Designation: A 786/A 786M – 00

Standard Specification for Rolled Steel Floor Plates[1]

This standard is issued under the fixed designation A 786/A 786M; 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 carbon, high-strength low-alloy, and alloy steel rolled floor plates for flooring, stairways, transportation equipment, and for general structural purposes. While it is generally provided in the as-rolled condition, it may also be provided in the heat-treated condition (see Appendix Table X1.1). Rolled floor plates have raised figures at regular intervals on one surface of the plate.

1.1.1 Carbon steel may be specified to chemical composition limits, the maximum carbon of which should not exceed 0.33 % or, an ASTM material specification with yield point or yield strength and tensile strength may be specified (see Appendix Table X1.1).

1.2 Rolled floor plate is customarily available in a limited number of gage numbers or thicknesses. Standard gage numbers and thicknesses are shown in Table 1. The maximum thickness to be delivered under this specification is 1 in. [25 mm].

1.3 When the steel is to be welded, it is presupposed that a welding procedure suitable for the grade of steel and intended use or service will be utilized. See Appendix X3 of Specification A 6/A 6M for information on weldability.

1.4 The values stated in either inch-pound units or SI units are to be regarded as standard. Within the text, 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 may result in noncomformance with the specification.

2. Referenced Documents

2.1 *ASTM Standards:*

A 6/A 6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling[2]

A 36/A 36M Specification for Carbon Structural Steel[2]

A 131/A 131M Specification for Structural Steel for Ships[2]

A 242/A 242M Specification for High-Strength Low-Alloy Structural Steel[2]

A 283/A 283M Specification for Low and Intermediate Tensile Strength Carbon Steel Plates[2]

A 284/A 284M Specification for Low and Intermediate Tensile Strength Carbon-Silicon Steel Plates for Machine Parts and General Construction[3]

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products[4]

A 514/A 514M Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding[2]

A 572/A 572M Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel[2]

A 573/A 573M Specification for Structural Carbon Steel Plates of Improved Toughness[2]

A 588/A 588M Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick[2]

A 656/A 656M Specification for Hot-Rolled Structural Steel, High-Strength Low-Alloy Plate with Improved Formability[2]

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment[5]

A 709/A 709M Specification for Carbon and High-Strength Low-Alloy Structural Steel Shapes, Plates, and Bars and Quenched and Tempered Alloy Structural Steel Plates for Bridges[2]

E 30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron[6]

E 59 Practice for Sampling Steel and Iron for Determination of Chemical Composition[6]

E 350 Test Method for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron[6]

2.2 *American Welding Society Standards:*

A5.1 Mild Steel Covered Arc-Welding Electrodes[7]

A5.5 Low-Alloy Steel Covered Arc-Welding Electrodes[7]

2.3 *Military Standards:*

MIL-STD-129 Marking for Shipment and Storage[8]

[1] This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.02 on Structural Steel for Bridges, Buildings, Rolling Stock, and Ships.

Current edition approved March 10, 2000. Published May 2000. Originally published as A 786 – 81. Last previous edition A 786 – 93.

[2] *Annual Book of ASTM Standards*, Vol 01.04.

[3] Discontinued. See *1994 Annual Book of ASTM Standards*, Vol 01.04.

[4] *Annual Book of ASTM Standards*, Vol 01.03.

[5] *Annual Book of ASTM Standards*, Vol 01.05.

[6] *Annual Book of ASTM Standards*, Vol 03.05.

[7] Available from American Welding Society, 550 N. W. LaJeune Rd., Miami, Fl 33135.

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

MIL-STD-163 Steel Mill Products Preparation for Shipment and Storage[8]

2.4 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipments (Civil Agencies)[8]

3. Classification

3.1 Individual floor plate patterns are manufactured exclusively by each producer and are not identical in dimension or appearance to patterns manufactured by other producers, although there may be a close resemblance. Standard patterns are shown in Figs. 1-3.

4. General Requirements for Delivery

4.1 Material furnished under this specification shall conform to the requirements of Sections 6, 7, 10, 11, 12, 14, 15, 16, 17, 18, and 19, and Table B of the current edition of Specification A 6/A 6M.

