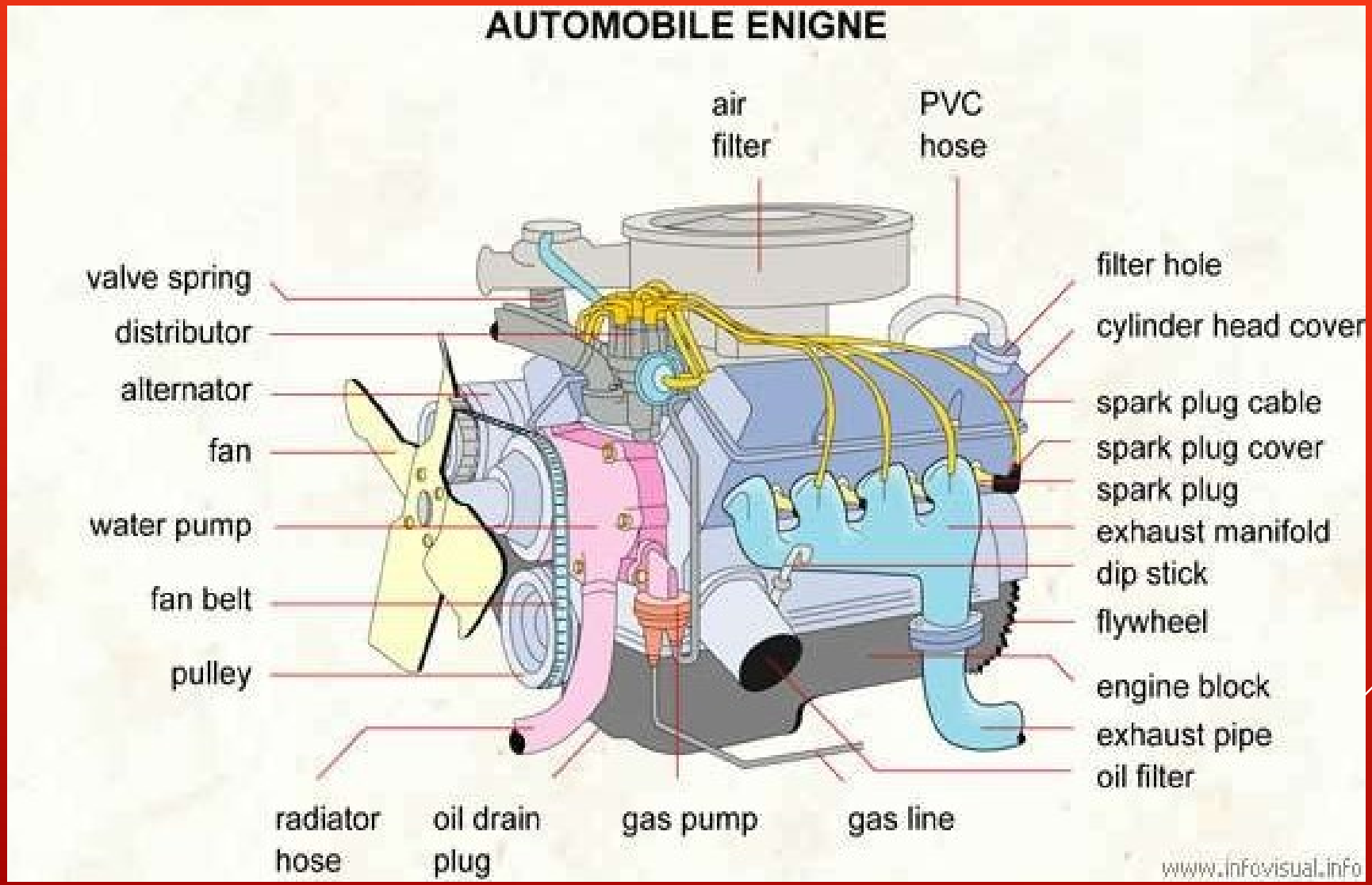
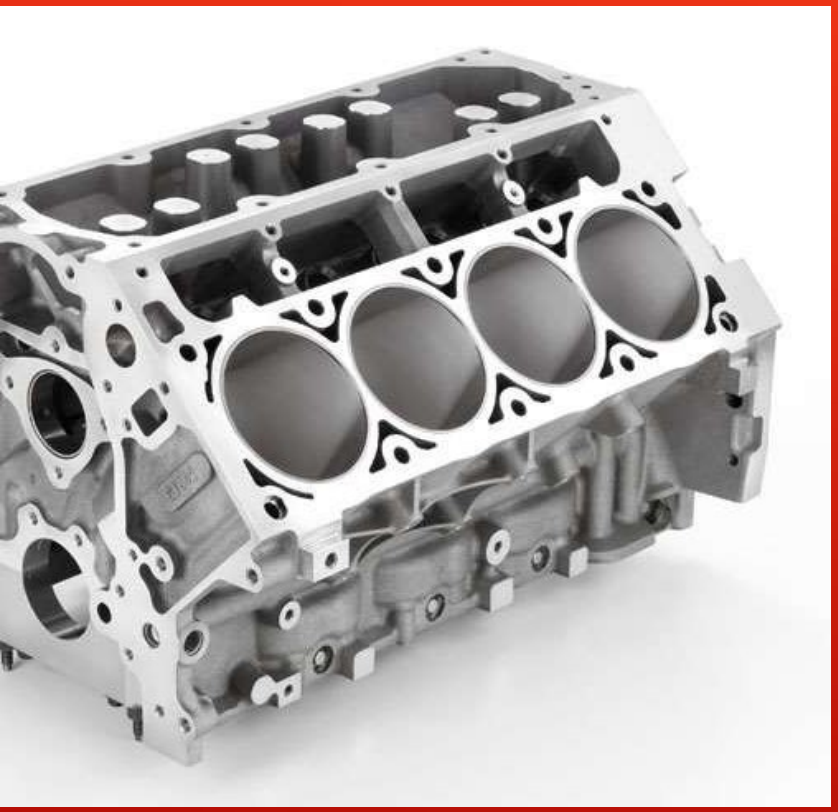
Unit 2 Constructional and functional details of I.C engine components

