



# **SNS COLLEGE OF TECHNOLOGY**



COIMBATORE -35

AN AUTONOMOUS INSTITUTIONS

ACCREDITED BY NBA –AICTE AND ACCREDITED BY NAAC –UGC WITH ‘A+’ GRADE

APPROVED BY AICTE, NEW DELHI & AFFILIATED TO ANNA UNIVERSITY, CHENNAI

## **DEPARTMENT OF AGRICULTURE ENGINEERING**

**19AGB301 –FARM TRACTORS**

III YEAR V SEM

**TOPIC : ENGINE OPERATION – IGNITION ENGINE CYCLE**

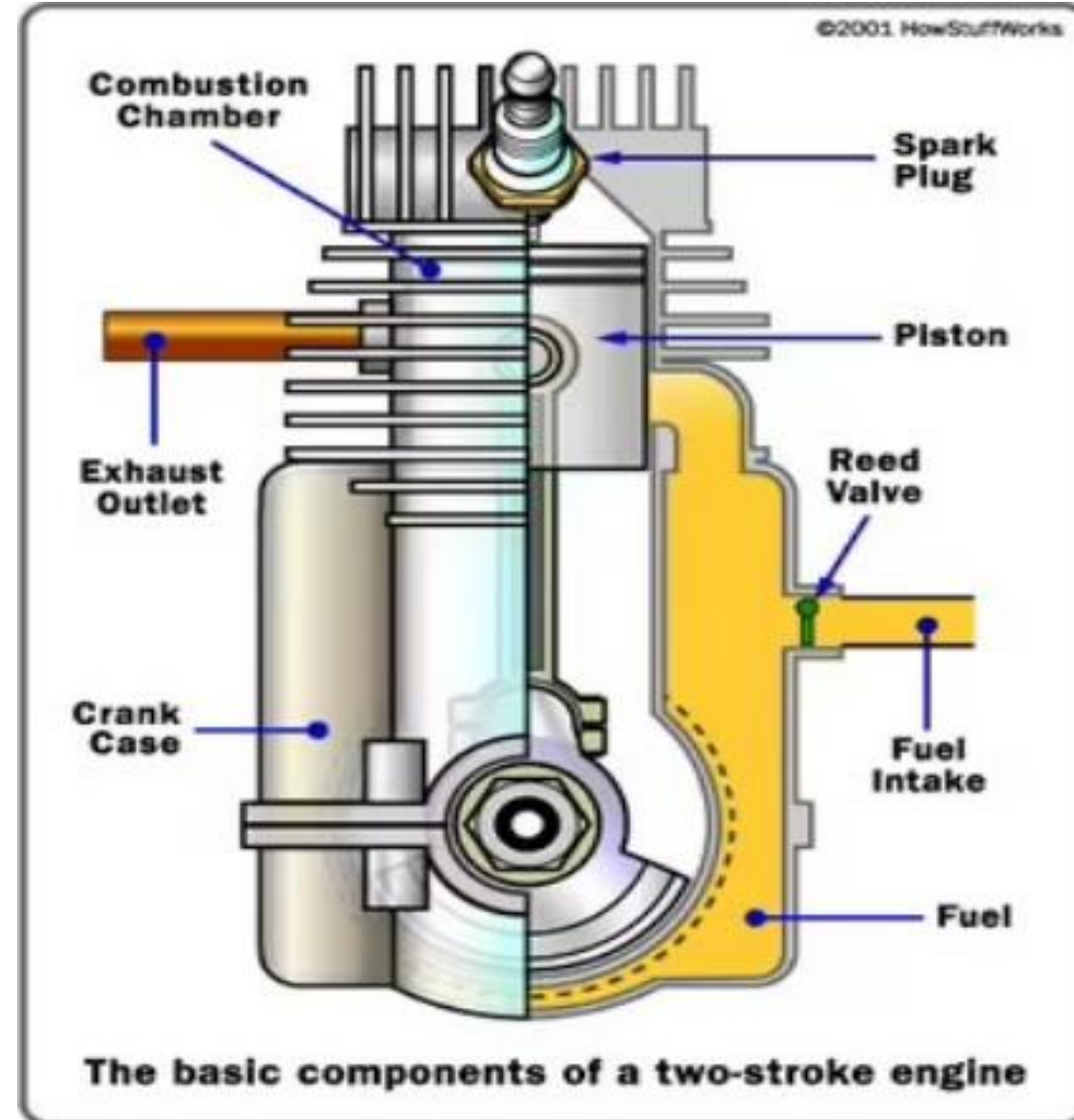


# ENGINE WORKING PROCESS

- *Combustion, also known as burning, is the basic chemical process of releasing energy from a fuel and air mixture. In an internal combustion engine (ICE), the ignition and combustion of the fuel occurs within the engine itself. The engine then partially converts the energy from the combustion to work.*



