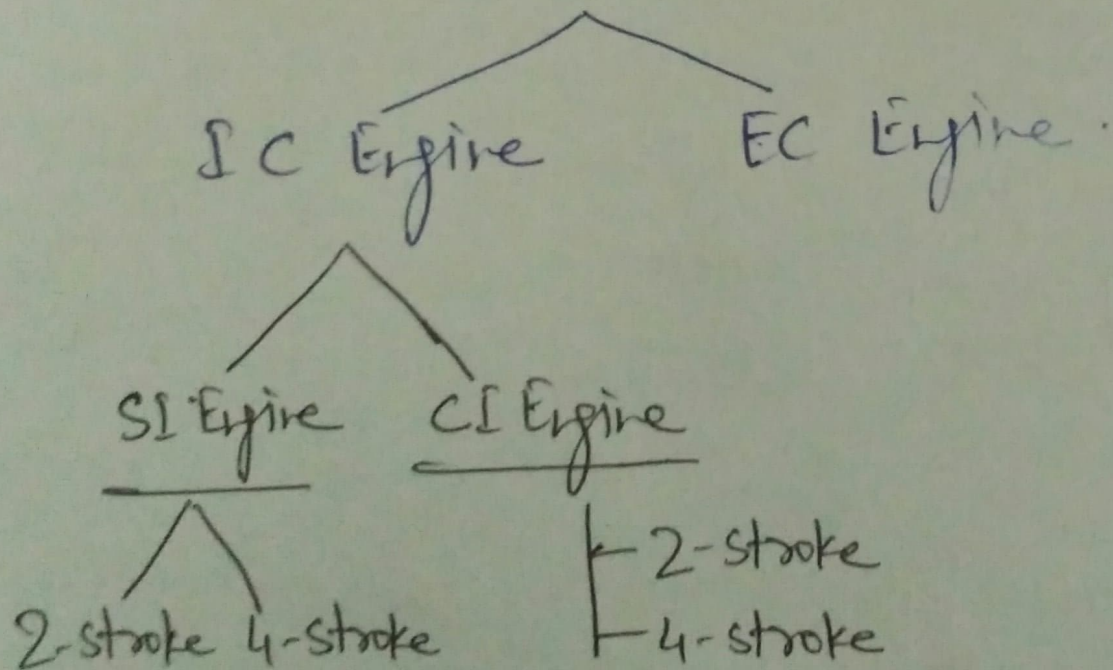


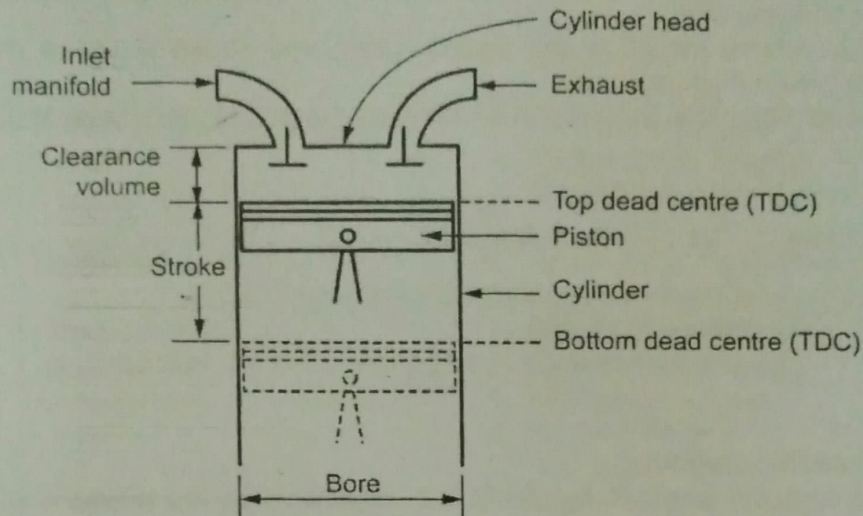
## Heat Engine →

A Heat engine is a system that converts Heat energy to mechanical energy, which can then be used to do mechanical work.



## IC ENGINE TERMINOLOGY:

The following terms/Nomenclature associated with an engine are explained for the better understanding of the working principle of the IC engines.



### 1. Bore:

The nominal inside diameter of the engine cylinder is called bore.

### 2. Top Dead Centre (TDC):

The extreme position of the piston at the top of the cylinder of the vertical engine is called top dead centre (TDC),

In case of horizontal engines. It is known as inner dead centre (IDC).

### 3. Bottom Dead Centre (BDC):

The extreme position of the piston at the bottom of the cylinder of the vertical engine called bottom dead centre (BDC).

In case of horizontal engines, it is known as outer dead center (ODC).

### 4. Stroke:

The distance travelled by the piston from TDC to BDC is called stroke.

In other words, the maximum distance travelled by the piston in the cylinder in one direction is known as stroke.

It is equal to twice the radius of the crank.



### 5. Clearance Volume (V<sub>c</sub>):

The volume contained in the cylinder above the top of the piston, when the piston is at top dead centre is called the clearance volume.

### 6. Swept Volume (V<sub>s</sub>):

The volume swept by the piston during one stroke is called the swept volume or piston displacement.

Swept volume is the volume covered by the piston while moving from TDC to BDC.

$$\text{Swept volume} = V_s = A \times L = \frac{\pi}{4} D^2 L$$

where

A = Cross sectional area of the piston in Sq.m,

L = Stroke in m, and

D = Cylinder bore i.e., inner diameter of the cylinder in m.

### 7. Compression Ratio (r<sub>c</sub>):

Compression ratio is a ratio of the volume when the piston is at bottom dead centre to the volume when the piston is at top dead centre.

Mathematically,

$$\begin{aligned} \text{Compression ratio} &= \frac{\text{MaximumCylinderVolume}}{\text{MinimumCylinderVolume}} \\ &= \frac{\text{SweptVolume} + \text{ClearenceVolume}}{\text{ClearenceVolume}} \end{aligned}$$

The compression ratio varies from 5 : 1 to 10 : 1 for petrol engines and from 12:1 to 22 : 1 for diesel engines.

Sl.No	Classification Criteria	Types
1.	No of Strokes per cycle	1. Four Stroke Engine 2. Two Stroke Engine
2.	Types of Fuel Used	1. Petrol or Gasoline Engine 2. Diesel Engine 3. Gas Engine 4. Bi-Fuel Engine
3.	Nature of Thermodynamic Cycle	1. Otto Cycle Engine 2. Diesel Cycle Engine 3. Dual Combustion Cycle Engine
4.	Method of Ignition	1. Spark Ignition (SI) Engine 2. Compression Ignition (CI) Engine
5.	No of Cylinders	1. Single Cylinder Engine 2. Multi Cylinder Engine
6.	Arrangement of Cylinders	1. Horizontal Engine 2. Vertical Engine 3. V – Type Engine 4. Radial Engine 5. Inline Engine 6. Opposed Cylinder Engine 7. Opposed Piston Engine
7.	Cooling System	1. Air Cooled Engine 2. Water Cooled Engine
8.	Lubrication System	1. Wet Sump Lubrication System 2. Dry Sump Lubrication System
9.	Speed of the Engine.	1. Slow Speed Engine 2. Medium Speed Engine 3. High Speed Engine
10.	Location of Valves	1. Over Head Valve Engine 2. Side Valve Engine