This book, now in soft cover, covers fundamentals and practical applications of paper coating. The book is divided into eight chapters which outline the process of making coated paper, the preparation, application and drying, mixing and dispersion in coating operations, continuous coating make-down system, screening of paper coatings and their ingredients, pumps and circulation systems, flow and material measurement in the coating process, raw material quality control, blade, air knife and rod coaters, and much more.

Table of Contents

Preface
Acknowledgements
List of Contributors
List of Figures and Tables

Chapter 1 Basestock, by Gordon L. Stout
  Introduction
  Sheet Integrity and Runnability
  Characteristics
  Papermaking and Coating Interdependencies
  Smoothness - An Attribute Necessary for a Quality Product
  Relationship of Product Requirements to the Manufacturing Process
  Additives to Improve Optical Properties
  Refining, Forming, Pressing, and Drying
  Summary
  Bibliography
  Resources

Chapter 2, Section I Typical Coating Components, by Lars G. Andersson
  Introduction
  Pigments
    A. Kaolin Clay
    B. Calcium Carbonate
    C. Titanium Dioxide
    D. Alumina Trihydrate
    E. Satin White
    F. Amorphous or Precipitated Silica and Silicate
    G. Plastic Pigments
    H. Structured or Engineered Pigments
  Binders
    A. Natural Binders
      1. Starch
      2. Soy Protein
      3. Casein
    B. Synthetic Binders
      1. Styrene-butadiene Latex
      2. Polyvinyl Acetate Latex
      3. Vinyl Acrylic Latex
      4. Acrylic Latex
      5. Polyvinyl Alcohol
  Additives
  Chapter 2, Section II Preparation of Starch for Pigmented Coatings, by Douglas K. Stinebaugh, Lawrence A. Gaspar, LeRoy E. Deters and Larry E. Fitt
    Introduction
    Introduction to Starch
    Starch Technology
    Development of Adhesive Character
    Starch Modification
    Starch Cooking Processes
    Operational Considerations
    In-mill Starch Modification Processes
    Supplied Modified Starches
    Bibliography
    Preparation of Solution
    Preparation of Coating Color
    Addition of Prepared Coating Modifier
    Dry Cutting
    Typical Formulations
    Coating Temperature

Chapter 2, Section III The Preparation of Soy Polymer, Isolated Soy Protein, and Casein Coatings, by Dale R. Dill and C.E. Coco
  Introduction
Screening Coating
Summary

Chapter 2, Section IV Mixing and Dispersion in Coating Operations, by G. Gordon Bugg
Introduction
The System
Agitation
  The Impeller
  The Tank
System Design
Mixing
Dispersion
  Particle Size Reduction
  System Viscosity
  Dispersion Systems
Summary of Mixing Operations - Factors to Consider

Chapter 2, Section V Continuous Coating Make-down System, by Richard H. Bublitz and Robert V. Hershey
Introduction
Batch vs. Continuous Coating Preparation
System Components
An Example of an Automatic System
Operation
Maintenance
Summary

Chapter 2, Section VI Screening of Paper Coatings and Their Ingredients, by Dale Midyette and John D. McInnes
Introduction
Screen Performance Considerations
Filter Media
Location of Filters
Materials of Construction
Types of Screens
Vibratory Screens
Basket Fillers
Tubular Pressure Filters
Mechanically Cleaned Filters
Filter Selection
Summary

Chapter 2, Section VII Pumps and Circulation System, by Raymon O. Wiener
Introduction
Types of Pumps
Progressing Cavity Pump
Rotary Pumps
  Tip Angle Control

Chapter 2, Section VIII Flow and Material Measurement in the Coating Process, by G. Gordon Bugg
Introduction
Flow Independent Systems
  Weight Basis Flow Independent Systems
  Volume-based Flow Independent Systems
  Flow Independent Systems - Advantages and Disadvantages
Flow Dependent Systems
  Direct Flow Measurement
  Indirect Flow Measurement
  Characterizing Fluid Flow: The Reynolds Number
  Three Types of Sensors
    A. Fluid Velocity Sensors
    B. Differential Pressure Sensors
    C. Mass Flow Sensors

Chapter 2, Section IX Raw Material Quality Control, by G. Gordon Bugg

Chapter 3, Section I Blade Coaters, by Theodore C. Vanya and E. William Wight
Introduction
Flooded Nip and Short Dwell Coaters
  Short Dwell Coater
  Coater Head
  Metering of the Coating
  Blade Loading Mechanism
  Mechanical Blade Loading
  Control of the Blade
  Washup
Roll and Blade Maintenance
Production Uses
Puddle-type Applicators
Fountain Applicators
TwoStream Coater
Coating Application
Metering Conditions
Production Uses
Bibliography
Resources

