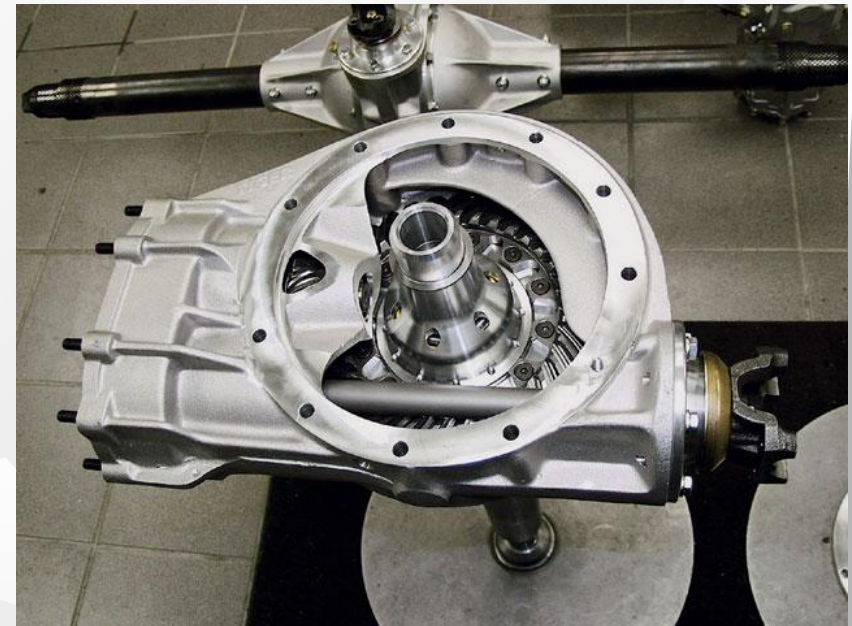


Transmission and Differential Break In Procedures Presentation.

How Break-In procedures improves component maintenance, performance and long-term durability.



Simple break-in solutions for improved performance & durability.

SynMax Performance Lubricants

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BREAK IN PROCEDURE OVERVIEW:

Break-in procedure increases metal surface technology by using heat and operation cycles to activate the metal micron sponge environment within the components and metals areas. Break-In process performs the simultaneous combination of:

- 1) Matching components by leveling the peaks and valleys of the surface areas**
- 2) Releasing contaminates held within the metal's sub surface level** including the holding case etc. Break-In procedure happens through heat, friction and cool down cycles, when metal expands and contracts (like a sponge that opens and closes pores to release and receive or soak in) particles and contaminates are released into the fluid and flushed away upon hot draining.

Remember: **Reverse effect happens** when surface technology (Moly or Diamond Like Additives.) **material is received into the metal surface pores** through similar heat and friction cycles.



WHAT HAPPENS IF I DO NOT BREAK IN MY TRANSMISSION OR DIFFERENTIAL ?

Most people do not perform proper break-in procedures and unfortunately suffer the consequences. – Even brand new components require a mating and cleaning process.

Quality OEM drive train component manufactures such as Frankland, Richmond, Tiger and others suggest a proper break-in procedure.

If the break-in procedure is not used, metal particles both big and small from the gears, and particles released from the case inner surface will perform a welding effect upon the bearings and gear faces – cause premature failure and shorten component life with reduced durability and performance.

Drive Train Break-In cycles

Have three hot run (running the car on track not sitting still) sessions at least 5 to 10 minutes each rpm increasing accordingly and allowing to cool down after each session to create a proper heat and cool cycle:

Light session 2500 – 3000 rpm. Medium session 4000 – 5000 rpm. Full throttle session 6000 +.

This performs heat and cooling cycle three times increasing intensity (slow, medium and full) total time period 45-60 minutes. When process is finished, immediately all drain fluids completely then replace with synthetic hi performance fluids.

Remember: Rest and allow the components to cool for 30 minutes between sessions. This allows the metal pours to Open and Close to release particles and contaminates into the Break- In oil.

Further to be released at hot oil drain and filter change.

Transmission & Differential Break-In cycles:

For maximum benefit; perform heat and cooling cycle three times increasing intensity (slow, medium and full) total time period 45-60 minutes.

Remember: Rest and allow the components Transmission or Differential – Rear End to cool for 30 minutes between sessions. This allows the metal pours to Open and Close to release particles and contaminates from the holding case and components into the Break- In Gear Lube.

Further to be released at Hot Lube Drain.

When process is finished, immediately all drain fluids completely then replace with synthetic hi performance fluids.

Engine Break-In cycles –

Q: Surface Preparation is another principal for improved Metal Surface Technology?

