



Designation: B 666/B666M – 96^{ε01}

Standard Practice for Identification Marking of Aluminum and Magnesium Products¹

This standard is issued under the fixed designation B 666/B666M; 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 NOTE ~~The wording regarding continuous marking in 5.1.8 was clarified editorially in June 1997.~~

1. Scope*

1.1 This practice establishes the physical item marking requirements for identification purposes for aluminum and magnesium products. Package marking for shipment and inspection acceptance is not within the scope of this standard.

1.2 The values stated in either inch-pound units or SI are to be regarded separately as standard. The SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems will result in nonconformance with the practice.

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

2.2 *ASTM Standards:*

¹ This practice is under the jurisdiction of ASTM Committee B-7 B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.03 on Aluminum Alloy Wrought Products.

Current edition approved April 10, 1996. 2001. Published June 1996. May 2001. Originally published as B 666 – 80. Last previous edition B 666/B 666M – 95^{ε1}.

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

- B 361 Specification for Factory-Made Wrought Aluminum and Aluminum-Alloy Welding Fittings²
- B 404 Specification for Aluminum and Aluminum-Alloy Seamless Condenser and Heat-Exchanger Tubes with Integral Fins²
- B 404M Specification for Aluminum and Aluminum-Alloy Seamless Condenser and Heat-Exchanger Tubes with Integral Fins²
- B 547 Specification for Aluminum and Aluminum-Alloy Formed and Arc-Welded Round Tube²
- B 881 Terminology Relating to Aluminum- and Magnesium-Alloy Products²

2.3 *ANSI Standards:*

- H35.1 Alloy and Temper Designation Systems for Aluminum²
- H35.1(M) Alloy and Temper Designation Systems for Aluminum²

2.4 *Military Standards:*

- MIL-STD-409 Alloy Nomenclature and Temper Designation System for Magnesium Base Alloys³

3. Terminology

3.1 *Definitions:*

- 3.1.1 *sheet*—a rolled wrought product rectangular in cross section and form 0.006 through 0.249 in. [over 0.15 through 6.30 mm] thick with sheared, slit, or sawed edges.
- 3.1.2 *coiled sheet*—sheet in coils with slit edges.
- 3.1.3 *flat sheet*—sheet with sheared, slit, or sawed edges, which has been flattened or leveled.
- 3.1.4 *plate*—a rolled wrought product rectangular in cross section and form 0.250 in. or thicker [over 6.30 mm in thickness], with either sheared or sawed edges.
- 3.1.5 *circles*—circles cut from coiled sheet, flat sheet or plate.
- 3.1.6 *tread plate*—sheet or plate having a raised, figured pattern on one surface to provide improved traction.
- 3.1.7 *foil*—a rolled wrought product rectangular in cross section of thickness less than 0.006 in. [up through 0.15 mm].
- 3.1.8 *rod*—a solid cylindrical wrought product that is long in relation to cross section, which is 0.375 in. or greater [over 10.00 mm] in diameter.
- 3.1.9 *bar*—a solid wrought product that is long in relation to cross section, which is square or rectangular (excluding plate and flattened wire) with sharp or rounded corners or edges, or is a regular hexagon or octagon, and in which at least one perpendicular distance between parallel faces is 0.375 in. or greater [over 10.00 mm].
- 3.1.10 *profile*—a wrought product that is long in relation to its cross-sectional dimensions and has a cross section other than that of sheet, plate, rod, bar, tube, or wire.
- 3.1.11 *structural profile*—a profile, rolled or extruded, in certain standard alloys, tempers, sizes, and sections, such as angles, channels, tees, zees, I-beams, and H-sections; commonly used for structural purpose.
- 3.1.12 *extruded profile*—a profile produced by extruding.
- 3.1.13 *tube*—a hollow wrought product that is long in relation to its cross section, which is round; a regular hexagon, a regular octagon, elliptical; or is square or rectangular with sharp or rounded corners, and has uniform wall thickness except as affected by corner radii.
- 3.1.14 *pipe*—extruded or drawn tube having certain standardized sizes of outside diameter and wall thickness commonly designated by nominal pipe sizes and ANSI schedule numbers.
- 3.1.15 *wire*—a solid wrought product that is long in relation to its cross section, which is square or rectangular with sharp or rounded corners or edges, or is round; a regular hexagon or a regular octagon, and whose diameter or greatest perpendicular distance between parallel faces (except for flattened wire) is less than 0.375 in. [up through 10.00 mm].
- 3.1.16 *forging*—a metal part worked to a predetermined shape by one or more such processes as hammering, upsetting, pressing, rolling, etc.
- 3.1.17 *die forging*—a forging formed to the required shape and size by working in impression dies.
- 3.1.18 *hand forging*—a forging worked between flat or simply shaped dies by repeated strokes or blows and manipulation of the piece.
- 3.1.19 *bus bar*—a rigid electric conductor in the form of a bar.
- 3.1.20 *casting*—a metal object, at or near finished shape, produced by introducing molten metal into a mold or a die and allowing it to solidify.
- 3.1.21 *ingot*—a cast form suitable for fabricating (rolling, forging, extruding, etc.) or remelting. Ingot for extruding was previously known as billet.
- 3.1.22 *marking:*
- 3.1.23 *spot marking*—marking the identification only once on the product.
- 3.1.24 *continuous marking*—recurring marking of the identification in intervals not greater than 40 in. [1000 mm] throughout the length of the product.
- 3.1.25 *perimeter marking*—marking continuously the identification in one or two rows adjacent to the four edges of the product.

