



Designation: ~~B 606–02~~ Designation: **B606 – 08**

Standard Specification for High-Strength Zinc-Coated (Galvanized) Steel Core Wire for Aluminum and Aluminum-Alloy Conductors, Steel Reinforced¹

This standard is issued under the fixed designation B606; 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 round, high-strength, zinc-coated (galvanized), steel core wire with Class A zinc coating used for mechanical reinforcement in the manufacture of special aluminum and aluminum-alloy conductors, steel reinforced.

1.2 This specification covers wire of diameter from 0.0500 to 0.1900 in. inclusive.

1.3 The values stated in inch-pound units or SI units are to be regarded separately as standard. The values in each system are not exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with this specification.*

1.1 This specification covers round, high-strength, zinc-coated (galvanized), steel core wire with Class A zinc coating (GA3) for use in overhead electrical conductors..

1.2 This specification covers wire of diameter from 0.0500 to 0.1900 in. inclusive or 1.27 to 4.82 mm inclusive.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

2. Referenced Documents

2.1 The following documents of the issue in effect on date of material purchase form a part of this specification to the extent referenced herein.

2.2 *ASTM Standards*:²

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

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

B6 Specification for Zinc

~~B193 Test Method for Resistivity of Electrical Conductor Materials~~ Test Method for Resistivity of Electrical Conductor Materials

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

3. Terminology

3.1 *Definitions*:

3.1.1 *lot*—unless otherwise specified in the contract or order, a lot shall consist of all coils of wire of the same diameter and unit lengths submitted for inspection at the same time.

3.1.2 *Product Code*—Defines product coating type, coating class and strength grade. This specification covers only High Strength Class A Zinc Coated products and identified as product code GA3.

4. Ordering Information

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

4.1.1 Quantity of each size,

¹ This specification is under the jurisdiction of ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.05 on Conductors of Ferrous Metals.

Current edition approved Oct. 10, 2002. Published October 2002. Originally published as B 606–75. Last previous edition B 606–98.

Current edition approved Nov. 1, 2008. Published December 2008. Originally approved in 1975. Last previous edition approved in 2002 as B606–02. DOI: 10.1520/B0606-08.

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* Vol 01.06, volume information, refer to the standard's Document Summary page on the ASTM website.

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

- 4.1.2 Wire diameter in inches or millimeters (Section 13),
- 4.1.3 Certification, if required (Section 18),
- 4.1.4 Test report, if required (Section 18), and
- 4.1.5 Package size (Section 19).
- 4.1.6 Order Example: Five multiple lengths of 12 000 ft. each, 0.1327 in. GA3 wire, packaged onto wooden non-returnable reels, with certified test report.
- 4.1.7 Product Code (see paragraph 3.1.2).

5. Materials and Manufacture

- 5.1 The base metal shall be steel produced by the open-hearth, electric-furnace, or basic-oxygen process.
- 5.2 The wire shall be cold drawn and coated with zinc to produce the desired properties.
- 5.3 The slab zinc used for coating shall be high grade or better, conforming to Specification B-6B6.

6. Chemical Composition

6.1 The steel shall conform to the requirements prescribed in Table 1. ~~TABLE 1~~Chemical Requirements

Element	Composition, %
Carbon	0.50 to 0.88
Manganese	0.50 to 1.30
Phosphorus, max	0.035
Sulfur, max	0.045
Silicon	0.10 to 0.35

~~6.2~~Chemical analysis shall be conducted in accordance with Test Methods, Practices, and Terminology A 751A 751.

