Designation: A 829/A 829M – 06

Standard Specification for Alloy Structural Steel Plates[1]

This standard is issued under the fixed designation A 829/A 829M; 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 structural quality alloy steel plates.

1.2 The plates are usually specified to chemical composition requirements, but tensile properties may also be specified.

1.2.1 When tensile properties are required, the specific requirements must be compatible with the chemical composition, condition, and plate thickness.

1.3 The plates are available in the following four conditions:

1.3.1 *Condition AR*—As rolled (hot rolled),

1.3.2 *Condition A*—Annealed,

1.3.3 *Condition N*—Normalized, and

1.3.4 *Condition NT*—Normalized and tempered.

1.4 The plates are available in the following three forms:

1.4.1 *Form I*—Rectangular,

1.4.2 *Form II*—Circular and semi-circular, and

1.4.3 *Form III*—Sketch, including rings.

1.5 The plates are available in the following five edge categories:

1.5.1 *Edge 1*—Mill edge,

1.5.2 *Edge 2*—Universal mill edge,

1.5.3 *Edge 3*—Sheared edge,

1.5.4 *Edge 4*—Gas cut edge, and

1.5.5 *Edge 5*—Special cut edge.

1.6 The plates are available in the following seven finishes:

1.6.1 *Finish 1*—As rolled (hot rolled),

1.6.2 *Finish 2*—Blast cleaned,

1.6.3 *Finish 3*—Blast cleaned and oiled,

1.6.4 *Finish 4*—Pickled,

1.6.5 *Finish 5*—Pickled and oiled,

1.6.6 *Finish 6*—Painted, one prime coat, and

1.6.7 *Finish 7*—Painted, one prime coat and one finish coat.

1.6.8 The plates are usually specified to have Finish 1.

1.7 Supplementary requirements are provided for additional requirements that may be specified on the order.

1.8 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 X 3 of Specification A 6/A 6M for information on weldability.

1.9 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 nonconformance with the specification.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

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

3. Ordering Information

3.1 Orders for plates under this specification should include the following information:

3.1.1 ASTM designation and year of issue.

3.1.2 Grade (see 5.1) or chemical composition (see 5.2).

3.1.3 Tensile properties, if required (see Section 6).

3.1.4 Coarse austenitic grain size, if required (see 4.1).

3.1.5 Condition (see 1.3).

3.1.6 Form (see 1.4).

3.1.7 Edge, if other than Edge 3 or 4 (see 4.3).

3.1.8 Finish (see 1.6).

3.1.9 Dimensions of plate.

3.1.10 Limitations on repair by welding, if any (see 4.5.2).

3.1.11 Supplementary Requirements, if any, including all the additional information called for in the Supplementary Requirements.

4. Materials and Manufacture

4.1 The steel shall be made to fine grain practice, unless coarse austenitic grain size is specified in the purchase order.

4.2 The plates shall be furnished in the condition specified in the purchase order.

4.2.1 Plates specified to be furnished in a heat-treated condition shall be heated to a suitable temperature at or above

[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 A01.02 on Structural Steel for Bridges, Buildings, Rolling Stock, and Ships.

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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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the upper critical temperature, but not exceeding 1700°F [925°C], held a sufficient length of time to attain essentially uniform temperature throughout, and cooled as appropriate for the condition specified.

4.3 *Edge*—Unless otherwise specified on the order, Edge 3 shall be furnished; provided, however, that Edge 4 may be furnished in place of Edge 3 at the supplier's option.

4.4 *Finish*—The plates shall be furnished with a finish as specified on the order.

4.5 *Repair by Welding*:

4.5.1 Repairs by welding shall be performed by competent welders using low-hydrogen electrodes selected so that the chemical composition of the deposited weld metal is similar to the nominal composition of the base plate.

4.5.2 If repair by welding is not acceptable, or if approval of the welding procedure by the purchaser is required, the order shall so specify.

