

PORTABLE FINE DUST MONITORING UNIT

**PM₁₀ - PM_{2.5} - PM₁
Inhalable - Thoracic - Respirable
Particle count distribution**

PersonalDustMonit



conTec
ENGINEERING SRL

Via Paisiello, 24 20131 Milano (MI) ITALIA
Tel ++39.02.26684830 (r.a.) Fax ++39.02.26683326
E-mail : info@conteng.it Sito WEB : www.conteng.it

PORTABLE FINE DUST MONITORING UNIT

PM10 - PM2.5 - PM1
Inhalable - Thoracic - Respirable
Particle count distribution

PersonalDustMonit

The P-DustMonit unit is an instrument for measuring and registering in continuation particles present in the air.

Laser scattering is the method used by P-DustMonit for measuring the particles that make up the atmospheric particulate and class them based on their dimensions.

This method allows:

- Measuring in $\mu\text{g}/\text{m}^3$ (in real time and at the same time) the fine particulate concentrations expressed as PM10 - PM2,5 - PM1
- Measuring in $\mu\text{g}/\text{m}^3$ (in real time and at the same time) the Inhalable - Thoracic - Respirable dusts concentrations as determined by the existing laws in force
- Measuring in real time and at the same time the number of particles present by classifying them at the same time in 8 different dimensional classes

Main characteristics of PersonalDustMonit:

- Very reliable
- Simple to use
- Possibility of storing all measurements carried out
- Possibility of downloading data measured for suitable uses
- Solid and light
- Internally battery powered
- Insensitive to vibrations and external collisions
- Long term calibration stability
- Low maintenance
- No radioactivity source
- Possibility to operate outside

TECHNICAL FEATURES:

Measurement method:	Laser scattering
Measurement:	PM10 - PM2.5 - PM1 Inhalable - Thoracic - Respirable Particle count distribution in 8 classes (0.3 μm - 0.5 μm - 0.7 μm - 1 μm - 2 μm - 3 μm - 5 μm - 10 μm)
Measuring range:	1 - 1,000 $\mu\text{g}/\text{m}^3$
Sample flow:	1l/min
Autonomy with internal battery:	24 hours
Internal battery recharge time:	3 hours
Possible power supply	220V 50Hz
Operating temperature:	from -10 to + 38°C
Protection degree:	can also operate outside
Dimensions:	18 (L) x 9 (D) x 28 (H) cm with probe H = 63 cm
Weight:	2.9 Kg.

Controlling the measuring system is carried out by means of an external small PC that manages the measuring instrument, memorises the relevant data and displays the measurements. The program is simple to use and allows all measurement parameters to be set manually.

Analyser control: Start / Stop / Analysis
 Setting of the analysis frequency
 Possible Setting of the calculation of the average drag of the measured values

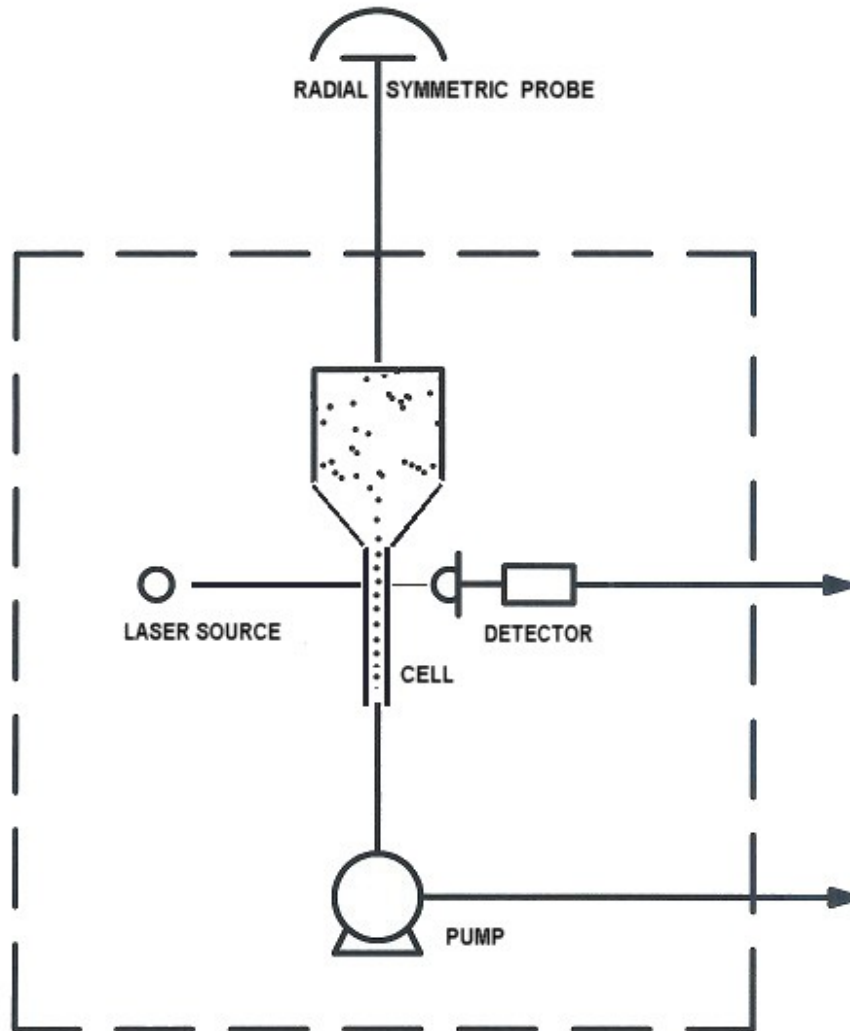
Data displayed on the PC: Measurement in real time for PM10
 Measurement in real time for PM2.5
 Measurement in real time for PM1

