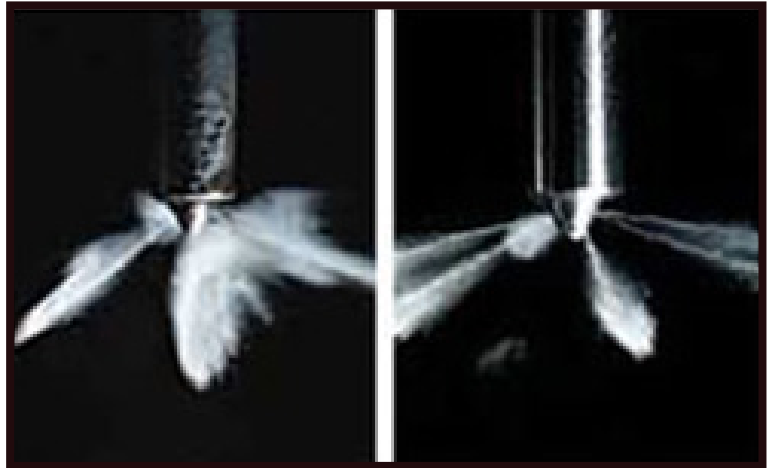


Combustion Chamber Deposits

Any time you have heat, pressure, and oxygen around petroleum, you're going to get the formation of carbon deposits. That means the internal combustion engine is a perfect place for their formation. Historically, automotive engineers and petroleum chemists have seen certain areas of the engine be the most prone to carbon deposit formation. And the deposits in these different areas have differing effects on the performance and operation of the engine.



The combustion chamber is the area of the engine where the fuel combusts or burns (stands to reason, right?). The fuel is combining with oxygen and being exposed to high amounts of heat in the chamber, so deposit formation is almost inevitable. Combustion chamber deposits are found in virtually all internal combustion engines, and they develop even within just a few hundred hours of operation from the start of the engine's life.

This was noted in research on gasoline engines by the JAE (Japanese Automotive Engineers); they noted it as a phenomenon that actually changed the conditions inside the engine. These deposits altered key factors like formation of NO_x gasses, changes in the combustion flame speed and thermal efficiency, even changes in the octane needs of the engine. Deposits would form on the piston crown, changing the volume inside the combustion chamber, which changes the minimum octane rating needed in the gasoline fuel to keep it igniting at the optimal time in the engine.

Researchers who have looked into the issue, trying to get a better handle on how these things happen, have settled on a hypothesis that combustion chamber deposits are formed when precursor molecules form from interactions between the fuel and air mixture as the flame "quenches" at the cylinder walls. The molecules get carried to the walls where they undergo reactions on the surface that eventually lead to deposit formation.

Injector Deposits

The formation of injector deposits are even more influential in the performance and efficiency of the engine. Automotive research suggests that injector deposits, just by themselves, can sap optimal fuel mileage and performance by 5-10% alone. The mechanism of formation is the same whether in gasoline or diesel fuel injectors. Small amounts of fuel, sometimes left over in the injector tip after engine shutdown, are exposed to the residual heat of the injector. This "cooks" the fuel – causes it to polymerize and react with oxygen to form carbon deposits. These injector tip deposits have the effect of changing the injector spray pattern and even reducing the effective flow area or spray of fuel at maximum lift. The net results of this are increased particulate emissions and reduced power and torque for the engine.

Way To Prevent Carbon Deposits In The Engine

Given that the different kinds of deposits are formed through the environmental conditions of the engine and the fuel system, there may not be an effective way to prevent their formation.

This is why an Air Induction service should be performed periodically to target and remove these deposits with a concentrated cleaning process.

Another thing that will help is to use fuel that is additized with an effective detergent package - to remove them as they are formed. This was partly the reason the Federal Government began requiring the addition of certain kinds of detergents in gasoline, because the body of research was clear that having detergents in fuel will help engines be more efficient and reduce harmful emissions going into the environment.

Now, the question of whether today's fuels have enough detergent in them may be up for debate. You can research what fuel retailers have the best additive packages at www.toptiergas.com