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Designation: A 959 – 01

Standard Guide for Specifying Harmonized Standard Grade Compositions for Wrought Stainless Steels[1]

This standard is issued under the fixed designation A 959; 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 standard provides a guide to ASTM Subcommittees A01.06, A01.10, A01.17, A01.22, and A01.28 for specifying chemical composition limits of wrought stainless steels. It is intended that these recommended grade composition limits be suitable for adoption by other standardization bodies that prepare standards for stainless steel products.

1.2 Included in this guide are the recommendations for determining the number of significant figures for specifying chemical composition from Test Methods, Practices and Terminology A 751.

1.3 All stainless steel UNS numbers and the stainless steel grades in all standards overseen by the aforementioned ASTM subcommittees have been included, except those grades applicable to restricted special end uses and alloys containing less than 10.5 % minimum chromium.

1.4 Not addressed are minor composition modifications which a specific product subcommittee may find necessary to accommodate effects of normal processing or to enhance fabricability by the producer or user, or both.

1.5 Also not generally addressed (except when established by ASTM product subcommittees) is a complete rationalization of all limits, especially when such would conflict with long-standing practices and is not justified by special technical effect.

1.6 Excluded from this guide are cast material and welding filler metal.

2. Referenced Documents

2.1 *ASTM Standards:*

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products[2]

E 527 Practice for Numbering Metals and Alloys (UNS)[2]

2.2 *SAE Standards:*

J 1086 Recommended Practice for Numbering Metals and Alloys[3]

HS-1086 FEB93 Metals and Alloys in the Unified Numbering System[3]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *austenitic grade*, *n*— is a metallurgical term meaning that the material is usually predominantly face-centered cubic in structure and hardenable only by cold working.

3.1.2 *austenitic-ferritic (duplex) grade*, *n*—is a metallurgical term meaning that the material is a mixture of austenitic and ferritic structures, with at least one-fourth of the lesser phase, and hardenable only by cold working.

3.1.3 *ferritic grade*, *n*—is a metallurgical term meaning that the material is body-centered cubic in structure (with little, if any, tempered martensite) and hardenable only slightly by cold working (responding little or only slightly to conventional heat treatment by quenching and tempering).

3.1.4 *martensitic grade*, *n*—is a metallurgical term meaning that the material is capable of being produced in a distorted body-centered cubic structure by conventional heat treating and quenching, and that the quenched structure is capable of conventional tempering. Martensitic grades are delivered in the annealed (ferritic) condition or the hardened and tempered (martensitic) condition.

3.1.5 *precipitation hardening grade*, *n*—is a metallurgical term meaning that the material may be basically austenitic or martensitic in structure and hardenable by precipitation hardening (sometimes called age hardening).

3.1.6 *standard stainless steel grade*, *n*—the listed chemical composition associated with a stainless steel grade identified by a particular UNS number appearing in SAE publication HS-1086 FEB93, except as modified by an ASTM subcommittee having oversight of a wrought stainless steel product where such a modification is justified by a specific technical effect.

[1] This guide is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.96 on Harmonization of Wrought Stainless Steel Requirements.

Current edition approved Oct. 10, 2001. Published December 2001. Originally published as A 959 – 96. Last previous edition A 959 – 00a.

[2] *Annual Book of ASTM Standards*, Vol 01.01.

[3] Available from Society of Automotive Engineers, Commonwealth Drive, Warrendale, PA 15096.

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