

MONSANTO
PRODUCTS
CATALOG

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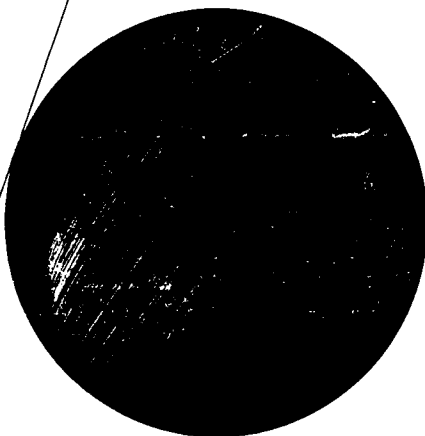
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28th Edition



CHEMICALS AND PLASTICS



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MONSANTO CHEMICAL COMPANY

MONSANTO CHEMICAL COMPANY ranks with the largest companies in the United States in the production of industrial chemicals and plastics. Sales and production are organized into six operating divisions, with twenty-eight plants and twenty-nine district offices in strategic locations throughout the world. Subsidiary companies are located in Great Britain, Canada, Australia, India, Argentina, Brazil, Mexico and Japan.

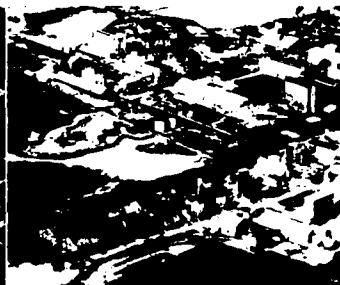
Products of the Organic Chemicals Division include flavors and condiments, insecticides, wood preservatives, oil additives, compounds for the control of weeds, fire-resistant hydraulic fluids, plasticizers and fine chemicals for pharmaceutical uses. An important operation of this division is the production of heavy chemicals and a wide variety of industrial organics including phenol, phthalic anhydride, benzoic acid and dye and drug intermediates. Other activities include the production of a vanadium catalyst for the manufacture of sulfuric acid. Specialized types of organics are represented in Monsanto's rubber chemicals.

The Phosphate Division at St. Louis converts elemental phosphorus into food grade phosphate-salt baking powders, dentifrices, medicinals, water softening compounds and all types of phosphate bases for soaps and detergents. Other products include both high sudsing and sudsless synthetic detergents and wetting agents, biphenyl, the polyphenyl detergents and plasticizers and aluminum oxide abrasives.

The Merrimac Division, headquartered at Everett, Massachusetts, produces heavy acids, basic industrial inorganics, dyestuff intermediates, flattening agents, lacquer and varnishes, synthetic resins for more efficient sizing of paper and textile finishes that are possible shrink-resistant wool and crush-resistant cotton. Some of the products of this division duplicate those of other divisions and thus provide an excellent source of supply for Monsanto customers. Nealco-Monsanto Company, a subsidiary of the Merrimac Division, produces pure and formulated industrial alcohols.



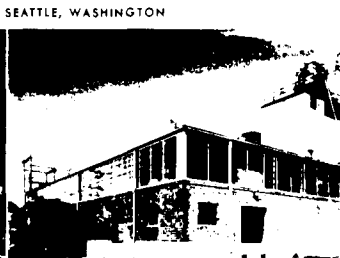
ST. LOUIS, MISSOURI



EVERETT, MASSACHUSETTS



SPRINGFIELD, MASSACHUSETTS



SEATTLE, WASHINGTON

0685001

The Plastics Division at Springfield, Massachusetts, offers the most complete line of plastics in the entire industry. These include thermoplastic and thermosetting molding powder, liquid and powder resins, electrical coatings, laminating varnishes, sheets and adhesives. The Western Division, with headquarters at Seattle, Washington, produces adhesives, synthetic resins and wood-treating preservative sealers at that plant location. Coatings and wood finishes are manufactured by the Western Division at Santa Clara, California. The Texas Division at Texas City produces styrene monomer for plastics and for the increasing use of this versatile resin-forming compound. Here during World War II, the company constructed, and put in operation in less than one year, a plant which turned out one-fourth of all the styrene requirements to make of the national synthetic rubber program. Some process in the manufacture of almost every product produced by industry requires the use of one or more chemicals available from Monsanto. The broad, diversified product list that makes up this catalog of chemicals and plastics supports the Monsanto slogan—"Serving Industry...Which Serves Mankind."



COLUMBIA, TENNESSEE

TEXAS CITY, TEXAS



0685002



Research

FROM ITS BEGINNING, Monsanto realized that research was an essential part of the foundation supporting the chemical industry. Consequently research was made an integral part of the company's operation.

Monsanto research divides itself into specific programs. Continuous investigations are carried out to improve standards of purity, physical forms and better packaging.

Research is also directed toward the improvement of chemical manufacturing processes. The aim of such studies is to increase efficiency so that savings may be reflected wherever possible in the cost of Monsanto chemicals.

A third direction of Monsanto research is toward the wider application of its products. Such studies review the processes used in hundreds of industries to determine how such processes may be simplified or how finished product quality can be improved through the proper use of chemicals.



Technical Counsel & Service

MONSANTO'S RESEARCH also concerns itself with technical problems of customers. These may range from working out standard chemical applications or may involve preparing chemicals to do a specific job for an industry which can be served by no commercial chemical or mixture of chemicals on the market. Problems of this type are as varied as a cross section of industry.

To serve plastics molders, a technical council studies questions of strength, moldability, speed of operation—any phase of plastics manufacturing, and returns a complete report with recommendations to the customer. Monsanto's Rubber Service Department is a complete facility for assistance to the rubber industry.

In the field of organics, technical service is available on problems of fortifying lubricating oil with suitable additives and the problems of plasticizing films and surface coatings.

Customers may receive advice on wood preservation

0685003

A fourth Monsanto application of science to industry is the vigorous search for new products. Research has produced a high-impact strength and abrasion-resistant, rag-filled melamine molding compound, fire-retardant, rag-filled melamine molding compound, fire-retardant agents for paper and textiles, and new compounds for processing natural and synthetic rubber. Still other chemicals have been developed for pharmaceutical manufacture, the paper industry, for petroleum processing, and for textile finishing. Much of this exploratory research is conducted by a Central Research organization. Here, specialized research—such as both laboratory and applied—is carried on, investigating new products and processes with applications in scores of industries. Product application problems are worked out in laboratories located in each division, sometimes in cooperation with Central Research. Monsanto chemists, physicists, biologists and engineers of all types apply their specialized experience and training to exploratory work in developing the new products and the more efficient processes which will be a vital part of industry's future.



tion, insecticide and herbicide formulation and problems of organic synthesis.

Technical Monsanto technicians study problems of formulation and manufacture of detergents and soap builders. Special laboratories work on textile problems that involve shrink and crush resistance, warp yarn sizing mercerization and wool fiber control. Technical assistance is available to manufacturers of hot or cold press plywood.

Frequently manufacturers who are attempting to improve quality or who wish to build some special product properly in their existing products call upon Monsanto for study and recommendation.

Although the greater part of the technical counsel and service is called for by established customers who request help on specific problems—this service is also available to industries in search of special compounds for processing or finishing.

Technical counsel and service to customers is an integral part of Monsanto's operation. It is available to all of the industries who use chemicals in their processing or could use them to obtain higher quality or more versatile products.



0685004

Nitron**VUEPAK****ETHAV****OBANE****Rezite****NIFOS-T****RESINOX***Lustrex***RESLOO****AROCLOR****SANTOPHEN 20****SANTOMERSE**

Trade-marks . . .

THE FOLLOWING LIST contains the major trade-marks owned by Monsanto, arranged alphabetically. The trade-marks are enclosed by quotation marks and the generic name of the product follows. For some products, grade designations follow the trade-mark outside of the quotation marks.

Whenever trade-marked products are referred to in correspondence, articles, advertising copy, news releases or sales promotion material—this same method of designation should be followed.

When copy is being prepared for publication, the generic or common name of the product as shown in the following list should appear as often as possible linked with the trade-mark. The generic name should be used at least once on every page where the trade-mark appears.

In addition to the following list, Monsanto owns the trade-mark "Monsanto," the block "M" design mark and the slogan, "Serving Industry . . . Which Serves Mankind."

Trade-marks which are registered in the U. S. Patent Office are marked with an asterisk (*). Registered trade-marks must be identified when they appear in print. This can be done either by the statement that they are registered marks; by use of an asterisk after the trade-mark referring to the abbreviated notice, "Reg. U. S. Pat. Off." as a footnote or the letter R enclosed within a circle, thus ®, following the mark.

"A-32" Rubber Accelerator
 "A-77" Rubber Accelerator
 "A-100" Rubber Accelerator
 "Alkophos" Aluminum Acid Phosphates
 "Areskap" Sodium Butyl-o-Phenylphenolsulfonate
 "Aresket" Sodium Butylbiphenylsulfonate
 "Aresklene" Disodium Dibutyl-o-Phenylphenoldisulfonate
 "Aroclor" Polychlorinated Polyphenyls
 "Benthal" Alkyd Resin Intermediate
 "Biolite" Mold Inhibitor
 "Butasan" Rubber Accelerator
 "Cedar Rez" Exterior Penetrating Sealer
 "Cerec" Styrene Copolymer Plastic
 "Color-Toned Rez" Exterior Penetrating Sealers
 "Coumarin Monsanto"
 "Cresantol" 3 Germicide
 "Cresantol" 15 Germicide
 "Crysalba" Dettifrice Base
 "D.P. Solution" Lacquer Additive
 "Driftwood Rez" Exterior Penetrating Sealer
 "El-Sixty" Rubber Accelerator
 "Ehasan" Rubber Accelerator
 "Ethavan" Flavoring and Aromatic
 "Ethyl Thiurad" Rubber Accelerator
 "Fibestos" Cellulose-Acetate Sheets
 "Flectol" H Rubber Antioxidant
 "Fungiseal" Wood Preservative
 "Guantal" Rubber Accelerator
 "HB-40" Partially Hydrogenated Terphenyl
 "Hibitite" Acid Inhibitor
 "Hibitite" L Acid Inhibitor
 "Hi-Gloss Rez" Interior Luster Wood Finish
 "Insoluble Sulfur 60"

"Laukein" Casein Glue
 "Laukein" Casein-Soybean Blend Glue
 "Laukein" Soybean Glue
 "Laukite" Melamine Resin Adhesives
 "Laukite" Phenolic Resin Adhesives
 "Laukite" Resorcinol Resin Adhesives
 "Laukite" Urea Resin Adhesives
 "Lautol" A, Wood Preservative
 "Lustrex" Latex and Resins Surface Coatings
 "Lustrex" Styrene Industrial Resins
 "Lustrex" Styrene Molding Compounds
 "Mahogany Rez" Exterior Penetrating Sealer
 "Merlon" Sodium Hypochlorite
 "Merlon" BR Textile Processing and Finishing Agent
 "Merlon" BRS Textile Processing and Finishing Agent
 "Merlon" KR-1, 2, 3, 4, 5 Textile Processing and Finishing Agents
 "Merlon" S Textile Processing and Finishing Agent
 "Merlon" SP Textile Processing and Finishing Agent
 "Mersize" CD-2 Paper Sizing Agent
 "Mersize" RM Paper Sizing Agent
 "Mersol" Proprietary Solvent Alcohol
 "Mertanol" Synthetic Tanning Agent
 "Mertax" Rubber Accelerator
 "Mertone" WB-2 Precoat for Paper
 "Methasan" Rubber Accelerator
 "Milmer" J Fungicide
 "Mono Thiurad" Rubber Accelerator
 "Monsanto AE-1" High Molecular Weight Ester Alcohol
 "Monsanto Detergent MCP"
 "Monsanto Emulsifiers H, L, M and R"
 "Monsanto Fire Retardant A"
 "Monsanto Fire Retardant B"
 "Montar" Synthetic Resins
 "Nealco" Anti-Freeze
 "Nidos" T Insecticide
 "Niran" Insecticide
 "Nitron" Cellulose-Nitrate Sheets
 "Pip-Pip" Rubber Accelerator
 "Pdraul" F-9 Functional Fluid
 "R-1" Rubber Accelerator
 "Redwood Rez" Exterior Penetrating Sealer
 "Reinforced Vuelite" Cellulose-Acetate
 "Resimene" Melamine-Formaldehyde Molding Powders
 "Resimene" Melamine-Formaldehyde Surface Coating Resins
 "Resimene" Melamine-Formaldehyde Industrial Laminating Resins
 "Resimene" Phenol-Formaldehyde Industrial Resins
 "Resimene" Phenol-Formaldehyde Surface Coating Resins
 "Resimene" Urea-Formaldehyde Surface Coating Resins
 "Resinox" Phenol-Formaldehyde Industrial Resins
 "Resinox" Phenol-Formaldehyde Molding Compounds
 "Resinow" HP Melamine-Formaldehyde Textile Resins
 "Resinow" M-75 Melamine-Formaldehyde Textile Resins
 "Resolder ASA"
 "Rez" Wood Sealer and Primer
 "Rezgard" A, Fire Retardant for Textiles
 "Rezgard" E Fire Retardant for Textiles
 "Rezite" Wood Sealer
 "RZ-c" Rubber Accelerator
 "SA-326" ortho-Biphenyl Biguanide
 "Saflex" Laminating Plastic for Safety Glass
 "Sage Rez" Exterior Penetrating Sealer
 "Santacizer" 1-H Plasticizer
 "Santacizer" 3 Plasticizer
 "Santacizer" 8 Plasticizer
 "Santacizer" 9 Plasticizer
 "Santacizer" B-16 Plasticizer
 "Santacizer" E-15 Plasticizer
 "Santacizer" M-17 Plasticizer
 "Santacizer" 140 Plasticizer
 "Santacizer" 141 Plasticizer
 "Santacizer" 160 Plasticizer

"Santobane" DDT Insecticide
 "Santobrite" Sodium Pentachlorophenate, Technical
 "Santocel" Silica Aerogel for Industrial Applications
 "Santocel" Silica Aerogel for Thermal Insulation
 "Santochlor" para-Dichlorobenzene
 "Santocure" Rubber Accelerator
 "Santodex" Oil Additive
 "Santoflex" AW Rubber Antioxidant
 "Santoflex" B Rubber Antioxidant
 "Santoflex" BX Rubber Antioxidant
 "Santoflex" 35 Rubber Antioxidant
 "Santolene" C Fuel Oil Additive
 "Santolene" E Fuel Oil Additive
 "Santolite" MHP Industrial Resin
 "Santolite" MS (80%) Industrial Resin
 "Santolube" 31 Oil Additive
 "Santolube" 52 Oil Additive
 "Santolube" 70 Oil Additive
 "Santolube" 203-A Oil Additive
 "Santolube" 205 Oil Additive
 "Santolube" 303-A Oil Additive
 "Santolube" 360 Oil Additive
 "Santolube" 374 Oil Additive
 "Santolube" 379 Oil Additive
 "Santolube" 382 Oil Additive
 "Santolube" 384 Oil Additive
 "Santolube" 388 Oil Additive
 "Santolube" 394-C Oil Additive
 "Santolube" 395-X Oil Additive
 "Santolube" 520 Oil Additive
 "Santomask" II Odor-Masking Agent
 "Santomerse" Alkyl Aryl Sulfonates
 "Santophen" 1 Germicide
 "Santophen" 20 Pentachlorophenol, Technical
 "Santopoid" 29 Oil Additive
 "Santopoid" 32 Oil Additive
 "Santopoid" 33 Oil Additive
 "Santopoid" 34 Oil Additive
 "Santopoid" S Oil Additive
 "Santopour" Oil Additive
 "Santopour" B Oil Additive
 "Santosite" Sodium Sulfite Anhydrous, Technical
 "Santotan" KR Basic Chrome Sulfate
 "Santovar" A, Rubber Antioxidant
 "Santovar" O Rubber Antioxidant
 "Santowhite" Rubber Antioxidant
 "Santowhite" L Rubber Antioxidant
 "Santowhite" MK Rubber Antioxidant
 "Skydrol" Functional Fluid
 "Sopanol" ortho-Tolyl Biguanide
 "Sred" Textile Detergent
 "Sterox" No. 5 Polyoxethylene Thioether
 "Sterox" No. 6 Polyoxethylene Thioether
 "Sterox" CD Polyoxethylene Ester
 "Sterox" SE Polyoxethylene Thioether
 "Sterox" SK Polyoxethylene Thioether
 "Stymer" S Textile Sizing Agent
 "Sulfasan" Xanthogen Disulfide
 "Syton" C-30 Silica Sol
 "Syton" W-20 and DS Silica Sols
 "Thioflex" Rubber Accelerator
 "Thioxax" Rubber Accelerator
 "Thiurad" Rubber Accelerator
 "Ultron" Vinyl Film
 "Ultron" Vinyl Resins and Compounds
 "Ultron" Vinyl Sheeting
 "Lraka" Base Rubber Accelerator
 "Vanillin Monsanto"
 "Vuelite" Cellulose-Acetate Embossed Shield Material for Fluorescent Lighting
 "Vucapak" Rigid Transparent Packaging Material
 "White Rez" Blonding Sealer for Toned Wood Effects

MORE THAN 400 Monsanto products serve more than half a hundred different industries all over the world.

Industries which supply the three necessities of mankind—food, shelter, clothing—find Monsanto a dependable source for the chemicals needed between raw materials and finished articles of commerce.

In the field of agriculture, Monsanto supplies weed killers and insecticides; food processing is supplied with preservatives, flavors, condiments and baking powder phosphates; textile chemicals run the gamut from scouring agents, through dyeing, to finishes for imparting crush and shrink resistance.

Monsanto supplies basic chemical needs to the iron and steel industry, from ferrophosphorus for special steels to the melamine baking enamels for finishing stoves, automobiles and refrigerators.

Monsanto organics are the intermediates for many pharmaceuticals, from common aspirin to penicillin.

The plastics industry is supplied with resins and molding powders. Monsanto plastics include both thermosetting and thermoplastic types. Special formulations are made for paper and fabric coating and also for extruding, laminating and calendering.

Exterior and interior plywood panels, as well as fine furniture, owe the strength of their glue bonds to Monsanto adhesives. Tires and rubber articles, from stair treads to hot water bottles, are processed with rubber chemicals found in Monsanto's product list.

The fifty-odd industries which use Monsanto products, represent a cross section of international business. Products from these industries are so many and so diverse that every hour of his life the average person uses something that owes at least part of its manufacture to a Monsanto chemical.

The pages immediately following list many of the major industries served by Monsanto and the principal products supplied to each, with page numbers on which full data may be found.

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CHEMICAL



RUBBER



PAPER



LEATHER



TEXTILES



LUMBER



SOAP



CERAMICS



WATER TREATMENT



0685007



Industries Served



"Alkaphos" Aluminum Acid Phosphate 39, 40
 Aluminum Oxide Abrasive Grain 40
 "Resinox" Phenol-Formaldehyde Industrial Resins 73, 74
 "Saflex" Laminating Plastic for Safety Glass 80
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Photo by Ewing Galloway, N.Y.

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Photo by Piaget, St. Louis

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Photo by Ewing Gallowsay, N.Y.

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Photo by American Asrlmes

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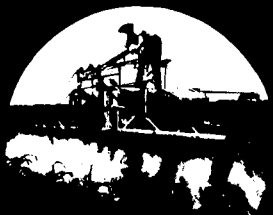
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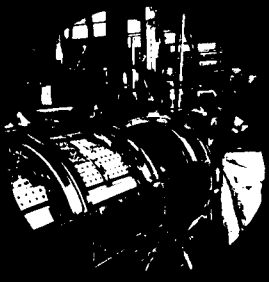
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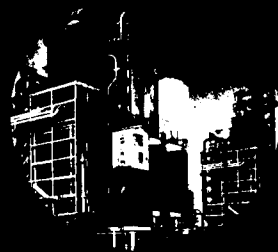
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Photo by Ewing Galloway, N.Y.

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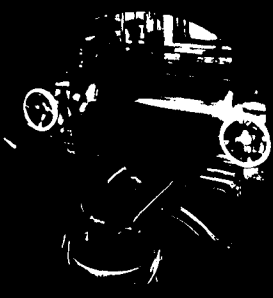
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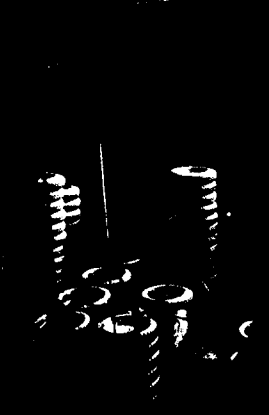
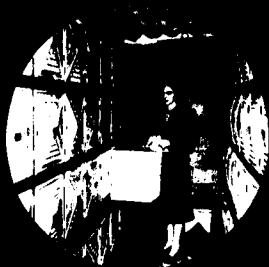
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Photo by Ewing Galloway, N.Y.

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ACCELERATORS, RUBBER

"A-32"

Standard Form: Liquid.

Specifications: Reaction product of butyraldehyde and butylidene aniline of complex chemical structure. Red-yellow to orange-brown oily liquid, slightly turbid when cold; Sp. Gr. 0.98; flash point 80°C.; soluble in benzene, chloroform, acetone and solvent naphtha.

Uses: Zinc oxide and fatty acid usually desirable but not always necessary. Gives high modulus and tensile. Flat curing and easy to process. Often useful as an activator of thiazole-type accelerator. Excellent for hard rubber.

Containers: 400 and 150-lb. steel drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"A-77"

Standard Form: Liquid.

Specifications: Condensation product of acetaldehyde and aniline by a special Monsanto process. Such products, known as aldehyde derivatives of Schiff's bases, are of complex chemical composition. Free-flowing reddish-brown liquid; Sp. Gr. 1.04; flash point 55°C.; soluble in benzene, chloroform, acetone and naphtha.

Uses: Excellent for hard vulcanizates, either natural or synthetic rubber. Use 1-2%. Should not be used with magnesium oxide or lime. Gives vulcanizates which will take a high polish.

Containers: 150-lb. steel drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"A-100"

Standard Form: Liquid.

Specifications: Aldehyde derivative of a Schiff's base made with use of butyraldehyde, acetaldehyde and aniline. Dark reddish-brown oily liquid; Sp. Gr. 1.04; flash point 85°C.; soluble in benzene, chloroform, acetone and solvent naphtha.

Uses: Excellent for hard rubber vulcanizates, either natural or synthetic. Use 1.0-2.0%. Gives tough, horny vulcanizates with little tendency toward brittleness.

Containers: 400 and 150-lb. steel drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"BUTASAN" (Zinc Dibutyl-dithiocarbamate)

Standard Form: Powder.

Specifications: Cream-colored powder; Sp. Gr. 1.24; 99.5% min. through 200 mesh; moisture 0.5% max.; soluble in carbon disulfide, benzene, chloroform and gasoline; insoluble in water and dilute caustic.

Uses: An ultra accelerator for latex; also used as an activator for thiazole-type accelerators.

ACCELERATORS

Containers: 100-lb. drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

DPG (Diphenylguanidine)

Standard Form: Powder.

Specifications: White powder; 99.5% min. through 200 mesh; moisture less than 0.5%; ash less than 0.3%; M.P. 145°C. min.; Sp. Gr. 1.15.

Uses: Sometimes used alone in mechanical-type compounds. On 100 parts rubber use 1.0-1.5% with 2-4% sulfur. Used as an activator.

Containers: 150-lb. fiber drums; 50-lb. paper bags.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"EL-SIXTY" [1,3 bis (2-benzothiazolyl-mercapto) thyl] urea]

Standard Form: Powder.

Specifications: Cream-colored powder; 99.5% min. through 200 mesh; moisture less than 1.0%; ash less than 0.5%; M.P. 220°C. min.; Sp. Gr. 1.29.

Uses: Requires zinc oxide and fatty acid. May be used, but for best results an activator is usually desirable. Excellent processing and curing characteristics to all types of compounds. Very effective in compounds containing high loads of retarding pigments such as clay.

Containers: 150-lb. fiber drums; 50-lb. paper bags.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "El-Sixty—An Accelerator for Rubber Vulcanization," 20-page booklet; "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"ETHASAN" (Zinc Diethyl-dithiocarbamate)

Standard Form: Powder.

Specifications: White powder; Sp. Gr. 1.44; 99.5% through 200 mesh; moisture 0.5% max.

Uses: An ultra accelerator used for latex, activation of zoles and straight acceleration. Comparable to "Pip-B" latex except gives somewhat lower modulus.

Containers: 100-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"ETHYL THIURAD" (Tetraethyl-thiuram-disulfide)

Standard Form: Powder.

Specifications: Gray-to-white powder; 100% through 200 mesh; at least 99.5% through 200 mesh; ash 0.5% max.; M.P. 67°C. min.; Sp. Gr. 1.26; very soluble in benzene and naphtha.

Uses: Either as a primary or secondary accelerator in the same manner as "Thiurad" and "Mono Thiurad". Activity, it is stronger than "Mono Thiurad" and than "Thiurad."

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Containers: 150-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"QUANTAL" (Diphenylguanidine Phthalate)

Standard Form: Powder.

Specifications: Product formed by reacting two molecules of diphenylguanidine and one molecule of phthalic acid; contains one-half mol of water of crystallization; white powder ranging from blue-white to faint gray; 99.5% min. through 200 mesh; moisture 3% max. (this amount present in the hydrate); ash less than 0.5%; M.P. 178°C. min.; Sp. Gr. 1.20.

Uses: Very weak when used alone. Excellent as a low-scorch activator for thiazole-type accelerators.

Containers: 150-lb. fiber drums; 50-lb. paper bags.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"MERTAX" (2-Mercaptobenzothiazole purified)

Standard Form: Powder.

Specifications: Light yellow powder; will not melt to clear liquid below 175°C.; ash 0.5% max.; 99 1/4% through 200 mesh; 100% through 100 mesh; moisture 0.5% max.; mercaptobenzothiazole content 97% min.; Sp. Gr. 1.42.

Uses: Same as for "Thiotax" but gives a material of higher purity, less color, less odor and less taste.

Containers: 50-lb. paper bags; 150-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"METHASAN" (Zinc Dimethyl-dithiocarbamate)

Standard Form: Powder.

Specifications: White powder; Sp. Gr. 1.66; 99.5% min. through 200 mesh; moisture 0.5% max.; Sp. Gr. 1.66.

Uses: An ultra accelerator used for latex, activation of thiazoles and straight acceleration. In latex, it is too slow for most practical applications.

Containers: 100-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"MONO THIURAD" (Tetramethyl-thiuram-monosulfide)

Standard Form: Powder.

Specifications: Lemon-yellow powder; 99.8% min. through 100 mesh; 99.0% through 200 mesh; moisture 0.5% max.; ash 0.5% max.; M.P. 103°C. min.; Sp. Gr. 1.39.

Uses: A very good activator for thiazole accelerators, somewhat safer to handle in this respect than "Thiurad." Gives low-compression set. Good results when used alone. Use 0.25-0.50% on the rubber or synthetic with normal sulfur.

Containers: 150-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"PIP-PIP" (Piperidinium pentamethylene dithiocarbamate)

Standard Form: Crystals.

Specifications: Uniform fine white-to-cream crystals; M.P. 170°C. min. at time of shipment; decomposes slowly in the presence of water and during storage with a corresponding drop in M.P.; Sp. Gr. 1.13; 5.0% soluble in water.

Uses: An ultra accelerator for latex and fast-curing cements.

Containers: 50-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"R-2" CRYSTALS

Standard Form: Crystalline solid.

Specifications: Reaction product of carbon bisulfide with methylene dipiperidine; light brown, coarse crystalline solid; Sp. Gr. 1.11; M.P. 59°C.; soluble in acetone, benzene and naphtha.

Uses: An ultra accelerator for latex and fast-curing cements.

Containers: 50-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"RZ-50" (50% solution of N, N'-dimethylcyclohexylamine salt of dibutylthiocarbamic acid)

Standard Form: Clear brown liquid.

Specifications: Color (N. P. A.) 8.0 max.; Sp. Gr. 0.96.

Uses: A fast accelerator for curing at room temperatures. Curing speed can be increased by the inclusion of "Thiotax" in the compound. "RZ-50" is useful in fast curing cements for spreader and combining work.

Containers: 250-lb. steel drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOCURE" (N-Cyclohexyl-2-benzothiazyl-sulfenamide)

Standard Form: Powder.

Specifications: Light tan or buff-colored powder; 100% through 20 mesh; M.P. 94°C. min.; Sp. Gr. 1.27; moisture 1.0% max.; ash 0.5% max.

Uses: Requires zinc oxide and fatty acid. Activators are sometimes desirable but not always needed. Gives excellent results in natural, reclaimed and synthetic rubbers. Exceptionally safe at processing temperatures but very powerful at curing temperatures. Gives high modulus and tensile. Fairly low melting point makes dispersion easy.

Containers: 50-lb. paper bags; 200 and 150-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

(Continued on next page)

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Literature: "Santocure—An Accelerator for Rubber Vulcanization," 52-page booklet; "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

THIOCARBANILIDE ("A-1")
(Also called *N-N'-diphenyl thiourea*)

Standard Form: Powder.

Specifications: White powder; 100.0% min. through 100 mesh; M.P. 148°C. min.; Sp. Gr. 1.32; ash less than 0.5%; moisture 0.5% max.; test must avoid decomposition conditions.

Uses: Activates thiazole accelerators but used best as straight accelerator in fast-curing stocks such as tube repair gum. Accelerates neoprene latex. Also used as a flotation agent and acid inhibitor.

Containers: 150-lb. fiber drums; 50-lb. paper bags.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"THIOFIDE" [2-2'-dithiobis (benzothiazole) (MBTS)]

Standard Form: Powder.

Specifications: Cream powder; Sp. Gr. 1.5; M.P. 170°C. min.; moisture less than 0.5%; ash less than 0.5%.

Uses: Requires zinc oxide and fatty acid and an activator is usually desirable. Safe handling when properly activated. Can be used successfully in a wide variety of stocks.

Containers: 150-lb. fiber drums; 50-lb. paper bags.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"THIOTAX" (2-Mercaptobenzothiazole)

Standard Form: Powder.

Specifications: Light yellow powder; will not melt to clear liquid below 170°C.; ash 0.5% max.; 99½% through 200 mesh; 100% through 100 mesh; moisture 0.5% max.; mercaptobenzothiazole content 94% min.

Uses: Requires zinc oxide and fatty acid. An activator is not needed but is often desirable. Activator must be adjusted carefully to avoid scorch difficulties.

Containers: 150-lb. fiber drums; 50-lb. paper bags.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"THIURAD" (Tetramethyl-thiuram-disulfide)

Standard Form: Powder.

Specifications: White powder; 99.5% min. through 200 mesh; ash 0.5% max.; Sp. Gr. 1.29; M.P. 144°C. min.

Uses: Requires zinc oxide and fatty acid. An excellent activator for thiazole accelerators. Also used as straight accelerator in two ways. In stocks containing normal sulfur use 0.15–0.50% on the rubber; for good aging and heat resistance use 2.0–4.0% and no sulfur. Excellent when used in same manner in Buna N and GRS.

Containers: 150-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"UREKA" BASE

Formula: 2-(2,4-dinitrophenylmercapto) benzothiazole.

Standard Form: Powder.

Specifications: Yellow-to-orange powder; 99.5% min. through 200 mesh; 0.5% max. ash; heat loss 0.5% max. M. P. 140°C. min.; Sp. Gr. 1.53.

Uses: Accelerator. "Ureka" Base is the thiazole derivative formerly used in the accelerator blends "Ureka" A, "Ureka" Blend B. The former was 40 parts "Ureka" B and 60 parts DPG; the latter was 40 parts "Ureka" B, 46½ parts Guantol and 13½ parts DPG. Requires zinc oxide, fatty acid and an activator.

Containers: 175-lb. fiber drums.

Shipping Classification: Rubber Accelerators NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

ACETANILID, U.S.P.

Molecular Weight: 135.16

Formula: NHCOCH_3



Standard Form: Crystalline solid.

Specifications: White crystals or powder; ash 0.05% max. conforms to U.S.P. tests for carbonizable impurities, heavy metals; solubility in ethyl alcohol 95% (1:4) complete. M.P. 114.0°C. min.; no crystals retained on 14 mesh; 30% max. powder retained on 80 mesh.

Uses: Pharmaceutical product.

Grades: Powder or crystals.

Containers: 150, 100 and 50-lb. fiber drums; 25-lb. box.

Shipping Classification: Acetanilid.

ACETIC ACID

Formula: CH_3COOH

Uses: Used in dyeing where a weak acid is required in the dye bath; manufacture of acetate solvents, cellulose acetate and formation of other acetates, such as aluminum, lead, sodium and ammonium acetate. Also used in manufacture of fish glue; as an antichlor; coagulation of rubber latex; destruction of fungi; disinfectant in gelatin; pickling of steels; giving added detergency and firmness to soap; stabilizing olive oil; protecting seedlings from injury due to frost and damping off; hardening and developing solutions for photographic films. (See table in general data section.)

Grades:

56% $\text{C}_2\text{H}_4\text{O}_2$: Sp. Gr. 1.067; freezing point -8.0°F .

70% $\text{C}_2\text{H}_4\text{O}_2$: Sp. Gr. 1.074; freezing point $+0.6^\circ\text{F}$.

80% $\text{C}_2\text{H}_4\text{O}_2$: Sp. Gr. 1.076; freezing point $+17.4^\circ\text{F}$.

84% $\text{C}_2\text{H}_4\text{O}_2$: Sp. Gr. 1.075; freezing point $+27.3^\circ\text{F}$.

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Glacial: 99% $C_2H_4O_2$; Sp. Gr. 1.0581; freezing point +58.3°F.

Containers: Aluminum drums; tank cars; tank trucks.

Shipping Classification: Acetic Acid.

ACETOPHENETIDIN, U.S.P. (Also known as phenacetin)

Molecular Weight: 179.21

Formula: $NHCOCH_3$



Standard Form: Crystalline powder.

Specifications: White crystalline powder; solubility in ethyl alcohol 95% (1:15) complete; M.P. 135.0°C. min.; ash 0.05% max.; 5% max. powder retained on 100 mesh.

Uses: Pharmaceutical product.

Containers: 200, 100 and 50-lb. fiber drums; 25-lb. boxes.

Shipping Classification: Chemicals NOIBN.

para-ACETYLAMINOBENZENESULFONYL CHLORIDE (Also known as N-acetylsulfanilyl chloride and para-acetylamino benzene sulfonchloride)

Molecular Weight: 233.67

Formula: $NHCOCH_3$



Standard Form: Crystals.

General Information—Properties: Light tan-to-brownish powder or fine crystals; assay 97.5% min.

Uses: An intermediate in the manufacture of sulfa drugs.

Containers: 150-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

ACETYSALICYLIC ACID, Starch Granulations

Standard Form: Granules.

Specifications: Made with acetylsalicylic acid, U.S.P.; white, pink or green granules. Assay: starch granulation 10%, 90.0% min.—91.0% max.; starch granulation 16%, 84.0% min.—85.0% max.; starch granulation 20%, 80.0% min.—81.0% max.; free salicylic acid conforms to U.S.P. test on acetylsalicylic acid.

MESH:

Retained on—	12-50 MESH	20-MESH
12-mesh screen	Trace, max.	
14-mesh screen	5.0% min.	
16-mesh screen	15.0% max.	
	20.0% min.	
	35.0% max.	
20-mesh screen	60.0% min.	
	75.0% max.	10% max.
Through—		
40-mesh screen	10.0% max.	

Uses: Pharmaceutical product.

Grades: 10%, 12-50 mesh, white; 16%, 12-50 mesh, white; 20%, 12-50 mesh, white; 10%, 12-50 mesh, pink; 10%, 20 mesh, pink; 10%, 12-50 mesh, green; 10%, 20 mesh, green.

Containers: 250-lb. fiber drums; 25-lb. boxes.

Shipping Classification: Acetylsalicylic Acid.

ACETYSALICYLIC ACID, U.S.P. (Aspirin)

Molecular Weight: 180.15

Formula:



Standard Form: Crystalline solid.

Specifications: White crystals or powder; assay 99.5% min.; solubility in ethyl alcohol 95% (1:5) complete; solubility in 10% Na_2CO_3 (1:20) complete; ash 0.05% max.; conforms to U.S.P. test for heavy metals, carbonizable impurities, resinous products, chloride, sulfate and free salicylic acid.

MESH: (All tests made on U. S. standard screens.)

	20-MESH	40-MESH	80-MESH
Retained on—			
20-mesh screen	Trace max.		
30-mesh screen	5.0% min.		
	10.0% max.		
40-mesh screen		Trace max.	
45-mesh screen	45.0% min.		
	60.0% max.		
50-mesh screen		10.0% min.	
		20.0% max.	
60-mesh screen	70.0% min.		none
	85.0% max.		
80-mesh screen		45.0% min.	2.0% max.
Through—			
100-mesh screen	10.0% max.		
140-mesh screen		25.0% max.	

Uses: Pharmaceutical product.

Grades: Crystals, 20 mesh; crystals, 40 mesh; powder, 80 mesh.

Containers: 250-lb. fiber drums; 25-lb. boxes.

Shipping Classification: Acetylsalicylic Acid.

"ALKOPHOS" (Aluminum Acid Phosphates)

Standard Form: Liquids and solids.

General Information—Properties:

Physical Condition	B	C	D	E
Al ₂ O ₃ %	15.8	8.6	22.2	12.8
P ₂ O ₅ %	61.0	33.1	37.8	33.9
SiO ₂ %	—	—	10.0	—
Ignition Loss %	23.2	59.3	30.0	53.3
pH of 1% Solution	2.2	2.2	2.7	2.7

Ratio: $Al_2O_3:3P_2O_5$ 1.0 1.0 1.67 1.67
"Alkophos" D contains 20% kaolin as a parting agent.

Uses: These products are offered as bonding agents for refractories, for high-temperature cements and for refractory paints. They afford high green strength which makes possible molded shapes set in place without firing and fired in place to yield high temperature nonslagging refractories.

(Continued on next page)

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Containers: B—200-lb. barrels; C—150-lb. carboys, 600-lb. lacquer-lined drums; D—400-lb. barrels; E—650-lb. lacquer-lined drums.

Shipping Classification: Aluminum phosphate.

Literature: Technical Bulletin P-33.

ALKYL ACID PHOSPHATES (Also known as alkyl phosphoric acids)

General Information—Properties:
AVERAGE PHYSICAL PROPERTIES

PHOSPHORIC ACID ESTER	P ₂ O ₅ %	VISCOSITY SUS		LBS. PER GAL.	PH	ACID NO.
		AT 100°F.	AT 25°C.			
Amyl	36	700	1.10	9.2	1.5	360
n-Butyl	39	320	1.12	9.3	2.5	420
Ethyl	51	580	1.30	10.8	2.3	550
Loralkyl	20	—	0.96*	8.0	2.6	280
Methyl	64	600	1.46	12.2	2.1	630
MIM	32	—	1.05	8.75	—	295
n-Octyl	27	360	1.025	8.4	2.3	294

*60° C.
Uses: Additions to paint and varnish compositions to improve adhesion to metal surfaces; as catalyst in urea resin formation; as polymerizing agents for resins and oils.

Containers:

Amyl acid phosphate—500-lb. lacquer-lined drums; 13-gal. carboys.

n-Butyl acid phosphate—13-gal. carboys.

Ethyl acid phosphate—13-gal. carboys.

Loralkyl acid phosphate—500-lb. open-top steel drums.

Methyl acid phosphate—13-gal. carboys.

MIM acid phosphate—13-gal. carboys; 475-lb. lacquer-lined drums.

n-Octyl acid phosphate—13-gal. carboys; 450-lb. lacquer-lined drums.

Shipping Classification: Acids Liquid NOIBN.

Literature: "Alkyl Phosphoric Acids," Technical Bulletin P-120.

ALUMINUM CHLORIDE SOLUTION 32° BÉ.

Molecular Weight: 266.7

Standard Form: Liquid.

Typical Analysis: Neutral salt, low in iron content; solutions have an acid reaction but contain no free acid. Al₂Cl₆·12H₂O, 50.3%; Al₂O₃, 10.6%; Fe, 0.005%.

Uses: Carbonizing fine wool such as piece goods, raw stock or shoddy, resulting in an exceptionally white, lofty wool; carbonizing colored goods where it has very little stripping action; soap manufacture for treatment of glycerin lyes where chloride of alumina is more desirable than sulfate. (See table in general data section.)

Containers: 13-gal. carboys.

Shipping Classification: Aluminum Chloride Liquid.

ALUMINUM METAPHOSPHATE

Molecular Weight: 263.91

Formula: Al(PO₃)₃

Standard Form: Powder.

Typical Analysis: P₂O₅, 80.14%; Al₂O₃, 19.90%; ignition loss 0.39%; Fe, 0.061%.

General Information—Properties: White powder; insoluble in water; M.P. approx. 1537°C.

Uses: Constituent of glazes, enamels and glasses; high temperature insulating cement.

Containers: 100-lb. net fiber drums.

Shipping Classification: Aluminum Phosphate.

ALUMINUM OXIDE ABRASIVE GRAIN (Also known as fused aluminum oxide and artificial corundum)

Standard Form: Granular powder.

Specifications: Fused aluminum oxide containing 99.97.5% Al₂O₃; hardness 9.6, Moh's scale.

Uses: Coarse-to-fine grades are available for grinding wheels, polishing, refractory purposes and for antislip tread use.

Containers: Wooden bbls. containing approx. 350-lbs. net.

Shipping Classification: Abrasive Grain.

ALUMINUM PHOSPHATE, MONO

Molecular Weight: 317.96

Formula: Al(H₂PO₄)₃

Standard Form: Powder.

General Information—Properties: White hygroscopic salt at 500°C., yields aluminum metaphosphate which is insoluble in water and practically insoluble in acids.

Uses: A bonding agent for materials to be subjected to very high-temperature conditions.

Containers: 100-lb. net fiber drums.

Shipping Classification: Aluminum Phosphate.

ALUMINUM PHOSPHATE, TRI

Molecular Weight: 121.95

Formula: AlPO₄

Standard Form: Powder.

General Information—Properties: Dry, granular, grayish white powder; soluble in alkalis and acids, insoluble in water.

Uses: Constituent of glass, ceramics, glazes and paper sizing.

Containers: 100-lb. net fiber drums; 200-lb. net bbls.

Shipping Classification: Aluminum Phosphate.

ALUMINUM SULFATE, COMMERCIAL

Molecular Weight: 603.35

Formula: Al₂(SO₄)₃·14.5 H₂O

Standard Form: Powder to lumps.

Typical Analysis:

Al₂O₃, 17.2%; FeO, 0.35%; Fe₂O₃, 0.01%.

Uses: Paper sizing and water treatment. Monsanto also produces a slab form (6"x18") for stock solutions containing 15.5–16.0% Al₂O₃. (See table in general data section.)

Grades: Papermaker's Alum.

Containers: 100-lb. paper bags; 350-lb. bbls.

Shipping Classification: Aluminum Sulfate.

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ALUMINUM SULFATE, IRON FREE

Molecular Weight: 603.35

Formula: $Al_2(SO_4)_3 \cdot 14.5 H_2O$

Standard Form: Powder.

Typical Analysis: Al_2O_3 , 17.2%; Fe_2O_3 , 0.01%.

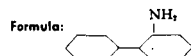
Uses: Sizing fine papers; manufacture of satin-white and dry colors; tanning white leathers; dyeing operations; manufacture of aluminum stearate.

Containers: 100-lb. paper bags; 400-lb. wooden bbls.

Shipping Classification: Aluminum Sulfate.

ortho-AMINOBIIPHENYL, TECHNICAL

(Also known as ortho-aminodiphenyl)



Standard Form: Cast solid.

Specifications: Purplish crystalline mass; crystallizing point 47.0°C. min.; assay 94.5% min. Distillation range: first drop 295.0°C. min.; 95% (1-96 ml) 8.0°C. max.; dry point 310.0°C. max.

Uses: An intermediate in dyestuff synthesis; production of resins and varnishes; synthesis of rubber products; solvent. Specifically used in making phenanthridine derivatives and carbazole. CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.

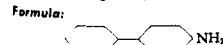
Containers: 475-lb. steel drums; tank cars.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

para-AMINOBIIPHENYL, TECHNICAL

(Also known as para-aminodiphenyl and xenylamine)

Molecular Weight: 169.22



Standard Form: Cast solid.

Specifications: Yellowish-brown crystalline mass; crystallizing point 50.5°C. min.

Properties: Distillation range: first drop 325.0°C. min.; 95% (1-96 ml) 8.0°C. max.; dry point 340.0°C. max.

Uses: An intermediate in dyestuff synthesis; production of resins and varnishes; solvent. CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.

Containers: 475-lb. steel drums.

Shipping Classification: Chemicals NOIBN. "Poison" label required.

AMMONIA, ANHYDROUS

Molecular Weight: 17.03

Formula: NH_3

General Information—Properties: Colorless gas, at normal temperatures and pressures, 0.597 times as heavy as air; below critical temperature, 271.2°F., readily condenses by application of pressure to a colorless liquid, wt. per gal. 5.33 lbs.; B.P. -28°F.

Uses: Refrigeration; condensing agent in the formation of phenol-formaldehyde resins; water treatment in connection with chlorine; partial neutralization of phosphate fertilizer; vulcanization of rubber; nitriding of steel; neutralizing agent after carbonizing; neutralizing excess carbon dioxide in water supplies; neutralizing and deodorizing rubber goods which have been cured with sulfur chloride; neutralizing petroleum stocks before cracking; as a relatively inexpensive source of hydrogen or nitrogen; solvent. (See table in general data section.)

Containers: 150, 100 and 50-lb. bottle-type cylinders; 150, 100 and 50-lb. horizontal-type cylinders.

Shipping Classification: Anhydrous Ammonia.

AMMONIA, AQUA

Molecular Weight: 35.05

Formula: NH_4OH

Standard Form: Liquid.

General Information—Properties: Pungent, water-white liquid; wt. per gal. 7.48 lbs. (26° B_é).

Uses: Partial neutralization of phosphate fertilizers; general household cleaning purposes; condensing agent in the formation of phenol-formaldehyde resins; antichlor; neutralizing agent after carbonizing; neutralization of excess carbon dioxide in water supplies; neutralizing and deodorizing rubber goods cured with sulfur chloride; neutralizing goods dyed with aniline black; preserving rubber latex; neutralizing oil before cracking; silk degumming; manufacture of cuprammonium silk; solvent; debairing agent for hides; reeling silk; penetrant in wetting back crusted tanned leather; for driving in fat liquor in leathermaking. (See table in general data section.)

Grades: Commercial Aqua Ammonia 16°, 18°, 26° B_é.

Containers: 110 and 55-lb. returnable steel drums; 13-gal. carboys.

Shipping Classification: Aqua Ammonia.

AMMONIUM BENZOATE

Molecular Weight: 139.15

Formula: $COONH_4$ 

Standard Form: Crystalline powder.

Specifications: Fine white crystalline powder; assay 98.0% min.; solution in water (1:10) clear.

Uses: Preservative.

Containers: 100, 50 and 25-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

AMMONIUM ETHYL PHOSPHATE

(Mixture of mono- and diethyl ammonium phosphates)

Standard Form: Liquid.

Typical Analysis: P_2O_5 , 38.0%.

General Information—Properties: Water-white to yellow-tinged liquid of ammoniacal odor; Sp. Gr. 1.23 at 25°C.; wt. per gal. 10.37 lbs.; pH 7.5% solution 7.0-7.2; viscosity 60 cps. at 25°C. Chemical constitution: 35% monoethyl diammonium phosphate; 50% diethyl ammonium phosphate

(Continued on next page)

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and 15% monoethyl ammonium hydrogen phosphate. In thin film is liquid at relative humidities above 40%; not stable to heat; when subjected to elevated temperatures for any length of time as a solution or while on any article, will liberate ammonia with a reduction in pH; at temperatures below 15°C. crystals will form in solution and dissolve with a rise in temperature or on dilution.

Uses: Flameproofing agent for paper, textiles, wood and other combustible materials.

Containers: 500-lb. net steel drums.

Shipping Classification: Ammonium Phosphate.

AMMONIUM METAPHOSPHATE

Molecular Weight: 97.02

Formula: NH_4PO_3

Standard Form: Powder.

General Information—Properties: White starch-like powder of low-bulk density; readily soluble except for a small fraction that produces an opalescent turbidity which persists several hours; solution essentially neutral.

Uses: Suggested for flameproofing and water softening.

Shipping Classification: Ammonium Phosphate.

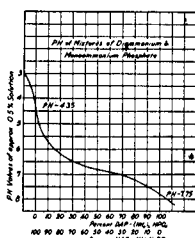
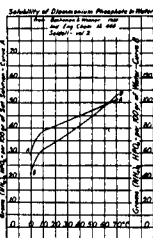
AMMONIUM PHOSPHATE, DI

(Also known as diammonium hydrogen phosphate, secondary ammonium phosphate and ammonium phosphate, dibasic)

Molecular Weight: 132.068

Formula: $(\text{NH}_4)_2\text{HPO}_4$

Standard Form: Crystalline or powdered material.



General Information—Properties: Brilliant white crystalline or powdered material; stable in air; very soluble in water; pH value of 1% solution 7.75; above 70°C. aqueous solutions lose ammonia readily.

Dissociation Pressure: According to Britzke and Dumajew (Gmelin's Handbuch der anorganische Chemie, Ammoniak, p. 423) and Warren (JACS 49, 1904, 1927):

Temp. °C. 98 111 125 135 147
 NH_3 in mm. Hg. 3.2 10.7 26.0 55.2 123.4

Uses: Fire retardant; yeast food by yeast producers and breweries; as bread improvers; to control pH of soda crackers; catalyst for urea-formaldehyde resins; chrome dyeing of wool.

Grades: Food (meets all U. S. Pure Food Law requirements); special grades supplied on request.

Containers: 100-lb. bags; 300 and 150-lb. drums.

Shipping Classification: Ammonium Phosphate.

AMMONIUM PHOSPHATE, HEMI-(Hemibasic)

Molecular Weight: 213.04

Formula: $\text{NH}_4\text{H}_2(\text{PO}_4)_2$

Standard Form: Crystals.

General Information—Properties: White hygroscopic crystals; very soluble in water; M.P. approx. 80°C.; pH 1% solution approx. 2.0.

Uses: Suggested for use in metal cleaning; for pH adjustment; as a strong phosphoric acid in solid form.

Containers: 600-lb. net weight wooden bbls.

Shipping Classification: Ammonium Phosphate.

AMMONIUM PHOSPHATE, MONO

(Also known as ammonium acid phosphate, primary ammonium phosphate, ammonium dihydrogen phosphate, ammonium phosphate, monobasic, and ammonium phosphate)

Molecular Weight: 115.04

Formula: $\text{NH}_4\text{H}_2\text{PO}_4$

Standard Form: Crystalline or powdered material.

General Information—Properties: A brilliant white crystalline or powdered material; stable in air; soluble in hot and cold water; pH of 1% solution 4.7.

