



Herguth Laboratories, Inc.

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## **Study of SUGAR CONTAMINATION IN AUTOMOTIVE FUELS**

The purpose of this study was to resolve solubility issues surrounding sugar in gasoline. This study supports the conventional wisdom that sugar is not soluble in gasoline. However, it demonstrates that if an alcohol is present some sugar will dissolve in the alcohol phase and get through the fuel filter.

**Conclusion:** Claims of problems occurring from sugar in the gasoline can no longer be dismissed as “not possible”. With alcohols being added to gasoline there is clear evidence that the sugar can pass through the filter and cause damage. The type of damage that we would expect would be fouled injector tips or deposits in carburetor needle valves. Anything beyond this would not be expected.



Sugar Sample

Sugar was thoroughly mixed into beakers of gasoline, ethanol and 85% gasoline / 15% ethanol mix.

Once allowed to stand for 24 hours the clear top portion of each was removed and a test for the presence of sugar was conducted. The results are presented in the Table below (gasoline = negative for sugar, while ethanol, and gasoline/ethanol mix = positive).



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We then drew the samples through a fuel filter to see if any of the sugar would pass through the filter. We tested the samples that had been drawn through the fuel filter and the results can be found in the Table below.

<b><i>Product Treatment</i></b>	<b><i>Sugar Test Result</i></b>
<b>Gasoline</b>	Negative
Gasoline w/ Sugar	Negative
Gasoline with Sugar After Fuel Filter	Trace*
<b>Ethanol</b>	Negative
Ethanol w/Sugar	Positive
Ethanol w/ Sugar After Fuel Filter	Positive
<b>85% Gasoline 15% Ethanol with Sugar</b>	Positive
85% Gasoline 15% Ethanol with Sugar After Fuel Filter	Positive

***TABLE OF TEST RESULTS***

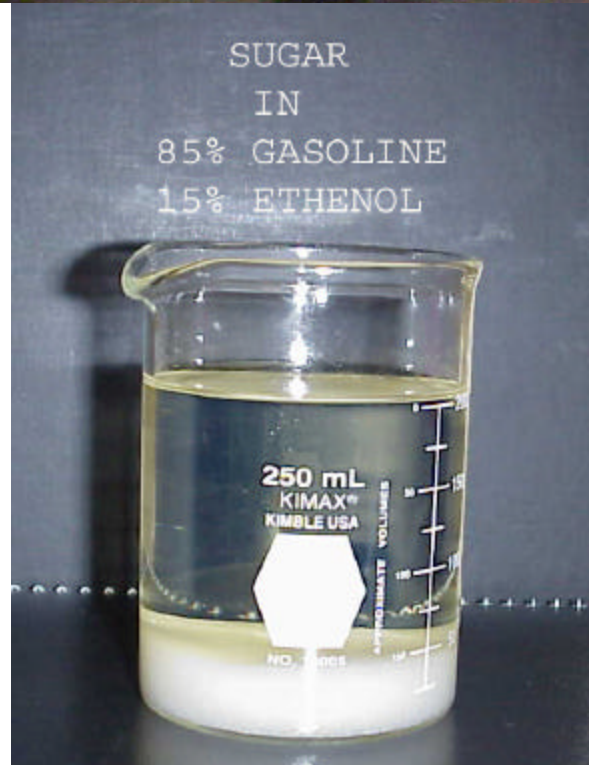
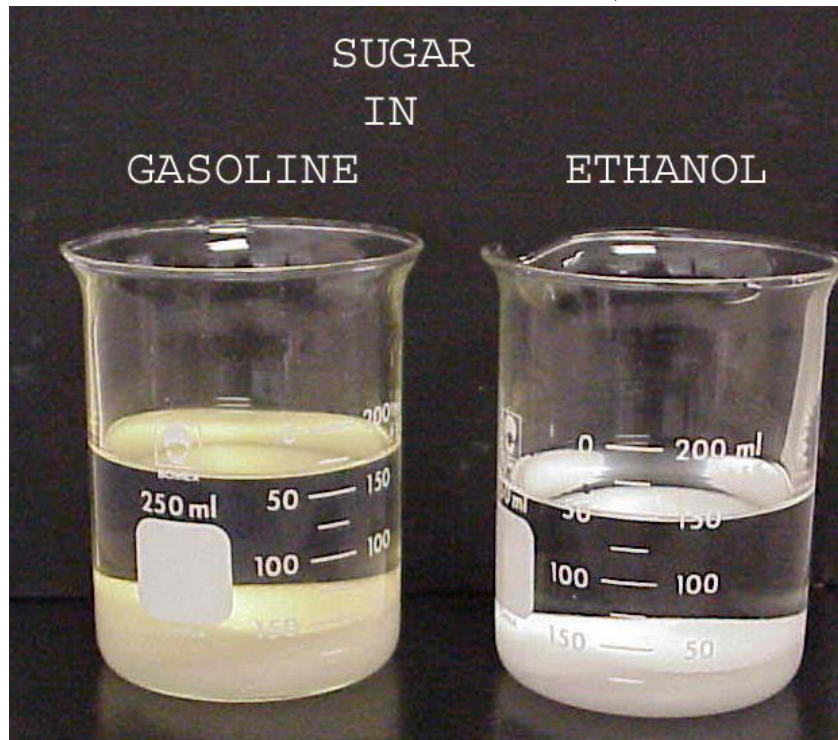
Note: The trace value for the gasoline sample after filter is not surprising since the suction was right down into the sugar granules and a few may have passed through giving the Trace reading.

