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Publisher *Taylor & Francis*

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International Journal of Environmental Analytical Chemistry

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713640455>

Book Information

To cite this Article (1988) 'Book Information', International Journal of Environmental Analytical Chemistry, 32: 1, 59 – 62

To link to this Article: DOI: 10.1080/03067318808079077

URL: <http://dx.doi.org/10.1080/03067318808079077>

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Book Information

VDI 2268 Part 1

Chemical Analysis of Particulate Matter. Determination of Ba, Be, Cd, Co, Cr, Cu, Ni, Pb, Sr, V, Zn in Particulate Emissions by Atomic Spectrometric Methods

April 1987, Final Version, German-English Edition, DM 41.50

Available from Beuth Verlag GmbH, P.O. Box 1145, D-1000 Berlin 30, FRG.

Guideline VDI 2268 Part 1 describes the determination of the elements barium, beryllium, cadmium, chromium, cobalt, copper, nickel, lead, strontium, vanadium and zinc in particulate emissions, for instance from waste incinerators, firing equipment, smelting-works, metal processing industries, and cement works.

Particulate emissions are sampled by passing a partial volume of the main waste gas stream through a filter cartridge filled with fine silica wool by means of a probe. This method is described in Guideline VDI 2066 Part 2. The weight of the particulate matter collected in the filter cartridge is determined gravimetrically. Afterwards the silica wool packing is removed from the cartridge and dissolved in an open or closed (pressure digestion) digestion vessel by treatment with acid mixtures. The sample solutions obtained by one of these methods are diluted and analysed by atomic absorption spectroscopy or by optical emission spectroscopy.

Further parts of Guideline VDI 2268 deal with the determination of the elements arsenic, antimony, selenium, and thallium and the analysis of heavy metals and metalloids in connection with other methods of sampling.

VDI 2452 Part 3**Gaseous Air Pollution Measurement. Measurement of Fluoride Ion Concentration. Sorption Method with Prepared Silver Balls and Heated Membrane Filter**

July 1987, Final Version, German–English Edition, DM 41.50.

Available from Beuth Verlag GmbH, P.O. Box 1145, D-1000 Berlin 30, FRG.

The series of Guidelines VDI 2452 describes analysis methods by wet processes for the determination of fluorides in ambient air.

The phytotoxic effect of gaseous inorganic fluorine compounds may appear even at extremely low concentrations. The exact measurement of the concentration of such compounds is therefore of particular importance.

Guideline VDI 2452 Part 3 presents a complete measurement procedure. The determination of the fluoride ions is effected either photometrically or electrometrically with an ion-sensitive lanthanum fluoride electrode. The sampling air is sucked through a membrane filter to separate particulate substances and subsequently through two sorption tubes filled with soda-coated silver balls in order to separate the components to be measured. Any particles contained in the sampling air withheld during sampling by the filter installed upstream of the sorption tube. With the electrometric method, the high selectivity of the electrode chains generally excludes any interference by other anions. The absolute fluoride detection limit is $0.1 \mu\text{g}$ and the relative fluoride detection limit is $0.1 \mu\text{g}/\text{m}^3$.

VDI 2463 Part 9**Particulate Matter Measurement. Measurement of Mass Concentration in Ambient Air. Filter Method. LIS/P Filter Device**

February 1987, Final Version, German–English Edition, DM 41.50.

Available from Beuth Verlag GmbH, P.O. Box 1145, D-1000 Berlin 30, FRG.

Guideline VDI 2463 Part 9 describes the measurement of the mass concentration of particles suspended in ambient air by means of the LIS/P filter device. Design and volume flow of the sampled air

correspond to those of the LIB filter device. However, the LIS/P filter device has an additional flow plate which is positioned below the aspiration tube. By means of the LIS/P filter method the particles suspended in the ambient air are collected on filters and determined gravimetrically. The LIS/P filter device is developed for stationary operation in order to determine the mass concentration of particles in the ambient air. Moreover, the quantity of the sample enables substance specific analysis.

VDI 3863 Part 1

Measurement of Gaseous Emission. Determination of Acrylonitrile. Gas Chromatographic Method. Grab Sampling

April 1987, Final Version, German-English Edition, DM 36.70.
Available from Beuth Verlag GmbH, P.O. Box 1145, D-1000 Berlin 30, FRG.

Acrylonitrile is technically used as a basic substance for the production of polymeres. Emissions of acrylonitrile may occur with production of the monomere, with polymerisation and with processing of the polymeres.

Gas chromatography is one of the methods for determining acrylonitrile in waste gases. In the procedure described in this Guideline grab sampling is being used. Alternate sampling procedures are described in further parts of Guideline VDI 3863.

By means of a gas sampling tube a sample is taken from the waste gas to be examined. This sample is introduced into a gas chromatograph and analysed with an appropriate separation column. The concentration of acrylonitrile is determined by external standardisation.

This method is appropriate for the determination of acrylonitrile in waste gases in the presence of other organic compounds.

VDI 2267 Part 6

Chemical Analysis of Suspended Particulates in Ambient Air. Measurement of the Mass Concentration of Cadmium by Atomic Absorption Spectrometry

March 1987, Final Version, German-English Edition, DM 36.70.
Available from Beuth Verlag GmbH, P.O. Box 1145, D-1000 Berlin
30, FRG.

Cadmium compounds predominantly are to be found adsorbed to suspended particulate matter with diameters $< 2 \mu\text{m}$. Guideline VDI 2267 Part 6 describes the measurement of cadmium bound to suspended particulate matter in ambient air by atomic absorption spectroscopy after sampling with plane filters. This is a complete procedure for routine application. It is appropriate for the evaluation and control of ambient air concentrations of cadmium bound to particulate matter. If glass fiber filters are used, the cadmium is extracted; membrane filters are totally decomposed in acid mixtures. Any remaining residues are filtered off and the clear solution is analysed for cadmium by atomic absorption (usually graphite-furnace technique).

VDI 2267 Part 4

Chemical Analysis of Particulates in Ambient Air. Determination of Lead, Cadmium and Their Inorganic Compounds as Part of the Dust Precipitation by Atomic Absorption Spectrometry

March 1987, Final Version, German-English Edition, DM 36.70.
Available from Beuth Verlag GmbH, P.O. Box 1145, D-1000 Berlin
30, FRG.

Lead and cadmium are to be found in ambient air mainly as constituents of particulate matter in form of their inorganic compounds. These elements may be found in the particulate precipitation and in suspended particulate matter, depending on their origin. The determination of lead and cadmium in suspended particulate matter is described in the Guidelines VDI 2267 Parts 2, 3, 6 and 11. In these Guidelines the complete procedure for the determination of lead and cadmium by means of atomic absorption spectroscopy is dealt with following the decomposition of particulate precipitation (wet or dry) collected in precipitation collectors. The determination of thallium in particulate precipitation is described in the Guideline VDI 2267 Part 7.