Selecting the Correct Motor Oil for the LT5 Engine

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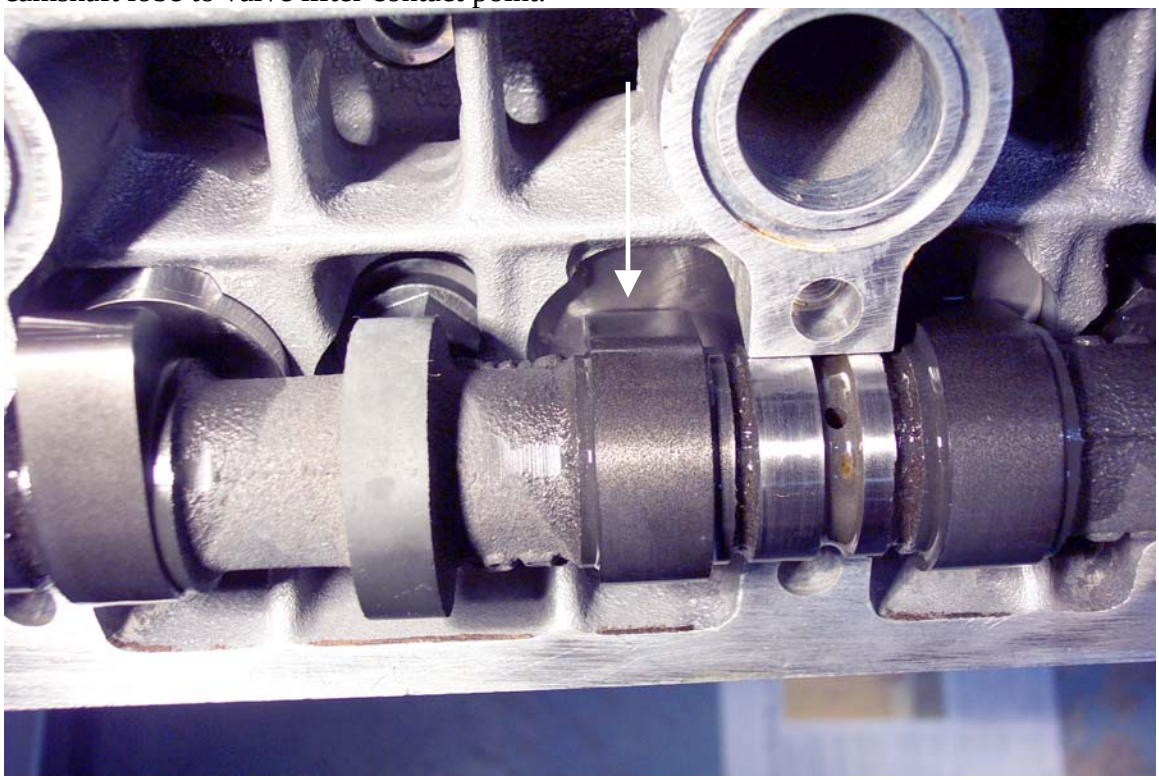
The ‘90 – ‘93 LT5 engines were designed for API category SG engine oil. The ’90 – ‘92 engines have SG printed on the oil filler cap. GM specified category “SG or SH”, for the ‘94 – ‘95 engines. These specifications are listed in the service manuals. Over the years motor oil has evolved up to the current category SN. Part of the evolution to category SN was a reduction of the content of oil additives that are considered to be poisonous to modern catalytic converters. These Extreme Pressure additives, collectively known as ZDDP are important to the LT5 engine.

The LT5 engine has flat valve lifters. ZDDP was developed to protect metal surfaces in extreme pressure applications. The most stressed area in most flat tappet engines is the camshaft lobe to valve lifter contact point.



The LT5 exhaust camshaft pushing down a valve lifter.

