HOW PCLLQJG WORKS ON DEPOSITS

The Deposit Removal Mechanism

Combustion Deposits are mostly carbon and aromatic compounds in a highly combustion resistant state. These deposits are the source of many engine problems, such as higher than normal fuel consumption, excessive harmful exhaust, and costly maintenance. Fuel problems and incomplete combustion ultimately cause complete engine failure.

Deposit formation begins with spherical molecules called primary particles and branched aromatic chains, both of which are produced in the early stages of combustion. The chain branches consist of alkyl, alcohol, carbonyl, and carboxyl compounds. The alkyls oxidize to alcohol, oxidizing to carbonyl, oxidizing to carboxyl. The oxidation process stops with the carboxyl compounds, which are acidic and highly combustion resistant with a high energy of activation.

The various branch compounds are attracted to the primary particles, which spin at extremely high velocities. When a branch becomes attached to a primary particle, the entire chain structure is quickly wrapped around the primary particle forming a secondary particle. These secondary particles agglomerate and form a tertiary particles. This can happen when several primary particles become attached to the same chain on different branches, and then simultaneously become secondary and tertiary particle, as they wrap up the chain.

Tertiary particles agglomerating on a surface will become further coated to form quaternary particles. The coated quaternary particles make up deposits. The chain structures coating the surface of deposits leave exposed branches. It is at these branches where Rennsli technology begins to break down and destroy the deposits as it modifies the surfaces.

The carboxyl branches are acidic, and attract the Rennsli catalyst oxide which is basic. When the two combine, a process called dehydration occurs, and a water molecule is produced. What remains is a compound with a low energy of activation, which readily breaks down at high temperatures, releasing a CO2 molecule and the catalyst oxide.

Upon releasing the CO_2 and the catalyst oxide, the end of the chain re-oxidizes to an alkyl, alcohol, or carbonyl compound, and finally to a carboxyl compound. When the end of the chain reaches this state, the catalyst oxide once again combines with the carboxyl and starts the break down cycle again. Over time, the deposits are removed by being converted to CO_2 and water.

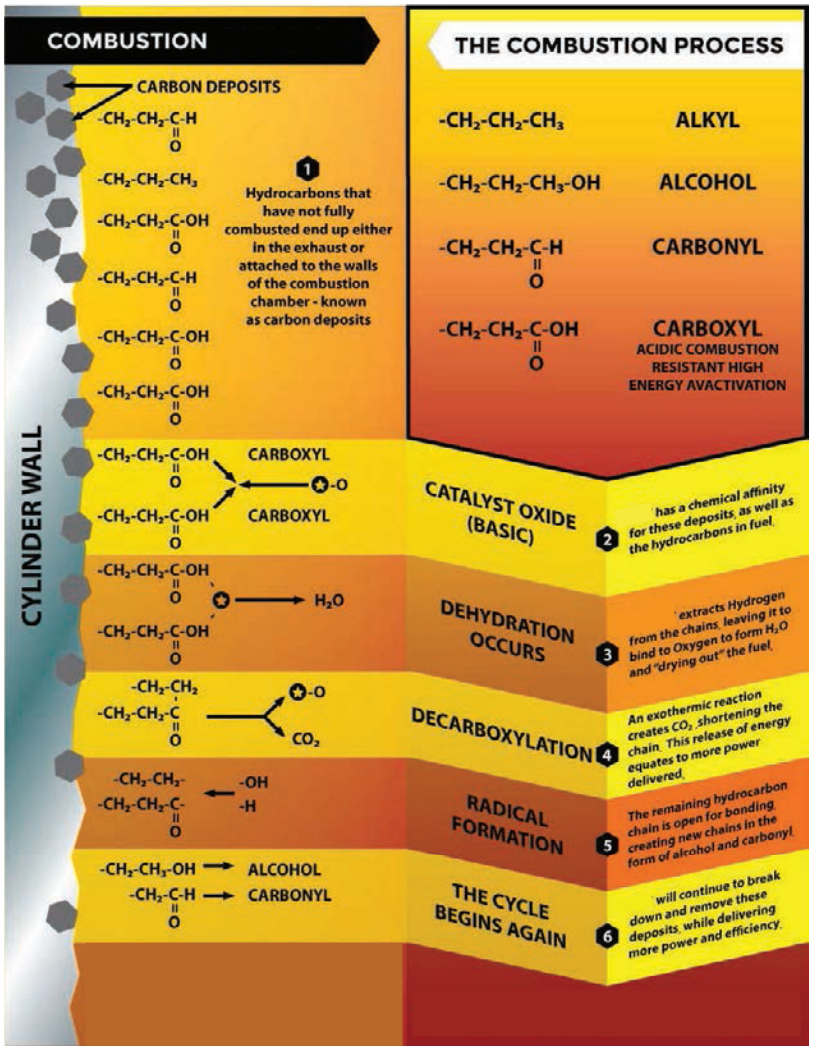
Rennsli inhibits the formation of new deposits in much the same way as it destroys existing deposits. It interacts with the ends of the aromatic chains and the attachment sites on the primary particles. This interaction keeps the primary particles from wrapping up full chains by blocking or destroying the attachment sites and breaking the chains.

This interference stops the deposit agglomeration process at the primary and secondary particle agglomeration stage. This results in much lighter and smaller particles that don't stick together and are more easily oxidized. The result of this interference is a lower mass of particulate emissions, and instead, an increased energy output and increased production of CO_2 and water, which are the desirable end products of the combustion cycle.

EFFECTS OF RENNSLI ON THE COMBUSTION PROCESS

The Rennsli technology interacts with the heavier, long chain, rate determining combustion resistant elements of the fuel, and existing carbon deposits. This interaction allows these deposits to break down and burn. The "molecular atomization" of the fuel, and the destruction and burning of the surface deposits produce the following positive effects on the combustion process:

- **Lmp k _jxcb, more complete combustion**
- **Optimal use of available oxygen**
- **Lower excess air requirements**
- **Removal of existing deposits**
- **Better heat transfer**
- **Lower fuel consumption**
- **Increased overall efficiency**



EFFECTS ON COMBUSTION BYPRODUCTS

Rennsli enhances the combustion process, which leads to the following positive effects on combustion byproducts:

Inhibition - of new deposit formation

Removal - of old carbon deposits

Prevention - of new deposit formation

Decrease - fuel consumption
- particulate, smoke and soot
- NO_X, SO_X, CO, and VOC emissions
- Carbon content in the ash
- fouling and corrosion due to decrease V_2O_5 activity
- cold-end corrosion due to decreased SO_3 formation

These effects lead to a significant increase in energy output by burning a larger portion of the Carbon available in fuel, and a significant reduction in corrosion due to much lower formation of SO_3, which increases the amount of SO_2, harmlessly captured in ash.