

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

Electroplating, Anodizing & Metal Treatment Handbook

Code: NI63	Format: paperback
Indian Price: ₹1475	US Price: \$150
Pages: 720	ISBN: 9788178331386
Publisher: Asia Pacific Business Press Inc.	

Description

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. Surface engineering techniques are generally used to develop a wide range of functional properties, including physical, chemical, electrical, electronic, magnetic, mechanical, wear-resistant and corrosion-resistant properties at the required substrate surfaces. In general, coatings are desirable, or even necessary, for a variety of reasons including economics, material conservation, unique properties, or the engineering and design flexibility which can be obtained by separating the surface properties from the bulk properties. Surface engineered products thus increase performance, reduce costs, control surface properties independently of the substrate and medium, thus offering an enormous potential in the finishing Industry.

Electro depositing of metals is a very significant industrial process. Electroplating is both an art and science .It entailed adhering a thin metal coating to an object by immersing it into an electrically charged solvent containing the dissolved plating metal. Electroplating served a number of functions, such as protecting from corrosion and wear, decoration, and electrical shielding. Anodizing most closely resembles standard electroplating. Anodizing or anodizing is an electrolytic passivation process used to increase the thickness of the natural oxide layer on the surface of metal parts. Anodizing increases corrosion resistance and wears resistance, and provides better adhesion for paint primers and glues than bare metal. Anodic films are most commonly applied to protect aluminium alloys.

The aim of this handbook is to give the reader a perspective on several metal surface treatment techniques which are generally followed in the finishing Industry. This is a unique compilation and it draws together in a single source technical principles of surface science and surface treatments technologies of plastics, elastomers, and

metals along with various formulae of bath solutions, current density, deposit thickness, manufacturing processes, various ingredients used in these processes. It is a very useful guide for the readers, engineers, scientists, practitioners of surface treatment, researchers, students, entrepreneurs and others involved in materials adhesion and processing.

Content

I. METAL SURFACE PREPARATION AND CLEANING

1. Basic Metal Surface

Nature of the Surface

Brightness

2. Polishing, Brushing and Buffing

Polishing

Adhesives

Lubrication

Brushing

Deburring

Buffing and Polishing Equipment

3. Mass Finishing Methods

Vibratory Finishing Equipment

Centrifugal Barrel Finishing

Parts to Media Ratios

Mass Finishing Media and Compounds

4. Electropolishing

The Electropolished Surface

Types of Metal Electropolished

Electropolishing Equipment

5. Solvent Cleaning

Solvent Cleaning

Diphase Cold Cleaning

Stability

Materials of Construction

Design Consideration

Location of Vapour Degreaser

Shutdown Procedure

Choosing a Vapour Degreasing Solvent

Water Removal

6. Alkaline Cleaning

Soils

Machining and Forming Oils

Alkaline Descalers

7. Oxide Removal

Oxide Removal from Copper Alloys

Equipment for Pickling and Bright Dipping

II. TYPICAL PROCESSING AND OPERATING SEQUENCES

8. Metals

Pretreatments

Preliminary Treatment

Final Treatment

Low-Carbon Steel

High-carbon and Low-Alloy Steels

Stainless Steels

Cast Irons

Copper and Copper-Base Alloys

Zinc-Base Die Castings

Magnesium and Its Alloys

Lead and Lead Alloys

Powder Metal Compacts

Less common Metals

Intermediate Electrodeposited Coating as Basis Metal Surface

9. Plastics

Plating

Electroless Plating

10. Wastewater Control and Treatment

Water Supply

Water and Chemical Conservation

Chemical and Water Recovery

Evaporative Recovery

Reverse Osmosis

Electrodialysis

Ion Exchange

Waste water Treatment-Segregation and Collection

Hexavalent Chromium Reduction

Pretreatment

Neutralization

Flocculation

Special Treatment Methods

Solids Management

Maintenance

11. Plating Bath Compositions and Operating Conditions

Effects of Hydrogen

Stripping and Salvaging of Defective Plated Items

III. TESTING ELECTRODEPOSITED COATINGS

12. Thickness Tests

Microscopic-Optical Methods

Double-Beam Interference Microscope, Interferometry

Magnetic Method

Eddy Current

Mass per Unit Area

Weight Gain Method

X-Ray Methods

Beta Backscatter (BBS)

