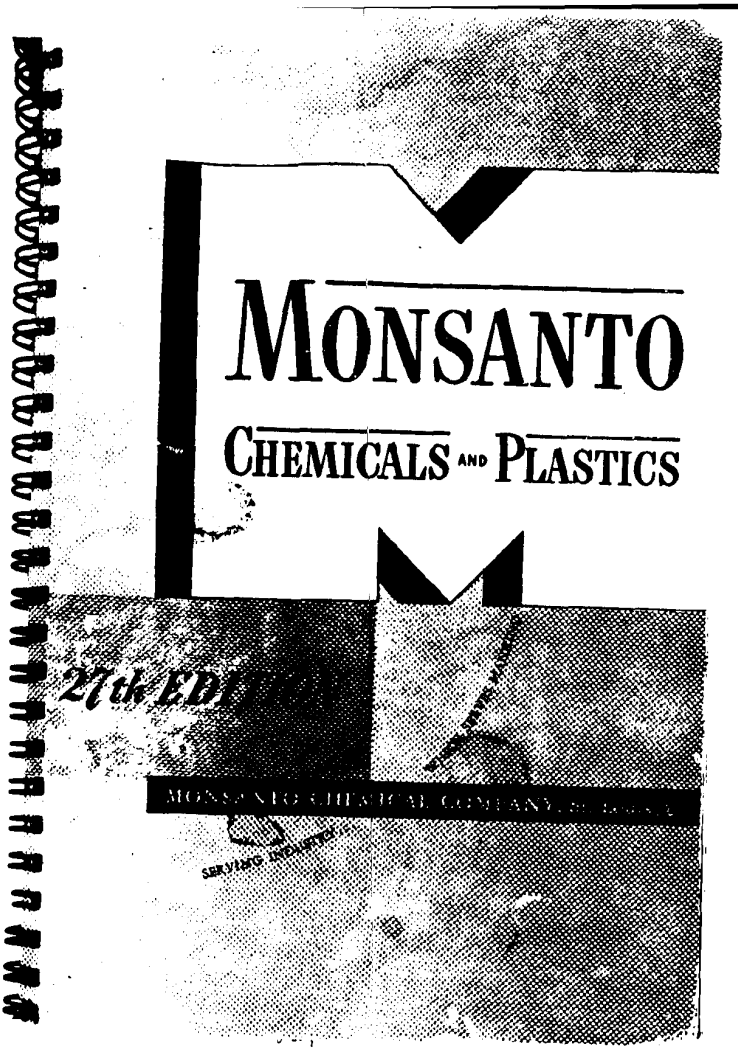



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WATER_PCB-00025784




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## HOW TO USE THIS BOOK

This is an entirely new edition, designed to bring together in the most convenient and useful form possible, sufficient information on all Monsanto products to serve as a buying guide and to enable users of chemicals to determine whether a material unfamiliar to them is of sufficient interest to merit further consideration. Those desiring more detailed information on specific products are referred to the Monsanto literature listed on page 186 or to their nearest Monsanto district office. Locations of these offices are given on page 4.

All products are listed alphabetically in the main section of the book according to their common chemical names or Monsanto trade names. Where a product has more than one common name, or both a trade name and a chemical name, it has been attempted to list all of these along with proper cross references, thus making the book self-indexing and eliminating the trouble of referring to an index first and then to a given page number.

To assist users of chemicals in acquainting themselves with the Monsanto products applicable in their particular industry, a classification of products according to industries is given on page 15. This classification should not be considered final or complete. New uses for Monsanto chemicals and plastics are opening up daily, some in fields entirely unsuspected a short time before. Likewise, no product should be considered as limited to the uses mentioned in this book.

The general data section beginning on page 194 contains a variety of physical and chemical information which will be useful in connection with certain products described in the alphabetical section. Specific reference to this data is made under products to which any of it applies.

The information contained in this catalog is to our best knowledge true and accurate, but all recommendations or suggestions are made without guarantee, since the conditions of use are beyond our control.

Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or use.

## A WORD ABOUT CONTAINERS

Because of the rapid changes taking place in the availability of containers at the time this book was compiled, no attempt was made to include container data of any kind. Users of Monsanto products may rest assured, however, that at all times their orders will be shipped in the highest quality and most satisfactory containers available. For current container information write your nearest Monsanto district office.

**CAUTION**

The products described in this book are primarily for manufacturing use. They should not be used on the human body, either internally or externally, until their safety for the use intended is clearly established, and then not unless under competent direction.



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## DISTRICT OFFICES

AKRON 8, OHIO
2nd National Building
Telephone: HEmlock 6191

BIRMINGHAM 3, ALA.
Brown Marx Building
Telephone: 7-0877

BOSTON 49, MASS.
Everett Station
Telephone: EVErett 5010

CHARLOTTE 2, N. C.
Johnston Building
Telephone: 2-3454

CHICAGO 11, ILL.
Tribune Tower
Telephone: WHItehall 6750

DAYTON 7, OHIO
Post Office Box 8
Station B
Telephone: FUlton 8165

DETROIT 2, MICH.
427 Fisher Building
Telephone: TRinity 2-5728

LONDON S. W. 1, ENGLAND
Victoria Street

LOS ANGELES 15, CALIF.
606 West Olympic Blvd.
Telephone: MIchigan 6048

MELBOURNE, AUSTRALIA
Somerville Road
Braybrook W. 19

MONTREAL, CANADA
378 St. Paul Street West
Telephone: MArket 4236

NEW YORK 20, N. Y.
30 Rockefeller Plaza
Telephone: CIrcle 7-6170

ST. LOUIS 4, MO.
1700 South Second Street
Telephone: CEntral 6233

SAN FRANCISCO 4, CALIF.
100 Bush Street
Telephone: DOuglas 4120

SEATTLE 4, WASH.
911 Western Avenue
Telephone: MAine 4203

SPRINGFIELD 2, MASS.
Indian Orchard Post Office
Telephone: 8371

TORONTO, CANADA
183 Front Street East
Telephone: WAverly 1143

WASHINGTON 5, D. C.
401 Shoreham Building
Telephone: EXecutive 4224

## WORKS

ANNISTON, ALABAMA
BAHIA, BRAZIL
CAMDEN, NEW JERSEY
CARONDELET, MISSOURI
DAYTON, OHIO
EVERETT, MASSACHUSETTS
LOCKPORT, NEW YORK
LOS ANGELES, CALIFORNIA
MELBOURNE, AUSTRALIA
MONSANTO, ILLINOIS
MONSANTO, TENNESSEE





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MONTREAL, CANADA
NITRO, WEST VIRGINIA
NORFOLK, VIRGINIA
OAK RIDGE, TENNESSEE
PORTSMOUTH, VIRGINIA
RUABON, N. WALES
ST. LOUIS, MISSOURI
SEATTLE, WASHINGTON
SPRINGFIELD, MASSACHUSETTS
STANBRIDGE, CANADA
SUNDERLAND, ENGLAND
TEXAS CITY, TEXAS
TRENTON, MICHIGAN
VANCOUVER, CANADA

## DIVISIONS and ASSOCIATED COMPANIES

MERRIMAC DIVISION, Everett Station, Boston 49, Mass.
ORGANIC CHEMICALS DIVISION, 1700 S. Second St., St. Louis 4, Mo.
PHOSPHATE DIVISION, 1700 S. Second St., St. Louis 4, Mo.
PLASTICS DIVISION, Indian Orchard Post Office, Springfield 2, Mass.
RUBBER SERVICE DEPARTMENT, 2nd National Building, Akron 8, Ohio.
CENTRAL RESEARCH DEPARTMENT, Dayton 7, Ohio.
FOREIGN DEPARTMENT, 1700 S. Second St., St. Louis 4, Mo.
I. F. LAUCKS, INC., 911 Western Ave., Seattle 4, Wash.
NEW ENGLAND ALCOHOL COMPANY, Everett Station, Boston 49, Mass.
SHAWINIGAN RESINS CORPORATION, Indian Orchard Post Office. Springfield 2, Mass.
MONSANTO EXPORT CO., 1700 S. Second St., St. Louis 4, Mo.
MONSANTO (CANADA), LTD., 378 St. Paul St. West, Montreal, Quebec.
MONSANTO CHEMICALS LTD., Victoria St., London, S. W. 1, England.
MONSANTO (AUSTRALIA) PTY. LTD., Somerville Road, Braybrook W. 19, Melbourne, Australia.
MONSANTO OF BRAZIL, INC., Avenida Beira Mar. Salvador, Bahia, Brazil.

## CABLE ADDRESS

"Monsanto" St. Louis
Codes: ABC, 6th and 7th
Acme, Bentley's and Bentley's Second



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# MONSANTO

## THE ORGANIZATION

Monsanto Chemical Company, founded in 1901 by John Francis Queeny and given his wife's maiden name, today is one of America's major producers of chemicals and plastics. Stemming from broadly diversified chemical raw materials such as coal tar, petroleum, phosphorus, cellulose, salt and sulfur, Monsanto products number in the hundreds and find use in virtually every branch of manufacturing industry.

Monsanto's four divisions and its subsidiary companies operate twenty-one plants in the United States, three in Canada and four overseas. Eight plants were in operation for the government during World War II.

## ORGANIC CHEMICALS DIVISION

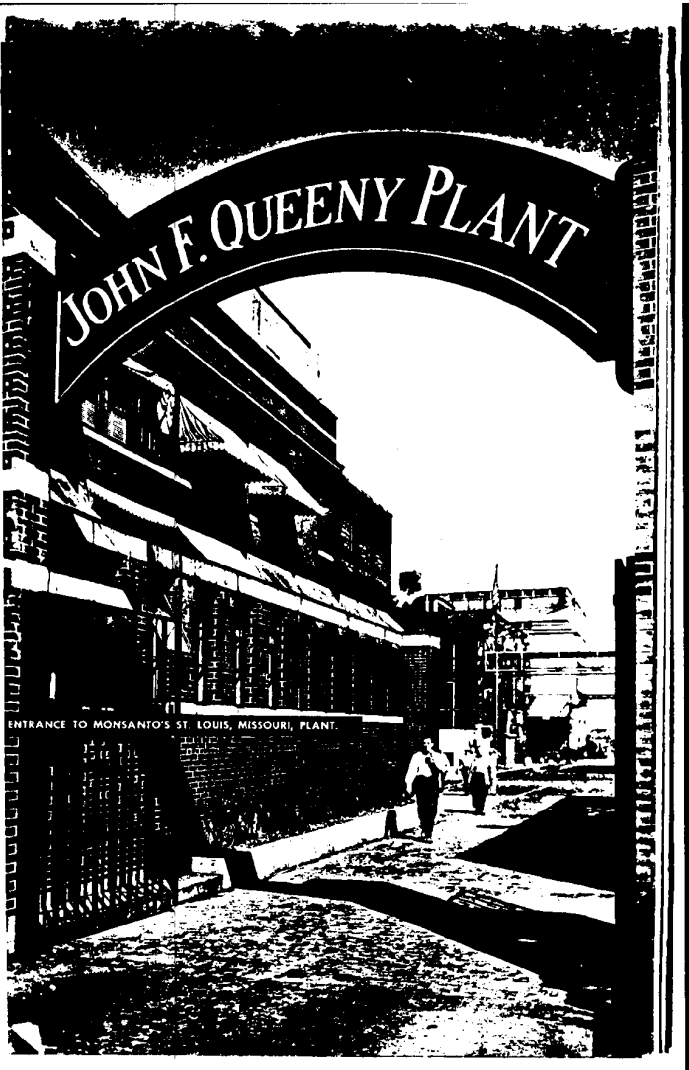
The Organic Chemicals Division is the lineal descendant of the original Monsanto works. To considerable extent, the division's products, too, derive from the research program begun in infant days. The original Monsanto product, saccharin, is now one of many made and sold by the division. Others fall in a wide variety of classifications including pharmaceuticals, drug intermediates, dye intermediates, petroleum additives, flavorings, plasticizers, resins, insecticides and heavy chemicals.

The division's largest plant is on the site of the original works at St. Louis. Here are manufactured the fine chemicals,



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ENTRANCE TO MONSANTO'S ST. LOUIS, MISSOURI, PLANT.

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many derived from coal tar, that established Monsanto's early reputation, as well as numerous other classes of products. Across the Mississippi River from St. Louis, in Monsanto, Illinois, the Organic Chemicals Division operates a large plant producing heavy chemicals and organic intermediates.

At Norfolk, Virginia, the division operates a plant manufacturing intermediates. It also operates plants at Texas City, Texas, and Bahia, Brazil.

## PHOSPHATE DIVISION

The phosphates and other compounds of phosphorus are, as a class, increasing in importance. They are finding use in such varied fields as medicinals, water treatment, dentrifices, soaps, metal treatment, textiles, leavening agents, foods and petroleum.

Operations of Monsanto's Phosphate Division are based on the production of elemental phosphorus at Monsanto, Tennessee. Here phosphate earth is dug from large open pit mines and charged into huge electric furnaces where the phosphorus is freed in elemental form.

From this elemental phosphorus comes phosphoric acid, the parent of the large family of phosphates which are made in the division's other plants at Anniston, Alabama, Carondelet, Missouri, and Trenton, Michigan. In addition, products of the division not derived from phosphorus are made at Anniston. These include diphenyl, Aroclors, Santowax, calcium carbide and aluminous abrasives. Headquarters for the division are at St. Louis.

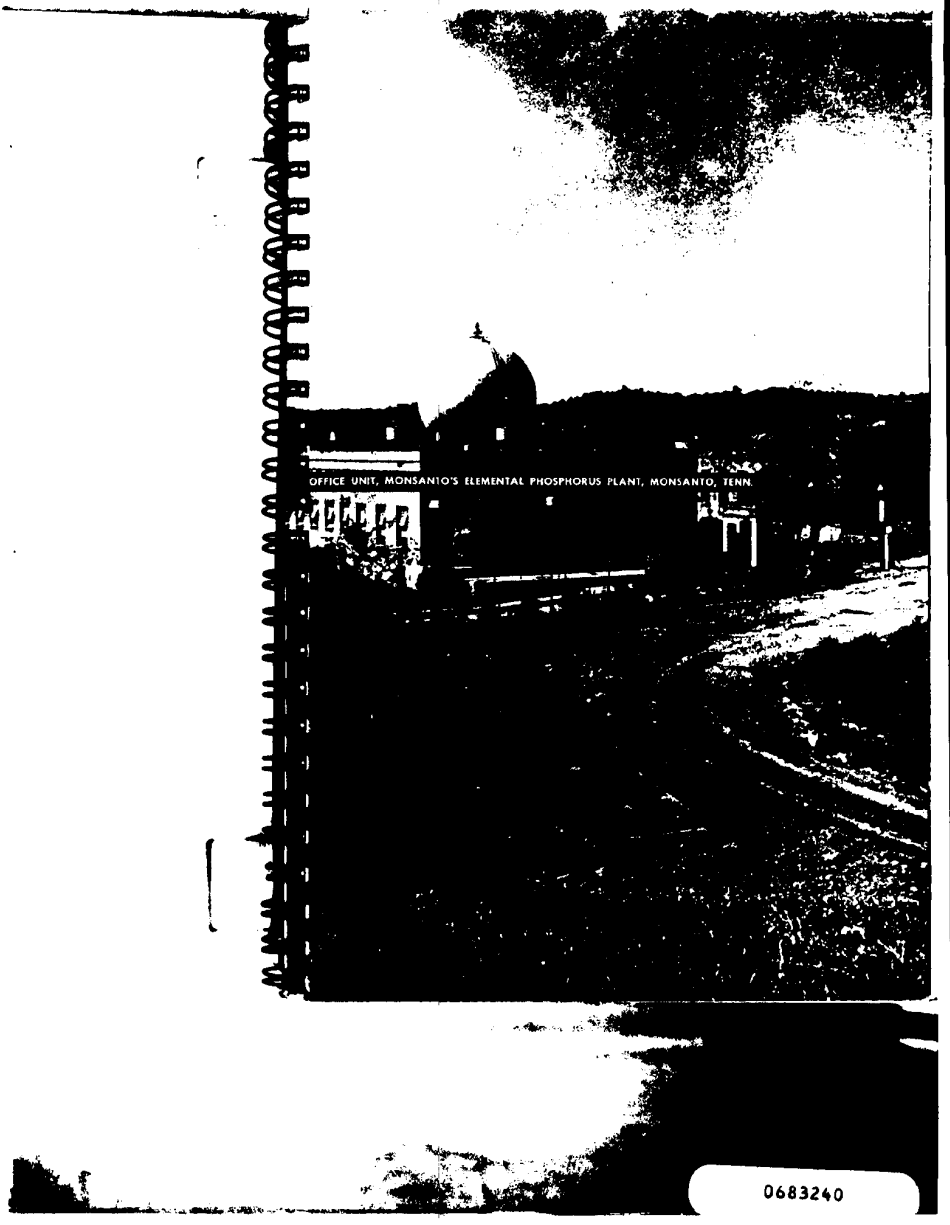
## RUBBER SERVICE DEPARTMENT

Monsanto's Rubber Service Department, part of the Organic Chemicals Division, provides the rubber industry with many chemicals, such as accelerators, antioxidants, mold lubricants, pigments, colors, preservatives, softeners and plasticizers. A modern laboratory is maintained for solving compounding problems. Available without cost to users of Rubber Service materials are the facilities of this laboratory and the help of its trained and experienced staff.



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Rubber Service headquarters are at Akron, Ohio, in the heart of the rubber manufacturing district. The plant is at Nitro, West Virginia.

## MERRIMAC DIVISION

A diversified line of heavy and industrial chemicals is manufactured by Monsanto's Merrimac Division, headquartered at Everett Station, Boston. Included among its products are acids, lacquers, alcohol, solvents, intermediates, tanning chemicals, commercial gases and lampblack.

The division operates three plants, the largest at Everett Station, Boston. Adjoining it are the facilities of the New England Alcohol Company, subsidiary of Monsanto. Lampblack is manufactured at Monsanto's Camden, New Jersey, plant.

Some products of the Merrimac Division duplicate those made at other plants of the company and thus provide an eastern source of supply for Monsanto customers.

## I. F. LAUCKS, INC.

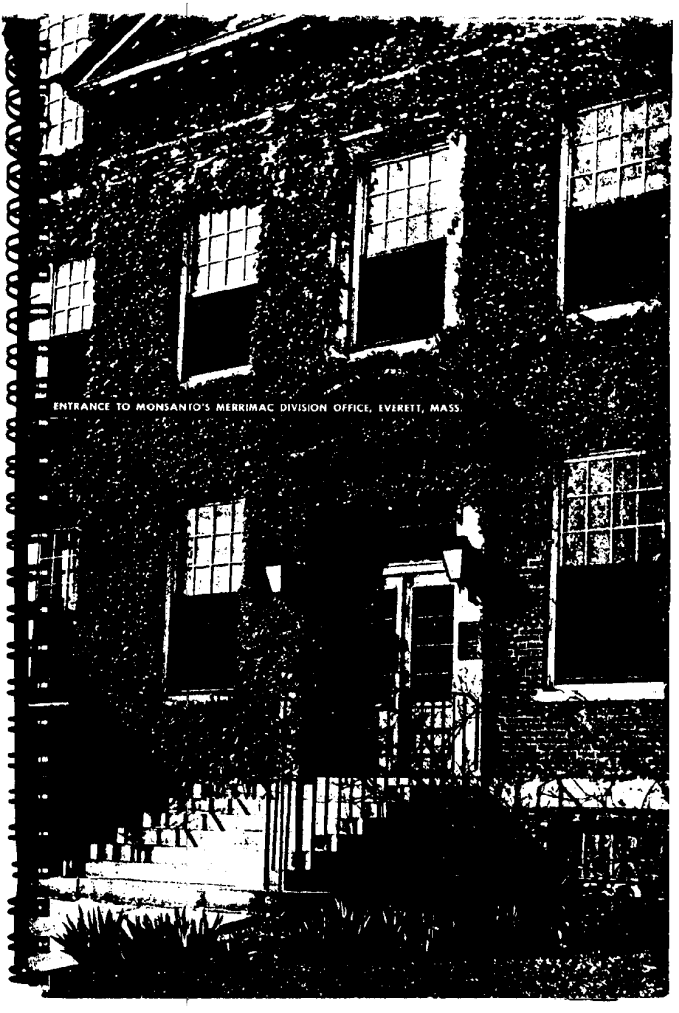
I. F. Laucks, Inc., and its Canadian subsidiary, Laucks, Ltd., were acquired by Monsanto Chemical Company in 1944. The Laucks organization is headquartered at Seattle, Washington, operating two plants there, one in Los Angeles, California, and others at Lockport, New York, and Portsmouth, Virginia. Laucks, Ltd., has one plant at Vancouver, British Columbia, and another at Stanbridge, Quebec.

The company was founded in 1908. Its chief products are synthetic resins and protein glues. Other Laucks products include wood preservatives, protective coatings and sealers. These products go principally into the plywood, woodworking, building construction, furniture, aircraft and boat-building industries.



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ENTRANCE TO MONSANTO'S MERRIMAC DIVISION OFFICE, EVERETT, MASS.

