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**NATIONAL STANDARD OF THE
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GB/T 21181-2025

Replacing GB/T 21181-2017

Secondary lead ingots

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Foreword

GB/T 21181-2025 was issued on 29 August 2025 by the State Administration for Market Regulation of the People's Republic of China and the Standardization Administration of the People's Republic of China, and comes into force on 1 March 2026. The /T in the designation marks it as a recommended national standard.

This is the official English translation published by openstd. SAC/TC 243 is in charge of the English translation; in case of any doubt about its contents, the Chinese original is authoritative.

The document is drafted in accordance with GB/T 1.1-2020 Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

This document replaces GB/T 21181-2017 Secondary lead and lead alloy ingots in whole. In addition to a number of structural adjustments and editorial changes, the following technical deviations have been made with respect to the 2017 edition: a) the scope was modified from "this standard is applicable to the production of recycled lead and its alloy ingots from lead containing waste materials through smelting process" to "this document is applicable to secondary lead ingots produced through pyrometallurgical processing of waste lead-acid batteries and other lead-bearing recycled materials, which are primarily used in lead-acid battery manufacturing, lead alloy production, and chemical industries etc."; b) two secondary lead designations, ZSPb99.994 and ZSPb99.992, were deleted; c) three secondary lead designations were added, ZSPb99.990, ZSPb99.986 and

ZSPb99.983; d) the designations of secondary lead alloy ingots were deleted; e) two physical specifications for secondary lead ingots were added, a mass per ingot of 30 kg plus or minus 2 kg and a mass per ingot of 45 kg plus or minus 2 kg.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights; the issuing body is not to be held responsible for identifying any or all such rights.

The document was proposed by the China Nonferrous Metals Industry Association and prepared by SAC/TC 243, the National Technical Committee on Nonferrous Metals of the Standardization Administration of China. The first edition was issued in 2007 as GB/T 21181-2007 Secondary lead and lead alloy ingots, the first revision was issued in 2017, and this is the second revised edition.

1 Scope

The product standard for lead ingots made from recycled material rather than from ore. Most of the lead in circulation in China comes back as spent lead-acid batteries, and it is smelted again and cast into ingots that go straight back into new batteries, into lead alloys and into the chemical industry - a loop that only works if the recycled ingot can be bought against a specification as precise as the one used for primary lead. That is what this document provides: it classifies secondary lead ingots into three designations by chemical composition, ZSPb99.990, ZSPb99.986 and ZSPb99.983, and for each of them fixes the minimum lead content and the maximum permitted content of the impurities that a recycled feedstock brings with it - silver, copper, bismuth, arsenic, antimony, tin, zinc, iron, cadmium and nickel - together with a cap on their sum. The lead content itself is not measured directly but calculated as 100 percent minus the sum of the listed impurities. Alongside the chemistry the standard fixes the physical form of the ingot, its shape and the permitted nominal masses, and the surface quality it has to show, and it then sets out the test methods, inspection rules, marking, packaging, transport, storage, accompanying documents and order contents. It is the 2025 revision of a standard first issued in 2007: it drops the lead alloy ingot designations and two of the older secondary lead grades, adds three new designations and two further ingot masses. It applies to secondary lead ingots produced by pyrometallurgical processing of waste lead-acid batteries and other lead-bearing recycled materials, and is used by secondary smelters, battery makers and the traders and inspectors between them.

This document specifies the product classification, technical requirements, test methods, inspection rules, marking, packaging, transportation, storage, accompanying documents and order contents of secondary lead ingots.

This document is applicable to secondary lead ingots produced through pyrometallurgical processing of waste lead-acid batteries and other lead-bearing recycled materials, which are primarily used in lead-acid battery manufacturing, lead alloy production, and chemical

industries etc.

2 Normative references

The contents of the following documents, through normative references in the text, constitute indispensable provisions of this document. For dated references, only the edition cited applies; for undated references, the latest edition (including all amendments) applies.

GB/T 4103 (all parts) Methods for chemical analysis of lead and lead alloys

GB/T 8170 Rules of rounding off for numerical values & expression and judgement of limiting values

3 Terms and definitions

There are no terms and definitions to be defined in this document.

4 Product classification

Secondary lead ingots are classified into three designations by chemical composition: ZSPb99.990, ZSPb99.986, ZSPb99.983.

5.1 Chemical composition

5.1.1 The chemical composition of secondary lead ingots shall comply with the specifications given in Table 1. Table 1 gives, for each of the three designations, the minimum mass fraction of the main element lead and the maximum mass fraction of each impurity element - silver, copper, bismuth, arsenic, antimony, tin, zinc, iron, cadmium and nickel - together with the maximum permitted sum of the impurity elements.

5.1.2 The lead (Pb) content is calculated as 100% minus the sum content of all impurity elements listed in Table 1.

5.1.3 When the buyer has special requirements for impurity elements of secondary lead ingots, it may be determined through negotiation between the supplier and buyer.

5.2 Physical specification

5.2.1 Secondary lead ingots shall be in the shape of rectangular trapezoid, with bundling grooves at the bottom and protruding parts at both ends.

5.2.2 The nominal mass per ingot shall be 48 kg plus or minus 2 kg, 45 kg plus or minus 2 kg, 40 kg plus or minus 2 kg, 30 kg plus or minus 2 kg, or 24 kg plus or minus 1 kg.

5.2.3 If the buyer has special requirements for the physical specification and shape of secondary lead ingots, it may be determined through negotiation between the supplier and buyer.

5.3 Surface quality

The surface of secondary lead ingots shall be free from slag, molten holes, granular oxides, inclusions and external contamination. There shall be no cold laps or no flash burrs larger than 10 mm (trimming is allowed).

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