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

Handbook on Gypsum and Gypsum Based Products (Mining, Processing, Transportation, Handling & Storage, Gypsum Board, Plaster of Paris with Machinery & Equipment Details)

Code: NI321	**Format:** paperback
Indian Price: ₹2275	**US Price:** $200
Pages: 360	**ISBN:** 9788194737919
Publisher: NIIR PROJECT CONSULTANCY SERVICES	

Description

Handbook on Gypsum and Gypsum based Products
(Mining, Processing, Transportation, Handling & Storage, Gypsum Board,
Plaster of Paris with Machinery & Equipment Details)
Gypsum is chemically known as calcium sulfate dihydrate and it contains calcium and sulfur, which is bound to oxygen and water. Gypsum is an abundant mineral and takes various forms including alabaster, which is a material, used in decoration and construction. This is a non-toxic mineral and it can be helpful to humans, animals, plant life, and the environment. The majority of gypsum produced is used to manufacture gypsum board or building plasters and it is used in many other ways. Gypsum products are used in dentistry, medicine, homes, and industry. In homes, gypsum plaster is used to make walls; in industry, it is used to make molds. Three types of gypsum products are plaster, stone, and high-strength or improved stone. The Gypsum and the Gypsum products are used for construction purposes. It is also used in industry for making pottery, moulds etc. It is used by orthopedics to make plaster casts and helps the dentist for the cast preparation, models and dies, impression material, investment material, mounting of Casts, as a mold material for processing of complete dentures etc.
The global gypsum board market size is anticipated to exhibit a CAGR of 11.9% in terms of revenue. Increasing utilization of gypsum boards in decorative and partitioning applications in residential constructions is anticipated to drive the market. The demand for gypsum boards is driven by the residential sector, where the product is widely used in multi-family constructions for room partitioning. Durability and

lightweight coupled with easy handling of the product are some of the factors anticipated to propel the demand.
The major contents of the book are Mining, Processing, Transportation, Handling & Storage, Gypsum Board, Plaster of Paris for gypsum, Plant Layout, Process Flow Chart and Diagram, Plant & Machinery Suppliers and Photographs of Machineries.
This book is one-stop guide to one of the fastest growing sector of the Gypsum and Gypsum based Products, where opportunities abound for manufacturers, retailers, and entrepreneurs. This is the only complete handbook on gypsum and gypsum based Products. It serves up a feast of how-to information, from concept to purchasing equipment.

Content

CONTENTS
1. INTRODUCTION
Chemical Identification and Analysis
Gypsum
Plaster of Paris
Calcium Sulfate
Physical-Chemical Properties
History of Gypsum
Gypsum Moulds
Gypsum Credentials
1. Unequalled as a Material for Interiors
2. Gypsum Products’ Unique Properties
Fire Properties
Fire Resistant
Non-Combustible
Effective in Fire
Acoustic Properties
Thermal Properties
Aesthetics and Design
Ease of Installation
From Products to Solutions

2. MANUFACTURING PROCESS
Raw Material
Dehydration: Rock into Plaster
Production Processes

Gypsum Unique Properties in Buildings
Gypsum is Fire Protective
Gypsum Regulates Sound
Gypsum equilibrates Humidity and Heat Peaks
Gypsum is Easy to Install and to Dismantle
Gypsum Acts as a Thermal Insulator when Combined with Insulation Materials
Gypsum is Impact Resistant
Gypsum is Multifaceted, Multipurpose, Supple and Aesthetic
Plaster Board
Gypsum Fibre Boards
Gypsum-Based Self-Levelling Screeds
Plaster Blocks
Decorative Plaster
Building Plaster
Uses of Gypsum
Chemistry of Gypsum Products
Chemistry of Gypsum Product Formation
Setting Mechanism
Manipulation Stages
Manufacture of Gypsum Precursors
“Plaster of Paris” “Hydrocal” “Densite”
Properties
Variables influencing Properties
Manufacturing Variables
User’s Variables
Effects of Increases in Variables on Final Properties
Occurrence of Gypsum
Gypsum Physical Properties
Agricultural Gypsum Uses
1. Gypsum Improves Soil Texture and Compacted Soils
2. Gypsum Decreases Bulk Density of Soil
3. Gypsum Stops Water Runoff, Erosion and Soil Crusting
4. Gypsum Improves Swelling Clays
5. Gypsum Increases Value of Organics
6. Gypsum Counteracts Subsoil Acidity
7. Gypsum Helps Reclaim Sodic Soils

8. Gypsum Decreased ph of Sodic Soils
9. Gypsum Enhances Water Use Efficiency
10. Gypsum Makes it Possible to Use Low Quality Irrigation Water
11. Gypsum Replaces Harmful Salts
12. An Excellent Fertilizer Source for Calcium and Sulfur
13. Gypsum Helps with High Bicarbonate Irrigation Water
14. Gypsum Makes Slightly Wet Soils Easier to Till
15. Gypsum Prevents Water Logging of Soil
16. Gypsum Helps Earthworms to Flourish
3. TYPES OF GYPSUM PRODUCTS
Setting of Gypsum Products
Theories of Setting of Gypsum Products
Hydration Theory
Dissolution Precipitation Theory
Setting Process
Stages
W:P Ratio
Recommended Ranges
Properties
Setting Time
Mixing Time
1. Loss of Gloss Test for Initial Set
2. Initial Gillmore Test for Initial Set
3. Gillmore Test for Final Setting Time
Vicat Test for Setting Time
Ready for Use Criterion
Control of Setting Time (S.T.)
4. PLASTER OF PARIS
Preparation of Plaster of Paris
Step 1 - Plaster of Paris Manufacture
Step 2 - Rehydration
Common Plaster Additives
Step 3 - Setting
Properties
Application of Plaster of Paris
Uses of Plaster of Paris
Architecture

Art
Uses in Medicinal and Fireproof Fields
Medicinal
Fireproof
5. GYPSUM BOARD
The Chemistry of Gypsum Board
Gypsum Board Manufacturing Process
Step-1
Step-2
Step-3
Step-4
Advantages of Gypsum Board
Areas of Applications
Gypsum Board for Acoustic Applications
Gypsum Board for Ceiling Application
Drywall
Manufacturing Process
Blending of Additives
Making the Sandwich
Finishing the Edges
Cutting the Panels
The Drying Process
The Finished Product
Types of Gypsum Board
Regular and Type X Gypsum Board
Types of Gypsum Board Based on Edges
Common Types of Gypsum Board
(a) Regular/Standard Gypsum Board
(b) Fire Resistance Gypsum Board
(c) Moisture Resistance Gypsum Board
(d) Fire & Moisture Resistance Gypsum Board
(e) Abuse-Resistant Gypsum Panels
(f) Exterior Gypsum Soffit Board
(g) Foil-Backed Gypsum Board
Gypsum Fiber Board
Glass Mat Gypsum Board
Sheathing
Backing Board
6. TYPES AND SOURCES OF GYPSUM
Mined Gypsum

Flue Gas Desulphurization (FGD) gypsum and
Spray-Dry Absorption materials (SDA)
Phosphogypsum
Pickle Gypsum
Drywall Gypsum
Landfill Versus Recycling
Green Building
Common Uses of Gypsum
Markets for Gypsum Products
General Benefits of Gypsum for Soils
Soil Crusting
Acid Subsoil
Sodic or Salt Contaminated Soils
Nutrient Availability
Runoff and Water Absorption
Animal Bedding
Poultry Bedding
Manure Treatment
Crops Known to Benefit From Gypsum
Plants that can Benefit from Gypsum Include
Animals
Application
7. DIFFERENT TYPES OF DRYWALL
1. Dry Lining Systems
2. Interior Partition Systems
3. Performance partition Systems
How to build a drywall
Installation
Drywall Tools
Fixing Tools
Cutting Tools
Marking Tools
Finishing Tools
Lifting Tools
Basic Principles to Design a Drywall
Key Design Criteria
Height
Maximum Partition Heights
Thermal Insulation
Different Types of Drywall

Benefits of Effective Thermal Insulation make Building
8. GYPSUM PRODUCTS IN DENTISTRY: TYPES, USES, PROPERTIES
Desirable Properties
Types of Gypsum Products
A. Plaster
B. Stone
C. High-Strength or Improved Stone
D. Other Types of Gypsum
Setting Reaction
Water/Powder Ratio
Setting Time
Definitions
1. Working Time or Initial Setting Time
2. Final Setting Time
Measurement
Variation in Setting Times
1. Increased Setting Time (A Slower-Setting Product)
2. Decreased Setting Time (A Faster-Setting Product)
Setting Expansion
Strength
9. GYPSUM AS AN AGRICULTURAL PRODUCT
Benefits of Gypsum as a Soil Amendment
Processing Gypsum into a Soil Amendment
Agricultural and Land Application uses of Gypsum
Gypsum as a Source of Plant Nutrients for Crops
Gypsum to Improve Soil Physical Properties
Gypsum to Improve Soil Chemical Properties
Gypsum for Nursery, Greenhouse, Landscape, and Sports Field Use
Gypsum for Landscape and Sports Field Use
Other Uses of Gypsum in Agriculture
Use of Gypsum as a Soil Conditioner
Causes of Poor Soil Structure
Recognition of Gypsum Responsive Soils
Exchangeable Sodium Percentage (ESP)
Exchangeable Magnesium Percentage (EMgP)

