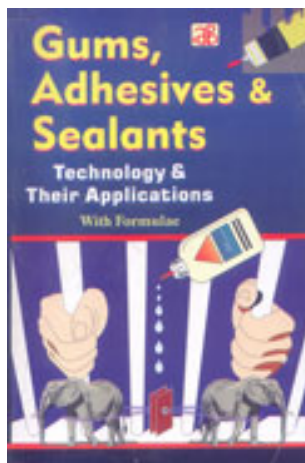


Gums, Adhesives & Sealants Technology & Their Applications (with Formulae)



Author: NIIR Board of Consultants & Engineers

Format: Paperback

ISBN: 8178330954

Code: NI8

Pages: 700

Price: Rs. 975.00 **US\$** 100.00

Publisher: Asia Pacific Business Press Inc.

Usually ships within **3** days

Gums, Adhesives and Sealants are occupying by and large, a conspicuous plateau in the modern industrial world by virtue of their versatility in diverse fields of applications. This potentially useful book furnishes technical aspects of various types of gums, adhesives and sealants which are so useful to a new entrepreneurs or established one. The book delineates in detail formulae, processes of various gums, adhesives and sealants along with addresses of machinery and raw material suppliers.

Contents

I INTRODUCTION TO ADHESIVES

ADVANTAGES OF ADHESIVE BONDING

HISTORY

TYPES OF ADHESIVES

Application and Setting

Origin

Cure; Solubility; Crosslinking

Hybrids and coupling Agents

Adhesive Films

High Temperature Resistance; Flame Retardance

MATCHING ADHESIVE TO ADHEREND

Critical Surface Tension

Solubility Parameter

Figure

DESIGNING POLYMERS FOR ADHESIVES

Grafting

Reactive Oligomers and Polymers

Copolymerization

Block Copolymers

Interpenetrating Polymer Network (IPN)
NEW TRENDS

I FUNDAMENTALS OF ADHESION

INTRODUCTION

Bond Types

Setting

Adhesive Joint Strengths

SURFACES AND THEIR CHARACTERIZATION

Solids

Liquids

INTERFACES

Thermodynamics of Adhesion

Acid-Base Considerations

SURFACE TREATMENT

Metal

Polymers

MEASUREMENT OF ADHESION

Introduction

Test Methods

STRENGTH OF ADHESION

Introduction

Molecular Interactions

Autohesion

Durability

Nondestructive Evaluation of Bonds

I ANIMAL GLUE

CHEMISTRY

MANUFACTURING

PROPERTIES

TEST GRADES

TESTING

CUSTOMER PREPARATION OF GLUE SOLUTIONS

LIQUID ANIMAL GLUES

FLEXIBLE AND NON-WARP GLUES

GLUE APPLICATION

COATED ABRASIVES

SET-UP WHEELS

GREASELESS BUFFING COMPOUNDS

GUMMED TAPE

GLASS CHIPPING

SIZING AND COATING

PAPER

COMPOUNDED RUBBER

GASKET MANUFACTURING

MATCHES

METAL REFINING

OTHER APPLICATIONS FOR ANIMAL GLUE

I CASEIN AND MIXED PROTEIN ADHESIVES

Manufacture of Casein

Specifications and Typical Analyses for Casein

CHEMISTRY AND PHYSICAL PROPERTIES OF GLOBULAR PROTEIN

CHEMICAL PROPERTIES OF CASEIN

PHYSICAL PROPERTIES OF CASEIN

Other Viscosity Factors

LIME-FREE CASEIN ADHESIVES

Preparation of Casein Solutions, General

Preservatives

Preparation of an Alkaline Casein Solution

Additives for Casein Solutions

APPLICATIONS USING CASEIN SOLUTIONS AND ADHESIVES

Casein as a Protective Colloid

Paper Coatings

Foil-to-Paper Laminating Adhesives

Ice Water Lable Paste Adhesives

CASEIN AND PROTEIN BLEND GLUES AS WOOD ADHESIVES

Chemistry of Protein Blend Glues

Formulation and Chemistry of Casein-Lime Glues

Mixing Casein Glue

Additives for Casein and Protein Blend Glues

Uses of Casein Glues

Specifications Applying to Casein Glue

