

# Met One Instruments BC 1054 Multi-spectrum Black Carbon Monitor

**The BC 1054 MultiSpectrum Black Carbon Monitor provides a reliable, cost effective solution for high time resolution data collected at 10 wavelengths ranging from the near-UV to near-IR.**

The BC 1054 MultiSpectrum Black Carbon Monitor comes standard with active flow control. Utilizing a robust design with a single mass flow controller and a single flow path, the standard configuration permits easy flow calibrations and leak tests. A high-concentration option is available and recommended for use when BC concentrations are expected to exceed 7,000 ng/m<sup>3</sup> on a routine basis. The high concentration option extends the time between tape replacement without sacrificing sensitivity.

All BC 1054 MultiSpectrum Black Carbon Monitors are equipped with a humidity control system that may be set to maintain a constant sample temperature and thereby reduce moisture-related measurement artifacts.

All BC 1054 MultiSpectrum Black Carbon Monitors are factory calibrated with a similar smoke chamber methodology used for over 15,000 Met One Instruments Inc's beta attenuation mass monitors. This ensures long-term stability, reproducibility and traceability. All equipment returned for service is recalibrated against the factory reference standard before being returned to the field thereby ensuring data continuity.

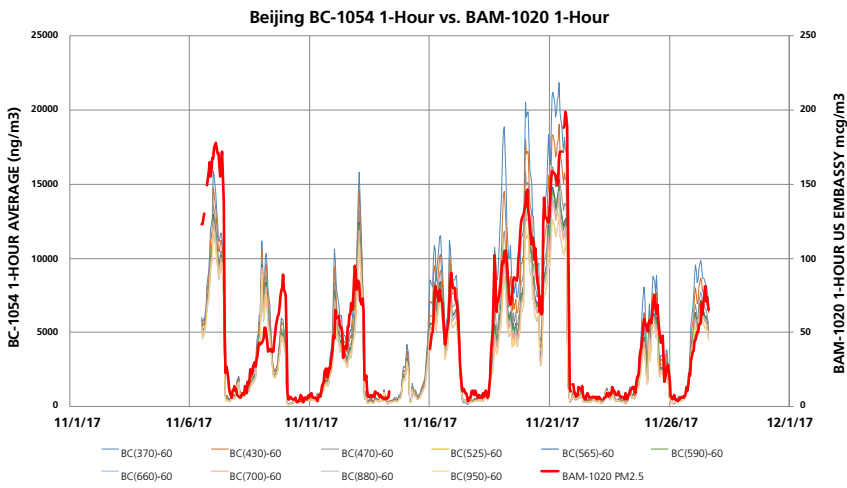
All BC 1054 MultiSpectrum Black Carbon Monitors are manufactured at an ISO-9001 facility. Additional measurements such as CO<sub>2</sub>, PM, and various meteorological parameters may be added to the BC 1054 MultiSpectrum Black Carbon Monitor. A variety of data output options exist including cloud modem, standard cellular or dial-up modem, RS-232, or RS-485 digital connections.

The Met One Instruments, Inc's BC 1054 MultiSpectrum Black Carbon Monitor measures the transmission of light at ten separate wavelengths through filter media onto which particulate matter "PM" containing black carbon "BC" is accumulating in real time and calculates concentrations at 370, 430, 470, 525, 565, 590, 660, 700, 880, and 950 nm with a standard time resolution of 1 minute. BC is generally considered to be the concentration at 880 nm. Organic carbon containing compounds "OC" is generally considered to be the difference between the 370 nm and the 880 nm concentrations.



## Applications:

- Air Quality Surveillance
- Global Warming Studies
- Particulate Emissions Studies
- Near-Roadside Monitoring
- Visibility Studies
- Climatology Studies
- Source Apportionment Determination
- Angstrom Absorption Exponent Determination



This chart shows the compensated output for all 10 channels for a BC-1054 equipped with the high concentration option and a PM2.5 cyclone operated in Beijing China under very high PM and BC concentrations. For comparison purposes, the output of a nearby Met One Instruments, Inc. BAM-1020 beta attenuation configured to operate as a US-EPA designated federal equivalent method for PM2.5 is shown. Note that the vertical scales for the BC 1054 and the BAM-1020 are different.