Uses: Flameproofing paper, wood, textiles; prevents after glow in matches; for special medicinal purposes; in the production of woven belting; nutrient solutions; manufacture of yeast, vinegar, yeast foods, bread improvers; acidulant in dye bath.

Grades: Food (meets all U. S. Pure Food Law requirements); special grades supplied on request.

Containers: 100-lb. bags; 300 and 150-lb. drums.

Shipping Classification: Ammonium Phosphate.

AMYL POTASSIUM SODIUM PHOSPHATE

(Mixture of sodium and potassium salts of the amyl phosphates)

Standard Form: Liquid.

General Information—Properties: Straw-colored liquid with slight pentanol odor; 60% solution in water; Sp. G. 1.339; wt. per gal. 11.2 lbs.; pH 7.0-7.3; slightly hygroscopic; gelatinous in anhydrous form.

Uses: An ingredient in vat printing pastes and a spinning agent for wool.

Containers: 500-lb. net steel drums.

Shipping Classification: Chemicals NOIBN.

ortho-ANISIDINE

(Also known as ortho-methoxyaniline and ortho-aminoanisole)

Molecular Weight: 123.15

Formula: OCH_3



Standard Form: Liquid.

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Specifications: Reddish-brown to amber liquid; crystallizing point 5.3 C. min. Distillation range: first drop 223.0°C. min.; 95% 1.2 C. max.; dry point 226.0°C. max. Solution in HCl clear.

Uses: A component of azo dyes and chemical intermediate. **CAUTION:** This product is toxic. Avoid breathing its vapors and avoid contact with the skin.

Containers: 495-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

para-ANISIDINE

(Also known as para-methoxyaniline and para-aminoanisole)

Molecular Weight: 123.15.

Formula: Oc1ccc(N)cc1



Standard Form: Cast solid.

Specifications: Fused, crystalline mass; crystallizing point 57.2 C. min. Distillation range: first drop 240.0°C. min.; 95% 2.0°C. max.; dry point 243.0°C. max. Solution in HCl clear.

Uses: A component of various azo dyestuffs; intermediate in chemical synthesis. **CAUTION:** This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.

Containers: 200-lb. tins; 450-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

ANTIOXIDANTS, RUBBER

"FLECTOL" H

Standard Form: Powder.

Specifications: Condensation product of acetone and aniline; light-colored powder; 99.5% min. through 200 mesh; M.P. 120°C. min.; Sp. Gr. 1.08; soluble in benzene, alcohol and naphtha.

Uses: Excellent for retardation of oxidation and heat deterioration. Use 1.0-2.0% in all types of compounds which do not require exceptional flex crack resistance. Discoloration in sunlight slight—small amounts may be used even in very light-colored articles. Very effective in latices and is easily prepared into excellent dispersions. In neoprene it acts as a vulcanization accelerator.

Containers: 150-lb. fiber drums; 50-lb. paper bags.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOFLEX" AW (6-Ethoxy-1,2-dihydro-2,2,4-trimethylquinoline)

Standard Form: Dark, viscous liquid.

Specifications: Heat loss 1.0% max.; Sp. Gr. 1.04.

General Information: Antioxidant for the prevention of the usual deterioration on aging. Has merit as a flex cracking

inhibitor. Causes discoloration and staining. Inhibits attack by ozone. Appears to be somewhat more effective with GRS than natural rubber. Suggested for compounds used in dynamic service where waxes are sometimes not desirable.

Containers: 450 and 150-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOFLEX" B

Standard Form: Solid.

Specifications: Reaction product of acetone and para-aminobiphenyl. Waxy, dark gray, lumpy solid; crystallizing point about 80°C.; Sp. Gr. 1.11; ash 0.1% max.; soluble in benzene and acetone.

Uses: Excellent for the retardation of flex cracking and oxidation. Use 1.0-2.0%; for high resistance to weathering and flexing use 3.0-4.0%. Discolors badly in sunlight.

Containers: 300-lb. drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOFLEX" BX

Standard Form: Solid.

Specifications: Constant composition blend of "Santoflex" B and N, N'-diphenyl-para-phenylenediamine. Waxy, dark gray, lumpy solid; Sp. Gr. 1.12; ash 0.3% max.; less than 1.0% insoluble in benzene.

Uses: The preferred antioxidant for retarding oxidation and flex cracking. Blooming may be encountered if more than 2.0% is used. Diphenyl-para-phenylenediamine mildly activates accelerators of the thiazole type.

Containers: 300-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOFLEX" 35

Specifications: Same composition as "Santoflex" BX but with higher N, N'-diphenyl-para-phenylenediamine content. Waxy, dark gray, lumpy solid; Sp. Gr. 1.14; ash 0.5% max.; less than 1.5% insoluble in benzene.

Uses: The preferred antioxidant for retarding oxidation and flex cracking when a high DPPD content is desired. Blooming may be encountered if more than 1.0% is used. Diphenyl-para-phenylenediamine mildly activates accelerators of the thiazole type.

Containers: 300-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOVAR" A (2,5-di-tert-amylhydroquinone)

Standard Form: Powder.

(Continued on next page)

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Specifications: Buff powder; moisture 0.5% max.; ash 0.5% max.; M.P. 165°C. min.; Sp. Gr. 1.05; soluble in acetone.

Uses: Especially recommended for retarding the deleterious action of oxidation and sunlight on uncured rubber and many resins. Use 0.5-4.0%. Excellent for adhesives. Tends to stiffen the film and prevent cold flow; inhibits oxidation of oxidizable oils and thus is good in compositions containing them. Also used as an antiskinning agent for paints, inks, oils, varnishes and enamels.

Containers: 125-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOVAR" O (2,4-di-*tert*-butylhydroquinone)

Standard Form: Powder.

Specifications: White-to-buff powder; moisture 1.0% max.; ash 0.5% max.; M.P. 210°C. min.; Sp. Gr. 1.095; soluble in acetone.

Uses: Especially recommended for retarding the deleterious action of oxidation and sunlight on uncured rubber and many resins. Use 0.5-4.0%. Excellent for adhesives. Tends to stiffen the film and prevent cold flow; inhibits oxidation of oxidizable oils and thus is good in compositions containing them. Also used as an antiskinning agent for paints, inks, oils, varnishes and enamels.

Containers: 125-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOWHITE" CRYSTALS (Dialkyl Phenol-Sulfide)

Standard Form: Light gray to tan powder.

Specifications: Fineness—trace retained on 50 mesh; moisture 1.0% max.; M.P. 140°C. min.; Sp. Gr. 1.097; ash 0.5% max.; soluble in acetone and alcohol.

Uses: A powerful nonstaining and nondiscoloring antioxidant for use in light-colored articles. Gives the same degree of protection as standard antioxidants. Use 1.0-2.0% on the rubber.

Containers: 100-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOWHITE" L

(Essentially) Thiobis (di-*sec*-amylphenol). The structure is complex.

Standard Form: Dark, viscous liquid.

Specifications: 0.25% max. ash; heat loss 0.5% max.; softening point 0°C. max.; Sp. Gr. 0.98.

General Information: A nonstaining and nondiscoloring antioxidant of medium strength. It is easily emulsified for use in latex and has no effect on latex stability.

Containers: 150-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"SANTOWHITE" MK (Dialkyl Phenol-Sulfide)

Standard Form: Liquid.

Specifications: Viscous liquid; ash 0.5% max.; heat loss 5.0% max.; Sp. Gr. 1.06; soluble in acetone, alcohol, benzene and carbon tetrachloride.

Uses: A powerful nonstaining antioxidant for use in light-colored articles. Gives the same degree of protection as standard antioxidants. Use 1.0-2.0% on the rubber.

Containers: 150-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"ARESOL" SODIUM BUTYL-ortho-PHENYLPHENOLSULFONATE

Standard Form: Liquid or dry powder.

Uses: Wetting, penetrating and spreading agent; spreads agent in insecticidal compositions, embalming fluids, meat pickling.

Containers: "Areskap"—50 (liquid)—250-lb. wooden bbls; Dry "Areskap"—100 (powder)—115-lb. drums.

Shipping Classification: Washing Compounds NOIBN.

Literature: "Areskap—Aresket—Aresklene," Technical Bulletin P-113.

"ARESKET" SODIUM BUTYLBIPHENYLSULFONATE

Standard Form: Liquid or dry powder.

Uses: Wetting, penetrating and spreading agent.

Containers: "Aresket"—240 (liquid)—250-lb. wooden bbls; Dry "Aresket"—300 (powder)—115-lb. drums.

Shipping Classification: Washing Compounds NOIBN.

Literature: "Areskap—Aresket—Aresklene," Technical Bulletin P-113.

"ARESKLENE" DISODIUM DIBUTYL-ortho-PHENYLPHENOLDISULFONATE

Standard Form: Paste.

Specifications: "Aresklene"—375; light brown paste, slightly aromatic; sulfates, trace; chlorides, trace; not soluble in solvents which are immiscible with water; pH approx. 7.5-8.5 for 1% solution of dry material at 25°C.; soluble (10-4 parts solvent) in alcohol, acetone, dibutyl tartrate, ethylglycol.

Uses: Wetting, penetrating and spreading agent used in kierboiling; scouring and dyeing textiles; industrial cleaner; deodorant preparations; insecticidal formulations; meat cleaning; stabilizer and wetting agent in latex used to treat cord or other fabrics.

Containers: 200-lb. steel drums.

Shipping Classification: Washing Compounds NOIBN.

Literature: "Areskap—Aresket—Aresklene," Technical Bulletin P-113; "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"AROCOR" POLYCHLORINATED POLYPHENYLS

Standard Form: Oils, resins or solids.

General Information—Properties: Chlorinated hydrocarbons varying from water-white mobile liquids and pale

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low viscous oils to light amber resins and opaque crystalline solids. Refractive indices above 1.6125. In general are stable on long heating at 150°C.; not affected by boiling with sodium hydroxide solution. (The light oils can be distilled at atmospheric pressure without appreciable decomposition and the viscous oils and resins distill readily under vacuum.) Viscous oils and resins almost odorless and tasteless at ordinary temperatures.

Most "Aroclor" materials flux readily with resinous and pitch-like materials to give products having a decreased fire hazard. (Viscous oils and resins do not support combustion when heated alone even at their boiling points—temperatures above 360°C.) All have excellent electrical characteristics, high dielectric strength and resistivity, low power factor; certain of the liquids have a high dielectric constant as compared with mineral oils. The oils and resins easily soluble in most common organic solvents and drying oils; hard crystalline materials are, in general, less soluble; all are insoluble in water. The more viscous oils and resins have excellent adhesive properties. All forms are thermoplastic, apparently undergo no further condensation or hardening upon repeated melting and cooling. Nondrying; when exposed to air no noticeable oxidation or hardening takes place. The clear resins have rather low vaporization losses; at 65.8°C. (150°F.) less than 0.04 gm. per sq. in. of surface per month.

Uses: Liquid "Aroclors" are used as dielectrics for condensers or capacitors and transformers. Solid "Aroclors" are used to impregnate carbon resistors, and when combined with other plastic materials, the "Aroclors" are excellent sealers or impregnating agents for a variety of electrical apparatus, wire coatings and tape. "Aroclors" are used as plasticizers and resins in lacquers including nitrocellulose, ethyl cellulose and cellulose acetate butyrate; to extend varnish resins and oils and as plasticizer and resin extenders for rubber-base paints, including chlorinated rubber styrene, butadiene and vinyls. In these protective coatings for metal, masonry and wood, "Aroclors" impart adhesion, resistance against moisture, acids, alkalies or other corrosive influence and they improve electrical insulating properties, durability and reduce flammability. For making aluminum pastes and act as carriers or dispersing medium for pigments. They function as sealers in waterproofing compounds, wood preservative formulations, caulking compounds and putty. Employed in asphaltic siding materials and cellulose products impregnated or laminated with asphaltic materials, the "Aroclors" plasticize the asphalt, reduce flammability and improve durability. For printing inks; in precision-casting waxes, floor waxes and other wax products. Used widely in synthetic adhesives including ethyl cellulose, styrene, vinyls and rubber-base materials, "Aroclors" improve adhesion and resistance against corrosive influences. "Aroclors" are used as secondary plasticizers for vinyl sheeting and films made from organosols and as plasticizers for vinyl profile extrusions, tubing and wire coating. Selected liquid "Aroclors" are used as non-flammable hydraulic fluids for die-casting machines. They are used as actuating media for thermostats. "Aroclors" are useful in cutting oils as extreme pressure lubricants, as high-temperature lubricants and as grinding fluids. "Aroclor" 1248 is employed as a nonflammable, liquid-phase, heat-transfer medium for continuous operation in closed systems at temperatures up to 300°C. and at normal atmospheric pressure.

Containers: 500-lb. steel drums; 400-lb. net fiber drums.

Shipping Classification: Resin Synthetic NOIBN Without Filler.

Literature:

"The Aroclors—Physical Properties and Suggested Applications," Technical Bulletin P-115.

"Aroclors as Used in Chlorinated Rubber," Technical Bulletin P-124.

"Aroclors as Used in Pliolite S-5," Technical Bulletin P-126.

"Aroclor Incombustible Lubricants Used in High-Pressure Compressors," Technical Bulletin P-128.

"An Indirect Heater for Unit Control Operations," Technical Bulletin P-130.

"Aroclors as Co-Plasticizers for Polyvinylchloride," Technical Bulletin P-131.

"Aroclors as Used to Extend or Substitute Carnauba Wax," Technical Bulletin P-132.

"Aroclor 1254 Co-Plasticizer with DOP for Vinyl Organosols and Pastes," Technical Bulletin P-134.

BARIUM METAPHOSPHATE

Molecular Weight: 295.32

Formula: $\text{Ba}(\text{PO}_3)_2$

Standard Form: Powder.

General Information—Properties: White powder; slowly soluble in acids; insoluble in water.

Uses: A constituent of glasses, porcelains and enamels.

Shipping Classification: Chemicals NOIBN.

BARIUM PHOSPHATE, DI

Molecular Weight: 233.35

Formula: BaHPO_4

Standard Form: Crystals.

General Information—Properties: Crystals; soluble in acids and NH_4Cl ; insoluble in water.

Uses: Suggested as an opacifying agent in enamels and frits.

Shipping Classification: Chemicals NOIBN.

BARIUM PYROPHOSPHATE, DI

Molecular Weight: 448.68

Formula: $\text{Ba}_2\text{P}_2\text{O}_7$

Standard Form: Powder.

General Information—Properties: White powder; soluble in acids and NH_4 salts; very slightly soluble in water.

Uses: Suggested as an opacifying agent in enamels and frits.

Shipping Classification: Chemicals NOIBN.

BATTERY ACID (Electrolyte)

Standard Form: Liquid.

Typical Analysis: Practically colorless liquid; H_2SO_4 , 93.2% min.; iron 0.005% max.; nitrogen compounds (as HNO_3) 0.001% max.; Sp. Gr. 1.210–1.835. (Acids of lower strengths should be calculated in proportion to above specification on H_2SO_4 content.)

Uses: Electrolyte is sulfuric acid, especially adapted to the needs of the storage battery trade. Various strengths can be furnished to meet the needs of the individual purchaser.

Containers: 13-gal. carboys; 1000-gal. tank trucks; 50-ton tank cars.

Shipping Classification: Sulfuric Acid. Corrosive liquid (white label required).

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"BENTHAL" ALKYD RESIN INTERMEDIATE

Specifications: Light yellow powder; ash 0.20% max.; M.P. 118°C. (min. to start); odor characteristic.

Typical Analysis: Phthalic anhydride 4.5-5.5%; benzoic acid 94.5-95.5%.

Uses: A technical benzoic acid containing 5% phthalic anhydride marketed specifically for the resin industry. Particularly effective in alkyds when added with phthalic anhydride during processing. "Benthal" has the following special advantages: reduces the acid value; reduces viscosity; retards yellowing on baking at elevated temperatures and after bodying; improves stability and flow.

Containers: 200-lb. net wt. fiber drums.

Shipping Classification: Dye Intermediate NOIBN.

BENZENESULFONIC ACID, TECHNICAL

Molecular Weight: 158.17

Formula: SO_3H



Standard Form: Liquid or crystalline mass.

General Information—Properties: Greenish-black viscous liquid or crystalline mass; crystallizing point 25°C. approx.; H_2SO_4 20.0-25.0%; benzenesulfonic acid 70.0-75.0%; Sp. Gr. 1.45 approx. at 25°/15.5°C.

Uses: An intermediate in organic synthesis; a catalyst in certain condensation reactions.

Containers: 500-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN.

BENZOIC ACID

Molecular Weight: 122.12

Formula: COOH



Standard Form: Fine powder or crystalline needles.

Specifications: U.S.P. Grade: White crystalline needles or fine powder; assay 99.5% min.; solution in alcohol (1:2.5); in 10% sodium carbonate (1:6) clear and colorless; meets U.S.P. test for carbonizable impurities; 5% max. powder retained on 100 mesh.

Technical Grade: White to yellowish-white granules or powder; assay 99.0% min.; solution in 10% Na_2CO_3 (1:6) slightly turbid or opalescent and practically colorless.

Uses: U.S.P. grade used in medicinal preparations; preservative in foodstuffs. Technical grade used in the manufacture of benzoates and benzoyl compounds; intermediate in the manufacture of dyes; mordant in calico printing; modifying agent in alkyd resins; color stabilizer in baking varnishes; dispersing agent in grinding of pigments.

Grades: U.S.P. and Technical.

Containers: U.S.P.—100, 50 and 25-lb. fiber drums; 100-lb. fiber drums (for milled material). Technical Grade—200-lb. fiber drums.

MONSANTO

Shipping Classification: U.S.P. Grade: Food Preservative Compound NOIBN. Technical Grade: Dye Intermediate NOIBN.

Literature: "Benzoic Acid and the Benzoates," 16-page booklet.

BENZOTRICHLORIDE

(Also known as α,α,α -trichlorotoluene)

Molecular Weight: 195.48

Formula:



Standard Form: Liquid.

Specifications: Colorless to light green or yellow liquid; crystallizing point -6.0°C. min. Distillation range: first drop 219.0°C. min.; 95% (1-96 ml) 1.5°C. max.; dry point 222.0°C. max.

Uses: An intermediate in dyestuff synthesis. CAUTION: Irritating to the skin. Vapors are highly irritating to the eyes. Avoid breathing vapors. Avoid contact with the skin.

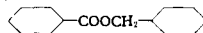
Containers: 13-gal. carboys (140-lbs. net).

Shipping Classification: Chemicals NOIBN. Corrosive liquid (white label required).

BENZYL BENZOATE, U.S.P.

Molecular Weight: 212.24

Formula:



Standard Form: Liquid.

Specifications: Essentially colorless liquid; crystallizing point 18.3°C. min.; refractive index 1.568-1.570 at 20°C. total chlorine 0.04% max.

General Information—Properties: High-boiling ester having a pleasant odor.

Uses: A miticide; fixative in perfumes; preparation of de-lousing and insect repellent formulations; medicinally in the treatment of scabies.

Containers: 475, 125-lb. and 5-gal. drums.

Shipping Classification: Insect Repellent NOIBN.

BENZYL CHLORIDE (Also known as alpha-chlorotoluene)

Molecular Weight: 126.58

Formula:



Standard Form: Liquid.

Specifications: Clear to slightly turbid, colorless to yellow liquid; Sp. Gr. 1.105-1.110 at 15.5°/15.5°C. Distillation range: first drop 177.5°C. min.; 95% (1-96 ml) 3.0°C. max. dry point 185.0°C. max.

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TOWOLDMON0043128
WATER_PCB-00034174

Uses: A highly reactive alkyl halide used in the production of the following: dyestuffs; perfume bases such as benzyl alcohol, acetate and other esters; plasticizers; resins; wetting agents; germicides; rubber accelerators; gasoline gum inhibitors; benzyl benzoate and various pharmaceuticals. **CAUTION:** This product is irritating to the skin. Vapors are highly irritating to the eyes. Avoid contact with the skin. Avoid breathing its vapors.

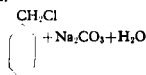
Containers: 475-lb. nickel drums; 4000-gal. nickel tank cars.

Shipping Classification: Chemicals NOIBN. Corrosive liquid (white label required).

BENZYL CHLORIDE, STABILIZED

Molecular Weight: 126.58

Formula:



Standard Form: Liquid.

Specifications (for material recovered from stabilized solution): Colorless to yellow liquid; Sp. Gr. 1.105–1.110 at 15.5°/15.5°C. Distillation range: first drop 177.5°C. min.; 95% (1–96 ml) 3.0°C. max.; dry point 185.0°C. max.

General Information—Properties: This form of benzyl chloride is stabilized by the addition of 23 pounds of 10% sodium carbonate solution to 450 pounds of the chloride. The wet material is a milky-white emulsion from which water may separate into a definite layer at either the bottom or top, depending upon the temperature and the concentration of Na_2CO_3 . The concentration of Na_2CO_3 slowly decreases on standing.

Uses: A highly reactive alkyl halide used in the production of the following: dyestuffs; perfume bases such as benzyl alcohol, acetate and other esters; plasticizers; resins; wetting agents; germicides; rubber accelerators; gasoline gum inhibitors; benzyl benzoate and various pharmaceuticals. **CAUTION:** This product is irritating to the skin. Vapors are highly irritating to the eyes. Avoid contact with the skin. Avoid breathing its vapors.

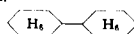
Containers: 473-lb. steel drums; tank cars.

Shipping Classification: Chemicals NOIBN. Corrosive liquid (white label required).

CYCLOHEXYL (Also known as dicyclohexyl)

Molecular Weight: 166.30

Formula:



Standard Form: Liquid.

General Information—Properties: Clear mobile liquid; aromatic odor; freezing point 2.2°C.; Sp. Gr. 0.884 at 25°/15.6°C.; refractive index 1.4790 at 25°C.; distillation range 5–95% between 238–240°C. (corr.); flash point 215°F.; fire point 220°F.; viscosity 34.2 SUS at 100°F.; soluble in organic solvents; insoluble in water.

Uses: Suggested as a high-boiling solvent, plasticizer, dielectric.

Containers: 400-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

"BIOLITE" MOLD INHIBITOR

Standard Form: Liquid.

General Information—Properties: Approximately a 20% aqueous solution of sodium pentachlorophenate. Light tan or brown liquid which may be irritating to the skin of some individuals.

Uses: A mildew control agent designed for use by laundries.

Containers: 55-gal. steel drums; 5-gal. drums.

Shipping Classification: Agricultural Fungicide NOIBN liquid.

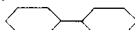
Literature: "Cut Mildew Loss With Monsanto Biolite," folder.

BIPHENYL

(Also known as diphenyl and phenylbenzene)

Molecular Weight: 154.20

Formula:



Standard Form: Crystalline solid.

General Information—Properties: Light yellow crystalline solid; B.P. 254.9°C.; freezing point 68.5–68.9°C.

Uses: Fungistat used to impregnate tissue wrappers, box liners and paper bags for packaging citrus fruit.

Containers: 75-lb. bags; 250-lb. bbls.; 100-lb. kegs.

Shipping Classification: Biphenyl.

BONE ASH

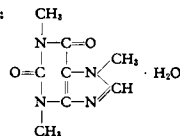
General Information—Properties: Mold-wash for coating molds used in casting copper wire bars, ingots and slabs. A superior mold coating for certain steel casting operations. This product is also used in producing high-grade china-ware.

Shipping Classification: Bone Ash.

CAFFEINE, U.S.P.

Molecular Weight: 121.21 (Anhydrous, 194.19)

Formula:



Standard Form: Powdered or flaked solid.

Specifications: White powder or flakes. Loss on drying at 80°C.: anhydrous powder 0.25% max.; hydrated flakes 5.75–6.50%. M.P. 236°C. min.; meets U.S.P. test for carbonizable impurities; trace max. flakes retained on 20 mesh.

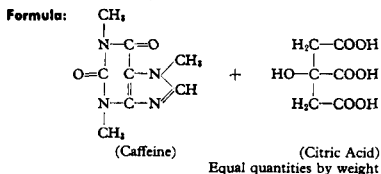
Uses: Pharmaceutical product.

Grades: Anhydrous powder or hydrated flakes.

Containers: 100 and 25-lb. fiber drums; 10 and 5-lb. boxes.

Shipping Classification: Chemicals NOIBN.

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CAFFEINE, CITRATED, U.S.P.

Standard Form: Powder.

Specifications: White powder; assay 48.0–52.0% anhydrous caffeine; loss on drying 0.2% max. at 50°C.; solubility in water (1:4) complete; conforms to U.S.P. tests for sulfate and heavy metals; 15.0% max. retained on 100 mesh.

Uses: Pharmaceutical product.

Containers: 100 and 25-lb. fiber drums; 5-lb. boxes.

Shipping Classification: Chemicals NOIBN.

CALCIUM METAPHOSPHATE

Molecular Weight: 198.04

Formula: $\text{Ca}(\text{PO}_3)_2$

Standard Form: Powder.

General Information—Properties: White powder; M.P. approx. 975°C.; very slowly soluble in water and acids.

Uses: Suggested as a constituent of glasses, porcelains and enamels.

Shipping Classification: Calcium Phosphate.

CALCIUM NITRATE

Formula: $\text{Ca}(\text{NO}_3)_2$

Standard Form: Crystals.

Typical Analysis: Calcium nitrate 80.4%; ammonium nitrate 4.75%; magnesium nitrate 1.5%; water 13.15%.

Uses: Coagulant in latex dipping processes, glue additive, fireworks manufacture.

Containers: 100-lb. net wt. bags.

Shipping Classification: Calcium Nitrate. Yellow label required.

CALCIUM PHOSPHATE, DI, ANHYDROUS

(Also known as phosphate of lime, secondary phosphate of lime, dicalcium orthophosphate and dibasic calcium phosphate)

Molecular Weight: 136.07

Formula: CaHPO_4

Standard Form: Finely divided powder.

Typical Analysis: Phosphorus 22.3%; calcium 29.0%.

General Information—Properties: White, tasteless, finely divided powder. Conforms with all food and drug laws. Insoluble in alcohol; soluble in dilute citric acid solution. Solubility in CO_2 —free water in gms. per liter:

ANHYDROUS	30°C.	50°C.	68°C.	100°C.
CaO	0.0414	0.667	0.0985	0.104
P_2O_5	0.0866	0.1630	0.2234	0.246
DIHYDRATE				
CaO	0.0954	0.2617	0.3409	0.3104
P_2O_5	0.2066	0.6182	0.3245	0.759

Uses: Mineral supplement in foods and cereals; polishing agent in tooth pastes and powders.

Grades: Medicinal; food; dentifrice; ADR.

Containers: 100-lb. bags; 350-lb. bbls.; 150-lb. kegs.

Shipping Classification: Calcium Phosphate.

CALCIUM PHOSPHATE, DI, DIHYDRATE

Molecular Weight: 172.10

Formula: $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$

Standard Form: Powder.

Typical Analysis: Phosphorus 18.1%; calcium 23.7%.

General Information—Properties: White tasteless crystalline powder; soluble in dilute citric acid solution; very slightly soluble in water; insoluble in alcohol and glycerol. The stabilized dentifrice grade is prepared specially for use in dentifrices and does not set-up hard when used to form late tooth paste.

Uses: Medicinal; mineral supplement for foods and cereals; polishing ingredient in tooth pastes and powders.

Grades: Regular food grade; stabilized dentifrice grade—accepted by American Dental Association; U.S.P.—conforms with U.S.P. XIII.

Containers: 60-lb. bags; 300-lb. bbls.; 125-lb. kegs.

Shipping Classification: Calcium Phosphate.

CALCIUM PHOSPHATE, MONO

(Also known as primary calcium phosphate, calcium dihydrogen phosphate, monobasic calcium phosphate, calcium acid phosphate and acid phosphate of lime)

Standard Form: Powder or granules.

General Information—Properties: A white stable material; soluble in water, giving an acid reaction.

Uses: Leavening agent in biscuits and crackers and acid leavening agent in pancakes; sole acid agent or mixed with sodium aluminum sulfate or sodium acid pyrophosphate in baking powders; in making self-rising, phosphated plain flour and prepared flours; to control pH of solution in milk.

Grades: Regular for phosphated and self-rising flour and baking powder. Granular for baking powder. All grades meet U. S. Pure Food Law requirements. Special grade will be supplied on request.

Containers: 100-lb. bags; 300-lb. bbls.

Shipping Classification: Calcium Phosphate.

CALCIUM PHOSPHATE, TRI

(Also known as tribasic calcium phosphate, normal calcium phosphate, neutral calcium phosphate and tertiary calcium phosphate)

Formula: $3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{Ca}(\text{OH})_2$

Standard Form: Powder.

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General Information—Properties: White amorphous powder, odorless and tasteless; practically insoluble in water. Complies with all Federal and State food laws. Conforms with specifications listed in National Formulary and accepted by the Council on Dental Therapeutics of the American Dental Association.

Uses: A mineral supplement in foods to supply calcium and phosphorus; base or polishing agent in tooth powder; ingredient in making milk glasses; antacid; conditioner to prevent caking in salt, sugar talc and other powdered material.

Grades: Dentifrice; conditioner (salt, sugar, etc.); and medicinal. (All material conforms to requirements of the U. S. Pure Food Laws.)

Containers: 60-lb. bags; 150-lb. bbls.

Shipping Classification: Calcium Phosphate.

CALCIUM PYROPHOSPHATE (Normal)

Molecular Weight: 254.20

Formula: $\text{Ca}_2\text{P}_2\text{O}_7$

Standard Form: Powder.

General Information—Properties: Finely subdivided powder; contains CaO, 43.8%; P_2O_5 , 55.5%.

Uses: Food fortification and vitamin tablets as a mineral supplement.

Containers: 100-lb. bags; 400-lb. bbls.; 100-lb. drums.

Shipping Classification: Calcium Phosphate.

CALCIUM SILICATE SLAG

Standard Form: Granular solid.

General Information—Properties: CaO, 47.18%; SiO_2 , 40.44%; Al_2O_3 , 7.62%; Fe_2O_3 , 0.20%; F, 2.62%; P, 0.55%; K₂O, 0.97%; Na₂O, 0.44%; MgO, 0.02%; Mn, 0.12%; SO_3 , 0.59%; C, 0.10%.

Uses: Constituent of glass mix.

Containers: Bulk.

Shipping Classification: Slag.

CAUSTIC SODA (Also known as sodium hydroxide)

Molecular Weight: 40.01

Formula: NaOH

Standard Form: Liquid.

Specifications: Colorless to light brown viscous liquid; sodium hydroxide 48.5% min., 50.5% max.; sodium carbonate 0.20% max.; sodium chloride 1.25% max.; sodium chloride 0.10% max.; iron 0.007% max.; sodium sulfate 0.04% max.; copper approx. 0.001%.

Uses: Petroleum refining; vegetable oil refining; tanning; soapmaking; textile manufacture (rayon); rubber reclaiming.

Containers: 50-ton tank cars.

Shipping Classification: Caustic Soda Liquid.

CHLORAL HYDRATE, U.S.P.

Molecular Weight: 165.42

Formula: $\text{CCl}_3\text{CH}(\text{OH})_2$

Standard Form: Crystals.

Specifications: Colorless, dry transparent crystals; assay 99.5% min.; solubility in water (1:1) complete; conforms to U.S.P. test for carbonizable impurities, chlorides and acidity.

Uses: Pharmaceutical preparations and veterinary medicines.

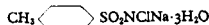
Containers: 100-lb. fiber drums; 40 and 25-lb. bottles.

Shipping Classification: Chemicals NOIBN.

CHLORAMINE-T, N.F. (Also known as N-sodium-N-chloro-para-toluenesulfonamide)

Molecular Weight: 281.70

Formula:



Standard Form: Crystalline powder.

Specifications: White or faintly yellow powder or crystals; solubility in water (2:15) complete; free alkali (as NaOH) 0.07–0.15%; loss on drying (3 hrs. at 97°C.) 18.0–20.0%; available chlorine 24.5–25.2%; assay 97.3% min.; trace max. retained on 10 mesh; 1.0–10.0% retained on 35 mesh.

Uses: A water-soluble, chlorine-bearing powder used as a germicide, disinfectant and deodorant.

Containers: 300, 100 and 50-lb. fiber drums; 25-lb. boxes.

Shipping Classification: Disinfectants Other Than Medicinal NOIBN.

CHLORINE

Molecular Weight: 70.91

Formula: Cl_2

Standard Form: Liquid.

Specifications: Clear, amber-colored liquid under slight pressure; about 1½ times as heavy as water; conforms with American Water Works Association specifications.

Uses: Municipal water purification, sewage treatment and swimming pool sterilization; slime control; pulp and textile bleaching; metallurgy; bleaching and processing of flour; organic synthesis; manufacture of metallic chlorides and hypochlorites. CAUTION: Chlorine is toxic and highly irritating. Avoid contact with the skin and breathing the vapors.

Containers: 150-lb. cylinders (net); tank cars.

Shipping Classification: Chlorine. Liquefied (green label required).

Literature: "Monsanto Chlorine," 20-page booklet.

META-CHLOROANILINE (Also known as meta-amino-chlorobenzene and 3-chloroaminobenzene)

Molecular Weight: 127.57

Formula: NH_2



Standard Form: Liquid.

Specifications: Clear, light yellow liquid; crystallizing point –10.6°C. min. Distillation range: first drop 22.0°C. min.; 95% (1–96 ml) 1.0°C. max.; dry point 231.0°C. max.

(Continued on next page)

0685048

Uses: An intermediate in the manufacture of azo dyestuffs. **CAUTION:** This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.

Containers: 515-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

ortho-CHLOROANILINE (Also known as *ortho-amino-chlorobenzene* and *2-chloroaminobenzene*)

Molecular Weight: 127.57

Formula:



Standard Form: Liquid.

Specifications: Discolors readily on exposure to air; crystallizing point -2.3°C . min. Distillation range: first drop 208.0°C . min.; 95% (1-96 ml) 1.0°C . max.; dry point 210.0°C . max. Solution in HCl very slight opalescence max.

Uses: An intermediate in the production of dyestuffs. **CAUTION:** This product is toxic. Avoid breathing its vapors and avoid contact with the skin.

Containers: 535-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

para-CHLOROANILINE (Also known as *para-amino-chlorobenzene* and *4-chloroaminobenzene*)

Molecular Weight: 127.57

Formula:



Standard Form: Cast solid.

Specifications: Yellowish-white solid; crystallizing point 69.5°C . min. Distillation range: first drop 229.0°C . min.; 95% (1-96 ml) 1.5°C . max.; dry point 233.0°C . max. Solution in HCl slight opalescence max.

Uses: An intermediate in the production of dyestuffs. **CAUTION:** This product is toxic. Avoid breathing its vapors and avoid contact with the skin.

Containers: 515-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

CHLOROBENZENE (Also known as *monochlorobenzene* and *chlorobenzol*)

Molecular Weight: 112.56

Formula:



Standard Form: Liquid.

Specifications: Clear, almost colorless liquid. Distillation

MONSANTO

range: first drop 131.5°C . min.; 95% (1-96 ml) 0.5°C . max.; 100% 1.0°C . max.; dry point 133.0°C . max.

Uses: Used principally as an intermediate in the preparation of the various substituted chlorobenzenes which are in turn intermediates for the preparation of dyestuffs, explosive insecticides and various other organic chemicals. Also used as an organic solvent.

Containers: 450-lb. steel drums; tank cars.

Shipping Classification: Chlorobenzol.

para-CHLORO-meta-CRESOL

General Information—Properties: White transparent crystals. Used as an efficient industrial preservative against mildew; auxiliary germicide in the manufacture of a septic and disinfectant fluids. Made by Monsanto Chemical Limited.

ortho-CHLOROPHENOL, TECHNICAL (Also known as *ortho-hydroxychlorobenzene* and *2-chlorohydroxybenzene*)

Molecular Weight: 128.56

Formula:



Standard Form: Liquid.

Specifications: Clear yellow-to-brown liquid; monochlorophenol (from Cl content) 95.0% min. Distillation range: first drop 173.0°C . min.; 95% (1-96 ml) 2.0°C . max.; dry point 178.0°C . max.

Uses: An intermediate in the production of dyestuffs and various other organic products. **CAUTION:** This product is toxic. Avoid breathing its vapors. Avoid contact with skin.

Containers: 545-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

para-CHLOROPHENOL (Also known as *para-hydroxychlorobenzene* and *4-chlorohydroxybenzene*)

Molecular Weight: 128.56

Formula:



Standard Form: Cast solid.

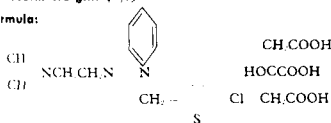
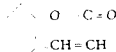
Specifications: Yellowish-to-brown crystalline mass; crystallizing point 42.5°C . min.; Sp. Gr. 1.256-1.262 at $45-15.5^{\circ}\text{C}$.

Uses: An intermediate in the production of dyestuffs; in synthesis of pharmaceuticals. **CAUTION:** Care should be exercised in handling this product. Avoid contact with skin.

Containers: 545-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

0685049

CHLOROSULFONIC ACID (Also known as sulfuric anhydride)**Molecular Weight:** 116.53**Formula:** ClSO₂OH**Standard Form:** Liquid.**Specifications:** Heavy mobile liquid; assay 98.5% min.**Uses:** In chlorosulfonation reactions. **CAUTION:** Chlorosulfonic acid reacts violently with water, forming hydrochloric and sulfuric acids.**Containers:** 700-lb., 55-gal. steel and stainless steel drums; 8-lb. bottles single; 80-lb. cases of ten; tank cars.**Shipping Classification:** Chlorosulfonic Acid. Corrosive liquid (white label required).**para-CHLORO-meta-XYLENOL****General Information—Properties:** Small white crystals. Used as a disinfectant intensifier and as a preservative and preventive against mold and mildew. Made by Monsanto Chemicals Limited.**CHLOROTHENYLPYRAMINE CITRATE****(N, N-dimethyl-N'-2-pyridyl-N'-2-(5-chlorothenyl) ethylenediamine citrate)****Molecular Weight:** 487.96**Formula:****Standard Form:** Crystalline solid.**Specifications:** White crystalline powder; ash 0.05% max.; assay 99.0% min.; loss on drying at 80 C. 0.5% max.; M.P. 114 C. min. to start.**Uses:** In pharmaceutical preparations where antihistaminic activity is desired.**Containers:** 100 and 25-lb. fiber drums.**Shipping Classification:** Chemicals NOIBN.**"COLOR-TONED REZ" EXTERIOR PENETRATING SEALERS ("Cedar Rez," "Driftwood Rez," "Mahogany Rez," "Redwood Rez," "Sage Rez")****General Information—Properties:** A pigmented penetrating sealer, to protect and preserve beauty of California redwood and western cedar.**Uses:** Applied to bare wood siding, shakes or shingles, "Color-Toned Rez" products penetrates wood pores, materially reducing absorption of moisture. They resist bleaching and discoloration, conceal effects of weather exposure. May also be used as interior finish to produce tinted, subdued color grain pattern on paneling, doors and woodwork. Comes ready-to-use and may be applied by brush or spray. One gallon covers from 200 to 350 sq. ft. depending on surface conditions.**Containers:** 5-gal. cans; 1-gal. cans (4 case); 1-qt. cans (12 case).**Shipping Classification:** Wood Filler Liquid.**Literature:** "How to Tint and Preserve Natural Wood Grains," folder; "Monsanto Wood Finishes for Home Decoration," 8-page booklet.**"COUMARIN MONSANTO" (Coumarin, N. F.)****Molecular Weight:** 146.14**Formula:****Standard Form:** Crystalline solid.**Specifications:** White crystals; melt (liquid) clear and colorless; M.P. 68.8 C. min.; solubility in ethyl alcohol 1:10 complete; moisture 0.10% max.; ash 0.05% max.; conforms to N. F. test for acetanilid.**Uses:** Flavor and odor principle used separately and in conjunction with vanillin or "Ethavan"; used in perfumes, soaps, tobacco, inks, rubber, foods and other products where flavoring or aromatic ingredients are required.**Grades:** Crystals; 60 mesh powder.**Containers:** 100 and 25-lb. fiber drums; 5 and 1-lb. cartons.**Shipping Classification:** Chemicals NOIBN.**Literature:** "Coumarin, Monsanto," folder; "Something About the Senses," 32-page booklet.**"CRESANTOL" 3 GERMICIDE****General Information—Properties:** Pale straw-colored liquid; a mixture of isomeric benzyl cresols. A powerful germicide used in the formulation of antiseptic and disinfectant fluids. Made by Monsanto Chemicals Limited.**"CRESANTOL" 15 GERMICIDE****General Information—Properties:** Clear straw-colored liquid; a controlled blend of chlorinated xylenols containing a proportion of free phenols. A germicide used in the formulation of antiseptic and disinfectant fluids. Made by Monsanto Chemicals Limited.**meta-CRESOL****General Information—Properties:** Colorless liquid; assay 98-100%; crystallizes at 10.5-12 C. Used in the manufacture of synthetic perfumes and nitro derivatives. Made by Monsanto Chemicals Limited.**ortho-CRESOL****General Information—Properties:** White crystalline mass; crystallizes at 30-31 C. Used in the manufacture of chemicals and as a dye intermediate. Made by Monsanto Chemicals Limited.**para-CRESOL****General Information—Properties:** Loose white crystals; crystallizes at 34.5 C. Dye intermediate. Made by Monsanto Chemicals Limited.

0685050

CRESOL-CRESYLIC ACID

General Information—Properties: Duty-free grades. Used as a flotation agent and gasoline antioxidant and in the manufacture of soaps, disinfectants, paint removers, textile chemicals, resins and dyestuffs. Made by Monsanto Chemicals Limited.

"CRYSALBA" DENTIFRICE BASE

Molecular Weight: 136.14

Formula: CaSO_4

Standard Form: Fine powder.

General Information—Properties: Extremely fine, white powder composed of minute particles of crystalline-shaped anhydrous calcium sulfate, standardized and specially prepared for use as a dentifrice base or polishing agent (paste or powder). Suitable for preparation of neutral, acid, basic, soap or magnesia-type dentifrice.

Containers: 375-lb. bbls.; 100-lb. paper bags; 175-lb. kegs.

Shipping Classification: Calcium Sulfate.

CYCLOHEXYLAMINE (Also known as hexahydroaniline)

Molecular Weight: 99.17

Formula: NH_2



Standard Form: Liquid.

Specifications: Clear, practically colorless liquid; Sp. Gr. 0.870–0.874 at 15.5°/15.5°C. Distillation range: first drop 132.0°C. min.; 95% (1–96 ml) 4.0°C. max.; dry point 137.5°C. max.

Uses: Dyestuff intermediate; petroleum additive; corrosion inhibitor; organic synthesis.

Containers: 375-lb. (approx.) 55-gal. drums.

Shipping Classification: Chemicals NOIBN.

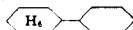
Literature: "Cyclohexylamine and Dicyclohexylamine," Technical Bulletin O-74.

CYCLOHEXYLBENZENE

(Also known as phenylcyclohexane)

Molecular Weight: 160.24

Formula:



Standard Form: Liquid.

General Information—Properties: Clear mobile liquid; aromatic odor; freezing point 4.8°C.; Sp. Gr. 0.935 at 25°/15.6°C.; refractive index 1.5205 at 25°C.; distillation range 5–95% between 239–241°C. (corr.); flash point 210°F.; flame point 220°F.; viscosity 31.2 SUS at 100°F.; resistivity 11.410×10^8 ohms/cc. at 100°C.; soluble in organic solvents; insoluble in water.

Uses: Suggested as a high-boiling solvent, plasticizer, intermediate for synthesis, dielectric, fixative for perfumes.

Containers: 400-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

DIAMYLAMMONIUM DIHYDROGEN PHOSPHATE

Molecular Weight: 255.30

Formula: $[\text{CH}_3(\text{CH}_2)_4]_2\text{NH}\cdot\text{H}_2\text{PO}_4$

Standard Form: Hard noncrystalline gum.

General Information—Properties: Hard noncrystalline yellow gum; very hygroscopic; soluble in water or alcohol slightly soluble in benzene; almost insoluble in acetone, sharp M.P. but gradually softens as heated; mobile liquid at 110°C.

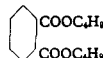
Uses: Suggested as a constituent of rust-inhibiting paint.

Shipping Classification: Resin Synthetic NOIBN With Filler.

DIBUTYL PHTHALATE

Molecular Weight: 278.34

Formula:



Standard Form: Liquid.

Specifications: Clear, oily liquid; color APHA 20 or less odor slight; acidity (as phthalic acid) 0.01% max.; Sp. 1.045 $\pm$ 0.001 at 25°/25°C.; refractive index 1.4905 $\pm$ 0.001 at 25°C.; assay (ester content) 99% min.; sulfur (wet strip test) negative.

Uses: One of the most widely used plasticizers for cellulose; miscible with all the common organic solvents with oils; soluble in water only to 0.001% at 30°C.; excellent light stability which permits its use in colorless, white, delicately tinted products. The stability of dibutyl phthalate and its high solvent power for most plastic materials make it one of the most acceptable plasticizers for general use.

Containers: 465-lb. steel drums; 45-lb. drums.

Shipping Classification: Dibutyl Phthalate.

Literature: "Monsanto Plasticizers," 80-page booklet.

2,5-DICHLORONITROBENZENE

(Also known as 1-nitro-2,5-dichlorobenzene)

Molecular Weight: 192.01

Formula: NO_2



Standard Form: Cast solid.

Specifications: Light yellow to light brown crystalline solid; crystallizing point 52.5°C. min.

Uses: An intermediate in the preparation of dyes. CAUTION: This product is toxic. Avoid breathing vapors and avoid contact with the skin.

Containers: 600-lb. steel drums; tank cars.

Shipping Classification: Dye Intermediate NO "Poison" label required.

2,4-DICHLOROPHENOL, TECHNICAL

(Also known as 2,4-dichlorohydroxybenzene)

Molecular Weight: 163.01

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Formula: OH



Standard Form: Cast solid.

Specifications: Yellow-to-brown crystalline mass; crystallizing point 40.0°C. min. Distillation range: first drop 213.5°C. min.; 95% (1-96 ml) 3.0°C. max.

Uses: An intermediate in the production of dyestuffs. CAUTION: Care should be exercised in handling this material. Avoid contact with the skin. Avoid breathing its vapors.

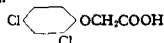
Containers: 545-lb. (approx.) steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

2,4-DICHLOROPHENOXYACETIC ACID (2,4-D)

Molecular Weight: 221.04

Formula:



Standard Form: Powder.

Specifications: Fine white powder; assay 99.0% min.; M.P. 138°C. min.

Uses: A plant hormone which possesses herbicidal properties.

Containers: 200 and 100-lb. fiber drums.

Shipping Classification: Weed Killing Compound NOIBN.

Literature: "2,4-D for Weed Control," Technical Bulletin O-50; "Formulating 2,4-D for Weed Control," 23-page booklet; "Chemical Weed Control In Orchards & Vineyards," 15-page booklet; "Chemical Weed Control on Rights-of-Way," 19-page booklet; "Controlling Weeds with Chemical Sprays," 19-page booklet; "Chemical Weed Control in Small Grains," 15-page booklet.

2,4-DICHLOROPHENOXYACETIC ACID—ISOPROPYL ESTER (Also known as 2,4-D isopropyl ester and isopropyl 2,4-dichlorophenoxyacetate)

Molecular Weight: 263.12

Formula:



Standard Form: Liquid.

Specifications: Pale yellow liquid; assay 99% min.; crystallizing point 5°C. min.; Sp. Gr. 1.255-1.270 at 25/25°C.

General Information—Properties: Possesses herbicidal properties similar to those of the free acid.

Uses: For same general purposes as free acid or sodium salt where volatility is not a hazard. Has the advantage of being oil soluble.

Containers: 55-gal. steel drums.

Shipping Classification: Weed Killing Compound NOIBN.

Literature: "2,4-D for Weed Control," Technical Bulletin O-50; "Formulating 2,4-D for Weed Control," 23-page booklet; "Chemical Weed Control in Orchards & Vineyards," 15-page booklet; "Chemical Weed Control on

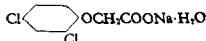
Rights-of-Way," 19-page booklet; "Controlling Weeds with Chemical Sprays," 19-page booklet; "Chemical Weed Control in Small Grains," 15-page booklet.

2,4-DICHLOROPHENOXYACETIC ACID—SODIUM SALT

(Also known as 2,4-D sodium salt and sodium 2,4-dichlorophenoxyacetate)

Molecular Weight: 261.05

Formula:



Standard Form: Powder.

Specifications: White powder; assay (as monohydrate) 97.0% min.

Uses: Possesses herbicidal properties similar to those of the free acid but is preferred in some instances as it is soluble in water to the extent of about 4% at 25°C., whereas the free acid is insoluble.

Containers: 100 and 50-lb. fiber drums.

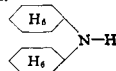
Shipping Classification: Weed Killing Compound NOIBN.

Literature: "2,4-D for Weed Control," Technical Bulletin O-50; "Formulating 2,4-D for Weed Control," 23-page booklet; "Chemical Weed Control in Orchards & Vineyards," 15-page booklet; "Chemical Weed Control on Rights-of-Way," 19-page booklet; "Controlling Weeds with Chemical Sprays," 19-page booklet; "Chemical Weed Control in Small Grains," 15-page booklet.

DICYCLOHEXYLAMINE

Molecular Weight: 181.31

Formula:



Standard Form: Liquid.

Specifications: Clear, practically colorless liquid; Sp. Gr. 0.913-0.919 at 15.5°/15.5°C. Distillation range: first drop 252.0°C. min.; 95% (1-96 ml) 4.0°C. max.; dry point 258.0°C. max.

Uses: An intermediate in the manufacture of oil additives and insecticides.

Containers: 375-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

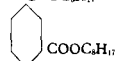
Literature: "Cyclohexylamine and Dicyclohexylamine," Technical Bulletin No. O-74.

DI (2-ETHYL HEXYL) PHTHALATE (D.O.P.)

(Also known as dioctyl phthalate or D.O.P.)

Molecular Weight: 390.54 (Pure compound)

Formula:



Standard Form: Liquid.

(Continued on next page)

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Specifications: Color APHA 50 max.; odor, very slight characteristic; Sp. Gr. 0.978-0.987 at 25°/25°C.; refractive index 1.4810-1.4880 at 25°C.; acidity (as phthalic) 0.01% max.

General Information—Properties: Di (2-Ethyl Hexyl) Phthalate (D.O.P.) is the largest volume plasticizer consumed in polyvinyl-chloride resin. It imparts very good low temperature flexibility, low volatility and good heat and light stability to a vinyl composition. It is often used with "Santicizer" 141 to give a composition of improved light stability, resistance to embrittlement and aging, flame resistance and ease of processing. In vinyl electrical compositions, D.O.P. imparts excellent electrical characteristics with good aging properties.

Uses: This plasticizer is widely used in plasticizing polyvinyl chloride for electrical insulation. D.O.P. is also compatible with most of the other resins commonly used in the plastics industry. It is an excellent general purpose plasticizer for use in vinyl plastics. It has been widely used in such vinyl applications as shower curtains, aprons, rainwear, upholstery, draperies, garden hose and many others which require good flexibility and aging characteristics.

