

*Semivolatile organic compound emissions from heavy-duty trucks operating on diesel and bio-diesel fuel blends*

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This study measured semivolatile organic compounds (SVOCs) in particle matter (PM) emitted from three heavy-duty trucks equipped with modern after-treatment technologies. Emissions testing was conducted as described by the George et al. VOC study also presented as part of this session. A temperature controlled chassis dynamometer was used at ambient temperature is -7 °C and 22 °C; vehicles were operated using two fuels (ultra-low sulfur diesel and 20 % soy biodiesel blend) over three driving cycles: cold start, warm start and heavy-duty urban dynamometer driving (HDDD) cycle. The SVOCs were measured for the cold start and by compositing the warm start and HDDD cycles. Thermal-optical analysis (TOA) and gas chromatography mass spectrometry (GC-MS) methods were applied to characterize the organic and elemental carbon components (OC and EC) and SVOCs in the aerosol particle emissions, respectively. The tested diesel vehicles emitted aerosols that were predominantly OC; the EC emissions varied strongly by vehicle due to the different on-board technologies. GC-MS results confirm the presence of *n*-alkanes and toxic polycyclic aromatic hydrocarbons in both the gas- and particle-phase emissions. However, there was limited indication of the hopane and sterane molecules in the emissions that are typically used as atmospheric indicators of vaporized motor oil in exhaust. The effect of fuel, load, temperature and operating conditions on OC-EC ratios and SVOC emission factors will be explored further as part of this study. Going forward, novel analytical-chemical approaches will be required to accurately measure the ultra-trace particle-phase contaminants associated with diesel and biodiesel vehicle combustion.