ISO 13319-1:2021 (E)

Determination of particle size distribution — Electrical sensing zone method — Part 1: Aperture/orifice tube method

Contents

Foreword

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Symbols
- 5 Principle
- 6 General operation
 - 6.1 Response
 - 6.2 Size limits
 - 6.3 Effect of coincident particle passage
 - 6.4 Dead time
 - 6.5 Analysis volume
- 7 Repeatability and reproducibility of counts
 - 7.1 Instrument repeatability
 - 7.2 Method reproducibility/intermediate precision
- 8 Operational procedures
 - 8.1 General
 - 8.2 Instrument location
 - 8.3 Linearity of the aperture/amplifier system
 - 8.4 Linearity of the counting system
 - 8.5 Choice of electrolyte solution
 - 8.5.1 General
 - 8.5.2 Special considerations for small apertures (D < 50 μm)
 - 8.5.3 Special considerations for large apertures (D > 400 μm)
 - 8.6 Preparation of electrolyte solution
 - 8.7 Recommended sampling, sample splitting, sample preparation and dispersion
 - 8.7.1 General
 - 8.7.2 Method 1: Using a paste
 - 8.7.3 Method 2: Alternative method applicable to low-density particles of less than 50 µm
 - 8.7.4 Suspensions and emulsions
 - 8.7.5 Verification of the dispersion
 - 8.8 Choice of aperture(s) and analysis volume(s)
 - 8.9 Clearing an aperture blockage
 - 8.10 Stability of dispersion
 - 8.11 Calibration
 - 8.11.1 General
 - 8.11.2 Calibration procedure microsphere calibration
- 9 Analysis
- 10 Calculation of results
- 11 Instrument qualification
 - 11.1 General
 - 11.2 Report

- Annex A (informative) Derivation of maximum count number to limit coincidence
- Annex B (informative) Fishbone diagram for method development
- Annex C (informative) Calibration and control of frequently used apertures
- Annex D (informative) Mass integration method for calibration and mass balance
 - D.1 General
 - D.2 Calibration procedure
 - D.2.1 General
 - D.2.2 Volume Vm of analysed suspension
 - D.2.3 Effective density of particles
 - D.2.4 Sample preparation
 - D.2.5 Determination of the calibration factor
 - D.2.6 Secondary calibration
 - D.2.7 Example of calibration by mass integration
 - D.3 Mass balance
 - D.3.1 General
 - D.3.2 Sample preparation
 - D.3.3 Procedure
 - D.3.4 Calculations
 - D.3.5 Results
 - D.3.6 Report
 - D.3.7 Theoretical example of mass balance
- Annex E (informative) Calibration for the measurement of porous and conductive particles
 - E.1 General
 - E.2 Particles of conductive materials
 - E.3 Porous particles
 - E.3.1 General
 - E.3.2 Sample preparation
 - E.3.3 Microscopy and ESZ measurements
 - E.4 Calculations for microscopy
 - E.4.1 General
 - E.4.2 Calculations

Annex F (informative) Technique using two (or more) apertures

- F.1 General
- F.2 Separation
- F.3 Calibration
- F.4 Analysis
- Annex G (informative) Chi-squared test of the correctness of instrument operation or sample preparation
 - G.1 General
 - G.2 Theory
 - G.2.1 General
 - G.3 Worked examples

Page count: 34