

FF-S-107C
May 27, 1969
SUPERSEDING
Fed. Spec. FF-S-107B
August 30, 1963
(See 6.5)

FEDERAL SPECIFICATION

SCREWS, TAPPING AND DRIVE

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for tapping screws, both thread cutting and thread forming, and metallic drive screws.

1.2 Classification.

1.2.1 Types. Tapping and drive screws shall be of the following types, as specified (see 6.2).

- Type AB - Thread forming, gimlet point.
- Type B - Thread forming, blunt point.
- Type BF - Thread forming, cone point.
- Type C - Thread forming, blunt point.
- Type D - Thread forming, blunt point.
- Type F - Thread forming, blunt point.
- Type G - Thread forming, blunt point.
- Type T - Thread forming, blunt point.
- Type BF - Thread forming, blunt point.
- Type BT - Thread forming, blunt point.

- Type U - Drive screw, pilot point.

Note: Type BG - Thread cutting, blunt point has been removed from this specification. Use type BF or BT.

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1.2.2 Head styles. Tapping and drive screws shall be of the following head styles:

<u>Head</u>	<u>Slotted</u>	<u>Recessed</u>	<u>Plain</u>
* Flat	-	X	-
** Flat	X	X	-
** Undercut flat	X	X	-
** Flat trim	-	X	-
** Oval	X	X	-
** Undercut oval	X	X	-
** Oval trim	-	X	-
Pan	X	X	-
Fillister	X	X	-
Truss	X	X	-
*** Hexagon	X	-	X
*** Hexagon Washer	X	-	X
Drive Screw	-	-	X
Round	X	-	-
* 99° - 101° Bearing surface			
** 80° - 82° Bearing surface			
*** Regular or indented, as specified (see 6.2)			

2. APPLICABLE DOCUMENTS

2.1 Specifications and standards. The following documents, of the issue in effect on date of invitations for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

- QQ-P-35 - Passivation Treatments for Austenitic, Ferritic and Martensitic Corrosion - Resisting Steel (Fastening Devices).
 QQ-P-416 - Plating, Cadmium (Electrodeposited).

Federal Standards:

- Fed. Std. No. 66 - Steel: Chemical Composition and Hardenability.
 Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued,

is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.)

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Washington.)

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-H-3982 - Hardware (Fasteners and Related Items), Packaging and Packing for Shipment and Storage.

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-109 - Quality Assurance Terms and Definitions.
 MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated the issue in effect on date of invitation for bids or request for proposal shall apply.

United of America Standards Institute (USASI) Standard:

B18.6.4 - 1966 - Slotted and Recessed Head Tapping Screws and Metallic Drive Screws.

(Applications for copies should be addressed to the United States of America Standards Institute, 10 East 40th Street, New York, New York, 10016.)

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3. REQUIREMENTS

3.1 Material.

3.1.1 Carbon steel. Unless otherwise specified in the contract or order, screws shall be manufactured from carbon steel (i.e. AISI 1016, 1018, 1019, 1021, 1022 or 1024). Carbon steel screws shall be heat treated or case hardened to meet all of the requirements specified herein.

3.1.2 Corrosion - resisting steel. When specified, corrosion-resisting steel shall be AISI 410 (hardened) in accordance with Fed. Std. No. 66. Cres screws shall meet all of the requirements specified herein, except for the performance requirements of 3.5.1 (see 3.5.2).

3.1.3 Other material. When other material is used for the manufacture of screws, such material shall conform to the material specification referenced in the contract or order. These screws shall meet all of the requirements specified herein, except for the performance requirements of 3.5.1 (see 3.5.2).

3.2 Dimension and tolerances. Dimensions and tolerances shall be in accordance with USAS B18.6.4 - 1966.

3.3 Protecting coating.

3.3.1 Unless otherwise specified (see 6.2), screws shall have a cadmium plating on carbon and alloy steel and a passivation treatment for corrosion-resisting steel.

