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Fine bubble technology — General principles for usage and measurement of fine bubbles —

Part 2: Categorization of the attributes of fine bubbles

Technologie des fines bulles — Principes généraux pour l'utilisation et la mesure des fines bulles —

Partie 2: Classification des attributs des fines bulles

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Foreword

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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 20480 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.

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Introduction

In recent years, readily available measurement techniques of bubbles have made it possible to characterize microbubbles and ultrafine bubbles. Such techniques have shown that ultrafine bubbles can almost remain as they are for a number of months.

Fine bubble technologies are very new, and their applications are useful in a number of fields today. Developing appropriate terminology for such a diverse area of technology is therefore critical to business trade or product acceptance, in view of the wide range of users of fine bubbles.

For better communication among the users of fine bubbles, this document introduces the quality criteria of a medium such as water, as well as two indices, one for size and the other for number concentration. This document also provides an explanation for classifying fine bubbles by dimensional characteristics and by rise velocity.

It should be noted that the motion of bubbles in a medium can be determined by buoyancy forces or randomly and thermally activated processes leading to Brownian motion. For this reason, larger bubbles can display buoyant behaviour (rise upwards) and smaller bubbles remain in the liquid medium displaying random motion. This document focuses on the definitions of such entities.

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Fine bubble technology — General principles for usage and measurement of fine bubbles —

Part 2:
Categorization of the attributes of fine bubbles

1 Scope

This document establishes the general principles and descriptors to allow users to describe the quality of the liquid media and the size and concentration of fine bubbles. It is also intended to allow users to classify fine bubbles by rise velocity.

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
rise velocity
velocity of a fine bubble upwards in liquid

3.2
terminal rise velocity
balancing velocity between the buoyancy of fine bubbles and the viscous drag

Note 1 to entry: It is the velocity in the opposite direction to the terminal settling velocity. If a rise velocity were to be defined as the terminal settling velocity, the rise velocity would be negative. Therefore, in the classification of fine bubbles, terminal rise velocity is preferred over terminal settling velocity to avoid confusion.

4 General principles for usage and measurement of fine bubbles

4.1 Standards system of fine bubble technology

The purpose of this document is to provide people who develop standards for fine bubble technology with an overall framework and guidelines, and to facilitate communication among users of fine bubbles. To assist in the preparation of consistent standards, a three-layered standard system has been established.

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