- The cycle includes four distinct processes: intake, compression, combustion and power stroke, and exhaust.
- Spark ignition gasoline and compression ignition diesel engines differ in how they supply and ignite the fuel.

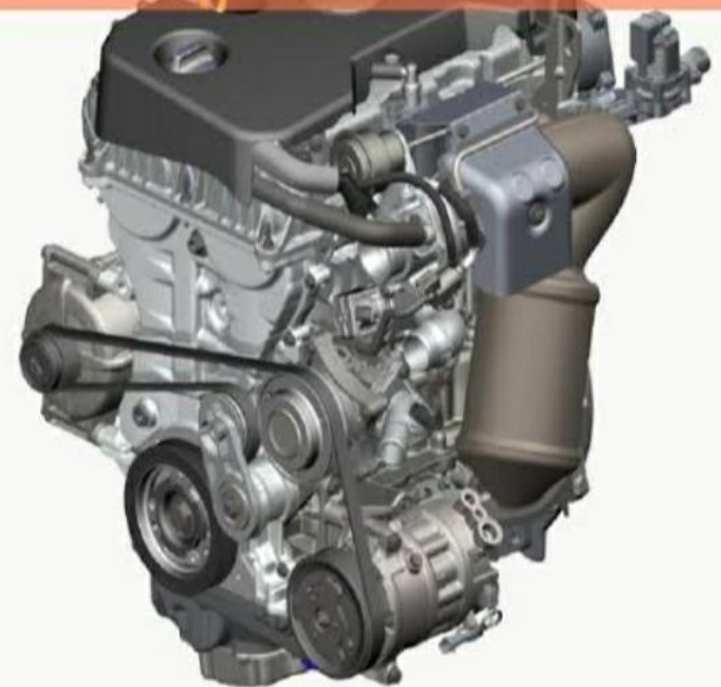




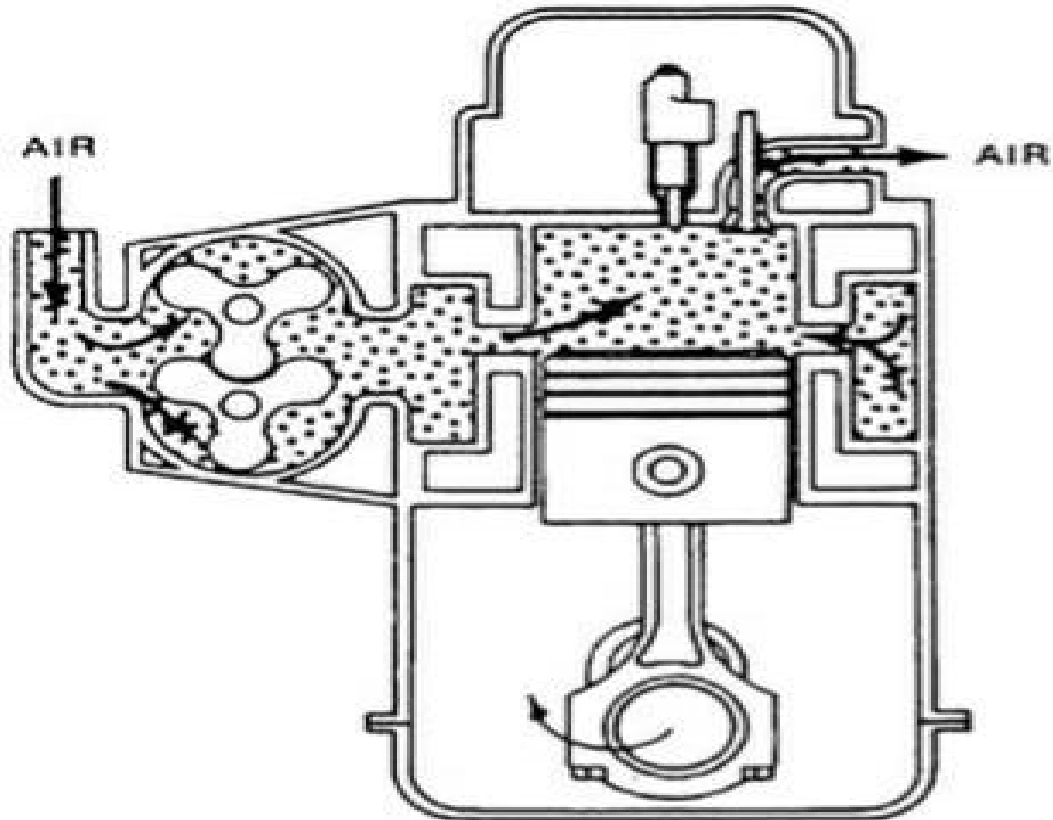
# IMPROVING COMBUSTION ENGINES

- Over the last 30 years, research and development has helped manufacturers reduce ICE emissions of criteria pollutants, such as nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM) by more than 99% to comply with [EPA emissions standards](#).

