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Technical Data Sheet

Antifreeze Fires

These are probably the most common among older automobile engine fires. Many car and trucks today are involved in fires that are caused by antifreeze leaking on to hot engine surfaces. Many of these fires are going completely unsolved because many investigators do not realize how flammable antifreeze is.
Many times you will hear the scenario that someone was driving along and noticed the engine was overheating or saw steam coming from the engine compartment and when they stopped the engine burst on fire. What happened here? Antifreeze is a mixture of ethylene glycol and water at a normal dilution of 50/50. Ethylene glycol has a flash point of 240.8^{o} F and the auto-ignition temperature is 775^{o} F. We also know that the manifold in a running gasoline engine or turbo charger in trucks can reach temperatures that exceed the Autoignition temperature of ethylene glycol. These temperatures can auto-ignite even the heaviest hydrocarbons found in the engine compartment

When hot antifreeze mix leaks onto the hot surfaces of an engine, the water will begin to boil, keeping the solvent mix at a temperature of approximately 232^{o} F until most of the water has boiled away. (Mixing antifreeze to water raises its boiling point) At this point, what remains is pure ethylene glycol that will now heat and vaporize to its flash point of 240.8^{o}F. If a stray spark from a high voltage wire or an electrical component occurs in the area of the vapors from the glycol, ignition will occur. If no spark is available, then the glycol will continue to heat and vaporize. If a portion of the glycol comes in contact with a hot manifold or turbo charger surface, then auto-ignition will occur. Once ignition occurs in either of the above cases, the fire will burn in a normal manner and ignite other petroleum products or plastics in the engine. This phenomenon has been reproduced and documented many times at K-Chem Labs. These experimental results have been used in courtrooms to prove beyond a doubt the manner in which antifreeze fires occur. Being a petroleum product, ethylene glycol or propylene glycol burn very intense and will reach temperatures in excess of 1300^{o} F. These temperatures are sufficient to cause the melting of aluminum and zinc engine components such as radiators, alternator housings, air conditioning pumps, valve covers and carburetors.