**Note:** Sugar and ethanol mix was evaluated by dry weight of sugar, before and after mixing in ethanol. The weight loss of the sugar was 0.28%. This is considered to be the percent solubility of sugar in ethanol.



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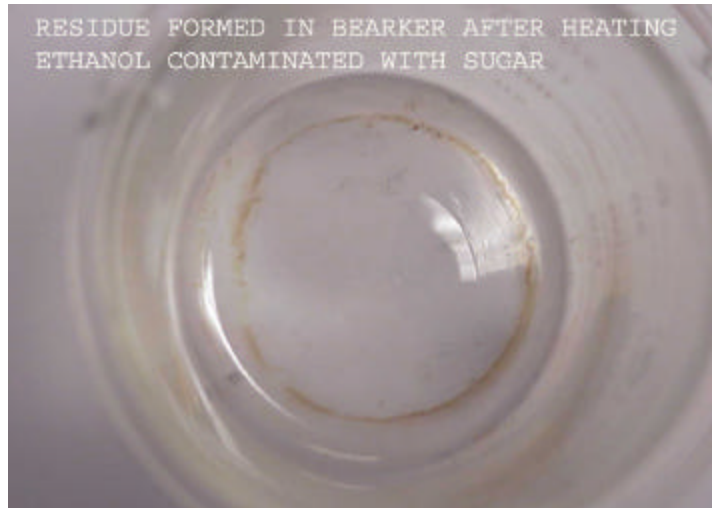
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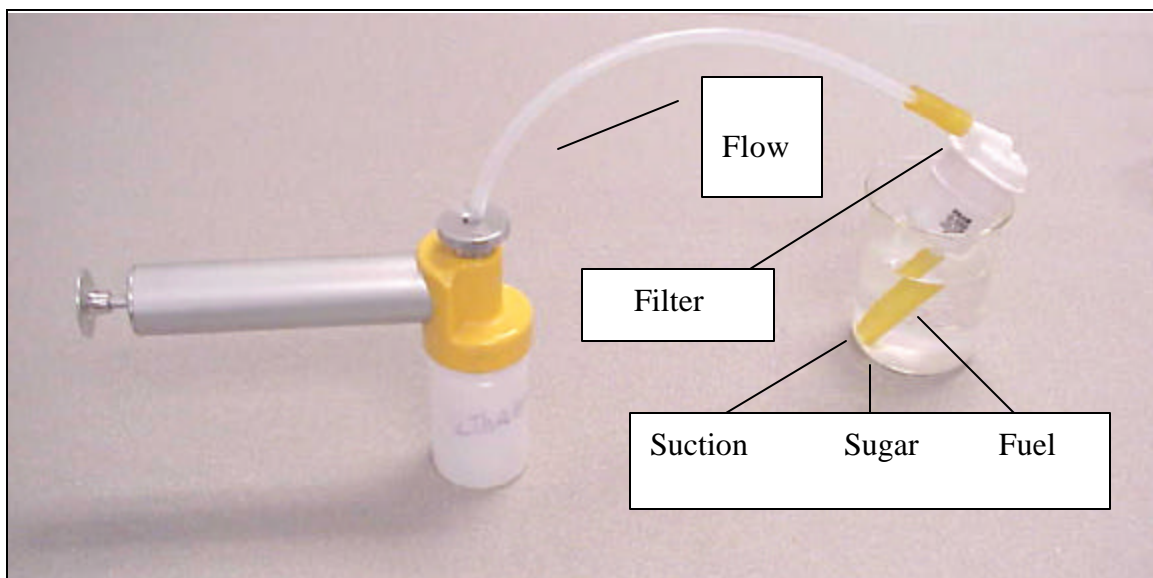


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***Deposit left in beaker after heating and evaporating Ethanol saturated with sugar.***



***The pickup portion of the sample device is on the very bottom of the beaker. It drew up sugar graduals and fuel.***

## **SUGAR TEST USED**

**Scope:** This test is a semi-quantitative test for the presence of carbohydrates such as sugar and flour. The test is sensitive to 0.05% or more and applies specifically to sugars.

