Microdust pro

The **Microdust Pro from Casella USA** is a portable, real time monitor for assessing the concentration of suspended particulate matter, and is probably the most versatile instrument available with the ability to measure from $1\mu gm^{-3}$ to 2500 mgm^{-3}.

It is the only hand-held real-time dust monitor on the market capable of graphically presenting variations in dust concentration on a real time scrolling graph – no longer is it necessary to wait to analyze results on a PC.
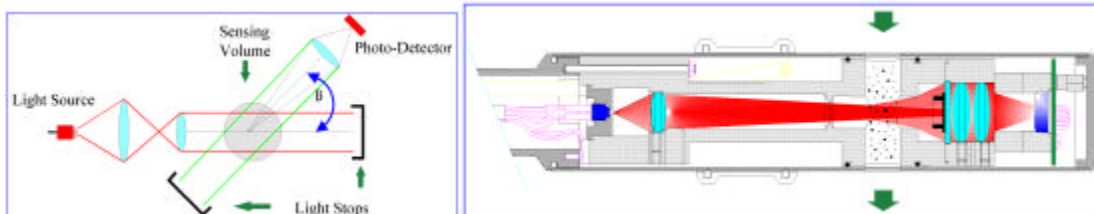
Features

- $1\mu gm^{-3}$ to 2500 mgm^{-3}
- Data-logger with >15,700 readings
- Detachable probe
- TSP, PM_{10}, $PM_{2.5}$ or respirable
- software calibration and zero
- 4 user defined calibration routines available for differing dust types
- Alkaline or rechargeable batteries
- 32bit **WinDustPro** PC software

Applications

- Occupational health & safety monitoring
- Walk through surveys
- Site boundary monitoring & environmental measurement
- Industrial process monitoring
- Testing respiratory equipment or air filtration efficiency
- Research activities

Operation

The Microdust Pro measures particulate concentrations using a near forward angle light scattering technique. Infrared light of 880nm wavelength is projected through the sampling volume where contact with particles causes the light to scatter. The amount of scatter is proportional to the mass concentration and is measured by the photo detector. By using a narrow angle of scatter (12-20°) the majority of light scattered is in the diffracted and refracted components, which minimizes the uncertainty associated with particle color, shape and refractive index.

Concentration range

The Microdust Pro has the advantage that there is **only one model which covers the entire measurement range** (0 – 2500 mgm^{-3}). It is possible to "fix" the range of the instrument, or have it as an "auto-ranging" device.

Display

The Pro incorporates a 128 x 64 pixel graphical backlit display. Dust concentrations are presented in two unique ways:

- *Graphical representation* – the Microdust Pro is the first real time particulate measuring instrument to have a scrolling graph of dust concentrations. The graph is able to show a continuous trace over a number of time-bases. These may be set on the X-axis at 100 seconds, 200 seconds, 15 minutes and 1 hour. The Y axis range may be auto-ranging or fixed.

- *Numerical values* – instantaneous concentrations are displayed, as well as values for the Time Weighted Average (TWA) and maximum concentrations. These values can be reset at any time by a "one button" reset.
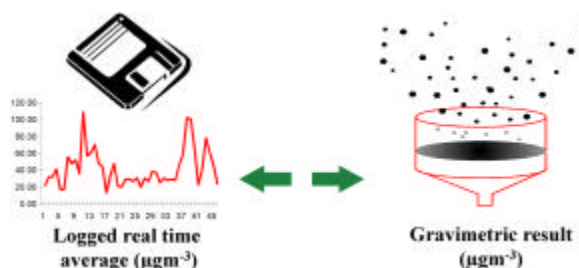
Calibration

Each Microdust Pro is individually **factory calibrated**, using a gravimetric technique. The instrument can be returned to this "factory" calibration setting at any time during its life by the use of a non-degradable **calibration insert** (supplied).

An individual **gravimetric calibration** is also possible. This involves the collection of a gravimetric (filtered) sample of the dust *after* it has passed through the probe optics. In this way, two averages are collected over the exposure period. One is from the filter, whilst the other is provided by the averaging function within the instrument. It is then possible to derive the difference in these two figures and correct accordingly.
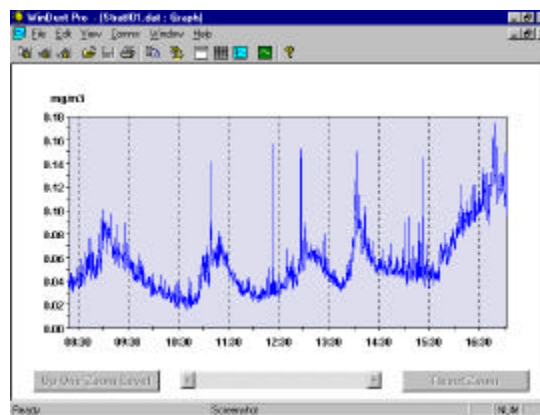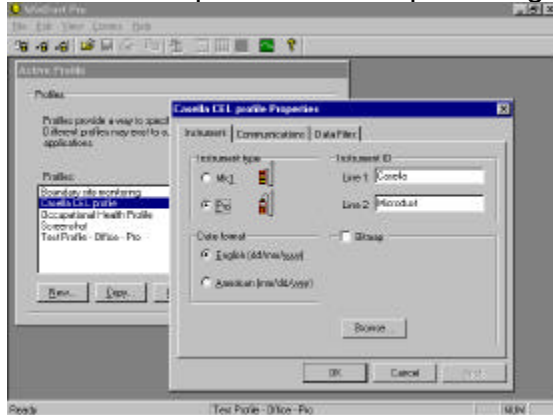
Additionally, it is possible to store 4 different calibration values within the instrument and select these according to the situation. All these procedures are accessible through the easy menu structure.

