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Fine bubble technology — Elimination method for sample characterization —

Part 1: Evaluation procedure

Technologie des fines bulles — Méthode d'élimination pour la caractérisation de l'échantillon —

Partie 1: Mode opératoire d'évaluation

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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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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 24261 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

Fine bubble technology has recently seen growth in its application to markets in cleaning, water treatment, agriculture, and aquaculture as well as biomedical fields. Now, methods are required to evaluate the generation systems. Especially characteristics like the number concentration index and the size index of fine bubbles are indispensable for those evaluations.

Furthermore, fine bubble dispersion water may contain other solid and liquid particles. Clearly due to this is a concern, as it may be impossible to evaluate the characteristics of fine bubbles. Therefore, it is an urgent task to address this concern.

There are several measurement methods widely used to evaluate the number concentration index and the size index of particles. However, there are few methods to distinguish bubbles in fine bubble dispersions from other particles.

This issue can be resolved, using the phenomenon by which the bubbles can be eliminated without any residues after dissolution and flotation. If a method that eliminates fine bubbles in specific size range is known, it is possible to distinguish fine bubbles from other solid and liquid particles. The eliminated particles can be fine bubbles. If most of fine bubbles decreased, a solution that doesn't have them can be used as a blank solution for measurements as background. Because it is expected that fine bubbles elimination techniques will develop further, standardizing elimination techniques and evaluation method is required.

This document is intended to specify the evaluation method for elimination efficiency of fine bubbles from fine bubble dispersions in water.

Standardization for evaluating elimination efficiency of fine bubbles enables easy and clear comparison among the several elimination techniques and realizes the optimization of conditions for respective elimination techniques.

Fine bubble technology — Elimination method for sample characterization —

Part 1: Evaluation procedure

1 Scope

This document specifies the evaluation procedure of fine bubble elimination for fine bubble dispersion in water. This document is applicable only to fine bubbles without shell.

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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20480-1 and the following 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
elimination of fine bubbles
process for decrease of the concentration index of fine bubbles

3.2
fine bubble dispersion
FBD
liquid which contains fine bubbles

[SOURCE: ISO 20298-1:2018, 3.1]

4 Requirements

4.1 Sample

The fine bubble dispersion to be evaluated shall be generated by cleaned fine bubble generating systems using pure water and pure gas such as air, nitrogen and oxygen.

The purity level of water and gas depends on the sample whose size and concentration indices of fine bubbles should be evaluated because fine bubble elimination is one of the evaluating process for specified samples. So, the purity level cannot be generally determined as measurement condition for evaluations of the elimination efficiency.