

Logo

106-E, Kamla Nagar, New Delhi-110007, India.  
Tel: 91-11-23843955, 23845654, 23845886, +918800733955  
Mobile: +91-9811043595  
Email: npcs.ei@gmail.com, info@entrepreneurindia.co  
Website: www.entrepreneurIndia.co

## **The Complete Technology Book on Detergents (2nd Revised Edition)**

<b>Code:</b> NI92	<b>Format:</b> paperback
<b>Indian Price:</b> ₹1100	<b>US Price:</b> \$125
<b>Pages:</b> 542	<b>ISBN:</b> 9789381039199
<b>Publisher:</b> NIIR PROJECT CONSULTANCY SERVICES	

### **Description**

The Indian detergent industry is about three decades old. An interesting and unique feature of detergent industry in India is the existence of non power operated units which do not use any electrical power for the production of detergent powder. But the production technology of detergents have been changed involving high technique in process control, more skilled personnel and requiring large input. There are various forms of detergents; liquid detergents, paste detergents, solid detergents etc. Whether in liquid or in powdered forms, present detergent products are complex mixtures of several ingredients including performance additives such as bleaches, bleach activators etc. The scope and spectrum of methods and techniques applied in detergent analysis have changed significantly during the last decade..

The book outlines features and experimental parameters for many essential procedures, and emphasizes the latest techniques and methods. This book emphasizes practical aspects of detergent production with latest development and other special products based on synthetic surfactants. This book basically deals with the builders, additives and components of detergents, recent developments in surfactant, manufacture of active Ingredients for detergents, manufacture of finished detergents, application and formulation of detergents, packaging of detergents, analysis of detergents, machinery photographs with their suppliers, directory of raw material suppliers etc.. This is an attempt to fill the need of those desirous of starting detergent industry in small scale sector and necessarily contains analytical methods for testing and evaluation of raw as well as final products.

# Content

## 1. Introduction

Definition

Biodegradability

Synthetic Detergents

Introduction

Surfactant Hydrophile-Hydrophobe Balance

Anionic Surfactants

Alkylaryl Sulfonates

Sulfonation

Sulfation

Neutralization

Nonionic Surfactants

Ethoxylation

Amphoteric Surfactants

Alkylolamides

Cationic Surfactants

## 2. Builders, Additives and components of detergents

Phosphates

Silicates

Soluble glass

Water glass

Soluble powders

Contribution by the alkaline radical  
( $\text{Na}_2\text{O}$  or  $\text{K}_2\text{O}$ )

Contribution by the  $\text{SiO}_2$  radical

Zeolites

Carbonates

Sodium Carbonate or Soda Ash- $\text{Na}_2\text{CO}_3$

Sodium Bicarbonate- $\text{NaHCO}_3$

Sodium Sesquicarbonate, or Modified Soda

Potassium Carbonate

Oxygen-releasing Compounds

Sundry Inorganic Builders

Borax

Sodium Chloride

Magnesium Sulphate

Insoluble Inorganic Fillers

Caustic Alkalis

Ammonia

Colloidal Silica

Sodium Hypochlorite

### 3. Recent Developments in Surfactant

Synthesis

Sulphation of glycerine

Nonionic surfactants

Amphoteric surfactants

Anionic surfactants

Nonionic surfactants

Cationic surfactants

Amphoteric surfactants

Miscellaneous surfactants

Surfactant synthesis

Toxicological studies

Effluent decolorisation

Synthesis of Surfactants and their Toxicity-IV

Diastereoisomers

Fructose  $C_6H_{12}O_6$

Saccharose or sucrose or table sugar

$C_{12}H_{22}O_{11}$

D-Mannose

D-Galactose

$\beta$ -Glucosamine

Anionic surfactants

Cationic surfactants

Nonionic surfactants

Sugar-based surfactants

Toxicity of surfactants

### 4. Manufacture of Active Ingredients for

Detergents

Sulphonation Process

Manufacture of Alkyl benzene sulphonic acid

(Acid Slurry)

