

Ethanol Standards Harmonization

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Ethanol Standards

- GM and OEM Interest in Standards
- Existing Standards
- Standards are Important
 - Sulfate
 - Chloride
- Test Methods are Also Important
- Selected Limits Compared
- Harmonization



GM and OEM Interest in Standards

- GM engineers its vehicles globally
- Global vehicles need global fuels
 - Multiple engineering solutions for multiple fuels is expensive
 - Multiple engineering solutions impedes trade in vehicles, components and technology
- A single specification allows thorough validation of technologies and components
 - Provides enhanced durability
 - Provides better customer satisfaction with vehicles and fuels
- Increasingly stringent emissions and emissions systems durability standards make consistent fuel quality critical



Existing Standards

- The major traders of ethanol are the US, Brazil and the EU
 - These areas have differing standards and standards bodies
- Brazil
 - ANP (Agência Nacional do Petróleo) issues all Brazilian fuels specifications, they are legal acts.
 - ABNT (Associação Brasileira de Normas Técnicas) issues test methods and are voluntary
- US
 - ASTM (American Society for Testing and Materials) issues standards.
 - D4806 is the standard for ethanol for blending with gasoline
- EU
 - CEN (Committee European de Normalization)
 - prEN 15376 is the provisional standard for ethanol for blending with gasoline



Standards are Important

- Sulfate was recently added to the ASTM standard due to a rash of clogged filters and injectors in the US midwest
- The chloride limit is longstanding but recent contamination in the UK reinforces its importance
 - This failure was caused by chlorides at 1/4 the ASTM and 3/4 the CEN allowable maximum in fuel ethanol for blending
 - The E85 specifications are much more restrictive
 - The fuel that caused the failure was 11 times the maximum allowable
- Varying specifications by end use can be dangerous
 - End use restrictions can get lost as product gets moved and marketed.
- E85 vehicles are validated to the E85 standard only



Sulphates from ethanol blending in gasoline

- Problem identified and addressed by ASTM:



GM

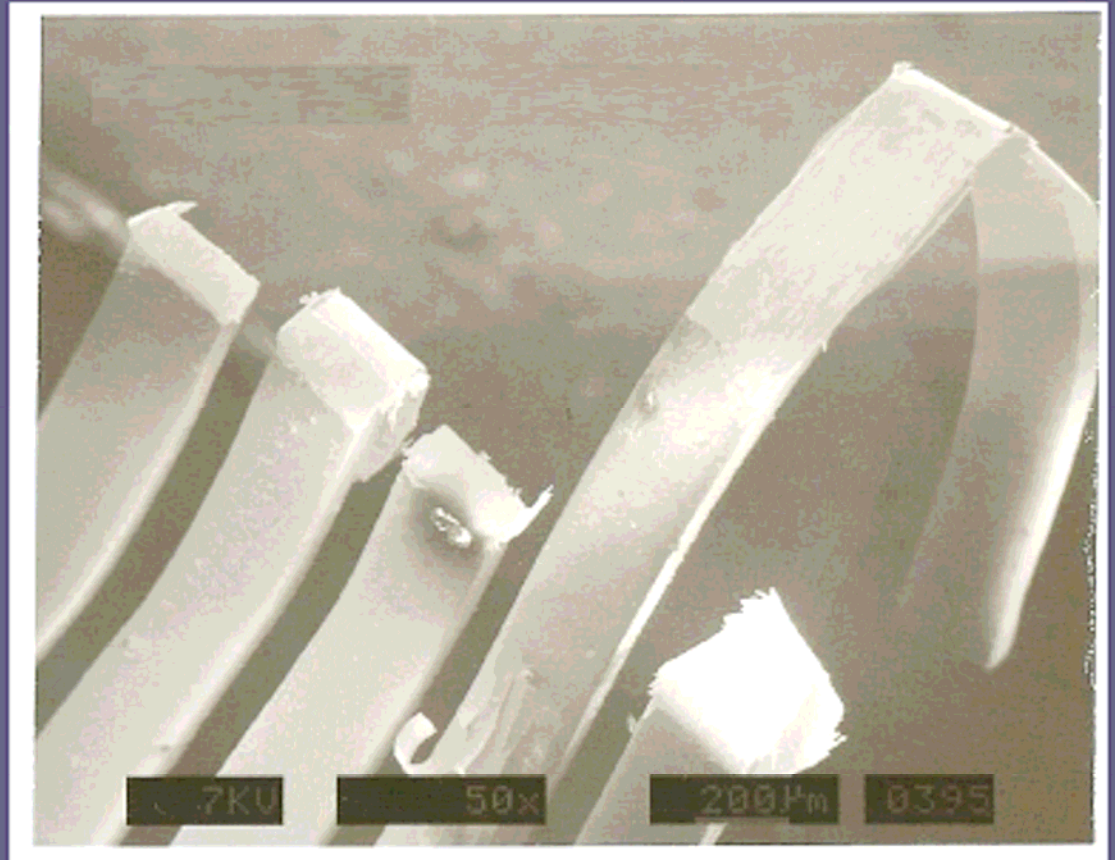
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Chloride impact on fuel sender

Chloride: 11mg/L.

Extreme failure @
15,000km.

“Robust” gold
wiper



GM

Test Methods are Also Important

- A standard without an appropriate test method needs improvement
- The ASTM E85 standard used methods that were out of scope
 - Updating these methods is a major part of the rewrite of this standard
 - Standards development is a major part of the rewrite
- Standards are not comparable unless the test methods are the same or equivalent
- Following the fine details of a method can be critical
- Appropriate standards and test methods are important to transitioning a country to biofuels
 - Automakers must have confidence that the vehicles will be protected before they introduce vehicles



Selected Limits Compared

- Acidity
 - The CEN and ASTM specifications are identical at 0.007 mass %
 - ANP is 0.0038 mass %
 - Both limits are long standing without notable problems
 - We should be able to harmonize based on surveys of actual properties
- pHe
 - The ANP and ASTM standards are overlapping
 - CEN does not have a pHe standard due to test method difficulties
- Copper
 - Copper is a catalyst in degrading gasoline
 - CEN and ASTM are at 0.1 ppm, ANP at 0.07
 - Copper source is probably beverage plants



Selected Limits Compared

- Sulfur
 - No common standard
 - Not naturally present in ethanol
 - Can argue that local gasoline standard should set limit
 - Can argue that lowest market (California, at present) should set limit
- Sulfate
 - ABN and ASTM agree on 4ppm
 - CEN still working but should be able to agree
 - Data to support limit is available
- Chloride
 - All agree at limit of 1 ppm for E85/E100
 - The much higher CEN and ASTM limits for blending ethanols pose a danger if misblended



Selected Limits Compared

- Water
 - No agreement on standards
 - Phase separation sets an upper limit
 - Economics encourage manufacturers to operate close to the limit
- Conductivity
 - Only ANB has a limit
 - High conductivity can cause failure
 - Conductivity is an easy test to run and covers lots of potential impurities
- Government regulatory issues
 - The US requires denaturant
 - The EU and Brazil do not



Harmonization

- Automakers jointly issue fuel specifications in the World Wide Fuel Charter
 - This defines what we think fuels should be
 - This is not just a wish list, it is carefully argued with data prior to issue
- How to harmonize?
 - The data can tell you where to go
 - Fuel surveys, QC history
 - Field problems
- Role of government
 - Government can facilitate agreement
 - Standards comparison and harmonization meetings
 - Independent collection and analysis of QC data
 - Action if stakeholders cannot agree
 - California forced ASTM to issue a diesel lubricity standard
 - Enforcement
 - A standard that is not honored is worse than no standard

