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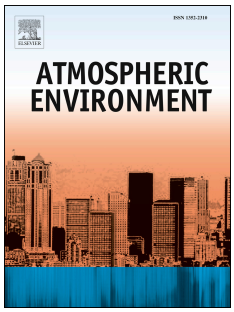

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Differences between Emissions Measured in Urban Driving and Certification Testing of Heavy-duty Diesel Engines

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Abstract

Emissions from eight heavy-duty diesel trucks (HDDTs) equipped with three different exhaust aftertreatment systems (ATS) for controlling nitrogen oxide (NO_x) emissions were quantified on a chassis dynamometer using driving schedules representative of stop-and-go and free-flow driving in metropolitan areas. The three control technologies were: 1) cooled exhaust gas recirculation (CEGR) plus a diesel particulate filter (DPF); 2) CEGR and DPF plus advanced engine controls; and 3) CEGR and DPF plus selective catalytic reduction with ammonia (SCR). Results for all control technologies and driving conditions showed PM emission factors were less than the standard, while selected non-regulated emissions (ammonia, carbonyls, and C_4–C_{12} hydrocarbons) and a greenhouse gas (nitrous oxide) were at measurement detection limits. However, NO_x emission factors depended on the control technology, engine calibration, and driving mode. For example, emissions from engines with cooled-exhaust gas recirculation (CEGR) were 239% higher for stop-and-go driving as compared with free-flow. For CEGR plus selective catalytic reduction (SCR), the ratio was 450%. A deeper analysis was carried out with the assumption that emissions measured for a drive cycle on either the chassis or in-use driving