



The Science of How it Works!

MANY people already know about the remarkable benefits of the Fitch Fuel Catalyst as documented in testimonials, before and after photos, independent testing, and in many cases from personal experience. To further strengthen awareness and be sure that potential customers really understand what the Fitch is, we're providing this introduction to the technology behind the Fitch. The more you understand it, the more you can appreciate it. The idea is to keep it simple, and don't be afraid to ask questions directly using the contact information provided.

FITCH is a TRUE definition of a catalyst

A substance that induces a chemical reaction without itself undergoing any permanent chemical change.

The Fitch Fuel Catalyst is a Heterogeneous Metallic Alloy (HMAC) that when in use, transforms or reformulates the molecular composition of fuel at ambient temperatures and pressures.

If you remember any of this, this is probably the most important takeaway:

Treating any fuel with Fitch metal alloy catalyst elements is like blowing air (adding oxygen) on a fire to get it started or to make it burn brighter and hotter. Fitch, using a different mechanism, does the same thing by oxygenating the fuel.

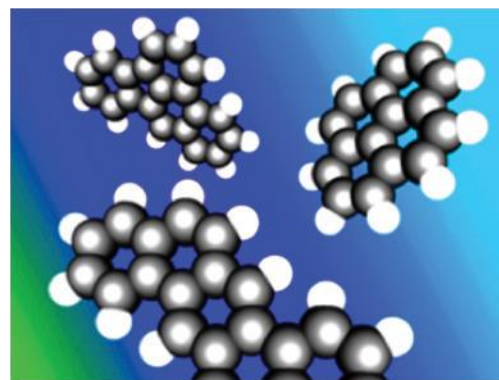
That applies to any hydrocarbon fuel including natural gas and propane. However, the focus of this document will be on liquid fuels like diesel, fuel oil and gasoline.

What does this mean for better fuel combustion?

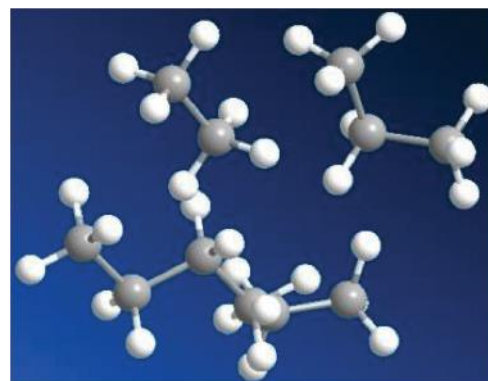
With oxygen already attached to the hydrocarbon molecules, but not combusted since the chain is still intact (not cracked), the fuel will more readily combust. Just like blowing air on a campfire to get it going.

THE REMOVAL OF hydrogen atoms from ring-shaped aromatic molecules (such as benzene) changes them into long-chain branched aliphatic molecules, which can accept oxygen more readily. The freed up hydrogen is redistributed to other molecules. This reduces diesel particulate matter (a serious controlled exhaust component) by as much as 20 percent.

Aromatic molecules



Aliphatic molecules



Okay, what makes this happen? Please read on:

Effect of Fitch treatment on simple hydrocarbon fuel based on mass spectrometer analysis

