



ENERGIZING KENYA



THE RIGHT LUBRICANT FOR YOUR TRANSMISSION SYSTEM

For those who were born before the 90's, we knew every car had three pedals and working the clutch was a rite of passage. Today, we have all manner of increasingly complex transmission (gear box) arrangements and with "no clutch pedals" to engage. Although the functioning of these mechanical wonders is fairly straightforward, keeping up with the right lubrication requirements for each can be a daunting task, if not a costly affair.

Getting the wrong oil into your transmission will definitely cost you an expensive repair or replacement. In this issue of SupaLub Post we look at the different transmission systems found especially in automobiles, their operating mechanisms, and provide a guide as to which lubricant is suitable for each, and what to look out for before changing your transmission oil.

FUNCTIONS AND COMPONENTS OF THE TRANSMISSION SYSTEM

The transmission system (power train) is the mechanism that transmits the power developed by the engine of the automobile to the driving wheels. It is a complex system comprising of clutch system, gear box (gear train), drive or propeller shaft, differential and axles (front and rear), and wheels. Transmission system ensures seamless shifts by providing controlled application of power by adapting the output of the engine to the drive wheels.

It transfers engine power to the driveshaft and rear wheels (or axle half shafts and front wheels in a front-wheel-drive vehicle). Gears inside the transmission change the vehicle's drive-wheel speed and torque in relation to engine speed and torque. Since engines need to operate at a relatively high rotational speed, which is inappropriate for starting, stopping, and slower travel, the transmission reduces the higher engine speed to the slower wheel speed, increasing torque in the process.

The transmission also allows the gear ratio between the engine and the drive wheels to change as the car speeds up and slows down. Shifting gears enables the engine to stay below the red-line and near the rpm band of its best performance, consequently achieve better fuel economy.

TYPES OF TRANSMISSIONS

There are three main classes of transmission systems:

- **Manual Transmission**
- **Automated Manual (semi-automatic) Transmission and,**
- **Automatic Transmission**

Manual transmissions (stick shift) consist of gear drives in non-synch (older) and synch mechanisms. They require manual operator intervention in engaging the clutch mechanism and gear selection at all speeds through the use of a gear selector stick connected to a complex system of gears. Although the system is now endangered, it still has considerable benefits over the newer more complex automatic systems in term of fuel economy and operating costs.

Automated manual or semi-automatic (clutch-less manual) is a hybrid form of transmission with an integrated electronic, hydraulic or pneumatic system handling manipulation of the clutch. In older models, the operator would be required to take control of gear selection, but in modern systems, the semi-automatics have incorporated both manual and automatic shifting modes, and use computerized gear shift and clutch control or electronically actuated clutch control.

Increasingly common automated manual is the dual or twin clutch transmission (DCT) or direct shift gearbox (DSG) that combines the best of manual and automatic transmission. It provides set of clutches (wet or dry, that is to say lubricated or not lubricated) for both odd and even gear selector gears thus providing seamless and extremely fast transition without loss of power or jerking with gear selection being manual or automatic or both

Automatic transmissions require the usual selection through P-R-N-D-L, but no operator intervention is needed in the actual selection of gear ratios. Autos rely on fluid friction or hydraulic pressure exerted within the transmission assembly, and instead of a clutch, a flywheel or torque convertor is placed in between the engine and transmission. The different automatic transmission assemblies include epicyclical or planetary gears and belt drives in continuously variable transmission system (CVT or IVT) which give an infinite number of gear ratios thus may provide better fuel economy and user experience.

SUITABLE LUBRICANTS FOR YOUR TRANSMISSION SYSTEM

Manual Transmission Oils

If you are "Ol' Skool" and still prefer the joys of a stick shift, the best lubricant for your gear box will be the conventional automotive gear oil. The oil may either be monograde or multigrade with viscosity grade, SAE 90 or SAE 80w90 with a performance level of API GL4 or GL5 depending with specifications provided in your user manual. Of all the transmission oils to select, this may be the easiest to pick off the shelf and use.

Automated Manual Transmission Oils

Semi-Autos such as the "wet" DCT offer best of both worlds and boast some incredible fast, yet seamless shifts. They are mostly found in race cars and high-end performance vehicles such as Bugatti Veyron, Nissan GT-R Porsche 911, Mitsubishi Evo X but sometimes may be found in normal everyday vehicles such as some models of VW Golf and Audi, trucks such as Mitsubishi Fuso, motorcycle such as Honda VFR among others. It is also important to note that although the construction of semi-autos is similar to manuals, where automatically actuated clutches are deployed, they function just like full autos.

