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Magnesium Alloy Forgings for Aerospace

航空航天用镁合金锻件

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Magnesium Alloy Forgings for Aerospace

1 Scope

This Standard specifies the requirements, test methods, inspection rules, markings, package, transportation, storage, quality certificate, and ordering forms (or contracts) of the magnesium alloy forgings for aerospace.

This Standard is applicable to the magnesium alloy die forgings and free forgings (hereinafter referred to as forgings) for aerospace.

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 231.1 Metallic Materials--Brinell Hardness Test - Part 1: Test Method

GB/T 4297 Magnesium Alloy Wrought Products – Macrostructure - Inspection Method

GB/T 5153 Designation and Composition of Wrought Magnesium and Magnesium Alloys

GB/T 6519 Process for Ultrasonic Inspection of Wrought Aluminum Alloy Products

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

GB/T 13748 (all parts) Chemical Analysis Methods of Magnesium and Magnesium Alloys

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

GB/T 32792 Packaging, Marking, Transportation and Storage of Magnesium Alloy Processing Products

3.7.1 The oxide film on the fracture of the forgings shall conform to the provisions of Table 3.

3.7.2 The fractograph of forgings shall be free of flux slag and the segregation defects of the compounds specified in Tables 4 and 5.

3.8 Ultrasonic flow detection

When forgings have ultrasonic testing requirements, they shall be determined by through the negotiation between the supplier and the purchaser, and indicated in the order form (or contract).

3.9 Appearance quality

3.9.1 The surface of the forgings shall be smooth and clean. The surface of finished forgings shall be oxidized. The oxide layer shall be intact; exposing no base metal, no falling off. After oxidization, the oiling protection is required.

3.9.2 The cracks and folds on the surface of the to-be-machined forgings shall be removed. Peeling, bubbles, bumps, indentations and other defects allow for being inspected and removed; their depths shall be confirmed. The parts removing or non-removing the defects shall ensure one-half nominal machining allowance for forgings.

3.9.3 The non-machined surface of the die forgings shall be free of folding, peeling, bumps, rough scars, and the like defects; however, the supplier is allowed to remove the existing defects; the removal parts shall be smoothly transited; the parts removing the defects shall ensure the one-sided limit size of the die forgings.

4 Test Methods

4.1 Chemical compositions

4.1.1 The arbitration analysis for the chemical compositions of the forgings shall be conducted as per the method specified in GB/T 13748.

4.1.2 The judgment of analytical value shall adopt the round-off comparison method. The rules for numerical rounding-off shall be conducted as per the provisions of GB/T 8170; the rounding-off digits shall be consistent with the limit digits specified in GB/T 5153.

4.2 Size deviation

4.2.1 The shape and size of free forgings shall be measured by the calipers, steel rulers, tape or the measuring gauges with the corresponding accuracy.

4.2.2 The size and deviation of die forgings shall be measured by scribing method, the

5.5.3 When the Brinell hardness of any specimen is unqualified, it is allowed to cut double number of samples on the adjacent portion or another forging for reinspection. If the reinspection results are totally qualified, then such batch (furnace) of products are judged to be qualified. If the reinspection results still have the unqualified samples, then such batch (furnace) of products are judged to be unqualified. When the supplier is allowed to inspect the products piece by piece through the negotiation between the supplier and the purchaser, the qualified ones shall be delivered.

5.5.4 When the tensile mechanical properties at room temperature of any specimen is unqualified, it is allowed to cut double number of samples on the adjacent portion or another forging for reinspection. If the reinspection results are totally qualified, then such batch (furnace) of products are judged to be qualified. If the reinspection results still have the unqualified samples, then such batch (furnace) of products are judged to be unqualified. When the supplier is allowed to inspect the products piece by piece through the negotiation between the supplier and the purchaser, the qualified ones shall be delivered.

5.5.5 When the macrostructure of any specimen is unqualified, it shall be judged as follows:

a) If the products are unqualified due to looseness, cracks, non-metallic inclusions, flux slag, oxide film and segregation of metal compounds, such batch of products shall be rejected.

b) If there is difference between the macrostructure flow line and standard sample, or if the vortex flow and across flow are unqualified, the supplier is allowed to take another double number of samples for reinspection; if the reinspection is qualified, then such batch of forgings are qualified. If any sample is unqualified in the reinspection, then such batch shall be judged to be unqualified.

5.5.6 When the fractograph of any specimen is unqualified, then such batch (melting-number) shall be judged to be unqualified.

5.5.7 When the ultrasonic flaw detection of any forging is unqualified, then such piece of forging shall be judged to be unqualified.

5.5.8 When the appearance quality of any forging is unqualified, then such piece of forging shall be judged to be unqualified.

6 Marking, Package, Transportation, Storage and Quality Certificate

6.1 Marking

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