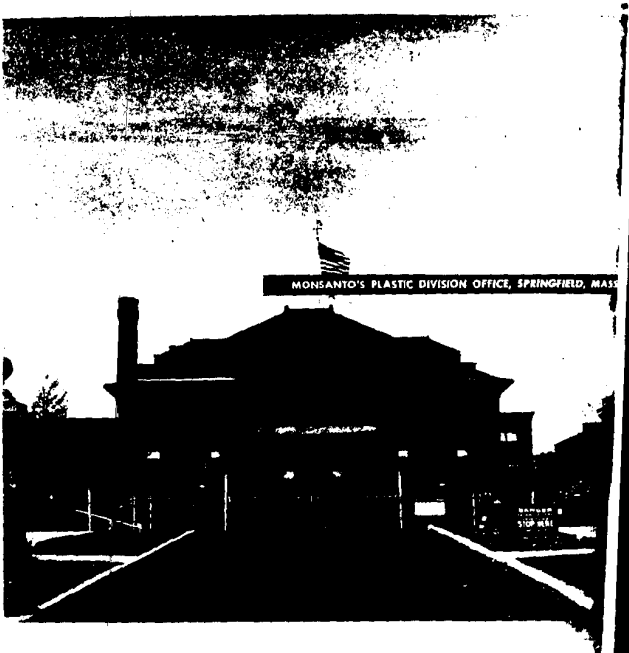
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## PLASTICS DIVISION

Monsanto's Plastics Division has gained a leading position in the new and growing plastics industry. The development of new plastics and their application is a continuing and accelerating process.

Plastics operations are consolidated at Springfield, Massachusetts. A construction program begun in 1938 has resulted in several major additions at Springfield, including a plant for the production of Resinox phenol-formaldehyde resins and molding materials and the plant of the Shawinigan Resins Corporation, a Monsanto associate manufacturing vinyl resins.



MONSANTO'S PLASTIC DIVISION OFFICE, SPRINGFIELD, MASS

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CENTRAL RESEARCH DEPARTMENT, DAYTON, OHIO

## CENTRAL RESEARCH DEPARTMENT

Research at Monsanto assumes both a divisional and a centralized function. Each division maintains its own research laboratories—Organic Chemicals Division at St. Louis and Nitro; Phosphate Division at Anniston; Plastics Division at Springfield, and Merrimac Division at Everett. The research function in each is kept separate from other laboratory operations, such as analytical control and testing.

The Central Research Department at Dayton, Ohio, supplements and augments the work of the divisional research labora-



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tories. It carries on much of the fundamental research of the company and its laboratories are equipped with the latest research aids, including electron microscopy, X-ray, electron diffraction, and complete spectographic equipment. The department conducts special investigations in cooperation with the operating divisions and studies of an exploratory nature that may not be related to the company's present products.

## DIVISIONAL DEVELOPMENT DEPARTMENT

A development department staff is maintained by each of the divisions and is comprised of qualified personnel experienced in the chemical problems and requirements of a wide variety of industries. Its function is to provide industrial users with sound technical counsel on problems relating to the application of Monsanto chemicals.

SERVING INDUSTRY . . . WHICH SERVES MANKIND



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## SOME INDUSTRIES SERVED BY

## MONSANTO AND PRODUCTS SUPPLIED

### AGRICULTURAL
Abrasives
Calcium Phosphate, Di
Calcium Sulfate
Ferric Chloride
Ferrophosphorus
Fungicides
Herbicides
Insecticides
Lacquers
Muriatic Acid
Nitric Acid
Phosilage
Phosphoric Acid
Plastics
Sodium Bisulfate
Sodium Sulfate
Sulfur
Sulfuric Acid
Wetting Agents (Santomerse)

### APPLIANCES
Abrasives
Cresol
Ferric Chloride
Hydrochloric Acid
Lacquers
Lampblack
Maleic Anhydride
Nitric Acid
Phosphoric Acid
Phthalic Anhydride
Plastics
Solvents
Sulfuric Acid

### AUTOMOTIVE
Abrasives
Acetic Acid
Alcohol
Aluminum Sulfate
Amyl Acetate
Aroclors (Chlorinated Biphenyl)
Battery Acid
Benzene
Butyl Acetate
Butyl Alcohol
Caustic Soda
Chlorine
Cresol
Diacetone Alcohol
Dibutyl Phthalate
Diethyl Phthalate
Ethyl Acetate
Ferric Chloride
Ferrophosphorus
Hydrochloric Acid
Lacquers
Maleic Anhydride
Nitric Acid
Phenol
Phosphoric Acid
Phthalic Anhydride
Plastics
Rubber Accelerators
Rubber Antioxidants
Resins
Santicizer 9
Santicizers (Phthalyl Glycollates)
Sodium Acetate
Sodium Phosphates
Sodium Sulfate
Sulfur
Sulfuric Acid
Tanning Chemicals
Thinners
Tricresyl Phosphate

### AVIATION
Abrasives
Alcohol
Amyl Acetate
Butyl Acetate
Dibutyl Phthalate
Ethyl Acetate
Finishes
Lacquers
Phosphoric Acid
Phthalate Esters
Plasticizers
Plastics
Primers
Rubber Accelerators
Rubber Antioxidants
Solvents
Sulfuric Acid
Surfacers
Thinners
Tricresyl Phosphate

### CARPETS AND RUGS
Acetic Acid
Aluminum Sulfate
Glauber's Salt
Insecticides



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TOWOLDMON0041330
WATER_PCB-00025799

Lacquers
Latex Accelerators and Antioxidants
Resins
Sodium Bisulfate
Sodium Bisulfite, Anhydrous
Sodium Phosphate, Tri
Sodium Pyrophosphate, Tetra
Sodium Sulfate, Anhydrous
Sulfuric Acid
Wetting Agent ( Santomerse)

## CERAMICS

Abrasives
Aluminum Metaphosphate
Barium Metaphosphate
Bone Ash
Hydrochloric Acid
Phosphoric Acid
Resins
Sodium Pyrophosphate, Tetra
Sodium Sulfate, Technical
Sulfuric Acid
Wetting Agent (Santomerse)

## CHEMICAL PROCESS

Acetic Acid
para-Acetyl-Amino-Benzenesulfonchloride
Alcohol
Aluminum Sulfate
Ammonia Anhydrous
Ammonia Aqua
Amyl Acetate
ortho-Anisidine
Butyl Acetate
Calcium Pyrophosphate
Caustic Soda
Chlorine
meta-Cresol
ortho-Cresol
para-Cresol
Cresylic Acid
Diacetone Alcohol
Dinitrochlorobenzene
Ethyl Acetate
Hydrochloric Acid
Maleic Anhydride
Mersol (Solvent)
Methyl Salicylate U. S. P. (Synthetic)
Mixed Acid
Monochlorobenzene
Monsanto Salt
Nitric Acid
ortho-Nitroaniline
ortho-Nitroanisole
Nitrocellulose Solutions
ortho-Nitrochlorobenzene
para-Nitrochlorobenzene
para-Phenetidin
Phenol
Phosphoric Acid
Phosphorus Oxychloride
Phosphorus Trichloride
Phthalic Anhydride
Piperidine
Pyridine
Salicylic Acid
Sodium Aluminate
Sodium Bisulfite
Sodium Pyrophosphate, Tetra
Sodium Sulfate, Technical
Sodium Sulfite
Solvents
Sulfuric Acid
Sulfuryl Chloride
Thiourea
Tricresyl Phosphate
para-Toluenesulfonamide
para-Toluenesulfonchloride
Wetting Agents

## COSMETICS AND PERFUMES

Alcohol
Benzoic Acid
Benzyl Chloride
Calcium Phosphate, Di
Calcium Phosphate, Tri
Caustic Soda
Coumarin Monsanto
meta-Cresol
Diethyl Phthalate
Ethavan
Methyl Salicylate U. S. P. (Synthetic)
Phosphoric Acid
Potassium Pyrophosphate, Tetra
Salicylic Acid
Vanillin Monsanto
Vuepak
Wetting Agents

## DAIRY PRODUCTS

Ammonia, Anhydrous
Ammonium Phosphate, Mono
Ethavan
Merclor (Sodium Hypochlorite)
Mertec (Chlorine-Resistant Paint)
Sodium Acid Pyrophosphate
Sodium Phosphate, Di
Sodium Phosphate, Tri
Sodium Pyrophosphate, Tetra
Sulfuric Acid
Vanillin Monsanto
Wetting Agents

## DENTAL PRODUCTS

Alcohol
Benzoic Acid



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Calcium Phosphate, Di
Calcium Phosphate, Tri
Calcium Pyrophosphate
Crysalba
Methyl Salicylate U. S. P. (Synthetic)
Plastics
Phosphoric Acid
Saccharin U. S. P.
Sodium Benzoate
Synthetic Detergents

## DYESTUFF MANUFACTURE

Acetic Acid
Aluminum Sulfate
Aluminum Sulfate, Iron Free
ortho-Aminobiphenyl
Aniline Oil
ortho-Anisidine
para-Anisidine
Benzotrichloride
Benzyl Chloride
ortho-Chloroaniline
meta-Chloroaniline
para-Chloroaniline
para-Chloro-meta-Cresol
ortho-Chlorophenol
para-Chlorophenol
Chlorosulfonic Acid
ortho-Cresol
para-Cresol
Cyclohexylamine
Dichloroaniline
ortho-Dichlorobenzene
Dichlorophenol
Dinitroaniline
Dinitrochlorobenzene
H Acid
Monochlorobenzene
Monsanto Salt
Nitrating Acid
ortho-Nitroaniline
ortho-Nitroanisole
ortho-Nitrochlorobenzene
meta-Nitrochlorobenzene
para-Nitrochlorobenzene
Nitrodichlorobenzene
ortho-Nitrophenol
para-Nitrophenol
ortho-Phenetidin
para-Phenetidin
Phenol
Phosphoric Acid
Phosphorus Oxychloride
Phosphorus Trichloride
Phthalic Anhydride
Saccharin U. S. P.
Salicylic Acid, Grade B
Sodium Acetate
Sodium Acid Pyrophosphate
Sodium Bisulfate
Sodium Bisulfite
Sodium Sulfate
Sodium Sulfate, Crystal
Sulfuric Acid
Sulfuryl Chloride
Terphenyls
Thioures
para-Toluenesulfonamide
para-Toluenesulfonchloride
para-Toluenesulfonic Acid
Wetting and Spreading Agents (Areskap, Aresket, Aresklene, Santomerse)

## ELECTRICAL

Aroclors
Cable Dope
Fungicides
Lacquers
Lampblack
Nitric Acid
Phosphoric Acid
Plastics
Plasticizers
Rubber Accelerators
Rubber Antioxidants
Resins
Sulfuric Acid

## ENGRAVING

Acetic Acid
Ferric Chloride
Nitric Acid
Plastics
Sulfuric Acid
Wetting Agent (Santomerse)

## FLORISTS AND FRUIT GROWERS

Ammonia, Anhydrous
ortho-Dichlorobenzene
para-Dichlorobenzene
Fungicides
Hydrochloric Acid
Insecticides
Sodium Phosphate, Tri
Vuepak
Wetting Agent (Santomerse)

## FOOD

Aluminum Metaphosphate
Ammonium Benzoate
Ammonium Phosphate
Benzoic Acid U. S. P.
Calcium Phosphates
Calcium Pyrophosphate



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Calcium Sulfate
Coumarin Monsanto
Dry Ice
Ethavan
Ferric Phosphate
Fungicides
Methyl Salicylate U. S. P. (Synthetic)
Muriatic Acid
Phosphoric Acid
Phosphoric Acid Paste
Saccharin U. S. P.
Sodium Acid Pyrophosphate
Sodium Benzoate U. S. P.
Sodium Bisulfate
Sodium Bisulfite, Anhydrous
Sodium Ferric Pyrophosphate
Sodium Phosphate, Di
Sodium Phosphate, Mono
Sodium Phosphate, Tri
Sodium Pyrophosphate, Tetra
Vanillin Monsanto

## GLASS AND VITREOUS WARE

Abrasives
Bone Ash
Chlorine
Hydrochloric Acid
Resins
Sodium Sulfate, Technical
Wetting Agent (Santomerse)

## INSECTICIDES

ortho-Chlorophenol
Cresol
Dibutyl Phthalate
ortho-Dichlorobenzene
para-Dichlorobenzene
Dimethyl Phthalate
Methyl Salicylate U.S.P. (Synthetic)
ortho-Nitrobiphenyl
Santobane (Monsanto's Dichloro-Diphenyl-Trichloroethane, Technical) (DDT)
Santophen 20 (Pentachlorophenol)
Sulfur
Trichlorobenzene
Wetting Agent (Santomerse)

## LAUNDRY

Acetic Acid
Chloramine-T
Chlorine
Meiclor (Sodium Hypochlorite)
Metlac (Alkali-Resistant Paint)
Sodium Bisulfite
Sodium Phosphate, Tri
Sodium Pyrophosphate, Tetra
Wetting Agent (Santomerse)

## LEATHER AND TANNING

Aluminum Sulfate
Aluminum Sulfate, Iron Free
Ammonia Aqua
Belt Cement
Caustic Soda
para-Chloro-meta-Cresol
para-Chloro-meta-Xylenol
ortho-Dichlorobenzene
Dopes
Hydrochloric Acid
Lacquers
Lampblack
Merclor (Sodium Hypochlorite)
Mertanol (Syntan)
Phenol
Salicylic Acid
Santotan (Basic Chrome Sulfate)
Sodium Bisulfate
Sodium Bisulfate, Iron Free
Sodium Bisulfite, Anhydrous
Sodium Phosphate, Di
Sodium Pyrophosphate, Tetra
Sodium Sulfhydrate
Sodium Sulfate, Crystal
Sodium Sulfide
Sulfuric Acid
Wetting and Spreading Agents (Areskot, Areskap, Areskiene, Santomerse)

## LUMBER

Adhesives
Lacquers
Permasan
Resins
Santobrite
Santophen 20
Trichlorobenzene

## METALS

Abrasives
Ammonia, Aqua
Bone Ash
C. P. Acids
Caustic Soda
Cresylic Acid
Ferrisul (Ferric Sulfate)
Ferrophosphorus
Hibitite
Hydrochloric Acid
Inhibited Acids
Mixed Acids
Nitric Acid



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Phosphoric Acid
Sodium Phosphate, Di
Sodium Phosphate, Tri
Sodium Pyrophosphate, Tetra
Sulfuric Acid
Wetting Agent (Santomerse)

**MINING**

Abrasives
Bone Ash
Calcium Carbide
C. P. Acids
Flotation Agents (Xanthates)
Sodium Bisulfate
Sodium Sulfide
Sodium Sulfite

**OIL REFINING**

Ammonia Anhydrous
Caustic Soda
Chlorine
Cresols
Cyclohexylamine
Dicyclohexylamine
Hibitite
Hydrochloric Acid
Phenol
Phosphoric Acid
Santolubes
Santopoid
Santopour
Sulfuric Acid

**PACKAGING**

Cellulose Acetate
Cellulose Nitrate
Fungicides
Insecticides
Lacquers
Polystyrene
Santicizer 8
Vuepak

**PAINT, VARNISH AND LACQUER**

Amyl Acetate
Antioxidants
Benzoic Acid
Butyl Acetate
Cellulose Nitrate Solutions
Diacetone Alcohol
Dibutyl Phthalat
Diethyl Phthalate
Dimethyl Phthalate
Ethyl Acetate
Fungicides
Insecticides
Lampblack
Maleic Anhydride
Monochlorobenzene
Paint Anti-Skinning Materials
Phenol
Phthalic Anhydride
Resins
Santicizers (Phthalyl Glycollates and other Plasticizers)
Santocel
Santolites (Resins)
Santomask (Deodorant)
Solvent Alcohol (Mersol)
Thinners
Tricresyl Phosphate
Triphenyl Phosphate
Vanillin Monsanto

**PAPER**

Alcohol
Aluminum Sulfate, Commercial and Iron Free
Ammonia, Anhydrous
Ammonia, Aqua
Ammonium Phosphate, Di
Ammonium Phosphate, Mono
Aroclors
Benzoic Acid
Bone Ash
C. P. Acids (Laboratory Reagents)
Chlorine
Coumarin Monsanto
Dibutyl Phthalate
Ferrisul
Fungicides
Hydrochloric Acid
Lacquers
Mersize
Mertanol 7L
Resins
Santicizers
Santobrite
Santolites
Santosite
Sodium Aluminate
Sodium Bisulfate
Sodium Bisulfite
Sodium Hypochlorite
Sodium Phosphate, Tri
Sodium Sulfate, Technical
Sodium Sulfide
Sodium Sulfite
Sulfuric Acid
Wetting Agents

**PHARMACEUTICAL**

Acetanilid U. S. P.
Acetophenetidin U. S. P.
Acetyl Salicylic Acid (Aspirin)



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WATER_PCB-00025803

Benzoic Acid U. S. P.
Caffeine U. S. P.
Calcium Phosphate, Di
Chloral Hydrate, U. S. P.
Chloramine-T, U. S. P.
Dichloramine-T, N. F.
Glycerophosphates
Magnesium Phosphates
Methyl Salicylate U. S. P. (Synthetic)
Phenol U. S. P.
Phenolphthalein U. S. P.
Phosphoric Acid
Potassium Ammonium Phosphate
Potassium Phosphate, Mono
Saccharin U. S. P.
Salicylates
Salol
Sodium Benzoate U. S. P.
Sulfanilamide U. S. P.

## PLASTICS AND SYNTHETIC RESINS

Adhesives
Ammonia, Aqua
Benzoic Acid, Technical
Casting Sealants
Cellulose Acetate
Cellulose Nitrate
Cement Adhesives
Cerex
Cresol
Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate
Low Pressure Laminating Resin
Laminating Resins
Maleic Anhydride
ortho-Aminobiphenyl
ortho-Nitrobiphenyl
Phenol
Phthalic Anhydride
Plastics
Polystyrene
Polyvinyl Acetals
Polyvinyl Butyral Resins
Resimene (Melamine Formaldehyde)
Resinox (Phenol-Formaldehyde)
Saflex
Santicizers (Specialty Plasticizers)
Santolites (Synthetic Resins)
Styramic
Styramic HT
Textile Resins
Thiourea
Tricresyl Phosphate
Triphenyl Phosphate
Vuelite
Vuepak

## POWER AND POWER PLANTS

Aluminum Sulfate
Chlorine
Cyclohexylamine
ortho-Dichlorobenzene
Ferrisul
Potassium Phosphate, Di
Santobrite
Santophen
Santosite
Sodium Aluminate
Sodium Phosphates
Sodium Sulfate

## PRINTING INKS

Aluminum Chloride
Aluminum Sulfate
Antioxidants
Anti-Skinning Agents
Aroclors
Coumarin Monsanto
Ferric Nitrate
Fungicides
Lampblack
Maleic Anhydride
Methyl Salicylate U. S. P. (Synthetic)
Phenol
Santocel
Santomask
Sodium Aluminate
Vanillin Monsanto

## RUBBER

Accelerators
Ammonia, Anhydrous
Ammonia, Aqua
Antioxidants
Caustic Soda
Coumarin Monsanto
Cyclohexylamine
Fungicides
Hydrochloric Acid
Insoluble Sulfur 60
Lacquers
Lampblack
Piperidine
Santobrite
Santocel
Sodium Sulfite
Softeners
Sulfur
Sulfuric Acid
Vanillin Monsanto
Wetting Agents



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WATER_PCB-00025804

## SOAPS AND DETERGENTS

Aluminum Chloride
Aluminum Sulfate
Antioxidants
C. P. Acids
Calcium Sulfate
Caustic Soda
Chlorosulfonic Acid
Coumarin Monsanto
Cresol
Ethavan
Hydrochloric Acid
Phenol
Sodium Phosphate, Di
Sodium Phosphate, Tri
Sodium Pyrophosphate, Tetra
Sodium Sulfate, Anhydrous
Sopanox
Sulfuric Acid
Wetting Agent (Santomerse)

## TEXTILES

Acetic Acid
Alcohol
Aluminum Chloride
Ammonia
Ammonium Phosphate, Di
Ammonium Phosphate, Mono
Amyl Acetate
Butyl Acetate
Calcium Phosphate, Di
Calcium Phosphate, Mono
Calcium Phosphate, Tri
Calcium Sulfate
Chlorine
Cresol
Dibutyl Phthalate
Ethyl Acetate
Ferric Nitrate
Ferrisul
Lacquers
Magnesium Ammonium Phosphate
Merclor
Mertec
Mixed Acid
Phenol
Phosphoric Acid
Plasticizers
Potassium Pyrophosphate, Tetra
Pyrano (Fireproofing Compound)
Resloom M-75
Resloom NC-50
Santobrite
Santophen 20 (Pentachlorophenol)
Sodium Acetate
Sodium Acid Pyrophosphate
Sodium Bisulfate
Sodium Bisulfite
Sodium Phosphate, Di
Sodium Phosphate, Mono
Sodium Phosphate, Tri
Sodium Potassium Ethyl Phosphate
Sodium Pyrophosphate, Tetra
Sodium Sulfate, Anhydrous
Sodium Sulfate, Crystal
Sodium Sulfite
Sopet
Sulfuric Acid
Syton W-20
Textile Resins
Tricresyl Phosphate
Wetting Agent and Synthetic Detergent (Santomerse)

## WATER TREATMENT

Aluminum Sulfate
Ammonia, Anhydrous
Ammonia, Aqua
Ammonium Ethyl Phosphate
Chlorine
Ferrisul (Ferric Sulfate)
Santobrite
Santosite (Reducing Agent)
Sodium Aluminate
Sodium Hypochlorite
Sodium Phosphate, Di
Sodium Phosphate, Tri
Sodium Sulfate, Anhydrous



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WATER_PCB-00025805

# MONSANTO PRODUCTS

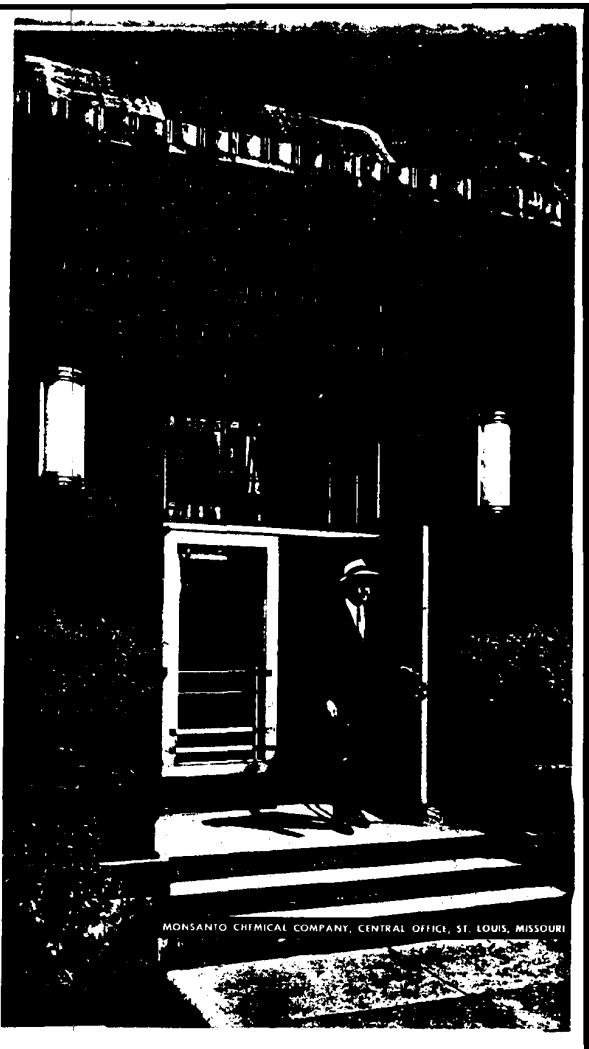


MONSANTO CHEMICAL COMPANY • ST. LOUIS



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WATER_PCB-00025807

**ABRASIVES** (See Aluminum Oxide Abrasive Grain)

## ACCELERATORS

### ACCELERATORS, RUBBER

See individual accelerators below for specifications and properties.

