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

GB/T 5155-2022

Magnesium and magnesium alloy extruded rods

镁及镁合金热挤压棒材

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1 Scope

China's national standard for extruded magnesium and magnesium alloy rods - round, square and hexagonal. Extrusion is the natural process for magnesium: worked hot, the metal flows well through a die, and the extrusion breaks up the cast structure and aligns the grain, giving properties a casting cannot approach. It also imposes the characteristic that any user must design around, which is that extruded magnesium is strongly anisotropic. The basal planes align with the extrusion direction, so the rod is markedly stronger in tension along its length than across it, and its yield strength in compression is substantially lower than in tension - a behaviour that has no counterpart in aluminium and that catches out designers who substitute one for the other. The standard specifies the classification, quality assurance, requirements, test methods, inspection rules, marking, packaging, transport, storage, quality certificates and order contents for such rods.

This document specifies the classification, quality assurance, requirements, test methods, inspection rules and markings, packaging, transportation, storage, quality certificates, purchase orders (or contracts) of magnesium and magnesium alloy extruded rods. This document applies to magnesium and magnesium alloy extruded round rods, square rods, hexagonal rods (hereinafter referred to as rods).

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) is applicable to this standard.

GB/T 3499 Magnesium ingots

GB/T 4297 Inspection method for macrostructure of wrought magnesium alloy products

GB/T 5153 Designation and composition of wrought magnesium and magnesium alloys

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

GB/T 13748 (all parts) Chemical analysis methods of magnesium and magnesium alloys

GB/T 16865 Test pieces and method for tensile test for wrought aluminium and magnesium alloys products

GB/T 17432 Methods of sampling for analyzing the chemical composition of wrought aluminum and aluminum alloys

GB/T 32792 Packing, marking, transporting and storing of magnesium alloy wrought products purchaser; meanwhile it shall be indicated in the purchase order (or contract).

6.4.2 There shall be no cracks, fractures, blisters, shrinkage tails, inclusions, bright rings, large grains, on the macrostructure test piece, that would damage the continuity of the metal.

6.4.3 There may be layers on the macrostructure test piece, which has a depth not exceeding half of the margin of diameter deviation. If the buyer requires no layers, it should be indicated in the purchase order (or contract).

6.4.4 The ZK61M alloy rod shall be inspected for the coarse-grained ring; the depth of the coarse-grained ring shall not be greater than 5 mm.

6.5 Appearance quality

6.5.1 The surface of the rod shall be clean. There shall be neither cracks, scars, corrosion spots, that cannot be removed by inspection and grinding, nor various pressed objects and concentrated bright circles reflecting the internal cracks of the rod. For the defects, such as cracks, scars, corrosion spots, that can be removed by grinding, they shall be polished and trimmed before oxidation and coloring; however, the depth of trimming shall not be greater than the maximum allowable deviation of the rod diameter; sandpaper should be used for polishing after trimming. Cracks shall not be ground.

6.5.2 The surface of the rod shall not have defects, such as crushing, bumping, cratering, air bubbles, blisters, abrasions, scratches, that affect the user's use; the depth of the defects shall not exceed the allowable negative deviation of the diameter. For rods, which have a diameter of less than 160 mm, the depth of the extrusion marks shall not exceed 0.1 mm; for rods, which have a diameter of not less than 160 mm, the depth of the extrusion marks shall not exceed

0.3 mm.

6.5.3 The surface of the rod should be oxidized; its oxide layer shall be intact, without exposing the base metal or falling off. If the oxidation treatment is not carried out, other anti-corrosion protection measures for the rod shall be determined, through negotiation between the supplier and the buyer; meanwhile it shall be specified in the purchase order (or contract).

7.1 Chemical composition

7.1.1 For the chemical composition analysis and arbitration of other alloy rods, except for LA93Z, LZ91N, LA93M, it shall be carried out according to the methods, which are specified in GB/T 13748 (all parts).

7.1.2 For the chemical composition analysis and arbitration of LA93Z, LZ91N, LA93M alloy rods, except for Li element, it shall be carried out according to the method, which

7.3 Mechanical properties The mechanical property test of the rod is inspected, according to the method specified in GB/T 16865.

7.4 Macrostructure The macrostructure inspection of the rod is carried out, according to the method specified in GB/T 4297.

7.5 Appearance quality The appearance quality of the rods is visually inspected. When the depth of the defect cannot be determined, the grinding method can be used for measurement.

8.1 Inspection and acceptance

8.1.1 The rod shall be inspected by the supplier, to ensure that the product quality conforms to the provisions of this document and the purchase order (or contract); meanwhile it shall fill the quality certificate.

8.1.2 The purchaser shall inspect the received products, according to the provisions of this document. If the inspection results are inconsistent with the provisions of this document and the purchase order (or contract), it shall be submitted to the supplier in writing, to be resolved through negotiation between the supplier and the buyer. For the objection, which belongs to the appearance quality and size deviation, it shall be raised, within one month from the date of receipt of the product. For the objection, which belongs to other properties,

it shall be raised, within three months from the date of receipt of the product. If arbitration is required, both the supplier and the buyer shall jointly conduct arbitration sampling on the buyer side.

8.2 Group-batching Rods shall be submitted for acceptance in batches. Each batch shall consist of the same alloy designation, state, specification. The batch weight is not limited.

8.3 Inspection items Each batch of rods shall be subject to exit-factory inspection. The inspection items shall include inspection of chemical composition, dimensional deviation, tensile mechanical properties at room temperature, macrostructure, appearance quality.

8.4 Sampling Sampling of rods shall comply with the provisions of Table 9. the above defects occur; it shall be judged one by one.

8.5.5 When the appearance quality of any rod is unqualified, the rod is judged to be unqualified.

9.1 Marking

9.1.1 The following imprints (or signs with the following imprints) shall be printed, on the front end of the accepted rods.

- a) Inspection seal by the quality inspection department of the supplier;
- b) Alloy designation;
- c) Delivery state;
- d) Batch number.

9.1.2 For the rod, which has a diameter of not less than 40 mm, it shall be printed on the front end. For the rod, which has a diameter of less than 40 mm, it shall hang two labels at the front end of the rod, per batch (or per box).

9.1.3 For rods, which have a diameter of not less than 20 mm AND have passed the acceptance inspection, the extruded end shall be marked with the letter "W".

9.1.4 The packaging box marking of rods shall be implemented, in accordance with the provisions of GB/T 32792.

9.2 Packaging, transport, storage

9.2.1 Rods should be greased and packaged. If there are special requirements, they shall be determined, through negotiation between the supplier and the buyer; meanwhile it shall be indicated in the purchase order (or contract).

9.2.2 Other requirements for the packaging, transportation, storage of bars shall be implemented, in accordance with the provisions of GB/T 32792.