



Tire Maintenance Guide

Tips on how effectively maintain your tires

Ver 3.0

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Tire Maintenance Guide

- Tips on How to Effectively Maintain Your Tire -

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1.0 Functions Of Tires

There are 4 major functions of tires and they are as follows:

- * To support the weight of your vehicle - a average car weighs between 1.4 to 1.8 tons which is equivalent to the weight of about 30 people. The air and the build up pressure in your tire play the important role of supporting the weight of the car plus the driver and passengers on board.
- * To absorb road shocks - the tires, together with the car's suspension system act as shock absorbents to reduce the effect of bumpy roads felt by the driver and the passengers in the car.
- * To transmit traction and braking forces - being the only contact between your car and the road, the rough surface of your tires provide traction when your car is moving off and also, provide the necessary braking when your car is coming to a stop.
- * To change and maintain the direction of travel - the tires turn according to the turning of the steering wheels, thus changing the direction of travel.

1.1 Importance of Tire Maintenance

Tire maintenance is an often overlooked aspect of car safety as people often focus on various exterior aspects and functionality of the car such as waxing and grooming, car engine & radiator system etc.

The importance of properly maintaining your car tires cannot be overemphasized as tires are the only contact between your car and the ground surface. Any damage done to the tires could result in unstable handling and potentially dangerous especially when the vehicle is going at high speed.

Some Important Facts

- 85% of all tire air pressure losses are the result of slow leaks that occur over a period of time. Only mere 15% are due to rapid air losses caused by contact with a road hazard.
- The result of a survey done by the Rubber Manufacturer Association (RMA) shows that while about 70% of the drivers wash their vehicles at least once a month, only a mere 15% of the population of drivers regularly check their tire pressure. The recommended interval of checking tire pressure for cars is once a month.
- In a study done in USA by the Society of Automotive Engineers, 75% of tire failures are preceded by slow air leaks or insufficient tire inflation.
- The federal government estimated that about 660 fatalities and 33,000 injuries occur on a yearly basis attributed to low tire pressure related accidents.
- The Insurance Industry Associate estimated a total of USD600 million in unnecessary damages could have been prevented in 2005 if drivers had simply paid attention to their tire pressure.

In general, tires that are properly maintained will have the following advantages:

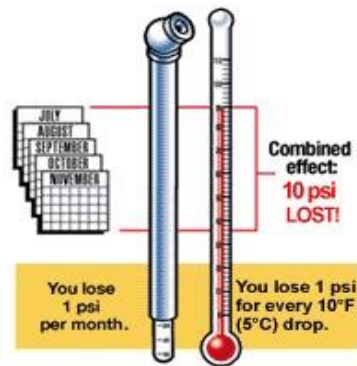
- A proper tire pressure will guard against avoidable crashes or breakdowns.
- Reduce frictional losses and therefore increase tire life.
- Enhance fuel efficiency, and lastly,
- Optimal vehicle handling

2.0 Reasons for Tires to Lose Pressure

In general, there are a few reasons that tire loses pressure and they are as follows:

- Sudden impact such as when the vehicle hit a hard object like a curb or going pass a high hump.
- Tire can lose air pressure quite suddenly if it comes into contact with sharp pointed road hazard.
- **Effect of Time:** Most if not all tires basically lose air as time passes - this is via natural leakage and permeation of air through the tire body. The estimated rate of lost in pressure is about 1psi a month.

Picture 1.1 Effects of time and temperature change on tire pressure



Tires can lose one psi (pounds per square inch) per month under normal conditions. Additionally, tires can lose 1 psi for every 10° F temperature drop.

- **Effect of drop in environmental temperature:** In general, the vehicle's tire loses 1 psi for every 5°C drop in temperature.

3.0 How to know what Tire Pressure is suitable for your vehicle?

Do you know who should you listen to to get the correct tire pressure for your car?

- A. Your car salesman.
- B. Your spouse.
- C. Your vehicle manufacturer.
- D. The tire retail shop that you bought your tires from.
- E. The tire manufacturer.

