



Designation: F880 – 12 (Reapproved 2017)

Standard Specification for Stainless Steel Socket, Square Head, and Slotted Headless- Set Screws¹

This standard is issued under the fixed designation F880; 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 the requirements for austenitic grade stainless steel socket-set screws (SSS) sizes 0.060 through 1.000 in. square head set screws (SHSS) sizes 0.190 through 1.500 in., and slotted headless set screws (HSS) 0.060 through 0.750 in., in two conditions, AF and CW.

1.2 *Units*—The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

NOTE 1—A complete metric companion to Specification F880 has been developed—F880M; therefore, no metric equivalents are shown in this specification.

1.3 The following hazards caveat pertains only to Test Method Section, Section 12 of this specification. *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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

[A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels](#)

¹ This specification is under the jurisdiction of ASTM Committee F16 on Fasteners and is the direct responsibility of Subcommittee F16.04 on Nonferrous Fasteners.

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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.

[A342/A342M Test Methods for Permeability of Weakly Magnetic Materials](#)

[A380 Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems](#)

[A555/A555M Specification for General Requirements for Stainless Steel Wire and Wire Rods](#)

[A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products](#)

[A967 Specification for Chemical Passivation Treatments for Stainless Steel Parts](#)

[D3951 Practice for Commercial Packaging](#)

[E18 Test Methods for Rockwell Hardness of Metallic Materials](#)

[F593 Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs](#)

[F788/F788M Specification for Surface Discontinuities of Bolts, Screws, and Studs, Inch and Metric Series](#)

[F1470 Practice for Fastener Sampling for Specified Mechanical Properties and Performance Inspection](#)

2.2 *ASME Standard:*³

[B 18.3 Socket Cap, Shoulder and Set Screws, Inch Series](#)

[B 18.6.2 Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws \(Inch Series\)](#)

3. Classification

3.1 The designation of the alloy group and condition for the two materials and conditions of this specification shall be consistent with the stainless steel designations in Specification [F593](#).

3.2 The austenitic stainless steel socket set screw shall be designated F880 Group 1 Condition AF (solution annealed) or F880 Group 1 Condition CW (cold worked).

4. Ordering Information

4.1 Orders for material under this specification shall include the following information:

4.1.1 Quantity (number of screws);

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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

4.1.2 Dimensions, including nominal thread designation, thread pitch, nominal screw length (inches) and point configuration. A standard part number may be used for this definition;

4.1.3 Name of the screw (SSS, SHSS or HSS);

4.1.4 Condition AF/CW;

4.1.5 Surface finish, if required. If a finish other than passivation is required, it must be specified on the order or product standard;

4.1.6 ASTM specification and year of issue; and

4.1.7 Any special or supplemental requirements.

4.1.8 If torque testing is required for socket set screws sizes over ½ inch.

4.2 *Example*—50 000 pieces 0.250-20 × 0.375 cone point SSS CW ASTM F880 – XX.

5. Materials and Manufacture

5.1 The screw may be forged, formed, extruded, machined, or ground to meet the dimensional characteristics and performance requirements.

5.2 *Heat Treatment*—Austenitic alloys Group 1 Condition AF screw shall be annealed by heating to 1900 ± 50°F to obtain maximum corrosion resistance and minimum permeability. The screws shall be held for a sufficient time at temperature, then cooled at a rate sufficient to prevent precipitation of the carbide and provide the properties in accordance with **Table 1**.

5.3 When condition CW is specified, the austenitic alloys shall be annealed as specified in **5.2**, generally by the raw material manufacturer, and then cold worked to develop specific properties.

6. Chemical Composition

6.1 The analysis of the screw material shall conform to the chemical composition specified in **Table 2**.

6.2 Unless otherwise specified in the inquiry and purchase order (see Supplementary Requirement S2), the choice of alloy used shall be that of the fastener manufacturer as determined by his fabrication methods and material availability. The specific alloy used by the manufacturer shall be clearly identified on all certification required in the purchase order and shall have a chemical composition conforming to the limits specified in **Table 2**.

6.3 When chemical analysis is performed by the purchaser using finished fasteners representing each lot, the chemical contents obtained shall conform to the limits specified in **Table 2** for the specific alloy. Chemical composition shall conform to the tolerances specified in Specification **A555/A555M**.

6.3.1 In the event of a discrepancy, a referee analysis of the samples for each lot as specified in **12.1** shall be made in accordance with **11.3.1**.

7. Mechanical Properties

7.1 Socket-set screws, when subjected to a torque test in accordance with **12.3.1**, shall withstand application of the test tightening torque specified in **Table 1** without evidence of the socket reaming or the screw bursting. Socket set screws in sizes in nominal diameters over ½ in. are not subject to torques testing unless required by purchaser. The test torque values must be supplied by purchaser and agreed to by the supplier.

7.2 The hardness limits from 70 to 95 HRB (125 to 210 DPH) for Condition AF and 96 HRB to 33 HRC (216 to 327 DPH) for Condition CW shall be met as determined using Test Methods **E18**.

8. Corrosion Resistance Requirements

8.1 *Carbide Precipitation:*

8.1.1 Rod, bar, and wire in the austenitic alloy groups 1, 2, and 3, except the free-machining grades, 303 and 303Se, used to make fasteners in accordance with this specification shall be

TABLE 1 Socket Set Screw Torsional Strength Requirements^A

Nominal Screw Size	Shortest Nominal Screw Lengths Subject to Torque Testing			Test Torque, in.-lb, min	
	Cup and Flat Points, in.	Cone and Oval Points	Half Dog Points, in.	AF	CW
0 0.060	0.109	0.125	0.109	0.3	0.6
1 0.073	0.125	0.141	0.125	0.7	1.2
2 0.086	0.125	0.141	0.141	0.7	1.2
3 0.099	0.141	0.156	0.156	1.6	3.3
4 0.112	0.141	0.172	0.156	1.6	3.3
5 0.125	0.172	0.188	0.172	3	5
6 0.138	0.188	0.203	0.188	3	5
8 0.164	0.188	0.219	0.203	9	16
10 0.190	0.188	0.250	0.234	16	26
¼ 0.250	0.250	0.312	0.297	40	67
⅜ 0.312	0.312	0.391	0.359	79	135
½ 0.375	0.375	0.438	0.438	138	237
⅝ 0.437	0.438	0.547	0.484	220	378
¾ 0.500	0.500	0.609	0.547	358	600
⅞ 0.625	0.625	0.875	0.875
1 0.750	0.750	1.000	1.000
1 ⅛ 0.875	0.875	1.000	1.000
1 ¼ 1.000	1.100	1.250	1.250

^AFor socket set screw sizes over ½ inch, torsional strength testing is not required unless specified by purchaser. The test torque values must be supplied by purchaser and agreed upon by the supplier.