

## Petroleum

**Crude oil**, or petroleum, is found in liquid form in the ground. It was made by decaying of organic materials like plants and animals that lived some millions of years ago.

It is a fossil fuel, a **non-renewable source of energy**. It is made up of a **mixture of hydrocarbons** with different boiling points.

It is extracted and refined into **finished petroleum products**.

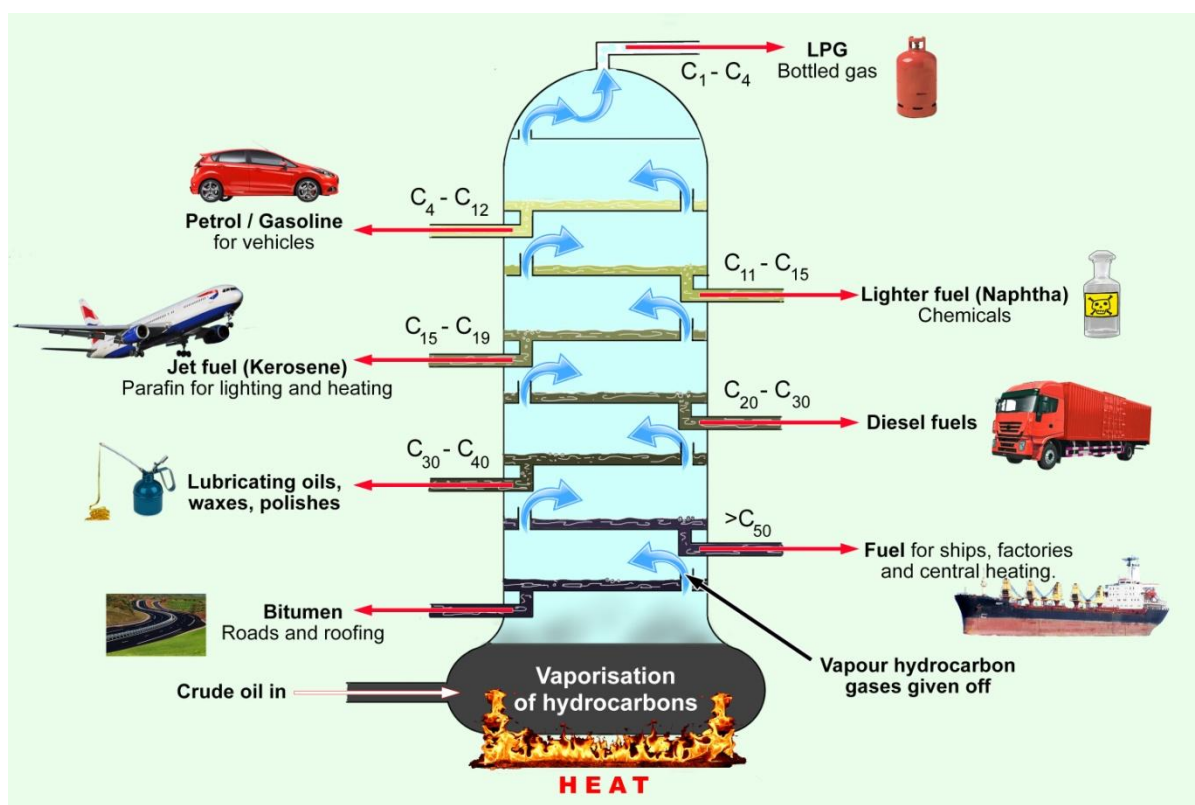


Fig. 1 (Source <http://www.mammothmemory.net/chemistry/fractional-distillation/remembering-the-order-of-the-fractions-of-crude-oil.html>)

### Oil Refining

The first step of oil refining consists of heating crude oil to separate its different components in a **distillation column (Fig. 1)**. Each fraction in petroleum evaporates at a specific boiling temperature after flowing into the **still**.

The fractions of the crude oil with the lowest boiling points are collected at the top of the column. They are **liquefied petroleum gases (LPG)<sup>1</sup>** and **gasoline or petroleum** for cars.

<sup>1</sup>LPG → for camping gas (C1 to C4)

**Naphtha** (C7 to C14) is distilled next and **kerosene** (jet fuel) is the fourth fraction of petroleum to be separated.

**Diesel**<sup>2</sup> and **lubricating oils** have the next highest boiling points. They are distilled and collected towards the bottom of the column.

Very long hydrocarbon molecules that make up **fuel oil** for ships are obtained at higher temperatures.

The main concept is that from the top to the bottom of the distillation column the hydrocarbon molecules get bigger according to the increase in temperature. In contrast, as the column gets gradually cooler towards the top shorter molecules change them from liquid to vapour because they require less energy (heat).

**Bitumen** comes out of all the fractions. It has the highest boiling point and is collected at the very bottom of the fractionating column.

#### USEFUL LINKS

[http://www.wermac.org/images/distillation\\_column1.gif](http://www.wermac.org/images/distillation_column1.gif)

[Distillation Column - YouTube](https://www.youtube.com/watch?v=BaBMXgVBQKk) <https://www.youtube.com/watch?v=BaBMXgVBQKk>

Crude Oil Fractions and their uses <https://www.youtube.com/watch?v=JZdvsQzOKuk>

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<sup>2</sup> Diesel → for lorries, cars and trains