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## Frequently Asked Questions



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### What is included in a complete brake job?

A complete brake job should restore the vehicle's brake system and braking performance to good-as-new condition. Anything less would be an incomplete brake job. Brake components that should be replaced will obviously depend upon the age, mileage and wear. There is no pat answer as to which items need replacing and which ones don't. It's a judgment call. A complete brake job should begin with a thorough inspection of the entire brake system; lining condition, rotors and drums, calipers and wheel cylinders, brake hardware, hoses, lines, and master cylinder.

Any hoses that are found to be age cracked, chafed, swollen, or leaking must be replaced. Make sure the replacement hose has the same type of end fittings (double-flared or ISO) as the original. Don't intermix fitting types. Steel lines that are leaking, kinked, badly corroded, or damaged must also be replaced.

For steel brake lines, use only approved steel tubing with double-flared or ISO flare ends. A leaking caliper or wheel cylinder needs to be rebuilt or replaced. The same applies to a caliper that is frozen (look for uneven pad wear), damaged or badly corroded.

Leaks at the master cylinder or a brake pedal that gradually sinks to the floor tells you that the master cylinder needs replacing. The rotors and drums need to be inspected for wear, heat cracks, warpage, or other damage. Unless they are in perfect condition, they should always be resurfaced before new linings are installed. If worn too thin, replace them. Rust, heat, and age have a detrimental effect on many hardware components. It's a good idea to replace some of these parts when the brakes are relined. On disc brakes, new mounting pins and bushings are recommended for floating-style calipers. High temperature synthetic or silicone brake grease (never ordinary chassis grease) should be used to lubricate caliper pins and caliper contact points.

On drum brakes. Shoe retaining clips and return springs should be replaced. Self-adjusters should be replaced if they are corroded or frozen. Use brake grease to lubricate self-adjusters and raised points on brake backing plates where shoes make contact. Wheel bearings should be part of a complete brake job on most rear-wheel drive vehicles and some front-wheel drive cars. Unless bearings are sealed, they need

### What kind of maintenance is recommended for the cooling system?

Replacing coolant on a regular basis will prolong the life of the radiator and other cooling system components. Most new car maintenance schedules call for coolant changes every three years or 50,000 miles. Many professional mechanics consider that too long and recommend every two years or 24,000 miles. There are some who argue that annual coolant changes on late model vehicles with bimetal engines (aluminum heads/iron blocks) and/or aluminum radiators is a good idea. It does not really make much difference how often the coolant is changed as long as it is changed before losing its corrosion resistance. Antifreeze is made of ethylene glycol (which never wears out) and various additives (which do wear out). Some additives provide "reserve alkalinity" to neutralize internal corrosion before it can start. As long as the coolant is changed before its reserve alkalinity is depleted, the cooling system should be no worse for the wear. If you wait too long, the result can be expensive internal corrosion in the radiator, heater core and engine.

### How can you tell when it is time to change the coolant?

The only way to know if the coolant still has adequate corrosion protection is to test it. By dipping a test strip in the coolant and noting its color change, you can determine coolant condition and whether or not it is time to replace it. When coolant is changed, the system should be reverse flushed rather than simply drained. This helps dislodge and remove accumulated debris and debris in the system. It also removes old coolant that would otherwise remain in the engine block. Use of a cooling system cleaner is not necessary unless the system has been badly neglected and is full of lime deposits. The cooling system should be refilled with a 50/50 mixture of ethylene glycol antifreeze and clean water. This provides freezing protection down to -34 degrees F and boil-over protection to 265 degrees F. When coolant is changed, inspect belts and hoses. Make a visual inspection for leaks. Pressure test radiator and cap. Check operation of heater and defroster. The thermostat does not need changing unless it has been causing trouble or the engine has severely overheated. If a thermostat is replaced, it should have the same temperature rating as the original. This is extremely important on late model vehicles with computerized engine controls. Fuel, ignition and emission functions are all affected by coolant temperature.

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### What type of motor oil is recommended?

Use the type of motor oil specified in your customer's owner's manual. Most manuals say it's okay to use a variety of viscosity grades depending on temperature conditions. Generally speaking, the following holds true: 10W-30 is best for all engines for year-round driving. 10W-40 is more popular in the aftermarket, but 10W-30 is actually a better oil because the additive package in it holds up better over the long haul. This is why General Motors does not recommend 10W-40 motor oils for any of its cars.

5W-30 is approved for most late-model four-cylinder, V-6 and V-8 engines on a year-round basis. It is not approved for many turbocharged or diesel applications, some high output V-8s, or applications involving driving at sustained highway speeds or towing in hot weather. It may not be the best choice for older, high mileage engines.

