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GB/T 42845.1-2023

Fine bubble technology - Characterization of microbubbles - Part 1: Off-line evaluation of size index

微细气泡技术 微气泡的表征 第1部分：粒径指数的离线评估

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Table of Contents

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents" Drafting. This document is Part 1 of GB/T 42845 "Characterization of microbubbles in fine bubble technology". GB/T 42845 has been released with Lower part.

1.Offline evaluation of particle size index. This document is modified using ISO 21910-1.2020 "Fine bubble technology. Characterization of microbubbles Part

1.Offline particle size index" Evaluate". Compared with ISO 21910-1.2020, this document has made the following structural adjustments.

---Adjust Appendix A to Appendix C, Appendix C to Appendix E, and Appendix E to Appendix A. The technical differences between this document and ISO 21910-1.2020 and their reasons are as follows:

---Added normative reference document GB/T 41914.1 (see Chapter 3) to improve operability;

---The document number and referenced measurement method (see Chapter 11) have been added to the test report to improve operability. The following editorial changes have been made to this document.

---In order to coordinate with existing standards, the diameter is changed to particle size (see 4.1);

--- Added a statement indicating the appendix;

---Deleted Figure A.1. Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents. This document is proposed by the Chinese Academy of Sciences. This document is under

the jurisdiction of the National Technical Committee on Standardization of Fine Bubble Technology (SAC/TC584). This document was drafted by: Nanobubble Detection Technology (Shanghai) Co., Ltd., Shanghai National Engineering Research Center for Nanotechnology and Applications Co., Ltd. Company, Ningbo Haibo Group Co., Ltd., Institute of Process Engineering, Chinese Academy of Sciences, Donghua University, National Nanoscience Center, Chinese Academy of Sciences Shanghai Institute for Advanced Study, Chang'an University, Guona Nanotechnology Research (Hebei) Co., Ltd., Shanghai Nanobarber Nanotechnology Co., Ltd., Shanghai Metallographic Environmental Technology Co., Ltd., Shanghai Fude Xintai Nanotechnology Co., Ltd. The main drafters of this document. Chen Luhai, Liu Yanan, Zhu Jun, Xia Shaohua, Li Zhaojun, Zhou Lan, Chen Lan, Geng Cong, Zhang Lijuan, Guo Jifeng, Luo Chao, Wang He, Zhang Han, Deng Siyu, Wang Meilin, Yan Ming, Wang Weizhong, Jiang Lili, Wang Guoping, Wang Guoxiang.

In recent years, the development of micro-bubble technology has expanded its application market and made it widely used in various fields, such as cleaning and purification engineering, Water treatment engineering (including water supply and sewage), agriculture and aquaculture, biomedicine and other fields. These applications further accelerate the technology Expansion and penetration in various fields. A variety of measurement techniques have been developed to evaluate the properties of microbubbles and are widely used in various fields. However, the dynamics of microbubbles Characteristics make it difficult for users to accurately measure the microbubble particle size index. The stability of microbubbles is low, and individual microbubbles are prone to shrinkage, deformation, and aggregation in water. and decomposition, so specific steps need to be followed for sampling and timely measurement. In accordance with the requirements of this document, equipping the specified type of measuring equipment and conducting sampling according to the specified steps will help to obtain comparable results. result. "Characterization of Microbubbles in Microbubble Technology" aims to standardize the characterization of microbubbles and currently consists of one part.

1.Offline evaluation of particle size index. The purpose is to establish an evaluation method for microbubble particle size index. Micro Bubble Technology Characterization of Micro Bubbles Part

1 Scope

GB/T 42845.1-2023 is Part 1 of the Chinese series on characterising microbubbles, and covers the off-line evaluation of the size index. Fine bubble technology is sold for water treatment, aquaculture, cleaning and agriculture on claims about bubble size, and the measurement is unusually treacherous: the bubbles dissolve, rise and coalesce while the sample is being taken, so what reaches the instrument is not what was in the tank, and two laboratories measuring the same generator disagree by more than the difference they are trying to detect. Most of the standard is therefore about the sampling system rather than the

instrument. It sets the sample and system requirements, the measuring equipment, the measurement environment, and the sampling and measurement system in detail - its structure, the layout of the components, the position of the loading tube opening and the instrument, and the configuration of the storage vessel. It took effect on 1 March 2024.

This document describes methods for the evaluation of the particle size index of microbubbles in microbubble dispersions and for the analysis of microbubbles from microbubble generation or storage containers. Sampling method of scattering points to test points of a measuring device. This document applies to microbubbles (shelled bubbles or shellless bubbles) with particle sizes ranging from 1 μm to 100 μm in water.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 41914.1 Microbubble Technology General Principles for the Use and Measurement of Microbubbles Part

3 Terms and definitions

The terms and definitions defined in GB/T 41914.1 and the following apply to this document.

3.1 measurement time measurement time The time required for a series of test processes is provided that the microbubble particle size index and/or bubble number concentration index remain relatively stable during the entire process. determined, and the results are reproducible through the above test process under similar test conditions.

Note. The measurement duration refers to the time period from the time of generation to the time of disappearance or the time period of generation (disappearance) plus the duration.

3.2 diluent waterdiluent Used for dilution, homogeneous water without any negative effects and with a known number and concentration of ultra-fine bubbles. Note

1.Dilution water is used to reduce the number concentration of ultrafine bubbles in the dispersion system, and does not change the total number of ultrafine bubbles and the particle aggregation state, size or surface chemical properties. Note

2.When evaluating ultrafine bubbles, dilution water with a concentration of zero ultrafine bubbles is called blank water. [Source: GB/T 42843.1-2023,3.2]

3.3 retention time retention time In a storage container, the length of time between the