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Nickel alloys — Determination of Nickel content — Inductively coupled plasma atomic emission spectrometric method

Alliages de nickel — Détermination du nickel — Méthode par spectrométrie d'émission atomique avec source à plasma induit par haute fréquence

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Foreword

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 155, *Nickel and nickel alloys*.

Nickel alloys — Determination of Nickel content — Inductively coupled plasma atomic emission spectrometric method

1 Scope

This Technical Specification describes an inductively coupled plasma atomic emission spectrometric method for the determination of nickel content (mass fraction) between 20,0 % and 80,0 % in nickel alloys.

Besides alloys where nickel is the main component regarding its content level, this method may also apply to alloys in which nickel has a content as high as several other elements (Fe, Cr, Co,...) and in which the “main element” cannot be specified.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 648, *Laboratory glassware — Single-volume pipettes*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Principle

Dissolution of a test portion in a mixture of hydrofluoric, hydrochloric, nitric and phosphoric acid, and fuming after addition of perchloric acid.

If necessary, addition of extra hydrofluoric acid and, if desired, addition of an internal reference element (scandium recommended).

Dilution of the test solution to a known volume. Nebulisation of this solution into an inductively coupled plasma atomic emission spectrometer and measurement of the intensity of the emitted light (including, where appropriate, that of the internal reference element).

The method uses a calibration based on a very close matrix matching of the calibration solutions to the sample composition and a bracketing of the mass fractions between ±2 % of the approximate content of nickel in the sample to be analysed.

The content of all elements in the sample has, therefore, to be approximately known. If the composition is not known, the sample shall be analysed by some semi quantitative method.

The advantage with this procedure is that all possible matrix interferences will be minimized which will result in a higher trueness. This is important for spectral interferences which can be severe in very highly alloyed matrixes. All possible interferences shall be kept at a minimum level. Therefore, it is essential that the spectrometer used meets the performance criteria recommended for the selected analytical lines.

The wavelengths reported in Table 1 have been investigated and the strongest possible interferences are given. If other wavelengths are used, they shall be carefully checked. The wavelength for the internal reference element should be selected carefully. The use of scandium at 363,07 nm is recommended. This line is interference-free for the elements and contents generally found in nickel alloys.

