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Designation: A 308/A 308M – 03

Standard Specification for Steel Sheet, Terne (Lead-Tin Alloy) Coated by the Hot-Dip Process[1]

This standard is issued under the fixed designation A 308/A 308M; 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.

1. Scope*

1.1 This specification covers sheet steel in coils and cut lengths coated with lead-tin alloy (terne metal, see 3.2.3) by the hot-dip process. This material is commonly known as terne and is used where ease of solderability and a degree of corrosion resistance are desirable. It is especially suitable where resistance to gasoline is required. Terne-coated sheet is also used for stamping, where the coating acts as a lubricant in the die, lessening difficulties in drawing. The weight of coating, always expressed as total coating on both sides, shall be specified in accordance with Table 1.

1.2 Material furnished under this specification shall conform to the applicable requirements of the latest issue of Specification A 924/A 924M, unless otherwise provided herein.

1.3 Terne-coated steel is available in a number of designations, types, and grades.

1.4 This specification is applicable to orders in either inch-pound units (as A 308) or SI units (as A 308M). Values in inch-pound and SI units are not necessarily equivalent. Within the text, SI units are shown in brackets. Each system shall be used independently of the other.

1.5 Unless the order specifies the "M" designation (SI units), the product shall be furnished to inch-pound units.

1.6 The text of this specification references notes and footnotes that provide explanatory material. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of this specification.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 309 Test Method for Weight and Composition of Coating on Terne Sheet by the Triple Spot Test

A 902 Terminology Relating to Metallic Coated Steel Products

A 924/A 924M Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process

E 517 Test Method for Plastic Strain Ratio *R* for Sheet Metal

E 646 Test Method for Tensile Strain-Hardening Exponents (*n* Values) of Metallic Sheet Materials

3. Terminology

3.1 *Definitions*—For definitions of terms and abbreviations used in this specification, see Terminology A 902.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *electrolytic nickel plate*, *n*—a nickel coating predeposited on steel sheet; used to promote a more uniform and more corrosion-resistant hot-dipped, long terne coating.

3.2.2 *terne-coated sheet*, *n*—steel sheet coated by immersion in molten terne metal; the steel sheet prior to immersion in the terne metal is either bare (uncoated) or with a predeposited electrolytic nickel coating.

3.2.3 *terne metal*, *n*—an alloy of lead with a small percentage of tin sufficient to obtain a smooth continuous coating.

3.2.3.1 *Discussion*—The minimum tin content is normally 8 %, with higher percentages used depending on the type of coating equipment used.

4. Classification

4.1 The material is available in four designations, as follows:

4.1.1 Commercial steel (CS Types A, B, and C),

[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 A05.11 on Sheet Specifications.

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[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.

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

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TABLE 1 Weight [Mass] of Coating (Total Both Sides)[A,B]

NOTE 1—*Coating Thickness/Weight [Mass] Equivalence*—The coating thickness may be estimated from the coating weight [mass] by using the following relationship: 0.25 oz/ft^2 [75 g/m^2] total both sides (LT25 [LTZ75]) is equal to 0.00027 in. or 0.27 mils [0.00508 mm] total both sides. This formula is not to be used for calculation of tensile strength of the base metal, which must be based on actual base metal thickness measurement.

Coating Designation	Minimum Requirements	
	Triple-Spot Test	Single-Spot Test
	Inch-Pound Units	
	oz/ft^2	oz/ft^2
LT01	no minimum[C]	no minimum[C]
LT25	0.25	0.20
LT35	0.35	0.25
LT40	0.40	0.30
LT55	0.55	0.40
LT85	0.85	0.70
LT110	1.10	0.90
	SI Units	
	g/m^2	g/m^2
LTZ01	no minimum[C]	no minimum[C]
LTZ75	75	60
LTZ110	110	75
LTZ120	120	90
LTZ170	170	120
LTZ260	260	215
LTZ335	335	275

[A] The coating designation number is the term by which this material is specified. The weight [mass] of coating in ounces per square foot [grams per square metre] of sheet refers to the total coating on both surfaces. Because of the many variables and changing conditions that are characteristic of continuous terne coating, the terne coating is not always evenly divided between the two surfaces of the terne-coated sheet, nor is the terne coating always evenly distributed from edge to edge. However, it can normally be expected that not less than 40 % of the single-spot check limit will be found on either surface.

