5450neDrive2_00001273

EPAct Light Duty Exhaust Fuel Effects Test Program

Cost and timing feedback
from SwRI

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Base Fuel Matrix (Cont'd)

- Original scope of program
  - Tier 2 fuel effects (RVP, E10, T50,T90, Aromatics)
- Computer generated optimal design
- Fuel variables:
  - T50 (3 levels)
  - T90 (2 levels)
  - EtOH (2 levels)
  - RVP (2 levels)
  - Aromatics (2 levels)
- 16 fuels, 19 vehicles
- VOC speciation, some 50 deg, no PM speciation
- Original cost estimate = $4.2M
- **Ex. 4 - CBI**

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Base Fuel Matrix (Cont'd)

Test Fuel Specification

PROPERTY	UNIT	METHOD	BLENDING TOLERANCE	TEST FUEL							
				1	2	3	4	5	6	7	8
Relative Density, 60/60°F	-	D4052	NA	Report	Report	Report	Report	Report	Report	Report	Report
API Gravity, 60°F	°API	D4052	NA	Report	Report	Report	Report	Report	Report	Report	Report
Ethanol Content	**vol. %**	**D5599**	**E0: < 0.1; E10: ± 0.5; E20: ± 0.5**	**0**	**0**	**10**	**0**	**0**	**10**	**0**	**0**
T10	°F	D86	± 10	140	140	140	140	140	140	140	140
T50	**°F**	**D86**	**± 4**	**195**	**195**	**195**	**195**	**195**	**195**	**215**	**215**
T90	**°F**	**D86**	**± 5**	**300**	**300**	**300**	**350**	**350**	**350**	**300**	**300**
FBP	°F	D86	-	<437	<437	<437	<437	<437	<437	<437	<437
DVPE	**psi**	**D5191**	**± 0.15**	**8.85**	**8.85**	**6.85**	**6.85**	**6.85**	**8.85**	**6.85**	**8.85**
Aromatics	**vol. %**	**D1319**	**± 1.5**	**15**	**40**	**40**	**15**	**40**	**15**	**15**	**15**
Olefins	vol. %	D1319	± 1.5	7	7	7	7	7	7	7	7
Benzene	vol. %	D3606	± 0.15	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
S	mg/kg	D5453	± 5	25	25	25	25	25	25	25	25
RON	-	D2699	± 2	93	93	93	93	93	93	93	93
MON	-	D2700	± 2	85	85	85	85	85	85	85	85
(R + M)/2	-	Calc.	± 2	89	89	89	89	89	89	89	89
C	mass %	Calc.	-	Report	Report	Report	Report	Report	Report	Report	Report
H	mass %	D4808 Method A	-	Report	Report	Report	Report	Report	Report	Report	Report
O	mass %	D5599	-	Report	Report	Report	Report	Report	Report	Report	Report
Water Content	mg/kg	E1064	-	Report	Report	Report	Report	Report	Report	Report	Report
Net Heat of Combustion	MJ/kg	D4809	-	Report	Report	Report	Report	Report	Report	Report	Report
Oxidation Stability	minute	D525	-	>240	>240	>240	>240	>240	>240	>240	>240
Copper Strip Corrosion, 3h at 122°F	-	D130	-	<No. 1	<No. 1	<No. 1	<No. 1	<No. 1	<No. 1	<No. 1	<No. 1
Solvent-Washed Gum Content	mg/100 ml	D381	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

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Proposed Program Costs

- Our proposal is to add 3 or 4 "real world" ethanol blends on all vehicles to generate data for GHG rule analysis*
  - **Fuels:** E0, E10, E15+ **Toxics:** Yes **Temps:** 50º and 75ºF
- Option B hinges on DOE involvement (DOE kicks in $2 Million)
- PM speciation (included above and proposed on 3/4 GHG "real world" fuels) using SwRI proposed methods, we feel, may result in **qualitative results only**. We're working to develop methods for this part of the program which will greatly improve the data quality. We would also like to explore the option of doing this PM work separately at NVFEL as a parallel program

OPTION	DESCRIPTION	FUELS	VEHICLES	COST
A	Base EPA Program + 3 GHG fuels	16 + 3 GHG	19	$4.0 M
B	EPA / DOE collaborative program + 4 GHG fuels	25 +2 (E85) + 4 GHG	19 + 2 High Emitters	$5.9 M

*Option A and B fuels are "parametric" fuels - not necessarily average real world fuels. We would add 3 "real world" fuels to illustrate the effects of ethanol for GHG rule preliminary data (same fuels to be used for PM speciation)

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- 3 or 4 "real world" ethanol blends on all vehicles to generate data for GHG rule analysis*
  - **Fuels:** E0, E10, E15+ **Toxics:** Yes **Temps:** 50º and 75ºF

- Include some speciation, N2O, NH3…

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Project Timing

- Testing estimated to begin in March 2008
  - Most of that time is waiting for fuels (need to decide ASAP which option to select!)
  - Time also required for test cell upgrades (for 50ºF tests) and additional fuel drum storage capacity
- Ability to provide data for GHG rule
  - We would add 3 or 4 in-use fuels (E0, E10, E15+) to each option and test these fuels first for a preliminary dataset
  - Includes both 50ºF and 75ºF tests (75ºF tests done first)
  - SwRI can run 27 tests/week at 75ºF (18 at 50ºF)
  - At this rate (plus 30% margin of safety) and starting 3/03/08:
    - Option A: 19 vehicles * 3 GHG fuels =**14 weeks (e.g. 6/09/08)**
    - Option B: 21 vehicles * 4 GHG fuels =**21 weeks (e.g. 7/28/08)**

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Take Away Points

- We need to pick fuels (Option A vs. B) ASAP to meet the March or April 2008 start date for main program
  - DOE response expected Tuesday, 11/6/07
- DOE involvement is necessary for any data on high level ethanol blends (anything >E10)
- We need the “OK” to add 3 or 4 fuels for GHG rule data generation so SwRI can begin recruiting vehicles and blending these fuels
- We feel their “non-VOC” PM speciation proposal is inadequate and are in the process of designing our own collection methods. It is questionable that this will be ready by March 08 and might need to be done as an addendum to the program (or done separately at our own lab)

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