3.3.1.1 Cadmium plating. Cadmium plating shall be Type II, Class 3 in accordance with QQ-P-416.

3.3.1.2 Passivation. Passivation treatment shall be in accordance with QQ-P-35.

3.3.2 Hydrogen embrittlement. Cadmium plated screws shall be subjected to an embrittlement relief treatment in accordance with QQ-P-416, as soon as possible after plating, to minimize the resulting embrittlement.

3.4 Recessed drive. Cross-recessed drives shall be either Type I, IA or II in accordance with USAS B18.6.4-1966, as specified (see 6.2). Military use shall be limited to Type I.

3.5 Performance requirements.

3.5.1 Carbon steel tapping screws. Carbon steel tapping screws shall be capable of meeting the drive requirements

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(all types except BF and BT) and the torsional strength requirements (all types) specified below.

3.5.1.1 Drive.

a. Thread forming screws shall, without deformation of their own threads, form a mating thread in the test plate until the tapered threads of the point are completely through the test plate.

b. Thread cutting screws shall, without deformation of their own threads, cut or form a mating thread in the test plate until the tapered threads of the point are completely through the test plate.

3.5.1.2 Torsional strength. The torsional strength required to cause a failure of carbon steel tapping screws shall equal or exceed the minimum values given in the applicable tables of USAS B18.6.4 - 1966.

3.5.2 Non-carbon steel tapping screws. The performance requirements of tapping screws made of a material other than carbon steel shall be subject to agreement between the manufacturer and user.

3.5.3 Drive screws. Drive screws shall, without shearing of the threads on the screw or breaking the screw, produce mating threads in the test plate.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Quality assurance terms and definitions. Quality assurance terms and definitions used herein are in accordance with MIL-STD-109.

4.2 Inspection provisions.

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4.2.1 Lot. Unless otherwise specified, a lot shall consist of screws of the same type, material, finish, size and head style produced under essentially like conditions and offered for acceptance at any one time.

4.2.2 Sampling.

4.2.2.1 Sampling for examination. A random sample of screws shall be selected from each lot in accordance with Inspection Level S-4 of MIL-STD-105, using the Acceptable Quality Levels (AQL's) specified in Table I.

4.2.2.2 Sampling for performance tests. A random sample of screws shall be selected from each lot in accordance with Inspection Level S-2 of MIL-STD-105, using an AQL of 2.5.

4.2.2.3 Sampling for passivation test. A random sample of three screws shall be taken from each lot.

4.2.2.4 Sampling for packaging and packing. Sampling for examination and test of preservation, packaging, packing and marking shall be in accordance with MIL-H-3982.

4.2.3 Certification.-

4.2.3.1 Material. When specified in the contract or order (see 6.2), the contractor shall furnish a certificate of the chemical composition and physical properties of the material being used (see 3.1.3).

4.2.3.2 Protective coating. When specified in the contract or order (see 6.2), the contractor shall furnish a certificate that the protective coatings (see 3.3) are in accordance with the applicable specification.

4.3 Examination.

4.3.1 Visual and dimensional. Each screw taken as specified in 4.2.2.1 shall be examined to determine conformance with this specification. Examination shall be conducted in accordance with Table I. Any screw in the sample containing one or more defects shall be rejected, and if the number of defective screws in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

TABLE I. Classification defects

<u>Categories</u>	<u>Defects</u>	<u>Inspection Method</u>
Critical	None defined	
Major	AQL = 2.5	
101	Protrusion gaging of flat head screws (6.4)	Gage
102	Recess penetration gaging (6.4)	Gage
103	Type not as specified	Visual
Minor	AQL = 6.5	
201	Thread length not as specified	SIE*
202	Screw length not as specified	SIE
203	Body diameter not as specified	SIE
204	Eccentricity not as specified	SIE
205	Bearing surface not as specified	SIE
206	Underhead fillet not as specified	SIE
207	Other dimensions not as specified	SIE
208	Protective coating missing or incomplete	Visual
209	Evidence of rust, pitting or spotting after passivation test (4.4.2)	Visual

*SIE Standard Inspection Equipment

4.3.2 Packaging and packing. Examination and test of preservation, packaging, packing and marking shall be in accordance with MIL-H-3982.

