

PART II

**PETROLEUM AND CHEMICALS: PRODUCTION,
TRANSPORTATION, AND PLANT LOCATION**

A GLOSSARY OF TECHNICAL TERMS*

ALKYLATE. Product obtained in the alkylation process. Chemically, it is a complex molecule of the paraffinic series, formed by the introduction of an alkyl radical into an organic compound.

ALKYLATION. A synthetic process for the manufacture of components for aviation gasoline.

ANTIKNOCK AGENTS. Chemical compounds which, when added in small amounts to the fuel charge of an internal-combustion engine, have the property of suppressing or at least of strongly depressing knocking. The principal antiknock agent which has been developed for use in fuels is tetraethyl lead. Iron carbonyl and aniline (and other aromatic amines) have had limited use.

API GRAVITY. Arbitrary scale for measuring the density of oils, adopted by the American Petroleum Institute. Water is 10° API, gasoline approximately 55-60°.

ASTM DISTILLATION. A distillation test made on such products as gasoline and kerosene to determine the initial and final boiling points and the boiling range.

BARREL. Petroleum industry uses 42-gallon barrel as the standard barrel.

BOTTOMS. In a distilling operation, the portion of the charge remaining in the still or flask at the end of the run; in pipe stilling or distillation, the portion that does not vaporize.

Btu. Abbreviation for British thermal unit, a unit of heat commonly used in heat engineering. It is the amount of heat necessary to raise the temperature of one pound of water one degree Fahrenheit.

CATALYST. A substance which effects, provokes, or accelerates reactions without itself being altered.

CATALYTIC CRACKING. A method of cracking in which a catalyst is employed to bring about the desired chemical reaction.

CETANE NUMBER. Diesel fuel ignitability performance measured by the delay of combustion after injection of the fuel. It represents a comparison of a fuel with standards which are cetane in alpha-methyl-naphthalene.

COKING. The process of distilling a charge of oil to coke. In the last part of a coking run on a shell still, the bottom of the still is at a red heat and most of the volatile matter is driven out, leaving the coke hard and dry.

CRACKED GAS OIL. The gas oil formed as one of the products of a cracking reaction. It should not be confused with the term "gas oil cracking stock," one of the possible inputs *into* a cracking still; "cracked gas oil" is sometimes known as "catalytic gas oil" if the cracking process has involved the use of catalysts.

CRACKING. High temperature treatment of a given material (usually termed the "cracking stock" or "charging stock"). In this process, the long molecules of the cracking stock are broken up, with the attendant formation of gasoline. Other reaction products are gas oils, residual oils, and various gases.

* Reprinted by permission from A. S. Manne, *Scheduling of Petroleum Refinery Operations*, Harvard University Press, Cambridge, Mass., 1956, pp. 5-9. Most of the definitions here are quoted directly from the glossary in *Fundamentals of Petroleum*, U. S. Bureau of Naval Personnel, NAVPERS 10883 (1953), pp. 161-172.

DISTILLATION. Distillation generally refers to vaporization processes in which the vapor evolved is recovered, usually by condensation, and a separation effected between those fractions which vaporize and those which remain in the bottoms. (See Fractional Distillation.)

END POINT (EP). The highest temperature indicated on the thermometer inserted in the flask during a standard laboratory distillation test. This is generally the temperature at which no more vapor can be driven over into the condensing apparatus.

FRACTIONAL DISTILLATION (SEE DISTILLATION). Fractional distillation implies the use of equipment for effecting a more complete separation between the low and high boiling components in a mixture being distilled than does the general term distillation. It is usually accomplished by the use of a bubble tower or its equivalent.

GAS OIL. Term originally used to mean oil suitable for the manufacture of illuminating gas. Now employed to designate an overhead distillate product with a boiling range intermediate between that of kerosene and residual fuel oil. The material is used as fuel for home furnaces and diesel engines and as a cracking stock. Also known as "distillate oil" or "middle distillate."

INITIAL BOILING POINT (IBP). The temperature at which the first drop of distillate falls from the condenser into the receiver in a standard laboratory distillation procedure.

KEROSENE. A petroleum overhead fraction with a boiling range intermediate between that of gasoline and gas oil. Used as an illuminant, stove oil, and tractor fuel.

MIDDLE DISTILLATES. A generic term for kerosenes and gas oils.

NAPHTHAS. Oils of low boiling range (80°F to 440°F), usually of good color and odor when finished. Sometimes refers to gasoline components and sometimes to special products, solvents, etc.

OCTANE NUMBER. Term used to indicate numerically the relative antiknock value of automotive gasolines, and of aviation gasolines having a rating below 100. It is based on a comparison with the reference fuels iso-octane (100 octane number) and normal heptane (0 octane number). The octane number of an unknown fuel is the volume per cent of iso-octane with normal heptane which matches the unknown fuel in knocking tendencies under a specified set of conditions. Either the Motor method or the Research method may be used in determining octane rating of automotive gasolines; either the Aviation method or Supercharge method may be used in determining the octane rating of aviation gasolines. The test method employed *must* be reported with the octane rating.

POLYMERIZATION. A process for uniting light olefins to form hydrocarbons of higher molecular weight.

RECYCLING. The reuse of cracked distillate products as a charge stock in the same cracking process.

REDUCED CRUDE. The bottoms remaining from a distillation of crude oil.

REFORMING. A process for converting low octane number naphthas or gasolines into high octane number products.

REID VAPOR PRESSURE. The measure of pressure exerted on the interior of a special container (Reid Vapor Pressure apparatus), under specified test conditions.

RESIDUAL FUEL OILS. Fuel oils which include either reduced crudes or viscous cracked residuum. Used as fuel for industrial heat and power and also for marine and locomotive boilers.

RESIDUUM. The dark colored, highly viscous oil remaining from crude oil, after the more volatile portion of the charge has been distilled off.

STRAIGHT-RUN GASOLINE (RAW GASOLINE). A gasoline which is obtained directly from crude by fractional distillation.

TETRAETHYL LEAD. A volatile lead compound, $Pb(C_2H_5)_4$, which, when added in small proportions to gasoline, increases the octane rating.

THERMAL CRACKING. The process of cracking by heat or by heat and pressure.

VISBREAKING. A mild cracking process employed in order to reduce the viscosity of residual stocks.