

Glossary and Acronyms

Aniline point— The lowest temperature at which the oil being tested is completely miscible with an equal volume of aniline.

API — American Petroleum Institute.

API gravity — An arbitrary scale adopted by the American Petroleum Institute for expressing the specific gravity of oils. Its relation to specific gravity is as follows:

$$^{\circ}\text{API} = \frac{141.5}{\text{Specific gravity at } 60^{\circ}\text{F}} - 131.5$$

Aromatics — A group of hydrocarbons of which benzene is the parent. They are called “aromatics” because many of their derivatives have sweet aromatic odours. These hydrocarbons are of a relatively high specific gravity and possess good solvent properties. Certain aromatics have valuable anti-knock (octane) characteristics. Typical aromatics are benzene, toluene, and xylene.

Asphalt — Natural or mechanical mixtures in which bitumen is associated with inert mineral matter. The term is normally qualified by indication of type or origin, for example, lake asphalt and natural asphalt.

ASTM— American Society for Testing Materials. This organization is responsible for issuing many of the standard methods used in the petroleum industry.

ATK — Aviation turbine kerosene.

Atmospheric pressure — (1) The pressure of air. (2) More specifically, the pressure of the air at sea level. (3) As a standard, the pressure at which the mercury barometer stands at 760 mm or 30 inches (equivalent to approximately 14.7 pounds per sq. inch).

Avtur — Aviation turbine kerosene.

Barrel — A common unit of measurement of liquids in the petroleum industry. It is equivalent to forty-two U.S. standard gallons.

Benzene — A pure aromatic hydrocarbon (q.v.) with a characteristic odour occurring in significant proportions in certain Far Eastern crude oils.

Benzine — Straight-run petroleum spirit boiling within the range of 176 to 266 °F.

Biomass fuels — Combustible material of vegetable origin, for example, wood, charcoal, corn-cobs, cotton stalks, rice husks, and dung cakes. Also refers to alcohol fuels derived from fermentation of vegetable sugars or starches and subsequent distillation.

Boiling range — See “Distillation range”.

Bitumen or asphaltic bitumen — Black to dark brown solid or semi-solid organic material which gradually liquefies when heated. These materials are usually obtained as residues from the vacuum distillation of petroleum.

Black oils — A general term applied to the heavier and darker coloured petroleum products such as heavy diesel fuel, fuel oil, and some cylinder stocks. It is used mainly in connection with shipping and storage; a black oil tanker is one used for carrying “black oils” and which would require cleaning before being used for “white oils”.

Blending — Intimate mixing of the various components in the preparation of a product to meet given specifications.

Bunker fuel — Any fuel oil or diesel fuel taken into the bunkers of ships.

Bunker “C” fuel oil — A heavy residual fuel oil used by ships, the industry, and for large-scale heating installations.

Catalytic reforming — Catalytic (or “cat”) reforming is one of the most

common petroleum-refining processes used to produce high-octane blending components for motor gasoline. The process takes naphtha (a straight-run light distillate product) and changes the chemical composition of the feedstock in the presence of a catalyst to make the product more suitable for use as engine fuel.

Commercial energy — Any energy form sold in the course of commerce or provided by a public utility. The term is virtually synonymous with conventional energy. Wood and other traditional fuels (see below) are not included although they are widely traded.

Conventional energy — Energy sources which have hitherto provided the bulk of the requirements for modern industrial society. These include coal (including lignite and peat); petroleum (including fuel oil, gasoline, kerosene, diesel fuel, natural gas, and liquefied petroleum gas); and electricity generated by burning one or other of these fuels or from geo-thermal, hydro, or nuclear power. Wood is not included in this category although it was extensively used in the past, and to some extent still is, for industrial purposes.

Cracking — A process in which the feedstock is subjected to a high temperature for a limited time with the object of increasing the yield of light products, for example, gasoline, at the expense of the heavier. Cracking processes are also the source of the olefins which are the intermediates in the manufacture of many petroleum chemicals. Sometimes a substance which promotes reaction, that is, a catalyst, is present. This has the effect of reducing the temperature at which cracking takes place and gives one greater control over the reaction.

