Refining of Petroleum

E content

by

Dr.Manjusha Hemant Aware

Professor

First Year Engineering Department

(Applied Chemistry)

Course Name: Environmental Chemistry

Unit No: IV

- **Liquid Fuels**
- **Petroleum**
- Petroleum or crude oil is the main source of liquid fuels. It is also known as rock oil or mineral oil. It is a dark - colored viscous liquid found deep in the earth's crust. It is a complex mixture of hydrocarbons (e.g paraffinic, olefinic and aromatic) with small quantities of optically active organic compounds containing O,N and S and traces of metallic constituents .
- The average composition of crude oil is as follows
- C 80 to 87.1%
- H 11.1 to 15 %
- S 0.1 to 3.5 %
- O 0.1 to 0.9 %
- N 0.4 to 0.9 %

Refining of petroleum

- The process by which the crude oil is freed from its impurities, separated into various fractions having **different boiling points** and further treated to remove undesirable tendencies and to impart specific properties in them is broadly known as “Refining of petroleum.”

Working

- The crude oil is heated to about **400 ^{0} C** in a furnace & hot vapours coming out are passed near the bottom of the tower.
- The tower is hot at the lower end & comparatively cooler towards the upper end.
- As the vapours of the oil rise up in the fractionating tower, they are gradually cooled & fractional condensation takes place through chimneys in trays at different heights of columns.
- The highest boiling fraction condense at the bottom & the lowest boiling fraction condense at the top.
- The outlets are attached at the side of the column at suitable heights to withdraw a number of fractions.
- The residue left in the retort **above 400 ^{0} C** is a black and tarry mass called '**asphalt or pitch**' .
- It is used for making paints and as a preservative for wood and metals. It is also used for metalling of roads.

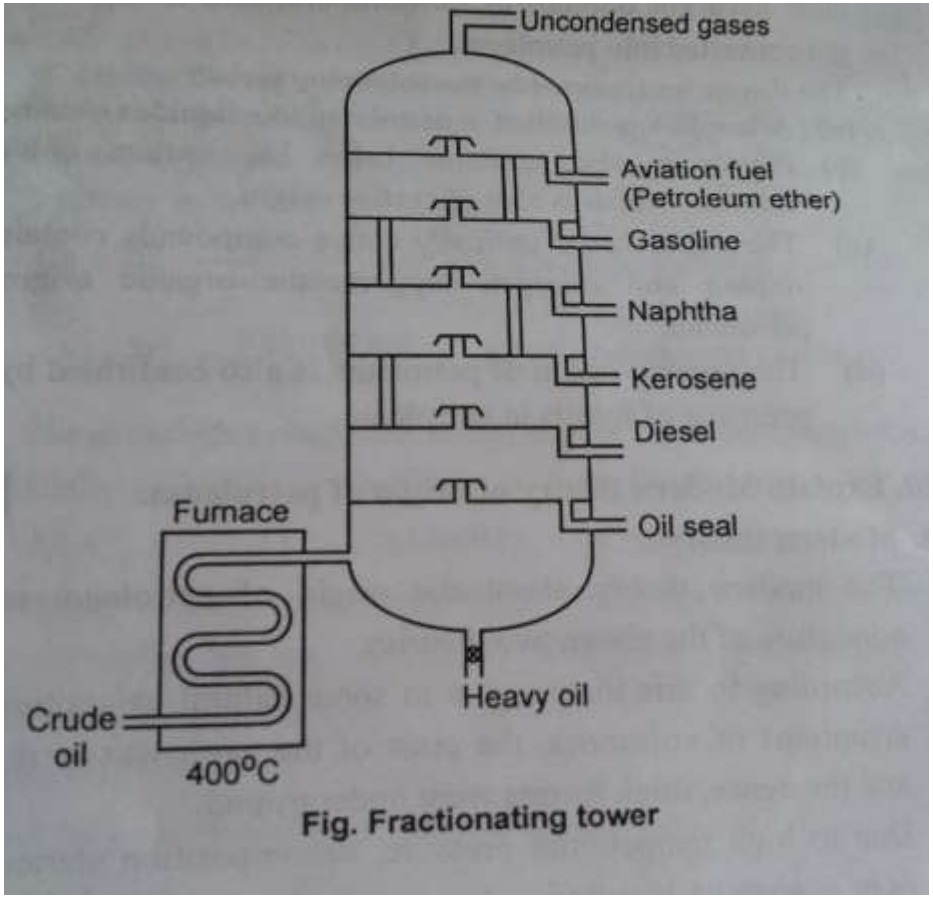


Fig. Fractionating tower

The different fractions of petroleum and their uses are discussed as follows.

Sr. No	Name of fraction	Boiling range	Composition of hydrocarbon	Uses
1	**Uncondensed gases**	Below 40^0C	C_1 to C_4	Domestic & Industrial fuel under LPG
2	**Aviation fuel or petroleum ether**	40-70^0C	C_5 to C_7	Fuel for aeroplane, helicopters, as solvent
3	**Petrol or gasoline**	70-120^0C	C_5 to C_8	Fuel for petrol engine, dry cleaning ,as solvent
4	**Naphtha or solvent spirit**	120 -180 ^{0}C	C_7 to C_{10}	As solvent and for dry cleaning
5	**Kerosene**	180-250 ^{0}C	C_{10} to C_{16}	For illuminating domestic fuel, for oil gas and fuel of jet engines.
6	**Diesel**	250-320 ^{0}C	C_{15} to C_{18}	Diesel engine fuel.

Sr. No	Name of fraction	Boiling range	Composition of hydrocarbon	Uses
7	**Heavy oil**	320-400 ^{0}C	C_{17} to C_{30}	For making petrol by cracking a)**Lubricating oils**(C_{18} to C_{20}) As a lubricant b)**Vaseline** (C_{20} to C_{22}) In cosmetics, medicines, ointment, lubricant etc. c) **Greases** (C_{22} to C_{26}) For lubrication d) **Wax** (C_{26} to C_{30}) In candles, boot polish etc
8	**Residue** Asphalt Petroleum coke	Above 400 ^{o} C	Above C_{30}	For road making, water proofing of roofs, as fuels

Thank You!