PORTABLE FINE DUST MONITORING UNIT

PM_{10} - $PM_{2.5}$ - PM_1
Inhalable - Thoracic - Respirable
Particle count distribution

P-DustMonit

conTec
ENGINEERING SRL

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Particle count distribution

P-DustMonit

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 µg/m ^{3} (in real time and at the same time) the fine particulate concentrations expressed as PM10 - PM2,5 - PM1
- Measuring in µg/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 15 different dimensional classes

Main characteristics of P-DustMonit:

- Very reliable
- Simple to use
- Possibility of storing all measurements carried out
- Possibility ofdownloading 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 15 classes (>0,30µm>0,40µm>0,50µm>0,60µm>0,70µm >0,85µm>1,00µm>1,50µm>2,00µm>2,50µm >3,00µm>4,00µm>5,00µm>7,50µm>10,0µm).
Measuring range:	1 - 10,000 µg/m^3
Sample flow:	1l/min
Autonomy with internal battery:	9 hours
Internal battery recharge time:	2 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:	4.5 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 Setting of the Relative Humidity level at which the heating of the probe is to be activated Possible Setting of the calculation of the average drag of the measured values
Data displayed on the PC:	Measurement in real time for PM_{10} Measurement in real time for $PM_{2.5}$ Measurement in real time for PM_{1} Measurement in real time for "INHALABALE" Measurement in real time for "THORACIC" Measurement in real time for "RESPIRABLE" Measurement in real time of the number of particles classified in 8 or 15 different site classes. Service data (sample flow, temperature and humidity and optional alarm indication).

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) External power supply with rechargeable battery and 220V charger for very long autonomous use of the P-DustMonít with the following characteristics:
   - Continuous power supply of the P-DustMonit = 3 days
   - Internal battery recharge time = 6 hours
   - Size : 18x26x24 cm
   - Weight : 6 Kg

B) Waterproof container for the PC to allow functioning in any environmental condition.

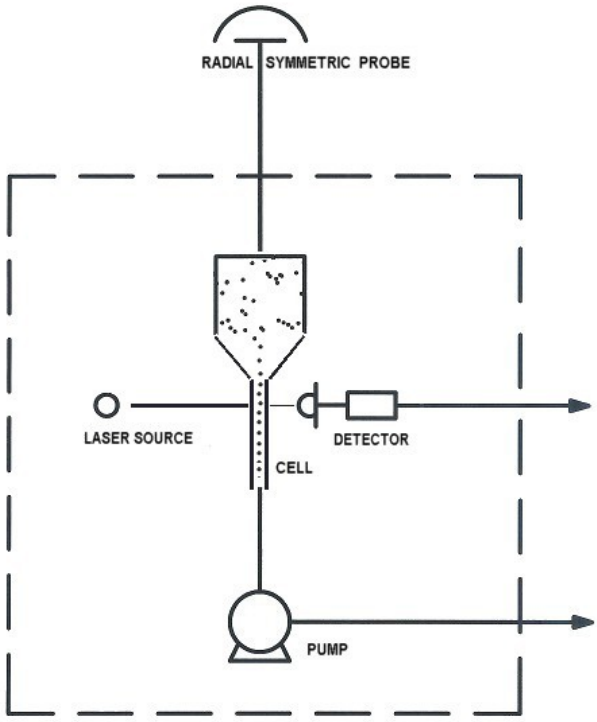
C) Travel case

Fine dust measuring methodology

PM_{10} - $PM_{2,5}$ – PM_1
Inhalable - Thoracic - Respirable
Particle count distribution

for “Laser-Scattering” instruments

All the above concentration are measured
in real time and simultaneously



A constant flow pump draws air in through a radial symmetric probe and pushes fit finto 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.

P-DustMonit Applications

The technical characteristics of P-DustMonit provide this instrument with many interesting applications.

