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Standard Guide for Packaging, Marking, and Loading Methods for Steel Products for Shipment¹

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This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This guide covers the packaging, marking, and loading of steel products for shipment. Assuming proper handling in transit, this guide is intended to assist shippers in packaging and loading steel products to arrive at their destination safely and in good condition. It is also intended that this guide may be used for attaining uniformity, simplicity, sufficiency, and economy in the shipment of steel products.

1.2 This guide applies to semi-finished steel products, bars, structural shapes and sheet piling, rods, wire and wire products, tubular products, plates, sheets, and strips, tin mill products, and castings.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

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

¹ This guide is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and are the direct responsibility of Subcommittee A01.94 on U.S. Government Requirements for Steel Mill and Foundry 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.

D996 Terminology of Packaging and Distribution Environments

D3950 Specification for Strapping, Nonmetallic (and Joining Methods)

D3953 Specification for Strapping, Flat Steel and Seals

D4169 Practice for Performance Testing of Shipping Containers and Systems

D4649 Guide for Selection and Use of Stretch Wrap Films

D4675 Guide for Selection and Use of Flat Strapping Materials¹

D5728 Practices for Securement of Cargo in Intermodal and Unimodal Surface Transport

2.2 Other Standards (most current revisions):

Uniform Freight Classification Code, Rule 41, Section 9³

National Motor Freight Classification 100–L, Item 222, Section 7⁴

ISTA, International Safe Transit Association, Pre-Shipment Test Procedure⁵

Association of American Railroads (AAR/TTCI) Closed Car Loading Methods and Open Top Loading Rules⁶

IMO/ILO/UN ECE Guidelines for Packing or Cargo Transport Units (CTUs)⁷

Driver's Handbook on Cargo Securement⁸

3. General Provisions

3.1 *Marking*—Manufacturers and users may follow the marking methods for individual steel products so described and illustrated herein. It is the responsibility of the purchaser to provide the producer with his requirements concerning protective wrapping materials.

³ Available from National Railroad Freight Classification, Uniform Classification Committee, 222 South Riverside Plaza, Chicago, IL 60606.

⁴ Available from National Motor Freight Traffic Association, Inc. (NMFTA), 1001 N. Fairfax St., Suite 600, Alexandria, VA 22314, <http://www.nmfta.org>.

⁵ Available from International Safe Transit Association (ISTA), 1400 Abbot Road, Suite 160, East Lansing, MI 48823-1900, <http://www.itsa.org>.

⁶ Available from Association of American Railroads, Transportation Technology Center, Inc. (AAR/TTCI), 55500 DOT Rd., Pueblo, CO 81001, <http://www.aar.com>.

⁷ Available from International Maritime Organization (IMO), Publishing Service, 4 Albert Embankment, London, SE1 7SR, United Kingdom, <http://www.imo.org>.

⁸ Available from Federal Motor Carrier Safety Administration (FMCSA), 1200 New Jersey Avenue, SE, Suite W60-300, Washington, DC 20590, <http://www.fmcsa.dot.gov>.

3.2 *Packaging*—Parties responsible for the packaging, loading and load securement should be familiar with and use the packaging terminology found in Terminology D996.

3.2.1 *Packaging and Load Securement Standards*—Shippers should refer to and comply with the governing standards and regulations applicable to the mode of transportation to be used for their specific shipments. These include, but are not limited to, Practices D5728, Guide D4649, Guide D4675, as well as, documents referenced in 2.2: Uniform Freight Classification Code, Rule 41, Section 9, National Motor Freight Classification 100–L, Item 222, Section 7, Association of American Railroads (AAR/TTCI) Closed Car Loading Methods and Open Top Loading Rules, IMO/ILO/UN ECE Guidelines for Packing or Cargo Transport Units (CTUs), and the Driver’s Handbook on Cargo Securement.

3.2.2 *Package and Loading Securement Methods*—Packaging and load securement methods should be developed and tested according to established protocols such as Practice D4169 and ISTA, International Safe Transit Association, Pre-Shipment Test Procedure.

3.2.3 *Packaging Material Standards*—Shippers and packagers of steel products should specify materials that comply with applicable specifications such as Specification D3950 and D3953.

3.2.4 **Safety Warning**—Failure to use proper packaging and load securement methods and materials may result in property damage, serious injury or death. Satisfactory past experience with methods and materials in itself is not sufficient to assure safety. In addition to understanding and complying with applicable standards, shippers should consult with suppliers of packaging and load securement materials to determine the best methods.

