



Cooling Turbocharged 914's

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Hi all, This is the first post to the New 914 Tech list.

If you have been following any of the 914 turbo conversions, you will be familiar with the problems of cooling the intake charge. I originally was going to use an air to air intercooler, however it would need to be mounted in the engine compartment, which is not the best location on a 914. The airflow through the intercooler is not great enough to effectively remove heat from it. Any hot air removed from the intercooler would just increase the air temp in the engine compartment, which would then be directed into the engine's cooling fan. Not what you really want. An air to water intercooler can be used, but this requires pumps, plumbing and an additional radiator to cool the coolant.

What choice is left? Alcohol Water injection. Alc. water injection is very effective at removing heat from the intake charge. The alc/water vapor creates a denser charge, which slows the burn rate of the fuel mixture in the cylinder, acting like a higher-octane race fuel. The alc/water vapor cools the cylinder temps and reduces the cylinder pressure. Alc/water vapor steam cleans the intervals of the cylinder removing carbon deposits as well.

Due to the space and lack of good cooling air locations on the 914, I chose to use an Alcohol Water injection set up. There are a lot of DIY pages to make systems using windshield washer pumps and the like, however I feel that these systems are crude at best. They do not provide enough pressure to form a fine vapor mist and do not have the delivery volumes needed to cool an engine. Also you run the risk of the system leaking and hydrolocking the engine.

After extensive research, I chose a Carroll Supercharging System. <http://www.carrollsupercharging.com> It is not cheap, basic kit is \$400-, but it is a well-engineered kit with check valves, solenoids and pressure activated on/off switches.

I will be installing my kit hopefully this week. I want to take before and after temp reading on the intake charge. The Alc/water system should drop the intake temp 50F within the first second it clicks on. We'll see. I have spoken with turbo guys who run a lot of boost, 25-30 psi, and they swear by these set-ups. The only down side is having to monitor and re-fill the reservoir. No alc/water, no cooling = big detonation troubles! I will fabricate my own tank as time goes on to ensure an adequate supply of cooling liquid for track sessions.

Speaking of track sessions, at Watkins Glen, John Dunkle and I ran my 914 at 14lb boost levels on 100 octane Unocal race gas. No Intercooling. The 914 flew and the oil and head temps stayed at 210F and 350-370f. We ran the car hard for 2 days and it stayed together.

I intend to regularly run 10-12 psi on pump gas with the alc/water injection.

Stay tuned,
Ed