

Changing Gear Lube



Manual transmissions, transfer cases and axles need to have their lubricants changed occasionally if your vehicle sees hard use. Remove the plug slowly or lube will spill and run down your arm. And wear gloves--used gear lube smells really nasty.

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You can't complain about the years of service your old 4x4 pickup has put in. It has done yeoman duty, day in and day out. In return, you've been more than happy to do much of its maintenance yourself. Now,

perusing the lubrication schedule in the owner's manual, you see it's time to change the lube in the manual gearbox. The manual calls for fresh lube in the axles and the transfer case, too. Looks like it's time to get a little dirty.

Going to the Well

Step one is to get the appropriate amounts of the right lubricants. Manual transmissions use 80W-90-weight gear lube, right? Uh, not always. Some

manufacturers actually use automatic transmission fluid. Read that again, slowly: Your manual transmission might be filled with ATF. The advantage of ATF over gear lube is its thinner viscosity, which means less drag and, consequently, improved fuel economy. Appropriately, the gears and bearings in transmissions that specify ATF are engineered to use the thinner lube. So, don't think you can save yourself some gas by putting ATF in your manual transmission unless it was designed for it.

Read the lubricant specifications page of the owner's manual carefully--if your manual transmission takes automatic trans fluid, you'd better know which ATF. These days there are nearly a half-dozen types of fluid on the market. There is no such thing as a universal fluid. Wait, it gets even weirder: There are at least a few manual gearboxes that are supposed to be filled with engine oil. So read your manual, don't ask too many questions, then buy and use what is specified.

The same caution goes for the transfer case. Yours might well call for either 80W-90 gear lube or ATF. Again, be sure you use the correct type.

Drive axles--that includes the front if you have 4wd--have ring-and-pinion gearsets with hypoid gears. The teeth are curved and they're not mounted on the same axis. Hypoid gears have more sliding friction than the constant-mesh gears of the transmission or the chain in the transfer case. Some manufacturers specify a different type of lube with better extreme-pressure lubrication qualities. These EP additives generally take the form of zinc compounds, which are slightly corrosive. Don't use this kind of lube in the transmission or transfer case as an upgrade.

Finally, many axles use friction-type limited-slip differentials, which call for still another kind of lube with modified friction characteristics. There are additives to allow a conventional hypoid lube to achieve this, or you can simply buy lube that

already incorporates the friction modifier in the bottle. (This is one of the few times we'll recommend the use of additives.)

While you're shopping for all this lube, you also may need to pick up copper sealing washers for the drain plugs. Maybe not--some drain plugs have a plastic, reusable washer and some use self-sealing tapered pipe threads. The counterman at the auto parts store will be able to tell you what you need.



CLICK TO ENLARGE

(1a) Check the level of lube in the gearbox or axle by inserting your finger.

Glug, Glug

Unless your 4x4 has tons of ground clearance, you'll need to give yourself the necessary room to work by raising your vehicle. And the best, safest way to do that is to use ramps.



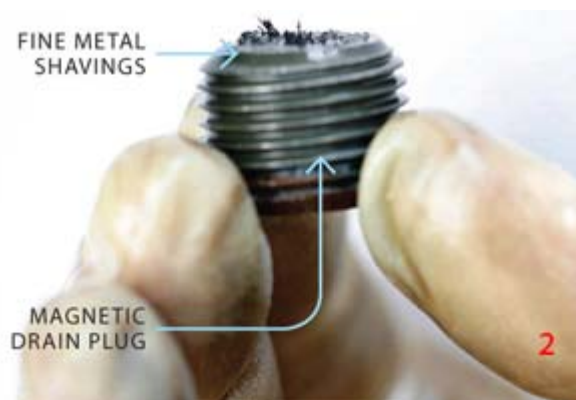
CLICK TO ENLARGE

(1b) Proper fill level is even with the bottom of the hole. Don't overfill by squirting lube in and cramming the plug home before it dribbles back out.

Alternatively, a floor jack and proper safety stands will give you more room to work. Don't work underneath any vehicle that's supported only by a jack. Ever.

