SAE International

SURFACE VEHICLE STANDARD

SAE J2596 AUG2013

Issued 2004-10
Revised 2013-08

Superseding J2596 OCT2004

Fastener Part Standard - Tapping Screws and Metallic Drive Screws (Inch Dimensioned)

RATIONALE

All references to ASME B18.6.4 and SAE J81 have been replaced by reference to ASME B18.6.3 that now covers tapping screws. For quality assurance, ASME B18.18 has replaced ASME B18.18.2. Other major changes are in regard to Field 2 and 3 of Figure 1. In Field 2, specific designators have been added for a number of thread types and points. In Field 2, the ASTM C 1513 configuration was deleted as the threads were not adequately defined in the standard. In Field 3, the PIN designator now provides diameters and threads for the configurations added in Field 2. In addition, dimensions are provided for the 5/16 and 3/8 size Type U screws. In 4.3.b, The PIN designator in Field 5 for length now utilizes three characters for lengths over six inches. Steel tapping screws with induction hardened ends per GM 6202M (material designator G4) are now inactive for new design. Additional coating options have been added to Field 7 and 4.5.3 for electro-deposited coatings has been revised. The procedure for measuring straightness has been changed from IFI-138 to ASME B18.2.9. IFI-113 is now listed as an alternative to SAE J78 and core hardness requirements for these products have been modified. Minor non-technical changes have been incorporated. Note 5.6 has been modified and Note 5.8 added. Appendix A has been updated.

TABLE OF CONTENTS

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/J2596_201308

1. SCOPE

This SAE Part Standard covers selected inch dimensioned tapping screws and metallic drive screws manufactured in accordance with American Society for Mechanical Engineers dimensional standards. This SAE standard covers material most often used in ship systems and equipment but its use may be applied wherever fasteners of the covered materials are used. This standard permits the fasteners to be identified and ordered by a Part Identification Number (PIN) as defined in this standard.

1.1 Purpose

The purpose of this document is to assist the designer and other personnel in providing requirements and Part Identification Numbers (PINs) for the most commonly used tapping and metallic drive screws. A PIN is normally required for all military applications and provides a useful means of communicating screw requirements to suppliers and manufacturers in a very succinct manner.

1.2 Tapping Screws and Metallic Drive Screw Part Numbers

This document provides PINs that can be used to identify the screws covered by this standard. The parts covered by this standard are manufactured in accordance with materials and processes identified in applicable standards issued by ASME, ASTM, IFI and SAE. The PIN identifies the type thread and point, nominal diameter, head style and drive, nominal length, fastener material, and finish (coating).

1.3 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards that may be involved in such use. It is the responsibility of manufacturers and users to consult with officials on the applicable health and environmental regulations regarding the handling, use and disposal of hazardous materials. For fasteners, some of the hazardous materials concerns are the application of the materials in platings (coatings), release of toxic vapors due to heat (for example, welding) and environmental regulations for disposal.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply except in those cases where an invitation for bid or procurement contract specifically identifies the issues in effect on a particular date.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE AMS2485 Coating, Black Oxide

SAE AMS2487 Anodic Treatment of Titanium and Titanium Alloys - Solution pH 12.4 Maximum

SAE AMS2488 Anodic Treatment - Titanium and Titanium Alloys - Solution pH 13 or Higher

SAE J78 Steel Self-Drilling Tapping Screws

2.1.2 ASME Publications

Available from the American Society of Mechanical Engineers, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900, Tel: 973-882-1170, www.asme.org.

ASME B18.2.9 Straightness Gage and Gaging for Bolts and Screws

ASME B18.6.3 Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series)

ASME B18.12 Glossary of Terms for Mechanical Fasteners

ASME B18.18 Quality Assurance for Fasteners

2.1.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org

ASTM A 342/A 342M Standard Test Methods for Permeability of Feebly Magnetic Materials

ASTM A 380 Standard Practice for Cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment, and Systems

ASTM F 1136 Zinc/Aluminum Corrosion Protective Coating for Fasteners

ASTM F 1137 Phosphate/Oil; and Phosphate/Organic Corrosion Protective Coatings for Fasteners

ASTM F 1470 Fastener Sampling for Specified Mechanical Properties and Performance Inspection

ASTM C 1513 Steel Tapping Screws for Cold Finished Steel Framing

ASTM F 1789 Standard Terminology for F16 Mechanical Fasteners

ASTM F 1941 Electrodeposited Coatings on Threaded Fasteners (Unified Inch Screw Threads (UN/UNR))

2.1.4 Department of Defense Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://quicksearch.dla.mil/.

MIL-DTL-13924 Coating, Oxide, Black, for Ferrous Materials

MIL-DTL-16232 Phosphate Coating, Heavy, Manganese or Zinc Base

2.1.5 General Motors Engineering Standards

Available from IHS Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Tel: 877-413-5184, www.global.ihs.com.