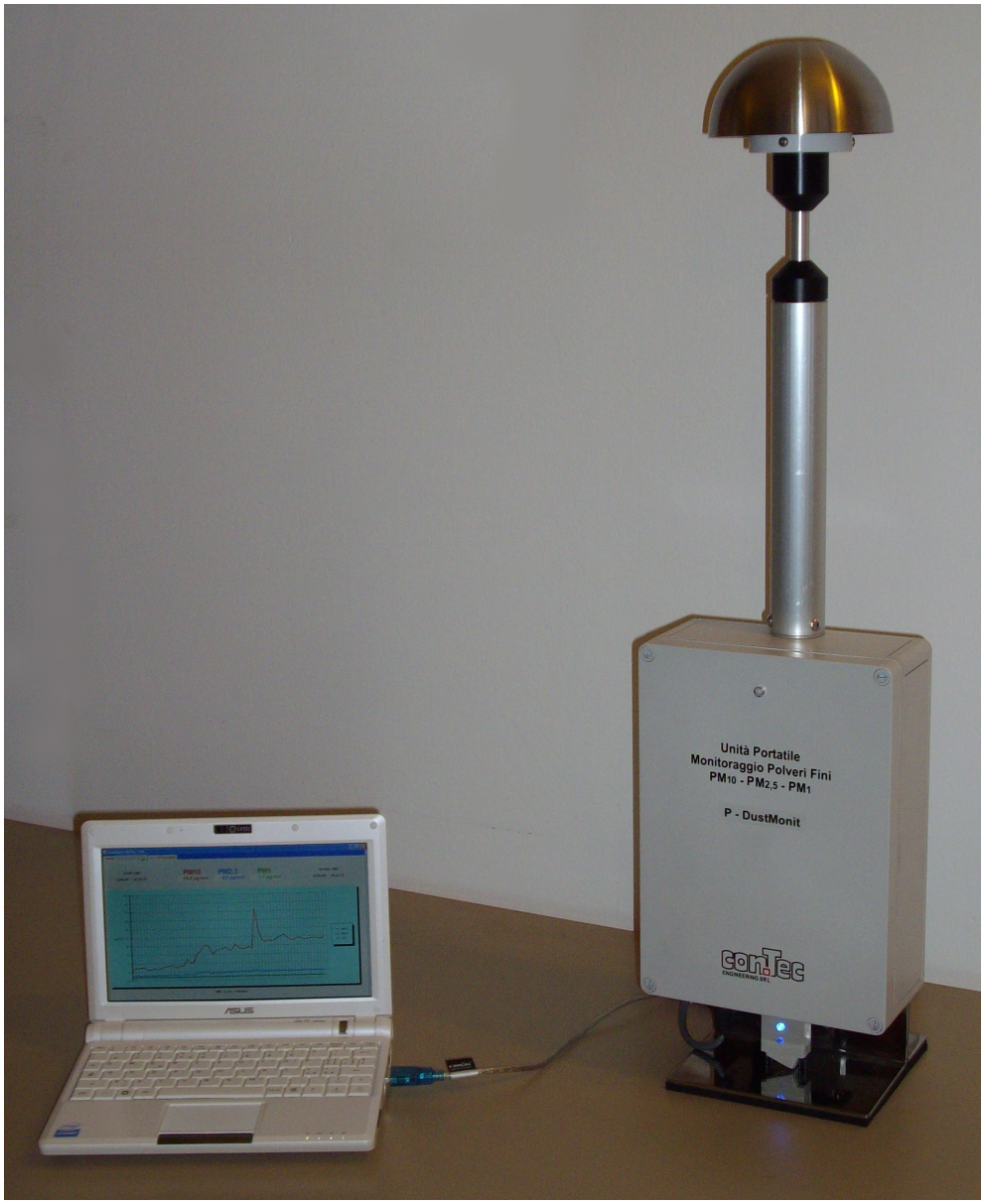
Laser scattering allows immediate and continuous measurement of fine particles present in the air both with respect to their number, their dimensions and their concentration in $\mu g/m^3$.

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:

- 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.
- Mapping an area with respect to the concentration of the atmospheric particulate.
- Use on moving vehicles such as cars, trucks, trains, planes, etc.


