Using synthetic-oil in engine break-ins
By Road & Track, Technical Correspondence Column, July 2000 issue

Many readers have questioned us on engine break-in procedures when using synthetic oil. Conventional wisdom has it that a new or freshly rebuilt engine should be broken in using mineral oil, then, once enough mileage has accumulated to ensure rings and cylinder walls have lapped themselves into harmony, synthetic oil can be used.

Readers have correctly pointed out that several major brands come from the factory with synthetic oil, among these being Corvette, Mercedes-Benz and Viper. How can these engines break-in if run on synthetic oil from day one, they ask?

To find out, we spoke with Mobil and Redline Oil companies for their take on the synthetic break-in question. Mobil's response was that engines break-in just fine on synthetics, and that any wear point in the engine significant enough to be an interference, and thus susceptible to rapid wear, would be a wear point no matter what lubricant is used.

Redline, on the other hand, has found it best to recommend a mineral oil break-in. Occasionally an engine will glaze its cylinder walls when initially run on Redline, they say, so by using a mineral oil for 2000 miles, verifying there is no oil consumption and then switching to the synthetic, glazing is eliminated.

Cylinder-wall glazing is not a deposit left on the cylinder wall, but rather a displacement of cylinder-wall metal. This happens when the high spots of the cylinder wall crosshatch are not cut or worn off by the piston rings, but rather rolled over into the valleys or grooves of the crosshatch. This leaves a surface that oil adheres to poorly, against which the rings cannot seal well. Compression is lost and oil consumed, and the only cure is to tear down the engine to physically restore the cylinder-wall finish by honing.

Why is glazing not a problem for the major manufacturer? Because they have complete, accurate control over their cylinder-wall finish and ring type. Redline deals with a huge variety of engines and manufacturers, both OEM and from the aftermarket. Cylinder-wall finish and ring type thus vary greatly, and glazing can therefore occur, albeit rarely.

While we were at it, we queried about synthetic oil-change intervals. Mobil says to use the maximum change interval specified by the engine manufacturer, regardless of oil type. Redline said that once past an OEM warranty, anywhere from 10,000 to 18,000 miles, or one year, whichever comes first, is appropriate depending on conditions (dust, short trips). They also recommend changing just the oil filter at 6000 to 7000 miles as a precaution against overloading the filter. Redline further noted a caution when using synthetics with leaded fuels, as synthetics do not hold lead in suspension as well as mineral oil. Aviation is one area where leaded fuel is still widespread, and avgas is often used by off-road and racing enthusiasts, so a relatively short oil change interval may thus be indicated.

Synthetic Break-in

By Tom Wilson
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Exxon/Mobil's official policy is that their synthetic oil may be used at any mileage, including factory fill, unless otherwise stated by the vehicle manufacturer. Mobil pointed out, as you did, that all Corvettes, Vipers, Porsches and Aston Martins are factory filled with Mobil 1 synthetic. We can only conclude that improvements in cylinder-wall finish and ring design or materials makes this possible.

It is also likely that vehicle manufacturers not using synthetics as the factory fill are also not optimizing their cylinder and ring packages for the slippery sythetics, in which case approximately 1000 miles on mineral oil should prove ample break-in time. In fact, in modern engines a very high percentage of ring break-in takes place very quickly, probably in the first 10 to 20 minutes of engine running. Certainly, some final lapping of the rings and cylinders takes place over several hundred miles after initial break-in.

Just to add some confusion, Porsche dynos all of its engines before installing them in the chassis. We were unable to determine what oil is used for the dyno session, but would presume it's Mobil 1