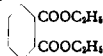
Containers: 55-gal. (440-lb.) and 5-gal. (40-lb.) black iron drums; tank cars.

Shipping Classification: Resin Plasticizer.

DIETHYL PHTHALATE

Molecular Weight: 222.32

Formula:



Standard Form: Liquid.

Specifications: Clear, water-white oily liquid; color APHA not darker than 10; odor very slightly aromatic; acidity (as phthalic acid) 0.01% max.; Sp. Gr. 1.120 ± 0.005 at 25°/25°C.; refractive index 1.5030 ± 0.001 at 20°C.; sulfur (copper-strip test) negative.

General Information—Properties: B.P. 295°C.; wt. per gal. 9.35 lbs.; miscible with all the common organic solvents and diluents.

Uses: Generally used in mixture with dimethyl phthalate as a plasticizer for cellulose acetate. Evaporation rate of diethyl phthalate is too high for successful use as a regular nitro-cellulose plasticizer, and it is not a solvent for cellulose acetate. Thus its range of usefulness is somewhat restricted. Mixtures of diethyl and dimethyl phthalates usually give better results than can be obtained by either one alone. Also used as a fixative in perfumes.

Containers: 500-lb. steel drums; 45-lb. drums; tank cars.

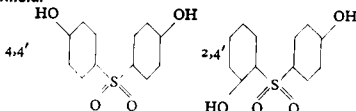
Shipping Classification: Diethyl Phthalate.

Literature: "Monsanto Plasticizers," 80-page booklet.

DIHYDROXY DIPHENYL SULFONE

(Also known as sulfonyl bis phenol)

Formula:



Standard Form: Powder.

Typical Analysis:

	PURITY	M.P.
Dihydroxy Diphenyl Sulfone NT	64-72% of 4,4'	175°
	36-28% of 2,4'	
Dihydroxy Diphenyl Sulfone, Crude	95%	
4,4'-Dihydroxy Diphenyl Sulfone	99-100%	236°
2,4'-Dihydroxy Diphenyl Sulfone	98-99%	176°

General Information—Properties: Readily nitrated, sulfonated and converted to ethers, esters, etc. Can be chlorinated but less readily than phenol.

Uses: Electroplating bath addition agent; base for phen resins; suggested as intermediate in organic synthesis.

Grades: 4,4' and 2,4'-Dihydroxy Diphenyl Sulfone; Dihydroxy Diphenyl Sulfone NT, Dihydroxy Diphenyl Sulfone Crude.

Containers: 150-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

2,3-DIMETHOXYBENZALDEHYDE, TECHNICAL

(Also known as ortho-veratraldehyde)

Molecular Weight: 166.17

Formula: CHO



Standard Form: Crystalline mass.

Specifications: Yellowish-brown fused crystalline mass; solubility in sodium bisulfite solution nearly complete; crystallizing point 47.0°C. min.; wt. per gal. 9.3 lbs. approx.

Uses: A perfume fixative and an intermediate in chemical synthesis.

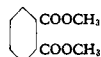
Containers: 450-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

DIMETHYL PHTHALATE

Molecular Weight: 194.18

Formula:



Standard Form: Liquid.

Specifications: Clear, water-white oily liquid; color APHA not darker than 10; odor not more than slightly aromatic; acidity (as phthalic acid) 0.01% max.; Sp. Gr. 1.190 ± 0.001 at 25°/25°C.; refractive index 1.5155 ± 0.001 at 20°C.; sulfur (copper-strip test) negative.

General Information—Properties: A solvent plasticizer for cellulose acetate; miscible with all common organic solvents and with oils (except petroleum oils); solubility in water 0.4% at 32°C.; excellent light stability; B.P. 282°C.; crystallizing point 0°C.; wt. per gal. 10 lbs.

Uses: Widely used but does not meet very rigid plastic requirements. Its use is restricted almost entirely to the cellulose acetate field where, as a general rule, it is used in combination with diethyl phthalate or some other plasticizer.

Containers: 500 and 50-lb. steel drums.

Shipping Classification: Dimethyl Phthalate.

Literature: "Monsanto Plasticizers," 80-page booklet.

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DINITROANILINE

(Also known as 1-amino-2,4-dinitrobenzene)

Molecular Weight: 183.12

Formula: NH_2 

Standard Form: Powder.

Specifications: Bright yellow powder; M.P. 177.5°C. min.; chlorides (total) 0.15% max.

Uses: An intermediate in the preparation of dyestuffs. CAUTION: This product is toxic. Avoid breathing its dust. Avoid contact with the skin.

Containers: 100-lb. fiber drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

2,4-DINITROCHLOROBENZENE, TECHNICAL

(Also known as 1-chloro-2,4-dinitrobenzene)

Molecular Weight: 202.56

Formula: Cl 

Standard Form: Cast crystalline solid.

Typical Analysis:

	2,4-DINITRO- CHLOROBENZENE	ISOMERIC DINITRO- CHLOROBENZENES
48.0°C.	95% approx.	5% approx.
46.5°C.	90% approx.	10% approx.

Uses: Production of explosives, photographic chemicals and dinitrophenol; intermediate in the preparation of dyestuffs. CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.

Grades: 2 grades of cast crystalline solids with min. crystallizing points of 48.0°C. and 46.5°C.

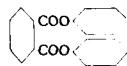
Containers: 600-lb. steel drums.

Shipping Classification: Dinitrochlorobenzol. "Poison" label required.

DIPHENYL PHTHALATE

Molecular Weight: 318.31

Formula:



Standard Form: Fused solid.

Specifications: Essentially white fused solid; free acid (as phthalic acid) 0.20% max.; free phenol 0.20% max.

General Information—Properties: Crystallizing point approx. 69°C.; readily soluble in ketones, esters and chlorinated hydrocarbons; solubility in alcohols, turpentine and linseed oil rather low, approx. 5.0 gm. per 100 cc. of solvent

at 25°C.; completely insoluble in water and gives increased water resistance to all compositions in which it is used.

Uses: Compatible with nitrocellulose and with the sulfonamide, phenolic, polystyrene and vinyl types of synthetic resins. In nitrocellulose lacquers produces hard coatings that have excellent gloss retention and weather resistance. Mixtures of diphenyl phthalate with either "Santolite" MS or "Santolite" MHP Industrial Resins are excellent plasticizers for nitrocellulose in odorless, flexible, adhesive coatings. Especially recommended for vinyl resins, polystyrene, ethyl cellulose and some of the natural resins such as damar.

Containers: 400-lb. fiber drums.

Shipping Classification: Resin Plasticizer.

Literature: "Monsanto Plasticizers," 80-page booklet.

"D.P. SOLUTION" LACQUER ADDITIVE

Standard Form: Liquid.

General Information—Properties: Pale straw-colored liquid; wt. per gal. 8.2 lbs.; 40% sol. in equal parts of ethyl alcohol and acetone.

Uses: An anticorrosion agent in lacquers and cotton solutions; an agent to prevent the settling of "Santocel" in flat lacquer formulations; for light and heat stabilization of vinyl chloride and vinyl copolymer resins.

Containers: 55 and 5-gal. Heresite-lined steel drums.

Shipping Classification: Chemicals NOIBN.

Literature: "D. P. Solution Suspending Agent for Santocel in Lacquers," Technical Bulletin M-90; "D.P. Solution for Use as a Stabilizer in Vinyl Resins," Technical Bulletin M-91.

**"ETHAVAN" FLAVORING AND AROMATIC
(Ethyl Vanillin)**

Molecular Weight: 166.17

Formula: CHO 

Standard Form: Fine crystalline needles.

Specifications: Fine white crystalline needles; completely soluble in ethyl alcohol 95% (1:2); ash 0.05% max.; M.P. 76.5°C. min.

Uses: A flavoring and aromatic. Has a flavor similar to that of vanillin but not identical with it. The relative flavoring strength of "Ethavan" approximates three times that of vanillin.

Containers: 100 and 25-lb. fiber drums; 5 and 1-lb. cartons.

Shipping Classification: Chemicals NOIBN.

Literature: "Ethavan," leaflet; "Something About the Senses," 32-page booklet.

ETHYL ACETATE

Molecular Weight: 88.10

Formula: $\text{CH}_3\text{COOC}_2\text{H}_5$

(Continued on next page)

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Standard Form: Liquid.

Typical Analysis: Water-white liquid; Sp. Gr. 0.899 at 15.5°C.; wt. per gal. 7.46 lbs.; ester content 92-94%; boiling range 70-80°C.; dryness, mixes with not less than 10 vols. of petroleum benzene without turbidity; acidity less than 0.02% as free acetic acid.

Uses: A nitrocellulose solvent, more active than either butyl or amyl acetate, evaporating faster with less resistance to moisture blush. Blends of all three with appropriate diluents, such as alcohols (ethyl, butyl and amyl), yield thinners and solvent mixtures of excellent cutting power and moisture resistance, good flow and leveling, and compatibility with various resins and oils. Used in the artificial leather industry and in formulating lacquers and finishes for wood, metals, textiles and paper.

Containers: 55-gal. steel drums; 5 and 1-gal. cans; tank cars; tank trucks.

Shipping Classification: Ethyl Acetate.

ETHYL ALCOHOL—190 Proof

(Also see "Mersol" Proprietary Solvent Alcohol and "Nealco" Anti-Freeze)

Molecular Weight: 46.07

Formula: C_2H_5OH

General Information—Properties: "Nealco" ethyl alcohol is manufactured by the fermentation of molasses. Offered in its pure state and in all formulas of Specially Denatured and Completely Denatured Alcohol as authorized by Federal Law under the provisions of Title III of the National Prohibition Act. Is of high uniform quality complying with the exacting specifications of the National Formulary VI and U.S.P. XI.

Grades:

1. **Tax Free:** 190 proof pure ethyl alcohol (95% by volume). May be withdrawn *Under Regulations and Provisions* by the U. S. or any governmental agency thereof, or by the several states and territories, or any municipal subdivision thereof, or by the District of Columbia, or for the use of any scientific university or college of learning, any laboratory for use exclusively in scientific research, or use in any hospital, or sanitarium, or for the use of any clinic operated for charity and not for profit, including use in the compounding of bona fide medicines for treatment outside of such clinics of patients thereof, but not for sale.

2. **Tax Paid:** 190 proof pure ethyl alcohol (95% by volume). (a) May be purchased by manufacturers and others for non-beverage use without Federal Permit or bond, but such users must sign affidavit that the alcohol so purchased is for industrial use only, as defined by Federal Alcohol Administration Regulation 2. (b) May be purchased by blenders and rectifiers. Subject to Federal Government Tax. (c) Individual state regulations apply on the purchase and use of pure Tax Paid Alcohol.

3. **Specially Denatured Alcohol:** May be withdrawn for use in a great number of specialized arts and industries. The character of the denaturant or denaturants employed is such that Specially Denatured Alcohol may be sold, possessed and used only pursuant to permit and bond approved by Internal Revenue Department, Alcohol Tax Division. All application forms covering the withdrawal of specially Denatured Alcohol may be obtained from the office of the District Supervisor, Internal Revenue Department, Alcohol Tax Division, of the district in which the purchaser's plant is located.

4. **Completely Denatured Alcohol:** 188 proof. May be withdrawn without permit or tax, but buyer must comply with certain Federal and State regulations covering records and storage.

Containers: 55 and 30-gal. nonreturnable drums; 40-lb. tank cars; 5-gal. cans.

Shipping Classification: Alcohol NOIBN or Denatured Alcohol.

Literature: "Nealco-Monsanto Industrial Alcohol," 5 page booklet.

ETHYL DI-(β -ETHANOL) AMMONIUM PHOSPHATE

Standard Form: Liquid.

General Information—Properties: Concentration 60% water solution; Sp. Gr. 1.18 (22° Bé.); pH 6.9-7.1.

Containers: 500-lb. net steel drums.

Shipping Classification: Chemicals NOIBN.

ETHYL POTASSIUM PHOSPHATE

Standard Form: Liquid.

General Information—Properties: Concentration 60% Sp. Gr. 1.39 at 25°C.; pH 7.5.

Uses: Nonflammable hydraulic fluid.

Containers: 500-lb. net steel drums.

Shipping Classification: Potassium Phosphate.

ETHYL POTASSIUM SODIUM PHOSPHATE

Molecular Weight: 186.13

Formula: $C_2H_5KNaPO_4$

Standard Form: Liquid.

Typical Analysis: P_2O_5 , 27.8%.

General Information—Properties: Essentially water-white solution; concentration 60%; Sp. Gr. 1.374 at 25°C. (38° Bé.); pH 6.9-7.4; viscosity 128 cps. at 25°C.; wt. per gal. 11.2; freezing point -50°C.

Uses: Useful as a nonflammable hydraulic fluid and humectant for air filters.

Containers: 500-lb. net steel drums.

Shipping Classification: Potassium Phosphate.

FERRIC ORTHOPHOSPHATE

Molecular Weight: 561.59

Formula: $FePO_4 \cdot Fe_3H(PO_4)_6 \cdot H_2O$

Standard Form: Powder.

General Information—Properties: Light buff-colored powder; very slightly soluble in water; more readily soluble in dilute hydrochloric acid.

Uses: Suggested as an addition agent in the fortification of foods.

Grades: Food.

Containers: 100-lb. net fiber drums.

Shipping Classification: Chemicals NOIBN.

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FERROPHOSPHORUS (Iron Phosphide)

Standard Form: Chill cast lumps, egg size, $\frac{1}{2}$ inch or less.

Typical Analysis: A gray alloy of iron and phosphorus which fractures easily; contains 23-26% phosphorus.

Uses: Used in iron and steel castings to increase fluidity; in sheet steel to prevent sticking of sheets in final rolling; in pigment to give stiffness and better surface for drawing; paint pigment.

Containers: Bulk; 500-lb. bbls.

Shipping Classification: Ferrophosphorus.

"FUNGISEAL" WOOD PRESERVATIVE*

Standard Form: Liquid.

General Information—Properties: A water-repellent toxic sealer for wood. Contains 5% pentachlorophenol supplied in various concentrations of water-resistant solids in petroleum distillate; also available as a 2-to-1 concentrate.

Uses: Preservation of plywood, crating, pontoon lumber, mah, doors and structural lumber against decay and a wide variety of wood-attacking insects and organisms; also made for use on ships and will pass BUSHIPS specifications. Does not affect the appearance of wood, is deeply penetrating and is paintable.

Containers: 5-gal. cans; 1-gal. cans (6/case); 50-gal. drums; tank cars.

Literature: Fungicidal folder; Technical Bulletin WP-3-347.

*Available only in the eleven western states.

GLUES**"LAUXEIN" CASEIN GLUE**

Standard Form: Powder.

General Information—Properties: A dry powder, only water need be added.

Uses: A water-resistant, cold-press process glue for joints, cabinet work and general woodworking.

Containers: 300, 100, 50 and 25-lb. drums.

Shipping Classification: Glue NOIBN.

Literature: Glue Book; Casein Glue folder; technical bulletins covering specific applications; Mixing Directions; Pressing Schedules.

"LAUXEIN" CASEIN-SOYBEAN BLEND GLUE

Standard Form: Powder.

General Information—Properties: A water-resistant adhesive in dry powder form. In some cases only water is added (cold-press process to be used). In other formulas the following chemicals are added: hydrated lime, caustic soda, silicate of soda, TS waterproofing agent and water. Plywood adhesive (cold-press or hot-press process may be used).

Uses: Gluing plywood and general woodworking.

Containers: 100-lb. sacks.

Shipping Classification: Glue NOIBN.

Literature: Glue Book; technical bulletins covering specific applications; Mixing Directions; Pressing Schedules.

"LAUXEIN" SOYBEAN GLUE

Standard Form: Powder.

General Information—Properties: A dry powder to which the following chemicals must be added: hydrated lime, caustic soda, silicate of soda, TS waterproofing agent and water.

Uses: Excellent plywood adhesive; also used for insulation board laminating, etc. Water resistant. Either cold-press or hot-press processes may be used.

Containers: 100-lb. sacks.

Shipping Classification: Glue NOIBN.

Literature: Glue Book; technical bulletins covering specific applications; Mixing Directions; Pressing Schedules.

"LAUXITE" MELAMINE RESIN ADHESIVE

Standard Form: Powder.

General Information—Properties: A waterproof, boil-proof, fungus-proof, weather-resistant adhesive which forms a colorless glue line and is stainless.

Uses: Bonding all woods where exterior exposure must be satisfactory. Water and hardener to be added in both hot-press or warm-temperature setting processes. Also used in combination with hot-press urea resin adhesive to fortify the urea glue and improve its durability.

Containers: Drums.

Shipping Classification: Glue NOIBN.

Literature: Glue Book; technical bulletins covering specific applications; Mixing Directions; Pressing Schedules.

"LAUXITE" PHENOLIC RESIN ADHESIVES

Standard Form: Powder or liquid.

General Information—Properties: Waterproof, boil-proof, fungus-proof and weather-resistant adhesives which are also resistant to salt water. Powder form (only water to be added) and liquid form ready for use. Hot-press process for both forms.

Uses: In plywood manufacture for aircraft, boats and exterior exposure.

Containers: 50-gal. drums; tank cars.

Shipping Classification: Glue NOIBN.

Literature: Glue Book; technical bulletins covering specific applications; Mixing Directions; Pressing Schedules.

"LAUXITE" RESORCINOL RESIN ADHESIVES

Standard Form: Liquid.

General Information—Properties: Room-temperature-setting, waterproof, boil-proof, fungus-proof, and weather-resistant adhesives which are resistant to salt water. Comes in liquid form to which hardener must be added. Used for wood gluing where joints must stand exterior exposure or continuous soaking.

Containers: 50 and 5-gal. drums; tank cars.

Shipping Classification: Glue NOIBN.

Literature: Glue Book; technical bulletins covering specific applications; Mixing Directions; Pressing Schedules.

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"LAUXITE" UREA RESIN ADHESIVES**Standard Form:** Powder or liquid.**Unextended,** these adhesives are water-resistant and fungus-proof on most constructions, forming a colorless glue line.1. **Hot-press process:**

- Powder form, no catalyst, only water to be added. Also in liquid form requiring hardener to be added.
- May be fortified with melamine resin which must be added separately, making it boil-resistant and waterproof while retaining its fungus-proof quality

2. **Cold-setting process:**

- Powder form, only water to be added.
- Liquid form, only hardener to be added.

Extended with flour or amylaceous materials, these adhesives are water-resistant.1. **Hot-press process:**

- Powder form; water, flour and catalyst added separately.
- Liquid form; water, flour and catalyst added separately.

2. **Cold-press process:**

- Powder form; water, flour and catalyst added separately.
- Liquid form; water, flour and catalyst added separately.

Uses: Unextended

Hot-press unfortified: For plywood manufacture requiring finest adhesion and no staining of plies. Fortified: For aircraft and similar high-grade plywood. Cold-setting: General wood gluing.

Extended

Hot-press: For furniture plywood.

Cold-press: For furniture plywood, and joint and assembly gluing.

Containers:

Powder form—250-lb. drums; 50-lb. bags.

Liquid form—50-gal. drums; tank cars.

Shipping Classification: Glue NOIBN.**Literature:** Glue Book; technical bulletins covering specific applications; Lauxite Urea Resin Book; Mixing Directions; Pressing Schedules.**LIQUID, READY-TO-USE GENERAL PURPOSE GLUE (No. 2805)****Standard Form:** Cream-colored liquid.**General Information—Properties:** Ready-to-use in cold-press gluing for joint assembly. No mixing is required. Adhesive 2805 will not harden in the pot and may be used in joint assembly operations where pressing times as low as one hour are required. It is recommended for use wherever water resistance is not required. A low cost adhesive whose bonds are unaffected by humidity changes. Can be diluted with water for use as a carton sealer.**Uses:** Joint gluing; bonding paper, cloth or other material to wood.**Containers:** 500-lb. Amercoated drums; 15-gal. paraffin-coated fiber drums; 5-gal. Amercoated cans; 1-gal. glass jars.**Shipping Classification:** Glue NOIBN.**GLYCEROPHOSPHATES**

The glycerophosphates are a group of products containing the glycerophosphate radical and may be used advantageously to carry such important elements as calcium, iron, magnesium, manganese, potassium and sodium in the formulation of pharmaceutical preparations.

GLUES**GLYCEROPHOSPHATE, CALCIUM, N. F.****Molecular Weight:** 210.15**Formula:** $\text{Ca}_3\text{C}_2\text{H}_4(\text{OH})_2\text{P}_2\text{O}_8$ **Standard Form:** Powder, 80 mesh.**Specifications:** Fine white powder; assay (dry basis) 98.0% min.; loss on drying at 130°C. 12.0% max.; solubility: water (1:50) complete at 25°C.; chloride (as CaCl_2) 0.1% max.; sulfate (as CaSO_4) 0.68% max.; free phosphate (P_2O_5) 0.02% max.; conforms to N.F. test for heavy metal 3.0% max. retained on 80 mesh; 5.0% max. on 100 mesh.**Containers:** 200 and 100-lb. fiber drums; 25-lb. boxes.**Shipping Classification:** Chemicals NOIBN.**GLYCEROPHOSPHATE, FERRIC, N. F.****Molecular Weight:** 621.90**Formula:** $\text{Fe}_2[\text{C}_2\text{H}_4(\text{OH})_2\text{P}_2\text{O}_8]_3$ **Standard Form:** Powder.**Specifications:** Buff or yellowish-green powder; assay (dry basis) 17.0% Fe min.; moisture 11.0% max.; chloride (as FeCl_3) 0.10% max.; sulfate (as $\text{Fe}_2(\text{SO}_4)_3$) 0.20% max.; free phosphate (as P_2O_5) 0.20% max.; 2.0% max. retained on 60 mesh; 10.0% max. on 140 mesh; 30.0% max. on 230 mesh.**Containers:** 200 and 100-lb. fiber drums; 25-lb. boxes; 5-lb. cartons.**Shipping Classification:** Chemicals NOIBN.**GLYCEROPHOSPHATE, MAGNESIUM****Molecular Weight:** 194.39**Formula:** $\text{MgC}_2\text{H}_4(\text{OH})_2\text{P}_2\text{O}_8$ **Standard Form:** Powder, 80 mesh.**Specifications:** White powder; assay (dry basis) 97.0% min.; moisture 12.5% max.; calcium (as CaCl_2) 0.30% max.; chloride (as MgCl_2) 0.10% max.; sulfate (as MgSO_4) 0.10% max.; free phosphate (as P_2O_5) 0.20% max.; 2.0% max. retained on 60 mesh; 4.0% max. on 80 mesh; 10.0% max. on 140 mesh.**Containers:** 200 and 100-lb. fiber drums; 25-lb. boxes; 5-lb. cartons.**Shipping Classification:** Chemicals NOIBN.**GLYCEROPHOSPHATE, MANGANESE, N. F.****Molecular Weight:** 225.00**Formula:** $\text{MnC}_2\text{H}_4(\text{OH})_2\text{P}_2\text{O}_8$ **Standard Form:** Powder, 80 mesh.**Specifications:** Pinkish-white powder; assay (dry basis) 98.0% min.; solubility in 25% citric acid solution (1:5) complete; moisture 11.0% max.; chloride (as MnCl_2) 0.15% max.; sulfate (as MnSO_4) 0.25% max.; free phosphate (P_2O_5) 0.20% max.; conforms to N.F. test for heavy metal 2.0% max. retained on 60 mesh; 4.0% max. on 80 mesh; 10.0% max. on 140 mesh.**Containers:** 200 and 100-lb. fiber drums; 25-lb. boxes; 5-lb. cartons.**Shipping Classification:** Chemicals NOIBN.**GLYCEROPHOSPHATE, POTASSIUM (Solution)****Formula:** $\text{K}_2\text{C}_2\text{H}_4(\text{OH})_2\text{P}_2\text{O}_8$ **Standard Form:** Liquid.

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Specifications: Clear, colorless or slightly yellowish 75% solution; assay 61.6–63.2% anhydrous salt; carbonate (as K_2CO_3) 0.50% max.; chloride (as KCl) 0.10% max.; sulfate (as K_2SO_4) 0.20% max.; free phosphate (as P_2O_5) 0.20% max.

Containers: 50-lb. drums.

Shipping Classification: Chemicals NOIBN.

GLYCEROPHOSPHATE, SODIUM (Solution)

Formula: $\text{Na}_2\text{C}_2\text{H}_4(\text{OH})_2\text{PO}_4$

Standard Form: Liquid.

Specifications: Clear, colorless or slightly yellow 75% solution; assay 50.0–52.0% anhydrous salt; carbonate (as Na_2CO_3) 0.50% max.; chloride (as NaCl) 0.10% max.; sulfate (as Na_2SO_4) 0.20% max.; free phosphate (as P_2O_5) 0.15% max.

Containers: 50-lb. drums.

Shipping Classification: Chemicals NOIBN.

GLYCEROPHOSPHATE, SODIUM, N.F.

Molecular Weight: 216.06

Formula: $\text{Na}_2\text{C}_2\text{H}_4(\text{OH})_2\text{PO}_4$

Standard Form: Crystalline solid.

Specifications: White crystals or powder; assay 68.0–72.0% anhydrous salt (equivalent to 96.4–104.9% hydrated salt); solubility in water 1:10 (complete); chloride (as NaCl) 0.05% max.; free phosphate (as P_2O_5) 0.02% max.; conforms to N.F. test for heavy metals and sulfate (as Na_2SO_4).

Grades: Crystals or powder.

Containers: 200 and 100-lb. fiber drums; 25-lb. boxes.

Shipping Classification: Chemicals NOIBN.

GLYCEROPHOSPHORIC ACID (Solution)

Formula: $\text{H}-\text{C}_2\text{H}_4(\text{OH})_2\text{PO}_4$

Standard Form: Liquid (35% solution).

Specifications: Clear, colorless liquid; APHA 30 max.; assay 35.0–36.0%; chloride (as CaCl_2) 0.15% max.; sulfate (as CaSO_4) 0.30% max.; calcium (as CaO) 0.35% max.; free phosphate (as P_2O_5) 0.50% max.

General Information—Properties: In the case of the less volatile salts, such as calcium, iron, magnesium and manganese glycerophosphates, solubility of these products may be materially increased if formulated with glycerophosphoric acid or certain accepted acids, such as lactic, citric and tartaric.

Containers: 5-gal. carboys.

Shipping Classification: Acid NOIBN Liquid.

H ACID

(8-Amino-1-naphthal-3,6-sodium Acid Disulfonate)

Molecular Weight: 341.29

Formula: NH_2OH

HSO_3Na SO_3Na

Standard Form: Powder.

Typical Analysis: Gray powder; 86–88% monosodium salt; trace of NaCl and Na_2SO_4 ; solubility in water complete.

Uses: An intermediate in the manufacture of dyestuffs.

Containers: 100-lb. bags.

Shipping Classification: Dye intermediate NOIBN.

"HB-40" PARTIALLY HYDROGENATED TERPHENYL

Standard Form: Liquid.

General Information—Properties: A clear, mobile, high-boiling hydrocarbon; almost colorless, only liquid with faint, pleasant odor; density 1.004 ± 0.003 at 25° 15.6°C ; wt. per gal. 8.37 (average); refractive index 1.5675 ± 0.0075 at 25°C ; distillation range 338–396 $^\circ\text{C}$. (640–745 $^\circ\text{F}$) (corr.); flash point $345 \pm 10^\circ\text{F}$; flame point $385 \pm 10^\circ\text{F}$; pour point minus $28 \pm 2^\circ\text{C}$. (-18°F); insoluble in water; miscible in all proportions at room temperature with a number of solvents and oils; viscosity 144 ± 20 SUS at 100°F , 39 ± 1 at 210°F .

Uses: Low cost secondary plasticizers for vinyl sheeting, free films and vinyl fabric or paper coatings. Plasticizer for vinyl protective coatings and adhesives. Used to plasticize vinyl profile extrusions, tubing, wire coating and injection and slush molding compounds made from vinyl resins. Plasticizer for styrene water dispersion paints, paper coatings, adhesives and styrene casting resins.

Containers: Tank cars; 400-lb. drums.

Shipping Classification: Resin Plasticizer.

Literature: "HB-40," Technical Bulletin P-104.

"HIBITITE" ACID INHIBITOR

Standard Form: Powder.

General Information—Properties: Derivative of an organic base; reddish-brown powder; soluble in concentrated sulfuric and hydrochloric acids. (For steel pickling acid containing "Hibitite," see Inhibited Acids.)

Uses: Widely used in acids for pickling and cleaning ferrous metals. Protects the metal by inhibiting the attack of the acid and by reducing the possibility of embrittlement from hydrogen penetration. Sulfuric acid containing "Hibitite" is used for pickling tin plate, wire, alloy steels, sheets for galvanizing; cleaning steel drums and sand filters; preparing articles for vitreous enameling; removing metal coatings.

Hydrochloric acid containing "Hibitite" is used for cleaning boilers, economizers, heat exchangers, pipe lines, condensers, tanks, tubes, coils, screens, pans, drums and similar equipment.

Containers: 300 and 75-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Hibitite Acid—Pickling Inhibitor," Technical Bulletin O-59; "Hibitite and Its Uses," bulletin.

"HI-GLOSS REZ" INTERIOR LUSTER WOOD FINISH

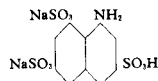
General Information—Properties: A clear, synthetic resin for high-gloss interior wood finish. Useful over "Rez" or "White Rez" treated surfaces to provide high luster finish; or deluxe satin finish when rubbed with pumice and oil. Comes ready-to-use for brush application. One gallon covers approximately 300 to 400 sq. ft.

Containers: 5-gal. cans; 1-gal. cans (4 case); 1-qt. cans (12 case); 1-pt. cans (24 case).

Shipping Classification: Wood Filler Liquid.

Literature: "Hi-Gloss Rez," folder; "Monsanto Wood Finishes for Home Decoration," 8-page booklet.

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HYDROCHLORIC ACID (Muriatic Acid)**Molecular Weight:** 36.47**Formula:** HCl**Standard Form:** Liquid.**Typical Analysis:** 18°Bé., 27.9% HCl; 20°Bé., 31.5% HCl; 22°Bé., 35.2% HCl.**Uses:** Used extensively in the starch, glucose, gelatin, steel galvanizing, paper, leather and glass industries. (See table in general data section.)**Grades:** 18°Bé.; 20°Bé.; 22°Bé.**Containers:** 13-gal. carboys; 13-gal. rubber drums; 900 to 2,200-gal. net tank trucks; 30 to 40-ton tank cars.**Shipping Classification:** Muriatic Acid.**2-HYDROXY-3-METHOXYBENZALDEHYDE, TECHNICAL (Also known as ortho-vanillin)****Molecular Weight:** 152.14**Formula:** CHO**Standard Form:** Crystalline solid.**Specifications:** Yellowish crystalline solid; crystallizing point 40.0°C. min.**Uses:** An intermediate in chemical synthesis.**Containers:** 225 and 50-lb. drums.**Shipping Classification:** Chemicals NOIBN.**INHIBITED ACIDS****Standard Form:** Liquid.**General Information—Properties:** Addition of "Hibitite" to sulfuric and hydrochloric acids results in a decreased rate of attack of the acid but does not retard action of acid on surface scale.**Uses:** Inhibited sulfuric acid is used for pickling tin plate stock; pickling sheets for galvanizing; preparing articles for vitreous enameling; pickling wire and high carbon steel; removing metal coatings; cleaning steel drums; cleaning sand filters. Inhibited hydrochloric acid is used for pickling alloy wire; cleaning boiler tubes, condensers, pipes, heater coils and drums.**Grades:** Solutions of "Hibitite" in Monsanto's commercial grades of 60°Bé. sulfuric acid, 66°Bé. sulfuric acid, 18°Bé. hydrochloric acid, 22°Bé. hydrochloric acid and 20°Bé. hydrochloric acid.**"INSOLUBLE SULFUR 60"****Standard Form:** Powder.**Specifications:** 100% through 50 mesh; heat loss not over 1.4%; CS₂ insoluble not less than 50.0%.**Uses:** Curing agent; in the rubber industry replaces regular sulfur where blooming of the raw stock is undesirable.**Containers:** 100-lb. paper bags.**Shipping Classification:** Sulfur Ground.**Literature:** "Monsanto Chemicals for the Rubber Industry," 48-page booklet.**KOCH ACID****(1-naphthylamine-3,6,8-trisulfonic acid, disodium salt)****Molecular Weight:** 427**Formula:****Standard Form:** Powder.**Typical Analysis:** 85-90% disodium salt.**Uses:** An intermediate in the manufacture of dyestuffs.**Containers:** 100-lb. bags.**Literature:** "Koch Acid," Technical Bulletin M-101.**LAMPBLACK****Standard Form:** Powder.**Typical Analysis:**

GRADE	FREE CARBON	% ABSORPTION	TINTING STRENGTH*	UNDER TONE	TOP TONE
#1	99.57	1.14	238	Blue	Black
AA	87.97	1.65	225	Blue-Black	Brown-Black
#2	99.42	1.32	208	Blue	Gray-Black
#8	91.71	1.54	205	Blue	Brown-Black
S-100	93.98	1.55	170	Blue	Black
BTA	95.57	1.50	160	Blue	Blue-Black
B-5	96.22	1.43	140	Blue	Blue-Black
#10	99.29	1.10	100	Blue-Gray	Gray-Black

*NOTE: The figures in the column TINTING STRENGTH are relative values using No. 10 Lampblack as a standard. For example: A value of 225 for tinting strength of A Lampblack means that this black is 2 1/4 times as intense as No. 10 Lampblack.

Uses: Pigment in paints, varnishes, enamels, inks, leather finishes, stencils, crayons, polishes; in pressed forms as electrical conductors and electrodes.**Containers:** Cartons.**Shipping Classification:** Lampblack NOIBN when wt. per cu. ft. is under 17 lbs.; Lampblack Compressed when wt. per cu. ft. is 17 lbs. or over.**Literature:** "Monsanto Bear Lampblack," 12-page booklet.**"LAUXTOL" A, WOOD PRESERVATIVE****Standard Form:** Liquid.**General Information—Properties:** A 5% oil solution pentachlorophenol. Furnished either in a ready-to-use form or in a 10-to-1 concentrate.**Uses:** Protects wood against termites, Lyctus (powder-pole) beetles, decay and a wide range of other wood-attacking insects and organisms. Used for the preservation of telephone poles, fence posts and lumber. This preservative irritating to the skin and mucous membranes if sufficient contact is allowed. The precautions for handling appear on labels and should be observed.

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Grades: 10-10-1 Concentrate and Ready-to-Use.

Containers: 5-gal. cans, 1-gal. cans (6 case); tank cars; 50-gal. drums.

Literature: "Lauxtol A," folder; Technical Bulletins WP-1-4* and WP-2-847.

*Available only in the eleven western states.

AD METAPHOSPHATE

Molecular Weight: 365.17

Formula: $Pb(PO_3)_2$

Standard Form: Powder or granules.

General Information—Properties: Dense white powder or granular material; M.P. approx. 700 °C.; very slightly soluble in water.

Uses: As raw material for lead-bearing phosphate glasses, etc.

Containers: 100-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

AD ORTHOPHOSPHATE, DI

Molecular Weight: 303.20

Formula: $PbHPO_4$

Standard Form: Powder.

General Information—Properties: White non-hygroscopic powder; soluble in acids; hydrolyzes in water to form a more basic lead phosphate.

Shipping Classification: Chemicals NOIBN.

AD ORTHOPHOSPHATE, MONO

Molecular Weight: 401.20

Formula: $Pb(H_2PO_4)_2$

Standard Form: Powder.

General Information—Properties: White hygroscopic powder; soluble in acid; hydrolyzes in water to form a more basic phosphate.

Uses: Primer pigment in vinyl-chloride coatings.

Shipping Classification: Chemicals NOIBN.

AD ORTHOPHOSPHATE, TRI

Molecular Weight: 811.59

Formula: Essentially $Pb_3(PO_4)_2$

Typical Analysis: PbO , 81.8%; P_2O_5 , 18.0%; H_2O , 0.2%.

General Information—Properties: White, dense microcrystalline powder; insoluble in water.

Uses: Suggested as a pigment.

Containers: 100-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

AD PYROPHOSPHATE, DI

Molecular Weight: 588.38

Formula: $Pb_2P_2O_7$

Standard Form: Powder.

General Information—Properties: White powder; insoluble in water. Has a high index of refraction and good hiding properties. Paints prepared from it give a very white dried film, which is quite desirable since most lead pigments tend to produce yellowing in the dried film.

Uses: Suggested as a pigment for white paints in vinyl coatings.

Containers: 100-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

LITHIUM METAPHOSPHATE

Molecular Weight: 85.92

Formula: $LiPO_3$

Standard Form: Granular powder.

General Information—Properties: White granular powder; insoluble in water.

Uses: Suggested for special glass or ceramic composition.

Shipping Classification: Chemicals NOIBN.

MAGNESIUM AMMONIUM PHOSPHATE

(Also known as magnesium ammonium orthophosphate)

Molecular Weight: 245.44

Formula: $MgNH_4PO_4 \cdot 6H_2O$

Standard Form: Powder.

Typical Analysis: P_2O_5 , 28.5%; MgO , 16.8%; NH_3 , 6.9%; ignition loss 54.5%; 99.5% on 100 mesh.

General Information—Properties: A hexahydrate and a monohydrate form exist. At ordinary temperatures dissociation of the hexahydrate to the monohydrate takes place without appreciable loss of ammonia. Above 60 °C. the monohydrate loses NH_3 , forming $MgHPO_4 \cdot H_2O$. Soluble in acids; insoluble in water; decomposes on heating.

Uses: An ingredient in fire-retarding paints for theater scenery and curtains; on brattice cloths in mines.

Grades: Technical.

Containers: 200-lb. net bbls.; 100-lb. net kegs.

Shipping Classification: Magnesium Phosphate.

MAGNESIUM METAPHOSPHATE

Molecular Weight: 182.28

Formula: $Mg(PO_3)_2$

Standard Form: Crystalline powder.

General Information—Properties: White crystalline powder; insoluble in water.

Uses: Suggested as a constituent of glass, glazes and porcelain enamels.

Shipping Classification: Magnesium Phosphate.

MAGNESIUM PHOSPHATE, DI

Molecular Weight: 174.36

Formula: $MgHPO_4 \cdot 3H_2O$

Standard Form: Crystals.

General Information—Properties: White crystals; soluble in acids; slightly soluble in water.

(Continued on next page)

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Uses: Suggested as an opacifying agent for enamels and frits.

Containers: 300-lb. bbls.; 100-lb. kegs.

Shipping Classification: Magnesium Phosphate.

MAGNESIUM PHOSPHATE, MONO

(Also known as magnesium phosphate, monobasic; acid magnesium phosphate; magnesium tetrahydrogen phosphate; magnesium biphosphate)

Formula: $MgH_2(PO_4)_2 \cdot 4H_2O$

Standard Form: Crystals.

Typical Analysis: P_2O_5 , 48.56%; MgO , 14.74%; ignition loss 36.81%.

Uses: Pharmaceutical preparations.

Grades: Technical.

Containers: 300-lb. net bbls.; 100-lb. net kegs.

Shipping Classification: Magnesium Phosphate.

MAGNESIUM PHOSPHATE, TRI

(Also known as neutral magnesium phosphate)

Molecular Weight: 334.98

Formula: $Mg_3(PO_4)_2 \cdot 4H_2O$

Standard Form: Crystalline powder.

Typical Analysis: P_2O_5 , 40.41%; MgO , 31.12%.

Uses: An antacid in pharmaceutical products.

Grades: Technical. Also available as octahydrate where better flow characteristics are desired.

Containers: 100-lb. bbls.

Shipping Classification: Magnesium Phosphate.

MAGNESIUM PYROPHOSPHATE, DI

Molecular Weight: 222.60

Formula: $Mg_2P_2O_7$

Standard Form: Crystalline powder.

General Information—Properties: White crystalline powder; M.P. 1,383°C.; soluble in acids; insoluble in water.

Uses: Suggested for use in ceramic industry as constituent of porcelains and enamels.

Shipping Classification: Magnesium Phosphate.

MALEIC ANHYDRIDE

Molecular Weight: 98.06

Formula:



Standard Form: Flakes, briquettes or cast solid.

Specifications: White flakes, fused mass or briquettes; crystallizing point 52.0°C. min.; water solution (4 gms. in

MONSANTO

10 ml) clear and colorless; glyceromaleate resin, clear slight amber color; iron 0.0005% max.

Uses: Used alone or in combination with other acids in manufacture of alkyl-type resins; a versatile intermediate for chemical synthesis.

Grades: Briquettes, fused mass, flakes.

Containers: Flakes—175-lb. fiber drums; fused mass—175 gal. drums (575-lbs. net); briquettes—200-lb. fiber drum

Shipping Classification: Maleic Anhydride.

"MERCLOR" SODIUM HYPOCHLORITE

Molecular Weight: 74.45

Formula: $NaOCl$

Standard Form: Liquid.

Typical Analysis: 22° Bé.; 12% available chlorine by volume.

Uses: Oxidizing agent for bleaching of vegetable fibers; chlorinating agent for water, organic compounds and wood (See table in general data section.)

Containers: 13 and 5-gal. carboys; tank truck 11,000 lb. net, 5,000 lbs. net.

Shipping Classification: Sodium Hypochlorite Solution.

"MERLON" TEXTILE PROCESSING AND FINISHING AGENTS

Textile chemicals recommended for processing and finishing textile fibers and fabrics.

"MERLON" BR

"MERLON" BRS

Standard Form: Liquid.

General Information—Properties: 50% plasticized polyvinyl-butyl resins dispersed in water; color, milky white; Sp. Gr. 1.01–1.03; pH 9.0–10.0; freely dispersible in water. **Containers:** 55-gal. nonreturnable drums; galvanized iron drums; 5-gal. cans.

Shipping Classification: Chemicals NOIBN.

Literature: "Merlon BR and BRS," Technical Bulletin T-16.

"MERLON" KR-1

"MERLON" KR-2

"MERLON" KR-3

"MERLON" KR-4

"MERLON" KR-5

Standard Form: Liquids.

General Information—Properties: Unplasticized polyvinyl-acetate resins dispersed in water; color, milky white; freely dispersible in water; pH 3.5–6.0.

Containers: 55 and 5-gal. nonreturnable drums; 10-gal. wooden bbls.

Shipping Classification: Synthetic Resin NOIBN Without Filler.

Literature: "Merlon KR," Technical Bulletin T-16.

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"MERLON" S

Standard Form: Liquid.

General Information—Properties: 40% unplasticized polystyrene resin dispersed in water; color, milky white; pH 8-9; Sp. Gr. 1.03; freely dispersible in water.

Containers: 55 and 5-gal. nonreturnable drums; 10-gal. wooden bbls.

Shipping Classification: Chemicals NOIBN.

Literature: "Merlon S and SP," Technical Bulletin T-15.

"MERLON" SP

Standard Form: Liquid.

General Information—Properties: 40% plasticized polystyrene resin dispersed in water; color, milky white; pH 8.0-9.0; Sp. Gr. 1.04; freely dispersible in water.

Containers: 55 and 5-gal. wooden bbls.

Shipping Classification: Chemicals NOIBN.

Literature: "Merlon S and SP," Technical Bulletin T-15.

"MERSIZE" PAPER SIZING AGENT

Standard Form: Liquid and paste.

General Information: "Mersize" CD-2, a 50% solids solution; "Mersize" RM, a 70% solids paste size with "Mersize" resin incorporated into a paste size.

Uses: "Mersize" CD-2 is used in paper manufacture with rosin size to reduce sizing costs, improve resistance to ink, water and other aqueous solutions, give better feathering resistance and more uniform, dependable sizing. "Mersize" RM is an economical and convenient form in which the "Mersize" solids to rosin size solids ratio is the recommended 3 to 1, thus permitting the use of a single product.

Containers: 500-lb. steel drums, tank cars.

Shipping Classification: Rosin Sizing NOIBN.

Literature: "Better Sizing at Low Cost with Mersize CD-2," 12-page booklet.

"MERSOL" PROPRIETARY SOLVENT ALCOHOL

Standard Form: Liquid.

Specifications: Composition: Alcohol, Special Denatured No. 1, 100 gals.; ethyl acetate, denatured with methyl isobutyl ketone, 5 gals.; gasoline, 1 gal.

Typical Analysis: Water-white liquid; Sp. Gr. 0.8146 max. at 60°/60°F.; nonresidual; distillation range 74-80°C.; acidity less than 0.005% as acetic acid.

General Information—Properties: A proprietary solvent alcohol formulated to have the advantages of Special Denatured Alcohol No. 1 without the necessity and burden of purchasing and operating under a government permit. Has the mild odor of alcohol and no residue.

Uses: May be used for most industrial purposes where SDA No. 1 is indicated; solvent for shellac and soft manila gums; lacquer thinners, cleaners, removers, polishes, dressings, inks, adhesives, celluloid, softeners, brighteners; fuel and dye and stain solvent.

Containers: 55-gal. steel drums; tank trucks; tank cars; 5-gal. cans.

Shipping Classification: Denatured Alcohol Solvent.

Literature: "Nealco-Monsanto Industrial Alcohol," 52-page booklet.

"MERTANOL" SYNTHETIC TANNING AGENT

Standard Form: Liquid or solid.

Typical Analysis:

	DENSITY	SULFONIC ACID EQUIVALENT	TOTAL SOLIDS
"Mertanol" L	10.1 lb./gal.	approx. 5% H ₂ SO ₄	46
"Mertanol" 7L	10.15 lbs./gal.	Neutral (pH 6-8)	49
"Mertanol" 7P	9.7 lbs./gal.	Neutral (pH 6-8)	40
"Mertanol" 7AN	25 lb./cu. ft.	Neutral (pH 6-8)	95

General Information—Properties: Synthetic tanning agent consisting of a naphthalenesulfonic acid condensation product in liquid and dry forms. The free sulfonic acid acidity has been completely neutralized and the sulfonic acidity neutralized to a definite degree.

Uses: Highly recommended for use in paper mills as a beater additive to eliminate or control pitch troubles, especially in mills where ground wood or unbleached sulfate pulps are used. Pitch is troublesome only when it begins to accumulate in the beaters, on the screens, Fourdrinier wires, cylinder molds, press rolls, drying cans, felts, etc. Such accumulations cause spots in the paper, plugging of the screens and wire, and sticking of the wet paper web to the press rolls and drying cans. Any one of these necessitate a shutdown to clean up the equipment affected. Pitch trouble may develop in all types of wood pulp but it is more prevalent with unbleached sulfate. The effectiveness of "Mertanol" appears to be due to a dispersing action on the pitch as well as the formation of a less sticky particle when precipitation occurs with the addition of alum. It is also helpful as a beater additive when glue is used in the finish and as a mordant for dyestuffs when paper is to be finished in a color. "Mertanol" serves to disperse pitch-forming organisms and makes possible an appreciable reduction in pitch-control measures. "Mertanol" 7P and 7AN are recommended.

Used in bleaching of chrome-tanned stock for making white leather; bleaching base stock for pastel leathers; pretanning pickled stock before regular tan to maintain a lighter colored leather throughout the tanning; vegetable tanning as an aid to penetration of the extracts and solubilization of non-tans; dyeing to give level dyeing and increased penetration of the dye; mordant for basic dyes in the dyeing of chrome-tanned and other leathers. "Mertanol" L, 7L and 7AN are recommended.

Grades: "Mertanol" L—liquid; "Mertanol" 7L—liquid; "Mertanol" 7P—liquid; "Mertanol" 7AN—solid.

Containers: Liquids—500-lb. tight wooden bbls. Solids—175-lb. fiber drums.

Shipping Classification: Extract Tanning NOIBN Liquid or Dry.

Literature: "Mertanol for the Leather Industry," mimeographed bulletin; "Monsanto Mertanol for Pitch Control," 7-page booklet.

"MERTONE" WB-2 PRECOAT FOR PAPER

Standard Form: Liquid.

General Information—Properties: A 15% colloidal dispersion of silica in water; odorless.

(Continued on next page)

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Uses: As a precoat on blueprint and other reproduction papers for clearer, more legible prints. On blueprint a darker, more lively blue is obtained. Also used on diazo paper, blueprint cloth, negative paper and Van Dyke paper. Precoating is performed by coaters. A license from Monsanto is required to employ the silica precoat process which uses "Mertone."

Containers: 55-gal. lined steel drums.

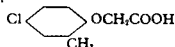
Shipping Classification: Chemicals NOIBN.

Literature: "Mertone WB-2, a Quality Building Precoat for Blueprint Paper," 8-page booklet.

2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCP)

Molecular Weight: 200.62

Formula:



Standard Form: Coarse powder.

General Information—Properties: Light tan, granular powder; assay approx. 60% 2,4-isomer, 35% other chloro-2-methylphenoxyacetic acids.

Uses: Possesses herbicidal properties similar to 2,4-D. However, specificity and tolerance may be different in some crops and on certain weeds.

Containers: Fiber drums.

Shipping Classification: Weed Killing Compound NOIBN—Rail; Agricultural Herbicide NOIBN—Other Than Liquid—Truck.

Literature: Technical Data Sheet.

METHYL SODIUM PHOSPHATE

(Mixture of Monomethyl Disodium Phosphate and Dimethyl Monosodium Phosphate)

Standard Form: Liquid.

General Information—Properties: Water-white liquid; concentration 60%; pH 6.9-7.2; Sp. Gr. 1.361-1.364 at 25°C.

Shipping Classification: Chemicals NOIBN.

METHYL para-TOLUENESULFONATE

Molecular Weight: 186.22

Formula: SO₃OCH₃



Standard Form: Crystalline solid or liquid.

Specifications: Crystallizing point 26°C. min.; color APHA 80 max.; chlorine (as Cl) 0.01% max.; acidity (as toluenesulfonic acid) 0.01% max.; Sp. Gr. at 25°/25°C. (supercooled liquid) 1.225-1.227; assay 99% min.

Uses: Dye intermediate, alkylating agent. Catalyst for alkyl and other organic ester preparations, photographic chemicals and pharmaceutical intermediates.

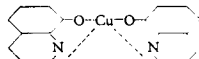
Containers: 500-lb. net, steel drums.

Shipping Classification: Dye Intermediate NOIBN.

"MILMER" 1 FUNGICIDE (Copper 8-Quinolinate, Technical)

Molecular Weight: 351.87

Formula:



Standard Form: Powder.

Specifications: Yellowish-green powder; assay 90% min. (by copper determination); moisture 1.0% max.

General Information—Properties: Very stable and non-hygroscopic; insoluble in water and organic solvents. Possesses strong fungistat properties, but it is relatively non-toxic to higher animals.

Uses: Fungistat to protect fabrics, leather and protective coating materials against organism attack.

Containers: 50-lb. fiber drums.

Shipping Classification: Fungicide Agricultural, NOIBN Other Than Liquid.

Literature: "Milmer 1," Technical Bulletin O-38; "Methods for Determining Copper 8-Quinolinate in Fabrics," Technical Bulletin O-42.

