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Understanding and measuring sub-23 nm particle emissions from direct injection engines

A large fraction of the total number of particles emitted by direct injection engines are below the adopted 23 nm diameter threshold and although the EU aims to regulate these emissions and impose limits for new light-duty vehicles, this is not yet possible due to the absence of accurate and reliable quantification methods, especially under real driving conditions.

The main reason for this is the lack of adequate knowledge regarding the nature of sub-23 nm particles from different engine/fuel combinations under different engine operating conditions. The EU funded project SUREAL-23 (EC grant No. 724136), coordinated by APTL, aims to “support the understanding, measurement and regulation of particle emissions below 23 nm, with the threshold of at least 10 nm”. Within this context, the objectives of SUREAL-23 are:

- to complement existing standard instrumentation by introducing extensive size and composition characterisation of exhaust particles especially for sizes below 23 nm,
- to support future emissions compliance through technical development in real driving emissions measurement,
- to fully characterise the nature of the particulate emissions which potentially evade current emission control technology and regulations,
- to contribute to future definitions of particulate emissions limits of the “Super Low Emission Vehicles”.

The proposed activities aid world regulation authorities to set proper emissions limits and define accurate and objective measurement protocols. The activities within SUREAL-23 will enhance innovation capacity and have a positive impact for the environment and the society •