ENGINE COMPONENTS



ENGINE BLOCK



Body of an engine containing the cylinders.

Normally made of ALUMINUM or CAST IRON.

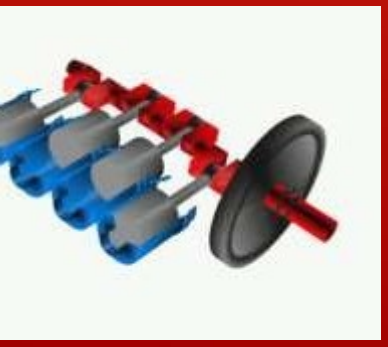
Old engine also have a case for water jackets

CAMSHAFT

- Rotating shaft used to push open valves at proper timing in engine cycle.
- Can be control HYDRAULICALLY or MECHANICALLY.
- Modern engine have more then two cams.

RANKSHAFT

- Mostly they made of forged steel or cast iron.
- It is attached with the engine block by MAIN BEARING.
- Rotates in circular motion
- Having crank weights attached with crankshaft
- It through which engine is work output supply to the system.
- It rotate by which work



ONNECTING ROD

Rod connecting the piston with rotating crankshaft.

Provided the contact from piston to the crankshaft.

Usually made of STEEL or ALLOY FORGED but in small engine it can be made of ALU

ISTON

A cylindrical-shaped mass that reciprocate back and forth in the cylinder transmitt
rce to the crankshaft.

The top of the piston is called CROWN and the sides are called SKIRT.

PISTON is made up of cast iron, steel or aluminum.

Aluminum piston are light . Used for light engine .

Piston is one of the important component of engine.

ISTON RING

Metal ring that fixed into a circumferential grooves around the piston.
Made up of highly polished chromed steel
t make a seal between piston and cylinder walls.
t also used for lubrication purpose.

ALVES

Used to allow the flow into and out of the cylinder at proper time in the cycle .

VALVES are made of forged steel.

Two stroke engine do not have valves they have ports system (slot).

