



**International
Standard**

ISO 18724

**Water quality — Determination of
dissolved chromium(VI) in water —
Photometric method**

*Qualité de l'eau — Détermination du chrome dissous(VI) dans
l'eau — Méthode photométrique*

**First edition
2025-10**

Document Preview
(<https://standards.iteh.ai>)

ISO 18724:2025

<https://standards.iteh.ai/catalog/standards/iso/7516eeee-2786-494d-907d-72ab790dd3d6/iso-18724-2025>

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

ISO 18724:2025

<https://standards.itih.ai/catalog/standards/iso/7516eeee-2786-494d-907d-72ab790dd3d6/iso-18724-2025>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Interferences	1
4.1 General	1
4.2 Sampling, preservation and storage	2
4.3 Interferences in photometry	2
5 Principle	2
6 Reagents	3
7 Apparatus	6
8 Sampling, sample pretreatment and sample storage	6
8.1 Sampling	6
8.2 Samples with reducing or oxidizing substances	6
8.3 Consideration of the self-absorption of coloured samples	7
8.4 Sample storage	7
9 Procedure	7
9.1 General	7
9.2 Required concentrations of reagents in the reaction vessel	7
9.3 Required concentrations of reagents in the reaction vessel for measuring the intrinsic absorption	8
9.4 Measurement	8
9.5 Calibration	8
9.6 Measurement of chromium(VI)	8
9.7 Validity check of the calibration function	8
9.8 Calculation considering the ordinate intercept	9
9.9 Calculation with zero adjustment of the photometer	9
10 Expression of results	9
11 Test report	10
Annex A (normative) Manual static technique	11
Annex B (normative) Automated static techniques	13
Annex C (normative) Automated dynamic techniques	15
Annex D (normative) Calculations for adjusting reagent concentrations, volumes and flows	22
Annex E (informative) Performance data	25
Bibliography	28

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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 230, *Water analysis*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition of ISO 18724:2025 cancels and replaces ISO 11083:1994, ISO 18412:2005 and ISO 23913:2006.

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.

Introduction

Chromium is an important raw material in the industrial manufacturing process that can contaminate sources of drinking water (e.g. groundwater, surface water). The most common oxidation states of chromium are +3 and +6. The hexavalent form (Cr(VI)) is far more toxic and water-polluting than the trivalent form (Cr(III)).

The chromium content depends on several factors: the availability of chromium in the rock, the weathering stage and the vicinity. Chromium(VI) occurs mainly in the aerobic environment; under reducing or anaerobic conditions, chromium(VI) is reduced to chromium(III).

Chromium(VI) occurs naturally in groundwater aquifers, mostly in low concentrations depending on the occurrence in geological formations, e.g. volcanic rocks.

Other sources of chromium(VI) contamination for the environment are industrial activities, e.g. the production of textiles, leather tanning or electroplating.

A sensitive and specific photometric method for the determination of hexavalent chromium is the reaction with 1,5-diphenylcarbazide (DPC). Most of the standardized procedures are based on DPC chemistry, specifying different reaction conditions.

This procedure describes a uniform procedure that can be used for different photometric measuring devices, such as static or dynamic techniques. The available techniques vary in sensitivity. The choice of the technique used for the measurement depends on the chromium(VI) concentration expected in the sample.

The choice of the analytical technique to be used and the needs-based sample preparation (e.g. matrix elimination) enables the determination of chromium(VI) in concentrations $\geq 0,02 \mu\text{g/l}$ in raw water, drinking water, surface water, aqueous eluates, cooling water and treated wastewater, provided that the matrix does not contain any reducing substances. Typical areas of application for the static techniques as well as FIA and CFA are samples with chromium(VI) concentrations $\geq 2 \mu\text{g/l}$. When using cuvettes with large optical path lengths, for example $> 100 \text{ mm}$, the range of application can be extended to concentrations $< 2 \mu\text{g/l}$ chromium(VI) (see [Annex A](#), [Annex B](#), [Clause C.2](#) and [Clause C.3](#)). When using coupled techniques [e.g. ion chromatography with post-column reaction (IC-PCR)], chromium(VI) concentrations $\geq 0,02 \mu\text{g/l}$ can be determined (see [Clause C.4](#)).

ISO 18724:2025

<https://standards.iteh.ai/catalog/standards/iso/7516eccc-2786-494d-907d-72ab790dd3d6/iso-18724-2025>