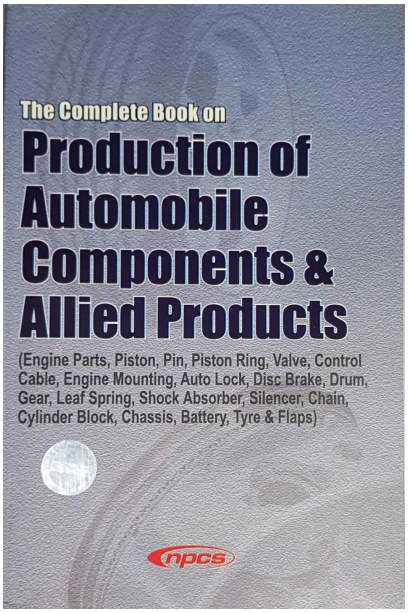
Entrepreneur India

106-E, Kamla Nagar, New Delhi-110007, India.
Tel: 91-11-23843955, +91 9097075054
Mobile: +91-9097075054
Email: npcs.ei@gmail.com, info@entrepreneurindia.co
Website: www.entrepreneurIndia.co



The Complete Book on Production of Automobile Components & Allied Products

Code	NI262
Format	paperback
Indian Price	₹2275
US Price	$200
Pages	536
ISBN	9789381039335
Publisher	NIIR PROJECT CONSULTANCY SERVICES

Description

The Complete Book on Production of Automobile Components & Allied Products (Engine Parts, Piston, Pin, Piston Ring, Valve, Control Cable, Engine Mounting, Auto Lock, Disc Brake, Drum, Gear, Leaf Spring, Shock Absorber, Silencer, Chain, Cylinder Block, Chassis, Battery, Tyre & Flaps)

The rapid urbanization, coupled with an overwhelming growth in the middle class population, has created a market that is extremely conducive for the automobile industry to flourish. It is inferred from the demand, the investment in the automobile industry is estimated at over hundredths of billions in the vehicles and auto components segment. The auto market is thought to be made primarily of automakers, but auto parts makes up another lucrative sector of the market. The major areas of auto parts manufacturing are: Original Equipment Manufacturers (OEMs) - The big auto manufacturers do produce some of their own parts, but they can't produce every part and component that goes into a new vehicle; Replacement Parts Production and Distribution - These are the parts that are replaced after the purchase of a vehicle. The book provides a characterization of vehicles, including structure, load, fuel used, requirement of various components, fabrication and so on. It will prove to be a layman’s guide and is highly recommended to entrepreneurs, existing units who wants to diversify in production of automobile and allied products, research centers, professionals and libraries, as it contains information related to manufacturing of integral parts of an automobile and practices followed in the finishing of the products. The topics covered in the book are: Classification of vehicles on the basis of load, fuel used and their parts; Material used in the manufacturing of automobile (Metals, Alloys, Polymers etc.); Technology used; Use of Aluminium in Automobiles; Use of Plastics in Automobiles; Manufacturing practices for Engine Parts(Auto Piston, Pins, Piston ring, Lead Storage Battery, Valve & Valve Seat, Automobile Silencer, Automobile Chain, Cylinder Block, Automobile Control Cable, Engine Mounting PAD, Auto Locks etc.); Manufacturing of Automobile Chassis, Disc Brake, Brake Drum, Gear, Gear Blank, Leaf Spring, Shock Absorbers, Automobile Tyres; Heat Treatment System for Automobile Parts; Forging Technology (Open Die Forging Process, Close Die Forging Process, Designing of forged parts) and Painting Technology(Conversion Coating, NAD Finishes, Aluminium Flake Orientation, Opacity, Gloss, Electro Powder Coating, Spot Repair, Electrostatic Spray etc.) for automobile parts; Scab Corrosion Test, Peel Resistance.

