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

GB/T 42513.7-2024

**Methods for chemical analysis of nickel alloys - Part 7:
Determination of cobalt, chromium, copper, iron and
manganese contents - Flame atomic absorption spectrometry**

镍合金化学分析方法 第7部分：钴、铬、铜、铁和锰含量的测定 火焰原子吸收光谱法

(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting:

This document is part 7 of GB/T 42513 "Chemical analysis methods for nickel alloys": GB/T 42513 has been published in the following parts:

--- Part 1: Determination of chromium content by ammonium ferrous sulfate potentiometric titration method;

--- Part 2: Determination of phosphorus content-Molybdenum blue spectrophotometric method;

--- Part 3: Determination of aluminum content by nitrous oxide-flame atomic absorption spectrometry and inductively coupled plasma atomic emission spectrometry Spectrum;

--- Part 4: Determination of silicon content by nitrous oxide-flame atomic absorption spectrometry and molybdenum blue spectrophotometry;

--- Part 5: Determination of vanadium content by nitrous oxide-flame atomic absorption spectrometry and inductively coupled plasma atomic emission spectrometry Spectrum;

--- Part 6: Determination of molybdenum content - Inductively coupled plasma atomic emission spectrometry;

--- Part 7: Determination of cobalt, chromium, copper, iron and manganese content: Flame atomic absorption spectrometry:

This document is modified to adopt ISO 7530-1:2015 Nickel alloys - Flame atomic absorption spectrometry - Part 1: Determination of cobalt, chromium, copper, iron and manganese content Determination of Quantity:

Compared with ISO 7530-1:2015, this document has many structural adjustments: The structural number comparison table between the two documents is attached:

Record A:

This document has many technical differences compared to ISO 7530-1:2015:

A list of these technical differences and their reasons is given in Appendix B:

The following editorial changes were made to this document:

--- In order to coordinate with the existing standards, the name of the standard is changed to "Chemical Analysis Methods for Nickel Alloys Part 7: Cobalt, chromium, copper, iron and manganese contents Determination of Flame Atomic Absorption Spectrometry";

---4.5.4.1 Add a note on sample dissolution in Sample Dissolution;

--- Added Appendix A (informative) "Comparison table of structure numbers between this document and ISO 11435:2011";

--- Added Appendix B (informative) "Technical differences between this document and ISO 11435:2011 and their causes";

--- Added Appendix D (informative) "Test sample information";

--- Added Appendix E (informative) "Statistical data on precision of method 1";

--- Added Appendix F (informative) "Original data of method 2 verification test";

--- Added Appendix G (informative) "Statistical data on precision of inductively coupled plasma atomic emission spectrometry";

Introduction

Nickel alloys are commonly used in instruments, electronic communications, pressure vessels, corrosion-resistant devices, aerospace and high-end special-purpose it is one of the important metal raw materials for industrial development: International standards for chemical analysis methods of nickel alloys have been published for dozens of years:

In:2008, with the progress of my country's industry, the demand for the production and import and export of high-end nickel alloy materials increased: To this end, the international standards were converted into national standards:

GB/T 42513 "Chemical Analysis Methods for Nickel Alloys" is a standard for the development and upgrading of the non-ferrous industry and the development of the domestic manufacturing industry:

In establishing a complete and feasible set of standard methods for testing chromium, phosphorus, niobium, molybdenum, aluminum, vanadium, silicon, cobalt, copper and other elements in nickel alloys, the conversion the following international standards:

---ISO 7592:2017 Nickel alloys - Determination of chromium content - Ammonium ferrous sulfate potentiometric titration method;

- ISO 9388:1992 Nickel alloys - Determination of phosphorus content - Molybdenum blue spectrophotometric method;
- ISO 7530-7:1992 Nickel alloys - Flame atomic absorption spectrometric analysis - Part 7: Determination of aluminium content;
- ISO 7530-8:1992 Nickel alloys - Flame atomic absorption spectrometric analysis - Part 8: Determination of silicon content;
- ISO 7530-9:1993 Nickel alloys - Flame atomic absorption spectrometric analysis - Part 9: Determination of vanadium content;
- ISO 11435:2011 Nickel alloys - Determination of molybdenum content - Inductively coupled plasma atomic emission spectrometry;
- ISO 7530-1:2015 Nickel alloys - Flame atomic absorption spectrometric analysis - Part 1: Determination of cobalt, chromium, copper, iron and manganese contents Determination;
- ISO 22033:2011 Nickel alloys - Determination of niobium content - Inductively coupled plasma atomic emission spectrometry;
- ISO 11436:1993 Nickel and nickel alloys - Determination of total boron content - Curcumin spectrophotometric method;
- ISO 23166:2018 Nickel alloys - Determination of tantalum content - Inductively coupled plasma atomic emission spectrometry;

GB/T 42513 is proposed to consist of 13 parts:

- Part 1: Determination of chromium content by ammonium ferrous sulfate potentiometric titration method;
- Part 2: Determination of phosphorus content-Molybdenum blue spectrophotometric method;
- Part 3: Determination of aluminum content by nitrous oxide-flame atomic absorption spectrometry and inductively coupled plasma atomic emission spectrometry Spectrum;
- Part 4: Determination of silicon content by nitrous oxide-flame atomic absorption spectrometry and molybdenum blue spectrophotometry;
- Part 5: Determination of vanadium content by nitrous oxide-flame atomic absorption spectrometry and inductively coupled plasma atomic emission spectrometry Spectrum;
- Part 6: Determination of molybdenum content - Inductively coupled plasma atomic emission spectrometry;
- Part 7: Determination of cobalt, chromium, copper, iron and manganese content by flame atomic absorption spectrometry;

- Part 8: Determination of niobium content by inductively coupled plasma atomic emission spectrometry;
- Part 9: Determination of total boron content Curcumin spectrophotometric method;
- Part 10: Determination of trace element content by glow discharge mass spectrometry;
- Part 11: Determination of silicon, manganese, phosphorus, chromium, nickel, copper, molybdenum, cobalt, iron, aluminum, vanadium, titanium, tungsten and niobium contents by X-ray fluorescence Spectrum;
- Part 12: Determination of tantalum content by inductively coupled plasma atomic emission spectrometry;
- Part 13: Determination of oxygen, nitrogen and hydrogen content - Inert gas fusion - thermal conductivity method/infrared absorption method:

GB/T 42513.7 will fill the gap in the national standard for the determination of cobalt, chromium, copper, iron and manganese content in nickel alloys in my country, and promote the development of nickel alloys in my country:

The advancement of alloy testing technology ensures that industry practitioners have standards to follow during production, application, scientific research and testing:

Chemical analysis methods for nickel alloys Part 7: Determination of cobalt, chromium, copper, iron and manganese contents Flame Atomic Absorption Spectrometry
Warning---People who use this document need to have practical experience in formal laboratory work: This document does not address all possible safety issues:

The user is responsible for taking appropriate safety and health measures and ensuring that the conditions stipulated by relevant national laws and regulations are met:

1 Scope

This document describes a method for the determination of cobalt, chromium, copper, iron and manganese in nickel alloys by flame atomic absorption spectrometry:

This document applies to the determination of cobalt, chromium, copper, iron and manganese content in nickel alloys: Method 1 Determination range of cobalt, copper, iron and manganese content (quality the determination range of chromium content in method 2 (mass fraction) is 0.01%~4.00%; the determination range of chromium content in method 2 (mass fraction) is 0.01%~4%:

The determination can also be carried out according to the method in Appendix C: