

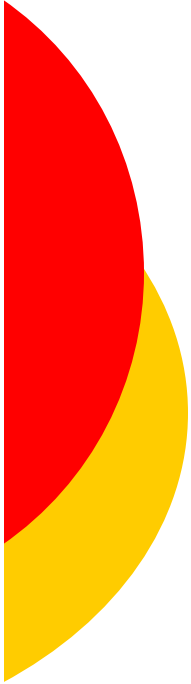
RFA Technical Committee and ASTM Fuel Specifications Updates

Fuel Ethanol Workshop
St. Louis, Missouri
June 28, 2007

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ETHANOL
THE RENEWABLE FUEL THAT DRIVES AMERICA


RFA
Renewable Fuels Association



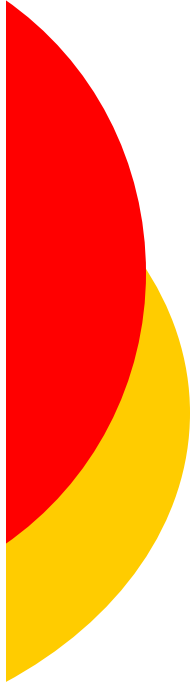
Fuel Ethanol Products

For blending with gasoline at a 10% maximum volume

“Alternative Fuel”

E-95





RFA Technical Committee

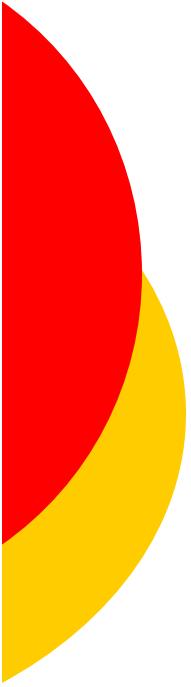
- Society Of Automotive Engineers (SAE)
- Auto Alliance
- World Wide Fuels Charter
- Weights and Measures Divisions
- Underwriters Laboratories (UL)
- California Air resources Board (CARB)
- American Petroleum Institute (API)
- Environmental Protection Agency (EPA)



ASTM Standards for Fuel Ethanol “Performance Specifications”

- ASTM D 4806-06c
Standard Specification for
Denatured Fuel Ethanol for
Blending with Gasolines for use
as Automotive Spark-Ignition
Engine Fuel
- ASTM D 5798-99
Standard Specification for
Fuel Ethanol (Ed75-Ed85)
for Automotive Spark-
Ignition Engines





Quality Assurance/Quality Control Protocols and Guidelines

- RFA Publication No. 040301
- Intended to be minimum quality guidelines for producers of fuel ethanol
- RFA producer members objective is be sure fuel ethanol in the marketplace meets ASTM D-4806

ASTM D4806-06c

<u>Parameter</u>	<u>Limits</u>	<u>Test Method</u>	<u>Frequency</u>
Ethanol, vol% min	92.1	D5501	Each batch in house
Methanol, vol% max	0.5	D5501	Each batch in house
Denaturant vol%	1.96 min 5.00 max		
Water, vol% max	1.0	E1064 E203	Each batch in house
Acidity, wt% max (mg/L)	0.007 (56)	D1613	Each batch in house
pHe	6.5 – 9.0	D6423	Each batch in house

ASTM D4806-06c

Parameter

Limits

Test Method

Frequency

Copper, mg/kg, max	0.1	D1688	Quarterly Third party
Chloride, mass ppm, max (mg/L)	40 (32)	D512 procedure C <i>New IC method soon</i>	Quarterly Third party
Sulfur, mass ppm max	30	D5453	Quarterly Third party
Gum (Solvent washed) mg/100mL, max	5	D381	Quarterly Third party
Appearance	Clear and Bright	Visual, room temp	Each batch in house

ASTM D4806-06c

Parameter

Limits

Test Method

Frequency

Sulfate, mass ppm max	4	<i>New methods soon</i> IC-Direct Injection IC-Aqueous Injection Potentiometric Lead Titration	<i>TBD</i>
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Is the product sold in California?



CARB requires
additional
specifications on
the denaturant



ASTM D4806 (California)

Parameter

Limits

Test Method

Frequency

Sulfur, ppm max	10	D5453-93	Quarterly Third party
Benzene, vol%, max	0.06	D5580-00	Each batch "calculated"
Aromatics, vol%, max	1.7	D5580-00	Each batch "calculated"
Olefins, vol%, max	0.5	D6550-00	Each batch "calculated"

California Denaturant Standards

Parameter

Limits

Test Method

Frequency

Benzene, vol%, max	1.1	D5580-00	Each batch
Aromatics, vol%, max	35	D5580-00	Each batch
Olefins, vol%, max	10	D6550-00	Each batch



So...why follow these standards?

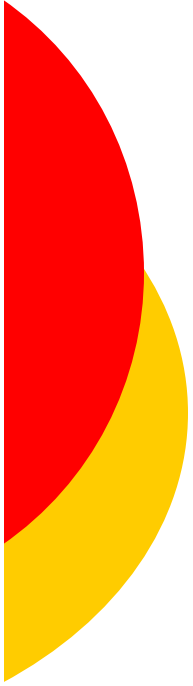
- Quality Assurance is a set of operating principles that when strictly followed during sample collection and analysis, will produce data of known and legally defensible quality.
- Quality Control is a measure within a sample analysis methodology



ASTM International (astm.org)

NEW

- Interlaboratory Crosscheck Program (ILCP)
- Program starting August 2007, deadline for sign up to participate in first round June 30th
- Designed to assist and benefit the laboratories assessment of quality assurance
- Statistical quality assurance program will enable the participating lab to improve and maintain a high level of performance in conducting routine ASTM ethanol specification test method
- Next year April, August and December rounds



E85[®] ASTM D5798-99

- E85 Task Force is comprised of Autos, Oil and Ethanol technical interests
- Volumes in commerce are growing which provides more feedback data to autos for performance related issues
- Hydrocarbon component and volatility are an important part of specification. They include seasonal and geographic blend parameters.

ASTM D5798

<u>Parameter</u>	<u>Limit</u>	<u>Method</u>	
Water, mass %	1.0	E 1064	
Ethanol, vol %	see below	D 5501	
Methanol, vol %	0.5	D 5501	
Appearance	C & B	visual	
pHe	6.5 - 9.0	D 6423	
Acidity, mass %	0.005	D 1613	
Chloride, mg/L	1	D 512	
Copper, mg/L	0.07	D 1688	
Phosphorus, mg/L	see below	D 3231	
Lead, mg/L	see below	D 5059	
Sulfur, ppm wt/wt	see below	D 5453	
Gum, unwashed mg/100mL	20	D 381	
Vapor pressure, psi DVPE	see below	D 5191	
<i>Volatility Class</i>	<u>1</u>	<u>2</u>	<u>3</u>
Ethanol, vol%, min	79	74	70
Hydrocarbon, vol%	17 - 21	17 - 26	17 - 30
Vapor pressure, psi	5.5 - 8.5	7.0 - 9.5	9.5 - 12.0
Phosphorus, mg/L	0.2	0.3	0.4
Lead, mg/L	2.6	2.6	3.9
Sulfur, ppm wt/wt	210	260	300



RFA Technical Committee



- E20 Blends
- Fuel Cells
- Publications
- Technical information website