4.3.3 Inspection gages. The contractor's inspection gages shall be an approved precision type, calibrated to standards traceable to the National Bureau of Standards. Current records of calibration shall be retained.

4.4 Tests.

4.4.1 Performance.

4.4.1.1 Drive and torsional strength (tapping screws). Each tapping screw taken as specified in 4.2.2.2 shall be subjected to a drive and torsional strength test to determine conformance to 3.5.1. The tests shall be conducted in accordance with USAS B18.6.4 - 1966.

4.4.1.2 Drive screw test. Each drive screw taken as specified in 4.2.2.2 shall be subjected to a drive test to

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determine conformance to 3.5.3. The test shall be conducted in accordance with USAS B18.6.4 - 1966.

4.4.2 Passivation. Each screw taken as specified in 4.2.2.3 shall be subjected to a passivation test conducted in accordance with QQ-P-35, and examined as specified in Table I.

4.4.3 Hydrogen embrittlement. Cadmium plated screws shall be tested for embrittlement relief in accordance with QQ-P-416, except that the screws shall be held under load for 23 hours, and then examined for cracks or fracture.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging and packing. The screws shall be preserved and packaged level A or C and packed level A, B, or C in accordance with MIL-H-3982. The levels of protection shall be as specified in the contract or order (see 6.2).

5.2 Marking.

5.2.1 Civil agencies. In addition to markings required by the contract or order, interior packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.2.2 Military activities. In addition to markings required by the contract or order, interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use.

6.1.1 Thread forming screws. Thread forming tapping screws are intended for use in material where large internal stresses are permissible or desirable to increase resistance to loosening.

6.1.2 Thread cutting screws. Thread cutting tapping screws are intended for use in material where destructive internal stresses are not desirable or where excessive driving torques are encountered.

6.1.3 Drive screws. Drive screws are forced into work by pressure and are intended for making permanent fastenings.

6.2 Ordering data. Purchasers should select the preferred option permitted herein and include the following information in procurement documents.

- (a) Title, number and date of this specification.
- (b) Type, head style, drive, size and length of screw.
- (c) Type of hexagon head (regular or indented) (1.2.2).
- (d) Material, if required (3.1).
- (e) Material certificate, if required (4.2.3.1).
- (f) Protective coating (3.3).
- (g) Protective coating certificate, if required (4.2.3.2).
- (h) Cross-recess type, if required (3.4).
- (i) Levels of preservation, packaging and packing required (5.1).
- (j) Marking, if required (5.2).

6.3 Method of inspection. When the inspection procedures specified in Section 4 of the specification are not applicable, maximum use of certification or a minimum degree of inspection will be employed as specified in Section XIV of the Armed Services Procurement Regulation in which the procurement document should specify the amount and location of inspection and the method for contractor's assurance that the requirements of this specification have been met.

6.4 Gaging and formulas. For information about gaging (protrusion and penetration), approximate hole sizes for various materials and formulas refer to USAS B18.6.4 - 1966.

6.5 Supersession data. This specification includes the requirements of MIL-S-6033, dated 24 March 1950.

CUSTODIANS:

Army - WC
Navy - None
Air Force - 82

Preparing activity:

Army - WC

CIVIL AGENCIES INTEREST:

AG, DC, GSA, JU, VA

Review activities:

Army - AV, ME, MI
MU, GL
Navy - None
Air Force - 85
DSA - IS
NSA

User activities:

Army - AT, CE
Navy - AS, MC, SA, SH, YD
Air Force - None

★U. S. GOVERNMENT PRINTING OFFICE : 1969 O - 395-522 (4047)

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 15 cents each.

