

Handbook on Steel Bars, Wires, Tubes, Pipes, S.S. Sheets Production with Ferrous Metal Casting & Processing

Author: B.P. Bhardwaj

Format: Paperback

ISBN: 9789381039311

Code: NI260

Pages: 408

Price: Rs. 1,775.00 **US\$** 150.00

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Usually ships within **5** days

Ferrous materials have made a major contribution to the development of modern technology; they span a tremendous range of properties and applications. Reflecting the industrial practices, the information provided here offers easy access to reliable processes involved in the manufacturing of Steel products like Steel Bars, Wires, Tubes, Pipes, Sheets etc that proves to be the backbone of construction and automobile industries booming worldwide.

The work closes the gap in the treatment of steel and cast iron. Each chapter takes into account the gradual transitions between the two types of ferrous materials. It demonstrates that ferrous metal and steel are versatile and customizable materials which will continue to play a key role in the future and also covers the operations performed on ferrous metals for converting them into a commodity.

The book provides a full characterization of steel, including structure, chemical composition, classifications, physical properties, production practices of different steel products, processing of ferrous metals and so on. It will prove to be a layman's guide for the entrepreneurs who are willing to invest in the ventures related to Iron and Steel Industries, as it contains information related to processing of ferrous metals and production practices followed in Steel products manufacturing units. The text discusses the importance and objectives of processes and material used for the production of disposable products. Many examples have been provided to illustrate the concepts discussed.

The topics covered in the book are: Casting of Ferrous Metals, Heat Treatment of Ferrous Metals, Stamping Process of Ferrous Metals, Forming Process of Ferrous Metals, Machining Process of Ferrous Metals, Joining Process of Ferrous Metals, Production of Stainless Steel Wire, Production and Fabrication of Steel Bars, Steel Tube & Pipe, Stainless Steel Sheet and Different Grades of Stainless Steel.

Contents

1. CASTING OF FERROUS METALS

Casting Methods

Sand Casting

Shell-mold Casting

Expendable-Pattern Casting (Lost foam Process)

Plaster-Mold Casting

Ceramic Mold Casting

Investment Casting (Lost Wax Process)

Vacuum Casting
Permanent Mold Casting
Die Casting
Centrifugal Casting
Casting Design and Quality
Corners, Angles and Section Thickness
Drafts and Tapers
Shrinkage
Parting Line

2. HEAT TREATMENT OF FERROUS METALS

Heat Treating Theory
Stages of Heat Treatment
Heating Stage
Soaking Stage
Cooling Stage
Heat Colors for Steel
Types of Heat Treatment
Annealing
Ferrous Metal
Nonferrous Metal
Normalizing
Hardening
Case Hardening
Carburizing
Cyaniding
Nitriding
Flame Hardening
Stationary Method
Circular Band Progressive Method
Straight Line Progressive Method
Spiral Band Progressive Method
Circular Band Spinning Method
Tempering
Quenching Media
Liquid Quenching
Water
Brine
Oil
Caustic Soda
Warning
Dry Quenching
Air
Solids

3. STAMPING PROCESS OF FERROUS METALS

Compound Die
Progressive Die
Stripper Designs
Fixed Stripper
Urethane Stripper
Spring Stripper
Stamping Terminology - Punch Operation
Perforating
Punch Stagger

Blanking
Piercing
Perforate and Shave
Piloting
Perforate and Extrude
Notching
Lancing
Coining
Embossing
Projection
Shear Angles
For More Information...

4. FORMING PROCESS OF FERROUS METALS

Rolling
Hot and Cold Rolling
Cold Rolling
Processes
Roll bending
Roll forming
Flat Rolling
Foil Rolling
Ring Rolling
Controlled Rolling
Mills
Rolling Mills
Tandem Mill
Defects
Shape
Profile
Roll Deflection
Draft
Surface Defects
Lap
Mill-shearing
Rolled-in scale
Scabs
Seams
Extrusion Process
Process
Hot Extrusion
Hot extrusion temperature for various metals
Cold Extrusion
Warm Extrusion
Equipment
Forming Internal Cavities
Indirect Extrusion
Hydrostatic Extrusion
Drives
Extrusion Defects
Materials
Metal
Advantages and disadvantages
Processes