"MONSANTO AE-1" HIGH MOLECULAR WEIGHT ESTER ALCOHOL

Standard Form: Liquid.

General Information—Properties: A light brown, oily, high molecular weight alcohol.

Viscosity: 442.3 centistokes at 30°C. (86°F.)
265.6 centistokes at 37.78°C. (100°F.)
19.1 centistokes at 98.89°C. (210°F.)

Density: 25°/25°C.—0.9971

Flash Point: (ASTM, D-92-33)—157°C. (314.6°F.)

Fire Point: (ASTM, D-92-33)—209°C. (408.2°F.)

Vapor Pressure:	Temp. °C.	V. P. (MM)
	224	14.6
	235	18.6
	272	61.9
	290	98.6
	313	116.2

The reactions of "Monsanto AE-1" are typical of any aliphatic alcohol. The compound contains an ester linkage and the possibility of trans-esterification is ever present when acids or alcohols are in the zone of reaction. Insoluble in water, ethylene glycol and lower alcohols, soluble in aromatic and aliphatic hydrocarbons, chlorinated hydrocarbons, ketones and ethers.

Uses: Plasticizer for rubber hydrochloride, chlorinated rubber and styrene-butadiene copolymers. Plasticizers for urea-formaldehyde resins and aminoplast-alkyd systems. It is useful as a defoaming agent in yeast production and to control foam in a variety of industrial applications.

Containers: 400-lb. drums.

Shipping Classification: Alcohol NOIBN.

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Literature: "Monsanto AE-1," Technical Bulletin No. P-140.

MONSANTO DETERGENT MXP"

General Information—Properties: Non-dusty, pulverent, built detergent based on a non-ionic synthetic wetting agent.

Uses: A highly efficient detergent with controlled sudsing action. Especially applicable where minimum suds are required. Since it is built with water-softening chemicals it is effective in either hard or soft water.

Containers: 100-lb. bags; 375-lb. bbls.; 100-lb. drums.

Shipping Classification: Washing Compound NOIBN Powder.

Literature: "Monsanto Detergent MXP," Technical Bulletin P-122.

MONSANTO EMULSIFIERS H, L, M AND R"

Standard Form: Liquid and paste materials.

General Information—Properties: These emulsifying agents were designed especially to meet the growing demands for more efficient emulsifiers in the agriculture field.

Uses: To produce emulsifiable concentrates and concentrated emulsions of insecticide and herbicide formulations.

Containers: Steel drums.

Shipping Classification: Washing Compound NOIBN.

Literature: "Monsanto Emulsifiers and Wetting Agents for Herbicide and Insecticidal Formulations," Technical Bulletin P-142.

MONSANTO FIRE RETARDANT A"

General Information—Properties: A substantially neutral mixture of ammonium phosphates containing a wetting agent to improve penetration.

Uses: Flame-retardant treatment of wood and paper.

Containers: 100-lb. bags; 300 and 150-lb. drums.

Shipping Classification: Ammonium Phosphate.

Literature: "Monsanto Fire Retardant A," Technical Bulletin P-29.

MONSANTO FIRE RETARDANT B"

General Information—Properties: An alkaline mixture of flame-retarding chemicals to give proper balance to flame extinguishing, elimination of afterglow and retention of tensile strength.

Uses: Fire retardant for textiles.

Containers: 100-lb. bags; 300-lb. drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Fire Retardant B," Technical Bulletin P-28.

"MONTAR" SYNTHETIC RESINS

Standard Form: Resin.

General Information—Properties: A series of related brown-to-black resins of the following typical characteristics.

SOFTENING POINT	% Cl	% CaO	% Fe	PENETRA- TION % 250 GM. CM X 10 ⁻¹ SEC.
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"Montar" 3	99-135 C.	51-52	3.47	0.31	—
"Montar" 4	125-157 C.	53-55	6.95	0.57	—
"Montar" 5	202-246 C.	53-54	1.27	0.07	—
"Montar" 6	175-205 C.	59-60	2.00	0.13	—
"Montar" 9	135-145 C.	—	—	—	63 at 50 C.
"Montar" 10	139 C.	27	0.65	0.04	47 at 75 C.

Containers: 100-lb. paper bags.

Shipping Classification: Coal Tar Resin.

"NEALCO" ANTI-FREEZE

Standard Form: Liquid.

Uses: A completely denatured ethyl alcohol type anti-freeze fluid for automobile, airplane and other gasoline engine-cooling systems. Will not corrode the radiator, form rust, sludge or sediment; will not cause leaks or attack hose connections.

Containers: 55 and 5-gal. nonreturnable drums; tank trucks; tank cars.

Shipping Classification: Alcohol Denatured.

Literature: "Nealco-Monsanto Industrial Alcohol," 52-page booklet.

"NIFOS"-T INSECTICIDE

(Monsanto's Technical Tetraethyl Pyrophosphate)

Standard Form: Liquid.

General Information—Properties: Dark colored, mobile liquid; Sp. Gr. 1.2; wt. per gal. 10 lbs.; viscous liquid below —60 C.; decomposes at 165 C. and above; miscible with water and other polar and aromatic solvents; immiscible with paraffinic oils such as kerosene or petroleum ether; hygroscopic and absorbs moisture rapidly from the air. In the presence of water a decomposition occurs over a period of several hours with a reduction in insecticidal activity and toxicity.

Contains approx. 40% tetraethyl pyrophosphate which has the empirical formula of $C_4H_{10}O_4P_2$ and a mol. wt. of 290.2. "Nifos"-T has higher biological activity than HETP. In the undiluted form is corrosive to most common metals of construction. The most satisfactory containers are either glass or metal having impervious lacquer liners. Exceedingly toxic to warm-blooded animals when introduced orally or absorbed through the skin. Therefore, handling the material requires careful precautions; it should not be allowed on the skin, inhalation of its vapors should be avoided.

Uses: Very effective in the control of a wide number of insects and mites when applied commercially. May be applied as a spray, aerosol or dust. At working concentrations no phytotoxicity is encountered on most plants. Lack of residual toxicity makes its application very promising to all truck crops as well as many others on which a toxic residue is undesirable.

Containers: 5-gal. lacquer-lined drums; 55-gal. lacquer-lined steel drums.

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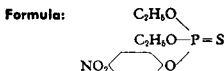
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Shipping Classification: Insecticides Agricultural NOIBN Liquid. Class B "Poison" label is required.

Literature: "Nifos-T," Technical Bulletin O-46.

"NIRAN" INSECTICIDE (Monsanto Parathion)

Molecular Weight: 291.27



Standard Form: Liquid.

General Information—Properties: Dark brown liquid; assay approx. 96.5%; crystallizing point about 0°C.; Sp. Gr. 1.26–1.28 at 25°/25°C. Miscible with aromatic and polar solvents; only slightly miscible in paraffinic solvents and water. Relatively noncorrosive to metals of construction and containers. Toxic to animals but has low plant toxicity.

Uses: Insecticide having high activity against a wide variety of insects and mites. May be applied as a spray, dust, dust suspension or aerosol.

Containers: 5-gal. drums; 55-gal. steel drums.

Shipping Classification: Insecticide Agricultural NOIBN Liquid. Class B "Poison" label required.

Literature: "Niran," Technical Bulletin O-52; "Handle Parathion Safely," folder.

NITRATING ACID (Mixed Acid)

Standard Form: Liquid.

Typical Analysis:

	80–15	45–53
Nitric Acid (HNO ₃)	80.0 %	45.0 %
Sulfuric Acid (H ₂ SO ₄)	15.0 %	53.0 %
Oxides of Nitrogen (N ₂ O ₅)	0.25 %	0.25 %

Uses: Nitrating in the chemical industry, particularly in the manufacture of explosives and dyestuffs. Special mixtures can be furnished to meet individual requirements.

Containers: 110-gal. drums; 75 and 50-ton tank cars.

Shipping Classification: Nitrating Acid. Corrosive liquid (white label required).

NITRIC ACID

Molecular Weight: 63.01

Formula: HNO₃

Standard Form: 36° Bé., 38° Bé., 40° Bé., and 42° Bé.

Typical Analysis: % HNO₃: 36° Bé., 52.3%; 38° Bé., 56.5%; 40° Bé., 61.4%; 42° Bé., 67.2%. Sp. Gr. will not vary more than 0.5° terms of Bé.; H₂SO₄ 0.05% max.; HCl 0.002% max. For higher strengths refer to Merrimac Division Sales Office.

Uses: Manufacture of insecticides, dyestuffs, drugs, pharmaceuticals, explosives, photoengraving, nitrates and nitro products. (See table in general data section.)

Containers: 13-gal. carboys; 15-gal. stainless steel drums; 1,800-gal. tank trucks; 50-ton tank cars.

Shipping Classification: Nitric Acid. Corrosive liquid (white label required).

ortho-NITROANILINE

(Also known as *ortho*-aminonitrobenzene)

Molecular Weight: 138.12

Formula: NH₂



Standard Form: Powder or flakes.

Specifications: Yellow-to-orange powder or flakes; M.P. 70.0°C. min. Assay: powder or flakes 98.70% min.; powder with tricalcium phosphate 98.50% min. Ash: powder or flakes 0.25% max.; powder with tricalcium phosphate 0.75% max.

General Information—Properties: Has a tendency to set up in lumps on standing. It is recommended that it be milled to proper fineness just before using. The addition of 0.5% tricalcium phosphate reduces the caking tendency. CAUTION: This product is toxic. Avoid breathing its dust and avoid contact with the skin.

Uses: An intermediate in the preparation of dyestuffs and in the manufacture of medicinals.

Containers: 200-lb. fiber drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

ortho-NITROANISOLE

(Also known as *ortho*-nitrophenylmethyl ether and 2-methoxynitrobenzene)

Molecular Weight: 153.13

Formula: OCH₃



Standard Form: Liquid.

Specifications: Light reddish or light amber liquid; crystallizing point 9.6°C. min. dry basis. Distillation range: first drop 270.0°C. min.; 95% 2.0°C. max.; dry point 273.0°C. max.; nitrophenol 0.05% max.

Uses: Production of such dye intermediates as *ortho*-anisidine and dianisidine; various organic syntheses. CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.

Containers: 550-lb. steel drums.

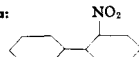
Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

ortho-NITROBIPHENYL, TECHNICAL

(Also known as *ortho*-nitrodiphenyl)

Molecular Weight: 199.20

Formula:



Standard Form: Crystalline solid.

General Information—Properties: Light yellow-to-reddish crystalline solid; crystallizing point 34.5°C. min.; B.P. 325°C. approx.

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Uses: An intermediate in chemical synthesis where it is useful in some applications as an alternate for substituted nitrobenzenes. A plasticizer with wide compatibility and low rate of hydrolysis, compatible with the cellulose esters and ethers, polyvinyl chloride, polyvinyl butyral, polyvinyl acetate, polystyrene, rosin and rosin esters, modified phenolic resins, oil-soluble phenolics, alkyd resins and vegetable oils.

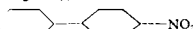
Containers: 525-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN.

para-NITROBIPHENYL

(Also known as para-nitrodiphenyl)

Molecular Weight: 199.20

Formula:  c1ccc(cc1)-c2ccc(cc2)[N+](=O)[O-]

Standard Form: Brown crystalline solid. Crystallizing point 110.0 C. min.

Uses: As an intermediate in dyestuff manufacture, in chemical synthesis or in the production of resins.

Containers: 475-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN.

meta-NITROCHLOROBENZENE

(Also known as meta-chloranitrobenzene)

Molecular Weight: 157.56

Formula: Cl



Standard Form: Cast solid.

Specifications: Greenish-yellow crystalline mass, clear when melted; crystallizing point 43.9 C. min.

Uses: For conversion into various dyestuff intermediates, chloranilines and chlorobenzidines. CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin. Toxicity reference: U. S. Public Health Bulletin No. 271 (1941).

Containers: 500-lb. drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

ortho-NITROCHLOROBENZENE

(Also known as ortho-chloranitrobenzene)

Molecular Weight: 157.56

Formula: Cl



Standard Form: Cast solid.

Specifications: Greenish-yellow crystalline mass; crystallizing point 31.0 C. (on sample as received).

Uses: Preparation of dyestuff intermediates. CAUTION: This material is toxic. Avoid breathing its vapors. Avoid

contact with the skin. Toxicity reference: U. S. Public Health Bulletin No. 271 (1941).

Containers: 550-lb. steel drums; tank cars.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

para-NITROCHLOROBENZENE

(Also known as para-chloranitrobenzene)

Molecular Weight: 157.56

Formula: Cl



Standard Form: Flakes.

Specifications: Light greenish-yellow flaked solid; can also be supplied in fused form; crystallizing point 82.5 C. min.

Uses: Preparation of dyestuff intermediates. CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin. Toxicity reference: U. S. Public Health Bulletin No. 271 (1941).

Containers: 325-lb. fiber drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

para-NITROPHENOL

(Also known as para-hydroxynitrobenzene)

Molecular Weight: 139.11

Formula: OH



Standard Form: Granules.

Specifications: Brown granular mass; M.P. (dry basis) 112.0 C. min.; assay 96.5% min.; water-insoluble material 0.20% max.; alcohol-insoluble material 0.20% max.

Uses: An intermediate in the production of dyestuffs and photographic chemicals such as para-aminophenol and methyl para-aminophenol; fungicide to prevent mold growth on chrome-tanned leather. CAUTION: This product is toxic. Avoid breathing its dust or vapors and avoid contact with the skin.

Containers: 200-lb. fiber drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

OCTADECYL ISOCYANATE (1-Isocyanato-octadecane)

Molecular Weight: 295 theoretical

Formula: CH₃(CH₂)₁₆NC=O

Continued on next page

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Standard Form: Liquid.

Typical Analysis: Hydrolyzable chlorides 0.25% max.; distillation range 150–185°C. at 4 mm.; amine equivalent 300–315 (gms. isocyanate per gm. mole of secondary amine); Sp. Gr. 0.86 at 25°C.

General Information—Properties: Highly reactive organic isocyanate; oily, light yellow liquid, slightly cloudy at room temperature; reacts readily with water, alcohols, amines and other compounds containing active hydrogen. Technical grade contains some hexadecyl isocyanate.

Uses: Organic synthesis, treatment of paper, waterproofing textiles.

Containers: 1-gal. bottles; 5-gal cans; 55-gal. drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Monsanto Isocyanates," Technical Bulletin P-125.

ortho-PHENETIDINE

(Also known as ortho-aminophenylethyl ether, ortho-aminophenetole and 2-aminoethoxybenzene)

Molecular Weight: 137.18

Formula: OC_2H_5



Standard Form: Liquid.

Specifications: Dark red liquid; crystallizing point (as received) —4.0°C. min. Distillation range: first drop 231.0°C. min.; 95% (1–96 ml) 2.0°C. max.; dry point 234.0°C. max.; solubility in HCl complete.

Uses: An intermediate in the production of dyestuffs. CAUTION: This product is toxic. Avoid breathing its vapors and contact with the skin.

Containers: 475-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

para-PHENETIDINE

(Also known as para-aminophenylethyl ether, para-aminophenetole and 4-aminoethoxybenzene)

Molecular Weight: 137.18

Formula: OC_2H_5



Standard Form: Liquid.

Specifications: Dark red liquid; crystallizing point (as received) 4.0°C. min. Distillation range: first drop 248.0°C. min.; 95% (1–96 ml) 2.0°C. max.; dry point 251.0°C. max.; solution in HCl opalescent max.

Uses: An intermediate in the production of dyestuffs and pharmaceuticals. CAUTION: This product is toxic. Avoid breathing its vapors and contact with the skin.

Containers: 475-lb. steel drums.

Shipping Classification: Dye Intermediate NOIBN. "Poison" label required.

PHENOL

(Also known as carbolic acid and hydroxybenzene)

Molecular Weight: 94.11

Formula: OH



Standard Form: Solid or liquid.

Specifications: Crystalline solid, U.S.P.: White crystalline solid; melt, colorless mobile liquid; solution in water (1:1) clear and colorless; non-volatile residue (100°C.) 0.0% max.; crystallizing point 40.6°C. min. Distillation range: first drop 180.0°C. min.; 100% (first drop to dry point) 2.0°C. max.; 50% to dry point 0.2°C. max.

Liquids: Colorless mobile liquids; assay: liquid 85%, 85.86.0%; liquid 88%, 88.0–89.0%.

Uses: An intermediate in the production of dyestuffs; production of resins for molding; preparation of varnishes, enamels, lacquers and paints; selective solvent in the manufacture of lubricating oils; disinfectant; textile printing; production of explosives, synthetic tanning materials, pharmaceuticals and medicinals, antiseptics, germicides and preservatives, deodorants, soaps, embalming fluid, vermexaminators, rubber compounds and photographic chemicals. CAUTION: This product is toxic. Avoid breathing vapors and contact with the skin.

Grades: Crystalline solid, U.S.P.; liquid 85%; liquid 88%.

Containers: 475-lb. steel drums; 200-lb. tins; tank cars.

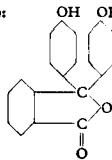
Shipping Classification: Phenol. "Poison" label required.

Literature: "Safe Handling of Phenol," 12-page booklet.

PHENOLPHTHALEIN, U.S.P.

Molecular Weight: 318.31

Formula: OH OH



Standard Form: Powder.

Specifications: White powder; M.P. 249.0°C. min.; solubility in alcohol (1:15) complete; acidity ml N 1000 NaOH gm. sample) 3.0 ml max.; ash 0.1% max.; arsenic 0.001% max.; conforms to U.S.P. test for fluorane and heavy metals; trace max. retained on 100 mesh.

Uses: Pharmaceutical preparations.

Containers: 250, 100 and 50-lb. fiber drums; 25-lb. box.

Shipping Classification: Chemicals NOIBN.

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PHENOLPHTHALEIN, YELLOW, Not U.S.P.**Standard Form:** Powder.

Specifications: Yellow powder; M.P. 257.0°C. min.; loss on drying 0.50% max.; ash 0.10% max.; acidity (ml N/1000 sodium hydroxide per 2 gm. sample) 5.0 ml max.; solution in ethyl alcohol 95% (1:15) clear; Sp. Gr. (approx.) 0.500-0.600; none retained on 20 mesh.

Uses: Pharmaceutical preparations.**Containers:** 150, 100 and 50-lb. fiber drums; 25-lb. boxes.**Shipping Classification:** Chemicals NOIBN.**PHENOLSULFONIC ACID****Molecular Weight:** 174.17**Formula:** $\text{HOC}_6\text{H}_4\text{SO}_3\text{H}$ **Standard Form:** Liquid or crystalline mass.

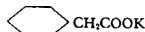
General Information—Properties: Available as either a 65% or 70% aqueous solution. Light brown-to-black liquid or crystalline mass depending on temperature; assay 65% min. or 70% min.; contains small amounts of free sulfuric acid, phenols and sulfones.

Uses: An intermediate in chemical manufacture.**Containers:** 600-lb. steel drums.**Shipping Classification:** Acid NOIBN Liquid.**PHENYLACETAMIDE****Molecular Weight:** 135.16**Formula:** $\text{C}_6\text{H}_5\text{CH}_2\text{CONH}_2$ **Standard Form:** Crystalline powder.

General Information—Properties: White crystalline powder with mild characteristic odor; assay approx. 98%; M.P. about 158°C.

Uses: A precursor for the manufacture of penicillin; can be used concomitantly with beta-phenylethylamine.**Containers:** 125-lb. fiber drums.**Shipping Classification:** Chemicals NOIBN.**PHENYLACETIC ACID***(Also known as alpha-toluic acid)***Molecular Weight:** 136.14**Formula:** $\text{C}_6\text{H}_5\text{CH}_2\text{COOH}$ **Standard Form:** Crystalline solid.

General Information—Properties: White crystalline solid with characteristic odor; M.P. about 76-77°C.; assay approx. 99%.

Uses: Base for manufacture of esters in perfume industry; intermediate in manufacture of pharmaceuticals; precursor for the manufacture of penicillin.**Containers:** 125-lb. fiber drums.**Shipping Classification:** Chemicals NOIBN.**PHENYLACETIC ACID, POTASSIUM SALT (Solution)**
*(Also known as potassium phenylacetate)***Formula:****Standard Form:** Liquid.

Specifications: Clear, pale yellow liquid with characteristic odor; assay 64.0% min.; pH range 7.0-8.0; refractive index 1.475-1.482 at 25°C.; Sp. Gr. at 25/25°C. 1.250-1.270.

General Information—Properties: Use of the liquid form of the potassium salt facilitates the handling of phenylacetic acid and reduces the odor problem. Two pounds of the solution are equivalent to one pound of phenylacetic acid.

Uses: As a precursor in the manufacture of Penicillin G.**Containers:** 540-lb. drums; tank cars.**Shipping Classification:** Chemicals NOIBN.**BETA-PHENYLETHYLAMINE***(Also known as 1-amino-2-phenylethane)***Molecular Weight:** 121.18**Formula:****Standard Form:** Liquid.

Specifications: Clear, colorless to slightly yellow liquid assay 99.0% min. Distillation range: first drop 197.0°C min.; 95% (1-96 ml) 2-5°C. max.; dry point 204.0°C. max.

General Information—Properties: Undergoes all chemical reactions characteristic of primary amines. Care should be exercised to minimize exposure of beta-phenylethylamine to the air since it rapidly absorbs carbon dioxide to form a carbonate.

Uses: A precursor for giving increased yields of Penicillin G. Can be used in the form of a liquid or in the form of the acetate or hydrochloride in an aqueous solution.

Containers: 55-gal. steel drums.**Shipping Classification:** Chemicals NOIBN.**PHENYL ISOCYANATE****Molecular Weight:** 119**Formula:** $\text{C}_6\text{H}_5\text{NCO}$

Specifications: Amine equivalent 119-124 (gms. isocyanate per gm. mole of secondary amine); hydrolyzable chloride 0.05% max.; B.P. 166°C.; freezing point about -30°C.; Sp. Gr. 1.1 at 20°C.

General Information—Properties: Very slightly soluble in water; decomposes on exposure; solubility in benzene infinite.

Containers: 1-gal. glass bottles; 55-gal. drums.**Shipping Classification:** Chemicals NOIBN.**PHOSPHORIC ACID (Orthophosphoric Acid)****Molecular Weight:** 98.00**Formula:** H_3PO_4 *(Continued on next page)*

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Specifications: Clear, water-white liquid miscible with water in all proportions; 75% and 85% H_3PO_4 . (Other concentrations supplied on request.)

General Information—Properties: Density and composition of water solutions of orthophosphoric acid at 15°/4°C.

DENSITY GM./CC.	DECREASE PER 1°C.	% H_3PO_4	% P_2O_5	%P
1.100	0.00030	17.52	12.69	5.54
1.150	0.00035	25.25	18.29	7.98
1.200	0.00045	32.52	23.55	10.28
1.250	0.00050	39.22	28.41	12.40
1.300	0.00055	45.51	32.96	14.39
1.339	0.00055	50.00	36.21	15.81
1.350	0.00060	51.22	37.10	16.19
1.400	0.00060	56.85	41.17	17.97
1.450	0.00060	62.27	45.10	19.68
1.500	0.00065	67.35	48.78	21.29
1.550	0.00070	72.11	52.23	22.79
1.581	0.00077	75.00	54.32	23.71
1.600	0.00075	76.75	55.59	24.26
1.650	0.00075	81.30	58.88	25.70
1.693	0.00080	85.00	61.56	26.87
1.700	0.00080	85.63	62.02	27.07
1.750	0.00080	89.88	65.10	28.41
1.800	0.00080	94.15	68.19	29.76
1.850	0.00080	98.13	71.07	31.02
1.874	0.00080	100.00	72.43	31.51

The density of more concentrated acids increases approximately linearly (within the range 72.44% to 85% P_2O_5) with the excess P_2O_5 over 72.44% according to the equation: Density at 15°/4°C. = $1.874 + 0.0171 (\%P_2O_5 - 72.43)$.

Uses: To increase translucency and improve color of porcelains and as a vitrifying agent and flux; manufacture of sodium phosphates, calcium phosphates and other phosphates; manufacture of ethylene gas; production of albumin derivatives; drying agent in the synthesis of various intermediate chemicals and dyes; process engraving and litho trades; penetrant to aid in the absorption of the gum on envelopes; manufacture of double and triple superphosphates and ammonium phosphate; the manufacture of gelatin; substitute for tartaric and citric acids in jelly, preserves and soft drinks; opacifier in glass manufacture; pickling and cleaning metals; manufacture of certain pharmaceutical chemicals and dental cements; glycerophosphate manufacture and purification of hydrogen peroxide; for brightening the finish on rope and twine; coagulant of rubber latex; manufacture of rustproofing compounds; silage preservation; defecating and clarifying agent in sugar; for brightening the color of silk; dyeing of cotton; calico printing; water softening and correction of alkalinity.

Grades: U.S.P.; food, meets all U.S. Pure Food Law requirements; commercial, clear, water-white liquid; Phosilage, meets all U.S. Food Law requirements.

Containers: Special 650-lb. (approx.) tight oak bbls.; 15-gal. stainless steel drums; 13-gal. carboys; tank cars.

Shipping Classification: Phosphoric Acid.

PHOSPHORIC ACID (Tetraphosphoric Acid)

General Information—Properties: Clear, water-white viscous liquid; P_2O_5 , 83–84%; does not crystallize at –50°C.; Sp. Gr. 2.060 at 20°C., 1.983 at 100°C., 1.960 at 125°C.

Uses: For industrial applications where a high-strength phosphoric acid is desired and as a drying agent.

Containers: 13-gal. carboys.

Shipping Classification: Phosphoric Acid.

PHOSPHOROUS ACID

Molecular Weight: 82.00

Formula: H_3PO_3

Specifications: Clear, water-white liquid, miscible with water in all proportions as 70% H_3PO_3 .

General Information—Properties: Typical values: Sp. Gr. 1.420 at 25°C.; electrical conductivity—approx. 0.15 reciprocal ohms; boiling point 70% solution—125°C. at 760 mm. Solution becomes saturated at –20°C. and freezes solid at approx. –50°C. Refractive index of supercooled 100% H_3PO_3 at 30°C. is 1.4420.

Uses: Intermediate in production of phosphites. Strong though sometimes slow reducing agent.

Containers: 13-gal. carboys.

Shipping Classification: Acids, NOIBN, liquid.

PHOSPHORUS, ELEMENTAL

(Also known as yellow phosphorus and white phosphorus)

General Information—Properties: Light yellow, wax-like, semi-transparent solid; burns spontaneously in air to form P_2O_5 ; M.P. 44.1°C.; very soluble in carbon disulfide; insoluble in water.

Uses: Manufacture of phosphorus alloys, phosphoric anhydride, phosphorus compounds, phosphoric acid, rodent poisons, flares, smoke screens, etc.

Grades: Monsanto process of manufacture provides over 99.9% purity.

Containers: 400-lb. drums; tank cars.

Shipping Classification: Phosphorus Yellow. Toxic and inflammable (yellow label required).

PHOSPHORUS OXYCHLORIDE

(Also known as phosphoryl chloride)

Molecular Weight: 153.35

Formula: $POCl_3$

Standard Form: Liquid.

Specifications: Water-white to yellow liquid; crystallizing point 0.8°C. min.; assay 99.0% min. Distillation range: first drop 106.0°C. min.; 95% (1–96 ml) 1.5°C. max.; dry point 108.5°C. max.; PCl_3 0.20% max.; iron 0.0005% max.

Uses: A chlorinating agent and catalyst in the preparation of various intermediates, dyestuffs, medicinals; reagent in the preparation of acetic anhydride and organic phosphates. **CAUTION:** Care must be exercised in handling this product. Avoid breathing its vapors. Avoid contact with the skin. It reacts with water with explosive violence.

Containers: 675-lb. nickel drums.

Shipping Classification: Phosphorus Oxychloride. Corrosive liquid (white label required).

PHOSPHORUS PENTOXIDE

(Also known as phosphoric anhydride, phosphoric oxide and solid P_2O_5)

Molecular Weight: 141.96

Formula: P_2O_5

Standard Form: White amorphous powder.

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General Information—Properties:

VAPOR PRESSURES: [after J. C. Southard and R. A. Nelson—J.A.C.S., 59,911 (1937)]

p = vapor pressure in cm. of mercury

T = absolute temperature

A (low temperature form) $\log_{10} p = 9.792 - (5000/T)$

B (high temperature form) $\log_{10} p = 11.113 - (7930/T)$

L (liquid) $\log_{10} p = 6.809 - (4320/T)$

Atmospheric sublimation temperature: 358.9°C.

Heat of vaporization:

A —22,800 calories per gm. molecule

B —36,200 calories per gm. molecule

L —19,700 calories per gm. molecule

Heat of fusion: 16,500 calories per gm. molecule

Probable molecular formula of vapor: P_4O_{10}

Uses: Manufacture of organic and phosphorus compounds and as a catalyst. A vigorous drying and dehydrating agent.

Containers: 400 and 60-lb. net drums.

Shipping Classification: Phosphoric Anhydride. Inflammable solid (yellow label required).

PHOSPHORUS TRICHLORIDE

Molecular Weight: 137.35

Formula: PCl_3

Standard Form: Liquid.

Specifications: Water-white liquid; Sp. Gr. 1.582–1.587 at 15.5–15.5°C. Distillation range: first drop 74.5°C. min.; dry point –8.0°C. max.; total range 3.0°C. max.

Uses: A chlorinating agent and catalyst in the preparation of various intermediates and dyestuffs; reagent in the preparation of acetic anhydride, organic phosphates, germicides and medicinals; manufacture of phosphorus oxychloride and phosphorus pentachloride; in producing iridescent metallic deposits. **CAUTION:** Care must be exercised in handling this product. Reacts with water. Avoid breathing its vapors. Avoid contact with the skin.

Containers: 700-lb. (approx.) nickel drums.

Shipping Classification: Phosphorus Chloride. Corrosive liquid (white label required).

PHthalic ANHYDRIDE

Molecular Weight: 148.11

Formula:

$C \quad O$

$\quad \quad O$

$C \quad O$

Standard Form: Flakes.

Specifications: White flakes; ash 0.03% max.; assay essentially 100%.

Uses: An intermediate in the production of dyestuffs, perfume bases, alcohol denaturants, pharmaceuticals and plasticizers such as dibutyl phthalate, dimethyl phthalate, diethyl phthalate, phthalyl glycolates and alkyd resins.

Containers: 80-lb. bags.

Shipping Classification: Phthalic Anhydride.

PHthalYL CHLORIDE (Phthaloyl Chloride)

Molecular Weight: 203.03

Formula:



Standard Form: Liquid.

Specifications: Yellowish liquid; assay 95.0% min.; crystallizing point 9.0°C. min.

Uses: Manufacture of plasticizers and resins.

Containers: 500-lb. nickel drums.

Shipping Classification: Chemicals NOIBN. Corrosive liquid (white label required).

PIPERIDINE (Also known as hexahydropyridine)

Molecular Weight: 85.15

Formula:



Standard Form: Liquid.

Specifications: Clear, water-white liquid of characteristic odor; assay 98% min.; pyridine 1.0% max.; Sp. Gr. 0.864–0.870 at 15.5–15.5°C.; distillation range 105.0°C. min. start; 108.0°C. max. dry point.

Uses: An intermediate in the manufacture of pharmaceuticals, wetting agents and germicides.

Grades: Also available in 95% grade.

Containers: 375-lb. steel drums; 7½ and 38-lb. drums.

Shipping Classification: Chemicals NOIBN. Inflammable material (red label required).

PLASTIC METAPHOSPHATE

Formula: $K_2Na_4(PO_3)_6$ or $KNa_5(PO_3)_6$

Standard Form: Powder.

Typical Analysis: P_2O_5 , 67.7%.

General Information—Properties: White powder; dissolves in water to form neutral, high viscosity solutions; attrition action necessary to break gel surface film for rapid dissolution in water; solubility up to 30% solution readily obtained; 30% solution has a viscosity similar to freshly-made honey; viscosity decreases on standing; thin films of solution air dry to transparent films. These films are hygroscopic in high humidities.

Uses: Suggested as a solution for priming and filling lime plaster, wood or other porous surfaces before papering or painting; vehicle for other fillers and water paints; brushing consistency obtained with less filler or pigment than when water is used; humectant properties assist in slower drying of surface finishes which crack when dried too rapidly; water softener; cleaner for painted walls; sizing agent for textile yarns and fabrics; agent for increasing viscosity in flotation work.

Containers: 100-lb. net fiber drums.

Shipping Classification: Sodium Phosphate.

0685070

PLASTICS

"CEREX" STYRENE COPOLYMER PLASTIC

General Information: "Cerex" 250 Styrene Copolymer is a rigid thermoplastic molding material which gives molded parts with better heat deformation resistance and dimensional stability than other thermoplastics. Has an ASTM heat distortion point of 227-234°F. and will withstand prolonged boiling in water without distortion.

PROPERTY	VALUE	UNITS	ASTM No.
<i>Mechanical</i>			
Tensile Strength	7,000—10,000	Lbs. per sq. in.	D638-40T
Elongation	1.5—2.5	Percent	D638-40T
Modulus of Elasticity	4-5 $\times 10^5$	In tension, lbs. per sq. in.	D638-40T
Hardness	M70—M80	Rockwell	D785-48T
Flexural Strength	10,000—15,000	Lbs. per sq. in.	D790-49T
Deflection	0.20—0.30	Inches	D790-49T
Impact Strength	0.25—0.35	{ Izod, ft. lbs. per in. of notch } { for $\frac{1}{4}$ " $\times$ $\frac{1}{2}$ " bar. }	D256-47T
Machining Qualities	Good		
<i>Thermal</i>			
Specific Heat	0.32	Cal. per gm. per °C.	
Thermal Expansion	6-8 $\times 10^{-5}$	in./in. per °C.	D696-44
Thermal Conductivity	1.9 $\times 10^{-4}$	Cal. per sec. per sq. cm. per °C. per cm.	C177-45
Heat Distortion	227—234°F. (108—112°C.)	@ 264 psi	D648-47T
Resistance to Heat	Boilable (for short periods)		
Deformation under Load	0.40—0.50	Percent, 4,000 psi @ 50° C.	D621-48T
<i>Optical</i>			
Color Possibilities	Nearly Unlimited (crystal slightly yellow)		
<i>Chemical</i>			
Specific Gravity	1.05—1.09		D792-48T
Moisture Absorption	0.04—0.05	Percent	D570-42
Burning Rate	1", min. (Slow)		D635-44
Resistance to:			
Alkalies	Excellent		
Acids	Attacked by strong oxidizing acids		
Solvents	Soluble in esters, aromatics, higher alcohol, and chlorinated hydrocarbons.		
Water	Excellent		
Oxygen	Excellent		
Effect of Sunlight	Slight		
<i>Electrical</i>			
Power Factor	{ .0001—.0003 .0001—.0003 .0001—.0005	60 cycles } 1 KC 1 MC	D150-47T
Dielectric Constant	2.5—2.7	60—10 ⁶ cycles/sec.	D150-47T
Loss Factor	.0025—.0014	60—10 ⁶ cycles/sec.	D150-47T
Dielectric Strength	Greater than 400	Short time, volts per mil, $\frac{1}{8}$ " thick	D149-44
Volume Resistivity	Greater than 10 ¹³	Ohm-cm.	D257-49T
Tendency to Track	None		
Arc Resistance	120—135	Secs.	D495-48T
<i>Molding</i>			
Type	Thermoplastic		
Molding Quality	Excellent		
Injection Molding Temperature	375—700	°F.	
Injection Molding Pressure	10,000	Psi	
Effect on Metal Inserts	None		
Bulk Factor	1.7—2.4	Granules	D954-48T
Mold Shrinkage	0.002—0.008	In. per in.	

NOTE: All tests run at 23°C. and 50% R.H. unless otherwise specified.

The above data represent average values determined on virgin molding powder under appropriate ASTM tests conducted on the present range of "Lustrex" colors and formulations. Any results determined in the field which exhibit major variations from the above data are attributable to dissimilar molding conditions or the introduction of additional materials to "Lustrex" molding powders as manufactured.

Uses: The unique combination of high heat distortion, dimensional stability, and added strength characteristics suggest many potential uses for household merchandise, electrical components, surgical and medical appliances, and industrial applications.

Containers: Bags or drums.

Shipping Classification: Resin Synthetic NOIBN Without Filler.

Literature: Development Bulletins.

0685071

FIBESTOS[®] CELLULOSE-ACETATE SHEETS

General Information: "Fibestos" Cellulose-Acetate Sheets have a limitless range of colors, strength and toughness. Easily punched, cemented, stamped, drilled and sawed. Available in a wide range of thicknesses and in an extremely wide variety of transparent, translucent, pastel and opaque colors, as well as in many mottles, pearls and decorative figurations.

Parts ation	Type	Thermoplastic
M No.	Forming Qualities	Excellent
	Forming Temperature, F.	210-300
2-49T	Forming Pressure, lbs. per sq. in.	100-5,000
2-49T	Molding Methods Applicable	Swaging, forming, compression
2-49T	Specific Gravity	1.28-1.32
2-49T	Specific Volume, cu. in. per lb.	21.6-21.0
2-49T	Density, lbs. per cu. in.	0.046-0.048
2-49T	Refractive Index ND	1.49-1.50
2-49T	Light Transmission, 0.125" colorless, %	88-92
4-T	Tensile Strength (Note 1), lbs. per sq. in.	4,000-7,500
	Elongation, %	15-80
	Modulus of Elasticity, in tension, lbs. per sq. in.	1-3 x 10 ⁶
	Compressive Strength, lbs. per sq. in.	4,000-30,000
	Flexural Strength, lbs. per sq. in.	4,000-15,000
44	Bursting Strength (Mullen) (Note 1), lbs. per sq. in.	50-500
	Impact Strength, Izod (notched) ft. lbs. per in. of notch	1.5-4.0
45	Impact Strength, Charpy (notched) ft. lbs. per in. of notch	1.0-4.0
2-45T	Rockwell Hardness	R95-120
	Machining Qualities	Good to Excellent
1-48T	Burning Rate .060" sheet	1.5-2.0 (some formulations self-extinguishing)
	Listed by Underwriters Laboratories as slow burning	
	Water Absorption 25 C. (Note 1), 24 hrs. Immersion, %	1.5-4.0
	Thermal Conductivity, cal. per sq. cm. per sec. per °C. per cm.	4-6 x 10 ⁻⁴
	Specific Heat, cal. per °C. per gram	0.3-0.45
	Thermal Expansion per °C.	6-15 x 10 ⁻⁵
2-48T	Softening Point, F.	140-230
2-42	Heat Distortion Point, F.	130-212
2-44	Maximum Recommended Service Temperature—continuous, F.	130-160
	Volume Resistivity, ohm-cm.	10 ¹⁰ -10 ¹²
	Dielectric Strength, Short Time 1/8" thickness, volts per mil.	200-350
	Dielectric Constant 25 C, 60 cycles	3.5-7.5
	10 ⁶ cycles	3.0-5.0
	Power Factor, 60 cycles	0.01-0.06
	Power Factor, 10 ⁶ cycles	0.04-0.09
	Odor	None to slight
	Taste	None to slight
2-4-T	Effect of Metal Inserts	Noncorrosive
	Effect of Weak Mineral Acids	Fair resistance
2-4-T	Effect of Strong Alkalis	Decomposes
2-4-T	Effect of Weak Alkalis	Slight
2-44	Effect of Strong Alkalis	Decomposes
2-49T	Effect of Hot Water	Softens and swells
	Effect of Cold Water	None

Solubility:

Soluble in low molecular weight esters, ketones, hydroxy esters, tetrachlorethane, ethylene dichloride—alcohol mixtures. Softens in alcohols, esters. Swells in some chlorinated hydrocarbons. Insoluble in aromatic hydrocarbons, aliphatic hydrocarbons, animal oils, mineral oils, and vegetable oils.

The above values except where otherwise noted are determined on samples conditioned and tested at 25 C. (77 F.) and 50% R. H.

NOTE 1: This property varies with thickness of sample and with temperature and humidity.

Uses: May be used for toys, novelties, tablemats, lamp shades, store window sunshades, sequins, greeting cards, specialty phonograph records, laminated identification cards, guide cards and filing equipment, and as base film for duplicating systems.

Containers: Fiber cartons.

Shipping Classification: Cellulose Derivative, Plastic Sheets Other Than Pyroxylin.

Literature: "Fabricating Fibestos and Vupak," Production Information Bulletin No. 50.

INDUSTRIAL RESINS

Standard Forms: Dry powders; ground lump; solution in alcohol, other organic solvents or water.

General Information—Properties: Industrial Resins are classified as follows:

(Continued on next page)

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"Lustrex" Styrene Industrial Resins

"Lustrex" industrial resins can be supplied both as dry powders and dispersions in water. These resins are available in a wide range of molecular weights in plasticized and unplasticized compositions. The higher polymers of styrene are characterized by high solution viscosities at low solids content, high softening points and good mechanical strengths. "Lustrex" resins of different molecular weights may be blended to give intermediate average molecular weight compositions. The "Lustrex" industrial resins are finding increased use as adhesives, impregnants for paper, leather, wood, glass mat, etc.

"Resimene" Melamine-Formaldehyde Industrial Laminating Resins

These resins offer a wide range of possibilities. A typical application is decorative laminates with a printed surface sheet impregnated with transparent "Resimene" resins. Such a material offers good abrasion resistance, and will withstand mild acids, alkalis and heat; is practically stainproof. Such laminates are widely used for counter tops, displays, decorative wall and door paneling, and many other applications requiring a durable material. Also, used in the production of glass, fabric and paper base industrial laminates, particularly noteworthy for their high heat resistance and arc resistance.

"Resinox" Phenol-Formaldehyde Industrial Resins

"Resinox" industrial resins are formulated for a wide variety of uses, including:

GRINDING WHEEL RESINS—For binding the components of abrasive wheels into stronger, more dense, and more resilient wheels. Special formulations to meet special requirements.

LAMINATING RESINS—For three types of laminates.

Electrical—High dielectrical strength, high surface and volume resistance, low power factor and low moisture absorption are all properties easily obtained with "Resinox" industrial resins.

Chemical—Laminates made from "Resinox" industrial resins are excellent because of their inertness and the ability to withstand exposure to the action of solvents of mild acids and alkalis.

Mechanical—High mechanical strength, dimensional stability due to the low moisture absorption and a low coefficient of thermal expansion make "Resinox" industrial resins useful.

BRAKE LININGS—For impregnating components of long wearing, tough, stable brake bands and clutch facings.

FOUNDRY RESINS—Liquid resins suitable as core binders in standard factory practice. Particularly noteworthy for their fast cure at low temperatures, high tensile strength, low gassing, excellent permeability, good collapsibility and shake out. Also, dry resins particularly adapted to the production of sand molds for the new "C" or shell molding process. A special bulletin describing the process is available.

SPECIALTY RESINS—Offer high mechanical strength, resistance to heat, cold and fungus. Used for impregnating paper, for plywood overlays, bonding glass, wood or other insulating material into handy bats, low pressure laminating, pulp moldings, wire enameling and for general adhesive purposes.

Containers: Drums or tank cars for liquid types; fiber drums for solid types.

Shipping Classifications: Synthetic Resins; Varnish or Liquid Glue—varies according to type and use.

Literature: Technical bulletins.

"LUSTREX" STYRENE MOLDING COMPOUNDS

General Information: A thermoplastic material made by a series of reactions from benzene and ethylene which yields a hard rigid transparent resin.

"Lustrex" molding compounds are available as dry powders of various screen sizes in a number of different formulations. The heat-resistant material is designated as "Lustrex" LX, the high impact material as "Lustrex" LT, while all other "Lustrex" materials are identified as "Lustrex" L. Both regular and heat-resistant styrene molding compounds are supplied in a full, brilliant color range from sparkling transparent through delicate pastels to rich opaques. "Lustrex" LT can be colored anything darker than the base resin's turbid, yellow-white color.

The data below represent average values determined on virgin molding powder under appropriate ASTM tests conducted on the present range of "Lustrex" colors and formulations. Any results determined in the field which exhibit major variations from the above data are attributable to dissimilar molding conditions or the introduction of additional materials to "Lustrex" molding powders as manufactured.

"Lustrex" L			
PROPERTY	VALUE	UNITS	ASTM NO.
<i>Mechanical</i>			
Tensile Strength	6,500-8,000	Lbs. per sq. in.	D638-49 ¹
Elongation	1.8-2.5	Percent	D638-49 ¹
Modulus of Elasticity	4.0-5.0 x 10 ⁶	In tension, lbs. per sq. in.	D638-49 ¹
Hardness	M65-80	Rockwell	D785-49 ¹
Compressive Strength	14,000-16,000	Yield, lbs. per sq. in.	D695-49 ¹
Flexural Strength	9,000-13,000	Lbs. per sq. in.	D790-49 ¹
Deflection	0.15-0.35	Inches, 25° C.	D790-49 ¹
Impact Strength	0.25-0.35	Izod, ft. lbs. per in. of notch	D256-49 ¹
Machining Qualities	Good		

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	PROPERTY	VALUE	UNITS	ASTM NO.
side by rent sins	Thermal			
	Specific Heat	0.32	Cal. per gm. per °C.	
	Thermal Expansion	$6-8 \times 10^{-5}$	Per °C.	D696-42T
	Thermal Conductivity	1.9×10^{-4}	Cal. per sec. per sq. cm. per °C. per cm.	C177-45 D648-45T
	Heat Distortion Resistance to Heat Deformation under Load	80-86 Good 0.8-1.0	°C. Percent—4,000 psi at 50 C.	D621-48T
sheet cids, door case	Optical			
	Refractive Index	1.59	ND	D642-42
	Light Transmission	88-90	Percent	D1003-49T
cls. ption with-	Chemical			
	Specific Gravity	1.050-1.070		D792-48T
	Moisture Absorption	0.03-0.04	Percent	D570-42
	Burning Rate	Moderate		D635-44
	Effect of Sunlight	Slight		
	Resistance to:			
	Alkalies	Excellent		
	Acids	Attacked by strong oxidizing acids		
	Water	Excellent		
	Oxygen	Excellent		
nt of	Solvents	Soluble in esters, aromatics, higher alcohols and chlorinated hydrocarbons.		
	Electrical			
	Power Factor	0.0001-0.0005	60—10 ⁶ cycles	D150-47T
	Dielectric Constant	2.45-2.65	60—10 ⁶ cycles	D150-49T
	Dielectric Strength	Greater than 400	Short time, volts per mil, 1/8" thick.	D149-44
ure Also dletin	Volume Resistivity	Greater than 10 ¹³	Ohm	D257-49T
	Arc Resistance	120-135	Secs.	D495-48T
	Tendency to Track	None		
	Molding			
	Type	Thermoplastic		
wood wire	Molding Quality	Excellent		
	Injection Molding Temperature	300-700	°F	
	Injection Molding Pressure	3,000 and up	Lbs. per sq. in.	
	Mold Shrinkage	0.002-0.008	In. per in.	
	Effect on Metal Inserts	None		
hard	Bulk Factor			
	Pelleted	1.6-1.9	Pellets	D954-48T
	Granular	1.7-1.9	Granules	
"Lustrex" LT				
s. The stres- a full- ything	Mechanical			
	Tensile Strength	4,700-6,000	Lbs. per sq. in.	D638-49T
	Elongation—At Yield	2.40-3.0	Percent	D638-49T
	Ultimate	10-15	Percent	
	Modulus of Elasticity	$2.4-3.6 \times 10^5$	In tension, lbs. per sq. in.	D638-49T
	Hardness	M10-20, R90-95, L55-60	Rockwell	D785-48T
	Shore Durometer	92		
	Compressive Strength	7,500-8,000	Yield, lbs. per sq. in.	D695-49T
	Flexural Strength	7,500-9,000	Lbs. per sq. in.	D790-49T
	Deflection (Yield)	0.35-0.50	Inches	D790-49T
on the m the siding	Impact Strength	0.80-1.20 3.8-4.2	Izod, ft. lbs. per in. of notch for 1/2" x 1/2" bar for 1/2" x 1/4" bar.	D256-47T
	Machining Qualities	Good		
18-49T 18-49T 18-49T 18-49T 18-49T 18-49T 18-49T	Thermal			
	Specific Heat	0.30-0.35	Cal. per gm. per °C.	
	Thermal Expansion	$3.4-3.8 \times 10^{-5}$	Per °C.	D696-44
	Thermal Conductivity	0.73×10^{-4}	@ 0 C. Cal. sec. C. cm: cm	
		1.2×10^{-4}	@ 25 C. Cal. sec. C. cm: cm	
		2.0×10^{-4}	@ 60 C. Cal. sec. C. cm: cm	
	Heat Distortion	190-195 F. (88-91 C.) 176-180 F. (80-82 C.)	(1/2" x 1/2" bar) (1/2" x 1/4" bar)	D648-45T
20-49T 20-49T 20-49T	Deformation under Load	0.59	Percent—2,000 psi at 50 C.	
		1.09	Percent—4,000 psi at 30 C.	D621-48T

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PROPERTY	VALUE	UNITS	ASTM No.
<i>Optical</i>			
Refractive Index	Not Applicable		D542-42
Light Transmission	.150"-6%-.050"-15%	Percent	D1003-49T
Color Possibilities	Transluents Opaque		
<i>Chemical</i>			
Specific Gravity	1.05-1.10		D792-48T
Moisture Vapor Transmission	0.0003-0.0005	g/in ² /24 hrs.	
Moisture Absorption	0.55	Percent maximum	D570-42
Nitroglycerine Absorption	Less than 0.55%		D635-44
Burning Rate	1.0 in./min. (Moderate)		
Resistance to:			
Alkalies	Excellent		
Acids	Attacked by strong oxidizing acids		
Water	Excellent		
Oxygen	Excellent		
Solvents	Soluble in esters, aromatics, higher alcohols and chlorinated hydrocarbons.		
<i>Electrical</i>			
Power Factor	.001-.004 .002-.005 .002-.005	60 cps. 1 KC. 1 MC.	D150-47T
Dielectric Constant	2.55-2.70 2.55-2.70 2.55-2.70	60 cps. 1 KC. 1 MC.	D150-49T
Dielectric Strength	Greater than 400	Short time and step by step, volts per mil, 1/8" thick.	D149-44 D257-49T
Volume Resistivity	Greater than 10 ¹³	Ohm	D495-48T
Arc Resistance	25-30	Secs.	
Tendency to Track	None		
<i>Molding</i>			
Type	Thermoplastic		
Molding Quality	Excellent		
Recommended Mold Temperature	180-190	°F.	
Injection Molding Temperature	400-600	°F.	
Injection Molding Pressure	5,000 and up	Lbs. per sq. in.	
Mold Shrinkage	.003-.010	In. per in.	
Effect on Metal Inserts	None		
Bulk Factor			
Pelleted	1.8	Pellets	D954-48T
<i>Mechanical</i>			
"Lustrex" LX			
Tensile Strength	7,000-8,000	Lbs. per sq. in.	D638-49T
Elongation	1.8-2.4		D638-49T
Modulus of Elasticity	5.0-6.0 x 10 ⁵	In tension, lbs. per sq. in.	D638-49T
Hardness	M65-80	Rockwell	D785-48T
Flexural Strength	10,000-14,000	Lbs. per sq. in., 25 C.	D790-49T
Deflection	0.25-0.40	Inches, 25 C.	D790-49T
Impact Strength	0.25-0.35	Izod, ft. lbs. per in. of notch	D256-47T
Machining Qualities	Good		
<i>Thermal</i>			
Specific Heat	0.32	Cal. per gm. per C.	D696-44
Thermal Expansion	6-8 x 10 ⁻⁵	Per C.	C177-45
Thermal Conductivity	1.9 x 10 ⁻⁴	Cal. per sec. per C. C. (264 psi)	D648-45T
Heat Distortion	93-97		
Resistance to Heat	Will withstand hot water		
Deformation under Load	0.38-0.40	Percent, 4,000 psi at 50 C.	D621-48T
<i>Optical</i>			
Color Possibilities	Unlimited		
<i>Chemical</i>			
Specific Gravity	1.05-1.07		D792-48T
Moisture Absorption	0.04-0.05	Percent	D570-42

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ASTM NO.	PROPERTY	VALUE	UNITS	ASTM NO.
	<i>Chemical (Contd.)</i>			
D542-42 D63-49T	Burning Rate	Slow		D635-44
	Resistance to:			
	Alkalies	Excellent		
	Acids	Attacked by strong oxidizing acids		
	Solvents	Soluble in esters, aromatics, higher alcohols and chlorinated hydrocarbons.		
D92-48T	Water	Excellent		
D50-42	Oxygen	Excellent		
	Effect of Sunlight	Slight		
	<i>Electrical</i>			
D635-44	Power Factor	0.0001-0.0005	60-10 ⁶ cycles	D150-47T
	Dielectric Constant	2.5-2.7	60-10 ⁶ cycles	D150-47T
	Dielectric Strength	Greater than 400	Short time, volts per mil, 1/8" thick.	D149-44
	Volume Resistivity	Greater than 10 ¹²	Ohm-cm.	D257-49T
	Tendency to Track	None		
	Arc Resistance	120-135	Secs.	D495-48T
	<i>Molding</i>			
	Molding Quality	Excellent		
D150-47T	Injection Molding Temperature	350-700	F.	
	Injection Molding Pressure	4,000 and up	Psi	
	Effect on Metal Inserts	None		
D150-49T	Bulk Factor	1.6-1.9	Pellets	D954-48T
	Mold Shrinkage	.002-.008	In. per in.	

