Scheduled Maintenance

Periodic Maintenance Services

Vehicle maintenance is an important factor for proper vehicle operation. It's the vehicle owner's responsibility to ensure that fluid levels (engine oil, coolant, etc.) are checked frequently, in accordance with the instructions in the vehicle owner's manual. However, many 'gas and go' vehicle owners may not take the time to fulfill these basic responsibilities. This places added importance on the performance of periodic maintenance services. If the vehicle owner isn't looking after his vehicle, it falls to the automotive service professional to ensure that proper maintenance procedures are performed. If the vehicle owner has the good sense to bring the vehicle to your shop, it's up to you to do the rest.

The frequency of scheduled inspection and maintenance services required by late model Subaru vehicles is minimal when compared with vehicles of the past. For example, even the very commonly used term 'tune-up' has lost most of its original meaning. In the old days, a 'tune-up' meant fresh spark plugs, points and condenser, and basic engine adjustments such as timing, idle mixture and idle speed. Modern technology has eliminated the need for many of these adjustments and replacement parts. However, the tune-up is alive and well—only its definition has changed.

While the number of vehicle items requiring regular replacement has decreased, the number of items needing periodic inspection has not. Whether you call it a tune-up or something else, this service offers an excellent opportunity for all engine belts, hoses and ignition wires to be checked for wear and tension. Old tune-up standbys like spark plugs, fuel and air filters are still on every Subaru vehicle and still require periodic inspection and replacement as necessary.

The same applies to all other items on the Subaru maintenance schedule. The important thing is to carefully inspect each item. If additional corrective action is required, now is the time to find out.

Drive Belts

Drive Belts

Drive belts should be inspected at the 30 month or 30,000 mile intervals and replaced at 60 month or 60,000 mile intervals. If inspection reveals that any of the belts is cracked, frayed or worn, they should be replaced. Proper belt tension, for both new and used belts, must be observed. Refer to the service manual for vehicle-specific belt tension information. Most Subaru vehicle employ sliding-bolt adjusters, which makes drive belt adjustment simple and precise.

Camshaft Drive Belt(s)

Different Subaru vehicles have employed different camshaft drive belt configurations, so you'll need to consult a vehicle service manual for belt inspection and replacement recommendations for the particular Subaru vehicle you're servicing. Most late model 49-state Subaru vehicles have a 30 month, 30,000 mile camshaft belt inspection recommendation, with a 105 month/105,000 mile replacement recommendation.

Inspecting the belt(s) before the recommended replacement interval involves removing the accessory drive belts, then removing a protective cover to get a look at the belt(s). Manually crank the engine through four rotations while checking the timing belt's back surface for cracks or damage. A loose belt, or one that is cracked or has been damaged by oil or coolant should be replaced. Measure the timing belt width, then compare this measurement to the service manual specifications. Misalignment of the idler pulley, tensioner, water pump pulley and cam sprockets may cause the edges of the timing belt to wear away. Any other visible signs of wear would make the belt a likely candidate for replacement.

Engine Oil

Engine Oil and Filter

The basic oil and filter change is the reason most of your Subaru customers will be bringing their vehicles in for service. After the initial 3000 mile service, the maximum recommended span between oil and filter changes is 7.5 months or 7500 miles. Extreme service pushes the recommendation back to three months or 3000 miles. If you've ever looked at a definition of 'extreme service,' you would probably find that most of your customers are driving under at least one of the conditions to fit this category.

The oil level and filler cap on all late model Subaru vehicles are colored yellow for easy identification by you (and by any vehicle owner who is conscientious enough to check his own oil). Oil grade and quantity recommendations are listed in the vehicle owner's manual as well as the service manual. To avoid the possibility of an oil leak after an oil change, the oil drain plug gaskets should be replaced with every oil change. Your Subaru parts department stocks these gaskets, along with genuine Subaru oil filters.

Cooling System

To inspect the engine oil level:

- Park the vehicle on a level surface.
- After turning off the engine, wait a few minutes for the oil to drain back into the oil pan before checking the level.
- Remove the oil level gauge and wipe it clean.
- Reinsert the level gauge all the way. Make sure the level gauge is correctly inserted and in the proper orientation.
- Remove it again and note the reading. If the engine oil level is below the "L" line, add oil to bring the level up to the "F" line.
- Just after driving or while the engine is warm, engine oil level may show in the range between the "F" line and the notch mark. This is caused by thermal expansion of the engine oil.
- To prevent overfilling the engine oil, do not add oil above the "F" line when the engine is cold.

