Designation: A641/A641M – 09a (Reapproved 2014)

Standard Specification for Zinc–Coated (Galvanized) Carbon Steel Wire[1]

This standard is issued under the fixed designation A641/A641M; 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 U.S. Department of Defense.

1. Scope*

1.1 This specification covers soft, medium, and hard temper zinc-coated (galvanized) carbon steel wire in coils for general use.

1.2 The supplementary requirements of this specification cover zinc-coated weights [masses] for nails, staples, and wire from which nails and staples are cut and formed.

1.3 This specification is applicable to orders in either inch-pound units (as A641) or SI units (as A641M). Values stated in either inch-pound units or SI units are to be regarded separately as the standard. Within the text, the SI units are shown in brackets. The values stated in the two systems are not exact equivalents; therefore, each system shall be used independent of the other, without combining values in any way.

1.4 This specification and some referenced specifications are expressed in both inch-pound and SI units. If the order specifies the applicable "M" specification designation, the product shall be furnished to SI units.

1.5 The text of this specification references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the specification.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A90/A90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

A700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment (Withdrawn 2014)[3]

A902 Terminology Relating to Metallic Coated Steel Products

B6 Specification for Zinc

E8 Test Methods for Tension Testing of Metallic Materials

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology A902.

4. Classification

4.1 *Temper*—The wire is classified with regard to mechanical properties by temper, which is related to tensile strength and stiffness. The temper designations are soft, medium, and hard.

4.2 *Zinc Coating*—Zinc coating on the wire is classified in a number of classes (Class 1, 2, 3, or A, 4, B, 5, C (see Table 1, Table 2, Table 3, and Table S1.1)) and as "regular coating."

NOTE 1—Class 2 coating has been eliminated since it is no longer generally specified by users except for nails, staples, and wire from which nails and staples are cut and formed, as presented in the Supplementary Requirements.

5. Ordering Information

5.1 Orders for material under this specification shall include the following information:

5.1.1 Quantity (weight [mass]),

5.1.2 Coated wire diameter,

5.1.3 Intended use, when the wire is to be used for nails or staples (see Supplementary Requirement S1),

5.1.4 Class of coating (see Table 1, Table 2, or Table 3 (or Table S1.1 when applicable)),

5.1.5 Temper (soft, medium, or hard) (Table 4 or Table 5), tensile strength-mechanical properties other than specified in Table 4 or Table 5 can be ordered upon agreement between the purchaser and producer,

5.1.6 ASTM designation and year of issue as A641–____ for inch-pound units, or A641M-____ for SI units.

5.1.7 Supplementary Requirements (if required).

NOTE 2—A typical ordering description (inch-pound units) is as follows: 50 000 lb, 0.120 in., zinc-coated wire, Class 1 coating, soft

[1] This specification is under the jurisdiction of ASTM Committee A05 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.12 on Wire Specifications.

Current edition approved Nov. 1, 2014. Published November 2014. Originally approved in 1992. Last previous edition approved in 2009 as A641/A641M - 09a. DOI: 10.1520/A0641_A0641M-09AR14.

[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] The last approved version of this historical standard is referenced on www.astm.org.

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

TABLE 8 Mandrel Diameters for Test for Adherence of Zinc Coating (Inch-Pound Units)

Wire Diameter, in.	Mandrel Diameters for Coating Classes	
	Regular and 1	Class 3, 4, 5 or A, B, and C
0.035 to under 0.076	1*D*[A]	2*D*[A]
0.076 to under 0.148	1*D*	3*D*
0.148 to 0.500, incl	2*D*	4*D*

[A] *D* = nominal wire diameter being tested.

TABLE 9 Mandrel Diameters for Test for Adherence of Zinc Coating (SI Units)

Wire Diameter, mm	Mandrel Diameters for Coating Classes	
	Regular and 1	Class 3, 4, 5 or A, B, and C
0.20 to under 1.90	1*D*[A]	2*D*[A]
1.90 to under 3.70	1*D*	3*D*
3.70 and over	2*D*	4*D*

[A] *D* = nominal wire diameter being tested.

for the property tested shall be deemed to conform to the specification requirements.

13. Inspection

13.1 Unless otherwise specified in the purchase order or contract, the manufacturer is responsible for the performance of all inspection and test requirements specified in this specification. Except as otherwise specified in the purchase order or contract, the manufacturer shall use his own or other suitable facilities for the performance of the inspection and test requirements, at his option, unless disapproved by the purchaser at the time the order is placed. The purchaser shall have the right to perform any of the inspection and tests prescribed in this specification when such inspections and tests are deemed necessary to ensure that the material conforms to prescribed requirements.

14. Rejection and Rehearing

14.1 Material that fails to conform to the requirements of this specification is subject to rejection. Rejection shall be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier shall make claim for a rehearing.

15. Certification

15.1 When specified in the purchase order or contract, a producer's or supplier's certification shall be furnished to the purchaser that the material was manufactured, sampled, tested, and inspected in accordance with this specification and has been found to meet the requirements. When specified in the purchase order or contract, a report of the test results shall be furnished.

16. Package and Package Marking

16.1 Unless otherwise specified, packaging, marking, and loading for shipment shall be in accordance with Practices A700.

17. Keywords

17.1 galvanized wire; steel wire; wire; zinc-coated carbon steel wire

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply only when specified by the purchaser in the contract or order.

S1. Zinc Coating on Wire for Nails and Staples

S1.1 These requirements apply only to nails and staples, and coated wire from which nails and staples are cut and formed, which are specified to have a Class 1 or Class 2 zinc coating.

S1.2 *Coating Weight [Mass]*—The zinc coating weight [mass] on the nails or staples, or on the wire to be used in the manufacture of nails and staples, as represented by test specimens tested in accordance with Section 12 of this specification and Test Method A90/A90M, shall conform to the requirements of Table S1.1 for the class specified.

S1.3 *Class 2 Coating Requirements*—The permissible variation in diameter of nails, staples, or wire specified to have Class 2 coating shall be the same as shown for Class 1 coating in Table 6 or Table 7. The test for coating adherence on nails,

TABLE S1.1 Minimum Weight [Mass] of Zinc per Unit Area of Uncoated Nail, Staple, or Wire Surface

Diameter of Staple Leg, Nail Shank, or Wire, in. [mm][A]	Class 1 Coating, oz/ft^2 [g/m ^{2}]	Class 2 Coating, oz/ft^2 [g/m ^{2}]
0.035 [0.89]	0. 10 [30]	0.30 [90]
0.048 [1.22]	0.15 [45]	0.30 [90]
0.062 [1.57]	0.15 [45]	0.35 [105]
0.076 [1.93]	0.20 [60]	0.40 [120]
0.080 [2.03]	0.25 [75]	0.45 [135]
0.092 [2.34]	0.28 [85]	0.50 [150]
0.148 [3.76]	0.35 [105]	0.60 [180]
0.192 [4.88]	0.50 [150]	0.70 [215]
0.207 [5.26] and larger	0.53 [160]	0.75 [230]

[A] Coating weights [mass] for diameters other than those shown in Table S1.1 are the coating weights [mass] for the next smaller diameter.

staples, or wire specified to have Class 2 coating shall be conducted using the mandrel diameter as shown for Class 1 coating in Table 8 or Table 9.

SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue (A641/A641M - 09) that may impact the use of this standard. (March 1, 2009)

(1) Revised 5.1.5 and 7.1.

Committee A05 has identified the location of selected changes to this standard since the last issue (A641/A641M - 03) that may impact the use of this standard. (January 1, 2009)

(1) Revised 9.1.