Calcium: Magnesium Ratio (Ca:Mg)
Clay Dispersion Index
10. MINING TECHNOLOGY
Exploration Techniques
Stratigraphy
Topography
Vegetation
Hydrology
Deposit Evaluation
Drilling and Sampling
Testing Procedures
11. PREPARATION OF OTHER GYPSUM AND ANHYDRITE
Phosphogypsum
Titanogypsum
Insoluble Anhydrite
Calcination Methods
Batch Kettle
Continuous Kettles
Submerged Combustion Kettles
Conical Kettle
Rotary Kilns
Impact Mill Calciner
Ring Ball and Roller Mills
Calcidyne Unit
Anhydrous and Multiphase Plaster
Hemihydrate Plasters
12. ROLE OF GYPSUM IN CEMENT
The Effect of Gypsum on Setting of Cement
The Effect of Gypsum Solubility
Optimum Gypsum Content
Strength and Volume Stability
Effects of Gypsum on Cement
13. TECHNOLOGY OF GYPSUM AND GYPSUM PLASTERS

14. GYPSUM TRANSPORTATION
Power Station to Plaster Board Factory
Packaging
Transportation

Truck
Rail
Barge
Ship
15. GYPSUM HANDLING AND STORAGE
Handling and Transportation
Gypsum Storage
Gypsum Panel Products
Safety Tips for Handling
Handling and Storage of Gypsum Panel Products:
A guide for distributors, Retailers, and
Contractors
Storage
Support Risers
Preventing Sagging Gypsum Panel Products
Preventing Sagging Gypsum Panel Products, cont.
Manual Handling
Mechanical Handling
Use of Wedges
Stocking Gypsum Panel Products on Job Sites
Loading Gypsum Panel Products
Open Top Rail Flatcars
Flatbed Trucks
Guidelines for Carriers, Drivers and Trailer
Loading Personnel
16. GYPSUM BOARD WASTE MANAGEMENT
Gypsum and Gypsum Board
Sustainability Imperative
Gypsum Board Waste and the Management
Recycling Process and Technology
Policy Instruments for Promoting Recycling
Action on Gypsum Board Waste
CRD Waste Management in Europe
17. GRINDING AND CALCINING OF GYPSUM

18. CRYSTALLISTAION AND DISSOLUTION OF
GYPSUM
Introduction
Background Information
Mineralogy

Crystal Nucleation: The Classical Nucleation Theory
The Induction Period and the Surface Free Energy
Crystallization of Gypsum
Gypsum Nucleation Kinetics
Gypsum Nucleation Induction Period and the Surface Free Energy
Inhibition of Gypsum Crystallization
Dissolution of Gypsum
Gypsum Dissolution Kinetics
Surface Behavior of Gypsum during Dissolution
19. GYPSUM PELLETIZING
Gypsum Waste
Recycled Gypsum Products
Agricultural Products
New Drywall
Cement
Paper Products
Composting
Flow Diagram of Typical Gypsum Pelletizing Process
Gypsum Pelletizing
Pelletizing Gypsum for Use as a Soil Conditioner
Benefits of Pelletizing Gypsum
The Basics of Pelletizing Gypsum
Disc Pelletizer
Rotary Dryer
Important Gypsum Pelletizing Elements
Binder
Equipment
Drying Gypsum
Drying Mined Gypsum
Beneficiation
Drying Gypsum for Use in Wallboard
Benefits to Drying Pelletized Gypsum
Improved Product Handling
Product Consistency
The Benefits of Adding a Pin Mixer to a Gypsum Pelletizing System
How it Works

Improved Blending
De-Dusting
Improved Productivity
Reduced Binder Usage
20. BIS SPECIFICATIONS

21. PROCESS FLOW SHEET

22. PLANT LAYOUT

23. PHOTOGRAPHS OF MACHINERY WITH SUPPLIER’S CONTACT DETAILS
Gypsum Board Making Machine
Plaster of Paris Making Machine
Rotary Kiln
Gypsum Cutting Machine
Storage Tank
Conveyors
Gypsum Rotary Dryer
Blower
Crusher
Scrubber
Hammer Mill
Coarse Grain Silos
Mixer
Gypsum Plaster Spraying Machine
Pulveriser
Automatic Corrugated Board Making Machine
Corrugated Board Making Machine
Rotary Calciner
Rotary Die Cutting Machine
Die Cutting Creasing
Conveyor Belt
Blower
VSI Crusher
Scrubber Making Machine
Semi-Automatic Hammer Mill
Gypsum Plaster Spraying Machine
Plaster Spray Machine
Semi-automatic Bandage Machine

Gypsum Powder Production Line
Gypsum Board Production Line Machine

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, info@entrepreneurindia.co
Website: www.entrepreneurIndia.co