



BSI Standards Publication

Fine bubble technology — Environmental applications

Part 2: Test method for evaluating aeration performance of fine bubble jet devices

National foreword

This British Standard is the UK implementation of ISO 4240-2:2024.

The UK participation in its preparation was entrusted to Technical Committee LBI/50, Fine Bubble Technology (FBT).

A list of organizations represented on this committee can be obtained on request to its committee manager.

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**Fine bubble technology —
Environmental applications —**

**Part 2:
Test method for evaluating
aeration performance of fine
bubble jet devices**

Technologie des fines bulles — Applications environnementales —

*Partie 2: Méthode d'essai pour l'évaluation des performances
d'aération des diffuseurs à fines bulles*

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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 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).

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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

Recent progress in the application of fine bubble technology demonstrates success in various technical fields. Fine bubble jet devices are generally applied in a pure oxygen aeration process to improve the oxygen transfer from gas phase to liquid phase in the environmental engineering fields, such as wastewater treatment and water ecological restoration. Small size jet devices ($\leq 1 \text{ m}^3/\text{h}$) are often used for cleaning. Medium size jet devices (1 to 10) m^3/h are often used in aquaculture and agricultural fields. Large size jet devices ($\geq 10 \text{ m}^3/\text{h}$) are often used for water treatment and water environment restoration. The fine bubble jet devices are operated in ejector mode (self-aspiration) or injector mode (pressurized oxygen supply). The mode of operation affects the achievable mass transfer and its energy efficiency.

To evaluate aeration device performance there is a need for a standard method for oxygen transfer measurements which can be applied for all types of fine bubble jet devices.

This document is intended to specify the test procedure to be applied to the fine bubble jet devices for oxygen aeration uses. Based on the performance data presented by each bubble generator manufacturer, the engineers who designed the aeration process can calculate how many generators should be used to meet the use requirements.

Fine bubble technology — Environmental applications —

Part 2:

Test method for evaluating aeration performance of fine bubble jet devices

1 Scope

This document describes the test methodology to evaluate the aeration performance of fine bubble jet devices based on an evaluation of the mass transfer coefficient of oxygen from gas to water.

It is applicable to evaluate the performance of fine bubble jet devices for aeration purpose.

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 20480-1, *Fine bubble technology — General principles for usage and measurement of fine bubbles — Part 1: Terminology*

ISO 20480-2, *Fine bubble technology — General principles for usage and measurement of fine bubbles — Part 2: Categorization of the attributes of fine bubbles*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO 20480-1, ISO 20480-2 and the following 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

aeration

oxygenation

process of introducing of air/oxygen into a body of water to increase its oxygen saturation

3.2

pure oxygen

gas containing more than 90 % oxygen

3.3

fine bubble jet device

device that accelerates and releases fluid with fine bubbles, including swirling flow system, ejector system and venture system