Cracking, catalytic — Cracking process in which a catalyst is used to promote the reaction.

Crude assay — A procedure for determining the general distillation characteristics and other quality information of crude oil.

Crude oil — The oil produced from an underground reservoir, after being freed of any gas which may have been dissolved in it under reservoir conditions, but before any other operation has been performed on it. In the oil industry, it is simply termed "crude".

Dehydrogenation — The removal of hydrogen from a chemical compound; for example, the removal of two hydrogen atoms from butane to make butylene, and the further removal of hydrogen to make butadiene.

Desulphurization — The removal of sulphur or sulphur compounds from crude oil or its products.

Diesel oil — This term is used in the report to include fuels suitable for use in diesel and other compression ignition engines and which are also frequently referred to as high-speed diesel oil and as automotive gas oil; the term “gas oil” is used to describe fuels inferior in quality to diesel oil but suitable for use in low or medium rotational speed engines; the term “diesel-gas oil” refers to both grades.

Distillate — A product obtained by condensing the vapours evolved when a liquid is boiled and collecting the condensate in a receiver separate from the boiling vessel.

Distillation range — A single pure substance has one definite boiling point at a given pressure. A mixture of substances will, however, exhibit a range of temperatures, usually determined at atmospheric pressure by means of standard apparatus, which is termed the “distillation” or “boiling” range.

Enhanced recovery or secondary recovery — Methods of extracting a higher proportion of crude oil from a reservoir than can be obtained initially using the natural energy of the reservoir.

Fractional distillation — See “Fractionation”.

Fractionation — A distillation process in which the distillate is collected as a number of separate fractions, each having a different boiling range.

Fuel oil — A general term applied to an oil used for the production of power or heat. In a more restricted sense it is applied to any petroleum product that is burnt under boilers or in industrial furnaces. These oils are normally residues, but distillates or blends of distillates and residues are also used as fuel oil.

Gas oil — A petroleum distillate having a viscosity and distillation range intermediate between those of diesel oil and light lubricating oil.

Gasoline — A refined petroleum distillate, normally boiling within the limits of 86 and 392 °F and suitable for use as a fuel in spark-ignited internal-combustion engines.

Geothermal power generation — The use of underground natural heat resources

in commercial use. This is usually superheated water deep in the earth that is used to generate steam to power turbo-electric generators.

Heavy fuel oil — A residual petroleum product with a high viscosity. Heavy fuel oil is primarily used for power generation and in industrial boilers.

Hydrocarbons — Materials composed entirely of carbon and hydrogen. The carbon atoms may be in linear or ring formations.

Heavy oil — Crude oil of high viscosity which in many cases prevents its being recovered from wells by normal methods.

Hydrocracking — A process combining cracking or pyrolysis, with hydrogenation. Feedstocks can include crude oils, residua, petroleum tars, and asphalts.

Hydroskimming refinery — A refinery with crude distillation and product quality upgrading facilities only as distinct from those with secondary processing units to increase the yield of distillate products.

IBP — Initial boiling point: the temperature at which the first drop of distillate falls from the condenser during a laboratory distillation test.

Kerosene — A refined petroleum distillate intermediate in volatility between gasoline and automotive diesel oil. Its distillation range falls within the limits of 300 and 572 °F. Its main uses are as an illuminant, for heating purposes, and as a fuel for certain types of internal-combustion engines.

Knock — The noise associated with self-ignition of a portion of the fuel and air mixture in the engine cylinder, ahead of the flame front.

Liquefied petroleum gas (LPG) — Light hydrocarbon material, gaseous at atmospheric temperature and pressure, held in a liquid state by pressure to facilitate storage, transport, and handling. Commercial liquefied gas consists essentially of propane, butane, or mixtures thereof.

Liquefied natural gas (LNG) — Oilfield or naturally occurring gas, chiefly methane, liquefied for transport purposes.

