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Replacing GB/T 4437.2-2003

Aluminum and Aluminum Alloy Extruded Tubes – Part 2: Seam Tubes

铝及铝合金热挤压管 第 2 部分：有缝管

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Standardization Administration of PRC.

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Foreword

GB/T 4437 *Aluminum and Aluminum Alloy Extruded Tubes* can be divided into the following two parts:

--- Part 1: Seamless Tubes;

--- Part 2: Seam Tubes.

This Part belongs to Part 2 of GB/T 4437.

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Part replaced GB/T 4437.2-2003 *Aluminum and Aluminum Alloy Extruded Tubes – Part 2: Seam Tubes*. Compared with GB/T 4437.2-2003, this Part has the major technical changes as follows besides the editorial modifications:

--- Add Grade 6101, 6101B, 6105, 6351, 6060, 6082 and 7003 in the product classification (see 3.1.1 of this Edition);

--- Add State H112 of Alloy 5052, State T6 of Alloys 6005 and 6005A, State T1 of Alloy 6005A, State T5 of Alloy 6061, State T1 of Alloy 6063 in the product classification (see 3.1.1 of this Edition);

--- Add the provisions of tube material categories for surface treatment, surface treatment modes and film code in the product classification (see 3.1.2 of this Edition);

--- Add the mechanical properties for Alloys 6101, 6101B, 6105, 6351, 6060, 6082, 7003 (see 3.4 of this Edition);

--- Add the mechanical properties for State H112 of Alloy 5052, State T6 of Alloy 6005, States T1 and T6 of Alloy 6005A, State T5 of Alloy 6061, State T1 of Alloy 6063 (see 3.4 of this Edition);

--- Add the conductivity for States T6 and T7 of Alloy 6101B (see 3.5 of this Edition);

--- Add the requirements for film performance (see 3.8 of this Edition);

--- Modify the mechanical property indexes of 1070A, 1060, 1050A, 1035, 1100, 1200, 2A11, 2A11, 2017, 2A12, 2024, 3003, 2A11, 2017, 2A12, 2024, 3003, 6005, 6005A, 6061, 6063, 6063A (see 3.4 of this Edition; 3.4 of Edition 2003);

--- Modify the requirements for standard dimensions, directly quote GB/T 4436 (see 3.3 of this Edition; 3.3 of Edition 2003).

Aluminum and Aluminum Alloy

Extruded Tubes – Part 2: Seam Tubes

1 Scope

This Part of GB/T 4437 specifies the requirements, test methods, inspection rules, mark, package, transportation, storage, quality certificate and ordering list (or contract) contents of aluminum and aluminum alloy extruded tubes produced by split-flow combination mold or bride combination mold.

This Part is applicable to the aluminum and aluminum alloy seam circular, rectangular, regular polygon tubes (hereinafter referred to as tube) produced by split-flow combination mold or bridge combination mold.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 3190 Wrought Aluminum and Aluminum Alloys - Chemical Composition Limits

GB/T 3199 Wrought Aluminum and Aluminum Alloy Products - Packing, Marking, Transporting and Storing

GB/T 3246.1 Inspection Method for Structure of Wrought Aluminum and Aluminum Alloy Products Part 1: Inspection Method for Microstructure

GB/T 3246.2 Inspection Method for Structure of Wrought Aluminum and Aluminum Alloy Products Part 2: Inspection Method for Macrostructure

GB/T 4436-2012 Wrought Aluminum and Aluminum Alloy Tubes - Dimensions and Deviations

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

GB/T 8013.1 Anodic Oxide Coating and Organic Polymer Coatings on Aluminum

and Its Alloys - Part 1: Anodic Oxide Coatings

GB/T 8013.2 Anodic Oxide Coatings and Organic Polymer Coatings on Aluminum and Its Alloys - Part 2: Combined Anodic Oxide Coating

GB/T 8013.3 Anodic Oxide Coatings and Organic Polymer Coatings on Aluminum and Its Alloys - Part 3: Organic Polymer Coatings

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

GB/T 12966 The Method for Electrical Conductivity Measurement of Aluminum Alloys by Use of Eddy Current

GB/T 16865 Test Pieces for Tensile Test for Wrought Aluminum and Magnesium Alloy Products

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

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

3 Requirements

3.1 Product classification

3.1.1 Grade, supply state

The grade, supply state of tube shall conform to the provisions of Table 1. When other grades or supply states are required, they shall be negotiated between the supplier and the purchaser, and be specified in the ordering list (or contract).