Alkyl benzene

Process to obtain straight chain normal

paraffins of desired chain length  
Major technologies using molecular sieves  
for separation of n-paraffins  
Process for alkylation of benzene by narrow  
cut (C10-C14) n-paraffin  
Review of technologies for production of LAB  
from n-paraffins  
UOP technology to manufacture lab from  
kerosene  
Prefractionation unit  
Feed preparation (hydrotreater) unit-hydrobon  
n-Paraffin Extraction Unit (MOLEX)  
Catalytic partial dehydrogenation unit-PACOL  
HF alkylation unit  
Advance in technology in production of LAB  
Improvements in dehydrogenation catalysts  
and process  
Introduction of additional step to achieve  
reduction of by-product diolefins-Define  
process  
Introduction of a solid catalyst in place of  
liquid HF catalyst-UPO-Detal Process  
Other raw materials for sulphonation  
Sulphuric acid and oleum (fuming sulphuric  
acid)  
Liquid SO<sub>3</sub>  
Sulphur  
Sulphonation with sulphuric acid and oleum  
Batch sulphonation  
Manufacturing process  
Sulphonation with 98% sulphuric acid  
Sulphonation with oleum  
Continuous sulphonation with oleum  
Chemithon Process  
Bellestra sulfan process  
Proctor & Gamble Process  
Rifenberick process  
Sulphonation with SO<sub>3</sub>  
Production of sulphur trioxide  
Sulphur burning SO<sub>3</sub> plant

Oleum stripping  
Stabilised liquid sulphur trioxide  
vapourisation  
Batch sulphonation  
Continuous sulphonation with sulphur  
trioxide  
Cascade sulphonation  
SO<sub>3</sub> withdrawal  
Sulphonation plant  
Exhaust gas scrubbing  
Ballestra Sulphurex Process  
Air drying  
SO<sub>2</sub>/SO<sub>3</sub> production  
Film sulphonation & sulphation  
(Sulphurex F)  
Double-step Neutralisation  
Alpha olefins hydrolysis  
Gas scrubbing  
SO<sub>3</sub> absorption in H<sub>2</sub>SO<sub>4</sub> column  
Heat recovery  
Mazzoni SOCS Process  
Chemithon SO<sub>3</sub> Sulphonation  
SO<sub>3</sub> generation  
Sulphonation  
Annular falling film reactor  
Neutraliser system  
Exhaust gas cleaning up system  
Allied chemical thin film sulphonation  
Stepan chemical process  
Manufacture of fatty alcohol sulphonates  
Sulphonation with chloro sulphonic acid  
Manufacture of alpha olefin sulphonate  
Wax cracking  
Ethylene polymerisation  
The natural route  
Comparison of AOS and methyl ester  
sulphonate  
Comparison of AOS and LABs in various  
products  
Dish-washing liquids

Fine cloths washing liquids  
Laundry soaps  
Toilet soaps  
Personal care products  
Detergent cakes  
Comparison of AOS with alcohol based  
surfactants  
Alfodet  
Product usage  
Ethoxylation Process  
Ethylene oxide  
Fatty acid  
Fatty alcohol  
Natural process  
Synthetic process  
Sodium reduction process  
High pressure hydrogenation  
OXO Process  
ALFOL Process  
Alkyl phenols  
Manufacture of lauric d-ethanol amide  
(Ninol AA 62)  
Method of manufacture  
Manufacture of super amide (2:1 type)  
Manufacture of methyl ester  
Manufacture of super-amide  
Manufacture of sulphate alkanolamides  
IGEPOB  
Manufacture of Igepon B conc. paste  
Recent Developments in Sulphonation  
Technology  
Direct Production of Extremely Viscous  
Sulphonic Acids Without the Use of Solvents  
Developments in Detergent Manufacture  
for Consumer Products  
Minimization of 1, 4-Dioxane  
Sodium Alpha Sulpho Methyl Ester  
(SASMA) Production  
Dry Active Detergent Manufacturing

