

## CLEAN SOLUTIONS FOR A BETTER WORLD

### *Compressed Natural Gas Division*

Traditionally, CNG is viewed as a fossil fuel substitute for gasoline (petrol), diesel, or propane fuel. Now with the advent of Biogas/Biomethane, CNG can also be produced from a renewable source.

Although its combustion does produce greenhouse gases, it is a more environmentally clean alternative to those fuels, and it is much safer than other fuels in the event of a spill (natural gas is lighter than air, and disperses quickly when released ) and has a significantly higher ignition temperature of around 600°C.

CNG is made by compressing natural gas (which is mainly composed of methane [CH<sub>4</sub>]), to less than 1% of its volume at standard atmospheric pressure.

Fact –Actual Emissions vary with engine design and the standard of the conversion.

Potential emission reductions are –compared to conventional gasoline (petrol):

- ✓ **Carbon Monoxide Reduced by 60%**
- ✓ **Carbon Dioxide Reduced by 25%**
- ✓ **Nitrogen Oxides Reduced by 50%**
- ✓ **Sulphur Oxides Reduced by 60%**
- ✓ **Non Methane Hydrocarbons Reduced by 75%**
- ✓ **Virtually No Particulates**

## Comparison of Pollutants Levels Emitted By Different Automotive Fuels

	CARBON MONOXIDE (CO)	NON METHANE HYDRO CARBON (NMHC)	NITROGEN OXIDES (NO)
PETROL	BASE	BASE	BASE
LPG	-20%	-10%	+20%
NGV	-60%	-75%	-50%
DIESEL	-40%	-10%	+700%

**Note:** The pollutants in the table above are toxic elements, poisonous at high level to healthy people, affect lung function, increase respiratory illness in children, contribute to acid rain formation, increase the toxic level harmful to fish and other aquatic life, contribute to visibility impairment and reduces oxygen delivery to body and tissues.

## Characteristics of Different Automotive Fuels

	NGV	LPG	PETROL	DIESEL
Composition	Mainly Methane Gaseous, Odorant added	Mixture Butane & Propane, Liquid/ Gaseous, Odorant added	Mixture of higher Hydro carbons, Liquid, Distinct Odor	Mixture of higher Hydro carbons, Liquid, Distinct Odor
Specific Gravity	0.7% (lighter than air)	1.86% (heavier than air)	Heavier than air	Heavier than air
Octane No (RON)	130	100–104	97	N/A
Auto-ignition Temperature (°C)	630	480–540	456	338
Flammability Limit	5%–15%	2.1%–9.5%	1.4%–7.6%	0.5%–5%
Heat Energy	51.6MJ/kg	49.55MJ/kg	47MJ/kg	45MJ/kg
Storage Pressure	3000 psig (Gaseous in Cylinder)	100–150 psig (Liquid + Gas) in Cylinder	Atmospheric (liquid) in tank	Atmospheric (liquid) in tank