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

Part 1: Terminology

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

Partie 1: Terminologie

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Foreword

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This document was prepared by ISO/TC 281, *Fine bubble technology*.

A list of all the parts in the ISO 20480 series can be found on the ISO website.

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Introduction

Applications of fine bubble technologies can be found in cleaning, environmental improvement, the food and drink sector, aeration systems, medicine, water and waste water treatment, as well as agriculture and aquaculture. Developing appropriate terminology for such diverse technologies is therefore critical to business trade or product acceptance by consumers.

Fine bubbles can be present in both liquids and solids. Fine bubbles can contain air or another gas. The bubble can be held in place by surface tension or be surrounded with a coating, e.g. a lipid. Fine bubbles generated for various applications can vary in size, gas content or bubble coating. The generation techniques used are also different.

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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Part 1: Terminology

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1 Scope

This document specifies terminology and definitions used in the area of fine bubble technology. Terminology in this document covers general principles, measurements, and individual applications of fine bubble technology.

2 Normative references

There are no normative references in this document.

3 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 http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
bubble
gas in a medium enclosed by an interface

3.2
fine bubble
bubble (3.1) with a *volume equivalent diameter* (3.8) of less than 100 µm

Note 1 to entry: 100 µm is also represented as 1×10^{-4} m.

Note 2 to entry: Annex A provides further information on the use of terms "fine bubble" or "*ultrafine bubble*" (3.3), instead of "nanobubble".

3.3
ultrafine bubble
fine bubble (3.2) with a *volume equivalent diameter* (3.8) of less than 1 µm

Note 1 to entry: Measured examples of ultrafine bubbles in water by particle characterization methods, in practical application fields, mostly range between 100 nm and 200 nm. The measured results can include contaminants, as well as ultrafine bubbles.

3.4
microbubble
fine bubble (3.2) with a *volume equivalent diameter* (3.8) in the range from equal or greater than 1 µm to less than 100 µm

Note 1 to entry: Figure 1 shows the size range of *bubbles* (3.1), fine bubbles, *ultrafine bubbles* (3.3), and microbubbles.

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