

Application of 1st Law of Thermodynamics in an Adiabatic process:-

Adiabatic process:- When a change in pressure and volume of a substance takes place but no heat is allowed to enter or leave it, the change (process) is said to be adiabatic.

During an adiabatic process no heat enters or leaves the gas.

$$\delta Q = 0$$

According to 1st law of thermodynamics

$$\delta Q = dU + \delta W$$

$$\therefore 0 = dU + \delta W$$

or, $dU = -\delta W$

\therefore In an adiabatic process

Increase (or decrease) in internal energy

= External work done on (or by) the gas

- (i) Adiabatic expansion:- When the volume of a substance increases (or pressure decreases) in an adiabatic change (process) the process is known as adiabatic expansion.
- (ii) Adiabatic ~~expansion~~ compression:- When the pressure of a substance increases (or decreases) in an adiabatic change (process) the process is known as adiabatic compression.