Designation: A 497 – 99$^{\epsilon 1}$

Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement[1]

This standard is issued under the fixed designation A 497; 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.

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

ε[1] NOTE—An editorial change was made in 15.3 in June 2001.

1. Scope

1.1 This specification covers welded wire fabric made from cold-worked drawn or rolled deformed wire, or a combination of deformed and non-deformed wires, to be used for the reinforcement of concrete.

1.2 The values stated in either inch-pound or SI units are to be regarded as the standard. Within the text the inch-pound units are shown in parenthesis. 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:*

A 82 Specification for Steel Wire, Plain, for Concrete Reinforcement[2]

A 496 Specification for Steel Wire, Deformed, for Concrete Reinforcement[2]

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment[3]

2.2 *Military Standards:*

MIL-STD-129 Marking for Shipment and Storage[4]

MIL-STD-163 Steel Mill Products Preparation for Shipment and Storage[4]

2.3 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipments (Civil Agencies)[4]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *convoluted wire, n*—when wire for welded fabric is shaped 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. Only non-deformed wire is normally subject to convolution.

3.1.2 *welded wire fabric, n—as used within the scope and intent of this specification,* welded wire fabric designates a material composed of cold-worked steel wire, 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 Orders for material to this specification should include the following information:

4.1.1 Quantity (weight or square area),

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

4.1.3 Wire spacings and sizes,

4.1.4 Minimum yield strength if Supplement S1 of Specification A 496 applies; and minimum yield strength if wire conforming to Specification A 82 is to be used and Supplement S1 of Specification A 82 applies.

4.1.5 Exclusion of over-steeling, if required (see 9.4.1),

4.1.6 Length and width of sheets or rolls,

4.1.7 Packaging (see Section 16), and

4.1.8 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 10 000 ft^2 welded deformed wire fabric for concrete reinforcement, 6 × 12–D6× D2, in flat sheets 96 in. wide by 240 in. long, in secured lifts, to ASTM A 497 – ____.

5. Materials

5.1 The wire used in the manufacture of welded wire fabrics shall conform to Specification A 496 and its Supplement S1 if so ordered, either solely or in combination with wire conforming to Specification A 82 and its Supplement S1 if so ordered.

5.2 Welded wire fabric 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

[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.

Current edition approved Oct. 10, 1999. Published December 1999. Originally published as A 497 – 64. Last previous edition A 497 – 97.

[2] *Annual Book of ASTM Standards,* Vol 01.04.

[3] *Annual Book of ASTM Standards,* Vol 01.05.

[4] Available from Standardization Documents Order Desk, Building 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.

by other suitable mechanical means which will assure accurate spacing and alignment of all members of the finished fabric.

6.2 Longitudinal and transverse members 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 grade and quality when fabricated in the manner herein required shall result in a strong, serviceable mesh-type product having substantially square or rectangular openings. It shall be fabricated and finished in a workmanlike manner, shall be free of injurious defects, and shall conform to this specification.

NOTE 2—A variation of manufacturing includes the application of one or more longitudinal convoluted wires at one edge of fabric 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

7.1 *Tensile*—Wire for the production of welded wire fabric, deformed, is described in Specification A 496. Tensile tests may be made on wire cut from the welded wire fabric 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 joint located approximately at the center of the wire being tested and the cross wire forming the welded joint shall extend approximately 25 mm (1 in.) beyond each side of the welded joint.

NOTE 3—Tensile and bend testing are normally done at the time wire is drawn. The manufacturer's finished product still must satisfy the mechanical properties when tested after fabrication.

7.2 *Bend Test*—The wire shall withstand the bend test as described in Specification A 496 and shall be performed on a specimen taken from between the welds.

7.3 *Weld Shear Strength*—The weld shear strength between longitudinal and transverse wires shall be tested as described in Section 8. The minimum average shear value in pounds-force shall not be less than 35 000, multiplied by the nominal area of the larger wire in square inches (or in Newtons, shall not be less than 241, multiplied by the nominal area in square millimetres), where the smaller wire is not less than size D4 and has an area of 40 % or more of the area of the larger wire.

7.3.1 Fabric having a relationship of larger and smaller wires other than that covered in 7.3 shall meet an average weld shear strength requirement of not less than 3.6 kN (800 lbf) provided that the smaller wire is not smaller than D4.

7.3.2 Weld-shear tests for determination of conformance to the requirements of 7.3 shall be conducted using a fixture as described in Section 8.

7.3.3 Four welds selected at random from the specimen described in 11.2 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 testing device.

7.3.4 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 7.3. If the average fails to meet the prescribed value, all the welds across the specimen shall then be tested. The fabric will be acceptable if the average of all weld shear test values across the specimen meets the prescribed minimum value.

8. Weld Shear Test Apparatus and Methods

8.1 As the welds in welded wire fabric contribute to the bonding and anchorage value of the wires in concrete, it is imperative that the weld acceptance tests be made in a jig which will stress the weld in a manner similar to which it is stressed in concrete. In order to accomplish this, the vertical wire in the jig must be stressed in an axis close to its center line. Also the horizontal wire must be held closely to the vertical wire, and in the same relative position, so as to prevent rotation of the horizontal wire. When the fabric is designed with different wire sizes, the larger diameter wire is the "vertical wire'' when tested (see Fig. 1[5]).

8.2 Fig. 1 shows the details of a typical testing jig together with two anvils which make it possible to test welds for wire up to 15.9 mm (0.625 in.) in diameter. This testing jig can be used in most tension testing machines and should be hung in a ball and socket arrangement at the center of the machine. This, or a similarly effective fixture designed on the same principle, is acceptable.

8.3 Test specimens should be inserted through the notch in the anvil using the smallest notch available in which the vertical wire will fit loosely. The vertical wire shall be in contact with the surface of the free rotating rollers while the horizontal wire shall be supported by the anvil on each side of the slot. The bottom jaws of the testing machine shall grip the lower end of the vertical wire and the load shall be applied at a rate of stressing not to exceed 689 MPa/min (100 ksi/min).

9. Dimensions

9.1 *Width*—The width of fabric shall be considered to be the center-to-center distance between outside longitudinal wires. The permissible variation shall not exceed 13 mm (0.5 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. When measurements involve a convoluted wire, the measurement shall be made to the approximate center of the sinusoidal wave shape.

9.2 *Length*—The overall length of flat sheets, measured on any wire, may vary ±25 mm (±1 in.), or 1 %, whichever is greater.

9.3 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 (0.5 in.) greater or less than the specified length.

[5] A detailed drawing showing complete dimensions of the testing jig may be obtained from ASTM Headquarters. Request ADJA0185.