A: Surface preparation: when a component is scheduled for final “ aerospace” coating- it is properly prepared through a variety of sonic cleansing, micro-level machining and heat cycle processes before the new Metal Surface Technology is applied.

Q: Can Surface Preparation be performed through a “ Break – In” process?

A: Yes, “Break–In or “Run-In” processes are performed by top teams at the highest form of Motorsports like NASCAR, Formula One and others. These factory racing groups have specialty divisions for assembly, preparation and testing. After building the components, they are broke-in on a special engine dyno test machine, then installed in the car.

Q: Can I perform this special "Break – In" process?

A: Yes, you can experience similar results of these professional "break-in" procedures through a simple "test & tune" session. First, fill with a break-in lube (non-synthetic straight mineral/ 100% petroleum) Special break-in gear lube with high levels of anti-wear and detergency packages designed to cleanse, carry and flush away micron metal particles.

Run the car / components at full operation temperature for 45 – 60 minutes. This can be achieved by a complete test and tune or single race session.

Then, as soon as the car comes in –while the transmission or differential is still hot (do not let cool), immediately drain the break-in fluids. Then fill with your special racing (synthetic) oils with special metal treatment additives (Moly or Diamond Like Additives)

Q: What happens during the "Break-In" process?

A: The goal of the "Break-In" process is to get metal components up to hot – operational temperatures – which opens the micron pores of the metal". With these run/break-in session(s), metal expands and contracts through heat and cooling cycles.

Metal surface micron peaks and valleys are properly worked and parts matched to each other.

The sub-micron metal particles, gasket, sealant, silicon and other materials are then flushed away with the draining of the hot break-in oil.



Q: I thought the Transmission or Differential was already broken in and ready to go?

A: The OEM / manufacturer (unless you have a specialty builder and pay for the special dyno time) to keep cost low does not have the time to work the components properly as required at full racing operation temperature.

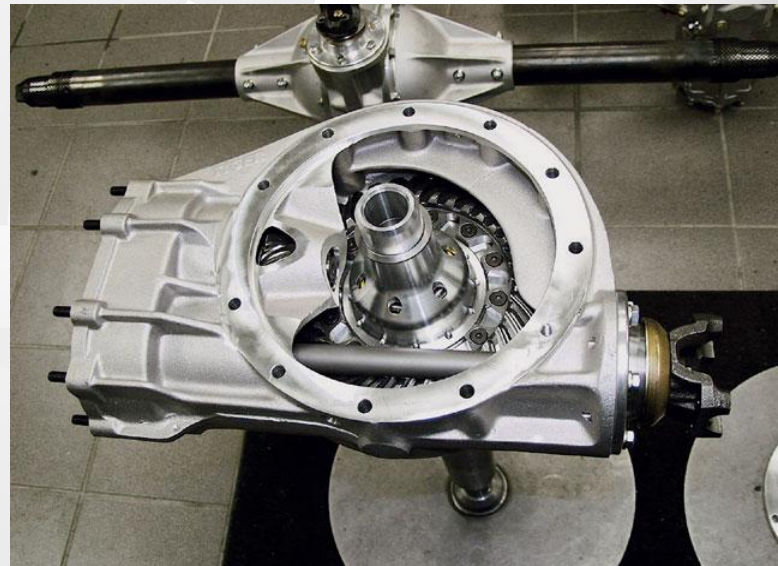
In most cases, the builder - manufacturer performs a short-term run-in procedure on the gears – just to make sure everything works properly.

Builder relies on the end-using customer to take responsibility to perform a complete break in, power up and cleansing procedure.

Q: Is it true that steel and aluminum case surfaces can have particles break off into the oil?

A: Yes, when component surfaces get to operational temperature (180 F+), sub micron level micro sized particles (silica sand with aluminum) will be forced to the surface.

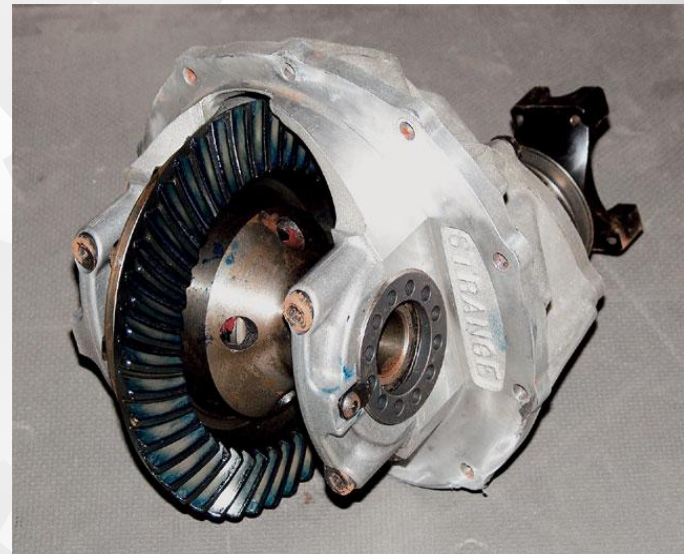
Then particles need to be flushed away immediately to prevent particle contaminates from causing further long-term damage.