Cooling System Hoses

Engine Cooling System and Engine Coolant

Engine coolant should be replaced at 30 month or 30,000 mile intervals. Check the condition of the hoses and other cooling system components during every scheduled maintenance visit. Check for cracked or otherwise damaged cooling systems hoses, as well as any signs of coolant leakage. A cooling system pressure test will confirm the integrity of the cooling system and radiator cap. A radiator hydrometer can be used to test the antifreeze concentration of the coolant.

Subaru recommends the use of Subaru Genuine Coolant in Subaru vehicles. This recommended coolant contains antifreeze and anti-rust agents that are specially made for Subaru engines, which feature aluminum crankcases. Other coolant types may cause internal engine or cooling system corrosion.

Some Subaru vehicles feature an air breather plug in the radiator, which can be used to remove trapped air during a coolant change. After refilling the cooling system with a 50/50 mixture of coolant and clean water, run the engine long enough to circulate the coolant and to assure that all the air has been removed from the cooling system. The radiator overflow bottle must be filled to the proper level as a final step.

Fuel Filter and Fuel Lines

Fuel Filters and Hoses

There's no easy way to check the inside of a fuel filter for dirt or other contamination buildup. That's why a 30 month or 30,000 mile replacement interval is prescribed. If the customer happens to buy a tank-load of bad gasoline before reaching this interval, it will be necessary to replace the fuel filter ahead of time. There's no way to clean the filter—replacement is the only option. Remove the battery negative cable before you begin work on the fuel filter. Remember, gasoline is a very flammable substance.

The fuel filter is just one small part of the fuel system. The fuel system includes many sections of steel and rubber fuel line that run the length of the vehicle several times. The fuel pump, fuel tank and fuel pressure regulator are just a few of the other parts of the fuel system. While you're replacing the fuel filter, don't forget to check the condition of the rest of the fuel system. If any of the rubber hoses (especially the ones that were opened up to replace the filter) look damaged or frayed, they must be replaced before they can cause any further damage. Weak fuel hose clamps should be replaced, and the new ones must be properly positioned and tightened to specification.

Air Filter

Air Filter

The air filter is another part that must be replaced at 30 month or 30,000 mile intervals. If the vehicle is operated in particularly dirty environments, more frequent filter replacements may be necessary. It doesn't take long to pull the filter out to take a look, so you'll probably want to add this step to your 7500 mile inspections.

Do not attempt to clean the air cleaner element. The filter paper of the element is wetted with a special non-inflammable slow-evaporating viscous fluid. It is resistant to cold weather and has a long service life. Dirt adhering to this filter paper forms porous laminations with the viscous liquid, which function as a filtration layer to reduce dust penetration into the filter paper. If this filter paper is cleaned, the filtration layer will be lost along with the viscous liquid.

Spark Plugs

Spark Plugs

Spark plugs have a 60 month or 60,000 mile replacement interval on most Subaru vehicles. There's not much more to say about them. If you have the extra time, it never hurts to remove one or two spark plugs to see how the engine is running between replacement intervals. This will also give you some advance information on how well the plugs are wearing. Also, unless you have the complete maintenance record for the vehicle, there's no way to tell for certain whether the spark plugs were replaced at the recommended interval. Pull one out and take a look.

Spark timing and idle speed are preset and do not require periodic adjustment, as was necessary during conventional tune-ups on older vehicles. Once again, if you want to take some extra time or if you suspect a problem, it's still possible to check the ignition timing and idle speed. If either is out of spec, they can be adjusted on most Subaru vehicles. Consult the appropriate vehicle service manual for additional information on timing and idle speed setting procedures and specifications.

Other Drivetrain Fluids

Drivetrain Fluid Levels

There is no recommended replacement interval for the transmission fluid on late model Subaru vehicles. The same applies to manual transmission and front and rear differential lubricants. In all cases, the recommended procedure is a fluid inspection at 30 month or 30,000 mile intervals. If the fluid in any of these units is found to be dirty, contaminated or at the incorrect level during the inspection, fluid replacement and/or seal or gasket repair are the only options.

Differential and transmission fluid recommendations for varying climate conditions can be found in the appropriate Subaru service manual. Subaru recommends against the practice of mixing lubricants from different manufacturers. Although both may comply with the GL and API ratings, lubricants from differ-

ent manufacturers are refined from different base oils and additives. Combining them may produce unpredictable results.