Viscosity and Pot Life

Certification of Fire Doors

Properties of Casein Glues

Durability of Casein Glues

I STARCH BASED ADHESIVES

MODIFICATION OF STARCHES

Fluidity Starches

Oxidized Starches

Dextrinization

Hydroxyethylation

Cationic Starches

Amphoteric Starches

Miscellaneous Derivatives

EFFECT OF ADDITIVES

Sodium Hydroxide

Borax

Urea

Glycerol

Soluble Soaps

Urea-Formaldehyde Resin

Miscellaneous Additives

STARCH ADHESIVES

Jelly Gums

Other Liquid Formulations

Pastes

Borated Dextrins

White Dextrins

Canary Dextrins

British Gums

Waxy Starch Dextrins

Dextrin/Silicate Blends

Pregelatinized Starches

APPLICATION AREAS

- Papermaking
- Paper Coating
- Corrugating
- Bag Adhesives
- Laminating Adhesives
- Tube Winding
- Corrugated Boxes
- Gummed Tapes
- Label and Envelope Adhesives
- Paper Box
- Textiles
- Wall Covering Adhesives
- Miscellaneous Uses

GOVERNMENTAL REGULATIONS: ADDITIVES

I NATURAL RUBBER ADHESIVES

INTRODUCTION

RAW MATERIALS

Natural Rubber Latex

Preservation

Dry Natural Rubber

Natural Rubber Grafted with Methyl Methacrylate (Heveaplus MG)

Depolymerized Rubber

Synthetic Polyisoprene

FORMULATION OF LATEX ADHESIVES

Quick-Grab Adhesive

Self-Adhesive Envelopes

Latex Pressure-Sensitive Adhesives

Tile Adhesives

Reseal Adhesives

Anchor Coat for Tufted Carpets

Other Nonvulcanizing Latex Adhesives

Vulcanizing Latex Adhesives

SOLUTION ADHESIVES FROM NATURAL RUBBER

Nonvulcanizing Adhesives

Vulcanizing Adhesives

Mastics, Asphaltics, and Sealants

GRAFTED COPOLYMER HEVEAPLUS MG

FORMULATIONS

I BUTYL RUBBER AND POLYISOBUTYLENE

INTRODUCTION

BASIC PROPERTIES

Butyl Rubber

Polyisobutylene

Halogenated Butyl Rubber

Butyl Rubber and Polyisobutylene Latices

Modified Butyls

FORMULATING AND PROCESSING

Choice of Polymer

Pigments and Fillers

Tackifiers, Plasticizers, and Other Polymeric Additives

Curing Systems
Solvents and Solution Processing
Mixing and Processing Techniques and Guidelines
APPLICATIONS AND FORMULATIONS
Adhesives and Mastics
Sealants
Mixing
I NITRILE RUBBER ADHESIVES
INTRODUCTION
PREPARATION OF NITRILE RUBBER
EMULSION TECHNOLOGY
Functionally Terminated Telechelic Liquid Polymers
COMPOUNDING NITRILE RUBBER CEMENTS
Polymer Selection and Solubilization
Types of Compounding Ingredients
APPLICATION
Nitrile Rubber Systems
Nitrile Rubber/Phenolic Adhesives
Nitrile Rubber/Epoxy Adhesives

I STYRENE-BUTADIENE RUBBER ADHESIVES
INTRODUCTION
Perspective
History of SBR
Manufacture of SBR
Basic Chemistry of SBR
SBR LATEXES IN ADHESIVES
General
Classification
Benefits of SBR Latexes
Compounding Ingredients
Major Applications
SBR (SOLID) IN ADHESIVES
General
Classification
Compounding Ingredients
Major Applications

I NEOPRENE (POLYCHLOROPRENE) -
BASED SOLVENT AND LATEX ADHESIVES
HISTORY
THE EFFECT OF POLYMER STRUCTURE
NEOPRENE SOLVENT-BASED ADHESIVE CEMENTS
Types of Neoprene
Antioxidants
Metal Oxides
Resins
Fillers
Curing Agents
Solvents
Adhesive Processing
End Uses
Application Methods

