The Complete Technology Book on Electroplating, Phosphating, Powder Coating and Metal Finishing (2nd Revised Edition)
Introduction

Electroplating is the process of depositing a metal coating onto the surface of an object through the use of an electrical current. Electroplating has evolved into a highly complex process requiring a high level of precision and expertise. Phosphating is the process of converting a steel surface to iron phosphate. This is mostly used as a pretreatment method in conjunction with another method of corrosion protection.

Related Projects: - Electroplating, Metal Polishing, Anodizing, Phosphating, Metal Finishing and Powder Coating projects
Common Electroplating Applications and Industries

Electroplating is everywhere. From automotive trim to the parts of the last rocket ship you watched get launched into space, electroplated materials are used for their versatility, their conductivity, their appearance, and more. Here are a few examples of common applications:

**EMI Shielding in Electronics:** Electromagnetic interference (EMI) is a concern in any situation involving electronic systems. EMI shielding using electroplating can protect a device or cabling, so that conflicting signals and interference are blocked. EMI shielding can also be used to help prevent power degradation issues in cables.

**Related Books:** Electroplating, Anodizing, Metal Treatment, Powder Coating, Metal Finishing, Electrochemical, Electroplating Chemicals
Chrome plating in automotive trim: Your “chrome” bumper may not actually be chrome. It’s most likely made from injection-molded ABS plastic, plated with a thin layer of copper, nickel, and chromium so that it’s super shiny, more resistant to rust, and not as easy to scratch.

Hard chrome plating on high wear surfaces: Hard chrome plating is used to increase the hardness, durability, and corrosion resistance on high wear surfaces. Chromium metal is used to add a hard, durable surface finish with improved wear, even in extreme situations. Parts last longer and resist corrosion, and chromium is less likely to wear away in harsh environments.

Related Videos: - Electrical, Electronic Industries and Power Projects
Electroplating is widely used in industry and decorative arts to improve the surface qualities of objects—such as resistance to abrasion and corrosion, lubricity, reflectivity, electrical conductivity, or appearance. It may also be used to build up thickness on undersized or worn-out parts, or to manufacture metal plates with complex shape, a process called electroforming. It is also used to purify metals such as copper.

The term "electroplating" may also be used occasionally for processes that use an electric current to achieve oxidation of anions on to a solid substrate, as in the formation of silver chloride on silver wire to make silver/silver-chloride electrodes. Electro polishing, a process that uses an electric current to remove metal captions from the surface of a metal object, may be thought of as the opposite of electroplating.

Three Different Types of Electroplating Process:

Tank plating process is the most popular and useful process that is suitable for all types of electroplating or electroforming processes. It produces a high quality surface of plating objects and allows you to plate many items at the same time. You can also clean or electro-polish the plating objects in a tank as well. Using this process you can plate many objects inside and outside as well. It is very quick (plating time is usually 30-60 seconds) but this process requires equipment such as a power supply (rectifiers), tanks, anodes, cathode turning stands, heating and agitation systems.

Related Projects: - Electroplating, Metal Polishing, Anodizing, Phosphating, Metal Finishing and Powder Coating projects
This equipment is very useful because it allows you to do many additional processes such as electro cleaning, stripping, electro etching and electro polishing. Usually each process, including rinsing, requires one tank with a correct solution. For example: just deep plating objects in a cleaning tank first, then take it out and deep it in a rinsing tank with tap water and finally deep it in a tank with the plating solution. Switch ON your power supply (rectifier) and wait for few seconds (it depends of the process) and then you will find your item fully plated.

Projects:- Project Reports & Profiles
2. The Brush plating process is widely used to plate fixed items like kitchen and bath taps, showers, tubes etc. It gives you a good quality of plated surface if you are experienced enough and if the object for this process has been prepared properly. The chemicals for this process are more expensive (if compared against tank plating chemicals) because they are more concentrated and you will able to plate only one object at a time. However for brush plating process you have to know that objects can be plated outside only. This process is fully suitable only for Gold, Silver, Nickel, Copper and Chrome plating. If you wish to plate your objects in other metal (like zinc, tin, bronze etc) then you will have no choice but to use a tank plating process to get a good quality of plating surface).