## 5. Manufacture of Finished Detergents

### Powders

#### Simple Absorption

#### Combined Absorption and Neutralization

#### Dry Mixing of Powders

#### Spray-drying of Powders

#### Colour

#### Particle Size and Spread

#### Bulk Density

#### Residual Moisture

#### Stickiness

#### Product Uniformity

#### Separation of Powder

#### Wet Scrubbing

#### Use of Fines

#### Combination of Spray-dried and Dry-mixed

#### Powders

#### Ballestra 'Complex' System

#### Patterson-Kelley Systems

#### Anhydro System

#### Drum-Drying of Powders

#### Liquid Detergents

#### Toilet Preparations

#### Paste Detergents

#### Calcium Sulphonates

#### Solid Detergents

#### Detergent Toilet Bars

#### Household Scrub Bars

#### Fabric Softeners

#### Abrasive Cleaners

## 6. Application and Formulation of Detergents

### Foam

#### Household Cleaning

#### Heavy-Duty Laundering

#### Foam Control

#### Light-Duty Household Products

#### General-Purpose Detergents

#### Choice of Non-ionic

Concentrated Powders  
Cold Water Washing  
Hard-Surface Cleaners  
Machine Dishwashing  
Abrasive-Type Cleaners  
Miscellaneous Household Cleaners  
Commercial Laundering  
Solvent Detergents  
Carpet and Upholstery Cleaners  
Textile Dressing  
Mercerizing  
Food and Dairy Industries  
Advantage of sulphamic acid  
Detergent Sanitizers  
Metal Cleaners  
Miscellaneous Cleaners  
Lavatory Cleaner  
Hand Cleansers  
Waterless Hand Cleansers

7. Important Formulations of Synthetic  
Detergent  
Detergent Powder  
Market Potential & Scope  
Synthetic Detergent Powder  
Manufacture of Household Detergent Powders  
Process  
Formulations for Detergent Powders  
General Purpose Powder  
Raw Material Requirements (per month)  
Process of Manufacture and Formulations  
Heavy Duty Liquid Detergents  
Opaque Lotion-Type Heavy Duty Liquid  
Detergent  
Process of Manufacture of Liquid Detergent  
Dish Washing Liquid Detergents  
Process of Manufacture  
Liquid and Cream Soap Products  
Liquids for the Washing of Fabrics  
Thick Liquids and Creams



Machine Dishwashing Products  
The Composition of Powder  
Liquid Cleansers for Hard Surface  
Window Panes Cleaning Liquid  
Dry Cleaning Detergent  
Process of Manufacture  
List of Plant & Machineries  
Raw Material Requirements (per month)  
Soap Powders  
Introduction  
Spray-Chilled Powders  
Formulation for Spray Chilled Soap Powders  
Spray Dried Powders  
Spray Drying Practice  
Cleansing Powder (Vim Type)  
Manufacturing Process  
Formulation for Cheap Cleansing Powder  
List of Plant and Machinery  
Raw Material Requirements  
Market Potential  
Liquid Detergents  
Requisites of Surfactants for Formulating  
Liquid Detergents  
Surfactants most Commonly Used  
Builders  
Viscosity Controllers  
Other Ingredients  
Household Liquid Detergents for Laundering  
Heavy Duty  
Procedure  
Light Duty: (for silk, wool etc.)  
Procedure

## 8. Packaging of Detergents

Packaging of Detergent Powder  
Types of Packaging  
Packaging of Detergent Bars  
Packaging Material Specifications  
Package Testing Methods  
Introduction

