

The R Factor- An Easy Fix That Will Save Consumers

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There are several road blocks limiting higher blends of ethanol from entering the marketplace such as the RVP waiver or how the EPA models ethanol's emissions. While many of these are complicated issues that require regulatory changes, one road block can be removed just by fixing a simple miscalculation in which the EPA is aware.

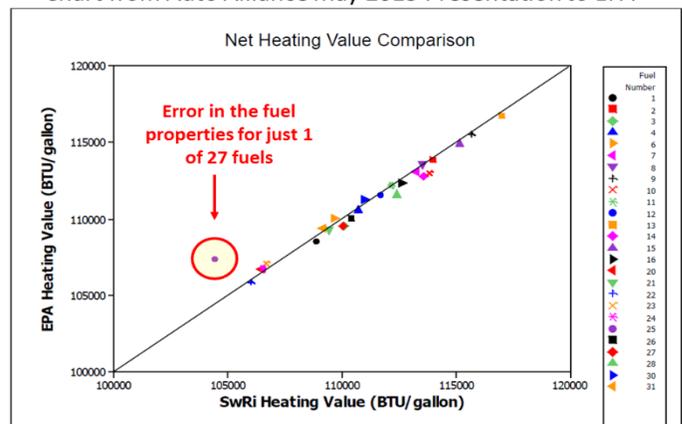
The miscalculation pertains to the R-factor, a calculation the auto industry uses to certify a vehicle's fuel economy based on how much carbon (CO₂) is in the fuel. Right now the autos certify new vehicles twice to account for the R-factor error. They certify using an E10 blend for regulated emissions and an E0 blend for CO₂ emissions and mileage. This not only is a waste of time, but it also limits ethanol and increases certification costs which is passed on to the consumer.

The issue with the R-Factor is that when it was developed in the 1970's, ethanol wasn't included in the gasoline makeup. Ethanol includes oxygen, so the current R-factor calculation shows that ethanol increases tailpipe CO₂ emissions, when in fact the opposite is true. This is why the autos certify on two different fuels for emissions, to make sure it gets proper credit for CO₂ emissions.

The EPA is aware of its own mistake. In a February 2013 memorandum, the EPA suggested an increase to the R-factor for ethanol blends from its previous 0.6, to 0.8-0.9. The memo reads, *"These results pointing to an R-factor between 0.8 and 0.9 are generally consistent with findings of the Auto/Oil program and EPA's 1987 theoretical analysis."* Although the EPA recognizes the R-Factor miscalculation, the 2017 Federal Register still shows the EPA uses an R-factor of 0.6.

To further complicate the issue, in May of 2013, the Alliance of Automotive Manufacturers and the Association of Global Automakers found the fuel data used by EPA to calculate the updated R-factor had a mistake. Of the 27 test fuels, one of them, had the wrong BTU value as noted in this chart. When removing the bad data and re-calculating the R-factor, an analysis showed that instead of EPA's previous results the R-Factor value was actually 0.96, or basically 1.0.

Chart from Auto Alliance May 2013 Presentation to EPA



Independent measurements of net heating value correlate for all fuels except #25. This indicates a fuel properties measurement error for #25.

This number makes a lot more sense to auto engineers with a strong background in fuel properties. Since ethanol has a better hydrogen to carbon ratio, meaning less carbon per BTU, the science shows simply adding ethanol should put the R-factor at 1.0 or greater. With this number, the CO₂ emissions tests are accurate.

So is this a simple mistake, we believe the answer is yes. Yet why won't EPA adjust the R-factor to at least its suggested 2013 calculated value? That is unclear, the Urban Air Initiative and others have raised the issue and continue to ask for a correction.

The lack of action by the EPA to update the R-factor continues to have big ramifications for the auto industry. The autos will continue certifying new vehicles twice, which is an extra burden and cost. Plus it prevents the autos from wanting to use higher blends of ethanol, which continues to limit the public's access to clean burning ethanol.