5. Ordering Information

5.1 Orders for material under this specification should include the following information, as necessary, to describe adequately the desired material:

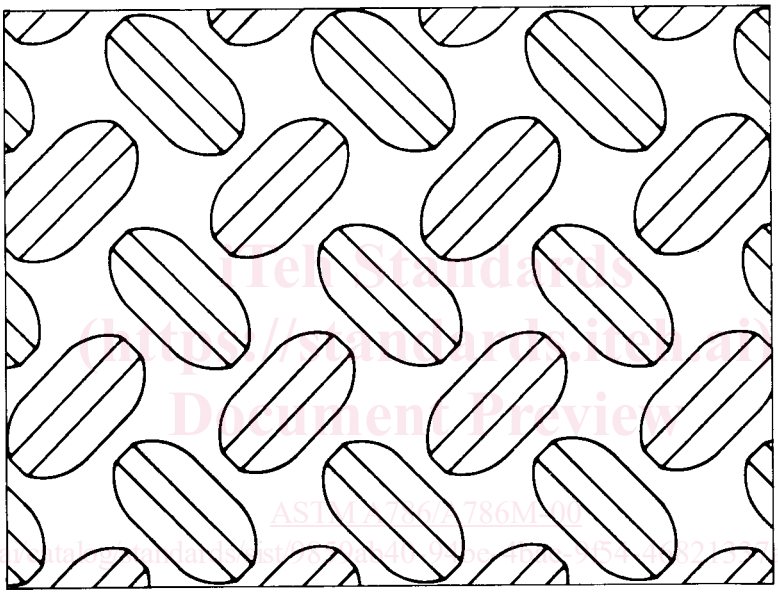
5.1.1 ASTM designation and year of issue,

5.1.2 Chemical composition limits or ASTM material designation and grade (if applicable) and year of issue (if neither is specified, the product will be supplied 0.33 % maximum carbon and without specified mechanical properties),