Microresistance Technique

13. Corrosion Tests

Outdoor Exposure Tests

Electrolytic Corrosion (EC) Test

14. Inspection

Factors in Visual Inspection

Arriving at a Standard of Acceptability

Degree of Finish

Inspection of Coloured and Other than Bright Finishes

Inspection Equipment

Inspection Personnel

IV. SURFACE PROTECTION AND FINISHING TREATMENTS

15. Phosphate Coating Processes

Amorphous Phosphate Coatings on Aluminum Surfaces

Process Cycles

Discussion of Process Steps in Practical Procedures

Immersion Processes

Spray Processes, with Solution Recirculation

Design Features

Simplified and Specialized Processes

16. Chromate Conversion Coatings

Metals Commonly Chromated

Control of Electroplating Solutions

Coatings for Conversion Coatings

17 Sulfuric and Chromic Acid Anodizing of Aluminium

Sulfuric Acid Anodizing

Colouring

Power Supply

Coating Properties

Chromic Acid Anodizing

Processing Steps

Electrolyte Maintenance

Designation System for Anodic Coatings

Anodizing and Surface Conversion Treatments

for Magnesium

Pickling

Tank Equipment for Cleaning Acid Pickling

Anodizing Processes

18. Electroplating Formulae of Various

Electroplating and Allied Chemicals

Electroplating not aluminium

Gold Electroplating

Iron Electroplating

19. Principles of Electroplating

Polarisation

20. Properties of Electroplating 428

Conducting Salts

Plating Quality

21. Electroplating or Coatings on Silver, Copper and leads

Coating of Silver

Alkaline Bath

Plant and Machinery Details for Electroplating Baths Salts

22. Conservation of Materials and Energy in

Electroplating Industries with Effluent Treatment

Regeneration and Recovery Techniques Applications

for Waste Water Treatment

Techniques for Uniform Metal Distribution Chemicals

will exceed the costs associated with purchasing

Choice of Finish and Process

Plating From Low Concentrated Solutions at

Room Temperature

23 Black Chrome Plating for Solar Energy Conversion

Hull Cell Studies

Effect of Plating Time on Optical Properties
24 Pickling of Metals
Chemical and Electrolytic Pickling Compared
Tin and Lead Additions
Regeneration of Pickling Solutions
25 Pickling Conditions and Solution Compositions
Pickling of Cast Iron
Pickling in Salt Baths
Pickling of Copper and Copper Alloys
Pickling of Copper Alloys
Pickling of Aluminium
Acid or Cold Pickling
Pickling of Magnesium
Pickling of Silver
Pickling of Titanium
26 Cadmium Plating
27 Cobalt Plating
28 Copper Plating
Coppering by Simple Immersion
Bath Preparation
29. Iron Plating
30 Nickel Plating
Nickel fluoborate bath
Precautions
Semi-Bright Nickel Plating
Stabilisers
Barrel Nickel Plating
Heavy Nickel Plating
Nickel Electroforming & Electrotyping
31 Silver Plating
Application of silver Plating
32 Gold Electroplating
Stripping Gold
Current-Density, 0.15 Ampere
Gold Baths for Hot Gilding
Tanks for Gold Baths
For Gold-Plating in the Cold Bath the Process Is As Follows
Gold Thread
Methods of Plating Stainless Steel
33 Nonelectrolytic Metal Coating Processes

Non-Catalytic Chemical Methods

Maintenance of Immersion and Contact Baths

Sensitizing for Chemical Reduction

34 Vapour-Phase Methods

Vacuum Evaporation

Coating Properties

Sputtering

Range of Applicability

Apparatus Configuration

Ion Plating

Chemical Vapour Deposition (CVD)

Apparatus Configuration

35 Catalytic Methods

Catalytic Chromium Plating

Electroless Copper Plating

Reducing Agents

The Operation of Electroless Copper Baths

Electroless Copper Treatment Sequence

Solution Formulations

Analysis of Deposit

Corrosion Resistance of Deposits

Applications for Electroless Nickel

Boron Nickel Alloys

36 Electroforming

Mandrel Types and Materials

Mandrel Design and Fabrication

Preparation of Mandrel Surfaces

Electroforming Solutions and Deposit Properties

Control of Electroforming Processes

Machining and Final Finishing of the Electroform

37. Industrial Anodising of Aluminium and its Alloys

Impurities and Bath Control

38. Environmental-Regulatory Restrictions, Response of Paint Industry and Eco-Friendly Coating

Enactment of Rule 66 on the Use of Organic Solvents

Strategy of Paint Industry

Powder Coatings

39 Plating of Precious Metals

Silver Plating

Operating Conditions

Materials of Construction
Maintenance and Control of Solutions
40. Control of Electroplating Solutions Using Hull
Cell Studies
Hull Cell
Case Studies using Hull Cell
Current Efficiency Test
41 Corrosion and their Preventive Measures and
Pollution Control Consideration
The Mechanism of Basic Corrosion
Protection of Intergranular Corrosion

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