TABLE 2 Tensile Requirements

Specified Diameter in.	Stress at 1 % Extension, min mm	Ultimate Tensile Strength, min kpsi	Elongation in 10 in.-or 250 mm, min %	
			kpsi/MPa	ksi/MPa
0.0500 to 0.0899, incl	1.270 to 2.283, incl	210	1450	235+6203.0
0.0900 to 0.1199, incl	2.286 to 3.045, incl	205	1410	230+5903.0
0.1200 to 0.1399, incl	3.048 to 3.553, incl	200	1380	225+5503.5
0.1400 to 0.1900, incl	3.556 to 4.823, incl	195	1340	220+5203.5

6.2 Chemical analysis shall be conducted in accordance with Test Methods, Practices, and Terminology A751.

7. Tensile Test standards.iteh.ai/catalog/standards/sist/aab2b58e-fca1-4128-9fb6-c646b98e580c/astm-b606-08

- 7.1 The zinc-coated steel core wire shall conform to the tensile and elongation requirements prescribed in Table 2 or Table 3.
- 7.2 Tensile tests shall be conducted in accordance with Test Methods and Definitions A 370A370, using the initial settings for determining stress at 1 % extension given in ~~Table 3~~Table 4 or Table 5 of this specification.
- 7.3 Test Specimens— The test specimens shall be free of bends or kinks other than the curvature resulting from the usual coiling operations. Any hand straightening necessary to permit insertion of the specimen in the jaws of the testing machine shall be performed by drawing between wood blocks or by some other equally satisfactory means.

8. Wrap Test

8.1 The material, as represented by the test specimens, shall not fracture when the galvanized wire is wrapped at a rate not exceeding 15 turns/min in a close helix of at least eight turns around a cylindrical mandrel with a diameter equal to three times the specified diameter of the wire under test, $\pm 5\%$.

9. Coating Test

9.1 The zinc-coated wire shall conform to the coating requirements prescribed in ~~Table 4~~Table 6 or Table 7. ~~TABLE 4~~Zinc Coating

TABLE 1 Chemical Requirements

Element	Composition, %
Carbon	0.50 to 0.88
Manganese	0.50 to 1.30
Phosphorus, max	0.035
Sulfur, max	0.045
Silicon	0.10 to 0.35

TABLE 3 Initial Settings for Determining Stress at 1 % Extension

MPa	Specified Diameter	Initial Stress		Initial Setting of Extensometer
	in.	mm	kpsi	ksin./in.
	0.0500 to 0.0899, incl	1.270 to 2.283, incl		0.0005 (0.05 % extension)
	0.0500 to 0.0899, incl	15	14	0.0005 (0.05 % extension)
-97		0.0005 (0.05 % extension)		
	0.0900 to 0.1199, incl	2.286 to 3.045, incl		0.0010 (0.10 % extension)
	0.0900 to 0.1199, incl	30	28	0.0010 (0.10 % extension)
193		0.0010 (0.10 % extension)		
	0.1200 to 0.1900, incl	3.048 to 4.832, incl		0.0015 (0.15 % extension)
	0.1200 to 0.1900, incl	46	42	0.0015 (0.15 % extension)

TABLE 3 Tensile Requirements (Metric)

Specified Diameter mm	Stress at 1 % Extension, min	Ultimate Tensile Strength, min		Elongation in 250 mm, min %
	MPa	MPa		
1.27 to 2.28, incl	1450	1620		3.0
2.29 to 3.04, incl	1410	1590		3.0
3.05 to 3.55, incl	1380	1550		3.5
3.56 to 4.82, incl	1340	1520		3.5

TABLE 5 Initial Settings for Determining Stress at 1 % Extension (Metric)

Specified Diameter	Initial Stress	Initial Setting of Extensometer
mm	MPa	mm/mm
1.27 to 2.28, incl	110	0.0005 (0.05 % extension)
2.29 to 3.04, incl	210	0.0010 (0.10 % extension)
3.05 to 4.82, incl	320	0.0015 (0.15 % extension)

TABLE 6 Zinc Coating

Specified Diameter of Coated Wire, in.	Area Density of Coating, min, of Uncoated Wire Surface, oz/ft ²
	Class A
0.0500 to 0.0599, incl	0.60
0.0600 to 0.0749, incl	0.65
0.0750 to 0.0899, incl	0.70
0.0900 to 0.1039, incl	0.75
0.1040 to 0.1199, incl	0.80
0.1200 to 0.1399, incl	0.85
0.1400 to 0.1799, incl	0.90
0.1800 to 0.1900, incl	1.00