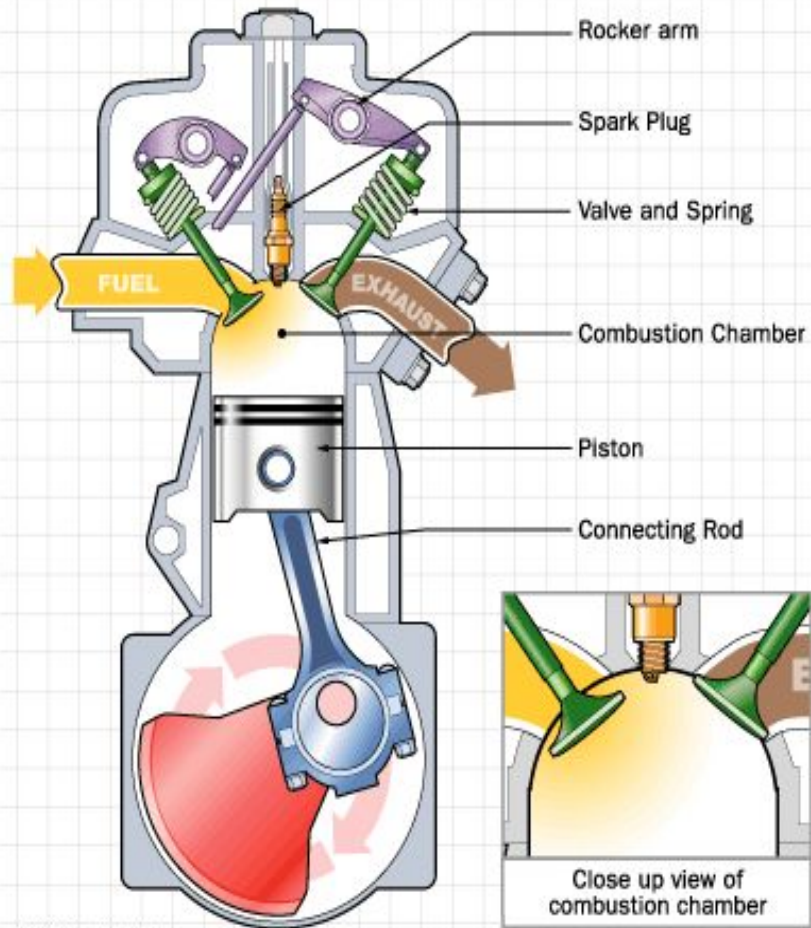


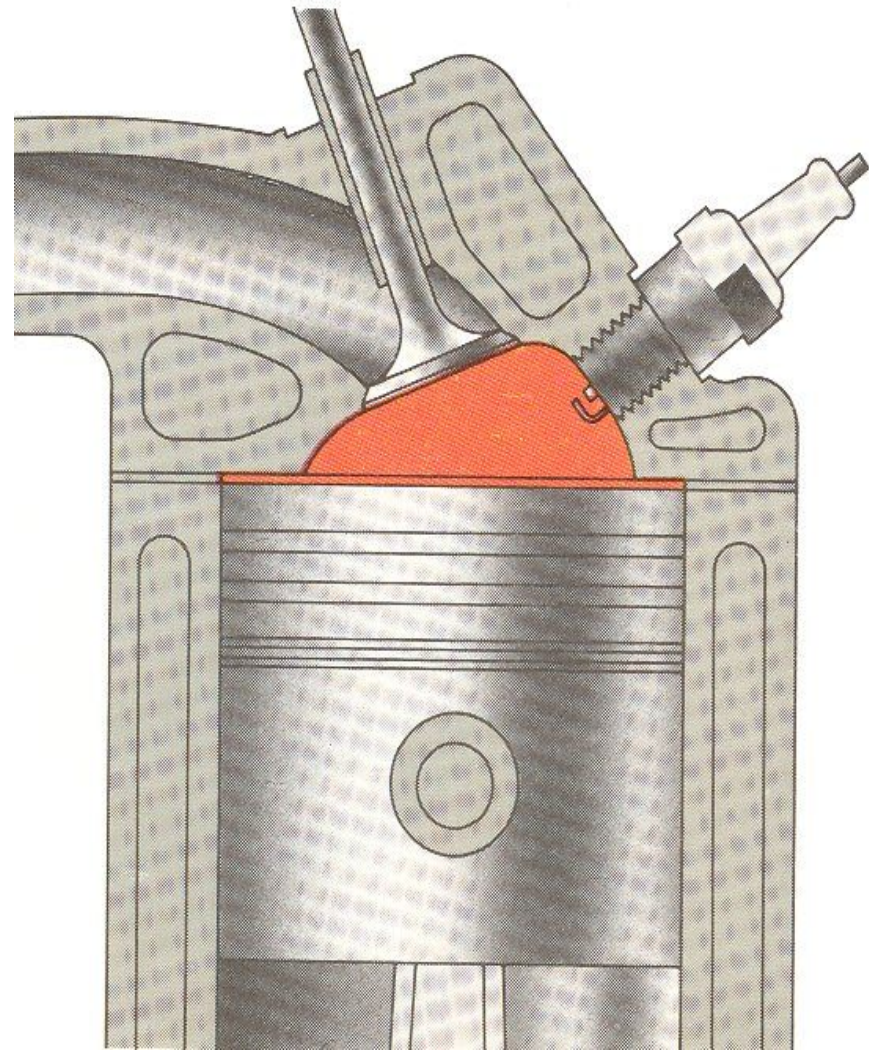
Combustion Chamber

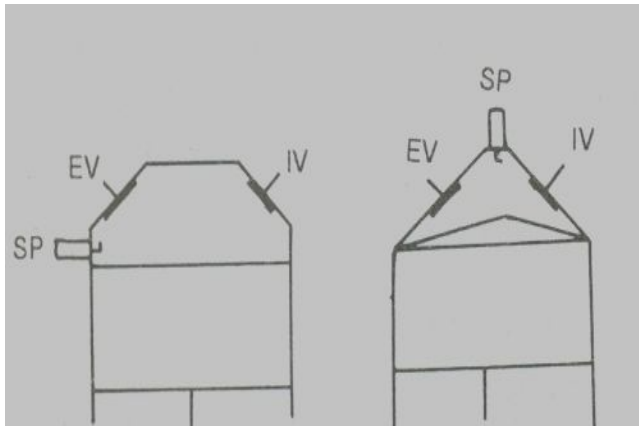
- Combustion chamber is the space enclosed between the piston head and cylinder head when the piston is at top dead center position.
- Depending upon the location of the spark plug, valves