² Annual Book of ASTM Standards, Vol 02.02.

³ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

3.1.26 *tagging*—attaching tags bearing the required identification markings to coils, bundles, or containers of items which are too small to mark or whose configuration preclude marking otherwise.

4. Basic Marking Requirements and Application

4.1 When required by the material specification or specified in the contract or purchase order, wrought aluminum and magnesium mill products shall be marked for identification purposes only with the following information on the product or on tags attached to the product:

4.1.1 *Name or Registered Trademark of the Company*, which performs the final processing or finishing operation such as rolling, stretching, thermal treatment, etc., prior to marketing the product;

NOTE 1—The company that performs nothing more than a simple shearing or sawing operation may be excluded from marking the product with its name.

4.1.2 *Alloy and Temper of the Product*—Designations shall be in accordance with ANSI H35.1 [H35.1M] for aluminum and MIL-STD-409 for magnesium;

4.1.3 *Basic Number of the Specification to which the Product was Produced*—The basic number does not include the revision indicator;

4.1.4 *Specified (Ordered) Dimensions of the Following Products:*

4.1.4.1 *Sheet and Plate*—Thickness in inches [millimetres],

4.1.4.2 *Coiled Wire and Spooled Wire*—Diameter in inches [millimetres],

4.1.4.3 *Tube:*

(1) *Straight Lengths*—Outside diameter and wall thickness, in inches [millimetres],

(2) *Coiled*—Wall thickness, in inches [millimetres],

4.1.4.4 *Pipe*—Nominal pipe size and ANSI schedule number;

4.1.5 When required by the material specification, additional spot marking of lot number on heat treated tempers of some-2000, 6000, 2xxx, 6xxx, and 7000 7xxx series wrought aluminum alloys shall be in accordance with 5.1. The definition of lot shall be that as defined in the material specification; ~~and~~.

4.1.6 For magnesium products, the applicable lot number shall be marked on each piece in at least one location.

4.1.7 When required by the material specification, the word “seamless” on certain tube or pipe.

NOTE 2—The requirements specified in 4.1 are minimum; marking systems that involve additional information shall be as agreed upon between the producer and the purchaser.

4.2 Metal purchased to AMS material specifications that reference this practice shall meet the requirements listed in 4.1 and shall be spot marked per 5.1 with the inspection lot number on the product or on a tag attached to the product.

4.3 When required by the material specification or specified in the contract or purchase order, marking of cast aluminum products shall be in accordance with Section 6.

4.34 Product marking shall be such that it shall not rub off or be otherwise obliterated by contact arising from normal handling, exposure to the elements, shipment, and storage. The height of the characters shall be commensurate with the size of the product being marked; for example, not less than 0.375 in. [9 mm] for flat sheet and plate, not less than 0.250 in. [6 mm] for hand forgings and not less than 0.125 in. [3 mm] for tubular products. Legibility of all markings shall be such as required for ready readability and the required permanency of identification.

4.45 Product marking shall be accomplished in a manner that will not adversely affect the subsequent fabrication of the material, or produce stresses that would be deleterious to the functioning of the finished product. Marking on the product shall be with marking fluid applied by printing, stamping, or stenciling. Ghost images of the characters may remain upon the removal of marking applied. Impression stamping is considered detrimental and shall not be used except on ingot, castings, forging, and certain tube products, or when required by prior agreement between the producer and purchaser.

