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Rack Mounted Environmental Dust Monitor

GRIMM EDM 180

19" Rack Mounted Environmental Dust Monitor for Simultaneous measurement of PM_{10} , $PM_{2.5}$ and PM_1 or PM coarse

Advantages

- ✓ Fully Automatic
- ✓ 19" Rack solution
- ✓ 3 different PMs
- ✓ Dehumidification
- ✓ Particle Size optional
- ✓ Relative Humidity sensor
- ✓ Air Temperature sensor
- ✓ Air Pressure sensor
- ✓ GESYTEC protocol
- ✓ Data Logger Card
- ✓ RS-232 port

Applications

- ✓ Enviro - Network
- ✓ Aerosol - Sizer
- ✓ Source identification

Design Benefits

- EC approved for PM-10
- PM relations
- TC value
- All in one system
- Service Data access
- Not critical to vibration
- No radioactive source
- No loss of SVC
- Low maintenance
- Auto Retrack system



The GRIMM EDM 180 fine dust measuring system is designed for the simultaneous real time measurement of PM_{10} & $PM_{2.5}$ according to European Standards EN 12341 for PM_{10} and EN 14907 for $PM_{2.5}$. (PM_1 is also reported but no EN standard currently exists).

The sister model GRIMM ECM 190 includes, in addition, particle count information from $0.25 \mu m$ to $32 \mu m$ in 31 size channels.

Measurement Principle

The Grimm model #180 dust monitor takes a continuous air sample with a flow controlled pump. The particles are measured by the physical principle of orthogonal light scattering.

Here particles are illuminated by a laser light and the scattered signal from the particle passing through the laser beam is collected at approx. 90° by a mirror and transferred to a recipient diode. Each signal of the diode is fed, after a corresponding reinforcement, to a pulse height analyser then classified to size and transmitted in each size channel. These counts are converted each 6 seconds to a mass distribution from which the different PM values derive.

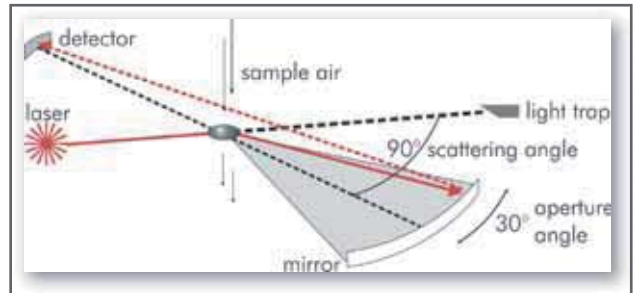
System Configuration EDM 180

The complete system for the installation in a 19" rack consists of the

- (#180) 19" rack Housing with space for
- (#179) 31 size channel Laser Aerosol Spectrometer and the upper
- (#181) sample pipe holding system. The
- (#182) 1,5 m long sample pipe with internal Nafion dryer and TSP head as well as sensors for out door temperature and relative air humidity.

1. **The ambient dust** enters the random sample head (on top of the #182 pipe) measuring system at a sampling rate of 72l/h and passes down the isotherm
2. **Dehumidification pipe**, where excess moisture is extracted from the sampled dust. This automatic system works without heating, so there is no loss in the semi volatiles.
3. Then the sample crosses the optical **measurement cell**, described above in detail.
4. Finally an internal processor determinates from the obtained size distribution in real time simultaneously the **PM₁₀ & PM_{2.5}** (EN 12341/EN 14907) and **PM₁ or PM coarse fractions**.
5. Also the temperature, relative humidity and pressure are automatically recorded.
6. All data are stored on an integrated data logger and transmitted to an RS-232.
7. The Total Count value (TC) is also given in counts/m³ at all times (in the Gysitech mode only).

Results of the measurement are shown on the front panel. The data is also stored and retrieved for PC display with our software for mass distribution in µg/m³ for PM₁₀, PM_{2.5} and PM₁. Remote data access is also possible.



The environmental fine dust monitor GRIMM model 180 fulfils all the formal EUROPEAN

requirements of EN 12341 and successful demonstration of **PM₁₀ equivalenz criteria**.

