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

GB/T 13820-2018

Replacing GB/T 13820-1992

Magnesium alloy castings

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Table of Contents

1	Scope
2	Normative References
3	Casting Classification...
4	Technical Requirements...
4.4	Geometrical Shape, Dimension and Weight Tolerance
4.5	Appearance Quality
5	Test Methods...
5.4	Appearance Quality
6	Inspection Rules
6.4.2	Mechanical properties
7	Marking, Packaging, Transportation and Storage

Foreword

This Standard is drafted in accordance with stipulations in GB/T 1.1-2009. This Standard serves as a replacement of GB/T 13820-1992 Magnesium Alloy Castings. In comparison with GB/T 13820-1992, there are several main technical changes as follows:

- The location of taking test pieces from castings is modified (please refer to 6.3.2.1; 6.3.1 in Version 1992);
- The requirements of mechanical properties of partial alloy body or attached casting sample are added (please refer to 4.3.1);
- The requirements of inclusion test of casting flux are added (please refer to 4.5.3);
- It is also added that segregation inhomogeneity that exists in the form of lines, streamlines and dots is allowed on the surface of magnesium alloy castings that contain zirconium (please refer to 4.5.8);
- The test methods of chemical composition of castings are modified (please refer to 5.1; 5.1 in Version 1992);
- The stipulations of batch are modified (please refer to 6.1; 6.1 in Version 1992);
- The test items of various castings are added (please refer to 6.2);

---Determination and re-inspection are added (please refer to 6.4);

---The requirements of re-sampling for analysis when alloys are unqualified in chemical composition are modified (please refer to 5.1.2;

6.2.4 in Version 1992);

1 Scope

GB/T 13820-2018 is the Chinese national standard for magnesium alloy castings produced by sand casting and metal mould casting. It fixes the classification of the castings, the technical requirements, the test methods, the inspection rules and the marking, packaging, transport and storage. Castings are sorted into classes by the severity of service, and for each class the standard sets what has to be verified: chemical composition, mechanical properties measured on separately cast or attached test bars, internal soundness, surface condition and dimensional conformity. This third edition replaces GB/T 13820-1992 and changes the substance in several places - it moves where the test piece is taken from the casting, adds mechanical property requirements for the alloy body and for attached cast samples, adds an inclusion test for the casting flux, allows the line, streamline and dot segregation that appears on zirconium-bearing magnesium castings, revises the chemical analysis methods and the definition of a batch, adds the test items per casting class together with determination and re-inspection, and deletes the routine inspection of the 1992 edition. Annex A shows how internal defects are read on an X-ray film.

This Standard specifies the classification, technical requirements, test methods, inspection rules, marking, packaging, transportation and storage of magnesium alloy castings (hereinafter referred to as "castings"). This Standard is applicable to magnesium alloy castings that are manufactured with sand casting and metal casting.

2 Normative References

The following documents are indispensable to the application of this Standard. In terms of references with a specified date, only versions with a specified date are applicable to this Standard. The latest version (including all the modifications) of references without a specified date is also applicable to this Standard.

GB/T 228.1 Metallic Materials - Tensile Testing - Part 1. Method of Test at Room Temperature

GB/T 1177-2018 Casting Magnesium Alloys

GB/T 6414 Castings - Dimensional Tolerances and Geometrical Tolerances and Machining Allowances

GB/T 11351 Mass Tolerances of Casting

GB/T 13748.1 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Part 1. Determination of Aluminum Content

GB/T 13748.4 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Part 4. Determination of Manganese Content - Periodate Spectrophotometric Method

GB/T 13748.6 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Determination of Silver Content - Determination of Silver Content - Flame Atomic Absorption Spectrophotometric Method

GB/T 13748.7 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Part 7. Determination of Zirconium Content

GB/T 13748.8 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Part 8. Determination of Rare Earth Content - Gravimetric Method

GB/T 13748.9 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Part 9. Determination of Iron Content - O-phenanthroline Spectrophotometric Method

GB/T 13748.10 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Part 9. Determination of Silicon Content - Molybdenum Blue Spectrophotometric Method

GB/T 13748.11 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Determination of Beryllium Content - Solochrome Cyanine R Spectrophotometric Method

GB/T 13748.12 Chemical Analysis Methods of Magnesium and Magnesium Alloys - Part 12. Determination of Copper Content

4.4 Geometrical Shape, Dimension and Weight Tolerance

4.4.1 The geometrical shape and dimension of castings shall comply with the requirement of drawings; the dimensional tolerance of castings shall comply with the stipulation in

GB/T 6414. When there are special requirements, they shall be indicated on the drawings.

4.4.2 When the demand side has requirements towards the weight of castings, the demand side shall negotiate and determine with the supply side.

4.5 Appearance Quality

4.5.1 Castings shall be cleaned up; there shall be no trimming or burr, sprue and riser head on the non-processing surface shall be cleaned up and maintain on the same level as the casting surface. Generally speaking, residue on the sprue and riser head on the surface to be processed shall not be 5 mm higher than the casting surface or affect X-radiographic inspection. Under special circumstances, this shall be negotiated and determined by the demand side and the supply side.

4.5.2 On the surface of castings, cold partition, crack, shrinkage cavity and penetrating

defects, and severe defective defects (such as defective casting and mechanical damage, etc.) are not allowed.

4.5.3 The variety and quantity of flux inclusion test that are displayed in constant- humidity cabinet shall be indicated by the demand side on drawings or technical agreements. In terms of castings that need to display flux inclusion test in the constant- humidity cabinet, the quantity and size of flux inclusions on all the surfaces before cleaning shall not exceed what is stipulated in HB 7738.

4.5.4 On the to-be-processed surface of castings, any defects that will not exceed the range of machining allowances through processing are allowed.

4.5.5 Parts that work as processing benchmarks on the castings shall be flat and smooth.

4.5.6 After cleaning, holes that exist on the non-processing surface and processed surface of the castings shall comply with the stipulation in Table 3. Defects on the surface of the castings shall not exceed the following range.

a) After oxidation treatment, scattered and dotted surface holes whose diameter is not more than

1.5 mm and whose depth is not more than 1 mm are allowed on the non-processing surface of the castings; scattered and dotted surface holes whose diameter is not more than 1 mm and whose depth is not more than

0.5 mm are allowed on the processed surface of the castings. drawings or technical agreements. In terms of castings with easily variable dimensions, they shall be tested one by one. The dimensions that must be tested shall be negotiated and determined by the demand side and the supply side. Dimensions that cannot be tested shall comply with the stipulation on drawings or technical agreements.

5.3.2 When the drawings have requirements towards the weight, weight and weight tolerance shall comply with the stipulation on drawings or technical agreements during acceptance check. If it is not clearly stipulated, the weight tolerance of castings shall comply with the stipulation in GB/T 11351.

5.4 Appearance Quality

5.4.1 Appearance quality can be tested through visual inspection, or with certain tools, instruments or appropriate methods.

5.4.2 When fluorescence detection or Kerosene infiltration inspection is needed on castings, comply with the stipulation in HB/Z 61.

5.4.3 The roughness level of the non-processing surface of castings shall comply with the stipulation in GB/T 15056.

5.5 Internal Quality The X-radiographic detection of castings shall comply with the