

**COMBUSTO**

**COMBUSTION THEORY**

**Air** .....

**Nitrogen (N<sub>2</sub>) 79%**  
**Oxygen (O<sub>2</sub>) 20%**  
**Others 1%**  
**(CO<sub>2</sub>, Ar, He)**



**COMBUSTION**

**Fuel**

**Heat** .....

**Spark**  
**Compression**

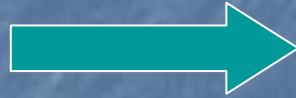
**Gas : CNG,LPG**

**Liquid : Gasoline, Kerosine, Diesel, Fuel Oil**

**Solid : Coal, Charcoal**

# LIQUID HYDROCARBON FUEL

CRUDE OIL



REFINERY



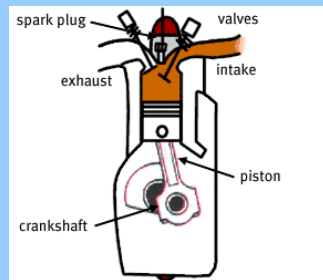


**Distillation Tower**

| <i>Fraction</i>       | <i>Carbons</i> | <i>BP °C</i> | <i>Uses</i>   |
|-----------------------|----------------|--------------|---|
| <b>Gases</b>          | 1 to 4         | < 40         | <ul style="list-style-type: none"> <li>Fuel in refinery               <ul style="list-style-type: none"> <li>Bottled and sold as LPG</li> </ul> </li> </ul> |
| <b>Napthas</b>        | 5 to 10        | 25 – 175     | <ul style="list-style-type: none"> <li>Blended into petrols</li> <li>Feedstock for making chemicals</li> </ul>  |
| <b>Kerosines</b>      | 10 to 16       | 150 – 260    | <ul style="list-style-type: none"> <li>Aviation fuel</li> </ul>   |
| <b>Light gas oils</b> | 14 to 50       | 235 – 360    | <ul style="list-style-type: none"> <li>Diesel fuel production</li> </ul>  |
| <b>Heavy gas oils</b> | 20 to 70       | 330 – 380    | <ul style="list-style-type: none"> <li>Feedstock for catalytic cracker</li> </ul>   |
| <b>Lubricants</b>     | > 60           | 340 – 575    | <ul style="list-style-type: none"> <li>Grease for lubrication</li> <li>Fuel additives</li> <li>Feedstock for catalytic cracker</li> </ul>                   |
| <b>Fuel oil</b>       | > 70           | > 490        | <ul style="list-style-type: none"> <li>Fuel oil (power stations and ships)</li> </ul>   |
| <b>Bitumen</b>        | > 80           | >580         | <ul style="list-style-type: none"> <li>Road and roof surfaces</li> </ul>  |