NEOPRENE LATEX-BASED ADHESIVES

Anionic Types

Nonionic Type

Compounding

Typical Formulations

I POLYSULFIDE SEALANTS AND ADHESIVES

POLYSULFIDE SEALANTS

Chemistry

Compounding

Curing Agents

Fillers

Plasticizers

Adhesion

Primers

Specifications

ADHESIVES FROM POLYSULFIDE LIQUID

POLYMER-EPOXY RESIN REACTIONS

Chemistry

Physical Properties

Applications

OTHER MERCAPTAN-TERMINATED POLYMERS

Polyethers

Polyesters

Urethanes

Olefin

I PHENOLIC RESIN ADHESIVES

CHEMISTRY

Formaldehyde

Novolaks

Strong Acid Reactions

Weak Acid Reactions

Resoles

Dispersion Resoles

Resin Cure

MANUFACTURE

ABRASIVES

Bonded Abrasives

Coated Abrasives

COATINGS

FOUNDRY

FRICION COMPOSITES

MOLDING COMPOUNDS

PHOTORESISTS AND CARBONLESS PAPER

LAMINATING

WOOD BONDING

INSULATION AND FOAM

GENERAL ADHESIVES

ENVIRONMENTAL AND TOXICOLOGICAL CONSIDERATIONS

I AMINO RESIN ADHESIVES

HISTORY

RAW MATERIALS

CHEMISTRY

END USES

Particleboard

Plywood

High-Pressure Decorative Laminates

Miscellaneous Applications

TOXICITY

I EPOXY RESIN ADHESIVES

INTRODUCTION

EPOXY RESINS USED IN ADHESIVES

Bisphenol A Based Epoxy Resins

Epoxy Novolac Resins

High performance Epoxy Resins

Flexible Epoxy Resins

CURING AGENTS USED IN ADHESIVES

Polysulfide

Amines

Aliphatic Amines

Cycloaliphatic Amines

Aromatic Amines

Polyamides

Amidoamines

Dicyandiamide

Catalytic Curing Agents

Anhydrides

SUMMARY

DILUENTS

FILLERS

ELASTOMERIC MODIFIERS

TYPICAL ADHESIVE FORMULATIONS

COMPLEMENTARY TECHNOLOGIES

Robotics

Induction Curing

APPLICATIONS AND SUMMARY

I POLYURETHANE - AND ISOCYANATE - BASED ADHESIVES

REASONS FOR THE EFFECTIVENESS OF POLYURETHANE AND ISOCYANATE-BASED ADHESIVES 321-323

TYPES AND USE OF POLYURETHANE AND ISOCYANATE BASED ADHESIVE SYSTEMS

Method A (isocyanate primer)

METHOD B (CONVENTIONAL PLASTIC OR
RUBBER VEHICLE + ISOCYANATE)

The Relative Effectiveness of "Vulcabond" T and Tx in
Rayon Cord-to-Natural Rubber Adhesion

Method C (in situ polyurethane polymerization)

Method D (polyurethane elastomer without or
with added polyisocyanate)

Method E (blocked di-or polyisocyanate)

Method F (aqueous dispersion)

Method G (film and tape)
Method H (powder)
POLYURETHANE STABILIZATION
HANDLING ISOCYANATE BASED ADHESIVES
IDENTIFICATION OF ADHESIVE COMPONENTS

I POLYOLEFIN AND ETHYLENE COPOLYMER-BASED
HOT MELT ADHESIVES
ADHESIVE FORMULATION
Polymers
Tackifiers
Waxes
HOT MELT ADHESIVES APPLICATIONS
Cases, Cartons, and Trays
Bookbinding
Nonwovens
Furniture
Labels
Polyester Beverage Bottles
Carpet Seaming Tape
Paper Laminates
HOT MELT APPLICATION EQUIPMENT
FUTURE OF HOT MELT ADHESIVE