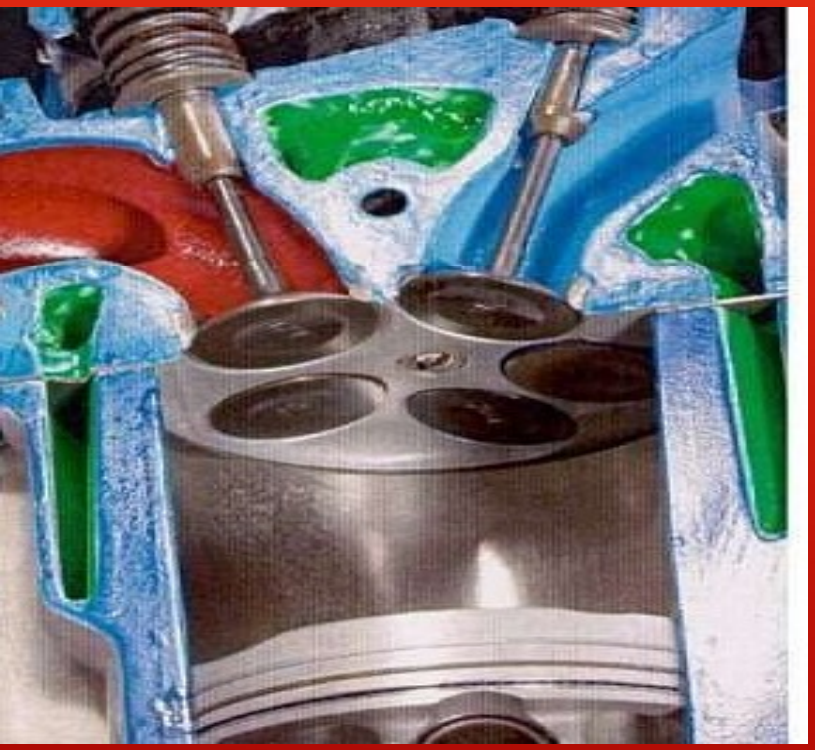
ALVE SPRING

The spring which attached at the valve.

Push back the valve / closed the valve.

YLINDER OR COMBUSTION CHAMBER

The end of the cylinder between head and piston face where combustion take pla



RANKCASE

The part of the engine block surrounding the rotating shaft.

The oil pan makes up part of the crank case housing.

ARBURETOR

CARBURETOR is used for making a air and fuel mixture .

t is replaced by EFI system.

A proper mixture is needed for proper combustion so that carburetor used.

t mixing up the fuel and air .

Making a rich or lean mixture as requirement.

ADIATOR

It is an HEAT EXCHANGER.

It is usually mounted in front of the engine in the flow of the air.

Used to cool down the engine and run proper thermodynamic cycle.

PARK PLUG

Electric device used to initiate combustion in SI engine.

Made up of the metal surrounded by the ceramic insulation.

