

What is refining?

The refining process begins with crude oil

Crude oil is unrefined liquid petroleum, which ranges in color from yellow to black, and may have a paraffin, asphalt, or mixed base. Crude oil is composed of thousands of different chemical compounds called hydrocarbons, all with different boiling points.

Refining turns crude oil into useful products

Petroleum refining separates crude oil into components used for a variety of purposes, from high-performance fuels to plastics.

The crude petroleum we get from refining is heated and changed into a gas for further refining

The hot gases are passed into the bottom of a distillation column. As they move up the height of the column, the gases cool below their boiling point and condense into a liquid. The liquids are then drawn off the distilling column at specific heights, ranging from heavy residuals at the bottom, raw diesel fuels in the mid-sections, and raw gasoline at the top. These raw fractions are then processed further to make several different finished products.

Although all fractions of petroleum find uses, the greatest demand is for gasoline

One barrel of crude petroleum contains 30-40% gasoline. However, to meet transportation demands we need to generate over 50% of gasoline per barrel. To close this gap and meet this demand, some of the other petroleum fractions must be converted to gasoline. This may be done by cracking – breaking down large molecules of heavy heating oil and heavy residuals; reforming – changing molecular structures of low quality gasoline molecules; and isomerization – rearranging the atoms in a molecule so that the product has the same chemical formula but has a different structure.

Did you know?

On January 1, 2017, there were 141 operable refineries in the United States with total crude distillation capacity of about 18.62 million barrels per calendar day (bpcd) and 19.80 million barrels per stream day (bpsd). The U.S. is now a net exporter of petroleum products – able to meet U.S. demand and help satisfy needs around the world.