Drive the vehicle around for a few minutes to warm up the trans or axles--but not so long that the exhaust system will press your shirt.

When you're ready to get to work, make sure the vehicle is level side to side or else the axles won't drain fully. You'll want to wear rubber or thick latex gloves. The sulfury smell of old transmission lube will stay on your hands through several washings, and it's a good idea to avoid absorbing potentially carcinogenic solvents through your skin.



(2) Furry coating, like this, on a magnetic drain plug is normal. Chips and pieces of broken teeth are not.

You'll need to remove two plugs from the transmission, axle or transfer case--one drain plug and one filler plug. Start by cleaning around both plugs. You don't want dirt and debris falling into the case when you remove the old plug. If a rag won't do it, use carb or brake cleaner--wear eye protection when spraying these. A lot of drain plugs are square holed, and by odd co-incidence are exactly the right size for a 3/8- or 1/2-in square ratchet. You may also see such odd things as large Allen drives or simple square pipe plugs you can turn with a crescent wrench.

Remove the fill plug first. Huh? You'll want to check the level in the sump to see if the gears have been running low. If you can't get the fill plug loose, you really don't want the drain plug out yet, lest you can't refill the thing with any lube at all, stranding your vehicle in the air. The level of lube is supposed to be even with the bottom of the fill plug, so stick your pinky in there to see if the level is close.

Got your drain pan? Now turn out the drain plug. Tight? It may have never, ever been removed before. Try some penetrating oil and a longer wrench if necessary.

Warning! Don't let lube shoot horizontally out of the hole and splash your arm, shirt, pants and shoes. Don't say we didn't warn you. Don't drop the drain plug into the drain pan unless you really prefer to go fishing for it later. It's slimy in the bottom of that drain pan.



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(3) Refill by squeezing lube into filler. Awkward clearances mean using a piece of hose.

Let the lube drain for at least 5 minutes.

Uh-oh. Your rear axle has a fill plug--but no drain plug. You'll need to loosen all of the bolts that hold the cover onto the casing and maybe pry a little to let the lube out. Be prepared to crack the paper gasket, which is probably hard and brittle. If you do that, you'll need to remove the cover, scrape and polish any gasket sealer off the mating faces, and reinstall the cover with a new gasket and sealer. Some Ford products that use a plastic differential cover specify that the cover must be replaced if it's ever removed--talk about planned obsolescence. We just remove them carefully, clean them meticulously and reinstall them with a bead of silicone gasket sealer. And no, bathtub caulk won't work--spring for the right stuff.

Fuzzy

Your drain plug may come out covered in what looks like fur. That fur is composed of metal wear particles that have been attracted to a magnet in the plug. If the particles are all small, it's fine and normal. Bigger chips are evidence of something broken, like a gear tooth, which is a Bad Thing. If you find anything bigger than a BB, keep it to show to the mechanic who will eventually be rebuilding your transmission or differential. Otherwise, clean off the fur with a rag and press on.



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(4) Really tight clearances mean longer hose, creative placement of bottle.

Fill 'er Up

Reinstall the drain plug. Pipe-threaded plugs can just be screwed in tightly with a dab of thread sealant or Teflon tape. If your plug used a copper seal ring, get a new one. Be sure the old ring isn't stuck to the plug or the case. Tighten to the torque spec in the manual. No torque wrench? Get it good and tight, but not tight enough to squeeze the washer out of round.

Now put in fresh lube. Fill until lube trickles back out of the hole, probably between 1 and 2 quarts, but check the owner's manual. Axles are filled with lube all the way out to the outer wheel bearings, and it may take a minute or two for the lube to find its way out there. When it seems full, wait a couple of minutes and check again.

New uh-oh. The fill plug is situated so there's no way to squeeze the lube in. In cases like this, you need to get creative with a turkey baster or a length of hose.

Done? Reinstall the fill plug snugly, following the same cautions for the drain plug. Don't strip the threads.

Hazmat

Now what do you do with several quarts of used lubricant? Check with your local sanitation department for the correct procedure, and dispose of it as if it were used engine oil. Many garages will take in a few quarts or so of used oil from homeowners for disposal, and in some states are actually required by law to do so.

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