**R. R. CLASSIFICATION:** Rubber Accelerators NOIBN.

**AVAILABLE LITERATURE:**

"El Sixty—An Accelerator for Rubber Vulcanization," 20 pages.
"Monsanto Chemicals for the Rubber Industry," 34 pages.
"Santocure—An Accelerator for Rubber Vulcanization," 52 pages.

### "A-10"

**SPECIFICATIONS:** Condensation product of aniline and formaldehyde. It is neither methylene dianilide nor formaldehyde aniline, but probably a mixture in which the latter product predominates. White or yellowish-tinted powder; loss on heating less than 5.0% when heated for two hours at 105°C.; m.p., begins to soften at 120°C.; sp. g. 1.17; uncombined reagents, no free aniline and not more than traces of formaldehyde.

### "A-19"*

**SPECIFICATIONS:** Formaldehyde derivative of a condensation product of aniline and acetaldehyde of complex chemical composition. Brown resinous powder; m.p. between 75°C. and 85°C.; sp. g. 1.17.

*Trade Mark Reg. U. S. Pat. Off.

### "A-32"

**SPECIFICATIONS:** Reaction product of butyraldehyde and butylidene aniline. The chemical structure of such products is necessarily complex. Red-yellow to orange-brown oily liquid, slightly turbid when cold; sp. g. 0.98; flash point 80°C.; soluble in benzene, chloroform, acetone and solvent naphtha.

### "A-77"*

**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. g. 1.04; flash point 55°C.; soluble in benzene, chloroform and acetone; partly soluble in alcohol and gasoline.

*Trade Mark Reg. in U. S. Pat. Off.



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## "A-100"

**SPECIFICATIONS:** Aldehyde derivative of a Schiff's base made with the use of both butyraldehyde and acetaldehyde. Dark reddish-brown oily liquid; sp. g. 1.04; flash point 85°C.; soluble in benzene, chloroform, acetone and solvent naphtha.

## "BUTASAN"* (Zinc N, N-Dibutyl-dithiocarbamate)

**SPECIFICATIONS:** Cream-colored powder; sp. g. 1.24; at least 99.5% through 200 mesh; moisture not over 0.5%; soluble in carbon disulfide, benzene, chloroform and gasoline; insoluble in water and dilute caustic.

**GENERAL INFORMATION:** 0.5 to 1% on rubber weight used in latex, cements, for dipped goods, adhesives, coatings, etc.

*Trade Mark Reg. U. S. Pat. Off.

## "DPG" (Diphenylguanidine)

**SPECIFICATIONS:** White powder; at least 99.5% through 200 mesh; moisture less than 0.3%; ash less than 0.3%; m. p. not less than 146°C.; sp. g. 1.19; strength, 98.5% min. of DPG by acidimetric titration; soluble in alcohol, benzene, chloroform and ether; very slightly soluble in water.

## "EL SIXTY"* (Di-(2-benzothiozyl-thiomethyl)-urea)

**SPECIFICATIONS:** A light cream-colored powder; 99.5% min. through 200 mesh; moisture less than 1.0%; ash less than 0.7%; m.p. 220°C. min.; sp. g. 1.29; very slightly soluble in acetone, alcohol and chloroform; slightly soluble in hot pyridine or orthodichlorobenzene.

*Trade Mark Reg. U. S. Pat. Off.

## "ETHASAN"* (Zinc N, N-Diethyl-dithiocarbamate)

**SPECIFICATIONS:** White powder; sp. g. 1.5; at least 99.5% through 200 mesh; moisture not over 0.5%; soluble in dilute caustic, carbon disulfide, benzene and chloroform; insoluble in gasoline and water.

**GENERAL INFORMATION:** 0.5 to 1% on rubber weight used in latex.

*Trade Mark Reg. U. S. Pat. Off.

## "GUANTAL"*

**SPECIFICATIONS:** Ester 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 not over 3% (this amount is

*(Continued)*



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WATER_PCB-00025809

present in the hydrate; ash less than 0.5%; m. p. 178°C. min.; sp. g. 1.20; soluble in alcohol; insoluble in benzene and gasoline.

*Trade Mark Reg. U. S. Pat. Off.

## "METHASAN"* (Zinc N, N-Dimethyl-dithiocarbamate)

**SPECIFICATIONS:** White powder; sp. g. 1.66; at least 99.5% through 200 mesh; moisture not over 0.5%; soluble in dilute caustic, carbon disulfide, benzene and chloroform; insoluble in gasoline and water.

**GENERAL INFORMATION:** 0.5 to 1% on rubber weight used in latex and cements.

*Trade Mark Reg. U. S. Pat. Off.

## "PIP-PIP" (Piperidine N-Pentamethylene-dithiocarbamate)

**SPECIFICATIONS:** Uniform fine white to cream crystals; m.p. not less than 165°C. at time of shipment; decomposes slowly in the presence of water and during storage with a corresponding drop in melting point; sp. g. 1.13; soluble in alcohol and solvents containing water, 5.0% soluble in water.

## "R-2" CRYSTALS

**SPECIFICATIONS:** Reaction product of carbon bisulfide with methylene dipiperidine; light brown, coarse crystalline solid; sp. g. 1.11; m.p. 59°C.; soluble in alcohol, acetone and benzene; slightly soluble in gasoline.

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

**SPECIFICATIONS:** Light tan or buff-colored powder; 100% through 30 mesh; m.p. not less than 94°C. min.; sp. g. 1.27; moisture not over 1.0% after drying 24 hours at 50°C.; ash not over 0.5%; very soluble in benzene, chloroform, chlorobenzene and butyl alcohol.

**AVAILABLE LITERATURE:** 52-page booklet, "Sanctocure—An Accelerator for Rubber Vulcanization."

*Trade Mark Reg. U. S. Pat. Off.

## THIOCARBANILIDE ("A-1")

**SPECIFICATIONS:** White powder; 99.0% min. through 100 mesh; m.p. not less than 148°C.; sp. g. 1.32; moisture not over 0.5%; ash less than 0.5%; test must avoid decomposition conditions; soluble in alcohol; insoluble in water and many other common solvents.

## "THIOFIDE"* (2-Benzothiazyl Disulfide)

**SPECIFICATIONS:** Cream to light yellow powder; sp. g. 1.5 at 25°C.; m.p. 175°C. min.; moisture less than 1%; ash less than 0.5%; soluble in benzene and chloroform.

*Trade Mark Reg. U. S. Pat. Off.



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## THIOTAX'' (2-Mercaptobenzothiazole)

**SPECIFICATIONS:** Cream to light yellow powder; sp. g. 1.42 at 25°C.; m. p. 175°C. min.; moisture 0.5% min.; ash 0.5% max.; purity 97% min.; soluble in acetone, alcohol, caustic soda and benzene.

## THIURAD''* (Tetramethyl-thiuram Disulfide)

**SPECIFICATIONS:** White powder; at least 99.5% through 200 mesh; no coarse particles; ash not over 0.5%; sp. g. 1.29; m. p. not less than 138°C.; odor, none; soluble in alcohol, acetone, benzene and chloroform; insoluble in water, dilute caustic and gasoline.

*Trade Mark Reg. U. S. Pat. Off.

## UREKA''*

**SPECIFICATIONS:** Blend of diphenylguanidine and 2,4-dinitrophenyl-2-thiobenzothiazole; light yellow powder; 99.5% min. through 200 mesh; moisture less than 0.5%; ash less than 0.5%; m. p. between 117°C. and 127°C.; sp. g. 1.25; soluble in alcohol and chloroform.

*Trade Mark Reg. U. S. Pat. Off.

## UREKA BLEND B''*

**SPECIFICATIONS:** A blend similar to Ureka with a portion of the DPG replaced by Guantal. Yellow to brownish powder; 99.5% min. through 200 mesh; m. p. 130°C. min.; sp. g. 1.33; moisture less than 2.8%; water present as water of crystallization in Guantal; ash less than 0.5%.

*Trade Mark Reg. U. S. Pat. Off.

## UREKA C''* (2-Benzothiazyl Thiolbenzoate)

**SPECIFICATIONS:** An acyl-thiazole powder in which the acidic hydrogen atom of 2-mercaptobenzothiazole has been replaced by a benzoyl group. A pale ivory or yellowish powder; 100% through 30 mesh; m. p. not less than 115°C.; sp. g. 1.43; moisture less than 0.5%; ash less than 0.5 %; soluble in chloroform and benzene; slightly soluble in alcohol.

*Trade Mark Reg. U. S. Pat. Off.

## ACETANILID, U.S.P.




**Mol. Wt. 135.16**

**STANDARD FORMS:** Crystals; powder.

*(Continued)*



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**SPECIFICATIONS:** White crystals or powder; ash 0.05% max.; conforms to U.S.P. tests for carbonizable impurities and heavy metals; solubility in ethyl alcohol 95%, complete; m. p. 114.0°C. min.; no crystals retained on 14 mesh; 3.0% max. powder retained on 80 mesh.

**R. R. CLASSIFICATION:** Acetanilid.

**GENERAL INFORMATION:** Pharmaceutical product.

## ACETIC ACID

$CH_3COOH$

**GRADES:** 58% $C_2H_4O_2$: sp. g. 1.067; freezing point—8.0°F.
70% $C_2H_4O_2$: sp. g. 1.074; freezing point +0.6°F.
80% $C_2H_4O_2$: sp. g. 1.076; freezing point +17.4°F.
84% $C_2H_4O_2$: sp. g. 1.075; freezing point +27.3°F.
Glacial: 99% $C_2H_4O_2$: sp. g. 1.0576; freezing point +58.3°F.

**R. R. CLASSIFICATION:** Acetic Acid.

**GENERAL INFORMATION:** Used in dyeing where a weak acid is required in the dye bath; in the manufacture of acetate solvents; manufacture of cellulose acetate; and in the 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 foodstuffs; giving added detergency and firmness to soap; stabilizing olive oil; protecting seedlings from injury due to root rot and damping off; hardening and developing solutions for photographic films. (*See table in general data section*)

## ACETONE C. P.*

**TYPICAL ANALYSIS:** Water-white liquid; non-volatile matter, not more than 0.001 gm. when 100 cc. are evaporated and heated to constant weight at 106°C. to 110°C.; miscible with distilled water in all proportions; dryness, no turbidity when one volume is mixed with 19 volumes of 60°Bé. gasoline at 20°C.; sp. g., 0.791-0.793 at 20°/20°C.; acidity, less than 0.002%, calculated as $CO_2$; purity, 99-100% acetone; potassium permanganate test, color of added potassium permanganate retained at least two hours when 1 cc. of a 0.1% solution is added to 100 cc. of acetone; chlorides, none; iron, none; odor, mild—non-residual; flash point, —18°C. (—0.4°F.); wt. per U.S. gal., 6.59 lbs. at 68°F.

**R. R. CLASSIFICATION:** Acetone.

**GENERAL INFORMATION:** Acetone is faster drying than ethyl acetate and a more active solvent. It is an important constituent of quick-drying waterproof cements; an active solvent for cellulose esters and ethers; a good dye solvent; a resin solvent used extensively in paint removers and cleaners; and for various extraction processes.

*Note. Not manufactured by us but furnished for the convenience of our customers.



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WATER_PCB-00025812

## CETOPHENETIDIN, U.S.P.




Mol. Wt. 179.21

**STANDARD FORMS:** Crystals; powder.

**SPECIFICATIONS:** White crystals or crystalline powder; solubility in ethyl alcohol 95% (1:15), complete; m. p. 135.0°C. min.; ash 0.05% max.; no crystals retained on 14 mesh; 5% powder retained on 100 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## ara-ACETYL-AMINO-BENZENESULFONCHLORIDE

(Also known as N-Acetylsulfanilyl Chloride)




Mol. Wt. 233.67

**STANDARD FORM:** Crystals.

**CHARACTERISTICS:** Light tan to brownish powder or fine crystals; assay, 97.5% min.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as an intermediate in the manufacture of sulfa drugs.

## ,CETYL SALICYLIC ACID, U.S.P.




Mol. Wt. 180.15

**STANDARD FORMS:** Crystals, 20 mesh
Crystals, 40 mesh
Powder, 80 mesh

**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.

(*Continued*)



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*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. | |
| | | 60.0% max. | 2.0% max. |
| Through— | | | |
| 100-mesh screen | 10.0% max. | | |
| 140-mesh screen | | 25.0% max. | |

**R. R. CLASSIFICATION:** Acetyl Salicylic Acid.

**GENERAL INFORMATION:** Pharmaceutical product.

## ACETYL SALICYLIC ACID, Starch Granulations

**STANDARD FORMS:** 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

**SPECIFICATIONS:** (Made with acetyl salicylic 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 acetyl salicylic acid.

*MESH*:

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

**R. R. CLASSIFICATION:** Acetyl Salicylic Acid.

**GENERAL INFORMATION:** Pharmaceutical product.



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WATER_PCB-00025814

## ACID CALCIUM PHOSPHATE (See Calcium Phosphate, Mono)

## AIRCRAFT FINISHES

**COMMERCIAL FINISHES:**

Aircraft finishes include protective and decorative coatings for every part of the aircraft structure, such as fabric dopes (clear and colors) for wings, control surfaces and fuselage; primers, surfacers and lacquers for aluminum and dural sheet; flameproof dopes for interiors, thinners, cleaning solvents. Properties of the commercial finishes in application conform to the best modern plant practice, and properties in service meet the severe requirements of resistance to stress, sea water corrosion, weather, gas and oil. Monsanto finishes have for years been accepted as standard by manufacturers and airlines.

| CODE NO. | TYPE OF PRODUCT |
|---|---|
| | *For Fabric—Dopes* |
| L-5857 | Skyline Clear Dope—flame-resistant, high solids, cold or hot spray application |
| L-5860 | Skyline Pigmented Dopes—all colors, flame-resistant, high solids, cold or hot spray application |
| L-3901 | Clear Nitrate Dope (high solids) |
| L-1031 | Clear Nitrate Dope (medium solids) |
| L-2194 | Clear Nitrate Dope (comm. grade) |
| L-760 | Fully Pigmented Dopes—all colors; non-bleeding reds; max. resistance to fading and chalking |
| L-5882 | Interior Fire-Resistant Clear Dope |
| L-5883 | Interior Fire-Resistant Pigmented Dopes—all colors |
| L-259 | Finish Reclaimer (Rejuvenater) for Nitrate Dope |
| | *For Metal—Primers, Surfacers, and Lacquers* |
| R-5570 | Yellow 1141 Zinc Chromate Primer |
| R-5569 | Yellow 1140 Zinc Chromate Primer |
| R-3552 | Gray 423 Lacquer and Dope Surfacer |
| L-2939 | Clear Aluminum Vehicle |
| R-3781 | Fully Pigmented Lacquers—all colors (except light shades); non-bleeding reds; MAX. resistance to fading |
| | *Thinners (Reducers)—All Types* |
| L-6134 | Skyline Dope Thinner |
| L-4518 | Standard lacquer and dope thinner |
| L-1087 | Retarder (anti-blush) |
| L-2680 | Brush wash for general cleaning |
| L-3854 | For fire-resistant dopes—interior |
| L-1034 | Wax-free remover (dope and lacquer) |

**U. S. Army and Navy Specification Finishes:**

Camouflage finishes for combat aircraft were added to the Monsanto line early in the Defense Program. These finishes are in addition to the original U. S. Army and U. S. Navy specification materials of which Monsanto has long been an approved supplier. Finishes under the new combined Army and Navy specifications (AN) are now available.

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| | |
|---|---|
| | *Metal Surfaces* |
| AN-TT-P-656 | Zinc Chromate Primer |
| AN-L-29 | Gloss Lacquers |
| AN-L-21 | Camouflage Lacquers |
| AN-TT-D-551 | Clear Aluminum Bronze Vehicle |
| | *Fabric Surfaces* |
| AN-TT-D-514 | Dope; Clear, Cellulose Nitrate |
| AN-TT-D-556 | Dope; Semi-pigmented, Cellulose Nitrate |
| AN-TT-D-554 | Dope; Cellulose Nitrate, Pigmented |
| AN-D-8 | Dope; Cellulose Nitrate, Pigmented |
| | *Camouflage* |
| AN-D-1 | Dope; Clear, Acetate Butyrate |
| AN-D-2 | Dope; Pigmented, Acetate Butyrate |
| AN-D-3 | Dope; Camouflage, Acetate Butyrate |
| | *Wood Surfaces* |
| AN-S-17 | Sealer, Liquid, Wood |
| | *Thinners* |
| AN-T-8 | Thinner; Zinc Chromate Primer |
| AN-T-27 | Thinner; Cellulose Acetate Butyrate Dope |
| AN-T-28 | Thinner; Cellulose Acetate Butyrate Dope, Blush-retarding |
| AN-TT-T-256 | Thinner; Cellulose Nitrate Dope and Lacquer |
| AN-TT-T-258 | Thinner; Cellulose Nitrate Dope and Lacquer, Blush-retarding |

**R. R. CLASSIFICATION:** Ship Lacquer as Lacquer; Thinner as Lacquer *Thinning Compound*.

## ALCOHOL (See Ethyl Alcohol)

## ALKYL PHOSPHORIC ACIDS

**PROPERTIES:**

Amyl Phosphoric Acid (from Pentasol): fluorescent reddish-amber liquid; sp. g. 1.28 at 25°C.; alkyl acid content, approx. 97%.*

n-Butyl Phosphoric Acid: fluorescent reddish-amber liquid; sp. g. 1.25 at 25°C.; alkyl acid content, approx. 97%.*

Ethyl Phosphoric Acid: pale straw-colored liquid; sp. g. 1.33 at 25°C.; alkyl acid content, approx. 97%.*

Methyl Phosphoric Acid: pale straw-colored liquid; sp. g. 1.42 at 25°C.; alkyl acid content, approx. 97%.*

n-Propyl Phosphoric Acid: reddish-amber liquid; sp. g. 1.24 at 25°C.; alkyl acid content, approx. 97%.*

*Balance of assay is ortho-phosphoric acid and unconverted alcohol.

**R. R. CLASSIFICATION:** Phosphoric Acid.

(*Continued*)



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TOWOLDMON0041347
WATER_PCB-00025816

**GENERAL INFORMATION:** The alkyl phosphoric acids are mobile liquids which can be neutralized with alkalies and amines to give water-soluble salts.

The methyl, ethyl and propyl phosphoric acids are water-soluble, but the butyl and amyl acids are not. The salts of all are water-soluble. The methyl and ethyl phosphoric acids and their salts are very hygroscopic (amine, sodium and potassium salts) whereas the propyl, butyl and amyl acids are not hygroscopic and their salts are only slightly so.

Alkyl phosphoric acids are used in textile and paper-processing compounds; as catalysts in urea resin formation; as polymerizing agents for resins and oils.

**AVAILABLE LITERATURE:** Technical Bulletin P-120, "Alkyl Phosphoric Acids."

## ALUM (See Aluminum Sulfate)

## ALUMINUM CHLORIDE SOLUTION 32° Bé.

$Al_2Cl_6$ Mol. Wt. 266.7

**STANDARD FORM:** Solution 32° Bé., 50% $Al_2Cl_6$ + 12 $H_2O$ approx.

**TYPICAL ANALYSIS:** Neutral salt, low in iron content. Solutions have an acid reaction but contain no free acid. Typical analysis as follows:

| | Liquid |
|---|---|
| $Al_2Cl_6$. 12 $H_2O$ | 50.3% |
| $Al_2O_3$ | 10.6 |
| Cl | 22.1 |
| Fe | 0.005 |

**R. R. CLASSIFICATION:** Aluminum Chloride Liquid.

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

## ALUMINUM METAPHOSPHATE

$Al(PO_3)_3$ Mol. Wt. 263.91

**PROPERTIES:** White powder; insoluble in water; m. p. approx. 1537°C.

**GENERAL INFORMATION:** Used as a constituent of glazes, enamels and glasses, and as a high temperature insulating cement.



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## ALUMINUM OXIDE ABRASIVE GRAIN

(Also known as fused aluminum oxide; artificial corundum)

**SPECIFICATIONS:** Fused aluminum oxide containing 95-99% $Al_2O_3$; hardness 9.6, Moh's scale.

**R. R. CLASSIFICATION:** Abrasive Flour or Grain.

**GENERAL INFORMATION:** Coarse to flour grades are available for grinding wheels, polishing, refractory purposes and for anti-slip or tread use.