Unità Portatile
Monitoraggio Polveri Fini
PM10 - PM2.5 - PM1
P - DustMonit
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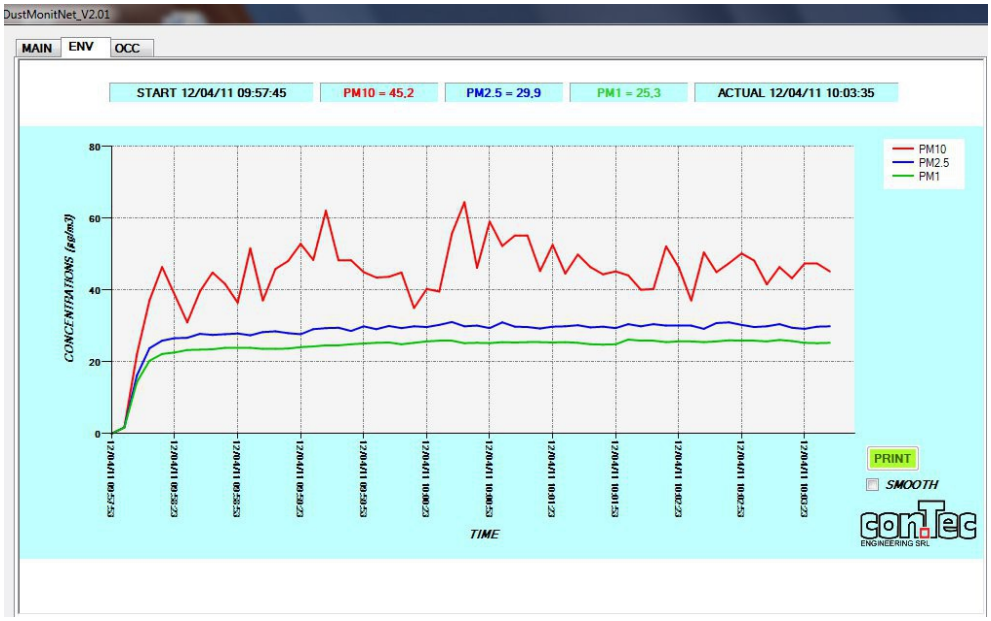
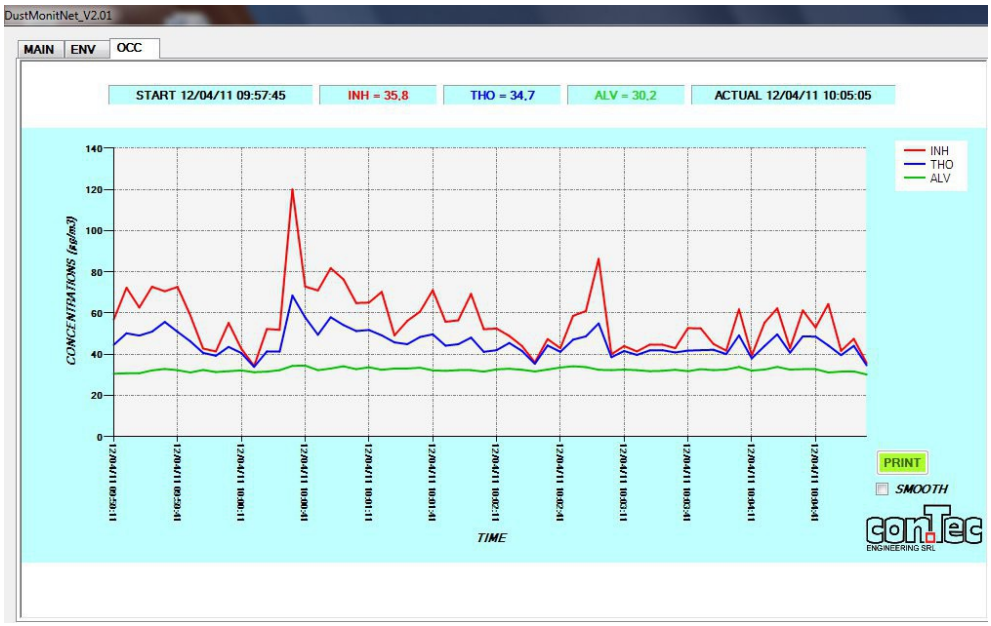
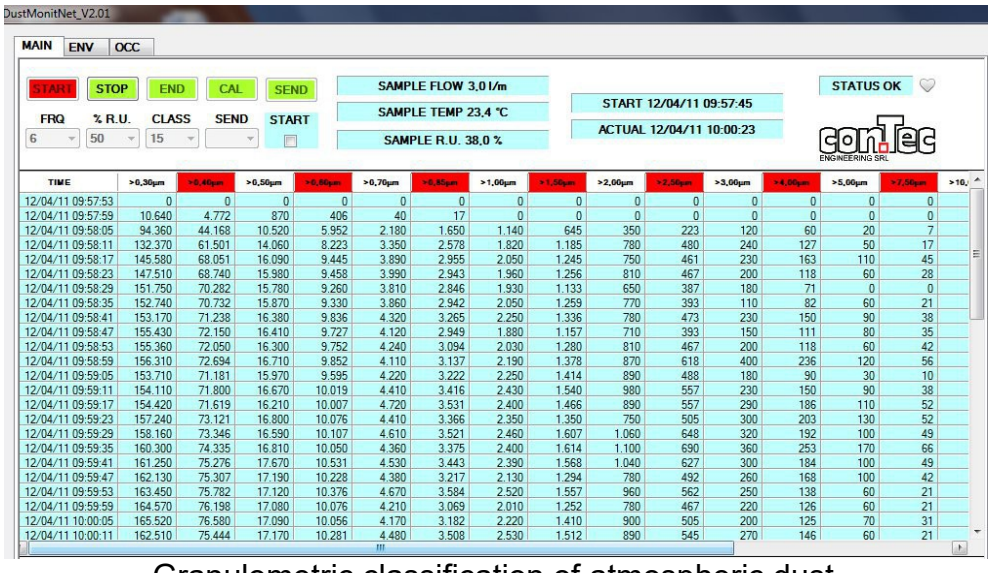
EXAMPLE OF THE PRESENTATION OF THE RESULTS