**Books:** [BOOKS & DATABASES](#)
3. The Pen plating process can be used to plate very small details, or individual small parts on a large object. For example, you can plate the fingernails or eyebrows on a bronze statue in silver. Pen plating is suitable only for Copper, Gold, Rhodium and Silver plating process.

Powder coating is a finishing process in which a coating is applied electrostatically to a surface as a free-floating, dry powder before heat is used to finalize the coating. The powder can be made of any number of products: polyester, polyurethane, polyester-epoxy, straight epoxy, and acrylics. Metal finishing is the final step in the manufacturing process used to provide aesthetics and environmental protection.

**Market Research: - Market Research Report**
A popular metal finishing process, electroplating is used in a variety of industries for a wide range of applications. The electroplating process uses an electric current to deposit a thin layer of material on top of an object. It’s primarily used to increase wear resistance, protect against corrosion, increase thickness, or change the aesthetic appeal of an object. In aerospace, automotive, computer, military, space exploration, medical device, healthcare, telecom, and other industries, it’s also used to add conductivity, heat resistance, help prevent oxidation, and to meet the demands of engineering teams for unique material combinations.

**Common Electroplated Finishes**

Electroplating can be done using several metals, including gold, platinum, rhodium, nickel, copper, tin, and, along with alloys made with a combination of these metals with others.


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**Benefits of Electroplating:**

Why is electroplating used in so many industries, for both industrial and consumer applications? Because it’s incredibly versatile. Here are some of the benefits of manufacturing and product applications:

**Protective barrier:** Electroplated parts can last longer with the protective barrier that’s applied during electroplating. They can hold up better under extreme heat and cold conditions, and more readily resist corrosion.

**Improve aesthetics:** Electroplating is commonly used to enhance the appearance of products, from jewelry to automotive interiors. It’s cost-effective and can be used to create a look of luxury.

**Reduce friction:** Electroplating can improve performance, by reducing friction in products like electrical connectors. Nickel plating is frequently used for this purpose.

**Related Book:** The Complete Technology Book on Electroplating, Phosphating, Powder Coating and Metal Finishing (2nd Revised Edition)
**Electricity conductivity**: Silver plating enhances electrical conductivity, a cost-effective and efficient option for manufacturers of electrical components, and electronic products.

**Oxygen absorption**: Electroplating an item with palladium absorbs excess oxygen from the manufacturing of automotive catalytic converters, improving their performance.

**Whisker prevention**: An alloy of zinc and nickel can help prevent the formation of whiskers, which are sharp protrusions that can occur during manufacturing operations. These whiskers can cause damage from arcing and shorts in electrical parts and components. Electroplating with this zinc-nickel alloy can significantly reduce this type of damage.

**Projects**: [Project Reports & Profiles]
Heat resistance: Gold and zinc-nickel alloys can be electroplated onto engine parts and components to reduce damage from extreme temperatures. This increases the parts/components lifespan and means they can better withstand extremely high temperatures.

Hardness: Electroplating can be used to make surfaces harder, making brittle materials much stronger and extending the lifespan of the plated object. Plated surfaces are also less susceptible to damage from being dropped or struck.

Added adhesion: Copper is often electroplated onto a piece when it needs to have a smoother and uniform finish. It’s an ideal way to provide an undercoating for adhesion or for additional plating with other materials.

Added thickness: There are times when a product needs to have an added thickness for the overall quality and longevity of the finish. Copper-nickel plating is a popular choice in manufacturing situations that call for higher thicknesses.
Uses of Electroplating

Talking about the uses of electroplating, apart from enhancing the appearance of the substrate it is used in various other purposes as well. The major application is to optimize a material’s resistance towards corrosion. The plated layer often serves as a sacrificial coating which reveals that it dissolves before the base substance. Some of the other common applications of electroplating involve:

- Improving wear resistance.
- Improving the thickness of the metal surface.
- Enhancing the electrical conductivity like plating a copper layer on an electrical component.
- Minimizing Friction.
- Improving surface uniformity.

