

Assessing the Effect of Five Gasoline Properties on Exhaust Emissions from Light-Duty Vehicles certified to Tier-2 Standards

Analysis of Data from EPA Phase 3

(EPAct/V2/E-89)

Appendix Q.3

Model Fitting Information for

Ethane (Bag 1)

This appendix suFMarizes model fitting for Bag-1 Ethane. Model-fitting techniques and approaches suFMarized in Section 8.7. Features of the data and modeling for this compound are listed below.

Fuel-parameter matrix: REDUCED

Media contamination: NO

No. measurements: 62

No. censored values: 0

Modeling approach: MIXED MODEL

Estimated Dependent Variable model: NO

Models fit for Bag-1 Ethane

Model Term	Notation	Model		
		Linear Effects (Full)	FM1	FM2
etOH	Z_e	•	•	×
Arom	Z_a	•	•	•
T50	Z_5	•	•	•
T90	Z_9	•	×	

Fitting history for Bag-1 Ethane – with ‘FM1’ selected as best fit model.

Fit Parameters				Test with respect to Full			Test with respect to Previous Model		
Model	p	-2lnL	BIC ¹	Dev. ¹	d	Pr> χ^2	Dev.	d	Pr> χ^2
Linear Effects	5	-19.51	-8.24						
FM1	4	-19.13	-9.48	0.3730	1	0.54			
FM2	3	-15.29	-7.25	4.2128	2	0.12	3.84	1	0.050
¹ A lower value indicates a better fit.				¹ The deviation is the difference in the -2loglik statistics for the nested and reference models, respectively, per Equation 14.					

Coefficients and Type-III Tests of Effect for the Full and Best-Fit Models – Ethane (Bag 1).

Effect	Full Model					Best-Fit Model (FM1)				
	Estimate	Std.Err.	d.f.	t -value	Pr> t	Estimate	Std.Err.	d.f.	t -value	Pr> t
Intercept	-4.3412	0.2224	57.00	-19.52	<0.00001	-4.3412	0.2226	57.01	-19.50	<0.00001
Z_e	0.05357	0.02621	57.00	2.04	0.046	0.05222	0.02620	57.00	1.99	0.051
Z_a	-0.1912	0.02298	57.01	-8.32	<0.00001	-0.1925	0.02296	57.01	-8.39	<0.00001
Z_5	0.1833	0.02555	57.00	7.17	<0.00001	0.1830	0.02563	57.00	7.14	<0.00001
Z_9	0.01363	0.02228	57.01	0.61	0.54					
σ_{veh}^2	0.2448					0.2454				
σ_{ε}^2	0.02939					0.02958				