

# Using Extractive FTIR to Measure N<sub>2</sub>O from Medium Heavy Duty Vehicles Powered with Diesel and Biodiesel Fuels

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## Abstract

A Fourier Transform Infrared (FTIR) spectrometer was used to measure N<sub>2</sub>O and other pollutant gases during an evaluation of two medium heavy-duty diesel trucks equipped with a Diesel Particulate Filter (DPF). The emissions of these trucks were characterized under a variety of operating conditions as well as environmental conditions. One vehicle used a NO<sub>x</sub> Absorber Catalyst (NAC) and the other used a Selective Catalytic Reduction (SCR) system for control of nitrogen oxides (NO<sub>x</sub>). Both vehicles were tested with two different fuels [ultra-low sulfur diesel (ULSD) and biodiesel (B20)] and ambient temperatures (70°F and 20°F), while the truck with the NO<sub>x</sub> absorber was also operated at two loads (a heavy and light weight). Three driving cycles provided emissions estimates under changing operating conditions: 1) a cold start with low transients (CSLT), 2) the federal heavy-duty urban dynamometer driving schedule (UDDS), and 3) a warm start with low transients (WSLT). Emission rates were compared between the two vehicles operating under different modes (cold start, ambient cycle and drive cycle). Emissions from the two NO<sub>x</sub> control technologies were also compared.