Books:- BOOKS & DATABASES
Applications of Electroplating

Electroplating is widely used in numerous sectors for coating metal objects with a thin layer of a different metal. The added metal has a desired property the original object lacks and is primarily used to improve corrosion resistance. Chromium plating is a great example. So much so that you’ll see it on many objects such as car parts, bath taps, gas burners, wheel rims and many others.

Other uses include:

- Increase wear resistance
- Protect against surface abrasions
- Reduce friction

Market Research: - Market Research Report
Improve electrical conductivity (copper layer onto an electrical component)
Prepare surfaces for better adhesion before painting or re-coating
Common metals used in electroplating include zinc, copper and tin but also precious metals like gold, silver and palladium. Plating is possible using single metals or with various combinations (alloys) that can provide additional value to the electroplating process. Silver and Tin are essential finishes for components that are designed to carry heavy electrical currents.

The electroplating market mostly is driven by the electronics and electrical industry and followed by the automotive industry. The demand for electroplating is rising rapidly from the end user industries which propel the growth of the market.

The increasing demand for durable metals and growing use of adaptable manufacturing processes for a wide range of applications in the automotive, aerospace & defense, and electrical & electronics industries are likely to boost the demand for electroplating. With the growing demand for high-performance automobile components having excellent resistance to corrosion to enhance the appearance of exterior automobile parts, such as emblems, door handles, hood ornaments, and wheel rims, is driving the demand for electroplating and likely to continue owing to the increasing automobiles production in Asia-Pacific and other emerging economies in the Middle East & Africa. The zinc-nickel electroplating is one of the popular methods of electroplating in the automotive industry.

Market Growth:-
The growing end-use industry is fuelling the growth of the market. Electroplating is widely used in industries for a variety of technological and decorative applications. With the advent in Industry 4.0, R&D within metal finishing is rising, the demand for durable metals with the adaptable manufacturing process is rising, from automotive to aerospace to Jewellery and machinery. Innovations are being brought to improved quality of electroplating, and to expand the markets for a decorative electroplated nickel or chromium plating owing to the rising requirement of the exceptional corrosion performance of decorative multilayer in automotive decorative plating.

Market Research: - [Market Research Report](http://www.entrepreneurindia.co)
However, increasing concern over toxic wastes produced by conventional metal finishing operations in the electroplating process and a growing push to develop alternative clean technology is predicted to hinder the growth of the market. The global electroplating market is projected to reach US$ 21.9 billion by the end of 2027, in terms of revenue, growing at CAGR of 3.7% during the forecast period (2019 to 2027).

Ongoing industrialization around the globe especially in the Asia Pacific region, along with increasing disposable income in the developed countries of Asia Pacific is fueling the demand for electroplating across electronics, automotive, and jewelry industry. According to the Coherent Market Insights analysis, Asia-Pacific is projected to register a CAGR of 4.6% due to robust demand across end-use industries. Therefore, ongoing industrialization is expected to fuel the market growth of electroplating.

Projects:-  Project Reports & Profiles
Rising demand for electroplating from aerospace and defense application for providing proper finishing to the machinery is expected to foster the market growth of electroplating. The finishing usually involves the process of coating metal that sticks to the surface of material and provide a protective bond. Moreover, the process also provides corrosion resistance, electrical conductivity, heat resistance, and friction wear to the machinery in the defense industry. Therefore, rising demand for electroplating for the aforementioned application in the defense industry is propelling the market growth.

Books: - **BOOKS & DATABASES**
The book cover various aspects related to different Electroplating, Phosphating, Powder Coating and Metal Finishing with their manufacturing process and also provides contact details of machinery suppliers with equipment photographs and plant layout.

A total guide to manufacturing and entrepreneurial success in one of today’s complete process of electroplating to metal finishing in industry. This book is one-stop guide to one of the fastest growing electroplating, Phosphating, powder coating and metal finishing industry, where opportunities abound for manufacturers, retailers, and entrepreneurs. The book serves up a feast of how-to information, from concept to purchasing equipment.