GM6202M Material and Performance Requirements For Induction Hardened Type TR (Thread Rolling) Tapping Screws (Inactive for new design)

2.2 Other Publications

2.2.1 IFI Publications

Available from Industrial Fasteners Institute, 6363 Oak Tree Boulevard, Independence, OH 44131, Tel: 216-241-1482, www.indfast.org.

IFI Publication Inch Fastener Standards Section H - An Introduction to Tapping Screws

IFI-113 Steel Self-Drilling Tapping Screws

3. DEFINITIONS

For fastener terms not defined herein, the definitions of ASME B18.12 shall apply. If the definitions are not identified in ASME B18.12 the definitions of ASTM F 1789 shall apply.

3.1 TAPPING SCREWS

Threaded fasteners with the capability to create “tap” mating threads when driven into preformed holes in metallic and non-metallic materials.

3.2 THREAD FORMING TAPPING SCREWS

These screws form their mating internal thread by displacing material adjacent to a pre-formed hole and pushing it into the open spaces between the threads of the tapping screw. Generally, thread forming screws are suitable in only thin sections of malleable material.

3.3 THREAD CUTTING TAPPING SCREWS

These screws have cutting flutes or edges at their point that permit the screws to act as a tap to cut their own mating threads when driven into a preformed hole.

3.4 THREAD ROLLING TAPPING SCREWS

These screws have specially designed threads that allow the screw to form a mating internal thread by applying intermittent pressures at the crest of the screw's thread rather than over the full thread flank. Frictional resistance is significantly lower than for thread forming screws and thus the screws are suitable for driving into thicker section and provide greater joint strength and integrity. For this standard, threads shall be coarse machine screw threads in the nominal sizes as identified in ASME B18.6.3. Self-Drilling Tapping Screws

These screws eliminate the need for a preformed hole by drilling, tapping, and fastening in a single operation.

3.5 METALLIC DRIVE SCREW (Type U)

A hardened screw with a blunt point and multiple thread starts with a helix angle of 45 to 65 degrees. It is used with a clearance hole in one of the parts to be fastened and designed for installation by impact in hole sizes as recommended in ASME B18.6.3.

4. TAPPING SCREW REQUIREMENTS

4.1 Tapping Screw Materials and Dimensions

This screw part standard utilizes ASME dimensional standards for screws and primarily SAE and ASTM standards for materials and coatings.

4.2 Part Identification Numbers (PINs) for Selected Tapping and Metallic Drive Screws

PINs are provided herein for selected tapping and drive screws for the purpose of common logistics parts identification between designers, fastener manufacturers, construction and repair activities, and equipment operators. PINs are provided for only those screw configurations and materials most likely to be needed for ship systems and equipment. Figure 1 provides part identification numbers for selected tapping and metallic drive screws. The PIN consists of a number of fields in order as identified in Figure 1. (There are no blank spaces in the PIN.) The next to last field in the PIN, Field 6, designates the screw material. Table 1 lists the material designators for Field 6 of the PIN along with the chemical and mechanical properties of the material.

4.3 Dimensional Requirements for Screws

The dimensional requirements for a particular tapping or drive screw configuration are to be as shown in ASME B18.6.3 Head dimensions shall be as shown in ASME B18.6.3. Thread and point dimensions for thread rolling, self-drilling and thread cutting screws shall be in accordance with the applicable product standard.

4.3.1 Lengths of Screws

Length tolerances for inch dimensioned tapping and metallic drive screws shall be in accordance with ASME B18.6.3 as applicable.

