



**International
Standard**

ISO 4240-3

**Fine bubble technology —
Environmental applications —**

**Part 3:
Test method for on-site evaluation
of the performance of algae bloom
removal facilities**

Technologie des fines bulles — Applications environnementales —

*Partie 3: Méthode d'essai pour l'évaluation in-situ des
performances des installations d'élimination des proliférations
d'algues*

**First edition
2026-10**

Sample Document

get full document from standards.iteh.ai



COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

All rights reserved.

This ISO publication is protected by copyright and is owned by ISO and/or its licensors.

The content of this ISO publication is provided under licence, not sold. Use is subject to the applicable licence terms issued by ISO, an ISO member body, or an authorized third-party distributor.

Except as required for implementation or expressly permitted by a separate licence, no part of this ISO publication may be reproduced, distributed, modified, used, or made available in any form or by any means – electronic or mechanical, including photocopying, scanning, recording, or posting on internal or external digital platforms.

Any use beyond the scope of the granted rights is prohibited and may result in legal action.

ISO copyright office
CP 401 • 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 and definitions	1
4 Principle	2
5 Test equipment	3
6 Test site preparation	3
7 Procedure	3
7.1 Weather conditions to test the algal bloom removal	3
7.2 Procedure of the test	3
8 Test report	5
Annex A (informative) Mechanism of flotation process for algal bloom removal using microbubbles	6
Annex B (informative) Example of algal bloom removal facility operation	10
Bibliography	14

Sample Document

get full document from standards.iteh.ai

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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 281, *Fine bubble technology*.

A list of all parts in the ISO 4240 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

Algal bloom in water systems can cause a variety of damages to the ecosystem. For instance, they can lead to a foul odour that negatively affects nearby residents. Moreover, the algal bloom reduces the amount of usable water resources and diminishes the quality of tap water. Despite efforts to remove the algal bloom using methods such as dredging or spraying of chemicals, they remain expensive, have limited application, and often provide only a temporary solution.

To address this issue at its core, an algal bloom removal facility that utilizes microbubbles is a possible solution. This technology targets the water systems where algal bloom occurs and uses microbubbles to float the microalgae and cyanobacteria across the water surface, making them easy to collect. Compared to the expensive and potentially harmful methods of using chemicals, this approach offers a more cost-effective and eco-friendly way of removing microalgae and cyanobacteria from the water system.

However, the algal bloom removal facility is usually too large to be tested in a laboratory, and even if sufficient space is available, it is often inefficient or impossible to reproduce natural water system conditions indoors. In some cases, tests have been conducted for individual parts of the facility, but such results cannot guarantee the overall performance once the parts are assembled. Therefore, an on-site evaluation method is required to ensure testing precision. This document provides a method for evaluating the performance of algal bloom removal facilities by measuring the chlorophyll-a concentration before and after treatment.

Sample Document

get full document from standards.iteh.ai

Sample Document

get full document from standards.iteh.ai

Fine bubble technology — Environmental applications —

Part 3:

Test method for on-site evaluation of the performance of algae bloom removal facilities

1 Scope

This document specifies the test method and procedure to evaluate the algal bloom removal rate using microbubbles in on-site microbubble-based algal-bloom removal facilities.

The evaluation of the removal rate is conducted by comparing chlorophyll-a concentration before and after treatment using microbubbles. The range of water and weather conditions are served for test because they influence the characteristics of microbubbles and the algal bloom removal rate.

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 10260, *Water quality — Measurement of biochemical parameters — Spectrometric determination of the chlorophyll-a concentration*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

3.1 chlorophyll-a

indicator for evaluating aquatic algae and *cyanobacteria* (3.4) biomass as a green pigment present in all algae and cyanobacteria

3.2 algal bloom removal facility

specialty manufactured device for removing microalgae and cyanobacteria in a natural body of water using a microbubble generator to float them on the surface of water when they occur in rivers and lakes with a depth of 0,5 m or more with slow or no flowrate

Note 1 to entry: In cases of excessive eutrophication, the majority of microalgae and cyanobacteria tend to accumulate within the top 0,5 m of the water column. Therefore, this depth is specified as the minimum effective treatment zone for the microbubble-based removal facility to achieve optimal efficiency.