Spark plugs only used in SI engine

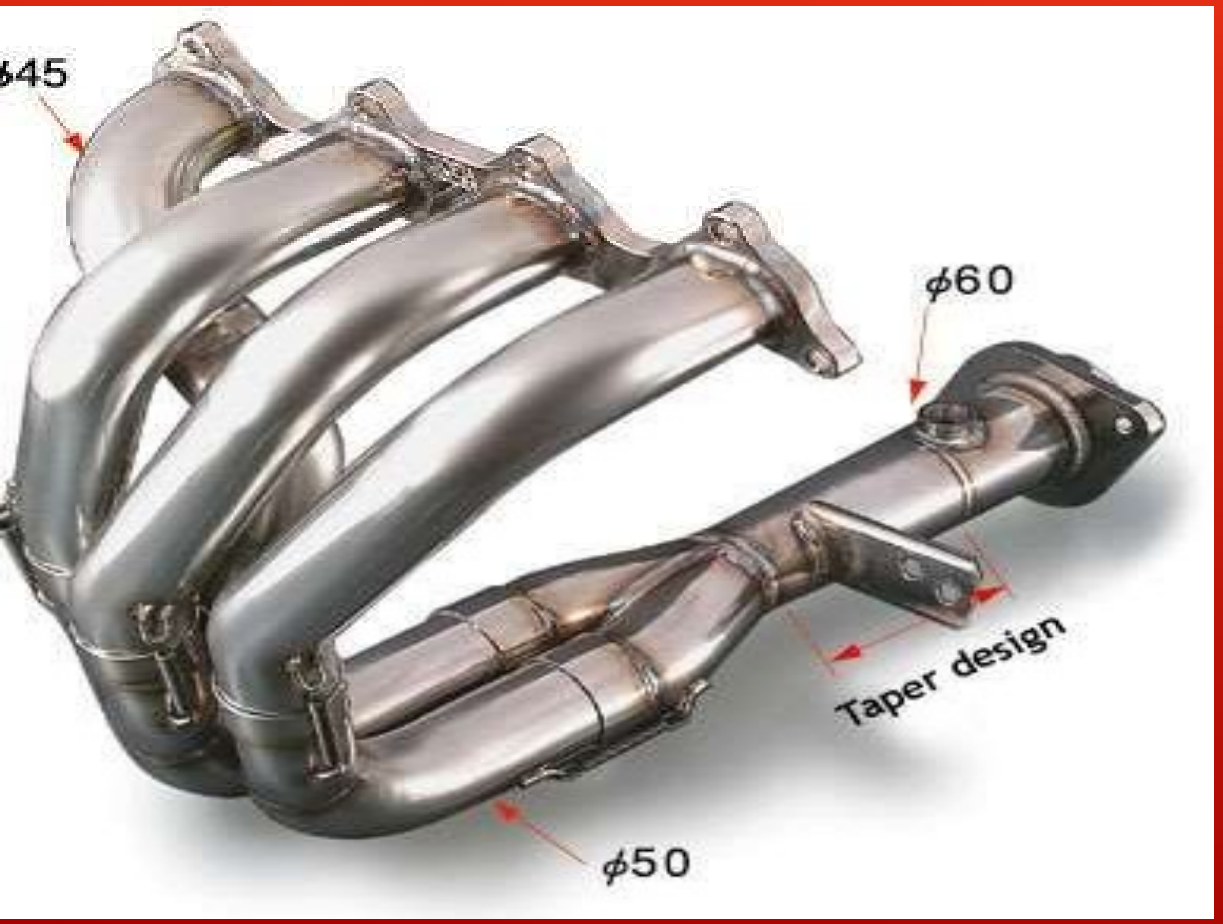
NTAKE MANIFOLD

- Piping system which delivers incoming air to the cylinder.
- They made up of cast metal ,plastic or composite materials.
- In IS engine fuel added to the air in intake manifold.

XHAUST MANIFOLD

Piping system which carry exhaust gases away from the system.

Made up of CASTIRON.



LYWHEEL

To store the energy , provide energy when it is needed and store.

It keeps the engine rotating.

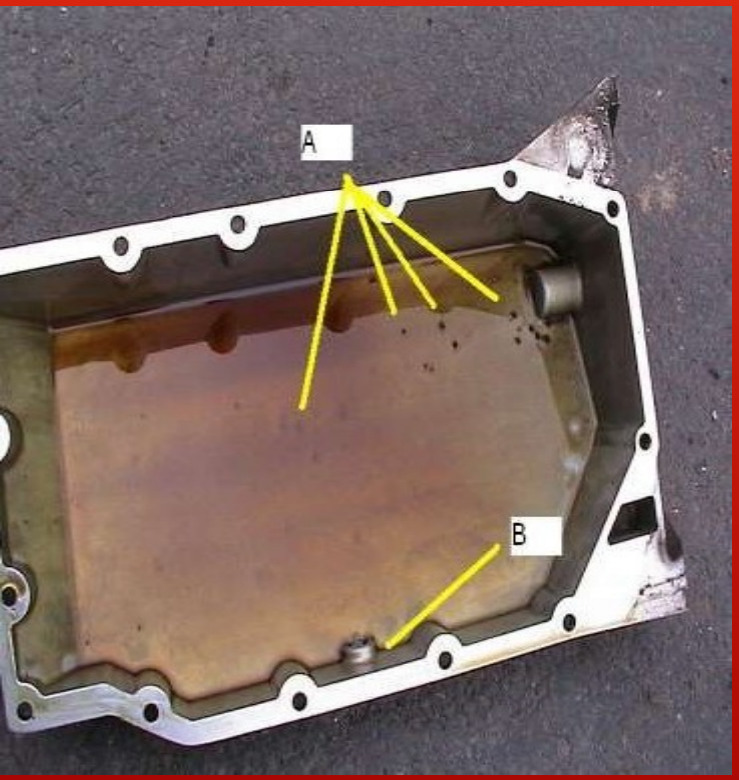
UEL INJECTOR

- A pressurized nozzle which spray the fuel into the incoming air on SI engine.
- Injector directly spray at the combustion chamber.
- It is placed at the centre of the combustion chamber.