5. Marking of Wrought Aluminum and Magnesium Mill Products

5.1 When required by the material specification or specified in the contract or purchase order, wrought aluminum and magnesium mill products shall be marked as follows:

5.1.1 *Coiled Sheet*—Spot marking in one or more rows near the outside end as shown in Fig. 1 [1M].

5.1.2 *Flat Sheet and Plate:*

5.1.2.1 Flat sheet less than 0.012 in. [up through 0.30 mm] (for O temper, less than 0.020 in. [up through 0.50 mm]) in thickness—Spot marking near one end,

5.1.2.2 Plate and flat sheet 0.012 in. and over [over 0.30 mm] (for O temper, 0.020 in. and over [over 0.50 mm]) in thickness and less than 6 in. [up through 150 mm] wide—Continuous marking in one row,

5.1.2.3 Plate up through 0.375 in. [10 mm] and flat sheet 0.012 in. and over [over 0.30 mm] (for O temper, 0.020 in. and over [over 0.50 mm]) in thickness, 6 through 60 in. [over 150 through 1500 mm] in width, and 36 through 200 in. [over 1000 through 5000 mm] in length—Continuous marking in rows running the direction of rolling on 6 in. [150 mm] centers across the width on one surface as shown in Fig. 2 [2M]. Every third row shall contain the producer’s name or trademark and the ordered thickness. The other two rows shall each contain the alloy and temper and the specification number, and shall be staggered.

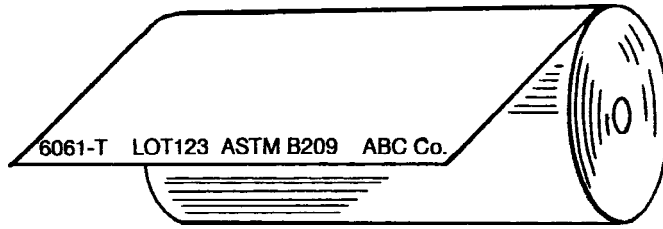


Fig. 1 Spot Marking for Coiled Sheet

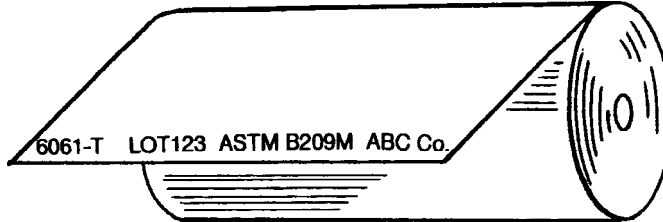


FIG. 1 M Spot Marking for Coiled Sheet

5.1.2.4 Plate over 0.375 in. [10 mm] in thickness, flat sheet and plate over 60 in. [1500 mm] in width or over 200 in. [5000 mm] in length—Same marking as 5.1.2.3 or perimeter marking on one surface. When perimeter marking of two rows is chosen, one row shall contain the producer's name or trademark and the ordered thickness, and the second row shall contain alloy and temper, and the specification number as shown in Fig. 3 [3M].

NOTE 3—If perimeter marking is applied to a full piece as produced but partial sheets or plates are supplied, an arrow shall be applied near one corner indicating the direction of rolling.

5.1.3 Circles:

5.1.3.1 Circles 24 in. and over [over 600 mm] in diameter—Spot marking on each circle unless the circle was cut from sheet or plate having continuous marking, and

5.1.3.2 Circles less than 24 in. [up through 600 mm] in diameter—Tagging or marking of shipping container.

NOTE 4—Alclad one side flat sheet, plate, circles, and coiled sheet shall be marked on the bare side.

5.1.4 Tread Plate—Spot marking near one end on the back side.

5.1.5 Foil—Marking of this product is not required. Package marking only.

5.1.6 Rod, Bar, and Extruded Profiles—Continuous marking of straight lengths as shown in Fig. 4 [4M], of sizes having an accessible flat surface of ½ in. or more [over 12.5 mm] in width (with less than ⅛ in. [3 mm and less] indented surface), or a diameter of ½ in. [over 12.5 mm] or more. Tagging is applicable to smaller sizes, lengths under 3 ft [1 m] and coils.

