# Examples of closed thermodynamic systems

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Here, we present illustrative examples of closed systems in different contexts:

It is called thermodynamic system or system to any set of objects that is convenient to consider as a unit and that can exchange energy with the environment.

In this way, the study of the phenomena that occur in a thermodynamic system can be reduced to the analysis of a series of more or less simple variables.

Obeying the degree of isolation that these systems present with respect to their environment, it is possible to recognize three different types:

We use cars and bikes in our daily routine to travel. To keep them going, we fill in petrol or diesel as per the design of the vehicle. The petrol or diesel in the vehicle undergoes combustion inside the engine and is an ideal example of a thermodynamic system. The system which involves the processing of heat and converting it to useful work involves thermodynamic processes. Nuclear power, electronic heat sink and rocket launch involve thermodynamics.

Thermodynamics is the branch of science that deals with heat and temperature and the inter-conversion of heat and other forms of energy. Since thermodynamics deals with the bulk system and does not deal with the molecular constitution of matter, it is known as macroscopic science.

Some examples of thermodynamic systems are washing machines, refrigerators and air-conditioners. Air-conditioner is a closed system that circulates refrigerant inside the system, altering the pressure of the refrigerant at different points to promote the transfer of heat. A refrigerator is an open system that absorbs heat from a closed space and passes it to a warmer area. In this article, let us study in detail the thermodynamic system and its types.

A system that is delimited from the surroundings by real or hypothetical boundaries is known as a thermodynamic system. A thermodynamic system refers to that part of the universe in which observations are made, and the remaining universe constitutes the surroundings. The surroundings contain everything other than the system. The system and the surroundings together make up the universe.

The universe = The system + The surroundings

A thermodynamic system is embedded in its environment or surroundings, through which it can exchange heat with, and do work on. It exchanges the heat to its surroundings through a boundary. The boundary is the wall

that separates the system and the environment. Thermodynamic systems can exchange energy or matter with the external environment and can also undergo internal transformations.

The below figure shows the thermodynamic system, surroundings and boundary concept.

Example: In a car, the engine burns gasoline inside the cylinder and is considered as a thermodynamic system; the radiator, piston, exhaust system and air outside form the environment of the system. The inner surfaces of the cylinder and piston are considered as the boundary.