and type of cylinder head , the combustion chambers in SI engines are of the following shapes:
 1. Spherical shape
 2. I-shape
 3. L-shape
 4. T-shape
 5. F-shape

Basic Hemi Engine Design

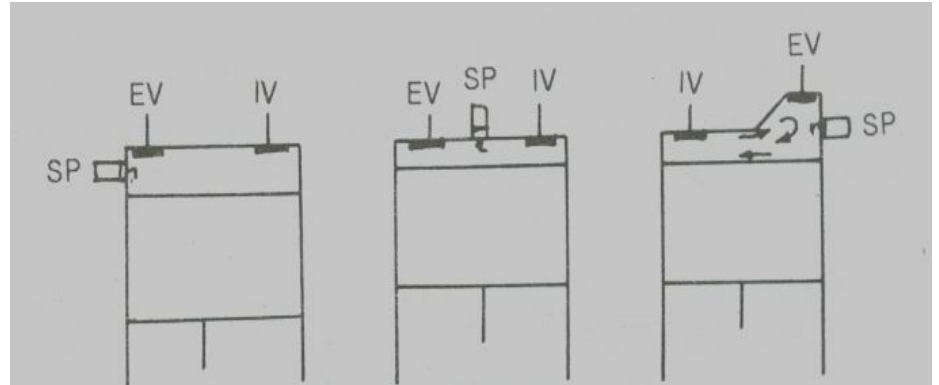


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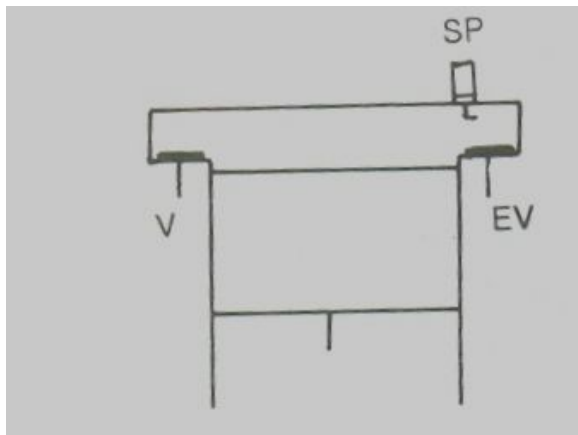