Content

Wheels
Fuel Used
Body
Transmission
Position of Engine
Engine in Front
Engine in the Rear Side
Layout of an Automobile Chasis
Components of the Automobile
Functions of Major Components of an Automobile
Chasis and Frame
Engine or Power Plant
Transmission System (Clutch and Gear Box)
Clutch
Final Drive
Braking System
Gear Box
Steering System
Front Axle
Suspension System
2. MATERIALS USED IN AUTOMOBILES
Introduction
Requirements of the Materials in Automotive
Lightweight
Cost
Safety, Crashworthiness
Crashworthiness Tests
Frontal Offset Crash Test Details
Side Impact Crash Testing/Ratings Criteria
Rollover Evaluations
Recycling and Life Cycle Considerations
Current Materials in Use and Their Future
Metals
Steel
New Grades of Steel and Alloys
a. Duplex Austenitic-ferritic Stainless Steel
b. Austenitic Stainless Steel
Advances in Manufacturing and Joining Technique
Aluminium
Aluminium Alloys for Body-in-white Applications
Aluminium Alloys for Brazing Sheet Applications

Magnesium
Mechanical Properties of Mg Alloys
Technical Problems and Solutions for Use of Magnesium Alloys in Automotive Industry
Plastics and Composites
Fabrication
Cost
Manufacturability
Design Data/Test Methodologies
Joining and Inspection
Renewable Materials, Barriers and Incentives in Use of Biocomposites
Thermoplastic/Thermoset Polymers
Composite Processing
3. MATERIALS AND TECHNOLOGY FOR
AUTOMOBILES
Introduction
Steel Sheets
High Strength Steel Sheets
New Precipitation-hardened High Strength Hot Rolled Steel Sheet “NANO-Hiten”
New High Strength Hot Rolled Steel Sheet for Strain Aging Use “BHT”
High Strength Galvannealed Steel Sheets
(1) SFG Hiten
(2) Low Carbon Equivalent Type Hiten
High Formability Ultra-high Strength Cold Rolled steel Sheets
High Carbon Steel Sheets with High Formability
Coated Steel Sheets
Coated Steel Sheets with High Lubrication for Automotive Use
(1) Development of Inorganic Type High Lubrication Galvannealed Steel Sheets
(2) Organic Solid Lubricant Technology
(3) Summary
Hot Dip Galvanized Steel Sheet with Excellent Surface Appearance
(1) Improvement of Surface Appearance
(2) Surface Roughness Transfer Technologies and Frictional Properties
(3) Summary
Evaluation and Application Technologies for Automotive Steel Materials
Tailor Welded Blanks
Application Technologies of Hydroforming
Application Technologies for High Strength Steel Sheets in Press Forming
Application of CAD-CAE Systems
High Frequency Electrical Materials for Cars of the Future “Super-Core”
Features of JFE Steel’s Super-Core
JNEX

JNHF
Automotive Applications
Stationary Equipment
Rotating Machinery
Other Electrical Applications
Summary
Ferritic Stainless Steels for Automobile Exhaust System Parts
Steels for Mufflers
Steels for Exhaust Manifolds
Steels for Catalytic Converter Substrate
Steel Tubes
HISTORY Tube
High Formability ERW Tubes for Automotive Use
Stainless Steel Tubes for High Temperature Service in Automotive Exhaust Systems
Bar Products for Automotive Use
Bearing Steels “NKJ”, “KUJ7”
Graphite Steel “HFC1 Steel”
BN Free Cutting Steel “CCBN Steel”
High Surface Durable Carburized Dual-phase Steel
High Toughness Microalloyed Steel for Hot Forging
Warm Compaction Method with Die Wall Lubrication for Iron Powder Metallurgy
Lightweight Composite Material for Automotive Headliner “KP Sheet”
4. USE OF ALUMINIUM IN AUTOMOBILES
Introduction
Aluminium in Automobile
Advantages
Disadvantages
Space Frame Technology
Sand Casting
Al-Si Alloys
Grain Refinement
Modification
Extrusion
Al-Si-Mg Alloys
Moment of Inertia
Heat Treatment
Solutionizing
Aging
Annealing
Exposed Loads on Chassis
Static Loads

