Designation: A787/A787M – 22

Standard Specification for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing[1]

This standard is issued under the fixed designation A787/A787M; 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, square, rectangular, and special shape, electric-resistance-welded carbon steel mechanical tubing, either zinc-coated (galvanized) after welding or produced from aluminum-coated, zinc-coated (galvanized), zinc-iron alloy-coated (galvannealed), 55 % aluminum-zinc alloy-coated, or zinc-aluminum-magnesium alloy-coated carbon steel sheet. Tubing for use as electrical conduit (EMT) or intermediate metallic conduit (IMC) is not covered by this specification.

1.1.1 The product is available in various grades based on chemical requirements (Sections 5 and 9).

1.1.2 The product is available in various Types (Section 3).

1.2 This specification covers mechanical tubing with outside diameters or maximum outside dimensions ranging from ½ to 15 in. [12.7 to 380.0 mm] and wall thickness from 0.028 to 0.180 in. [0.70 to 4.60 mm]. Indeterminate wall thicknesses may be ordered. In those cases the more stringent tolerances of Tables 3, 4, 5, 6, 12 and 13 shall apply.

1.3 When sizes within the ranges listed above are ordered, all other requirements of the specification shall be met.

1.4 This specification is expressed in both inch-pound units and in SI units; however, unless the purchase order specifies the applicable M specification designation (SI units), the inch-pound units shall apply. The values stated in either SI units or inch-pound units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. 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 nonconformance with the standard.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A463/A463M Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process

A653/A653M Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

A792/A792M Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

A924/A924M Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

A1046/A1046M Specification for Steel Sheet, Zinc-Aluminum-Magnesium Alloy-Coated by the Hot-Dip Process

B6 Specification for Zinc

3. Classification

3.1 The types of tubing covered by this specification are:

Type Number	Code Letters	Description
1	AWAC	electric-resistance-welded aluminum-coated carbon steel mechanical tubing
2	AWG	electric-resistance-welded galvanized carbon steel mechanical tubing
3	AWPG	electric-resistance-welded carbon steel mechanical tubing, post-hot dipped galvanized
4	AWGA	electric-resistance-welded carbon steel mechanical tubing, zinc-iron alloy-coated (galvannealed)
5	AWGZ	electric-resistance-welded carbon steel mechanical tubing, 55 % aluminum-zinc alloy-coated
6	AWZAM	electric-resistance-welded carbon steel mechanical tubing, zinc-aluminum-magnesium alloy-coated

[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 A01.09 on Carbon Steel Tubular Products.

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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**

4. Ordering Information

4.1 The ordered wall thickness of the tubing shall be the total of the base metal and the metallic coating.

4.2 Orders for material under this specification shall include the following:

4.2.1 Quantity (feet, metres, or number of lengths),

4.2.2 Type, code letters, and description (Sections 1 and 3),

4.2.3 ASTM specification designation number,

4.2.4 Coating designation and type of coating,

4.2.5 Chemically treated or not chemically treated raw material,

4.2.6 Oiled or dry (Section 16),

4.2.7 Extra smooth coating (if required),

4.2.8 Customer application, including fabrication,

4.2.9 Flash condition (7.1),

4.2.10 Steel chemical requirements of Type 1, 2, 4, 5 or 6, if applicable (Sections 5 and 9),

4.2.11 Report of chemical analysis if required (Sections 10 and 11),

4.2.12 Shape (round, square, rectangular, or special),

4.2.12.1 Dimensions: round—any two of the following: inside diameter, outside diameter, or wall thickness; square or rectangular—outside dimension, wall thickness, and corner radii, if required. (See 12.1 and 13.1 and 13.2.)

4.2.13 Length: round tubing—mill lengths or definite cut lengths (see 12.2); square and rectangular tubing—mill cut lengths and specified length (see 13.4).