NOTE: All tests conducted at 23°C., 50% R.H. unless otherwise indicated.

Uses: The "Lustrex" molding compounds are used for housewares, luxury packages, refrigerator parts, toys, radio cabinets, television masks and lenses, wall tile, electronic components, military applications, notions, novelties, industrial pipe and fittings and appliance insignia.

Containers: Bags or drums.

Shipping Classification: Synthetic Resin Without Filler.

Literature: Technical Bulletins.

"NITRON" CELLULOSE-NITRATE SHEETS

General Information: A cellulose-nitrate plastic which continues as the most suitable material for many exacting uses such as drawing instruments, fountain pens, tool handles, tooth brush handles, heel coverings, watch and instrument crystals. The range of colors and special effects obtainable is unlimited. Easy to fabricate and can be molded, drawn or blown.

	Type	Thermoplastic
	Forming Quality	Limited see note 1
	Forming Temperature, F.	200-250
D654-48T	Forming Pressure, lbs. per sq. in.	100-5,000
	Tendency to Cold Flow	Slight to marked
	Extruding	See note 2
	Specific Gravity	1.35-1.85
	Specific Volume, cu. in. per lb.	20.5-19.8
D638-49T	Density, lbs. per cu. in.	0.0488-0.0504
D638-49T	Refractive Index ND	1.48-1.58
D638-49T	Ultimate Tensile Strength, lbs. per sq. in.	5,000-10,000
D885-48T	Elongation, %	10-50
D900-49T	Modulus of Elasticity, in tension, lbs. per sq. in.	2-4 x 10 ⁶
D900-49T	Impact Strength, Charpy (notched) ft. lbs. per in. of notch	4.0-6.6
D250-47T	Compressive Strength, lbs. per sq. in.	20,000-30,000
	Flexural Strength, lbs. per sq. in.	8,000-10,000
	Rockwell Hardness	R95-115
	Machining Qualities	Very good
	Burning Rate	Very rapid
D3600-44	Thermal Conductivity, cal. per cm ² per sec. per °C. per cm.	3.1-5.1 x 10 ⁻⁴
D57-45	Specific Heat, cal. per °C. per gram.	0.34-0.38
D3648-45T	Thermal Expansion per °F.	6.5-8.9 x 10 ⁻⁴
	per °C.	12.0-16.0 x 10 ⁻⁴
D621-48T	Maximum Recommended Service Temperature—continuous, F.	110 F.
	Softening Point, F.	160-195 Decomposes at 272 F. in 30 minutes
	Heat Distortion Point, F.	110-150
D902-48T	Effect of Heat, dry	Discolors on continued heating at 212 F. Decomposes at higher temperatures.
D50-42	Volume Resistivity, ohm-cm.	2-30 x 10 ¹¹

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Dielectric Strength, short time, volts per mil.....	600-1,200
Dielectric Constant, 60 cycles.....	6.7-7.3
Dielectric Constant, 10 ⁶ cycles.....	6.2
Power Factor, 60 cycles.....	0.06-0.15
Power Factor, 10 ⁶ cycles.....	0.07-0.10
Odor.....	None or camphorous
Taste.....	Tasteless or slight
Effect of Age.....	Slight hardening and yellowing
Effect of Sunlight.....	Yellows and embrittles
Effect of Ultraviolet Light.....	Yellows and decomposes on extended exposure
Effect of Weak Mineral Acids.....	Good resistance
Effect of Strong Acids.....	Attacked by oxidizing acids. Good resistance to most nonoxidizing acids at temperatures up to 100 F.
Effect of Weak Alkalis.....	Very slowly decomposes
Effect of Strong Alkalis.....	Decomposes
Water Absorption, 24 hrs. immersion, %.....	0.6-2.0
Effect of Hot Water.....	Softens, slight shrinkage
Effect of Cold Water.....	None
Effect of Metal Inserts.....	Largely noncorrosive, holds inserts well

Solubility:

Soluble in alcohols, ketones, esters. Insoluble in aromatic hydrocarbons, aliphatic hydrocarbons, mineral oils, animal oils, vegetable oils.

The above values except where otherwise noted are determined on samples conditioned and tested at 25 C. (77°F.) and 50% R. H.

NOTE 1: "Nitron" must be molded at low temperatures, hence only forming, drawing, and simple molding operations can be performed. Ordinary compression molding is impractical.

NOTE 2: "Nitron" is compounded with solvent for processes that require easy flowability, e.g. extrusion. Solvent-free compositions decompose at lower temperatures than are required to render them flowable.

Containers: Fiber cartons.

Shipping Classification: Cellulose Derivative, Plastic Sheets Pyroxylin.

POLYVINYL-BUTYRAL RESINS

General Information: Compounds of polyvinyl-butyrals resins were developed during the war as elastomers for fabric coatings, free film, and in molded and extruded products. Used as fabric coatings in such articles as military waterproof clothing, floor gear and liner bags.

By varying the degree of plasticization and the quantity and type of fillers and other ingredients these resins can be compounded into plastics ranging from hard, stiff molding materials to extremely soft and extensible products. Can be compounded to any color including a clear colorless transparent.

Polyvinyl-butyl plastics are unique among the vinyl elastomers in that by incorporation of certain ingredients, they can be cured in a manner similar to the vulcanization of rubber. This curing renders the plastic more resistant to heat and insoluble in common solvents. It also allows the rubber processor to employ the plastic in his usual operations in virtually the same way as rubber.

Soaps and common washing chemicals have no harmful effect other than slight extraction of plasticizer by hot water, resulting in some stiffening after many washings. Cured stocks can be washed in hot water, boiled or steam sterilized with no effect other than slight plasticizer extraction.

Because of the many variables present in a coating operation including coating technique and nature of the fabric, the following information is presented on a typical transparent vinyl-butyl composition tested in film form.

Properties:

Specific Gravity at 25°/25°C.....	1.077
Tensile Strength (ASTM D-412).....	1,650 psi
Elongation at Break.....	300%
Shore Hardness.....	40
Brittle Point (ASTM D-746).....	-49°C.
Modulus of Rigidity at 25°C.....	250 psi
at -20°C.....	37,000 psi
Heat Resistance (24 hrs. at 105°C.).....	2.9% weight loss
Water Absorption (24 hrs. at 25°C.).....	2.7%
Weathering	
Twin Arc Weatherometer.....	200 hrs.—negligible change
Sun Lamp.....	140 hrs.—very slight yellowing
Florida Exposure (2 months).....	180 sun hours

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On a typical coated fabric consisting of a 3.50 cotton sheeting coated with 1.5 ounces per square yard of Monsanto vinyl butyral, the following information was obtained:

Hydrostatic Strength	60 psi
Mullen.....	No seepage
Suter (50 cm. for 1 hr.).....	No effect
Flex Resistance (R. H. Macy, Bureau of Standards Test) 10,000 folds and creases.....	
Stain Resistance	
No stain caused by:.....	Coffee, tea, ketchup, mustard, ink, cooking oils and fats, jam
Stains caused by:.....	Printing ink, lipstick, shoe polish, iodine
Washability.....	Sustains ten washings in neutral soap and warm water without appreciable deterioration. The fabric can be ironed on the uncoated side.

Uses: Monsanto's transparent vinyl-butyl compositions are recommended for coating of textiles in the general fields of water-proof apparel, household furnishings, and related applications. Butyral can be used in household furnishings such as tablecloths (one of the more outstanding uses), upholstery, slip covers, draperies, bed spreads, cottage sets, dressing table skirts and countless others. The coating adds the valuable properties of water-proofness and stain resistance to most of the standard textile applications. Outside the home, a stain-resistant coating for automobile seat covers, outdoor furniture, and beach accessories offer additional uses. The resin is also recommended as a basis for various adhesive formulations, plasticizing of phenolic resins and similar industrial resin uses.

Containers: Drums.

Shipping Classification: Lacquer. Flammable (red label required).

Literature: Development Bulletins.

REINFORCED "VUELITE" CELLULOSE ACETATE (Laminated with Wire Screen for Protective Use)

General Information—Properties: Originally developed by Monsanto to provide a safe, shatter-resistant glazing material that would end the danger of flying glass during enemy air raids or under shell fire. Consists of 14x18-mesh wire screen (other types on special order) approximately 0.011" thick laminated between two sheets of clear cellulose acetate. Can be furnished in various thickness. Expansion and contraction through the full range of humidity and a temperature range from -40° F. to 150° F. is less than 1%. Remains flexible at -40° F. and can be bent over a 3' radius without cracking or crazing. Visible light transmission of sheets of standard thickness is 60-65% (calculated) and ultra-violet transmission at 3130 Angstroms 49% and at 3650 Angstroms 58%. Heat conductivity of sheets of standard thickness is approximately 50 B.T.U. per square foot, per hour, per degree F.

Weights For Estimating

GAUGE	SIZE	SQ. FT. PER SHEET	WEIGHT PER SQ. FT.	WEIGHT PER SHEET
.032-.034	20X50	6.944	0.359	2.49 lbs.
.034-.034	24X52	8.667	0.359	3.11 lbs.

In order to attain maximum yield it is advisable to study the sizes of pieces needed in respect to the sizes of the standard sheets available and cut accordingly.

Uses: Glazing for greenhouses, farm buildings, skylights, and many other installations where glass breakage is a problem, or where the material's high ultraviolet transmission and excellent insulating qualities would be advantageous.

Containers: Fiber cartons.

Shipping Classification: Cellulose Derivative, Plastic Sheets Other Than Pyroxylin.

"RESIMENE" MELAMINE-FORMALDEHYDE MOLDING POWDERS

General Information—Properties: Supplied as cellulose-filled molding compounds.

Thermosetting materials, excellent light-fastness; excellent resistance to acids, alkalis, boiling water and the effects of weather and age; remarkable surface hardness; high resistance; low water absorption; freedom from taste and odor. Special properties may be gained by variations of fillers. Excellent dimensional stability.

Containers: Drums.

Shipping Classification: Resins Synthetic—varies according to type and use.

Literature: Technical bulletins.

"RESINOX" PHENOL-FORMALDEHYDE MOLDING COMPOUNDS

General Information: Over a period of years, "Resinox" molding materials have been developed to meet practically every important industrial demand. They include a broad range of general purpose materials; acid, alkaline, water and heat-resistant materials; low-loss electrical materials; and a wide range of impact materials.

Since fillers vary the properties of "Resinox" molding compounds, the following table gives the range attained by the most common fillers of wood flour, cotton flock, mica and asbestos.

(Continued on next page)

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Properties:

Molding Quality	Fair-excellent
Compression Molding Temperature, °F	290-400
Compression Molding Pressure, lbs./sq. in.	2,000-4,500
Compression Ratio (bulk factor)	2.02-5.53
Mold Shrinkage, in. per in.	0.004-0.009
Specific Gravity	1.25-1.75
Specific Volume, cu. in./lb.	22.0-28.7
Tensile Strength, lbs./sq. in.	4,200-8,000
Modulus of Elasticity, lbs./sq. in. $\times 10^6$	8-45
Compressive Strength, lbs./sq. in.	20,000-35,000
Flexural Strength, lbs./sq. in.	3,000-15,000
Impact Strength, ft. lbs./in. of notch, Izod (ASTM)	0.26-0.70
Rockwell Hardness	M85-M125
Thermal Conductivity, 10^{-4} cal./sec./sq. cm./°C./cm.	3-20
Specific Heat, cal./°C./gm.	-0.25-0.36
Thermal Expansion $10^{-5}/^{\circ}\text{C.}$	2.0-7.5
Resistance to Heat °F. (continuous)	150-400
Softening Point, °F.	None
Distortion under Heat °F.	240-285
Tendency to Cold Flow	Very slight
Volume Resistivity, ohm-cms. (50% R.H. and 25°C.)	10^9-10^{12}
Dielectric Strength, short time, volts/mil., $\frac{1}{8}$ " thickness	250-500
Dielectric Strength, step-by-step, volts/mil., $\frac{1}{8}$ " thickness	200-400
Dielectric Constant, 60 cycles	5-20
Dielectric Constant, 10^4 cycles	4-20
Dielectric Constant, 10^6 cycles	4.5-20
Power Factor 60 cycles	0.04-0.30
Power Factor 10^4 cycles	0.04-0.20
Power Factor 10^6 cycles	0.005-0.10
Water Absorption, immersion 48 hrs. (%)	0.01-0.06
Burning Rate	Very low
Effect of Age	None
Effect of Sunlight	Light shades discolor
Effect of Weak Acids	None to slight
Effect of Strong Acids	Decomposed by oxidizing acids
Effect of Weak Alkalies	Slight to marked
Effect of Strong Alkalies	Decomposes
Effect of Organic Solvents	None on bleed-proof materials
Machining Qualities	Fair
Color Range	Limited

Uses: Recommended for such articles as clock cases, toys, buttons, telephones, knobs, business machine housings, miscellaneous electrical applications, closures, television, radio and air conditioning cabinets, etc.

Containers: Fiber drums and multiwall paper bags.

Shipping Classification: Resins Synthetic NOIBN With Filler.

Literature: "Resinox—A Monsanto Plastic," 12-page booklet.

"SAFLEX" LAMINATING PLASTIC FOR SAFETY GLASS

General Information—Properties: A flexible polyvinyl-butyl sheet plastic used as the interlayer in making "High-tens" safety glass. Available in rolls 750 ft. long, 0.015" thick for normal production, but heavier gauges possible if demand requires. Cut to required width.

The "Saflex" sheet acts as the bonding agent between the two glass sheets of the sandwich; when the glass is broken, serves best as a cushioning agent to absorb shock and an adhesive to hold broken pieces of glass together to prevent them from flying. Glass lamination will stand 18 feet ball drop test at 0°F. and 120°F. ($\frac{1}{2}$ lb. ball—12"x12" plate glass). The tough, flexible plastic gives protection at all normal temperature ranges.

For military vehicles and aircraft, multiple layer laminations of glass and "Saflex" are used for protection against small caliber bullets, bomb or shell fragments and flying debris.

Containers: Six and nine roll fiber carton pallets or fiber drums.

Shipping Classification: Resins Synthetic NOIBN Without Filler.

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SURFACE COATING RESINS

Standard Form: Dry powders, and solution in organic solvents, water emulsions.

"Lustrex" Latexes and Resins

"Lustrex" latexes and resins are stable aqueous dispersions of styrene (polymerized) for use in:

1. Protective coatings—to deposit films resistant to alkali, acid, alcohol and water.
2. Adhesives—as a base for adhesives for bonding paper, cloth, wood and other porous materials.
3. Paper coating—on decorative papers to give a flexible film with improved water and scuff resistance.
4. Water-soluble paints—for improved washability, smoother film appearance, better sealing properties and other advantages.
5. Wax compositions—to provide antislip properties, to improve water resistance, to improve heat stability, to increase hardness of softer waxes and to reduce dust pick-up.

"Resimene"

MELAMINE-FORMALDEHYDE—Butylated melamine resins unmodified and especially modified to meet the requirements of the surface coating industry. These organosoluble resins used in rapid baking industrial finishes are offered in a wide variety of solids and solvent combinations. As they vary in specific properties, they are of special interest to the formulator who desires to meet general trade conditions or to accentuate a given property to meet a specialty requirement.

"Resimene" surface coating resins are intended for use in conjunction with other resinous materials with which they are compatible (e.g. alkylid resins) in the formulation of various types of baking enamels. Each such resin contributes somewhat different properties. Enamel formulators make their choice of amino resins with regard to these properties.

All of the melamine resins impart a very high degree of exterior durability.

PHENOL-FORMALDEHYDE—"Resimene" P-97 is an outstanding phenolic resin in its class because of the excellent combination of chemical resistance it imparts and because it may be used with a wider range of modifying materials than is usual for its class.

UREA-FORMALDEHYDE—"Resimene" urea resins represent a low-cost means of imparting thermosetting properties to many types of industrial enamel coatings. "Resimene" U-920 is adaptable for catalyzed low-bake finishes for wooden articles as well as for high-solids, one-coat normal bake metal finishes.

Vinyl Resins

"BUTVAR"® B-73—A polyvinyl-butyral resin having low viscosity at high hydroxyl content. For use in coatings for bottle cap liners, can liners, metal lacquers to increase adhesion. Also where its good light resistance and adhesion qualities would be of paramount interest.

"BUTVAR"® B-76—A polyvinyl-butyral resin having both low viscosity and low hydroxyl content. For use in the formulation of wash primer, providing a binder which adheres well to all metal surfaces, even though they may be damp at the time of application.

RESIN F-770—A polyvinyl-formal resin having a low hydroxyl content and low solution viscosity. For use as the vehicle in wash primer types of coatings and in applications such as drum, can and tank linings in conjunction with phenolic resins.

Containers: Drums or tank cars.

Shipping Classification: Resins Synthetic—varies according to type and use.

Literature: Technical bulletins; Data Book.

"ULTRON" VINYL FILM

"Ultron" films are produced in a variety of gauges. Unsupported films are stainproof, flexible, tough and have high-tear resistance. "Ultron" films are waterproof, dustproof, and will resist cracking or stiffening on aging. They can be cleaned easily by merely wiping with a damp cloth. An extensive light-fast color range in transparents, translucent and opaques is available. Fabricating is fast and easy since this material can be stitched, cemented or electronically heat sealed.

Lightweight films are used extensively for shower curtains, tablecloths, aprons, closet accessories, inflated toys, protective covers in home and industry, raincoats, packaging and other related uses. Heavy films are embossed in a variety of surface finishes and are used for upholstery, shoes, handbags and other leather-like applications.

Containers: 200-yd. rolls in cardboard boxes. Jumbo rolls supplied on request.

Shipping Classification: Synthetic Resins NOIBN Without Filler.

"ULTRON" VINYL RESINS AND COMPOUNDS**Resin**

"Ultron" 300 resin is a polymer of vinyl chloride which is characterized by excellent mechanical and electrical properties, light and heat stability and chemical resistance.

"Ultron" resin is used to produce lightweight and heavy gauge film, sheeting, extrusion compounds for profile shapes and insulated wire and cables, and injection and compression molding compounds.

Molding Compounds

"Ultron" molding compounds with a wide variety of properties can be formulated. Flexible and rigid parts can be obtained according to the requirements. Fittings and parts molded of "Ultron" are particularly valuable in industries involving the use of chemicals.

Molding materials are used for parts requiring dimensional stability and a certain degree of flexibility such as gaskets, cushioning devices and similar applications.

(Continued on next page)

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Extrusion Compounds

"Ultron" extrusion compounds are used for wire and cable insulation, and flexible tubing. This material offers excellent electrical properties and exceptional resistance to moisture, flame, oxidation and abrasion. "Ultron" can be extruded on standard plastics extruding machines.

"Ultron" extrusion compounds are used for primary insulation in building wire, appliance wire and portable and flexible cord, as well as jacket insulation for cables. "Ultron" compounds are also used for garden hose, shoe and upholstery welting, medical tubing and miscellaneous profile shapes.

Containers: 50-lb. bags.

Shipping Classification: Synthetic Resin NOIBN Without Filler.

"ULTRON" VINYL SHEETING

Flexible "Ultron" pearl sheeting is a revolutionary development in the manufacture of configurations for vinyl sheeting. It has a beautiful, lustrous mother-of-pearl appearance which is not duplicated in any other currently available vinyl sheeting. An unlimited range of other than pearl configurations can be developed.

Flexible "Ultron" pearl sheeting is available in sizes up to 23"x56" unpolished and up to 22"x55" polished.

Containers: Fiber cartons.

Shipping Classification: Synthetic Resin NOIBN Without Filler.

"VUELITE" EMBOSSED SHIELD MATERIAL FOR FLUORESCENT LIGHTING

General Information—Properties: Embossed cellulose acetate, developed by Monsanto to serve as diffusing panels for fluorescent lighting fixtures.

Glare and brightness are eliminated by a suitable design that spreads the light evenly. The excellent light transmission factor of the material assures highly efficient light distribution.

Although a fluorescent fixture may be large in size, the addition of a "Vuelite" diffusing panel adds very little to its weight, thereby allowing the design of a low-weight fixture. The danger of breakage of "Vuelite" as compared with glass of the same size is very small.

"Vuelite" is easily formed to shape. Fixtures that require panels with more than a six-inch radius are fitted with diffusing panels by slipping flat sheets in position. Smaller sizes and intricate shapes are formed with inexpensive molds or tools while punch drilling, and cutting operations are carried out with ordinary tools.

"Vuelite" sheets are 20" x 50" in size, available in the following designs:

NUMBER	NAME	LIMITING GAUGE NOT UNDER	SIZE	DIRECTION OF DESIGN
4B	"H" Line	0.050"	20X47	Lengthwise
6B	Whipcord	0.040"	20X47	Lengthwise
8B	Silk	0.050"	20X49	Lengthwise
9B	Cobra	0.050"	20X47	Lengthwise
20B	Large Cube	0.050"	20X47	Both ways
27B	Mesh	0.050"	20X49	Lengthwise
42B	Aztec	0.040"	20X49	Crosswise
44B	Glow Worm	0.040"	20X49	Lengthwise
54B	Sahara	0.050"	20X47	Both ways
55B	No. 5174	0.050"	20X49	Both ways
65B	Large Crackle	0.040"	20X49	Both ways

Containers: Fiber cartons.

Shipping Classification: Cellulose Derivative, Plastic Sheets Other Than Pyroxylin.

"VUEPAK" RIGID TRANSPARENT PACKAGING MATERIAL

General Information—Properties: For the properties of "Vuepak" see "Fibestos" Cellulose-Acetate Sheets. Standard gauge of "Vuepak" are 0.005", 0.0075", 0.010", 0.0125", 0.015" and 0.020". In addition to continuous length rolls 30" and 60" wide sheets and cut pieces can be supplied.

A clear transparent sheet plastic that can be drawn, scored, beaded, folded, or stitched. With suitable inks, the surface can readily be printed in one or more colors.

Uses: Extensively used in the manufacture of durable rigid transparent containers, packages and displays for all types of consumer products. "Vuepak" is also widely used for index tabs, wallet windows and swings, table mats, transparent envelopes, laminated cards, passes, etc. Originally used chiefly for luxury items, "Vuepak" containers have now become a successful packaging medium for greeting cards, food products, candies, household appliances, cosmetics and dry products of all types. An important contributing factor to the broader use of "Vuepak" containers has been the improved efficiency of fabricating equipment and techniques in the plants of the more than two hundred firms now established as "Vuepak" fabricators. For special requirements "Vuepak" containers can be made with metal bottoms and tops, or in combinations with boxboard, paper, wire frames or wood.

Containers: Fiber cartons or drums.

Shipping Classification: Cellulose Derivative, Plastic Sheets Other Than Pyroxylin.

Literature: "Fabricating Fibestos and Vuepak," Production Information Bulletin No. 50.

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POTASSIUM AMMONIUM PHOSPHATE, MONO (Also known as ammonium potassium phosphate)

Molecular Weight: 251.128

Formula: $\text{KH}_2\text{PO}_4 \cdot \text{NH}_4\text{H}_2\text{PO}_4$

Standard Form: White crystals.

Uses: In pharmaceutical products for special medicinal purposes; fermentation of wines.

Grades: Technical crystals.

Containers: 350-lb. bbls.; 150-lb. kegs.

Shipping Classification: Potassium Phosphate NOIBN.

POTASSIUM METAPHOSPHATE

Molecular Weight: 118.08

Formula: KPO_3

Standard Form: Powder.

General Information—Properties: White powder; M.P. approx. 810°C.; practically insoluble in water; insoluble in alcohol.

Uses: Suggested for ceramic glazes; phosphate glasses; polishing agent.

Containers: 200-lb. net bbls.

Shipping Classification: Potassium Phosphate.

POTASSIUM PHOSPHATE, DI

Molecular Weight: 174.18

Formula: K_2HPO_4

Standard Form: Anhydrous solid; 60% solution in water.

General Information—Properties: Anhydrous; white hygroscopic powder, highly soluble, 100 gms. water will dissolve 233 gms. K_2HPO_4 at 25°C.; insoluble in alcohol; concentrated aqueous solutions are miscible with glycerin; pH of 1% solution 9.2, very hygroscopic; at 25°C. and 35% relative humidity, K_2HPO_4 absorbs water to form a 70% solution.

Uses: Humectant; fermentation correcting salt balance in evaporated milk, nutrient solutions; medicinals.

Containers: 350-lb. bbls.; 150-lb. kegs.

Shipping Classification: Potassium Phosphate.

POTASSIUM PHOSPHATE, MONO

(Also known as potassium dihydrogen phosphate and potassium biphosphate)

Molecular Weight: 136.09

Formula: KH_2PO_4

Standard Form: White crystals.

Typical Analysis: P_2O_5 , 51.69%; K_2O , 34.31%; ignition loss 13.24%; SO_4 none; pH 4.6.

Uses: To control pH of culture media in penicillin manufacture; special medicinal purposes.

Containers: 350-lb. net bbls.; 150-lb. net kegs; 100-lb. bags.

Shipping Classification: Potassium Phosphate.

POTASSIUM PHOSPHATE, TRI

Molecular Weight: 212.27

Formula: K_3PO_4

Standard Form: Powder.

General Information—Properties: White crystalline powder; soluble in water; insoluble in alcohol; very hygroscopic.

Grades: Hydrated.

Containers: 250-lb. net fiber drums.

Shipping Classification: Potassium Phosphate.

POTASSIUM PYROPHOSPHATE, TETRA

Molecular Weight: 330.34

Formula: $\text{K}_4\text{P}_2\text{O}_7$

Standard Form: Powder.

General Information—Properties: White powder, hygroscopic in air; pH value in 1% solution 10.4 at 25°C.; solubility 190 gms. in 100 gms. water at 25°C.

Uses: In textile oils and soaps to increase emulsifying values and to prevent formation of insoluble hard water soaps; clarifying agent; to improve cleansing action of soaps.

Containers: 350-lb. bbls.; 150-lb. kegs.

Shipping Classification: Washing Compound Dry.

Literature: "Tetra Potassium Pyrophosphate," Technical Bulletin P-23.

"PYDRAUL F-9" FUNCTIONAL FLUID

Standard Form: Liquid.

General Information—Properties: A clear, light amber, oily, nonflammable-type hydraulic fluid with excellent lubricity and pumping characteristics; highly resistant to mechanical shear and breakdown, and inert to the common metals of construction.

Uses: Hydraulic fluid in die casting machines, hydraulic presses, automatic welding machines and similar applications.

Containers: 55-gal. steel drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Pydraul F-9," Technical Bulletin O-75.

REODORANTS, RUBBER

(Also see Vanillin and Coumarin)

General Information—Properties: Monsanto provides, but does not manufacture, the following types of rubber reodorants for the convenience of its customers.

CIRODEX NO. 19—Pale yellow liquid; deodorizes; 0.15–0.20 lbs. used in 100 lbs. of rubber.

CIRODEX NO. 188—Pale yellow liquid; odor, lily; 0.20–0.50 lbs. used in 100 lbs. of rubber.

CIRODEX NO. 198—Pale yellow liquid; odor, musk; 0.20–0.50 lbs. used in 100 lbs. of rubber.

Containers: 5-lb. bottles.

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RESIN SC-2

Standard Form: Powder.

General Information—Properties: A linear polymer containing carboxyl groups scattered along its length; soluble in alkaline solution; non-putrefactive.

Uses: Thickening agent, protective colloid, emulsifying agent, starch additive, adhesive ingredient, coating resin when properly plasticized. Can substitute for casein in many applications.

Containers: 30-gal. fiber drums.

Shipping Classifications: Rail—Synthetic Resin NOIBN without filler. Truck—Synthetic Resin Powder.

Literature: Development Data Sheet MD-8.

RESIN SC-3

Standard Form: Powder.

General Information—Properties: The half methylamyl ester of Resin SC-2; soluble in aqueous alkaline solution and in organic solvents; forms water-resistant films.

Uses: Protective colloid, thickening agent, emulsifying agent, shellac substitute, protective film former.

Containers: 30-gal. fiber drums.

Shipping Classifications: Rail—Synthetic Resin NOIBN without filler. Truck—Synthetic Resin Powder.

Literature: Development Data Sheet MD-9.

RESIN SC-4

Standard Form: Powder.

General Information—Properties: The half secondary butyl ester of Resin SC-2; soluble in aqueous alkaline solution and in organic solvents; forms water-resistant films.

Uses: Protective colloid, emulsifying agent, protective film former, thickening agent. Can substitute for shellac in many applications.

Containers: 30-gal. fiber drums.

Shipping Classifications: Rail—Synthetic Resin NOIBN without filler. Truck—Synthetic Resin Powder.

Literature: Development Data Sheet MD-11.

"RESLOOM" HP MELAMINE-FORMALDEHYDE TEXTILE RESIN

Standard Form: Crystalline powder.

General Information—Properties: Fine, white crystalline powder; freely soluble in water; hygroscopic—contact with moisture must be avoided.

Uses: A melamine-formaldehyde type resin recommended for crush resistance and shrinkage control of wool, rayon and cotton fabrics. Application requires curing temperature of 300°F.

Containers: 55 and 5-gal. steel drums.

Shipping Classification: Synthetic Resin NOIBN without Filler.

Literature: "Resloom for Washable Woolens, Worsteds and Blends," Technical Bulletin T-8.

"RESLOOM" M-75 MELAMINE-FORMALDEHYDE TEXTILE RESIN

Standard Form: Liquid.

General Information—Properties: Water-clear 60% resin solution; freely soluble in water.

Uses: A melamine-formaldehyde type resin recommended for shrinkage control and stabilization of wool, cotton and rayon fabrics. Application requires curing temperatures of 300°F.

Containers: 55 and 5-gal. steel drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Resloom for Washable Woolens, Worsteds and Blends," Technical Bulletin T-8.

"RETARDER ASA"

Formula: Acetylsalicylic Acid.

Standard Form: White powder.

Specifications: Through 100 mesh 0.1% max. retained. M. P. 130°C. min.; Sp. Gr. 1.36; moisture .25% max.

Uses: Scorch retarder for rubber processing. Use .25% to .50% on the rubber.

Literature: "Monsanto Chemicals for the Rubber Industry," 48-page booklet.

"REZ" WOOD SEALER AND PRIMER

General Information—Properties: A synthetic resin primer and sealer. Provides a penetrating, preserving and protective "seal" for all wood surfaces, especially soft woods: Douglas Fir Plywood, pine, cedar, etc. Controls grain raise; minimizes moisture absorption and checking; equalizes fiber density and gives hard, uniform surface for smooth, easy, economical and durable finishes with paint, enamel or stain. One gallon covers approx. 600 sq. ft.

Uses: A primer and sealer under wax or varnish for high-grade finish for new or old floors. Eliminates dusting when applied to bare concrete floors.

Containers: 50-gal. drums; 5-gal. cans; 1-gal. cans (6/case); 1-qt. cans (12/case); 1-pt. cans (24/case).

Shipping Classification: Wood Filler Liquid.

Literature: "Rez," folder and "Craftsman's Tricks," folder; "Monsanto Wood Finishes for Home Decoration," 8-page booklet.

"REZGARD" A, FIRE RETARDANT FOR TEXTILES

Standard Form: Crystalline powder.

General Information—Properties: White, crystalline powder; pH 8.0; completely soluble in water.

Uses: Nondurable, flame-retarding agent for cotton and viscose fibers and fabrics.

Containers: 100-lb. paper bags.

Shipping Classification: Chemicals NOIBN.

Literature: "Rezgard," 18-page bulletin.

"REZGARD" E FIRE RETARDANT FOR TEXTILES

Standard Form: Liquid.

General Information—Properties: Clear, colorless 75% solution; Sp. Gr. 1.23; pH 7.0-7.2; completely soluble in water.

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DE Uses: Nondurable, flame-retarding agent for cotton, viscose and acetate fibers and fabrics.

Containers: 55 and 5-gal. nonreturnable drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Rezgard," 18-page bulletin.

REZITE™ WOOD SEALER

General Information—Properties: Supplied with various concentrations of water-resistant solids (varying from 12-32% in petroleum distillate). A series of industrial water-repellent sealers for wood. Used to minimize change in dimension of all types of lumber. Does not affect adversely the feel and appearance of wood, and surfaces properly treated may be painted or glazed.

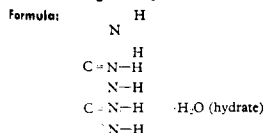
Containers: 50-gal. drums; tank cars.

Shipping Classification: Wood Sealer Liquid.

Literature: "Here's Why Plywood Is Rezited," leaflet.

SA-326™ ortho-BIPHENYL BIGUANIDE

Molecular Weight: 271.32



Standard Form: Powder.

General Information—Properties: White to faintly pink powder; M.P. above 150°C.; ash not over 0.5%; pH of 1% solution 8.0.

Solubility	25°C.	75°C.
Water	0.1%	0.3%
Alcohol	10%	25%
Carbitol	25%	85%
Cellosolve	40%	65%

Uses: A soap antioxidant effective in minute quantities in restraining the oxidation of soap and the resulting rancidity, discoloration and other adverse qualities, all of which must be avoided in producing a product of highest grade. Particularly valuable in preventing discoloration of refined toilet soaps.

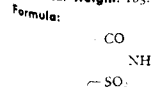
Containers: 50-lb. paper bags; 150-lb. drums.

Literature: "SA-326," Technical Bulletin P-101.

SACCHARIN, U.S.P.

(Also known as *saccharin insoluble*, and *ortho-sulfobenzimidide*)

Molecular Weight: 183.18



Standard Form: Powder.

Specifications: White crystalline powder; assay 98% min.; M.P. 227.0°C. min.; loss on drying 0.50% max.; solubility in 10% Na₂CO₃ (1:5) complete.

Uses: Sweetener for tooth pastes, mouth washes and pharmaceutical preparations. Approximately 500 times the sweetening power of sugar.

Containers: 100 and 25-lb. fiber drums; 5-lb. cartons; 1-lb., 1/4-lb. and 1-oz. cans.

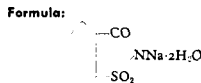
Shipping Classification: Chemicals NOIBN.

Literature: "Saccharin Monsanto, the Perfect Sweetener," folder; "The Sweetest Story Ever Told," booklet of saccharin-sweetened food recipes.

SACCHARIN, SODIUM, U.S.P.

(Also known as *soluble saccharin* and *sodium ortho-sulfobenzimide*)

Molecular Weight: 241.21



Standard Form: Crystalline solid.

Specifications: White crystals or powder; solubility in water (1:8) complete. Loss on drying at 125°C.: crystals 14.0% min., 14.35% max.; powder 5.3% min., 5.8% max.

Uses: Sweetener in tooth pastes, mouth washes and pharmaceutical preparations; in beverages and food in place of sugar for diabetics. Crystals approximately 375 times the sweetening power of sugar; powder approximately 425 times the sweetening power of sugar.

Grades: Soluble granular crystals; soluble powder.

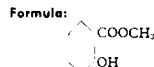
Containers: 100 and 25-lb. fiber drums; 5-lb. cartons; 1-lb., 1/4-lb. and 1-oz. cans.

Shipping Classification: Chemicals NOIBN.

Literature: "Saccharin Monsanto, the Perfect Sweetener," folder; "The Sweetest Story Ever Told," booklet of saccharin-sweetened food recipes.

SALICYLATE, METHYL, U.S.P.

Molecular Weight: 152.14



Standard Form: Liquid.

Specifications: Clear, colorless liquid; assay 98.0% min.; solubility in 70% ethyl alcohol (1:7) complete; solubility in N KOH (1:10) complete; Sp. Gr. 1.180-1.185 at 25-25°C.; conforms to U.S.P. test for heavy metals.

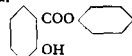
Uses: Pharmaceutical product; flavoring agent in foodstuffs and beverages; odorant in printing inks and insecticides.

Containers: 500 and 50-lb. drums.

Shipping Classification: Wintergreen Oil NOIBN.

Literature: "Methyl Salicylate Monsanto," folder; "Something About the Senses," 32-page booklet.

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SALICYLATE, PHENYL, N.F. (Salol)**Molecular Weight:** 214.21**Formula:****Standard Form:** Crystals.

Specifications: White crystals; solubility in ethyl alcohol 95% (1:6) complete; M.P. 41.0°C. min.; conforms to N.F. tests for chloride, sulfate, free acid, free phenol and free salicylic acid.

Uses: Pharmaceutical product.**Containers:** 100-lb. fiber drums; 25-lb. boxes.**Shipping Classification:** Chemicals NOIBN.**SALICYLATE, SODIUM, U.S.P.****Molecular Weight:** 160.11**Formula:****Standard Form:** Powder or crystals

Specifications: White powder or crystals; assay (as received) 99.5% min.; conforms to U.S.P. tests for heavy metals and carbonizable impurities; powder trace max. retained on 60 mesh, 1.0% on 80 mesh, 2.0% on 100 mesh.

Uses: Pharmaceutical product.**Containers:** 200 and 100-lb. fiber drums; 25-lb. cartons.**Shipping Classification:** Sodium Salts Chemicals NOIBN.**SALICYLIC ACID (ortho-Hydroxybenzoic Acid)****Molecular Weight:** 138.12**Formula:****Standard Form:** Needles or powder.

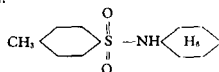
Specifications: U.S.P. Grade: White needles or powder; assay 99.5% min.; M.P. 158.0°C. min.; conforms to U.S.P. test for carbonizable substances; ash 0.05% max.; powder 0.4% max. retained on 100 mesh.

"B" Grade: White needles; assay 99.5% min.; M.P. 158.0°C. at start.

Uses: Manufacture of medicinals and dyestuffs; industrial preservative; intermediate in many organic syntheses.**Grades:** U.S.P. and technical.**Containers:** 150 and 100-lb. fiber drums; 25-lb. cartons.**Shipping Classification:** Salicylic Acid.**SALT CAKE (Sodium Sulfate, Anhydrous, Technical)****Molecular Weight:** 142.06**Standard Form:** Powder.**Grades:** 93-95% and 98-99%.

General Information—Properties: The 93-95% grade is typical white salt cake. The 98-99% grade is a specimen having a brownish color and Na₂SO₄ content of approximately 99%.

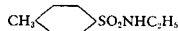
For refined sodium sulfate, see Sodium Sulfate, Anhydrous.

Uses: Manufacture of sulfate pulp, glass, sodium sulfide, treatment of boiler feed waters.**Containers:** Bulk car loads.**Shipping Classification:** Salt Cake.**"SANTICIZER" 1-H PLASTICIZER****(N-cyclohexyl para-Toluenesulfonamide)****Molecular Weight:** 253**Formula:****Standard Form:** Fine white crystals.

Specifications: M.P. 84°C. min.; moisture 0.25% max. color of melt APHA 250 max.

General Information—Properties: "Santicizer" 1-H is a white solid plasticizer which is relatively light stable and of a low order of toxicity. It is soluble in alcohol, esters, ketones, aromatic hydrocarbons and vegetable oils. It is insoluble in water. It is compatible with a wide variety of resins including most of the cellulosic and vinyl resins.

Uses: "Santicizer" 1-H is used in special crystallizing finishes, paper coatings, textile coatings and adhesives. It is a useful plasticizer in nitrocellulose lacquers, imparting relatively sharp softening point. It is also used to incorporate incompatible components such as paraffin wax for producing special coating effects such as crystallizing lacquer. For improved adhesion where flexibility in nitrocellulose is required, it is used in combination with dibutyl phthalate or "Santicizer" 160. It improves the moisture resistance of cellulose acetate and improves flexibility, hardness and light stability of ethyl cellulose. It is compatible with and imparts good flexibility to shellac and kauri resin.

Containers: 400-lb. (approx.) fiber drums.**Shipping Classification:** Resin Plasticizer.**Literature:** "Monsanto Plasticizers," 80-page booklet.**"SANTICIZER" 3 PLASTICIZER****(N-Ethyl para-Toluene Sulfonamide)****Molecular Weight:** 199.27**Formula:****Standard Form:** Crystalline solid.

Specifications: Practically white crystalline solid; M.P. 58.0°C. min.; acidity (as acetic acid) 0.10% max.; Sp. Gr. 1.166-1.176 at 65°/65°C.

Uses: "Santicizer" 3 is a solid, sulfonamide type plasticizer. Its compatibility with commonly used resins is limited but is widely used in combination with other plasticizers. Either in combination or alone it imparts high gloss, toughness and

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hardness. It sharpens the softening point of some thermoplastics, especially the cellulose esters. Its use makes possible such products as heat sealing lacquer coatings and adhesives. It is compatible with cellulose acetate to the extent of 50 parts per 100 parts of resin. In addition to its effect on toughness and gloss, it improves the flow of molding compositions and lowers moisture permeability. Its compatibility with polyvinyl formal is approximately the same as with cellulose acetate and its use improves flow and imparts excellent gloss.

Containers: 400-lb. fiber drums.

Shipping Classification: Resin Plasticizer.

Literature: "Monsanto Plasticizers," 80-page booklet.

"SANTICIZER" 8 PLASTICIZER

Mixture of *N*-Ethyl-ortho- and para-Toluenesulfonamides

Molecular Weight: 199.27

Formula:



Standard Form: Liquid.

Specifications: Light yellow, viscous liquid; odor slight, characteristic; unsubstituted amide 9-13%; acidity (as acetic acid, 0.1% max.

General Information—Properties: Readily miscible with all common organic solvents except the petroleum hydrocarbons in which it is only very slightly soluble. In water, soluble to approx. 0.13% at 23°C., 0.21% at 48°C.; solubility in water decreased by presence of ammonia but increased by other alkalis; soluble in castor oil, slightly soluble in china wood oil; insoluble in linseed oil; retentivity in cellulose acetate approx. 90 parts by weight to 100 of acetate; imparts a high degree of plasticity. A solvent for both nitrocellulose and cellulose acetate.

Uses: An excellent plasticizer for cellulose acetate, giving a brilliance and polish not obtainable with other plasticizers. Being practically insoluble in petroleum hydrocarbons, is a valuable plasticizer for coatings designed to withstand gasoline and related products. Has some plasticizing action on such protein compounds as casein, glue, soybean protein and corn protein. May be used alone or in conjunction with other materials such as glycerin or similar compounds; greatly increases the flexibility of shellac with considerable softening effect; also very useful with polyvinyl-acetate adhesives. "Santicizer" 8 is one of the best plasticizers known for synthetic polyamides such as nylon and related resins.

Containers: 500 and 50-lb. drums.

Shipping Classification: Resin Plasticizer.

Literature: "Monsanto Plasticizers," 80-page booklet.

"SANTICIZER" 9 PLASTICIZER

Mixture of ortho- and para-Toluenesulfonamides

Molecular Weight: 171.21

Formula:



Standard Form: Fine granules.

Specifications: Fine granular particles; M.P. 105°C. min.; acidity, pH 4.6 min.

General Information—Properties: Solubility quite low in coal-tar hydrocarbons and negligible in petroleum hydrocarbons; readily soluble in most other solvents, and in hot linseed, china wood and castor oils; soluble in water only about 1.0% at 34°C., but this is increased by the presence of alkali; least soluble of Monsanto plasticizers in ethylene dichloride and benzene; solubility in ethylene dichloride approx. 4%, in benzene approx. 1.5%, each at 30°C.

Uses: "Santicizer" 9 differs greatly from other plasticizers in its action. Relatively small amounts impart a gloss to polished articles, give smooth working and uniform curing of molded thermosetting products. Blends readily with most synthetic resins, does not impair the softening action of liquid plasticizers. Particularly valuable to the makers of molding compositions. In some phenolaldehyde resins it appears to act not only as a lubricant but also as a promoter, giving more uniform and thorough curing. In amounts of about 20 parts per 100, has a temporary plasticizing action on protein compounds such as corn protein and soybean protein. In melamine coating and laminating resins, "Santicizer" 9 promotes solution stability and compatibility, improves flowout during baking or curing, and increases impact strength and abrasion resistance.

Containers: 250-lb. fiber drums.

Shipping Classification: Resin Plasticizer.

Literature: "Monsanto Plasticizers," 80-page booklet.

"SANTICIZER" B-16 PLASTICIZER (Butyl Phthalyl Butyl Glycolate)

Molecular Weight: 336.37

Formula:



Standard Form: Liquid.

Specifications: Color APHA 45 max.; Sp. Gr. 1.097 ± 0.005 at 25°C.; refractive index 1.490 ± 0.002 at 25°C.; acidity (as acetic acid) 0.02% max.; essentially odorless; sulfur (copper strip test) negative.

General Information—Properties: A practically colorless liquid plasticizer; B.P. 219°C. at 5 mm.; does not crystallize at temperatures as low as -35°C.; water solubility 0.012% at 30°C.; extremely light-stable; darkens on heating above 290°C.

Uses: A widely used polyvinyl-chloride plasticizer where a tasteless and nontoxic composition is required; has received Bureau of Animal Industry approval for use in vinyl food wrappings. Imparts good heat and light stability. Especially useful in beverage tubing, food packaging, hospital sheeting and anatomical restorations. Solvent for nitrocellulose, compatible with most resins, imparting good flexibility. Miscible with castor, linseed and china wood oils; somewhat retards gel formation in the latter on heating. Swells crepe rubber but appears to have no effect on vulcanized rubber; an excellent plasticizer for chlorinated rubber, from 10 to 25 parts per 100 usually required. An exceptionally good plasticizer for polystyrene. Mixtures of "Santicizer" B-16 and "Santolite" resins may be used to plasticize casein and corn protein.

Containers: 500-lb. steel drums.

Shipping Classification: Resin Plasticizer.

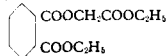
Literature: "Monsanto Plasticizers," 80-page booklet.

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"SANTICIZER" E-15 PLASTICIZER (Ethyl Phthalyl Ethyl Glycolate)

Molecular Weight: 280.27

Formula:



Standard Form: Liquid.

Specifications: Color APHA 20 max.; Sp. Gr. 1.180 ± 0.005 at $25^\circ/25^\circ\text{C}$; refractive index 1.498 ± 0.002 at 25°C ; acidity (as acetic acid) 0.02% max.; odor slight; sulfur (copper-strip test) negative.

General Information—Properties: Miscible with the common organic solvents except the petroleum hydrocarbons; when heated, miscible with vegetable oils but partially separates on cooling; solubility in water 0.0175% at 30°C .

Uses: Solvent for both nitrocellulose and cellulose acetate and for most resins. Light-fast; does not evaporate even from the thinnest films. With both cellulose acetate and nitrocellulose gives clear, tough flexible films which have greatly increased resistance to moisture penetration. Highly recommended for use with cellulose acetate. Has been approved by Bureau of Animal Industry as a nontoxic plasticizer; may be used in cellulose-based lacquers for paper or in foils to be used for food wrapping and packaging.

Containers: 500-lb. steel drums.

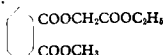
Shipping Classification: Resin Plasticizer.

Literature: "Monsanto Plasticizers" 80-page booklet.

"SANTICIZER" M-17 PLASTICIZER (Methyl Phthalyl Ethyl Glycolate)

Molecular Weight: 266.24

Formula:



Standard Form: Liquid.

Specifications: Color APHA 20 max.; Sp. Gr. 1.220 ± 0.005 at $25^\circ/25^\circ\text{C}$; refractive index 1.504 ± 0.002 at 25°C ; acidity (as acetic acid) 0.02% max.; odor, slight characteristic; sulfur (copper-strip test) negative.

General Information—Properties: A solvent for both nitrocellulose and cellulose acetate; imparts a high degree of plasticity undiminished even in extremely thin films exposed to air currents for a long time. Very light-stable and may be used in transparent or tinted articles without danger of yellowing. Not miscible with castor, linseed, or china wood oils or with petroleum hydrocarbons, readily miscible with other organic solvents; solubility in water 0.09% at 30°C , but imparts a considerable degree of resistance to moisture penetration to both nitrocellulose and cellulose-acetate films.

Uses: Probably the best cellulose-acetate plasticizer available. Dissolves "Santolite" resins, and as both are very resistant to petroleum products and compatible with so many film-forming materials, they make an excellent combination for producing gasoline-resistant coatings.

Containers: 550-lb. steel drums.

Shipping Classification: Resin Plasticizer.

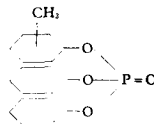
Literature: "Monsanto Plasticizers," 80-page booklet.

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"SANTICIZER" 140 PLASTICIZER (Cresyl Diphenyl Phosphate)

Molecular Weight: 340.31

Formula:



Standard Form: Liquid.