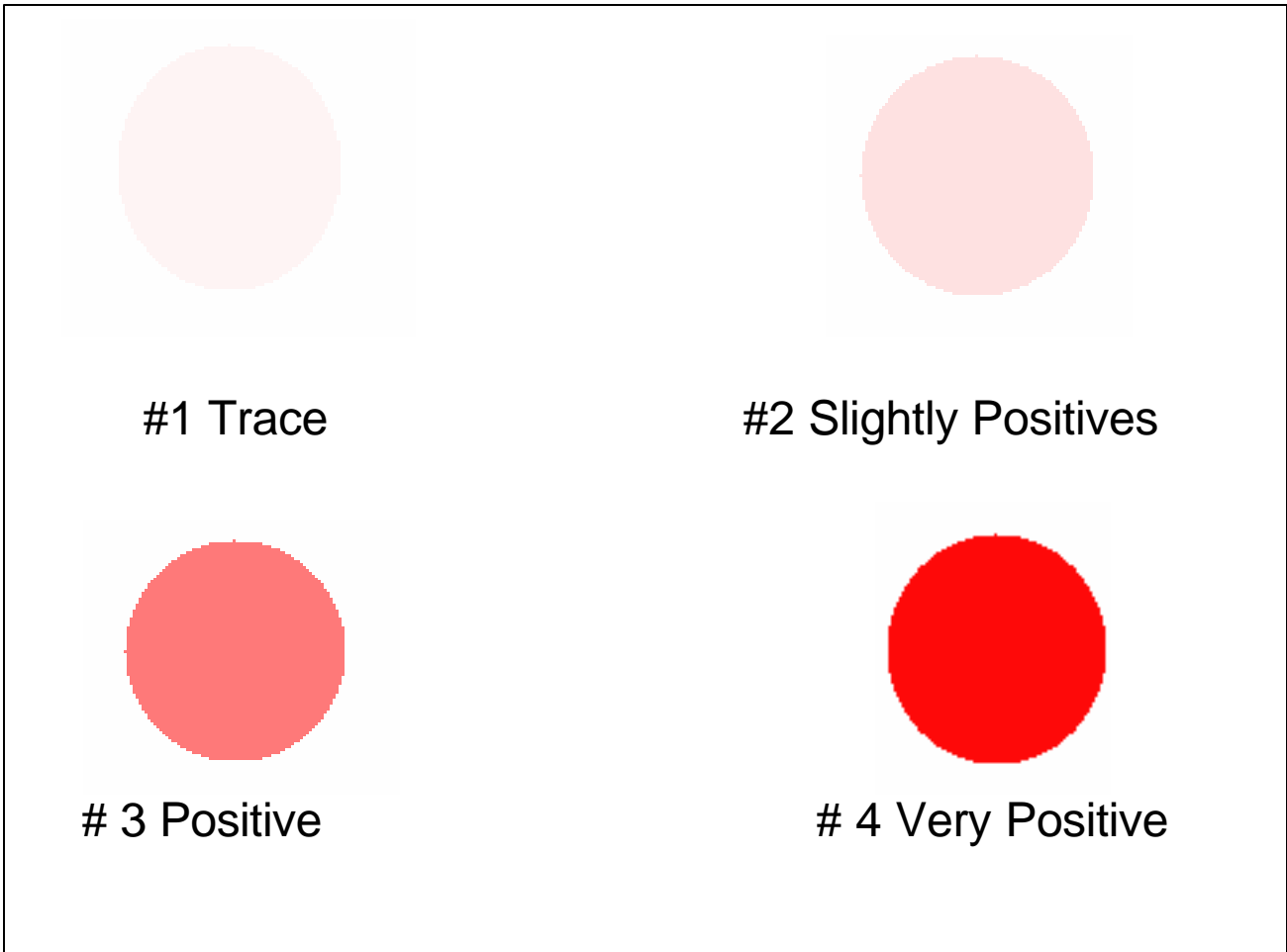


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***Interpretation of Test Results***

No Change - White Filter Paper = Negative  
Barely Discernable Change #1 Circle = Trace  
Pink Circle #2 Circle = Slightly Positive  
Pink to Red # 3 Circle = Positive  
Very Red # 4 Circle = Very Positive



\*\*\*\*\* END \*\*\*\*\*