4. Manufacturing of Lead Storage Battery
Introduction
Market Potential
Basis & Presumptions
Implementation Schedule
Technical Aspects
I. Process of Manufacture
Process Flow Chart
II. Quality Control & Standard
III. Production Capacity (Per Annum)
IV. Motive Power Required
V. Pollution Control Requirements
VI. Energy Conservation
Lighting
Additional Information
5. Manufacturing of Valve and Valve Seat
Introduction
Methodology
Material Selection
Exhaust Valve
Criteria of Exhaust Valve
Chemical Analysis
Mechanical Properties
Physical Properties
Exhaust Valve Seat Insert
Criteria for Material Selection of Engine Valve Seat Insert
Extrusion
Process Selection
Exhaust Valve
Flow Processes
Friction Welding
Upsetting
Steps
Forging
Heat Treatment
Advantages
Steps
Stellite Deposition
Advantages
Head Diameter Facing
Groove CNC Turning

Description of the Product
What is an Engine Block?
Functional Requirements of a Cylinder Block
Required Material Properties
Metals Used in the Manufacture of the Cylinder Blocks
Manufacturing the Cylinder Block
Mechanical Properties of the Alloys
Gray Cast Iron Alloys
Compacted Graphite Cast Iron
Aluminium Alloys
Magnesium Alloys
Casting Processes
Green Sand Molding
Lost Foam Casting
Market Potential
Basis and Presumption
Implementation Schedule
Technical Aspect
Manufacturing Process
Alternate Technology
Production Targets
Quality Control and Standards
Utilities
Energy Conservation
Pollution Control
9. Manufacturing of Cylinder Linear
Introduction
Production Capacity : 45000 Per Annum
Market & Demand Aspects
Manufacturing Process & Source of Technology
Basis of Project Preparation and Technical Aspects
Presumption
Implementation Schedule
Quality Control & Standards
Pollution Control
10. Manufacturing of Automobile Control Cable
Introduction
Market Potential
Basis and Presumptions
Technical Aspects
Process of Manufacture

Implementation Schedule
Process Flow Chart
Quality Control and Standards
Motive Power
Pollution Control
11. Manufacturing of Engine Mounting PAD
Introduction
Market Potential
Basis and Presumptions
Implementation Schedule
Technical Aspects
Process of Manufacture
12. Manufacturing of Auto Locks
Project Profile on Casting for Auto Locks
Part - II
Introduction
Market Potential
Basis & Presumptions
Implementation Schedule
Technical Aspects
Process of Manufacture
Quality Control and Standards
Pollution Control
Energy Conservation
7. MANUFACTURING OF AUTOMOBILE CHASSIS
1. Manufacturing of automobile Body
Automobile Body Manufacturing Processes
BIW Manufacturing Processes
Blanking and Stamping Processes
Subassembly Processes and Major subassemblies of a BIW
Body Framing Process
Door Manufacturing Processes
Rolling and Blanking Processes
Stamping Process
Door Hanging and Fitting Process
Door Hanging Process
Door Fitting
Market Potential
Basis and Presumptions
Implementation Schedule
Technical Aspects

Process of Manufacture
Pollution Control
Energy Conservation
2. Manufacturing of Disc Brake
Introduction
Grey Cast Iron as Material for Production of Disc Brake
Aluminium as the Material for the Holder
Manufacturing Process of DISC Brake and Holder
Cold Chamber
Hot Chamber
Heat Treatment for Holder
i. Cooling Rate
ii. Shrinkage
a. Volumetric Shrinkage
b. Linear Shrinkage
Finishing Process
Driving the Lathe
Holding and Rotating the Work
Holding, Moving and Guiding the Cutting Tool
For Disc Brake
For the Holder
Methodology
Summary
3. Manufacturing of Brake Drum
Introduction
Market Potential
Basis and Presumptions
Implementation Schedule
Technical Aspects
Process of Manufacture
Quality Control and Standards
Production Capacity (per annum)
Pollution Control
4. Manufacturing of Gear Blank
Introduction
Market and Demand Aspects
Raw Materials
Manufacturing Process
The Process of Flow Chart
5. Manufacturing of Gear
Introduction

