

Improperly inflated tires are costly, unsafe

There is a sure way to increase your gas mileage. It will not cost anything but your time and a little effort: Check the air pressure in your tires regularly.

Chances are good that most drivers have not checked — or inspected — their tires today, yesterday, a week ago, or even a month ago. Thus, underinflated

tires across the nation are causing a waste of millions of barrels of oil each year.

We checked (with permission) a group of cars on a large parking lot and found that a striking percentage of cars tested had underinflated tires — many drastically below the tire manufacturer's recommended air pressure level.

With me was a B.F. Goodrich tire specialist who had with him a professional, highly accurate air pressure gauge normally used to test tire pressures on race cars. Selecting cars at random, all four tires were checked, the inflation pressures recorded, tire sizes and conditions noted, and the manufacturer's recommended inflation

pressures for that particular size tire were written down. After checking 25 vehicles — domestics and imports — we found that 39 percent of all the tires checked were underinflated by four pounds per square inch (psi) or more. Twelve percent were overinflated four psi or more.

Thirteen of the 25 vehicles

had good tires and the rest had one or more tires that showed problems caused by spot balding, worn shoulders and cupping.

On one car we checked, the two front tires had seven pounds less air than recommended, and the left and right rear tires had 15 and 16 pounds less, respectively, than they should have had.

Such severe underinflation results in increased tire flexing, which can cause excessive tire temperatures and early failure. Vehicle stability and handling also can be adversely affected — resulting in severe sway or oversteer, for example.

Many studies have shown that improper inflation can cost consumers money.

Turbo engines are boost into future

Car And Driver predicts that it "will power us into the future."

Motor Trend describes the '80s as "the decade ... (perhaps) the century for it."

What is it? The turbocharger — the most inexpensive way to transform an ordinary combustion engine into a high-powered machine without jeopardizing either reliability or gas mileage.

A by-product of the gas economy era, turbochargers can deliver high performance from a small displacement engine. Running at low rpm, the engine produces high mileage per gallon, but kicks in like a Kentucky Thoroughbred in the stretch at Churchill Downs when the turbo goes to work.

As a result, Buick, Ford, International, Mercedes-Benz, Pontiac, Porsche, Datsun and Saab now — or will soon — offer stock production cars featuring the power on demand of turbos. Literally dozens of companies now offer aftermarket turbo kits for a wide range of cars.

Basically, turbocharging uses the power of an engine's exhaust to force large amounts of highly pressurized air into the engine, thereby increasing the engine's ability to "breathe" and burn fuel. There is no demand on the engine when the engine operates at a low rpm, only when your foot pushes the pedal to the floor. Thus, you have the advantages of high power when needed and normal economy when you're off the "boost."

Since an internal combustion engine is essentially a gasoline powered air pump, it pulls air in through the intake, pumping it into the combustion chamber, and then forces it out through the exhaust system. Power is derived by adding fuel to the air and burning the resultant mixture in the combustion chamber.

During combustion, considerable energy is released when the fuel is burned in the engine cylinders. While some of this energy is converted into useful work pushing the piston down on the power stroke, a great portion of the released energy is lost out the exhaust in the form of heat.

A turbocharger is designed to recapture some of this otherwise lost heat energy and use it to help the engine overcome some of its pumping losses which reduce the engine's volumetric efficiency.

A turbocharger consists of an exhaust turbine and an inlet compressor connected by a common shaft. The exhaust turbine is driven by the exhaust stream at speeds of up to 120,000 rpm. The inlet compressor revolves at the same high rate, compressing air to five to seven pounds of boost pressure and forcing it into the engine's intake manifold, making the resulting mixture much denser. Since auto engines operate on the amount of air available, presto — more efficiency!

More mixture in the combustion chamber creates higher cylinder pressure — hence the engine realizes a higher compression ratio, without changing to different pistons or chamber shapes. This higher cylinder pressure results in improved combustion efficiency.

While maximum combustion efficiency and volumetric efficiency are the ideal, there are trade-offs which limit the degree of practical turbo modification. For example, as the effective compression ratio increases so does cylinder pressure. This increases the load on the engine, placing a higher premium on the strength of its internal components. Increased loadings and heat levels generated by increased cylinder pressures place greater demands on the entire engine. Thus, it is imperative that a turbo system designer understand a turbo's effects on an engine and take them all into account during turbo development.

For proper engine function, many design and mechanical factors must be weighed.

Fuel-injected engines are best — they are easier to install and maintain. The precise combination, setup and maintenance of all the right parts guarantees reliability, fuel efficiency, clean exhaust and throttle responsiveness.

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