

## Entrepreneur India

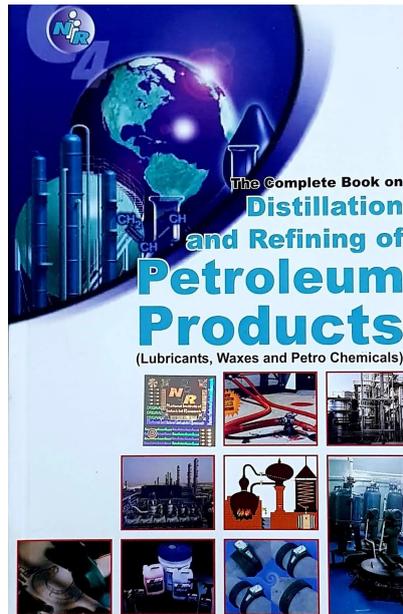
106-E, Kamla Nagar, New Delhi-110007, India.

Tel: 91-11-23843955, +91 9097075054

Mobile: +91-9097075054

Email: npcs.ei@gmail.com, info@entrepreneurindia.co

Website: www.entrepreneurIndia.co



## The Complete Book on Distillation and Refining of Petroleum Products (Lubricants, Waxes and Petrochemicals)

<b>Code</b>	NI152
<b>Format</b>	paperback
<b>Indian Price</b>	₹975
<b>US Price</b>	\$100
<b>Pages</b>	496
<b>ISBN</b>	8186623973
<b>Publisher</b>	National Institute of Industrial Research

### Description

The most dynamic industry of the century is the petroleum and petrochemicals industry. It has taken the fundamental knowledge of chemistry and chemical engineering and transformed itself from a simple processing industry for fuel and lubricants to an extremely complex chemical process industry which has branched out into synthetic rubber, plastics, fertilizers and many other fields. Petroleum (crude oil) is a mixture of different hydrocarbons. Many useful products can be made from these hydrocarbons. The fractions are separated from one another using a process called fractional distillation. This process is based on the principle that different substances boil at different temperatures. The applications of distillation in petroleum industry are quite varied. The assaying of crude oils and the evaluation many petroleum products depend on distillation. Petroleum products obtained from processes such as distillation often need supplementary purification. Refining is a process of purification of products by means of chemical process. Chemical engineering and petroleum processing have in a very real sense grown up together. Studies on fluid flow, heat transfer, distillation, absorption, and the like were undertaken and applied to wide variety of materials because of need in the petroleum processing field. The largest share of oil products is used as energy carriers: various grades of fuel oil and gasoline. Heavier (less volatile) fractions can also be used to produce asphalt, tar, paraffin wax, lubricating and other heavy oils. Refineries also produce other chemicals, some of which are used in chemical processes to produce plastics and other useful materials. Hydrogen and carbon in the form of petroleum coke may also be produced as petroleum products. Petrochemicals have a vast variety of uses. The use of petroleum hydrocarbons to make synthesis gas has made petroleum and natural gas the world main source of ammonia, the source of almost all nitrogen fertilizers. While petroleum product demand in the western world is relatively stagnant, for developing countries, particularly those in Asia, demand is booming. It is all about growing populations and their escalating need for energy.

Some of the fundamental of the book are the nature of petroleum, crude oil processing, distillation in the petroleum industry, refining of lubricating oils, petrolatum, and waxes, residue fluidized catalytic cracking, chemical thermodynamics of petroleum , benefits of biodiesel produced from vegetable oil, petroleum products used as fuel oils, manufacture of asphalt from petroleum, petroleum waxes, chlorinated waxes, synthesis gas etc.

The book presents information and data which will help oil companies, large scale users of commercial petroleum products in efficient storage, handling and utilization of these products. Different formulae, processes for the production of petroleum products are given in this book. This will be very useful book for new entrepreneurs, existing units, technocrats, researchers, institutional libraries etc.

## **Content**

## 1. Introduction

Historical

The Nature of Petroleum

Largest Energy Supplier

Origin

Constituents of Petroleum

Aliphatics, or open chain Hydrocarbons

Ring Compounds

Lesser Components

## 2 Crude Oil Processing

Fundamentals

Ideal Solutions

Real Solutions

Critical Phenomena

Chemical Dissimilarity

Azeotropism

Immiscibility

Ordinary Distillation

Steam Distillation

Extractive Distillation

Absorption

Process Equipment

Single Stage

Plate Columns

Differential Columns

Wetted Wall

Rotary

Packed

Distillation in the Petroleum Industry

Analytical Applications

Single stage Processes

Multistage Processes

Manufacturing Applications

Primary Distillation

Process feed Preparation

Product Fractionation

Combination Processing.

### 3. Refining

Refining by Chemical Methods

Sulfuric Acid Treating

Reactions with Hydrocarbons

Paraffinic and Naphthenic Hydrocarbons

Aromatics

Olefins

Manner and Effects of Treating

Refining by Physical Methods

Bauxite.

