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

GB/T 26027-2024

High damage tolerance aluminium alloy profiles

高损伤容限铝合金型材

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Foreword

This document was issued on 25 April 2024 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 November 2024.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 26027-2024 specifies high damage tolerance aluminium alloy profiles. Damage tolerance is the aerospace design philosophy that assumes a crack is already present and requires the structure to carry load until it is found: the alloys and tempers chosen for it, such as the 2000 series in the T3 condition, trade peak strength for slow crack growth and high fracture toughness, and the profiles made from them go into the lower wing and fuselage structure of Chinese aircraft. The standard sets the product classification, the technical requirements, the test methods, the qualification of the product, the process control, the inspection rules, the marking, packaging, transport, storage and quality certificate, and the contents of the order or contract. It took effect on 1 November 2024.

This document specifies the product classification, technical requirements, test methods, product qualification, process control, inspection rules, marking, packaging,

transportation, storage and quality certificate and order (or contract) contents of high damage tolerance aluminum alloy profiles.

This document applies to high damage tolerance aluminum alloy profiles (hereinafter referred to as "profiles").

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3190, Wrought aluminum and aluminum alloy - Chemical composition

GB/T 3199, Wrought aluminium and aluminium alloy products - Packing, marking, transporting and storing

GB/T 3246.1, Inspection method for structure of wrought aluminium and aluminium 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 3251, Compression test method for aluminium and aluminium alloy products

GB/T 6519-2024, Ultrasonic inspection of wrought aluminium and magnesium alloy products

GB/T 7999, Optical emission spectrometric analysis method of aluminum and aluminum alloys

GB/T 8005.1, Aluminium and aluminium alloy terms and definitions - Part 1.

Product and method of processing and treatment

GB/T 12966, The methods for determining aluminium and aluminium alloys conductivity using eddy current

5.7 Ultrasonic flaw detection acceptance grade

The ultrasonic flaw detection results of profiles shall comply with Grade A in GB/T 6519-2024.

5.8 Macro-structure

Cracks, stratification, shrinkage tails, pores, bright grains, metal inclusions, and non-metallic inclusions are not allowed to exist on the macro-structure samples of the profiles. The depth of the coarse grain ring at the corners of the profiles is allowed to exceed 3 mm, but not allowed to exceed 5 mm. The depth of the coarse grain ring in other parts shall not be greater than 3 mm. When the buyer has requirements for grain size, it shall be determined by negotiation between the supplier and the buyer, and indicated in the order (or contract).

5.9 Microstructure

Over-burning is not allowed in the profile microstructure.

5.10 Appearance quality

5.10.1 Metal indentation, non-metal indentation, cracks, bubbles, or surface corrosion are not allowed on the profile surface; however, water marks are permitted.

5.10.2 Mold marks, pits, bumps, scratches, dents, straightening marks, and abrasions that do not exceed half of the negative deviation value are allowed on the profile surface. The supplier is allowed to grind it longitudinally to a smooth surface. After grinding, the wall thickness deviation of the profile shall not exceed its allowable deviation range.

6 Test methods

6.1 Chemical composition

The chemical composition analysis of the profiles shall be carried out according to the methods specified in GB/T 20975 (all parts) or GB/T 7999. The arbitration shall be carried out according to the methods specified in GB/T 20975 (all parts).

6.2 Dimension deviation

The dimension deviation of the profile shall be tested in accordance with the method specified in GB/T 14846-2014.

6.3 Room temperature tensile mechanical properties

The room temperature tensile mechanical properties of the profiles shall be tested according to the method specified in GB/T 16865. When the buyer has special

requirements for sample selection, the supplier and the buyer can refer to GB/T 16865 for negotiation and determination, and indicate it in the order (or contract).

6.4 Compression properties

The compression properties of the profile shall be tested according to the method specified in GB/T 3251.

6.5 Conductivity

6.5.1 Conductivity of test pieces

The conductivity of test pieces of the profiles shall be tested according to the method specified in GB/T 12966. When using tensile test pieces, if the profile size and surface cannot meet the test requirements, the supplier and the buyer may refer to GB/T 12966 to agree on the test method and indicate it in the order (or contract).

6.5.2 Conductivity uniformity

The conductivity uniformity test of the profile shall be carried out on the profile surface according to the method specified in GB/T 12966.

6.6 Exfoliation corrosion resistance

The exfoliation corrosion resistance of the profile shall be tested according to the method specified in GB/T 22639-2022.

6.7 Ultrasonic flaw detection acceptance grade

The ultrasonic flaw detection acceptance grade of the profiles shall be evaluated in accordance with the provisions of GB/T 6519-2024. The ultrasonic inspection method shall be determined by negotiation between the supplier and the buyer and shall be indicated in the drawing, order form (or contract). If not specified, use the contact method.

6.8 Macro-structure

The macro-structure of the profile shall be tested according to the method specified in GB/T 3246.2.

6.9 Microstructure

The microstructure of the profile shall be tested according to the method specified in