[B] As the performance for the long terne-coated sheet is related to the coating thickness, material carrying the statement "meets ASTM A 308 [A 308M] requirements" should also specify the particular coating designation.

[C] "No minimum" means that there are no established minimum requirements for triple- and single-spot tests.

4.1.2 Deep drawing steel (DDS),

4.1.3 Extra deep drawing steel (EDDS), and

4.1.4 Structural steel (SS).

4.2 Structural steel is available in several grades.

4.3 The material is available with several coating weights [masses] (coating designations) as shown in Table 1.

5. Ordering Information

5.1 Terne-coated sheet in coils or cut lengths is produced to thickness requirements expressed to 0.001 in. [0.01 mm]. The thickness of the sheet includes both the base metal and the coating.

5.2 Orders for material under this specification shall include the following information, as necessary, to describe adequately the required material:

5.2.1 Name of material (long terne-coated steel sheet),

5.2.2 Designations of sheet steel (CS (Types A, B, and C) DDS, EDDS, and SS including grade or SS),

5.2.2.1 When a CS type is not specified, Type B will be furnished.

5.2.3 ASTM designation number and year of issue,

5.2.4 Coating designation (see 8.1.1 and Table 1),

5.2.5 Nickel plating; specify with or without (if unspecified, the sheet steel would usually be supplied without nickel plating),

5.2.6 Specify whether oiled or not oiled,

5.2.7 Dimensions (show thickness, minimum or nominal width, and length, if cut length). The purchaser shall specify the appropriate table of thickness tolerances in Specification A 924/A 924M that applies to the order, that is, the table of thickness tolerances for ⅜-in. [10-mm] edge distance, or the table of thickness tolerances for 1-in. [25-mm] edge distance.

5.2.8 Coil size requirements (specify maximum outside diameter (OD), acceptable inside diameter (ID), and maximum weight),

5.2.9 Certification, if required, and heat analysis and mechanical property report,

5.2.10 Application (part identification and description), and

5.2.11 Special requirements (if any).

NOTE 1—Typical ordering descriptions are as follows: terne-coated sheet, Deep Drawing Steel (DDS), ASTM A 308 – ____; coating designation LT25, oiled 0.024 in. minimum by 32 in. by coil, 24 in. ID, 15 000–lb max for fuel tank—upper half, or terne-coated sheet, Deep Drawing Steel (DDS), ASTM A 308M–coating designation LTZ75, oiled, 0.60 mm minimum by 810–mm by coil, 600–mm ID, 7000–kg max for fuel tank upper half.

6. Chemical Composition, Base Metal

6.1 The heat analysis of the base metal furnished under this specification shall conform to the requirements shown in Table 2.

6.1.1 Include in the report of the heat analysis, each of the elements in Table 2. When the amount of copper, nickel, chromium, or molybdenum is less than 0.02 %, report the analysis as <0.02 % or the actual determined value. When the amount of vanadium, titanium, or columbium is less than 0.008 %, report the analysis as <0.008 % or the actual determined value.

7. Mechanical Properties

7.1 Structural steel sheet shall conform to the mechanical property requirements in Table 3 for the type, grade, or class specified, or combination thereof.

7.2 The typical mechanical properties for CS (Types A, B, and C), DDS, and EDDS sheet designations are listed in Table 4. These mechanical properties are nonmandatory. They are intended solely to provide the purchaser with as much information as possible to make an informed decision on the steel to be specified. Values outside of these ranges are to be expected.

7.3 When base metal mechanical properties are required, all tests shall be conducted in accordance with the methods specified in Specification A 924/A 924M.

7.4 *Bending Properties*:

7.4.1 *Minimum Cold-Bending Radii*—Structural steel sheet is commonly fabricated by cold bending. There are many interrelated factors that affect the ability of a steel to cold form over a given radius under shop conditions. These factors

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