Fullers Earth (Attapulgate, Floridin, Florida Earth)

Acid activated Bentonite

Magnesol

Florisil

Silica Gel

Carbon

Alumina

Commercial Applications

Separation of Classes of Hydrocarbons

Refining of Lubricating Oils, Petrolatums, and Waxes

Stabilizing Gasolines

Regeneration of Adsorbents

Solvent Refining Processes

Aromatics Recovery

Refining Lubricating Oil Stocks.

Separation of Wax

Propane Deasphalting

### 4. Cracking

Introduction

Catalytic Cracking

Residue Fluidized Catalytic Cracking (RFCC or RCC)

Hydrocracking

FCC versus HCU

Reforming

Thermal Reforming

Catalytic Reforming

Isomerization

Hydrocracking

Operating Variables

## 5. Chemical Thermodynamics of Petroleum

### Hydrocarbons

#### Introduction

#### Fundamental Relationships

#### The Standard Free Energy and Equilibrium

#### Status of Thermodynamic Data

#### Applications to Petroleum Processing

#### General Considerations

#### Aromatization of Paraffins and Naphthenes

#### Isomerization of n Butane

## 6. Gasoline

### Introduction

#### Composition, Manufacture, and use of Gasoline

#### Volatility of Gasoline

#### Air Fuel Mixtures and Combustion

#### Phenomena of Knocking

#### Ethyl Alcohol as an IC Engine Fuel

#### Alcohols as auto fuels

#### Issues not in favour of Alcohol

#### Blending Alcohol and Gasoline

## 7. Diesel Fuels

### Diesel Combustion

### Ignition Quality

## 8. Bio Diesel

### Introduction

#### Disadvantages of Vegetable Oil as Diesel Fuel

#### Benefits of Biodiesel Produced from Vegetable Oil

#### Disadvantages of Biodiesel produced from Vegetable Oil

#### Biodiesel Production from various vegetable oils on

#### Different Countries

#### Country Source of biodiesel

#### Economics of Biodiesel Project

#### Tax Incentives in Developed Countries

#### World Production Level of Biodiesel

#### Price in USA

Projected Indian Demand Scenario For Biodiesel  
Average annual CAGR for High Speed Diesel  
Demand for Biodiesel  
Potential Indian Demand for Biodiesel  
Choice of Jatropha  
Cultivation Practices of Jatropha Plant  
Soil Condition:  
Conditions for growth:  
Cultivation practices and yield  
Jatropha Oil Content  
Eco Friendly Biodiesel  
Rich Resources  
Vigorous Pursuit  
Fulfilling basic criteria  
Advantages  
Feed stock

## 9. Kerosene, Absorbent, Oils, and Fuels Oils

Kerosene  
Chemical Properties  
Physical Properties  
Manufacture  
Testing Methods  
Miscellaneous Uses  
Absorbent Oils  
Fuel Oils  
Combustion of Fuel Oils  
Petroleum Products Used as Fuel Oils  
Certain Unusual Crude Oils  
Crude Oil Residua  
Gas Oils, Distillate Fuel Oils.

## 10. Lubrication and Lubricants

Friction and Lubrication

## 11. Waxes

Beeswax  
Carnauba Wax

Spermaceti  
Ozocerite  
Paraffin Wax  
Montan Wax  
Candelilla Wax  
Synthetic Waxes  
Petroleum Waxes  
Chemical Properties and Composition  
Crystallization of Wax  
Dewaxing of Heavy Oils

## 12. Petroleum Asphalts

Chemical and Physical Composition  
Chemical composition  
Mineral Oil  
Resins  
Asphaltenes  
Carbenes and Carboids  
Possible Structures of the Nuclei in Resins, and Asphaltenes  
Physical Constitution  
Physical Properties and Tests  
Manufacture of Asphalt from Petroleum  
Residual or Straight run Asphalts  
Air blown Asphalts  
Uses of Asphalts  
Road Oils  
Asphalt Emulsions  
Solid Asphalts.

## 13. Miscellaneous Petroleum Products and Derived Products

Miscellaneous Petroleum Products  
White Oils  
Industrial Naphtha Solvents  
Paints, Varnishes and Lacquers  
Dry Cleaning  
Cutback Asphalt  
Rubber  
Miscellaneous  
Petroleum Insecticides

- By Products
- Petroleum Coke
- Sulfuric Acid Sludge
- Petroleum Sulfonic Acids
- Chemicals Derived from Petroleum
- Acetylene
- Chemicals Derived from Olefinic Hydrocarbons.
- Alcohols
- Ethyl Alcohol
- Isopropyl Alcohol
- Secondary Butyl Alcohol
- Tertiary Alcohols
- Higher Alcohols
- Glycols And Glycerol
- Addition of Halogenes
- Polymers
- Oxidation Products
- Miscellaneous Products
- Chemicals Derived from Paraffinic Hydrocarbons
- Chlorination Products
- Nitration Products
- Oxidation Products.
- Chemicals Derived from Aromatic Hydro carbons
- Hydrogen
- Carbon Blacks
- Fischer Tropsch Process and Products

