# 4.7 Standardised measuring methods

| | Individual measuring method | Continuous measuring method |
|---|---|---|
| *Sampling* | – | *NEN-ISO 10396* |
| *Waste gas parameters* | | |
| $O_2$ | | NEN-ISO 12039 |
| CO | | NEN-ISO 12039 |
| $CO_2$ | | NEN-ISO 12039 |
| volume flow rate | ISO 10780 | NEN-ISO 14164 |
| moisture content | EPA method 4[a] | |
| *Particulates* | NEN-EN 13284-1 | ISO 10155 |
| | ISO/DIS 9096 | VDI 2066 Blatt 4, 6 |
| size of particulates | VDI 2066 Blatt 5 | |
| *Inorganic compounds* | | |
| asbestos | ISO 10397 | |
| | ISO 8672 | |
| heavy metals | NVN 2817 | |
| | NPR 6425 | |
| | draft NEN-EN 14385 | |
| Hg | NEN-EN 13211 | |
| *Gases and vapours* | | |
| $NO_x$ (as $NO_2$) | NEN-ISO 11564 | NEN-ISO 10849 |
| $SO_2$ ($SO_x$ as $SO_2$) | ISO 7934 | ISO 7935 |
| | NEN-ISO 11632 | |
| | VDI 2462 Blatt 7 | |
| $NH_3$ | NEN 2826 | |
| Cl, HCl | NEN-EN 1911-1, 2, 3 | VDI 3480 Blatt 3 |
| F, HF | NEN 2819 | |
| | VDI 2470 Blatt 1 | |
| | ISO/CD 15713 | |
| $H_2S$ | VDI 3486 Blatt 1,2 | VDI 3486 Blatt 3 (semi-cont.) |
| $Cl_2$ | VDI 3488 Blatt 1,2 | |
| *Organic compounds* | | |
| $C_xH_y$ total | NEN-EN 13649 | NEN-EN 13526 |
| | | NEN-EN 12619 |
| PAHs | NVN 2816 | |
| | ISO/DIS 11338-1 | |
| | ISO/DIS 11338-2 | |
| | VDI 3873 Blatt 1 | |
| PCBs | sampling: particulate clott | filter |
| | analysis: see PCDD/PCDF | |
| PCDDs/PCDFs | NEN-EN 1948-1, 2, 3 | |
| benzene, toluene, xylene | VDI 2457 Blatt 5 | |
| butadiene | VDI 3953 Blatt 1 E | |
| vinyl chloride | VDI 3493 Blatt 1 | |
| acrylonitrile | VDI 2457 Blatt 1 E | |
| | VDI 3863 Blatt 1, 2, 3 | |
| odour | NVN 2820 | |
| | draft NEN-EN 13725 | |

**Abbreviations of (standard) specifications**

ISO International Standard
Quality standards are specified in ISO standards for continuous systems of measurement. A specific system of measurement is not prescribed; what is prescribed is how the quality standards must be checked. This avoids a standard or guideline having to be drawn up for each type of measuring appliance.

ISO/DIS ISO Draft International Standard

ISO/CD ISO Committee Draft

NEN Nederlandse Norm (*Dutch Standard*)

NVN Nederlandse Voornorm (*Dutch pre-Standard*)

NPR Nederlandse Praktijk Richtlijn (*Dutch Practice Guidelines*)

VDI Verein Deutscher Ingenieure (*Association of German Engineers*)

EPA (US) Environmental Protection Agency

CAN/CSA Canadian Standards Association

CEN Comité Européen de Normalisation (*European Normalization Committee*)

EN European Standard

If, for a particular measurement, a European (EN) standard is available, this standard should be applied. Also in the area of quality control of laboratories and automated measuring systems, such European standards are available, namely NEN-EN-ISO/IEC 17025 and draft EN 14181.

- EPA method 4
  Determination of moisture content in stack gases

- EPA method 8
  Determination of sulfuric acid and sulfur dioxide emissions from stationary sources

- NEN-EN 1911-1: 1998, Uitworp door stationaire bronnen – Handmatige methode voor de bepaling van HCL – Deel 1: Monsterneming van gassen

- NEN-EN 1911-2: 1998, Uitworp door stationaire bronnen – Handmatige methode voor de bepaling van HCL – Deel 2: Absorptie van gasvormige componenten

- NEN-EN 1911-3: 1998, Uitworp door stationaire bronnen – Handmatige methode voor de bepaling van HCL – Deel 3: Analyse van absorptievloeistoffen en berekening van resultaten

