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## Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement<sup>1</sup>

This standard is issued under the fixed designation A955/A955M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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<sup>ε1</sup>Note—Editorial corrections were made to the Summary of Changes in October 2011.

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### 1. Scope\*

~~1.1~~<sup>1.1</sup> This specification covers deformed and plain stainless-steel bars for concrete reinforcement in cut lengths and coils used in applications requiring resistance to corrosion or controlled magnetic permeability. The standard sizes and dimensions of deformed bars and their numerical designation shall be those listed in Table 1. The text of this specification references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the specification.

1.1.1 Supplementary requirement (S1) of an optional nature is provided. It shall apply only when specified by the purchaser. In order to obtain a controlled magnetic permeability product, steel conforming to Supplementary Requirement S1 should be ordered.

1.2 The chemical composition of the stainless steel alloy shall be selected for suitability to the application involved by agreement between the manufacturer and the purchaser. This is an important consideration in achieving the desired corrosion resistance or controlled magnetic permeability, or both, because these properties are not provided by all stainless steels.

NOTE 1—The alloys shown in Table 2 have found the most use in North America. Other alloys may also provide desired properties; consult with the manufacturer for stainless steel alloy properties and availability.

1.3 Requirements for the relative deformation area of three-sided deformed bars are contained in Annex A4.

1.4 Bars are of ~~three~~<sup>two</sup> minimum yield strength levels, namely, 40 000 [280 MPa], 60 000 [420 MPa, MPa] and 75 000 psi [520 MPa], designated as Grade 40 [280], Grade 60 [420], [420] and Grade 75 [520], respectively.

~~1.5~~<sup>1.5</sup> Plain rounds Plain bars in sizes up to and including 2 in. [50.8 mm] in diameter in coils or cut lengths, when ordered, shall be furnished under this specification in Grade 40 [280], Grade 60 [420], [420] and Grade 75 [520], respectively. Bending properties, when required, shall be by agreement between the manufacturer and purchaser. Requirements providing for deformations and marking shall not be applicable to plain bars.

1.6 Weldability of most stainless steel compositions is generally good, however, pre-weld or post-weld procedures, or both, are necessary. Where material is to be welded, a welding procedure suitable for the chemical composition and intended use or service shall be used. Retesting of physical properties should be considered following welding procedures depending upon the steel composition and welding operation involved.

NOTE 2—It is recommended that the user consult the manufacturer for information available from the Nickel Development Institute (NIDI) (Toronto, Canada).

1.7 This specification is applicable for orders in either inch-pound units (as Specification A955) or in SI units (as Specification A955M).

1.8 The values stated in either inch-pound or SI units are to be regarded separately 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 shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

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<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.05 on Steel Reinforcement.

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\*A Summary of Changes section appears at the end of this standard.

## 2. Referenced Documents

### 2.1 *ASTM Standards:*<sup>2</sup>

- A6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
- A276 Specification for Stainless Steel Bars and Shapes
- A342/A342M Test Methods for Permeability of Feebly Magnetic Materials
- A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- A510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel
- A510M Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel (Metric)
- A700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment
- A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
- C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory
- E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- G15 Terminology Relating to Corrosion and Corrosion Testing

### 2.2 *U.S. Military Standard:*<sup>3</sup>

- MIL-STD-129 Marking for Shipment and Storage

### 2.3 *U.S. Federal Standard:*<sup>3</sup>

- Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

## 3. Terminology

### 3.1 *Definitions of Terms Specific to This Standard:*

- 3.1.1 *deformations, n*—transverse protrusions on a deformed bar.
- 3.1.2 *deformed bar, n*—steel bar with protrusions; a bar that is intended for use as reinforcement in reinforced concrete construction.
  - 3.1.2.1 *Discussion*—The surface of the bar is provided with lugs or protrusions that inhibit longitudinal movement of the bar relative to the concrete surrounding the bar in such construction. The lugs or protrusions conform to the provisions of this specification.
- 3.1.3 *plain bar, n*—steel bar without protrusions.
- 3.1.4 *relative deformation area, n*—the ratio of the deformation bearing area (projected deformation area normal to the bar axis) to the shearing area (nominal bar perimeter times the average spacing of the deformations).
- 3.1.5 *rib, n*—longitudinal protrusion on a deformed bar.
- 3.1.6 *stainless steel, n*—a steel that contains 11 % or more chromium.
- 3.1.7 *three-sided bar, n*—deformed steel bar with three rows of transverse deformations.
- 3.1.8 *two-sided bar, n*—deformed steel bar with two rows of transverse deformations.

## 4. Ordering Information

- 4.1 It shall be the responsibility of the purchaser to specify all requirements that are necessary for material ordered to this specification. Such requirements shall include but are not limited to the following:
  - 4.1.1 Quantity (weight) [mass],
  - 4.1.2 Name of material (deformed and plain stainless steel bars for concrete reinforcement),
  - 4.1.3 Chemical composition (stainless steel alloy),
  - 4.1.4 Heat treatment condition,
  - 4.1.5 Size,
  - 4.1.6 ~~Cut lengths or coils,~~
  - 4.1.6 Cut lengths or coils,
  - 4.1.7 Deformed or plain,
  - 4.1.8 Grade (strength level),
  - 4.1.9 Descaling method and finish,
  - 4.1.10 Packaging (see Section 24),
  - 4.1.11 Supplementary requirement (if desired), and
  - 4.1.12 ASTM designation and year of issue.

## 5. Materials and Manufacture

- 5.1 The bars shall be rolled from properly identified heats of mold or strand cast steel.
- 5.2 Bars shall be furnished in one of the following heat treatment conditions, as shown in Specification A276, and as needed to meet the requirements of this specification.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://www.dodssp.daps.mil>.