DIN EN 14211:2012-11 (E)

Ambient air - Standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence

Contents

Page

Contents 2

Foreword 4

1 Scope 5

2 Normative references 6

3 Terms and definitions 6

4 Abbreviated terms 11

5 Principle 11
5.1 General 11
5.2 Measuring principle 11
5.3 Type approval test 12
5.4 Field operation and quality control 12

6 Sampling 13
6.1 General 13
6.2 Sampling location 13
6.3 Sampling system 13
6.4 Control and regulation of sample flow rate 14
6.5 Sampling pump for the manifold 15

7 Analyser equipment 15
7.1 General 15
7.2 Converter 15
7.3 Ozone generator 16
7.4 Reaction chamber 16
7.5 Optical filter 16
7.6 Detector 16
7.7 Ozone removal device 16
7.8 Sampling pump for the analyser 16
7.9 Particle filter 16

8 Type approval of nitrogen dioxide and nitrogen monoxide analysers 16
8.1 General 16
8.2 Relevant performance characteristics and performance criteria 17
8.3 Design change 19
8.4 Procedures for determination of the performance characteristics during the laboratory test 20
8.5 Determination of the performance characteristics during the field test 32
8.6 Type approval and uncertainty calculation 35

9 Field operation and ongoing quality control 36
9.1 General 36
9.2 Suitability evaluation 36
9.3 Initial installation 38
9.4 Ongoing quality assurance/quality control 39
9.5 Calibration of the analyser 41

9.6 Checks 43
9.7 Maintenance 48
9.8 Data handling and data reports 48
9.9 Measurement uncertainty 49

10 Expression of results 49

11 Test reports and documentation 50
11.1 Type approval test 50
11.2 Field operation 51

Annex A (normative) Test of lack of fit 53

Annex B (informative) Sampling equipment 55

Annex C (informative) Types of chemiluminescence analysers 57

Annex D (informative) Manifold testing 60

Annex E (normative) Type approval 62

Annex F (informative) Calculation of uncertainty in field operation at the hourly limit value 81

Annex G (informative) Calculation of uncertainty in field operation at the annual limit value 89

Annex H (informative) Significant technical changes 99

Bibliography 100