## ALUMINUM PHOSPHATE

$AlPO_4$ Mol. Wt. 121.95

**PROPERTIES:** Dry, granular, grayish-white powder; soluble in alkalies and acids; insoluble in water.

**GENERAL INFORMATION:** Constituent of glass, ceramics, glazes and paper sizing.

## ALUMINUM PHOSPHATE, MONO

$Al(H_2PO_4)_3$ Mol. Wt. 317.96

**PROPERTIES:** Concentrated solution (approx. 50% solids), clear, which may crystallize upon prolonged standing. When evaporated at 150°C., a white hygroscopic salt is obtained. Further heating at 500°C., yields aluminum metaphosphate which is insoluble in water and practically insoluble in acids. The melting point of aluminum metaphosphate is above 1700°C.

**GENERAL INFORMATION:** Used as bonding agent for materials which are to be subjected to very high temperature conditions.

## ALUMINUM PYROPHOSPHATE

$Al_4(P_2O_7)_3$ Mol. Wt. 455.80

**PROPERTIES:** White powder or granular material; slightly soluble in acids; insoluble in water.

**GENERAL INFORMATION:** Suggested for phosphate glasses; ceramic compositions; also as a catalyst.

## ALUMINUM SULFATE, COMMERCIAL

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

**GRADE:** Papermaker's Alum.

**STANDARD FORM:** Fine to lump.

**TYPICAL ANALYSIS:** $Al_2O_3$, 17.2%; FeO, 0.35%; $Fe_2O_3$, 0.01%.

*(Continued)*



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R. R. CLASSIFICATION: Aluminum Sulfate.

GENERAL INFORMATION: Used in paper sizing and water treatment. Monsanto also provides a slab form (6"x6"x18") for stock solutions; this form contains 15.5—16.0% $Al_2O_3$. *(See table in general data section)*

## ALUMINUM SULFATE, IRON FREE

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

STANDARD FORM: Fine to lump.

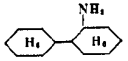
TYPICAL ANALYSIS: $Al_2O_3$, 17.2%; $Fe_2O_3$, 0.01%.

R. R. CLASSIFICATION: Aluminum Sulfate.

GENERAL INFORMATION: Used in sizing fine papers; manufacture of satin-white and dry colors; tanning white leathers; dyeing operations; manufacture of aluminum stearate.

## *ortho*-AMINOBICYCLOHEXYL

(Also known as *ortho*-aminodicyclohexyl, 2-aminodicyclohexyl and 2-aminobicyclohexyl)



Mol. Wt. 181.31

PROPERTIES: Colorless liquid; boiling point approx. 270°C.; sp. g. 0.933 at 25°/25°C.; purity approx. 96%.

R. R. CLASSIFICATION: Chemicals NOIBN.

GENERAL INFORMATION: A possible intermediate for pharmaceuticals, dyes, rubber chemicals, insecticides, plasticizers, etc.

## *ortho*-AMINOBIPHENYL PHOSPHATE, PRIMARY

(Also known as *ortho*-aminodiphenyl phosphate, primary)

$(C_6H_5 \cdot C_6H_4NH_2) \cdot H_3PO_4$

PROPERTIES: White granular solid (becomes pink on aging); dissolves in water with hydrolysis; soluble in alcohol and ether; decomposes at high temperatures but stable without melting up to 150°C.

## *ortho*-AMINOBIPHENYL PHOSPHATE, SECONDARY

(Also known as *ortho*-aminodiphenyl phosphate, secondary)

$(C_6H_5 \cdot C_6H_4NH_2)_2 \cdot H_3PO_4$

PROPERTIES: White granular solid, darkens on aging; soluble in water, alcohol and ether; sinters with decomposition at 150°C



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## *ortho*-AMINOBIPHENYL PHOSPHATE, TERTIARY

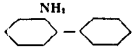
(Also known as *ortho*-aminodiphenyl phosphate, tertiary

$(C_6H_5{\cdot}C_6H_4NH_2)_2{\cdot}H_3PO_4$

**PROPERTIES:** White granular solid, darkens on aging; soluble in water, alcohol and ether; sinters with decomposition at 150°C.

## *ortho*-AMINOBIPHENYL, TECHNICAL

(Also known as 2-aminobiphenyl, *ortho*-aminodiphenyl and 2-aminodiphenyl)



Mol. Wt. 169.22

**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.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in dyestuff synthesis; in the production of resins; in the production of varnishes; in the synthesis of rubber products; as a solvent. Specifically used in making phenanthridine derivatives and carbazole. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*

## *para*-AMINOBIPHENYL, TECHNICAL

(Also known as 4-aminobiphenyl, *para*-aminodiphenyl, 4-aminodiphenyl, and Xenylamine)



Mol. Wt. 169.22

**STANDARD FORM:** Cast solid.

**SPECIFICATIONS:** Yellowish-brown crystalline mass; crystallizing point 50.5°C. min. Distillation range: first drop 325.0°C. min.; 95% (1-96 ml), 8.0°C. max.; dry point, 340°C. max.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in dyestuff synthesis; in the production of resins; in the production of varnishes; as a solvent. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*

## AMINOBUTANYL ETHYL PHOSPHATE

**PROPERTIES:** Concentration 60%; pH 7.3; sp. g. 1.147 (18.5° Bé.) at 25°C.



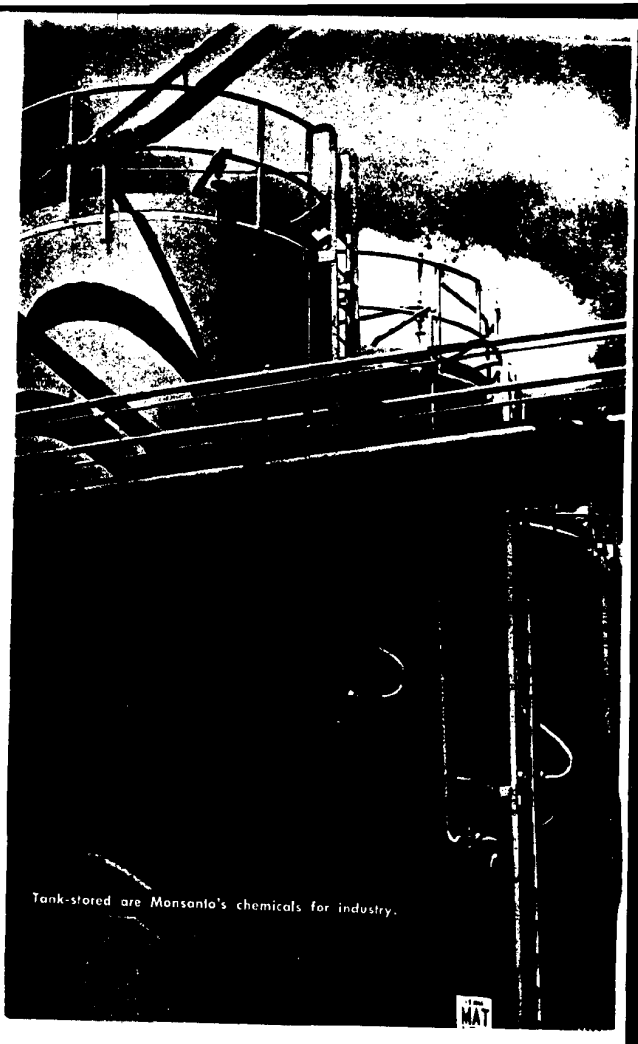
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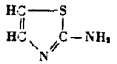

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## AMINOMETHYLPROPANYL ETHYL PHOSPHATE

**PROPERTIES:** Concentration 80%; pH 7.4; sp. g. 1.147 (18.5 Bé.) at 25°C.

## 2-AMINOTHIAZOLE



Mol. Wt. 100.14

**STANDARD FORM:** Crystals.

**CHARACTERISTICS:** Light brown crystals.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as an intermediate in organic synthesis.

## AMMONIA, ANHYDROUS

**PROPERTIES:** At normal temperatures and pressures ammonia anhydrous is a colorless gas, 0.597 times as heavy as air. Below the critical temperature, 268°F., it is readily condensed by the application of pressure to a colorless liquid weighing 5.33 lbs. per gal., and having a boiling point of —28°F.

**R. R. CLASSIFICATION:** Anhydrous Ammonia.

**GENERAL INFORMATION:** Ammonia anhydrous is used in refrigeration; as a condensing agent in the formation of phenol formaldehyde resins; in water treatment in connection with chlorine; partial neutralization of phosphate fertilizer; in vulcanization of rubber; nitriding of steel; as a 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; and as a solvent. (*See table in general data section*)

**AVAILABLE LITERATURE:** Booklet "Monsanto Ammonia for Refrigeration."

## AMMONIA, AQUA

$NH_4OH$ Mol. Wt. 35.05

**STANDARD FORMS:** Commercial Aqua Ammonia 16°, 18°, 20°, 26° Bé.

**PROPERTIES:** Pungent, water-white liquid; wt. per gal. 7.48 lbs. (26°).

**R. R. CLASSIFICATION:** Ammonia Aqua.

**GENERAL INFORMATION:** Uses—1. Partial neutralization of phosphate fertilizers. 2. General household cleaning purposes. 3. As a condensing agent in the formation of phenol formaldehyde resins. 4. As an antichlor. 5. After carbonizing, as a neutralizing agent. 6. Neutralization of excess carbon dioxide in water supplies. 7. Neutralizing and deodorizing rubber goods

(*Continued*)



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WATER_PCB-00025823

which have been cured with sulfur chloride. 8. Neutralizing goods which have been dyed with aniline black. 9. Preserving rubber latex. 10. Neutralizing oil before cracking. 11. Silk degumming. 12. Manufacture of cuprammonium silk. 13. As a solvent. 14. As a dehairing agent for hides. 15. For reeling silk. 16. As a penetrant in wetting back crusted tanned leather. 17. As a penetrant for driving in fat liquor in leather making. (*See table in general data section*)

## AMMONIUM ALKYL PHOSPHATES

(See under individual alkyl groups)

## AMMONIUM BENZOATE



$COONH_4$

Mol. Wt. 139.15

**STANDARD FORM:** Powder.

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

**I. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a preservative.

## AMMONIUM DIPHENYL PHOSPHATE

$NH_4(C_6H_5)_2PO_4$

**PROPERTIES:** Grayish-white, crystalline solid; very soluble in water and hygroscopic at high humidities; pH of 1% solution in water - 5.1; $NH_3$ content 6.1; $P_2O_5$ content 24.3%.

**GENERAL INFORMATION:** Suggested as a humectant.

## AMMONIUM ETHYL PHOSPHATE

(Mixture of mono- and diethyl ammonium phosphates)

**STANDARD FORM:** 75% solution in water.

**PROPERTIES:** Water-white to yellow-tinged liquid of ammoniacal odor; sp. g. 1.23 at 25°C.; wt. per gal. 10.37 lbs.; pH 75% sol. - 7.0-7.2; viscosity at 25°C., 60 cps. Chemical constitution: 67% monoethyl ammonium phosphate; 33% diethyl ammonium 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 the solution and will dissolve with a rise in temperature or on dilution.

**I. R. CLASSIFICATION:** Ammonium Phosphate.

**GENERAL INFORMATION:** Used as flameproofing agent for paper, textiles, wood and other combustible materials.



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WATER_PCB-00025824

## AMMONIUM HYDROXIDE C. P.

$NH_4OH$ Mol. Wt. 35.05

**SPECIFICATIONS:** Colorless liquid, free from suspended matter; strength ($NH_3$) 28.0% min.; non-volatile matter 0.005% max.; carbon dioxide ($CO_2$) 0.002% max.; total sulfur (as $SO_4$) 0.0003% max.; chloride (Cl) 0.00005% max.; pyridine, to pass A.C.S. test; substances reducing ($KMnO_4$), to pass A.C.S. test; iron 0.0001% max.; heavy metals (as lead) 0.0005%.

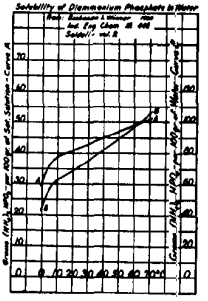
**R. R. CLASSIFICATION:** Chemicals, Ammonia.

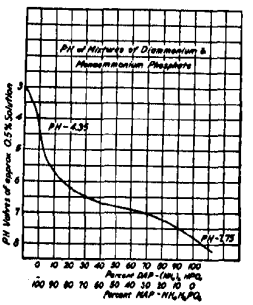
**GENERAL INFORMATION:** Laboratory reagent.

## AMMONIUM METAPHOSPHATE

$NH_4PO_3$

**PROPERTIES:** A viscous, semi-solid material; water-soluble and hygroscopic; contains excess free acid.




## AMMONIUM PHOSPHATE, MONO

(Also known as ammonium acid phosphate, primary ammonium phosphate, ammonium dihydrogen phosphate, ammonium phosphate mono-basic, ammonium biphosphate)

$NH_4H_2PO_4$ Mol. Wt. 115.04

**GRADES:** Food (meets all U.S. Pure Food Law requirements); special grades will be supplied on request.

(*Continued*)



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TOWOLDMON0041356
WATER_PCB-00025825

**PROPERTIES:** A white crystalline material, stable in air and soluble in hot and cold water; pH of 1% solution, 4.7.

**R. R. CLASSIFICATION:** Phosphate of Ammonia.

**GENERAL INFORMATION:** Used as a retardant in fireproofing and paper specialties, for special medicinal purposes, in the production of woven belting and as a yeast food.

## AMMONIUM PHOSPHATE, DI

(Also known as diammonium hydrogen phosphate, secondary ammonium phosphate, and ammonium phosphate di-basic)

$(NH_4)_2HPO_4$ Mol. Wt. 132.068

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

**PROPERTIES:** White crystalline material, stable in air and very soluble in water; pH value of 1% solution, 7.75. At temperatures 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 |
|---|---|---|---|---|---|
| p $NH_3$ in mm. Hg. | 3.2 | 10.7 | 26.0 | 55.2 | 123.4 |

**R. R. CLASSIFICATION:** Phosphate of Ammonia.

**GENERAL INFORMATION:** Used as a fire retardant in fireproofing and as a yeast food by yeast producers and breweries.

## AMMONIUM PHOSPHATE, HEMIBASIC

$NH_4H_2(PO_4)_3$

**PROPERTIES:** White hygroscopic crystals; very soluble in water; m. p. approx. 80°C.; pH in 1% solution approx. 2.0.

**GENERAL INFORMATION:** Suggested in metal cleaning; for pH adjustment; as a strong phosphoric acid in solid form.

## AMMONIUM PYROPHOSPHATE, DI

$(NH_4)_2H_2P_2O_7$

**PROPERTIES:** A white hygroscopic powder; quite soluble in water; stable at room temperature, but loses ammonia above 100°C.; pH of 1% solution, 4.7; reverts rapidly to the corresponding orthophosphate salt if heated at 50°C. in concentrated solution.

**GENERAL INFORMATION:** Suggested as a water-softening agent in application where sodium from sodium pyrophosphate may be objectionable.



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TOWOLDMON0041357
WATER_PCB-00025826

## AMMONIUM PYROPHOSPHATE, TETRA

$(NH_4)_4P_2O_7$

**PROPERTIES:** White hygroscopic powder; quite soluble in water; loses ammonia slowly at room temperature and quite rapidly at elevated temperatures; pH of 1% solution, 8.2; reverts rapidly to the corresponding orthophosphate salt if heated at 50°C in concentrated solution.

**GENERAL INFORMATION:** Suggested as a water-softening and emulsifying agent in applications where sodium phosphates may be objectionable.

## AMMONIUM TETRAPHOSPHATE, DI

$(NH_4)_6H_2P_4O_{13}$

**PROPERTIES:** A hygroscopic, white, sticky solid; very soluble in water; stable at room temperature but loses ammonia if heated above 100°C.; pH of 1% solution, 4.8; reverts rapidly to the corresponding orthophosphate salt if heated at 50°C. in concentrated solution.

**GENERAL INFORMATION:** Suggested for water softening.

## AMMONIUM TETRAPHOSPHATE, TRI

$(NH_4)_5H_2P_4O_{13}$

**PROPERTIES:** White, hygroscopic powder; quite soluble in water; loses ammonia slowly at room temperature and quite rapidly at elevated temperatures; pH of 1% solution, 8.0; reverts rapidly to the corresponding orthophosphate salt if heated at 50°C. in concentrated solution.

## AMMONIUM SALICYLATE N.F. (See Salicylates)

## AMYL ACETATE

**TYPICAL ANALYSIS:** Water-white liquid; odor, non-residual; sp. g. 0.865-0.870 at 15.5°C.; shipping wt. per gal. 7.20 lbs.; acidity, less than 0.01% as free acetic acid; dryness, mixes with petroleum benzine in all proportions without turbidity. Boiling range: below 110°C., none; above 130°C., less than 50%; above 150°C., none; ester content, 85-90%.

**R. R. CLASSIFICATION:** Amyl Acetate.

**GENERAL INFORMATION:** Used as a nitrocellulose solvent. It is less active than ethyl or butyl acetate and more resistant to moisture. Blends of all three with appropriate diluents such as alcohols (ethyl, butyl and amyl) yield thinners and solvent mixtures of excellent cutting power, moisture resistance, good flow and leveling, and compatibility with various resins and oils. Used in the artificial leather industry and in formulating lacquer finishes for wood, metals, textiles and paper.



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TOWOLDMON0041358
WATER_PCB-00025827

## AMYL PHOSPHORIC ACID (See Alkyl Phosphoric Acids)

## ANILINE OIL

(Also known as aminobenzene)



Mol. Wt. 93.12

**SPECIFICATIONS:** Slightly yellowish liquid; purity, 99.5% min.; distillation range, 95% within 0.5°C.; distillation limits, 183.50 to 185.00°C. (dry point); crystallizing point,—6.35°C. min.; moisture, 0.10% max.; solution in HCl, complete; nitrobenzene, none.

**I. R. CLASSIFICATION:** Aniline.

**GENERAL INFORMATION:** A basic intermediate in the dyestuff industry. It also finds application in the production of rubber accelerators, as a constituent of resins and in the manufacture of explosives. *CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.*

## *ortho*-ANISIDINE

(Also known as *ortho*-methoxyaniline, *ortho*-aminoanisole, and 1-amino-2-methoxybenzene)



Mol. Wt. 123.15

**STANDARD FORM:** Liquid.

**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.

**I. R. CLASSIFICATION:** Dye Intermediate.

**GENERAL INFORMATION:** Used as a component of azo dyes and in the manufacture of dyestuff intermediates. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*

## *para*-ANISIDINE

(Also known as *para*-methoxyaniline, *para*-aminoanisole, and 1-amino-4-methoxybenzene)



Mol. Wt. 123.15

**STANDARD FORM:** Cast solid.

*(Continued)*



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TOWOLDMON0041359
WATER_PCB-00025828

**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.

**R. R. CLASSIFICATION:** Dye Intermediate.

**GENERAL INFORMATION:** Used as a component of various azo dyestuffs and as an intermediate in chemical synthesis. *CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.*

## ANTIOXIDANTS, OIL (See Santolube)

## NTIOXIDANTS

## ANTIOXIDANTS, RUBBER

See individual antioxidants below for specifications.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**AVAILABLE LITERATURE:**
"Monsanto Chemicals for the Rubber Industry," 34 pages.

## "FLECTOL H"*

**SPECIFICATIONS:** Condensation product of acetone and aniline; light-colored powder; 99.5% min. through 200 mesh; m. p. 120°C. min.; sp. g. 1.08; solubility approx. 10% in benzene and alcohol, and 1.0% in gasoline; insoluble in water.

*Trade Mark Reg. U. S. Pat. Off.

## "OXYONE"* (2, 4-Diaminodiphenylamine)

**SPECIFICATIONS:** Brown crystalline powder; 99.5% through 100 mesh and 95% through 200 mesh; ash not over 5.0%; m. p. not less than 123°C.; sp. g. 1.25; soluble in alcohol, chloroform and benzol; very slightly soluble in cold water and gasoline.

*Trade Mark Reg. U. S. Pat. Off.

## "PERFLECTOL X"* (N, N'-Diphenyl-*para*-phenylenediamine)

**SPECIFICATIONS:** Dark gray powder; m. p. 130°C. min.

*Trade Mark Reg. U. S. Pat. Off.



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TOWOLDMON0041360
WATER_PCB-00025829

## "SANTOFLEX B"*

**SPECIFICATIONS:** Reaction product of acetone and para-aminobiphenyl. Waxy, dark gray, lumpy solid; crystallizing point about 80°C.; distillation range at least 85%, must distill up to 190°C. at 2 mm. pressure; sp. g. 1.045; ash not over 0.1%; soluble in benzene and alcohol.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOFLEX BX"*

**SPECIFICATIONS:** Constant composition blend of Santoflex B and N,N'-diphenyl-para-phenylenediamine. Waxy, dark gray, lumpy solid; sp. g. 1.11; ash not over 2.0%; less than 1.5% insoluble in benzene.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOVAR O"* (Di-tert-butylhydroquinone)

**SPECIFICATIONS:** White powder; m. p. 210°C. min.; sp. g. 1.095 at 25°C.; completely insoluble in 3 times its weight of acetone.

**GENERAL INFORMATION:** Recommended as an antioxidant in oils, paints and rubber.

*Trade Mark Reg. U. S. Pat. Off.

