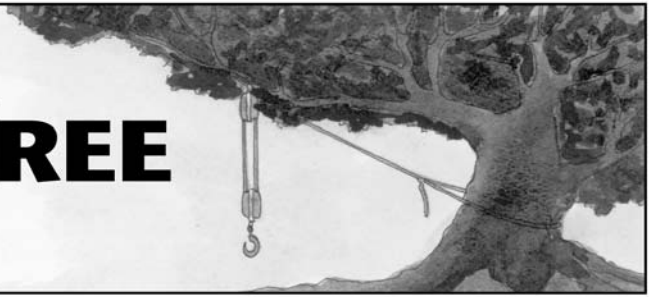


THE SHADE TREE



WHY ASK WHY – LIQUIDS IN YOUR TRUCK by Robert Patton

Servicing a new and unfamiliar vehicle model for the first time can be frustrating. As I thumbed through the Volkswagen New Beetle (diesel) Owner's Manual there were many listings for lubricants that only showed the manufacturer's part numbers (in this case those of Volkswagen). Purchase of the Robert Bentley shop manual did not give any further insight. Nor did a visit to the local VW parts counter unlock the mystery of the specification of the lubricants needed for routine maintenance. Case in point, what is the specification for and, thus, alternate (read: less expensive?) for the lubricant needed for the five-speed gearbox?

I took the path less researched, as there was not an easy answer, and purchased (\$20.00 per liter) the Volkswagen part number G 005 000 oil for my gearbox. I vowed to get some answers to many of the other VW specific part numbers, as they have a special number for all things liquid [power steering (what is G002 000 synthetic oil), oil, antifreeze] used in the vehicle. The only thing easy was the DOT-4 brake fluid.

Thinking back, I had run into a similar situation with another foreign car I once owned. Anyone care to point me in the direction of a "Pentosin CHF 7.1 or equivalent" fluid for a car's power steering system? Perhaps your experience as a new Turbo Diesel owner and its unique liquids is not unlike mine with the Volkswagen's mystery lubricants. Care to explain the difference in the engine oil for a diesel versus the engine oil used in your car? How about the New Venture 4500, five-speed gearbox oil – what makes it so unusual? The NV5600 gearbox oil is yet again different? Friction modifier fluid for the differential – where do I find such a product? Automatic transmission fluid, specification ATF 7176+4, sounds strange to me. Anything special needed for antifreeze? Brake fluid? Power steering fluid?



Special lubricants for your vehicle

Do my new car experiences parallel your experience with the new ownership of your Turbo Diesel truck? Can we take these negative frustrations and make them into an opportunity to learn? You bet. Let's start with the lubricant that gets changed with the greatest frequency, the engine's lube oil.

FIRST THING TO NOTE – YOUR OWNER'S MANUAL

Yep, time to issue the editorial disclaimer. The authoritative source for this article is the Owner's Manual from my '99 2500 Turbo Diesel. Specifications do change (the '99 book listed ATF type 7176+3 as being acceptable) and you should use the products listed in your manual. Our article is an effort to clarify and thus help you find readily available lubricants. Also, our article is written to stress the importance of using the correct lubricant by giving you some of the technical reasons behind the lubricant's uniqueness.

LUBE OIL CONSIDERATIONS

Many of you inquire about selecting the "best" for your truck. We hear a lot of questions like, "How about Mobil 1 or the Castrol Syntec synthetic lubricants?" Good intentions, but these oils are not blended to meet the requirements of a diesel. The API (American Petroleum Institute) "donut" rating for both oils is CD. Note the first letter "C" stands for Commercial or compression engine (a diesel). The "D" is the specification test the oil was tested at and was able to pass. The "D" specification was developed in 1952. The current "C" or diesel specification is CH4. Always use diesel engine oil rated API CH-4/SH. See your Owner's Manual and TDR Issues 2, 3, 10, 11, 12, 13 and 15 for more information.

The oil also needs to pass the API S (S stands for a service or spark/gasoline engine) category and current specification H. The S classification is needed to address and prevent wear on the sliding camshaft tappets.

