

## MSE-402

### FUEL, FURNACE & REFRATORY

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#### TYPE OF FUELS

The fuels can be commonly classified on the basis of physical state of their occurrence, source, process of production and renewable/non-renewable quality as follows:

- ✚ **Physical state of fuel**, i.e., solid (coal, coke, charcoal, etc.), liquid (petrol, diesel, etc.) and gas (methane, hydrogen, etc.).
- ✚ **Source of fuel**, i.e., primary sources like coal, crude oil, and natural gas which occur in nature or secondary sources like coke, diesel, hydrogen, etc. which are prepared by some industrial processes.
- ✚ **Process of production**, i.e., purposefully manufactured fuel like metallurgical coke or by-product fuel like blast furnace gas.
- ✚ **Nature of fuel**—Non-renewable (fossil) fuels like coal, crude oil, natural gas or renewable fuels like hydrogen, biomass, etc.

#### PROPERTIES OF FUEL:

The various properties of liquid fuels are given below.

- ✚ **Chemical composition:** Carbon content, water content, ash content, sulphur, nitrogen, hydrogen content etc.
- ✚ **Density**
- ✚ **Specific gravity**
- ✚ **Viscosity**
- ✚ **Flash point**
- ✚ **Pour point**
- ✚ **Specific heat**
- ✚ **Calorific value**

### Liquid Fuels

Liquid fuels are mainly oils, tars and pitches and are derived from the following sources:

- ✚ **Petroleum**
- ✚ **Oil Shales**
- ✚ **Coal, by carbonization**
- ✚ **Coal, by hydrogenation**

### Gaseous fuel

The following is a list of the types of gaseous fuel:

- ✚ **Fuels naturally found in nature:**
  - Natural gas
  - Methane from coal mines
- ✚ **Fuel gases made from solid fuel**
  - Gases derived from coal

- Gases derived from waste and biomass
- From other industrial processes (blast furnace gas)

### **+ Gases made from petroleum**

- Liquefied Petroleum gas (LPG)
- Refinery gases
- Gases from oil gasification

### **+ Gases from some fermentation process**

## **Solid fuel:**

Solid fuel refers to various forms of solid material that can be burnt to release energy, providing heat and light through the process of combustion.

Solid fuels can be contrasted with liquid fuels and gaseous fuels.

## **Common examples of solid fuels:**

1. wood,
2. charcoal,
3. peat,
4. coal,
5. Hexamine fuel tablets,
6. wood pellets,
7. corn,
8. wheat
9. and other grains.

## **Solid fuels are mainly classified into two categories,**

- + Natural fuel:** naturally occurred

**Example -wood, coal, etc.**

 **Manufactured fuels:** manufactured by human being/human made/

**Example: charcoal, coke, briquettes, etc.**

**Different types of solid fuels are:**

- a. Wood
- b. Biomass
- c. Peat
- d. Coal
- e. Coke
- f. Municipal waste
- g. Fossil fuels