# ANTISEPTICS AND GERMICIDES

**Chloramine-T U.S.P.** (See under C)

**para-Chloro-meta-Cresol** (See under C)

**para-Chloro-meta-Xylenol** (See under C)

**Dichloramine-T N.F.** (See under D)

**Phenol U.S.P.** (See under P)

**"Santophen"** (See under S)

## "AREskap"* (Monobutyl Phenylphenol Sodium Monosulfonate)

**STANDARD FORMS:** Liquid; dry powder.

**R. R. CLASSIFICATION:** Washing Compound NOIBN.

(*Continued*)



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TOWOLDMON0041361
WATER_PCB-00025830

**GENERAL INFORMATION:** Wetting, penetrating and spreading agent; used as spreading agent in insecticidal compositions, in embalming fluids and in metal pickling.

**AVAILABLE LITERATURE:** Bulletin, "Areskap—Aresket—Aresklene."

*Trade Mark Reg. U. S. Pat. Off.

## "ARESKET"* (Monobutyl Biphenyl Sodium Monosulfonate)

**STANDARD FORMS:** Liquid; dry powder.

**R. R. CLASSIFICATION:** Washing Compound NOIBN.

**GENERAL INFORMATION:** Wetting, penetrating and spreading agent.

**AVAILABLE LITERATURE:** Bulletin, "Areskap—Aresket—Aresklene."

*Trade Mark Reg. U. S. Pat. Off.

## "ARESKLENE"* (Dibutyl Phenylphenol Sodium Disulfonate)

**STANDARD FORMS:** Paste; dry powder.

Dry Aresklene-400: Tan hygroscopic powder, slightly aromatic; sulfates, trace; chlorides, trace; m. p. about 160°C. with decomposition; pH, approx. 7.5-8.5 for 1% solution of dry material at 25°C.; soluble (10 parts to 90 parts solvent) in alcohol, acetone, dibutyl tartrate, ethylene glycol, ethyl acetate and butyl cellosolve.

Aresklene-375: Light brown paste, slightly aromatic; sulfates, trace; chlorides, trace; not soluble in solvents which are immiscible with water.

**R. R. CLASSIFICATION:** Washing Compound, NOIBN.

**GENERAL INFORMATION:** Wetting, penetrating and spreading agent used in kierboiling, scouring and dyeing textiles, in industrial cleaners, in deodorant preparations, in insecticidal formulations, in metal cleaning and as a stabilizer and wetting agent in later used to treat cord or other fabrics.

**AVAILABLE LITERATURE:** Bulletin, "Areskap—Aresket—Aresklene."

*Trade Mark Reg. U. S. Pat. Off.

## "AROCLORS"*

**SPECIFICATIONS:** The Aroclors are chlorinated hydrocarbons which vary from water-white mobile liquids and pale yellow viscous oils to light amber resins and opaque crystalline solids. *Non-flammability*: The viscous Aroclor oils and resins do not support combustion when heated alone even at their boiling points—temperatures above 360°C. Most of the Aroclors flux readily with resinous and pitch-like materials to give products having a decreased fire hazard. *Electrical properties*: The Aroclors have excellent electrical characteristics, high dielectric strength and resistivity, low power factor. Certain of the liquid Aroclors have a high dielectric constant as compared with that of mineral oils. *Solubility*: The Aroclor oils and resins

(*Continued*)



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are easily soluble in most of the common organic solvents and drying oils. The hard crystalline materials are in general less soluble than the oils or resins. All Aroclors are insoluble in water. *Adhesiveness*: The more viscous Aroclors and Aroclor resins have excellent adhesive properties. *Thermoplasticity*: The Aroclors are thermoplastic, and apparently undergo no further condensation or hardening upon repeated melting and cooling. *Non-drying properties*: The Aroclors are non-drying, and when they are exposed to the air no noticeable oxidation or hardening takes place. *Vaporization loss*: The clear resins have rather low vaporization losses. At 65.8°C. (150°F.) these losses are less than 0.04 gm. per square inch of surface per month. *Odor and taste*: The Aroclor viscous oils and resins are almost without odor and taste at ordinary temperatures. *Refractive indices*: The refractive indices of these materials are above 1.6125. *Stability*: The Aroclors in general are stable on long heating at 150°C. and are 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. *Corrosiveness*: The Aroclors have practically no corrosive action when applied to metallic surfaces.

**GENERAL INFORMATION:** Uses: *Lacquer, paint and varnish*: Aroclors impart resistance to moisture, gas, acids, alkalies and ultra-violet light and improve electrical insulating properties and durability. They function as both plasticizers and resins in nitrocellulose and ethyl cellulose lacquers. *Sealing Waxes*: Where a moisture proof, non-flammable wax or one with good electrical insulating properties is desired. *Adhesives*: Aroclors in adhesive application have the desirable qualities of being non-crystalline, insoluble in water, thermoplastic, light in color, practically odorless, non-drying and soluble in most organic solvents. They provide excellent adhesion even to lacquered or varnished surfaces. *Impregnation*: Aroclors are used in impregnation of materials and articles to give them resistance to moisture, flame, alkalies and acids, and to improve electrical insulating properties. Corresponding to each clear Aroclor there is also a black Aroclor of similar properties. *Flameproofing*: Aroclors are used in combination with many other materials to reduce the flammability of those materials. *Rubber and rubber substitutes*: The liquid Aroclors have a solvent action on rubber and act as a plasticizer. The solid Aroclors impart flame resistance. *Plastics*: The Aroclors are compatible with nitrocellulose, ethyl cellulose and vinyl resins. In ground powder form the solid Aroclors are excellent organic pigments.

**AVAILABLE LITERATURE:** 20-page booklet, "The Aroclors—Physical Properties and Suggested Applications."

*Trade Mark Reg. U. S. Pat. Off.

## BARIUM METAPHOSPHATE

$Ba(PO_3)_2$ Mol. Wt. 295.32

**PROPERTIES:** White powder; slowly soluble in acids; insoluble in water.

**GENERAL INFORMATION:** Used as a constituent of glasses, porcelains and enamels.



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## BARIUM PHOSPHATE, DI

$BaHPO_4$ Mol. Wt. 233.35

**PROPERTIES:** Crystals; soluble in acids and $NH_4Cl$; insoluble in water.

**GENERAL INFORMATION:** Suggested as an opacifying agent in enamels and frits.

## BARIUM PYROPHOSPHATE, TETRA

$Ba_2P_2O_7$ Mol. Wt. 448.68

**PROPERTIES:** White powder; soluble in acids and $NH_4$ salts; very slightly soluble in water.

**GENERAL INFORMATION:** Suggested as an opacifying agent in enamels and frits.

## BATTERY ACID (Electrolyte)

**TYPICAL ANALYSIS:** Practically colorless liquid; $H_2SO_4$, 93.2% min.; iron, 0.005% max.; nitrogen compounds (as $HNO_3$), 0.001% max.; sp. g. 1.210-1.835. (Acids of lower strengths should be calculated in proportion to above specification on $H_2SO_4$ content.)

**R. R. CLASSIFICATION:** Sulfuric Acid.

**GENERAL INFORMATION:** 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.

## BELT CEMENT

**GENERAL INFORMATION:** Nitrocellulose base cements for cementing ply belting and laps. Characterized by strength, flexibility, rapid-drying properties and resistance to water. Specially adapted to power belting. More flexible types are offered for wool combing aprons and paper machine dryer felts.

**R. R. CLASSIFICATION:** Lacquer.

## BENZENE SULFONIC ACID, TECHNICAL



$SO_3H$

Mol. Wt. 158.17

**CHARACTERISTICS:** Greenish-black viscous liquid or crystalline mass; crystallizing point, 25°C. (approx.); $H_2SO_4$, 24.0-25.0%; benzene sulfonic acid, 70.0-71.0%; sp. g. 1.45 (approx.) at 25°/15.5°C.

(*Continued*)



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**R. R. CLASSIFICATION:** Dye Intermediate NOIBN.

**GENERAL INFORMATION:** Used as an intermediate in organic synthesis and as a catalyst in certain condensation reactions.

## BENZOATE OF SODA (See Sodium Benzoate)

## BENZOIC ACID




Mol. Wt. 122.12

**GRADES:** U.S.P. and Technical.

**SPECIFICATIONS OF U.S.P. GRADE:** White crystalline needles or fine powder; assay, 99.5 min. (dry basis); m. p. 122.5°C. min.; solution in alcohol (1:2.5) and in 10% sodium carbonate (1:6), clear and colorless; meets U.S.P. test for carbonizable impurities; 5% max. powder retained on 100 mesh.

**SPECIFICATIONS OF TECHNICAL GRADE:** White to yellowish-white granules or powder; assay, 99.25% min.; solution in 10% $Na_2CO_3$ (1:6), slightly turbid or opalescent and practically colorless; approx. 10-20% retained on 20 mesh; approx. 90% retained on 100 mesh.

**R. R. CLASSIFICATION:** U.S.P. Grade—Food Preserving Compound. Technical Grade—Dye Intermediate NOIBN.

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

## BENZOTRICHLORIDE




Mol. Wt. 195.48

**STANDARD FORM:** Liquid.

**SPECIFICATIONS:** Colorless to light green or yellow liquid; crystallizing point, 6.0°C. min. Distillation range: first drop, 218.0°C. min.; 95% (1-96 ml), 2.0°C. max.; dry point, 223.0°C. max.

**R. R. CLASSIFICATION:** Chemicals NOIBN. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used as 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.*



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## BENZYL CHLORIDE

$C_7H_7Cl$



Mol. Wt. 126.58

**STANDARD FORMS:** Liquid anhydrous; stabilized (benzyl chloride with 10% sodium carbonate solution added).

**SPECIFICATIONS:** For anhydrous liquid and material recovered from the stabilized solution below: colorless to light yellow liquid; sp. g. 1.104-1.108 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.

Note: 23 lbs. of 10% $Na_2CO_3$ solution are added to 450 lbs. of benzyl chloride contained in 55 gal. black iron drums. The wet material is a milky-white emulsion, from which water may separate into a definite layer at either the bottom or top depending on the temperature and the concentration of $Na_2CO_3$. *The concentration of $Na_2CO_3$ slowly decreases on standing.*

**R. R. CLASSIFICATION:** Chemicals NOIBN. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used in the production of the following: dyestuffs; perfume bases such as benzyl alcohol, acetates, benzoate and phenyl ethyl alcohol; plasticizers; resins, wetting agents; rubber accelerators; gasoline gum inhibitors; benzyl cellulose, benzyl benzoate; 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.*

## BERYLLIUM METAPHOSPHATE

$Be(PO_3)_2$ Mol. Wt. 166.98

**PROPERTIES:** White porous powder or granular material; has a high melting point; insoluble in water.

**GENERAL INFORMATION:** Used as a raw material for special ceramic compositions; as a catalyst carrier.

## BIPHENYL (See Diphenyl)

## BISULFATE OF SODA (See Sodium Bisulfate)

## BISULFITE OF SODA (See Sodium Bisulfite)

## BLEACH (See Merclor)



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## BONE ASH

**GENERAL INFORMATION:** Mold wash grade 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 opal and other translucent glasses.

**R. R. CLASSIFICATION:** Bone Ash.

## BONE BLACK

**GRADES:** Twelve grades are available which vary in fineness, top tone, undertone, tinting strength and color in oil.

**SPECIFICATIONS:** In general, bone blacks when compared with lampblack or carbon black have greater hardness and lower oil absorption. They mix easily with water, shellacs and lacquer, and are relatively stable to sunlight. Specifications for the various standard grades are as follows:

| Grade No. | % of Moisture | % $P_2O_5$ | % Free Carbon | Oil Absorption* | % through 325 Screen |
|---|---|---|---|---|---|
| 45 | 4.10 | 33.50 | 9.20 | 46.2 | 99.89 |
| 150 | 4.10 | 33.50 | 9.20 | 46.2 | 99.90 |
| 250 | 4.94 | 33.05 | 9.75 | 43.9 | 99.40 |
| 350 | 4.07 | 30.15 | 13.84 | 43.9 | 99.85 |
| 439 | 4.78 | 32.05 | 14.57 | 50.2 | 99.95 |
| 439 Spec | 4.78 | 31.73 | 15.12 | 50.5 | 99.90 |
| 450 & 450-CT. | 4.88 | 34.50 | 9.30 | 42.7 | ** |
| 650 | 4.23 | 34.00 | 8.75 | 43.9 | 99.73 |
| 841 | 4.02 | 32.95 | 8.90 | 46.2 | 99.90 |
| 850 | 3.82 | 34.60 | 8.37 | 43.9 | 99.90 |
| Ceco | 4.95 | 32.30 | 9.70 | 46.3 | 99.95 |

*Lbs. oil per 100 lbs. pigment.
**No. 450, 99.90; No. 450-CT., 99.67.

**R. R. CLASSIFICATION:** Animal Charcoal, Other Than Spent.

**GENERAL INFORMATION:** Chief use is as a pigment in leather finishes, artificial leather, paints, lacquers, japans, inks and wall paper. Bone black has good jetness and is easy to wet, whereas lampblack wets only with difficulty and has much less jetness.

## BRONZING LIQUIDS

**GENERAL INFORMATION:** Clear lacquer base mediums for aluminum and bronze powders. Several types offered for metal, wood, fabric and paper. Applied by spray or machine coating. Many are inhibited to retard gelling.

**R. R. CLASSIFICATION:** Bronzing Liquid.

## "BUTASAN" (See Accelerators, Rubber)



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## BUTYL ACETATE

**TYPICAL ANALYSIS:** Water-white liquid; sp. g. 0.872-0.877 at 20°/20°C.; 7.3 lbs. per gal.; ester content, 88-90%. Boiling range: below 115°C., none; below 122°C., not over 10%; below 125°C., at least 90%; below 130°C., 100%; dryness, mixes with 19 vols. 60° Bé. gasoline; less than 0.01% as free acetic acid.

**R. R. CLASSIFICATION:** Butyl Acetate.

**GENERAL INFORMATION:** Used as a nitrocellulose solvent. Is intermediate in activity between ethyl acetate and amyl acetate. 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, compatibility with various resins and oils. Used in formulating lacquer finishes for wood, metals, textiles, leather and paper.

## BUTYL ACID PYROPHOSPHATE

**PROPERTIES:** Sp. g. 1.23 at 25°C.

## BUTYL ALCOHOL*

**TYPICAL ANALYSIS:** Water-white liquid; sp. g. 0.810-0.813 at 20°/20°C.; 6.76 lbs. per gal. Boiling range: below 115°C., none; above 118°C., none; dryness, mixes with 19 vols. 60° Bé. gasoline; not more than 0.01% as acetic acid.

**R. R. CLASSIFICATION:** Butyl Alcohol.

**GENERAL INFORMATION:** Butyl alcohol is not a nitrocellulose solvent. Its use in lacquers and lacquer thinners imparts good blush resistance and leveling properties. It is a good solvent for some resins including shellac.

*NOTE: Not manufactured by us but furnished for the convenience of our customers

## n-BUTYL PHOSPHORIC ACID (See Alkyl Phosphoric Acids)

## BUTYL PHTHALATE (See Dibutyl Phthalate)

## BUTYL PHTHALYL BUTYL GLYCOLLATE (See Santicizer B-16)



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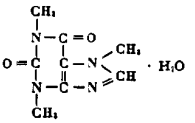
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## CABLE LACQUERS

**GENERAL INFORMATION:** Manufactured in clear, black and colors for application by gasket, for high tension automotive cables and primary wires. Special types are available that are flameproof, resistant to hot oil, and have high-heat test ratings; also non-inflammable type sleeving lacquer of high dielectric strength. All types build well, giving a tough, glossy, flexible finish.

**R. R. CLASSIFICATION:** Lacquer.

## CAFFEINE, U.S.P.



Mol. Wt. 212.21

**STANDARD FORMS:** Powder, anhydrous; powder, hydrated.

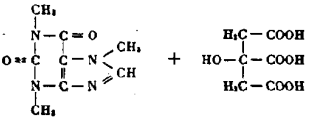
**SPECIFICATIONS:** White powder, loss on drying at 80°C: anhydrous powder 0.25% max.; hydrated flakes, 5.75-6.50%; m. p. 235°C. min.; meets U.S.P. test for carbonizable impurities.

| *MESH* | *Hydrated* | *Anhydrous* |
|---|---|---|
| Retained on— | | |
| 20-mesh screen | Trace max. | |
| 35-mesh screen | 12.0% max. | |
| 45-mesh screen | 18.0% max. | |
| 100-mesh screen | | None |
| 200-mesh screen | | 2.5% max. |

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## CAFFEINE, CITRATED, U.S.P.



(Caffeine) (Citric Acid)

Equal quantities by weight

**STANDARD FORM:** Powder.

*(Continued)*



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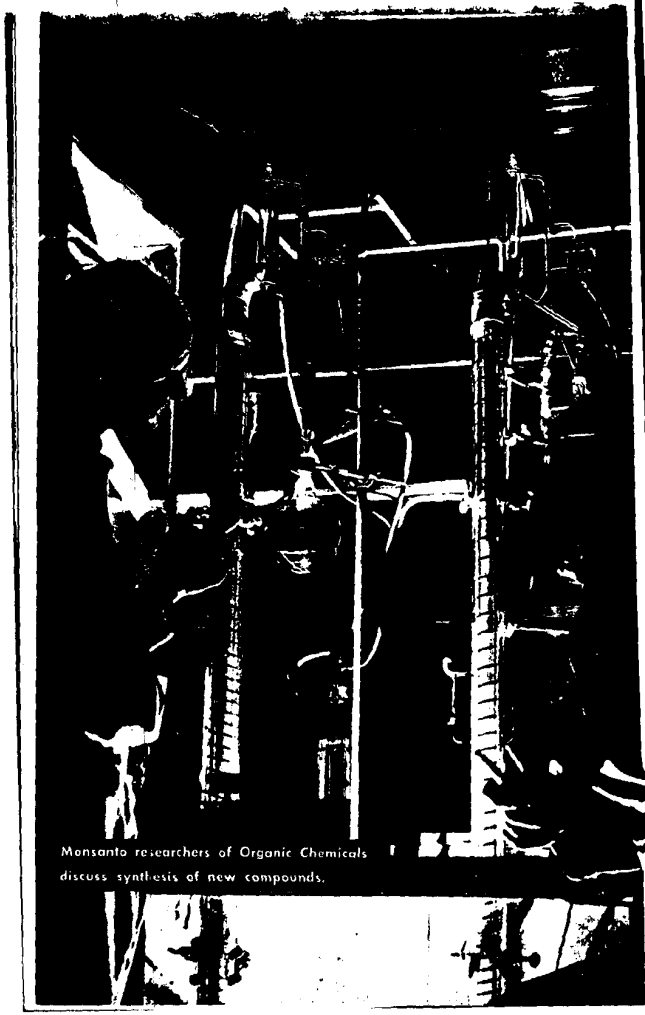
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This skytower rises above Monsanto's plant for intermediates at Norfolk, Virginia.

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Monsanto researchers of Organic Chemicals discuss synthesis of new compounds.

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TOWOLDMON0041371
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**SPECIFICATIONS:** White powder; assay 48.0-52.0% anhydrous caffeine; loss on drying at 50°C., 0.2% max.; solubility in water (1:4), complete; conforms to U.S.P. tests for sulfate and heavy metals; 15.0% max. retained on 100 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## CALCIUM ACID PYROPHOSPHATE

$CaH_2P_2O_7 \cdot xH_2O$

**PROPERTIES:** White powder; slightly soluble in water; pH of 1% solution 3.8-4.0.

**GENERAL INFORMATION:** Suggested as a burnishing agent.

## CALCIUM AMMONIUM ACID ORTHOPHOSPHATE

Approx. $CaNH_4(H_2PO_4)_2 \cdot 2H_2O$ (with excess $NH_3$)

$CaO$ - 14.6%

$P_2O_5$ - 58.7%

$NH_3$ - 6.9%

$H_2O$ - 20.3%

**PROPERTIES:** White, granular, semi-crystalline powder; soluble in water to give an acid solution; pH 4.0-4.4; stable at ordinary temperatures; decomposes on heating; liberates $NH_3$ in presence of alkalies; m. p. near 100°C.; after melting remains plastic down to 60°C.

## CALCIUM GLYCEROPHOSPHATE N.F. (See Glycerophosphates)

## CALCIUM MAGNESIUM PYROPHOSPHATE

$Ca_2P_2O_7 \cdot xMg_2O_7$ (x approx. 1.15)

**PROPERTIES:** Gray powder; soluble in acids; insoluble in water.

**GENERAL INFORMATION:** Suggested as a constituent of porcelains and enamels.

## CALCIUM METAPHOSPHATE

$Ca(PO_3)_2$

**PROPERTIES:** White powder; m. p. approx. 976°C.; very slowly soluble in water and acids.

**GENERAL INFORMATION:** Suggested as a constituent of glasses, porcelains and enamels.



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## CALCIUM NITRATE

$Ca(NO_3)_2 \cdot 3H_2O$

**STANDARD FORMS:** White crystals; 75% water solution.

**TYPICAL ANALYSIS:**

| | *White Crystals* | *Solution* |
|---|---|---|
| $Ca(NO_3)_2 \cdot 3H_2O$ | 98.95% | 74.21% |
| Heavy Metals | none | none |
| Iron | none | none |
| $R_2O_3$ | none | none |
| Water | none | 25% |

Balance to make up 100% is probably magnesium nitrate.

**R. R. CLASSIFICATION:** Calcium Nitrate.

**GENERAL INFORMATION:** Used as a coagulant in latex dipping processes.

## CALCIUM PHOSPHATE, MONO

(Also known as primary calcium phosphate, calcium di-hydrogen phosphate, mono-basic calcium phosphate, calcium acid phosphate, and acid phosphate of lime)

**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 grades will be supplied on request.

The following mixtures are carried in stock:

| *Neut. Strength* | *Constituents* |
|---|---|
| 52 | Regular, Starch and 15% Calcium Sulfate |
| 50 | Regular and Starch |
| 50 | Granular and Starch |
| 45 | Regular, Starch and 18% Calcium Sulfate |
| 45 | Regular, Starch and 30% Calcium Sulfate |
| 45 | Regular and Starch |

**PROPERTIES:** A white stable material, soluble in water, giving an acid reaction.

**R. R. CLASSIFICATION:** Calcium Phosphate.

**GENERAL INFORMATION:** Used in bakeries for leavening purposes and to prevent the formation of "rope" in bread; as a leavening agent in biscuits and crackers and as an acid leavening agent in pancakes; as 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 malt.