The specification for engine oil set forth in the most recent 2001 Owner's Manual is soon to be obsolete. Issue 35, page 74, had a two page discussion of the next C (commercial or compression/diesel) specification "CI." The reason for the new specification was covered in detail, but for this issue's look at fluids for the Turbo Diesel, a quick summary will suffice. The following summary will also point out the difference in C/commercial or compression/diesel lube oils versus the S/service or spark/gasoline lube oils.

In Issue 35, Tom Berg gives some useful pointers. "You will see diesels with cooled EGR by late next year, and by early 2004 most truck diesels will have cooled EGR. These engines will run hotter and produce more soot than today's models. They'll also produce more acids that can attack internal parts. The new motor

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oil products will be formulated to take the greater loads and protect both new and existing diesels, say petroleum engineers.

“Acids will be formed from the sulfur and nitrogen in exhaust gasses that will find their way into the combustion chambers and then past the rings into the crankcase. Mixing sulfur with condensed water forms sulfuric acid, and nitrogen with water forms nitric acid – both nasty, corrosive compounds. Acids attack any metals they touch, so have to be neutralized through increased alkaline reserves in the new oil.

“Sulfuric acid will remain a problem as long as relatively high-sulfur fuel is on the market, he said. Most of today’s fuel can have as much as 500 parts per million of sulfur. In summer of 2006, the Environmental Protection Agency, which also sets federal exhaust emissions limits, will require fuel sulfur to be cut to 15 ppm. This should reduce the acid issue.

“Ability to neutralize acid is among the things expressed in an oil’s Total Base Number, or TBN. TBN also describes detergents and other additives, as well as the oil’s stamina as it works to combat contaminants. TBN as a whole is a bigger issue with new oil (CI-4) than the individual problem of soot.

“Will PC-9 be okay for all engines, including now-current models? Probably. Like previous oil types, most CI-4 formulations will be “backwards compatible.” In fact, because CI-4 will perform better, it will allow users to slightly extend their drain intervals if they want to.”

MANUAL TRANSMISSION Five-Speed NV4500 Manual Transmission

Reference your Owner’s Manual and you’ll note instructions to change the NV4500’s gearbox oil every 30-50 thousand miles, depending on load. Use 75W-90, GL-4 or 80W-90, GL-4 rated synthetic oil. Chrysler part number 4874459 or Castrol Syntorq. Often members will ask about the GL-4 rated Castrol synthetic gear lubricant (75W-90). If the GL-4 classification is good, shouldn’t a GL-5 rated lubricant be better? In the case of the NV4500 gearbox, not necessarily so. The GL-5 oil uses twice the amount of sulfur/phosphorous additive package as GL-4. At high temperatures, the phosphorous plates out and reduces the coefficient of friction of the synchronizer rings (New Venture Gear has seen this on shift stand tests). Since there’s twice as much of it, there’s more of a detrimental effect compared to GL-4.

Although it does not affect the NV4500, the additional sulphur content of GL-5 attacks brass.

Like the Volkswagen saga, the GL-4 rated, Castrol Syntorq lubricant is difficult, if not impossible, to find at the local auto parts store. Thankfully there are advertisers in the TDR [Standard Transmission and Gear comes to mind – they sell the Syntorq in ½ and one-gallon quantities, (800) 783-8726] that have this lubricant for resale.

For a full exposé on the Castrol Syntorq see Mike Nowicki’s story in Issue 33, page 14-16, and Joe Donnelly’s comments in Issue 31, page 23 and again in Issue 33, page 17.

Six-Speed NV5600 Manual Transmission

To quote from the Owner’s Manual, “This transmission is filled with manual transmission fluid at the factory. This fluid does not require periodic changing. If it is necessary to add or change the fluid in this transmission use Mopar manual transmission fluid (Mopar part number 4874464 or Texaco 1874). These are the only lubricants recommended for use in the NV-5600 transmission.”