5.1.7 Structural Profiles—Spot marking near one end as shown in Fig. 5 [5M].

5.1.8 Tube and Pipe—Continuous marking of non-round straight lengths in a single row of sizes having both a wall thickness of 0.029 in. and greater [over 0.72 mm] and a flat surface of ½ in. or more [over 12.5 mm] in width. Continuous marking of round straight lengths in a single row of sizes having both a wall thickness of 0.029 in. and greater [over 0.72 mm] and a diameter of ½ in. or more [over 12.5 mm]. Tagging is applicable to each coil or bundle of smaller sizes and lengths under 3 ft [1 m].

5.1.9 Wire—Tagging of coils and straight lengths, and spot marking on one flange of spools.

5.1.10 Bus Bar—Spot marking near one end except that specification number shall not be required to be marked on this product.

5.1.11 Forgings:

5.1.11.1 Hand Forging—Spot marking on one place of each piece.

5.1.11.2 Die Forging—Marking in accordance with the requirements of the forging drawing.

6. Marking of Cast Aluminum Products

6.1 Castings—Marking shall be that as specified by the applicable material specification or as agreed upon between the producer and the purchaser.

6.2 Remelt Ingot for Castings:

6.2.1 Marking of Aluminum Ingot—The producer's name or trademark (see 4.1.1), alloy designation (see 4.1.2) and cast number shall be impression-stamped or otherwise permanently marked on each ingot or if strapped together, not less than four ingots in each bundle, two in the top layer and two in the bottom layer. Specification number shall not be required to be marked on this product.

6.2.2 Marking of Magnesium Ingot—The producer's name or trademark (see 4.1.1), alloy designation (see 4.1.2), and cast number shall be impression-stamped or otherwise permanently marked on each ingot or bundle, if strapped together. Specification number shall not be required to be marked on this product.

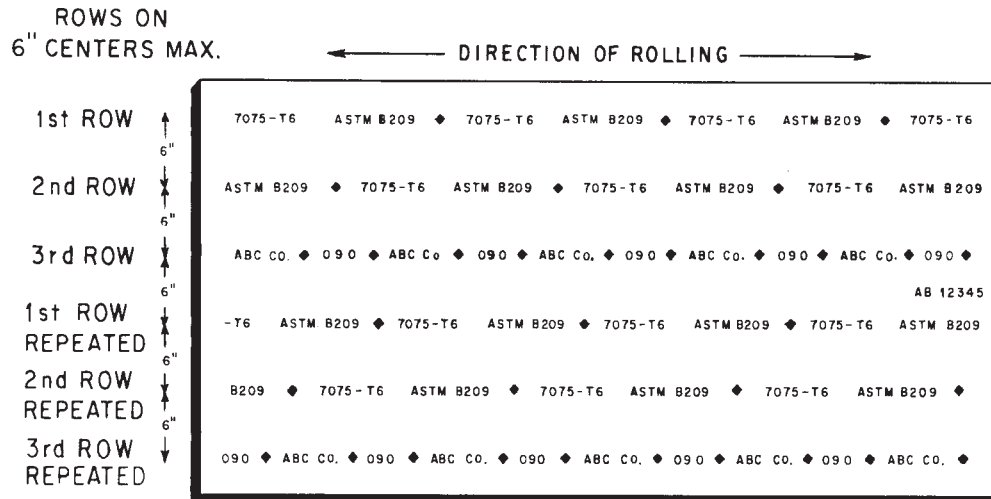


FIG 2 Continuous Marking for Plate Through 0.375 in. and Flat Sheet 0.012 in. and over (for O Temper, 0.020 in. and over) in Thickness, 6 Through 60 in. in Width, and 36 Through 200 in. in Length