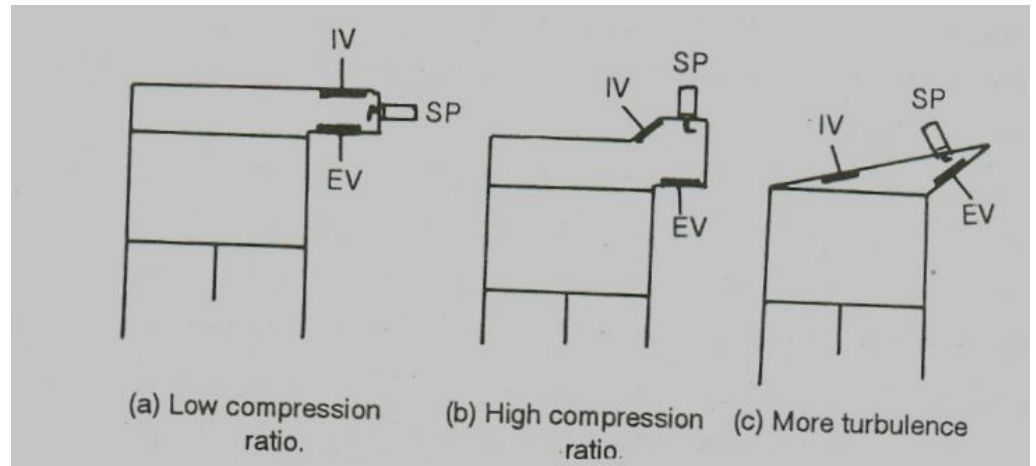
Spherical Shape



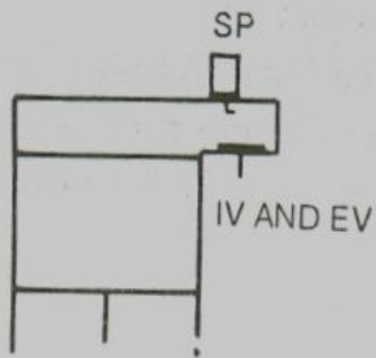
I-Head



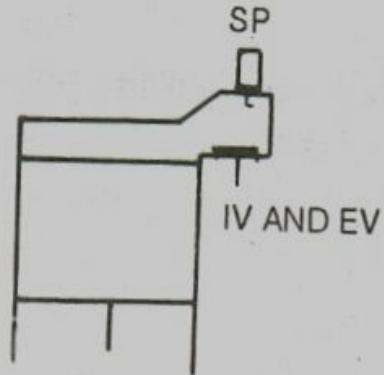
T-head



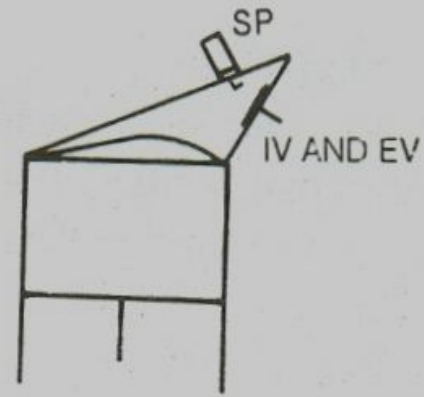
F-head



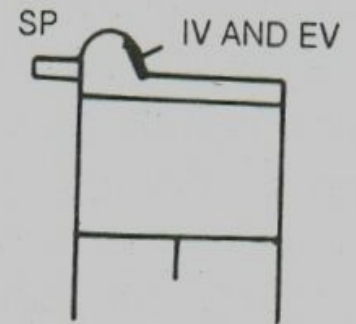
(a) Low compression ratio.



(b) High compression ratio.



(c) More turbulence



(d) More turbulence

L-head

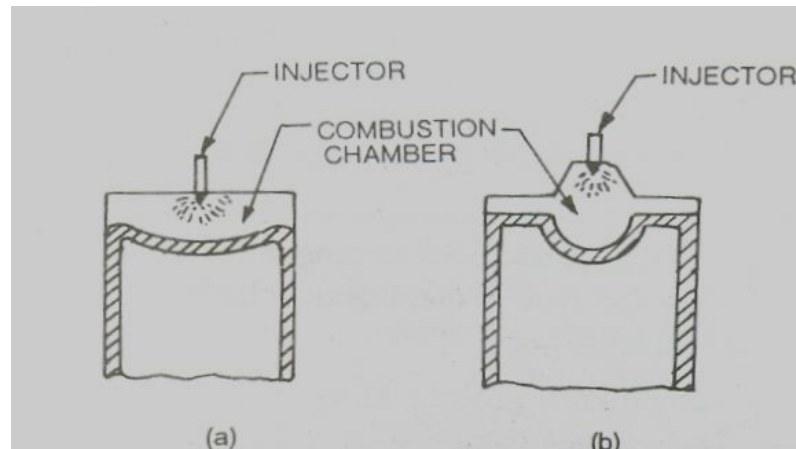
- In Spherical shape combustion chambers, Inlet and Exhaust valves are fitted in the cylinder head. Spark plug may be at the center or at side of the head.
- I-head combustion chambers have overhead valves. The engines with this type of combustion chamber are used in high speed vehicles and racing cars.
- T-shape combustion chamber projects around the cylinder head. The spark is fitted at the top and valves in the sides. This type of engines have good efficiency.
- F-head combustion chamber projects at one side of the cylinder head. The location of the sp plug and valves are as shown
- L-head combustion chambers use side valves.