This is another example of a lubricant that you will not find at the local auto parts store. We’ve yet to do a full-blown exposé on the NV5600’s lubricant. Discussions with Mike Patton, owner of Standard Transmission and Gear, revealed the following:

The New Venture 5600 gearbox uses a synthetic 30-weight oil. From New Venture literature we know to use the Mopar 4874464 part number. However, Pennzoil Synchronesh, 30-weight, synthetic fluid has been confirmed as an acceptable alternative. The Pennzoil will likely not be easily found, but they’ve got it in stock at Standard Transmission.

AUTOMATIC TRANSMISSION FLUID

For the automatic transmission the latest DaimlerChrysler specification calls for the use of “ATF+4, type 7176.”

Unlike the scenario of GL-4 versus GL-5 (in which the former is good but the latter is *not* better), the latest ATF+4 type 7176 can safely be used in all previous 47 RE/RH automatic transmissions. In this case, logic prevails – if +3 is good, then +4 is better! This information was verified by D/C’s customer advocate personnel. If you have any doubts about the correct transmission fluid, consult your Owner’s Manual.

Briefly the reason Dodge has a special specification and special +3 and +4 designations is the highly refined base stock and friction modifiers specifically designed for the Chrysler transmissions.

Again, we have another Volkswagen-saga lubricant. The ATF type 7176+4 is difficult to locate at the local auto parts store. However, the older 7176+3 was available – oddly enough, with the brand name AAMCO ATF 7176+3. As much as I might respect the AAMCO transmission rebuild shops, I was left searching for another name brand. At a different auto parts store (I believe PepBoys) Quaker State ATF 7176+3 was readily available. I’ve yet to run across the 7176+4 (hey guys, the ATF+4 will work in +3 applications too!) at the local auto store. However, your local Amsoil has Amsoil ATF 7176+4 readily available in synthetic form.

A footnote to the ATF fluid discussion. Many owners are new to the Dodge product. In order to check the ATF fluid level, the transmission should be at operating temperature and the fluid checked on level ground with the transmission sector in *neutral*. When in neutral the fluid is being routed through the transmission cooler unit. If you check the fluid in park the level will show higher than it actually is, as fluid is not being routed to the cooler in the park position. If you make this mistake, the transmission may be operating without sufficient fluid.

AXLE LUBRICANT

The Owner's Manual suggests that the differential oil be changed every 30-50 thousand miles depending on the load factor.

The specification for the axle oil is straightforward: use an API GL-5 rated oil. While the manual (in this case the '99 booklet) is specific in this GL-5 recommendation, it does not specify exactly what the viscosity should be for replacement fluid. However, it does mention that the factory fill for the Dana 80 rear axle (all 3500 series trucks and 2500 series trucks with either the six or five-speed manual transmission) was a SAE 80W90 and the Dana 70 rear axle (automatic 2500 series trucks) and Dana 60 front axles (all trucks) contain a SAE 90 weight oil.

This replacement fluid is easy to find at the local auto parts store. However, should your differential be a limited slip model you'll have to add Mopar's Hypoid Gear Oil Additive Friction Modifier to your fluid mixture. Yes, the lubricant is easy to find; the friction modifier is not. For the modifier I do not know of any product other than the recommended Mopar fluid that could (or should) be considered for use. For lack of verifiable information, stay with the factory recommended Mopar friction modifier for your limited slip differential.

TRANSFER CASE

Wow, here is another easy one. The manual reads, "Use Mopar ATF +4 Automatic Transmission Fluid Type 7176 or equivalent, or a fluid of the type labeled Mercon or Dexron III automatic transmission fluid." While it may be difficult to find the Mopar ATF +4, 7176, it is easy to find Mercon or Dexron III at the local parts store. For simplicity I would suggest using the ATF +4 in the transfer case too.

ANTIFREEZE/COOLANT

Many owners have heard the truck-stop stories about special additives and conditioners that are necessary in diesel engines. These stories are occasioned by a problem called cavitation erosion (pitting of the cylinder walls due to the implosion of air bubbles in the cooling system) which does occur in many diesel engines. But the answer is not to be found in a special "brew" for your Turbo Diesel engine. For a complete technical discussion, see Issue 32, page 119.