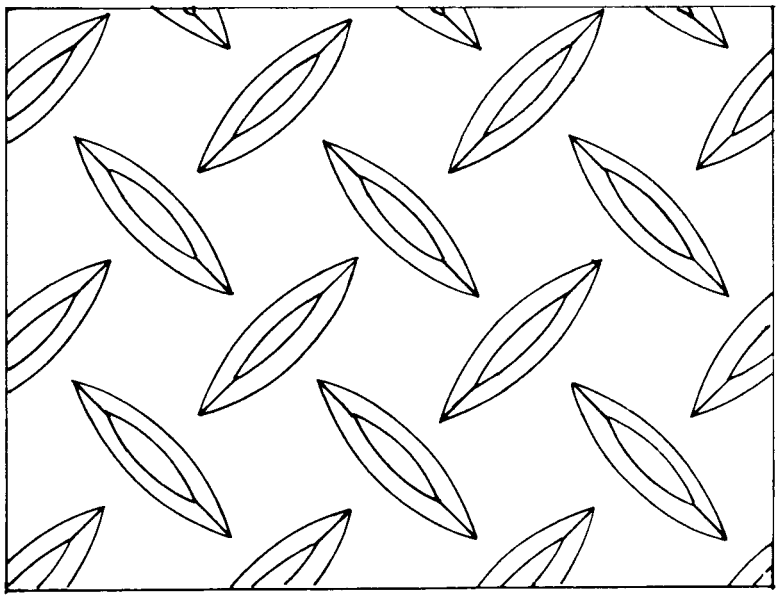
5.1.3 Product (rolled floor plate),

5.1.4 Pattern designation (see Figs. 1-3),

5.1.5 Dimensions,

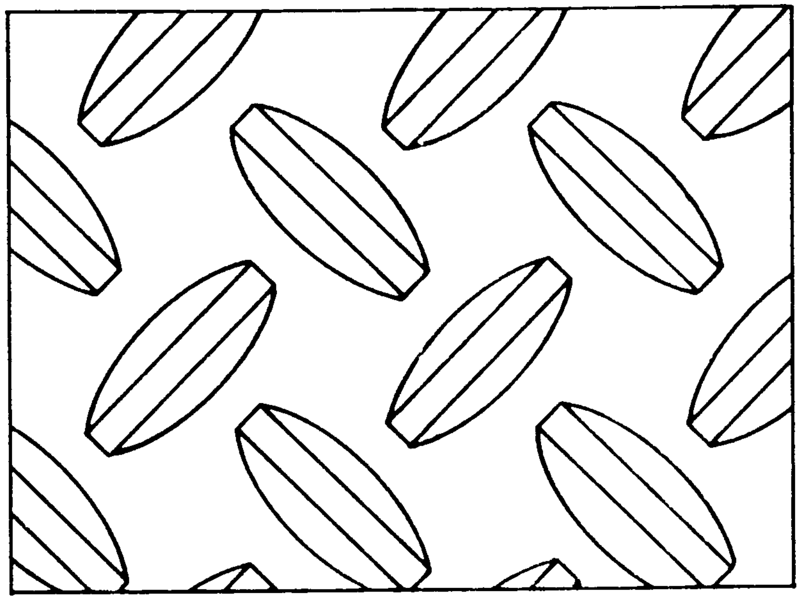


Pattern No. 1

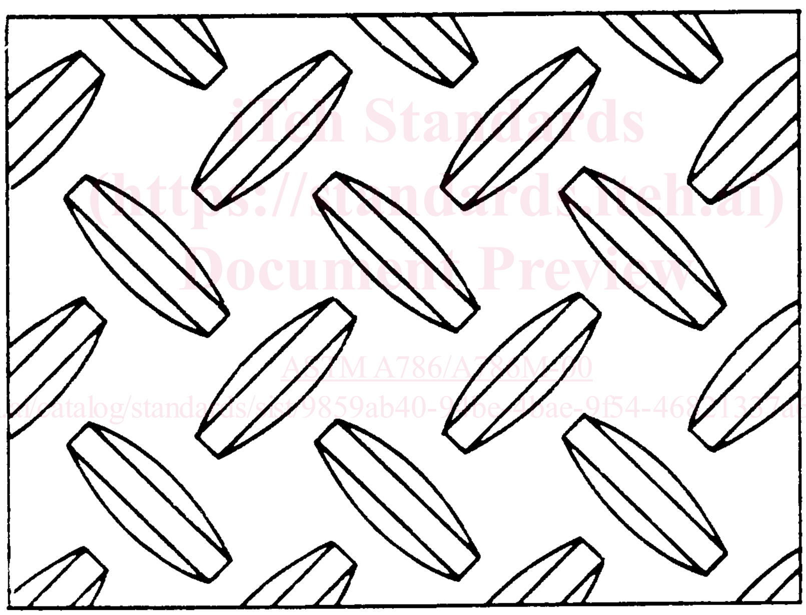


Pattern No. 2

FIG. 1 Floor Plate Patterns (Full Scale) for Patterns Nos. 1 and 2



Pattern No. 3



Pattern No. 4

FIG. 2 Floor Plate Patterns (Full Scale) for Patterns Nos. 3 and 4

5.1.6 Quantity (weight or number of pieces),

5.1.7 Supplementary requirements, if any, and

5.1.8 "M" specification designation (SI units) if desired. (Unless specifically designated on the order, the material shall be furnished to inch-pound units.)

6. Manufacture

6.1 The steel shall be made by one of the following processes: open-hearth, basic-oxygen, or electric-furnace.

6.2 Rolled steel floor plates are furnished in the hot-rolled condition unless otherwise required by the plate specification to which they are ordered (see Appendix Table X1.1). The purchaser may specify the heat treatment to be used provided it is not in conflict with the requirements of the material specification. When no heat treatment is required, the manufacturer or processor at his option may heat treat the plates by normalizing, stress relieving, or normalizing and then stress relieving to meet the material specification.

