



Tech Sheet

‘Turbo Myths and Facts’

Myth- This turbo is totally oil cooled as water cooling is troublesome.

Fact- There is no such thing as a small oil cooled turbo charger!! All turbo chargers are oil fed due to the fact that they all have bearings that need lubricating. Turbocharger units are either water-cooled or not! Full Stop!! Unfortunately most aftermarket turbo kit manufacturers specify a non-water cooled or use the water-cooled turbo, but leave the water-cooling disconnected. All for a cost sake!! As usual, the excuses used leave the customer confused! Water cooling came about to increase the durability and life expectancy of a turbo unit. This is visible if we look at factory turbo charged 4WD's. They nearly all use water-cooling.

Myth- The engine will run a much lower engine temperature if it is Intercooled.

Fact- A diesel engine compresses the cylinder air charge to approx. 500PSI. This is done as the air needs to be red hot so that when the diesel fuel is injected, it immediately ignites. As we can see, hot air for a diesel is not a problem. Intercoolers are generally sold with the myth of running cooler denser air and lower temperatures, whilst dramatically increasing power. The temperature part would be true only if the increased power part was left out. To get the increase in power sold with an Intercooler we now have to increase the fuel loading higher. As I always say, more fuel makes more power with the offset of more heat.

Let's now look at the other possible problems associated with Intercooling. Over fuelling and hungry for power is the biggest one which definitely 'cooks' engines. The most common of all though is radiator air flow restriction. The radiator needs cool air to cool the hot engine coolant. Generally up front we have a bullbar, driving lights, bug screens (all diverting small amounts of air flow), we then have the introduced Intercooler dumping hot air over the air conditioning condenser (most air conditioners shut off if the engine coolant starts to get too hot to try and aid in keeping cool air going to the radiator) which is dumping now extremely hot air over the poor old radiator. The radiator is now getting the leftovers and is expected to cool the power enhanced, hard working engine. This problem gets worse as the ambient air temperature increases. So... an Intercooler added to a turbo system might not run cooler.

Myth- Particular companies don't increase the engine output too much, when turbocharging, so as to keep long engine life.

Fact- This comment is alarmist! It is impossible to gauge the original life of a diesel engine let alone one that is now turbo charged. If a turbo system is set up correctly, it will have no effect on engine life. Here, at **Berrima Diesel**, we suggest that engine life could be possibly lengthened, with the install of a correctly set up turbo system, due to the fact that it is now running with increased efficiency which can help with reducing soot build up in engine oil and around piston rings etc! We see vehicles that we turbo charged many years ago coming back with 500,000+ km on the engine and no sign of it wearing out. Diesels last if correctly maintained!

Myth- You must fit a Fuel pump aneroid (fuel compensator) when you fit a turbo as it will run better and give you more power.

Fact- For starters the addition of an aneroid to your injection pump will cost upwards of \$1000-\$1800 on top of a turbo system. It is specifically designed as a Pollution Control Device and is fitted only to factory turbo diesels. Unfortunately in aftermarket turbo fitment, an aneroid can be used as a device to mask over fuelling and over powering the engine. I find it most amusing when I hear comments from 'Diesel Pump Shops' like:- 'If it runs too lean it will burn holes through the pistons so it must be fuelled up well. With an aneroid we can fuel it up!' This is only technically possible with a Petrol engine!!!

REMEMBER THIS DIESEL SAYING- 'Rich is Hot (more Fuel)....Lean is Cool (less Fuel)!!'

Myth- Some companies promote large, low boost, cool running turbo units!!!

Fact- It's simple physics. Pressure and volume are relative to each other. A turbo running higher boost gets higher volumes of air to an engine than the one running lower boost. The higher the boost the more air volume! A turbo is only an air supply device. Boost pressures used in turbo charging are relatively low and don't generate much heat if any. If we kept compressing the air to a couple of hundred PSI though, air would soon heat up. It still stands that fuel makes the heat in the equation!! Loads of fuel means loads of heat. A correctly matched turbo spins up fast so as to keep a nice lean mixture down low and to get a torque increase early in the rev range (a lean mixture is cool and clean in a diesel!!). As we know, diesel engines produce maximum torque at low engine revs so we need a turbo to be at maximum boost at those low engine revs. What's happened now to the 'large low revving turbo'? Not much, until the engine revs get up high. Too late for the boost to arrive at high revs! In fact if the boost is kept low and the turbo spins up slowly, the fuel and air mixture can be quite rich in the low to mid working range of the engine. 'Rich means heat in a diesel'. That's why using a large 'cool' turbo charger is a fallacy! With the high revving diesels of today, a turbo needs to boost early and hold the boost through the large rev range. The variation in a 4WD diesel rev range can be 4000RPM between idle and redline.

Myth- Use the old manifold and just adapt the turbo to it.

Fact- This is a real worry. The original exhaust manifold is not designed to have the weight of a turbo unit swinging off it or the increased backpressure that a turbo creates in the system. Having a specifically designed new exhaust manifold for the turbo to bolt to is only common sense. A specific turbo exhaust manifold is internally split for cylinders 1,2,3 from 4,5,6. This is specific for exhaust flow and increased low speed torque.

Myth- The turbo must be mounted high up in the engine bay so as not to crack in water.

Fact- High mounting in certain engine bays can lead to excessive engine bay temperature. We have seen some funny cases! The most common is systems using a high mount position, for the turbo, in the Nissan Patrol. We have seen some melted glove boxes, cooked batteries and even paint damage to bonnets. As far as water crossings cracking turbo housings go, I don't know who would drive at full speed long enough to get the turbo orange hot and then plough into a river deep enough to fill the engine bay. You can imagine the picture let alone the splash! The castings are strong enough to withstand splashing and possible immersion, whilst hot, under most conditions.

Myth- You need a high flow foam filter when turbo charging.

Fact- If you don't know our stance on this subject just ask! Ask the turbo reconditioning industry how much foam they find behind compressor wheels in turbo chargers when they are being rebuilt!

Myth- The problem is they use a petrol turbo unit.

Fact- No such thing. A turbo is a turbo. Turbo units are designed on exhaust flow not the fuel used!