Chapter 3, Section II Rod Coaters, by George L. Booth
Introduction
Rod Coaters
Champion Process
Champflex Coater
Dedicated Rod Coater Systems
Rod
Patent Review
Bibliography
Literature Cited
Patents

Chapter 3, Section III Air Knife Coaters, by Herbert B. Kohler
Introduction
Coating Application System
Single Roll
Two Roll
Three Roll
Smoothing Roll
Air-knife Metering Element
Air Delivery System
Blowers
Blower Requirements
The Aftercooler
Piping
Pressure and Flow Adjustments
Coating Exhaust and Recovery Systems
Air-knife Setup
Fine Tuning
Contour Coating
Summary
Bibliography
Resources

Chapter 3, Section IV Transfer Roll Coaters, A History, by George L. Booth
Introduction
Transfer Roll Coaters
The Consolidated Process
The Faebber Coater
St. Regis Roll Coater
Combined Locks Process
Kimberly Clark-Mead (KCM) Coater
Champion Hamilton Coater
West Virginia Coater
Offset Gravure Coater
The Transfer Roll Coater Challenge
Film Split
Rheology in Roll Coating
Leveling Index
Theoretical Treatment of Roll Shear Conditions
Hypothetical Mechanism of Patterning
Transfer Roll Coater Uses
Summary
Bibliography
Literature Cited

Chapter 3, Section V Cast Coated Papers, by George L. Booth
Cast Coating Processes
Wet Process
Precast Coating
Wet Process
Prevention of Air Bubbles
Treatment for Release Properties
Gel Process
Acid Insolubilization of the Coating
Thermal Insolubilization
Precast Coating
Discussion of Important Patents
Use of Coagulants
Pretreatment with Oleaginous Materials
Treatment of Chromium Casting Surface to Impart Passivity
Effect of Coating Composition
Use of Special Pigment, Adhesive or Additives
Effect of Coat Weight
Other Factors in Cast Coating
Gloss Coatings Supercalendered Paper
Polymer Coatings
Application of Cast Coating
Bibliography
Literature Cited

Chapter 3, Section VI Surface Sizing and Precoating of Basestock, by Charles P. Klass
Introduction
Coating Holdout
Surface Sizing and Precoating Chemicals
Starch
Film Formers Other Than Starch

Page 3 of 9
Chapter 3, Section VII Coated Board, by Terry Kellogg

Recycled Board
- Basestock
- Coating Application and Metering
  - Basecoat
  - Topcoat
  - Third Coat
- Coating Formulation
- Drying and Finishing
- End-use Considerations

Unbleached Kraft Board
- Basestock
- Coating Application and Metering
  - Basecoat
  - Topcoat
  - Third Coat
- Coating Formulation
- Drying and Finishing
- End-use Considerations

Solid Bleached Sulfate Board
- Basestock
- Coating Application and Metering
  - Basecoat
  - Topcoat
  - Third Coat
- Coating Formulation
- Drying and Finishing
- End-use Considerations

Chapter 4 Drying, by William L. Bracken, Robert A. Daane, Ernest A. DeSanti, James Y. Hung, Donald W. Lawton, John F. Munce, Robert E. Pelffer, E.C. Porter Jr., Marion R. Ricks Jr., and Michael Wunderlich

Introduction
- Steam Cylinder Dryers
- Air Impingement Dryers
- Tunnel Dryer

Chapter 5 Process Control, by Sanford I. Shapiro

Introduction
- Process Control
  - Control System Technology
  - Single-window Integration
- Basestock
- Coating Preparation
- Coating Solids Control
- The Coater
  - Machine Drives
  - Coater Station
- Product Sensors
- Coat Weight Measurement
  - Differential Beta
  - X-ray Fluorescence
  - X-ray Transmission
  - Differential X-ray
- Moisture and Other Sensors
- Coat Weight Control
- Drying
  - Cross-direction Control
    - CD Coat Weight
    - CD Moisture
- Optimizing Controls
  - Coordinated Speed Change
  - Speed Optimization Control
  - Startup Control
  - Automatic Grade Change
  - Target Optimization
- Supercalender
- Summary
- Bibliography
- Literature Cited

