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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 46918.1-2025

**Fine bubble technology - Evaluation method for determining
gas content in fine bubble dispersions in water - Part 1: Oxygen
content**

微细气泡技术 水中微细气泡分散体系气体含量的测量方法 第1部分：氧气含量
(English Translation)

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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 46918 "Method for Measurement of Gas Content in Microbubble Dispersion Systems in Water Using Microbubble Technology".

GB/T 46918 has published the following parts.

---Part 1: Oxygen Content;

---Part 2: Hydrogen content.

This document is modified to adopt ISO 7383-1:2024 "Microbubble technology - Measurement of gas content in microbubble dispersion systems in water".

Part 1: Oxygen Content.

This document has undergone the following structural adjustments compared to ISO 7383-1:2024.

---Chapter 4 has been added;

---Chapter 5 corresponds to Chapter 7 in ISO 7383-1:2024;

---Chapter 6 corresponds to sections 6.1 and 6.2 of ISO 7383-1:2024;

---7.1 and 7.2 correspond to 4.2 and 4.1 in ISO 7383-1:2024;

---Chapter 8 corresponds to Chapter 5 in ISO 7383-1:2024;

---Chapter 9 corresponds to Chapter 8 in ISO 7383-1:2024;

---Chapter 10 corresponds to Chapter 9 in ISO 7383-1:2024;

---Chapter 11 corresponds to Chapter 10 in ISO 7383-1:2024.

The technical differences between this document and ISO 7383-1:2024, and the reasons therefor, are as follows.

---The wording of the scope has been changed, replacing "methods for assessing oxygen content" with "methods and procedures for measuring oxygen content (molecular oxygen)".

Supplementary information regarding the characteristics, detection limits, and measurement ranges of the three measurement techniques will be separated from the main text and divided into Notes 1 to 4.

Replace "upper limit" with "upper range" (see Chapter 1) to improve standardization;

---Added the normative reference document GB/T 42843.1-2023 (see 5.1.6) for microbubble technology measurement, sampling, and sample preparation, to...

Adapt to my country's technological conditions and improve operability;

---ISO 5813:1983 (see 7.2, 9.4 and 10.2) and GB/T 41914.1 have been replaced by the normatively referenced GB/T 7489-1987.

ISO 20480-1 (see Chapter 3) and GB/Z 44387 have replaced ISO/T R23015 (see Chapter 8) to adapt to my country's standards.

Technical conditions and improved operability;

---Explanations of the principles of the optical sensor method, electrochemical probe method, and iodometric method have been added (see Chapter 4) to improve operability;

---Instrument and equipment descriptions for optical sensor and electrochemical probe methods have been added (see 5.1 and 5.2) to improve operability;

---The instrumentation description for iodometric titration has been revised (see 5.3) to improve operability;

---The description of recorded water sample salinity has been revised (see Chapter 6) to better align with domestic usage;

---Added explanations of interference from electrochemical probe methods and iodometric methods (see Chapter 7) to improve operability;

---Added test report verification of the characterization method for the existence of ultrafine bubbles, including gas flow rate, gas pressure, and microbubbles in the equipment.

The generation principle (see Chapter 11) is used to improve operability.

The following editorial changes have been made to this document.

---Added notes on selective membranes in the electrochemical probe method (see 4.2);

---All data and graphs regarding the effect of ultrafine bubbles on oxygen content measurement in Informative Appendix A have been revised and replaced with new data;

---All data and graphs regarding the impact of air bubbles adhering to the sensor surface on test results in Informative Appendix B have been revised, using new...

Data replacement.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Chinese Academy of Sciences.

This document is under the jurisdiction of the National Technical Committee on

Standardization of Microbubble Technology (SAC/TC584).

Introduction

In recent years, microbubble dispersion technology in water has been applied in various industries. Especially in the fisheries and food processing industries, microbubble technology...

This technique is widely accepted as a means of controlling dissolved oxygen levels. For example, the use of microbubbles in aquaculture can prevent dissolved oxygen levels in the water.

Oxygen deficiency.

Determining the oxygen content in water is essential for monitoring the role and effectiveness of microbubbles. However, in determining the oxygen content in microbubble dispersions in water...

When measuring oxygen content, it is important to note that the presence of fine air bubbles may affect the measurement results.

When microbubbles of air are present in water, as the bubbles slowly rise and gradually contract, the air inside the bubbles continuously dissolves into the water.

In the meantime, unless the dissolved oxygen in the water is already supersaturated, this process will cause the oxygen content in the water to continue to rise. Furthermore, it is generated by dissolved gases.

Visible air bubbles deposited on the surface of the oxygen sensor may also affect the measurement results.

Therefore, in order to assess the oxygen content of a microbubble dispersion in water, it is necessary to understand the state of the bubbles in the sample water during the measurement process.

This document aims to specify the use of three widely accepted measurement methods in industry-optical sensor method, electrochemical probe method, and iodine method.

This method specifies a procedure for assessing the oxygen content in a microbubble dispersion system in water. The oxygen content includes dissolved oxygen (oxygen) in the dispersion.

And molecular oxygen present in microbubbles. Standardized methods for assessing oxygen content can conveniently and reliably compare microbubbles under different conditions.

The oxygen content in the foam dispersion.

GB/T 46918, "Method for Determination of Gas Content in Microbubble Dispersion Systems