



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

GB/T 3098.1-2010

Replacing GB/T 3098.1-2000

Mechanical properties of fasteners - Bolts, screws and studs

紧固件机械性能 螺栓、螺钉和螺柱

(English Translation)

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Table of Contents

Foreword	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Symbols and abbreviated terms	
5 Designation system for property classes	
6 Materials	
7 Mechanical and physical properties	
8 Applicability of test methods	
9 Test methods	
10 Marking	
Annex A (informative) Relation between tensile strength and elongation after fracture	
Annex B (informative) Influence of elevated temperatures on mechanical properties of fasteners	
Annex C (informative) Elongation after fracture for full-size fasteners	
Bibliography	

Foreword

This document was issued on 10 January 2011 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China and the Standardization Administration of China, and has applied since 1 October 2011.

It replaces GB/T 3098.1-2000.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer, customer or inspection body applies.

It is Part 1 of GB/T 3098, Mechanical properties of fasteners, whose other parts cover nuts, set screws and further fastener types.

1 Scope

This part of GB/T 3098 specifies the mechanical and physical properties of bolts, screws and studs made of carbon steel and alloy steel when tested at an ambient temperature of 10 °C to 35 °C. Fasteners (bolts, screws and studs) that conform to this part at that temperature may not keep the specified mechanical and physical properties at higher

temperatures (see Annex B) or lower temperatures.

Note 1: Fasteners conforming to this part are used in applications from -50 °C to +150 °C. Users are advised to consult the parties concerned for temperatures outside that range, up to a maximum of +300 °C.

Note 2: Information on the selection and application of steels for low and high temperatures is given, for example, in EN 10269, ASTM F2281 and ASTM A320/A320M.

Certain fasteners may not fulfil the tensile or torsional requirements of this part because the geometry of their head reduces the shear area in the head: fasteners with a low head, with or without an external driving feature, a low round or cylindrical head with an internal driving feature, or a countersunk head with an internal driving feature (see 8.2).

This part applies to fasteners: a) made of carbon steel or alloy steel; b) with general purpose metric threads according to GB/T 192; c) with coarse threads M1.6 to M39 and fine pitch threads M8x1 to M39x3; d) with diameter/pitch combinations according to GB/T 193; e) with tolerances according to GB/T 197, GB/T 9145 and GB/T 22029.

This part does not apply to set screws and similar threaded fasteners not under tensile stress (see GB/T 3098.3).

This part does not specify requirements for weldability, corrosion resistance, resistance to shear stress, torque/clamp force performance or fatigue resistance.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 90.3, Fasteners - Quality assurance system (GB/T 90.3-2010, ISO 16426:2002, IDT)

GB/T 192, General purpose metric screw threads - Basic profile (ISO 68-1:1998, MOD)

GB/T 193, General purpose metric screw threads - General plan (ISO 261:1998, MOD)

GB/T 196, General purpose metric screw threads - Basic dimensions (ISO 724:1993, MOD)

GB/T 197, General purpose metric screw threads - Tolerances (ISO 965-1:1998, MOD)

GB/T 228.1, Metallic materials - Tensile testing - Part 1: Method of test at room temperature (GB/T 228.1-2010, ISO 6892-1:2009, MOD)

GB/T 229, Metallic materials - Charpy pendulum impact test method (GB/T 229-2007, ISO 148-1:2006, MOD)

GB/T 230.1, Metallic materials - Rockwell hardness test - Part 1: Test method (GB/T 230.1-2009, ISO 6508-1:2005, MOD)

GB/T 231.1, Metallic materials - Brinell hardness test - Part 1: Test method

GB/T 3098.2, Mechanical properties of fasteners - Nuts - Coarse thread (GB/T 3098.2-2000, idt ISO 898-2:1992)

GB/T 3098.3, Mechanical properties of fasteners - Set screws (GB/T 3098.3-2000, idt ISO 898-5:1998)

GB/T 3098.13, Mechanical properties of fasteners - Torsional test and minimum torques for bolts and screws with nominal diameters 1 mm to 10 mm (GB/T 3098.13-1996, idt ISO 898-7:1992)

GB/T 4340.1, Metallic materials - Vickers hardness test - Part 1: Test method (GB/T 4340.1-2009, ISO 6507-1:2005, MOD)

GB/T 5267.1, Fasteners - Electroplated coatings (GB/T 5267.1-2002, ISO 4042:1999, IDT)

GB/T 5267.2, Fasteners - Non-electrolytically applied zinc flake coatings (GB/T 5267.2-2002, ISO 10683:2000, IDT)

GB/T 5267.3, Fasteners - Hot dip galvanized coatings (GB/T 5267.3-2008, ISO 10684:2004, IDT)

GB/T 5276, Fasteners - Bolts, screws, studs and nuts - Symbols and designations of dimensions (GB/T 5276-1985, eqv ISO 225:1983)

GB/T 5277, Fasteners - Clearance holes for bolts and screws (GB/T 5277-1985, eqv ISO 273:1979)

GB/T 5779.1, Fasteners - Surface discontinuities - Bolts, screws and studs for general requirements (GB/T 5779.1-2000, idt ISO 6157-1:1988)

GB/T 5779.3, Fasteners - Surface discontinuities - Bolts, screws and studs for special requirements (GB/T 5779.3-2000, idt ISO 6157-3:1988)

GB/T 9144, General purpose metric screw threads - Preferred plan (GB/T 9144-2003, ISO 262:1998, MOD)

GB/T 9145, General purpose metric screw threads - Limits of sizes for screw threads of medium quality (GB/T 9145-2003, ISO 965-2:1998, MOD)

GB/T 16825.1-2002, Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Verification and calibration of the force-measuring system

GB/T 22029, Hot-dip galvanized external screw threads with clearance for the coating (GB/T 22029-2008, ISO 965-4:1998, MOD)

ISO 4885:1996, Ferrous products - Heat treatments - Vocabulary

3 Terms and definitions

For the purposes of this part, the following terms and definitions apply.

3.1

finished fastener

fastener for which all manufacturing steps have been completed, with or without surface coating and with full or reduced loadability, and which has not been machined into a test piece

3.2

machined test piece

test piece machined from a fastener to evaluate material properties

3.3

full-size fastener

finished fastener with a shank diameter d_s approximately equal to d or $d_s > d$, or a screw fully threaded to the head, or a fully threaded stud

3.4

fastener with waisted shank

finished fastener with a shank diameter $d_s < d_2$

3.5

base metal hardness

hardness closest to the surface (when traversing from core to outside diameter) just before an increase or decrease occurs, denoting respectively carburization or decarburization

3.6

decarburization

loss of carbon at the surface of a ferrous material (steel) (see ISO 4885:1996)