Q: What if my components are matched; do I still need a break-in procedure?

A: Yes, even when your components are matched; you need both the case and gear components to experience the same heat cycles for break-in & flushing.

If not, unexpected micron metal particles with other materials, floating within the oil will cause long term damage.





Q: If the component surface were Micro polished (REM) smooth, would there be any further concerns?

A: Yes, there could be concerns to look out for – although the surface is polished to a mirror--like finish, when the gear is at operational temperature and use – it is very hard for the oil to stick and stay upon the gear surface to perform the job of lubrication. **You always need slight micron area for the oil to hold and stick** (like cross hatch swirls on cylinder walls).

Example: if you had a drop of oil and placed it upon a mirror (ultra smooth finish) and moved the mirror angle slightly, the oil would slide right off. Then same oil drop – on a micron fine surface that hold oil in small “pocket” areas would have lubrication.

For the ultimate metal surface area technology, micro polishing is fine as long as it is followed up by an aerospace level coating ***designed to work with the metal surface area holding the lubricant as it expands and contracts during operation cycles.***

Q: What break in Gear lube should be selected for this procedure:

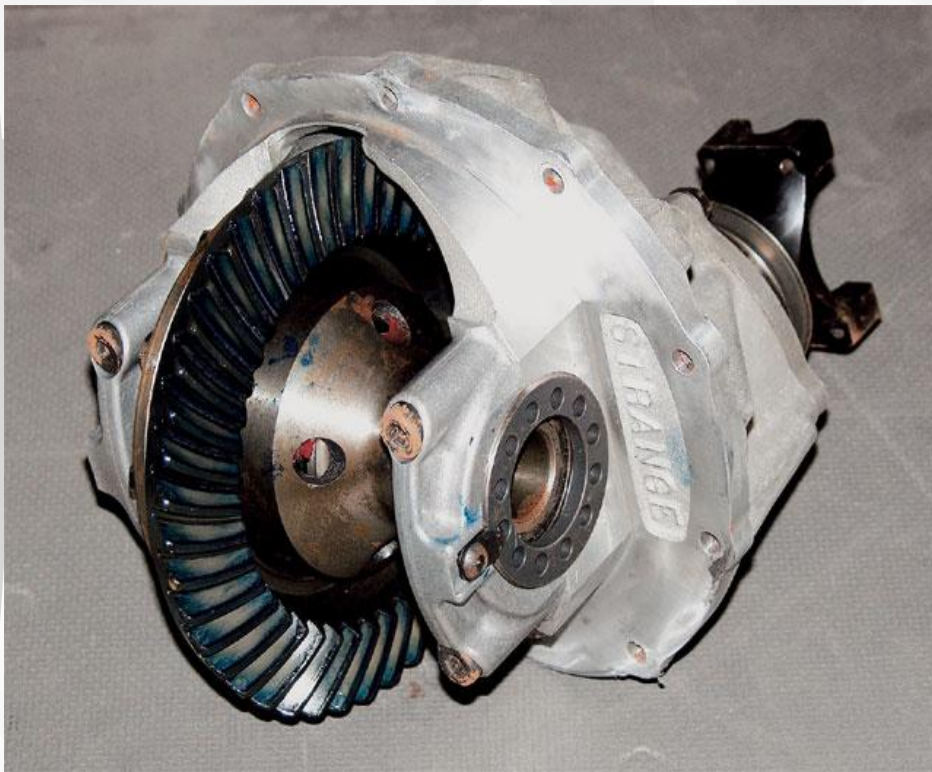
A: Break-In Gear Lube should be specially designed 100% Petroleum / Mineral oil base oils with special detergency and high Zinc & Sulfur anti-wear additive levels is a standard selection for the automotive & racing application.. Do not use a synthetic or synthetic blend oils.

Break-In process requires the firmest base oil to perform the cleansing process. Previously, the choice was a good cheap gear lube (which did not provide protection or mate parts together properly).

Recently the choice of professional / competition NASCAR level builders is a product that cannot be found (**unless a special break-in gear lube blend as available through SynMax**) is an old fashion high sulfur **100% petroleum 80W90 gear lube designed in the 50's, 60's and 70's.**

This is not available in the standard commercial market place because of long term environmental use concerns.

Break In Procedures for drive-train Improvement **END.**



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