Methane — A light, odourless, flammable gas, CH₄; the first member of the paraffin series C_nH_{2n+2}; boiling point: -304 °F. It is the chief constituent of natural gas. It is also often produced by the partial decay of plants in swamps, so that its occurrence is not uncommonly misinterpreted as an indication of the presence

of petroleum.

Middle distillates — These include kerosene, jet fuel, diesel fuel, and distillate fuel oil.

Naphtha — A cut covering the end of the motor spirit and the beginning of the kerosene range, frequently used as a feedstock for reforming processes. It is also known as “heavy benzene” or “heavy gasoline”.

Naphthenates — The salts of naphthenic acids. Their uses include serving as paint driers and as wood and textile preservatives.

Naphthenic acids — Organic acids found in crude oils from certain sources. They have a characteristic unpleasant odour. They are mainly used in the preparation of naphthenates (q.v.).

Natural asphalts — Mixtures occurring in nature in which bitumen is associated with inert mineral matter.

Natural gas — Gas found in certain localities issuing from the earth under pressure and often produced in association with crude petroleum when it acts as an important factor in the recovery of the latter. Natural gas is usually classified as “wet” or “dry”, depending on whether the proportions of gasoline constituents which it contains are large or small. Natural gas is also referred to as “Casinghead gas”.

Natural gasoline — A low-boiling liquid petroleum product extracted from natural gas. In its “wild” or unstabilized condition it contains fairly high proportions of propane and butanes. The propane and part of the butanes are removed by certain processes, yielding a stabilized gasoline suitable for blending with other gasoline. Natural gasoline is sometimes referred to as “Casinghead gasoline”.

Octane number — The octane number of gasoline is a measure of its anti-knock value. The higher the octane number, the higher the anti-knock quality of the gasoline. The quality is determined in a standard engine by matching for detonation the gasoline under test against a mixture of iso-octane and normal-heptane, both pure hydrocarbons, the percentage by volume of iso-octane in that mixture being noted as the octane number.

Oil shale — A rock, of sedimentary origin, with an ash content of more than 33 per cent; the contained organic matter yields oil when destructively distilled, but not appreciably when extracted with ordinary solvents for petroleum.

Olefins (alkenes) — A series of aliphatic hydrocarbons containing a double bond which are more reactive than paraffins. The lowest members are ethylene, propylene, and butylene.

Paraffins (alkanes) — A series of saturated aliphatic hydrocarbons, the lowest members of which are methane, ethane, and propane. The higher homeologues are solid waxes.

OPEC — The Organization of Petroleum-Exporting Countries.

Primary energy — An energy form in which there has been no chemical transformation before use. The term is of significance principally in relation to electricity generation, where hydropower is regarded as primary energy and thermal-generated power as secondary energy. Nuclear power is commonly referred to as primary energy although this does not accord with a strict interpretation of the definition.

Recoverable reserves — Reserves of oil and gas recoverable from known reservoirs, with existing technology, under present economic conditions.

Reforming — A process in which straight-run feedstocks, for example, benzines or naphthas, are subjected to high temperatures and pressures with the object of changing their chemical structure in such a way as to increase their octane number (cf. “Catalytic reforming” [q.v.]).

Reid vapour pressure — The vapour pressure (q.v.) of petroleum products, for example, motor spirit, measured at 100 °F in the Reid apparatus and reported in pounds per sq. inch.

Residual fuel oil — The material remaining as unevaporated liquid from processes involving distillation or cracking.

Residuum reduction — Refers to processes that reduce the yield of atmospheric residue or residual fuel oil.

Secondary conversion — In this book secondary conversion refers to processes, fluid catalytic cracking and hydrocracking, that enable residual fuel oil to be converted to distillate products.

Solid fuels — Some forms of solid energy are coal and lignite. All primary solid fuels are converted from a volume or mass basis to a common tonne of oil equivalent using specific national conversion factors.

Sour crude — Crude oil containing appreciable amounts of hydrogen sulphide and mercaptans.

