

## Hoses

Hoses are used in many systems on every vehicle. They carry liquids such as fuel, oil, coolant and transmission fluid. They transport gasses such as the refrigerant used in the air conditioning system. And, they route engine vacuum to numerous parts, which may include the cruise control actuator, power brake booster, exhaust emission controls and electronic sensors for the engine management system.

Hoses fail when they leak or burst. The consequences of any hose failure leak is directly tied to the contents of the hose. An air conditioner hose failure typically results in little more than some physical and financial (repair cost) discomfort. Coolant leaks are much more problematic, and if a vehicle is driven any distance with a low coolant level severe engine damage can result. Fuel and oil leaks are the most critical because they may result in a fire that can destroy the vehicle and cause extreme personal injury or even death.



To protect yourself from inconvenience, unwanted repair bills, and potential injury, you should inspect your car's underhood hoses once a month — or anytime you notice one of the warning signs described below.

## Hose Warning Signs

You may be experiencing hose problems if you notice any of the following:

- The smell of gasoline when the engine is running (stop and check immediately! — do not start or drive the vehicle if a fuel leak is present)
- Visible fluid leakage on the pavement under your car (except air conditioning condensation)

- A sweet burning smell (indicates a coolant leak)
- A smoky burning smell (indicates an oil or transmission fluid leak)
- Visible smoke or steam from underhood
- A “Check Engine” light on the dash (possible vacuum hose leak)
- A high engine temperature gauge reading or an illuminated engine temperature warning light (stop and check at the earliest safe opportunity — do not start or drive the vehicle if a coolant leak is too large to allow a full coolant level to be maintained)

### Hose Inspection

**Cold Engine Inspection:** To avoid accidental injury or burns, inspect for small leaks and check hose condition when the engine is cold. Check for hoses that are cracked, frayed or missing pieces. Also look for hoses that have been cut or abraded from contact with other components. Inspect around hose ends for dampness, deposits, or buildup of dried coolant. These indicate a minor “cold leak” may be present, which occurs only after the vehicle has warmed up and cooled down. Firmly squeeze the radiator and heater hoses. A hose that feels hard or makes a “crunching” sound when squeezed is deteriorating and should be replaced. Hoses that are extremely soft, sticky, or oil-soaked are apt to fail and should also be replaced.



**Warm Engine Inspection:** Use extreme caution working around hot engine parts. Drive the car long enough for the engine to reach full operating temperature. Park, shut off the engine and open the hood. Inspect the upper radiator hose. If it is collapsed, the radiator cap may be faulty and should be tested by a qualified technician. Look carefully at all the hoses to spot any swollen areas that would indicate internal damage or weak spots.

All deteriorated hoses and coolant leaks should be attended to as soon as you notice them. Over time, these leaks will get worse and may lead to an expensive repair. An inexpensive gasket or a simple tightening of a hose clamp now may be all that is needed to avoid an expensive repair later.



For more information about Making Sense of Car Care, contact your local AAA club, a AAA Approved Auto Repair facility or visit AAA.com.

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**Important safety information:** Due to the complex nature of today's vehicles, it is essential that you use the utmost care when working on your car or truck. Before attempting any service or repair, consult your owner's manual. Be sure you understand the service procedure completely, have the proper tools, and adhere to all safety precautions, including handling instructions for any chemicals you are using. If you are unsure about any repair, consult a professional technician.



MAKE SENSE  
OF CAR CARE!



Vehicle owners who perform their own maintenance often overlook underhood belts and hoses, a practice that can lead to problems down the road. Belts play a critical roll in driving the alternator, water pump, power steering pump and other vehicle accessories. Hoses carry fuel, hydraulic fluid and vital engine coolant. A little attention to these important components can go a long way toward preventing breakdowns and ensuring that your car operates at its best.

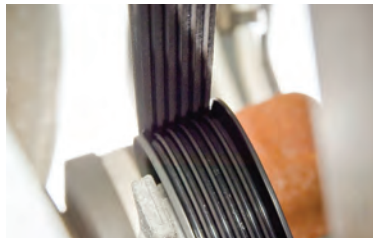
Many drivers wait until they get an indication of a problem before they take their vehicle into a repair facility for service. However, when it comes to belts and hoses, by the time there are symptoms of a problem, it may be too late to prevent significant damage. A professional technician should inspect the belts and hoses annually as part of regular vehicle maintenance, but many basic inspections can be done right in your own driveway.

## Belts

When a belt fails and breaks, the component(s) it was powering immediately cease to function. This can result in something relatively benign, such as no air conditioning, or something much more serious, such as a loss power steering, coolant circulation or engine operation. To meet their various needs, automobiles use up to three different types of belts:

### Serpentine Belts

Serpentine belts, used on nearly all newer vehicles, are wide and thin with a series of small V-shaped grooves on one side that fit into matching grooves on the accessory drive pulleys. The backside of the belt is typically flat and smooth, often rolls against one or more idler pulleys, and may also be used to drive certain components. Most cars use a single serpentine belt for all of the accessories; the belt gets its name from the twisting path it follows to wrap around all the pulleys. However, some cars use additional serpentine or V-belts (see below) to power selected accessories.



### V-Belts

V-belts get their name from the “V” shape of their cross section, which is wide at the top and tapers inward toward the bottom. The tapered V-shape fits into a matching V groove on each accessory drive pulley. V-belts are common on older cars, and are still used today in some applications. Engines equipped with V-belts usually have multiple belts driving the accessories.



### Timing Belts

The timing belt differs from serpentine and V-belts in both function and design. Rather than powering engine accessories, a timing belt connects the engine’s crankshaft and camshaft(s), and makes sure they turn together in proper relationship to one another. To do this, a timing belt is wide and thin like a serpentine belt, but its underside has crosswise “teeth” that fit into matching slots on special cogged pulleys that prevent the belt from slipping and maintain the proper relationship between the engine’s rotating parts.



On most cars, the timing belt cannot be seen because a protective cover on the front of the engine encloses it. In addition to its primary job, the timing belt on some engines is also called on to drive the water pump, oil pump or balance shaft(s). Not every engine uses a timing belt; many use timing gears or a timing chain instead. If your vehicle has a timing belt that requires regular service, it will be called out in the owner’s manual or maintenance schedule.

Like serpentine and V-belts, timing belts can and do fail. However, if a timing belt breaks or slips on its pulleys, the engine may not run and major internal damage can occur. Many engines have clearance built in so timing belt failure will not cause engine damage. These designs are called non-interference engines. However, on some engines timing belt failure will allow the pistons and valves to make physical contact causing serious damage. These designs are called interference engines. Engine repairs of this type are costly, but can be prevented by replacing the timing belt at the intervals specified by the vehicle manufacturer.

## Belt Warning Signs

You may be experiencing belt problems is you notice any of the following:

- A squealing noise as the engine is accelerated
- A squealing noise when the steering wheel is turned fully in either direction when parking
- A slow, rhythmic slapping sound at idle
- A whirring or grinding noise from a pulley when the engine is running.

## Belt Inspection

Fortunately, before they get to the point of failure, most belts show signs of wear that indicate they need to be replaced. To spot these signs, you should perform a visual belt inspection and belt tension check once a month. Some belt manufactures state that visual inspection is not fully adequate to determine the level of belt wear, and recommend that belts be replaced at four-year intervals regardless of appearance.

Always service your car’s belts with the engine off and cold to prevent accidental injuries from moving parts and burns from hot components. Carefully inspect the belts, including their edges and undersides, for the signs of wear described below. Visible wear may indicate a belt that needs replacement or a belt-driven component that is failing.

Glazing is when the area of the belt that contacts the pulleys becomes slick and shiny. This usually occurs when a belt is lose and slips on the pulleys. A glazed belt can no longer grip adequately and must be replaced or it will continue to slip even more.

Cracking is a common sign of impending belt problems. Cracked V-belts should always be replaced, but occasional, widely-spaced cracks in the ribs of a serpentine belt are not cause for immediate alarm. However, regular cracks spaced closely together indicate a belt in need of replacement.

Oil-soaked belts occur when leakage from engine gaskets and other underhood sources allow grease, oil, or other engine fluids to drip onto the belt or drive pulleys. Belts that are oil soaked frequently slip and become glazed, and the fluid contamination may weaken the belt and lead to breakage. Replace the belt, and be sure to also repair the leak that led to the problem.

Pilling is when the belt’s rubber outer layer wears off and builds up on the drive pulleys. Pilling is caused by low belt tension and misaligned or worn pulleys can cause this condition. Clean the pulleys thoroughly before replacing the belt, and if the problem recurs, consult a AAA Approved Auto Repair facility for further diagnosis.

### Belt Tension

Check and adjust the belt tension on a regular basis. If the belt is too tight, it can cause bearings in the accessory components, or the engine itself, to wear prematurely. If the belt is too loose, it will slip and squeal, increasing belt wear and decreasing the efficiency of the driven accessory.

Nearly all V-belts require manual tension adjustment. However, most serpentine belts are fitted with spring-loaded automatic tensioners – although some earlier applications do require manual adjustment. The most accurate way to check



belt tension is with a gauge designed for that purpose, but you can also gauge the tension by applying moderate pressure to the belt at the midpoint of its longest straight section. If the tension is correct, the belt will deflect approximately 1/2 inch.

Automatic serpentine belt tensioners often incorporate a wear indicator to show when the belt is worn or stretched to the point of needing replacement. If the line or arrow on the moving portion of the tensioner falls outside the operating range marked on the fixed part of the tensioner, you should replace the belt. When replacing any belt, be sure to check the condition of the drive and idler pulleys as well. Loose bearings, misalignment or physical damage can quickly damage the new belt unless those problems are resolved prior to installation.