IL PAN

Oil reservoir usually bolted at the bottom of the crankcase.

Act as a oil sump.



IL PUMP

Pump used to distribute oil from oil pan to the required point for lubrication purpose

OIL FILTER

To filter the oil.

Clean oil is need for proper lubrication.

TARTER

arter is an electrical device which is used to provide initial torque to the engine at t
ne of start.

URBO CHARGER

Turbine compressor used to compress incoming air into the engine.

The turbine is powered by the exhaust flow of the engine so it take very little useful w

from engine.

HANK YOU

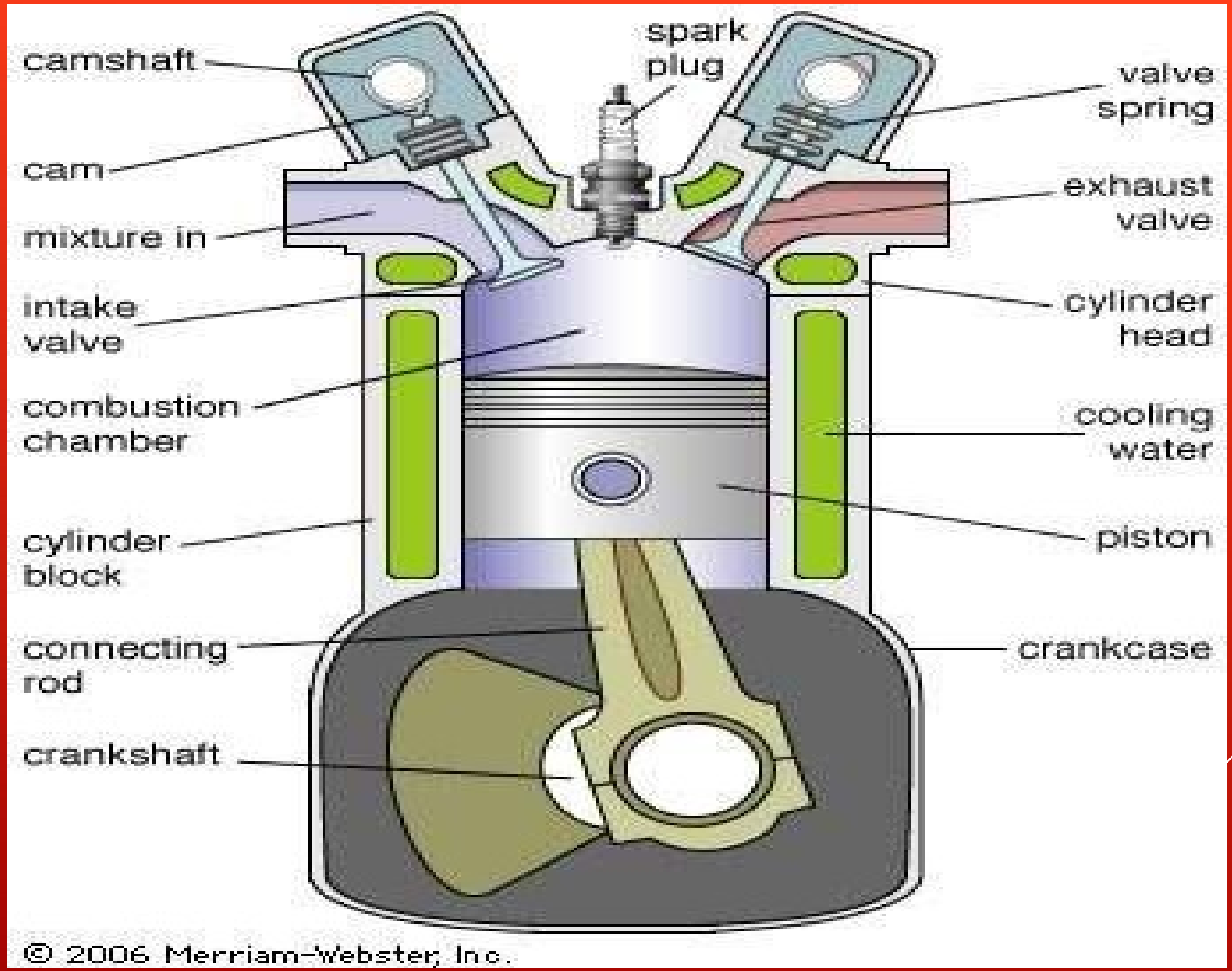
OMBUSTION CHAMBERS IN SI ENGINES

The design of combustion chamber has an important influence upon the engi
rformance and its knock properties. The design of combustion chamber involves t
ape of the combustion chamber, the location of the sparking plug and t
position of inlet and exhaust valves. Because of the importance of combusti
amber design.

It has been a subject of considerable amount of research and development in t
t