5. Chemical Composition

5.1 The heat analysis shall conform to the requirements for the applicable grade listed in Table 1, unless otherwise specified as in 5.2.

5.2 The chemical composition for heat analysis may be specified in accordance with the ranges and limits listed in Table 2. In such instances, the heat analysis shall conform to the requirements specified on the order.

6. Tensile Requirements

6.1 When tensile requirements are specified, the requirements must be compatible with the chemical composition, condition, and the plate thickness.

6.2 The specified tensile strength range shall be not less than the applicable range listed in Table 3.

7. General Requirements for Delivery

7.1 Material furnished under this specification shall conform to the requirements of the current edition of Specification A 6/A 6M, for the ordered material, unless a conflict exists in which case this specification shall prevail.

8. Certification

8.1 A report of the heat analysis and the results of all tests required by the order shall be furnished to the purchaser. The

TABLE 1 Standard Steels Alloy Plate Compositions

NOTE 1—Where ". . ." appears in this table there is no requirement.

SAE Number	Chemical Composition Limits, %								
	Carbon	Manganese	Phosphorus, max	Sulfur, max	Silicon	Nickel	Chromium	Molybdenum	Vanadium, min
1330	0.28–0.33	1.60–1.90	0.035	0.040	0.15–0.35	. . .	. . .	. . .	. . .
1335	0.33–0.38	1.60–1.90	0.035	0.040	0.15–0.35	. . .	. . .	. . .	. . .
1340	0.38–0.43	1.60–1.90	0.035	0.040	0.15–0.35	. . .	. . .	. . .	. . .
1345	0.43–0.48	1.60–1.90	0.035	0.040	0.15–0.35	. . .	. . .	. . .	. . .
4118	0.18–0.23	0.70–0.90	0.035	0.040	0.15–0.35	. . .	0.40–0.60	0.08–0.15	. . .
4130	0.28–0.33	0.40–0.60	0.035	0.040	0.15–0.35	. . .	0.80–1.10	0.15–0.25	. . .
4135	0.32–0.39	0.65–0.95	0.035	0.040	0.15–0.35	. . .	0.80–1.10	0.15–0.25	. . .
4137	0.35–0.40	0.70–0.90	0.035	0.040	0.15–0.35	. . .	0.80–1.10	0.15–0.25	. . .
4140	0.36–0.44	0.75–1.00	0.035	0.040	0.15–0.35	. . .	0.80–1.10	0.15–0.25	. . .
4142	0.38–0.46	0.75–1.00	0.035	0.040	0.15–0.35	. . .	0.80–1.10	0.15–0.25	. . .
4145	0.43–0.48	0.75–1.00	0.035	0.040	0.15–0.35	. . .	0.80–1.10	0.15–0.25	. . .
4150	0.48–0.53	0.75–1.00	0.035	0.040	0.15–0.35	. . .	0.80–1.10	0.15–0.25	. . .
4340	0.38–0.43	0.60–0.80	0.035	0.040	0.15–0.35	1.65–2.00	0.70–0.90	0.20–0.30	. . .
E4340	0.38–0.43	0.65–0.85	0.025	0.025	0.15–0.35	1.65–2.00	0.70–0.90	0.20–0.30	. . .
4615	0.13–0.18	0.45–0.65	0.035	0.040	0.15–0.35	1.65–2.00	. . .	0.20–0.30	. . .
4617	0.15–0.20	0.45–0.65	0.035	0.040	0.15–0.35	1.65–2.00	. . .	0.20–0.30	. . .
4620	0.17–0.22	0.45–0.65	0.035	0.040	0.15–0.35	1.65–2.00	. . .	0.20–0.30	. . .
5160	0.56–0.64	0.75–1.00	0.035	0.040	0.15–0.35	. . .	0.70–0.90	. . .	. . .
6150	0.48–0.53	0.70–0.90	0.035	0.040	0.15–0.35	. . .	0.80–1.10	. . .	0.15
8615	0.13–0.18	0.70–0.90	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8617	0.15–0.20	0.70–0.90	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8620	0.18–0.23	0.70–0.90	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8622	0.20–0.25	0.70–0.90	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8625	0.23–0.28	0.70–0.90	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8627	0.25–0.30	0.70–0.90	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8630	0.28–0.33	0.70–0.90	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8637	0.35–0.40	0.75–1.00	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8640	0.38–0.43	0.75–1.00	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8655	0.51–0.59	0.75–1.00	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	. . .
8742	0.40–0.45	0.75–1.00	0.035	0.040	0.15–0.35	0.40–0.70	0.40–0.60	0.20–0.30	. . .