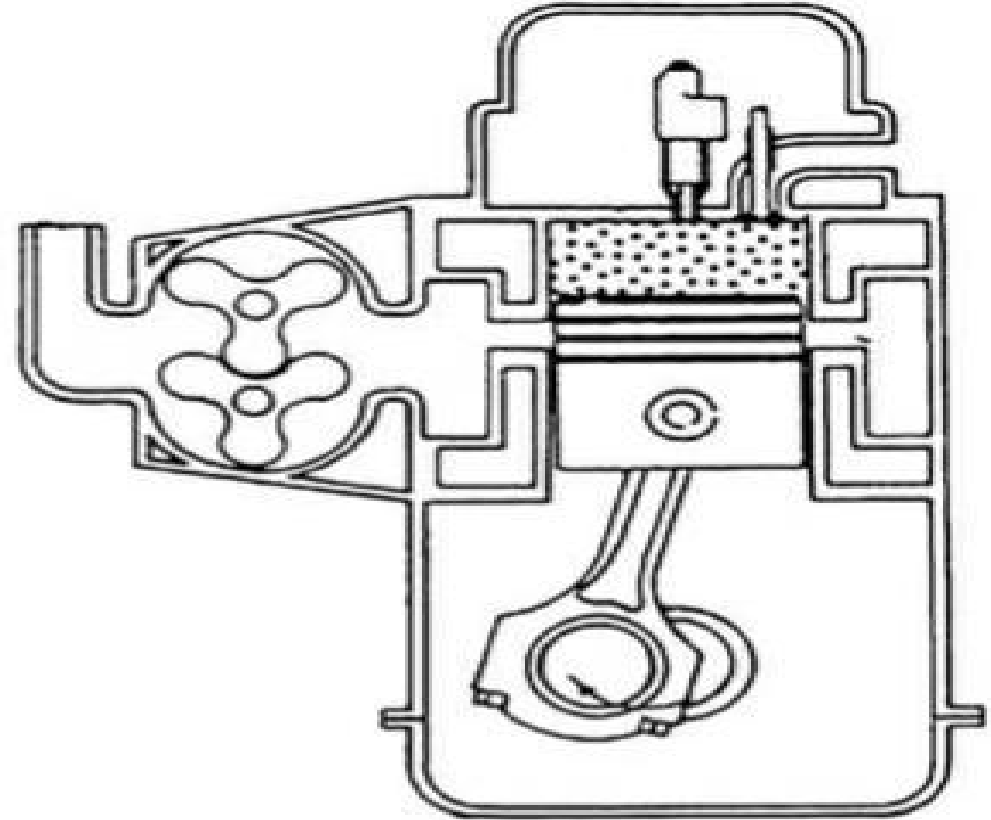
## Internal Combustion Engine



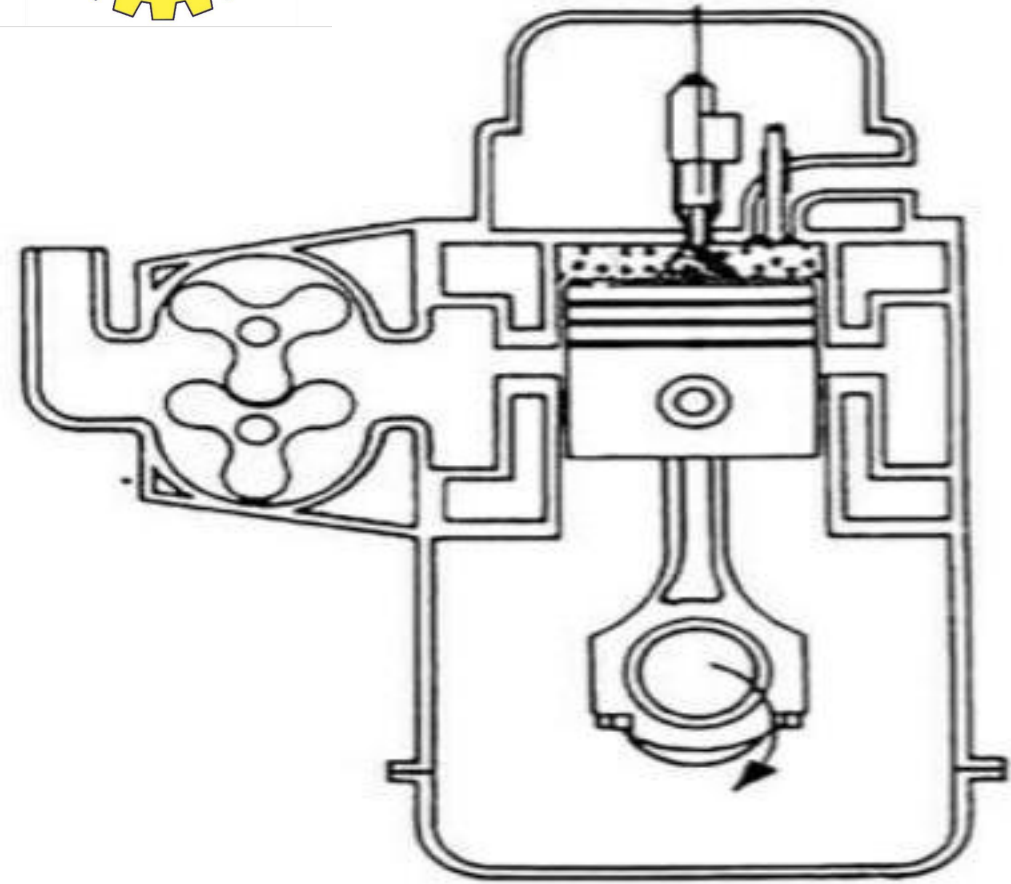
# SCHEMATIC OF A TWO-STROKE COMPRESSION IGNITION ENGINE



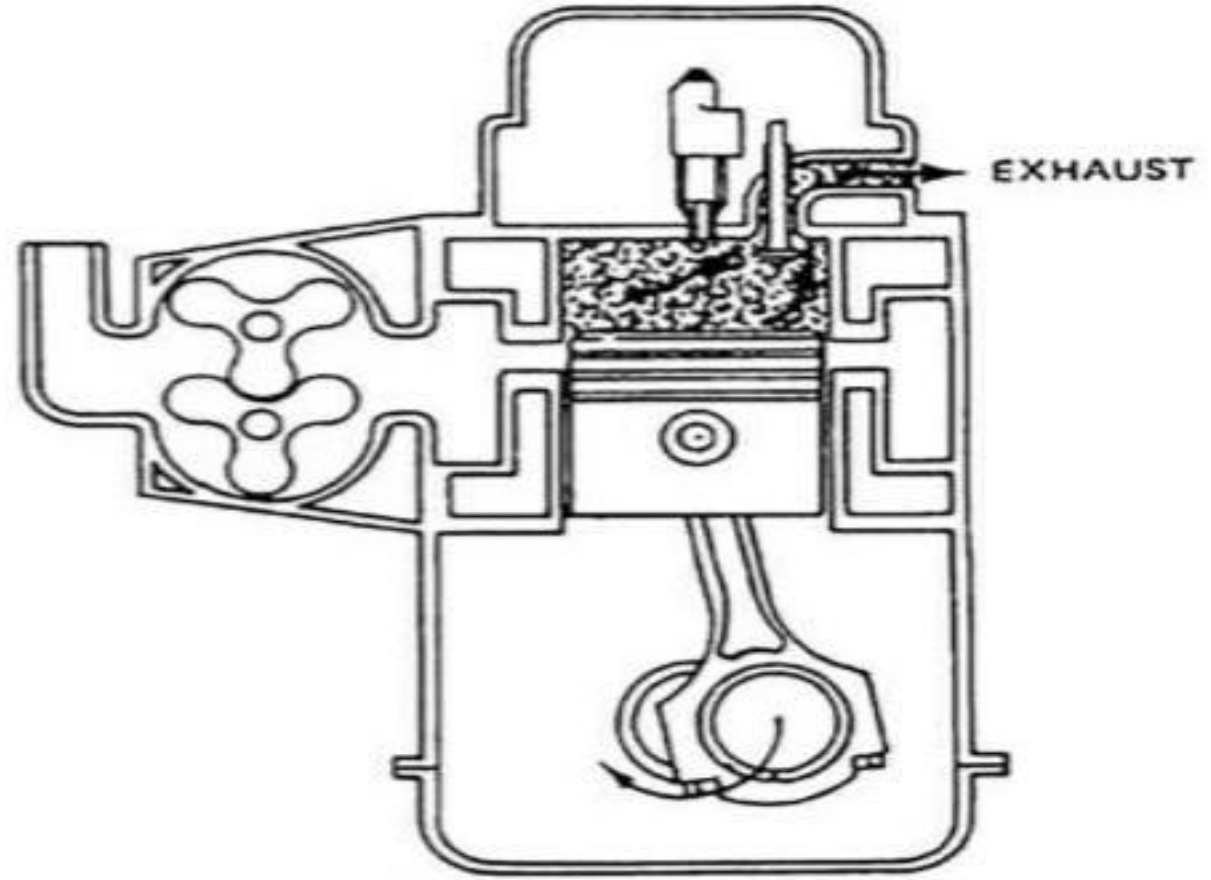