Rear differentials and manual transmissions feature familiar add and drain plugs, while many Subaru automatic transmissions actually have a drain plug in the transmission pan (a feature welcomed by anyone who's ever had the misfortune to take an ATF bath). Another welcome feature is the fill level dipstick that can be found on manual as well as automatic Subaru transaxles.

Brake Fluid

ABS Components

Many late model Subaru vehicles are equipped with ABS braking systems. The added complexity of these systems provides an additional incentive for following the recommended brake fluid replacement interval of 30 months or 30,000 miles. Brake fluid accumulates water and other contaminants over time. These contaminants can attack the internal parts of the brake system, compromising its performance and possibly causing brake failure.

The brake master cylinder has a semi-transparent reservoir, making it possible to check the fluid level without removing the reservoir cover. This minimizes the exposure to outside air and limits the amount of moisture that can reach the brake fluid. The fluid level will drop as the brake shoes and pads wear, but the reservoir is large enough to compensate for these changes. If the fluid level is very low, it's a sure sign the brake pads or shoes are nearly worn out, or there is a leak in the brake system.

Front Brake Pad Inspection

Note: *When the brake fluid level in the reservoir tank is lower than the specified limit, the brake fluid warning light in the combination meter will come on.*

Subaru warns against mixing brake fluids from different manufacturers. Doing so may degrade the quality of the fluid. Only DOT 3 or 4 brake fluid should be used in any Subaru vehicle. Consult the service manual for vehicle-specific brake bleeding procedures.

Brake Pads, Shoes, Rotors and Drums

Rear Brake Inspection

Since it's impossible to predict the life span of the brake friction materials, there are no specified replacement intervals for these parts. The maintenance schedule calls for inspection of all brake components during 30 month or 30,000 mile major services. As we mentioned in our Safety Inspection section, it's possible to visually inspect the remaining pad thickness by sighting through the caliper inspection holes. A more precise method involves moving the caliper to get a clear shot at the pads. The Subaru service manual lists minimum pad thickness specs, as well as disc rotor runout limits.

Some Subaru models have drum brakes at the rear, while others have disk brakes. Minimum brake lining thickness as well as drum dimension specifications for drum brake models can be found in the vehicle service manual. Minimum rotor and pad thickness dimensions for rear disk models can also be found in the service manual.

Models equipped with rear disk brakes feature a drum brake setup inside the rear rotor that serves as the parking brake assembly. Remove the caliper, caliper bracket and rear brake pads to reach the parking brake assembly. Adjust the parking brake (to compensate for wear by turning of the parking brake star wheel adjuster. Rear drum brakes feature automatic adjusters.

While you're working on inspecting the brakes, you're right around the corner from another unpredictable maintenance item. Inspect the front and rear drive axle boots for deformation, damage or failure. While these are normally very long-lived, there's no way of predicting what debris or other material might come in contact with and possibly damage the axle boots. If the boots are damaged, replace them with new ones.

Keep an eye on brake wear items during your regular maintenance inspections. If it appears unlikely that the vehicle will make it to the next inspection before the brakes are completely worn out, alert the owner. He'll then have the option to have the work done now or during a return visit at a later date.

Brake Hose

Brake Hoses and Lines

At 15 month/15,000 mile intervals, check the following brake system items:

- Scratches, swelling, corrosion or traces of fluid leakage on brake hoses or pipe joints,
- Adjacent parts interfering with brake pipes or hoses during driving or loose connections or clamps,
- Any traces of fluid leakage, scratches or other damage on the master cylinder, wheel cylinder, pressure control valve and hill-holder.

Rear Parking Brake Assembly

Service Brake and Parking Brake

Procedures for checking brake pedal free height and specified pedal stroke can be found in the vehicle service manual. These tests must also be performed during the 15 month/15,000 mile service. A low or spongy service brake pedal is a sure indication of a brake problem. Check to see if air is in the hydraulic line by the feel of the pedal operation. The brake system must be bled to remove the air. Check for even operation of all brakes, using a brake tester or by driving the vehicle for a short distance on a straight road.

The parking brake should be adjusted after adjusting the shoe clearance for the rear brakes. Adjust the parking brake lever by turning the adjuster (double nut) until the parking brake lever is set at the specified number of "clicks" when the specified amount of force is exerted (consult service manual). The parking brake mechanism must apply and release completely, with no brake drag after the parking brake lever is released. Rusted or binding parking brake cables may keep the parking brake from releasing normally.