Percent concentration vs molecular weight

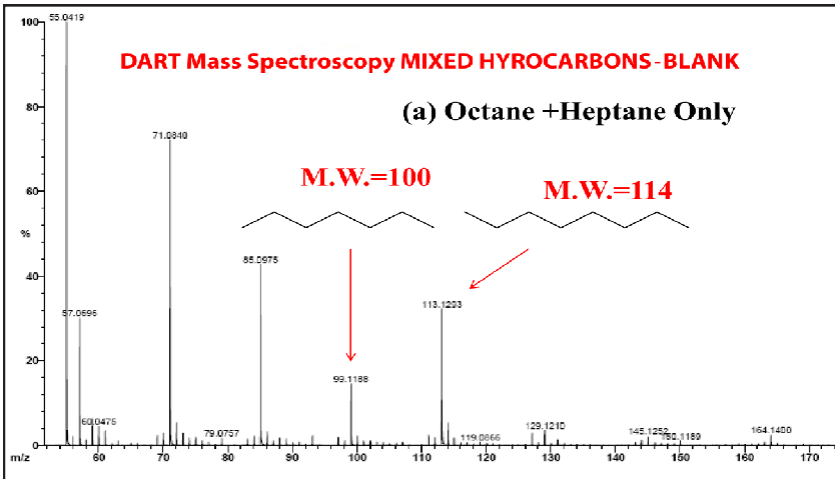
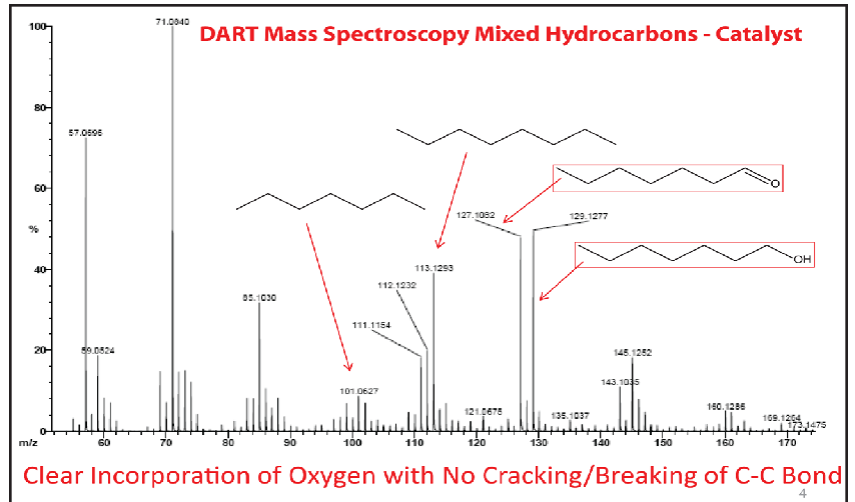


FIGURE 1: This figure is the mass spectrometer analysis of a test blank with two primary fuel molecules – Heptane (100) and Octane (114) with the arrows showing position (molecular weight) and concentration of each.

Images courtesy of UConn and Dept of Energy investigation of fuel reforming catalysts for efficient energy use summary August 2012

FIGURE 2: Mass Spectrometer analysis of the same sample exposed to the Fitch catalyst:



Note the significant reduction in concentration of the MW=100 and the appearance of two large peaks further up the scale at around MW=130

What happened?

Note the squiggly lines representing the hydrocarbon molecules. The ones after treatment are heavier (have a higher molecular weight) because they now have oxygen attached to them in the form of O atom and OH molecule.

Longevity of Catalyst

All right, this is remarkable! Why do we have a limit on product service life? (For standard models 5,000 hours or 250,000 miles and for heavy-duty commercial models 10,000 hours or 500,000 miles)

Unfortunately, most hydrocarbon fuels also contain varying amounts of trace metals like vanadium that can block the positive reaction from taking place. This is known as poisoning of the catalyst over time. That is the term used in the chemical industry: the poisoning of the catalyst effect.

When enough trace metals penetrate the catalyst surface, the benefits will be lost. However, each Fitch model has been configured with enough catalyst elements to provide the desired benefit for the given warranty (standard or commercial) for the amount of fuel that must be treated for a given engine or boiler. Toward the end of that period, benefits will be reduced, but not eliminated.



That is why we encourage customers—particularly commercial customers who put a lot of operating hours on their equipment – to consider replacement of units as they begin to reach the end of their service life.



Available in a variety of options: from drop-in capsules to inline cylinders and large canister models for applications covering small yard equipment to marine, power generation, heating, and more.

So there you have it: a simple introduction to just how the Fitch Fuel Catalyst works. We believe that the more you understand the process, the better you can appreciate its remarkable capabilities. Contact us anytime to learn about the multiple applications and performance value of the Fitch.

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