3.3 *Package Identification:*

3.3.1 All marking shall be legible and of a size consistent with the space available to be marked. All tags shall be securely affixed to the package to prevent loss in transit. Tags shall be of a size to show clearly all of the information needed, and shall be able to withstand reasonable exposure to the elements.

3.3.2 *Marking Metal Surfaces*—Unless otherwise specified, metal surfaces shall be marked with either permanent ink or paint.

3.3.3 *Marking Containers*—All materials used for marking containers shall be resistant to the elements.

3.4 *Weight and Count*—When steel products are invoiced on mill scale weights and such weights are checked after shipment, variations from invoice weights up to 1 % are normally expected due to differences in the kind, type, and location of the scales. When invoiced on weights determined by a scale at the mill, where there are large quantities of one size or thickness, or where the number of pieces in a lift or bundle is needed to be shown on the identification tags and shipping papers, the count is considered approximate and the weight is the more accurate. When steel products are invoiced on theoretical weights, the invoice weights are based on the number of pieces or lineal feet shipped.

3.5 *Packaging Lists or Tally*—Furnished as needed. Such lists are compiled as accurately as practicable, subject to confirmation by the official shipping notice or invoice.

4. Semi-Finished Steel Products

4.1 *Product Grades:*

4.1.1 Carbon, alloy, and stainless steel ingots, blooms, billets, and slabs.

4.1.2 Carbon steel skelp in coils.

4.2 *Marking:*

4.2.1 It is normal practice to stamp or paint the heat number on each piece shipped loose and to show the heat number on a tag attached to each secured lift of smaller size billets. The ordered size and weight may be painted on at least one piece of each size when shipped loose or on at least one piece of each secured lift. Each skelp coil is tagged or marked with the heat number and the size.

4.2.2 *Color Marking*—There is no generally recognized color code for identification of steel grades. When specified, color marking to denote grade is applied. In such cases a dash of color on one end of loose pieces is sufficient. In the case of secured lifts of smaller sizes, the grade is shown on a tag attached to the lift or by a dash of one color on one end of the lift.

5. Hot-Rolled Bars and Bar-Size Shapes

5.1 *Product Grades:*

5.1.1 Carbon, alloy, and stainless steel bars, and bar-size shapes.

5.1.2 Concrete reinforcing bars.

5.2 *Marking:*

5.2.1 *Carbon, Alloy, and Stainless Steel Bars, and Bar-Size Shapes:*

5.2.1.1 It is normal practice to identify each lift or coil with a tag containing the following information:

- (1) Manufacturer’s name, brand, or trademark,
- (2) Size,
- (3) ASTM designation (year date is not needed),
- (4) Heat number,
- (5) Weight (except coils),
- (6) Purchaser’s name, and
- (7) Purchaser’s order number.

5.2.1.2 *Die Stamping of Carbon Steel Bars*—The ultimate uses of the products do not usually need die stamping. Therefore, this method of marking for other than mill identification needs additional labor and handling.

5.2.1.3 *Die Stamping of Alloy and Stainless Steel Bars*—When specified, heat numbers or symbols are stamped on one end or on the surface near the end of rounds, squares, hexagons, and octagons 2 in. (51 mm) and larger, and on flats 2 in. in width or 2 in. or over in thickness.

5.2.1.4 The above described marking is practicable on smaller sizes down to a minimum of 1 in. (25 mm) in thickness and 1 in. in width for flats, and not less than 1 in. in thickness or diameter for other bars, but because of its precise nature, such marking delays normal production.

5.2.1.5 Stamping of sizes under 1 in. is not practicable. These sizes are secured in lifts and tagged to show heat numbers or symbols.

5.2.1.6 *Color Marking*—There is no standard color code for identification of steel grades. When marking of bars with identification colors is needed, the following practices are regularly employed:

(1) Sizes 2 in. (51 mm) and over are marked on one end with not more than two colors.

(2) Sizes 1½ in. (38 mm) up to 2 in. (51 mm) are marked on one end with not more than one color.

(3) Sizes smaller than 1½ in. (38 mm) are not marked individually; but the bundle, lift, or pile (any size bar or flats) is marked on one end with a dab of paint of one color or not more than two different colored stripes.

(4) Bars are regularly painted after assembly into lifts, and due to the non-uniformity of ends, it is not expected that paint will be on every bar in the lift. Any other paint marking slows normal production. Superimposed color marking needs additional labor and time for drying.

(5) When the back of the tag is color marked, one or two colors are used or the names of the colors are given.

5.2.2 *Concrete Reinforcing Bars:*

5.2.2.1 It is normal practice to identify each lift with a tag containing the following information:

(1) Manufacturer's name, brand, or trademark,

(2) Size or bar designation number, and

(3) Grade and specification.