For the definitive answer on coolant, I consulted the Owner's Manual, "Recommended Engine Coolant."

The manual reads: "Chrysler Corporation vehicles have been designed to operate on ethylene glycol-based engine coolant. Ethylene glycol-based coolants are the only type recommended for use in your Chrysler Corporation vehicle.

"Maintain cooling system solution at a 50% concentration of ethylene glycol antifreeze with water. A higher concentration of antifreeze is recommended if temperatures below -37°F are anticipated, but not to exceed 70% antifreeze. A 50% antifreeze mixture should be maintained year-round for protection against corrosion, boiling, or freezing. If coolant is rusty or dirty, discard and refill as recommended. Do not use additional rust inhibitors

or anti-rust products, as they may not be compatible with the radiator coolant."

The preceding passage from the Owner's Manual material does not give any specifics on the ethylene glycol-based coolants to be used in your Turbo Diesel. Without specifics, let's defer to Cummins and an excerpt from the B-Series engine Owner's Manual.

"Cummins Engine Company, Inc. recommends using either a 50/50 mixture of good quality water and fully formulated anti-freeze, or fully formulated coolant when filling the cooling system.

"Good quality water is important for cooling system performance. Excessive levels of calcium and magnesium contribute to scaling problems, and excessive levels of chlorides and sulfates cause cooling system corrosion."

Contacts at Cummins confirmed that you should use a good quality ethylene glycol-based coolant. It is easy to buy these coolant products. Can you do better? I consulted the TDR's way-back reference index to our Issue Eight, six-page cooling system article. From Issue Eight I found the following recommendation from Cummins: "The best 'brew' is a low silicate anti-freeze that meets ASTM specification 4985 (GM test 6038M) criteria. Be aware of the quality of water used in your cooling system and keep the calcium/magnesium < 170 parts per million, chlorine < 40 ppm and sulfur < 100 ppm to minimize the possibility of scaling or corrosion."

While you are welcomed to search for the best brew, I vote to keep it simple with products you can purchase close to home and good old distilled water. If you feel the need for the brew, try your local Fleetguard outlet (a Cummins distributor) and ask for Fleetguard pre-mixed Complete antifreeze solution. Gallon containers are part number CC2825 and are reasonably priced at less than \$7.

POWER STEERING

Oops, here is another vague specification: "Only petroleum fluids specially formulated for minimum effect on rubber hoses should be used. Mopar Power Steering Fluid 04883077 is a fluid of this type and is recommended." Without a clear definition I have defaulted to the Mopar part number and will do some further research for the next TDR magazine.

BRAKE FLUID

Yes, another easy item to cross-reference. The manual from my '99 Turbo Diesel reads, "Only brake fluid conforming to DOT-3 and SAE 1703 should be used. " DOT-3 fluid is easy to obtain.

A GOOD SOURCE

I earlier noted that the ATF 7176+4 was readily available through many of the different Amsoil dealers. In my search for oddball VW specifications, the Amsoil Product Selection Guide cross-reference book proved invaluable. As an example, the VW part number G005 000 proved to be a synthetic 75W90 GL-4, not unlike the oil for the Dodge's NV4500 gearbox. From their cross-

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or anti-rust products, as they may not be compatible with the reference book I was able to locate the VW and Dodge lubricants that I needed. Your local Amsoil dealer, as noted in their advertisements, has a wealth of information at his disposal with the Amsoil Product Selection guide. Give 'em a call.

To summarize, I have attended many factory-type presentations where liquids for the vehicle have been discussed. From Dodge to Ford, VW to Mercedes, the engineers have designed their product with a specific fluid in mind. I hope our article has shed some light on why the oftentimes unique fluid is necessary. My experience tells me that it is irresponsible to second-guess the engineers. However, as consumers we should not be locked into a sole source for these important fluids. Hopefully the article has given you some easy to follow alternatives.

Robert Patton



Jim Swanson's California Caseworks truck

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