The results of the measurements are saved in text form (with delimiters that allow automatic importation in the most common programs of the calculation) on the "SDHC" card provided with the PC.

OPTIONS

- A) Geographical position detector unit which sends position coordinates to PC, if the unit is outdoor, and the software process data.
- B) External power supply with rechargeable battery and 220V charger for very long autonomous use of the PersonalDustMonit with the following characteristics:
 - Continuous power supply of the PersonalDustMonit = 7 days
 - Internal battery recharge time = 6 hours
 - Size : 18x26x24 cm
 - Weight : 6 Kg
- C) Rucksack containing PersonalDustMonit when the instrument is carried around.
- D) Travel case

“LASER SCATTERING” MEASUREMENT METHOD



A constant flow pump draws air in through a radial symmetric probe and pushes it into a cell where each particle is hit with a laser.

The energy reflected by each particle, proportional to its dimension, is measured by a high-velocity photodiode which generates counting signals as well as dimensional ones.

The system software equates these values with volume unit and sends the final results via a serial RS232 to the standard engineering unit.

PersonalDustMonit Applications

The technical characteristics of PersonalDustMonit provide this instrument with many interesting applications.

Laser scattering allows immediate and continuous measurement of fine particles present in the air both with respect to their number, their dimensions and their concentration in $\mu\text{g}/\text{m}^3$.

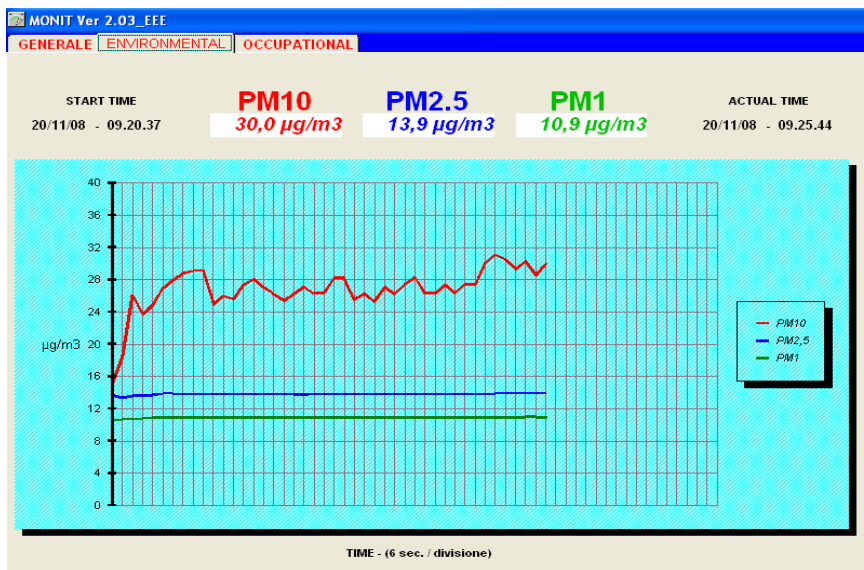
The management software installed on the PC provided, manages the measurement system, presents the relative values in real time and saves them on adequate support for successive processing.

The compactness, the reduced dimensions, the lightness and its long lasting autonomous supply make this instrument easy to use.