5.2.2.2 *Color Marking*—When specified, a dab of paint, one color only for each grade, is placed on one end of each lift to distinguish grades. Such marking augments but does not replace the marking needs contained in the product specification.

6. Cold-Finished Bars

6.1 *Product Grades*—Carbon, alloy, and stainless steel bars.

6.2 *Marking:*

6.2.1 *Carbon, Alloy, and Stainless Steel Bars:*

6.2.1.1 It is normal practice to identify each lift with a tag containing the following information:

(1) Manufacturer's name, brand, or trademark,

(2) Size,

(3) ASTM designation (year date is not needed),

(4) Heat number,

(5) Weight,

(6) Purchaser's name, and

(7) Purchaser's order number.

6.2.1.2 *Die Stamping*—It is not regular practice to die-stamp cold-finished bars. Therefore, when specified, this method of marking retards the normal flow of materials.

6.2.1.3 *Color Marking*—When the marking of bars with identification colors is needed, the following practices are employed:

(1) Sizes 1½ in. (38 mm) and over are marked on one end with not more than two colors.

(2) Sizes smaller than 1½ in. are not marked individually, but the bundle, lift, or pile is marked on one end with a dab of paint of one color or not more than two different colored stripes.

(3) Any other paint marking slows normal production.

(4) Superimposed color marking also needs additional labor and time for drying.

(5) When the back of the tag is marked, one or two colors are used or the names of the colors are spelled out.

7. Structural Shapes and Steel Sheet Piling

7.1 *Product Grades:*

7.1.1 Carbon, high-strength low-alloy, and stainless steel structural shapes.

7.1.2 Steel sheet piling.

7.2 *Marking:*

7.2.1 *Carbon, High-Strength Low-Alloy, and Stainless Steel Structural Shapes:*

7.2.1.1 It is normal practice to mark each individual structural shape shipped loose or tag each secured lift with the following information:

(1) Manufacturer's name, brand, or trademark,

(2) Section designation or size of section,

(3) Heat number,

(4) Length, and

(5) Grade or type (stainless steel).

7.2.1.2 *Die Stamping*—When specified, the heat number is die-stamped in one location. Die stamping or hot rolling the heat number into structural shapes is not universally practiced. The standard sizes of steel die-stamps are ¼ in., 5/16 in., and 3/8 in. (6.4 mm, 7.9 mm, and 9.5 mm). Any additional or different marking other than as indicated above or specifying stamping with steel die-stamps of sizes other than indicated is negotiated between purchaser and manufacturer.

7.2.1.3 *Color Marking*—On structural shapes made to certain ASTM specifications, color marking is needed. Each structural shape shipped loose is marked with one or two color stripes. When shipped in secured lifts, the lift is marked with a vertical stripe for the full height of the lift. Each piece in the lift shall be marked by this stripe.

7.2.2 *Steel Sheet Piling*—It is normal practice to mark each steel sheet piling with the following:

(1) Manufacturer's name, brand, or trademark,

(2) Heat number, and

(3) Length.

7.2.2.1 Additional or different marking may need additional handling and complicates the normal marking procedure.

8. Rods, Wire, and Wire Products

8.1 The purchaser should give careful consideration to marking, packaging, and loading needs when ordering.

8.2 *Product Grades:*

8.2.1 Hot-rolled rods (all grades).

8.2.2 Merchant wire products.

8.2.3 Carbon, alloy, and stainless steel wire (in coils).

8.2.4 Carbon, alloy, and stainless steel wire (straightened and cut).

8.3 *Marking:*

8.3.1 *Hot-Rolled Rods in Coils*—It is normal practice to tag each coil with the following information:

- 8.3.1.1 Manufacturer's name, brand, or trademark,
- 8.3.1.2 Grade, product identification or type (stainless steel only),
- 8.3.1.3 Size,
- 8.3.1.4 Heat number,
- 8.3.1.5 Purchaser's name, and
- 8.3.1.6 Purchaser's order number.

(1) When identification colors are specified, marking practice shall be limited to paint striping coil with one color.

8.3.2 *Merchant Wire Products*—It is normal practice to identify each package with the following information, as applicable:

- 8.3.2.1 Manufacturer's name, brand, or trademark,
- 8.3.2.2 Product name:
 - (1) Design or construction
 - (2) Style,
- 8.3.2.3 Size,
- 8.3.2.4 Type or class of coating,
- 8.3.2.5 Finish,
- 8.3.2.6 Length,
- 8.3.2.7 Width and mesh, and
- 8.3.2.8 Height.