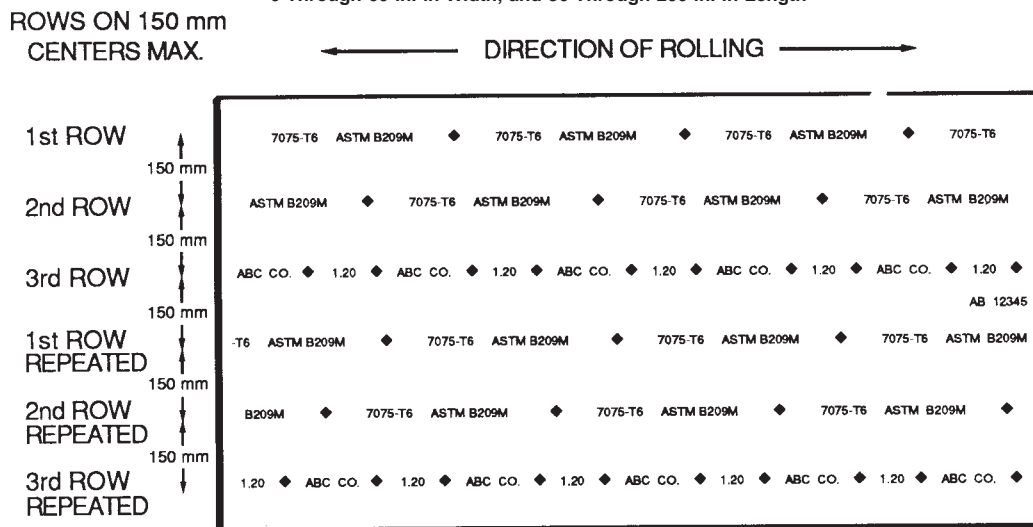


FIG. 2 M Continuous Marking for Plate Through 10 mm and Flat Sheet over 0.30 mm (for O Temper, over 0.50 mm) in Thickness, over 150 Through 1500 mm in Width, and 1000 Through 5000 mm in Length

6.3 *Ingot or Billet for Fabricating*—When specified in the contract or purchase order, marking shall include the producer’s name or trademark, alloy and cast number. Specification data shall not be required to be marked on these products.

7. Marking of Unalloyed Aluminum and Magnesium Ingot

- 7.1 When specified in the contract or purchase order, unalloyed aluminum ingot shall be marked as follows:
 - 7.1.1 Producer’s name, logo, or trademark,
 - 7.1.2 Production location either permanently cast in, impression stamped, or otherwise marked,
 - 7.1.3 Metal grade or aluminum designation impression stamped or otherwise marked with legible characters, and
 - 7.1.4 Cast number, or other identification, by convention which allows traceability of specific ingot to a specific chemical composition.

7.2 When specified in the contract or purchase order, unalloyed magnesium ingot shall be permanently marked on each ingot, pig, billet, or pallet as follows:

- 7.2.1 Producer’s name or trademark,
- 7.2.2 Cast number, or other identification by convention which allows traceability of the product to a specific chemical composition.

8. Marking of Special Products

8.1 When specified in the contract or purchase order, marking of special products that are not covered in this specification shall be in accordance with that specified by the applicable material specification.

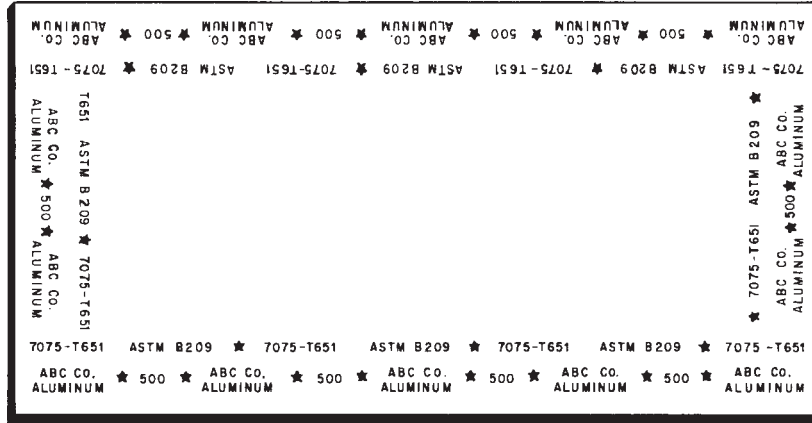


FIG 3 Perimeter Marking for Plate over 0.375 in. in Thickness, Flat Sheet and Plate over 60 in. in Width or over 200 in. in Length