Specifications: Clear mobile liquid; color APHA 40 max. Sp. Gr. 1.208 ± 0.005 at $25^\circ/25^\circ\text{C}$; refractive index 1.560 ± 0.010 at 25°C ; acidity (as H_3PO_4) 0.01% max.

General Information—Properties: An essentially odorless and colorless liquid plasticizer; B.P. approx. 258°C . at mm.; pour point -37°C . approx.

Uses: Quite similar to tricresyl phosphate in that it imparts flame retardance, excellent permanence and chemical stability and equal heat and light stability; gives better low temperature characteristics and abrasion resistance; is stronger solvent and slightly more efficient than tricresyl phosphate.

Can be used wherever tricresyl phosphate is used. Improves flexibility imparted by "Santicizer" 140 makes it preferable to tricresyl phosphate in many applications such as varnishes, lacquers and paper coating. Considerably more compatible than tricresyl phosphate with cellulose acetate. It is a liquid, making it much easier to handle than triphenyl phosphate. Therefore, has found considerable use in cellulose acetate, especially when used in conjunction with other active plasticizers.

Other resins with which it is useful are cellulose nitrate ethyl cellulose, cellulose acetate-propionate, polyvinyl formal and polyvinyl butyral.

Containers: 55 and 5-gal. drums; tank cars.

Shipping Classification: Resin Plasticizer.

Literature: "Monsanto Plasticizers," 80-page booklet "Santicizer 140," Technical Bulletin O-D-103.

"SANTICIZER" 141 PLASTICIZER

Standard Form: Liquid.

Specifications: Color APHA 100 max.; odor, slight characteristic; Sp. Gr. $1.089-1.093$ at $25^\circ/25^\circ\text{C}$; refractive index $1.507-1.510$ at 25°C ; acidity (as H_3PO_4) 0.01% max.

General Information—Properties: "Santicizer" 141 combines into one compound the nonflammability of tricresyl phosphate, and the efficiency and permanence of older vinyl plasticizers. Imparts superior low-temperature flexibility, improved abrasion and moisture resistance and good electrical properties. Gives excellent resistance to embrittlement and deterioration to polyvinyl-chloride compositions when exposed to sunlight. Compatible in amounts up to 20% including 300 parts of plasticizer per 100 parts of resin.

Uses: A flame-retardant plasticizer developed by Monsanto especially for use in vinyl plastics. Excellent for use with polyvinyl-chloride films, sheets, extrusions, moldings, organosols and plastisols—in any application where efficient, permanent, flame-retardant plasticizer is required. Especially recommended in making flexible film for curtains, aprons, rainwear, and hospital sheeting.

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soft, pliable coatings for tablecloths, upholstery and draperies. "Santizicer" 141 possesses low toxicity and is suitable for products that will come in intimate contact with the human body. Useful in food wrappings and has been approved by the Bureau of Animal Industry as a nontoxic plasticizer.

Containers: 55-gal. steel drums.

Shipping Classification: Resin Plasticizers.

Literature: "Monsanto Plasticizers," 80-page booklet; "Santizicer 141," Technical Bulletin O-D-114; "Santizicer 141—the Safe Plasticizer," 14-page booklet.

"SANTICIZER" 160 PLASTICIZER

(Butyl Benzyl Phthalate)

Molecular Weight: 312.35

Formula: CCCCC(=O)OC1=CC=CC=C1C(=O)OCCCC1

Standard Form: Liquid

Specifications: Color APHA 75 max.; Sp. Gr. 1.111–1.119 at 25–25°C.; acidity (as phthalic acid) 0.02% max.

General Information—Properties: A clear, oily, liquid plasticizer having a slight characteristic odor. Shows good low temperature performance; possesses good heat and light stability and low volatility.

Uses: A relatively non-volatile plasticizer for polyvinyl chloride, polyvinyl chloride-acetate, polyvinyl butyral, ethyl cellulose and nitrocellulose. In addition, compatible with cellulose triacetate, polyvinyl formal, cellulose acetate-butyrate, cellulose-propionate, polyvinyl acetate and acrylics. Superior to many of the commonly used plasticizers in its permanence, oil resistance, flexibility and stability.

An excellent vinyl plasticizer where stability and flexibility are desired. Because of its high plasticizing efficiency, it is of outstanding value in increasing output of processing equipment such as extruders and calenders. Used successfully in vinyl organosols which are useful in the coating and free film field.

Very effective in cellulosic lacquers, imparting toughness, flexibility, low-moisture vapor transfer; has good permanence and heat and light stability. An excellent plasticizer for polyvinyl butyral and for low molecular weight polystyrene which is further polymerized later for coating and impregnating work.

Containers: 55 and 5-gal. drums; tank cars.

Shipping Classification: Resin Plasticizer.

Literature: "Monsanto Plasticizers," 80-page booklet; "Santizicer 160," Technical Bulletin O-D-110 R-1.

"SANTOBANE" DDT INSECTICIDE (Monsanto's Dichloro-Diphenyl-Trichloroethane, Technical; also known as 2,2-bis(para-chlorophenyl)-1,1,1-trichloroethane)

Molecular Weight: 354.50

Formula: ClC1=CC=C(C=C1)C(Cl)(Cl)C2=CC=C(Cl)C=C2

Standard Form: Granular powder.

Specifications: Fine or medium granular powder with a white-to-cream color; characteristic odor; crystallizing point 89.6°C. min.; organically bound chlorine 48.0–51.0%; pH of water extract, 6.0–8.0.

General Information—Properties: Bulking value approx. 45 lbs. per cu. ft.; soluble to varying degrees in common organic solvents; relatively insoluble in water.

Uses: When properly formulated possesses broad insecticidal qualities, acting both as a contact and stomach poison. An insecticide base used in dusting powders, emulsions, suspensions and solutions for the control of various agricultural and household insects.

Containers: 100-lb. bags.

Shipping Classification: Chemicals NOIBN.

Literature: "How to Control Insects with Santobane Monsanto DDT," 20-page booklet; "A Guide for Formulating Santobane Monsanto DDT," 21-page booklet.

"SANTOBRITE" SODIUM PENTACHLOROPHENATE, TECHNICAL

Molecular Weight: 288.36

Formula: [Na+].[O-]C1=CC=C(C=C1)C(Cl)(Cl)C(Cl)(Cl)C(Cl)Cl

Standard Form: Neutral powder, pellets or briquettes.

Specifications: Light tan powder, pellets or briquettes Assay 88.0% min. Free alkali (as NaOH) 0.5–0.9%.

General Information—Properties: Comparatively odorless; stable under ordinary atmospheric conditions when stored in a dry place; bulking value 52 lbs. per cu. ft. for briquettes; 25 lbs. per cu. ft. for powder; soluble in water and various organic polar solvents. Relatively inert toward organic compounds; solutions are noncorrosive to iron, steel, copper and brass.

"Santobrite" and its solutions may be irritating to the skin and mucous membranes of some individuals, and are somewhat toxic to man and the higher animals. For detailed information on uses and methods of handling, write for listed literature.

Uses: A water-soluble industrial preservative, fungicide and herbicide. Used for the manufacture of termite-resistant cellulose insulating board and for the preservation of wood, cellulose products, textiles, starches, adhesives, leather, oils, paints, latex and rubber. Also for control of slime and algae; manufacture of herbicides; as a fermentation disinfectant; for control of sap stain in green lumber.

Containers: Briquettes: 100-lb. bulk fiber drums; powder: 50-lb. paper bags in corrugated boxes; pellets: 100-lb. fiber drums.

Shipping Classification: Sodium Pentachlorophenolate (Wood Preservatives, NOIBN Dry)

Literature:

- "Santobrite for the Preservation of Adhesives," Technical Bulletin O-1
- "Santobrite and Santophen 20 for Paint Preservation," Technical Bulletin O-2
- "Santobrite for Microorganism Control in the Pulp and Paper Industry," Technical Bulletin O-5
- "Santobrite for the Control of Slime and Algae," Technical Bulletin O-15
- "Santobrite for the Preservation of Rubber Latex," Technical Bulletin O-17
- "Santobrite," Technical Bulletin O-23
- "Determination of Chlorophenols and Their Salts in Impregnated Materials," Technical Bulletin O-24

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"SANTOCEL" SILICA AEROGEL FOR INDUSTRIAL APPLICATIONS

Typical Analysis: SiO_2 , 89.5-91.5%; Na_2SO_4 , 2.5-3.5%; Al_2O_3 and Fe_2O_3 , 1.0%; volatile* 4.0-6.0%; pH (4.0 gms. in 100 cc. H_2O) 3.5-4.0.

*Volatile portion is water, alcohol and acetaldehyde.

General Information—Properties: Colors, white-transparent in vehicles; absolute density 17.1 lbs. per gal., 0.0585 gal. per lb.; Sp. Gr. 2.2; refractive index 1.464; oil absorption 2.0-2.5 g. oil/g. "Santocel" by ASTM. Dry bulk density: "Santocel" C, 6 lbs. per cu. ft.; "Santocel" CX and ARD, 3.5-4.0 lbs. per cu. ft. Average particle size: "Santocel" C, 3-5 microns in diameter; "Santocel" CX and ARD, 1-3 microns in diameter.

Uses: Flattening agent to produce matte finishes in coatings of all types (lacquers, varnishes, vinyl resin coatings and resin dispersions); bodying agent in printing inks; bulking agent for dry powders; free-flowing and anticaking agent for dry powders; insecticide for stored grain; application aid for rubber cements; reinforcing agent for rubber; bodying agent to make lubricating greases; dry grinding aid for DDT and other sticky powders; to raise heat distortion point, as in molded brake linings; mold lubricants for hard rubber; bodying agent for paint removers; antisetting agent for pigments; antislip agent in paste floor waxes; flattening agent for free film and textile coatings.

"Santocel" C is recommended for the above uses with the following exceptions: "Santocel" CX is recommended as a flattening agent for fabric coatings when the only method of incorporation is by stirring; "Santocel" CX is recommended as a bulking agent for dry powders because of its very low dry bulk density; "Santocel" ARD is recommended for making greases.

Grades: "Santocel" C, "Santocel" CX, "Santocel" ARD.

Containers: Multiwall bags 5 ply, net wt. 25-lbs. for C, 15 for CX and ARD.

Shipping Classification: Insulating Material NOIBN.

Literature: "17 Profit Building Industrial Applications of Santocel," 12-page booklet.

"SANTOCEL" SILICA AEROGEL FOR THERMAL INSULATION

Standard Form:

"Santocel" A—Sugar-sized particles

"Santocel" AO—"Santocel" A, with finely divided silicon added as opacifier for radiant heat

Typical Analysis: Approximate analysis for all insulation grades of "Santocel": SiO_2 , 93.0-96.0%; volatile* 0.5-1.5%; Na_2SO_4 , 2.5-3.5%; Fe_2O_3 and Al_2O_3 , 1%.

*Volatile is water, alcohol, acetaldehyde.

General Information—Properties: Known technically as a silica aerogel. Produced by chemically and physically treating sodium silicate to yield a silica gel in which the liquid phase has been replaced by air without destroying the gel structure. The resulting particle is 94% dead air contained within submicroscopic pores. Dry bulk density: "Santocel" A, 5 lbs. per cu. ft.; "Santocel" AO, 5.75 lbs. per cu. ft.; absolute density 17.1 lbs. per gal.; Sp. Gr. 2.2; specific heat 0.234; angle of repose 12.5°; thermal conductivity (mean temp. 60°F.) 0.150 BTU./Hr./Ft.²/in.²/F.

Uses: Adapted for any use where efficiency or space saving is a factor in thermal insulation, especially in freezers, shipping containers, insulated trucks, trailers and freight cars, liquid oxygen manufacture and storage, and cold-storage

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room doors, high-pressure steam lines. "Santocel" AO, recommended where mean temperatures exceed 100°F.

Containers: Multiwall paper bags 20-lbs. net; bulk car loads.

Shipping Classification: Insulating Material NOIBN.

Literature: "Santocel—The Chemical Insulation," 12-pg. booklet; information on specific applications sent on request.

"SANTOCHLOR" para-DICHLOROBENZENE

Molecular Weight: 147.01

Formula: ClC1=CC=CC=C1Cl



Standard Form: Crystals.

General Information—Properties: White crystals; crystallizing point 52.8°C. min.

Uses: As an intermediate in the production of dyestuffs; a deodorant; mothicide, larvacide, and in control of peach tree borers.

Grades: Standard crystal sizes:

No. 0 (approx. 1/4-inch pellets)—For peach tree borers and for insecticide and miscellaneous uses.

No. 1 (approx. 1/4-inch nuggets)—For shaker top cans.

No. 34 (approx. rice-size granules)—A combination of two uniformly sized crystals. For shaker top cans and for compressing into cakes.

Blocking mix—Mixture of sizes under 7 mesh.

Fines—Mixture of sizes less than 16 mesh.

Containers: 200 and 100-lb. fiber drums; cartons.

Shipping Classification: Paradichlorobenzol.

Literature: "Santochlor for the Control of Peach Tree and Stone Fruit Borers," Technical Bulletin O-18; "Santochlor for Clothes Moth Control," folder; "Santochlor," Technical Bulletin O-54; "Santochlor for Mildew Control," Technical Bulletin O-63.

"SANTODEX" OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An all hydrocarbon light-colored, viscous material. Typical inspection data: Sp. Gr. 0.899 at 60°/60°F.; viscosity 300 cts. at 210°F. flash point 350°F.

Uses: Designed specifically to improve the viscosity index of lubricating oil.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oils NOIBN.

Literature: "Santodex," Technical Bulletin O-48.

"SANTOLENE" C FUEL OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An oily liquid having the following typical properties: Saybolt Universal viscosity 52 seconds at 210°F., 259 seconds at 100°F.; Sp. Gr. 0.884 at 60°/60°F.

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Uses: Corrosion and rust inhibitor for use in light petroleum products.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santolene C," Technical Bulletin O-62.

"SANTOLENE" E FUEL OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An oily liquid having the following typical properties: Saybolt Universal viscosity 60 seconds at 210 F.; Sp. Gr. 0.95 at 60°/60 F.; sulfur 1.2%; barium 5.0%.

Uses: Sludge inhibitor for fuel oils to prevent burner screen clogging and reduce rusting. Concentrations as low as 0.02% have been used satisfactorily.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

"SANTOLITE" MHP INDUSTRIAL RESIN

Standard Form: Hard resin.

Specifications: Hard, practically colorless resin; refractive index (25 gms. in 75 gms. normal butyl acetate) 1.4280–1.4310; penetration (200 gm. load for 5 seconds at 25°C.) 2.0 mm. max.

General Information—Properties: An aryl sulfonamide-formaldehyde resin similar to "Santolite" MS in characteristics, except that it is much harder, softening at about 62°C., brittle at normal temperatures. Nearly colorless, well adapted to specialty and heat-sealing lacquers, fabric coatings, molding compositions and the like. Being incompatible with drying oils it cannot be used as a varnish material.

Exceptional features of this resin are the ease with which it may be worked into practically any formula using a cellulose ester and the wide variation of properties obtained by its use. Its high degree of solubility makes very concentrated solutions possible; its extreme compatibility with plasticizers and cellulose esters removes much of the danger of blushing, sweating and separation.

Uses: Can be used in spraying, dipping or brushing lacquers to make clear, colorless, odorless coatings of good gloss and adhesion. It does not materially increase the viscosity of the solution and permits the building up of a high-solids content in the lacquer. Compatible with all the common plasticizers.

Containers: 60-lb. cased cans.

Shipping Classification: Resin Synthetic NOIBN Without Filler.

Literature: "Santolite MHP," Technical Bulletin O-D-112.

"SANTOLITE" MS (80%) INDUSTRIAL RESIN

Standard Form: Liquid.

Specifications: Light-colored, viscous liquid; free-flowing at temperatures above 20°C.; composition 80% "Santolite" MS, 20% normal butyl acetate.

General Information—Properties: Soft, practically colorless resin made by the condensation of formaldehyde with aromatic sulfonamides.

Uses: "Santolite" MS, like all the "Santolite" resins, is compatible with both nitrocellulose and cellulose acetate; being a solvent for both, it can be used in any proportion. Forms brittle compositions with both these esters but the addition of a plasticizer makes such combinations permanently flexible. Readily miscible with all the common organic solvents and thinners except petroleum hydrocarbons; not miscible with varnish and paint oils. Excellent for water-white lacquers which will not be exposed to extreme weather conditions, its high gloss and lack of color being unusual in the resin field.

Containers: 540-lbs. approx., 55-gal. drums; 45-lbs. approx., 5-gal. drums.

Shipping Classification: Resin Synthetic NOIBN Without Filler.

"SANTOLUBE" 31 OIL ADDITIVE

Standard Form: Liquid or crystalline mass.

General Information—Properties: Essentially a phosphite ester of an alkylated phenol. Typical inspection data: Sp. Gr. 1.04 at 60°/60 F.; color NPA 4; phosphorus 5.7%; nitrogen 0.22%; chlorine 0.05%.

Uses: As an addition agent for engine oils where improvement in oiliness, film strength and oxidation resistance is desirable; from 0.25 to 0.5% is usually found to be the optimum concentration.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Chemicals NOIBN.

Literature: "Santolube 31," Technical Bulletin O-33.

"SANTOLUBE" 52 CUTTING OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An oiliness agent for cutting fluids having the following typical properties: Saybolt Universal viscosity 99 seconds at 210 F.; 2300 seconds at 100 F.; Sp. Gr. 0.97 at 60°/60 F.

Uses: An oiliness agent for cutting fluids to improve cutting, tapping and threading efficiency.

Containers: 55-gal. steel drums.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santolube 52," Technical Bulletin O-73.

"SANTOLUBE" 70 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An oily viscous liquid having the following typical properties: Sp. Gr. 0.926 at 60°/60 F.; Saybolt Universal viscosity 480 seconds at 210 F.

Uses: Rust inhibitor for turbine oils.

Containers: 55-gal. steel drums.

Shipping Classification: Chemicals NOIBN.

"SANTOLUBE" 203-A OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An oil-soluble complex metallo-organic with pronounced detergent properties. The active material is a barium base compound dissolved in a

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lubricating oil, the final product having the following typical properties: Saybolt viscosity 55 at 210°F.; Sp. Gr. 0.96 at 60°/60°F.; barium 5.0%; sulfur 1.2%.

Uses: A detergent additive for use in crankcase lubricating oils together with a corrosion inhibitor such as "Santolube" 394-C.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oils NOIBN.

Literature: "Santolube 203-A," Technical Bulletin O-58.

"SANTOLUBE" 205 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A blend of 10 parts of the detergent additive "Santolube" 203-A and 3 parts of the corrosion inhibitor "Santolube" 394-C.

Uses: An additive for compounding Heavy and Medium Duty engine lubricating oils.

Containers: 55-gal. drums; tank cars.

Shipping Classification: Petroleum Oils NOIBN.

Literature: "Santolube 205," Technical Bulletin O-57.

"SANTOLUBE" 303-A OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An oil-soluble, complex metallo-organic compound of the sulfurized alkyl phenol type containing about 4% barium and 0.9% sulfur. Physically, an oily material with the following typical properties: flash point 400°F.; Saybolt viscosity 100 at 210°F.; Sp. Gr. 0.94 at 60°/60°F.

Uses: A detergent additive for crankcase lubricating oils together with a corrosion inhibitor such as "Santolube" 394-C. Certain combinations of these two additives have received approval under U. S. Army 2-104B Specification.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oils NOIBN.

Literature: "Santolube 303-A," Technical Bulletin O-71.

"SANTOLUBE" 360 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark, viscous liquid with the following properties: Saybolt Universal viscosity 45-55 seconds at 210°F.; phosphorus 0.50-0.59%; sulfur 4.83-5.55%; barium 3.94-4.15%; lbs. per gal. 8.06 (approx.).

Uses: A detergent-dispersant, inhibitor-type additive for motor oils. Also functions as a pour point depressant. Recommended for compounding Heavy Duty oils of the 2-104B type.

Containers: 55-gal. drums.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santolube 360," Technical Bulletin O-66.

"SANTOLUBE" 374 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark, viscous liquid with the following approximate properties: Saybolt Universal viscosity 50-60 seconds at 210°F.; Sp. Gr. 0.965-0.985 at 60°/60°F.; phosphorus 0.72-0.84%; sulfur 6.42-7.24%; barium 3.52-3.72%.

Uses: A detergent-dispersant, inhibitor-type additive for motor oils. Also functions as a pour point depressant. Recommended for compounding Heavy Duty oils of the 2-104 type.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santolube 374," Technical Bulletin O-67.

"SANTOLUBE" 379 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark, viscous liquid with the following approximate properties: Saybolt Universal viscosity 50-60 seconds at 210°F.; Sp. Gr. 0.965-0.980 at 60°/60°F.; sulfur 5.40-6.16%; phosphorus 0.68-0.68%; barium 3.78-3.98%.

Uses: A detergent-dispersant, inhibitor-type additive for motor oils. Also functions as a pour point depressant. Recommended for compounding Heavy Duty oils of the 2-104B type.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum oil NOIBN.

Literature: "Santolube 379," Technical Bulletin O-68.

"SANTOLUBE" 382 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark, viscous liquid with the following approximate properties: Saybolt Universal viscosity 50-60 seconds at 210°F.; Sp. Gr. 0.965-0.980 at 60°/60°F.; phosphorus 0.39-0.46%; sulfur 4.56-5.31%; barium 6.28-6.45%.

Uses: A detergent-dispersant, inhibitor-type additive for motor oils. Also functions as a pour point depressant. Recommended for compounding Heavy Duty oils of the MIL-O-2104 type.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

"SANTOLUBE" 384 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark, viscous liquid with the following approximate properties: Saybolt Universal viscosity 45.0-55.0 seconds at 210°F.; Sp. Gr. 0.947-0.960 at 60°/60°F.; phosphorus 0.10-0.14%; sulfur 2.00-2.60%; barium 4.65-4.95%.

Uses: May be used as the principal detergent component along with a suitable inhibitor, in compounding Heavy Duty motor oils meeting Army and Navy specifications.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

"SANTOLUBE" 388 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: Tentative specifications are as follows: Saybolt Universal viscosity 50-60 seconds at 210°F.; phosphorus 0.45-0.55%; sulfur 5.6% barium 6.07-6.25%.

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Uses: A detergent-dispersant, inhibitor-type additive for motor oils. Also functions as a pour point depressant. Recommended for compounding Heavy Duty oils of the MIL-O-2104 type.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

"SANTOLUBE" 394-C OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An amber, viscous liquid with the following approximate properties: Saybolt viscosity 100 at 210°F.; Sp. Gr. 1.03 at 60°/60°F.; phosphorus 4%; sulfur 13.0%.

Uses: An effective and versatile antioxidant and bearing corrosion inhibitor for engine lubricating oils. Finds wide application in compounding Premium and Heavy Duty motor oils.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oils NOIBN.

Literature: "Santolube 394-C," Technical Bulletin O-30.

"SANTOLUBE" 395-X OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: An amber liquid with the following typical characteristics: Saybolt viscosity 80 at 210°F.; Sp. Gr. 1.007 at 60°/60°F.; phosphorus 3.7%; sulfur 11.0%; barium 1.1%.

Uses: An oxidation and bearing corrosion inhibitor for crankcase oils designed to meet Premium motor oil requirements as defined by the American Petroleum Institute.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oils NOIBN.

"SANTOLUBE" 520 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A detergent of the same chemical type as "Santolube" 303-A but with higher unit effectiveness. Typical inspection data: flash point 400°F.; Saybolt viscosity 65 at 210°F.; Sp. Gr. 0.96 at 60°/60°F.; barium 6.0%; sulfur 0.8%.

Uses: A detergent additive for use in crankcase oils together with a corrosion inhibitor such as "Santolube" 394-C.

Containers: 55-gal. drums; tank cars.

Shipping Classification: Petroleum Oils NOIBN.

"SANTOMASK" II ODOR-MASKING AGENT

Standard Form: Liquid.

General Information—Properties: Clear, light yellow liquid; pleasant characteristic odor; flash point approx. 210°F.; Cleveland open cup method; flow point below 0°C.; wt. per gal. approx. 8.7 lbs.

Uses: Odor-masking ingredient for interior paints, printing inks and similar products having objectionable natural odors. In addition to masking odors, may reduce or eliminate irritation to eyes, nose and throat caused by volatile components of some interior paints. Will not affect drying time, color durability and other characteristics of paints and inks.

Containers: 33 and 55-gal. drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Santomask for After-Odor Control of Interior Paint, Printing Inks and Some Other Odoniferous Formulations," Technical Bulletin O-16.

"SANTOMERSE" ALKYL ARYL SULFONATES

General Information—Properties: The salts of a homologous series of substituted aromatic sulfonic acids. The "Santomerse" series consists of six products, each distinctive in character and developed to meet a certain industrial need.

"Santomerse" D—neutral powder 100% active

"Santomerse" S—30% aqueous solution of "Santomerse" D

"Santomerse" 30X—25% aqueous solution of "Santomerse" D and 5% sodium sulfate

"Santomerse" No. 1—neutral flakes and bead form 40% active

"Santomerse" 80—neutral flakes 80% (min.) active

"Santomerse" No. 3—neutral powder 100% active

"Santomerse" No. 3—paste (75% "Santomerse" No. 3 in water)

"Santomerse" No. 55—neutral flakes 55% active

Uses: Highly efficient surface-active wetting, spreading, penetrating, emulsifying agents and detergents used in the following industries: textile, paper, leather, adhesive, rubber, insecticide, dust collection, soap, cosmetic, ceramic, detergent, metal cleaning, plating, emulsions, dyes, pharmaceutical, embalming fluid, laundry, steel, paint, cement, glue, felt, color, etc.

Containers: "Santomerse" D—115-lb. drums; "Santomerse" S—450 and 250-lb. drums; "Santomerse" 30X—450-lb. drums; "Santomerse" No. 1—75-lb. bags; 175, 200 and 225-lb. drums; "Santomerse" 80—200-lb. drums; "Santomerse" No. 3 (powder)—115-lb. drums; "Santomerse" No. 3 (paste)—175-lb. steel drums; "Santomerse" No. 55—55-gal. fiber drums.

Shipping Classification: Washing Compound NOIBN.

Literature:

"Santomerse No. 1," Technical Bulletin P-118

"Santomerse D, Santomerse No. 3, Santomerse S, Santomerse No. 3 Paste," Technical Bulletin P-123

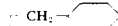
"Santomerse 30X," Technical Bulletin P-135

"Monsanto Chemicals for the Rubber Industry," 48-page booklet

"SANTOPHEN" 1 GERMICIDE (ortho-Benzyl-para-chlorophenol, Technical)

Molecular Weight: 218.68

Formula: OH



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Standard Form: Flaked solid.

Specifications: White to light tan or pink flakes; crystallizing point 45.0°C. min.; Sp. Gr. 1.202-1.206 at 55°/55°C.; free acidity (as HCl) 0.01% max.; odor slight phenolic max.

General Information—Properties: "Santophen" 1 possesses high bactericidal and fungicidal activity, but low toxicity to higher animals. When properly formulated for disinfectant use, it is considered nonirritating in use dilutions. Insoluble in water, but highly soluble in alcohol and other

(Continued on next page)

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organic solvents; dispersible in aqueous media with the aid of soaps or synthetic dispersing agents. Noncorrosive to most metals or other engineering materials.

Uses: Used as the active principle, or as an enhancing agent for disinfectants.

Containers: 55 and 22-gal. lacquer-lined drums.

Shipping Classification: Disinfectant Other Than Medicinal NOIBN.

Literature: "Santophen 1 For Use In Disinfectants," Technical Bulletin O-51 (Preliminary).

"SANTOPHEN" 20 PENTACHLOROPHENOL, TECHNICAL

Molecular Weight: 266.35

Formula: OH



Standard Form: Flakes.

Specifications: Dark, grayish flakes; crystallizing point 174.0°C. min.; alkali insoluble material 1.0% max.; assay 96.0% min.; pine oil solution NPA 5.5 max.

General Information—Properties: Chlorophenol odor; bulking value 45.5 lbs. per cu. ft.; stable under ordinary conditions; relatively non-hygroscopic and unreactive chemically; soluble to various degrees in organic solvents; relatively insoluble in water.

"Santophen" 20 and its solutions and formulations may be irritating to the skin and mucous membranes and are somewhat toxic to man and the higher animals. Precautions suggested for handling should be observed.

Uses: Highly toxic to fungi, termites and many forms of bacteria. Used industrially where the growth of microorganisms must be prevented or controlled; to protect wood against rot, termites and Lyctus (Powder-Post) beetles; as an effective herbicide. "Santophen" 20 is used frequently in oil solutions or as the sodium salt (see "Santobrite").

Containers: 100-lb. fiber drums.

Shipping Classification: Wood Preservatives NOIBN, Dry (Pentachlorophenol).

Literature:

- "Santophen 20," Technical Bulletin O-25
- "Santobrite and Santophen 20 for Paint Preservation," Technical Bulletin O-2
- "Chemicals for Termite Control," Technical Bulletin O-13
- "Determination of Chlorophenols and Their Salts in Impregnated Materials," Technical Bulletin O-24
- "Toxicology and Dermatology of Pentachlorophenol and Sodium Pentachlorophenate," 18-page booklet
- "Destroy Weeds with Monsanto Santophen 20," Monsanto Progress Report
- "Building with Santophen 20 Preserved Wood," folder
- "The Killers in the Field," 35-page booklet
- "Prevent This with Monsanto Santophen 20," folder
- "Penta," 25-page booklet
- "Penta Chlorophenol Monsanto's Santophen 20," 12-page booklet
- "Wood Preserving Applications with Monsanto's Penta," 7-page booklet
- "Fence Posts," folder

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"SANTOPOID" 29 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark, oily, viscous liquid with the following typical properties: Sp. Gr. 1.09 at 60°/60°F.; flash point 295°F.; viscosity 55 cts. at 100 F.; sulfur 8.5%; chlorine 23.0%; phosphorus 0.56%; metals none.

Uses: "Santopoid" 29 in suitable base oils is approved at 6.5% by weight for U. S. Army 2-105B Specification.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santopoid 29," Technical Bulletin O-47.

"SANTOPOID" 32 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A foam-inhibited, dark, oily, viscous liquid with the following typical properties: Sp. Gr. 1.18 at 60°/60°F.; sulfur 7.4-9.0%; chlorine 24.5-27.5%; phosphorus 0.49-0.59%; Saybolt Universal viscosity 80-90 seconds at 210 F.; flash point 250 F.; color, ASTM (dilute) 5/4 min.

Uses: Recommended for compounding gear lubricants designed to meet Military Specification MIL-L-2105.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santopoid 29," Technical Bulletin O-47.

"SANTOPOID" 33 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A foam-inhibited, dark, oily, viscous liquid with the following typical properties: Sp. Gr. 1.11 at 60°/60°F.; flash point 250 F.; Saybolt Universal viscosity 60 at 210 F.; sulfur 8.5%; chlorine 25.0%; phosphorus 0.56%.

Uses: Recommended for compounding gear lubricants designed to meet Military Specification MIL-L-2105.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santopoid 29," Technical Bulletin O-47.

"SANTOPOID" 34 OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A foam-inhibited, amber, oily, viscous liquid with the following typical properties: Sp. Gr. 1.11 at 60°/60°F.; flash point 250 F.; sulfur 7.9%; chlorine 25.0%; phosphorus 0.55%.

Uses: Recommended for compounding gear lubricants designed to meet Military Specification MIL-L-2105.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santopoid 29," Technical Bulletin O-47.

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SANTOPOID" S OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark, oily, viscous liquid, chemically a chlornaphtha xanthate; Sp. Gr. approx. 1.20 at 60 °F.; flash point 250 °F.; viscosity 65 cts. at 100 °F.; sulfur 11%; chlorine 34%.

Uses: "Santopoid" S at 10% by weight in mineral oil is approved under Federal Specification VV-L-761 for extreme pressure lubricants. Normally 7.5% by weight is sufficient to compound commercial lubricants satisfactory for hypoid and other gears. Lower percentages are used for milder E. P. Products.

Containers: 55-gal. steel drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santopoid S and Santopoid S-RI," Technical Bulletin O-32.

SANTOPOUR" OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark liquid with the following typical characteristics: flash point 400 °F.; Saybolt viscosity 60 at 210 °F.; color ASTM (dil.) 4½; neutralization number 0.15; pour point plus 10 °F.

Uses: A pour point depressant for petroleum oils.

Containers: 55-gal. drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santopour-Santopour B," Technical Bulletin O-61.

SANTOPOUR" B OIL ADDITIVE

Standard Form: Liquid.

General Information—Properties: A dark liquid with the following typical characteristics: flash point 400 °F.; Saybolt viscosity 55 at 210 °F.; color ASTM (dil.) 5; neutralization number 0.3; pour point 0 °F.

Uses: A pour point depressant for petroleum oils.

Containers: 55-gal. drums; tank cars.

Shipping Classification: Petroleum Oil NOIBN.

Literature: "Santopour-Santopour B," Technical Bulletin O-61.

SANTOSITE" SODIUM SULFITE ANHYDROUS, TECHNICAL

Molecular Weight: 126.06

Formula: Na₂SO₃

Standard Form: Powder.

Specifications: Tan to slightly pink crystalline powder; foreign odor very slight max.; assay (Na₂SO₃) 93.0% min.; color of filtrate from 10% solution in water not darker than APHA 250.

General Information—Properties: Will oxidize to sodium sulfate if not kept dry. Normally contains less than 1% sodium chloride; less than 0.1% iron; less than 0.2% insoluble; less than 0.2% organic matter. The balance of impurity is sodium sulfate. The unfiltered water solution has a brown color due to suspended Fe(OH)₃. Normally all of the product will pass through a No. 20 U. S. Standard sieve.

Uses: As a reducing agent in oxygen removal from boiler feed water; depressant in ore flotation; manufacture of rubber, paper and cordage. When added to chrome tanning liquor produces a milder tanning agent which gives leather a tighter grain and a finer break. Highly efficient in the semi-chemical pulping of straw and wood for paper manufacture; is being developed as an impregnant to facilitate grinding of pulp wood logs.

Containers: 100-lb. paper bags.

Shipping Classification: Sodium Sulfite.

Literature: "Santosite for Removing Oxygen from Boiler Feed Water," Technical Bulletin O-26; "Santosite the Milder Pulping Agent," folder.

"SANTOTAN" KR BASIC CHROME SULFATE

Formula: Contains approx. 50% of Cr₂(SO₄)₂(OH)₂.

Standard Form: Crystals.

Specifications: Dark green crystals; solution in water (5:500) clear; basicity (Cr₂O₃/SO₃) 101-105; basicity (Schorlemmer) 37.3-39.7; chromium as Cr₂O₃ 23.9% min.

Uses: In chrome tanning of calf, cow and horse hides and sheepskins.

Containers: 100-lb. paper bags.

Shipping Classification: Tanning Extract Dry NOIBN.

"SKYDROL" FUNCTIONAL FLUID

Standard Form: Liquid.

General Information—Properties: A clear, green, mobile, nonflammable-type hydraulic fluid with outstanding lubricity, stability, noncorrosiveness, good viscosity and resistance to oxidation.

Uses: Hydraulic fluid in cabin superchargers, expansion turbines for air-conditioning systems and the hydraulic system itself in aircraft.

Containers: 475, 45 and 9-lb. drums.

Shipping Classification: Chemicals NOIBN.

Literature: "More Safety in The Air With Monsanto Skydrol," 12-page booklet; "Skydrol," Technical Bulletin O-D-600.

SODIUM ACID PYROPHOSPHATE

(Also known as disodium dihydrogen pyrophosphate and acid sodium pyrophosphate)

Molecular Weight: 221.97

Formula: Na₂H₂P₂O₇

Standard Form: Powder.

General Information—Properties: White powder, soluble in water; min. neutralizing value 74; pH of 1% solution 4.2.

Uses: As baking acid for prepared flours, doughnut flours; in manufacture of baking powders and baking creams; in oil well drilling muds.

Grades: Food and commercial. Food grade meets all U. S. and State Pure Food Law requirements.

Containers: 100-lb. bags; 350 and 100-lb. drums.

Shipping Classification: Sodium Phosphate.

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SODIUM AMMONIUM PHOSPHATE

(Also known as microcosmic salt, sodium ammonium hydrogen phosphate, salt of phosphorus, phosphorus salt and fusible salt of urine)

Formula: $\text{NaNH}_2\text{HPO}_4 \cdot 4\text{H}_2\text{O}$

Standard Form: Crystals.

General Information—Properties: Transparent, white efflorescent, monoclinic crystals; gives off water and ammonia on heating leaving NaPO_3 ; contains above 32% P_2O_5 , 7.5% NH_3 and 14% Na_2O .

Uses: Principally in analytical laboratories for standardizing uranium solution; for determination of Mg and Mn; as a reagent in blow pipe analysis.

Grades: Commercial.

Containers: 300-lb. bbls.; 150-lb. kegs.

Shipping Classification: Sodium Phosphate.

SODIUM BENZOATE

Molecular Weight: 144.11

Formula: COONa



Standard Form: Powder.

Specifications: U.S.P. Grade: Thin white flakes or white powder; solubility in water (10:18 at 25°C.) complete; solubility in 90% ethyl alcohol (1:50 at 25°C.) complete; N/10 alkali or acid per 2 gm. sample 0.2 ml. max.; pH 6.8–10.4; moisture 0.50% max.; assay 99.0% min.; chlorides (as NaCl) 0.05% max.; sulfates (as Na_2SO_4) 0.05% max.

Technical Grade: White or slightly tinted powder; assay 99.0% min. (dry basis); solution in water (10:18) essentially complete but slightly inferior to U.S.P. quality; chlorides (as NaCl) 0.6% max.; sulfates (as Na_2SO_4) 0.6% max.; phthalic acid, 0.1% max.

Uses: U.S.P. Grade: For preserving foods, tobacco and medicinal preparations.

Technical Grade: As an industrial preservative and rust inhibitor.

Grades: U.S.P. and Technical.

Containers: 100, 50 and 25-lb. fiber drums.

Shipping Classification: U.S.P.: Food Preserving Compound NOIBN; Technical: Chemicals NOIBN.

Literature: "Preserving with Monsanto Sodium Benzoate," folder; "Benzoic Acid and the Benzoates," 16-page booklet.

SODIUM BISULFATE (Nitric Cake)

Molecular Weight: 120.07

Formula: NaHSO_4

Standard Form: Globular.

Typical Analysis: 37% H_2SO_4 available.

Uses: Used to replace either sulfuric acid or combination of sulfuric acid and Glauber's salt. One hundred lbs. nitric cake is approximately equivalent to 39.8 lbs. 66° sulfuric acid and 147 lbs. Glauber's salt.

Used principally in viscose rayon spinning baths; dyeing woolen goods; refining nickel ores; manufacture of sulfate pulp; in tanneries for pickling, deliming and making one-pot (tan solutions); as an acid scour for household use; in agriculture for disinfecting soil; as a bowl cleaner in sanitary trade.

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Containers: 100-lb. polyethylene bags; 100-lb. plywood kegs; 330 and 400-lb. fiber drums; 470-lb. steel drum bulk carloads.

Shipping Classification: Sodium Bisulfate (Nitric Cake).

SODIUM BISULFITE

Molecular Weight: 104.07 (Solution); 190.13 (Anhydrous)

Formula: NaHSO_3 (Solution); $\text{Na}_2\text{S}_2\text{O}_3$ (Anhydrous).

Standard Form: Solution: 33°Bé. containing approx. 21% SO_2 ; wt. per gal. 10.78 lbs. Anhydrous (sodium metabisulfite): 66% SO_2 (approx.).

Typical Analysis:

	SOLUTION	ANHYDROUS
SO_2	21.5%	66%
Na_2SO_4	3.00	1.5
Fe	0.006	0.002

Uses: In dye manufacture; as source of SO_2 for reducing sodium bichromate to basic chrome sulfate in tanning; bleaching of vegetable tan extracts; production of hydrosulfite for vat dyeing; antichlor in bleaching ground wood bleaching dyes out of wooden coloring drums used for dyeing leather; antichlor in pulp bleaching; antichlor in laundries; bleaching of straw, rabbit fur, sugar syrups, glue and glucose. (See table in general data section.)

Containers: Liquid—550-lb. tight hardware bbls.; Anhydrous—400-lb. fiber drums; 100-lb. moisture-proof paper bags.

Shipping Classification: Sodium Bisulfite Dry or Sodium Bisulfite Liquid.

SODIUM FERRIC PYROPHOSPHATE

Formula: $\text{Na}_2\text{Fe}_2(\text{P}_2\text{O}_7)_3 \cdot x\text{H}_2\text{O}$

Standard Form: Powder.

General Information—Properties: A finely subdivided powder; soluble in hydrochloric acid; insoluble in water contains min. of 15.5% iron.

Uses: For iron enrichment of flours, cereals, food beverage. It does not induce rancidity in cereal products.

Containers: 100-lb. net weight containers.

Shipping Classification: Chemicals NOIBN.

SODIUM FLUOROACETATE (Compound 1080)

Molecular Weight: 100.03

Formula: FCH_2COONa

Standard Form: Powder.

Specifications: Fine white powder; active material 90.0% min.; inorganic fluorine 1.0% max.; chlorides (as NaCl) 1.0% max.; insoluble material in 50% solution in water 0.2% max. at 30°C.

Typical Analysis: Assay 95.6%; inorganic fluorine 0.93% chlorides 0.76%; alkalinity (as NaOH) 0.17%; weight loss 0.33% at 110°C.; 90% through 35 mesh; water-insoluble material 0.06%.

Uses: Water-soluble rodenticide which may be used for the control of all species of rats and field rodents. Sales are made only to federal, state, county and city agencies and to qualified pest control operators.

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WATER_PCB-00034224

Containers: Wooden cases containing 50, 25 and 2—8-oz. friction-top tin cans; wooden cases containing 64 and 16—1-oz. friction-top tin cans.

Shipping Classification: Vermin Exterminator. "Poison" label required.

Literature: Brochure prepared by the Insect Control Committee, Rodent Control Subcommittee of the National Research Council, Washington 25, D. C.

SODIUM METAPHOSPHATE, LOW pH

Formula: $(\text{NaPO}_3)_x$

General Information—Properties: Clear, water-soluble glass; very hygroscopic pH of 1% solution 5.5.

Containers: 100-lb. net fiber drums.

Shipping Classification: Sodium Phosphate.

SODIUM METAPHOSPHATE (Insoluble)

Standard Form: Powder.

General Information—Properties: White powder, generally stated to be the monometaphosphate— NaPO_3 ; soluble in hot concentrated H_2SO_4 ; insoluble in water.

Uses: Suggested as a mild abrasive; has mild polishing power; softens hard water, probably by base ion exchange method.

Containers: 100-lb. bags.

Shipping Classification: Sodium Phosphate.

SODIUM PHOSPHATE, DI, ANHYDROUS

(Also known as phosphate of soda, sodium phosphate dibasic, secondary sodium phosphate and exsiccated sodium phosphate)

Molecular Weight: 141.98

Formula: Na_2HPO_4

Standard Form: Powder.

General Information—Properties: Soluble in water; insoluble in alcohol; on exposure to air will absorb 2–7 mols H_2O depending on humidity and temperature; loses molecular water at 240 °C. forming tetrasodium pyrophosphate; pH of 1% solution 8.8 at 25°C. One lb. anhydrous product equivalent to 2.5 lbs. crystalline (dodecahydrate).

Uses: For boiler water treatment; in making glazes for potteries, porcelains and chinaware; as an emulsifier in making process cheese; in various chemical processes; in manufacture of dyestuffs such as Schuitzer's green; in the preparation of enamels; in tinning and soldering; in leather tanning; as a bath ingredient in galvanoplastic work; in the manufacture of pigments such as cobalt phosphate; in the weighting of silk and impregnating of textiles in dyeing and calico printing; in the adjustment of condensed milk; medicinal.

Grades: Food (Granular and Powdered); Medicinal, U.S.P.

Containers: 100-lb. bags; 350 and 100-lb. drums.

Shipping Classification: Disodium Phosphate

SODIUM PHOSPHATE, DI, DUOHYDRATE

(Also known as phosphate of soda, sodium phosphate dibasic, secondary sodium phosphate)

Molecular Weight: 178.0

Formula: $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$

Standard Form: Crystalline powder.

General Information—Properties: Soluble in water, insoluble in alcohol; equivalent to 82% of sodium phosphate, di, anhydrous (see preceding product for further information on properties.)

Uses: Especially recommended for use in preventing coagulation during condensation of milk and as an emulsifying agent in processing cheese.

Grades: Food (conforms with Federal and State Pure Food Laws).

Containers: 100-lb. bags.

Shipping Classification: Disodium Phosphate.

SODIUM PHOSPHATE, HEMI (Hemibasic)

Molecular Weight: 218.00

Formula: NaH_2PO_4

Standard Form: Crystals or granules.

Typical Analysis: Na_2O , 14.2%; P_2O_5 , 61.7%.

General Information—Properties: Hygroscopic crystals or granular material; solubility 190 gms./100 gms. of water at 32°C.; pH of 1% solution 2.2; M.P. approx. 128 °C.

Uses: Suggested for treating silage; as a strong phosphoric acid in solid form; metal cleaning.

Containers: 600-lb. net bbls.

Shipping Classification: Sodium Phosphate.

SODIUM PHOSPHATE, MONO

(Also known as sodium phosphate, monobasic; sodium dihydrogen phosphate; sodium biphosphate; monosodium orthophosphate and acid sodium phosphate)

Molecular Weight: 119.99

Formula: NaH_2PO_4

Standard Form: Powder.

General Information—Properties: Contains not less than 58% P_2O_5 , pH value of 1% solution 4.6.

Uses: For conditioning boiler water and in electroplating.

Grades: Food; commercial.

Containers: 100-lb. bags; 350 and 100-lb. drums.

Shipping Classification: Sodium Phosphate.

SODIUM PHOSPHATE, TRI

(Also known as normal sodium phosphate; sodium phosphate, tribasic; tertiary sodium phosphate and TSP)

Molecular Weight: 380.16

Formula: $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$

Standard Form: Crystalline material.

Specifications: White crystalline material, uniformly sized; quickly soluble in water giving an alkaline reaction, pH of 1% solution 11.8.

Uses: Principally in cleaners and detergents for both household and industrial use; in fruit cleaning to remove insecticide sprays and inhibit growth of fruit mold; in water treatment for softening and conditioning water.

Containers: 100-lb. bags; 325 and 100-lb. drums.

Shipping Classification: Trisodium Phosphate.

Literature: "T.S.P.," leaflet.

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SODIUM PHOSPHITE, DI, ANHYDROUS**Molecular Weight:** 125.98**Formula:** Na_2HPO_3 **Standard Form:** Crystalline powder.**General Information—Properties:** White crystalline, hygroscopic powder; pH of 2% solution 7.0; decomposes without melting at approx. 130°C.; assay 63–65% H_3PO_3 .**Uses:** As a mild reducing agent in neutral solution, humectant, antioxidant.**Shipping Classification:** Chemicals NOIBN.**SODIUM PHOSPHITE, HEMI****Molecular Weight:** 186.00**Formula:** NaH_2PO_3 **Standard Form:** Crystalline powder.**General Information—Properties:** White crystalline powder; pH of 2% solution 1.9; M.P. 156°C.; assay 87% H_3PO_3 .**Uses:** As a convenient source of phosphorous acid in solid form; as a metal cleaner.**Shipping Classification:** Chemicals NOIBN.**SODIUM PHOSPHITE, MONO, ANHYDROUS****Molecular Weight:** 103.99**Formula:** NaH_2PO_3 **Standard Form:** Crystalline powder.**General Information—Properties:** White crystalline, hygroscopic powder; pH of 2% solution 3.9; decomposes without melting at approximately 250°C.; assay 76–78% H_3PO_3 .**Uses:** As a mild reducing agent, humectant, antioxidant.**Shipping Classification:** Chemicals NOIBN.**SODIUM PYROPHOSPHATE, TETRA**

(Also known as sodium pyrophosphate, pyrophosphate of soda, normal pyrosodium phosphate, alkaline sodium pyrophosphate and TSPP)

Molecular Weight: 265.95**Formula:** $\text{Na}_2\text{P}_2\text{O}_7$ **Standard Form:** Crystals or granules.**General Information—Properties:** White crystalline material or white granular powder; pH of 1% solution 10.2. Solubility: 6 parts in 100 parts of water at 15°C.; 40 parts in 100 parts of water at 100°C.**Uses:** As a soap builder; conditioning oil drilling wells; in bleaching, especially for straw, and as an ink eradicant; in manufacture of iron pyrophosphate and other pyrophosphates; household and industrial cleaner and detergent; in dye bath for putting certain types of dye in complete solution; electroplating; metal cleaning; electrolytic separation of various metals; as emulsifier in process cheese manufacture; degumming textiles; stabilizing hydrogen peroxide baths; reagent for de-inking newsprint.**Grades:** Anhydrous.**Containers:** Regular—100-lb. paper bags; 300-lb. and 100-lb. drums; Powdered—100-lb. paper bags; 350-lb. and 100-lb. drums.**Shipping Classification:** Sodium Phosphate.**Literature:** "Tetra Sodium Pyrophosphate," Technical Bulletin P-24.**SODIUM SULFATE, ANHYDROUS****Molecular Weight:** 142.06**Formula:** Na_2SO_4 **Standard Form:** Granular crystals.**Typical Analysis:** White granular crystals; 99% Na_2SO_4 available.**General Information—Properties:** Differs from Glauber's salt only in sodium sulfate content. Glauber's salt contains 43% sodium sulfate and 56% water of crystallization; anhydrous sodium sulfate contains 99% sodium sulfate and no water of crystallization. For crude sodium sulfate, see Salt Cake.**Uses:** For diluting dry dyestuffs and in tanning; as a leveler in dyeing wool and silk; for the precipitation of barium sulfate or blanc fixe; neutralizing of sulfonated oils; treating softened boiler feed water to prevent caustic embrittlement, salting skins.**Containers:** 100-lb. net multiwall paper bags.**Shipping Classification:** Sodium Sulfate.**SODIUM TRICHLOROACETATE****Molecular Weight:** 185.47**Formula:** CCl_3COONa **Standard Form:** Powder.**General Information—Properties:** Gray-white granular powder; assay 90% min.**Uses:** Possesses herbicidal properties. Particularly useful for controlling perennial grassy weeds. May be used against annual grasses in certain crops.**Containers:** Fiber drums.**Shipping Classification:** Weed Killing Compound NOIBN—Rail; Agricultural Herbicide NOIBN—other than air—Truck.**SODIUM TRIMETAPHOSPHATE****Molecular Weight:** 305.93**Formula:** $(\text{NaPO}_3)_3$ **Standard Form:** Powder.**General Information—Properties:** White powder; water-soluble salt; non-hygroscopic.**Uses:** Suggested as a modifying agent for rate of set plaster.**Containers:** 400-lb. net bbls.**Shipping Classification:** Sodium Phosphate**SODIUM TRIPOLYPHOSPHATE****Molecular Weight:** 367.93**Formula:** $\text{Na}_3\text{P}_3\text{O}_{10}$

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Standard Form: Granules or powder.