Temperature
Hot Working and Cold Working
Drop Forging
Open-die Drop Forging
Impression-die Drop Forging
Design of impression-die forgings and tooling
Press Forging
Upset Forging
Automatic Hot Forging
Roll Forging
Net-shape and Near-net-shape Forging
Cost Implications
Induction Forging
Equipment
Hydraulic Drop-hammer
Bending Process
Process
Bending Process
Types
Air Bending
Bottoming
Coining
Three-Point Bending
Folding
Wiping
Rotary Bending
Roll Bending
Elastomer Bending
Joggling
Calculations
Bend Allowance
Bend Deduction
K-factor
Material Considerations
Advantages
Shearing Process
Nature of Cut Edges
Equipment Characteristics
Operation
Maintaining Quality
Design Considerations
5. MACHINING PROCESS OF FERROUS METALS
Turning Operations
Chuckling the Workpiece
Adjusting the Tool Bit
Cutting Speeds
Setting Speed and Feed
Turning with Hand Feed
Turning with Power Feed
Measuring the Diameter
Turning a Shoulder
Grinding
Processes

Surface Grinding
Cylindrical Grinding
Creep-Feed Grinding
Centerless Grinding
A Schematic of ELID Grinding
Grinding Wheel
Lubrication
The Workpiece
Workholding Methods
Workpiece Materials
Workpiece Geometry
Effects on Workpiece Materials
Threading
Subtractive Methods
Thread Cutting
Taps and Dies
Single-Point Threading
Thread Milling
Thrilling
Thread Grinding
Thread Lapping
Thread Casting and Molding
Additive Methods
Combinations of subtractive, additive, deformative, or transformative methods
Drilling Operations
Purpose
Uses
Characteristics
Care of Drilling Machines
Lubrication
Special Care
Types of Drilling Machines
Hand-Feed
Power-Feed
Safety Precautions
Drilling Machine Safety
Tools and Equipment
Twist Drills
Special Drills
Sharpening Twist Drills
Precheck
Drill Point
Clearance Angle
Rake Angle
Drill Grinding Machines
Single Wheel Fixture
Double Wheel Swing Arm
Other Types of Cutters
Countersinks
Counterbores
Combined Countersink and Center Drill
Reamers
Boring Tools

Field Expedient Cutters
Tap and Die Work
Drill Holding Devices
Geared Drill Chucks
Drill Sockets and Drill Sleeves
Drill Drifts
Work Holding and Drilling Devices
Machine Table Vises
Step Blocks
Clamps
V-Blocks
Angle Plates
T-Slot Bolts
Jigs
Drilling Support Device
Cutting Fluids
Laying Out and Mounting Work
Laying Out Work
Laying Out Hole Centers
Center-Punching the Layout
Layout of Multiple Holes
Mounting Workpieces
Vise Mounting
Table or Base Mounting
General Drilling Operations
The Drilling Process
Selecting the Drill
Installing the Drill
Selecting Drill Speed
Selecting Drill Feed
Aligning and Starting Holes
Starting Holes with Center Drill
Drawing a Drill Back on Center
Drilling
Drilling Deep Holes
Drilling a Pilot Hole
Drilling Thin Material
Using a Depth Stop
Checking the Depth of Drilled Holes
Drilling Round Stock
Operational Checks
Special Operations on Drilling Machines
Countersinking
Types of Countersinks
Countersink Alignment
Procedures for Countersinking
Counterboring and Spot Facing
Counterboring
Spot Facing
Tapping
Tapping Large Holes
Tapping Small Holes
Reaming

Hand Reamers
Machine Reamer
Reaming Operations
Boring
6. JOINING PROCESS OF FERROUS METALS
Riveting
Solid Rivets
Types
Semi-Tubular Rivets
Drive Rivet
Flush Rivet
Friction-Lock Rivet
Self-Pierce Rivets
Sizes
Installing rivets on M3 tank hull
Detail of a 1941 riveted ship hull, with the rivets clearly visible
Joint Analysis
Solid & Semi Tubular Rivets
Welding
Introduction to Welding Processes
Details of Welding Processes
Gas Welding
Flame Characteristics
Fusion arc Welding
Shielded Metal arc Welding
Submerged arc welding (SAW)
Flux cored arc welding (FCAW)
Gas shielded arc Welding
MIG and TIG
MIG welding (gas metal arc welding)
Pulsed MIG welding
Hot Wire MIG
Plasma MIG
TIG welding
Pulsed TIG Welding
Hot Wire TIG
Spot TIG
Electrical Method
Electric Resistance Welding
Electro-Slag Welding (ESW)
Induction Pressure Welding
Energy Method
Electron Beam Welding (EBW)
Laser Beam Welding
Plasma Welding
Special methods
Explosive Welding (EW)
Friction Welding
Radial Friction Welding of Pipes
Diffusion Bonding
Selection of Welding Process
Classification of Electrodes
Electrode Coating

