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ICS 77.120.10

CCS H 61

National Standard of the People's Republic of China

GB/T 40386—2021

Recycling materials for pure aluminium

Released on 2021-08-20

Implemented on 2022-03-01

Issued by

The State Administration for Market Regulation (SAMR) and

The Standardization Administration of the People's Republic of China

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Preface

This document was drafted in accordance with GB/T 1.1-2020 Directives for Standardization—Part 1: Rules for the structure and drafting of standardizing documents.

Please note that some of the contents of this document may involve patents. The issuing agency of this document is not responsible for identifying patents.

This document was proposed by China Nonferrous Metals Industry Association.

This document is under the jurisdiction of the National Nonferrous Metals Standardization Technical Committee (SAC/TC 243).

The drafting organizations of this document are: Shandong Nanshan Science and Technology Research Institute Co., Ltd., Guangzhou Youbo Good Material Technology Co., Ltd., Northeast Light Alloy Co., Ltd., Foshan Nanhai District Yimao Metal Material Co., Ltd., Southwest Aluminum (Group) Co., Ltd., Non-ferrous Metal Technology and Economic Research Institute Co., Ltd., Xiamen Xiashun Aluminum Foil Co., Ltd., Shandong Chuangxin Metal Technology Co., Ltd., Shandongnanshan Aluminum Co., Ltd., Chengdu Sunshine Aluminum Products Co., Ltd., Liaoning Zhongwang Group Co., Ltd., Ningbo Huilong Renewable Resources Technology Co., Ltd.

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Recycling materials for pure aluminium

1 Scope

This document specifies the classification, requirements, test methods, inspection rules, factory inspection and acceptance, packaging, transportation, storage, quality certificates and purchase orders (or contracts) of recycling materials for wrought aluminium alloys.

This document is applicable to the pure aluminium raw materials (hereinafter referred to as raw materials) used for melting and casting obtained from recycled aluminum after sorting and processing.

2 Normative references

The content of the following documents constitutes an indispensable clause of this document through normative references in the text. Among them, for dated reference documents, only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document.

2 Normative references

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GB/T 8005.1 aluminium and aluminium alloys. Terms and definitions. Part 1: product and method of processing and treatment

GB/T 40382-2021. Recycling materials for wrought aluminium alloys

3 Terms and definitions

The following terms and definitions defined in GB/T8005.1 apply to this document.

3.1 Recycling materials for pure aluminium

Pure aluminium raw materials for melting and casting that are obtained after sorting and other processing treatments of recycled aluminum that meet the relevant requirements of this document.

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3.2 Foreign material

Non-metallic substances doped or attached to raw materials.

Note: foreign materials include wood, textiles, plastics, glass, stone, paper, sand, rubber, sludge, powders (powder, oil, crystalline salt, fiber powder, etc.) with a particle size of not more than 2 mm, and materials covered with organic polymer coatings, etc. They do not include the packaging of this product and other substances that need to be used during transportation.

3.3 Volatile substance

At a temperature lower than the melting point of the metal, the volatile substance can be separated from the raw material after being properly heated.

3.4 Metal recovery rate

The proportion of the pure aluminium produced after the raw materials are pretreated and smelted according to the methods specified in this document, expressed as mass fraction.

4 Categories

4.1 The category, description, source, composition type and packaging method of raw materials are shown in table 1. See Appendix A for typical examples of sources of raw materials.

Table 1 Category, description, source, composition type and packaging method of raw materials

Category of raw materials	Description of raw materials	Source of raw materials	Packaging method of raw materials ^a	
			Bulk	Bulk
Recycled aluminum ingot	It is an aluminum ingot for melting and casting that is made of recycled	pure aluminium machining residues and geometric scraps, unqualified	bundle	

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		aluminum products and meets the requirements of this document.	produced in the process of pure aluminium,		
Material	Heavy material	It is obtained after dismantling, mechanical separation or manual sorting, classification and other pretreatment processes to remove the inclusions in the recycled aluminum, and it meets the aluminum materials specified in this document.	pure aluminium products that have lost their original functions and recycled aluminum composed of broken materials	Bagging/boxing/bundle/nude packing/wrapping	compaction packages/blocks ^b
	Light material				
	small material				Easily disassembled package/block
<p>a. See GB/T 40382-2021 for typical illustrations of raw material packaging methods. When the buyer has special requirements for raw material packaging methods, it shall be negotiated by both the supplier and the buyer and indicated in the order form (or contract).</p> <p>b. Compaction packages/blocks refer to compacted scraps that cannot be disassembled manually.</p>					

4.2 The size and specification of the recycled aluminum ingot and the net weight of the ingot shall be negotiated between the supplier and the buyer. See table 2 for dimensions and net weights of other raw materials.

