Designation: A494/A494M – 26

Standard Specification for Castings, Nickel and Nickel Alloy[1]

This standard is issued under the fixed designation A494/A494M; 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 U.S. Department of Defense.

1. Scope*

1.1 This specification covers nickel, nickel-copper, nickel-copper-silicon, nickel-molybdenum, nickel-chromium, and nickel-molybdenum-chromium alloy castings for corrosion-resistant service.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. 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.

1.3 *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]

A488/A488M Practice for Steel Castings, Welding, Qualifications of Procedures and Personnel

A781/A781M Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use

A957/A957M Specification for Investment Castings, Steel and Alloy, Common Requirements, for General Industrial Use

3. Terminology

3.1 *Definitions:*

3.1.1 *master heat*—a single furnace charge of refined alloy, which may either be poured directly into castings or into remelt alloy for individual melts.

3.1.2 *melts*—a single furnace charge poured into castings. When master heats are used to prepare melts, a melt analysis shall be reported.

4. General Conditions for Delivery

4.1 Except for investment castings, castings furnished to this specification shall conform to the requirements of Specification A781/A781M, including any supplementary requirements that are indicated on the purchase order. Failure to comply with the general requirements of Specification A781/A781M constitutes nonconformance with this specification. In case of conflict between the requirements of this specification and Specification A781/A781M, this specification shall prevail.

4.2 Investment castings furnished to this specification shall conform to the requirements of Specification A957/A957M, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the general requirements of Specification A957/A957M constitutes nonconformance with this specification. In case of conflict between the requirements of this specification and Specification A957/A957M, Specification A957/A957M shall prevail.

5. Ordering Information

5.1 Orders for castings to this specification should include the following information:

5.1.1 Quantity, in pieces, and

5.1.2 Grade designation (Table 1) and class (Table 2).

5.2 The purchaser shall specify any of the following information required to adequately describe the desired material:

5.2.1 Heat-treat condition (see 6.1 and 6.2),

5.2.2 Repair welding (see Section 11),

5.2.3 Source inspection requirements, if any (see Specification A781/A781M),

5.2.4 Marking-for-identification requirements, if any (see 13.1), and

5.2.5 Supplementary requirements desired, including the standards of acceptance.

6. Heat Treatment

6.1 Castings shall be heat treated in accordance with the requirements in Table 2.

[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 A01.18 on Castings.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. 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**

TABLE 1 Composition Requirements[A,B]

Grade Type UNS	Element, %																		
	C	Mn	P	S	Si	Cu	Mo	Fe	Ni	Cr	Nb[C]	W	V	Bi	Sn	Co	Ta	Al	Ti
CU5MCuC Ni-Cr N08826	0.050	1.0	0.030	0.020	1.0	1.50–3.50	2.5–3.5	Balance	38.00–44.0	19.5–23.5	0.60–1.20	[E]	[E]	. . .	. . .				
CW2M Ni-Cr N26455	0.02	1.00	0.03	0.02	0.80	[E]	15.0–17.5	2.0	Balance	15.0–17.5	[E]	1.0	[E]	. . .	. . .				
CW6M Ni-Cr N30107	0.07	1.00	0.030	0.020	1.00	[E]	17.0–20.0	3.0	Balance	17.0–20.0	[E]	[E]	[E]	. . .	. . .				
CW6MC Ni-Cr N26625	0.06	1.00	0.015	0.015	1.00	[E]	8.0–10.0	5.0	Balance	20.0–23.0	3.15–4.50	[E]	[E]	. . .	. . .				
CW12MW Ni-Cr N30002	0.12	1.00	0.030	0.020	1.00	[E]	16.0–18.0	4.5–7.5	Balance	15.5–17.5	[E]	3.75–5.25	0.20–0.40	. . .	. . .				
CX2M Ni-Cr N26059	0.02	1.00	0.020	0.020	0.50	[E]	15.0–16.5	1.50	Balance	22.0–24.0	[E]	[E]	[E]	. . .	. . .				
CX2MW Ni-Cr N26022	0.02	1.00	0.025	0.020	0.80	[E]	12.5–14.5	2.0–6.0	Balance	20.0–22.5	[E]	2.5–3.5	0.35	. . .	. . .				
CY2Co Ni-Cr-Co N07130	0.020	0.50	0.015	0.010	0.40	[E]	0.50	1.50	Balance	24.0–26.0	0.15–0.50	0.20	[E]	. . .	[E]	19.0–22.0	0.10–0.25	1.0–1.6	1.0–1.6
CY40 Ni-Cr N06040	0.40	1.50	0.03	0.02	3.00	[E]	[E]	11.0	Balance	14.0–17.0	[E]	[E]	[E]	. . .	. . .				
CY5SnBiM Other N26055	0.05	1.5	0.03	0.02	0.5	. . .	2.0–3.5	2.0	Balance	11.0–14.0	. . .	. . .	. . .	3.0–5.0	3.0–5.0				
CZ100 Ni N02100	1.00	1.50	0.03	0.02	2.00	1.25	. . .	3.00	95.00 min	. . .	. . .	. . .	. . .	. . .	. . .				
M25S Ni-Cu N24025	0.25	1.50	0.03	0.02	3.5–4.5	27.0–33.0	. . .	3.50	Balance	. . .	[E]	. . .	. . .	. . .	. . .				
M30C[D] Ni-Cu N24130	0.30	1.50	0.03	0.02	1.0–2.0	26.0–33.0	. . .	3.50	Balance	. . .	1.0–3.0	. . .	. . .	. . .	. . .				
M30H Ni-Cu N24030	0.30	1.50	0.03	0.02	2.7–3.7	27.0–33.0	. . .	3.50	Balance	. . .	[E]	. . .	. . .	. . .	. . .				