The European Air Quality Directives ("Daughter" Directives) 1999/30/EC, 2000/69/EC specifies the principles of the reference methods to be used for the measurement of concentrations of the PM10 fraction of suspended particulate matter (EN12341).

To show the equivalency of a candidate method the field tests for the Environmental Dust Monitor Model #180 by GRIMM Aerosol Technik have been conducted by the German laboratory LUBW (former UMEG, accredited according EN ISO/IEC 17025).

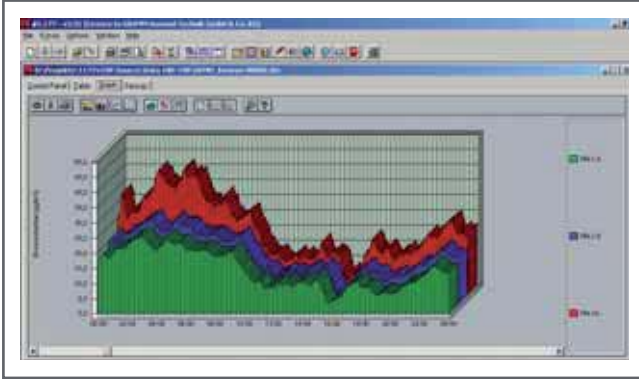
Reference unit was the low volume sampler model SEQ 47/50 with PM10-inlet from Sven Leckel Ingenieurbüro GmbH. Several field tests with two of each system during different seasons as well as laboratory tests had to be conducted.

The candidate instrument Grimm EDM 180 has met the quality criteria set by the reference unit and is now approved.

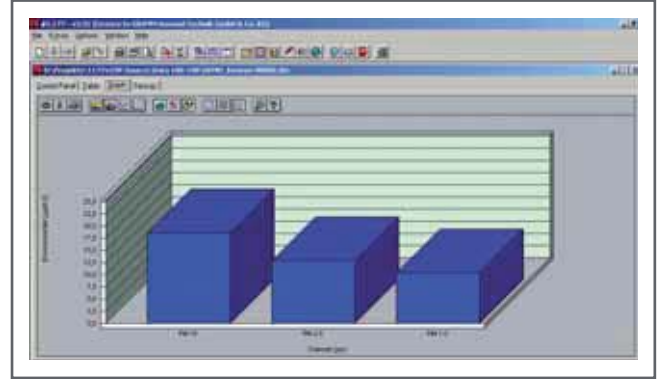


Environmental Data Presentation

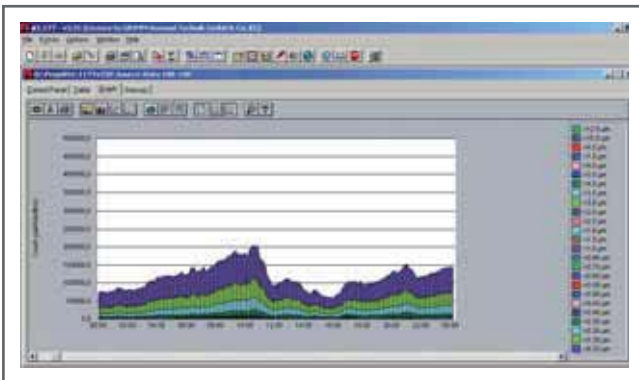
Examples obtained from the Grimm EDM 180 System by the use of the Grimm software #177



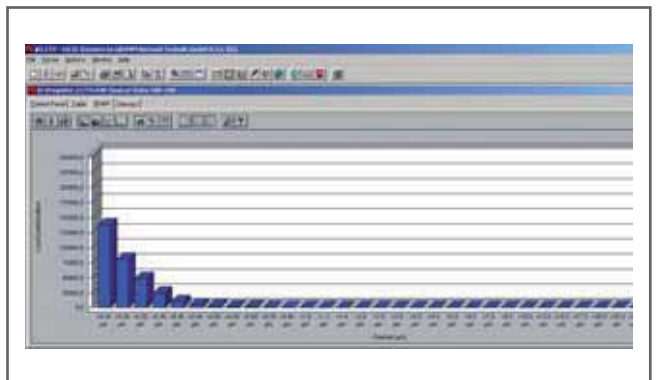
Graph shows the presentation of PM_{10} , $PM_{2.5}$ and PM_1 mass obtained in **real time data over one day**.



