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

GB/T 3621-2022

Titanium and titanium alloy plate and sheet

钛及钛合金板材

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Foreword

This document was issued on 12 October 2022 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 May 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 3621-2022 covers titanium and titanium alloy plate and sheet, from how the material is designated to what has to travel with it. Products are classified by designation, delivery state and size against a table, and the technical requirements clause, the longest in the document, sets what each of them has to meet. Test methods follow, with chemical composition determined by the referenced analytical standards and an arbitration analysis named for the case where buyer and seller do not agree. The inspection rules place the check with the supplier or a third party and preserve the buyer's right to re-inspect on receipt, and the closing clauses cover marking, packaging, transport, storage, the accompanying documents, and the contents of the order form. That last clause does more work than it looks. Titanium plate goes into heat exchangers, chemical plant and airframes, where the designation and the delivery state, not the word titanium, decide whether the material will take the forming and the service it was bought for, and an order that leaves them unstated lets the mill ship something entirely legitimate and entirely useless. For titanium mills, equipment fabricators, and inspection and acceptance staff.

This document specifies the classification and identification, technical requirements,

test methods, inspection rules, marking, packaging, transportation, storage, as well as accompanying documents and order forms, of titanium and titanium alloy plate and sheet (hereinafter referred to as plate and sheet).

This document applies to plate and sheet produced by the rolling method.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 228.1-2021, Metallic materials - Tensile testing - Part 1: Method of test at room temperature

GB/T 228.2, Metallic materials - Tensile testing - Part 2: Method of test at elevated temperature

GB/T 232, Metallic materials - Bend test

GB/T 2039, Metallic materials - Uniaxial creep testing method in tension

GB/T 3620.1, Designation and composition of titanium and titanium alloys

GB/T 3620.2, Designation and composition of titanium and titanium alloys

GB/T 4698 (all parts), Methods for chemical analysis of titanium sponge, titanium and titanium alloys

GB/T 6611, Terminology and metallographs for titanium and titanium alloys

GB/T 8180, Wrought titanium and titanium alloy products packing marking transporting and storing

GB/T 23605, Determination of beta transus temperature of titanium alloys

GB/T 38982, Method of measuring shape and dimension for wrought titanium and titanium alloy products

YS/T 1262, Method for chemical analysis of titanium sponge, titanium and titanium alloys - Determination of multielement content - Inductively coupled plasma atomic emission spectrometry

3 Terms and definitions

Terms and definitions determined by GB/T 6611 and GB/T 38982 are applicable to this document.

4 Classification and identification

4.1 Product classification

4.1.1 The designation, state and specifications of the product shall comply with the provisions in Table 1.

4.1.2 The nominal size of plate and sheet shall be within the range specified in Table 1. It is recommended that for plate and sheet with a thickness not greater than 5.0 mm, the nominal thickness should be an integral multiple of 0.1 mm; for plate and sheet with a thickness greater than 5.0 mm, the nominal thickness should be an integral multiple of 0.5 mm; the nominal width of plate and sheet should be an integer multiple of the width of 10 mm; the nominal length should be an integer multiple of the length of 50 mm.

4.2 Product identification

Products are identified in the order of product name, designation, state, specifications, and document number.

Example 1: A plate, manufactured with the TA2 designation, in annealed state, with a thickness of 1.0 mm, a width of 1 000 mm and a length of 2 000 mm, is identified as:

6 Test methods

6.1 Chemical composition

The chemical composition analysis of the product shall be carried out according to the provisions of GB/T 4698 (all parts) or YS/T 1262, and the arbitration analysis shall be carried out according to the provisions of GB/T 4698 (all parts).

6.2 Dimensions and their allowable deviation

The measurement of the external dimensions of the product and its allowable deviation shall be carried out in accordance with the provisions of GB/T 38982, wherein the allowable deviation of thickness shall be measured at a position not less than 100 mm

from the top corner and not less than 10 mm from the edge.

6.3.1 Mechanical properties

6.3.1 The tensile properties of the product at room temperature shall be carried out in accordance with the provisions of GB/T 228.1-2021. For plates with a thickness less than 3.0 mm, take P1 samples; for plates with a thickness of 3.0 mm ~ 6.0 mm, take P7 samples; for plates with a thickness greater than 6.0 mm ~ 10.0 mm, take P7 or R8 samples; for plates with a thickness greater than 10.0 mm, take P7 or R7 sample.

6.3.2 The test of high temperature tensile properties of the product shall be carried out in accordance with the provisions of GB/T 228.2.

6.3.3 The test of high-temperature endurance property of the product shall be carried out according to the provisions of GB/T 2039. During the test, the endurance property of the TA15 plate shall be tested according to the test time of 50 h, and the arbitration test shall be carried out according to the test time of 100 h.

6.4 Bending properties

The test of bending properties of the product is carried out in accordance with the provisions of GB/T 232. For plate and sheet with a thickness greater than 5.0 mm, the sample can be machined and thinned to not less than 5.0 mm, and the original surface on one side shall be retained. During the bending test, the retained original surface of the sample shall be located on the tensile deformation side; the plate with a thickness not greater than 5.0 mm shall be subjected to the bending test according to the full section. The width of the sample is 15 mm.

6.5 beta transus temperature

The test of beta transus temperature of the product shall be carried out according to the provisions of GB/T 23605.

6.6 Appearance quality

The test of appearance quality of the product shall be carried out by visual inspection.

7 Test rules

7.1 Inspection and acceptance