- NEN-EN 1948-1: 1997, Emissies van stationaire bronnen – Bepaling van de concentratie aan PCDD's/PCDF's – Deel 1: Monsterneming
- NEN-EN 1948-2: 1997, Emissies van stationaire bronnen – Bepaling van de concentratie aan PCDD's/PCDF's – Deel 2: Extractie en opwerking
- NEN-EN 1948-3: 1997, Emissies van stationaire bronnen – Bepaling van de concentratie aan PCDD's/PCDF's – Deel 3: Identificatie en kwantificering
- VDI 2066 Blatt 4: 1989, Particulate matter measurement – Measurement of particulate matter in flowing gases – Determination of dust load by continuous – Measurement of optical transmission
- VDI 2066 Blatt 5: 1994, Particulate matter measurement – Dust measurement in flowing gases – Particle size selective measurement by impaction method – Cascade impactor
- VDI 2066 Blatt 6: 1989, Particulate matter measurement – Measurement of particulate matter in flowing gases – Determination of dust load by continuous measurement of scattered light with the photometer KTN
- VDI 2457 Blatt 1 E: 1997, Gaseous emission measurement – Chromatographic determination of organic compounds – Fundamentals
- VDI 2457 Blatt 5:1981, Gaseous emission measurement – Chromatographic determination of organic compounds – Sampling in gas vessels, chromatographic analysis
- VDI 2462 Blatt 2: 1974, Gaseous emission measurement – Determination of sulphur dioxide – Titrimetric hydrogen peroxide method
- VDI 2462 Blatt 3: 1974, Gaseous emission measurement – Determination of sulphur dioxide – Gravimetric hydrogen peroxide method
- VDI 2462 Blatt 4: 1975, Gaseous emission measurement – Determination of sulphur dioxide concentration – Infrared absorption units UNOR 6 and URAS 2
- VDI 2462 Blatt 7: 1985, Measurement of gaseous emissions – Measurement of the sulfur-trioxide concentration – 2-propanol method
- VDI 2470 Blatt 1: 1975, Gaseous emission measurement – Measurement of gaseous fluorine compounds – Absorption method
- NPR 2786: 1996, Luchtkwaliteit – Debietmeting en debietregeling
- NVN 2816:1990, Luchtkwaliteit – Uitworp door stationaire bronnen – Bepaling van de concentratie aan polycyclische aromatische koolwaterstoffen
- NVN 2817: 1996, Luchtkwaliteit – Uitworp door stationaire bronnen – Monsterneming en analyse voor het bepalen van de gehalten aan arseen, cadmium, chroom, koper, kwik, lood en zink en hun verbindingen in zwevend stof en in de gasfase
- NEN 2819: 1994, Luchtkwaliteit – Uitworp door stationaire bronnen – Monsterneming en bepaling van het gehalte aan fluoride
- NVN 2820: 1995, Luchtkwaliteit – Sensorische geurmetingen met een olfactometer
- NEN 2826: 1999, Luchtkwaliteit – Uitworp door stationaire puntbronnen – Monsterneming en bapling van het gehalte aan gasvormig ammoniak
- VDI 3480 Blatt 3: 1992, Gaseous emission measurement – Continuous determination of gaseous inorganic chlorine compounds by the ECOMETER
- VDI 3486 Blatt 1: 1979
  Measurement of gaseous emissions; Measurement of the hydrogen sulfide concentration; potentiometric titration method
- VDI 3486 Blatt 2: 1979
  Measurement of gaseous emission; Measurement of the hydrogen sulfide concentration; lodometric titration method
- VDI 3486 Blatt 3: 1980
  Measuring of gaseous emissions; measuring of the hydrogen sulfide concentrations; colorimetric method (monocolor analyser)
- VDI 3488 Blatt 1: 1979, Gaseous emission measurement – Measurement of chlorine and oxides of chlorine – methyl orange method
- VDI 3488 Blatt 2: 1980, Gaseous emission measurement – Measurement of chlorine concentration – Bromide iodide method
- VDI 3493 Blatt 1: 1982, Gaseous emission measurement – Determination of vinyl chloride; gas chromatographic method – Grab sampling
- VDI 3863 Blatt 1: 1987, Measurement of gaseous emission – Determination of acrylonitrile – Gaschromatographic method – Grab sampling

- VDI 3863 Blatt 2: 1991, Gaseous emission measurement – Determination of acrylonitrile – gas chromatographic method – Sampling by absorption in low temperature solvents

- VDI 3863 Blatt 3: 1988, Measurement of gaseous emissions – Determination of acrylonitrile – Sampling by enrichment on activated carbon – Desorption with dimethylformamide

- VDI 3873 Blatt 1: 1992, Emission measurement – Measurement of Polycyclic Aromatic Hydrocarbons (PAH) in stationary industrial plants – Dilution method (RWTÜV method) – Gas-chromatographic determination