## CALCIUM PHOSPHATE, DI

(Also known as phosphate of lime, precipitated bone, secondary phosphate of lime, dicalcium *ortho*-phosphate and dibasic calcium phosphate)

(*Continued*)



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Anhydrous: $CaHPO_4$ Dihydrate: $CaHPO_4 \cdot 2H_2O$

Mol. Wt. 136.068 Mol. Wt. 172.084

**STANDARD FORMS:** Anhydrous; dihydrate.

**PROPERTIES:** Insoluble in alcohol; soluble in dilute citric acid solution. Solubility in $CO_2$ - free water in gms. per liter:

| | *30°C.* | *50°C.* | *68°C.* | *100.1°C.* |
|---|---|---|---|---|
| *Anhydrous* | | | | |
| CaO | 0.0414 | 0.667 | 0.0985 | 0.1046 |
| $P_2O_5$ | 0.0866 | 0.1630 | 0.2234 | 0.2461 |
| *Dihydrate* | | | | |
| CaO | 0.0954 | 0.2617 | 0.3409 | 0.3109 |
| $P_2O_5$ | 0.2066 | 0.6182 | 0.3245 | 0.7591 |

**GRADES:** Medicinal; food: dentifrice.

**R. R. CLASSIFICATION:** Calcium Phosphate.

**GENERAL INFORMATION:** Used as a mineral supplement in diets that are deficient in calcium and phosphorus; as polishing agent in tooth pastes and powders.

## CALCIUM PHOSPHATE, DI, DIHYDRATE, STABILIZED

$CaHPO_4 \cdot 2H_2O$

**PROPERTIES:** White tasteless crystalline powder; soluble in dilute citric acid solution; very slightly soluble in water; insoluble in alcohol and glycerin.

**GENERAL INFORMATION:** Retains water of crystallization and remains free flowing during prolonged storage under abnormal conditions. Does not set-up in tooth paste preparations. Uses: medicinal; supplement for foods; polishing ingredient in tooth pastes.

## CALCIUM PHOSPHATE, TRI

(Also known as tri-basic calcium phosphate, normal calcium phosphate, neutral calcium phosphate, tertiary calcium phosphate)

**STANDARD FORM:** White powder.

**GRADES:** Dentrifice, conditioner (salt, sugar, etc.,) and medicinal. All material conforms to requirements of the U. S. Pure Food Laws.)

**PROPERTIES:** White amorphous powder, odorless and tasteless; practically insoluble in water.

**R. R. CLASSIFICATION:** Calcium Phosphate.

**GENERAL INFORMATION:** Used as a mineral supplement to supply calcium and phosphorus; as a base or polishing agent in tooth powder; as an ingredient in making milk glasses; as an antacid; as a conditioner to prevent caking in salt, sugar, talc and other powdered material.



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TOWOLDMON0041374
WATER_PCB-00025843

## CALCIUM PHOSPHATE, X-C

**GENERAL INFORMATION:** Extra rich in calcium. Used as a mineral supplement to supply calcium and phosphorus, especially in enriched flours; to control pH of baked products in order to reduce loss of thiamin $B_1$ in baking process; in phosphating plain flours.

## CALCIUM PYROPHOSPHATE

$Ca_2P_2O_7$ Mol. Wt. 254.20

**PROPERTIES:** A finely subdivided powder; contains 43.8% CaO and 55.5% $P_2O_5$.

**GENERAL INFORMATION:** Used in food fortification and vitamin tablets as a mineral supplement.

## CALCIUM SALICYLATE (See Salicylates)

## CALCIUM SESQUI PYROPHOSPHATE

$Ca_4H_4(P_2O_7)_3 \cdot 6H_2O$

**PROPERTIES:** White powder; partially soluble in water with acid reaction.

## CALCIUM SILICATE SLAG

**PROPERTIES:**

| | |
|---|---|
| %CaO | 47.18 |
| $\%SiO_2$ | 40.44 |
| $\%Al_2O_3$ | 7.62 |
| $\%Fe_2O_3$ | 0.20 |
| %F | 2.62 |
| %P | 0.55 |
| $\%K_2O$ | 0.97 |
| $\%Na_2O$ | 0.44 |
| %MgO | 0.02 |
| %Mn | 0.12 |
| $\%SO_4$ | 0.59 |
| %C | 0.10 |

## CALCIUM SODIUM ACID PYROPHOSPHATE

$Ca_2Na_2H_6(P_2O_7)_3 \cdot 4H_2O$

**PROPERTIES:** White powder; soluble in water with acid reaction.



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WATER_PCB-00025844

## CALCIUM SODIUM PYROPHOSPHATE

$CaNa_2P_2O_7 \cdot xH_2O$

%CaO —18.4
%$Na_2O$ —18.8
%$P_2O_5$ —45.0
%$H_2O$ —17.8

**PROPERTIES:** White, light, semi-crystalline powder; apparent sp. g. 0.74; solubility: cold water approx. 2%; hot water approx. 12%; water solution pH 9.3; only mildly abrasive (Index 2 to 5 as determined by the Carondelet method).

**GENERAL INFORMATION:** Suggested as a dentifrice base (abrasive for alkaline tooth powders and pastes).

## CALCIUM SULFATE (See Crysalba)

## CARBOLIC ACID (See Phenol)

## CARBON DIOXIDE GAS

$CO_2$

**TYPICAL ANALYSIS:** 100% $CO_2$ approx.; sp. g. of liquefied gas, 1.057.

**R. R. CLASSIFICATION** Carbon Dioxide Liquefied.

**GENERAL INFORMATION:** Monsanto carbon dioxide is liberated from pure soda ash. It is purified, dried and compressed to 400 lbs. per sq. in. in a multi-stage compressor, then condensed or liquefied and placed in steel cylinders. Thus prepared, it is entirely free from odor and taste and is widely used in carbonating beverages. It is also used as a non-oxidizing atmosphere, in rubber vulcanizing, in dry cleaning, in preserved foods, or wherever an inert oxygen-free medium is required. Liquefied carbon dioxide is the cheapest source of high pressure which is portable and without fire hazard.

## CARBON DIOXIDE, SOLID (Dry Ice)

**STANDARD FORM:** Blocks, 10"x10"x10", weighing 50 to 55 lbs.

**R. R. CLASSIFICATION:** Carbon Dioxide Solidified.

**GENERAL INFORMATION:** A product of molasses fermentation in the manufacture of alcohol. Carbon dioxide thus produced as compared with the gas from other sources permits higher yield and a purer product, requiring less processing for purification prior to liquefying and solidifying. Used for low temperature refrigeration.

## CASTING SEALANT (See Plastics, Thalid X-100 Resins)



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WATER_PCB-00025845

## CAUSTIC SODA

(Also known as sodium hydroxide)

NaOH Mol. Wt. 40.00

**STANDARD FORM:** Solution 50%.

**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 chlorate 0.10% max.; iron 0.007% max.; sodium sulfate 0.04% max.; copper approx. 0.001%.

**R. R. CLASSIFICATION:** Caustic Soda.

**GENERAL INFORMATION:** Used in petroleum refining, vegetable oil refining, tanning, soap making, textile manufacture (rayon), rubber reclaiming.

## CELLULOSE ACETATE (See Plastics, Fibestos, Reinforced Vuelite)

## CELLULOSE NITRATE (See Plastics, Nitron)

## CELLULOSE NITRATE SOLUTIONS

**GENERAL INFORMATION:** Made from RS (regular soluble) cotton of any desired viscosity. Viscosity, solid content, and solvent composition can be regulated to meet customer requirements. Used in manufacture of lacquers, leather dopes, fabric coatings, artificial leather finishes, etc. Composition of standard base solutions follows:

**STANDARD NITROCELLULOSE SOLUTIONS**

| *Formula Number* | *Viscosity of Nitrocellulose* | *Wt. NC to 1 gal. Solvents* | *Percent Nitrocel. dry* | *Active Solvent** | *Weight one gallon* |
|---|---|---|---|---|---|
| R-1202 | ½ Seconds | 64 oz. | 35.9 | Butyl Acetate | 8.71 lbs. |
| R-4683 | ½ " | 64 " | 36.5 | Ethyl Acetate | 8.54 " |
| R-2816 | 6 " | 45 " | 28.1 | Butyl Acetate | 8.53 " |
| R-1205 | 15-20 " | 28 " | 19.5 | Butyl Acetate | 7.99 " |
| R-1204 | 15-20 " | 28 " | 19.5 | Ethyl Acetate | 8.1 " |
| L-4692 | 250-400 " | 16 " | 13.0 | Ethyl Acetate | 7.2+ " |

*Usual added diluents: Toluol, xylol, naphthas (varying aromaticity), alcohols (ethyl, butyl, amyl).

**R. R. CLASSIFICATION:** Lacquer.

## CELLULOSE SOLUTIONS

**GENERAL INFORMATION:** Made from other soluble cellulose derivatives such as cellulose acetate, cellulose acetate butyrate and ethyl cellulose. All such solutions are made to required specifications as to type of soluble cellulose, viscosity, concentration and solvent composition.



0683293

TOWOLDMON0041377
WATER_PCB-00025846

## CEMENTS

**GENERAL INFORMATION:** Rapid-drying waterproof cements in various soluble cellulose and resin bases; also heat-sealing cements. A complete line of cements is offered for adhering wood, metal, paper and fabric to various plastic materials; also cements inhibited to retard gelling for packaging in collapsible lead and other metal tubes, such as household cement.

**R. R. CLASSIFICATION:** Lacquer.

## CEREX (See Plastics)

## CHLORAL HYDRATE, U.S.P.

$CCl_3CH(OH)$ Mol. Wt. 165.42

**STANDARD FORM:** Crystals.

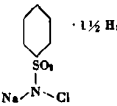
**SPECIFICATIONS:** Colorless, dry transparent crystals; assay 99.5% min.; solubility in water (1:1), complete; water solution neutral to litmus; conforms to U.S.P. test for carbonizable impurities and chlorides.

**R. R. CLASSIFICATION.** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in pharmaceutical preparations and veterinary medicines.

## CHLORAMINE-B

(Also known as N,N-sodium chlorobenzene sulfonamide)



$\cdot 1\frac{1}{2}\ H_2O$

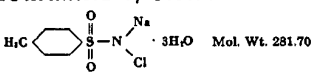
Mol. Wt. 240.65

**STANDARD FORM:** Crystalline powder.

**SPECIFICATIONS:** Nearly white crystals or crystalline powder; soluble in water; active chlorine 14.45% min.

**GENERAL INFORMATION:** Chloramine-B is a water-soluble, chlorine-bearing powder used as a germicide, disinfectant and deodorant.

## CHLORAMINE-T, U.S.P.



$\cdot 3H_2O$ Mol. Wt. 281.70

**STANDARD FORM:** Crystalline powder.

*(Continued)*



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TOWOLDMON0041378
WATER_PCB-00025847

**SPECIFICATIONS:** White or faintly yellow powder or granules; 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%; active chlorine 12.25-12.60%; assay 97.3% min.

*MESH*
Retained on 10-mesh screen—Trace max.
Retained on 35-mesh screen—1.0%-7.0%.

**R. R. CLASSIFICATION:** Disinfectant other than medicinal.

**GENERAL INFORMATION:** Chloramine-T is a water-soluble, chlorine-bearing powder used as a germicide, disinfectant and deodorant.

## CHLORINATED BIPHENYL (See Aroclors)

## CHLORINE

**SPECIFICATIONS:** Clear, amber-colored liquid; about 1½ times as heavy as water; conforms with American Water Works Association specifications.

**R. R. CLASSIFICATION:** Chlorine. Liquefied (green label required).

**GENERAL INFORMATION:** Used for municipal water purification, sewage treatment and swimming pool sterilization, for slime control, in pulp and textile bleaching, metallurgy, bleaching and processing of flour, organic synthesis, and in the manufacture of metallic chlorides and hypochlorites. *CAUTION: Chlorine is toxic and highly irritating. Avoid contact with the skin and breathing the vapors.*

**AVAILABLE LITERATURE:** 20-page booklet, "Monsanto Chlorine."

## *para*-CHLORO-*meta*-CRESOL,

white transparent crystals; used as a disinfectant intensifier; made by Monsanto Chemicals Limited.

## *ortho*-CHLORO-*para*-TOLUENE-SODIUM SULFONATE

(See Monsanto Salt)

## *para*-CHLORO-*meta*-XYLENOL,

white crystals; used as a disinfectant intensifier and as a preservative and preventive against mold and mildew; made by Monsanto Chemicals Limited.



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WATER_PCB-00025848

## *ortho*-CHLOROANILINE

(Also known as *ortho*-aminochlorobenzene and 1-amino-2-chlorobenzene)



Mol. Wt. 127.57

**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.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in the production of dyestuffs. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*

## *meta*-CHLOROANILINE

(Also known as *meta*-aminochlorobenzene and 1-amino-3-chlorobenzene)



Mol. Wt. 127.57

**STANDARD FORM:** Liquid.

**SPECIFICATIONS:** Clear, light yellow liquid; crystallizing point approx. —10.0°C. Distillation range: first drop, 228.0°. min.; 95% (1-96 ml), 1.0°C. max.; dry point, 231.0°C. max.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in the manufacture of azo dyestuffs. *CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.*

## *para*-CHLOROANILINE

(Also known as *para*-aminochlorobenzene and 1-amino-4-chlorobenzene)



Mol. Wt. 127.57

**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, 231.0°C. max; solution in HCl, slight opalescence max.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in the production of dyestuffs. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*



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TOWOLDMON0041380
WATER_PCB-00025849

## CHLOROBENZENE



Mol. Wt. 112.56

**STANDARD FORM:** Liquid.

**SPECIFICATIONS:** Clear, almost colorless liquid. Distillation range: first drop, 131.5°C. min.; 95% (1-96 ml), 0.5°C. max.; dry point, 133.5°C. max.

**R. R. CLASSIFICATION:** Monochlorobenzene.

**GENERAL INFORMATION:** Major use is as an intermediate in the preparation of the various substituted chlorobenzenes which are in turn intermediates for the preparation of dyestuffs, explosives and various other organic chemicals. Also used as an organic solvent.

## *ortho*-CHLOROPHENOL, TECHNICAL

(Also known as *ortho*-hydroxychlorobenzene and 1-chloro-2-hydroxybenzene)



Mol. Wt. 128.56

**STANDARD FORM:** Liquid.

**SPECIFICATIONS:** Clear yellow to brown liquid; monochlorophenol (from Cl content), 96.0% min. Distillation range: first drop, 173.0°C. min.; 95% (1-96 ml), 2.0°C. max.; dry point, 178.0°C. max.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in the production of dyestuffs and various other organic products. *CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.*

## *para*-CHLOROPHENOL

(Also known as *para*-hydroxychlorobenzene and 1-chloro-4-hydroxybenzene)



Mol. Wt. 128.56

**STANDARD FORM:** Cast solid.

**SPECIFICATIONS:** Essentially water-white; crystallizing point 42.5°C. min.; sp. g. 1.256-1.262 at 45.0°/15.5°C.

**R. R. CLASSIFICATION:** Dye Intermediate.

**GENERAL INFORMATION:** Used as an intermediate in the production of dyestuffs, and in the synthesis of pharmaceuticals. *CAUTION: Care should be exercised in handling this product. Avoid contact with the skin.*



0683297

TOWOLDMON0041381
WATER_PCB-00025850

## CHLOROSULFONIC ACID

(Also known as sulfuric chlorohydrin)

$ClSO_3OH$ Mol. Wt. 116.53

**STANDARD FORM:** Liquid.

**SPECIFICATIONS:** Heavy mobile liquid; assay 98.5% min.

**R. R. CLASSIFICATION:** Chlorosulfonic Acid. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used in chlorosulfonation reactions. *CAUTION: Chlorosulfonic acid reacts violently with water, forming hydrochloric and sulfuric acids.*

## CHROME SULFATE (See Santotan)

## CITRATED CAFFEINE, U.S.P. (See Caffeine, Citrated)

# COATINGS

## "LAUXTEX"*

**STANDARD FORM:** Powder.

**GENERAL INFORMATION:** Casein-bound texture finish for interior use. Mixes with cold water. Available in six pastel colors and white.

**R. R. CLASSIFICATION:** Dry Earth Paint.

**AVAILABLE LITERATURE:** Lauxtex Color Card.

*Trade Mark Reg. U. S. Pat. Off.

## "VELLO"*

**STANDARD FORM:** Powder.

**GENERAL INFORMATION:** Casein-bound wall finish, limeproof, with lithopone pigment base, especially formulated for interior use. Mixes with ordinary cold water. Meets U. S. Government specifications for washability, meets all TT-P-23a requirements. In ten pastel colors and white.

**R. R. CLASSIFICATION:** Dry Earth Paint.

**AVAILABLE LITERATURE:** Vello Color Card.

*Trade Mark Reg. U. S. Pat. Off.



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TOWOLDMON0041382
WATER_PCB-00025851

## COBALTOUS PHOSPHATE, DI

$CoHPO_4 \cdot xH_2O$

**PROPERTIES:** Pale violet-red powder; soluble in acid; insoluble in water.

**GENERAL INFORMATION:** Suggested as coloring agent for pigments, glazes.

## COBALTOUS PHOSPHATE, TRI

$Co_3(PO_4)_2 \cdot 2H_2O$

**PROPERTIES:** Pink powder; soluble in acids; insoluble in water.

**GENERAL INFORMATION:** Suggested as a coloring agent for pigments, glazes and glass.

## CONTACT MASS (See Vanadium Sulfuric Acid Catalyst

## COPPER ORTHOPHOSPHATE

$Cu_3(PO_4)_2 \cdot 3H_2O$

**PROPERTIES:** Fine blue powder; soluble in acids and $NH_4OH$; very slightly soluble in water.

**GENERAL INFORMATION:** Suggested as a fungicide.

## COPPER PYROPHOSPHATE

$Cu_2P_2O_7 \cdot xH_2O$

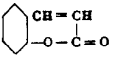
**PROPERTIES:** Pale blue, light, fluffy powder; soluble in acids; soluble in aqueous solution of tetrapotassium pyrophosphate; insoluble in water.

**GENERAL INFORMATION:** Suggested as a catalyst, fungicide and insecticide.

## COPPERAS NITRATE OF IRON (See Ferric Sulfate)

## COTTON SOLUTIONS (See Cellulose Nitrate Solutions)

## "COUMARIN MONSANTO" (Coumarin N. F.)



Mol. Wt. 146.14

**STANDARD FORMS:** Crystals, fine; crystals, large—4 mesh.

(*Continued*)



0683299

TOWOLDMON0041383
WATER_PCB-00025852

**SPECIFICATIONS:** Fine or large 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; large crystals 5.0% max. retained on 4 mesh screen; 95.0% min. retained on 8 mesh screen.

**R. R. CLASSIFICATION:** Coumarin.

**GENERAL INFORMATION:** Coumarin is a flavor and odor principle used separately and in conjunction with vanillin. It is used in perfumes, soaps, tobacco, inks, rubber, foods and other products where flavoring or aromatic ingredients are required.

**AVAILABLE LITERATURE:** Folder, "Coumarin Monsanto."

## CREAMERY ACID (See Sulfuric Acid)

## *meta*-CRESOL

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

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

Loose white crystals, crystallizes 34.5°C.; dye intermediate; made by Monsanto Chemicals Limited.

## CRESOL-CRESYLIC ACID

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.

## CRESYLIC ACID (See Cresol)

## "CRYSALBA"*

$CaSO_4$ Mol. Wt. 136.14

**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 (paste or powder).

(*Continued*)



0683300

TOWOLDMON0041384
WATER_PCB-00025853

**R. R. CLASSIFICATION:** Calcium Sulfate.

**PRINCIPAL USES:** Used as a tooth paste base or polishing agent. Suitable for preparation of neutral, acid, basic, soap or magnesia type dentifrice.

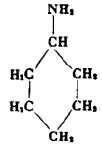
*Trade Mark Reg. U. S. Pat. Off.

## "CURODEX"

A complete line of reodorants for the rubber trade: not manufactured by us but furnished for the convenience of our customers.

## CYCLOHEXYLAMINE

(Also known as hexahydroaniline)



Mol. Wt. 99.17

**STANDARD FORM:** Liquid.

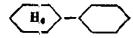
**SPECIFICATIONS:** Clear, practically colorless; sp. g. 0.870-0.874 at 15.5°/15.5°C. Distillation range: first drop, 132.0°C. min.; 95% (1-96 ml), 4.0°C. max.; dry point, 137.5°C. max.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a dyestuff intermediate; as a petroleum additive; as a component in boiler water treatment; as a component of corrosion inhibitors; in organic synthesis. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*

**AVAILABLE LITERATURE:** Development Department Bulletin 27, "Cyclohexylamine and Dicyclohexylamine."

## CYCLOHEXYL BENZENE



Mol. Wt. 160.248

**CHARACTERISTICS:** Clear, colorless liquid; distillation range, 238°-241° C.; sp. g. 0.937 at 25°/25°C.; refractive index, 1.5205; freezing point, 4.8°C.; flash point, 210°F.; viscosity, 31.2 SUS at 100°F.; resistivity 11.410 x $10^6$ ohms/cc. at 100°C.

