

ISO 13317-1:2024-04 (E)

Determination of particle size distribution by gravitational liquid sedimentation methods - Part 1: General principles, requirements and guidance

Contents		Page
Foreword.....		iv
Introduction.....		v
1 Scope.....		1
2 Normative references.....		1
3 Terms and definitions.....		1
4 Symbols and abbreviated terms.....		5
5 Measurement principle and technical realisations.....		8
5.1 General measurement principle.....		8
5.2 Technical realisation of sedimentation-based measurement techniques.....		10
6 Measurement data and basic rules of data evaluation.....		13
6.1 Sedimentation velocity distribution.....		13
6.2 Stokes-based analysis for obtaining particle size distributions.....		16
6.2.1 Particle size.....		16
6.2.2 Quantification of size fractions.....		17
6.3 Deviations from Stokes-based analysis.....		21
6.3.1 General.....		21
6.3.2 Upper limit for sedimentation velocity and particle size.....		22
6.3.3 Lower limits for particle size.....		22
6.3.4 Limits for particle concentration.....		23
6.3.5 Handling of porous and heterogeneous particles.....		23
6.3.6 Handling of non-spherical particles and particle agglomerates.....		23
7 Performing size analyses.....		24
7.1 General.....		24
7.2 Sampling.....		24
7.3 Dispersion process and primary sample preparation.....		24
7.4 Secondary sample preparation (sample conditioning).....		25
7.5 Instrument preparation.....		26
7.6 Measurement.....		26
7.7 Data analysis.....		27
7.8 Reporting.....		27
8 System qualification and quality control.....		29
8.1 General remarks.....		29
8.2 Reference materials.....		29
8.3 Performance qualification.....		30
8.4 Sources of measurement uncertainty.....		32
8.5 Accuracy and measurement of uncertainty of particle velocity.....		32
8.6 Combined and expanded uncertainty of velocity measurement.....		34
8.7 Combined and expanded uncertainty of particle size (Stokes diameter).....		35
Annex A (informative) List of gravitational sedimentation-based particle sizing techniques.....		37
Annex B (informative) Remarks on particle density.....		39
Annex C (informative) Sedimentation beyond the validity of Stokes' law.....		45
Annex D (informative) Example for the determination of the uncertainty of velocity and particle size.....		53
Annex E (informative) Impact of the measurement zone width on the resolution of measured particle size distributions.....		62
Bibliography.....		65