Electroplating and Metal Finishing concerns itself with the development and applications of composites and non metallic coatings. These coatings are used for decorative, protective and functional application. Some of the other common metal surface finishing technologies are phosphating, pickling, electroforming, powder coating etc. Electroplating is the process of applying a metallic coating to an article by passing an electric current through an electrolyte in contact with the article, thereby forming a surface having properties or dimensions different from those of the article. Metal finishing has now come to be known as surface engineering. Surface engineering techniques are generally used to develop a wide range of functional properties. In addition to the decorative aspects, metal finishing aids the protection of metals and alloys from corrosion and rusting. A great potential exists for development of new materials involving, for example, coatings of metals composites particle incorporated anodic coatings and even films of sapphire like materials, porous files of niobium etc. and coating of refractory metals like molybdenum and tungsten. Phosphate coatings have a wide field of application in manufacturing industry, both as an aid to mechanical production operations and in surface finishing. The major applications for phosphate treatments fall into four areas; pre treatment prior to organic coatings, protection against corrosion, anti wear coatings and phosphating as a production aid. Powder coating of aluminium, extrusions in particular, has become an important feature in the finishing of aluminium. There are several advantages of powder; powder coating overspray can be recycled and thus it is possible to achieve nearly 100% use of the coating, powder coating production lines produce less hazardous waste than conventional liquid coatings, capital equipment and operating costs for a powder line are generally less than for conventional liquid lines. Surface finishing is a broad range of industrial processes that alter the surface of a manufactured item to achieve a certain property. Currently, the trend is towards surface treatments. Industries in developing countries like India have to be increasingly aware of the need not only for up gradation of existing technologies but also for indigenization of new technologies on a time bound basis. The content of the book includes information about technology involved in surface engineering of metals; some of them are electroplating plant, barrel planting plant, electroplating equipment, cleaning, pickling and dipping, equipment for hot alkaline cleaners, electrolytic and chemical processes for the polishing of metals, canning stainless steel electro-polishing solution, electroforming in gramophone record production, silver plating, fluoborate plating, gold plating (gilding), cadmium plating, zinc plating, chemical finishing of aluminium, powder coating of aluminium, bright nickel electro plating, copper plating, etc. This book covers an intensive study of technology of electroplating, phosphating, powder coating and metal finishing. The first hand information on these technologies is dealt in the book and can be very useful for those looking for entrepreneurship opportunity in the said industry.
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23. BRIGHT NICKEL ELECTRO-PLATING

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.

24. ELECTROPLATING SOLUTIONS
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White Brass
Bronze Plating
Cadmium Electro-plating
Alkaline Cyanide Baths
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Production Plating Conditions
Acid Sulfate Baths
Preparation of the Plating Bath
Production Plating Conditions
Neutral Chloride Baths
Preparation of the Plating Bath
Production Plating Conditions
Acid Fluoborate Baths

25. DECORATIVE CHROMIUM PLATING
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Chemistry for Trivalent Chromium
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Waste Treatment
Corrosion Protection
Decorative Black Chromium
Bulk Chromium Plating

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Fixturing and Rack Design
Stop Offs
Tapes
Lacquers
Wax
Shields and Robbers
Specialty Chromium Baths
Trivalent Chromium
Black Chromium
Porous Chromium
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Strike
Typical Pyrophosphate Bath
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Other Alkaline Baths
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Maintenance and Control
Constituents
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Maintenance and Control
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Directory Section

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