## DECA CHLORO METATERPHENO DIQUINONE

$C_{15}Cl_{10}O_4$

**PROPERTIES:** Orange powder; soluble in alcohol; water-insoluble.

**GENERAL INFORMATION:** Suggested as an insecticide; oil addition agent.



0683301

TOWOLDMON0041385
WATER_PCB-00025854

## DETERGENTS (See Santomerse)

## DIACETONE ALCOHOL, TECHNICAL

**TYPICAL ANALYSIS:** Nearly water-white liquid; acidity, neutral; odor, non-residual; sp. g. 0.918 at 15.5°C.; shipping wt. per gal., 7.60 lbs.; diacetone content, 85%; boiling range, theoretical boiling point 164°C. (decomposes at 130°-140°C.); dryness, mixes with 5 vols. of petroleum naphtha without turbidity.

**R. R. CLASSIFICATION:** Diacetone.

**GENERAL INFORMATION:** Diacetone alcohol is one of the most active high-boiling solvents for nitrocellulose. It is a solvent for cellulose esters and ethers and some resins and dyes. Diacetone alcohol is miscible with, and has a high tolerance for nearly all lacquer diluents. Higher percentages of water are tolerated than with most solvents.

## DIALKYL HYDROGEN PHOSPHATE (See Alkyl Phosphoric Acids)

## DIAMMONIUM PHOSPHATE (See Ammonium Phosphate, Di-)

## DIAMMONIUM PYROPHOSPHATE
(See Ammonium Pyrophosphate, Di)

## DIAMMONIUM TETRAPHOSPHATE
(See Ammonium Tetraphosphate, Di)

## DIAMYLAMMONIUM DIHYDROGEN PHOSPHATE

$[CH_3\cdot(CH_2)_4]NH\cdot H_2PO_4$

**PROPERTIES:** Hard non-crystalline gum of yellow color; very hygroscopic; soluble in water or alcohol; slightly soluble in benzene; almost insoluble in acetone, no sharp melting point but gradually softens as heated, and is mobile liquid at 110°C.

**GENERAL INFORMATION:** Suggested as a constituent of rust-inhibiting paints.

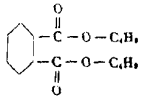
## DIBARIUM PHOSPHATE (See Barium Phosphate, Di)



0683302

TOWOLDMON0041386
WATER_PCB-00025855

## DIBUTYL PHTHALATE



Mol. Wt. 278.34

**SPECIFICATIONS:** Clear, oily liquid; color (APHA), 35 max.; odor, slight; acidity (as phthalic acid), 0.01% max.; sp. g. 1.045±0.001 at 25°/25°C.; refractive index 1.4905±0.001 at 25°C.; assay (ester content), 99% min.; sulfur (copper strip test), negative.

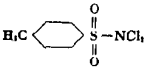
**R. R. CLASSIFICATION:** Dibutyl Phthalate.

**GENERAL INFORMATION:** Dibutyl phthalate is one of the most widely used plasticizers for nitrocellulose. It is miscible with all the common organic solvents and with oils but is soluble in water only to the extent of 0.001% at 30°C. It has excellent light stability which permits its use in colorless, white or 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.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

## DICALCIUM PHOSPHATE (See Calcium Phosphate, Di)

## DICHLORAMINE-T, N.F.



Mol. Wt. 240.11

**STANDARD FORM:** Crystalline powder.

**SPECIFICATIONS:** Yellowish-white crystalline powder; crystallizing point, 80.0°C. min.; assay (available chlorine), 29.25% min.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Dichloramine-T is a water-insoluble, active chlorine-bearing product. It must be stored away from light and in a cool place.

## 2,5-DICHLOROANILINE

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



Mol. Wt. 162.02

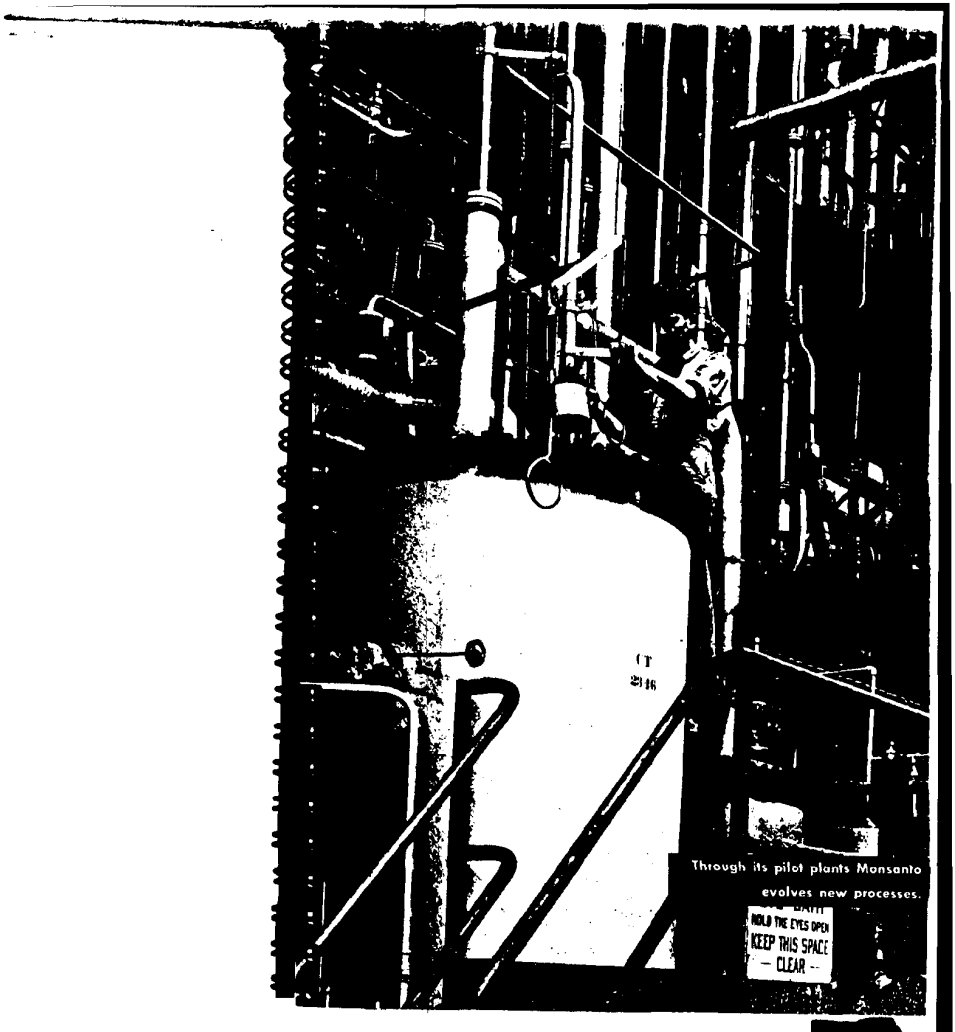
**STANDARD FORM:** Fused crystalline mass.

*(Continued)*



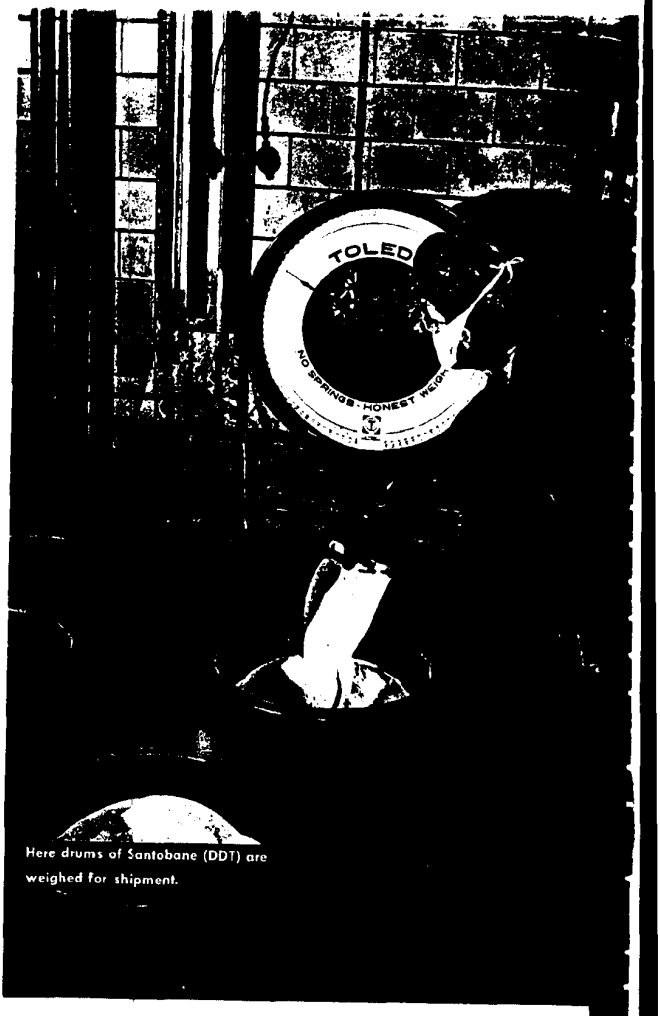
0683303

TOWOLDMON0041387
WATER_PCB-00025856




0683304

TOWOLDMON0041388
WATER_PCB-00025857




Here drums of Santobane (DDT) are weighed for shipment.

0683305

TOWOLDMON0041389
WATER_PCB-00025858

**CHARACTERISTICS:** Light brown crystalline mass; crystallizing point, 48.6°C. min. Distillation range: start, 247°C. min.; 95%, within 1.5°C.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in the preparation of azo dyestuffs. *CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.*

## DICHLOROBENZENE (See Santochlor and ortho-Dichlorobenzene

## *para*-DICHLOROBENZENE (See Santochlor)

## *ortho*-DICHLOROBENZENE, TECHNICAL

(Also known as 1, 2-dichlorobenzene)



Mol. Wt. 147.01

**STANDARD FORM:** Liquid.

**CHARACTERISTICS:** Colorless to slightly yellow liquid; crystallizing point, 7.0°C. max.; 100% (first drop, dry point), 14.0°C. max.; sp. g. at 1.305-1.313 at 15.5°/15.5°C.; composition, 75-85% ortho-dichlorobenzene, 15-25% para-dichlorobenzene. Distillation range: first drop, 175.0°C. min.; 90%, 5.0°C. range max.

**R. R. CLASSIFICATION:** Ortho-dichlorobenzene.

**GENERAL INFORMATION:** Used as a dyestuff intermediate; solvent; ingredient in cleaning preparations; and as an insecticide and fungicide.

## DDT (See Santobane)

## 2,5-DICHLORONITROBENZENE (See 1-Nitro-2,5-Dichlorobenzene)

## 2,4-DICHLOROPHENOL

(Also known as 1,3-dichlor(-4-hydroxybenzene)



Mol. Wt. 163.01

**STANDARD FORM:** Cast solid.

**SPECIFICATIONS:** Yellow to brown crystalline mass; crystallizing point,

(*Continued*)



0683306

TOWOLDMON0041390
WATER_PCB-00025859

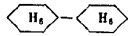
42.0°C. min. Distillation range: first drop, 214.5°C. min.; 95% (1.96 ml), 2.0°C. max.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as 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.*

## DICOBALTOUS PHOSPHATE (See Cobaltous Phosphate, Di-

## DICYCLOHEXYL

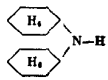


Mol. Wt. 166.30

**PROPERTIES:** Clear mobile liquid; aromatic odor; freezing point, 2.2°C.; sp. g. 0.884 at 25°/15.6°C.; refractive index 1.4790 at 25°C.; distillation range, 5 to 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.

**GENERAL INFORMATION:** Suggested as a high-boiling solvent, plasticizer, dielectric.

## DICYCLOHEXYLAMINE



Mol. Wt. 181.31

**STANDARD FORM:** Liquid.

**CHARACTERISTICS:** Clear, practically colorless liquid; sp. g. 0.916-0.920 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°C. max.; flash point (Tagliabue open cup), above 200°F.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as an intermediate in the manufacture of oil additives and insecticides. *CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.*

**AVAILABLE LITERATURE:** Development Department Bulletin 27, "Cyclohexylamine and Dicyclohexylamine."

## DIETHYL ACID PYROPHOSPHATE

**PROPERTIES:** Sp. g. 1.5 at 25°C.



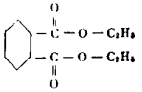
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WATER_PCB-00025860

## DIETHYL AMMONIUM PYROPHOSPHATE

**PROPERTIES:** Concentration 70%; sp. g. 1.3 at 25°C.

## DIETHYL PHTHALATE



Mol. Wt. 222.23

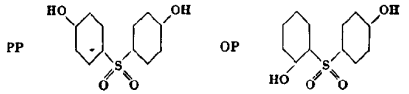
**SPECIFICATIONS:** Clear, water-white oily liquid; color (APHA), not darker than 10; odor, very slightly aromatic; acidity (as phthalic acid) 0.01% max.; sp. g. 1.120 ±0.005 at 25°/25°C.; refractive index 1.5030 ±0.001 at 20°C.; sulfur (copper-strip test), negative.

**R. R. CLASSIFICATION:** Diethyl Phthalate.

**GENERAL INFORMATION:** Diethyl phthalate is a colorless liquid plasticizer generally used in mixture with dimethyl phthalate as a plasticizer for cellulose acetate. It is miscible with all the common organic solvents and diluents. Evaporation rate of diethyl phthalate is too high for successful use as a regular nitrocellulose 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. Boiling point is 295°C.; wt. per gal., 9.35 lbs. It is also used as a fixative in perfumes.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

## DIHYDROXY DIPHENYL SULFONE



**GRADES:** pp' Dihydroxy Diphenyl Sulfone
op' Dihydroxy Diphenyl Sulfone
Technical: mixture of pp' and op'

**STANDARD FORM:** Dry powder

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Can be readily nitrated and sulfonated and converted to ethers, esters, etc. Can be chlorinated but not as readily as phenol.

**AVAILABLE LITERATURE:** 2-page bulletin, "Dihydroxy Diphenyl Sulfone."

## DI-ISOAMYL ACID PYROPHOSPHATE

(See Isoamyl Acid Pyrophosphate, Di)



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WATER_PCB-00025861

## DILEAD ORTHOPHOSPHATE (See Lead Orthophosphate, Di)

## DIMAGNESIUM PHOSPHATE (See Magnesium Phosphate, Di)

## 2,3-DIMETHOXY BENZALDEHYDE, TECHNICAL

(Also known as *ortho*-veratraldehyde)



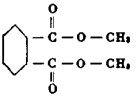
Mol. Wt. 166.17

**CHARACTERISTICS:** Yellowish-brown fused crystalline mass; solubility in sodium bisulfite, nearly complete; crystallizing point, 47.5°C. min.; sp. g. 1.117 at 60°C.; wt. per gal., 9.3 lbs. approx.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a perfume fixative and as an intermediate in chemical synthesis.

## DIMETHYL PHTHALATE



Mol. Wt. 194.18

**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. g. 1.190 ±0.001 at 25°/25°C.; refractive index 1.5155 ± 0.001 at 20°C.; sulfur (copper strip test), negative.

**R. R. CLASSIFICATION:** Dimethyl Phthalate.

**GENERAL INFORMATION:** Dimethyl phthalate is a solvent plasticizer for cellulose acetate. It is miscible with all common organic solvents and with oils (except petroleum oils) and has a solubility in water of 0.4% at 32°C. It has excellent light stability. Dimethyl phthalate is much used but cannot be said to meet very rigid plasticizer requirements. Its use is restricted almost entirely to the cellulose acetate field, and there, as a general rule, it is used in combination with diethyl phthalate or some other plasticizer. Dimethyl phthalate has a boiling point of 282°C., a crystallizing point of 0°C., and weighs 10 lbs. per gal.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."



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## 2, 4-DINITROANILINE

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



Mol. Wt. 183.12

**STANDARD FORM:** Powder.

**SPECIFICATIONS:** Bright yellow powder; m. p. 177.5°C. min.; chlorides (total) 0.15% max.

**R. R. CLASSIFICATION:** Dye Intermediate.

**GENERAL INFORMATION:** Used as an intermediate in the preparation of dyestuffs. *CAUTION: This product is toxic. Avoid breathing its dust. Avoid contact with the skin.*

## 2, 4-DINITROCHLOROBENZENE, TECHNICAL

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



Mol. Wt. 202.56

**STANDARD FORM:** Cast crystalline solid.

**GRADES:** 3 grades of cast crystalline solids with crystallizing points of 48.0°C., 46.5°C. and 44.0°C.

**APPROXIMATE ANALYSIS:**

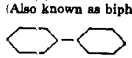
| | 2:4 dinitrochlorobenzene | isomeric dinitrochlorobenzenes |
|---|---|---|
| 48.0°C. | 96% Approx. | 4% Approx. |
| 46.5°C. | 93% " | 7% " |
| 44.0°C. | 88% " | 12% " |

**R. R. CLASSIFICATION:** Dinitrochlorobenzol. "Poison" label required.

**GENERAL INFORMATION:** Used in the production of explosives, photographic chemicals, and dinitrophenol, and as an intermediate in the preparation of dyestuffs. *CAUTION: This product is toxic. Avoid breathing its vapors. Avoid contact with the skin.*

## DIPHENYL

(Also known as biphenyl, phenyl benzene)



Mol. Wt. 154.2

**PROPERTIES:** Technical diphenyl is a light yellow crystalline solid; boiling point, 254.9°C.; freezing point, 68.5°-68.9°C.

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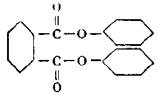
**R. R. CLASSIFICATION:** Diphenyl.

**GENERAL INFORMATION:** Used as a high-temperature, low-pressure heat transfer medium. It is also the starting point for many derivatives such as Aroclors (chlorinated biphenyl) and the sulfonic acid, nitro, amino and hydroxy compounds.

## DIPHENYLGUANIDINE

(See DPG under Accelerators, Rubber

## DIPHENYL PHTHALATE



Mol. Wt. 318.31

**SPECIFICATIONS:** Essentially white coarse powder: melt, clear and light yellow color; free acid (as phthalic), 0.20% max.; free phenol, 0.25% max. A fused product of the same specifications can also be supplied.

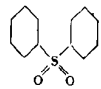
**R. R. CLASSIFICATION:** Lacquer Solvent.

**GENERAL INFORMATION:** Diphenyl phthalate has a crystallizing point of about 69°C. and is readily soluble in ketones, esters and chlorinated hydrocarbons. Its solubility in alcohols, turpentine and linseed oil is rather low, approx. 5.0 gm. per 100 cc. of solvent at 25°C. Diphenyl phthalate is compatible with nitrocellulose and with the sulfonamide, phenolic, polystyrene and vinyl types of synthetic resins. In nitrocellulose lacquers it produces hard coatings that have excellent gloss retention and weather resistance. Mixtures of diphenyl phthalate with either Santolite MS or Santolite MHP are excellent plasticizers for nitrocellulose in odorless, flexible, adhesive coatings.

Diphenyl phthalate is completely insoluble in water and gives increased water resistance to all compositions in which it is used. It is especially recommended for vinyl resins, polystyrene, ethyl cellulose, and some of the natural resins such as Damar.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

## DIPHENYL SULFONE



**GRADES:** Technical: grayish-white powder.
Purified: white needles or leaflets.

(*Continued*)



0683311

TOWOLDMON0041395
WATER_PCB-00025864

R. R. CLASSIFICATION: Chemicals NOIBN.

GENERAL INFORMATION: Slightly soluble in hot water and soluble in most organic solvents. Can be chlorinated, nitrated or sulfonated. Its characteristics suggest its use as an intermediate in organic syntheses or in the preparation of diphenyl sulfides, selenides and their derivatives.

**DIPPING LACQUERS** (See Lacquers)

**DISINFECTANT INTENSIFIERS** (See Santophen, Areskap)

**DISODIUM PHOSPHATE** (See Sodium Phosphate, Di)

**DISPERSING AGENTS** (See Areskap, Aresket, Aresklene, Santomerse)

**DIVINYL BENZENE SOLUTION** (See Plastics)

**"D.P. SOLUTION"***

STANDARD FORM: 40% sol. in equal parts of ethyl alcohol and acetone.

PROPERTIES: Pale straw-colored liquid; 8.2 lbs. per gal.

R. R. CLASSIFICATION: Chemicals NOIBN.

GENERAL INFORMATION: Used as an anti-corrosion agent in lacquers and cotton solutions; as an agent to prevent the settling of Santocel in flat lacquer formulations; and for light and heat stabilization of vinyl chloride and vinyl copolymer resins.

*Trade Mark Reg. U. S. Pat. Off.

**DRY ICE** (See Carbon Dioxide, Solid)

**"EL SIXTY"** (See Accelerators, Rubber)

**ELECTROLYTE** (See Battery Acid)

**EMULSIFYING AGENTS** (See Areskap, Aresket, Aresklene, Santomerse)

**ENAMELS** (See Lacquers)

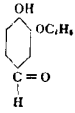


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WATER_PCB-00025865

## "ETHASAN" (See Accelerators, Rubber)

## "ETHAVAN"* (Ethyl Vanillin)



Mol. Wt. 166.17

**STANDARD FORM:** Needles.

**SPECIFICATIONS:** Fine white crystalline needles: completely soluble in ethyl alcohol 95% (1:2); ash 0.05% max.; m. p. 76.5°C. min.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Ethavan is used as a flavoring and aromatic, and 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.

**AVAILABLE LITERATURE:** Leaflet, "Ethavan."

*Trade Mark Reg. U. S. Pat. Off.

## ETHYL ACETATE

**TYPICAL ANALYSIS:** Water-white liquid; sp. g., 0.895 at 15.5°C.; 7.40 lbs. per gal.; ester content, 85-90%. Boiling range: 70°-80°C. Dryness, mixes with not less than 10 vols. of petroleum benzine without turbidity; less than 0.02% as free acetic acid.

**R. R. CLASSIFICATION:** Ethyl Acetate.

**GENERAL INFORMATION:** Used as a nitrocellulose solvent. It is a more active solvent than either butyl or amyl acetate, evaporating the fastest, and having the least 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.

