

Lubricating Oils, Greases and Petroleum Products Manufacturing Handbook

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Lubricating oils are specially formulated oils that reduce friction between moving parts and help maintain mechanical parts. Lubricating oil is a thick fatty oil used to make the parts of a machine move smoothly.

The lubricants market is growing due to the growing automotive industry, increased consumer awareness and government regulations regarding lubricants. Lubricants are used in vehicles to reduce friction, which leads to a longer lifespan and reduced wear and tear on the vehicles. The growth of lubricants usage in the automotive industry is mainly due to an increasing demand for heavy duty vehicles and light passenger vehicles, and an increase in the average lifespan of the vehicles. As saving conventional resources and cutting emissions and energy have become central environmental matters, the lubricants are progressively attracting more consumer awareness.

Greases are made by using oil (typically mineral oil) and mixing it with thickeners (such as lithium-based soaps). They may also contain additional lubricating particles, such as graphite, molybdenum disulfide, or polytetrafluoroethylene (PTFE, aka Teflon). White grease is made from inedible hog fat and has a low content of free fatty acids. Yellow grease is made from darker parts of the hog and may include parts used to make white grease. Brown grease contains beef and mutton fats as well as hog fats. Synthetic grease may consist of synthetic oils containing standard soaps or may be a mixture of synthetic thickeners, or bases, in petroleum oils. Silicones are greases in which both the base and the oil are synthetic.

Asia-Pacific represents the largest and the fastest growing market, with volume sales projected to grow at a CAGR of 5% over the analysis period. Automotive lubricants represents the largest product market, with engine oils generating a major chunk of the revenues. The market for industrial lubricants is supported by the huge demand for industrial engine oils and growing consumption of process oils.

The major content of the book are Food and Technical Grade White Oils and Highly Refined Paraffins, Base Oils from Petroleum, Formulation of Automotive Lubricants, Lubricating Grease, Aviation Lubricants, Formulation and Structure of Lubricating Greases, Marine Lubricants, Industrial Lubricants, Refining of Petroleum, Lubricating Oils, Greases and Solid Lubricants, Refinery Products, Crude Distillation and Photographs of Machinery with Suppliers Contact Details.

This book will be a mile stone for its readers who are new to this sector, will also find useful for professionals, entrepreneurs, those studying and researching in this important area.

1. Food and Technical Grade White Oils and Highly Refined Paraffins

1. WHITE OILS

- Introduction

2. MANUFACTURE BY ACID TREATMENT

3. HYDROTREATMENT PROCESSES

- Introduction

- Second-Stage Operation

- Products

- Product Specifications for Polynuclear Aromatics

4. REFINED WAXES

2. Base Oils from Petroleum

1. INTRODUCTION

2. BASE OIL COMPOSITION

- Components of Crude Oil

- Characteristics of the Hydrocarbons for Lubricant Performance

- Crude Oil Selection for Base Oil Manufacture

3. PRODUCTS AND SPECIFICATIONS

- Introduction

- Physical Properties - Viscosity •Chemical Properties - Oxidation •Base Oil Categories: Paraffinics •Safety of Petroleum Base Oils

4. CONVENTIONAL BASE OIL MANUFACTURING METHODS

- Historic Methods

- Base Oil Manufacture in a Modern Refinery

- Base Oil Production Economics

- Distillation

- De-asphalting

- Solvent Extraction

- Solvent De-waxing •Finishing

5. MODERN CATALYTIC PROCESSES

- Severe Hydrotreatment

- Special Base Oils from Hydrocracking

- Special Base Oils by Wax Isomerisation

- Catalytic De-waxing

- Iso-De-waxing

6. CATEGORISATION OF BASE OILS

3. Formulation of Automotive Lubricants

1. INTRODUCTION

2. PASSENGER CAR ENGINE OILS

- Passenger Car Engine Types

- Passenger Car Trends and Emission Legislation

- Formulation and Functions of a Passenger Car Engine Oil (PCEO)

- Lubricant Formulation Trends

- Passenger Car Lubricant Specifications and Evaluating Lubricant Performance

3. Heavy-Duty Diesel Engine Oils

- Heavy-Duty Trends and Emission Legislation •Heavy-Duty Engine Strategies Applied to Reduce Exhaust Emissions

4. MOTORCYCLES AND SMALL ENGINES

- Introduction

- Overview of Two-Stroke Lubricants

- Two-Stroke Specifications
- Four-Stroke Motorcycle Lubricants-Overview
- Four-Stroke Motorcycle Specifications
- Lubricant Composition and Impact on Clutch Performance
- Emissions and the Future

4. Lubricating Grease

1. INTRODUCTION TO LUBRICATING GREASE

2. STRUCTURE AND RHEOLOGICAL PROPERTIES

- Structure of Grease •The Rheology of Grease

3. THE CHEMISTRY OF GREASE

- Introduction •Base Fluids in Grease •Grease Thickeners •Grease Manufacturing

4. APPLICATIONS •Introduction •Grease as a Lubricant •Grease as a Sealant •Grease as a Matrix •Grease as a Corrosion Inhibitor •Benefits of Grease

