CONTINUOUS FINE DUST MEASURING SYSTEM

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

DustMonit

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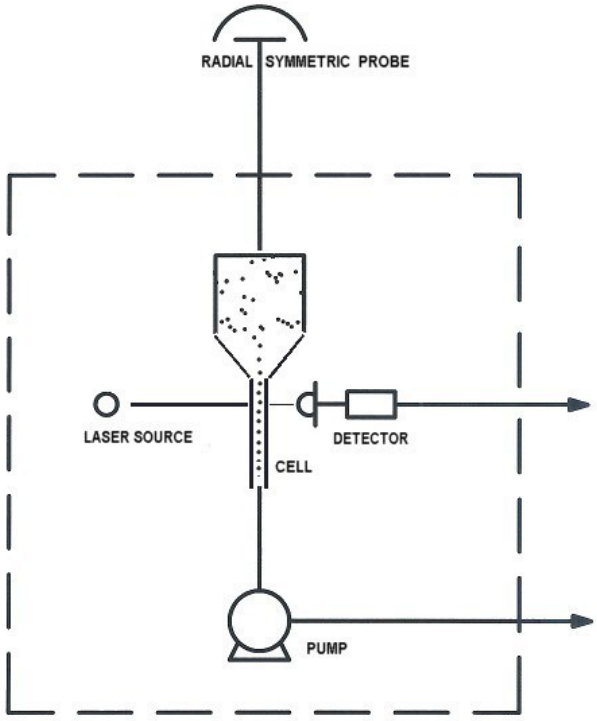
Fine dust measuring methodology

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.

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PM10 - PM2.5 - PM1

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Particle count distribution

DustMonit

The dust monitoring unit DustMonit is a complete system for continuous monitoring of particulate concentration in the air.

The system consists of the following elements:

1. Inox housing (IP65)
2. Heated probe
3. Dust spectrometer
4. Local PC for management and storage of the measured values
5. Software for unit control

This measuring system has been designed for making reliable continuous measurements without the presence of operators.
This unit can be used in air pollution monitoring networks, in mobile laboratories, in places you need in a particular time a particulate concentration measurement.
The methodology used by DustMonit for detecting particles in the air and for classifying them depending on their dimensions is “Laser Scattering”.

This instrument give you the following possibilities:

- Measuring in real time and simultaneously the dust concentrations expressed as PM 10 - PM2.5 - PM1 without utilizing external impactors.

- Measuring in real time and simultaneously the dust concentrations expressed as Inhalable - Thoracic - Respirable (as described in EN 481) without utilizing external impactors.

- Measuring in real time and simultaneously the numbers and distribution of particles in 15 dimensional classes.

MAIN FEATURES

- Very reliable
- Low maintenance
- Long term calibration stability
- Insensitiveness to vibrations
- No radioactive source
- No need for shelter

SPECIFICATIONS

Measurement method:Laser-scattering

Measurements	:PM_{10} - $PM_{2.5}$ - PM_1 Inhalable - Thoracic - Respirable Particle count distribution in 15 dimensional 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 ÷ 10,000µg/m^3
Sample flow	:1l/min
Output	:RS232
Power supply	:220V 50Hz 40W
Temperature range	:-10 ÷ 40°C
Size	:50 x 40 x 20 cm
Weight	:15Kg

CONTROL SYSTEM CHARACTERISTICS

The control system of the unit is made with an incorporated PC menaging the instrument, storing the measurements and displaing the measurements.

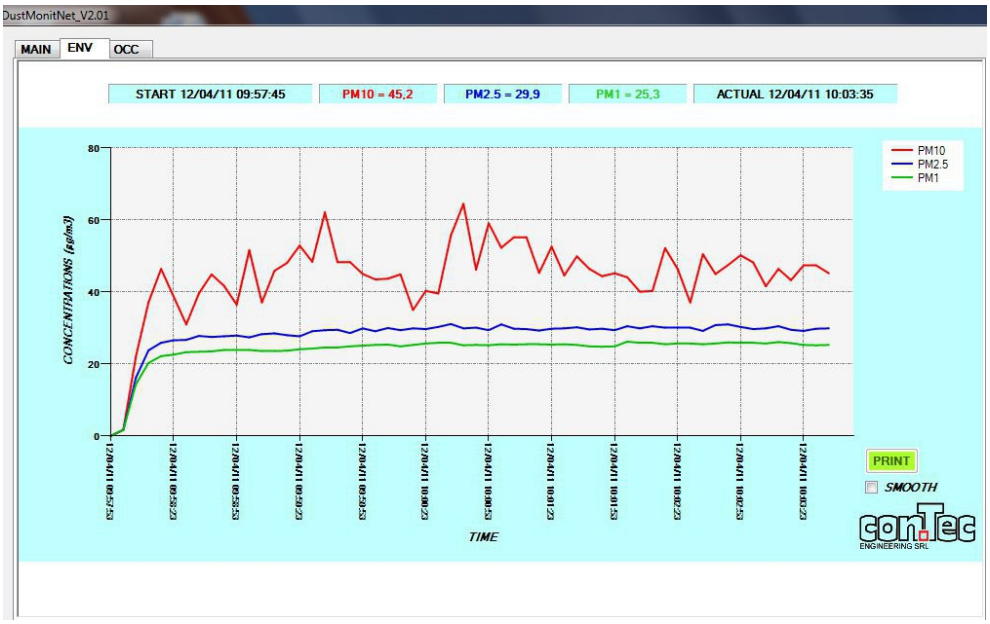
SOFTWARE CHARACTERISTICS

A simple program allows you to set manually all measuring parameters.

