ECGS Gear Oil Recommendation - Why We Recommend Non-Synthetic Oil

ECGS recommends Dino (Non-Synthetic) 85w140 Lucas oil with a Ford or Dana limited slip additive for clutch style posi's. The gear oil question is an age old debate that comes down to opinion. We base our opinion on differentials we have seen. Scientifically it has been proven that that when measuring diff temps, the actual “metal objects” stay cooler using a quality dino oil with an additive package over synthetic oils. However it has been proven that synthetic “oils” can stay cooler then dino oil. So it depends on what temperature you measure the “metal” or the “oil” hence why both can claim they are better.

Other findings and this varies based on the actual synthetic used. Synthetics thin out quickly once hot and lose their cling ratio to the metal object, when the oil is stuck to the gear it provides a cooling factor for the metal. We also believe that dino oil has better pressure properties, i.e. it provides a better cushion then synthetic for two reasons. First, it does not thin out as much and two it clings to the gear.

Another important attribute of differential oil is water separation. A gear oil that will hold its separation from water will protect the differential. It is in our experience that if you add water to a diff with Synthetic there is no clear delineation between the two. On a dino oil there is excellent water separation properties. Water will ruin diffs as it affects its pressure properties resulting in surface wear quickly, so any oil that keeps its separation properties will outperform one that will not.

An easy not so scientific test is to install synthetic and run your diff for 30 minutes, pop cover and watch how it comes out and feel it. Most we have seen are extremely thin and act almost like water. Same test with Lucas it runs slower and will be stuck to the gear.

All synthetics cost more money than Lucas dino oil, and I feel there is a risk in what you are getting with synthetic. I find it much wiser to run the lower cost oil and increase the frequency of change. No matter which oil used, the higher the heat in the diff, the faster oxidation occurs and the oil breaks downs. At 140 degrees if no trash or moisture is introduced oil will basically last a million miles. However for roughly every 20 degrees above 140 it cuts life expectancy in half. A well broke in diff under normal conditions will run around 200 degrees and a quality gear oil will last 100k using above formula. However it is not uncommon for differentials to see higher temps when worked hard (steep grades, towing, speed, shock loading, ect.) which is why manufacturers generally recommend 30k intervals normal service and 15k or less for severe service. A differential that is too small for the vehicle obviously sees more strain and thus builds more heat. So an undersized diff under normal conditions will

run hotter and require more frequent changes. Other notes on heat: 300 degrees is too hot, 250-270 is normal for a new diff and gear oil should be changed at 500 miles.

In the end comparing gear oil is a useless debate that is tainted by advertisement and claims that aren't proven, it all comes down to heat and the oil breaking down. Instead of spending $100 dollars on synthetic, spend $20 on Lucas and install a $50 temp gage on your diff. If your diff regularly sees mileage over 200f change the oil frequently, if it doesn't save your money. The flip side to this is synthetic sellers say their oil stays cooler and lasts longer. I think it is false advertisement that can't be proven by the average purchaser. If you ran dino and the diff regularly ran above 200 it would be worth trying a high quality synthetic oil and proving their claims with a temp gauge.

Opinions on specific gear oils:

Royal Purple: In our opinion one of the worst gear oils made

Valvoline synthetic: Better than royal purple but dino out performs

Ford synthetic: Probably Valvoline not the worst but think dino is better

GM synthetic: Similar to ford

Toyota synthetic: Average same performance as most dino's I think Lucas is better

Mobil 1 synthetic: Better than economy dino's and is likely comparable to Lucas or other quality dinos with additive packages

Amsoil severe duty: Better than all economy Dino's and all synthetics on the market, but marginal over a quality dino with additive package

Redline shockproof: Same as Amsoil

The only synthetic's I would consider are Amsoil, and redline, along with some industrial synthetic's that aren't really marketed to your everyday user. But would only consider if I was trying to control a heat problem, or shock load issue generally related to doing something the differential was never designed to do in the first place.

In the end changing the oil more frequently will result in less wear and longer life in and will cost less money.

Conclusion Notes:

- **ECGS RECOMMENDS LUCAS DINO 85W140 & LUCAS 80W90 FOR EXTREME COLD**
- **4 Most Important Attributes to Gear Oil**
  - **Cling Ratio**
  - **Water separation properties**
  - **Cushioning Factor**
  - **Temperature Control**
- **Temp Reference Chart – oil change frequency**
  - **170 Deg - 100,000 Miles**
  - **200 Deg - 50,000 Miles**
  - **220 Deg - 25,000 Miles**
  - **240 Deg - 12,000 Miles**
  - **260 Deg - 5,000 Miles**
  - **260-300 Deg – 500-1000 Miles until Temp is controlled**
- **Differential Temp Guide**
  - **250-275 Degrees is Normal for new differentials breaking in, do not Tow or take long road trips for first 500 miles as this builds additional heat. 300 degrees is to hot and diff should be allowed to cool.**
  - **Normal operating Temp for a differential adequate for vehicle in stock applications 170-220 degrees**
  - **Normal operating Temp - Large tires, Undersized Differentials, Towing 200-250 Degrees.**
- **Final Notes**
  - **Change your oil frequently your diff will thank you**
  - **If water is ever introduced to differential change it immediately, keep in mind that a differential that is hot and then becomes cool will naturally draw in moisture, so it is not always a water crossing that causes moisture contamination, always run a vent to a dry area and insure it breathes easily.**