Sour gas — Hydrocarbon gas containing undesirable sulphur compounds, sulphuretted hydrogen and methyl mercaptan.

Special boiling-point spirit — A petroleum solvent fractionally distilled to specifically selected distillation characteristics. Such distillates are normally manufactured from well-refined straight-run naphthas; the various volatilities are designed to enable a suitable grade to be chosen for any particular industrial purpose.

Sweet — Products which give a negative result in the Doctor test, a test for the presence in light distillates of a particular type of sulphur component known as mercaptans.

Sweet gas — Hydrocarbon gas free from sulphur compounds.

Sweetening — Any treatment which renders a sour product sweet, for example, Doctor treatment, hypochlorite treatment, or copper sweetening.

Tar — A term sometimes used to describe heavy liquid residues derived from petroleum processes. The word “tar” usually indicates the black viscous liquid resulting from the distillation of solid materials such as coal or wood.

Tetra ethyl lead (TEL) — A colourless stable liquid obtained commercially by the action of lead-sodium alloy on ethyl chloride. When added in small proportions to motor spirit, it increases the octane number. For this purpose, tetra ethyl lead is used in the form of ethyl fluid.

Thermal power generation — A power generation process which uses oil, gas, or coal to generate thermal energy, usually in the form of system heat which is used to drive electric generators. However, the term also includes diesel engines and gas turbines.

Topped crude — Crude oil from which some of the lighter constituents have been removed by distillation.

Topping plant — Distillation equipment for the removal of the volatile fractions of an oil.

Traditional or non-commercial energy — Those energy forms generally used

in “traditional” or pre-industrial societies. They are largely synonymous with biomass fuels and the term is generally regarded as excluding mineral fuels and hydropower, despite the fact that water wheels have been in use for over 1,000 years. These energy forms are sometimes also referred to as non-commercial energy, even though wood fuels are often traded.

Treatments — Somewhat loosely used to cover all those refining operations in which small proportions of undesirable constituents are removed from products by chemical or physical means, for example, acid treatment sweetening.

Ultimate recoverable reserves (URR) — The total amount of oil and gas recovered and believed to be recoverable from both discovered and undiscovered reservoirs, in the light of probable improvements in technology, and based on a geological evaluation of a particular area or territory.

Vapour pressure — The pressure exerted by the vapour escaping from a liquid. As the temperature of the liquid rises its vapour pressure increases; eventually it exceeds the pressure of the confining atmosphere and the liquid boils. In the petroleum industry, vapour pressures are usually reported as “Reid vapour pressure”.

Visbreaking — Viscosity breaking; lowering or “breaking” the viscosity of residue by cracking at relatively low temperatures.

Viscosity — The property of a fluid which determines its rate of flow. As the temperature of a fluid is increased, its viscosity decreases and it therefore flows more readily.

VLCC — Very large crude carrier (applies to oil tankship).

Volatility — The ease with which a product begins to vapourize. Volatile substances have relatively high vapour pressures and therefore boil at relatively low temperatures.

White products — A term applied to the more volatile petroleum products, such as gasoline, white spirit, kerosene. It is not to be confused with the term “white oils”.

White spirit — A refined distillate intermediate in distillation range between gasoline and kerosene (that is, with a distillation range of about 302 to 392 °F). It is used as a paint thinner and for dry cleaning, and so forth. The term “mineral turpentine” or “turpentine substitute” is sometimes used for white spirit, but is not recommended, owing to possible confusion with gum turpentine. In the United

States the term “petroleum spirits” is used for white spirit.

Xylene — Colourless liquid, $C_6H_4(CH_3)_2$, of the aromatic group of hydrocarbons, made by the catalytic reforming of certain naphthenic petroleum fractions. Used as high-octane motor and aviation spirit blending agents, solvents, and chemical intermediates. Isomers are metaxylene, orthoxylene, and paraxylene.

SOURCE: Lakdasa Wijetilleke, *World Refinery Industry* (Washington, DC: World Bank, 1984).