y years. It has resulted in raising the compression ratio from 4: 1 before the F
orld War period to 8: 1 to 11:1 in present times with special combustion Chamb
signs and suitable anti-knock fuels.

he basic requirements of a good ombustion chamber are to provide :-

- High power output
- High thermal efficiency
- low specific fuel consumption
- Smooth engine operation
- Reduced exhaust pollutants.


camshaft
cam
mixture in
intake valve
combustion chamber
cylinder block
connecting rod
crankshaft
spark plug
valve spring
exhaust valve
cylinder head
cooling water
piston
crankcase
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IFFERENT TYPES OF COMBUSTION CHAMBERS SED IN SI ENGINE

few representative types of combustion chambers of which there are
nany more
ariations are enumerated and discussed below:-

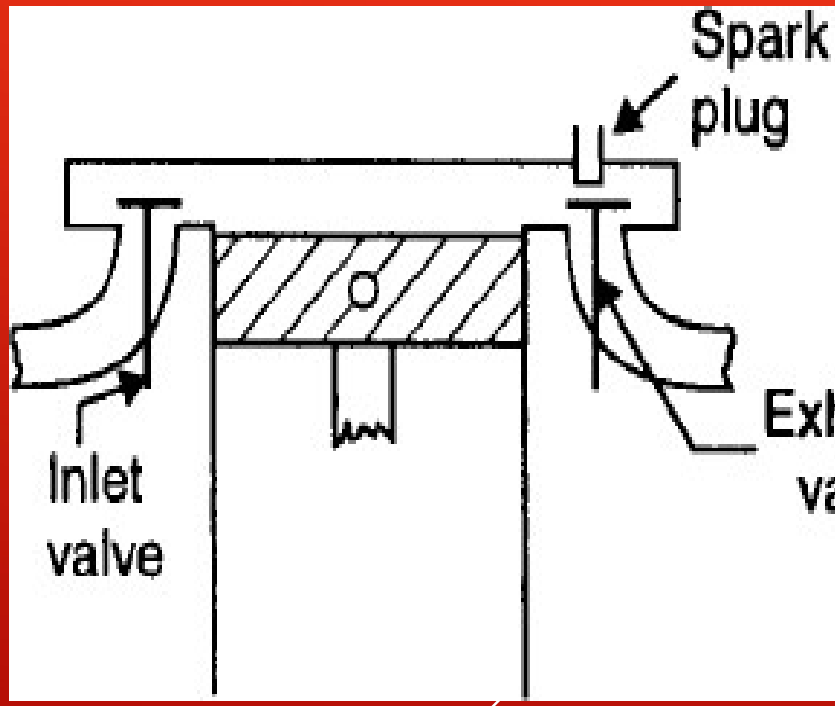
. T-head combustion chamber.
. L-head combustion chamber.
. I-head (or overhead valve) combustion chamber.
. F-head combustion chamber.

. T Head Type Combustion chambers :-

This was first introduced by Ford Motor Corporation in 1908.

