NCWM Petroleum Subcommittee Meeting

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The scope of D 4814 states:

- 1.3 The spark-ignition engine fuels covered in this specification are gasoline and its blends with oxygenates, such as alcohols and ethers.

D 4814 is based on technical data:

- Numerous CRC programs were conducted to develop the current volatility classes.
- Temperature data and distribution logistics were also taken into consideration in establishing the volatility classes.
- The proper process for change is a request to Subcommittee A.
- Changes to property limits require data demonstrating no degradation of vehicle performance.
ASTM D 4814

• The auto industry uses fuels meeting the various volatility classes of D 4814 for its engine calibration work.

• Changes to D 4814 that are piecemeal, based on individual state waivers and exemptions, will create another set of boutique fuels.
  
  - The volatility limits in D 4814 are already wide enough that more permutations of fuel volatility, temperature, and geography will result in un-optimized calibrations.

  - There is a trade off in simultaneously calibrating for good driveability and tight emissions standards.
Alliance fuel survey data

• The Alliance conducts fuel surveys twice a year (January and July)

• Data for E10 from the two 2006 surveys were analyzed for conformance to ASTM volatility limits

• Goal was to see how many E10 sample do not meet ASTM volatility limits
Alliance fuel survey data

• Survey details
  - Samples containing at least 9.0 volume % ethanol were used in the analysis
  - Winter 2006: 133 samples
  - Summer 2006: 152 samples
  - Cities and number of samples (winter/summer):
    - Albuquerque (1/2), Boston (2/13), Chicago (15/16), Cleveland (12/7), Dallas (0/14), Denver (10/9), Detroit (11/8), Houston (0/14), Kansas City (2/1), Las Vegas (15/0), Minneapolis/St. Paul (12/14), New York (13/16), Philadelphia (0/12), Phoenix (21/0), Pittsburgh (0/1), Seattle (3/3), St. Louis (16/12), Washington, D.C. (0/10)
Vapor pressure – winter 2006

17.3% out of compliance for ASTM
Vapor pressure – winter 2006
Vapor pressure – summer 2006

3.9% out of compliance for ASTM

Measured vp - ASTM vp

Fuel number
T50 – winter 2006

12.8% out of compliance for ASTM
T50 – winter 2006

Cumulative %

T50, F

0 1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0 9 0 1 0 0

130 140 150 160 170 180 190 200 210 220 230

0 10 20 30 40 50 60 70 80 90 100

Cumulative %
T50 – summer 2006

10.5% out of compliance for ASTM
T50 – summer 2006
T-V/L 20 – winter 2006

17.3% out of compliance for ASTM
T-V/L 20 – winter 2006
14.5% out of compliance for ASTM
T-V/L 20 – summer 2006

Graph showing cumulative percent on the x-axis and T/V/L, F on the y-axis.

Cumulative percent

0 10 20 30 40 50 60 70 80 90 100

110

120

125

130

135

140

145

150
One experience with non-ASTM fuel

• Ambient conditions
  - NW New Mexico: altitude approximately 5,000 ft
  - summer 2005: temperatures greater than 90°F

• Symptoms
  - Inability to restart hot engine or hard start
  - Stalls with hot engine
  - Affected a large number of customers
  - Information from customers pointed to two brands coming from one refiner
  - At least one other OEM experienced similar problems
One experience with non-ASTM fuel

• Fuel analysis

  ➢ Retail samples from 6 brands were collected in July and sent to an independent lab for analysis

  ➢ Four brands were E0
    • VP: 8 – 9 psi
    • T50: 178 - 216°F
    • T V/L 20 (calc): 133 - 145°F

  ➢ Three suspect fuels representing two brands from one refiner were E10
    • Vapor pressure: 9 – 10 psi
    • T50: 149 - 151°F (NM allows 158°F min during summer)
    • T V/L 20 (meas): 124 - 128°F
      ✓ Below either vapor lock protection for July (140°F min) or August (133°F min)
One experience with non-ASTM fuel

• Dealers experiences
  - Immediate response was to replace fuel pump
    - Did not necessarily eliminate the problem
  - Switching to one of the brands that did not have low T50 or T V/L 20 without replacing the pump was effective in eliminating the problem

• Data was shared with NM Petroleum Standards Bureau
Conclusions

• Survey data indicate the majority of E10 can meet ASTM volatility limits
  ➢ Non-compliant fuel is generally limited to specific geographic areas
  ➢ The drive to even lower vapor pressure will make E10 less prone to exceed ASTM volatility limits

• Vehicle hot driveability problems have been observed with fuels not meeting ASTM summertime volatility limits
  ➢ Significant negative impact on consumers and OEMs