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Standard Specification for Castings, Iron-Chromium-Nickel-Molybdenum Corrosion-Resistant, Duplex (Austenitic/Ferritic) for General Application[1]

This standard is issued under the fixed designation A890/A890M; 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 a group of cast duplex stainless steels (austenitic/ferritic).

1.2 The duplex stainless steel alloys offer a combination of enhanced mechanical properties and corrosion resistance when properly balanced in composition and properly heat treated. Ferrite levels are not specified, but these alloys will develop a range of approximately 30 to 60 % ferrite with the balance austenite.

1.3 The values stated in either ~~inch-pound~~SI units or ~~metric (SI)~~ inch-pound units are to be regarded separately as standard. ~~Within the text the metric (SI) units are shown in brackets.~~ The values stated in each system ~~are~~may not be exact equivalents; therefore, each system ~~must~~shall be used independently of the other. Combining values from the two systems may result in non-conformance with the ~~specification.~~ standard.

1.3.1 Within the text, the SI units are shown in brackets.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A732/A732M Specification for Castings, Investment, Carbon and Low Alloy Steel for General Application, and Cobalt Alloy for High Strength at Elevated Temperatures

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

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E562 Test Method for Determining Volume Fraction by Systematic Manual Point Count

E1245 Practice for Determining the Inclusion or Second-Phase Constituent Content of Metals by Automatic Image Analysis

3. Ordering Information

3.1 Orders for material to this specification shall include the following, as required, to describe the material adequately:

3.1.1 Description of casting by pattern or drawing number (dimensional tolerance shall be included on the casting drawing),

3.1.2 Specification designation and grade including year of issue,

3.1.3 Options in the specification (See 9.1), and

3.1.4 Supplementary requirements desired, including the standards of acceptance.

4. Process

4.1 The steel shall be made by the electric furnace process with or without separate refining such as argon-oxygen-decarburization (AOD).

5. Heat Treatment

5.1 Castings shall be heat treated in accordance with the requirements in Table 1.

NOTE 1—Proper heat treatment of these alloys is usually necessary to enhance corrosion resistance and in some cases to meet mechanical properties. Minimum heat-treat temperatures are specified; however, it is sometimes necessary to heat-treat at higher temperatures, hold for some minimum time at temperature and then rapidly cool the castings in order to enhance the corrosion resistance and meet mechanical properties.

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[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.**

TABLE 1 Heat Treatment Requirements

Grade	Heat Treatment
~~1A, 1B, 1C~~	~~Heat to 1900°F [1040°C] minimum, hold for sufficient time to heat casting uniformly to temperature, quench in water or rapid cool by other means.~~
1B, 1C	Heat to 1900°F [1040°C] minimum, hold for sufficient time to heat casting uniformly to temperature, quench in water or rapid cool by other means.
2A	Heat to 2050°F [1120°C] minimum, hold for sufficient time to heat casting uniformly to temperature, quench in water or rapid cool by other means.
3A	Heat to 1950°F [1070°C] minimum, hold for sufficient time to heat casting uniformly to temperature, quench in water or rapid cool by other means.
4A	Heat to 2050°F [1120°C] minimum for sufficient time to heat casting uniformly to temperature and water quench, or the casting may be furnace cooled to 1850°F [1010°C] minimum, hold for 15 min minimum and then water quench. A rapid cool by other means may be employed in lieu of water quench.
5A	Heat to 2050°F [1120°C] minimum, hold for sufficient time to heat casting to temperature, furnace cool to 1910°F [1045°C] minimum, quench in water or rapid cool by other means.
6A	Heat to 2010°F [1100°C] minimum, hold for sufficient time to heat casting uniformly to temperature, quench in water or cool rapidly by other means.

6. Chemical Composition

6.1 The steel shall conform to the requirements as to chemical composition prescribed in Table 2.

7. General Requirements

7.1 Material furnished to this specification shall conform to the requirements of Specification A781/A781M, including any