
**Guidelines for performance evaluation
of treatment technologies for water
reuse systems —**

**Part 5:
Membrane filtration**

*Lignes directrices pour l'évaluation des performances des techniques
de traitement des systèmes de réutilisation de l'eau —*

Partie 5: Filtration sur membrane



This document is a preview generated by EKO



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

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, definitions, and abbreviated terms	1
3.1 Terms and definitions.....	1
3.2 List of abbreviated terms.....	4
4 Concepts of membrane filtration technology for water reuse	5
4.1 General.....	5
4.2 Membrane type and treatment objectives.....	5
4.3 Filtration unit process.....	6
4.4 Membrane filtration process design and pre- and post-shipment tests.....	7
5 Principles and general guidelines for performance evaluation	7
5.1 General.....	7
5.2 Functional requirements for membrane filtration process.....	7
5.3 Non-functional requirements for membrane filtration process.....	8
6 Performance evaluation for functional requirement	8
6.1 General.....	8
6.2 Water quality based performance evaluation.....	8
6.3 Process based performance evaluation.....	9
6.4 Integrity monitoring.....	9
6.4.1 Direct Integrity Monitoring.....	9
6.4.2 Indirect integrity monitoring.....	11
7 Performance evaluation for non-functional requirements	12
7.1 General.....	12
7.2 Energy consumption.....	12
7.3 Chemical consumption.....	13
7.4 Brine water disposal or treatment.....	13
7.5 Solid waste for disposal.....	14
7.6 Life cycle cost.....	14
Annex A (informative) Examples of parameters on the specification sheet	15
Annex B (informative) Recommended frequency of data collection	17
Annex C (informative)	18
Bibliography	19

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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 282, *Water Reuse*, Subcommittee SC 3, *Risk and performance evaluation of water reuse systems*.

A list of all parts in the ISO 20468 series can be found on the ISO website.

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

Guidelines for performance evaluation of water reclamation systems are essential for municipalities, utilities and reclaimed water users to meet water quality requirements without compromising public health. ISO 20468-1, *Guidelines for performance evaluation of treatment technologies for water reuse systems* specifies fundamental requirements for the overall water reuse system, which mainly focuses on the finished water quality. When operating a water reclamation system, performance evaluations at the point of an individual water reclamation process, helps to provide early warnings to enable operator response in avoiding adverse impacts on public health, and to comply with the targets of final water quality. It is particularly important for membrane-based water reclamation processes that are often employed as the most important barriers for the removal of major constituents in wastewater (e.g. particulates, dissolved solids, and pathogens). In addition, guidelines for performance evaluation of individual treatment processes in terms of environmental and economic performances can also assist decisions on the appropriate selection of water reclamation technologies, which is of paramount importance in water reuse. This document is intended to provide stakeholders typical performance evaluation approaches designed for membrane filtration technologies. In addition, this document is expected to assist the development and operation of water reuse projects, in which process designers, plant managers, and operators are involved. Similar to ISO 20468-1, this document is mainly comprised of functional and non-functional requirements for the performance evaluation of membrane filtration technologies.

Guidelines for performance evaluation of treatment technologies for water reuse systems —

Part 5: Membrane filtration

1 Scope

This document provides guidelines for performance evaluation methods of water reclamation systems using membrane technologies. This document provides guidance in ensuring treated wastewater quality levels at the point of exit from the membrane filtration processes. It also provides potential methods for evaluating the environmental and economic performance of membrane filtration processes in water reuse. This document helps plant designers, operators and end users to effectively design and operate the membrane-based water reclamation systems.

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 20670:2018, *Water reuse — Vocabulary*

3 Terms, definitions, and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO 20670, and the following apply.

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

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

3.1 Terms and definitions

3.1.1

backwash

reverse flow of water with/without air across a membrane (i.e. from permeate side to feed side)

Note 1 to entry: It is designated to remove the deposited foreign substances (foulants) from the membrane.

3.1.2

bubble point pressure

pressure differential at which bubbles first appear on one surface of an immersed porous membrane, as pressure is applied to the other side

3.1.3

cleaning

operation during which membranes are cleaned using a membrane cleaning system with or without chemical reagents

EXAMPLE backwashing, flushing, chemical cleaning.