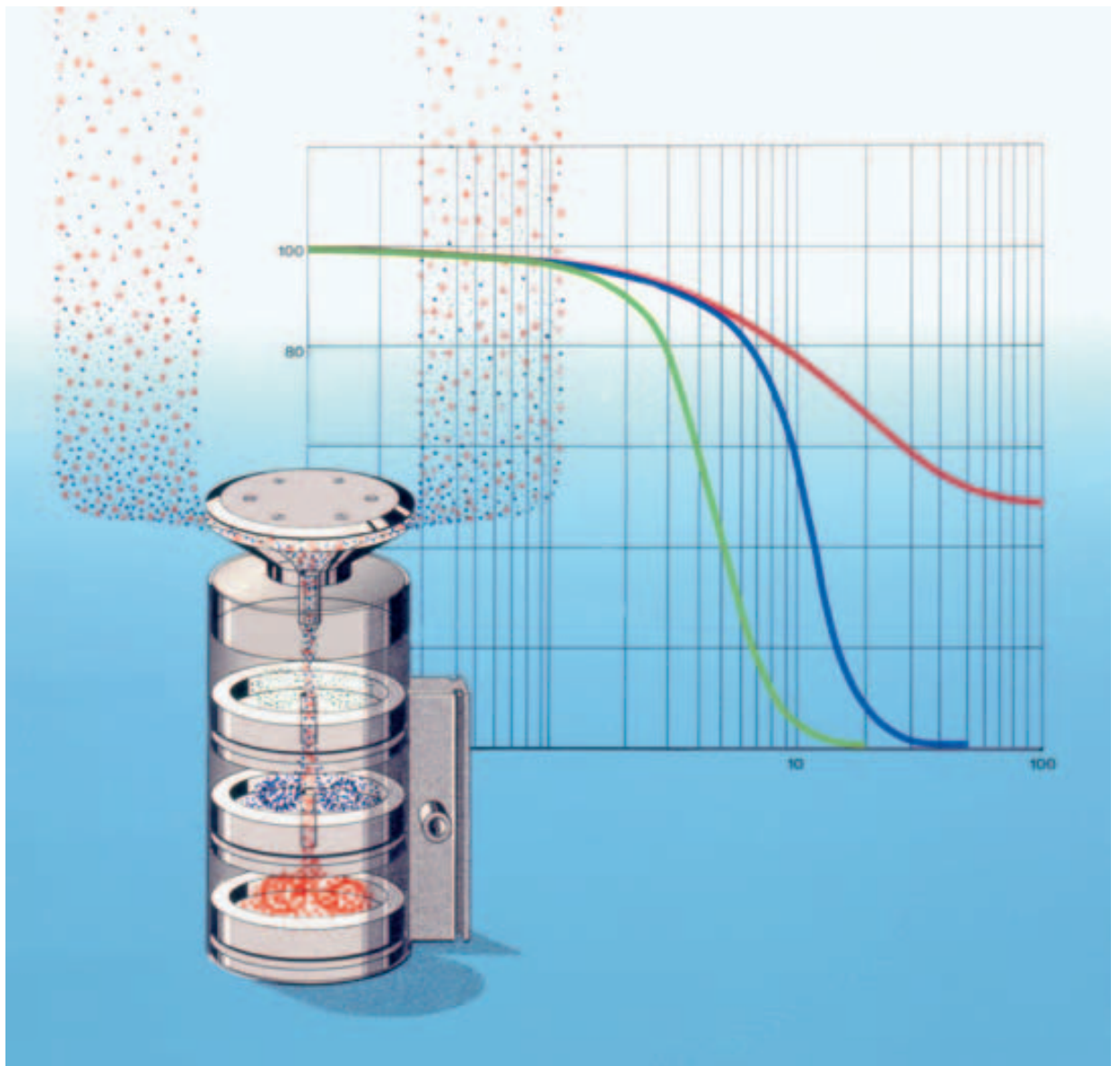


Respicon / Respicon TM



Gravimetric and combined gravimetric/photometric measurement of inhalable, thoracic and respirable dust fractions

