EPAct/V2/E-89: Assessing the Effect of Five Gasoline Properties on Exhaust Emissions from Light-Duty Vehicles Certified to Tier 2 Standards

Final Report on Program Design and Data Collection

Appendix J
Refueling Location Experiments

Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

National Renewable Energy Laboratory
U.S. Department of Energy

Coordinating Research Council

NOTICE

This technical report does not necessarily represent final EPA decisions or positions. It is intended to present technical analysis of issues using data that are currently available. The purpose in the release of such reports is to facilitate the exchange of technical information and to inform the public of technical developments.

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For each chosen vehicle SwRI conducted the fuel change sequence given in Table J-1. This sequence was based on what was used during the conduct of Phase 3 testing, and should be representative of the actual Phase 3 test procedure. For each vehicle, the sequence was conducted at each of two refueling locations using the same pair of E20 and E0 fuels. The refueling locations used for each chosen vehicle are given in Table J-2. A schematic of the refueling locations is given in Figure J-1. All fuel samples were collected approximately half way through each drain

TABLE J-1. FUEL CHANGE SEQUENCE

STEP	DESCRIPTION	REQUIRED SAMPLE ANALYSES
1	Collect fuel sample from vehicle while draining fuel via fuel rail.	Density @ 60°F by D4052 Ethanol concentration by D5599 Ethanol concentration by Petrospec
2	Fill fuel tank to 40% with designated E20 Group 1 fuel. Fill-up fuel temperature must be less than 50°F.	
3	Start vehicle and execute catalyst sulfur removal procedure described in Appendix C of CRC E-60 Program report. Apply side fan cooling to the fuel tank to alleviate the heating effect of the exhaust system.	
4	Collect fuel sample from vehicle while draining fuel via fuel rail.	Density @ 60°F by D4052 Ethanol concentration by D5599 Ethanol concentration by Petrospec
5	Fill fuel tank to 40% with designated E20 Group 1 fuel. Fill-up fuel temperature must be less than 50°F.	
6	Perform three 2-phase (bags 1 and 2) LA92 cycles. During these prep cycles, apply side fan cooling to the fuel tank to alleviate the heating effect of the exhaust system.	
7	Collect fuel sample from vehicle while draining fuel via fuel rail.	Density @ 60°F by D4052 Ethanol concentration by D5599 Ethanol concentration by Petrospec
8	Fill fuel tank to 40% with designated E0 Group 2 fuel. Fill-up fuel temperature must be less than 50°F.	
9	Start vehicle and execute catalyst sulfur removal procedure described in Appendix C of CRC E-60 Program report. Apply side fan cooling to the fuel tank to alleviate the heating effect of the exhaust system.	
10	Collect fuel sample from vehicle while draining fuel via fuel rail.	Density @ 60°F by D4052 Ethanol concentration by D5599 Ethanol concentration by Petrospec
11	Fill fuel tank to 40% with designated E20 Group 2 fuel. Fill-up fuel temperature must be less than 50°F.	
12	Perform three 2-phase (bags 1 and 2) LA92 cycles. During these prep cycles, apply side fan cooling to the fuel tank to alleviate the heating effect of the exhaust system.	
13	Collect fuel sample from vehicle while draining fuel via fuel rail.	Density @ 60°F by D4052 Ethanol concentration by D5599 Ethanol concentration by Petrospec

TABLE J-2. REFUELING LOCATIONS

BRAND	MODEL	LOCATION A	LOCATION B
Chevrolet	C1500 Silverado	Containment Pad	South
Toyota	Camry	Containment Pad	South
Toyota	Sienna	Containment Pad	South
Dodge	Caliber	Containment Pad	South
Honda	Civic	Containment Pad	South
Honda	Odyssey	Containment Pad	South
Nissan	Altima	Containment Pad	South

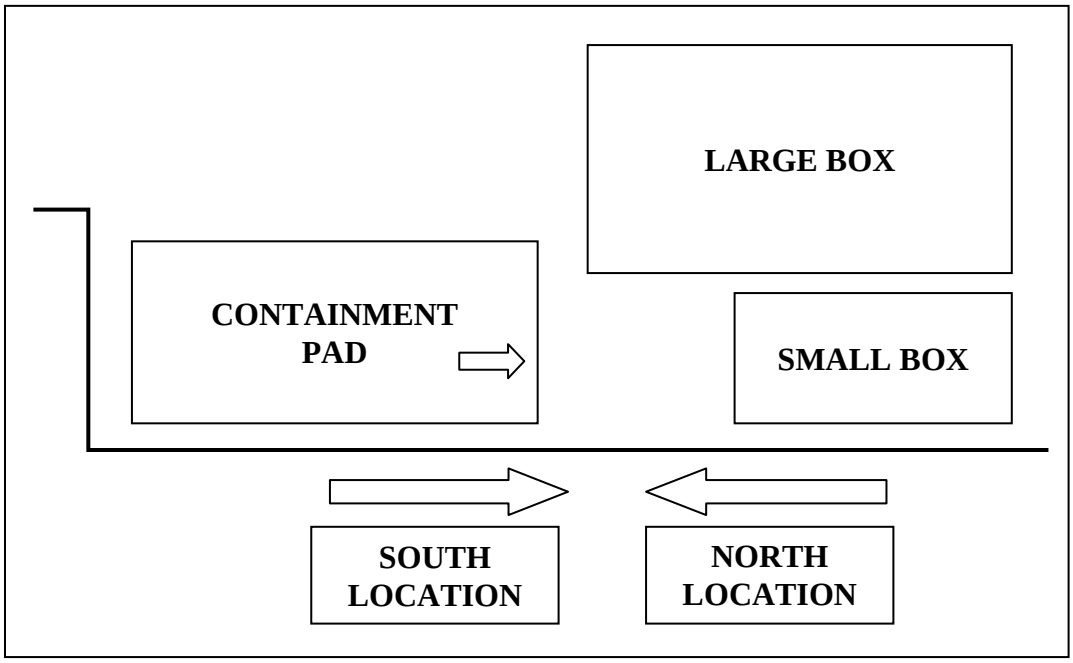

FIGURE J-1. SCHEMATIC OF VEHICLE REFUELING LOCATIONS