



## Differential Quality

Since 1990 many air sampling instruments have adopted the microprocessor as the heart of their operating system. The advantage of this change, over traditional analog or simple pneumatic controls, has been significant. Aside from improvements in precision and accuracy of air flow rate control, additional parameters, such as temperature and barometric pressure have been added. Start and stop times may be programmed into many samplers and data logging with information download is frequently possible.

Traditionally, instrument manufacturers worked to an airflow control standard of  $\pm 5\%$  of the selected flow rate. The operational temperature range was  $0^{\circ}$  to  $40^{\circ}$  C. These figures were often found in OSHA, NIOSH and EPA standards. With the promulgation of EPA's  $PM_{2.5}$  standard in 1997 the rules changed to  $\pm 2\%$  of the selected air flow rate and a temperature range of  $-30^{\circ}$  to  $40^{\circ}$  C. EPA also required that barometric pressure have an accuracy of  $\pm 10$  mm of Hg and temperature of  $\pm 2^{\circ}$  C. Further requirements were stated for the purchase of air flow audit devices, that they be NIST traceable, have the same performance range as the instrument being calibrated and accuracy performance of twice the required sampler values (Numerically half). These requirements are not part of the regulation but do form the basis for the acquisition of calibrators by the Agency. They require portable air flow calibrators to be transfer standards.

The results of EPA's, highly successful,  $PM_{2.5}$  filter sampling program has led to a dichotomy of air sampling instrument availability. Some manufacturers, such as Mesa, who hold several EPA Designations and are required to operate under the ISO 9001:2000 Quality Standard, produced what is well termed, "Environmental Quality" instruments, meeting EPA's more stringent Precision, Accuracy and Temperature range requirements, for both sampling and air flow calibration/audit equipment. A number of companies in the air sampling industry, but not all, are still producing instruments to the older "Industrial Hygiene" quality,  $\pm 5\%$  standards. While  $\pm 5\%$  may be good enough, it should be borne in mind that the  $\pm 5\%$  will be lost if one attempts to use this equipment under the extremes of the ambient environment.