7. Chemical Composition

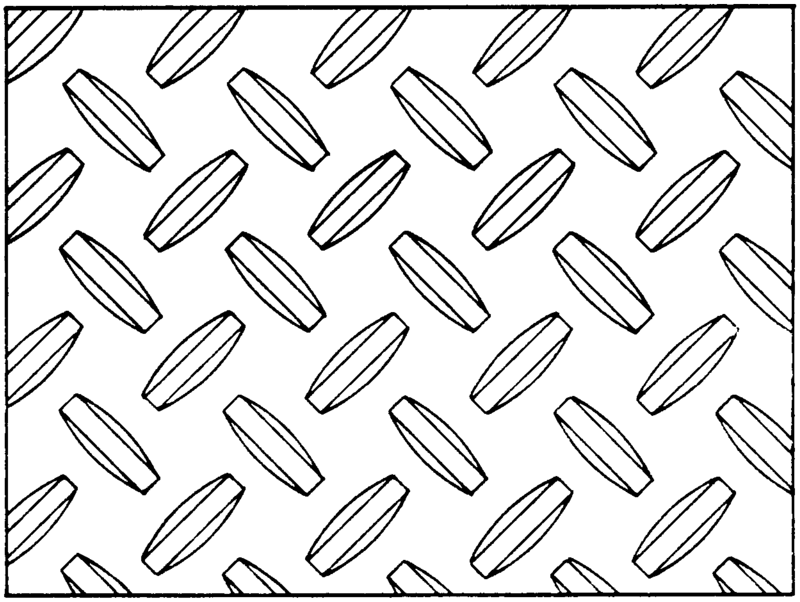
7.1 *Specified to Chemical Limits Only*:

7.1.1 The heat analysis shall conform to the chemical requirements specified on the purchase order.

7.1.2 The steel shall conform on product analysis to the requirements prescribed on the purchase order subject to the product analysis tolerances in Specification A 6/A 6M.

7.2 *Specified to an ASTM Plate Specification*:

7.2.1 The heat analysis shall conform to the chemical



Pattern No. 5

FIG. 3 Floor Plate Patterns (Full Scale) for Pattern No. 1

requirements table listed in the plate specification which is ordered (see Appendix Table X1.1).

7.2.2 The steel shall conform on product analysis to the requirements prescribed in the heat analysis table for the ordered specification subject to the product analysis tolerances in Specification A 6/A 6M.

7.3 Floor plate may be specified copper bearing with not less than 0.20 % copper in heat analysis or not less than 0.18 % copper on product analysis.

TABLE 1 Standard Thicknesses and Theoretical Weight [Mass] for Rolled Floor Plates

Thickness		Theoretical[A,B]		Thickness		Theoretical[A,B]		Thickness		Theoretical[A,B]	
Gage No.	[mm]	Weight, lb/ft^2	[Mass, kg/m^2]	in.	[mm]	Weight, lb/ft^2	[Mass, kg/m^2]	in.	[mm]	Weight, lb/ft^2	[Mass, kg/m^2]
18[C]	[1.4]	2.40	[11.72]	1/8	[3.5]	6.16	[30.08]	1/2	[13]	21.47	[104.8]
16[C]	[1.6]	3.00	[14.65]	3/16	[5]	8.71	[42.53]	9/16	[14]	24.02	[117.3]
14	[2.0]	3.75	[18.31]	1/4	[6]	11.26	[54.98]	5/8	[16]	26.58	[129.8]
13	[2.5]	4.50	[21.97]	5/16	[8]	13.81	[67.43]	3/4	[20]	31.68	[154.7]
12	[3.0]	5.25	[25.63]	3/8	[10]	16.37	[79.93]	7/8	[22]	36.78	[179.6]
10	[4.0]	6.81	[33.25]	7/16	[11]	18.92	[92.38]	1	[25]	41.89	[204.5]

[A] One cubic foot of rolled steel is assumed to weigh 490 lb. [One cubic metre is assumed to weigh 7850 kg.]
[B] Theoretical weights are shown for estimating convenience.
[C] The reverse side of the plate is flat except for the portion below the raised figures which may be hollow.

8. Tensile Properties

8.1 The material as represented by the test specimen shall conform to the requirements for yield point or yield strength, and tensile strength in the plate specification that is ordered. The tension test shall be conducted on specimens with the raised figures present. Thickness is measured at a position between the raised figures in an area unaffected by the pattern. Percent elongation is not required for rolled floor plate. ASTM plate specifications that may be ordered are listed in Table X1.1.