~Answer Below~

Answer: C. The vehicle manufacturer, is the correct answer. Some people mistakenly think that the information that is listed on the sidewall of the tire will tell the correct tire pressure for the car, which is not the case.

Many vehicle manufacturer will provide the recommended tire pressure and vehicle load limit on the tire information placard and in the vehicle owner's manual. Tire placards are permanent labels attached to the vehicle door edge (doorjamb) , glove-box door, or inside of the trunk lid (engine compartment area). Once you located this information, check your tire pressure against the information and make sure your vehicle is not overloaded - especially when you are planning for a vacation.

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3.1 Determination of Tire Pressure

For most radial tires, unless for trained eyes or when we have reference to compare to, most of us will not be about to determine the extent of tire pressure lost using visual judgment. See the picture below for better understanding.



Picture 3.1 Visual comparison of 100% (left) and 50% pressure:

Difference is observable but not obvious unless one pays attention

A tire can be as much as 50% under inflated before it is visibly noticeable. Not only are under inflated tires more prone to damage and failure, but they can lead to higher fuel costs.

Because tires may naturally lose air over time, it is important to check your tire pressure at least once a month. For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, pump station and other retail outlets. Do note that the tire inflation number that vehicle manufacturers provide refers to the pressure when a tire is cold. To get an accurate tire pressure reading for your tires, measure tire pressure when the car has been unused for at least three hours.

Tip:

3.2 Types Of Tire Pressure Gauges

There are currently three primary, common types of tire pressure gauges, namely:

- The old fashion 'pencil' type mechanical gauge.
- The dial gauge.
- The digital tire pressure gauge.

While the digital type is perceived to be more accurate, all the three types of pressure gauges do the job well.

The key is choose a quality brand within each category and keep one handy in you glove box and put it to good use.

All the gauges are available in many popular stores like the Wal Mart, Sears etc.

3.2.1. A Unique Tire Pressure Gauges – Liquid Filled Gauge

Appended below is the picture of liquid pressure gauge from Quickcar.net.



The liquid filled gauges are for accurate measurement of tire pressure and catered to the car racing industry.

The liquid filled gauges are designed to be equipped with bleeder valves to equate the internal pressure that of the external environment.

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4.0 Four Important Aspects of Tires Maintenance – Inflate, Rotate and Tire Tread

4.1 Tire Inflation

Maintaining a proper tire inflation is important for safe driving as well as increasing the life span of your tires. Inflating the tires to the manufacturers' recommended pressure level and proper balance of pressure levels among the four tires is important for the car's safety.

Over and Under Inflation: Both over and under inflation are no good to the car. Over inflated tires will wear out faster at the center of the tire whereas under inflated tires will wear out faster at the edge of the tires. Also, under inflated tire create extra unnecessary traction and causes the tire to wear out sooner than it should, and reduce the fuel economy of the car which is something you do not want to happen.

Checking: The *recommended interval of checking the car tire is minimum once a month* and when the tires are cold (i.e. In rested state for more than 3 hours).



Picture 4.1 Steps in Checking Tire Pressure

- i. Remove tire valve cap
- ii. Place the end of the tire gauge over the tire valve
- iii. Press the tire gauge to read the pressure reading
- iv. Pump air into to tire if needed. Recheck pressure with gauge if necessary.
- v. Replace Tire Valve Cap

Always inflate the tires to the manufacturers' recommended tire pressure level. Any suspicion of leakage should be attended to immediately as a safety precaution. Again, note that checking should be done when the tire is not used and cooled down to ensure accurate readings are taken.

Other inflation tips: i) Inflate for maximum load that your tire will carry and make sure that your vehicle's total load do not exceed the recommended maximum load. ii) Avoid introducing moisture into your tire

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4.2 Tire Rotation

The main reason for the rotation is to have a more even out wear and tear for all the four tires.

Tire rotation is important as it ensure even wear and tear of the tires, and thus extending the tires useful lifespan. For best results, it is recommended that you rotate your tires every 5,000 to 6,000 miles interval.

Appended below are the correct rotation patterns for directional tread, front wheel drive as well as rear and four wheel drive vehicles.