Materials Used in Gear Manufacturing Process
Classification of Gears
1. Milling Process
2. Gear Planning Process
3. Gear Shapers
4. Gear Hobbing
5. Bevel Gear Generating
Gear Manufacture by Casting Method
Methods of Forming Gears
Roll Forming
Stamping
Powder Metallurgy
Extrusion
Gear Generating Process
Gear Hobbing
Type of Hobbing
Arial Hobbing
Radial Hobbing
Tangential Hobbing
Gear Shaping (The Fellows Process)
Rack - Type Cutter Generating Process
Pinion Type Cutter Generating Process
Advantages
Disadvantages
Gear Cutting by Milling
Disc Type Cutter
End Mill Cutter
Advantage
Used
Bevel Gear Generating
Straight Bevel - Gear Generator
Spiral Bevel - Gear Generator
Gleason Method
Templet Gear Cutting Process
Gear Finishing Process
Gear Shaving
Gear Grindings
Disadvantage
Gear Lopping
Shot Blasting
Phosphate Coating

Gear Planning
The Sunderland Process
The Maag Process
Principal of Gear Planning
6. Manufacturing of Gear Box Housing
Introduction
Market Potential
Basis & Presumptions
Implementation Schedule
Technical Aspects
a. Production Details and Process of Manufacturing
b. Quality Control & Standards
Process Flow Graphic Representation
Pollution Control
Energy Conservation
7. Manufacturing Process of Leaf Spring
Introduction
History of Leaf Spring
Construction of Leaf Spring
Standard Size of Automobile Suspension Spring
Material Used in Leaf Spring
Basic Characteristics of Spring Materials
Mechanical Properties of Leaf Spring
Manufacturing of Leaf Spring
Shearing
Main Eye Rolling
Tapering
Drilling
Hardening
Tempering
Hardness Test
Shot Peening
Market Potential
Implementation Schedule
Technical Aspects
A. Production Details and Process of Manufacture
B. Quality Specification
Process Flow Chart
Pollution Control Measures
Energy Conservation
8. Manufacturing Process of Shock Absorbers

Historical Development of Shock Absorbers
Adoption of Hydraulic Telescopic Dampers
Non-pressurised Twin Tube Telescopic Hydraulic Dampers
Gas Charged Shock Absorbers
i. Mono-tube Shock Absorbers
ii. Twin Tube Pressurised Shock Absorbers
Spring Assisted Dampers
Structure of Industry, Ownership Pattern & Installed Capacity
Geographical Distribution of Shock Absorber Manufacturers
Raw Materials, Semi-finished Components Used & Their Sources of Supply
Major Imports of Raw-materials to Sustain Indigenous Production
Manufacturing Processes & Machines Generally Used
9. Manufacturing Process of Automobiles Tyres
Tyre - Modern Vehicle Design Elements
Front-wheel Drive
Powerful Brakes
Power Steering
‘Hot Hatches’
Diesel Engines
How to Make a Tyre
Raw Material Tyre Components
Chemicals
Textiles
Components
Natural Rubber
Steel
Tyre Construction
The Compound
Primary Processing
Extruding
Coating
Calendering
Stages in Building a Tyre
Stage 1 - Flat Forming
Stage 2 - Shaping
Stage 3 - Moulding the Tyre
Stage 4 - Finishing and Inspection
Tyre Trouble
Problems Caused by Under Inflation
The Dangers of Overloading
The Effects of High Speed Travel

