CALIBRATION CURVES

Once accurate threshold settings have been obtained for the OPC by measuring monodisperse calibration particles of various sizes, calibration curves can be generated with appropriate software or hardware. These curves provide a means of data interpolation between the calibration points.

Calibration points represent the particle sizes selected for the calibration so that initially the sizing error at any of these points is close to zero. Due to time and temperature drift, sizing errors at the calibration points will change slightly but typically be less than 5%. Sizing errors at particle sizes in between the calibration points can be considerably higher depending on how well the calibration curve simulates the real response of the particle
counter.

Mathematical models can be used to estimate the theoretical Mie scattering response at different particle sizes. The theoretical response for a particle counter is our closest approximation of the true response of the counter (Fig. 10). Different calibration standards were used to generate the two different calibration curves that are also shown in Figure 10.

Differences between the theoretical curve and either of the calibration curves result in additional sizing errors. This is why it is important during field verification to use the same particle sizes used by the manufacturer during calibration. Estimates of sizing errors over the complete calibration region are shown (Fig.11). In some regions the particles are being slightly undersized, and in other regions they are being slightly oversized. The fact that both conditions are occurring minimizes the error on cumulative counts for real world samples.

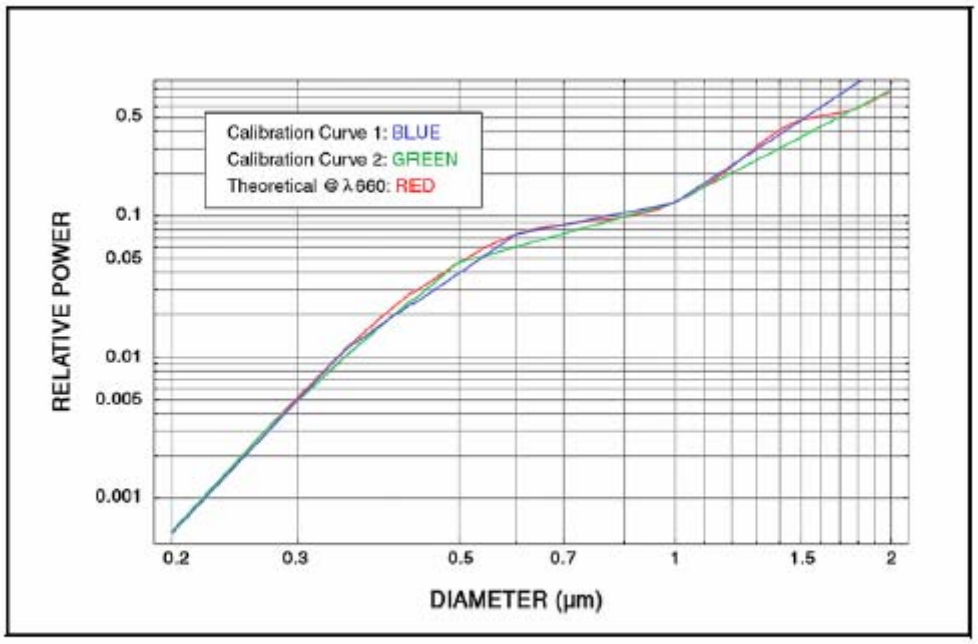

Figure 10. Calibration curves are a good approximation of the theoretical response of the particle counter. Differences between the calibration curves and the theoretical curve result in decreased sizing accuracy at those specific particle sizes.