Classification of Diesel Engine combustion chambers are as follows,

1. Open combustion chamber
2. Pre-combustion chambers
3. Swirl combustion chambers
4. Squish combustion chamber
5. Air cell & energy cell

Open combustion chamber

- Open combustion chamber is made like groove inside the top of the piston.
- The injector fitted at the center of the cylinder head so that it injects the fuel in the combustion chamber.

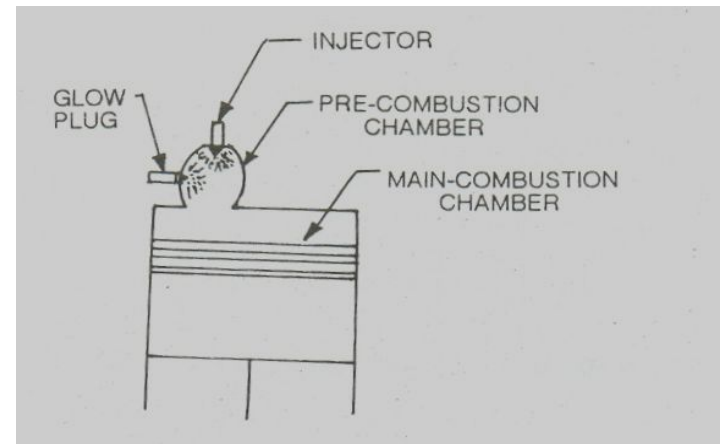


Open Combustion Chamber

Pre-combustion chamber

- In pre-combustion chamber there are two combustion chambers – one is auxiliary combustion chamber and the other is main combustion chamber.
- The auxiliary combustion chamber is smaller in size than the main combustion chamber and is called pre-combustion chamber.
- Fuel is injected into the pre-combustion chamber where it partly burns. This partly burnt fuel goes through a small orifice in the main combustion chamber, where the complete combustion takes place.
- The turbulence created in the combustion chamber helps to ignite the fuel completely.

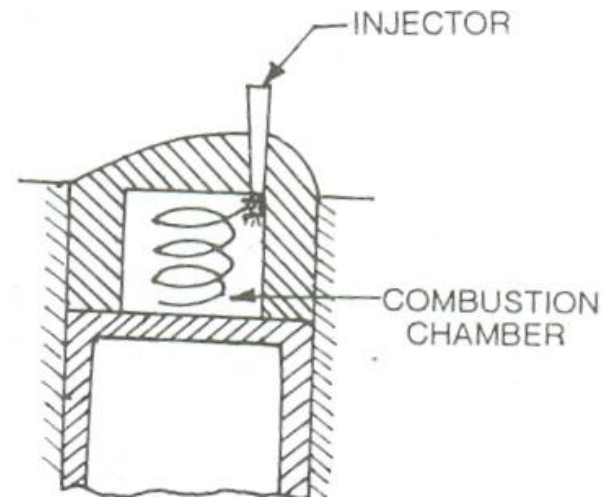
Pre-Combustion Chamber



Swirl combustion chamber

- Swirl is a circular motion which is given to the incoming air during the suction stroke. In the swirl combustion chamber (also known as turbulence combustion chamber) the air is given a swirl while coming in the cylinder.
- The fuel is injected in the swirled air so that mixing and burning of the fuel takes place completely.

