APBF-DEC NO_X ADSORBER/DPF PROJECT: PASSENGER CAR PLATFORM

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ABSTRACT

Due to increased fuel costs and a desire to reduce dependence on foreign oil, the diesel engine is becoming a prime candidate for future medium-duty vehicle applications in the United States. The diesel engine ex-hibits high thermal efficiency and superior durability compared to the gasoline engine. The main obstacle to increased use of diesel engines is the upcoming (extremely strin-gent) EPA Tier 2 emission standards. To succeed, these vehicles must comply with emission standards while maintaining their excellent fuel economy. The availability of technologies, such as common rail fuel injection systems, low-sulfur diesel fuel, NO_x adsorber catalysts, and diesel par-ticulate filters, allow the development of powertrain systems with the potential to comply with targeted requirements. In support of this, the U.S. Department of Energy (DOE) has undertaken several test projects as part of its Advanced Petroleum Based Fuels - Diesel Emission Control (APBF-DEC) activity. Primary questions among those addressed by these projects are sulfur tolerance, durability, and performance of the NO_x adsorber/DPF system for varying fuel sulfur levels. The test bed for one pro-ject in this activity is an Audi A4 Avant equipped with a 1.9L prototype TDI engine with common rail fuel injection.

While NO_x adsorber catalyst (NAC) sys-tems have demonstrated extremely high lev-els of NO_x reduction in steady-state labor-atory evaluations, the application of NAC systems to actual transient engine appli-cations requires development of an integrated engine-emissions management system. This paper discusses the integrated engine-emissions system management and the development of regeneration control strategies. Performance of fresh and aged systems tested over the FTP-75, HFET, and US06 test cycles will also be summarized, including emissions of regulated and presently unregulated species.