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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Mechanical properties of fasteners - Part 5: Tapping screws
(English Translation)**

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020

Directives for standardization - Part 1.Rules for the structure and drafting of
standardizing documents.

This document is Part 5 of GB/T 3098 Mechanical properties of fasteners. GB/T 3098
has already published the following parts.

- GB/T 3098.1 Mechanical properties of fasteners - Bolts, screws and studs.
- GB/T 3098.2 Mechanical properties of fasteners - Part 2.Nuts.
- GB/T 3098.3 Mechanical properties of fasteners - Set screws.
- GB/T 3098.5 Mechanical properties of fasteners - Part 5.Tapping screws.
- GB/T 3098.6 Mechanical properties of fasteners - Stainless steel bolts, screws
and studs.
- GB/T 3098.7 Mechanical properties of fasteners - Thread rolling screws.
- GB/T 3098.8 Mechanical properties of fasteners - Parts for bolted connections
for use at temperatures from -200 °C~+700 °C.
- GB/T 3098.9 Mechanical properties of fasteners - Prevailing torque type steel

nuts.

-- GB/T 3098.10 Mechanical properties of fasteners - Bolts, screws, studs and nuts made of non-ferrous metals.

-- GB/T 3098.11 Mechanical properties of fasteners - Drilling screws with tapping screw thread.

-- GB/T 3098.12 Mechanical properties of fasteners - Cone proof load test on nuts.

-- GB/T 3098.13 Mechanical properties of fasteners - Torsional test and minimum torques for bolts and screws with nominal diameters from 1 mm to 10 mm.

-- GB/T 3098.14 Mechanical properties of fasteners - Widening test on nuts.

-- GB/T 3098.15 Mechanical properties of fasteners - Stainless steel nuts.

-- GB/T 3098.16 Mechanical properties of fasteners - Stainless steel set screws.

-- GB/T 3098.17 Mechanical properties of fasteners - Preloading test for the detection of hydrogen embrittlement - Parallel bearing surface method.

Mechanical properties of fasteners - Part 5. Tapping screws

1 Scope

This document specifies the requirements for materials, mechanical and physical properties, test methods, inspection, marking and labeling of tapping screws when tested under ambient temperatures of 10 °C~35 °C.

This document applies to tapping screws made of carburized steel with thread specifications of ST 2.2~ST 9.5 and threads conforming to GB/T 5280.

Tapping screws are used to create mating threads in metal sheets without deforming their own threads. Tapping screws are not intended for preload conditions, although they can withstand low levels of tensile stress after installation.

2 Normative references

The provisions of the following documents constitute the essential clauses of this document through normative references in this text. Among them, for any dated reference, only the version corresponding to that date applies to this document; for any undated reference, the latest version (including all amendments) applies to this

document.

GB/T 3099.4 Terminology of fasteners - Control, inspection, delivery, acceptance and quality (GB/T 3099.4-2021, ISO 1891-4:2018, MOD)

GB/T 4340.1 Metallic materials - Vickers hardness test - Part 1. Test method (GB/T 4340.1-2024, ISO 6507-1:2023, MOD)

GB/T 5280 Tapping screws thread (GB/T 5280-2002, idt ISO 1478:1999)

GB/T 39310 Fasteners - Types of inspection documents (GB/T 39310-2020, ISO 16228:2017, MOD)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

tapping screw

sheet metal screw

Screws with threads conforming to GB/T 5280 form mating threads on the material of the clamped part (usually a thin metal sheet) when screwed into the bottom hole without deforming their own threads.

4 Materials

Tapping screws shall be made of cold-heading steel that can be surface carburized (e.g., GB/T 6478, ISO 4954, EN 10263-3, ASME B18.6.3, JIS G 3507).

5.1 General requirements

Whether during the manufacturing process or during final product inspection, when tested according to the methods specified in Chapter 6 at an ambient temperature of

10 °C~35 °C, tapping screws shall meet the mechanical and physical properties

specified in Chapter 5, as shown in Table 1.

The requirements of this chapter shall apply to tapping screws delivered by the supplier, i.e., without changes to the delivery conditions. If the buyer makes changes or further

processing, the buyer shall be responsible for all changes in consistency of characteristics caused by the changes or processing.

Table 1 -- Section numbers for mechanical and physical properties and related test methods

Performance and clause Clause of the test method

Materials 4 --

Surface hardness 5.2 6.2

Depth of carburized layer 5.3 6.3

Core hardness 5.4 6.4

Microstructure 5.5 6.5

Screwing-in performance 5.6 6.6

Torsional strength 5.7 6.7

Ductility a 5.8 6.8

a It is only used as a routine test for process control.

5.2 Surface hardness

It is tested according to 6.2; the surface hardness of the tapping screw after heat treatment shall be ≥ 450 HV0.3.

5.8 Ductility

It is tested according to 6.8; the head of the tapping screw shall not separate from the shank [see Figure 4b)].

6.1 General requirements

The test specimens should be tapping screws in their delivered condition (with or without coating), and appropriate treatment shall be performed if necessary.

6.2 Surface hardness test

Surface hardness test shall be conducted in accordance with GB/T 4340.1. The minimum load for Vickers-hardness testing is 2.942 N (HV0.3). The indentation formed by the pyramid indenter shall be on a flat surface, preferably on the head of the tapping