Picture 4.2-1 Correct Tire Rotation Pattern for Directional Tread

Front



Picture 4.2-2 Tire Rotation Pattern for Front Wheel Drive Vehicle



Picture 4.2-3 Tire Rotation Pattern for Rear and Four Wheel Drive Vehicle

How to rotate? Your role as the vehicle owner is to be aware of the fact that tires need to be rotated and to approach your vehicle mechanics to do the rotation. Your mechanic will know the right way of rotation for the type and make of your car. Some owner's manual provides information on how the tires are to be rotated and the interval (6,000 miles or 10,000 km for general usage or earlier) required to do so. While the above is a general guide on how the rotation can be done, the rotation pattern may vary, depending on the type and make of the car, as well as the tire.

4.3 Tire Tread

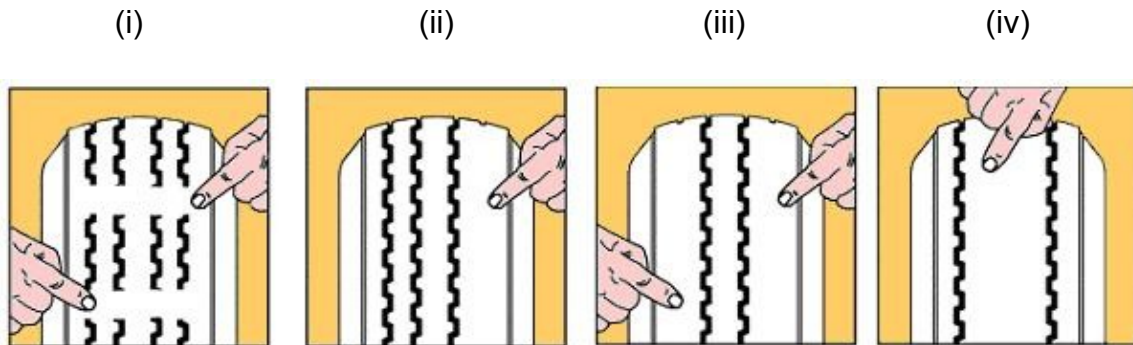
Tire Tread

Proper tire tread is important as it provide the necessary gripping action to the ground where your vehicle is in contact, and is especially important in wet conditions. Generally, when the tread is worn down to about 1/16 of an inch, it means that the tire is rather worn out and is time for you to change to new tires.

Checking a tire's treads periodically ensure the safety and effectiveness of your tires and ensure that your car's tires are safe. Excessive wear can result in a loss of traction, especially on wet and slippery roads. Tires are regular wear items and staying on top of their condition not only ensures your safety, but also gives you the opportunity to plan ahead and budget for inevitable tire replacement.

Types of Tire Wear

The pictures below show some of the possible types of tire wear.



Picture 4.3 Types of Tire Wear

- i) Exposed tread bar (replace tire)
- ii) Irregular shoulder wear (send your car for inspection by professional technician)
- iii) Pattern of tire wear due to under inflation } Send for
- iv) Pattern of tire wear due to over inflation } Inspection

Checking Tire Tread: How?

There are two popular ways for checking to see if there is enough tread on your tires.

Method 1

Most commercial tires have tread wear indicator bars molded into the tread. Tire wear bars are good as a hands-off visual indication that a tire needs replacement. These bars are located at the bottoms of the tread grooves in a few locations around the tire, and when the tire is worn to the point where any of them become visibly flush with the adjacent tread ribs, it is an indication that it is time to replace the tire.

Method 2



Picture 4.3 Using coin to determine if there is enough tread

There is another easy and popular way to check if the tire has enough tread and that is to use a penny. Place the Lincoln's head upside down and insert into the tread – when the top of Lincoln's head is seen (which means the tread is shallow), it is time to replace the tires.

Tire Replacement:

In general, it is best to replace all four tires with brand new tires when replacing your tires, as this practice minimizes and prevents problems that can appear with poor alignment and poor balance.