- VDI 3953 Blatt 1: 1991, Measurement of gaseous emissions – Determination of 1, 3-butadiene – Gas chromatographic method – Sampling by enrichment on activated carbon – Headspace analysis

- ISO 7934: 1989, Stationary source emissions – Determination of the mass concentration of sulfur dioxide – Hydrogen peroxide/barium perchlorate/Thorin method

- ISO 7935: 1992, Stationary source emissions – Determination of the mass concentration of sulfur dioxide – Performance characteristics of automated measuring methods

- ISO 8672: 1993, Air quality – Determination of the number concentration of airborne inorganic fibres by phase contrast optical microscopy – membrane filter method

- ISO 8756: 1994, Air quality – Handling of temperature, pressure and humidity data

- ISO/DIS 9096: 2001, Emissie van stationaire bronnen – Bepaling van de concentratie aan vaste deeltjes (20-1000 mg/m$^3$)

- ISO 10155: 1995, Stationary source emissions – Automated monitoring of mass concentrations of particles – Performance characteristics of automated measuring methods

- NEN-ISO 10396: 1999, Emissies van stationaire bronnen – Monsterneming voor de automatische bepaling van gasconcentraties

- ISO 10397: 1993, Stationary source emissions – Determination of asbestos plant emissions – Method by fibre count measurement

- ISO 10780: 1994, Stationary source emissions – Measurement of velocity and volume flowrate of gas streams in ducts

- NEN-ISO 10849: 1998, Emissies van stationaire bronnen – Bepaling van de concentratie aan stikstofoxiden – Prestatiekenmerken van geautomatiseerde meetsystemen

- ISO/DIS 11338-1:2000, Stationary source emissions – Determination of the mass concentration of polycyclic aromatic hydrocarbons – Part 1: Sampling

- ISO/DIS 11338-2: 1999, Stationary source emissions – Determination of the gas and particle-phase polycyclic aromatic hydrocarbons from statioanry sources – Part 2: Sample preparation, clean-up and determination

- NEN-ISO 11564: 1998, Emissie van stationaire bronnen – Bepaling van de massaconcentratie stikstofoxiden – Fotometrische methode met naftylethyleendiamine

- NEN-ISO 11632: 1998, Emissies van stationaire bronnen – Bepaling van de concentratie van zwaveldioxide – Methode met behulp van ionchromatografie

- NEN-ISO 12039: 2001, Stationary source emissions – Determination of carbon monoxide, carbon dioxide and oxygen – Performance characteristics and calibrated automated measuring systems

- ISO/FDIS 12141:1999, Stationary source emissions – Determination of mass concentration of particulate matter (dust) at low concentrations – Manual gravimetric method

- NEN-EN 12619:1999, Emissies van stationaire bronnen – Bepaling van de massaconcentratie van totaal gasvormig organisch koolstof in hoge concentraties in verbrandingsgassen – Continue methode met vlamionisatiedetector

- NEN-EN 13211: 2001, Luchtkwaliteit – Emissies van stationaire bronnen – Bepaling van de concentratie aan totaal kwik

- NEN-EN 13284-1: 2001, Stationary source emissions – Determination of low range mass concentration of dust (<50 mg/m$^3$) – Part 1: Manual gravimetric method

- NEN-EN 13526: 2001, Emissies van stationaire bronnen – Bepaling van de massaconcentratie van totaal gasvormig organisch koolstof in verbrandingsgassen uit processen waar oplosmiddelen gebruikt worden – Continue methode met vlamionisatiedetector

- NEN-EN 13649: 2001, Emissies van stationaire bronnen – Bepaling van de massaconcentratie van individuele gasvormige organische componenten – Geactiveerde koolstof en vloeistofmethode

- ontw. NEN-EN 13725: 1999, Air quality – Determination of odour concentration by dynamic olfactometry

- ontw. NEN-EN 13824-1: 1999, Stationary source emissions – Determination of low range mass concentration of dust – Part 1: Manual gravimetric method

- NEN-ISO 14164: 1999, Emissies van stationaire bronnen – Bepaling van het volumedebiet van gasstromen in schoorstenen – Geautomatiseerde methode

- draft NEN-EN 14385: 2002, Luchtkwaliteit – Emissies van stationaire bronnen – Bepaling van de totale emissie van specifieke elementen

- ISO/CD 15713: 1999, Stationary source emissions – Sampling and determination of fluoride content

- CAN/CSA-Z223.2-M86 'Method for the continuous measurement of oxygen, carbon dioxide, carbon monoxide, sulphur dioxide and oxides of nitrogen in enclosed combustion flue gas streams