# COMBUSTION

## INTERNAL COMBUSTION



## ENGINE

**POWER & TORQUE**

## EXTERNAL COMBUSTION



## BURNER

**FLAME & HEAT**

# INTERNAL COMBUSTION : APPLICATIONS



**Mobile  
Engine**



# INTERNAL COMBUSTION : APPLICATIONS

**Generator**



**Water Pump**



**Water Turbine**



**Stationary  
Engine**

# EXTERNAL COMBUSTION : APPLICATIONS

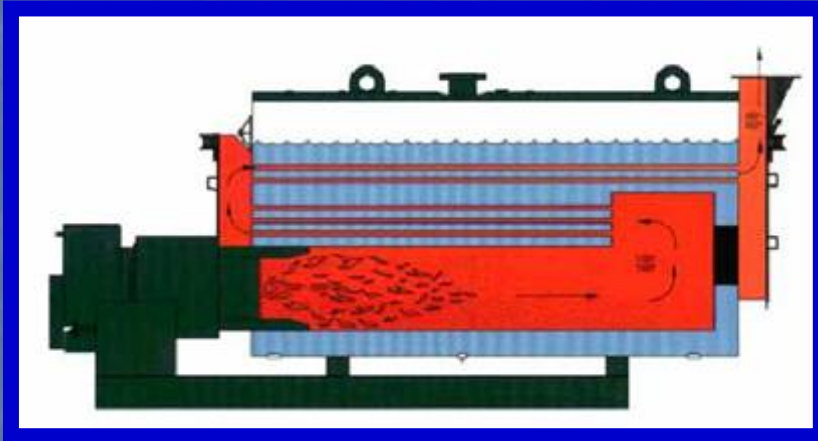


**BURNER  
FURNACE**





# EXTERNAL COMBUSTION : APPLICATIONS



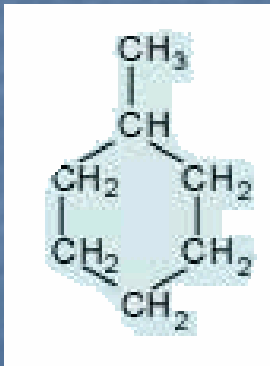
**BURNER  
BOILER**



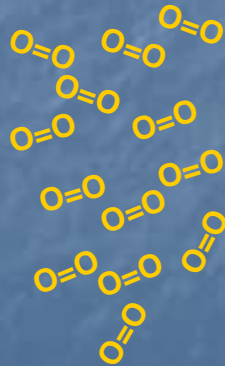
# COMPLETE COMBUSTION

Number of **Oxygen molecules** must be enough to react with all **Hydrocarbon** (Carbon & Hydrogen) Molecules to form Carbon-dioxide ( $\text{CO}_2$ ) and Water ( $\text{H}_2\text{O}$ ).

Hydrocarbon



+  $\text{O}_2$   $\longrightarrow$

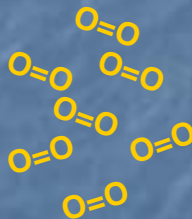
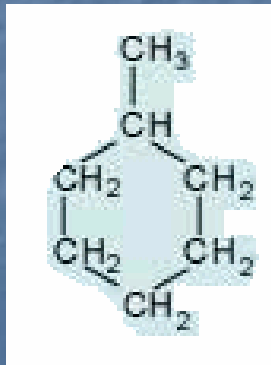


$\text{CO}_2 + \text{H}_2\text{O}$   
&  
**HEAT**

# INCOMPLETE COMBUSTION

Number of **Oxygen molecules** are **NOT ENOUGH** to react with all **Hydrocarbon** (Carbon & Hydrogen) Molecules. Some Carbon Molecules are formed to Carbon-monoxide (CO), Carbon-dioxide (CO<sub>2</sub>). The remaining **Carbons** become **Black Smoke**.

Hydrocarbon



CO + CO<sub>2</sub> +  
H<sub>2</sub>O + Carbon  
& **less HEAT** ↓

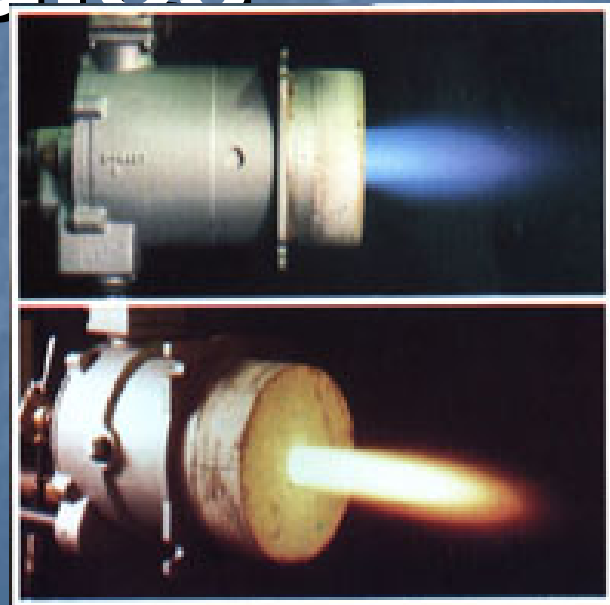
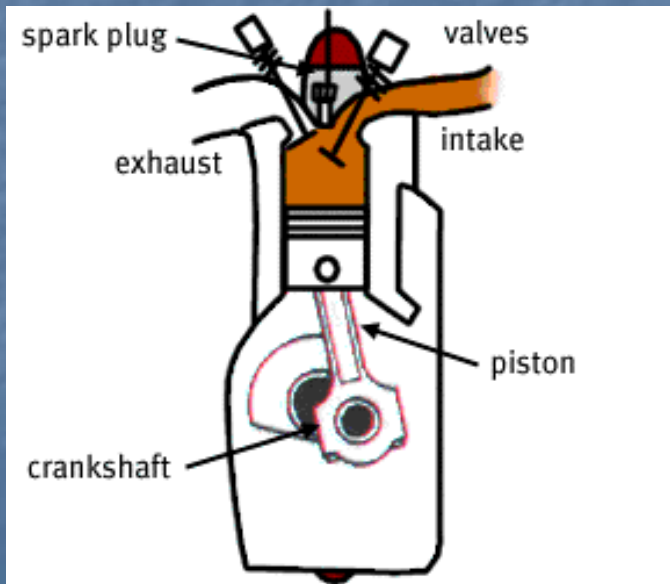