I POLYVINYL ACETAL ADHESIVES
CHEMISTRY
HEALTH, TOXICOLOGY, AND SAFETY
PHYSICAL PROPERTIES
Solubility
Compatibility
Viscosity
Mechanical Properties
Thermal Properties
USES AS AN ADHESIVES
Hot Melts
Thermosetting Adhesives
Adhesion to Metal
Adhesion to Natural Surfaces
Green Strength Binder
Composites
Adhesion to Glass
Other Uses

I ACRYLIC ADHESIVES
TECHNOLOGY
Chemistry
Glass Transition Temperature (T_g)
Crosslinked Thermosets
BONDING PROCESSES
Pressure Sensitive
Contact Bonding
Heat and Pressure Bonding
Vacuum Bonding

Wet Laminating Adhesives
Filled Adhesives
ENGINEERING ADHESIVES
Chemistry and Technology
Radiation Curing
Application Processes
Current Uses

I PRESSURE-SENSITIVE ADHESIVES FOR TAPES AND LABELS

CONSTRUCTIONS

Manufacture
Backings
Release Coatings and Liners

ADHESIVE SYSTEMS

Tackifiers
Rubber-Based Adhesives
Acrylics
Silicones
Miscellaneous Polymers
Surface Energetics

Tack
Peel Adhesion
Cohesive Strength

TEST METHODS

Tack Testing
Peel Adhesion Testing
Shear Resistance Testing
Miscellaneous Tests

Tapes
Labels and Decals
Other Products
Adhesive Mass Thicknesses

I FACTORS INFLUENCING GUM COSTS AND APPLICATIONS

DEFINITION OF GUM

FACTORS AFFECTING RAW GUM COSTS

1. Exudate Gums
2. Seaweed Gums
3. Seed Gums
4. Starch and Cellulose Derivatives

INDUSTRIALLY VALUABLE PROPERTIES OF GUMS

1. Linear Natural Polysaccharides
2. Branched Neutral Polysaccharides
3. Polysaccharides with Carboxyl Groups
4. Polysaccharides with Strong Acid Groups
5. Polysaccharides with basic Groups

MODIFIED GUMS

1. Introduction of Neutral Groups
2. Introduction of Acidic Groups
3. Introduction of Groups
4. Graft Polymers
5. Other Chemical Modifications of Natural Polysaccharides

I AGAR

INTRODUCTION

SOURCE

1. Raw Material
2. Processing
3. Finished Product

HISTORY

1. Discovery
2. Manufacture
3. Use
4. Present Applications
5. Derivatives

IV. STRUCTURE

PROPERTIES

1. Solid
2. Sols
3. Gels

I ALGIN

INTRODUCTION

PRODUCTION

1. Source
2. Seasonal Variations
3. Harvesting
4. Processing
5. Grades
6. Industrial Importance
7. Potential Amount

APPLICATIONS

1. Introduction
2. Mode of Action
3. Foods

DAIRY PRODUCTS

BAKERY PRODUCTS

OTHER FOOD PRODUCTS

4. Pharmaceuticals and Cosmetics
5. Industrial Applications

PAPER PRODUCTS

TEXTILE PRODUCTS

RUBBER PRODUCTS

OTHER INDUSTRIAL USES

STRUCTURE

PROPERTIES

1. Dissolution
2. Solution Properties
3. Gels
4. Films
5. Compatibilities
6. Algin in Foods
7. Other Properties

I LAMINARAN

INTRODUCTION

PRODUCTION

1. Source
2. Producing Areas
3. Seasonal Effects
4. Collection
5. Preparation

HISTORY OF DEVELOPMENT

STRUCTURE

PROPERTIES

I CHITIN AND ITS DERIVATIVES

INTRODUCTION

PRODUCTION

1. Crustaceans
2. Insects
3. Fungi
4. Preparation
5. Preparation of Deacetylated Chitin, Other Chitin Derivatives, and D-Glucosamine
6. Grades
7. Potential Amount

HISTORY

IV APPLICATION

1. Sizing
2. Adhesives
3. Emulsion Stabilization and Thickening
4. Pharmaceuticals and Cosmetics
5. Extruded Fibers and Films
6. Glycosamine Hydrochloride in Foods and Pharmaceuticals