Tyre Technology
Striking the Balance
Better Performance
Correct Tyre Fitment
Fitting the Right Tyre
Specifically for Taxi Tyres
Dunlop Taxi Tyres
Dunlop’s Classic Tyre Range
How to Fit Tyres Correctly
Specialist Wheel Types
Valves
Tubes
4 x 4 Tyres
Fitment of Radial Winter Tyres
Retread Tyres
Sidewall Markings
The Meaning of Sidewall Markings
Tyre Construction
Major Components
Cross (Bias) - and Radial-ply Tyre Features
Characteristics
Ride Comfort
Acceleration and Braking
Cornering
Tyre Life
Fuel Consumption
Initial Cost
Tyre Material
Natural and Synthetic Rubbers
Natural Rubber (NR)
Chloroprene (Neoprene) Rubber (CR)
Styrene-butadiene Rubber (SBR)
Polysoprene Rubber (IR)
Ethylene Propylene Rubber (EPR)
Polybutadiene Rubber (BR)
Isobutene-isoprene (Butyl) Rubber (IIR)
Tyre Tread
Tread Bite
Tread Drainage Grooves
Tread Ribs
Tread Blocks

Tread Slits or Sips
Selection of Tread Patterns
Normal Car Tyres
Wet Weather Car Tyres
Truck Tyres
Off on Road Vehicles
Tyre Profile and Aspect Ratio
Tyre Manufacturing
Tyre Sizes and Designations
Construction Type
Speed Marking of Tyres
Size
Casing Profile
Related Topics
Nanotechnology in Automotive Tyres
The Drivers for Better Tyres
What Nano-enabled Functionalities can Offer
Impact
Economic/Industry
Impact on European Citizen
Challenges
Environment, Health & Safety
Transport: Nanotechnology in Automotive Tyres
EU Competitive Position
Summary
10. Manufacturing of Auto Tubes and Flaps
Introduction
Market Potential
Basis and Presumptions
Implementation Schedule
Technical Aspects
Process of Manufacture
8. HEAT TREATMENTS OF AUTOMOBILES
Introduction
Materials Used in Autovehicles
Bake Hardening Steel Sheets
High Tensile Strength Steel Sheets
Corrosion Resistant Coated Steel Sheets
Constructional Steels
Case Hardening Steels
Heat Resistant Steels

Powder Metallurgy Products
Non-ferrous Alloy Powder Metallurgy Products
Copper Alloys
Aluminium Alloys
Magnesium Alloys
Titanium Alloys
Composite Materials
Plastics and Rubber
Glass and Ceramics
Heat Treatment
Types of Heat Treatment
Processing Technology in Heat Treatment
Carburizing and Carbonitriding
Nitro-carburizing
Induction Hardening
Powder Metallurgy and Sintering
Key Issue in Heat Treatment: Atmosphere Control
Carbon Potential Control
Gas Carburizing Processes
Reduced Pressure Carburizing (Vacuum Carburizing)
High Pressure Gas Quenching
Carbonitriding
Low Temperature Nitrocarburizing and Oxy-nitro-carburizing
Surface Modification and Hybrid Heat Treatment
Solid Lubricant Coatings
Emerging Technologies in Materials, Heat Treatment and Surface Engineering
Materials
Carburizing and Carbonitriding
New Nitriding Methods for Aluminium
Nitriding of Stainless and Maraging Steels
Furnaces for Heat Treatment of Fasteners and Automobile Parts
Specifications of the Line
Washing Machine
Hardening Furnace
Quenching Tank
Continuous Hot Blast Tempering Furnace
Double Layer Dyeing Tank
Capacity of the Main Furnace
Crucible Type Annealing Furnaces
Application
Features

Electropainting
Anodic Electrocoat
Resin Systems
Pigmentation
Practical Considerations
Basic Plant Requirements
Control Methods
Deficiencies of Anodic Electrocoat Primers
Cathodic Electrocoat
Resin System
Pigmentation
Colour
Mechanism of Deposition
Performance Characteristics
Plant Requirements
Dip Rinsing
Ultrafiltration
Control Method
Pretreatment
General Appraisal and Current Developments
Surfacers
Background
Introduction
Product Types and Formulation
Resins Systems
Alkyds
Epoxy Esters
Polyesters
Epoxies: Film Modifiers
Crosslinking Resins
Pigmentation
Prime Pigments
Extenders
Polyurethane-modified polyester surfacer (including ‘colour keyed’ products)
Summary of Basic Parameters
Film Properties (Stoved Film)
Anti-chip Coatings
Background and Resin Types
Pigmentation
Inverted or Reverse Process
Electro Powder Coating (EPC)