5. Aviation Lubricants

1. INTRODUCTION

2. PISTON ENGINE LUBRICANTS

- Lubrication of Rotary Engines
- Lubrication of Conventional Aircraft Piston Engines

3. AVIATION GAS TURBINE LUBRICANTS

- Base Oil Technology
- Anti-oxidant Additives
- Anti-wear and Load-Carrying Additives
- Corrosion Inhibitor Additives
- Anti-foam Additives
- Specifications

4. AIRCRAFT HYDRAULIC FLUIDS

- Introduction
- Hydrocarbon-Based Hydraulic Fluids
- Phosphate Ester-Based Hydraulic Fluids

5. AIRCRAFT GREASES

6. HELICOPTER TRANSMISSION LUBRICANTS

6. Formulation and Structure of Lubricating Greases

1. INTRODUCTION

2. APPLICATIONS

- Land Transportation •Industrial Applications •Aerospace Applications •Radiation

3. GELLANTS

- Simple Soaps •Complex Soaps •Synthetic Soaplike Salts •Noncarboxylic Salts •Dyes and Pigments •Polymers •Inorganic Gellants

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5. ADDITIVES

- Antioxidants
- Anticorrosants
- Antiwear and Extreme-Pressure Agents
- Other Additive

6. FUNDAMENTAL PROPERTIES

- Structure
- Internal Structure
- Get Network Structure

- Gross Structure
- Flow
- Plastic Flow
- Thixotropy
- Work Breakdown
- Lubrication Mechanisms
- Oxidation

7. Marine Lubricants

1. INTRODUCTION

2. MARINE DIESEL ENGINES

- Classification by Engine Speed •Slow-Speed Engines •Medium-Speed Engines

3. FUEL OIL

4. BASE OILS

5. ADDITIVES

- Main Additive Types
- Alkaline Detergents
- Dispersants
- Antioxidants
- Corrosion Inhibitors
- Anti-Wear, Load-Carrying and Extreme Pressure Additives
- Pour-Point Depressants
- Anti-Foam Additives

6. PROPERTIES AND FORMULATION OF MARINE LUBRICANTS

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- Introduction
- Demulsibility
- Rust and Corrosion Protection
- Oxidation and Thermal Stability
- Load Carrying

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8. CYLINDER OILS

- Introduction •Colloidal Stability •Acid Neutralisation •Spreadability •Engine Tests •Field Tests

9. TRUNK PISTON ENGINE OILS

- Filterability
 - Heavy Fuel Engine Tests
- ### 10. ANALYSIS OF IN-SERVICE OILS
- Introduction •Density
 - Viscosity •Flash Point •Insolubles •Base Number •Water Content •Wear Metals

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- General aspects of Industrial Lubricants •Classification of Industrial Lubricants

2. BEARING LUBRICANTS

- Bearings
- Gaseous Lubricants
- Greases
- Solid Lubricants

3. COMPRESSOR LUBRICANTS

- General Description •Lubricants for Gas Compressors •Vacuum Pump Lubricants

4. INDUSTRIAL GEAR LUBRICANTS

- General Description •Lubricants

5. TURBINE LUBRICANTS

•General Description •Industrial Turbine Lubricants

6. METALWORKING LUBRICANTS

•General Description of Metalworking Processes •Lubricant types for Metal Forming Processes

•General Lubricant types for Metal Cutting Processes

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7. SPECIALITIES •Process Oils •Textile Oils •Slide Way Oils •Cylinder Oils •Other Lubricants and related Products

9. Refining of Petroleum

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2. EMULSION BREAKING

3. DISTILLATION

4. NATURAL GAS AND NATURAL GASOLINE

5. CRACKING

6. POLYMERIZATION

7. ALKYLATION

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10. ISOMERIZATION

11. FINISHING PROCESSES

12. TREATMENT OF GASOLINE

13. BLENDING OF GASOLINES

14. KEROSENE

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10. Lubricating Oils

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3. BOUNDARY LUBRICATION

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15. SIGNIFICANCE OF CLOUD AND POUR POINT

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2. Applications for Grease Lubrication
3. Structure and Properties of Greases
4. Materials Used in Making Greases
5. Characteristics of Greases from Various Metallic Soaps
6. Greases from Nonsoap Thickeners
7. Pure Petroleum Greases
8. Grease Additives and Fillers

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9. Consistency
10. Apparent Viscosity
11. Dropping Point
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13. Water Resistance
14. Extreme Pressure Qualities
15. Grease Specifications

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17. Lamellar Solids
18. Organic Compounds

RADIATION DAMAGE TO GREASES

12. Refinery Products

1. LOW-BOILING PRODUCTS
2. GASOLINE
3. GASOLINE SPECIFICATIONS
4. DISTILLATE FUELS

•Jet and Turbine Fuels •Automotive Diesel Fuels •Railroad Diesel Fuels •Heating Oils

5. RESIDUAL FUEL OILS

13. Crude Distillation

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2. ATMOSPHERIC TOPPING UNIT
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4. AUXILIARY EQUIPMENT
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About NIIR

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Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

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