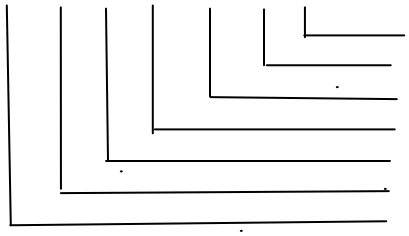
4.3.2 Diameters of Screws

Diameters shall be restricted to those identified in the applicable product standard.

4.3.3 Thread Types

Thread types and fits shall be restricted to those identified herein and permitted in the applicable dimensional standard. All tapping screws with the letter "B" in their type designation have spaced threads with a greater helix angle than machine threads. Machine threads approximate the 60° threads of the Unified Thread form of the fine and coarse thread series.

J2596 AB 08 SF 12[1] G1 Z PART IDENTIFICATION NUMBER (PIN) SYSTEM



Field 7 Coatings
Field 6 Material
Field 5 Nominal Length
Field 4 Head Style and Drive
Field 3 Nominal Size (Diameter)
Field 2 Thread and Point Type
Field 1 SAE Standard

[1] For lengths over six inches use three digits. See Field 5.

Field 1 – J2596

Field 2 – Thread and Point Type

Field 2	**ASME B18.6.3 Types** (See 4.4 and 5.4 for selection guidance)
AB	Type AB Thread Forming Tapping Screw - Spaced Threads
AR	Type ABR Thread Forming Tapping Screw - Spaced Threads
BB	Type B Thread Forming Tapping Screw - Spaced Threads
BP	Type BP Thread Forming Tapping Screw - Spaced Threads
BF	Type BF Thread Cutting Tapping Screw - Spaced Threads
BT[2]	Type BT Thread Cutting Tapping Screw - Spaced Threads
DC[3]	Type D Thread Cutting Tapping Screw - Coarse Thread
DF[3]	Type D Thread Cutting Tapping Screw - Fine Thread
FC[3]	Type F Thread Cutting Tapping Screw - Coarse Thread
FF[3]	Type F Thread Cutting Tapping Screw - Fine Thread
GC[3]	Type G Thread Cutting Tapping Screw - Coarse Thread
GF[3]	Type G Thread Cutting Tapping Screw - Fine Thread
TC[3]	Type T Thread Cutting Tapping Screw - Coarse Thread
TF[3]	Type T Thread Cutting Tapping Screw - Fine Thread

NOTES: [2] Previously the Type BT screws were covered under the BF Designator
[3] All these screws were previously covered under a CD Designator

TR	ASME B18.6.3 Thread Rolling Screws (Coarse Thread Series)
	SAE J78 and IFI-113 Types (See 4.4.3 and 5.4.3 for selection guidance)
BW	Type BSD Self-Drilling Tapping Screws - Style 2 Point - Spaced Threads
BX	Type BSD Self-Drilling Tapping Screws - Style 3 Point - Spaced Threads
CW	Type CSD Self-Drilling Tapping Screws - Style 2 Point - Coarse Threads
CX	Type CSD Self-Drilling Tapping Screws - Style 3 Point - Coarse Threads
UU	Type U Metallic Drive Screw

FIGURE 1 - PART IDENTIFICATION NUMBERS FOR TAPPING AND METALLIC DRIVE SCREWS (INCH DIMENSIONED)

Field 3 Nominal Size (Diameter) (See 4.3.2 for selection of diameters.)

FIELD 3	TAPPING SCREWS[4]					DRIVE SCREWS[4]	
	NOMINAL SIZE	BASIC DIA.	COARSE THREADS	FINE THREADS	SPACED THREADS	NOMINAL SIZE	BASIC DIA.
02	2	0.0860	2-56	2-64	2-32	2	0.1000
03	3	0.0990	3-48	3-56	3-28	3	-
04	4	0.1120	4-40	4-48	4-24	4	0.1160
05	5	0.1250	5-40	5-44	5-20	-	-
06	6	0.1380	6-32	6-40	6-20	6	0.1400
07	7	0.1510	-	-	4-19	7	0.1540
08	8	0.1640	8-32	8-36	8-18	8	0.1670
10	10	0.1900	10-24	10-32	10-16	10	0.1820
12	12	0.2160	12-24	12-28	12-14	12	0.2120
14	-	-	-	-	-	14	0.2420
N4	1/4	0.2500	1/4-20	1/4-28	1/4-14	-	-
N5	5/16	0.3125	5/16-18	5/16-24	5/16-12	5/16	0.3150
N6	3/8	0.3750	3/8-16	2/8-24	3/8-12	3/8	0.3780
N7	7/16	0.4375	7/16-14	7/16-20	7/16-10	-	-
N8	1/2	0.5000	1/2-13	1/2-20	1/2-10	-	