Do not let lower prices tempt you to purchase used tires instead of new ones and be careful when purchasing used tires. Make sure that you check the conditions of the used tires and ask intelligent questions. Watch out for tires that are being re-grooved, a malpractice called "grooving," which compromises the condition of the tire and therefore your personal safety.

If your tires contain embedded steel treads, and when one can see the metal showing through the rubber material, it is a severe tire problem and the tires must be replaced immediately as continual driving on tires with visible steel treads is a major safety risk.

Choose tires carefully. Some drivers buy a tire based on initial price or appearance. For optimum performance in wet conditions, select a tire with tread design and rubber compounds that provide enhanced wet weather driving capabilities.

Should you observe unequal or abnormal wear, it is recommended that you approach a trained mechanic to identify the root cause for the problem. If your car needs alignment work, it is best that it is done before a new set of tires are installed.

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4.4 Tire Balancing

Unbalanced tires cause vibration, which can lead to driver fatigue, premature / irregular tire wear, and unnecessary wear to your vehicle's suspension. Your tires should be balanced when they are mounted on wheels for the first time or when they are remounted after repair. Tire balance should be checked at the first sign of a vibration for safety reasons.

If you experience any vibration at your steering, make sure that you get down your vehicle and inspect your tires to identify the potential problem – such as uneven wear. Put on your spare tire if necessary and drive slowly to the nearest service station.

Other Important Considerations

4.5 Tire Wall Damages

One of the things that you want to do is to check if your tire wall suffered any damage on a regular basis. Look out for bubble, bumps or even cuts which shouldn't be there. These possible tire wall damages can be caused by tough road conditions or hitting curbs /pavement during driving or parking.

In addition, you may also want to observe for cracks - which could be caused by aging of the rubber and / or effects of fluctuation in temperatures on the tires.

When any of the above signs are observed, it is time to change your tires, regardless of the conditions of the tire tread..

It is a good practice to replace all four tires when bubble, bumps or cuts are observed, especially if the tires are already fairly old.

4.6 Tire Storage

In the event that you have more than 1 set of tires and need to store the extra set(s), the best way to store it is to keep them in horizontal position. Keeping tires in vertical position can deform your tires and make them undesirable for smooth rides or even jeopardized safety.

5.0 Tire Valve and Valve Stem Caps

The combination of tire valve stem and the associated valve stem cap is an important component of your tire set. The valve stem allows air to be pumped into the tire and stays where it should be whereas the valve stem cap help to keep out dirt and moisture. A properly designed and manufactured valve stem cap also help to keep the pressure within the tire should the tire valve starts to fail.

The tire valve is essentially a component that is pre-fixed with the tire by the tire manufacturer. The tire's valve main function is to contain the inflation of air in the tires. These valves can either be made of rubber or metal material.

The rubber type valve can and will deteriorate as time passes, and should be replaced as new tires are purchased. While the vehicle owner has less control on the quality of the valve he received, he can take some proactive measures with regard to the valve stem cap. The primary function of the valve stem cap is keeping out moisture and dirt/dust particles, as these external factors can interfere with the proper operation and therefore the integrity of the tire valve.

The valve stem cap is an important item as high quality valve stem cap also double up as “pressure leak stopper”, and it is therefore wise to get good quality valve stem caps that has the right air tight seal built-into the valve stem cap. The air tight seal will help to contain the air pressure in the event that the valve of the tire break down.

There are primarily four types of Valve Stem Cap in the market:

- Plastic material – these are the basic valve stem cap that usually comes together with the tire.
- Metal decorative type – these types of valve stem cap has better visual appearance than the plastic materials. Many of these are chrome plated material or are made of steel that has high durability and appealing shinny appearance.
- Built-In pressure gauge – This type of valve stem caps has built-in pressure gauge and call tell the pressure of your car tire any time you wish. However, they can be quite eyes catchy and can be easily removed by anyone.
- [Anti-theft tire valve stem caps](#) – The anti theft tire valve stem cap ensure that the valve caps remained at where they should be and thereby ensure that your valves and valve stems are protected from dust and dirt at all times. They serves to protect the valve and the valve stem and therefore help to ensure that the car tire pressure is maintained at consistent level.

