# Parametric model for estimation of mass concentration based on particle count distribution for ambient air monitoring

## ABSTRACT

The application of optical based instrument in particulate matter monitoring has gained interest among researchers in recent years due to their high degree automation in providing real time reading of particulate matter concentrations. Such instrument usually comes in compact form making it compatible for in-situ monitoring especially for dense monitoring network. Theoretically, optical based instrument is unable to measure the mass concentration of particulate matter which is the key parameter in air quality monitoring. Instead, the mass concentration is calculated based on particle size distribution under assumptions that all particles is spherical using a known density. This being said, the accuracy of the reported mass concentration by optical instrument can be easily deteriorated if one of these assumptions is violated. Therefore, there is a need for a thorough evaluation on the particle to mass conversion factor in order to improve the accuracy of the reported mass concentrations by an optical instrument. In this study, the reported mass concentration from an optical based instrument as a function of particle distribution through random air sampling was investigated. The obtained data was then used to develop a parametric model for calculation of particulate mass concentration based on particle count distribution. The model developed was evaluated at several site and reported a good accuracy with high correlation ($R^2 > 0.97$) in estimation of mass concentration.