Clutch Adjustment

Clutch Operation

Some Subaru vehicles are equipped with cable-operated clutch systems, while others feature a hydraulic arrangement. Clutch linings, like brake linings, do wear over time. Cable-operated clutch systems will require adjustment to compensate for wear. Adjustment details, as well as information about the adjustment of the hill-holder system installed on some manual transmission-equipped Subaru vehicles, can be found in the appropriate vehicle service manual.

To test a Subaru hydraulic clutch system pedal free play:

- Push the release fork to retract the slave cylinder push rod. The fluid level in the clutch master cylinder should rise.
- If the fluid level rises, the pedal free play is correct.
- If the fluid level does not rise, or the push rod cannot be retracted, adjust the clutch pedal according to the service manual procedures.

Suspension Inspection

Check the fluid level using the scale on the outside of the clutch master cylinder reservoir. If the level is below "MIN," add DOT 3 or 4 brake fluid to bring it up to "MAX." Inspect the underside of the master cylinder, clutch damper, slave cylinder, hoses, pipes and couplings for fluid leaks. If leaks are found, correct them by retightening the fitting and/or replacing the damaged parts.

Steering and Suspension

Steering and suspension parts are a lot like the brake system components—their proper operation is vitally important to the safety of the driver and his passengers, but it is very difficult to determine how long it will be before any of these components will require attention. That's why an inspection of all steering and suspension components is required at 15 month/15,000 mile intervals. Changes to these systems may be too gradual for the driver to even notice, leaving it to you to ferret out and correct any wear or damage that has taken place.

We won't cover all of the steering and suspension checks here—there's too much variation between different Subaru models to do an adequate job. What you're looking for is anything that reduces the original precision of the steering and suspension systems. Perhaps the steering has a little too much play in it or the shocks and struts don't handle the bumps in the road as well as they did

when new. Specific tests for the Subaru model you're working on can be found in the service manual.

Check the power steering system for dampness or other signs of fluid leakage. The power steering pump reservoir is a good place to start. If the reservoir is low, the fluid has probably leaked out, as it has no place else to go. Approved fluids for the power steering system include Dexron II, IIE or III.

Suspension ball joints and steering tie rod ends may develop looseness or their protective boots may split open. Looseness in the tie rod ends can usually be felt in the steering, while a worn ball joint is more difficult to spot in this manner. To test for play in a front suspension ball joint:

- Raise the vehicle until the front wheels are off the ground.
- Grasp the bottom of the tire and move it in and out. If relative movement is observed between the brake disc cover and the end of the transverse link, the ball joint may be excessively worn.
- Grasp the end of the transverse link and move it up and down. Relative movement between the housing and the transverse link boss indicates the ball joint may be excessively worn.
- If relative movement was observed during these tests, the ball joint must be removed for further testing. Ball joint testing specifications are contained in the service manual.

Ball Joint Inspection

Wheel Arch Height and Wheel Alignment

Wheel arch height (vehicle ride height) as well as front and rear wheel alignment must be inspected at 30 month/30,000 mile intervals. Specifications are contained in the service manual. Toe is the only possible alignment adjustment to the front and rear suspensions. If camber, caster, steering angle (front) or thrust angle (rear) are out of specification, inspect the vehicle for damage to suspension components or other vehicle damage. This would also be a good time to check for any obvious damage to any other suspension components, tightness of bolts and nuts and the condition of other undercar components.

Wheel Alignment

Front and Rear Wheel Bearing Lubricant

One of the oldest maintenance procedures on older vehicles was "remove and repack wheel bearings." The procedure involved disassembling the front wheel bearing assemblies, cleaning them, packing them with fresh grease, then reassembling them. The wheel bearings on Subaru vehicles are sealed, and do not require this regular procedure. However, the wheel bearings must be inspected at 60 month/60,000 mile intervals.

Rather than disassembling the wheel bearings to clean and inspect them, this procedure involves measuring the amount of axial play that is present in the wheel bearings. If the play exceeds specification, this indicates the bearings may have worn. If the bearing passes the play test and is not making any noise, no further disassembly is required. The next inspection is 60 months/60,000 miles later, unless a problem develops before then. Specific information on testing the front and rear wheel bearing lubricant can be found in the service manual.

Wheel Bearing Lubricant

Valve Clearance

Some Subaru vehicles are equipped with hydraulic valve lash adjusters, while others feature "solid" lash adjusters. Those equipped with solid adjusters require an inspection of the valve clearance at 105 months/105,000 miles. Consult the service manual to determine whether the vehicle you are servicing has solid or hydraulic valve lash adjusters. Procedures for adjusting valve clearance on solid adjuster engines can also be found there.