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Guidelines for water quality grade classification for water reuse

Lignes directrices pour la classification de la qualité de l'eau en vue de sa réutilisation

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

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 reaffirmation of the importance of water along with food security and energy was a significant outcome in the actions and the follow-up framework passed at the United Nations Conference on Sustainable Development (Rio+20). With respect to the management of water resources, essential actions include the prevention of water contamination, more efficient water usage, and the treatment and best practices for reuse of wastewater as a water resource by households, industries, and agriculture, particularly in growing urban areas.

Today, many regions in the world face water shortages, and the feasibility of using reclaimed water to meet water demands for various purposes is of great interest. On the other hand, the potential health implications of using reclaimed water is of global concern. This has led to an increasing need to specify appropriate water quality parameters for specific reclaimed water applications, as well as develop methods of assessing and managing health risks from both regulatory and application perspectives. Unless these needs are addressed, opportunities for the development of sustainable and appropriate reclaimed water applications will be lost.

Health risks associated with the use of reclaimed water occur when users use the reclaimed water inappropriately without knowing its intended purpose. Therefore, it is important that the reuse application be clearly identified.

Guidelines for water quality grade classification for water reuse

1 Scope

This document provides guidelines for water quality grade classification to help users determine the suitability and quality of the reclaimed water for safe non-potable reuse applications, based on the level of exposure. The intention is to enable the water quality grade to be identified at the point of use.

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, *Water reuse — Vocabulary*

3 Terms and definitions

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 URL addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
water quality grade
grade of reclaimed water quality, indicating suitable reuse application based on the level of exposure

4 Water quality grade classification for reuse application

4.1 Water quality grade for reuse application

Water quality of reclaimed water is classified into three grades, reflecting the suitability for direct public access and/or body contact:

— High grade: water quality suitable for non-potable water reuse applications with a high potential for direct public access and/or body contact.

— Medium grade: water quality suitable for non-potable water reuse applications with a limited potential for direct public access and/or body contact.

— Fair grade: water quality suitable for non-potable water reuse applications without potential for direct public access and/or body contact.

A suitable water quality grade should be identified and determined at the discretion of the local jurisdiction, authorities, regulators, etc.

4.2 Water quality grade classification

Table 1 shows the classifications of the water quality grades for reuse application of reclaimed water.

Table 1 — Water quality grade classification for non-potable reuse application in relation to the level of treatment

Quality grade	Possible exposure	Application examples	Examples of minimum treatment requirement
High	Direct body contact — open public access — access by children — potential for unintended ingestion and inhalation	— recreational activities — equipment and vehicle washing — dust suppression in an urban environment — urban stream augmentation without downstream potable water intake — public toilet and urinal flushing — fire suppression water supply — playground irrigation — unrestricted urban irrigation — agricultural irrigation of food crops consumed raw — park and golf course surface irrigation, with unrestricted public access	Secondary treatment with filtration and disinfection
Medium	Incidental body contact (direct body contact is not advised)	— landscape water feature — landscape impoundment — industrial water applications — manufacturing process water — power facility and building cooling water — irrigation of gardens with restricted public access — restricted urban irrigation — agricultural irrigation of processed food crops — irrigation of food crops other than vegetables (orchards, vineyards) and horticulture — park and golf course surface irrigation with restricted public access — agricultural irrigation of non-food crops	Secondary treatment and disinfection

Table 1 *(continued)*

Quality grade	Possible exposure	Application examples	Examples of minimum treatment requirement
Fair	Prohibit body contact	— irrigation of seeded crops — agricultural forage crop irrigation — irrigation of industrial and energy crops — landscape irrigation without public access	Secondary treatment high rate clarification with coagulation, flocculation or stabilization ponds
NOTE 1 "Application examples" and "Examples of minimum treatment requirement" can be set in accordance with standards in each country. NOTE 2 The exposure frequency and exposure dose can be considered in relation to personal protection means and water quality grade classification for different use applications. NOTE 3 High quality grade should have adequate removal of pathogens for public health protection. NOTE 4 When "Fair grade" reclaimed water is applied for landscape irrigation, it is sometimes important to take care of the aesthetic aspects, such as odour or appearance. NOTE 5 The secondary treatment is biological oxidation. See ISO 20468-1. NOTE 6 "Treatment requirement" could be higher depending on the nature of the specific water "Application". NOTE 7 Further examples of minimum treatment requirement are available in ISO 16075-2 and ISO 20426. NOTE 8 Water quality levels of ISO 16075-2 approximately correspond to the quality grades in this document as follows: A in ISO 16075-2 = High, B&C = Medium, D&E = Fair. NOTE 9 Water quality levels of ISO 20426 approximately correspond to the quality grades in this document as follows: A in ISO 20426 = High, B&C = Medium, D = Fair.			

5 Display of water quality grades

The water quality grades should be displayed in locations where they can be seen and recognized correctly by reclaimed water users at the time of use. Table 2 to 4 show the examples of water quality grades and clear indications of the reuse applications and the related precautions.

Table 2 — Example of display of water quality grade (High grade)

Type of water	Reclaimed water
Quality grade	High
Application	Toilet flushing
Precautions	 Not drinking water

Table 3 — Example of display of water quality grade (Medium grade)

Type of water	Reclaimed water
Quality grade	Medium
Application	Landscape impoundment
Precautions	 No swimming

Table 4 — Example of display of water quality grade (Fair grade)

Type of water	Reclaimed water
Quality grade	Fair
Application	Landscape irrigation without public access
Precautions	Do not trespass

In addition to the information on the reuse application and the related precautions shown in Table 2 to Table 4, the following complementary information is beneficial, and helps users ensure proper and safe use of reclaimed water if it is displayed at the places of end use with water quality grades:

— types of source water;

— prohibited types of reuse application;

— notifications for exposed persons;

— type of treatment.

— commonly used symbols

Prohibited types of reuse application for each grade should be determined on the basis of the result of health risk assessment of reclaimed water. See ISO 20426.