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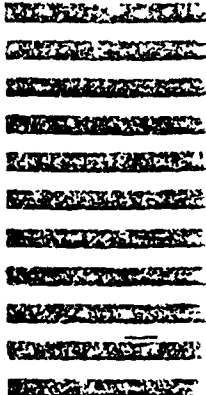


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4. TYPE OF ORGANIZATION *(Mark one)* VENDOR USER MANUFACTURER OTHER *(Specify)* _____b. ADDRESS *(Street, City, State, ZIP Code)*

5. PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

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7a. NAME OF SUBMITTER *(Last, First, MI)* - Optionalb. WORK TELEPHONE NUMBER *(Include Area Code)* - Optionalc. MAILING ADDRESS *(Street, City, State, ZIP Code)* - Optional8. DATE OF SUBMISSION *(YYMMDD)*

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FF-S-107C
AMENDMENT-2
September 1, 1970
SUPERSEDING
Amendment-1
October 27, 1969

FEDERAL SPECIFICATION
SCREWS, TAPPING AND DRIVE

This amendment, which forms a part of Federal Specification FF-S-107C, dated May 27, 1969, was approved by the Commissioner, Federal Supply Service, General Services Administration for the use of all Federal agencies.

PAGE 1

Paragraph 1.1 - Delete in its entirety and substitute the following:

1.1 Scope. This specification covers the requirements for thread cutting, thread forming and thread rolling tapping screws, and metallic drive screws.

Paragraph 1.2.1 - Add the following:

- Type A - Thread forming, gimlet point.
- Type SF - Thread rolling, high performance, blunt point.
- Type SW - Thread rolling, high performance, blunt point.
- Type TT - Thread rolling, high performance, blunt point.

Paragraph 1.2.1 - Change the word "forming" to "cutting" for types D through BT.

PAGE 2

Paragraph 1.2.2, line 2 - Change the word "ot" to "of".

PAGE 3

Paragraph 2.2 - Change the name and address of the institute to read as follows:

American National Standards Institute Inc. (ANSI):

(Application for copies should be addressed to the American National Standards Institute Inc., 1430 Broadway, New York, New York 10018.)

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Paragraph 2.2 - Add the following:

Industrial Fasteners Institute (IFI) Standard:

IFI-112 - High Performance Thread Rolling Screws.

(Application for copies should be addressed to the Industrial Fasteners Institute, 1505 East Ohio Building, 1717 East 9th Street, Cleveland, Ohio 44114.)

PAGE 4

Paragraph 3.2 - Delete in its entirety and substitute the following:

3.2 Dimensions and tolerances. Dimensions and tolerances shall be in accordance with ANSI B18.6.4-1966, except for types SF, SW and TT which shall be in accordance with IFI-112.

Paragraph 3.5.1 - Delete in its entirety and substitute the following:

3.5.1 Carbon steel tapping screws. Carbon steel tapping screws shall be capable of meeting the drive requirements (all types except BF, BT, SF, SW and TT) and the torsional strength requirements (all types except SF, SW and TT) specified below. Types SF, SW and TT carbon steel tapping screws shall be capable of meeting the mechanical and performance requirements specified in IFI-112.

PAGE 7

Paragraph 4.4.1 - Add the following:

(All types except SF, SW and TT.)

PAGE 8

Add the following new paragraph:

4.4.4 Mechanical and performance. (Types SF, SW and TT.) Each tapping screw taken as specified in 4.2.2.2 shall be subjected to mechanical and performance tests to determine conformance to 3.5.1. The tests shall be conducted in accordance with IFI-112.

Add the following new paragraph:

6.1.4 Thread rolling screws. Thread rolling tapping screws are intended for use where performance capabilities beyond those normally expected of other types of tapping screws are required.

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Paragraph 6.2, line 1 - Change the word "Odering" to "Ordering".

Military Custodians:

Army - WC
Navy - None
Air Force - 82

Preparing activity:

Army - WC