Physical Tests

Substance

Dimensions

Bursting strength

Compression resistance

Tensile strength

Scuff resistance

Moisture content

Other Tests

Wax/polythene substance in coated wrappers

Stability to alkali

Stability to soap

Water absorption

Type of fluting

Machine direction of paper and board

Stiffness of board

Miscellaneous Tests

Packaged Commodities Rules

Introduction

Declarations to be Made on Every Package

Permissible Errors of Quantity

Commodities to be Packed in Specified  
Quantities

Management of Detergent Factories

Technical Efficiency

Introduction

Yield

Fatty acid yield

Glycerol yield

Active detergent yield

Over/under usage of materials

Packing loss/gain

Oil usage pattern

Scrap and downgrading losses

Productivity

Steam, water, electricity

Financial Summary

Pollution Control

Introduction

Sources of Pollution

Oil spills  
Chemical spills  
Bleaching  
Chemical treatment  
Glycerine Recovery  
Synthetic Detergents  
Sulphonation  
Detergent powder manufacture  
Handling of Raw Materials  
Slurry Making, Wash Water  
Tower and Air Lift Exhausts  
Powder Spillages  
Fluidiser Exhaust Air  
Boiler House  
Coal spillages  
Water treatment section  
Boiler Blow Down  
Chimney exhaust  
Boiler ash  
Space and location  
Effluent characteristics  
The requirements of treated effluent  
Effluent treatment methodology  
Treatment of Gaseous Effluents  
Chemical bleaching  
Saponification of oils  
Toilet soap mixer  
Refrigeration system  
Oleum handling in the sulphonation plant  
Oleum still furnace  
NSD bar mixer exhaust  
Boiler exhaust  
Analytical Support  
Introduction  
Oils  
Chemicals  
Packaging Materials  
In-process Materials  
Finished Products  
Microbiological Controls

Analytical Equipments  
General Comments  
Quality Control  
Introduction  
Organisation  
Facilities  
Specifications  
Chemicals  
Packaging materials  
Finished product  
Sampling  
Sampling of Raw Materials  
Packing materials  
Finished products  
Vendor education and rating  
Process audit  
Reporting  
Microbiological Controls  
Bureau of Indian Standards Specifications  
Quality Assurance  
Introduction  
Conventional Approach to Quality  
Recommended Approach to Quality  
Company Quality Policy  
Brand Quality Objectives  
Implementation of Quality Assurance  
Quality Control  
Quality Audit  
Summary  
Total Quality Management (TQM)  
ISO 9000 Series Standards  
Common Quality Problems of Detergents  
Detergent powder  
Detergent Cake  
Stain Removal  
Introduction  
Type of Stains  
Removal of Stains  
Lime soap  
Protein stains

Iron compounds  
Stains due to dyes  
Mildew stains  
Physical methods of stain removal  
Assessment of stain removal

## 9. Analysis of Detergents

Introduction

Synthetic Detergents

Active Matter

Principle

Standard sodium lauryl sulphate  
solution-0.004M

Determination of the purity of sodium lauryl  
sulphate

Molarity of sodium lauryl sulphate

Standard benzethonium chloride  
(hyamine 1622) soln. 0.004M

Determination of anionic active matter

Moisture of Detergent Powders and Cakes

Principle

Process

pH of 1% solution

Principle

Procedure

TFM and Combined Glycerol in Oils

Combined glycerol in oils

Principle

Procedure

Estimation of TFA

## 10. Enzymatic Detergents Empower, Metrizyme

Detergezime

The importance of cleaning instruments  
prior to disinfection

The definition and properties of enzymes

The benefits associated with incorporation  
of enzymes into detergents

The properties and benefits of surfactants  
in enzymatic detergents

Practical usage of enzymatic detergents  
Comparative assessment of Metrex and  
competitor enzyme products

Directory Section

List of Raw Material Suppliers  
Plant and Machinery Suppliers  
Photographs of Machinery and Equipment

## **About NIIR Project Consultancy Services (NPCS)**

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.

NIIR PROJECT CONSULTANCY SERVICES  
106-E, Kamla Nagar, New Delhi-110007, India.  
Tel: 91-11-23843955, 23845654, 23845886, +918800733955  
Mobile: +91-9811043595  
Email: [npcs.ei@gmail.com](mailto:npcs.ei@gmail.com), [info@entrepreneurindia.co](mailto:info@entrepreneurindia.co)  
Website: [www.entrepreneurIndia.co](http://www.entrepreneurIndia.co)