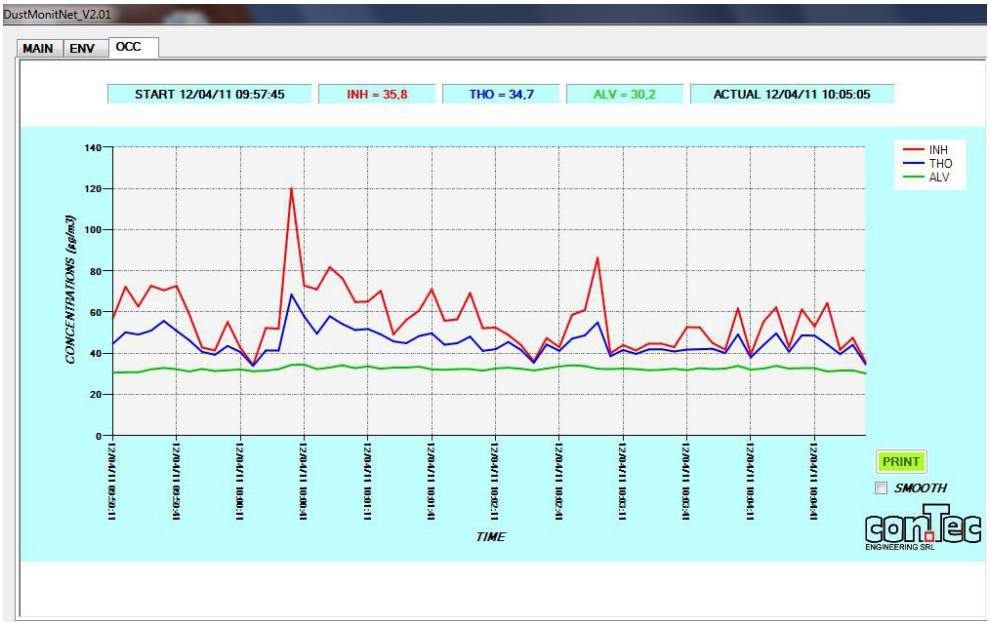
Dust monitor controls	: Analisys Start/Stop Measurement time set Heating probe set Average On/Off COM port setting
Data presentation	: Real time PM_{10} measurement Real time $PM_{2.5}$ measurement Real time PM_1 measurement Real time “Inhalable” measurement Real time “ Thoracic” measurement Real time “Respirable” measurement Real time particles count and classification in 8 or 15 dimensional classes Service data (sample flow, sample temperature and humidity and optional alarm indication)

All results are stored in a SDHC card (supplied with the PC) in “txt” format, ready to be imported in the most common data processing software.
If there is a voltage drop the instrument continues to work for two hours powered by internal rechargeable battery.

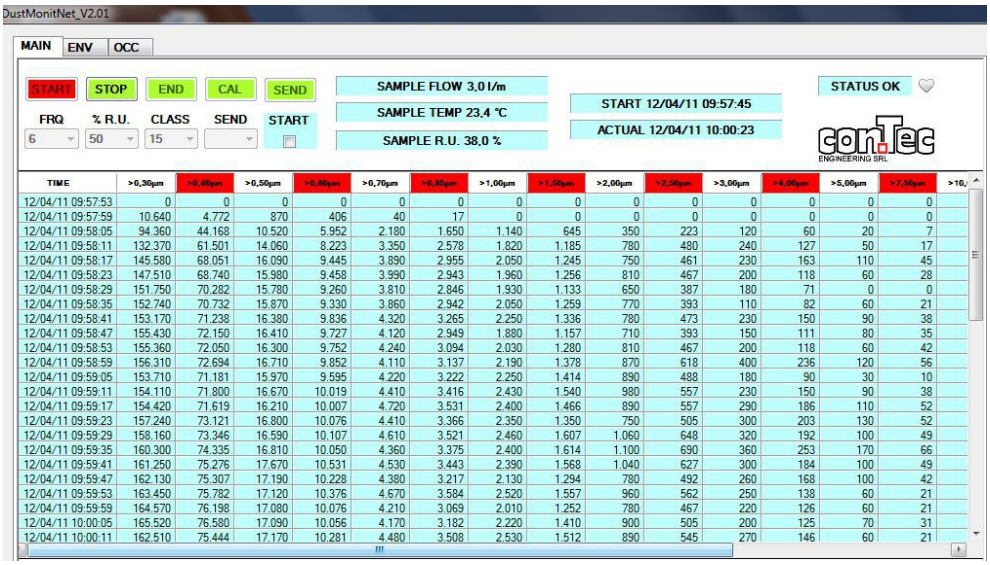
EXAMPLE OF THE PRESENTATION OF THE RESULTS



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	>0,60µm	>0,70µm	>0,80µm	>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

DustMonit Applications

The technical characteristics of 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.

This equipment is used mainly for:

- Immediate measurement of the concentration of dusts present in a specific location both urban and industrial.
- Valuating the environmental safety degree with respect to the particulate in a working area.
- Particulate measuring equipment in air pollution monitoring networks.
- Use on moving vehicles such as mobile laboratories, trains, etc...