

TRANSIENT, REAL-TIME, PARTICULATE EMISSION MEASUREMENTS IN DIESEL ENGINES

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ABSTRACT

An instrument was developed to measure transient particulate mass emissions from diesel engines. This instrument, while based on laser-induced incandescence, allows measurements at 10 Hz. Using such an instrument, measurements were performed in the exhaust of a 1.7L Mercedes-Benz engine coupled to a low-inertia dynamometer. Comparative measurements performed under engine steady-state conditions show the instrument to agree

within $\pm 12\%$ of measurements with a scanning mobility particle sizer. Moreover, the instrument showed far better time response to a step change in engine operation when compared with a TEOM 1105. Similar measurements performed over an urban driving cycle revealed that the instrument does not yield negative mass concentrations, unlike a typical TEOM.