Automotive Topcoats
Alkyd or Polyester Finishes
Basic Chemistry
General Properties
Thermosetting Acrylic/NAD Finishes
Basic Chemistry
General Properties
Metallic Appearance
‘Sagging’
‘Solvent-popping’ Resistance
Thermoplastic Acrylic Lacquers
Basic Chemistry
General Properties
Basecoat/clear Technology
Solvent-borne
Basic Chemistry
Application/Process
Colour/Pigmentation
Aluminium Flake Orientation
Undercoats
Performance/Durability
Water-borne
Processing
Characteristics
Pigmentation of Automotive Topcoats
Solid Colours
Durability
Opacity/Gloss
Cost
Bleed
Metamerism
Use of Lead Chromate Pigments
‘Single Coat’ Metallics
Durability
Opacity/Gloss
Cost
Colour Matching
Choice of Aluminium Flake
Basecoat/Clear Metallics
Opacity
Cost

Colour Matching/Durability
Choice of Aluminium Flake
In-factory Repairs
Thermosetting Finishes (Panel Repairs)
Thermoplastic Acrylic Lacquers (Spot Repair)
Painting of Plastic Body Components
Sheet Moulded Compound (SMC) and Dough Moulded Compound (DMC)
Polyurethane: PU RIM and PU RRIM
Injection Moulded Plastics
Painting Problems
Adhesion
Heat Distortion
Surface Texture
Solvent Sensitivity
Degradation of Mechanical Properties
Paint Processes and Products
On-line
Off-line
‘Part-way’ Down Paint Line
Spray Application
Air Spray
Spray Losses
Automatic Spray
Low-pressure Hot Spray
Airless Spray
Electrostatic Spray
Electrostatic Spray—Metallic Appearance
Resistivity
‘Interior’ Application (Electrostatic Spray)
Electrostatic Application of Water-Borne Automotive Coatings
General Plant Design Features
Paint Circulating System for Electrical Insulation
Externally Charged Atomizers
Application Efficiency—Practical Considerations and Processes
Modern Spraybooth Design—Ventilation Modes
Preconditioning the Air
Concentrators
Process Details: Typical Application Parameters—Turbo Bells
Stoving Procedures
Oven Technology
Design Considerations of Convection Ovens

Oven Configuration
Oven Ventilation
Oven Heating
Fresh Air Requirements
Fuel Available/Heating Method
Fume and Odour Emission
Thermal Incineration
Catalytic Combustion
Future Stoving Developments
Performance/Testing
Appearance
Performance
Physical Properties
Chemical Resistance
Test Procedures
Cure (Test for Crosslinking Products)
Sandability (Surfacers)
Adhesion: Crosshatch Test (1.5mm or 2.0mm template)
Hardness
Stone-chip Resistance
Impact Test
Flexibility
Acid Resistance
Alkali Resistance
Acid and Alkali Resistance (Alternative Procedure)
Water Immersion (Continuous)
Humidity Resistance (Continuous)
Scab Corrosion Test
Florida Exposure (5° South)
Peel Resistance: Florida 5° South
Accelerated Weathering
Future Developments
High Solids Technology
Higher Solids Surfacer Technology
High Solids Polyester Topcoats
Higher Solids Basecoats
Ultra High Solids Coatings
Water-Borne Products
Surfacers
Basecoats
Powder Coatings and Aqueous Slurries

Aqueous Powder Slurries
Solid Colour Basecoats
Clearcoats
Pigmentation
Painting of Plastics
Electrodeposition and Spray Application

About Niir

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.