9. Permissible Variations

9.1 The permissible variation for dimensions shall not exceed the limits in Tables 2-7 or Tables A1.1-A1.6, inclusive.

SUPPLEMENTARY REQUIREMENTS

Standardized supplementary requirements for use at the option of the purchaser are listed in Specification A 6/A 6M. Those that are considered suitable for use with this specification are listed by title:

S2. Product Analysis

PERMISSIBLE VARIATIONS IN DIMENSIONS AND WEIGHTS IN INCH-POUND UNITS

TABLE 2 Permissible Variations for Weight for Rolled Floor Plates Carbon, High-Strength Low-Alloy and Alloy Steel

NOTE 1— Tolerances for overweight for lots of circular and sketch[A] plates are 1¼ times the amounts in the table below.
NOTE 2—Tolerances for overweight for single plates are 1⅓ times the amounts in the table below.
NOTE 3—Tolerances for overweight for single circular and sketch plates are 1⅔ times the amounts in the table below.

Gage No. or Thickness, in.	Equivalent Theoretical Weight, lb/ft^2	Tolerances for Average Weight of Lots[B] Expressed in Percentage of the Specified Weights per Square Foot	
		Over	Under
18	to 3.00 excl	10	5
16, 14, 13, and 12	3.00 to 6.16, excl	8	5
10 and 1 / 8	6.16 to 8.71, excl	6	5
3 / 16	8.71 to 11.26, excl	5.5	3
1 / 4	11.26 to 13.81, excl	5	3
5 / 16	13.81 to 16.37, excl	4.5	3
3 / 8	16.37 to 18.92, excl	4	3
7 / 16	18.92 to 21.47, excl	3.5	2.5
1 / 2 and 9 / 16	21.47 to 26.58, excl	3	2.5
5 / 8 , 3 / 4 , 7 / 8 , and 1	26.58 to 41.89, incl	2.5	2.5

[A] Sketch plates are plates having three or more sides, and forms other than circles, squares, and rectangles.
[B] The term lot means all the plates of each tabular weight group represented in each shipment.

TABLE 3 Permissible Variations for Width and Length for Rolled Floor Plates Carbon, High-Strength Low-Alloy and Alloy Steel

Specified Dimensions, in.		Tolerances, in.,[A] Over Specified Width and Length for Thicknesses and Equivalent Weights Given					
		Under 3 / 8 in.		3 / 8 to 5 / 8 in., excl		5 / 8 to 1 in., incl	
Width	Length	Under 16.37 lb/ft^2		16.37 to 26.58, lb/ft^2, excl		26.58 to 41.89 lb/ft^2, incl	
		Width	Length	Width	Length	Width	Length
To 96, incl	under 120	3 / 8	1 / 2	7 / 16	5 / 8	1 / 2	1
	120 to 240, excl	3 / 8	3 / 4	1 / 2	7 / 8	5 / 8	1 1 / 8
	240 to 360, excl	3 / 8	1	1 / 2	1 1 / 8	5 / 8	1 1 / 2
	360 to 480, incl	7 / 16	1 1 / 4	1 / 2	1 3 / 8	5 / 8	1 5 / 8

[A] Tolerances under specified width and length:
(a) For thicknesses 3 / 16 in. (8.71 lb/ft^2) and over: 1 / 4 in.
(b) For thicknesses under 3 / 16 in.: 1 / 8 in.

TABLE 4 Permissible Camber for Raised Figures for Rolled Floor Plates Carbon, High-Strength Low-Alloy and Alloy Steel (See Fig. 4)

Camber, as it relates to raised figures, is the curvature of the raised figures in the length direction, measured over the entire length of the plate.	3 / 8 in. × (number of feet of length)/5

TABLE 5 Permissible Camber[A] for Rectangular Sheared-Rolled Floor Plates and Gas-Cut Rolled Floor Plates Carbon, High-Strength Low-Alloy and Alloy Steel (See Fig. 5)

Thicknesses, in.	Specified Weights, lb/ft^2	Widths, in.	Camber Tolerances for Thickness and Widths Given
To 1, incl	to 41.89, incl	all	1 / 8 in. × (number of feet of length)/5

[A] Camber, as it relates to plates, is the horizontal edge curvature in the length, measured over the entire length of the plate in the flat position.