1 – SCAVENGING



2 – COMPRESSION



3 – POWER



4 – EXHAUST



AIR



AIR FUEL MIXTURE



EXHAUST

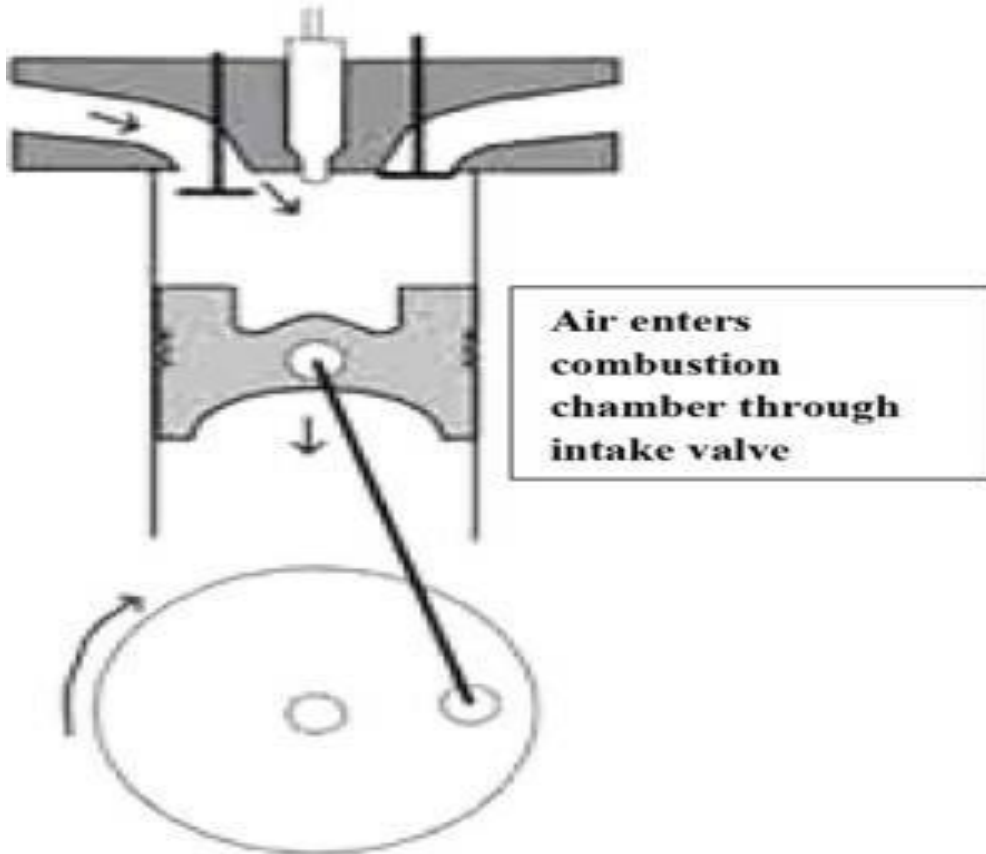


- two primary approaches to the compression ignition engine – the two-stroke and the four-stroke architecture.
- Very large CI engines (ship and locomotive, in particular) tend to be two-stroke, primarily because the engine speed is limited to low-revolutions per minute (RPM).