[4] Sizes and diameters limited to those in applicable product standards for each of the types in Field 2

Field 4 Head Style and Drive (See 4.3)

Metallic Drive Screws

DR – Drive Screw - Round Head

Tapping Screws

Cross Recessed Drives (Type I per ASME B18.6.3)

CF – Flat Countersunk Head (82°)
CT – Flat Countersunk Trim Head (82°)
CU – Undercut Flat Countersunk Head (82°)
CP – Pan Head
CS – Pan Head with combination Cross-Recessed and Slotted Drives
CV - Oval Countersunk Head (82°)
CW - Oval Countersunk Trim Head (82°)
CY - Undercut Oval Countersunk Trim Head (82°)
CL - Fillister Head

Tapping Screws - Hex Head Drives (per ASME B18.6.3)

HR – Regular Hex Head
HS - Regular Hex head with slotted drive
HW – Hex Washer Head
WS - Hex Washer head with slotted drive

Tapping Screws – Slotted Head Drives (per ASME B18.6.3)

LF – Slotted Flat Countersunk Head
LP – Slotted Pan Head
LV – Slotted Oval Countersunk Head
LL – Slotted Fillister Head

Tapping Screws – Square Recessed Drives Type III per ASME B18.6.3

SF – Square Recessed Flat Countersunk
SV – Square Recessed Oval Countersunk Head
SP – Square Recessed Pan Head

Tapping Screws – Type VI Drives per ASME B18.6.3

TF - Flat Countersunk Head
TT – Truss Head
TP – Pan Head

FIGURE 1 - PART IDENTIFICATION NUMBERS FOR TAPPING AND METALLIC DRIVE SCREWS (INCH DIMENSIONED) (CONTINUED)

Field 5 Nominal Screw Length[1] – Nominal Screw Lengths shall be designated in 16ths of an inch as identified below:

Field 5	Nominal Length	Field 5	Nominal Length	Field 5	Nominal Length
01	0.0625	**07**	0.4375	**20**	1.25
02	0.125	**08**	0.50	**24**	1.50
03	0.1875	**10**	0.625	**28**	1.75
04	0.25	**12**	0.75	**32**	2.00
05	0.3125	**14**	0.875		
06	0.375	**16**	1.00		

For lengths over 2.00 inches, Field 5 shall be the length in 16ths of an inch. For lengths over 6 inches use three digits. The following length increments are recommended:

2 inches and less	See Field 5 lengths above
2 to 3 inches	1/4 inch
> 3 inches	1/2 inch

Length tolerances shall be in accordance with ASME B18.6.3.

NOTES:

[1] For short length countersunk screws, the undercut head configuration will be supplied in accordance with ASME B18.6.3. The lengths that are undercut vary with nominal size (diameter) and type of thread. Review ASME B18.6.3 carefully when selecting lengths as lengths are measured differently for various head types.

Field 6 Material (See Table 1 and 4.4 for Field 6 designator and mechanical property requirements)

Field 7 Coatings (See 4.5) If no coatings are applicable, do not use a coating designator. Otherwise select from the coatings below:

B = Black oxide with supplementary treatment for corrosion resistance (See 4.5.2)
Z = Zinc – Electro-deposited (See 4.5.3)
Z1 = Zinc Phosphate with supplementary protective oil type compound (See 4.5.4)
Z2 = Zinc Phosphate Coating with supplementary zinc rich epoxy resin coating (See 4.5.4)
Z3 = Zinc/Aluminum (Chromium/Zinc) Inorganic Coating (See 4.5.5)
Z4 = Zinc-Nickel Electro-deposited (See 4.5.3)

FIGURE 1 - PART IDENTIFICATION NUMBERS FOR TAPPING AND METALLIC DRIVE SCREWS (INCH DIMENSIONED) (CONTINUED)

4.4 Materials

Materials shall be limited to those listed in Table 1 and shall be designated in Field 6 of the PIN by the two character designation listed in Table 1.