General Information—Properties: White granular material or white powder; water-soluble with excellent water-softening and detergent properties; pH 9.5 of 1% solution. A calcium sequestering agent and also has a high binding power for most of the metals of Group II and Group IV.

Uses: Soap builder; detergent and water softener; conditioning oil drilling muds; eliminates scum and soap curds in hard water.

Containers: 100-lb. bags; 350 and 100-lb. drums.

Shipping Classification: Phosphate of Soda.

"SOPANOX" ortho-TOLYL BIGUANIDE

Standard Form: Powder.

General Information—Properties: An amino compound effective in minute quantities in restraining the oxidation of soap and the resulting rancidity, discoloration and other adverse qualities, all of which must be avoided in producing a product of highest grade.

Uses: Our experience shows that "Sopanox" satisfies the exacting demands of manufacturers of soaps produced from animal or vegetable oils, filled or unfilled. Particularly valuable in preventing discoloration of refined toilet soaps.

Containers: 125-lb. drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Sopanox," Technical Bulletin P-100.

"STED" TEXTILE DETERGENT

Standard Form: Crystalline powder.

General Information—Properties: Pale yellow, crystalline powder; pH 10.5.

Uses: A powerful detergent recommended for many types of textile cleaning operations, particularly wool scouring.

Containers: 100-lb. paper bags; 300-lb. net drums.

Shipping Classification: Washing Compound NOIBN Powder.

Literature: "Sted," Technical Bulletin T-19.

"STEROX" NO. 5 POLYOXYETHYLENE THIOETHER

Standard Form: Liquid.

General Information—Properties: Nonionic surface-active agent and detergent with fast wetting speed and good solution properties. Highly resistant to precipitation by metallic salts. Compatible with other types of detergents, builder materials and most enzyme desizing agents. 85% active liquid with inorganic salts; Sp. Gr. 1.056 at 25 C.; pour point 20 F. pH 6-8.

Uses: Wetting and scouring agent in textile operations. Component for liquid detergent formulations. Useful as a wetting agent and detergent in baths of high metallic salt concentration.

Containers: 450-lb. net 55-gal. steel drums.

Shipping Classification: Washing Compound Liquid.

Literature: "Sterox No. 5, Sterox No. 6," Technical Bulletin P-136.

"STEROX" NO. 6 POLYOXYETHYLENE THIOETHER

Standard Form: Liquid.

General Information—Properties: Nonionic surface-active agent, designed especially for operations where exceptionally fast wetting and high scouring efficiency is desired. Compatible with principal textile operations. 85% active liquid without inorganic salts; Sp. Gr. 1.041; pour point 20 F. pH 6-8.

Uses: Designed especially for textile operations where fast wetting, good scouring and emulsification of grease soil are needed. Scouring efficiency particularly advantageous for raw wool and woolen piece goods scouring. Effective re-wetting agent for textiles.

Containers: 450-lb. net 55-gal. steel drums.

Shipping Classification: Washing Compounds Liquid.

Literature: "Sterox No. 5, Sterox No. 6," Technical Bulletin P-136.

"STEROX" CD POLYOXYETHYLENE ESTER

Standard Form: Liquid.

General Information—Properties: Nonionic, 100% active surface-active agent with exceptionally high detergent action accompanied by unusually low foaming. Compatible with other type detergents and builder materials. Light amber liquid; Sp. Gr. 1.050 at 25 C.; pour point 50 F. pH 7-8.

Uses: Mixed with builder materials, an unusually high cleaning action is obtained with the singular quality of very little sudsing. Used as a dedusting and conditioning agent for detergent compositions. Used in insecticide and herbicide formulations. Excellent re-wetting agent for paper towels and products to increase water absorbency. Dispersing agent with low foam characteristics for powdered materials.

Containers: 450-lb. net steel drums.

Shipping Classification: Washing Compound Liquid.

Literature: "Sterox CD," Technical Bulletin P-129.

"STEROX" SE POLYOXYETHYLENE THIOETHER

Standard Form: Liquid.

General Information—Properties: Light amber liquid, 100% nonionic-type, surface-active agent and detergent. Compatible with other types of wetting agents, detergents and builders. Good solution properties and high resistance to precipitation by metallic salts; Sp. Gr. 1.0495 at 25 C.; pour point 60 F. pH 6-8.

Uses: Detergent powders and liquids. Penetrant for starch adhesives. Textile mill specialty compounds.

Containers: 450-lb. net 55-gal. steel drums.

Shipping Classification: Washing Compound Liquid.

Literature: "Sterox SE, Sterox SK," Technical Bulletin P-133.

"STEROX" SK POLYOXYETHYLENE THIOETHER

Standard Form: Liquid.

General Information—Properties: Light amber liquid, 100% active nonionic-type, surface-active agent and detergent. Extremely fast wetting action, good detergency and

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emulsifying properties; Sp. Gr. 1.0345 at 25°C.; pour point 55 F. pH 6-8.

Uses: Wetting agent and penetrant for insecticidal and herbicidal formulations. Wetting agent with low foam characteristics for wet collection dust systems. De-emulsifier for some hydrocarbon-water emulsions.

Containers: 450-lb. net 55-gal. steel drums.

Shipping Classification: Washing Compound Liquid.

Literature: "Sterox SE, Sterox SK," Technical Bulletin P-133.

"STYMER"-S TEXTILE SIZING AGENT

Standard Form: Crystalline powder, 100% solid.

General Information—Properties: A styrene resin; fine, free-flowing crystalline powder; freely soluble in water; pH of 5% solution 7.5-8.5.

Uses: A textile chemical recommended for warp sizing.

Containers: 50-lb. paper bags; 250-lb. fiber drums.

Shipping Classification: Sizing NOIBN.

Literature: "Stymer S—Synthetic Size for Synthetic Warps," 16-page booklet; "Stymer S," folder.

STYRENE MONOMER

Standard Form: Liquid.

Specifications: Color (APHA Platinum-Cobalt Scale) not over 15 units; free from suspended matter and sediment; assay 99.5% min.; viscosity 0.87 cps. max. at 25°C.; Sp. Gr. 0.9038-0.9057 at 25°/25°C.; refractive index not less n_D 25°C. 1.5434; tertiary butyl catechol 10 ppm. min., 15 ppm. max.; aldehydes (benzaldehyde) 0.02% max.; peroxide (diethyl peroxide) 0.01% max.; chlorine 0.01%; sulfur 0.01% max.; polymer content not greater than 0.20%; completely soluble as a 10% solution in dioxane, toluene and methyl ethyl ketone.

General Information—Properties: An aromatic hydrocarbon with an aliphatic side chain containing a double bond which permits polymerization, copolymerization and other reactions. A colorless material that polymerizes and copolymerizes with other light-colored materials to yield clear or light-colored products.

Uses: Production of styrene molding compounds; GR-S type synthetic rubber; styrenated oils for surface coating resins; styrene-modified alkyds for air drying and baking finishes; low-pressure laminating resins; dispersions of styrene polymers and copolymers for modifying properties of paper and textiles; ion exchange resins.

Containers: 55-gal. nonreturnable steel drums; tank cars.

Shipping Classification: Styrene Liquid.

Literature: "Styrene Monomer and Its Use in Surface Coatings," 24-page booklet.

SUCCINIC ANHYDRIDE

Molecular Weight: 100.07

Formula:



Standard Form: Crystals.

MONSANTO

Specifications: White crystalline material; unsaturated acids (as maleic acid) 0.50% max.; crystallizing point 118.0°C. min.; assay 99.0% min.

Uses: In the manufacture of pharmaceuticals and alkyl resins.

Containers: 200-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

SULFANILAMIDE, U.S.P. (para-Aminobenzenesulfonamide)

Molecular Weight: 172.21

Formula: NH₂



Standard Form: Powder.

Specifications: Assay 99.5% min.; M.P. 164.5°C. min. solution in N/2HCl (2:30) clear; ash 0.05% max.; chloride (as HCl) 0.014% max.; conforms to U.S.P. test for sulfates and heavy metals. 10% max. retained on 100 mesh.

General Information—Properties: CAUTION: Sulfanilamide should be administered only under supervision of competent physician or veterinarian.

Uses: In pharmaceutical preparations and veterinary medicines.

Grades: Powder, 100 mesh.

Containers: 100-lb. fiber drums; 25-lb. boxes.

Shipping Classification: Chemicals NOIBN.

"SULFASAN" XANTHOGEN DISULFIDE

Standard Form: Liquid.

Specifications: A mobile, free flowing, amber-red liquid. Sp. Gr. 1.26 at 25°C.; crystallizes below 20°C.; ash not more than 0.2%; heat loss not over 0.5% at 100°C./1 hr.; very soluble in all common solvents; insoluble in water.

Uses: Herbicide used as both a pre-emergence and post-emergence weed killer. Can be sprayed on planted soil at any time between planting and crop emergence at the rate of 3½-10 lbs. per acre in 5 gal. of oil. May be used either as a concentrate or emulsified in any amount of water from 25-200 gal. per acre. Kills weeds but permits crop to emerge and grow without harm.

Containers: 150-lb. drums.

SULFUR DIOXIDE, LIQUID

Molecular Weight: 64.07

Formula: SO₂

Standard Form: Liquid.

Specifications: Colorless; non-volatile residue 0.0025% max.; moisture 0.005% max.

Uses: In leather tanning, oil refining, refrigeration, air conditioning, sugar refineries; antichlor in textiles; hydrosulfite in textiles; diluent in manufacture of sulfuric acids; manufacture of sulfonyl chloride; fruit preservation; wine making; manufacture of gelatin and corn products.

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Containers: Tanks; multi-unit cars and 1-ton cylinders.

Shipping Classification: Sulfur Dioxide.

Literature: "The Safe Handling of Sulfur Dioxide," Technical Bulletin O-49.

SULFURIC ACID

Molecular Weight: 98.08

Formula: H₂SO₄

Standard Form: 60° Be.; 66° Be.; 98% H₂SO₄ various strengths oleum.

Typical Analysis: For complete data on sulfuric acid content and freezing points of the various grades, see the tables in the General Data Section.

Uses: Used extensively in steel mills, enameling works, oil refineries, pigment works, by-product gas plants, fertilizer plants, tanneries and many other industries.

Containers: 13-gal. carboys; steel drums; tank cars.

Shipping Classification: Sulfuric Acid.

SYTON® C-30 SILICA SOL

Typical Analysis:

SiO ₂	"SYTON" C-30 30.0% ± 0.4
H ₂ O	70.0% ± 0.4
NaCl	Trace
pH	9.8 ± 0.2
Color	Milky White
Specific Gravity	1.198-1.205
Freezing Point	32 F.

General Information—Properties: Permanent colloidal dispersions of silica (SiO₂) in water. "Syton" will freeze at 32 F. and the silica is precipitated irreversibly. For shipment during winter months, this must be considered.

Uses: Recommended as an antisip agent in emulsion-type waxes, as an antiblocking and gloss controlling agent in water-based finishes, latex, etc.; to improve bond strength of rubber adhesives and increase modulus of latex films and thread and to control tack; as a liquid dusting agent or mold lubricant; to raise the heat distortion point of plastics and similar systems; and to surface-harden water-based laminating resins.

Containers: 55 and 5-gal. lined nonreturnable drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Syton for Industrial Applications," Technical Bulletin M-100.

SYTON® W-20 AND DS SILICA SOLS

Standard Form: Liquid.

General Information—Properties: Milky-white liquid-stable dispersion of 35% and 30% respectively colloidal silica particles in water; odorless, nontoxic.

Uses: A textile chemical recommended for improving wool, worsted, cotton and rayon spinning efficiency; finishing agent for delustering, reducing slippage, increasing seam strength of acetate, rayon, nylon and silk fabrics; improving woolen spinning efficiency.

Containers: 55 and 5-gal. steel drums.

Shipping Classification: Chemicals NOIBN.

Literature: "Syton for Worst Spinning," Technical Bulletin T-12; "Syton for Textile Finishes," 12-page booklet; "Syton for Woolen Spinning," Technical Bulletin T-20.

meta-TERPHENYL

Molecular Weight: 230.29

Formula: C₁₈H₁₄

Standard Form: Flakes.

General Information—Properties: Yellow flakes; density 1.164 at 25°C.; solidification point 83-85°C.; distillation range 370-378°C. (corr.); flash point 207°C.; flame point 229°C.; viscosity 39.3 SUS at 99.8°C., —32.4 SUS at 155°C.; soluble in benzene; slightly soluble in alcohol; insoluble in water.

Uses: As a high-melting plasticizer; to make smoke pellets for toy electric trains; processing aid in molding vinyl and styrene records.

Grades: Coal Tar Resin.

Literature: "The Terphenyls," Technical Bulletin P-106.

ortho-TERPHENYL

Molecular Weight: 230.29

Formula: C₁₈H₁₄

Standard Form: Oily solid.

General Information—Properties: Density 1.14 at 25°C.; solidification point 54-55°C.; distillation range 330-340°C. (corr.); flash point 171°C.; flame point 193°C.; viscosity —104.4 SUS at 60°C., —40.6 SUS at 99.8°C.; soluble in alcohol; very soluble in benzene, turpentine and petroleum solvents; insoluble in water.

Shipping Classification: Coal Tar Resin.

Literature: "The Terphenyls," Technical Bulletin P-106.

para-TERPHENYL

Molecular Weight: 230.29

Formula: C₁₈H₁₄

Standard Form: White crystalline material.

General Information—Properties: Density 1.236 at 25°C.; solidification point 209-213°C.; distillation range 381-388°C. (corr.); flash point 209°C.; flame point 238°C.; viscosity —28.8 SUS at 225°C.; slightly soluble in benzene, turpentine and petroleum solvents; insoluble in water.

Shipping Classification: Coal Tar Resin.

Literature: "The Terphenyls," Technical Bulletin P-106.

TERPHENYL, MIXED ISOMERIC

Molecular Weight: 230.29

Formula: C₁₈H₁₄

Standard Form: Solid.

General Information—Properties: Yellow solid; density 1.133 at 25°C.; boiling range 364-418°C. (corr.); flash point 191°C.; flame point 238°C.; viscosity —32.4 SUS at 155°C., —28.5 SUS at 225°C.; slightly soluble in alcohol; moderately soluble in benzene, turpentine and petroleum solvents; insoluble in water.

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Uses: Processing aid in the molding of vinyl and styrene records. Agent to reduce the moisture vapor transmission of certain microcrystalline waxes.

Containers: 70-lb. bags; 200-lb. bbls.

Shipping Classification: Coal Tar Resin.

Literature: "Mixed Isomeric Terphenyls," Technical Bulletin P-105.

TETRACHLOROPHENOL, TECHNICAL

Molecular Weight: 231.90

Formula: OH



Standard Form: Flakes or lumps.

Specifications: Light tan-to-brown flakes or lumps; alkali-insoluble material 1% max.; crystallizing point 60-63°C.

Uses: For the same general purposes as pentachlorophenol, but differs slightly from this product in its characteristics. Additional data on properties and uses available upon request.

Containers: 100-lb. fiber drums.

Shipping Classification: Wood Preservative NOIBN Dry.

THENYLPYRAMINE HYDROCHLORIDE

(*N*, *N*-dimethyl-*N'*-2-pyridyl-*N'*-2-thenylethylenediamine hydrochloride)

Molecular Weight: 297.85

Formula: $C_{14}H_{20}N_5SCl$

Standard Form: Crystalline solid.

Specifications: White or yellowish-white crystals; assay 99.0% min.; ash 0.05% max.; loss on drying at 100°C. 0.5% max.; M. P. 160.0°C. min. to start; trace max. retained on 40 mesh.

Uses: In pharmaceutical preparations where antihistaminic activity is desired.

Grades: Thenylpyramine can also be supplied in the form of the fumarate salt, which is preferred in certain applications.

Containers: 100 and 25-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

THIOPHOSPHORYL CHLORIDE, TECHNICAL

Molecular Weight: 169.42

Formula:



Standard Form: Liquid.

Specifications: Colorless to light straw liquid. Distillation range: first drop 117°C. min.; 95% (2.5-97.5 ml) 4°C. max.; dry point 125°C. max.

Uses: Intermediate in insecticide manufacture.

Containers: 675-lb. nickel drums.

Shipping Classification: Chemicals NOIBN.

THIOUREA (Also known as thiocarbamide, sulfocarbamide, and sulfourea)

Molecular Weight: 76.12

Formula: NH_2CSNH_2

Standard Form: Crystals.

Specifications: White, free-flowing crystals; moisture 0.50% max.; ash 0.05% max.

Uses: In manufacture of thioglycolic acid; as an intermediate in the production of pharmaceuticals; in the manufacture of vulcanization accelerators; as an ingredient of insecticidal compositions; mothproofing agent in treating furs, feathers, skins and fabrics; an intermediate in the production of resins and waxes.

Containers: 75-lb. paper bags.

Shipping Classification: Chemicals NOIBN.

Literature: "Thiourea," Development Department Bulletin 28.

para-TOLUENESULFONAMIDE

(Also known as para-toluenesulfonic acid amide and para-sulfonamidatoluene)

Molecular Weight: 171.22

Formula: CH_3



Standard Form: Crystalline powder. (A refined powder also available.)

Specifications: Light brownish, crystalline powder; crystallizing point (dried material) 135.0°C. min.; ash 0.6% max.; alcohol-insoluble material 0.6% max.; moisture 0.5% max.

Uses: As an intermediate in the production of active chlorine-bearing compounds; as an intermediate in the production of dyestuffs; as a plasticizer; as a base in the production of plasticizers and resins. Also see "Santizier" 9, a mixture of ortho and para-toluenesulfonamides.

Containers: 225 and 275-lb. fiber drums (refined).

Shipping Classification: Chemicals NOIBN.

TOLUENESULFONIC ACID, TECHNICAL

Molecular Weight: 172.20

Formula: CH_3



Standard Form: Liquid or semicrystalline solid.

Specifications: Viscous liquid or semicrystalline solid with a greenish-to-black color; toluenesulfonic acid 94.0% min.; H_2SO_4 1.0% max.; water 2.0% max.; toluene 0.2% max.

General Information—Properties: A mixture of approx. 80% para isomer and 20% ortho isomer.

Uses: In the manufacture of dyestuff intermediates and as a catalyst in certain organic reactions.

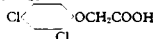
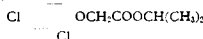
Containers: 100-lb. steel drums.

Shipping Classification: Chemicals NOIBN.

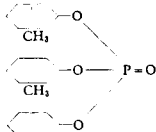
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para-TOLUENESULFONYL CHLORIDE*Also known as para-toluenesulfonchioride)***Molecular Weight:** 190.65**Formula:** CH₃SO₂Cl**Standard Form:** Crystals.**Specifications:** Grayish-white or yellowish crystals; assay 95% min.; crystallizing point 65.5° C. min.**Uses:** As a condensing agent and as an intermediate in dustuff synthesis.**Containers:** 387-lb. (approx.) gumwood bbls.**Shipping Classification:** Chemicals NOIBN.**meta-TOLYLENE DIISOCYANATE (2,4 Diisocyanate)****Molecular Weight:** 174 (theoretical)**Formula:** C₈H₆N₂O₂**Standard Form:** Liquid.**General Information—Properties:** Clear mobile liquid, orange-to-white; total chloride 1.5% max.; distillation range 95-100° C. at 5 mm.; amine equivalent 87-91 (gms. of isocyanate per gm. mole of secondary amine); M.P. 19.5-21.4° C. Highly reactive organic diisocyanate. Will react readily with water, alcohols, amines, ortho and other compounds containing active hydrogen.**Uses:** Suggested for organic synthesis, adhesives, polymers, tanning, bonding of rubber to textiles and textile treatment.**Containers:** 20 and 10-oz. ampoules, 10-lb. bottles; 35-lb. carboys.**Shipping Classification:** Chemicals NOIBN.**Literature:** "Isocyanates," Technical Bulletin P-125.**1, 2, 4-TRICHLOROBENZENE****Molecular Weight:** 181.46**Formula:** Cl

Cl

Standard Form: Liquid.**General Information—Properties:** Clear, essentially colorless liquid, Sp. Gr. 1.448-1.458 at 25.0°-15.5° C.; crystallizing point 16.7° C. min. Distillation range: first drop 212.5° C. min., 95% 2.0° C. max. Dry point 218.0° C. max.**Uses:** 1, 2, 4-Trichlorobenzene is a fairly pure compound as differentiated from trichlorobenzene, technical; used as a chemical intermediate principally in the manufacture of dustuffs.**Containers:** 55-gal. steel drums.**Shipping Classification:** Trichlorobenzene.**TRICHLOROBENZENE, TECHNICAL****Molecular Weight:** 181.46**Formula:****Standard Form:** Liquid.**Specifications:** Practically clear, colorless to light yellow liquid; Sp. Gr. 1.460-1.477 at 15.5°-15.5° C.; crystallizing point 10.0° C. max. Distillation range: first drop 205.0° C. min.; 50% 213.0° C. min.; 90% 215.0° C. min. Dry point 250.0° C. max.**General Information—Properties:** Essentially a mixture of various isomers of trichlorobenzene.**Uses:** In organic synthesis, as a solvent and as an insecticide**Containers:** 625-lb. (approx.) drums.**Shipping Classification:** Trichlorobenzene.**2, 4, 5-TRICHLOROPHENOXYACETIC ACID (2, 4, 5-T)****Molecular Weight:** 255.49**Formula:** Cl**Standard Form:** Powder.**Specifications:** White-to-gray powder; assay 98.0% min.; M. P. 150.0° C. min. at end; ash 0.5% max.; moisture 0.5% max.**General Information—Properties:** Insoluble in water, soluble in alcohol, readily forms sodium and alkanol amine salts. A hormone-type compound having high plant toxicity for many species.**Uses:** Either by itself or in the form of a salt or ester as a herbicide. Is of particular value for brush control.**Containers:** 200 and 50-lb. fiber drums.**Shipping Classification:** Weed Killing Compound NOIBN.**Literature:** 2,4,5-T Progress Report; "Formulating 2,4,5-T for Weed Control," 18-page booklet.**2, 4, 5-TRICHLOROPHENOXYACETIC ACID—ISOPROPYL ESTER (Also known as 2, 4, 5-T isopropyl ester and isopropyl 2, 4, 5-trichlorophenoxyacetate)****Molecular Weight:** 297.57**Formula:** Cl**Standard Form:** Cast solid.**Specifications:** Tan-to-brown solid; assay 98.0% min.; crystallizing point 46° C. min.; acidity (as 2,4,5-T) 2.0% max.**Uses:** For same general purposes as the free acid but is directly soluble in oil. Is more convenient to use where volatility is not a hazard.**Containers:** 250-lb. fiber drums.**Shipping Classification:** Weed Killing Compound NOIBN

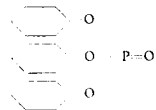
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TRICRESYL PHOSPHATE**Molecular Weight:** 368.36**Formula:** CH_3 **Standard Form:** Liquid.

Specifications: Clear, practically colorless liquid; Sp. Gr. 1.166 ± 0.007 at $25^\circ/25^\circ\text{C}$; acidity (as H_3PO_4) 0.01% max.; potassium permanganate test, no change in 30 minutes.

General Information—Properties: High boiling point; relatively non-volatile, evaporation loss less than 0.10% in 100 hours at 100°C . Refractive index is approx. 1.556 at 20°C . Viscosity increases rapidly at temperatures below normal; at approx. -35°C . a solid transparent mass without crystalline structure. Miscible with all the common solvents and thinners, linseed, china wood and castor oils; solubility in water less than 0.002% at 85°C ., imparts good moisture resistance to nitrocellulose films. The ortho isomer which is reputed to be the toxic element in normal tricresyl phosphate, has been virtually eliminated from Tricresyl Phosphate Monsanto, thereby reducing toxicity dangers to a minimum and making the product more suitable for many applications. Elimination of the ortho isomer causes no impairment in plasticizing qualities.

Uses: The standard fire-retarding plasticizer for nitrocellulose and vinyls. Being a solvent for nitrocellulose, it has a high retentivity and can be used in large proportions without danger of sweating or separation. Widely used in vinyl resins, particularly in electrical applications; has good electrical properties and imparts flame resistance to the composition. Compatible with most lacquer resins and gives firm, tough, flexible films of excellent weathering qualities.

Containers: 500-lb. and 50-lb. steel drums.**Shipping Classification:** Resin Plasticizer.**Literature:** "Monsanto Plasticizers," 80-page booklet.**TRIPHENYL PHOSPHATE****Molecular Weight:** 326.28**Formula:****Standard Form:** Flakes.

Specifications: White flakes, faintly aromatic; M.P. 48.5°C . run. start; permanganate test, no change in 30 minutes; acidity (as H_3PO_4) 0.003% max.

General Information—Properties: Miscible with the common solvents and thinners and with vegetable oils; solubility in water 0.001% at 34°C , 0.002% at 54°C ; imparts some

moisture resistance to cellulose-acetate films. Retentivity of cast cellulose-acetate films nearly 80%; that is, it can be incorporated in the proportion of 8-10 of acetate without separation and blooming. Imparts good flexibility and gives clear, tough compositions without tendency toward tackiness. Is toxic and should not be used in articles such as toys which are to come in contact with foodstuffs. One of the most valuable properties of triphenyl phosphate is that of fire retarding. When used alone on cellulose-acetate films, amount of triphenyl phosphate equal to 20% of the cellulose-acetate weight produces films which will not support combustion.

Uses: Chiefly as a plasticizer and fire retardant.**Containers:** 225-lb. fiber drums.**Shipping Classification:** Resin Plasticizer.**Literature:** "Monsanto Plasticizers," 80-page booklet.**TRIPHENYL PHOSPHITE****Molecular Weight:** 310.28**Formula:****Standard Form:** Crystalline solid.

General Information—Properties: A crystalline solid slightly below room temperature; at higher temperature an oily liquid weighing about 9.85 lbs. per gal.

Uses: A color stabilizer in pale-bodied alkyds and other products.

Containers: 55 and 5-gal. drums.**Shipping Classification:** Chemicals NOIBN.**UREA ORTHOPHOSPHATE, MONO****Molecular Weight:** 158.06**Formula:** $\text{CO}(\text{NH}_2)_2 \cdot \text{H}_3\text{PO}_4$ **Standard Form:** Crystalline solid.

General Information—Properties: A white crystalline, non-hygroscopic solid; soluble in water; pH of 1% solution 2.3; M.P. $113-117^\circ\text{C}$.

Shipping Classification: Chemicals NOIBN.**VANADIUM SULFURIC ACID CATALYST**

Uses: In manufacture of sulfuric acid by contact process (Not suitable for other purposes).

Containers: 20-liter tin cans in cases.**Shipping Classification:** Chemicals NOIBN.

0685103

MONSANTO

"VANILIN MONSANTO" (Vanillin U.S.P.; also known as methylprotocatechuic aldehyde and 3-methoxy-4-hydroxybenzaldehyde)

Molecular Weight: 152.14

Formula: CHO



Standard Form: Fine crystals.

Specifications: Fine, white crystalline needles; M.P. 81.5 C. min.; no foreign flavor (in sugar solution); loss on drying 0.06% max.; solubility in alcohol (1:2) complete.

Uses: As a flavoring agent in foodstuffs and beverages and as an odorant in rubber.

Containers: 100 and 25-lb. fiber drums; 5 and 1-lb. cartons.

Shipping Classification: Chemicals NOIBN.

Literature: "Vanillin Monsanto," leaflet; "Something About the Senses," 32-page booklet.

"WHITE REZ" BLONDING SEALER FOR TONED WOOD EFFECTS

General Information—Properties: A white-pigmented, synthetic resin wood sealer and primer which can be applied to any wood where a blonde or toned grain effect is desired. Provides a subdued grain pattern. Eliminates the use of acids and neutralizers. It comes ready-to-use and can be applied by brush, spray or cloth to provide a hard, even surface which remains smooth under water, oil or spirit stains. One gal. covers approx. 400 to 600 sq. ft.

Containers: 5-gal. cans; 1-gal. cans (4 case); 1-qt. cans (12 case); 1-pt. cans (24 case).

Shipping Classification: Wood Filler Liquid.

Literature: "White Rez," folder; "Monsanto Wood Finishes for Home Decoration," 8-page booklet.

ZINC AMMONIUM PHOSPHATE

Molecular Weight: 178.40

Formula: ZnNH_4PO_4

Standard Form: Crystalline powder.

General Information—Properties: White crystalline powder; soluble in acids and ammoniacal solutions; insoluble in water; decomposes with loss of NH_3 when heated.

Uses: A water-insoluble, flame-retardant agent for textiles, paper and paints.

Containers: 100-lb. fiber drums.

Shipping Classification: Chemicals NOIBN.

ZINC METAPHOSPHATE

Molecular Weight: 223.34

Formula: $\text{Zn}_2\text{P}_2\text{O}_7$

Standard Form: Powder.

General Information—Properties: White powder; M.P. approx. 922 C.; slowly soluble in acids; insoluble in water; has a very low thermal coefficient of expansion.

Uses: Suggested for use as a constituent of glasses, porcelain and enamels.

Containers: 200-lb. net kegs.

Shipping Classification: Chemicals NOIBN.

ZINC ORTHOPHOSPHATE, TRI

Molecular Weight: 386.10

Formula: $\text{Zn}_3(\text{PO}_4)_2$

Standard Form: Crystalline powder.

General Information—Properties: White crystalline powder; soluble in acids and ammoniacal solutions; insoluble in water.

Uses: Suggested as a constituent of phosphate rustproofing compositions.

Shipping Classification: Chemicals NOIBN



The following products made by Monsanto Chemicals (Australia) Limited, Melbourne, Australia, are at present available for sale by M.C.(A.)L. Those marked with an asterisk are not available for export by M.C.(A.)L. to the United States.

ACETYL SALICYLIC ACID, B.P. (Aspirin)

2,4-D ACID AND SODIUM SALT

DIMETHYL PHTHALATE

FORMALDEHYDE

METHYL SALICYLATE, B.P.

PHENOL, B.P.

SALICYLANILIDE, TECHNICAL —

("FUNGISAL O")

SALICYLIC ACID, B.P.

SALICYLIC ACID, TECHNICAL

SODIUM ACETATE

SODIUM SALICYLANILIDE —

("FUNGISAL W")

*SODIUM SULPHACETAMIDE

*SODIUM SULPHAMERAZINE

SULPHABENZAMIDE

*SULPHACETAMIDE, B.P.

*SULPHADIAZINE, B.P.

*SULPHAGUANIDINE, B.P.

*SULPHAMERAZINE

2,4,5-T ACID

Plastics

"EXCELITE" PHENOL-FORMALDEHYDE

INDUSTRIAL RESINS

"EXCELITE" PHENOL-FORMALDEHYDE

MOLDING COMPOUNDS

Glues

"LAUXEIN" CASEIN GLUE

"LAUXEIN" CASEIN-SOYBEAN BLEND GLUE

"LAUXEIN" SOYBEAN GLUE

"LAUXITE" RESORCINOL RESIN ADHESIVES

"LAUXITE" UREA RESIN ADHESIVES

The following products, made by Monsanto Chemicals Limited, London, England, are not at present available for sale by Monsanto in the United States.

COLMARONE RESIN

PURE TRICRESOL

ortho and meta RICH CRESYLIC ACIDS

SODIUM PHENATE

0685104

General Data

TESTING LIQUIDS WITH THE BAUMÉ HYDROMETER

MONSANTO PRODUCTS, when made to a Baumé specification, may vary 0.2° Bé. above but never below the specified strength. The hydrometer used should be of limited range, not more than 10° Bé., and should be at least 10" in length. Its accuracy should be certified by the manufacturer. Our own hydrometers are tested against standard glasses certified by the U. S. Bureau of Standards.

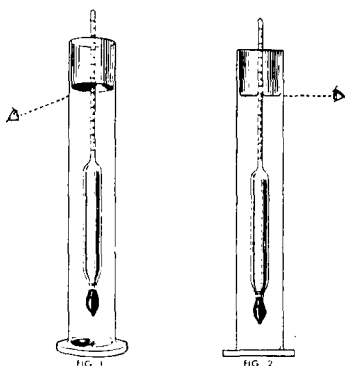
Method of Reading the Hydrometer*

The correct method of reading the hydrometer is illustrated in Figs. 1 and 2. The sample of liquid is placed in a clear glass jar or cylinder and the hydrometer carefully immersed in it to a point slightly below that to which it naturally sinks, and is then allowed to float freely.

The reading should not be taken until the liquid and the hydrometer are free from air bubbles and are at rest.

In taking the reading the eye should be placed slightly below the plane of the surface of the liquid (Fig. 1) and then raised slowly until this surface, seen as an ellipse, becomes a straight line (Fig. 2). The point at which this line cuts the hydrometer scale should be taken as the reading of the instrument (Fig. 2).

In case the liquid is not sufficiently clear to allow the reading to be made as above described, it will be necessary to



Method of Reading Baumé Hydrometer

read from above the liquid surface and to estimate as accurately as possible the point to which the liquid rises on the hydrometer stem. It should be remembered, however, that the instrument is calibrated to give correct indications when read at the principal surface of the liquid. It will be necessary, therefore, to correct the reading at the upper meniscus by an amount equal to the height to which the liquid creeps up on the stem of the hydrometer. The amount of this correction may be determined with sufficient accuracy for most purposes by taking a few readings on the upper and the lower meniscus in a sample of the clear liquid and noting the difference.

The magnitude of the correction will obviously depend upon the length and value of the subdivisions of the hydrometer scale and must be determined in each case for the particular hydrometer in question.

Correcting for Temperature

The thermometer must be used along with the hydrometer in testing any liquid.

Hydrometers do not indicate the correct strength of a liquid unless read at the exact temperature indicated on the spindle, that is, at 60°F. Accurate readings may be obtained by bringing the liquid to this temperature by cooling or warming, but in most instances a correction can be applied with sufficient accuracy by reference to the following tables. For all liquids listed in this booklet, except ammonia the correction is added when the test is made above 60°F and subtracted when made below 60°F. For ammonia the reverse is true.

Conversion Formulae for Density Scales

Heavy Liquids

$$\text{Degrees Twaddell} = (\text{Sp. Gr.} - 1) \times 200$$

$$\text{Sp. Gr.} = \frac{\text{Deg. Tw.} + 200}{200}$$

$$\text{Degrees Baumé} = 145 \frac{145}{\text{Sp. Gr.}}$$

$$\text{Sp. Gr.} = \frac{145}{145 - \text{Deg. Bé.}}$$

Light Liquids

$$\text{Degrees Baumé} = \frac{140}{\text{Sp. Gr.}} - 130$$

$$\text{Sp. Gr.} = \frac{140}{130 + \text{Deg. Bé.}}$$

*U. S. Bureau of Standards, Circ. No. 57

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0685105

THE DILUTION AND CONCENTRATION OF LIQUIDS AND MIXTURES

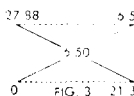
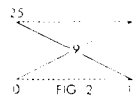
Rectangle Method

THE FIGURES expressing the percentage concentration of two solutions (or those of one solution, and the figure 0 for water, where dilution with water is desired) are written in the two left hand corners of a rectangle, and the figure expressing the desired concentration is placed on the intersection of the two diagonals of this rectangle.

Now subtract the figures on the diagonals, and write the result at the other end of the respective diagonal. These figures then indicate what quantities of the solutions whose concentration is given on the other end of the respective *horizontal* line, must be taken to obtain a solution of the desired concentration. For example, to make a 12% solution, by mixing an 8% and a 15% solution we prepare Fig. 1, which indicates that we have to take 3 parts by weight of the 8% solution, and 4 parts by weight of the 15% solution to obtain (7 parts by weight of) the 12% solution.

Again, if we wish to dilute a 25% solution so as to obtain a 9% solution, we place the figure 25 in, for example, the upper left corner of a rectangle and place figure 0 (concentration of the solution in pure water) in the lower left corner, and then place the figure 9 (desired concentration) at the point of intersection of the diagonals, and subtracting across the diagonals, we obtain Fig. 2: 9 parts by weight of the 25% solution, if mixed with 16 parts by weight of water, will give 25 parts by weight of a 9% solution.

In diluting to a given Baumé strength or specific gravity, the percentage composition, corresponding to the Baumé of specific gravity, must be taken from the following tables. For instance, supposing a 32° Baumé chloride of alumina solution is to be diluted to 8° Baumé with water. By reference to table on page 114, a 32° Baumé solution contains 27.88% Al_2Cl_6 , and an 8° Baumé solution contains 6.50% Al_2Cl_6 . These percentages must be used in finding the weights of chloride of alumina and water to be mixed by the above method. According to the scheme as outlined above, the percentages are arranged as in Fig. 3 and the subtractions made along the diagonals, the lower from the higher. Thus when 32° Baumé chloride of alumina is mixed with water in the proportion 6.50 pounds to 21.38 pounds, 27.88 pounds of solution will be obtained at 8° Baumé.



WEIGHTS PER GALLON AT 60°

	Pounds
Acetic Acid 56%.....	8.90
Acetic Acid 70%.....	8.96
Acetic Acid 80%.....	8.97
Acetic Acid 84%.....	8.96
Acetic Acid Glacial.....	8.83
Alcohol Proprietary Solvent (Mersol).....	6.79
Aluminum Chloride 32° Bé.....	10.70
Aqua Ammonia 16° Bé.....	7.99
Aqua Ammonia 18° Bé.....	7.89
Aqua Ammonia 20° Bé.....	7.78
Aqua Ammonia 26° Bé.....	7.48
Battery Acid 1.400.....	11.67
Diacetone Technical.....	7.65
Ethyl Acetate.....	7.46
Hydrochloric Acid 18° Bé.....	9.52
Hydrochloric Acid 20° Bé.....	9.67
Hydrochloric Acid 22° Bé.....	9.83

	Pounds
Mercilor 22° Bé.....	9.83
Nitric Acid 36° Bé.....	11.09
Nitric Acid 38° Bé.....	11.30
Nitric Acid 40° Bé.....	11.51
Nitric Acid 42° Bé.....	11.74
Oleum 25% (at 15° C.).....	16.12
Oleum 60% (at 15° C.).....	17.52
Phosphoric Acid 75%.....	13.19
Sodium Bisulfite 33° Bé.....	10.79
Sulfuric Acid 50° Bé.....	14.06
Sulfuric Acid 60° Bé.....	14.22
Sulfuric Acid 66° Bé.....	15.30
Sulfuric Acid 98%.....	15.37

Weight per Gallon = Sp. Gr. x 8.337
 1 Cubic Foot = 7.481 gallons
 1 Gallon = 3.785 liters

0685106

general data

CONVERSION TABLES FOR UNITS OF VOLUME AND WEIGHT

TO CONVERT FROM	MULTIPLY BY									
	To Cu. In.	To Cu. Ft.	To Cu. Yd.	To Fl. Oz.	To Pint	To Quart	To Gallon	To Cc. / Mil.	To Liter	To Cu. Yds.
Cu. In.	1	0 0,5787	0 0,2143	0 5541	0 03463	0 01732	0 004329	16 39	0 01639	0 00013
Cu. Ft.	1728	1	0 03704	957 5	59 84	29 92	7 481	28320	28 32	0 0240
Cu. Yd.	46656	27	1	25850	1616	807 9	202 0	764600	764 6	0 054
Fl. Oz.	1 805	0 001044	0 0,3868	1	0 0625	0 03125	0 007813	29 57	0 02957	0 0023
Pint	28 88	0 01671	0 0,6189	16	1	0 5	0 125	473 2	0 4732	0 040
Quart	57 75	0 03342	0 001238	32	2	1	0 25	946 4	0 9464	0 0808
Gallon	231	0 1337	0 004951	128	8	4	1	3785	3 785	0 3078
Cc. / Mil.	0 06102	0 0,3531	0 0,1308	0 03381	0 002113	0 001057	0 0,2642	1	0 001	0 0000
Liter	61 02	0 03531	0 001308	33 81	2 113	1 057	0 2642	1000	1	0 901
Cu. Meter	61020	35 31	1 308	33810	2113	1057	264 2	1000000	1000	1

TO CONVERT FROM	MULTIPLY BY					
	To Grain	To Oz. Troy	To Lb. Troy	To Oz. Av.	To Lb. Av.	To Gram
Grain	1	0 002083	0 0,1736	0 002286	0 0,1429	0 06480
Oz. Troy	480	1	0 08333	1 097	0 06857	31 10
Lb. Troy	5760	12	1	13 17	0 8229	373 2
Oz. Av.	437 5	0 9115	0 07596	1	0 0625	28 35
Lb. Av.	7000	14 58	1 215	16	1	453 6
Gram	15 43	0 03215	0 002679	0 03527	0 002205	1
Kilogram	15432	32 15	2 679	35 27	2 205	1000

NOTE: The small subnumeral following a zero indicates that the zero is to be taken that number of times, thus 0.0.1428 is equivalent to 0.0001428.

- 1 gallon = 8.345 lbs. av. of water at 4° C. (39° F.)
- 8.337 lbs. av. of water at 15.56° C. (60° F.)
- 8.330 lbs. av. of water at 20° C. (68° F.)
- 8.321 lbs. av. of water at 25° C. (77° F.)
- 1 lb. av. = 0.1198 gallon of water at 4° C. (39° F.)
- 0.1199 gallon of water at 15.56° C. (60° F.)
- 0.1200 gallon of water at 20° C. (68° F.)
- 0.1202 gallon of water at 25° C. (77° F.)

For purposes of rough calculation:

$$\text{gallons} \times \frac{100}{12} = \text{pounds of water}$$

$$\text{pounds of water} \times \frac{12}{100} = \text{gallons}$$

0685107

general data

DENSITIES AND CONCENTRATIONS OF SODIUM HYDROXIDE SOLUTIONS

Per Cent						Per Cent					
Cautic Soda (NaOH)	Equivalent Sodium Oxide (Na ₂ O)	Degrees Baume at 60° F. (Am. Std.)	Specific Gravity at 60° F.	Lbs. Caustic Per Gal. of Liquid at 60° F.	Grams NaOH per Liter at 60° F.	Cautic Soda (NaOH)	Equivalent Sodium Oxide (Na ₂ O)	Degrees Baume at 60° F. (Am. Std.)	Specific Gravity at 60° F.	Lbs. Caustic Per Gal. of Liquid at 60° F.	Grams NaOH per Liter at 60° F.
1.00	0.77	1.66	1.012	0.08	10.10	28.00	21.69	34.35	1.310	3.06	366.58
2.00	1.55	3.23	1.023	0.17	20.43	29.00	22.47	35.25	1.321	3.19	382.79
3.00	2.32	4.77	1.034	0.26	30.99	30.00	23.24	36.13	1.332	3.33	399.21
4.00	3.10	6.27	1.045	0.35	41.77	31.00	24.02	36.99	1.342	3.47	415.78
5.00	3.87	7.73	1.056	0.44	52.77	32.00	24.79	37.83	1.353	3.61	432.57
6.00	4.65	9.16	1.067	0.53	63.99	33.00	25.57	38.65	1.363	3.75	449.51
7.00	5.42	10.56	1.079	0.63	75.43	34.00	26.34	39.45	1.374	3.89	466.67
8.00	6.20	11.93	1.089	0.73	87.09	35.00	27.12	40.24	1.384	4.04	483.98
9.00	6.97	13.29	1.101	0.83	98.99	36.00	27.89	41.01	1.394	4.19	501.50
10.00	7.75	14.60	1.112	0.93	111.10	37.00	28.67	41.76	1.404	4.33	519.17
11.00	8.52	15.89	1.123	1.03	123.43	38.00	29.44	42.50	1.415	4.48	537.06
12.00	9.30	17.15	1.134	1.13	135.97	39.00	30.22	43.21	1.425	4.63	555.03
13.00	10.07	18.39	1.145	1.24	148.75	40.00	30.99	43.92	1.435	4.78	573.28
14.00	10.85	19.61	1.156	1.35	161.74	41.00	31.77	44.60	1.444	4.94	591.61
15.00	11.62	20.80	1.167	1.46	174.96	42.00	32.54	45.28	1.454	5.09	610.13
16.00	12.40	21.96	1.178	1.57	188.39	43.00	33.32	45.93	1.464	5.25	628.76
17.00	13.17	23.11	1.190	1.69	202.05	44.00	34.09	46.57	1.473	5.40	647.57
18.00	13.95	24.23	1.201	1.80	215.91	45.00	34.87	47.20	1.483	5.56	666.59
19.00	14.72	25.33	1.212	1.92	230.01	46.00	35.64	47.83	1.492	5.72	685.79
20.00	15.50	26.41	1.223	2.04	244.33	47.00	36.42	48.44	1.502	5.88	705.16
21.00	16.27	27.47	1.234	2.16	258.85	48.00	37.19	49.05	1.511	6.05	724.72
22.00	17.05	28.51	1.245	2.28	273.60	49.00	37.97	49.65	1.521	6.21	744.45
23.00	17.82	29.53	1.256	2.41	288.56	50.00	38.74	50.23	1.530	6.38	764.36
24.00	18.60	30.53	1.267	2.53	303.74	51.00	39.52	50.82	1.540	6.55	784.45
25.00	19.37	31.51	1.278	2.66	319.13	52.00	40.29	51.39	1.549	6.72	804.77
26.00	20.14	32.47	1.289	2.79	334.73	53.00	41.06	51.95	1.558	6.89	825.10
27.00	20.92	33.42	1.300	2.93	350.55						

DATA FOR SODIUM HYDROXIDE SOLUTIONS AT 176°F

Per Cent						Per Cent					
Cautic Soda (NaOH)	Equivalent Sodium Oxide (Na ₂ O)	Degrees Baume at 60° F. (Am. Std.)	Specific Gravity at 60° F.	Lbs. Caustic Per Gal. of Liquid at 60° F.	Grams NaOH per Liter at 60° F.	Cautic Soda (NaOH)	Equivalent Sodium Oxide (Na ₂ O)	Degrees Baume at 60° F. (Am. Std.)	Specific Gravity at 60° F.	Lbs. Caustic Per Gal. of Liquid at 60° F.	Grams NaOH per Liter at 60° F.
38	52.59	56.9	1.645	9.32	1116.6	71.70	55.55	58.6	1.680	10.05	1204.6
43	53.02	57.1	1.650	9.42	1129.1	72.25	55.98	58.9	1.685	10.16	1217.4
49	53.44	57.3	1.655	9.52	1141.5	72.79	56.40	59.2	1.690	10.26	1230.2
54	53.86	57.6	1.660	9.63	1154.0	73.35	56.83	59.4	1.695	10.37	1243.3
58	54.30	57.9	1.665	9.74	1166.8	73.90	57.26	59.7	1.700	10.48	1256.3
61	54.71	58.1	1.670	9.84	1179.2	74.43	57.67	60.0	1.705	10.59	1269.0
65	55.14	58.3	1.675	9.95	1192.1						

0685108

general data

AQUA AMMONIA*

By W. C. Ferguson

Degrees Baume	Specific Gravity 60° 60°F.	Per Cent NH ₃	Degrees Baume	Specific Gravity 60° 60°F.	Per Cent NH ₃
10.00	1.0000	0.00	20.00	0.9313	17.4
10.25	0.9982	0.40	20.25	0.9318	17.5
10.50	0.9964	0.80	20.50	0.9302	17.6
10.75	0.9947	1.21	20.75	0.9287	17.7
11.00	0.9929	1.62	21.00	0.9272	17.8
11.25	0.9912	2.04	21.25	0.9256	17.9
11.50	0.9894	2.46	21.50	0.9241	18.0
11.75	0.9876	2.88	21.75	0.9226	18.1
12.00	0.9859	3.30	22.00	0.9211	18.2
12.25	0.9842	3.73	22.25	0.9196	18.3
12.50	0.9825	4.16	22.50	0.9180	18.4
12.75	0.9807	4.59	22.75	0.9165	18.5
13.00	0.9790	5.02	23.00	0.9150	18.6
13.25	0.9773	5.45	23.25	0.9135	18.7
13.50	0.9756	5.88	23.50	0.9121	18.8
13.75	0.9739	6.31	23.75	0.9106	18.9
14.00	0.9722	6.74	24.00	0.9091	19.0
14.25	0.9705	7.17	24.25	0.9076	19.1
14.50	0.9688	7.61	24.50	0.9061	19.2
14.75	0.9672	8.05	24.75	0.9047	19.3
15.00	0.9655	8.49	25.00	0.9032	19.4
15.25	0.9639	8.93	25.25	0.9018	19.5
15.50	0.9622	9.38	25.50	0.9003	19.6
15.75	0.9605	9.83	25.75	0.8989	19.7
16.00	0.9589	10.28	26.00	0.8974	19.8
16.25	0.9573	10.73	26.25	0.8960	19.9
16.50	0.9556	11.18	26.50	0.8946	20.0
16.75	0.9540	11.64	26.75	0.8931	20.1
17.00	0.9524	12.10	27.00	0.8917	20.2
17.25	0.9508	12.56			
17.50	0.9492	13.02	27.25	0.8903	20.3
17.75	0.9475	13.49	27.50	0.8889	20.4
18.00	0.9459	13.96	27.75	0.8875	20.5
18.25	0.9444	14.43	28.00	0.8861	20.6
18.50	0.9428	14.90	28.25	0.8847	20.7
18.75	0.9412	15.37	28.50	0.8833	20.8
19.00	0.9396	15.84	28.75	0.8819	20.9
19.25	0.9380	16.32	29.00	0.8805	21.0
19.50	0.9365	16.80			
19.75	0.9349	17.28			

*This table has been approved and adopted as a standard by the Manufacturing Chemists' Association of the United States.