Figure 1: BC-1054 vs. TAPI-633 (AE-33) IR (880 nm) Channel, 1-H Time Resolution, Elizabeth NJ

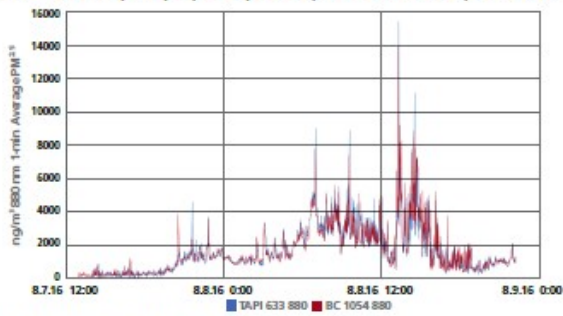


Figure 2: Scatter Plot of Same Data - Elizabeth NJ

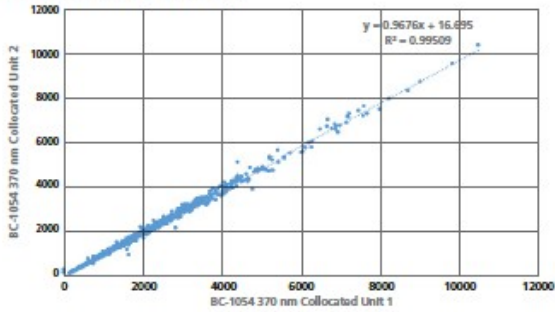


Figure 3: Collocated Unit 370 nm Comparison 1-h

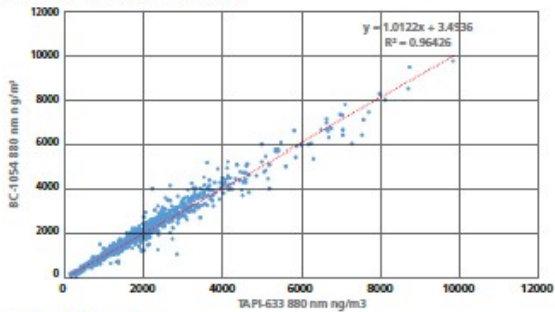
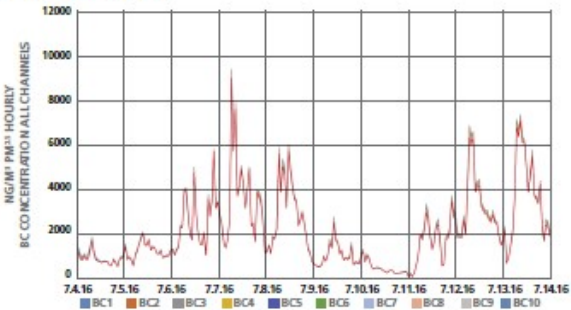


Figure 4: 10 Wavelength Comparison



## The BC 1054 offers the following advanced features:

- Active flow control at either 2 or 5 LPM.
- Compact flash storage of greater than 1-year worth of data
- Built in filter-loading correction algorithm with user selectable parameters
- Cloud service for data storage available
- Advanced diagnostics for flow, optics, and tape drive operation
- Ultra-high sensitivity with lower limits of detection less than 1 ng/m<sup>3</sup>

Measurement Principle:	Filter-Based Multiple Wavelength Optical Absorption
Illumination Wavelengths:	370, 430, 470, 525, 565, 590, 660, 700, 880 and 950 nm
Measurement Range:	<1 ng/m <sup>3</sup> to >100,000 ng/m <sup>3</sup> (effective)
Display Resolution	0.1 ng/m <sup>3</sup>
Limit of Detection:	< 8 ng/m <sup>3</sup> with (1 minute resolution)
Measurement Interval:	< 1 ng/m <sup>3</sup> with (1 hour resolution)
Flow Rate: Pump Type:	1-minute standard (1 second optional) 2 or 5 LPM, standard user selectable, mass flow controlled and reported under actual conditions. Internal AC vacuum pump
Filter Tape:	Reinforced glass fiber
Power Supply:	12 VDC Universal 100-240 VAC 50/60Hz input, 12 VDC 8.5 A output supply included
Power Consumption:	50 W
Operating Temperature:	0 to +40 °C
Ambient Temperature:	-30 to +50 °C
Ambient Humidity Range:	0 to 90% RH non-condensing
Data Storage:	One USB Flash Drive Port Cloud service available, stores more than 1 year of 1-minute data
Data Collection Interface:	Single serial output through RS-232, USB, or through Ethernet port 1,200 to 115,200 baud.
Compatible Software:	Comet™ software and USB/Ethernet driver CD included
User Interface:	Menu-driven interface with 4x20 character backlit LCD display and dynamic keypad
Mounting Options:	Bench top or equipment rack mountable Rack mount hardware is standard
Inlet:	PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> sharp cut cyclones available at either 2 or 5 LPM sampling rates through flexible tubing.
Unit Weight:	Approximately 40 lbs (18 kg)
Unit Dimensions:	Height: 10.5" (26.7 cm) Width: 17" (43 cm) Depth: 15.8" (40 cm) <i>Specifications are subject to change at any time.</i>

