



**International
Standard**

ISO 9441

**Steel — Determination
of niobium content —
4-(2-Pyridylazo)-resorcinol (PAR)
spectrophotometric method**

*Aciers — Détermination de la teneur en niobium — Méthode
spectrophotométrique au moyen de 4-(2-Pyridylazo)-résorcinol
(PAR)*

**Second edition
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*.

This second edition cancels and replaces the first edition (ISO 9441:1988), which has been technically revised.

The main changes are as follows:

- the normative references have been revised;
- the precision data has been updated;
- the text has been improved editorially.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Steel — Determination of niobium content — 4-(2-Pyridylazo)-resorcinol (PAR) spectrophotometric method

1 Scope

This document specifies a spectrophotometric method by using 4-(2-pyridylazo)-resorcinol (PAR) for the determination of niobium in steel. The method is applicable to all types of steel with niobium contents between 0,005 % (mass fraction) and 1,3 % (mass fraction).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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*

ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle

Dissolution of a test portion in hydrochloric acid followed by oxidation with hydrogen peroxide.

Precipitation of niobium and tantalum with phenylarsonic acid, using zirconium as a carrier.

Formation of a complex of niobium with 4-(2-pyridylazo)-resorcinol (PAR) in a sodium tartrate medium buffered by a sodium acetate solution adjusted to pH 6,3.

Spectrophotometric measurement of the coloured complex at a wavelength of about 550 nm.

5 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or grade 2 water as specified in ISO 3696.

5.1 Pure iron, in flake or powder form, with a niobium content less than 0,000 5 % (mass fraction).