

Technical Article: Synthetic Oil Use

From Jim Ingle, GM Powertrain Engineer (this question was asked in terms of adding Mobil 1 to a ZR-1 after engine break-in):

"There is probably more misunderstanding of lubricants and "old wife's tales" about them than any other automotive issue. A lot of this appears to be a result of overly conservative writers of owner's manuals, etc. looking for excuses to deny payment for warranty work.

For years, new cars were shipped with non-detergent oil as factory fill...so called "break-in" oil. I've never quite understood the intent of all this, but it was probably some misguided do-gooder's theory that leaving wear products in place in a new engine provided self-lapping mechanisms to promote burnishing of wearing surfaces. In fact, detergent oils primarily are intended to remove and inhibit combustion products from building up on pistons, valves and other moving parts and hold these in suspension until the oil is changed. The break-in of contacting surfaces is primarily accomplished by the wearing off of microscopic "peaks" protruding through the lubricant film and has little to do with the presence or absence of foreign material. Fortunately, we finally have near universal understanding of the process.

As far as use of so-called "synthetic" lubricants goes, their chief claim to fame is a lower rate of change of viscosity versus temperature. They stay more fluid at low temperatures and more viscous at high temperatures. We use Mobil 1 as factory fill for engine oil in ALL Corvettes now, including the ZR-1, so there is no magic mileage at which it can be used. If there were such a thing as "seating of rings" etc., this will have nothing to do with it. The lubricity of "slipperiness" of synthetic lubricants is generally about the same as conventional "mineral-based" lubricants. (The actual definition of all this is a bit perplexing to me since they are all petroleum products!)

We started using Mobil 1 in all Corvettes with the introduction of the LT1 engine as a 1992 model base engine. Management wanted to save weight and money by eliminating the engine oil cooler and decided to use Mobil 1 instead. Mobil made us an "offer we couldn't refuse" on the oil for installing their logo on the car and allowing them to advertise it as factory fill on all Corvettes.

This was disappointing to me because the oil-to-water oil cooler we used on L98s not only

cooled the oil, more importantly it HEATED the oil with engine coolant during warmup to help "boil off" the water (a primary combustion product) which is a major oil contaminant and accumulates if the oil temperature doesn't exceed 212 deg. F each time the engine is operated. Of course, the ZR-1 doesn't have an oil-to-water cooler either, so both cars now share the requirement for frequent oil changes when driven mainly on short trips (this is probably not clear in the owner's manual). My own recommendation, which is shared by many in the industry, is to change oil by the calendar rather than by mileage...to simplify, change at the start of each season (4 times a year).

Bottom line: you can put Mobil 1 in your car any time you want to."

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