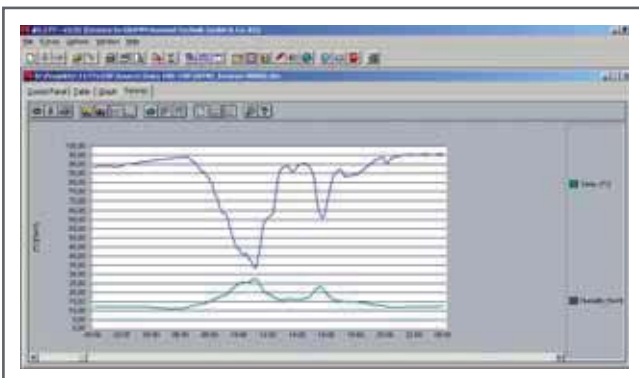
Graph shows the PM_{10} , $PM_{2.5}$ and PM_1 **mean time mass over one day** (for gravimetric comparisons).



Graph shows the real time count presentation in counts of all **31 different size channels**, obtained with ECM 190



Graph shows the mean time count presentation in counts of all **31 different size channels**.



Graph shows the meteorological data presentation of **temperature and humidity**.

Most of our units work in different **national networks** and they have our unit attached to their own data presentation system (and not our Grimm #177 software).

SOURCE APPORTIONMENT

The GRIMM environmental particle analysers are **unique** in their ability to provide real time information on source apportionment of particulates.

The capability to measure in **real time** the PM_{10} , $PM_{2.5}$ and PM_1 values, combines with meteorological data, permits an accurate source identification.

The ability to see aerosol particle size changes in the PM values will help our understanding in determining the type of contamination.

For example particle concentrations may be rising due to a local factory emission or maybe a nearby airport or other pollution source.

This is a **significant advance** in the environmental monitoring philosophy.

It is also possible to show the **service data in real time**:

- The instrument performance
- Possible warning signals
- Error messages.

Technical Specification

Grimm EDM 180 Mass Monitor

Measurement principle: Light Scattering (90°)
Reports simultaneously: PM₁₀, PM_{2.5} & PM₁ or PM course
Measurement range: 0.25 to >32 microns
Particle counts: 1 to 2,000,000 particle/litre
Dust mass: 0.1 to >1500 µg/m³
Sample flow: 1.2 l/min, volume controlled
Reproducibility: 3 % in max. range
Power supply: 230VAC, 50Hz / 110VAC, 60Hz.
Size & Weight 19", 6 HE & 15 kg
Sample pipe length: 1.5 m (or 3m optional)
Shelter temp.: + 10° to +30°C

Grimm ECM 190 Count Monitor

Measurement principle: Light Scattering (90°)
Measurement range: 0.25 to 32 µm in 31 sizes
Channel thresholds: 0.25- 0.28- 0.3- 0.35- 0.4- 0.45- 0.5-
0.58- 0.65- 0.7- 0.8- 1- 1.3- 1.6- 2.0-
2.5- 3- 3.5- 4- 5- 6.5- 7.5- 8.5- 10-12.5- 15- 17.5- 20- 25- 30-
32 µm and above.
Particle counts: 1 to 2,000,000 particle/litre
Sample flow: 1.2 l/min, volume controlled
Reproducibility: 3 % in max. range
Power supply: 230VAC, 50Hz / 110VAC, 60Hz
Size & Weight 19", 6 HE & 15 kg
Sample pipe length: 1.5 m or 3m (optional)

At any time the ECM 190 instrument can be switched to an EDM and then will give reports simultaneously in PM₁₀, PM_{2.5} & PM₁ of the dust mass from 0.1 to >1500 µg/m³.

Some examples Shown are of world wide installations of the Grimm EDM 180.

Dealer:



Northern Europe



Western China



North America



South Africa

The European Leader in Particle Measurement Technology

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