Chapter 6 Web Handling and Off-Machine Coater Drives, by Gerald I. Kheboian, and Robert J. Alheid
Introduction
Web Handling
Unwind
  Web Control
  Center Unwind
  Drive Motor on Unwind Stands
  Roll Diameter and Weight
  Core Diameter
  Build Down Ratio
  Vacuum Rolls and Vacuum Tables
  Isolation
Guiding Equipment
  Web Guides and Web Spreaders
  Unwind Guiding
  Intermediate Guiding
  Rewind Guiding
Tension Control
  Constant Torque
  Basic Speed Regulator
  Rewind Tension Control
  by Current Control
  Dancer Roll Control
  Force Transducer Control
  How to Deal with Sections with Limited Capability to Control Tension
  Differential Tension
  Stall Tension
Sources of Coating Variations
  Drive System
  Drying Equipment
  Air Drying
  Cylinder Drying
Rewind Telescoping
Wrinkling
Impression Marks and Scratches
Roll Shape
Gear Reducers and Power Supply Selection
Drive Application Data
  Integral vs. Proportional Operation Control
  Speed-monitoring System
  Selecting a Tension-indicating System
Wiring Design
Operation Requirements
  Stopping
  Machine Speeds
  Acceleration
Motoring and Regeneration
Characteristics of Power Units
  Sizing Power Supplies
Master Section Determination
Horserpower Requirements
  Normal Running Load (NRL)
  Recommended Drive Capacity (RDC)
Subject Index

- acrylic latex
- actuators
- agitation
- agitator(s)
- air bubbles
- air flotation dryer
- air impingement
- air knife
- airfloat clay
- airfoil nozzle
- alginate
- alkaline papermaking
- alumina trihydrate
- ammoniacal salts
- ammonium hydroxide
- applicator
- axial
- backing roll
- backup roll
- backwashing
- bag filters
- base sheet
- basestock
- basis weight
- basket filters
- batch
- belt drives
- bent blade
- binder
- binder migration
- binders
- biocides
- blade
- blade angles
- blade clamp
- blade coating
- blade holder
- blade metering
- blade pressure
- blades
- blending
- bluff body
- bottom liner
- Bowed Roll
- brakes
- break(s)
- brightness
- broke handling
- brush polisher
- brush polishing
- bulk storage
- CaCO₃
- calcined clay
- calcium carbonate (CaCO₃)
- calender
- calendering
- caliper
- carboxymethyl cellulose (CMC)
- casein
- cast coating
- caustic
- center unwind
- centrifugal pump
- ceramic
- Champflex Coater
- Champion Hamilton Coater
- Champion Process charting
- chatter
- chrome plated
- clam shell
- Clay
- closed-loop
- CMC
- coagulants
- Coanda airfoil
- coat weight(s)
- coated board
- coated one side
- coated two side(s)
- coating basestock
- coating chatter
- coating head
- coating kitchens
- coating preparation
- coating weight
- cockle
- color pan
- color plant
- Combined Locks Process
- conduction
- Consolidated Process
- contaminants
- contamination
- control charts
- convection
- cooking
- core
- Coriolis mass sensor
- corn starch
- Croda red ink
- cross-direction control
- crosslinker
curl
cylinder dryers
dancer roll
dandy roll
DCS
deaerators
Delaminated clay Density
dewatering
diaphragm pump
diaphragm seals
differential pressure sensors
dilatant dispersants
disperser(s)
dispersing
dispersion
Distributed Control System (DCS)
Doppler sensors
draw roll
dry cutting
dryer
drying
duster
dynamic seals
dyne cracks
electromagnetic waves
emitter
emulsified wax
emulsion
Engineered pigments
entrailed air
entraped air
enzyme conversion
ethylated starch
evaporation
Faraday coater
Faraday's Law
filled roll
filler(s)
film split
film
gate roll
geared reduction
gear type pump
gelatinization
Glass Transition Temperature
gloss
gloss calender
gravity lines
gravity strainers
gravure
grooved rods
halogen gas
heat load
heat transfer
heat transfer coefficient
HEC
high velocity air cap dryer
holdout
hoods
horsepower
hydroxyethyl cellulose (HEC)
steam injunction
steel roll
steel-to-steel
Stefan-Boltzmann law
stickies
stiffness
storage
streaking
structured pigments
tubular filters
tungsten wire
tunnel dryer
Turbine sensors
turbulence
turbulent flow
turret-type unwind
U-tube
unbleached kraft board
unnipped roll
unwind
vacuum roll
vacuum table
valves
variables-speed drive
velocities
vessel
vibratory screens
vinyl
viscosity
Vortex meters
Vortex sensors
water box
water-retention agents
waterwashed clay
wavelengths
wax paper
web guides
web spreaders
wedge wire
weigh tank
West Virginia Coater
wet-on-wet
Wien's displacement law
wire wound rods
stuffing box
styrene-butadiene latex (SBR, S/B)
styrene-butadiene latex (SBT, S/B)
suction
supercalender
supercalendered
supercalendering
surface sizing
woven stainless steel
wrap angle
wrinkles
X-bar
Yankee dryers
Zahn cup viscosity
surface treatment
suspended solids
synthetic fabric
tank(s)
tear
temperature
tensile
TiO$_2$
titanium dioxide
top liner
topcoat
torque
tracking
transfer roll coater
transfer-type
unwind
transmitter
triple coating


downstream