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

GB/T 3190-2020

**Chemical composition of wrought aluminium and aluminium
alloys**

变形铝及铝合金化学成分

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Table of Contents

- 1 Scope
- 2 Normative References
- 3 Requirements
 - 3.1 Chemical Composition
 - 3.3 Component Analysis Element Limit Value Expression of Limit Value a
- 4 Others
- Appendix A

Foreword

This Standard was drafted in accordance with the rules in GB/T 1.1-2009. This Standard serves as a replacement of GB/T 3190-2008 Wrought Aluminum and Aluminum Alloy - Chemical Composition. In comparison with GB/T 3190-2008, apart from editorial modifications, the main technical changes are as follows:

- Normative References are modified (see Chapter 2; Chapter 2 of Version 2008);
- In the table of International Four-digit Designations and Chemical Composition, 79 designations are added; 6 designations are deleted (see 3.1.1; 3.1.1 of Version 2008);
- In the table of Domestic Four-character Designations and Chemical Composition, 29 designations are added; Designation - 2A97 is deleted (see 3.1.1; 3.1.1 of Version 2008);
- The header of the table of International Four-digit Designations and Chemical Composition and the table of Domestic Four-character Designations and Chemical Composition is modified; eight element columns are added. "Ag", "B", "Bi", "Ga", "Li", "Pb", "Sn" and "V" (see 3.1.1; 3.1.1 of Version 2008);
- The control requirements for aluminum and aluminum alloy materials for packaging are added (see 3.1.5);
- The requirements for sampling are modified (see 3.2; 3.2 of Version 2008);
- The requirements for component analysis are modified (see 3.3;

3.3 of Version 2008);

---The designations and chemical compositions of inactive alloys are added (see Appendix A);

1 Scope

China's national standard for the chemical composition of wrought aluminium and aluminium alloys, and the current edition of GB/T 3190, replacing the 2008 edition. It specifies the designations and the chemical composition limits of these alloys, together with the requirements for sampling and for compositional analysis, with a normative annex covering the designations and compositions of inactive alloys and an informative annex comparing the letter designations used in the tables with the designations previously used. It is the reference document of the Chinese aluminium industry: every wrought aluminium product standard, every drawing that calls up an alloy, and every mill certificate ultimately points back to the composition tables here. The document is built around two tables. The first gives the international four-digit designations - the 1000 to 8000 series registered internationally - with their composition limits, and the second gives the domestic four-character designations used in China for alloys that have no international registration. The 2020 revision is substantial on both. Seventy-nine designations were added to the international table and six removed; twenty-nine were added to the domestic table and one removed. Eight element columns were added to both - silver, boron, bismuth, gallium, lithium, lead, tin and vanadium - which reflects both the arrival of alloys deliberately containing these elements, aluminium-lithium above all, and the tightening of limits on elements such as lead that are now controlled for reasons of product regulation rather than metallurgy. Control requirements were added for aluminium and aluminium alloy materials used in packaging, and the sampling and analysis requirements were revised. Issued on 31 March 2020 and in force since 1 February 2021.

This Standard stipulates the chemical composition of wrought aluminum and aluminum alloys. This Standard is applicable to aluminum and aluminum alloy processed products (sheets, strips, foils, pipes, rods, profiles, wires and forgings, etc.) manufactured by the method of pressure machining, as well as the ingots and billets used.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 7999 Optical Emission Spectrometric Analysis Method of Aluminum and Aluminum Alloys

GB/T 8170 Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values

GB/T 16474 Designation System for Wrought Aluminum and Aluminum Alloy

GB/T 17432 Methods for Sampling for Analyzing the Chemical Composition of Wrought Aluminum and Aluminum Alloys

GB/T 20975 (all parts) Methods for Chemical Analysis of Aluminum and Aluminum Alloys

GB/T 27675 Designation System for Aluminum and Aluminum Alloys Composite Sheets, Strips and Foils
YS/T 870 Chemical Analysis of High Purity Aluminum - Determination of Trace Impurities - Inductively Coupled Plasma Mass Spectrometry

3.1 Chemical Composition

3.1.1 The designation system for wrought aluminum and aluminum alloys shall comply with the stipulations of GB/T 16474. The chemical composition of wrought aluminum and aluminum alloys shall comply with the stipulations of Table 2, Table 3 and Table A.1. In Table 2, Table 3 and Table A.1, the expression of limit value shall comply with the stipulations in Table 1. Table 1 -- Expression of Element Limit Value

3.1.2 The designation system for composite materials shall comply with the stipulations of GB/T 27675, among which, the chemical composition of aluminum alloy materials shall comply with the stipulations of this Standard.

3.1.3 Aluminum and aluminum alloy materials used for the food industry shall control

3.1.4 Aluminum and aluminum alloy materials used for the electrical and electronic equipment industry shall control

3.1.5 Aluminum and aluminum alloy materials used for packaging shall control

3.2 Sampling The sampling for the analysis of chemical composition shall comply with the stipulations of GB/T 17432.

3.3 Component Analysis Element Limit Value Expression of Limit Value a

3.3.1 Merely conduct routine analysis on the elements specified in the values other than "Al" and "Others" in Table 2, Table 3 and Table A.1. When it is suspected that the mass fraction of non-routine analysis elements exceeds the limits of this Standard, the producer shall analyze these elements.

3.3.2 The chemical composition analysis method in Table 2, Table 3 and Table A.1 shall comply with the stipulations of GB/T 20975, GB/T 7999 or YS/T 870. In terms of designations whose "Co" element content is less than 0.005%, or, designations whose "Al" element content is not less than 99.90%, the arbitration analysis of chemical composition shall adopt the method specified by YS/T 870. The arbitration analysis of "O" element

content may also be determined through negotiation between the demand-side and the supply-side. The arbitration analysis of the remaining chemical compositions shall adopt the method specified by GB/T 20975.

3.3.3 When calculating "the sum" of "others" in Table 2, Table 3 and Table A.1, before the summation, the various element analysis values shall be expressed to 0.XX%.

3.3.4 In Table 2, Table 3 and Table A.1, "Al" element content which is $\geq 99.00\%$ shall be determined through the method of calculation.

4 Others

4.1 The designations and chemical compositions of inactive alloys are shown in Appendix A.

4.2 Please refer to Appendix B for the comparison relationship of four-character designations and previously used designations.

Appendix A

(normative) Designations and Chemical Compositions of Inactive Alloys The designations and chemical compositions of inactive alloys are shown in Table A.1.