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Treated wastewater reuse for irrigation — Guidelines for the adaptation of irrigation systems and practices to treated wastewater

Réutilisation des eaux usées traitées en irrigation — Lignes directrices pour l'adaptation des systèmes et pratiques d'irrigation aux eaux usées traitées

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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 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 1, *Treated wastewater reuse for irrigation*.

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.

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Introduction

Irrigation is gaining importance all over the world, and the lack of water available from surface or groundwater is driving the introduction of treated wastewater for this purpose. Accordingly, some adaptation is needed to the equipment included in the irrigation system to ensure its proper functioning.

The composition of treated wastewater (TWW) is different from that of freshwater. TWW contains more nutritional elements and microbial populations. It is also characterized by a higher salt concentration, anions and cations with a high precipitation potential of sediments of low solubility salts. These characteristics can severely disrupt the operation of the TWW irrigation systems, which can result in poor performance of the system, and potentially harmful to the environment.

Changes in water quality of reservoirs or secondary water resources can affect the water systems' efficiency, as all parts of the irrigation system, such as filters, pipes and emitters, can be adversely affected by low quality water.

The transport efficiency of irrigation equipment is dependent on the quality of the treated wastewater used, due to several factors such as:

— formation of biofilm on interior pipe walls,

— scale precipitation, organic material and fertilizers, and

— excess build-up of sediment.

Irrigation systems clogging types can be classified into three categories:

— organic and inorganic particles (minerals) sedimentation,

— chemical precipitation of low solubility salts, and

— biofouling -attachment/detachment of microorganism colonies on the irrigation system interior surface, which results in biofilm development.

This document provides guidelines on how to use TWW in or with irrigation systems and to protect them from clogging.

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Treated wastewater reuse for irrigation — Guidelines for the adaptation of irrigation systems and practices to treated wastewater

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1 Scope

This document provides guidelines to planners and practitioners on how to adjust irrigation equipment so as to allow direct utilization of treated wastewater (TWW) for irrigation. It deals with the adjustment of all components of irrigation systems to TWW quality in respect to physical, chemical and biological parameters.

This document provides guidelines on how to protect irrigation equipment so as to guarantee water systems functionality at high levels of efficiency.

This document includes recommendations for

a) pumping stations,

b) filtration,

c) water network systems,

d) irrigation equipment: emitters (drippers, sprinklers, mini sprinklers, micro sprinklers, sprayers and irrigation machine (sprinklers and sprayers),

e) physical treatment of irrigation equipment, and

f) chemical treatment of irrigation equipment.

This document defines TWW parameters at the irrigation system inlet after a wastewater treatment plant, in order to allow optimal and continual functioning of the irrigation systems and to allow uniformity of emitters' discharge.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

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