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.

Designation: A297/A297M – 21a

Standard Specification for Steel Castings, Iron-Chromium and Iron-Chromium-Nickel, Heat Resistant, for General Application[1]

This standard is issued under the fixed designation A297/A297M; 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 iron-chromium and iron-chromium-nickel alloy castings for heat-resistant service. The grades covered by this specification are general purpose alloys and no attempt has been made to include heat-resisting alloys used for special production application.

NOTE 1—For heat-resisting alloys used for special product application, reference should be made to Specifications A351/A351M, A217/A217M, and A447/A447M.

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]

A217/A217M Specification for Steel Castings, Martensitic Stainless and Alloy, for Pressure-Containing Parts, Suitable for High-Temperature Service

A351/A351M Specification for Castings, Austenitic, for Pressure-Containing Parts

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A447/A447M Specification for Steel Castings, Chromium-Nickel-Iron Alloy (25-12 Class), for High-Temperature Service

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. General Conditions for Delivery

3.1 Except for investment castings, material furnished to this specification shall conform to the requirements of Specification A781/A781M, including any supplementary requirements that are indicated in 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.

3.2 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.

4. Ordering Information

4.1 The inquiry and order should include or indicate the following:

4.1.1 A description of the casting by pattern number or drawing (dimensional tolerances shall be included on the casting drawing),

4.1.2 Grade of steel,

4.1.3 Options in the specification, and

4.1.4 The supplementary requirements desired, including the standards of acceptance.

5. Process

5.1 Alloys shall be made by the following processes: electric arc, electric induction, or other approved processes.

[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 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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TABLE 1 Composition Requirements[A,B]

Grade (UNS Number)	Type	Element, %								
		Carbon	Manganese	Phosphorus	Sulfur	Silicon	Chromium	Nickel	Molybdenum[C]	Other[D]
HF (J92603)	19Cr-9Ni	0.20–0.40	2.00	0.04	0.04	2.00	18.0–23.0	8.0–12.0	0.50	. . .
HH (J93503)	25Cr-12Ni	0.20–0.50	2.00	0.04	0.04	2.00	24.0–28.0	11.0–14.0	0.50	. . .
HI (J94003)	28Cr-15Ni	0.20–0.50	2.00	0.04	0.04	2.00	26.0–30.0	14.0–18.0	0.50	. . .
HK (J94224)	25Cr-20Ni	0.20–0.60	2.00	0.04	0.04	2.00	24.0–28.0	18.0–22.0	0.50	. . .
HE (J93403)	29Cr-9Ni	0.20–0.50	2.00	0.04	0.04	2.00	26.0–30.0	8.0–11.0	0.50	. . .
HT (N08605)	15Cr-35Ni	0.35–0.75	2.00	0.04	0.04	2.50	15.0–19.0	33.0–37.0	0.50	. . .
HU (N08004)	19Cr-39Ni	0.35–0.75	2.00	0.04	0.04	2.50	17.0–21.0	37.0–41.0	0.50	. . .
HW (N08001)	12Cr-60Ni	0.35–0.75	2.00	0.04	0.04	2.50	10.0–14.0	58.0–62.0	0.50	. . .
HX (N06006)	17Cr-66Ni	0.35–0.75	2.00	0.04	0.04	2.50	15.0–19.0	64.0–68.0	0.50	. . .
HC (J92605)	28Cr	0.50	1.00	0.04	0.04	2.00	26.0–30.0	4.00	0.50	. . .
HD (J93005)	28Cr-5Ni	0.50	1.50	0.04	0.04	2.00	26.0–30.0	4.0–7.0	0.50	. . .
HL (N08604)	29Cr-20Ni	0.20–0.60	2.00	0.04	0.04	2.00	28.0–32.0	18.0–22.0	0.50	. . .
HN (J94213)	20Cr-25Ni	0.20–0.50	2.00	0.04	0.04	2.00	19.0–23.0	23.0–27.0	0.50	. . .
HP15Nb	25Cr-35Ni	0.05–0.25	0.50–1.60	0.030	0.030	0.50–1.50	24–27	34–38	0.50	Nb 0.5–1.5
HP (N08705)	26Cr-35Ni	0.35–0.75	2.00	0.04	0.04	2.50	24–28	33–37	0.50	. . .
HPNb (N28701)	25Cr-35Ni-1Nb	0.38–0.45	0.50–1.50	0.03	0.03	0.50–1.50	24–27	34–37	0.50	Nb 0.5–1.5
HPNbS (N28702)	25Cr-35Ni-1Nb-2Si	0.38–0.45	0.50–1.50	0.03	0.03	1.50–2.50	24–27	34–37	0.50	Nb 0.5–1.5
HG10MNN (J92604)	19Cr-12Ni-4Mn	0.07–0.11	3.0–5.0	0.040	0.03	0.70	18.5–20.5	11.5–13.5	0.25–0.45	Cu 0.50 Nb[E] N 0.20–0.30
CT15C (N08151)	20Cr-33Ni-1Nb	0.05–0.15	0.15–1.50	0.03	0.03	0.15–1.50	19.0–21.0	31.0–34.0	. . .	Nb 0.50–1.50

[A] Where ellipses (...) appear in this table there is no requirement, and the element need not be analyzed or reported.
[B] All values are maximums except where a range is provided.
[C] Castings having a specified molybdenum range agreed upon by the manufacturer and the purchaser may also be furnished under these specifications.
[D] Niobium (Nb) and Columbium (Cb) both designate element 41.
[E] Grade HG10MNN shall have a niobium content of not less than 8× the carbon, but not over 1.00 %.

6. Heat Treatment

6.1 Castings for heat-resistant service may be shipped in the as-cast condition without heat treatment. If heat treatment is required, the treatment shall be established by mutual agreement between the manufacturer and the purchaser and shall be so specified in the inquiry, contract, or order.