**Market Research: - Market Research Report**
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British Standard 1389: 1973 Phosphate Treatment of Iron and Steel
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Treatment of High Tensile Steels
Equipment for Phosphating
Immersion Phosphating Plant
Spray Phosphating Equipment
Tanks
Solution Heating
Fume Extraction
Sludge Removal
Phosphating Processes
Key to Table
Light Weight Iron Phosphate Processes
Canphos 301
Canphos 304
Equipment
Solution Composition and Operating Conditions
Preparation of the 300 Range Phosphating Solutions
Operating Sequences
Solution Maintenance
Heavy Zinc Phosphate Processes
Equipment
Canphos
Canphos
Solution Composition and Operating Conditions
Preparation of the 400 Range of Phosphating Solutions
Solution Maintenance
Visual Control
Calcium Modified Zinc Phosphate Processes
Canphos
Canphos
Canphos
Equipment
Solution Preparation
Operating Sequences
Solution Maintenance
Addition Rates
Light Weight Zinc Phosphate Processes
Canphos
Canphos
Solution Composition and Operating Conditions
Solution Preparation
Solution Maintenance
Addition Rates
Manganese Phosphate Processes
Canphos
Equipment
Solution Composition
Operating Conditions
Solution Preparation
Operating Sequences
Solution Maintenance
Phosphating Process Sequences
Pre-Treatment Processes
Alkaline Cleaners
Equipment
Maintenance
Defoaming
Pickling and Derusting
Conditioning
Post Phosphating Treatments
Sealing Treatment
Chromic Rinse Solution (DEF STAN 03-11/1)
Equipment
Oils and Lubricants
Black Finishes
Sealphos 721 Black Stain
Sealphos 708 Matt Black
Aluminium Pre-Treatment
Alibond 802
Equipment
Solution Composition
Operating Conditions
Operating Sequence
Solution Maintenance
Solution Analysis
General Phosphating Information
Sludge Removal
Control of Solution Composition and Chemical Balance
Effluent Treatment
13. ELECTROPAINTING OF ALUMINIUM

The Process

Principles of Electropainting

Process Details

Jigging

Pre-treatment

Paint Application

4 Rinsing and Ultrafiltration

Stoving

Costs

Conclusion

Developments

The Future
14. POWDER COATING OF ALUMINIUM

Method of Application

Equipment
Electrostatic Generator and Gun
Powder Recovery
Stoving
Powder Coating Production
Colour
Thermoplastic Powder Coatings
Polyethylene (Polythene)
PVC
Nylon
Factors Affecting Use of Thermo-plastic Coatings
15. BRIGHT NICKEL ELECTROPLATING

Brighteners
Levellers
Stress Relievers
Wetting Agents
Properties of electro-deposited bright nickel
Brightness
Reflectivity
Roughness and Pitting
Porosity
Corrosion Resistance
Chromability
Adhesion and Surface Preparation
Ductility
Internal Stress
Hardness
Effect of hydrogen absorption
Properties of Bright Nickel Baths
Stability
Cathode and anode efficiencies
Operating range
Simplicity of operation
Throwing power
The incorporation and effect of organic addition agents
Mechanisms of incorporation of organic compounds in electro-deposits
Cathodic Reduction
Interaction of organic additions
Levelling
Effect of additives on structure
Grain size, orientation and brightness of electro-deposits
Effect of additions on stress, ductility and hardness
Stress first decreases, then rises as concentration is increased.
16. BIS SPECIFICATIONS

17. PHOTOGRAPHS OF MACHINERY WITH SUPPLIER’S CONTACT DETAILS

Electroplating Rectifiers
Electroplating Process Tank
Rotating Barrel
Auto Stat
Automatic Voltage Controller
Automatic Powder Coating Plant
ED Coating Plant / CED Coating Plant
Control panels
Advance Controller
Painting Booth
Metal Finishing Machines

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Rotary Dryers
Shot Blasting
Vibratory Finishing Machines
Polyamide (Glide) Coating
Zinc Plating Plants
Material Handling System
Flocking Units
Electric Oven
Industrial Oven
Plating Barrel
Servo Stabilizer

