

Tech Basics: Hot Stuff, Cold Stuff

Keeping the temp right for the application can give you a lift in performance?

By Godfrey Towns

HOT STUFF

1. Tyres



A hot tyre is stickier, and a stickier tyre grips the bitumen better. In everything from Formula 1 cars (where they weave all over the track on the warm-up lap to get some temp into the tyres) to full-house drag racing (where a burn-out is obligatory) warming the tyres gets better results. But that doesn't mean that a huge burn-out at the drags on street tyres will give you a great edge - you're more likely just to see a heap of your money go up in smoke! A small burn-out is all that it takes to get some temp into the tyres.

2. Coolant

Keeping the engine coolant too cold results in poor fuel atomisation, high fuel consumption and a lack of throttle response. In an EFI car a too-low coolant temp may even make the car run continuously rich. If you've taken out the thermostat or have a mechanically-driven fan that needlessly operates all of the time... change them! Best is that the coolant comes up to temp quickly and then stabilises at 85 or so degrees. An external bypass system can also improve the efficiency of the cooling system.

3. Exhaust Gas



As the exhaust gas temp drops so does the speed of the gas flow. So keeping the gases hot will cause the gases to rush down the pipes faster, taking the gas away from contaminating the combustion chamber and so letting more air/fuel mixture in. The easiest way of achieving this is to lag the header pipes with ThermoTec tape. It's available in rolls and can be retained on the tubes by either special clips or normal jubilee hose clamps. We're only talking of a few percent improvement in power, but every little bit sure helps!

4. Heat Treatment

Heat treating pushrods, gears and the like can give benefits in terms of toughness and resistance to wear. But it's not the sort of thing that you can do at home with an oxy-acetylene kit! The temps have to be just right, the parts have to be kept at that temp for the right length of time, and how the objects are cooled ("quenched") is also vital. Check the Yellow Pages under 'Heat Treatment - Metal' to find an expert.

5. Plugs



A plug must get hot enough to burn off carbon deposits that would otherwise form on it, resulting in mis-firing. However, in a modified engine the temperature in the combustion chamber may be much higher than in the standard engine - allowing the plug to overheat and perhaps cause pre-ignition. In this situation a 'colder' plug is needed. This type of plug sheds more heat and stays at the right temp even in the hotter environment. The first step is to try a set of plugs one heat range colder.

COLD STUFF

6. Intake Air Temp



While the temp of the air going into the engine needs to be warm enough for the fuel to easily atomise, in most engines in Australia the intake air is **stoo** warm most of the time. Colder air has more oxygen in the same volume, and so colder air results in more power.

Any engine that picks up intake air from within the engine bay will benefit by having a duct installed from the aircleaner to the grille or an opening in the front spoiler.

7. Fuel

Since normal petrol starts to boil at temps upwards of about 70 degrees C, you don't need to be Einstein to realise that hot fuel lines could soon be full of vapour not liquid! No only will this give hard starting, but hot fuel gives less power than cold stuff. That's why drag racers use a cool-can with the fuel line spiralling through packed-in ice. Easiest is to insulate the fuel line from underbonnet heat with slip-on pipe insulation.

8. Brakes

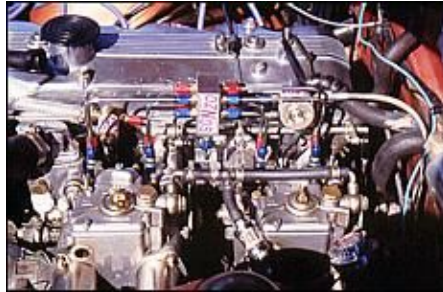


The greatest handicap to good braking performance is heat build-up in the brakes. Hot brakes result in discs and pads going 'off' and brake fluid boiling. Both lead to a dramatic downturn in braking performance. Fitting alloy wheels will give cooler brakes through better airflow, but for best results fit some brake ducts to the front brakes. Pick up air from the front of the car and direct it at the back of the discs through holes cut in the dust plates.

9. Amps

When they're working hard car sound amps get hot. That's why they're usually covered in cooling fins or even fitted with a cooling fan. But for the in-built cooling system to work there needs to be free airflow over the fins and the fan intake needs to be unblocked. Also don't mount the amp upside-down, because this will change the way in which air circulates past the cooling fins. Keeping the amp out of the sun will also help it to keep its cool.

10. Nitrous



The pressure of nitrous varies with the temp of the cylinder. That means that if you've set your system up with the right mixtures on a 20 degree C day, with the tank in the sun on a 30 degree day the pressure of the stuff in the bottle will be higher. Another factor is that the liquid changes into a gas more readily as the temp goes up. In fact, at temps over about 37 degrees the contents of the bottle will become entirely gas. You don't want this! Keeping the bottle out of the sun and even covering it with an insulating blanket will help keep it cool.

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