

# Characteristics of C I Engine Fuels

## Ignition Quality:

- Ability of fuel to ignite promptly after injection.
- Measured in terms of delay period.
- Shorter delay period => better ignition quality.
- High cetane number fuels => better ignition quality.
- Lower self ignition temperature => better ignition quality.

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## Volatility:

- Ease of evaporation
- More volatile => more rate of evaporation => good rate of mixing of fuel and air
- More volatile => chances of fire hazard is more
- C. I. fuels should be sufficiently volatile in the operating temperature range to produce good mixing and combustion.

Why **SUFFICIENTLY** not **MORE** volatile?

- Partly because of high demand of high volatile fuels for S I Engines.
- Partly, because of poor ignition quality.

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## Viscosity:

- Effects fuel atomisation and operation of high pressure fuel pumps
- High viscosity => low atomisation (large fuel droplets)
- High viscosity => high penetration of the spray jet
- High viscosity => starting problems and smoky exhaust
- Low viscosity => poor lubrication => more wear

Also, high tendency to leakage past the piston in the pump

- ❖ Maximum and minimum values suitable for an engine should be specified.

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## Handling Ease:

### Cloud point:

- ❖ Temperature below which the wax content of the petroleum oil separates out in solid form.
- May clog the fuel lines and fuel filters

### Pour point:

- ❖ Temperature below which gravity feeding of the fuel from the reservoir to the engine may not be possible.
- ❖ Fuel should have a pour point 5 – 10 °C below the operating temperature

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## **Safety:**

### **Flash point:**

- ❖ Lowest temperature at which a fuel will vaporise sufficiently to form a combustible mixture of fuel vapour and air above the fuel.

### **Fire point:**

- ❖ Temperature at which enough vapours will rise to produce a continuous flame above the liquid level.
- ❖ The flame must sustain at least for five seconds.

## Rating of Fuels

Fuels are rated for their antiknock qualities.

☐ Gasoline : Octane number

☐ Diesel : Cetane number

Resistance to knock depends upon the chemical composition of fuel (or characteristics of hydrocarbon in the fuel).

### **Other operating parameters:**

- F-A ratio
- Ignition timing
- Engine speed
- Shape of combustion chamber
- Compression ratio etc