



### **HIGHER OCTANE FUEL INCREASES POWER**

Higher compression and improved engine breathing will increase power. These modifications may lead to detonation or combustion knock, which is then eliminated by using fuel with a higher octane. Modern vehicles have sophisticated engine management systems that can detect engine knock and will adapt the engine to run on the fuel without knocking. Modern vehicles are tuned to use Premium Unleaded Fuel with an octane of 95 to gain best emissions performance per kilometer. When they use a lower octane fuel the engine will adapt to use that fuel without knocking but this will mean a loss in power.

### **BP ULTIMATE OCTANE 98 minimum**

BP Ultimate is the highest octane retail fuel that BP has on the market. It has an octane rating between 98 and 100 and does not contain ethanol. It is suitable for all cars but older pre 1986 vehicles designed for leaded fuel may need to add an additive to prevent valve seat recession. BP Ultimate also contains a high dose of additive to protect the fuel system and to remove deposits that foul intake valves and the combustion chamber causing poor combustion and knock. BP Ultimate is better than required by the Australian Fuels Standards of 2000 for Premium Unleaded Petrol. Cars with knock sensors and engine management systems can take advantage of the higher octane to develop more power and performance. Older cars that were originally using super petrol were designed for 98 octane fuel and so can be tuned back to original performance with BP Ultimate.

### **BP UNLEADED 95 Octane 95 minimum**

This is the mid range octane petrol which conforms closely to the European Standard for petrol and is therefore the basic fuel for many imported vehicles. It has a lower additive treat than BP Ultimate and lower octane so provides efficient performance and economy with a keep clean additive treatment. BP Ultimate is meets the standards required by the Australian Fuels Standards of 2000 for Premium Unleaded Petrol

### **BP UNLEADED 91 Octane 91 minimum**

This is the lowest octane fuel in the market and meets the standards required by the Australian Fuels Standards of 2000 for regular Unleaded Petrol. Engines using the regular unleaded petrol are not as efficient or economical as engines with higher compression using the higher octane fuels. The exception would be some hybrid engines where economy is improved by the use of electric motors. BP Unleaded 91 contains a basic additive treatment to keep injectors clean.

### **BP UNLEADED 91 with 10% Ethanol Octane 91 minimum**

This is BP Unleaded 91 with up to 10% ethanol. Because ethanol has a higher octane the addition of ethanol increases the octane to 94 typically so potentially there are economy and power benefits. However because the ethanol contains oxygen there can be up to 3% reduction in fuel economy to offset the power

benefits. It is formulated with a special additive blend to provide increased engine protection and cleanliness. It is not recommended for use in equipment with fibre glass tanks such as boats and bikes because older fibre glass may not be resistant to the ethanol..

## OCTANE BOOSTERS

Various additives are sold as octane boosters, invariably these include metal additives such as Lead , Manganese, Iron (Plutocene). These can be very useful in older engines but with modern engines the metal oxides can foul spark plugs and oxygen sensors and need to be used with caution.

The following table summarises some important fuel properties:

Fuel	RON typical	MON typical	Air/fuel ratio by mass stoichio-metric	Air/fuel ratio by mass maximum power #	Latent heat of vapourisation MJ/kg	Highest useful compression ratio *
BP Ultimate	99	88	14.4	12.0	0.34	9.5-10.5
BP Unleaded 95	95	85	14.4	12.0	0.34	9 - 9.5
BP Unleaded 91	91	82	14.7	12.5	0.34	8.5 - 9
BP Regular Unleaded with 10% ethanol (e10)	93	82	14.7	12.5	0.34	9.5

\* Approximate compression ratios only - depends on engine design and application.

# Air/fuel ratios will vary slightly with fuel composition.

Smaller cylinders with shorter flame path allow higher compression to be used. Very high engine speeds also allow higher compression, for example in racing boats where low speed, high load operation is avoided.

**For further information, please call the BP Lubricants and Fuel  
Technical Helpline 1300 139 700 local call  
or visit [www.bp.com.au/fuelnews](http://www.bp.com.au/fuelnews)**