Areas of application

Personal related dust measuring instrument for workplace measurement

- Construction sites
- Bulk materials
- Tunnel construction
- Wood processing
- Cement production
- Production of plastic injection moulded parts
- Mining
- Welding smoke



Monitoring of cement production

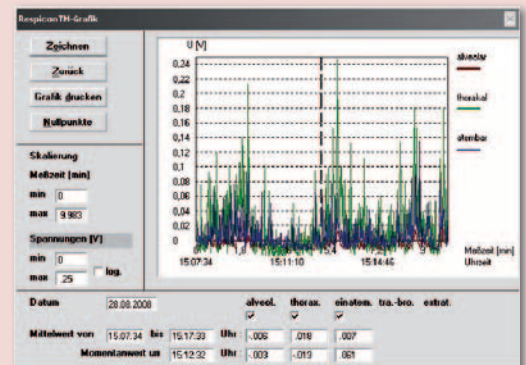
Main features and benefits

- Measurement of the three fractions of dust
 - inhalable (I-dust)
 - thoracic (T-dust)
 - respirable (R-dust)
- Easy calibration of the photometer on basis of the gravimetric data detected (Respicon TM)
- Determination of max concentration and current values
- Compact and robust design
- Low detection limit of $50 \mu\text{g}/\text{m}^3$
- Storage of measurements
- Comprehensive SW for illustration and data analysis



Analysis Software

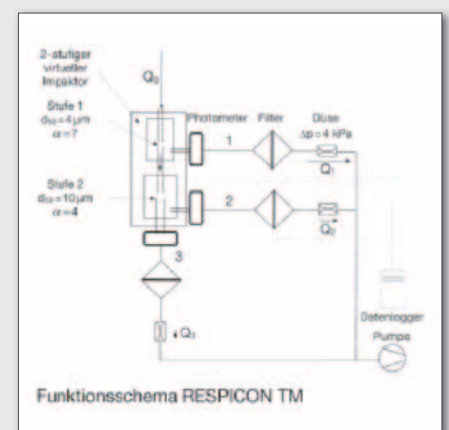
- Calibration of the photometer with the filter weights
- Graphical illustration of values measured
- Export of data for further processing e.g. to MS Excel



Operating principle

The Respicon includes a multi-level virtual impactor with three filter stages for the collection of dust for further gravimetric determination. The impactor stages enable an aerodynamic separation of the dust (aerosol) into the fractions and an increase of the coarse dust fraction.

Furthermore the instrument includes one optical measuring chamber for scattered light in each filter stage for the direct measurement of the dust concentration over time.



Measuring Principle

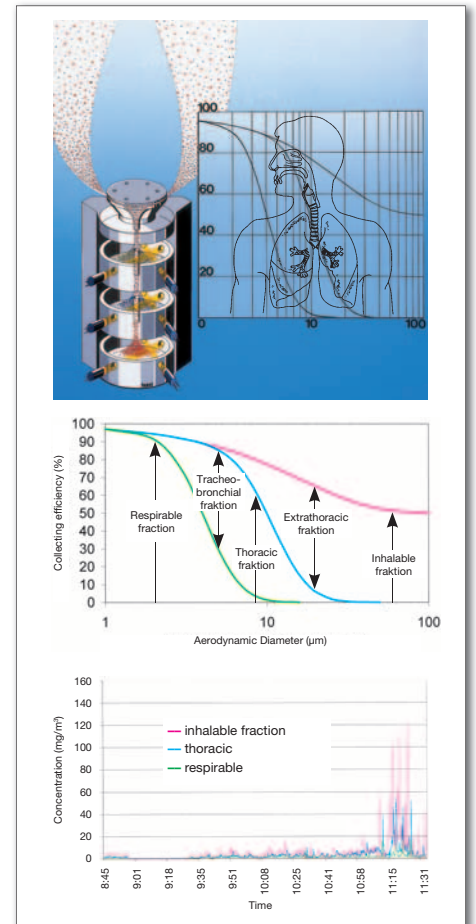
The RESPICON/RESPICON TM consists of a two-stage virtual impactor which is arranged together with the three analysis filters in a rotationally symmetrical concentric configuration. The airborne dust is drawn in through a ring gap and into the RESPICON/ RESPICON TM via a three-stage flow divider.

