

# PORTABLE AEROSOL SPECTROMETER DUST DECODER 11-D



The model 11-D, in its compact and rugged design, combines all advantages of the previous portable GRIMM aerosol spectrometers with the improved optical detection, long-term battery operation, and facilitated handling.

This configuration places the 11-D in the leading position of the portable aerosol spectrometers for monitoring inhalable, thoracic and respirable dust, PM values, and particle number concentration.

The 11-D is the optimal solution for reliable, flexible and real-time measurements for aerosol research and indoor air quality, e.g. at workplaces, interior of vehicles, or for process analysis.



## FEATURES

- real-time monitoring of particle number, occupational dust mass fractions, and PM values
- additional information on particle number, particle surface, and dust mass distribution
- 31 equidistant size channels, PSL traceable
- integrated 47 mm PTFE filter (GRIMM dual technology)
- versatile data acquisition and communication interfaces (Bluetooth, USB, Ethernet, RS-232)
- rinsing air for protecting laser and detector in optical cell
- internal sensor for temperature (T) and relative humidity (RH) in optical cell
- total inlet flow (1.2 L/min) analyzed in optical cell
- self-test of all optical and pneumatic components for high quality standards

## APPLICATIONS

- aerosol science
- $PM_{2.5}$  in indoor environments according to VDI 4300, part 11
- Indoor Air Quality (IAQ) in buildings and vehicles
- process control in industry
- workplace monitoring (inhalable, thoracic, respirable) according to EN 481
- monitoring of Permissible Exposure Limit (PEL) with high time resolution
- dust pollution measurements

inhalable  
thoracic  
respirable

TSP  $PM_{10}$   
 $PM_4$   $PM_{2.5}$   $PM_1$   
 $PM_{coarse}$

counts & mass

0.25 - 35  $\mu m$

real - time  
portable

## TECHNICAL DATA

### SPECIFICATIONS

measured parameters	dust fractions acc. to EN 481 (inhalable, thoracic, respirable) TSP, PM <sub>10</sub> , PM <sub>4</sub> , PM <sub>2.5</sub> , PM <sub>1</sub> , and PM <sub>coarse</sub> number concentration and size distribution
dust mass	0 – 100 000 µg/m <sup>3</sup>
particle size range	0.253 – 35.15 µm
size channels	31, equidistant
particle number	0 – 3 000 000 p/L diluter available for higher concentrations
reproducibility	> 97% of total measuring range, according to ISO 21501-1

### FUNCTION

detection principle	light scattering at single particles with diode laser; detection volume aerodynamically focused, no border zone error
detector	fast signal processing, 2 x 16 raw data channels
time resolution	6 s, 31 channels (selectable storage intervals) 1 s, 16 channels (either 0.253 - 2.982 µm or 2.982 - 35.15 µm)
volume flow rate	1.2 L/min, ± 3% constant due to self-regulation, according to ISO 21501-1; automatic altitude correction
internal rinsing air flow rate	0.4 L/min, protects laser optics, reference air for self-test
gravimetric control	47 mm PTFE filter

### HANDLING

operation	keypad or PC with GRIMM software (wireless or data cable)
connectivity	Bluetooth, USB, RS-232, Ethernet
analog input	1 port (0 – 10 V) for external sensors
power supply	in: 100 – 240 VAC, 47 – 60 Hz, out: 13 VDC, 2.5 A
power consumption	5.4 W
battery	Li-Ion battery, 10.8 V, 6.8 Ah for minimum 10 h operation with desktop smart quick charger
operating conditions	+4 to +40°C (39 - 104°F), RH < 95%, non-condensing, non-corrosive, or explosive gases
storage and transport	-20 to +50°C (-4 – 122°F), RH < 95%
dimensions (h x w x d)	27 x 13 x 7 cm (10.5 x 4.8 x 2.6 in)
weight	2.1 kg (4.6 lbs)

### ACCESSORIES

1179	GRIMM software for 11-D
1146	GPS sensor
1152	isokinetic sampling probe for 4 - 25 m/s
1145A	carrying bag
1158-TRH	external sensor for temperature and relative humidity
1159-10, 1159-100	capillary diluter (1:10 or 1:100)

