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Methods for sampling for analyzing the chemical composition of wrought aluminum and aluminum alloys

变形铝及铝合金 化学成分分析取样方法

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Methods for sampling for analyzing the chemical composition of wrought aluminum and aluminum alloys

1 Scope

This Standard specifies terms and definitions of sampling methods for chemical composition analysis of wrought aluminum and aluminum alloys, reagents, main tools and equipment, sample selection, specimen preparation, storage and resampling.

This Standard applies to the preparation method of specimens for chemical composition analysis of deformed aluminum and aluminum alloy products and semi-finished products. The preparation of specimens for chemical composition analysis of cast aluminum alloy ingots, aluminum master alloys, other metal and alloy products or semi-finished products may also refer to the methods specified in this Standard.

2 Normative references

The following referenced documents are indispensable for the application 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 aluminium and aluminium alloys - Chemical composition limits*

GB/T 8005.1, *Aluminium and aluminium alloy terms and definitions - Part 1: Product and method of processing and treatment*

GB/T 8005.2, *Terms of aluminium and aluminium alloys - Part 2: Chemical analysis*

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 8005.1 and GB/T 8005.2 apply.

4 Reagents

4.1 Acetone (ρ 0.79g/L).

4.2 Anhydrous ethanol (ρ 0.79g/L).

5 Main tools and equipment

5.1 Sampling spoon: The surface is firmly attached, uniform and complete, clean (no metal residues and other contaminants), dry and heat-resistant (during the sampling process, the film will not fall off due to high temperature) coating. Enough to hold the molten metal required to pour a sample.

5.2 Sampling mold: It is made of steel or cast iron. There is no pores, rust and residue on the surface of the inner cavity. The surface of the inner cavity shall be passivated after sandblasting. The shape of the inner cavity shall be a casting sample with a smooth and uniform surface and a size that meets the requirements of the chemical composition analysis method.

5.3 Sample preparation equipment: Clean drills, lathes, milling machines, tools, etc. Cemented carbide tools shall be used to prepare samples. If steel tools are used, iron adhering to them shall be removed before sample preparation.

6 Sample selection

6.1 Sampling during casting (or casting-rolling)

6.1.1 When casting (or casting-rolling) is stable, use the sampling scoop (5.1) or a skimming tool to push away any scum in the sampling area in the launder. Immediately insert the sampling spoon (5.1) diagonally into the cleaning area below the liquid level of the launder. Quickly stir. When the sampling scoop (5.1) reaches the melt temperature, scoop and retract the sample. The molten metal scooped by the sampling scoop (5.1) shall not come into contact with solid metal, slag, moisture, iron or dust.

6.1.2 Immediately pour the molten metal scooped by the sampling spoon (5.1) into the heated sampling mold (5.2) at a uniform and gentle flow rate. Use molten metal to drive out all the air in the sampling mold (5.2) until the molten metal fills the gate. When injecting molten metal, the sampling die (5.2) shall not be inclined to prevent the molten metal from overflowing the injection port.

NOTE: The sampling mould shall preferably be heated by pre-casting a sample (not the test sample) in the sampling mould.

6.1.3 After the molten metal in the sampling mold (5.2) has slowly solidified without stirring, open the sampling mold (5.2) to take out the sample. The surface of the sample shall have no shrinkage cavities, no inclusions, no slag inclusions, no cracks, and the surface is not rough.

6.1.4 At least one sample is drawn per melt. For continuous casting, at least one sample shall be taken per shift.

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