5W-30 is used as the factory fill oil on most new cars because it pumps through the engine more quickly after start-up (important for keeping overhead cams properly lubed). It also makes cold weather starting easier and reduces fuel consumption. Straight viscosity oils have limited temperature ranges and lack the versatility of multiviscosity oils. They can be safely used as long as their temperature limits are observed. Straight 10W is okay for cold weather starting and driving, but too thin for warm weather driving. Straight 20W is okay for all around driving, but doesn't provide the temperature protection of straight 30W (which gets too thick at low temperatures for easy cold starting). Straight 40W and 50W oils are primarily for heavy-duty applications.

Special multiviscosity oils such as 20W-50 are typically formulated for racing or severe duty applications such as towing.

Synthetics are a good alternative for any of the above because most provide extended temperature protection and service life

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### Why Preventive Maintenance?

Manufacturers know that a properly maintained car will be more dependable, safer, last longer, and increase your satisfaction with their product. Car makers and owners also have a responsibility to make sure emission controls receive regular service and are functioning properly. Regular maintenance helps accomplish these goals by keeping your engine running efficiently and eliminating potential problems that may leave you stranded.

### What's in it for you?

More Dependable Car. A car that retains the "new car feel" Less chance of a costly breakdown

A safer car for you and your family Doing your part for cleaner air A car worth more at trade in or sale

An intact warranty Manufacturer Maintenance Schedules The manufacturer creates detailed maintenance schedules outlining specific operations to be performed on various components and systems. This is done at different mileage intervals to ensure proper operation and prevent premature wear. The manufacturer also indicates what services must be done to maintain the factory warranty and extended warranty.

### What are the basics test performed on a car?

Testing for DTS's (Diagnostic Trouble Codes), using PCM Scanner. Testing Pressure, to find out if you have the right fuel pressure test by a repeated failure in a specific area in any one type of transmission. Many products are available from the manufacturer and in the aftermarket to alleviate these problems.

### Will it hurt to overfill the transmission?

No although, it is possible that gross overfilling can cause the fluid to be subjected to moving parts and become aerated which could cause abnormal operation. You may also notice leaks that ordinarily would not occur. The transmission case is vented preventing pressure buildup in normally un-pressurized areas. Severe overfilling can raise the fluid level such that the transmission may lose fluid through the vent or leak from the seals that are above the normal fluid level.

### Why did my transmission fail?

Most of the time it's due to design flaws. These are failures that were not caused by abuse, misuse, lack of maintenance, or excessive mileage. A design flaw is characterized by a repeated failure in a specific area in any one type of transmission. Many products are available from the manufacturer and in the aftermarket to alleviate these problems.

### What should a complete tune-up include?

Electronic ignition, computerized engine controls, and electronic fuel injection have eliminated many adjustments that were once part of a "traditional" tune-up. Most would agree that a tune-up today is a preventive maintenance service and engine performance check. Call it what you will, a complete tune-up should combine elements of preventive maintenance, adjustment and performance analysis. One of the main reasons people bring a vehicle in for a tune-up is because they are experiencing some kind of drive ability problem. Things like hard starting, stalling, hesitation, misfiring, poor fuel economy, or lack of power are seldom cured by a new set of spark plugs and a few turns of a screwdriver. Every tune-up should include a comprehensive performance check to verify that no drive ability problems or trouble codes exist.

Another item that should be included is an emissions check. Thirty-five states now have a formal vehicle emissions inspection program, and all but two include a tailpipe emissions check. Most mechanics will check EGR valve operation, the PCV valve, and make a visual inspection of other emission control components and plumbing. But unless an actual emissions performance check is made at the tailpipe, there is no way to know whether or not the vehicle will meet applicable emission standards. An emissions check is a must. Taking into account longer service intervals and reduced maintenance requirements of today's vehicles, a tune-up is probably only necessary every 30,000 miles, or once every two to three years. This is altered when a drive ability or emissions problem arises that requires diagnosis and repair.

The best guide to tune-up frequency is probably the recommended spark plug replacement interval in a vehicle's owner's manual.

Our list of items that should be included in a "complete" tune-up include:

- Replace spark plugs
- Replace rotor
- Check distributor cap (replace if necessary)
- Check timing (adjust if necessary)
- Check ignition wires (replace if necessary)
- Check ignition performance (firing voltage and ignition patterns)
- Check idle speed (adjust if necessary)
- Check choke (carbureted engines)
- Clean fuel injectors
- Check compression and/or power balance (identifies bad fuel injectors as well as compression problems)
- Check manifold intake vacuum (reveals exhaust restrictions)
- Check battery/charging voltage
- Check exhaust emissions (verifies fuel mixture, ignition performance and emissions performance)
- Check vehicle computer for trouble codes
- Install new air filter
- Replace fuel filter
- Replace PCV valve
- Check all emission controls (EGR valve, air pump, etc.)
- Check all vital fluid levels (engine oil, transmission fluid, coolant, brakes, power steering)
- Check belts and hoses
- Check safety items such as lights, wipers, tires (including inflation pressure), horn, etc.