

## Fuel Dilution

It's normal to expect some fuel to mix with oil during the combustion process. The level of fuel dilution can vary depending on operating conditions, including excessive idling or short-trip driving. However, a severity 3 or 4 level (see table below) does not necessarily mean the oil must be changed.

Some engines are more susceptible to higher levels of fuel dilution, including gasoline direct-injection (GDI) engines. GDI engines are designed with the fuel injectors located directly in the cylinder, rather than through the intake port. While this promotes better use of the fuel during the combustion process, it leads to more fuel getting past the piston rings and into the crankcase.

Extensive studies of oil-analysis results over the years have demonstrated that even with traditionally high levels of fuel dilution, most GDI engines do not show elevated wear-metal levels. Oil-analysis reports recommended customers change oil due to fuel dilution, but no mechanical issues or unusual engine wear were taking place.

Because of this, Oil Analyzers Inc. has changed the comments for all gasoline direct-injection engines with high fuel dilution. The fuel-dilution level will be flagged, but oil changes will no longer be recommended unless elevated wear metals are found or the oil viscosity is greatly affected.

If your report comes back with elevated fuel dilution, other key results of the report should be considered before concluding that fuel dilution is having a negative impact or deciding to change the oil. The first result to consider is viscosity. Fuel contamination causes oil viscosity to decrease. When it decreases too much, it leads to wear and the presence of wear metals. If wear-metal levels are normal (severity 0 or 1) on the report, the oil is still doing its job and providing sufficient lubrication even with fuel dilution. This can be the case even with a full-viscosity-grade drop in the oil.

While a high level of fuel dilution might be startling, it may not be as bad as you think. It's important to consider all indicated results, especially viscosity and wear metals, in order to understand the impact of fuel dilution. As always, taking multiple samples from the vehicle will provide further evidence that the fuel dilution is a concern or simply "normal" for your vehicle and operating conditions.

		Severity 1	Severity 2	Severity 3	Severity 4
Fuel - Diesel		2.0%-3.4%	3.5%-4.9%	5.0%-6.9%	≥7.0%
Fuel - Gasoline		1.5%-2.4%	2.5%-3.4%	3.5%-4.9%	≥5.0%