
Glossary

API gravity: American Petroleum Institute measure of specific gravity or density of crude oil, condensate, or liquid petroleum products that is calibrated in terms of degrees API and calculated as follows:

$$^{\circ}\text{API} = (141.5 / \text{Specific Gravity at } 60^{\circ}\text{F}) - 131.5$$

Asphalt: A cement-like material obtained by petroleum processing containing primarily bitumens with a conversion factor of approximately 5.5 barrels per short ton.

Atmospheric crude oil distillation: The refining process of separating crude oil components at atmospheric pressure by heating to temperatures of about 600–750 °F, depending on the nature of the crude oil and desired products and on subsequent condensing of the fractions by cooling.

Barrel: A unit of volume equal to 42 U.S. gallons.

Barrels per day (BPD): The amount of input that a distillation facility can process under usual operating conditions (calendar day) or within a twenty-four-hour period running at full capacity (stream day), usually reported in millions (MBPD).

Bitumen: A hydrocarbon mixture that is highly viscous and often solid, composed primarily of dense and large polymeric molecules having molecular weights in excess of 15,000.

Bituminous coal: The most common coal used primarily to generate electricity.

British thermal unit (BTU): The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 °F at the temperature at which water has its greatest density (approximately 39 °F).

Butane (C₄H₁₀): A normally gaseous straight-chain or branch-chain hydrocarbon extracted from natural gas or refinery gas streams. It includes isobutane and normal butane.

Byproducts: A secondary product derived from a manufacturing process or chemical reaction.

Carbon residue: The leftover amount of carbon that remains from a chemical process, such as heating up oil.

Catalytic hydrocracking: A refining process that uses hydrogen and catalysts with relatively low temperatures and high pressures for converting middle-boiling or residual material to high-octane gasoline, reformer charge stock, jet fuel, and/or high-grade fuel oil. The process uses one or more catalysts, depending on product output, and can handle high sulfur feedstocks without prior desulfurization.

Catalytic hydrotreating: A refining process for treating petroleum fractions from atmospheric or vacuum-distillation units (for example, naphthas, middle distillates, reformer feeds, residual fuel oil, and heavy gas oil) and other petroleum (for example, cat-cracked naphtha, coker naphtha, and gas oil) in the presence of catalysts and substantial quantities of hydrogen.

Coal: A combustible rock whose composition consists of more than 50 percent by weight and more than 70 percent by volume carbonaceous material.

Condensates: A broad category of hydrocarbon mixtures of various lighter compounds in the 45–75 °API gravity range, where gas condensates include natural gas liquids, hexanes, and a small portion in the heptane-octane range and lease condensates exclude natural gas plant liquids.

Conventional gasoline: Finished motor gasoline not included in the oxygenated or reformulated gasoline categories. Note: this category excludes reformulated gasoline blendstock for oxygenate blending (RBOB) as well as other blendstock.

Conventional crude oil: A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface-separating facilities.

Delayed coking: A process by which heavier crude oil fractions can be thermally decomposed under conditions of elevated temperatures and pressure to produce a mixture of lighter oils and petroleum coke. Light oils can be processed further in other refinery units to meet product specifications, while the coke can be used either as a fuel, to generate electricity, or to manufacture steel or aluminum.

Density: A measurement of the weight of a substance contained in a given volume of that substance.

Diesel: A heavier fuel with more complex hydrocarbons made up of kerosene, distillates, and heavy gas oil.

Dilbit: A mixture of ultra-light and extra-heavy bitumen with an API gravity in the range of 19–22 °API that enables bitumen to flow in a pipeline.

Distillate fuel oil: A general classification for one of the petroleum fractions produced in conventional distillation operations. It includes diesel fuels and fuel oils. Products known as No. 1, No. 2, and No. 4 diesel fuel are used in trucks, automobiles, off-highway engines, railroad locomotives, and agricultural machinery. Products known as No. 1, No. 2, and No. 4 fuel oils are used primarily for space heating and electric power generation.

Dumbbell crudes: Oils that contain primarily a mixture of extra-heavy hydrocarbons and ultra-light hydrocarbons and too few intermediary petroleum co-products in the middle range.

Emission factor: Multipliers developed to calculate greenhouse gas emissions per unit of energy.

Energy content or heating value: The heat of combustion or heat released when a known quantity of fuel is burned under specific conditions.

Ethane (C₂H₆): A normally gaseous straight-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of -127.48 °F. It is extracted from natural gas and refinery gas streams.

Flammable: The degree to which something will burn or ignite, causing fire or combustion.

Heavy gas oil: Petroleum distillates with an approximate boiling range from 651–1,000 °F.

Heavy metals: Any of a number of higher atomic weight elements, including nickel and vanadium, with the properties of a metallic substance at room temperature.

High temperature simulated distillation (HTSD): A method for identifying the share of heavy residuals in oils, which relates to the amount of carbon embedded in them, that considers higher temperature conditions than an oil assay.

Hydraulic fracturing or fracking: A technique to propagate fractures in a rock layer by a pressurized fluid to liberate oil or natural gas by creating conduits along which oil and gas from source rocks can migrate to reservoir rocks.

Hydrocarbon: An organic compound consisting primarily of hydrogen and carbon.

Hydrogen: The lightest of all gases, occurring chiefly in combination with oxygen in water that exists also in acids, bases, alcohols, petroleum, and other hydrocarbons.

Intermediary products: The building blocks of petroleum products, including butane, propane, and diesel.