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TABLE 2 Heat Analysis Ranges[A] For Alloy Steel Plates

Element	When Maximum of Specified Element is, %	Range[A] %
Carbon	To 0.25, incl	0.06
	Over 0.25 to 0.40, incl	0.07
	Over 0.40 to 0.55, incl	0.08
	Over 0.55 to 0.70, incl	0.11
	Over 0.70	0.14
Manganese	To 0.45, incl	0.20
	Over 0.45 to 0.80, incl	0.25
	Over 0.80 to 1.15, incl	0.30
	Over 1.15 to 1.70, incl	0.35
	Over 1.70 to 2.10, incl	0.40
Sulfur	To 0.060, incl	0.02
	Over 0.060 to 0.100, incl	0.04
	Over 0.100 to 0.140, incl	0.05
Silicon	To 0.15, incl	0.08[B]
	Over 0.15 to 0.20, incl	0.10[B]
	Over 0.20 to 0.40, incl	0.15[B]
	Over 0.40 to 0.60, incl	0.20[B]
	Over 0.60 to 1.00, incl	0.30
	Over 1.00 to 2.20, incl	0.40
Copper	To 0.60, incl	0.20
	Over 0.60 to 1.50, incl	0.30
	Over 1.50 to 2.00, incl	0.35
Nickel	To 0.50 incl	0.20
	Over 0.50 to 1.50, incl	0.30
	Over 1.50 to 2.00, incl	0.35
	Over 2.00 to 3.00, incl	0.40
	Over 3.00 to 5.30, incl	0.50
	Over 5.30 to 10.00, incl	1.00
Chromium	To 0.40, incl	0.20
	Over 0.40 to 0.80, incl	0.25
	Over 0.80 to 1.05, incl	0.30
	Over 1.05 to 1.25, incl	0.35
	Over 1.25 to 1.75, incl	0.50
	Over 1.75 to 3.99, incl	0.60
Molybdenum	To 0.10, incl	0.05
	Over 0.10 to 0.20, incl	0.07
	Over 0.20 to 0.50, incl	0.10
	Over 0.50 to 0.80, incl	0.15
	Over 0.80 to 1.15, incl	0.20
Vanadium	To 0.25, incl	0.05
	Over 0.25 to 0.50, incl	0.10

[A]Range is the arithmetical difference between the two limits.
[B]A range of 0.25 is commonly specified for this level of silicon, rather than the range listed.

TABLE 3 Tensile Strength Ranges

Specified Maximum Tensile Strength, ksi [MPa]	Tensile Strength Range, ksi [MPa]
Up to 70 [480]	15 [100]
Over 70 to 110 [480 to 760]	20 [135]
Over 110 to 140 [760 to 965]	25 [170]

report shall also include a certification that the material was manufactured in accordance with the requirements of this specification.

9. Keywords

9.1 alloy; plates; steel; structural steel

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SUPPLEMENTARY REQUIREMENTS

Supplementary requirements shall not apply unless specified in the purchase order or contract. 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:

S1. Vacuum Treatment,
S2. Product Analysis, and
S8. Ultrasonic Examination.

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue (A 829/A 829M – 04) that may impact the use of this standard.

(1) Table 1 was revised.

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