Specific gravity determinations were made at 60°F. compared with water at 60°F.

$$\text{Baumé} = \frac{140}{\text{Sp. Gr.}} - 130.$$

Allowance for Temperature

The coefficient of expansion for ammonia solutions varying with the temperature. Correction must be applied according to the following table:

De- grees Baume	Corrections to be Added for Each Degree Below 60°F.			Corrections to be Subtracted for Each Degree Above 60°F.		
	40°F.	50°F.	70°F.	80°F.	90°F.	100°F.
14	0.015° Bé.	0.017° Bé.	0.020° Bé.	0.022° Bé.	0.024° Bé.	0.026° Bé.
16	0.021° "	0.023° "	0.026° "	0.028° "	0.030° "	0.032° "
18	0.027° "	0.029° "	0.031° "	0.033° "	0.035° "	0.037° "
20	0.033° "	0.036° "	0.037° "	0.038° "	0.040° "	0.042° "
22	0.039° "	0.042° "	0.043° "	0.045° "	0.047° "	0.049° "
26	0.053° "	0.057° "	0.057° "	0.059° "	0.061° "	0.063° "

0685109

TOWOLDMON0043192
WATER_PCB-00034238

general data

ANHYDROUS AMMONIA

Temp. Deg. F.	Pressure Lbs. per Sq. in Abs.	Specific Volume		Heat of Vaporization, B.T.U.
		of Liquid Cu. Ft. per Lb.	of Sat. Vapor, Cu. Ft. per Lb.	
-40	10.12	0.0234	25.45	601.9
-35	11.74	0.0235	22.14	598.3
-30	13.56	0.0236	19.35	594.7
-25	15.61	0.0238	16.95	591.1
-20	17.91	0.0239	14.89	587.4
-15	20.46	0.0240	13.15	583.6
-10	23.30	0.0241	11.63	579.9
-5	26.46	0.0242	10.32	576.1
0	29.95	0.0244	9.19	572.2
5	33.79	0.0245	8.20	568.3
10	38.02	0.0246	7.34	564.4
15	42.67	0.0248	6.583	560.4
20	47.75	0.0249	5.920	556.3
25	53.50	0.0250	5.336	552.2
30	59.39	0.0252	4.820	548.1
35	65.91	0.0253	4.364	543.9
40	73.03	0.0255	3.959	539.7
45	80.75	0.0256	3.599	535.3
50	89.09	0.0258	3.278	531.0
55	98.03	0.0259	2.992	526.5
60	107.7	0.0261	2.734	522.0
65	118.1	0.0263	2.503	517.5
70	129.2	0.0264	2.296	512.8
75	141.1	0.0266	2.109	508.1
80	153.9	0.0268	1.940	503.4
85	167.4	0.0270	1.788	498.5
90	181.8	0.0271	1.650	493.5
95	197.3	0.0273	1.524	488.5
100	213.8	0.0275	1.408	483.4
105	231.2	0.0277	1.305	478.2
110	249.6	0.0280	1.210	472.9
115	269.2	0.0282	1.122	467.4
120	289.9	0.0284	1.042	461.9
125	311.6	0.0286	0.970	456.3

Sp. Gr. Liquid 0.6364 at 32°F.

0685110

TOWOLDMON0043193
WATER_PCB-00034239

general data

ALUMINUM SULFATE 60° 60°F.

Beveridge

Degrees Baume	Specific Gravity	Per Cent Sulfate Alumina (17% Al_2O_3)	Lbs. per Gal. Sulfate Alumina (17% Al_2O_3)	Per Cent Basic Sulfate Alumina (17.4% Al_2O_3)	Lbs. per Gal. Basic Sulfate Alumina (17.4% Al_2O_3)
0.00	1.000	0.00	0.00	0.00	0.00
0.50	1.0035	0.53	0.044	0.6	0.050
1.00	1.0069	1.07	0.090	1.1	0.092
1.50	1.0105	1.64	0.138	1.7	0.150
2.0	1.0140	2.16	0.181	2.3	0.195
2.5	1.0175	2.70	0.228	2.9	0.246
3.0	1.0211	3.28	0.279	3.5	0.298
3.5	1.0247	3.79	0.323	4.1	0.350
4.0	1.0284	4.40	0.376	4.7	0.403
4.5	1.0320	4.97	0.427	5.3	0.456
5.0	1.0357	5.52	0.476	6.0	0.518
5.5	1.0394	6.10	0.528	6.7	0.581
6.0	1.0432	6.73	0.585	7.3	0.635
6.5	1.0469	7.33	0.638	7.9	0.690
7.0	1.0507	7.98	0.700	8.5	0.745
7.5	1.0545	8.56	0.751	9.2	0.809
8.0	1.0584	9.18	0.808	9.8	0.865
8.5	1.0623	9.82	0.860	10.5	0.931
9.0	1.0662	10.43	0.925	11.1	0.988
9.5	1.0701	11.05	0.980	11.8	1.05
10.0	1.0741	11.65	1.04	12.4	1.11
10.5	1.0781	12.26	1.10	13.1	1.18
11.0	1.0821	12.90	1.16	13.8	1.25
11.5	1.0861	13.53	1.22	14.4	1.30
12.0	1.0902	14.13	1.28	15.1	1.37
12.5	1.0943	14.71	1.34	15.7	1.43
13.0	1.0985	15.32	1.40	16.4	1.50
13.5	1.1027	15.98	1.47	17.1	1.57
14.0	1.1069	16.60	1.53	17.7	1.63
14.5	1.1111	17.25	1.59	18.4	1.70
15.0	1.1154	17.90	1.66	19.1	1.77
15.5	1.1197	18.48	1.72	19.9	1.86
16.0	1.1240	19.13	1.79	20.4	1.91
16.5	1.1284	19.80	1.86	21.1	1.99
17.0	1.1328	20.40	1.92	21.8	2.06
17.5	1.1373	21.06	1.99	22.4	2.12
18.0	1.1417	21.73	2.06	23.1	2.20
18.5	1.1462	22.43	2.14	23.7	2.26
19.0	1.1508	23.10	2.21	24.4	2.34
19.5	1.1554	23.78	2.28	25.1	2.42

0685111

general data

ALUMINUM SULFATE 60°/60°F.—Continued

Degrees Baumé	Specific Gravity	Per Cent Sulfate Alumina (17% Al ₂ O ₃)	Lbs. per Gal. Sulfate Alumina (17% Al ₂ O ₃)	Per Cent Basic Sulfate Alumina (17.4% Al ₂ O ₃)	Lbs. per Gal. Basic Sulfate Alumina (17.4% Al ₂ O ₃)
20.0	1.1600	24.38	2.35	25.7	2.49
20.5	1.1647	24.99	2.42	26.4	2.56
21.0	1.1694	25.60	2.49	27.1	2.64
21.5	1.1741	26.22	2.56	27.7	2.71
22.0	1.1789	26.87	2.64	28.4	2.79
22.5	1.1837	27.50	2.71	29.1	2.87
23.0	1.1885	28.16	2.78	29.8	2.95
23.5	1.1934	28.85	2.86	30.3	3.02
24.0	1.1983	29.50	2.94	31.1	3.11
24.5	1.2033	30.18	3.02	31.7	3.18
25.0	1.2083	30.85	3.10	32.4	3.27
25.5	1.2134	31.54	3.18	33.1	3.35
26.0	1.2185	32.24	3.27	33.8	3.44
26.5	1.2236	32.95	3.35	34.5	3.52
27.0	1.2288	33.63	3.44	35.2	3.61
27.5	1.2340	34.35	3.52	35.9	3.70
28.0	1.2393	35.03	3.61	36.7	3.79
28.5	1.2446	35.75	3.70	37.3	3.87
29.0	1.2500	36.46	3.79	38.1	3.97
29.5	1.2554	37.20	3.88	38.8	4.06
30.0	1.2609	37.90	3.98	39.7	4.18
30.5	1.2664	38.58	4.06	40.3	4.26
31.0	1.2719	39.30	4.16	41.0	4.35
31.5	1.2775	40.02	4.25	41.8	4.46
32.0	1.2832	40.73	4.35	42.5	4.55
32.5	1.2889	41.49	4.45	43.3	4.66
33.0	1.2946	42.20	4.54	44.1	4.76
33.5	1.3004	42.96	4.64	44.9	4.87
34.0	1.3063	43.71	4.75	45.7	4.98
34.5	1.3122	44.48	4.86	46.5	5.09
35.0	1.3182	45.20	4.95	47.4	5.21
35.5	1.3242	46.00	5.07	48.3	5.34
36.0	1.3303	46.80	5.18	49.2	5.46
36.5	1.3364	47.58	5.29	50.1	5.59

FREEZING POINTS OF 0.6% BASIC ALUM SOLUTIONS

Baumé at 60°F.	Freezing Points, degrees F.
5	31
10	30
15	29
20	27
25	24
30	21
35	38

0685112

TOWOLDMON0043195
WATER_PCB-00034241

GENERAL DATA

general data

ALUMINUM CHLORIDE 60°/60°F.

Bischoff

ACE1

Oudem

Degrees Baumé	Specific Gravity	Per Cent Al ₂ Cl ₆	Lbs. Per Gal. Al ₂ Cl ₆ + 12H ₂ O	Degrees Baumé	Specific Gravity	Per Cent Al ₂ Cl ₆	Lbs. Per Ga Al ₂ Cl ₆ + 12H ₂ O
0.00	1.0000	0.00	0.00	17.50	1.1373	14.73	2.53
0.50	1.0035	0.35	0.038	18.00	1.1417	15.16	2.60
1.00	1.0069	0.75	0.113	18.50	1.1462	15.60	2.60
1.50	1.0105	1.17	0.178	19.00	1.1508	16.05	2.78
2.00	1.0140	1.58	0.242	19.50	1.1554	16.53	2.88
2.50	1.0175	2.00	0.307	20.00	1.1600	16.94	2.96
3.00	1.0211	2.40	0.370	20.50	1.1647	17.43	3.06
3.50	1.0247	2.78	0.430	21.00	1.1694	17.88	3.15
4.00	1.0284	3.16	0.490	21.50	1.1741	18.33	3.25
4.50	1.0320	3.58	0.557	22.00	1.1789	18.78	3.34
5.00	1.0357	4.00	0.625	22.50	1.1837	19.22	3.43
5.50	1.0394	4.38	0.686	23.00	1.1885	19.68	3.53
6.00	1.0432	4.81	0.756	23.50	1.1934	20.13	3.62
6.50	1.0469	5.20	0.820	24.00	1.1983	20.57	3.72
7.00	1.0507	5.63	0.890	24.50	1.2033	21.03	3.81
7.50	1.0545	6.05	0.962	25.00	1.2083	21.50	3.90
8.00	1.0584	6.50	1.04	25.50	1.2134	21.98	4.02
8.50	1.0623	6.92	1.11	26.00	1.2185	22.38	4.12
9.00	1.0662	7.32	1.18	26.50	1.2236	22.82	4.21
9.50	1.0701	7.75	1.25	27.00	1.2288	23.20	4.30
10.00	1.0741	8.13	1.32	27.50	1.2340	23.70	4.41
10.50	1.0781	8.57	1.39	28.00	1.2393	24.13	4.50
11.00	1.0821	9.00	1.47	28.50	1.2446	24.58	4.61
11.50	1.0861	9.46	1.55	29.00	1.2500	25.02	4.72
12.00	1.0902	9.90	1.63	29.50	1.2554	25.53	4.83
12.50	1.0943	10.28	1.70	30.00	1.2609	25.99	4.94
13.00	1.0985	10.70	1.77	30.50	1.2664	26.45	5.04
13.50	1.1027	11.15	1.85	31.00	1.2719	26.92	5.16
14.00	1.1069	11.60	1.93	31.50	1.2775	27.38	5.27
14.50	1.1111	12.05	2.02	32.00	1.2832	27.88	5.40
15.00	1.1154	12.50	2.10	32.50	1.2889	28.33	5.50
15.50	1.1197	12.95	2.19	33.00	1.2946	28.78	5.62
16.00	1.1240	13.37	2.27	33.50	1.3004	29.24	5.73
16.50	1.1284	13.83	2.35	34.00	1.3063	29.68	5.85
17.00	1.1328	14.30	2.44	34.50	1.3100	30.00	5.92

*Al₂Cl₆+12H₂O, chloride of alumina crystal. For chloride of alumina 32° Bé. (W) the above pounds per gallon of solution.

0685113

TOWOLDMON0043196
WATER_PCB-00034242

general data

ACETIC ACID 60°/60°F

Wiemann

Lbs.
T. Gal
M.C.L.
12110°

2.53
2.60
2.69
2.78
2.88

2.96
3.06
3.15
3.25
3.34

3.43
3.53
3.62
3.72
3.81

3.90
4.02
4.12
4.21
4.30

4.41
4.50
4.61
4.72
4.83

4.94
5.04
5.16
5.27
5.40

5.50
5.62
5.73
5.85
5.92

Specific Gravity	Per Cent $C_2H_3O_2$	Specific Gravity	Per Cent $C_2H_3O_2$	Specific Gravity	Per Cent $C_2H_3O_2$
1.0000	0	1.0469	34	1.0735	68
1.0016	1	1.0480	35	1.0739	69
1.0032	2	1.0491	36	1.0743	70
1.0047	3	1.0502	37	1.0747	71
1.0062	4	1.0512	38	1.0750	72
1.0077	5	1.0523	39	1.0752	73
1.0093	6	1.0533	40	1.0754	74
1.0108	7	1.0543	41	1.0756	75
1.0123	8	1.0553	42	1.0757	76
1.0137	9	1.0562	43	1.0758	77
1.0152	10	1.0572	44	1.0758	78
1.0167	11	1.0581	45	1.0758	79
1.0181	12	1.0590	46	1.0758	80
1.0195	13	1.0599	47	1.0757	81
1.0210	14	1.0607	48	1.0756	82
1.0224	15	1.0617	49	1.0754	83
1.0238	16	1.0625	50	1.0752	84
1.0252	17	1.0633	51	1.0749	85
1.0266	18	1.0641	52	1.0746	86
1.0280	19	1.0648	53	1.0741	87
1.0294	20	1.0656	54	1.0736	88
1.0308	21	1.0663	55	1.0730	89
1.0321	22	1.0670	56	1.0723	90
1.0334	23	1.0676	57	1.0715	91
1.0347	24	1.0683	58	1.0706	92
1.0360	25	1.0689	59	1.0696	93
1.0373	26	1.0695	60	1.0684	94
1.0385	27	1.0701	61	1.0670	95
1.0398	28	1.0707	62	1.0654	96
1.0410	29	1.0712	63	1.0635	97
1.0422	30	1.0717	64	1.0614	98
1.0434	31	1.0722	65	1.0590	99
1.0446	32	1.0727	66	1.0563	100
1.0457	33	1.0731	67		

Re. water

0685114

TOWOLDMON0043197
WATER_PCB-00034243

general data

HYDROCHLORIC ACID (Muriatic Acid)*

By W. C. Ferguson

Degrees Baume	Specific Gravity 60° 60°F.	Per Cent HCl	Degrees Baume	Specific Gravity 60° 60°F.	Per Cent HCl
1.00	1.0069	1.40	15.25	1.1176	23.33
2.00	1.0140	2.82	15.50	1.1197	23.75
3.00	1.0211	4.25	15.75	1.1219	24.16
4.00	1.0284	5.69	16.0	1.1240	24.57
5.00	1.0357	7.15	16.1	1.1248	24.73
5.25	1.0375	7.52	16.2	1.1256	24.90
5.50	1.0394	7.89	16.3	1.1265	25.06
5.75	1.0413	8.26	16.4	1.1274	25.23
6.00	1.0432	8.64	16.5	1.1283	25.39
6.25	1.0450	9.02	16.6	1.1292	25.56
6.50	1.0469	9.40	16.7	1.1301	25.72
6.75	1.0488	9.78	16.8	1.1310	25.89
7.00	1.0507	10.17	16.9	1.1319	26.05
7.25	1.0526	10.55	17.0	1.1328	26.22
7.50	1.0545	10.94	17.1	1.1336	26.39
7.75	1.0564	11.32	17.2	1.1345	26.56
8.00	1.0584	11.71	17.3	1.1354	26.73
8.25	1.0603	12.09	17.4	1.1363	26.90
8.50	1.0623	12.48	17.5	1.1372	27.07
8.75	1.0642	12.87	17.6	1.1381	27.24
9.00	1.0662	13.26	17.7	1.1390	27.41
9.25	1.0681	13.65	17.8	1.1399	27.58
9.50	1.0701	14.04	17.9	1.1408	27.75
9.75	1.0721	14.43	18.0	1.1417	27.92
10.00	1.0741	14.83	18.1	1.1426	28.09
10.25	1.0761	15.22	18.2	1.1435	28.26
10.50	1.0781	15.62	18.3	1.1444	28.44
10.75	1.0801	16.01	18.4	1.1453	28.61
11.00	1.0821	16.41	18.5	1.1462	28.78
11.25	1.0841	16.81	18.6	1.1471	28.95
11.50	1.0861	17.21	18.7	1.1480	29.13
11.75	1.0881	17.61	18.8	1.1489	29.30
12.00	1.0902	18.01	18.9	1.1498	29.48
12.25	1.0922	18.41	19.0	1.1508	29.65
12.50	1.0943	18.82	19.1	1.1517	29.83
12.75	1.0964	19.22	19.2	1.1526	30.00
13.00	1.0985	19.63	19.3	1.1535	30.18
13.25	1.1006	20.04	19.4	1.1544	30.35
13.50	1.1027	20.45	19.5	1.1554	30.53
13.75	1.1048	20.86	19.6	1.1563	30.71
14.00	1.1069	21.27	19.7	1.1572	30.90
14.25	1.1090	21.68	19.8	1.1581	31.08
14.50	1.1111	22.09	19.9	1.1590	31.27
14.75	1.1132	22.50	20.0	1.1600	31.45
15.00	1.1154	22.92	20.1	1.1609	31.64

0685115

TOWOLDMON0043198
WATER_PCB-00034244

general data

HYDROCHLORIC ACID (Muriatic Acid)* — Continued

Degrees Baumé	Specific Gravity 60° 60°F	Per Cent HCl	Degrees Baumé	Specific Gravity 60° 60°F	Per Cent HCl
20.2	1.1619	31.82	23.2	1.1904	37.58
20.3	1.1628	32.01	23.3	1.1914	37.80
20.4	1.1637	32.19	23.4	1.1924	38.03
20.5	1.1647	32.38	23.5	1.1934	38.26
20.6	1.1656	32.56	23.6	1.1944	38.49
20.7	1.1666	32.75	23.7	1.1953	38.72
20.8	1.1675	32.93	23.8	1.1963	38.95
20.9	1.1684	33.12	23.9	1.1973	39.18
21.0	1.1694	33.31	24.0	1.1983	39.41
21.1	1.1703	33.50	24.1	1.1993	39.64
21.2	1.1713	33.69	24.2	1.2003	39.86
21.3	1.1722	33.88	24.3	1.2013	40.09
21.4	1.1732	34.07	24.4	1.2023	40.32
21.5	1.1741	34.26	24.5	1.2033	40.55
21.6	1.1751	34.45	24.6	1.2043	40.78
21.7	1.1760	34.64	24.7	1.2053	41.01
21.8	1.1770	34.83	24.8	1.2063	41.24
21.9	1.1779	35.02	24.9	1.2073	41.48
22.0	1.1789	35.21	25.0	1.2083	41.72
22.1	1.1798	35.40	25.1	1.2093	41.99
22.2	1.1808	35.59	25.2	1.2103	42.30
22.3	1.1817	35.78	25.3	1.2114	42.64
22.4	1.1827	35.97	25.4	1.2124	43.01
22.5	1.1836	36.16	25.5	1.2134	43.40
22.6	1.1846	36.35			
22.7	1.1856	36.54			
22.8	1.1866	36.73			
22.9	1.1875	36.93			
23.0	1.1885	37.14			
23.1	1.1895	37.36			

*This table has been approved and adopted as a standard by the Manufacturing Chemists' Association of the United States.

Specific gravity determinations were made at 60°F. compared with water at 60°F.

From the specific gravities, the corresponding degrees Baumé were calculated by the following formula:

$$\text{Baumé} = 145 - \frac{145}{\text{Sp. Gr.}}$$

Allowance for Temperature

At 10° to 15° Bé. correction of 1 40° Bé. or 0.0002 Sp. Gr. for every 1°F.

At 15° to 22° Bé. correction of 1 30° Bé. or 0.0003 Sp. Gr. for every 1°F.

At 22° to 25° Bé. correction of 1 28° Bé. or 0.00035 Sp. Gr. for every 1°F.

0685116

TOWOLDMON0043199
WATER_PCB-00034245

GENERAL DATA

general data

NITRIC ACID*

By W. C. Ferguson

Degrees Baume	Specific Gravity 60° 60°F.	Per Cent HNO ₃	Degrees Baume	Specific Gravity 60° 60°F.	Per Cent HNO ₃
10.00	1.0741	12.86	21.25	1.1718	28.02
10.25	1.0761	13.18	21.50	1.1741	28.30
10.50	1.0781	13.49	21.75	1.1765	28.57
10.75	1.0801	13.81	22.00	1.1789	29.07
11.00	1.0821	14.13	22.25	1.1813	29.43
11.25	1.0841	14.44	22.50	1.1837	29.78
11.50	1.0861	14.76	22.75	1.1861	30.14
11.75	1.0881	15.07	23.00	1.1885	30.40
12.00	1.0902	15.41	23.25	1.1910	30.86
12.25	1.0922	15.72	23.50	1.1934	31.21
12.50	1.0943	16.05	23.75	1.1959	31.58
12.75	1.0964	16.39	24.00	1.1983	31.94
13.00	1.0985	16.72	24.25	1.2008	32.31
13.25	1.1006	17.05	24.50	1.2033	32.68
13.50	1.1027	17.38	24.75	1.2058	33.05
13.75	1.1048	17.71	25.00	1.2083	33.42
14.00	1.1069	18.04	25.25	1.2109	33.80
14.25	1.1090	18.37	25.50	1.2134	34.17
14.50	1.1111	18.70	25.75	1.2160	34.56
14.75	1.1132	19.02	26.00	1.2185	34.94
15.00	1.1154	19.36	26.25	1.2211	35.33
15.25	1.1176	19.70	26.50	1.2236	35.70
15.50	1.1197	20.02	26.75	1.2262	36.09
15.75	1.1219	20.36	27.00	1.2288	36.48
16.00	1.1240	20.69	27.25	1.2314	36.87
16.25	1.1262	21.03	27.50	1.2340	37.26
16.50	1.1284	21.36	27.75	1.2367	37.67
16.75	1.1306	21.70	28.00	1.2393	38.08
17.00	1.1328	22.04	28.25	1.2420	38.49
17.25	1.1350	22.38	28.50	1.2446	38.90
17.50	1.1373	22.74	28.75	1.2473	39.31
17.75	1.1395	23.08	29.00	1.2500	39.72
18.00	1.1417	23.42	29.25	1.2527	40.13
18.25	1.1440	23.77	29.50	1.2554	40.54
18.50	1.1462	24.11	29.75	1.2582	40.95
18.75	1.1485	24.47	30.00	1.2609	41.36
19.00	1.1508	24.82	30.25	1.2637	41.77
19.25	1.1531	25.18	30.50	1.2664	42.18
19.50	1.1554	25.53	30.75	1.2692	42.59
19.75	1.1577	25.88	31.00	1.2719	43.00
20.00	1.1600	26.24	31.25	1.2747	43.41
20.25	1.1624	26.61	31.50	1.2775	43.82
20.50	1.1647	26.96	31.75	1.2804	44.23
20.75	1.1671	27.33	32.00	1.2832	44.64
21.00	1.1694	27.67	32.25	1.2861	45.05

0685117

TOWOLDMON0043200
WATER_PCB-00034246

general data

NITRIC ACID*—Continued

Degrees Baumé	Specific Gravity 60° 60°F.	Per Cent HNO ₃	Degrees Baumé	Specific Gravity 60° 60°F.	Per Cent HNO ₃
32.50	1.2889	45.68	41.25	1.3976	64.93
32.75	1.2918	46.14	41.50	1.4010	65.67
33.00	1.2946	46.58	41.75	1.4044	66.42
33.25	1.2975	47.04	42.00	1.4078	67.18
33.50	1.3004	47.49	42.25	1.4112	67.95
33.75	1.3034	47.95	42.50	1.4146	68.73
34.00	1.3063	48.42	42.75	1.4181	69.52
34.25	1.3093	48.90	43.00	1.4216	70.33
34.50	1.3122	49.35	43.25	1.4251	71.15
34.75	1.3152	49.83	43.50	1.4286	71.98
35.00	1.3182	50.32	43.75	1.4321	72.82
35.25	1.3212	50.81	44.00	1.4356	73.67
35.50	1.3242	51.30	44.25	1.4392	74.53
35.75	1.3273	51.80	44.50	1.4428	75.40
36.00	1.3303	52.30	44.75	1.4464	76.28
36.25	1.3334	52.81	45.00	1.4500	77.17
36.50	1.3364	53.32	45.25	1.4536	78.07
36.75	1.3395	53.84	45.50	1.4573	79.03
37.00	1.3426	54.36	45.75	1.4610	80.04
37.25	1.3457	54.89	46.00	1.4646	81.08
37.50	1.3488	55.43	46.25	1.4684	82.18
37.75	1.3520	55.97	46.50	1.4721	83.33
38.00	1.3551	56.52	46.75	1.4758	84.48
38.25	1.3583	57.08	47.00	1.4796	85.70
38.50	1.3615	57.65	47.25	1.4834	86.98
38.75	1.3647	58.23	47.50	1.4872	88.32
39.00	1.3679	58.82	47.75	1.4910	89.76
39.25	1.3712	59.43	48.00	1.4948	91.35
39.50	1.3744	60.06	48.25	1.4987	93.13
39.75	1.3777	60.71	48.50	1.5026	95.11
40.00	1.3810	61.38			
40.25	1.3843	62.07			
40.50	1.3876	62.77			
40.75	1.3909	63.48			
41.00	1.3942	64.20			

*This table has been approved and adopted as a standard by the Manufacturing Chemists' Association of the United States.

Specific gravity determinations were made at 60°F. compared with water at 60°F.

From the specific gravities, the corresponding degrees Baumé were calculated by the following formula:

$$\text{Baumé} = 145 - \frac{145}{\text{Sp. Gr.}}$$

Allowance for Temperature

At from 10° to 20° Bé. correction of 1 30° Bé. or .00029 Sp. Gr. for every 1°F.
 At from 20° to 30° Bé. correction of 1 23° Bé. or .00044 Sp. Gr. for every 1°F.
 At from 30° to 40° Bé. correction of 1 20° Bé. or .00060 Sp. Gr. for every 1°F.
 At from 40° to 48.5° Bé. correction of 1 17° Bé. or .00084 Sp. Gr. for every 1°F.

0685118

general data

SULFURIC ACID*

By W. C. Ferguson and H. P. Talbot

De- grees Be.	Specific Gravity 60° 60° F.	Per Cent H ₂ SO ₄	Freezing (Melting) Point Deg. F.	De- grees Be.	Specific Gravity 60° 60° F.	Per Cent H ₂ SO ₄	Freezing (Melting) Point Deg. F.
0	1.0000	0.00	32.0	36	1.3303	42.63	-70
1	1.0069	1.02	31.2	37	1.3426	43.99	-60
2	1.0140	2.08	30.5	38	1.3551	45.35	-53
3	1.0211	3.13	29.8	39	1.3679	46.72	-47
4	1.0284	4.21	28.9	40	1.3810	48.10	-41
5	1.0357	5.28	28.1	41	1.3942	49.47	-35
6	1.0432	6.37	27.2	42	1.4078	50.87	-31
7	1.0507	7.45	26.3	43	1.4216	52.26	-27
8	1.0584	8.55	25.1	44	1.4356	53.66	-23
9	1.0662	9.66	24.0	45	1.4500	55.07	-20
10	1.0741	10.77	22.8	46	1.4646	56.48	-14
11	1.0821	11.89	21.5	47	1.4796	57.90	-15
12	1.0902	13.01	20.0	48	1.4948	59.32	-18
13	1.0985	14.13	18.3	49	1.5104	60.75	-22
14	1.1069	15.25	16.6	50	1.5263	62.18	-27
15	1.1154	16.38	14.7	51	1.5426	63.66	-33
16	1.1240	17.53	12.6	52	1.5591	65.13	-39
17	1.1328	18.71	10.2	53	1.5761	66.63	-49
18	1.1417	19.89	7.7	54	1.5934	68.13	-59
19	1.1508	21.07	4.8	55	1.6111	69.65	†
20	1.1600	22.25	+ 1.6	56	1.6292	71.17	†
21	1.1694	23.43	- 1.8	57	1.6477	72.75	†
22	1.1780	24.61	- 6.0	58	1.6667	74.36	†
23	1.1885	25.81	-11	59	1.6860	75.99	- 7
24	1.1983	27.03	-16	60	1.7059	77.67	-12.6
25	1.2083	28.28	-23	61	1.7262	79.43	-27.3
26	1.2185	29.53	-30	62	1.7470	81.30	-39.1
27	1.2288	30.79	-39	63	1.7683	83.34	-46.1
28	1.2393	32.05	-49	64	1.7901	85.66	-46.4
29	1.2500	33.33	-61	64½	1.7957	86.33	-43.6
30	1.2609	34.63	-74	64½	1.8012	87.04	-41.1
31	1.2719	35.93	-82	64½	1.8068	87.81	-37.9
32	1.2832	37.26	-96	65	1.8125	88.65	-33.1
33	1.2946	38.58	-97	65½	1.8182	89.55	-24.6
34	1.3063	39.92	-91	65½	1.8239	90.60	-13.4
35	1.3182	41.27	-81	65½	1.8297	91.80	- 1
				66	1.8354	93.19	-29

*This table has been approved and adopted as a standard by the Manufacturing Chemists' Association of the United States.

†Below -40°.

Specific gravity determinations were made at 60°F., compared with water at 60°F.

0685119

TOWOLDMON0043202
WATER_PCB-00034248

general data

SULFURIC ACID*—Continued

From the specific gravities, the corresponding degrees Baumé were calculated by the following formula: Baumé = $145 - 145/\text{Sp. Gr.}$

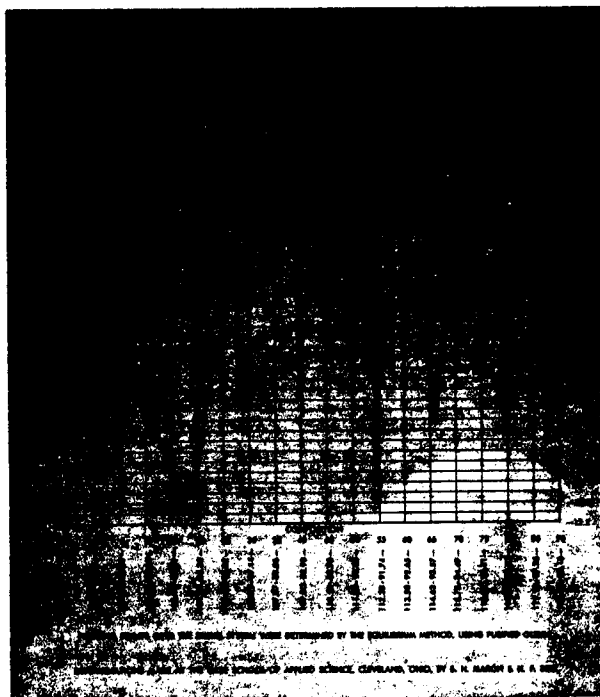
Allowance for Temperature

At 10° Bé.	.029° Bé. or .00023 Sp. Gr. for every 1°F.
At 20° Bé.	.036° Bé. or .00034 Sp. Gr. for every 1°F.
At 30° Bé.	.035° Bé. or .00039 Sp. Gr. for every 1°F.
At 40° Bé.	.031° Bé. or .00041 Sp. Gr. for every 1°F.
At 50° Bé.	.028° Bé. or .00045 Sp. Gr. for every 1°F.
At 60° Bé.	.026° Bé. or .00053 Sp. Gr. for every 1°F.
At 63° Bé.	.026° Bé. or .00057 Sp. Gr. for every 1°F.
At 66° Bé.	.0235° Bé. or .00054 Sp. Gr. for every 1°F.

For temperatures above 60°F., the correction is added to the observed indication; below 60°F. subtracted.

Oleum Freezing Point Diagram

ADOPTED—1941



0685120

general data

SODIUM BISULFITE 60° 60°F.

H. B. Bischoff

Degrees Baume	Specific Gravity	Per Cent NaHSO ₃	Per Cent SO ₂ Available	Degrees Baume	Specific Gravity	Per Cent NaHSO ₃	Per Cent SO ₂ Available
0.00	1.0000	0.00	0.00	20.00	1.1600	21.32	13.11
0.50	1.0034	0.51	0.31	20.50	1.1647	21.88	13.21
1.00	1.0069	1.02	0.63	21.00	1.1694	22.44	13.31
1.50	1.0104	1.53	0.94	21.50	1.1741	23.00	13.41
2.00	1.0140	2.04	1.26	22.00	1.1789	23.57	13.51
2.50	1.0175	2.55	1.57	22.50	1.1837	24.14	13.61
3.00	1.0211	3.06	1.88	23.00	1.1885	24.71	13.71
3.50	1.0247	3.57	2.20	23.50	1.1934	25.28	13.81
4.00	1.0284	4.08	2.51	24.00	1.1983	25.85	13.91
4.50	1.0320	4.59	2.83	24.50	1.2033	26.42	14.01
5.00	1.0357	5.11	3.15	25.00	1.2083	26.99	14.11
5.50	1.0394	5.63	3.47	25.50	1.2134	27.56	14.21
6.00	1.0432	6.15	3.79	26.00	1.2185	28.13	14.31
6.50	1.0469	6.67	4.11	26.50	1.2236	28.70	14.41
7.00	1.0507	7.19	4.43	27.00	1.2288	29.27	14.51
7.50	1.0545	7.71	4.75	27.50	1.2340	29.85	14.61
8.00	1.0584	8.24	5.07	28.00	1.2393	30.43	14.71
8.50	1.0623	8.77	5.40	28.50	1.2446	31.00	14.81
9.00	1.0662	9.30	5.72	29.00	1.2500	31.57	14.91
9.50	1.0701	9.83	6.05	29.50	1.2554	32.14	15.01
10.00	1.0741	10.36	6.38	30.00	1.2609	32.71	15.11
10.50	1.0781	10.89	6.70	30.50	1.2664	33.28	15.21
11.00	1.0821	11.42	7.03	31.00	1.2719	33.86	15.31
11.50	1.0861	11.95	7.36	31.50	1.2775	34.43	15.41
12.00	1.0902	12.48	7.68	32.00	1.2832	35.01	15.51
12.50	1.0943	13.02	8.02	32.50	1.2889	35.62	15.61
13.00	1.0985	13.56	8.35	33.00	1.2946	36.25	15.71
13.50	1.1027	14.10	8.68	33.50	1.3004	36.88	15.81
14.00	1.1069	14.65	9.02	34.00	1.3063	37.51	15.91
14.50	1.1111	15.20	9.36	34.50	1.3122	38.14	16.01
15.00	1.1154	15.75	9.70	35.00	1.3182	38.78	16.11
15.50	1.1197	16.30	10.03	35.50	1.3242	39.42	16.21
16.00	1.1240	16.85	10.37	36.00	1.3303	40.06	16.31
16.50	1.1284	17.40	10.71	36.50	1.3364	40.69	16.41
17.00	1.1328	17.96	11.05	37.00	1.3426	41.30	16.51
17.50	1.1372	18.52	11.39	37.50	1.3488	41.91	16.61
18.00	1.1417	19.08	11.74	38.00	1.3551	42.52	16.71
18.50	1.1462	19.64	12.08	38.50	1.3615	43.12	16.81
19.00	1.1508	20.20	12.43	39.00	1.3680	43.72	16.91
19.50	1.1554	20.76	12.77	39.50	1.3742	44.32	17.01

0685121

general data

PERCLOR

Bé.°	Tw.°	Per Cent Available Cl by Volume	Bé.°	Tw.°	Per Cent Available Cl by Volume
0.25	0.34	0.11	9.00	13.24	4.30
0.50	0.70	0.21	9.25	13.62	4.43
0.75	1.04	0.32	9.50	14.02	4.57
1.00	1.38	0.43	9.75	14.42	4.71
1.25	1.74	0.54	10.00	14.82	4.84
1.50	2.10	0.65	10.50	15.62	5.09
1.75	2.44	0.76	11.00	16.42	5.38
2.00	2.80	0.87	11.50	17.22	5.65
2.25	3.14	0.98	12.00	18.04	5.94
2.50	3.50	1.10	12.50	18.86	6.24
2.75	3.86	1.21	13.00	19.70	6.52
3.00	4.22	1.32	13.50	20.54	6.83
3.25	4.58	1.43	14.00	21.38	7.12
3.50	4.94	1.55	14.50	22.22	7.41
3.75	5.30	1.66	15.00	23.08	7.71
4.00	5.68	1.78	15.50	23.94	8.01
4.25	6.04	1.90	16.00	24.80	8.31
4.50	6.40	2.01	16.50	25.66	8.60
4.75	6.76	2.13	17.00	26.56	8.92
5.00	7.14	2.26	17.50	27.44	9.23
5.25	7.50	2.38	18.00	28.34	9.54
5.50	7.88	2.51	18.50	29.24	9.87
5.75	8.26	2.63	19.00	30.16	10.19
6.00	8.64	2.75	19.50	31.08	10.51
6.25	9.00	2.88	20.00	32.00	10.84
6.50	9.38	3.01	20.50	32.94	11.18
6.75	9.76	3.13	21.00	33.88	11.52
7.00	10.14	3.26	21.50	34.82	11.89
7.25	10.52	3.39	22.00	35.78	12.23
7.50	10.90	3.52	22.50	36.72	12.60
7.75	11.30	3.64	23.00	37.70	12.95
8.00	11.68	3.77	23.50	38.68	13.33
8.25	12.06	3.90	24.00	39.66	13.71
8.50	12.46	4.05	24.50	40.66	14.11
8.75	12.84	4.18	25.00	41.66	14.50

0685122

general data

TABLE OF COMPARATIVE PROPERTIES OF MONSANTO PLASTICIZERS

Flash Points	Boiling Points at 760 MM*	Molecular Weights	Crystallizing Points
470 F. — Tricresyl Phosphate (243 C.)	420 C. — Tricresyl Phosphate	390.5 — Dioctyl Phthalate	105 C. — Santicizer 9
450 F. — Santicizer 140 (232 C.)	405°C. — Diphenyl Phthalate	368.4 — Tricresyl Phosphate	
437 F. — Triphenyl Phosphate (225 C.)	390°C. — Santicizer 140 (approx.)	362.4 — Santicizer 141	
435 F. — Diphenyl Phthalate (224 C.)	386°C. — Dioctyl Phthalate	340.3 — Santicizer 140	86-87 C. — Santicizer 1-H
425°F. — Dioctyl Phthalate (218 C.)	375°C. — Santicizer 141 (approx.)	336.4 — Santicizer B-16	69°C. — Diphenyl Phthalate
420 F. — Santicizer 9 (215 C.)	370°C. — Santicizer 160	326.3 — Triphenyl Phosphate	59.0 C. — Santicizer 3
405 F. — Santicizer 141 (207 C.)	370°C. — Triphenyl Phosphate (approx.)	318.3 — Diphenyl Phthalate	49 C. — Triphenyl Phosphate
390 F. — Santicizer 160 (199 C.)	360°C. — Santicizer 9	312.4 — Santicizer 160	
386 F. — Santicizer E-15 (190 C.)	350°C. — Santicizer 1-H	280.3 — Santicizer E-15	34.5 C.* — Ortho Nitrobiphenyl
380 F. — Santicizer M-17 (193 C.)	345 C. — Santicizer B-16	278.3 — Dibutyl Phthalate	20 C.* — Santicizer E-15
371 F. — Santicizer 3 (188 C.)	340 C. — Dibutyl Phthalate	266.3 — Santicizer M-17	
345 F. — Santicizer 8 (174 C.)	330 C. — Ortho-Nitrobiphenyl (approx.)	253.0 — Santicizer 1-H	0 C. — Dimethyl Phthalate
340 F. — Dibutyl Phthalate (170 C.)	320 C. — Santicizer E-15	222.2 — Diethyl Phthalate	Less than 0 C. — Santicizer 8
305 F. — Diethyl Phthalate (152 C.)	310°C. — Santicizer M-17	199.3 — Santicizer 3	Less than -0.3 C.* — Diethyl Phthalate
300 F. — Dimethyl Phthalate (149 C.)	298 C. — Diethyl Phthalate	199.2 — Ortho-Nitrobiphenyl	
289.5 F. — Ortho-nitrobiphenyl (143 C.)	282 C. — Dimethyl Phthalate	194.2 — Dimethyl Phthalate	Dibutyl Phthalate Santicizer 160 Santicizer B-10 Santicizer M-17 Tricresyl Phosphate Santicizer 142 Dioctyl Phthalate
		171.2 — Santicizer 9	Less than -35 C. — Santicizer 142

*From vapor pressure curves.

*Supercools readily.

0685123

TABLE OF COMPARATIVE PROPERTIES OF MONSANTO PLASTICIZERS—Continued

	Refractive Index at 25°C.	Specific Gravity at 25°C.	Weight per Gallon at 25°C.	Color (APHA* Max. Specification)
izer 9	1.613 (approx.) Ortho-Nitrobiphenyl	1.220 Santicizer M-17	10.18 Santicizer M-17	APHA 200 Santicizer 8
		1.208 Santicizer 140	10.08 Santicizer 140	
		1.203 Ortho-Nitrobiphenyl	10.04 Ortho-Nitrobiphenyl	
zer 1-H		1.190 Santicizer 8	9.93 Santicizer 8	
yl ite		1.189 Dimethyl Phthalate	9.92 Dimethyl Phthalate	
zer 3	1.560 Santicizer 140	1.180 Santicizer E-15	9.85 Santicizer E-15	APHA 100 Santicizer 141
nyl ate	1.556 Tricresyl Phosphate			
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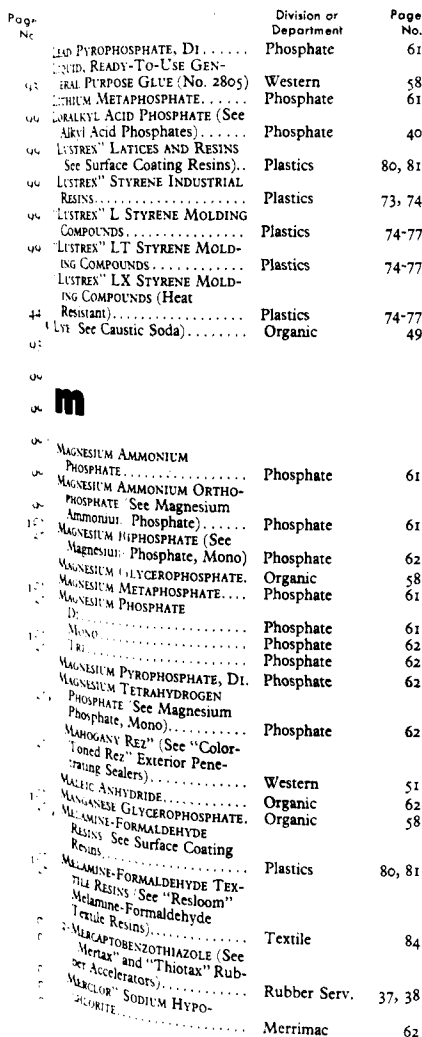
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WOOD PRESERVATIVES	
"FUNGISEAL" WOOD PRESERVATIVE.....	Western 57
"LAUXTOL" A, WOOD PRESERVATIVE.....	Western 60
"SANTOBRITE" SODIUM PENTACHLOROPHENATE, TECHNICAL	Organic 89
"SANTOPHEN" 20 PENTACHLOROPHENOL, TECHNICAL.....	Organic 94

X

XANTHOGEN DISULFIDE (See "Sulfasan" Xanthogen Disulfide).....	Rubber Serv.	100
XENYLAMINE (See para-Aminobiphenyl, Technical).....	Organic	41

Z

ZINC AMMONIUM PHOSPHATE....	Phosphate	105
ZINC DIBUTYL-DITHIOCARBAMATE (See "Butasan" Rubber Accelerator).....	Rubber Serv.	36
ZINC DIETHYL-DITHIOCARBAMATE (See "Ethasan" Rubber Accelerator).....	Rubber Serv.	36
ZINC DIMETHYL-DITHIOCARBAMATE (See "Methasan" Rubber Accelerator).....	Rubber Serv.	37
ZINC METAPHOSPHATE.....	Phosphate	105
ZINC ORTHOPHOSPHATE, TRI....	Phosphate	105

Monsanto Sales and Distributing Organization

MONSANTO is an efficient organization of service and supply to users of chemicals. Twenty-eight plants, twenty-nine district offices, together with representatives in sixty different countries make possible the manufacture and rapid distribution of more than 400 chemicals for almost every modern industry everywhere. Listed below are the complete addresses of the Monsanto offices located to serve these industries. For any information about Monsanto products or service, please contact the office nearest you or the central office, 1700 South Second Street, St. Louis 4, Missouri.

Domestic Sales Offices

AKRON 11, OHIO (O,RS,M,Ph)
920 Brown Street
Telephone Hemlock 6191

BIRMINGHAM 3, ALABAMA (O,Ph,M)
924 Brown-Marx Building
Telephone 7-0877

BOSTON 49, MASSACHUSETTS (O,Ph,M,T)
Everett Station
Telephone Everett 7-5010

CHARLOTTE 2, NORTH CAROLINA (O,Ph,M)
1117 Johnston Building
Telephone 2-3454

CHARLOTTE 2, NORTH CAROLINA (T)
1117 Johnston Building
Telephone 5-4870

CHICAGO 54, ILLINOIS (O,Ph,Pi,M)
Merchandise Mart Building
Telephone Whitehall 4-6750

CINCINNATI 2, OHIO (O,Ph,M)
1517 Carew Tower
Telephone Dunbar 1414

CLEVELAND 14, OHIO (O,Ph,M)
875 Union Commerce Building
Telephone Superior 1-3830

DETROIT 2, MICHIGAN (O,Ph,Pi,M)
827 Fisher Building
Telephone Trinity 2-5728

HOUSTON 2, TEXAS (O,M)
904 City National Bank Building
Telephone Atwood 6421

LOS ANGELES 15, CALIFORNIA (O,Ph,Pi,M,W,RS,T)
714 W. Olympic Boulevard
Telephone Richmond 7-7201

MINNEAPOLIS-ST. PAUL, MINNESOTA (O,Pi,M)
Foshay Tower
Telephone Filmore 4651

NEW YORK 22, NEW YORK (O,Ph,Pi,M,MCL,T)
445 Park Avenue
Telephone Plaza 9-8200

PHILADELPHIA 7, PENNSYLVANIA (O,Ph,M,T)
723 Widener Building
Telephone Locust 4-0247

PORTLAND, OREGON (O,Ph,Pi,M,W,T,RS)
421 S. W. Sixth Avenue
Telephone Broadway 2549

ST. LOUIS 4, MISSOURI (O,Ph,Pi,M,W)
1700 S. Second Street
Telephone Main 4000

SAN FRANCISCO 4, CALIFORNIA (O,Ph,Pi,M,W,RS)
111 Sutter Street
Telephone Yukon 6-6232

SEATTLE 4, WASHINGTON (O,Ph,Pi,M,W,RS)
911 Western Avenue
Telephone Main 4203

SPRINGFIELD 2, MASSACHUSETTS (Pi)
Telephone 8371

Foreign Sales Offices

ADELAIDE, AUSTRALIA
South Australia

BOMBAY, INDIA
Jhangir Building

BRISBANE, AUSTRALIA
Eagle Farm Road

BUENOS AIRES, ARGENTINA
La Valle 1139, 3 Piso

LONDON S.W. 1, ENGLAND
Victoria Station House
Victoria Street

MANCHESTER, ENGLAND
430-432 Royal Exchange Bldg.

MELBOURNE, AUSTRALIA
Somerville Road
Braybrook W. 19

MONTREAL, CANADA
425 St. Patrick Street
Ville La Salle

SYDNEY, N.S.W., AUSTRALIA
249 George Street

TORONTO, CANADA
183 Front Street East

VANCOUVER, CANADA
Granville Island
Telephone Pacific 2842

Monsanto sales representatives are located in the principal cities of the world. Refer to the classified section of your telephone directory under "Chemicals and Plastics" for name, address, etc.

KEY: Key letters indicate divisional products handled by above offices.

(O)—Organic
MCL—Monsanto Chemicals Ltd.

Ph—Phosphate
Pi—Plastics

M—Merrimac
W—Western

RS—Rubber Service
T—Textile

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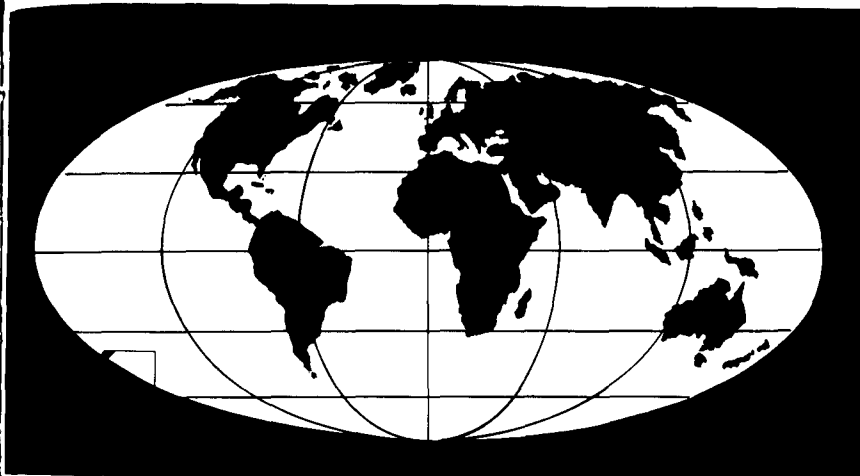
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Divisional Offices and Associated Companies

MERRIMAC DIVISION
Everett Station, Boston 49, Massachusetts
ORGANIC CHEMICALS DIVISION
1700 S. Second Street, St. Louis 4, Missouri
PHOSPHATE DIVISION
1700 S. Second Street, St. Louis 4, Missouri
PLASTICS DIVISION
Springfield 2, Massachusetts
TEXAS DIVISION
Texas City, Texas
WESTERN DIVISION
911 Western Avenue, Seattle 4, Washington
CENTRAL RESEARCH DEPARTMENT
Dayton 7, Ohio
FOREIGN DEPARTMENT
1700 S. Second Street, St. Louis 4, Missouri
RUBBER CHEMICAL SALES
920 Brown Street, Akron 11, Ohio
TEXTILE CHEMICALS DEPARTMENT
Everett Station, Boston 49, Massachusetts
MONSANTO EXPORT COMPANY
1700 S. Second Street, St. Louis 4, Missouri
MONSANTO OVERSEAS CORPORATION
1700 S. Second Street, St. Louis 4, Missouri
NEALCO-MONSANTO COMPANY
Boston 9, Massachusetts

SHAWINIGAN RESINS CORPORATION
Springfield 2, Massachusetts
MONSANTO-ATANOR, INDUSTRIAS QUIMICAS
ARGENTINAS, S.A., Buenos Aires, Argentina
MONSANTO CHEMICALS (AUSTRALIA) LTD.
Somerville Road, Braybrook W.19,
Melbourne, Australia
MONSANTO S.A. PRODUTOS QUIMICOS E PLASTICOS
Sao Paulo, Brazil
MONSANTO CANADA LTD.
425 St. Patrick St., Ville La Salle
(Montreal), Canada
MONSANTO CHEMICALS LTD.
Victoria Station House, Victoria Street
London S. W. 1, England
MONSANTO CHEMICALS OF INDIA, LTD.
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MONSANTO-KASEI KOGYO, K.K.
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Tokyo, Japan
MONSANTO MEXICANA, S.A.
Tonala N. 136, Mexico, D. F., Mexico
CABLE ADDRESS
"Monsanto" St. Louis Codes: ABC, 6th and 7th Acme, Bent-
ley's and Bentley's Second

Manufacturing Plants

1 the principal cities of
ur telephone directory
dress, etc.

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ANNISTON, ALABAMA
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Monsanto Chemical Company
St. Louis, U. S. A.

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