

# Met One Instruments BAM-1020 PM-Coarse Measurement System

## INTRODUCTION

The difference between  $PM_{10}$  and  $PM_{2.5}$  is known as  $PM_{Coarse}$ . No  $PM_{Coarse}$  standard exists in the US, nor is it likely to exist any time soon. Standards do exist for both  $PM_{10}$  and  $PM_{2.5}$  as they are widely monitored in the United States and abroad through the use of continuous monitors, such as the Met One Instruments BAM-1020.  $PM_{Coarse}$ , on the other hand, is monitored far less frequently.

The Met One Instruments  $PM_{Coarse}$  Measurement System provides our customers with an economical, flexible, common-sense approach for  $PM_{Coarse}$  measurement. The Met One  $PM_{Coarse}$  Measurement System consists of two, independent BAM-1020 monitors, which are interfaced to one another in order to produce,  $PM_{10}$ ,  $PM_{2.5}$  and  $PM_{Coarse}$  data. The clear advantage of this approach is that it provides the end user with maximum flexibility: the BAM-1020 monitors may be collocated to produce US-EPA designated  $PM_{10}$ ,  $PM_{2.5}$  and  $PM_{Coarse}$  data or they may be separated to provide independent US-EPA designated  $PM_{10}$  or  $PM_{2.5}$  measurements. It also mimics the US-EPA  $PM_{Coarse}$  Reference Method, which consists of independent  $PM_{10}$  and  $PM_{2.5}$  manual samplers. *Another compelling advantage of this approach is that the end user is using the time-proven BAM-1020 monitors instead of specialized equipment developed only for this limited application.*