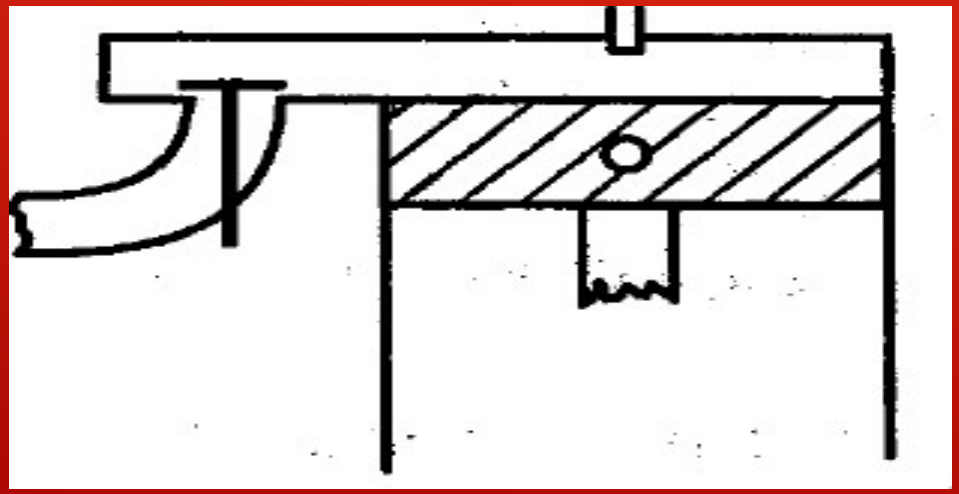
Requires two cam shafts (for tuating the in-let valve and haust valve separately) by two cams ounted on the two cam shafts.

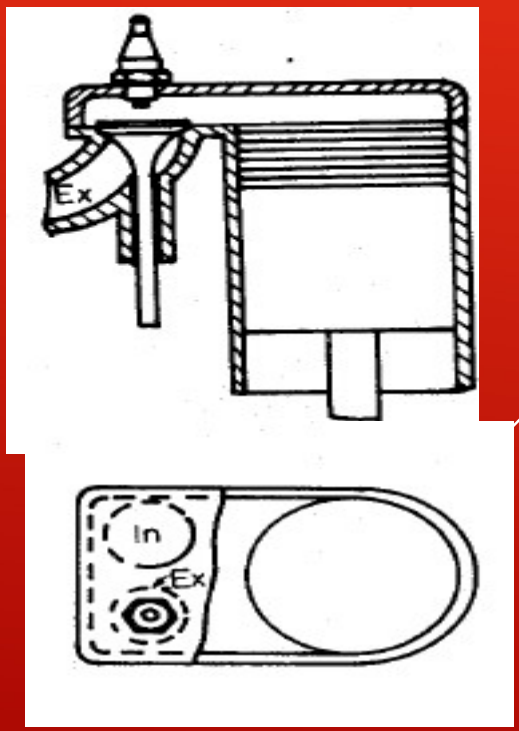
Very prone to detonation. There was violent tonation even at a compression ratio of 4. is is because the average octane number in 08 was about 40 -50.



. L Head Type Combustion chambers :-

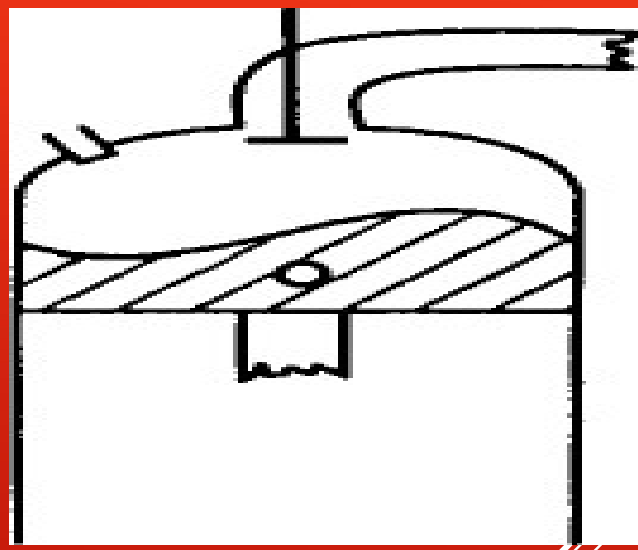
lt is a modification of the T-head type of combustion chamber. It provides the o values on the same side of the cylinder, and the valves are operated through ppet by a single camshaft. This was first introduced by Ford motor in 1910-30 d was quite popular for some time.