Table 2 Raw material size specifications and net weight

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Raw material packaging method		Size and net weight of raw materials		
		Large material		small material
		Heavy material	Light material	
Bulk		The diameter of the aluminum rod or wire in the raw material shall not be less than 10 mm, and the thickness or wall thickness of other materials shall not be less than 2 mm. The net weight of the block shall not be less than 10 kg.	The diameter of the aluminum rod or aluminum wire in the raw material shall not be less than 0.8 mm, and the thickness or wall thickness of other materials shall not be less than 0.2 mm. The net weight of the block shall not be less than 10 kg and not less than 5 kg.	The diameter or thickness (or wall thickness) of the material block shall not be less than 0.2 mm. The net weight of the block shall be less than 5 kg.
compacted scrap	Easily disassembled package/block	The size and the net weight of the material block shall meet the requirements of bulk materials. The maximum size of the easily disassembled block shall be no more than 500 mm. The length of the easily disassembled package shall be no more than 2 400 mm, the width shall be no more than 1100 mm, the height shall be no more than 1,000 mm, and the net weight shall be no more than 1500 kg.		
	compaction packages/blocks	The size of the material block and the net weight of the material block shall meet the requirements of bulk materials. The maximum size of the compacted block shall not be greater than 500 mm, and the height of the compaction package shall not be greater than 500 mm.		

5 Requirements

The content of foreign material, the fractured structure of the secondary aluminum ingot and the radioactive contaminants should meet the requirements of GB/T 40382-2021.

6 Test method

The test should be carried out in accordance with the provisions of GB/T 40382-2021.

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7 Inspection rules

It should meet the requirements of GB/T 40382-2021.

8 Incoming inspection and acceptance

The purchaser shall carry out incoming inspection and acceptance in accordance with Appendix B. If the inspection result does not conform to the provisions of this document and the purchase order (or contract), it shall be submitted to the supplier in writing. If arbitration is required, a unit recognized by both the supplier and the buyer can be entrusted to conduct arbitration and take samples together with the buyer.

9 Packaging, transportation, storage and quality certificate

It should meet the requirements of GB/T 40382-2021.

10 Contents of the purchase order (or contract)

The purchase order (or contract) for the materials listed in this document shall include the following:

- A) type of raw material, source of raw material;
- B) the packaging form of the raw materials;
- C) composition type;
- D) special requirements for the appearance and size specifications of the raw materials;
- E) foreign material content;
- F) volatile content;
- G) metal recovery rate;
- H) number of this document

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Appendix A

(Informative)

Typical examples of raw material sources

Figures A.1 to A.8 show typical figure examples of raw material sources.



Figure A.1 New pure aluminium wire and cable



Figure A.2 Pure aluminium processing remnants and geometric waste

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Figure A.3 New clean printing plate base



Figure A.4 Old pure aluminium wire and cable

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Figure A.5 Conductive aluminum plate



Figure A.6 Electrical aluminum particles

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Figure A.7 Clean printing plate base



Figure A.8 Aluminum appliances

Appendix B

(Normative)

Incoming inspection and acceptance

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B.1 Inspection items and requirements

B.1.1 Inspection items

Each batch of raw materials shall be inspected for appearance quality, volatile content, metal recovery rate, and chemical composition.

B.1.2 Appearance quality

B.1.2.1 The surface of recycled aluminum ingots shall be kept clean and free of serious flashes or pores.

B.1.2.2 The appearance of other raw materials shall be clean, free of obvious oil, sand, and corrosion. There shall be no obvious paper, plastic, rubber, foam, fiber, iron, copper, tin and other non-aluminum metals.

B.1.3 Volatile substance content

The raw material moisture shall not be more than 0.5%, and other volatile matter shall not be more than 1%.

B.1.4 metal recovery rate

The metal recovery rate of raw materials shall meet the requirements of Table B.1.

Table B.1 metal recovery rate

Raw material category	Recycled aluminum ingots	Large material		small material
		Heavy material	Light material	
Metal recovery rate	≥97%	≥97%	≥96%	≥94%

B.1.5 chemical composition

The chemical composition shall meet the requirements of Table B.2.

B.2 chemical composition

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chemical composition	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Other ^b		Al ^c
									single	total	
mass fraction ^a %	0.25	0.4	0.05	0.05	1.3	0.05	0.07	0.05	0.05	-	99.5

a. Where the content in the table is a single value, aluminum is at the lowest limit, and other elements are at the highest limit.

b. "Other" refers to elements that are not listed or specified in the table for mass fraction values.

c. The aluminum mass fraction is determined by calculation: 100.00% minus the sum of all analyzed metal elements and silicon elements whose mass fraction is not less than 0.010%. The value of each element before the summation should be expressed to 0.0X%.

B.2 Sample preparation

It shall comply with the provisions of Appendix H of GB/T40382-2021.

B.3 Inspection methods and determination of inspection results

It should be carried out in accordance with the provisions of GB/T 40382—2021 Appendix H.