Air pollution expressed as "PM_{10}" "$PM_{2,5}$" "PM_{1}"



Air pollution expressed as Inhalable - Thoracic - Respirable



TIME	>0,30µm	>0,40µm	>0,50µm	>0,65µm	>0,70µm	>0,85µm	>1,00µm	>1,50µm	>2,00µm	>2,50µm	>3,00µm	>4,00µm	>5,00µm	>7,50µm	>10,
12/04/11 09:57:53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/04/11 09:57:59	10.640	4.772	870	406	40	17	0	0	0	0	0	0	0	0	
12/04/11 09:58:05	94.360	44.168	10.520	5.952	2.180	1.650	1.140	645	350	223	120	60	20	7	
12/04/11 09:58:11	132.370	61.501	14.060	8.223	3.350	2.578	1.820	1.185	780	480	240	127	50	17	
12/04/11 09:58:17	145.580	68.051	16.090	9.445	3.890	2.955	2.050	1.245	750	461	230	163	110	45	
12/04/11 09:58:23	147.510	68.740	15.980	9.458	3.990	2.943	1.960	1.256	810	467	200	118	60	28	
12/04/11 09:58:29	151.750	70.282	15.780	9.260	3.810	2.846	1.930	1.133	650	387	180	71	0	0	
12/04/11 09:58:35	152.740	70.732	15.870	9.330	3.860	2.942	2.050	1.259	770	393	110	82	60	21	
12/04/11 09:58:41	153.170	71.238	16.380	9.836	4.320	3.265	2.250	1.336	780	473	230	150	90	38	
12/04/11 09:58:47	155.430	72.150	16.410	9.727	4.120	2.949	1.880	1.157	710	393	150	111	80	35	
12/04/11 09:58:53	155.360	72.050	16.300	9.752	4.240	3.094	2.030	1.280	810	467	200	118	60	42	
12/04/11 09:58:59	156.310	72.694	16.710	9.852	4.110	3.137	2.190	1.378	870	618	400	236	120	56	
12/04/11 09:59:05	153.710	71.181	15.970	9.595	4.220	3.222	2.250	1.414	890	488	180	90	30	10	
12/04/11 09:59:11	154.110	71.800	16.670	10.019	4.410	3.416	2.430	1.540	980	557	230	150	90	38	
12/04/11 09:59:17	154.420	71.619	16.210	10.007	4.720	3.531	2.400	1.466	890	557	290	186	110	52	
12/04/11 09:59:23	157.240	73.121	16.800	10.076	4.410	3.366	2.350	1.350	750	505	300	203	130	52	
12/04/11 09:59:29	158.160	73.346	16.590	10.107	4.610	3.521	2.460	1.607	1.060	648	320	192	100	49	
12/04/11 09:59:35	160.300	74.335	16.810	10.050	4.360	3.375	2.400	1.614	1.100	690	360	253	170	66	
12/04/11 09:59:41	161.250	75.276	17.670	10.531	4.530	3.443	2.390	1.568	1.040	627	300	184	100	49	
12/04/11 09:59:47	162.130	75.307	17.190	10.228	4.380	3.217	2.130	1.294	780	492	260	168	100	42	
12/04/11 09:59:53	163.450	75.782	17.120	10.376	4.670	3.584	2.520	1.557	960	562	250	138	60	21	
12/04/11 09:59:59	164.570	76.198	17.080	10.076	4.210	3.069	2.010	1.252	780	467	220	126	60	21	
12/04/11 10:00:05	165.520	76.580	17.090	10.056	4.170	3.182	2.220	1.410	900	505	200	125	70	31	
12/04/11 10:00:11	162.510	75.444	17.170	10.281	4.480	3.508	2.530	1.512	890	545	270	146	60	21	

Granulometric classification of atmospheric dust