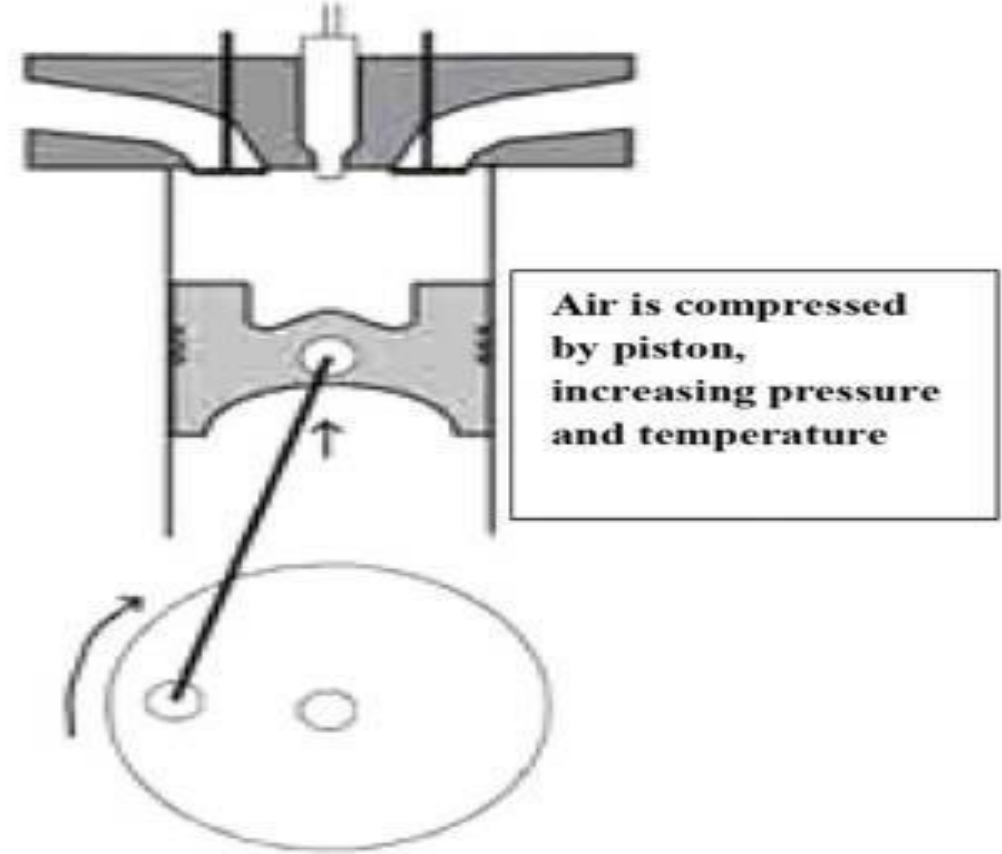


# SCHEMATIC OF FOUR-STROKE COMPRESSION IGNITION ENGINE

## Induction



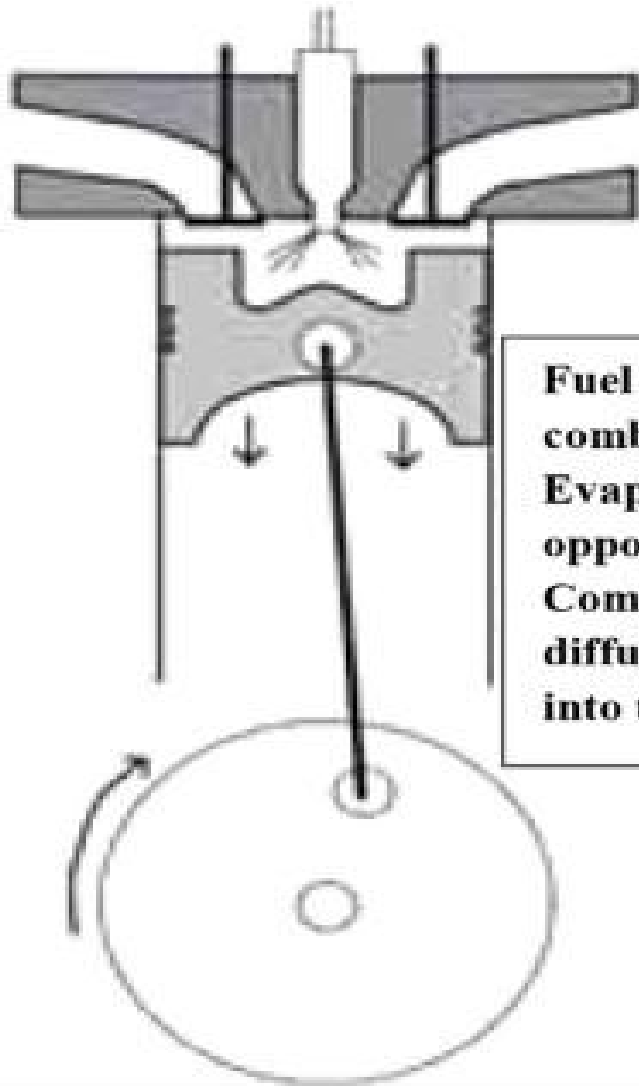
## Compression





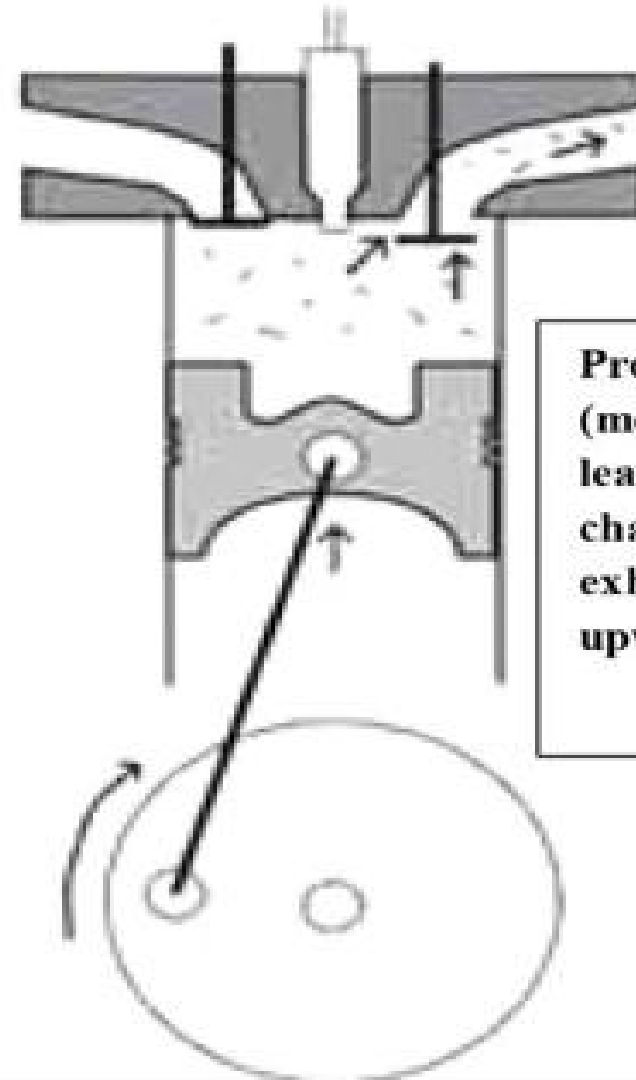


## Power



**Fuel is directly injected into combustion chamber. Evaporation creates the first opportunity for auto-ignition. Combustion is controlled by diffusion of fuel from the spray into the hot, pressurized air.**

