

Fuels Workshop

May 2, 2005

California Environmental Protection Agency



Air Resources Board

Agenda

- ✦ Introduction
- ✦ Topics (presentation by ARB and Others):
 - Additives
 - Silver-Corrosion Inhibitors
 - Gasoline
 - CaRFG3 Predictive Model Update
 - Permeation Emissions Estimate
 - Test Methods
 - CARBOB Model Validation
 - Diesel
 - Lubricity
 - Biodiesel
- ✦ Other Topics?
- ✦ Open Discussions
- ✦ Closing Remarks

Topics: Additives

Overview

- ✦ The problem
 - Fuel Sending Unit Failures
- ✦ Actions Taken
- ✦ Silver Corrosion Inhibitors

Fuel Sending Unit Failures

- ✦ Failures
 - Widespread Failures in the Northeast and Gulf Coast in 2004
- ✦ Failures Caused by Corrosion
- ✦ Corrosion Caused by Elemental Sulfur in Gasoline
 - Traces of reactive sulfurs (i.e hydrogen sulfide, mercaptans) act synergistically

Actions Taken

- ✦ ASTM adopted Silver Corrosion Standard and Silver Strip Test
- ✦ Refineries are examining their operations
- ✦ Test batches of gasoline
 - Additize as necessary
 - Correct refinery operations
- ✦ Improve new fuel sensors

Silver Corrosion Inhibitors

- ✦ Chemistry/Properties
- ✦ Treat Rates
- ✦ Causes Engine Deposits

Engine Deposits

- ✦ At the maximum recommended dosage rate, engine deposits can increase
- ✦ Adequate levels of detergent additive can mitigate deposit forming tendency of corrosion inhibitors

Findings

- ✦ Anticipate no problem with the current recommended use of silver corrosion inhibitors
- ✦ Refinery use is intermittent
- ✦ Need to monitor

Proposed ARB Staff Advisory

- ✦ Monitoring Program
- ✦ Inclusion of Additive in Certification Test Fuel

Certification Test Fuels

For future gasoline certifications:

- ✦ Silver corrosion inhibitor will be a required component of the certification test fuel
- ✦ Silver corrosion inhibitor is added at the maximum recommended treat rate
- ✦ Exception for oil companies not planning to use silver corrosion inhibitors

Topics: Gasoline

CaRFG3 Predictive Model Update

- ✦ New Data Set Sources:
 - Alliance of Automobile Manufacturers
 - CRC E67 Study conducted by CE-CERT, UC Riverside
 - Other ?
- ✦ Availability?

Permeation

- ✦ In 1999, ARB staff learned that ethanol in gasoline increases evaporative emissions through a process known as permeation
- ✦ Permeation is when fuel migrates through the soft fuel system found on motor vehicles
- ✦ At the 1999 Hearing, the Board directed staff to conduct permeation study and report back

Permeation Test Program

- ✦ In 2002, the CRC and ARB co-funded permeation study
- ✦ Results:
 - Ethanol fuel higher than MTBE on all vehicles and higher than non-oxy on almost all vehicles
 - 65% or 1.4 grams/day more than MTBE gasoline
 - 45% or 1.1 grams/day more than non-oxygenated gasoline

Permeation Emissions Increase

- ✦ Study results do not directly provide the emissions impact of permeation
- ✦ Vehicle activity and fuel temperature data must be integrated to provide an appropriate temporal and spatial distribution of emissions
- ✦ Staff receiving public comments on permeation emissions draft report

How to Deal with the Hydrocarbon Emissions Increase from Ethanol Use?

- ✦ Hydrocarbon emissions increase well into the foreseeable future
 - New vehicle standards help
 - Slow turn over of fleet
- ✦ Report back to the Board later this year
 - Better estimate of ethanol permeation impact on emissions
 - Measures to mitigate the impact

What's Next

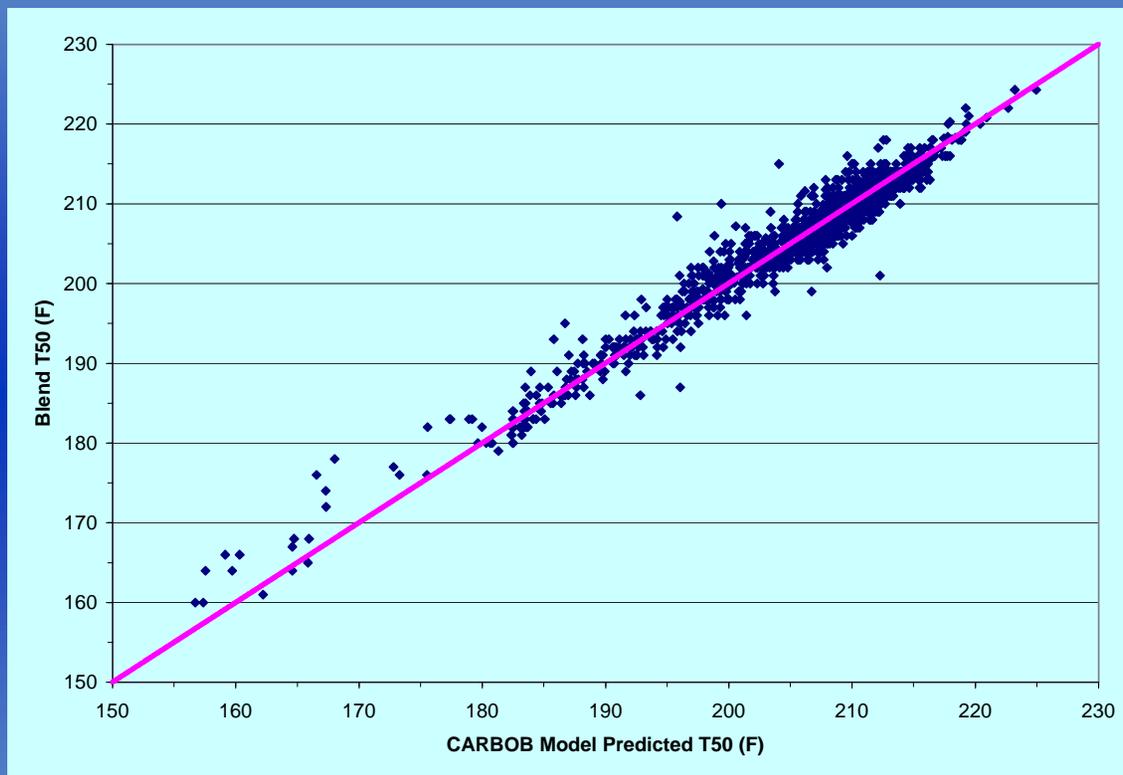
- ✦ The CRC is proceeding with a second stage of the test program
- ✦ Two additional vehicles: LEV II and PZEV
- ✦ Two additional fuels: 10% ethanol and a higher aromatics fuel
- ✦ E-85 will also be tested on an flexible fueled vehicle

Test Methods

CARBOB Model Validation

- ✦ CARBOB regulation approved by Board April 25, 2001
- ✦ CARBOB regulation allows refiners to certify blends without having to do hand blends of ethanol
- ✦ The Board directed staff to validate the CARBOB model using Phase 3 RFG
- ✦ Refiners have submitted their data
- ✦ Expect work to be finished by the end of the summer

Measured vs. Predicted T50



Topics: Diesel

Other Topics?

Open Discussions

Closing Remarks