Classification of Electrodes

Selection of Electrodes

Weld Joint Considerations

General Procedure

Type of Welded Joints

General

Groove-welds

Various types of groove welds

Fillet Welded Joint

Comparison of Joints

Welding Symbols

7. PRODUCTION OF STAINLESS STEEL WIRE

Melting Process

Billet Production

Production of Spring Wire

Conclusion

Wire Drawing

Process

Mechanical Properties

8. PRODUCTION OF STEEL BARS

Hot Rolled Bars

Cold Twisted Deformed Bars

Tmt Bars

Mild Steel Bars (as per IS: 432, part-I -1982)

Deformed Steel Bars (as per IS: 1786-1985)

Various Grades of Mild Steel Bars

Physical Requirement

Steel Bars for RCC Work

General Precautions for Steel Bars in Reinforcement

Weight of Different Steel Bars

Stainless Steel Bar-Round

Product Stocking and Processing Service Program

Bar Grade Datasheets

Bright Mild Steel Bar

Types of Cold Finished Bars

Grade Datasheets

Stainless and Engineering Steel Bar and Wire Product Specifications

Stainless Steel Bar

Stainless Steel Hollow Bar

Stainless Steel Wire

Welding wire

Carbon Bar Steel Products

Carbon and Alloy Steel Hollow Bar

Low Alloy Steel Bar

Production Flow

Pickling

Continuous Pickling Line

Cold Rolling

Annealing

Skin Pass

Warehousing

9. PRODUCTION OF STEEL TUBE AND PIPE

Introduction

Seamless Tube and Pipe
Pierce and Pilger Rolling Process
Plug Rolling Process
Continuous Mandrel Rolling Process
Push Bench Process
Pierce and Draw Process
Tube Extrusion Process
Cross Rolling Processes
Assel Rolling Process
Diescher Rolling Process
Downstream Tube Cold Forming
Cold Drawing
Cold Pilgering
Welded Tube and Pipe
Pressure Welding Processes
Fretz-Moon Process
Electric Resistance Welding
DC Processes
Low-Frequency Process
High-Frequency Processes
High-Frequency Induction Welding Process
High-Frequency Conduction Welding Process
Fusion Welding Processes
Submerged-Arc Welding Process
Gas-Shielded Arc Welding Processes
The Production of Longitudinally Welded Pipe (U-ing/O-ing process)
Spiral Pipe Production
Spiral Pipe Production in Integrated Forming and SAW Welding Lines
Spiral Pipe Production with Separate Forming and SAW Welding Lines

10. MANUFACTURING OF STAINLESS STEEL SHEET

Raw Material
Manufacturing Process
Heat Treatment
Descaling
Cutting
Finishing
Manufacturing at the Fabricator or End User
Bending Process of Steel Sheet
The Air Bending Process
Recommended Inside Bend Radius
Flange Dimensions
Channels
Distortion Near Bends
Flat Layouts
Theoretical Sheet Metal Thickness Gauges

11. GRADES OF STAINLESS STEEL

A Brief Overview of Stainless Steel
Austenitic Grades
Straight Grades
"L" Grades
"H" Grades
Type 304
Type 316

Type 317
Type 317L
Type 317LM
Type 317LMN
Type 321, Type 347
Martensitic Grades
Type 410
Type 410S
Type 414
Type 416
Type 420
Type 431
Type 440
Ferritic Grades
Type 430
Type 405
Type 409
Type 434
Type 436
Type 442
Type 446
Duplex Grades
Precipitation Hardening Grades
Superalloy Grades

About NIIR

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