## Exhaust



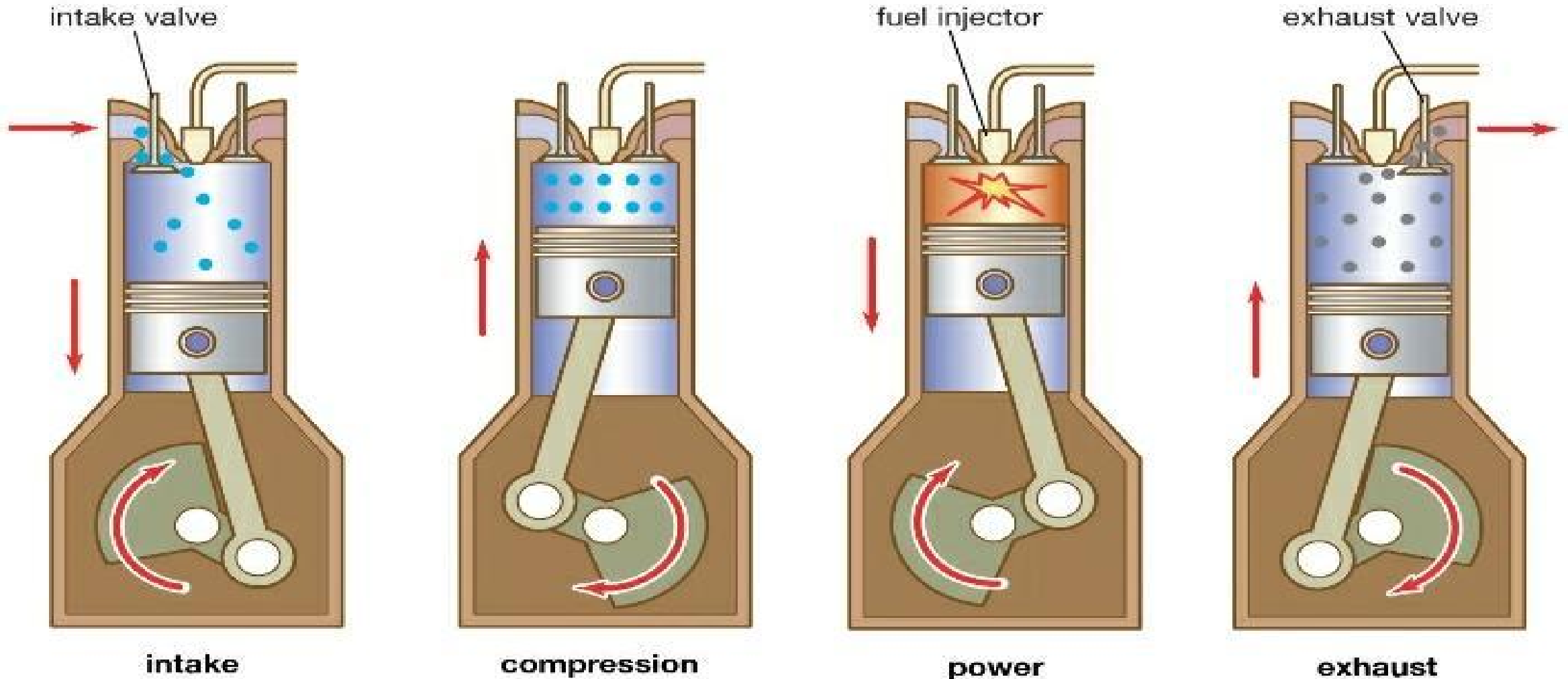
**Products of combustion (mostly CO<sub>2</sub> and H<sub>2</sub>O) leave the combustion chamber through the exhaust valve, pushed by upward piston motion.**



- the engine is two- or four-stroke, the intent is to create high-pressure and high-temperature air near the end of the compression portion of the cycle.
- The injected fuel is then exposed to the high-pressure and high-temperature air and auto-ignites very rapidly.
- This diffusion process occurs in milliseconds, while the actual reactions occur on the microsecond timescale, so the fluid mechanics of diffusion are



# DIESEL ENGINES





- The compression ignition engine or diesel engine is the type that has most commonly been used for power generation, particularly in off-grid situations.
- The engine uses a higher compression ratio than a spark ignition engine to heat air in the engine cylinder. Some engines increase efficiency further by using turbochargers or superchargers.



# Reference videos

- <https://youtu.be/Pu7g3uIG6Zo>
- <https://youtu.be/OiX9oXvxZWs>
- <https://youtu.be/fTAUq6G9apg>



Thank  
you