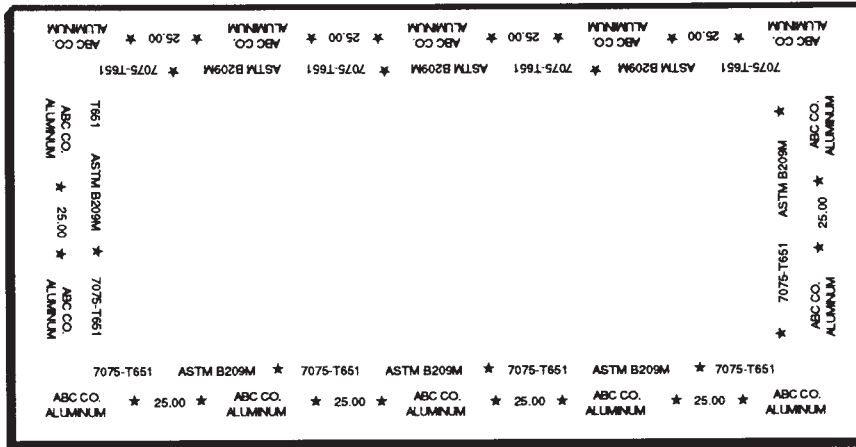


FIG. 3 M Perimeter Marking for Plate over 10 mm in Thickness, Flat Sheet and Plate over 1500 mm in Width or over 5000 mm in Length

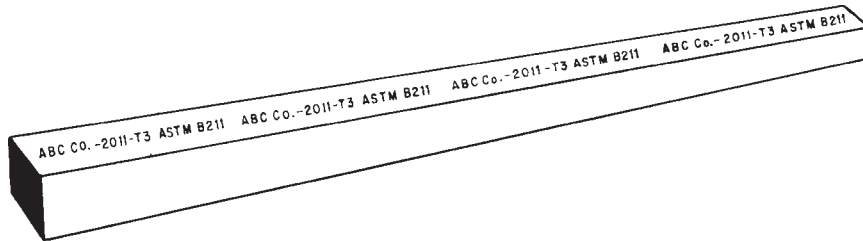


FIG 4 Continuous Marking for Rod, Bar, Profiles and Tube in Straight Lengths

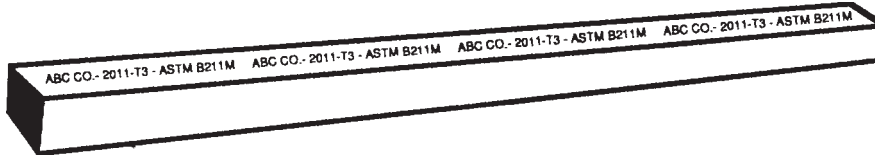


FIG. 4 M Continuous Marking for Rod, Bar, Profiles and Tube in Straight Lengths

8.2 Special products that are to be marked in accordance with requirements in the applicable material specification are welding fittings (Specification B 361); condenser and heatexchanger tubes with integral fins (Specifications B 404 and B 404M); and formed and arc-welded round tube (Specification B 547).

9. Keywords

9.1 aluminum products; identification markings; magnesium products

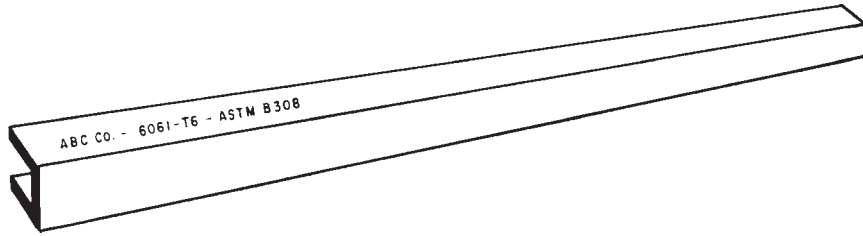


FIG 5 Spot Marking for Structural Profiles

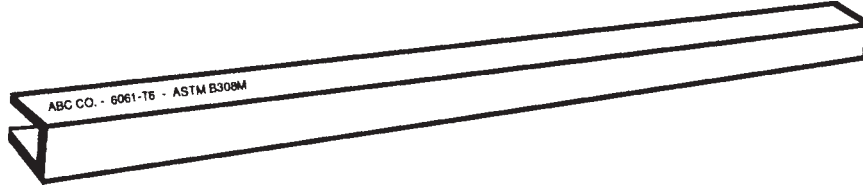


FIG. 5 M Spot Marking for Structural Profiles

SUMMARY OF CHANGES

This section identifies the principal changes to this standard that have been incorporated since the last issue. (~~*T*~~) The term “shape”

- (1) B 881 was replaced by “profile.” added to the Referenced Documents section.
- (2) Reference for 5.1 was added to 4.1.5.
- (3) 4.2 was added to address SAE-AMS needs for spot marking of lot number.
- (4) “Lot 123” was added to Fig. 1 and Fig. 1M to show marking of Lot numbers.

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