

EXPANDED CAPACITY MICROWAVE-CLEANED DIESEL PARTICULATE FILTER

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Beginning in FY 2000, the DOE Partnership for a New Generation of Vehicles (PNGV) Program has funded the development of a ceramic-fiber, diesel particulate filter system that is cleaned by microwave energy (Mw-DPF). That silicon carbide fiber filter cartridge was a round, corrugated wall-flow configuration. The shape was adequate for the relatively low exhaust flows experienced on a PNGV-type vehicle.

Recently, Industrial Ceramic Solutions (ICS) has developed a flat, pleated, multiple-filter cartridge design, which has demonstrated 1/20th of the back-pressure of the classic wall-flow cartridges. This higher exhaust capacity, multiple-cassette design will allow the use of the Mw-DPF's in Class 8 diesel vehicles or even larger electric cogeneration diesels and locomotives.

The pleated cassettes are inexpensive to fabricate and can be used as catalyst carriers without the microwave unit. The design and operation of the pleated ceramic-fiber filter system is discussed. Data are presented comparing the flat, pleated-media back-pressure to that of a wall-flow DPF.

Emissions testing on the first flat, pleated-filter unit by the National Transportation Research Center shows the particulate removal efficiency. Photographs of a complete microwave filter system, mounted on a 7.3-liter diesel vehicle, will be discussed.

This system is being prepared for a 7,000-mile controlled track test to demonstrate system durability using periodic chassis dynamometer FTP emissions testing. The filter will be microwave cleaned at a variety of engine operating conditions from idle to full load.