8.3.3 *Carbon, Alloy, and Stainless Steel Wire*—It is normal practice to identify each coil or package with the following information:

- 8.3.3.1 Purchaser's name,
- 8.3.3.2 Purchaser's order number,
- 8.3.3.3 Manufacturer's name, brand, or trademark,
- 8.3.3.4 Grade, product identification or type (stainless steel only),
- 8.3.3.5 Size,
- 8.3.3.6 Heat number,
- 8.3.3.7 Quality (when applicable),
- 8.3.3.8 Finish, and
- 8.3.3.9 Weight (except coil).

8.3.4 When identification colors are specified, marking practice shall be limited to paint striping coil, one end of bundle or lift with one color.

9. Tubular Products

9.1 *Product Grades:*

- 9.1.1 Mechanical tubing.
- 9.1.2 Pressure tubing.
- 9.1.3 EMT conduit.
- 9.1.4 Rigid conduit.
- 9.1.5 Standard pipe.
- 9.1.6 Line pipe.
- 9.1.7 Oil country goods.
- 9.1.8 Couplings and fittings.
- 9.1.9 Stainless steel tubing and pipe.

9.2 *Marking*—It is normal practice to identify each piece of large diameter steel pipe or tubing shipped loose, or each secured lift or package of smaller sizes with the following information:

- 9.2.1 Manufacturer's name, brand, or trademark.

NOTE 1—The above practice is subject to modification as to standard

specifications, if applicable.

10. Plates

10.1 *Product Grades:*

- 10.1.1 Carbon, high-strength low-alloy, and alloy steel plates, cut length.
- 10.1.2 Carbon and alloy steel plate in coils.
- 10.1.3 Stainless steel plates.
- 10.1.4 Floor plates.

10.2 *Marking*—It is normal practice to identify each piece, lift, or coil with those specified in applicable standards (ASTM, ASME, and so forth).

11. Sheets and Strip

11.1 *Product Grades:*

- 11.1.1 Carbon steels.
- 11.1.2 Alloy steels.
- 11.1.3 Electrical steels.
- 11.1.4 Metallic coated (except in mill products).
- 11.1.5 Nonmetallic coated.
- 11.1.6 Painted.
- 11.1.7 Stainless steels.

11.2 *Marking*—It is normal practice to identify each coil, group of coils, or lift of cut lengths with the following information:

- 11.2.1 Manufacturer's name, brand, or trademark,
- 11.2.2 Width and gauge or thickness,
- 11.2.3 Product type,
- 11.2.4 Weight (except strip, coil),
- 11.2.5 Purchaser's name, and
- 11.2.6 Purchaser's order number.

11.2.7 Stainless steel coils and cut lengths are also identified with the following:

- 11.2.7.1 Finish, and
- 11.2.7.2 Heat number or coil number.

11.3 *Carbon Steel Sheets, Coils:*

11.3.1 *General*—All coil weights are subject to mill manufacturing limits. When individual coil weights are needed, narrow sheet coils are generally weighed in groups and the weight of the group is averaged over the number of coils in the group. This average is not intended to be the actual weight of each individual coil of the group.

12. Tin Mill Products

12.1 *Product Grades:*

- 12.1.1 Tin plate.
- 12.1.2 Black plate.
- 12.1.3 Electrolytic chromium-coated steel (tin-free steel).

12.2 *Marking:*

12.2.1 *Cut Lengths*—Packages of cut length tin plate are identified with the following:

- (1) Manufacturer's name, brand, or trademark,
- (2) Basis weight,
- (3) Size,
- (4) Type,
- (5) Temper,
- (6) Coating weight (when applicable),

- (7) Product classification,
- (8) Surface treatment (when applicable), and
- (9) Differential markings (when applicable).

12.2.2 *Coils*—It is normal practice to identify each coil package with the following information:

- (1) Manufacturer's name, brand, or trademark,
- (2) Width,
- (3) Basis weight,
- (4) Type,
- (5) Temper,
- (6) Coating weight (when applicable),
- (7) Coil number,
- (8) Lineal feet,

- (9) Weight,
- (10) Product classification,
- (11) Differential markings (when applicable), and
- (12) Surface treatment (when applicable).

13. Castings

13.1 *Marking*—It is normal practice to have the heat number, alloy type, and pattern number cast or stamped on the surface of castings. The purchase order number may be shown on a tag attached to each box, skid, pallet or loose casting.

14. Keywords

14.1 loading; marking; packaging; shipment; steel products

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