TABLE 1 - MECHANICAL PROPERTY REQUIREMENTS OF TAPPING AND DRIVE SCREW MATERIALS

Field 6[1] Designator	UNS Designation	Name/ Material Specification	Hardness	Additional Requirements
A1	UNS A96061	Aluminum – Alloy 6061	40 HRB min.	
A2	UNS A97075	Aluminum – Alloy 7075-T73	80 HRB min.	
C2	UNS C27000 or UNS C27400	Brass – Cu 270 or Brass – Cu 274	55-80 HRF	Very Limited Availability
C6	UNS C65100	Silicon Bronze – Alloy 651	75 HRB min	
G1	UNS G10160 (Minimum)	Carbon Steel – Case Hardened	As required to meet performance	ASME B18.6.3
G2	UNS G10180 (Minimum)	Per SAE J78 or IFI-113	Case C50 –56 Core C30-38[2]	See 4.4.3
G3	As applicable	Killed steel wire	Case – 45 HRC (min.) Core – 28 – 38 HRC[2]	ASME B18.6.3
G4[3]	UNS G40370	Cold heading quality, killed steel conforming to SAE 4037	End induction hardened to HRC 45 min.	GM6202M
S1 *(See 5.3)*	UNS S30400 UNS S30403 UNS S30500 UNS S38400 UNS S30430 UNS S30433 UNS S31600 UNS S31603	Austenitic Stainless Steels Alloy 304 Alloy 304L Alloy 305 Alloy 384 Alloy XM7 Alloy 302 HQ (most common) Alloy 316 Alloy 316L	96 HRB – 33 HRC	Cold Worked Condition (See 4.7.3)
S2 *(See 5.3)*	UNS S31600 UNS S31603	Alloy 316 Alloy 316L	See above	Cold Worked (See 4.7.3)
S4	UNS S41000 UNS S42010	Alloy 410 Hardened Alloy 4201 Hardened	38-43 HRC	(See 4.7.3)
T1	UNS R55111	Titanium Alloy 5111	24 HRC min.	

1. For a specific designator, the supplier may furnish any of the alloys listed.
2. The core hardness values specified are less than those in the applicable product standard and apply to both plain and electroplated screws.
3. This designation is inactive for new design. No superseding part standard.

4.4.1 Steel Tapping Screws

Steel Tapping Screws shall meet the material requirements of ASME B18.6.3. Material designator G1 per field 6 of Table 1 applies. Specific hardness requirements are not invoked but the screws must meet the performance requirements of ASME B18.6.3.

4.4.2 Steel Thread Rolling Tapping Screws

Material shall meet the requirements of designator G3 or G4 per Field 6 of Table 1. Screws of G3 material shall be casehardened to 45 HRC minimum in accordance with ASME B18.6.3 requirements. Screws of G4 material shall have induction-hardened points in accordance with GM6202M requirements; however this material is inactive for new design.

4.4.3 Steel Self-Drilling Tapping Screws

Type BSD and CSD self-drilling tapping screws shall meet the material and other requirements of either SAE J78 or IFI-113 using the Field 6 material designator G2 per Table 1 with the exception that core hardness shall be 30 to 38 HRC. The surface hardness shall be 50 to 56 HRC.

4.4.4 Stainless Steel Screws

Material for stainless steel screws shall be in accordance with the Field 6 designator as identified in Table 1.

4.4.5 Non-Ferrous Screws

Material for non-ferrous screws shall be in accordance with the Field 6 designator as identified in Table 1.

4.5 Coating Requirements

Coatings shall be limited to those identified herein. General industry practice is to provide tapping and metallic drive screws uncoated with a natural (as processed) finish. Coatings may be applied to alloy and carbon steels for corrosion protection. The applicable coating shall be designated in the part identification number as indicated in Figure 1. While not normally recommended, the black oxide coating can be specified for materials other than steel where a shiny natural appearance must be avoided.

4.5.1 Required Treatments/Coatings for Stainless Steel and Titanium Screws

All corrosion-resistant steel screws shall be passivated in accordance with ASTM A 380. This treatment is not identified in the part identification number since the treatment is mandatory. All titanium alloy screws shall be anodized in accordance with SAE AMS2487 or SAE AMS2488 Type 2 (except testing requirements may be negotiated between manufacturer and coating supplier).