STRUCTURE

PROPERTIES

1. Solubility and Viscosity
2. Gels
3. Films and Fibers
4. Adhesiveness
5. Compatibilities

I GUM ARABIC

INTRODUCTION

PRODUCTION

1. Republic of the Sudan
3. Nigeria
4. Tanganyika
5. Morocco
6. British Somaliland and Abyssinia
7. South Africa
8. India
9. Australia
10. Miscellaneous

TYPES OF GUM IN THE UNITED STATES

STRUCTURE

ARABIC ACID

1. Preparation

2. Properties
3. Degraded Gum Arabic
4. Derivatives of Arabic Acid

FACTORS WITH AFFECT VISCOSITY

1. Concentration
2. Temperature
3. Electrolytes
4. pH
5. Solvents Others Than Water
6. Aging
7. Mechanical Treatment
8. Ultrasonic Vibrations and Ultraviolet Irradiation

OTHER PHYSICAL PROPERTIES

1. Surface Tension
2. Freezing Point

COACERVATION

1. Introduction
2. Gum Arabic-Gelatin Coacervates
3. Preparation of Coacervates
4. General Properties, Physical Appearance, and Composition
5. Effect of Temperature
6. Effect of pH
7. Reactions of Salts
8. Physical Phenomena
9. Uses of Gum Arabic-Gelatin Coacervates
10. Coexisting Coacervates
11. Other Coacervates

CHEMICAL PROPERTIES

1. Chemical Reactivity
2. Solubility
3. Enzymes

SEPARATION AND IDENTIFICATION OF GUM ARABIC

1. Isolation of Gum Arabic from Commercial Products
2. Systematic Analytical Scheme
3. Physical Confirmatory Tests
4. Chemical Confirmatory Tests
5. Direct Tests for Gum Arabic in Some Commercial Products

USES

1. Foods
2. Adhesives
3. Paints
4. Inks
5. Lithography
6. Textiles
7. Miscellaneous

I CORN HULL GUM

INTRODUCTION

SOURCE AND PREPARATION

DEVELOPMENT OF USE

STRUCTURE

PROPERTIES

I GUAR GUM

INTRODUCTION

PRODUCTION

1. Source and Producing Areas
2. Agronomics
3. Purification
4. Grades

USES

1. HISTORY
2. Mining Industry
3. Foods
4. Cosmetics and Pharmaceuticals
5. Paper Industry
6. Explosives
7. Derivatives

STRUCTURE

PROPERTIES

1. Viscosity
2. Gels
3. Films
4. Adhesiveness
5. Miscellaneous

I GUM KARAYA

INTRODUCTION

Production

1. Source
2. Producing Areas
3. Seasonal Effect
4. Collection
5. Purification
6. Grades
7. Impurities
8. Potential Amount

USES

1. History
2. Commercial Value

STRUCTURE

PROPERTIES

1. Dissolution and Viscosity Measurements
2. Gels
3. Films
4. Adhesiveness
5. Acid Resistance
6. Dispersibility
7. Ropiness
8. Water Retention

I PECTIN

INTRODUCTION

PRODUCTION

1. Source
2. Producing Areas
3. Seasonal Effects

4. Collection
5. Purification
6. Grades and Definitions of Grades
7. Impurities
8. Quantities Marketed
9. General Industrial Uses Other Than is Foods

FOOD

Mode of Action

Structure

Properties

1. Pectin Types as Defined by Degree of Methylation
2. Solubility
3. Solutions, Stability and Viscosity
4. Gels
5. Assay Methods, Calculations, and Composition

DIRECTORY SECTION

PRESENT MANUFACTURERS

SUPPLIERS OF RAW MATERIALS

SUPPLIERS OF THE PLANT M/C & EQUPT.

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, directory, 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 bureau, consultants and consultancy firms as one of the input in their research.

National Institute of Industrial Research , 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** niir@vsnl.com **Website:** NIIR.org

Sat, 05 Jul 2008 21:11:26 -0400