# COMBUSTO

Principle

**BIO - CATALYST**

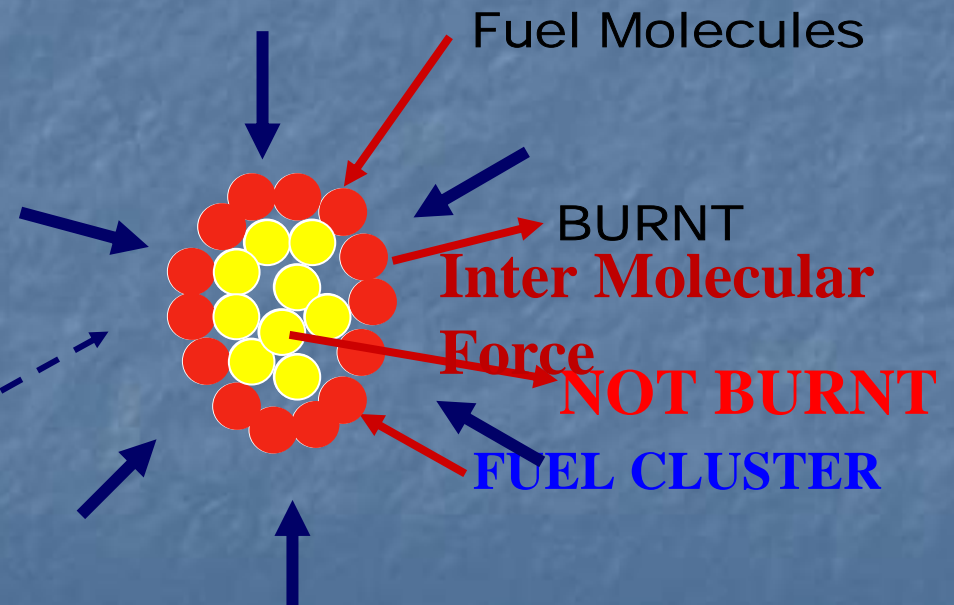
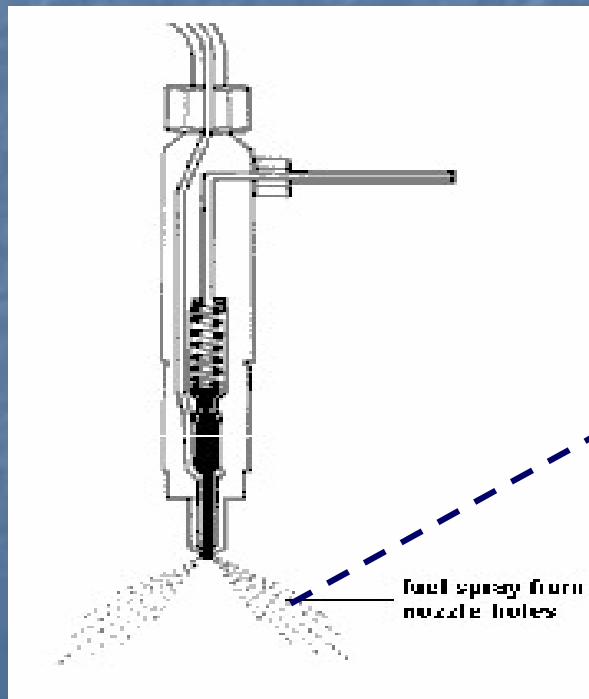
Break a Cluster of Fuel  
Molecules to single Fuel  
Molecules



# COMBUSTO

## Principle

A large **FUEL CLUSTER** is formed due to the **Inter Molecular Force**. Some molecules are **not burnt** and **released** with the exhaust gas.