4.5.2 Black Oxide Coatings

Black oxide coatings shall be in accordance with SAE AMS2485 or MIL-DTL-13924 and have an oil or other supplementary preservative treatment.

4.5.3 Electro-Deposited Coatings

Electro-deposited coatings (zinc and zinc-nickel) shall be in accordance with ASTM F 1941 for inch dimensioned screws as provided herein. The minimum coating thickness shall be 0.0002 inches except for nominal size No. 3 and smaller diameter screws for which the minimum thickness shall be 0.00015 inches when measured in accordance with ASTM F 1941. Hydrogen embrittlement relief shall be provided in accordance with ASTM F 1941 and the applicable fastener standard for coated screws with a specification permitted case hardness greater than HRC 38. Requirements for a supplementary chromate finish shall be as follows:

a. Hexavalent chromium is prohibited.

b. Additional corrosion protection shall be provided for zinc and zinc-nickel coatings with a chromate finish in accordance with ASTM F 1941. Corrosion protection shall be at least equivalent to ASTM F 1941 Designation Code 3C

4.5.4 Phosphate Coatings

A supplementary coating shall be provided for improved corrosion resistance and shall be selected from one of the applicable coatings below:

Z1 = Zinc Phosphate with supplementary protective oil type compound (Coating shall be in accordance with MIL-DTL-16232 or ASTM F 1137 and shall meet 72 hour salt spray test.)
Z2 = Zinc Phosphate Coating with supplementary zinc rich epoxy resin coating. (Coating shall be in accordance with ASTM F 1137 Grade II or Grade III and shall meet 240 hour salt spray test.)

NOTE: Zinc Phosphate coatings should not be used if contact with alkaline materials or exposure to temperatures above 93 °C (200 °F) is expected.

4.5.5 Zinc/Aluminum or Chromium Zinc Inorganic Coating

This coating shall meet the requirements of Grade 3 in accordance with ASTM F 1136.

4.6 Straightness

When invoked or in case of dispute, at maximum material limit, screws must be straight within the limit established by the straightness requirements of Table 2 based on the gauged length. The gauged length of tapping screws is the length of the screw minus the head height as identified in ASME B18.6.3. The straightness shall be checked with a straightness gage as identified in ASME B18.2.9, Straightness requirements shall be in accordance with Table 2 when tested in accordance with ASME B18.2.9. Testing for straightness is required only if specifically invoked by the purchaser.

TABLE 2 - OUT-OF-STRAIGHTNESS LIMITS FOR TAPPING SCREWS AND METALLIC DRIVE SCREWS

(Inches)	Maximum Out-of-Straightness Limit (Inches per Inch of Gauged Length)
1 inch through 8 inches	0.006
Greater than 8 inches	0.008

4.7 Quality Assurance

Unless otherwise specified in the ordering document, the quality assurance requirements identified herein shall apply. The tests and inspections of the applicable standard (ASME B18.6.3 or SAE J78) for the Thread and Point Type as identified in Field 2 of the Part Identification Number in Figure 1 shall apply. The characteristics designated in Table 3 shall be inspected in accordance with the sampling levels of Table 3. The applicable standards may not identify sampling levels for some inspections and Table 3 may require more samples than the applicable tapping screw standard. For non-designated characteristics, the Inspection and Quality Assurance requirements of ASME B18.18 shall apply except disposition of non-conforming lots shall be in accordance with ASTM F 1470.

4.7.1 All types of screws

The hardness shall be measured to verify compliance with the requirements of table 1.

4.7.2 Steel Screws

Carbon steel screws shall be manufactured and tested in accordance with the material, performance and workmanship requirements of the applicable standard (See Field 2, Figure 1). For coated screws, the coating thickness shall be verified by one of the methods identified in ASTM F 1941. All steel screws with electrodeposited coatings shall be tested for hydrogen embrittlement in accordance with 4.5.3. The number of samples shall not be less than Level B per ASTM F 1470.

