

FUEL FOR THOUGHT

98-octane fuel is the most popular choice here, making up close to two-thirds of petrol sold. But is it worth the money?



Motorists who fill up with high-octane petrol swear by it, saying it gives their cars extra oomph.

Shell, purveyor of the costliest V-Power (nearly 31 cents a litre more than 92-octane fuels), claims its "designer" petrol is selling extremely well. Caltex does not offer 92-octane petrol here at all. Today, 98-octane fuel makes up 62 per cent of petrol sold here. Back in 1999, when petrol was not as expensive as today, 98 made up 82 per cent of sales.

To motorists, these signs may give the impression that high-octane petrol is indeed better for your car. And that the lower-octane fuels are somehow inferior. But is this true? To gather empirical evidence, Torque tested two cars on a dynamometer – an instrument that measures actual power output at the wheels. It is more meaningful than measuring the output

Subaru Impreza 1.6A – Horsepower –

	2027rpm	3000rpm	4054rpm	5027rpm
Caltex 95	20.3	34.3	46.4	55.9
Shell 95	21.5	36.3	50.4	60.7
Esso 95	22.6	36.5	50.5	60.4
SPC 95	20.6	36.5	50.3	60.1
Shell V-Power 98	22.3	34.4	48.0	57.2
Caltex Platinum 98	21.7	33.9	45.3	54.9

Subaru WRX 2.5T – Horsepower –

	2000rpm	3000rpm	4000rpm	4500rpm
Caltex 95	45.4	93.8	130.1	139.2
Shell 95	36.2	100.5	142.7	151.7
Esso 95	38.4	99.0	139.5	150.7
SPC 95	38.6	100.7	141.5	151.8
Shell V-Power 98	44.8	94.7	133.5	140.9
Caltex Platinum 98	42.7	92.1	130.4	140.0



of engines themselves.

We conducted the test at Subaru distributor MotorImage's flagship facility in Toa Payoh. The test cars were a Subaru Impreza 1.6 and a Subaru WRX 2.5 turbo. These all-wheel drive cars were also provided by MotorImage. Each test run costs around \$100, but the distributor was kind enough to waive that.

Costs aside, there was the time and effort devoted to the experiment. The exercise spanned over a week because each fuel on each car was tested three times to arrive at an average. And the facility had paying customers to attend to in between.

The cars had to be drained of fuel and refilled, strapped on to the dynamometer and unstrapped and, of course, we had to go buy the fuels. Torque was present to document the whole process.

We picked 95-octane samples from Caltex, Shell, Esso and SPC. We also had Shell V-Power and Caltex Platinum – two ultra-premium 98-octane grades. We did not sample 92-octane petrols, although the conclusions from the comparisons here should be telling enough.

Before going further, let's get the jargon out of the way. What is octane? In simple terms, it is an indicator of how resistant a petrol is to pre-ignition (detectable as a knocking or pinging

noise) under a given pressure. Pre-ignition is undesirable as it disrupts optimal combustion and may even lead to engine damage in the long run. The higher the octane number, the more it can be compressed without pre-igniting.

MotorImage deputy general manager Mitsugi Satoshi, who was previously with DaimlerChrysler and Nissan Diesel, says pre-ignition typically takes place at very low revs. "If you started driving 20, 30 years ago, you might recall the occasional pinging noise you heard when you were starting off," says the man who majored in combustion. "It disappeared after you attained a certain speed."

These days, most engines are fitted



with anti-knock sensors which all but rids the car of the annoying trait

Still, higher compression engines will need higher octane fuels for optimal performance. As a general guideline, anything with a compression ratio of more than 9:1 will need more than 92-octane. And only those with ratios 11:1 and above will benefit from 98.

But what about supercharged or turbo engines, which typically have relatively low stated ratios? Mr Satoshi explains that the low figures are not indicative of the actual compression in the engine. "Remember the air that enters the engine is already compressed (by the turbo, for instance)," he points out.

So, a turbo'd engine with a stated engine compression ratio of 8.5:1 but has a 0.8-bar (0.8 times more than atmospheric pressure) blower actually experiences a compression ratio of 15.3:1 (8.5 multiplied by 1.8). Hence it would do well with a higher octane fuel.

Fuel consultant Ong Eng Tong,



a 40-year veteran of the oil industry, says most cars here will run fine on 92. "Using a higher octane than your car requires is just throwing money into the drain. And you are polluting the environment more, because high-octane fuels contain more harmful substances like benzene," he adds. Benzene is a potent cancer-causing substance.

Now, let's get to the results. The tests show that if the 1.6 is driven by someone who stays within 3,000rpm most of the time, Esso's 95-octane produced the most power at any given point. If, on the other hand, it is piloted by someone who is constantly heavy-footed, Shell's 95 churned out the highest output. The "ultra-premium" 98-octanes did not boost absolute power, but did produce more available torque at lower engine speeds.

Instead of newton-metre, torque is best expressed as the effortlessness with which a vehicle pulls away, especially at

lower speeds.

Shell's V-Power brought on torque in the quickest fashion, and sustained a flatter torque curve over a wide rev range. Since drivers tend to "sense" a car with more readily available torque on public roads, it explains why many swear by this costly fuel. But Esso 95 just about matches V-Power in this respect, while costing less.

With the 2.5 turbo WRX, 95-octane grades from Caltex and SPC seem to do the job well for relaxed drivers, and Shell 95 serves the more aggressive driver best. You will notice from the charts that the WRX has an inverted V-shaped torque curve. It peaks at around 3,600rpm, and thereafter heads south like a playground slide.

Again, Shell V-Power produced the best torque characteristics, followed closely by Shell 95 and Esso 95.

Because we do not drive like pre-programmed robots, and do not keep our eyes glued to the tachometer all the time,

we often gauge a car's performance by the seat of our pants. And easily available torque is most detectable – on public roads anyway.

If nothing else, the experiment concludes that there is no one superior fuel as far as measurable output is concerned. As with many things in life, the two-worded question "what's best?" often elicits a two-worded answer: "It depends."

But one thing is crystal clear: high octane does not mean high performance ■

* The two cars tested are rough proxies to cars on the road. Your own car may not yield exact results, so it is best to refer to your owner's manual to see which octane fuel is recommended. Also, fuel economy is not measured in this test, as how you drive is the biggest determinant of that. But, usually, a fuel that is formulated to give more power does not always give the best economy.

5W-30



5W-40



API
SM

15W-50



Fortified Additives

X REV

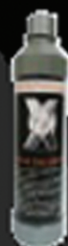
Fuel
Treatment



Engine
Cleaner



Gear
Treatment



FULLY SYNTHETIC ENGINE TREATMENT LUBRICANTS

with Complex Ester Base Oil (Group V)