ISO 13320:2020-01 (E)

Particle size analysis - Laser diffraction methods

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms, definitions and symbols **1**
3.1 Terms and definitions 1
3.2 Symbols 6

4 Principle **8**
4.1 General 8
4.2 Theory 8
4.3 Typical instrument and optical arrangement 9
4.4 Measurement zone 11
4.5 Application and sample presentation 11
4.6 Off-line measurements 12
4.7 In-line measurements 12
4.8 Online measurements 12
4.9 At-line measurements 13
4.10 Scattering and detectors 13

5 Operational requirements and procedures **13**
5.1 Instrument location 13
5.2 Dispersion gases 13
5.3 Dispersion liquids 14
5.4 Sample inspection, preparation, dispersion and concentration 14
5.4.1 Sample inspection 14
5.4.2 Preparation 14
5.4.3 Dispersion 14
5.4.4 Concentration 15
5.5 Measurement 15
5.5.1 Setting up instrument and blank measurement 15
5.5.2 Sample preparation 16
5.5.3 Data collection of the scattering pattern 16
5.5.4 Selection of an appropriate optical model 16
5.5.5 Conversion of scattering pattern into PSD 16
5.5.6 Robustness 17
5.6 Resolution and sensitivity 17
5.6.1 General 17
5.6.2 Resolution 17
5.6.3 Sensitivity and result variability 17

6 Accuracy repeatability and instrument qualification **18**
6.1 General 18
6.2 Accuracy 19
6.2.1 Introduction 19
6.2.2 Accuracy test 19
6.3 Instrument repeatability 19
6.3.1 Introduction 19
6.3.2 Repeatability test 19
6.4 Method repeatability 20
6.4.1 Introduction 20
6.4.2 Method repeatability test 20

6.5 Accuracy under intermediate precision conditions 20
6.5.1 General 20
6.5.2 Intermediate precision conditions (general test) 21

7 Reporting of results 21
7.1 General 21
7.2 Sample 21
7.3 Dispersion 22
7.4 Laser diffraction measurement 22
7.5 Analyst identification: 22

Annex A (informative) **Theoretical background of laser diffraction 24**

Annex B (informative) **Advice on dispersion liquids 41**

Annex C (informative) **Dispersion methods — Recommendations 42**

Annex D (informative) **Instrument preparation — Recommendations 44**

Annex E (informative) **Error sources and diagnosis 46**

Annex F (informative) **Refractive index — Recommendations 49**

Annex G (informative) **Laser diffraction robustness and ruggedness 51**

Annex H (normative) **Certified reference materials, reference materials and comparison parameters 54**

Bibliography 57