for weld shear strength if the average of the four samples complies with the value stipulated in 7.4. If the average fails to meet the prescribed value, all the welds across the specimen shall then be tested. The welded wire reinforcement shall be deemed acceptable if the average of all weld shear test values across the specimen meets the prescribed minimum value.

8. Dimensions, Mass, and Permissible Variations

8.1 Width—The width of welded wire reinforcement shall be considered to be the center-to-center distance between outside longitudinal wires. The permissible variation shall not exceed 13 mm [½ in.] greater or less than the specified width. In case the width of flat sheets or rolls is specified as the overall width (tip-to-tip length of cross wires), the width shall not vary more than ±25 mm [±1 in.] from the specified width.

8.2 Length—The overall length of flat sheets, measured on any wire, shall not vary more than ±25 mm [±1 in.], or 1 %, whichever is greater.

8.3 Overhang of the transverse wires shall not project beyond the centerline of each longitudinal edge wire more than a distance of 25 mm [1 in.], unless otherwise specified. When transverse wires are specified to project a specific length beyond the center line of a longitudinal edge wire, the permissible variation shall not exceed 13 mm [½ in.] greater or less than the specified length.

8.4 The permissible variation in diameter of any wire in the finished welded wire reinforcement shall conform to the tolerances prescribed for the wire before fabrication, in Specification A 82/A 82M, with the following exceptions:

8.4.1 Because of the mechanical characteristics of fabricating welded wire reinforcement, the out-of-round requirements shall not apply.

8.4.2 Unless otherwise precluded by the purchaser in 4.1, the manufacturer shall be permitted to apply over-sized wire. The size differential shall not exceed two “W” size increments on sizes MW52 [W 8] and smaller, and four “W” size

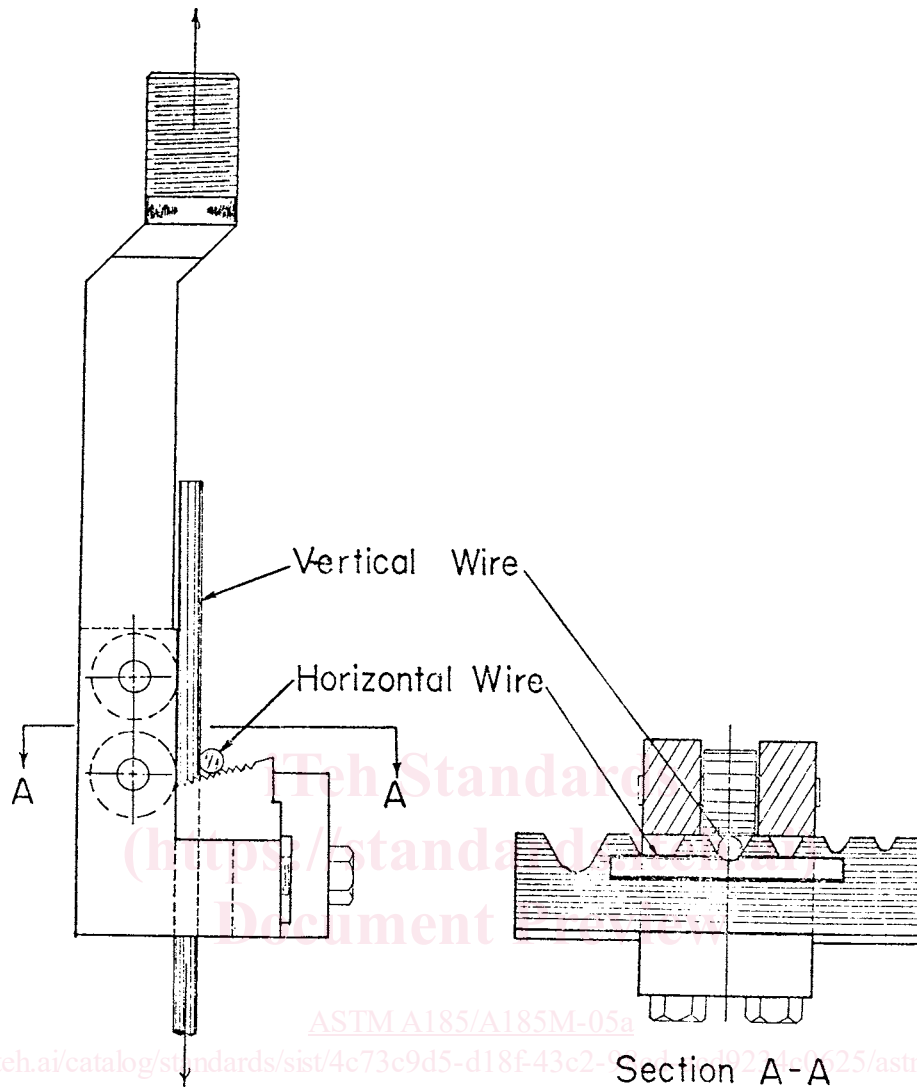


FIG. 1 Welded Wire Reinforcement Weld Tester

increments on sizes larger than MW52 [W 8]. A “W” size increment is a whole number increment, for example, W 5 to W 6, or W 5.4 to W 6.4, etc. In all cases where such oversteeling is practiced, the manufacturer shall identify the welded wire reinforcement with the style originally ordered. With the permission of the purchaser, the manufacturer shall be permitted to exceed the limits of this section.

8.5 The average spacing of wires shall be such that the total number of wires contained in a sheet or roll is equal to or greater than that determined by the specific spacing, but the center-to-center distance between individual members shall not vary more than 6.35 mm [$\frac{1}{4}$ in.] from the specified spacing. Sheets of welded wire reinforcement having the specified length shall not be required to contain an identical number of transverse wires, and therefore, shall be permitted to have various lengths of longitudinal overhang.

9. Number of Tests

9.1 One test for conformance to tensile strength and bend requirements, and one check for conformance to dimensional

characteristics shall be made for each 7 000 m²[75 000 ft²] of welded wire reinforcement or remaining fraction thereof.

9.2 One test for conformance to weld shear strength requirement shall be made for each 28 000 m²[300 000 ft²] of welded wire reinforcement or remaining fraction thereof.

10. Weld Shear Test Apparatus and Methods

10.1 As the welds in welded wire reinforcement contribute to the bond and anchorage value of the wires in concrete, the weld acceptance tests shall be made in a weld tester that stresses the weld in a manner similar to which it is stressed in concrete. In order to accomplish this the vertical wire in the weld tester shall be stressed in an axis close to its center line. Also the horizontal wire shall be held closely to the vertical wire, and in the same relative position, so as to prevent rotation of the horizontal wire. When the welded wire reinforcement is