4.2.14 Squareness of cut: round tubing, if required (see 12.3); square and rectangular tubing, if required (see 13.7),

4.2.15 Burrs removed, if required (see 15.2),

4.2.16 Special packaging (Section 19),

4.2.17 Customer specification number, if applicable,

4.2.18 Special requirements,

4.2.19 Special marking (Section 18), and

4.2.20 Recoating of outside diameter weld and heat-affected area, on precoated steel, if required.

5. Process

5.1 The steel shall be made from any process.

5.1.1 If a specific type of melting is required by the purchaser, it shall be stated on the purchase order.

5.1.2 The primary melting may incorporate separate degassing or refining and may be followed by secondary melting, using electroslag remelting or vacuum remelting. If secondary melting is employed, the heat shall be defined as all of the ingots remelted from a single primary heat.

5.1.3 Steel may be cast in ingots or may be strand cast. When steel of different grades is sequentially strand cast, identification of the resultant transition material is required. The producer shall remove the transition material by an established procedure that positively separates the grades.

5.2 For tubing produced from precoated steel sheet, the composition of the coating shall comply with the applicable specification.

5.2.1 *Specification* A463/A463M—Coating designation for aluminum coated-sheet.

5.2.2 *Specification* A653/A653M—Coating designation for galvanized and galvannealed steel sheet.

5.2.3 *Specification* A792/A792M—Coating designation for 55 % aluminum-zinc alloy-coated steel sheet.

5.2.4 *Specification* A1046/A1046M—Coating designation for zinc-aluminum-magnesium alloy-coated steel sheet.

5.2.5 Other grades of coated steel sheet, as listed in Table 1 and Table 2, may be used as the precoated material for the steel tubing upon agreement between the manufacturer and the purchaser. Such steel sheet shall meet the requirements of Specification A463/A463M, A653/A653M, A792/A792M, A924/A924M, and A1046/A1046M except for the chemical requirements.

6. Manufacture

6.1 Tubes shall be made by the electric-resistance welding process and shall be made from hot or cold-rolled precoated steel except for Type 3.

6.1.1 The weld shall not be located within the radius of the corners of any shaped tube unless specified by the purchaser.

6.2 Special manufacturing practices allow for post-hot dipped galvanizing of welded tubing. If this product is desired all sections of this specification will apply except Table 3. Wall thickness tolerances shall be determined by agreement between the producer and purchaser.

7. Flash Conditions

7.1 The flash conditions under which tubing may be furnished are as follows: The flash shall be removed from the outside diameter of tubing covered by this specification. Tubing furnished to this specification may have the following conditions of welding flash on the inside diameter.

7.1.1 *Flash-In*—All tubing in which the inside diameter welding flash does not exceed the wall thickness or 3⁄32 in. [2.38 mm], whichever is less.

7.1.2 *Flash Controlled to 0.010 in. [0.25 mm], Maximum*—Tubing in which the height of the remaining welding flash is controlled so as not to exceed 0.010 in. [0.25 mm]. This condition is available in over 0.750 in. [19.0 mm] outside diameter and gauges consistent with Tables 5 and 6.

TABLE 1 Chemical Requirements for Low-Carbon Steels[A,B]

Grade Designation[C]	Composition, %			
	Carbon	Manganese	Phosphorus, max	Sulfur, max
MT1010	0.05 to 0.15	0.30 to 0.60	0.035	0.035
MT1015	0.10 to 0.20	0.30 to 0.60	0.035	0.035
MTX1015	0.10 to 0.20	0.60 to 0.90	0.035	0.035
MT1020	0.15 to 0.25	0.30 to 0.60	0.035	0.035
MTX1020	0.15 to 0.25	0.70 to 1.00	0.035	0.035

[A] Rimmed or capped steels that may be used for the above grades are characterized by a lack of uniformity in their chemical composition, and for this reason product analysis is not technologically appropriate unless misapplication is clearly indicated.

[B] Chemistry represents heat analysis. Product analysis, except for rimmed or capped steel, is to be in accordance with usual practice as shown in Table 7.

[C] The letters MT indicate mechanical tubing.