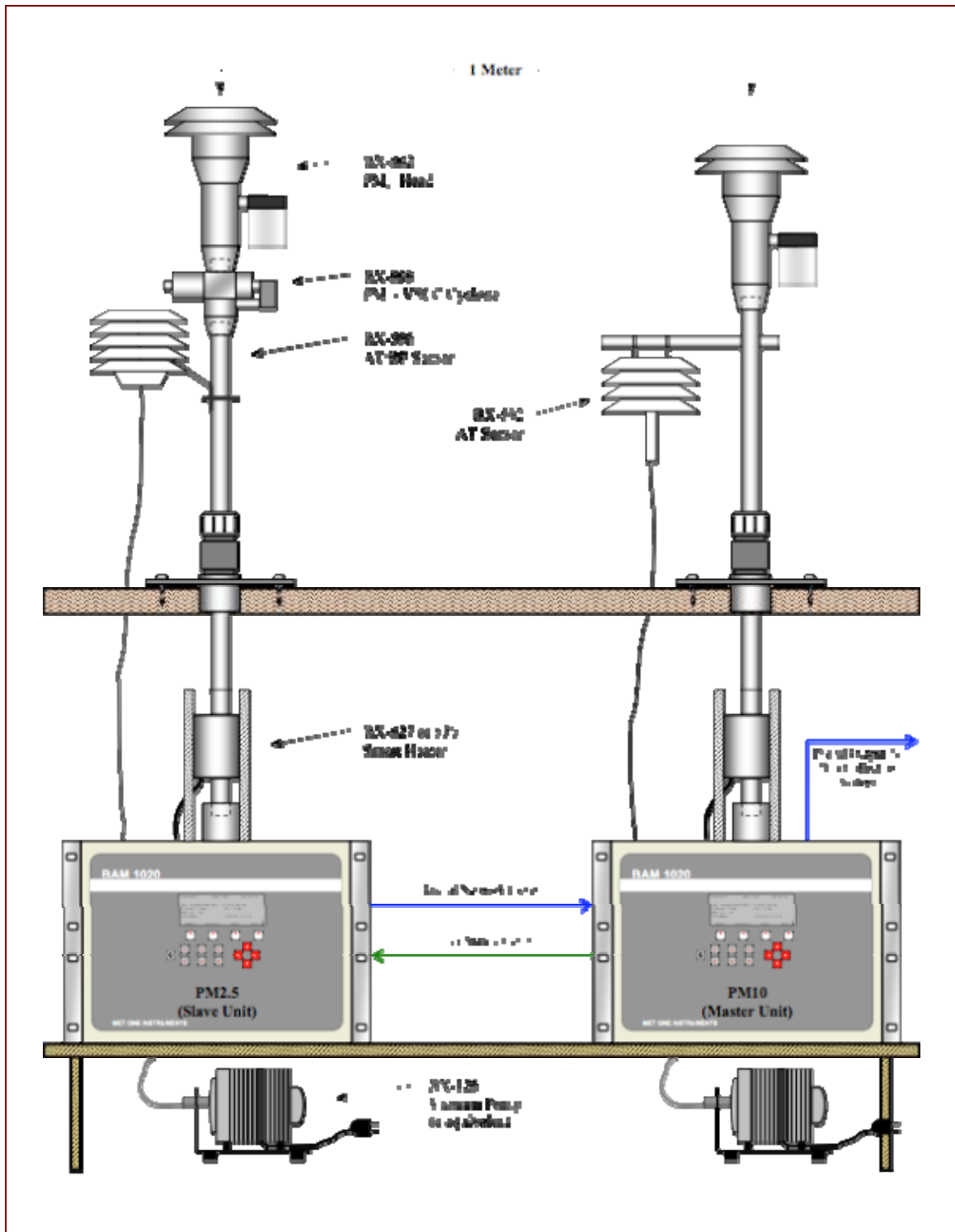
## FEATURES OF THE BAM-1020 PM-COARSE MEASUREMENT SYSTEM

- 1 SYSTEM, 2 MONITORS, 3 MEASUREMENTS
- $PM_{2.5}$ ,  $PM_{10}$ ,  $PM_{Coarse}$
- EACH METHOD US-EPA DESIGNATED AS EQUIVALENT
- TIME-PROVEN RELIABILITY AND EASE OF USE OF THE BAM-1020
- MONITORS MAY ALSO BE OPERATED INDEPENDENTLY US-EPA EQUIVALENT METHODS FOR  $PM_{2.5}$  OR  $PM_{10}$ .

## DESIGNATIONS AND CERTIFICATIONS

- $PM_{10}$  (US-EPA EQPM-0698-115)
- $PM_{2.5}$  (US-EPA EQPM-0308-170)
- $PM_{Coarse}$  (US-EPA PENDING)
- TUV
- KOREA, CHINA, AUSTRALIA

Figure 1: BAM-1020 PM-Coarse System



## PRINCIPLE

Two, independent BAM-1020 monitors are collocated by installing them within 1 and 4 meters of one another. A special  $PM_{Coarse}$  board and synchronization cable connects the BAM-1020 monitors and allows  $PM_{10}$ ,  $PM_{2.5}$  and  $PM_{Coarse}$  data to be available through one of the BAM-1020 monitors. Should the user desire independent  $PM_{10}$  and  $PM_{2.5}$  measurements, the synchronization cable is disconnected. It's as simple as that.

Each BAM-1020 employs the principle of beta attenuation, which has proven itself over time to be more reliable, simpler and more accurate than other commonly used techniques in continuous particulate monitors. Furthermore, each BAM-1020 is providing independent data.

## OPERATION

On each BAM-1020 monitor at the beginning of each hourly measurement cycle, the transmission of beta rays being emitted from a source containing a small quantity of carbon-14, is measured across clean filter tape spot by a sensitive photomultiplier tube with a scintillator. Next, air is sampled through the clean spot on the filter tape. Particulate matter in the air being sampled will be collected thereby creating a dirty spot on the tape. Finally, the transmission of beta rays is measured again, this time however across the dirty spot. The difference in the transmission of beta rays between the clean and dirty spots may be used to accurately and reliably determine the PM concentration.

## ADVANTAGES

Beta gauges have significant operational advantages over other automated PM techniques.

**Table 1: BAM-1020 Specifications**

PARAMETER	SPECIFICATION
Measurement Principle:	Relative Particulate Concentration by Beta Attenuation.
US-EPA Existing Designations:	$PM_{10}$ : EQPM-0798-122 (Equivalent Method) $PM_{2.5}$ : EQPM-0308-170 (Equivalent Method) $PM_{Coarse}$ : US-EPA Designation is Pending and Expected in 2009.
Standard Range:	0 - 1000 $\mu g/m^3$ (0 – 1.000 $mg/m^3$ )
Optional Ranges:	0 - 0.100, 0.200, 0.250, 0.500, 2.000, 5.000, 10.000 $mg/m^3$

<b>Sensitivity (<math>\sigma</math>) (24 hours):</b>	< 0.5 $\mu\text{g}$ from 0.000 mg to 0.100 mg/m <sup>3</sup>
<b>Sensitivity (<math>\sigma</math>) (1 hour):</b>	< 2 $\mu\text{g}/\text{m}^3$ from 0.000 mg to 0.100 mg/m <sup>3</sup>
<b>Resolution:</b>	$\pm 1 \mu\text{g}/\text{m}^3$
<b>Lower Detection Limit (<math>2\sigma</math>): (24 hours)</b>	< 1 $\mu\text{g}/\text{m}^3$
<b>Measurement Cycle Time:</b>	1 Hour
<b>Flow Rate:</b>	16.7 liters/minute, adjustable from 0-20 LPM. Volumetric or EPA Standard flow.
<b>Operating Temp. Range:</b>	0 to +40°C
<b>Ambient Temp. Range:</b>	-30° to +60°C
<b>Ambient Humidity Range:</b>	0 to 90% RH, non-condensing.
<b>Approvals:</b>	US EPA, CE, NRC, TUV
<b>Weight:</b>	21 kg (46.3 pounds) approximate, excludes pump.
<b>Dimensions</b>	12" (H) x 17" (W) x 18" (D) (31mm x 43mm x 45mm)