Kerogen: A very high molecular weight mixture of organic chemical compounds that make up a portion of the organic matter in sedimentary rocks. It forms oil shale deposits when present in high concentrations in shale.

Kerosene: A light petroleum distillate that is used in space heaters, cookstoves, and water heaters and is suitable for use as a light source when burned in wick-fed lamps. It is used for commercial and military turbojet and turboprop aircraft engines.

Kilogram: The base unit of mass in the International System of Units equal to exactly 1,000 grams and approximately 2.2 pounds.

Life-cycle analysis (LCA): An analysis of the amount of carbon dioxide emitted from the time of oil extraction through combustion, often through the lens of individual fuels, such as gasoline or diesel.

Middle distillates: A general classification of refined petroleum products that includes distillate fuel oil and kerosene.

Million barrels per day (MBPD): Standard volumetric flow rate of oil.

Motor gasoline (finished): A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline is characterized as having a boiling range of 122–158 °F at the 10 percent recovery point to 365–374 °F at the 90 percent recovery point.

Naphtha: A generic term applied to a petroleum fraction with an approximate boiling range of 122–400 °F.

Natural gas liquids (NGL): Those hydrocarbons in natural gas that are separated from the gas as liquids through the process of absorption, condensation, adsorption, cooling in gas separators, gas processing, or gas cycling plants. Generally, natural gas liquids include natural gas plant liquids and lease condensate.

Oil assay: A test to chemically evaluate the crude oil feedstocks in terms of their molecular and chemical characteristics.

Oil sands (also known as tar sands or bituminous sands): A type of unconventional oil deposit of loose sand or partially consolidated sandstone containing naturally occurring mixtures of sand, clay, and water, saturated with a dense and extremely viscous form of petroleum technically referred to as bitumen.

Oil shale: Name for oils contained in kerogen when the source rock is shale.

Oil value chain: The steps that lead to the transformation of hydrocarbons into an array of marketable petroleum products.

Pentanes (C₅H₁₂) plus: A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas that includes isopentane, natural gasoline, and plant condensate.

Petrochemical feedstocks: Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics.

Petroleum: A broadly defined class of liquid hydrocarbon mixtures that includes crude oil, lease condensate, unfinished oils, refined products obtained from the processing of crude oil, and natural gas plant liquids.

Petroleum coke or pet coke: Relatively pure carbon produced in delayed or fluid cokers that can be sold as is (marketable coke) or further purified by calcining.

Petroleum products: Refinery outputs obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds, including unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

Petroleum refinery: An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

Propane (C₃H₈): A normally gaseous straight-chain hydrocarbon, which is a colorless paraffinic gas that boils at a temperature of -43.67 °F.

Refinery: An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and oxygenates.

Refinery input, total: The raw materials and intermediate materials processed at refineries to produce finished petroleum products. They include crude oil, products of natural gas processing plants, unfinished oils, other hydrocarbons and oxygenates, motor gasoline and aviation gasoline blending components, and finished petroleum products.

Refinery production: Petroleum products produced at a refinery or blending plant.

Residual (or residuum): The bottom-of-the-barrel heaviest intermediary product from raw oil that requires temperatures over 1,050 °F and extensive conversion treatments to turn them into marketable co-products.

Residual fuel oil: A general classification for the heavier oils, known as No. 5 and No. 6 fuel oils, that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations and that is used in steam-powered vessels in government service power plants. No. 6 fuel oil includes Bunker C fuel oil and is used for the production of electric power, space heating, vessel bunkering, and various industrial purposes.

Shale oil, also known as tight oil or light tight oil (LTO): A petroleum play that consists of light crude oil contained in oil-bearing shale rock formations of relatively low porosity and permeability.

Sulfur: A yellowish nonmetallic element, sometimes known as brimstone. It is present at various levels of concentration in many fossil fuels whose combustion releases sulfur compounds that are considered harmful to the environment.

Synthetic crude oil: An intermediate product produced when an extra-heavy or unconventional oil source is upgraded into a transportable form.

Terajoule (TJ): A measure of energy equal to one trillion (10¹²) joules.

Thermal cracking: A refining process in which heat and pressure are used to break down, rearrange, or combine hydrocarbon molecules. Thermal cracking includes gas oil, visbreaking, fluid coking, delayed coking, and other thermal cracking processes (for example, flexicoking).

Tight oil: See shale oil; tight oils can be located in rocks other than shale.

Total acid number (TAN): An indicator of naphthenic and possibly other acids present in crude oils that are highly corrosive.

Unconventional Oil: A growing array of hydrocarbons that either are not produced by conventional means or are not constituted as conventional liquid hydrocarbons, including solid ancient bitumen adhered to sand and clay in oil sands, extra-heavy tacky oils that resist flow, dense immature kerogen fused to oil shale, and ultra-light petroleum liquids trapped in tight shale oil.

Upgrading: A facility that upgrades bitumen (extra-heavy oil) into synthetic crude oil so it can be handled by an oil refinery.

Viscosity: Characteristic of oil regarding its resistance to change form.

Volatile: A group of compounds with low boiling points and the tendency to vaporize.

West Texas Intermediate (WTI): A crude stream produced in Texas and southern Oklahoma that serves as a price reference for a number of other crude streams traded in the U.S. spot market at Cushing, OK.

For a more complete list of terms see, www.eia.gov/tools/glossary/index.cfm?id=