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6.0 Conclusion

Followings are the pointers with regards to properly maintaining your tires:

- Regular check of tire pressure, all tires including the spare.
- Recommended interval: about once a month (when tire is in its 'cold ' state) and under normal weather conditions (i.e. no major temperature fluctuation as it will affect tire pressure). Important to also check before going for a long distance driving.
- Check the tire tread to make sure that the tires are not worn either by visually checking the marks provided by the tire manufacturer or by using a coin.
- Make sure that the tire wears evenly and no abnormal wear and tear. Consult professional if unsure.
- Inspect the tires regularly to ensure that there are no foreign objects such as stone, glasses embedded into the tire.
- Minimize hitting the curbs or sharp objects will help to prolong the life of the tires.
- Ensure that your tires stem valves have good valves stem caps

Indirect Tips (on Safe Driving):

- Focus driving – pay attention to the weather and road conditions.
- Maintain a safe distance from the car in front.
- Drive smoothly when accelerating, deceleration, braking or turning. Avoid jerking or abrupt movements whenever possible.
- Avoid exceeding the maximum load of the vehicle.
- Try to do day trips instead of night trips for better visibility, attention span as well as availability of possible needed technical assistance.
- The driver and all passengers should use safety belts, both lap and shoulder straps. Pull them snug to ensure they work properly.

Enjoy a safe journey!

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Resources

For Your Tire Supply: [The Tire Rack](#)

Purchasing Tires Via The Net

Buying tires online via the internet is becoming something very common in the recent years.

The idea of purchasing the right set of tires for your car from the comfort of your home is catching on for many people. Many good and reliable websites that are focus on tires have sprung up in the last few years and these tire sites allow you, the customer to choose your tires and make your purchase. One of the site that is currently doing very well is Tirerack.com.

Why Tire Rack?

We particularly like Tire Rack, an Indiana-based tire and wheel distributor, for the following reasons:

- * The Tire Rack not only is the country's largest one-stop source for tires, it is in fact leading the way in online tire, wheel and performance automotive accessory sales.
- * The Tire Rack is a leading destination for all car parts and accessories purchases, it is the the exclusive distribution outlet for Praxis Advanced Suspensions, exclusive importer of Kosei Wheels from Japan, and many reputable brands.
- * An excellent place to buy tires and wheels, including the winter tires at best possible price.
- * It is also leading the way in terms of its website, providing good source of information and that the helpful reviews they have on their site are very useful and the service consultant are reliable with their recommendations.
- * On Tirerack's site, you can read the reviews of people who owned similar car as yours or from other car owners who have purchase the tires that you are interested at.
- * It is a place to go to if you need to know more about tire sizing. It even have a section that allow you to see how the wheel will appear on your vehicle.

With so many benefits, it is hardly any surprise many people are purchasing their tires online and in particular, through [Tire Rack](#), which will provide a seamless and pleasant tire shopping experience.

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Resources

For Your Car Accessories: [JC Whitney](#)

J.C. Whitney is the largest direct marketer of auto parts and accessories. The company began life in 1915 as The Warshawsky Company, a scrap metal yard on the south side of Chicago.

The company's founder was a Lithuanian immigrant named Israel Warshawsky. Throughout World War I, Israel bought failed auto manufacturers and added new parts to his inventory. The Warshawky Company continued to grow, even during the Great Depression.

In 1934, Israel's son Roy joined his father at the company after graduating from the University of Chicago. Roy proposed expanding out from the Chicago-area with a nationwide catalog and placed an ad in Popular Mechanics for sixty dollars. The ad offered readers a "giant auto parts catalog" if they sent in twenty-five cents and response to the ad was huge.

Roy took charge after his father's death in 1943. He continued to grow the business through World War II, always developing new strategies in response to changing customer needs. Roy retired in 1991. In 2002, The Riverside Company acquired JC Whitney.

[JC Whitney](#) has been around for a long time, and will be here for a long time to come. As the single largest cataloger of automotive parts, accessories and related items in the U.S. their nationally recognized brand and solid industry standing has ensured customer confidence.

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