

## Abstract

Current regulations applies to Diesel engines and changes in particles measurement through non gravimetric methods have led the improvements in design and optimization of these engines in terms of pollutants emissions. Also, there are more rigorous requirements for measurement techniques and methodologies are applied in order to measure such emissions.

Since 2003 a group of experts in Pollution and Energy sponsored by the United Nations Economic Commissions for Europe (UNECE-GRPE) started a program for particle measurement called "*Particle Measurement Programme (PMP)*", the aim of this program was to develop a new measurement technique, in order to replace or complementing the particle measurement via gravimetric method, which had been implemented in Europe from 1993 with the introduction of EURO 1 emissions regulations.

The PMP measurement protocol established as a metric the particle number concentration with a diameter higher than 23 nm. In this case solid particles are defined as particles capable to remain in the exhaust aerosol after being diluted and heated in a evaporation tube at temperatures between 300°C and 400°C.

In order to develop an alternative methodology of the PMP protocol, this work is based on the theoretical - experimental study of different parameters that affects the particle measure when the engine is operating over transient conditions. This document deals with the elaboration of a particle measurement methodology, defined from the theoretical effects of the sampling system and the experimental validation of these.

Using the developed methodology, a number of studies were performed in order to characterize the particles emissions of Diesel engine over transient operating conditions, and also with the use of diverse fuel formulation. These studies were focused on evaluate the behavior of total particle concentration and particle size distribution particles over transient operating conditions, as well the evaluation of nuclei mode particles , which remain the major part of the particles with diameters below 23 nm.