Logged real time
average (µgm^{-3})

Gravimetric result
(µgm^{-3})

Software

The **WinDustPro** software offers the user the ability to perform the following functions:

- Create a "profile" for the instrument (logging interval, parameters and "identifier" for multiple instruments). Transfers control profile from the PC to the instrument.
- Recover data from the instrument
- Production of line graphs based upon historical data
- Tabular and report presentation of data files
- Real time presentation of prevailing conditions via the RS232 connection

Data-logging

The Microdust Pro features an internal logger which can store up to 15,700 data points over 32 separate runs. The logging interval can be set from 2 seconds to 10 minutes. At 2 seconds, it is possible to record 8.75 hours of data; at 5 minutes, this equates to a total logging time of 50 days. Recorded values include:

- Average concentration over the logging period (mgm^{-3})
- Maximum concentration over the logging period (mgm^{-3})
- Date and time stamp

Ordering Information

176000A   **Microdust pro kit in carry case**
Includes calibration insert, clean air bellow, rechargeable batteries (4), power supply, 32 bit software & RS232 comms cable

Accessories

103214B	**Gravimetric dust adapter**
103187B	**Aspirated adapter**
103182B	**Respirable dust adapter**
151280B	**Size selective adapter**
103396B	**Iso-kinetic adapter** (for use with stack sampler)

OPERATION

Sensing Technique:	Near forward light scattering - 880nm infra red
Ranges:	All instruments provide 0 to 2500 mgm^{-3} over four ranges as standard:
Resolution:	0.001 mgm^{-3} (1μgm^{-3})
Operating Temp Range:	0 to 50°C (non condensing)
Storage Temp Range:	-20°C to +55°C
Calibration:	Gravimetric method using 'Arizona Fine' calibration dust (ISO12103-1, A2)
Zero Stability:	±0.002 mgm^{-3}/ °C
Span Stability:	<0.7% FSD / °C

POWER

Battery:	4 x AA / MN1500 cells - Alkaline or rechargeable NiCd
Operating Duration:	Alkaline (2700mAh) typically >20 hours NiCd cells (950mAh) typically >10 hours
Battery Charging:	Internal NiCd fast charger circuitry (with time-out protection)
Charge Rate:	Fast charge rate 450mA, Standby charge rate 55mA
Power Adapter:	Universal input voltage range 100-240VAC, 47-63Hz
Output:	12VDC @ 0.8A

GENERAL

Analogue Output:	0 to 2.5 V$_{DC}$ FSD, 500Ω output impedance (3ms update rate)
Keypad:	7 key tactile membrane
Weight:	Instrument only = 0.97 Kg (complete kit with flight case = 4.5Kg)
Dimensions:	Probe = 35mm Ø x 290mm total length Instrument H x W x D = 245 x 95 x 50mm Case: 135 x 490 x 370mm
Maintenance:	Factory cleaning required annually depending on measurement conditions

DISPLAY

Display:	128 x 64 pixel LCD graphics panel with backlight
Displayed Values:	
Instantaneous reading: *Other readings:*	Rolling average concentration over a user selectable period (1 to 60 sec) AVE & MAX concentration since power on or reset
Scrolling Graphs:	100 / 200 seconds, 15 minutes or 60 minutes (Y Axis auto-ranging or fixed)
Battery voltage:	Battery Voltage with 'OK' / 'Low' status message.

CALIBRATION

Factory Calibration:	Traceable isokinetic technique (wind tunnel) and ISO 12103-1
User Calibration:	Four user defined calibration settings available.
Routine Calibration:	Software calibration for zero & span setting. Optical calibration filter supplied (restores factory calibration)

DATA LOGGING

Internal Memory:	64K EEPROM providing 15,700 data points
Logging Interval:	Adjustable from 2 to 600 seconds.
Recorded Values:	Average, spot, max & min concentration over logging period
Serial Interface:	RS232 up to 38.4K baud

SOFTWARE

WinDustPro provides a friendly graphical interface for instrument configuration, data download and graphical report presentation	
Operating System:	Microsoft™ Windows 95, 98 or NT (16 or 32 bit)
Requirements:	IBM compatible PC with RS232 serial port, 8Mb RAM, FDD, HDD, VGA