# COMBUSTO

## Principle

# After Using

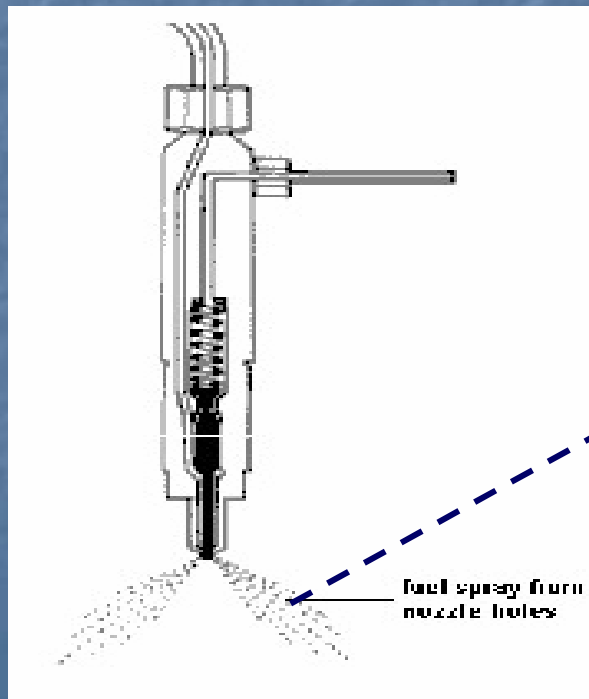
The logo for COMBUSTO is displayed in a stylized, italicized font. The letters are white with a blue outline and a yellow drop shadow, giving it a three-dimensional appearance. The word is set against a white rectangular background.

**COMBUSTO**

# COMBUSTO

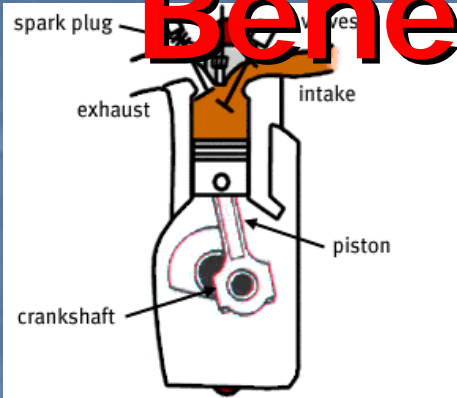
## Principle

The **INTER MOLECULAR FORCE** is removed by the **COMBUSTO**, resulting that the fuel Cluster is broken apart and become **single fuel molecules**.



# COMBUSTO

## Benefits



**Complete**

**Combustion**

**Enhance  
Engine  
Performance**

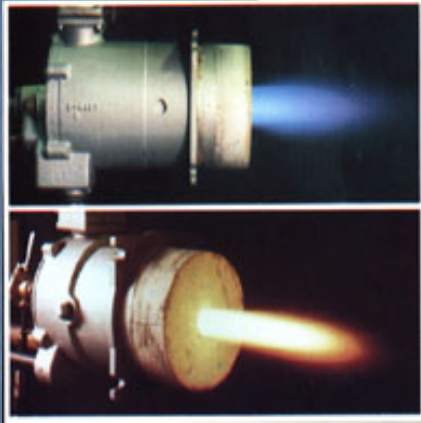
**Fuel Saving**

**Reduce  
Black  
Smoke**

**Keep  
Engine  
Clean**



# COMBUSTO



fits

**Complete**

**Combustion**

**Provide**

**More Heat  
Performance**

**Fuel Saving**

**Reduce  
Black  
Smoke**

**Keep  
Burner  
Clean**