This is true for the LT5 and to a lesser extent it applies to the steel camshaft chain and sprocket surfaces that are also subject to extreme pressure in the LT5. In the 90’s emissions designers became concerned because the metals from the ZDDP additive were found on catalytic converter substrate. This reduces their emissions performance.

To improve catalytic converter durability, efforts were made to reduce the amount ZDDP additive. Going forward, the problem with extreme pressure at the valve lifter was addressed with the roller valve lifter. The extreme pressure issues with chain drives can be eliminated with the use of belts for the camshafts.

In my opinion, modern motor oil is not appropriate for the LT5 engine. Category SN oil is not backward compatible with SG or SH because the amount of extreme pressure protection has been reduced. ZDDP has two components, phosphorus and zinc. The amounts of phosphorus and zinc are:

	API SG	API SH	API SN
Phosphorus	.12% / 1200 ppm.	.12% / 1200 ppm.	.08% / Max. 800 ppm. Min.600 ppm.
Zinc	.13% / 1300 ppm.	.13% / 1300 ppm.	.08% / Max. 800 ppm. Min.600 ppm.

What do these numbers mean in terms of engine wear?
I believe that the effect on the LT5 engine is small. Life is easy for the LT5 valve actuation parts. Because there are two valves per port, the valves are small and light. The valve open spring pressure is about 225 pounds. Compare that to a typical flat lifter push rod engine like a stock 396/427/454 engine. On the big block the spring pressure is 330 pounds times the 1.7 rocker ratio = 561 pounds on the lifter.

Using oil with the full EP protection package over the life of an LT5 provides the best in terms of low lifter wear. The use of category SN oil probably causes a small amount of additional wear.

Exactly what is the effect on the catalytic converters?
The LT5 normally passes about twice as much oil through the exhaust as most engines. Typical oil consumption is one quart per 750 to 1000 miles if the engine is run, as it should, to 7000 rpm a lot. Therefore the catalysts are in an especially harsh environment with the volume of oil and the metallics from the EP additives. The metallic material causes what is termed ‘deactivation’. The deposits don’t build on the substrate to any measurable extent. So clogging of the catalyst is not a concern. However, if the car is subject to emissions testing it might be useful to favor the catalysts over the valve lifters. The catalysts are needed to pass the next emissions test. That’s an immediate concern. This might be more important than the ultimate life of the lifters. The lifters might suffer just a little more than average wear over the life of the engine. Using SN oil as an emissions test strategy may be useful.

Generally, is it okay to use category SN oil?
The API category SN performance test added the use of flat lifter engines in the testing process. It has been said that new additives have been designed to provide EP protection without using ZDDP. The flat lifter testing is new for the category SN oil which was released in 2010. As far as I know this engineering has not been proven yet. More time and experience will tell.

My oil recommendations for the LT5 engine.
Today we don’t need to worry about whether modern motor oil provides good EP wear protection. The market place has stepped up to offer motor oil especially designed for our engines that were engineered for category SG oil. Amsoil offers their AMO product. I believe that it provides the best protection. It has the full EP additive package. In addition

it is 10W-40 viscosity. The higher viscosity offers more film thickness, which adds to EP protection. The higher viscosity might cause an approximately one hp power loss to shear the thicker oil. I think that the added protection is more important than a one hp power loss. The OE 5W-30 lubricant is specified as an all season oil for use throughout the country. For use in ambient temperatures over 20 degrees F. I think that it is better to use 10W-30. If one wants to use 10W-30 viscosity, Amsoil offers their Z-Rod product in 10W-30.
Amsoil AMO 10W-40. Phosphorus 1265. Zinc 1378.
Amsoil Z-Rod 10W-30. Phosphorus 1320. Zinc 1440.

Mobil 1 High Mileage 10W-40. Phosphorus 1000. 83% of category SG.
Zinc 1100. 92% of category SG.
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Zinc 1100. 92% of category SG.

Other manufactures offer similar products. Look for key words like: older engines, high zinc, flat tappets.