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Ignitable Fuels As Possible Causes for Vehicle Fires

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Today's vehicles have a higher amount of ignitable fuels than the vehicles 30 years ago. The vehicles are designed for more power, less weight, and better fuel economy. It is a fact that the required smog device systems have decreased the fuel mileage. To compensate for this, the automobile manufacturers came up with ways to increase the efficiency of the engine, design, and weight of the vehicle. This is good for the end user but bad if you have a fire or accident.

Newer cars have become much lighter through the use of plastics, are built with smaller turbo engines, and lighter weight metals and components such as wheels, transmissions, suspensions, etc. According to the American Metal Market Newspaper, the plastic weight in a vehicle has risen from an average of 150 pounds to 300 pounds. The steel weight has decreased from 2,202 pounds to 1,170 pounds; the iron weight has also decreased from 540 pounds to 450 pounds. Plastics and the alloy metals would not be the first fuel ignited in a new car but they are there in abundance and will burn violently when they are ignited.

What would ignite them? Liquid fuels. Liquid ignitable fuels are what run your vehicle. Gasoline powers the engine. Oil lubricates the engine. Antifreeze cools your engine and transmission. Automatic transmission fluid makes the transmission operate. Brake fluid stops your vehicle.

The gasoline in 1973 was put into your carburetor through a fuel pump that developed 3 to 7 PSI (pounds per square inch). Today's fuel injected engines normally operate at 35-45 PSI and some models may reach as much as 100 PSI. Gasoline has a very low ignition temperature (-45f degrees). Fuel system leaks account for about 40% of all car fires. These leaks involve the carburetor or carburetor inlet leaks, fuel injection system – either injectors or injector lines, and fuel supply line leaks. Any

place there is a man-made connection, such as the fuel filter, fuel pump, injector lines, etc.; there is a chance for a leak. Road damage to the lines may also produce a leak.

The chances of a small leak with 35-45 PSI in a fuel-injected system may not be as detectable as with a leak in a carburetor system. The pressurized fuel will be atomized and ignite faster than a droplet of fuel from a carburetor system. Fuel in a high-pressure system will also find a weak junction and leak faster than a low-pressure system.

Just because the gasoline has been distributed in the engine without causing a problem does not mean the potential for trouble is over. The fuel that is ignited in the engine puts off a very hot gaseous vapor, commonly called the exhaust. The temperatures as the exhaust exits the engine into the exhaust manifold will be about 1000 degrees (rich condition) – 1500 degrees (very lean condition) for a proper operating engine. If the fuel mixture is too rich or too lean, the manifold temperatures will rise. An abnormal fuel mixture will also affect the exhaust system all the way out to the tail pipe. Remember, there is a muffler in this exhaust system, which normally operates around 400 degrees. A catalytic converter operates around 1700 degrees internally with an outside temperature of 700 to 1100 degrees. Even the end of the tailpipe can be 300 degrees. Damage to any of these components can cause excessive heat to adjacent components (fuel lines).

The other liquids in your vehicle also have relatively low ignition points. Your lubricating oil has a flash point between 250-475 degrees. It doesn't take much to ignite an oil leak when the normal operating temperature of the oil is above 208 degrees.

Power steering fluid operates at 140 degrees with a flash point at 385 Degrees. It is always under pressure while the engine is operating.

Turning the wheel past the normal stop will raise the PSI up to 1400.

Break fluid is generally not a first ignition problem but after a fire starts in the engine compartment it will definitely add fuel to the fire. Brake fluid can be ignited if a leak sprays on a hot surface while applying brake pedal pressure. The brake fluid in the system is not under any pressure when not in use.

Automatic transmission fluid flash point is about 175 degrees. Automatic transmissions can operate at a temperature of 180-200 degrees. They have also been known to "bubble over" out the dipstick, thus the locking dipstick.

Another consideration is when you turn off an automobile the temperatures of the components in the engine compartment can rise by 85 or more degrees after two to three minutes. This is caused by the lack of circulation of cooling fluids such as antifreeze and oil, which removes 40% of the internal engine heat and airflow from the fan.

The electrical system is also a very good source of heat and it can produce sparks, which can ignite the liquid fluids. Loose plug wires, loose electrical connections, and overheated wires will provide enough heat to ignite all of your liquid fluids.

As you can see the liquid fluids in your car have a great potential for starting a fire. The abundant amount of plastics and lighter metals used in the construction of cars makes for a hotter fire, a faster moving fire, and more fire damage.

There are a few suggestions that may prevent a vehicle fire.

1. Check all hoses for seepage, cracking or wear on a regular basis.
2. Leaking and seeping can only be seen if the engine is clean. Clean engines also run cooler.

3. Oil leaks from valve covers can drip on manifolds and cause fires.
4. Any leaking fluid can cause a fire; keep it dry and clean.
5. If you work on your own car, do not repair a fuel line with a piece of rubber hose. Replace it with an OEM (original engine manufacturer) part.
6. If you change your own fuel filter be careful not to cross thread or over tighten the nuts.
7. Catalytic converters produce excessive heat; don't park in weeds or grass.
8. Don't leave cigarette butts in the ashtray; ¼ full old water bottles or cola can work really well, just remember, "It's not cola".
9. If you lose your fuel cap, get an OEM as a replacement, not the first one you find that fits.
10. Authorized technicians should do all installation of after market electronic systems. Improper installation may have an effect on your insurance coverage.
11. Check all hoses; duel, power steering, cooling, transmission, and brake lines for any type of damage or wear.
12. Investigate any strange smells or odors.
13. Have any abnormalities on the instrument panel checked and repaired.
14. Keep all fluid levels full but do not over fill.
15. Do not use high pressure to clean engine compartment, damage to electronic components can occur.
16. Light seepage (except fuel) is acceptable. Fix leaks, not small seeps, because some auto shops will bleed you dry fixing seeps and can make them worse.
17. Find a good auto shop and have your vehicle inspected every two years. Older vehicles should be checked more often.
18. A good technician knows where to look for chaffing, like under the hose or wire harness.
19. After 10 years, any component made of rubber has a potential for failure.
20. TAKE CARE OF IT; YOU ARE DRIVING A BOMB

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