Some DCT performance specifications by automakers include Audi/VW TL 052, BMW DCTF/drivelogic 7-speed, Ford/Nissan powershift 6-speed, Mitsubishi SST 6-speed, Peugeot/Citroen DCS 6-speed, Volvo powershift 6-speed among others. Just like the other fluids, DCT fluid must not be used in "dry" DCT, conventional automatic transmissions, CVTs or manual gearboxes.

Automatic Transmission Oils

Autos have become very popular given improved fuel economy and convenience it brings in modern day traffic, allowing you the driver to somewhat focus on “more important things” than working the clutch. And as, these systems continue to advance in terms of performance, they also have greater demand on the performance rating on the oil required. For conventional automatic transmissions, most common compliance requirement is the General Motors Dexron specifications.

These include the most common specifications namely Type A, Suffix A, Dexron IID, Dexron IIE, Dexron IIIF, Dexron IIIG, Dexron IIH, Dexron VI among others. In addition to these, automakers also provide their own specifications based on vehicle year of manufacture and model such as Toyota D-II/T-IV/WS, Nissan Matic C/D/J/S, Mitsubishi ATF SP-IV, Mazda M-III, Subaru ATF, Honda Ultra ATF/DW-1, BMW ATF D-3, Ford Mercon V, Audi/VW ATF, Hyundai/KIA SP-II/SP-IV and others. The ATF oil must not be used in other transmission systems such as CVT or DCT or wherever it is not recommended since it will lead to transmission failure.

Continuously variable transmissions on the other hand require CVT compliant oil depending on the automakers specifications such as Toyota TC, Nissan NS-2, Mitsubishi CVT-J, Mazda CVT, Subaru i-CVT, Honda HMMF, Audi/VW TL 52180, Jeep CVTF+4, Ford CVT/Mercon C, MB 263.20 and others. CVT transmissions may be pulley, toroidal or hydrostatic type deployed in different modes namely, push belt type, chain type or power split type in hybrid vehicles. CVT oils must not be used in conventional AT transmissions or DCT transmissions.

Changing the Transmission Oil

After driving off a yard or show room, most of us quickly ensure we have a change of engine oil (whether necessary or not) but “forget” to check and confirm the condition of other critical fluids in the system (<https://nationaloil.co.ke/wp-content/uploads/2019/12/SUPA-LUB-POST-ISSUE-2-NOV-2019-002.pdf>) including the transmission oil. And finally, when we do, the transmission oil is likely last to be changed if ever. Due to advances in lubrication technology, transmission oils tend to serve for the entire life of the equipment, however due increased complexity and high performance requirements, modern transmission systems equally demand much more from the oil, and therefore for-life application may not always be the case.

Extending oil drain intervals beyond recommended timelines may not result in immediate gearbox failure but will impact the efficiency of the system and may compromise fuel economy. One of the most costly mistakes encountered in changing of transmission oils, is the use of wrong “automatic” oil. In determining the most suitable oil for your transmission, it is important to note that there are different transmission systems and each requires a specific oil. There is no one-fits-all kind of oil here, and therefore it is extremely critical that one ensures the selection criteria for the oil is observed.

This sometimes has been caused by “lack of awareness” on the part of service technicians who interpret all “autos” as same ignoring information available to assist them make the call on the oil to be used. Lately conventional ATs, CVTs, DCTs or DSGs all essentially operate as full autos, however as seen earlier they have varying operating principles and construction and therefore each requires specific oil of application.

Changing your Transmission Oil

- ◆ Check level and the condition of the existing oil using the provided dip stick. If the oil is light coloured and at correct level, you will need to use the recommended service interval to make the call, but with dark coloured oil that may contain debris, a change is inevitable even if mileage has not been exhausted.

NB: Sealed transmissions will not have a dip stick, and are designed to be maintenance free and therefore you will need to visit a qualified service technician for assistance

- ◆ Confirm the correct oil specification from your user manual. The information may also be available with the transmission oil dip stick or indicated on steering fluid reservoir cap.
- ◆ Buy your oil from a reputable source selling quality approved brand(s). Read through the product information on the label to verify the indicated specifications meet the recommended specifications.
- ◆ With the correct oil in hand, proceed to change the oil the recommended way or seek the assistance of a qualified service techni-

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