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

GB/T 3620.1-2016

**Designations and chemical compositions of titanium and
titanium alloys**

钛及钛合金牌号和化学成分

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Foreword

This Standard was drafted according to the rules given in GB/T 1.1-2009. This Standard replaces GB/T 3620.1-2007 "Designation and composition of titanium and titanium alloys". Compared with GB/T 3620.1-2007, the main technical content changes of this Standard are as follows: - RESTORE the designation and chemical composition of industrial pure titanium in GB/T 3620.1-1994; - Uniformly CHANGE the designation of industrial pure titanium by adding "G" behind the designation of industrial pure titanium; - SORT the designations in tables according to the classification of titanium; - REVISE the editorial errors of TA22-1, TA24, TC15 and TC17 designations; - REVISE the Si content in TA19; - ADD a total of 8 newly registered alpha-type and near-alpha-type alloy designations, namely TA29, TA30, TA31, TA32, TA33, TA34, TA35 and TA36; - ADD A total of 6 newly registered beta-type and near-beta-type alloy designations, namely TB12, TB13, TB14, TB15, TB16 and TB17; - ADD a total of 6 newly registered alpha-beta-type alloy designations, namely TC27, TC28, TC29, TC30, TC31 and TC32; - ADD the naming rules for the designation of titanium alloys; - SPECIFY the requirements for the implementation of designation and chemical composition of industrial pure titanium. This Standard is under the jurisdiction of the National Technical Committee on Non-ferrous Metals of Standardization Administration of China (SAC/TC 243). Drafting organizations of this Standard. Baoti Group Co., Ltd., Baoji Titanium Industry Co., Ltd., China Non-ferrous Metal Industry Standard Metrology and Quality Institute. Participating drafting organizations of this Standard. Beijing Institute of Aeronautical Materials, Western Metal Materials Co., Ltd., Aerospace Research Institute of Materials & Processing Technology, CSIC Luoyang Ship Material Research Institute, CHALCO Shenyang Nonferrous Metal Processing Co., Ltd.,

General Research Institute for Nonferrous Metals, Hunan GoldSky Titanium Industry Technology Co., Ltd. Main drafters of this Standard. Feng Junning, Qiao Lu, Ma Zhongxian, Hu Zhijie, Chen Feng, Wang Jian, Li Xianjun, Liu Dongsheng, Zhang Yuwei, Qing Daga, Wang Yang, Wang Li, Peng Hui, Wei Yanguang. The previous versions of the standard replaced by this standard are. - GB/T 3620-1983, GB/T 3620.1-1994, GB/T 3620.1-2007. Designation and composition of titanium and titanium alloys

1 Scope

China's national standard for the designations and chemical compositions of titanium and titanium alloys. It specifies the chemical composition and the composition analysis and reporting, with an informative annex listing deleted designations and their compositions. This is the foundation document of the Chinese titanium industry: every other titanium standard - for bar, sheet, tube, forgings, castings - specifies its products by the grades defined here. Titanium is used where its combination of properties cannot be had otherwise: half the density of steel with comparable strength, essentially immune to seawater and to most acids, and biocompatible enough to be implanted. The alloy system divides into the commercially pure grades, distinguished mainly by how much oxygen and iron they carry, and the alloyed ones, of which Ti-6Al-4V accounts for most of world consumption. The annex listing deleted designations is the useful part in practice: an old drawing calls for a grade that no longer exists, and this is where its composition is found.

This Standard specifies the designation and chemical composition of titanium and titanium alloy products. This Standard applies to various finished and semi-finished products (including ingots) pressure-processed by titanium and titanium alloys.

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 3620.2 Titanium and titanium alloys - Permissible variations of chemical composition for wrought product analysis

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

3.1 Designation and chemical composition

3.1.1 The designation and chemical composition of titanium and titanium alloy products shall comply with the specifications of Table 1, Table 2 and Table 3.

3.1.2 Boron is added in nominal quantities and the measured data is reported for reference.

3.1.3 In Table 1, Table 2 and Table 3, when it only specifies the upper limit of Si element, it

shall be controlled as an impurity element.

3.2 Other elements

3.2.1 Other elements refer to trace elements that are inherently present in the production process of titanium and titanium alloys, not artificially added elements.

3.3 Allowable deviation of compositions When the demand party takes samples from products for chemical composition retest analysis, the allowable deviation of its compositions shall comply with GB/T 3620.2.

4 Chemical composition analysis and analysis report

4.1 The chemical composition arbitration analysis of titanium and titanium alloy products shall be carried out according to GB/T 4698, and the routine inspection may be carried out according to ICP or other approved methods.

4.2 Unless otherwise specified in the product standards, the supply party may take samples from titanium and titanium alloy ingots (or from the finished products for hydrogen element) for chemical composition analysis of products.

5 Others

5.1 Annex A is the designation and chemical composition of titanium and titanium alloys that were deleted in the previous revisions of GB/T 3620.1.

5.2 Annex B shows the correspondence between designations of industrial pure titanium in Table 2 and pure titanium in ASTM standard system.

5.3 Annex C shows the naming rules for titanium and titanium alloys.

Annex A

(informative) Designation and chemical composition of deleted titanium and titanium alloys
The designation and chemical composition of deleted titanium and titanium alloys are shown in Table A.1.

Annex B

(informative) Correspondence between designations of industrial pure titanium in Table 2 of this Standard and pure titanium in ASTM standard system
The correspondence between designations of industrial pure titanium in Table 2 of this Standard and pure titanium in ASTM standard system is shown in Table B.1.

Annex C

(normative) Naming rules for titanium and titanium alloys C.1 Basic rules for naming of designation C.1.1 Classification C.1.2 Naming rules C.1.2.1 The naming of the designation of titanium and titanium alloys shall be based on the registration system. Before the naming of the designation, the designation shall be registered, and the name shall be unified. C.1.2.2 The designation of titanium and titanium alloys is indicated by letters and numbers. C.2 Combination method for designation C.2.1 The first digit of the designation is capital letters "T", which indicates titanium and titanium alloys. C.2.4 The ultra-low-gap alloys of the same designation are marked with the letter "ELI" after the numbers, and there is no gap between the numbers and "ELI". C.3 Combination rules for nominal composition C.3.1 The nominal composition of titanium alloy designations only lists the elements of which the range must be controlled. C.3.2 The determination of the element content in the nominal composition shall be based on the arithmetical mean within its control range.