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Determination of particle size distribution — Electrical sensing zone method —

Part 2: Tunable resistive pulse sensing method

Détermination de la distribution granulométrique — Méthode de détection de zones électrosensibles —

Partie 2: Méthode par détection d'impulsions résistives accordable (TRPS)

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Foreword

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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

Monitoring particle size distributions and particle concentrations are required in various fields, where particle dispersions in liquid play a role. The electrical sensing zone technique has, since its discovery by W. H. Coulter around 1950, been widely employed for size and count analysis of (blood) cells, bacteria and other fine particles. Over the last decades, the application range has expanded to nanoparticles, such as liposomes, exosomes, and nano- and micro-bubbles, as a result of improved electronics and aperture fabrication. The tunable electrical sensing zone technique is useful for the determination of the size distribution, concentration and zeta potential of micro- and nanoparticles suspended in a liquid. The purpose of this document is to provide the background and procedures for application of tunable electrical sensing zone equipment for particle size distribution and concentration measurements, so as to improve the reproducibility and the accuracy of the acquired results.

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Determination of particle size distribution — Electrical sensing zone method —

Part 2: Tunable resistive pulse sensing method

1 Scope

This document specifies the measurements of particle size distribution and concentration of suspended particles, ranging from 40 nm to 100 µm, using tunable resistive pulse sensing (TRPS). This document provides a comprehensive overview of the methodologies that are applied to achieve reproducible and accurate TRPS measurement results. This document also includes best practice considerations, possible pitfalls and information on how to alleviate or avoid these pitfalls.

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 terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

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

3.1
aperture
small diameter hole through with suspension is drawn

[SOURCE: ISO 13319-1:2021, 3.2]

3.2
sensing zone
volume of electrolyte within and around the aperture in which a particle is detected

[SOURCE: ISO 13319-1:2021, 3.3]

3.3
pulse frequency
number of pulses per duration

3.4
detection range
size range between the smallest and largest detectable particle diameter

3.5
dynamic range
ratio between the largest and smallest detectable particle diameter

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