#### 14. Propylene

- Introduction
- Polypropylene
- Propylene Trimer and Tetramer
- Acrylonitrile
- Acrylic Fibers
- Acrylamide
- Other Acrylonitrile Derivatives
- Acetonitrile
- Allyl Chloride
- Epichlorohydrin
- Epoxy Resins
- Other Epichlorohydrin Derivatives

Allyl Alcohol Derivatives  
Diallyl Amine  
1,2-Dibromo-3-Chloropropane  
Dichloropropanes, Dichloropropenes  
Acrolein  
Methionine  
1,2,6-Hexanetriol  
Glutaraldehyde  
Propylene Oxide  
Propylene Glycol  
Polyethers  
Dipropylene Glycol  
Higher Propylene Glycols  
Isopropanolamines  
Propylene Carbonate  
1,3-Propylene Diamine  
Polypropylene Oxide Elastomers  
Isopropanol  
Acetone  
Diacetone Alcohol (DAA)  
Methyl Isobutyl Ketone (MIBK)  
Hexylene Glycol  
Methyl Isobutyl Carbinol (MIBC)  
Isopropylamines  
Isoprene

## 15. Synthesis Gas

Introduction

Methane reforming

Naphtha reforming

Fuel oil partial oxidation

Reformer off-gas purification by low temperature fractionation

Topsøe SEA autothermal process using naphtha

Ammonia

Nitrogen Fertilizers

Mixed Fertilizers

Urea

Urea formaldehyde resins

Sulfamic acid

Melamine

Nitric Acid  
Ammonium nitrate  
Potassium nitrate  
Nitroparaffins  
Ammonium Phosphates  
Ammonium Sulfate  
Ammonium Chloride  
Hydrazine  
Carbon Dioxide  
Methanol  
Formaldehyde  
Hexamethylene tetramine  
Pentaerythritol  
Polyacetals  
Glycolic acid  
Textile finishes  
Methylamines  
Monomethylamine  
Dimethylamine  
Trimethylamine  
Methyl Chloride  
Silicones  
Methyl cellulose  
Arsenicals  
Tetramethyl lead  
Dimethylsulfate  
Methyl Glucoside  
Methyl Bromide  
OXO CHEMICALS  
n Butyraldehyde  
Ethyl 1, 3 hexanediol  
Trimethylolpropane  
Butyric acid  
Butyraldehyde  
Isobutanol  
Isobutyric acid  
Neopentyl glycol  
Pantothenic acid  
Octanols  
Octoic acid  
Propionic acid

n Propanol  
Heavy Oxo Chemicals  
PHOSGENE  
Diisocyanates  
Polycarbonates  
Chlorinated Isocyanurics  
Substituted Urea, Carbamate and Thiocarbamate Pesticides  
Other Phosgene Derivatives  
FORMIC ACID  
Oxalic Acid  
NEO ACIDS  
PURE HYDROGEN  
Hydrogenated Fats and Oils  
Tetrahydrofuran  
Sorbitol  
Hydrogen Peroxide  
Organic Peroxides  
Other hydrogen peroxide derivatives  
Furfuryl Alcohol  
Fatty Alcohols  
Fatty Nitriles and Amines

## 16. Other Petrochemicals

Petroleum Waxes  
Chlorinated Waxes  
n Paraffins  
Detergent Raw Materials  
Carbon Black  
Cresols  
Synthetic p Cresol  
Synthetic o Cresol  
Tricresyl Phosphate  
Cyclopentadiene  
Petroleum Resins  
Naphthenic Acids  
Hydrogen Sulfide  
Sulfur  
Phosphorus Pentasulfide  
Mercaptans  
Thioglycolic Acid

Thiourea  
Dimethyl Sulfoxide

## About Niir

NIIR Project Consultancy Services (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. Its various services are: Pre-feasibility study, New Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Preparation of Project Profiles and Pre-Investment and Pre-Feasibility Studies, Market Surveys and Studies, Preparation of Techno-Economic Feasibility Reports, Identification and Selection of Plant and Machinery, Manufacturing Process and/or Equipment required, General Guidance, Technical and Commercial Counseling for setting up new industrial projects and industry. NPCS also publishes various technology books, directories, databases, detailed project reports, market survey reports on various industries and profit making business. Besides being used by manufacturers, industrialists, and entrepreneurs, our publications are also used by Indian and overseas professionals including project engineers, information services bureaus, consultants and consultancy firms as one of the inputs in their research.