

Intercooling 2.4Ltd Hilux Surf.



Information taken from discussions on Intercooling on the Hilux surf Site:

The purpose of Intercooling is to lower the temperature of the air (compressed by the turbo) that is fed into the engine combustion chamber and this means more power without increasing wear and tear on the engine. So basically it is a win-win situation. The only negative might be cost.

An intercooler cools the intake air and that allows more oxygen to enter each cylinder on compression. But because you get more oxygen in the motor you get a more powerful and hotter combustion bang. Therefore A larger diameter exhaust system should be fitted prior to installing an intercooler as this will help to take the heat out of the motor.

The advantage of an intercooler is that cooling the air intake offsets the increase in combustion temp unlike upping boost, fuel pressure and mod injectors etc that a lot of surfs have done without a problem. FOR EXAMPLE: Upping boost to 12lb can give a increase up to 50c over inlet temp to just under 100c. Now the intercooler seems a safer option. Any mod will increase engine temp it depends on the margin between actual running temp and designed temp. Meaning the water temp may be 70c without a thermostat and 85c with one so after a mod it may increase to 72c and with hard work in mud, sand etc may increase to say 78c which is still under 85c so your thermostat can still maintain a constant temp.

An Intercooler (Comparing a 1kz-te & a Prado TD 1kz-te Intercooled) will drop the intake air temp by about 60% (For a good efficient IC). This kind of drop will do nothing but good things for your engine, even if there is a 2Psi drop its still better as the air is cooler & therefor the engine runs more efficiently (Cooler air is denser therefore creates a bigger bang)

As stated an intercooler is a Win-Win situation, the only loss is \$\$\$ out of your pocket buying one, they are WAY over priced for a small radiator.

Rich means hotter running for a diesel, leaner means cooler running which is better and part of the whole aim of the intercooling exercise..... cool the engine by giving it cool oxygen rich air to burn more efficiently (like your car on a cold day), then add more fuel richening the mixture and warming the motor back up as more fuel and air is combusted. End result is the engine operates still at a safe temperature but has much more power as it has more bang on compression.. exactly the same effect as the turbo forcing more air in and adding more fuel.

When a turbo is used, it compresses the intake air, when air is compressed it gets hot, so you are pumping hotter air into the engine (if a 20degree day your probably pumping in at least 40-50degree air at normal boost) so an intercooler in effect cools this air before it goes into the engine. This in turn give the engine more power as the air is cooler and more easily burnt.

Cooler air = denser air mass = more powerful combustion = more power.

When more air is introduced the burn mixture becomes leaner, a leaner mixture with a diesel creates a cooler combustion temp which means in theory the engine will run slightly cooler under normal driving. Unless you are capable of doing most of the work yourself a intercooler can be quite expensive to fit for little gain. If your after better performance than a bigger exhaust is much better bang for buck.