



# SURFACE VEHICLE STANDARD

J78™

JUL2021

Issued 1972-07  
Revised 2021-07

Superseding J78 APR2013

(R) Steel Self-Drilling Tapping Screws

## RATIONALE

SAE J78 is being revised to update some of the testing procedures and add requirements for point Styles 2, 3, 4, and 5, which are in common use.

### 1. SCOPE

#### 1.1 General

This SAE Standard covers the dimensional and general specifications, including performance requirements, for carbon steel self-drilling tapping screws suitable for use in general applications having point Styles 2, 3, 4, and 5.

It is the objective of this document to ensure that carbon steel self-drilling tapping screws, by meeting the mechanical and performance requirements specified, shall drill a hole and form or cut mating threads in materials into which they are driven without deforming their own thread and without breaking during assembly.

#### 1.2 Screw Types and Application

The two types of self-drilling tapping screws covered by this document are designated and described as follows:

##### 1.2.1 Type BSD

Type BSD screws shall have spaced threads with drill points of varying configuration, designated Style 2, Style 3, Style 4, and Style 5 designed to accommodate different panel thickness conditions as delineated in Section 6.

##### 1.2.2 Type CSD

Type CSD screws shall have threads of machine screw diameter-pitch combinations approximating unified form with drill points of varying configuration, designated Style 2, Style 3, Style 4, and Style 5 designed to accommodate different panel thickness conditions as delineated in Section 6. Type CSD screws are not subject to thread gaging but shall meet dimensions specified in this document. They are intended for application where the use of a machine screw pitch thread is preferred over the spaced thread.

#### 1.3 Head and Drive Types

The head types and drive types applicable to self-drilling tapping screws covered by this document shall include those specified in ASME B18.6.3, except for slotted head and hex (non-washer) head designs which are not recommended for self-drilling screws.

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2021 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

**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  
http://www.sae.org

SAE WEB ADDRESS:

**For more information on this standard, visit**  
[https://www.sae.org/standards/content/J78\\_202107](https://www.sae.org/standards/content/J78_202107)

## 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.

#### 2.1.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE J423 Methods of Measuring Case Depth

#### 2.1.2 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), [www.asme.org](http://www.asme.org).

ASME B18.6.3 Machine Screws, Tapping Screws, and Metallic Drive Screws

ASME B18.21.1 Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers

#### 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](http://www.astm.org).

ASTM F1941/F1941M Electrodeposited Coatings on Mechanical Fasteners

## 3. DIMENSIONAL REQUIREMENTS

### 3.1 General Dimensions

Dimensions and general specifications applicable to heads, body, and screw length for Type BSD and Type CSD screws shall conform to those specified for Type B and Type C tapping screws, respectively, as specified in ASME B18.6.3, except as specified in 3.2 to 3.4.

### 3.2 Heads

The underside on all non-countersunk styles of heads on milled point self-drilling screws may be chamfered at the periphery of head in accordance with the dimensions specified in Figure 1 and Table 1 and/or may be undercut into the bearing surface of the head as shown in Figure 2 at the discretion of the manufacturer to facilitate threading close to the head.

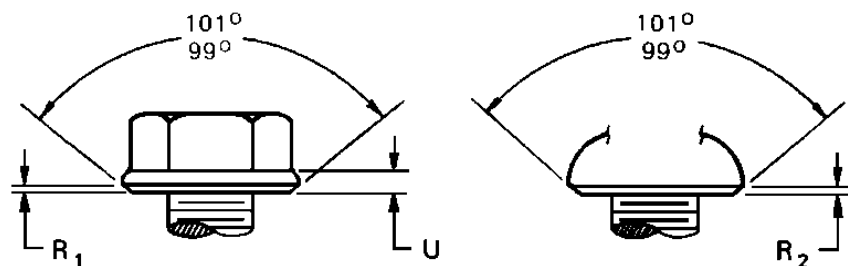


FIGURE 1A—HEX WASHER HEAD

FIGURE 1B—RECESSED HEADS

**Figure 1 - Head chamfers on milled point screws**



**Figure 2 - Optional undercut in bearing surface**

**Table 1 - Head chamfer dimensions for milled point self-drilling tapping screws in figure 1**

| Nominal Screw Size | U Washer Thickness Max | U Washer Thickness Min | R <sub>1</sub> Chamfer Height Hex Washer Heads Ref | R <sub>2</sub> Chamfer Height Recessed Heads Ref |
|--------------------|------------------------|------------------------|----------------------------------------------------|--------------------------------------------------|
| 4                  | 0.030                  | 0.020                  | 0.015                                              | 0.015                                            |
| 6                  | 0.040                  | 0.025                  | 0.015                                              | 0.015                                            |
| 8                  | 0.050                  | 0.035                  | 0.020                                              | 0.015                                            |
| 10                 | 0.050                  | 0.035                  | 0.020                                              | 0.020                                            |
| 12                 | 0.050                  | 0.035                  | 0.020                                              | 0.020                                            |
| 1/4                | 0.060                  | 0.040                  | 0.025                                              | 0.020                                            |

### 3.3 Eccentricity

Eccentricity is defined as one-half of the full or total indicator reading.

#### 3.3.1 Eccentricity of Hex and Hex Washer Heads

Hex and hex washer heads shall not be eccentric with the axis of screw by an amount equal to more than 4% of the basic screw diameter.

#### 3.3.2 Eccentricity of Recess

The recess in recessed head screws shall not be eccentric with the axis of screw by an amount equal to more than 4% of the basic screw diameter.

#### 3.3.3 Recess Wobble

A firm fit between the driver bit and recess is critical for the proper driving of self-drilling screws. All recessed screws made to this standard shall conform to the wobble requirements specified in ASME B18.6.3.

### 3.4 Length of Thread

#### 3.4.1 Type BSD Screws

For screws of nominal lengths equal to or shorter than 1.50 inches, the full form threads shall extend close to the head such that the specified minor diameter limits are maintained to within one pitch (thread), or closer if practicable, of the underside of the head. There shall be no threading into the underhead fillet. See Figure 3. For screws of nominal lengths longer than 1.50 inches, the length of full form thread shall be as specified by the purchaser.