18. PLANT LAYOUT AND PROCESS FLOW SHEETS
#InvestingCapitalForBusiness
#HowToMakeYourBusinessMoreSuccessful #investorbusiness
#Startupcapital #BusinessPlanning #TechnologyTrendsForBusiness
#StartupIdea #NPCS #DetailedProjectReport
Niir Project Consultancy Services (NPCS) can provide Process Technology Book on

The Complete Technology Book on Electroplating, Phosphating, Powder Coating and Metal Finishing (2nd Revised Edition)

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- Export-Import Market Potential
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Working Capital Requirement, uses and applications, Plant Layout, Project Financials, Process Flow Sheet, Cost of Project, Projected Balance Sheets, Profitability Ratios, Break Even Analysis. The DPR (Detailed Project Report) is formulated by highly accomplished and experienced consultants and the market research and analysis are supported by a panel of experts and digitalized data bank.

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- We adopt a systematic approach to provide the strong fundamental support needed for the effective delivery of services to our Clients’ in India & abroad.
We at NPCS want to grow with you by providing solutions scale to suit your new operations and help you reduce risk and give a high return on application investments. We have successfully achieved top-notch quality standards with a high level of customer appreciation resulting in long lasting relation and large amount of referral work through technological breakthrough and innovative concepts. A large number of our Indian, Overseas and NRI Clients have appreciated our expertise for excellence which speaks volumes about our commitment and dedication to every client's success.
We bring deep, functional expertise, but are known for our holistic perspective: we capture value across boundaries and between the silos of any organization. We have proven a multiplier effect from optimizing the sum of the parts, not just the individual pieces. We actively encourage a culture of innovation, which facilitates the development of new technologies and ensures a high quality product.
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- Project Identification
- Detailed Project Reports/Pre-feasibility Reports
- Market Research Reports
- Business Plan
- Technology Books and Directory
- Industry Trend
- Databases on CD-ROM
- Laboratory Testing Services
- Turnkey Project Consultancy/Solutions
- Entrepreneur India (An Industrial Monthly Journal)
How are we different?

- We have two decades long experience in project consultancy and market research field.
- We empower our customers with the prerequisite know-how to take sound business decisions.
- We help catalyze business growth by providing distinctive and profound market analysis.
- We serve a wide array of customers, from individual entrepreneurs to Corporations and Foreign Investors.
- We use authentic & reliable sources to ensure business precision.
Our Approach

- Requirement collection
- Thorough analysis of the project
- Economic feasibility study of the Project
- Market potential survey/research
- Report Compilation
Who do we Serve?

- Public-sector Companies
- Corporates
- Government Undertakings
- Individual Entrepreneurs
- NRI’s
- Foreign Investors
- Non-profit Organizations, NBFC’s
- Educational Institutions
- Embassies & Consulates
- Consultancies
- Industry / trade associations
Sectors We Cover

- Ayurvedic And Herbal Medicines, Herbal Cosmetics
- Alcoholic And Non Alcoholic Beverages, Drinks
- Adhesives, Industrial Adhesive, Sealants, Glues, Gum & Resin
- Activated Carbon & Activated Charcoal
- Aluminium And Aluminium Extrusion Profiles & Sections,
- Bio-fertilizers And Biotechnology
- Breakfast Snacks And Cereal Food
- Bicycle Tyres & Tubes, Bicycle Parts, Bicycle Assembling
Sectors We Cover  Cont...

- Bamboo And Cane Based Projects
- Building Materials And Construction Projects
- Biodegradable & Bioplastic Based Projects
- Chemicals (Organic And Inorganic)
- Confectionery, Bakery/Baking And Other Food
- Cereal Processing
- Coconut And Coconut Based Products
- Cold Storage For Fruits & Vegetables
- Coal & Coal Byproduct
Sectors We Cover

- Copper & Copper Based Projects
- Dairy/Milk Processing
- Disinfectants, Pesticides, Insecticides, Mosquito Repellents,
- Electrical, Electronic And Computer based Projects
- Essential Oils, Oils & Fats And Allied
- Engineering Goods
- Fibre Glass & Float Glass
- Fast Moving Consumer Goods
- Food, Bakery, Agro Processing
Sectors We Cover  Cont...

