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

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Aluminium alloy ingots for casting

铸造铝合金锭

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1 Scope

China's national standard for aluminium alloy ingots for casting. These ingots are the feedstock of every foundry making aluminium castings - engine blocks and cylinder heads, transmission housings, wheels, structural die castings - and the alloy is what determines whether a casting can be made at all. Casting alloys are not the same family as wrought alloys, and the difference is silicon: seven to twelve per cent silicon gives the melt the fluidity to fill a thin section and reduces the shrinkage that would otherwise tear the casting as it solidifies, and no wrought alloy contains anything like it. Copper and magnesium are added for strength and for response to heat treatment. The impurity that governs quality is iron, because it forms brittle needle-shaped phases that cut a casting's ductility - and it accumulates from recycled metal and from steel tooling, so it can only be diluted, never removed. The standard specifies the requirements, test methods, inspection rules, marking, packaging, transport, storage, quality certificate and order contents.

This Standard specifies the requirements, test methods, inspection rules, marking, packaging, transportation, storage, quality certificate and order (or contract) content of aluminum alloy ingots for casting. This Standard is applicable to aluminum alloy ingots for aluminum alloy castings (hereinafter referred to as ingot castings).

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 3246.1 Inspection Method for Structure of Wrought Aluminum and Aluminum Alloy Products - Part

3 Terms and Definitions

The terms and definitions in GB/T 8005.1 and GB/T 26492.1 are applicable to this Standard.

4.1 Ingot Casting Nameplate

4.1.1 Ingot casting nameplate shall be represented in the form of 3 digits +

1 English letter + decimal point + 1 digit, which is illustrated below.

4.1.2 The first digit in nameplate represents the group code of ingot casting. The group of ingot casting shall be determined by the main alloy elements. The specific requirements shall comply with the stipulation in Table 1 below.

4.1.3 The second and third digits in the nameplate is the sequence number of ingot casting. It is adopted to identify different ingot castings in the same group.

4.1.4 The English letter in front of the decimal point and the digit behind the decimal point are type identification code. They are adopted to identify different types of the same ingot castings whose chemical composition is approximately the same.

4.2 Chemical Composition

4.2.1 The chemical composition of ingot casting shall comply with the stipulation in Table 2.

4.2.2 In Table 2, if the content has an upper and lower limit, it is alloy element; if the content is a single numerical value, it is the highest limit; "

---" refers to unstipulated specific value;

4.2.3 Ingot castings for the food and hygiene industry shall control. ; ingot castings for the electrical and electronic equipment industry shall control.

4.3 Mechanical Properties under Room Temperature Tensile When the demand side has certain requirements towards the mechanical properties of ingot castings under room temperature tensile, the content shall be negotiated and determined by the demand side

and the supply side and indicated in the order sheet (or contract).

4.5 Fracture Organization The fracture organization of ingot castings shall be compact; there shall be no slag or slag inclusions.

4.6 Amount of Slag When the demand side has certain requirements towards the amount of slag in ingot castings, the content shall be negotiated and determined by the demand side and the supply side. Then, the specific grade shall be indicated in the order sheet (or contract). The amount of slag in ingot castings shall not be greater than Grade-2.

4.7 Microstructure When the demand side has certain requirements towards the microstructure of ingot castings, the content shall be negotiated and determined by the demand side and the supply side and indicated in the order sheet (or contract).

5.1 Chemical Composition

5.1.1 The method of analyzing chemical composition shall comply with the stipulation in GB/T 20975 or GB/T 7999. The arbitration analysis shall adopt the method stipulated in GB/T 20975.

5.1.4 In the calculation of "A1" content, the summation of the analytical numerical value of conventional analytical elements and unconventional analytical elements which doubtfully exceed the limit value shall be adopted as "total element content".

5.2 Mechanical Properties under Room Temperature Tensile The test of mechanical properties under room temperature tensile shall comply with the stipulation in GB/T 16865.

5.3 Degree of Pinhole At 1/4 ingot length on the opposite of the sprue, saw a test piece whose thickness is 25 mm ~ 30 mm for the test of pinhole degree. Process the fracture surface till the surface roughness Ra is not more than 1.6 μm . Use gasoline, ethyl alcohol or acetone to clean it.

5.4 Fracture Organization At 1/4 ingot length on the opposite of the sprue, start sawing from the bottom, till it reaches an area of not more than 1/3 ingot thickness. Break the ingot casting and obtain the test piece. Fracture organization shall receive visual inspection.

5.6 Microstructure The test of microstructure shall comply with the stipulation in GB/T 3246.1.

5.7 Appearance Quality Appearance quality shall receive visual inspection.

6.1 Inspection and Acceptance Check

6.1.1 Ingot casting shall be inspected by the supply side's technical department. It shall be guaranteed that product quality complies with this Standard and the stipulation in the order sheet (or contract).

6.2 Group Batch Ingot castings shall be submitted for inspection in batches. Each batch

shall be constituted of ingot castings of the same nameplate and the same smelting number.

6.3 Weight Ingot castings shall be weighted by "jin" [Translator note. 1/2 kilogram].

6.4 Inspection Items

6.4.1 Each batch of products shall receive the test of chemical composition and appearance quality.

6.5 Sampling The sampling of ingot castings shall comply with the stipulation in Table 4.

6.6 Determination of Inspection Result

6.6.1 When any test piece is unqualified in the inspection of chemical composition, this batch of products shall be deemed as unqualified.

6.6.2 When any test piece is unqualified in the inspection of mechanical properties under room temperature tensile, take a double number of test pieces and re-inspect.

6.6.3 When any test piece is unqualified in the inspection of degree of pinhole, take a double number of test pieces and re-inspect. If the inspection result is completely qualified, this batch of products shall be deemed as qualified; if it is still unqualified, then, this batch of products shall be deemed as unqualified.

7 Marking, Packaging, Transportation, Storage and Quality Certificate

7.1 Marking On the surface of ingot casting, manufacturer's logo, nameplate and smelting number shall be clearly marked.

7.2 Packaging, Transportation and Storage

7.2.1 Stacking shall be orderly.

7.2.4 The steel strip used for bundling shall receive anti-rust treatment on the surface and be selected in accordance with relevant model numbers in GB/T 25820.

7.2.5 Ingot casting shall be stacked, stored and transported in accordance with the nameplate; different nameplates of ingot castings shall not be stacked together.

7.3 Quality Certificate Each batch of ingot castings shall be attached with a quality certificate that complies with the requirement in this Standard. It shall indicate.