TABLE 3 - DESIGNATED INSPECTION CHARACTERISTICS AND INSPECTION LEVELS

Designated Characteristic (as applicable, see 4.7)	Testing Standard	Sampling Level[(1)]
Non Destructive Inspection/Test Requirements **(All screws)**		
Dimensional Characteristics – Applicable characteristics at the sampling levels identified in the Testing Standard	ASME B18.18 Category 2	Per ASME B18.18
Penetration and Wobble Gauging of Recessed Heads – Applicable to all recessed head screws)	ASME B18.6.3	B
Destructive Inspection/Test Requirements (As applicable)		
Drive test (for tapping screws per ASME B18.6.3)	ASME B18.6.3	B
Drill-Drive Test (for self-drilling screws per SAE J78 or IFI-113)	SAE J78 or IFI-113	Per test Std
Drill Hole Size (for self-drilling screws per SAE J78 or IFI-113)	SAE J78 or IFI-113	D
Case Depth and Core Hardness (self-drilling screws)	SAE J78 or IFI-113	C
Torsional strength test (Per ASME B18.6.3, SAE J78, or IFI-113 as applicable)	Per Applicable Std	C
Ductility test (for SAE J78 or ASME B18.6.3 screws)	PerApplicable Std	D
Hydrogen embrittlement test (all steel screws with coatings)	See 4.53 and 4.7.2	B
Hardness test (all screws with specific hardness requirements)	See 4.7.1	B
Coating Thickness (applicable to coated screws)	Per Coating Std	B
Non-Destructive Inspection (Required Only When Specifically Invoked or In Event of Dispute)		
Straightness (See 4.6 and 5.6)	ASME B18.2.9	A

1. Sampling Levels are per ASTM F 1470. For non-designated characteristics and inspections/tests listed in the applicable standards but not specifically listed in Table 3, Level C inspection shall apply unless a specific level is identified in the applicable standard.

4.7.3 Stainless Screws

Stainless steel screws shall be manufactured and tested in accordance with the material, performance and workmanship requirements of the applicable standard (See Field 2, Figure 1). The Drive and Torsional Torque Test requirements in ASME B18.6.3 have values specifically for steel screws and the requirements are not considered applicable for stainless steel screws unless the purchaser and supplier agree to the material for the test plates and applicable values and these supplemental requirements are identified in the purchase order. The tests and inspections in Table 3, when applicable, shall be performed.

4.7.4 Non-Ferrous Screws

Non-ferrous screws shall be manufactured and tested in general accordance with the material, performance and workmanship requirements of the applicable standard (See Field 2, Figure 1). The Drive and Torsional Torque Test requirements in ASME B18.6.3 have values specifically for steel screws and the requirements are not considered applicable for other materials unless the purchaser and supplier agree to the material for the test plates and applicable values and these supplemental requirements are identified in the purchase order. The tests and inspections in Table 3, when applicable, shall be performed.

4.8 Marking Requirements

Tapping screws are not normally marked for identification. Each shipping unit or package shall be clearly marked with the following:

a. SAE J2596 Part Identification Number.

b. Alloy number and condition

c. Size

d. Name and brand or trademark of the manufacturer

e. Country of origin

f. Number of pieces

4.8.1 Optional Marking for Self-Drilling Screws

When specified by the purchaser, steel self-drilling screws shall be marked as shown in SAE J78.

4.8.2 Head Marking

Head marking to identify manufacturer is required only when specified in the referenced standard.

5. NOTES

This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.

5.1 Intended Use

This standard establishes requirements and PINs for tapping and drive screws of selected materials. While this standard was developed specifically for ship systems and equipment, its use is not restricted to these applications.

5.2 Identification of Part Numbering System on Drawings

On drawings where a column exists for identifying the manufacturer or his Commercial and Government Entity (CAGE) Code, indicate the CAGE Code "81343/J2596" or "SAE J2596" as required by the drawing standard. If no column exists or there is space only for the 5-digit CAGE Code, then a note must indicate that the part numbers are defined in SAE J2596.

5.3 Magnetic Permeability

For certain applications, low magnetic permeability may be required. Most non-ferrous fasteners have a relative magnetic permeability in air of 2.0 maximum when determined in accordance with ASTM A 342/A 342M on the finished fastener. For CRES fasteners, alloy 316/316L should be specified when low magnetic permeability is required. The relative magnetic permeability should not exceed 2.0 maximum for 316/316L alloy fasteners while similar CRES fasteners of other 300 series alloy may exceed this value. If compliance with magnetic permeability requirements is necessary, the requirements must be identified in addition to the part identification number for the screw.