Coarse particles pass straight through to the lower collector while other particles are aerodynamically separated. Particles of smaller diameter follow flow paths and are distributed into the other stages according to their flow characteristics.

The first virtual impactor stage separates out the respirable fraction. The second stage addresses the thoracic fraction. Both these fractions are separated out through concentrically arranged filters with central holes. The coarse particles with an aerodynamic particle diameter larger than 10 µm are collected on the last filter.

The RESPICON TM measures the aerosol fractions at each stage with scattered-light photometers. Photometer 1 measures the respirable fraction. Photometer 2 measures the thoracic dust but with the bronchial fraction enriched in concentration by factor 7. Photometer 3 measures the dust seen by photometer 2 plus the extrathoracic function enriched in concentration by a factor of 28. This allows real-time measurement of each fraction with almost identical sensitivity.

The three dust fractions are collected on the filters for weighing or chemical analysis. The instrument is connected to a portable pump and a data logger.



Data Logger DSS8

Measurement range

L	Low range	-1 to +1 V
M	Medium range	-5 to +5 V
H	High range	-10 to +10 V

With built-in adapter for current an additional measuring range of -20 to +20 mA is available.

For each channel, one of these ranges can be selected. Channels not in use can be switched off.

Operating modes

Mode A Respicon TM mode

Mode B Data logger mode

In all measuring ranges, the measurement values are displayed in a range between -100 % and +100 %.

This corresponds to 0-5 V in channels 1-3 (Respicon mode) of the Respicon TM.

A complete Respicon TM measuring system includes

- The dust measuring device RespiconTM
- The sampling pump
- The data logger DSS8
- A wall power supply 230 V, 4.8 VA
- The software RESPICON

Important accessories

- Rotameter kit
- Stage flow checker
- Total flow checker
- Transport case
- Leather bag for data logger



Respicon TM with data logger at filter system

Technical Data

Respicon/Respicon TM	
Measuring principle	Simultaneous dust collection acc. to EN 481 in three size fractions (inhalable, thoracic, respirable). Respicon TM: additional scattered-light measurement (Tyndall effect) in each of the three stages.
Size of detected particles	Inhalable: < 100 µm Thoracic: < 10 µm Respirable: < 4 µm (< 2,5 µm with optional inlet head)
Fractioning	Two-stage virtual impactor
Measuring range Respicon TM [mg/m ³]	0–200, DEHS particles d = 1 µm
Sensitivity Respicon TM	20 mV / (mg/m ³)
Limit of detection [µg/m ³]	approx. 50, DEHS particles d = 1 µm
Filter modules	For filter cassettes with glass-fiber or membrane filters with 37 mm diameter
Tripod socket	Whitworth thread W ¼" at bottom of lowermost stage
Dimensions and weight	H x D: 80 x 55 mm, 200 g (Respicon), H x D: 110 x 60 mm, 475 g (Respicon TM)
Standards	EN481, ISO7708, ACGIH, AIHA, MAK, TRGS, test report acc. to prEN13205 is available
Pump unit	
Flow rate	3,11 l/min
Pressure difference	4 kPa
Operating time	> 8 h
Data logger	
Voltage channels	8, including 5 for further sensors
Measurement range in each channel	± 1 V, ± 5 V, ± 10 V, optional -20 ... 20 mA
Sampling interval [s]	1–99 in steps of 1 s
Resolution	0,01 %
Memory	512 kByte
Operating modes	
DC operation	Respicon TM / data logger
DC operation	6 NiMH rechargeable batteries, 1.3 Ah capacity, charging time during operation approx. 10 – 12 hours, approx. 6 when logger is switched off
AC Operation	Power supply and charging unit AC 230 V/ DC 12 V, 400 mA, power consumption max. 5,2 W
Operating time	> 8 h
Interface	RS232
Baud rate	1200, 9600, 19200, 38400 Baud (adjustable)
Accessories	<ul style="list-style-type: none"> • Evaluation software • Carrying case
Protection class	IP40 (Data logger + power supply)
Dimensions and weight	L x B x H: 210 x 100 x 55 mm, 575 g

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