- Fruits & Vegetables Processing
- Ferro Alloys Based Projects
- Fertilizers & Biofertilizers
- Ginger & Ginger Based Projects
- Herbs And Medicinal Cultivation And Jatropha (Biofuel)
- Hotel & Hospitability Projects
- Hospital Based Projects
- Herbal Based Projects
- Inks, Stationery And Export Industries
Sectors We Cover

- Infrastructure Projects
- Jute & Jute Based Products
- Leather And Leather Based Projects
- Leisure & Entertainment Based Projects
- Livestock Farming Of Birds & Animals
- Minerals And Minerals
- Maize Processing (Wet Milling) & Maize Based Projects
- Medical Plastics, Disposables Plastic Syringe, Blood Bags
- Organic Farming, Neem Products Etc.
Sectors We Cover  cont...

- Paints, Pigments, Varnish & Lacquer
- Paper And Paper Board, Paper Recycling Projects
- Printing Inks
- Packaging Based Projects
- Perfumes, Cosmetics And Flavours
- Power Generation Based Projects & Renewable Energy Based Projects
- Pharmaceuticals And Drugs
- Plantations, Farming And Cultivations
- Plastic Film, Plastic Waste And Plastic Compounds
- Plastic, PVC, PET, HDPE, LDPE Etc.
Sectors We Cover  Cont...

- Potato And Potato Based Projects
- Printing And Packaging
- Real Estate, Leisure And Hospitality
- Rubber And Rubber Products
- Soaps And Detergents
- Stationary Products
- Spices And Snacks Food
- Steel & Steel Products
- Textile Auxiliary And Chemicals
Sectors We Cover  cont...

- Township & Residential Complex
- Textiles And Readymade Garments
- Waste Management & Recycling
- Wood & Wood Products
- Water Industry (Packaged Drinking Water & Mineral Water)
- Wire & Cable
MARKET RESEARCH REPORTS
To get a detailed scenario of the industry along with its structure and classification
To provide a comprehensive analysis of the industry by covering aspects like:
- Growth drivers of the industry
- Latest market trends
- Insights on regulatory framework
- SWOT Analysis
- Demand-Supply Situation
- Foreign Trade
- Porters 5 Forces Analysis
Objective

➢ To provide forecasts of key parameters which helps to anticipate the industry performance
➢ To help chart growth trajectory of a business by detailing the factors that affect the industry growth
➢ To help an entrepreneur/manager in keeping abreast with the changes in the industry
➢ To evaluate the competitive landscape of the industry by detailing:
   ➢ Key players with their market shares
   ➢ Financial comparison of present players
Venturist/Capitalists
Entrepreneur/Companies
Industry Researchers
Investment Funds
Foreign Investors, NRI’s
Project Consultants/Chartered Accountants
Banks
Corporates

Click here for list
Data Sources

Secondary Research
- Surveys
- One-on-one Interactions
- Databases

Primary Research

Online Research
- Industry Journals

Industry Sources
- Industry Experts
- Industry Associations
- Companies

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Scope & Coverage

Present Status
(Indian & Global)

Macro Environment

Indian Market

Outlook & Forecasts
(5Years)

Demand Assessment

Internal Market Analysis

SWOT & Porters Analysis
Our research team comprises of experts from various financial fields:

- MBA’s
- Industry Researchers
- Financial Planners
- Research veterans with decades of experience
Structure of the Report

1. Overview
2. Market Analysis
   - 2.1 Growth Drivers
   - 2.2 Emerging Trends in the Industry
   - 2.3 Regulatory Framework
   - 2.4 SWOT Analysis
   - 2.5 Herfindahl–Hirschman Index (HHI)
3. Market Forecasts
4. Key Players
5. Key Financials and Analysis
5.1 Contact Information
5.2 Key Financials
5.3 Financial comparison
6. Industry Size & Outlook
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