



ISO 23500-1

**Preparation and quality
management of fluids for
haemodialysis and related
therapies —**

**Part 1:
General requirements**

*Préparation et management de la qualité des liquides
d'hémodialyse et de thérapies annexes —*

Partie 1: Exigences générales

**Second edition
2024-08**

This is a preview of ISO 23500-1:2024. [Click here to purchase the full version from the ANSI store.](#)



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Published in Switzerland

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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 150, *Implants for surgery*, Subcommittee SC 2, *Cardiovascular implants and extracorporeal systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 205, *Non-active medical devices*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 23500-1:2019), which has been technically revised.

The main changes are as follows:

- WHO Drinking Water Guideline has been used as the main drinking water quality reference instead of the US EPA or other European standards;
- thallium has been removed from the list of contaminants, as no studies have reported data to indicate that this contaminant is of particular concern in the haemodialysis setting;
- alternative water treatment technologies (e.g. reverse osmosis pre-treatment with ultrafiltration) have been included in the subclauses dealing with water treatment technology (refer to [B.2.7](#) and [B.2.8](#));
- a new annex ([Annex H](#)) has been added to provide clarification of the different water quality monitoring approaches (online versus offline monitoring);
- the microbiological analytic methods have been updated to include endotoxin testing using recombinant Factor C (rFC), flow cytometry, autofluorescence and rapid tests (e.g. ATP);
- a new annex ([Annex I](#)) has been added to provide guidance on risk assessment;
- the validation of water treatment systems has been revised to include validation steps (e.g. installation qualification, operational qualification, performance qualification and revalidation);
- further guidance has been added on technical needs after the typical technical interventions in [Clause E.4](#).

A list of all parts in the ISO 23500 series can be found on the ISO website.

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This document is the base standard for standards dealing with water treatment and the production of dialysis fluid in the ISO 23500 series.

The objective of the ISO 23500 series is to provide users with guidance for handling water and concentrates and for the production and quality oversight of dialysis fluid used for haemodialysis. The need for such guidance is based on the critical role of dialysis fluid quality in providing safe and effective haemodialysis, and the recognition that day-to-day dialysis fluid quality is under the control of the healthcare professionals who deliver dialysis therapy.

[Annex A](#) provides further information on the rationale for the development and provisions of this document.

The equipment used in the various stages of dialysis fluid preparation is generally obtained from specialized vendors. Dialysis practitioners are generally responsible for maintaining that equipment following its installation. Therefore, this document provides guidance on quality oversight and maintenance of the equipment to ensure that dialysis fluid quality is acceptable at all times. At various places in this document, the user is advised to follow the manufacturer's instructions regarding the operation and maintenance of equipment. In instances in which the equipment is not obtained from a specialized vendor, it is the responsibility of the user to validate the performance of the equipment in the haemodialysis setting and to ensure that appropriate operating and maintenance manuals are available.

[Annex B](#) provides further information on the system components that are used for water treatment, concentrate and dialysis fluid preparation at a dialysis facility. These descriptions are intended to provide the user with a basis for understanding why certain equipment can be required and how it should be configured; the descriptions are not intended to be detailed design standards. Requirements for water treatment equipment are provided in ISO 23500-2.

Increasingly, self-contained, integrated systems designed and validated to produce water and dialysis fluid are becoming available and used clinically. This document applies to systems assembled from individual components. Consequently, some of the requirements in ISO 23500-1 and ISO 23500-2 do not apply to integrated systems, however such systems are required to comply with the requirements of ISO 23500-3, ISO 23500-4 and ISO 23500-5. In order to ensure conformity when using such systems, adherence to the manufacturer's instructions regarding the operation, testing and maintenance of such systems is required to ensure that the system is being operated under the validated conditions.

This document reflects the conscientious efforts of healthcare professionals, patients and medical device manufacturers to develop recommendations for handling water and concentrates and for the production and surveillance of dialysis fluid for haemodialysis and protecting haemodialysis patients from adverse effects arising from known chemical and microbial contaminants that can be found in improperly prepared dialysis fluid.

[Annexes F](#) and [G](#) provide further information regarding the special considerations for home and acute haemodialysis. This document together with its constituent parts is directed towards the healthcare professionals involved in the management or routine care of haemodialysis patients and responsible for the quality of dialysis fluid. However, the physician in charge of dialysis has the ultimate responsibility for ensuring that the dialysis fluid is correctly formulated and meets the requirements of all applicable quality standards.