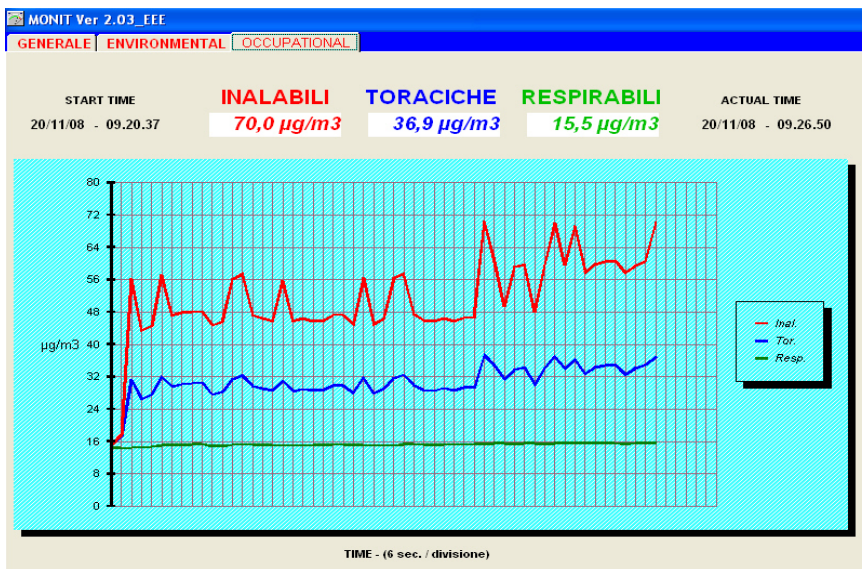
This equipment is used mainly for:

- Measuring the concentration of the particles inhaled by a person during any day or part of it.
It is possible to obtain both the measurement of the concentrations of the fine particulate where the person has been and has worked through the day and the measurement of the number of the particles (total or divided in particle classes) that the individual has inhaled with the contemporary specification of time and place where the measured particles were inhaled.
- Mapping an area with respect to the concentration of the atmospheric particulate.
- Immediate measurement of the concentration of dusts present in a specific location both urban and industrial.
- Controlling and checking the forecast modelling of the concentrations of the particulate in the atmosphere.
- Valuating the environmental safety degree with respect to the particulate of a moving individual in a working area.
- Use on moving vehicles such as cars, trucks, trains, planes, etc.

EXAMPLE OF THE PRESENTATION OF THE RESULTS



Air pollution expressed as "PM₁₀" "PM_{2,5}" "PM₁"



Air pollution expressed as Inhalable - Thoracic - Respirable

MONIT Ver 2.03_FEE
 GENERALE ENVIRONMENTAL OCCUPATIONAL

START TIME 20/11/08 - 09.20.37
 ACTUAL TIME 20/11/08 - 09.23.26

FREQUENZA DI MISURA: 6 30 60 300 600 900
 SET U.R.%: 10

PORTA SERIALE: 1 2 3 4 Media

TIME	>0,30 µ	>0,50 µ	>0,70 µ	>1,00 µ	>2,00 µ	>3,00 µ	>5,00 µ	>10,0 µ	ALARM	FLOW	TEMI
20/11/08 09.21.32	100.788	7.046	1.245	498	138	32	4	0	0	0	3,0
20/11/08 09.21.38	101.298	7.069	1.177	494	152	34	16	3	0	0	3,0
20/11/08 09.21.44	101.822	7.048	1.167	492	153	32	12	2	0	0	3,0
20/11/08 09.21.50	102.400	7.125	1.158	501	155	39	13	2	0	0	3,0
20/11/08 09.21.56	102.555	7.112	1.145	517	175	42	16	3	0	0	3,0
20/11/08 09.22.02	102.857	7.143	1.137	518	170	44	16	2	0	0	3,0
20/11/08 09.22.08	103.016	7.189	1.128	510	169	46	17	2	0	0	3,0
20/11/08 09.22.14	103.154	7.263	1.136	513	173	50	17	2	0	0	3,0
20/11/08 09.22.20	103.118	7.246	1.140	522	181	51	17	2	0	0	3,0
20/11/08 09.22.26	102.662	7.164	1.162	507	160	39	13	2	0	0	3,0
20/11/08 09.22.32	102.436	7.163	1.152	508	166	41	14	2	0	0	3,0
20/11/08 09.22.38	102.773	7.196	1.162	518	173	49	14	3	0	0	3,0
20/11/08 09.22.44	102.760	7.224	1.157	519	173	50	16	3	0	0	3,0
20/11/08 09.22.50	102.857	7.216	1.149	510	176	47	16	2	0	0	3,0
20/11/08 09.22.56	102.920	7.217	1.147	513	165	46	15	2	0	0	3,0
20/11/08 09.23.02	102.895	7.252	1.157	518	168	46	14	2	0	0	3,0
20/11/08 09.23.08	102.872	7.198	1.138	508	168	45	14	3	0	0	3,0
20/11/08 09.23.14	102.880	7.233	1.162	512	165	45	14	2	0	0	3,0
20/11/08 09.23.20	102.841	7.198	1.141	506	164	46	15	2	0	0	3,0
20/11/08 09.23.26	102.826	7.222	1.166	522	171	45	14	2	0	0	3,0

Granulometric classification of atmospheric dust

