SOLVING CRANKCASE EMISSIONS

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The science behind our InterCharger™ technology involves a number of well proven fundamentals combining chemistry and quantum physics. In itself, chemistry alone does not explain how improved combustion reactions contribute to better engine performance or reduction in exhaust temperature. Likewise, quantum physics does not clearly explain the intricate chemical reactions involving catalytic modifications. However, the study of both sciences combined with extensive in-field research and development has consistently proven the merits of our InterCharger™ technology to the science professionals and the equipment operators.

As most of us know, a theory on paper is just a theory until it can be demonstrated consistently in real applications. We have eight-years of uncompromised success in the field and fortunately the theories provide an accurate and positive explanation.

Industry professionals are aware that crankcase emissions are very toxic and difficult to deal with. Since many of the compounds in these emissions are carcinogenic, strict emissions regulations are forcing engine manufactures to recycle these gases back into the engine intake. Engines do not tolerate the coagulating and poor combusting characteristics of these toxic gases. Since oil vapor does not burn as well as fuel, it is understandable why engines perform poorly and exhaust emissions become worse when these gases are recycled.

It is important to note that these emissions cannot be filtered and simply vented into the atmosphere as they are still toxic. Filtering systems are now being implemented on many recycled crankcase systems simply to prolong the engine's durability by capturing the larger, more coagulating compounds before the engine can ingest them. Maintenance becomes a concern as excessive contamination restricts the flow of crankcase gases. The vapors that do pass through the filter still do not burn as well as the fuel often resulting in reduced performance, excess exhaust emissions and even prematurely contaminating the engine oil.

Our technology deals with these complex and toxic compounds as would an oil refinery. Although oil refining techniques have been used for many decades, they are virtually unknown in the application of emissions modification for the purpose of combustion improvement. Crankcase emissions contain the same molecular compounds as crude oil and many of which are susceptible to reforming procedures. There are many types of catalytic processes developed to effectively modify oil compounds but only certain types of select modifications will yield desirable results for the intended purpose. For example, exhaust catalysts are simply designed to decompose the hydrocarbon compounds into their constituent atoms subsequently allowing them to be oxidized. They also produce exothermic reactions which under many conditions are not tolerable without careful considerations given to their location. Our interest is in endothermic reactions. The chemistry encompassing these types of reactions may be described as follows:

"A reaction in which heat is absorbed when it goes from reactant to product; the reactants are at a lower energy state than the products."

In this particular application the oil vapors enter at a low energy state and exit at a higher energy state as a result of the selected chemical reactions. The chemical reactions involving catalytic modifications are very complex but one brief description is as follows:

"Bi-functional catalysts containing hydrogenation promoters on an acidic support are used to process heavy oil feeds in the petroleum industry. The oil feeds are composed of paraffin's, other saturates, and aromatics – all complex molecules. The catalyst starts the breakdown of the components in the hydrocarbon compounds by forming carbonium ions that are positively charged molecular fragments, via the protons ($H\pm$) in the acidic function. These ions are so reactive that they change their internal molecular structure spontaneously breaking down into smaller fragments. In general, free radicals are formed by the hemolytic rupture of a bond in a stable molecule with the production of two fragments, each with an unpaired electron. The resulting free radicals may participate in further reactions." Hence, molecules with unpaired electrons are generally unstable and it is this instability which promotes further chemical reactions amongst other hydrocarbon compounds.

When crankcase gases are modified in such a way as to become unstable after leaving the catalytic system, their coagulating characteristics are not only minimized, but they assist in the decomposition of larger more complex hydrocarbons including fuels and oil vapors. This characteristic is very important as these freshly modified gases halt the contamination of the engine intake system and actually begin to decontaminate sticky otherwise insoluble hydrocarbons from the intake track, valves and piston rings. After years of field experience and testing, we have consistently demonstrated the merits of this InterCharger reaction with hundreds of engines (diesel, gasoline, propane and natural gas). The outcomes were statistically significant showing compression restoration, hydrocarbon and other emission reductions, longevity of the lubrication and performance improvement.

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