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Use of reclaimed water in industrial cooling systems —

Part 2: Guidelines for cost analysis

Utilisation de l'eau recyclée dans les systèmes de refroidissement industriels —

Partie 2: Lignes directrices relatives à l'analyse des coûts

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Contents

Page

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).

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 4, *Industrial water reuse*.

A list of all parts in the ISO 22449 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

Large amounts of water resources are used in industrial development. Industrial cooling water use accounts for a high proportion of industrial water use. Industrial water reuse is one of the promising ways to solve water shortages and to provide a new water source for cooling systems. The quality of reclaimed water is of great importance for the design and operation of industrial cooling systems. Industrial wastewater must meet the requirements of the cooling systems before it can be used as make-up water. Consequently, the primary cost consideration is related to the costs of treating industrial wastewater. In addition, for new-built cooling systems based on life-cycle consideration, the capital cost, operating cost and maintenance cost need to be considered.

This document provides a comparative cost analysis method for cooling systems using reclaimed water. It will be conducive to establishing an effective and unified cost analysis method in different countries for further cost comparison. This document is intended to lead the use of reclaimed water in industries worldwide, promoting the reuse of water resources, improving water-use efficiency and putting into practice the concept of the industrial circular economy.

Use of reclaimed water in industrial cooling systems —

Part 2:
Guidelines for cost analysis

1 Scope

This document provides guidelines for cost analysis of the use of reclaimed water in industrial cooling systems.

This document is intended for new-built industrial cooling systems using reclaimed water as make-up water, in which the reclaimed water originates from industrial wastewater and is generated through wastewater treatment systems for reuse. The source of industrial wastewater is from all the production plants inside the enterprise.

In this document, the levelized cost of cooling water (LCOCW) is used to compare and determine which industrial cooling system is more expensive per-kilowatt-hour heat removed.

Use of reclaimed water will have a direct impact on the operating cost of cooling systems and the environment. External benefits, including positive externalities and negative externalities, are provided in Annex A, which considers environmental, social and financial elements.

This document is intended for all types of stakeholders involved in reclaimed water use in new-built industrial cooling systems.

This document aims to ensure consistency within any organization engaged in reclaimed water reuse.

This document provides a broad framework within which costs for new-built industrial cooling systems using reclaimed water can be assessed. The currency used is local currency (LCY).

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 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/

3.1.1
capital cost
capital expenditure
money used to purchase, install and commission a capital asset

[SOURCE: ISO 15663-3:2001, 2.1.3, modified — preferred term changed from capital expenditure to capital cost.]