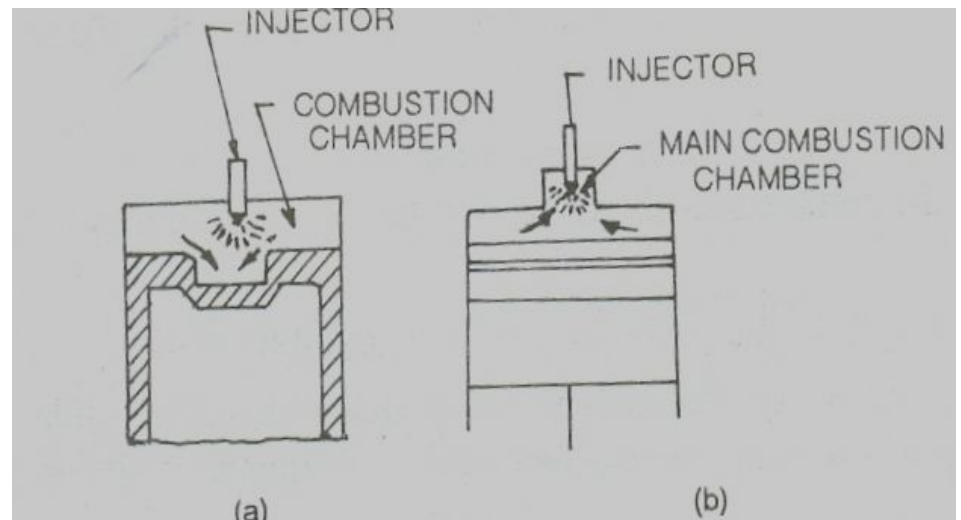
Swirl Combustion Chamber



Squish combustion chamber

- Squish is a flow of air which goes from the periphery to the center of the cylinder. To get a squish in the combustion chamber, a groove is made inside the piston head.
- During the compression stroke when the piston moves from BDC to TDC, it squeezes the air from the periphery towards the center. This action gives turbulence to the air. The fuel is injected at the center of the combustion chamber. Some times the squish combustion chamber is made inside the cylinder head.

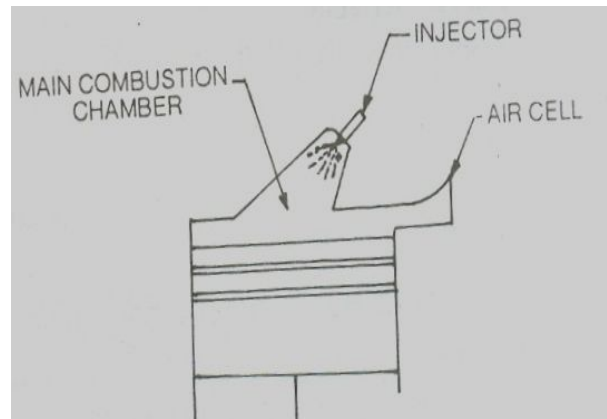
Squish Combustion Chamber



Air cell combustion chamber

- Air cell is a small combustion chamber connected through air in a narrow passage with the main combustion chamber as shown in the sketch.
- During compression stroke air is compressed in the air cell also. When the fuel is injected in the main combustion chamber, it burns and the piston moves down.
- At this time the compressed hot air of the air cell comes in the main chamber creating a turbulence a making complete combustion. There is more heat loss due to increased surface of the cylinder.

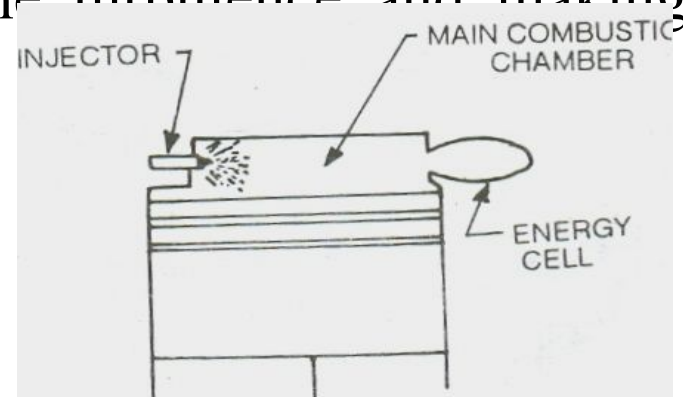
Air Cell



Energy cell

□ Energy cell is also called lanova combustion chamber. It works on the principle of air cell and pre-combustion chamber. Energy cell is connected through a narrow passage with the main combustion chamber which can be closed by a plunger. When the engine is started narrow opening is kept open which connects the energy cell and main cell. When the fuel is injected into the main chamber 10% of it also goes to the minor cell. The combustion first takes place in the main combustion chamber and then spreads upto energy cell, where pressure increases. As the piston moves down , the hot gasses from the energy cell comes in the main chamber due to pressure difference, creating the turbulence and making the complete combustion.

Energy Cell



Engine positioning

- Front engine front wheel drive
- Front engine rear wheel drive
- Rear engine rear wheel drive
- Front engine all wheel drive