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

Part 1: General

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

Partie 1: Généralités

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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Foreword

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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 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).

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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 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

The rapidly growing global market for water reuse technologies inevitably demands standards which are applicable on a world-wide basis be developed. Many regions in the world are facing water shortages, and there is great interest in fit-for-purpose water reuse technologies that can treat and reclaim wastewater to a water quality level that is suitable for a wide range of reuse applications that can satisfy non-potable water demands, thereby conserving precious potable water resources. The implementation of water reuse programs raises public and regulatory concern regarding potential human health, environmental and societal impacts. This has led to an increasing need to specify various aspects of water reuse projects, and regulators, reuse technology suppliers, and users of those technologies have a growing need for international standardization. A great number of opportunities for sustainable water use and development based on water reclamation can be lost without ISO water reuse standards.

Standardization needs to include objective specification and evaluation of levels of service and water reuse system performance dependability including safety, environmental protection, resilience and cost-effectiveness considerations. Hence, appropriate methods are needed to evaluate the performance of treatment technologies for water reuse systems.

The performance of treatment technologies for water reuse, *inter alia*, should be evaluated properly in order to select the most appropriate technologies in an unbiased way to achieve the objectives of water reuse projects. Despite considerable research and development on treatment technologies, such scientific knowledge is largely held within commercial interests. Performance evaluations are also useful for assessing the efficiency of existing wastewater reclamation systems and operations, including the identification of continuous improvement opportunities. To address these challenges, this document provides methods and tools, which can be accepted by most stakeholders, to evaluate the performance of treatment technologies for water reuse systems for a multitude of applications. This document provides treatment technology functional requirements and non-functional requirements, the former based on water quality parameter concentration or removal efficiency and the latter based on performance indicators. A step-by-step procedure for evaluating the functional requirements and examples of non-functional key performance indicators and evaluation methods are provided.

This document is intended for use by planners and managers of water reuse projects, technical advisors, designers, operators of the treatment systems, those involved in monitoring, assessing, regulating and other activities of third-party organizations or relevant authorities, as well as treatment technology manufacturers.

The application of the guidelines for performance evaluation at the stages of procurement, designing and operation of treatment systems can enable, for example:

— designers to identify and evaluate an optimal treatment system design which will meet regulatory performance requirements;

— manufacturers to determine technology performance expectations;

— operators to evaluate and improve the operating efficiency and performance of water reuse treatment systems.

This document is not intended to address the design and integration of specific unit treatment processes or overall treatment system design.

This document can be useful for the application of management system standards, such as ISO 9001, ISO 14001, ISO 22301, ISO 50001, and ISO 55001.