Over head valve or I head combustion chamber :-

Since 1950 or so mostly
rhead valve combustion
ers are used. This type of combustion chamber has both the alve and the exhaust valve located in the cylinder head. An ad engine is superior to side valve engine at high ession ratios.

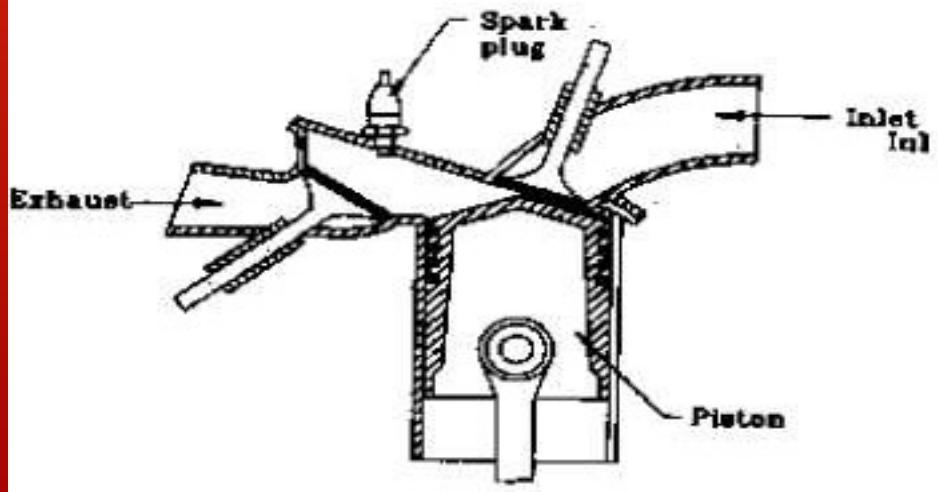


wer pumping losses and higher volumetric efficiency from better breathing of
ne from larger valves or valve lifts and more direct passageways.
ss distance for the flame to travel and therefore greater freedom from knock, o
r words, lower octane requirements.
ss force on the head bolts and therefore less possibility of leakage (of compress
s or jacket water).
moval of the hot exhaust valve from the block to the head, thus confining h
res to the head. Absence of exhaust valve from block also results in more unifo
ing of cylinder and piston.
ower surface-volume ratio and, therefore, less heat loss and
air pollution.
asier to cast and hence lower casting cost.

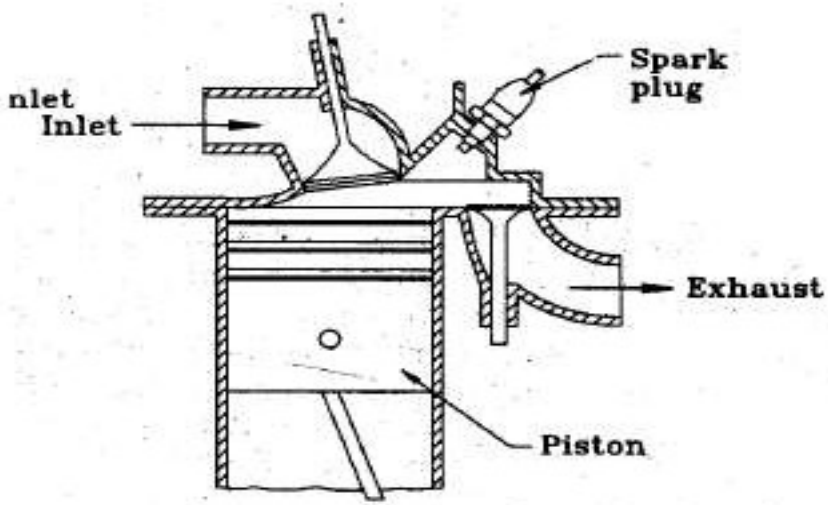
F Head combustion chamber :-

n such a combustion chamber one valve is in head and other in the block. This de
compromise between L-head and I-head combustion chambers.
One of the most F head engines (wedge type) is the one used by the Rover Compar
eral years. And another successful design of this type of chamber is that used in W
ps.

F- head used by Rover Company



F – head used in Willeys jeep.




Thank
you