

THE MICRODUST PRO

The Microdust pro from Casella CEL is a portable, real time monitor for assessing the concentration of suspended particulate matter. It is probably the most versatile instrument available with the ability to measure from 1µgm-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 analyse results on a PC.

Features

- An incredible measurement capability from 1µgm-3 to 2500 mgm-3
- Comprehensive data-logger providing over 15,700 data points
- Detachable probe for identification of problem areas
- Options for TSP, PM10, PM2.5 or ISO Respirable measurement
- Instrument software calibration and zero routines
- 4 user defined calibration routines available for differing dust types
- Option of alkaline or rechargeable batteries
- 32bit WinDust pro PC software

Applications

- Occupational health and safety monitoring
- Walk through surveys
- Site boundary monitoring and 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 (figure 1). Infrared light of 880nm wavelength is projected through the sensing volume where contact with particles causes the light to scatter (figure 2). 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 scattered light is in the diffracted and refracted components, which minimises the uncertainty associated with particle colour, 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 graphics LCD with backlight. Dust concentrations are presented in two unique ways:

- Graphical representation - the Microdust pro is the first hand-held real-time particulate measuring instrument to have



a scrolling graph of dust concentrations (figure 3). 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 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 (figure 4).

Additionally, it is possible to name and store 4 user defined calibration values within the instrument and select these according to the situation. All these procedures are accessible through the easy to use menu structure.



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 1 second to 10 minutes. At 5 seconds, it is possible to record 22 hours of data; at 5 minutes, this equates to a total logging time of 50 days. Recorded values include:

- Average concentration between each logged point
- Summary maximum & average concentration for each run
- Date and time stamp

Software

The WinDust pro software offers the user the ability to perform the following functions:

- Create a "profile" for the instrument. This specifies the logging interval, operating parameters, and an "identifier" or name for the instrument. This is particularly useful when more than one instrument is owned (figure 5).
- Transfer this control profile from the PC to the instrument.
- Recover data from the instrument
- Production of line graphs based upon historical data (figure 6)
- Tabular and report presentation of data files
- Real time presentation of prevailing conditions via the RS232 connection

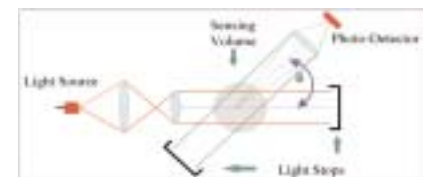


Figure 1



Figure 2



Figure 3

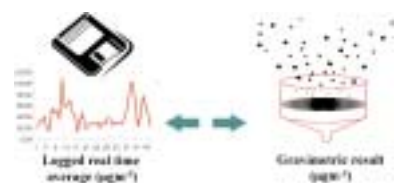


Figure 4.



Figure 5.

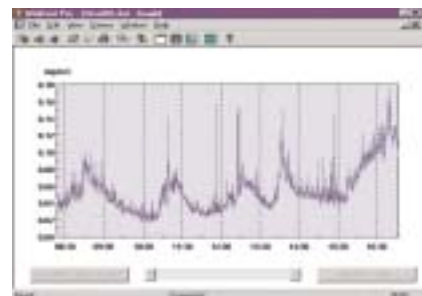


Figure 6.

Operation

Sensing Technique: Near forward light scattering - 880nm infra red
 Ranges: All instruments provide 0 to 2500 mgm-3 over four ranges as standard:
 0 - 2.5, 0 - 25, 0 - 250, 0 - 2500 mgm-3
 Active range may be fixed or auto-ranging
 Resolution: 0.001 mgm-3 (1µgm-3)
 Operating Temp Range: 0 to 50°C (non condensing)
 Storage Temp Range: -20°C to +55°C
 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 >9 hours
 Battery Charging: Internal NiCd fast charger circuitry
 N.B. Charger may be disabled for dry cell operation.
 Power Adapter: Universal input voltage range 100-240Vac, 47-63Hz

General

Analogue Output: 0 to 2.5 VDC FSD, 500Ω output impedance
 Keypad: 7 key tactile membrane
 Weight: Instrument only = 0.97Kg (complete kit in carry case 4.5 Kg)
 Dimensions: Probe = 35mm Ø x 290mm total length
 Instrument H x W x D = 245 x 95 x 50mm
 Carry Case H x W x D = 135 x 490 x 370mm

Display

Display: 128 x 64 pixel LCD graphics panel with backlight
 Displayed Values:
 Instantaneous reading: Rolling average concentration over a user selectable period (1 to 60 seconds)
 Time weighted Average: Average concentration since power on or reset
 Maximum value: Maximum concentration since power on or reset
 Scrolling Graphs: Real time graphs of dust concentration
 Selectable time-base periods of 100 / 200 seconds, 15 minutes or 60 minutes
 Y Axis may be auto-ranging or fixed
 Battery Voltage with status icon

Calibration

Factory Calibration: Traceable isokinetic technique (wind tunnel) and ISO 12103-1, A2 fine test dust
 Dust box calibration for high concentrations
 User Calibration: Four user defined calibration settings available
 Routine Calibration: Software calibration for zero and span setting
 Optical calibration filter supplied (restores factory calibration)

Data Logging

Internal Memory: 64K EEPROM providing 15,700 data points
 Logging Interval: Adjustable from 1 to 600 seconds
 Recorded Values: Individual, average and max / min concentrations over logging period
 Serial Interface: RS232 up to 38.4K baud
 IrDa (Future expansion / optional extra)

Software

WinDust pro provides a friendly graphical interface for instrument configuration, data download and graphical report presentation
 Operating System: Microsoft Windows 95, 98, NT or 2000
 Requirements: IBM compatible PC with RS232 serial port, 8Mb RAM, FDD, HDD, VGA colour graphics

Ordering Information

Microdust Pro in carry case	176000A	
Accessories		MICRODUST PRO Kit (176000A) includes:
Gravimetric dust adapter	103214B	Microdust Pro 0 - 2500mgm ⁻³
Aspirated adapter	103187B	Individual calibration insert & Clean air bellows
Respirable dust adapter	103182B	Rechargeable batteries (x4)
Size selective adapter	151280B	Universal mains PSU (110V/240V ac) with UK, Europe and USA plug adaptors
Iso-kinetic adapter (for use with stack sampler)	103396B	Windows Windust Pro software & RS232 communication cable
In car charger	176086B	Hard carrying case