3.9.4 The appearance quality of the surface treatment tube shall conform to the relevant provisions of GB/T 8013.1~GB/T 8013.3.

4 Test Methods

4.1 Chemical compositions

4.1.1 The analysis method of chemical compositions shall conform to the provisions of GB/T 20975 or GB/T 7999; the arbitration analysis shall adopt the method stipulated in GB/T 20975. The “Al” mass fraction is calculated as per the method stipulated in GB/T 3190; when calculating the “Al” mass fraction, take the analysis values sum between conventional analysis element and suspiciously excessive unconventional analysis elements as the “sum of the element mass fraction”.

4.1.2 The judgment of analysis values shall adopt the rounding comparison method; the numerical rounding rules shall be carried out as per the relevant provisions of GB/T 8170; while the number of rounding digits shall be consistent with the limit digits specified in GB/T 3190.

4.2 Dimension deviation

The measurement method for dimension deviation of the tube shall conform to the provisions of GB/T 4436-2012.

4.3 Mechanical properties of tensile at room temperature

The test for mechanical properties of tensile at room temperature shall be performed as per the method specified in GB/T 16865.

4.4 Conductivity

The test method for conductivity of tube shall be performed as per the method specified in GB/T 12966.

4.5 Macrostructure

The test for macrostructure of tube shall be performed as per the method specified in GB/T 3246.2.

4.6 Microstructure

The test for microstructure of tube shall be performed as per the method specified in GB/T 3246.1.

4.7 Film performance

5.5.1 When the chemical compositions of any specimen is unqualified, if the product can be distinguished the melting times, then such melting times represented by the specimen shall be judged as unqualified; other melting times shall be inspected one by one; only the qualified one can be delivered. If the melting times can't be distinguished, then such batch shall be judged unqualified.

5.5.2 When the dimension deviation of any specimen is unqualified, the such piece of specimen shall be judged unqualified.

5.5.3 When the mechanical properties of tensile at room temperature of any specimen is unqualified, take double number of the specimens from such batch (or heat treatment furnace) products to re-test. If the re-test results are all qualified, then such batch (or heat treatment furnace) products are qualified. If there is still specimen that is unqualified in the re-test results, then such batch (or heat treatment furnace) products shall be judged unqualified. The supplier is allowed to inspect the product piece by piece through the negotiation between the supplier and the purchaser; only the qualified ones can be delivered.

5.5.4 When the macrostructure of any specimen is unqualified, the judgment shall be as follows:

a) If the specimen is unqualified due to cracks, non-metallic inclusions, then such batch of products are rejected. However, the supplier is allowed to inspect the product piece by piece, only the qualified ones can be delivered;

b) If the specimen is unqualified due to layer, coarse-grained ring, the tube is allowed to extrude the tail end and cut a section to re-test till it is qualified; other tubes in such batch shall accept the cutting tail on the maximum length where the defects distribute on the tube or inspection of piece by piece; only the qualified ones can be delivered.

c) If the specimen is unqualified due to weld seam, the tube is allowed to extrude the head end and cut a section to re-test till it is qualified; other tubes in such batch shall accept the cutting head on the maximum length where the defects distribute on the tube or inspection of piece by piece; only the qualified ones can be delivered.

5.5.5 If the microstructure of the specimen is unqualified, the product can distinguish the heat treatment furnace times, then such furnace times represented by the specimen shall be judged as unqualified; other furnace times shall be inspected one by one; only the qualified ones can be delivered. The product that can't distinguish the furnace times, then such batch of products shall be judged unqualified.

5.5.6 If the film performance of any tube is unqualified, then it shall be judged as specified in GB/T 8013.1~GB/T 8013.3.

a) Supplier name;

b) Product name or surface treatment tube categories;

c) Grade, supply state, dimension and specification;

d) Color (or color number), film code of surface treatment tubes;

e) Product batch number or production date;

f) Net weight or the number of pieces;

g) Results of various analytical tests;

h) Inspection seal of the supplier's quality supervision department;

i) This Part number;

j) Package date (exit-factory date).

7 Ordering List (or Contract) Contents

The ordering list (or contract) that orders the materials listed in this Part shall include the following contents:

a) Produce name or surface treatment tube categories;

b) Grade;

c) Supply state;

d) Dimension and specification;

e) New weight or the number of pieces;

f) Color (or color number), film code of surface treatment tubes;

g) Particular requirements from the purchaser;

--- Particular requirements for dimension;

--- Particular requirements for mechanical properties of tensile at room temperature;

--- Particular requirements for the depth of coarse-grained ring;

--- Particular requirements for conductivity index;