## ETHYL ACID PHOSPHATE (See Alkyl Phosphoric Acids)

## ETHYL ACID PYROPHOSPHATE
(See Diethyl Acid Pyrophosphate)



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TOWOLDMON0041397
WATER_PCB-00025866

## HYL ALCOHOL—190 Proof

$C_2H_5OH$ (*Also see Mersol, a proprietary solvent type alcohol,* and Nealco Anti-Freeze).

**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.

**R. R. CLASSIFICATION:** Alcohol NOIBN or Denatured Alcohol.

**GENERAL INFORMATION:** Nealco ethyl alcohol is manufactured by the fermentation of molasses. It is 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. It is of high uniform quality complying with the exacting specifications of the National Formulary VI and U.S.P. XI.

**AVAILABLE LITERATURE:** 68-page booklet, "Nealco Industrial Alcohol."

## THYL ALKALI PHOSPHATE

(See Ethyl (Ammonium, Potassium, Sodium) Phosphate)

## THYL DI (β-ETHANOL) AMMONIUM PHOSPHATE

**PROPERTIES:** Concentration 60% in water solution; sp. g. 1.18 (22° Bé.); pH 6.9-7.1.



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TOWOLDMON0041398
WATER_PCB-00025867

## ETHYL METAPHOSPHATE

**PROPERTIES:** Sp. g. 1.42 at 25°C.

## ETHYL PHOSPHATE (See Triethyl Phosphate)

## ETHYL PHOSPHORIC ACID (See Alkyl Phosphoric Acids)

## ETHYL PHTHALYL ETHYL GLYCOLLATE (See Santicizer E-15)

## ETHYL POTASSIUM PHOSPHATE

**PROPERTIES:** Concentration 60%; sp. g. 1.39 at 25°C.; pH 7.5.

## ETHYL POTASSIUM SODIUM PHOSPHATE

$C_2H_5KNaPO_4$

**PROPERTIES:** Essentially water-white solution; concentration, 60%; sp. g. 1.374 at 25°C. (38.5° Bé.); pH 6.9-7.2; viscosity at 25°C. 128 cps.

**GENERAL INFORMATION:** Suggested as a humectant and fiber lubricant; in felting.

## ETHYL TRI (β-ETHANOL) AMMONIUM PHOSPHATE

**PROPERTIES:** Medium straw-colored liquid of slightly alcoholic odor; sp. g. 1.19 at 25°C.; wt. per gal. 9.9 lbs.; liquid at all ranges of relative humidity but very viscous when anhydrous; pH 7.0-7.4; strength, 60% solution in water.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a plasticizer for water-soluble materials and as a humectant.

## ETHYL VANILLIN (See Ethavan)

## FERRIC ACID PYROPHOSPHATE

$Fe_4H_4(P_2O_7)_3$

**PROPERTIES:** Pinkish-white powder; very slightly soluble in water.



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TOWOLDMON0041399
WATER_PCB-00025868

## FERRIC CHLORIDE SOLUTION (Iron Perchloride)

$FeCl_3$

**STANDARD FORM:** Liquid.

**GRADE:** 42°Bé.

**TYPICAL ANALYSIS:** Ferric chloride 42°Bé.: total $Fe_2O_3$, 20.3%; FeO, 1.0%; combined $Fe_2O_3$, 19.2%; $FeCl_3$, 39.0%.

**R. R. CLASSIFICATION:** Iron Chloride Liquid.

**GENERAL INFORMATION:** Used as an acid oxidizing agent in etching, photo engraving, and in the manufacture of textile printing rolls and brass signs. It is used in water and sewage treatment for its iron content.

## FERRIC GLYCEROPHOSPHATE (See Glycerophosphates)

## FERRIC METAPHOSPHATE

$Fe(PO_3)_3$

**PROPERTIES:** White powder; insoluble in water.

**GENERAL INFORMATION:** Suggested as raw material for glazes, enamels and glasses.

## FERRIC NITRATE, SOLUTION (True Nitrate of Iron)

$Fe(NO_3)_3$

**GRADE:** 47°Bé., 16.0% $Fe_2O_3$.

**R. R. CLASSIFICATION:** Iron Nitrate.

**GENERAL INFORMATION:** A source of ferric hydroxide for mineral tan and buff colors on cotton; brown papers; logwood blacks on silk; shoe stains and inks.

## FERRIC ORTHOPHOSPHATE

$FePO_4 \cdot Fe_2H(PO_4)_2 \cdot 6H_2O$

**PROPERTIES:** Light buff-colored powder; very slightly soluble in water but more readily soluble in dilute hydrochloric acid.

**GENERAL INFORMATION:** Suggested as an addition agent in the fortification of foods.

## FERRIC ORTHOPHOSPHATE, MONO

$FeH_6(PO_4)_3$

**PROPERTIES:** Pink powder; reacts with water with solution of 50% of the $P_2O_5$ content and a minor proportion of the iron content. A water-insoluble residue of more basic iron phosphates is formed.



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TOWOLDMON0041400
WATER_PCB-00025869

## FERRIC ORTHOPHOSPHATE, TRI

$FePO_4$

**PROPERTIES:** Gray powder; soluble in acids; insoluble in water.

**GENERAL INFORMATION:** Suggested as a pigment for priming paints.

## FERRIC PYROPHOSPHATE, TETRA

$Fe_4(P_2O_7)_3 \cdot 8H_2O$

**PROPERTIES:** White or yellowish-white; very slightly soluble in water or in dilute hydrochloric acid; apparent density is 0.24 gm./cc.; Fe content, 23.5%.

**GENERAL INFORMATION:** Suggested as an addition agent in the fortification of foods.

## FERRIC SODIUM PYROPHOSPHATE

(See Sodium Ferric Pyrophosphate)

## FERRIC SULFATE (See Ferrisul)

## FERRIC SULFATE, SOLUTION (Copperas Nitrate of Iron)

$Fe_2(SO_4)_3$

**GRADE:** 47°Bé., 15.7% $Fe_2O_3$.

**R. R. CLASSIFICATION:** Ferric Sulfate Solution.

**GENERAL INFORMATION:** A strong solution of ferric sulfate, containing no nitric acid. Used as a source of ferric hydroxide for mineral tan and buff colors on cotton, brown papers, logwood blacks on silk, shoe stains and inks.

## "FERRISUL"* (Anhydrous Ferric Sulfate)

$Fe_2(SO_4)_3$

**STANDARD FORM:** Pellets 4-40 mesh.

**TYPICAL ANALYSIS:** 90% min. $Fe_2(SO_4)_3$.

**R. R. CLASSIFICATION:** Dry Ferric Sulfate.

**GENERAL INFORMATION:** An effective coagulant for the treatment of water supplies, sewage and industrial waste. In solution, it is a mild oxidizing agent and can be used for pickling certain alloys such as the stainless steels, brass and other copper alloys. It is also used in various organic reactions.

(*Continued*)



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WATER_PCB-00025870

**AVAILABLE LITERATURE:**

"Ferrisul for Metal Treatment." 12 pages.
"Ferrisul for Treatment of Water, Sewage and Industrial Wastes." 16 pages.
Merrimac Literature 48, "Ferrisul for Pickling Cartridge Cases (Brass)."
Merrimac Literature 72, "Pickling Copper and Its Alloys with Ferrisul."
Merrimac Literature 65, "Pickling Copper-Clad or Brass-Clad Steel with Ferrisul Plus Inhibited Sulfuric Acid."
Merrimac Literature 56, "Pickling Steel Cartridge Cases with Ferrisul."
Merrimac Literature 4360-9, "Recommendations for the Use of Ferrisul for Pickling 18-8 Stainless Steel Wire."
Merrimac Literature 4360-10, "Recommendations for the Use of Ferrisul for Pickling 18-8 Stainless Steel Annealed After Drawing or Spinning Operations."

*Trade Mark Reg. U. S. Pat. Off.

## FERROPHOSPHORUS (Iron Phosphide)

**STANDARD FORMS:** Chill cast lumps, egg size; powder. Contains 23-26% phosphorus.

**R. R. CLASSIFICATION:** Ferrophosphorus.

**GENERAL INFORMATION:** An alloy of iron and phosphorus. Used in iron and steel castings to increase fluidity; in sheet steel to prevent sticking of sheets in final rolling; in wire to give stiffness and better surface for drawing.

**AVAILABLE LITERATURE:** Phosphorus-Iron Alloys Bulletin No. 1. A report of general exploratory research upon the influence of phosphorus in low carbon, low alloy steels, 36 pages.

Bulletin No. 2. A report of experimental research investigation upon corrosion and mechanical influences of alloying elements in low alloy steels, 62 pages plus charts.

Bulletin No. 3. Abstracts of U. S. patents relating to phosphorus as an alloying element in steel and list of iron and steel patents, 54 pages.

Bulletin No. 4. Reports of experimental research investigation upon influence of phosphorus in steels in elevated temperature service and in Cr-Mo steels, 20 pages.

## FERROPHOSPHORUS, SUPERFINE

$Fe_3P$·$Fe_2P$ (approx.)

**PROPERTIES:** A black powder with a brownish undertone; particle size—5 microns and finer.

**GENERAL INFORMATION:** Suggested as a paint pigment and insecticidal dust.

## "FIBESTOS" (See Plastics)



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TOWOLDMON0041402
WATER_PCB-00025871

**"FLECTOL H"** (See Antioxidants)

**FLOTATION AGENTS** (See Xanthates)

**FUNGICIDES** (See Santobrite and Santophen 20)

**FUNGISEALS** (See Wood Preservatives)

**GERMICIDES** (See Antiseptics and Germicides)

**GLAUBER'S SALT** (See Sodium Sulfate, Crystal)

## GLUES

### "LAUXEIN"* CASEIN GLUES

Dry powder form; only water to be added; mainly joint glues, cabinet glues, general woodworking; water resistant; cold-press process.

*Trade Mark Reg. U. S. Pat. Off.

### "LAUXEIN"* SOYBEAN GLUES

Dry powder form. Chemicals to be added: hydrated lime, caustic soda, silicate of soda, TS waterproofing agent and water; plywood glues, insulation board laminating etc.; water-resistant; cold-press or hot-press process may be used.

*Trade Mark Reg. U. S. Pat Off.

### "LAUXEIN"* CASEIN-SOYBEAN BLEND GLUES

Dry powder form; water-resistant.

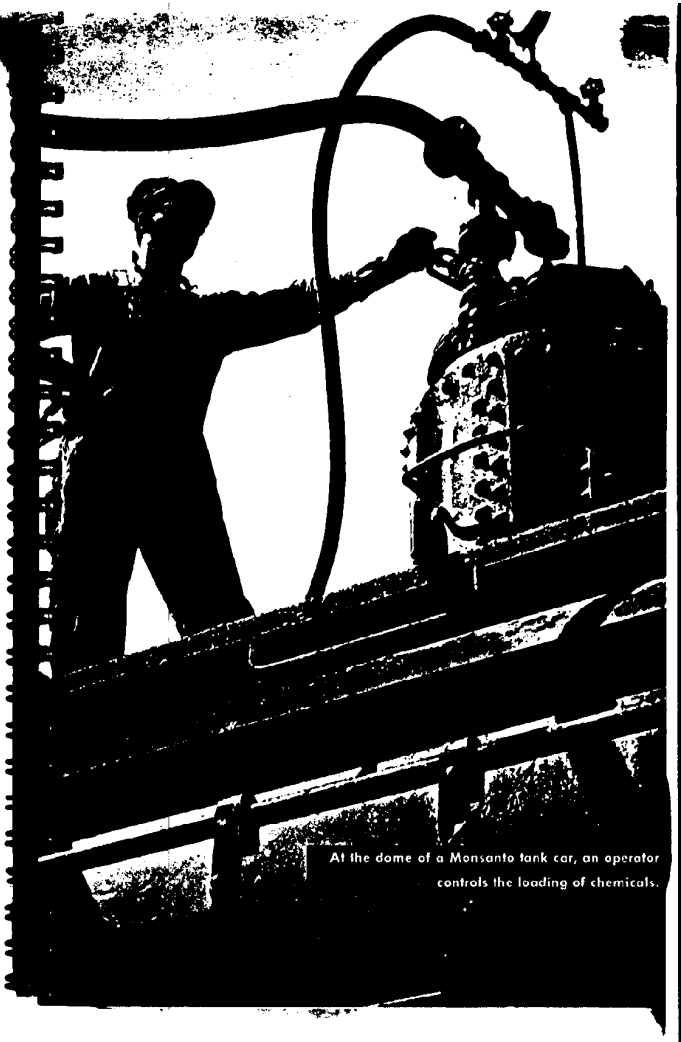
1. Only water to be added; for plywood gluing and general wood-working; cold-press process.
2. Chemicals to be added: hydrated lime, caustic soda, silicate of soda, TS waterproofing agent and water; plywood glues; cold-press or hot-press process may be used.

*Trade Mark Reg. U. S. Pat. Off.



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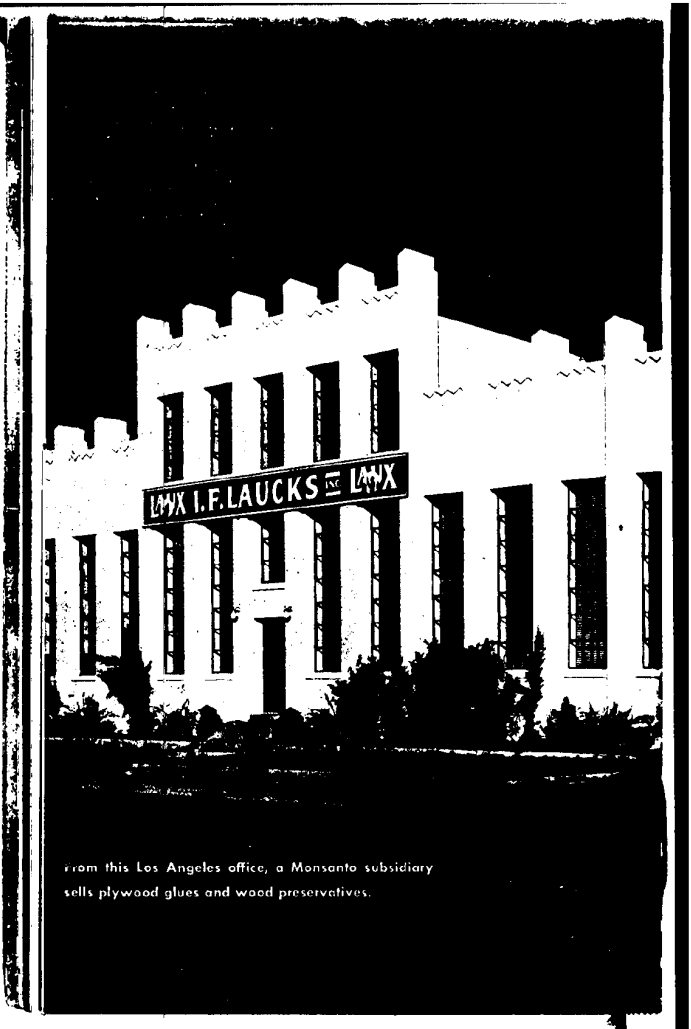
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WATER_PCB-00025872



At the dome of a Monsanto tank car, an operator controls the loading of chemicals.

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TOWOLDMON0041404
WATER_PCB-00025873




From this Los Angeles office, a Monsanto subsidiary sells plywood glues and wood preservatives.

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TOWOLDMON0041405
WATER_PCB-00025874

## LAUXITE"* MELAMINE RESIN GLUES

Waterproof, boil-proof, fungus-proof, weather-resistant; color, white, stainless.

1. Hot-press process:
   Water and hardener to be added.
   Uses: For bonding all woods where exterior exposure must be satisfactory.
2. Warm-temperature setting:
   Water and hardener to be added.
   Uses: For bonding all woods where exterior exposure must be satisfactory.

*Trade Mark Reg. U. S. Pat. Off.

## LAUXITE"* PHENOLIC RESIN GLUES

Waterproof, boil-proof, fungus-proof, weather-resistant and resistant to salt water.

1. Hot-press process:
   (a) Powder form; only water to be added.
   Uses: Plywood manufacture.
   (b) Liquid form; ready to use.
   Uses: Plywood manufacture for aircraft, boats, and exterior exposure.
2. Warm-temperature-setting: (resorcinal base).
   (a) Powder form; water and hardener to be added.
   Uses: Wood gluing where joints must stand exterior exposure or continuous soaking.
   (b) Liquid form; hardener to be added.
   Uses: Wood gluing where joints must stand exterior exposure or continuous soaking.

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## LAUXITE"* UREA RESIN GLUES

A. Unextended are water-resistant and fungus-proof on most constructions; color, white, stainless.

1. Hot-press process:
   Powder form, no catalyst.
   Uses: For plywood manufacture requiring finest adhesion and no staining of plies.
   Fortified are waterproof, boil-resistant and fungus-proof.
   Powder form, only water to be added; fortifier may be added separately.
   Uses: For aircraft and similar high-grade plywood.

*(Continued)*



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WATER_PCB-00025875

2. Cold-setting:
   (a) Powder form, only water to be added.
   Uses: General wood gluing.
   (b) Liquid form, only hardener to be added.
   Uses: General wood gluing.

B. Extended with flour or amylaceous materials. Water-resistant.

1. Hot-press process:
   (a) Powder form, water, flour and catalyst added separately.
   Uses: For furniture plywood.
   (b) Liquid form, water, flour and catalyst added separately.
   Uses: For furniture plywood.
2. Cold-press process:
   (a) Powder form, water, flour and catalyst added separately.
   Uses: For furniture plywood and joint and assembly gluing.
   (b) Liquid form, water, flour and catalyst added separately.
   Uses: for furniture plywood and joint and assembly gluing.

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## GLYCEROPHOSPHATES

**SPECIFICATIONS:** See individual glycerophosphates below.

**GENERAL INFORMATION:** 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. In the case of the less soluble salts, such as calcium, iron, magnesium and manganese, the solubility of these products may be materially increased if they are formulated with glycerophosphoric acid or certain accepted food acids, such as lactic, citric and tartaric.

## GLYCEROPHOSPHATE, CALCIUM, N. F.

$CaC_3H_5(OH)_2PO_4$ Mol. Wt. 210.15

**STANDARD FORM:** Powder, 80 mesh.

**SPECIFICATIONS:** Fine white powder; assay (dry basis), 98.0% min.; sp. g. 0.42-0.50; loss on drying at 130°C., 12.0% max.; solubility in water at 25°C. (1:50), complete; chloride (as $CaCl_2$) 0.1% max.; sulfate (as $CaSO_4$), 0.68% max.; free phosphate (as $P_2O_5$), 0.02% max.; conforms to N.F. test for heavy metals; 3.0% max. retained on 80 mesh; 5.0% max. on 100 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

## GLYCEROPHOSPHATE, FERRIC, N. F.

$Fe_2[C_3H_5(OH)_2PO_4]_3$ Mol. Wt. 621.90

**STANDARD FORM:** Powder.

(*Continued*)



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**SPECIFICATIONS:** Buff or yellowish-green powder; assay (dry basis), 17.0% Fe min.; moisture, 10.0% max.; chloride (as $FeCl_3$), 0.10% max.; sulfate (as $Fe_2(SO_4)_3$), 0.03% max.; free phosphate (as $P_2O_5$), 0.20% max.; 2.0% max. retained on 60 mesh; 10.0% max. on 150 mesh; 30.0% max. on 250 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

## GLYCEROPHOSPHATE, MAGNESIUM

$MgC_3H_5(OH)_2PO_4$ Mol. Wt. 194.39

**STANDARD FORM:** Powder, 80 mesh.

**SPECIFICATIONS:** White powder; assay, 97.0% min.; moisture, 12.5% max.; calcium (as CaO), negative; chloride (as $MgCl_2$), 0.10% max.; sulfate (as $MgSO_4$), 0.10% max.; free phosphate (as $P_2O_5$), 0.20% max.; conforms to N.F. test for heavy metals; 2.0% max. retained on 60 mesh; 4.0% max. on 80 mesh; 10.0% max. on 100 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

## GLYCEROPHOSPHATE, MANGANESE, N.F.

$MnC_3H_5(OH)_2PO_4$ Mol. Wt. 225.00

**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, 10.0% max.; chloride (as $MnCl_2$), 0.15% max.; sulfate (as $MnSO_4$), 0.03% max.; free phosphate (as $P_2O_5$), 0.20% max.; conforms to N.F. test for heavy metals; 2.0% max. retained on 60 mesh; 4.0% max. on 80 mesh; 10.0% max. on 150 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

## GLYCEROPHOSPHATE, POTASSIUM (Solution)

$K_2C_3H_5(OH)_2PO_4$

**STANDARD FORM:** Solution 75%.

**SPECIFICATIONS:** Clear, colorless or slightly yellowish 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.; conforms to N.F. test for heavy metals.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

## GLYCEROPHOSPHATE, SODIUM, N.F.

$Na_2C_3H_5(OH)_2PO_4 \cdot 5\frac{1}{2}H_2O$ Mol. Wt. 315.15

**STANDARD FORMS:** Crystals, 10-80 mesh; powder

*(Continued)*



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TOWOLDMON0041408
WATER_PCB-00025877

**SPECIFICATIONS:** White crystals; assay, 68.0-72.0% anhydrous salt equivalent to 96.35-104.9% 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 $Na_2SO_4$); no crystals retained on 10 mesh, 40.0% min. crystals on 80 mesh.

**R. R CLASSIFICATION:** Chemicals NOIBN.

## GLYCEROPHOSPHATE, SODIUM (Solution)

$Na_2C_3H_5(OH)_2PO_4$ **STANDARD FORM:** Solution 75%.

**SPECIFICATIONS:** Clear, colorless or slightly yellow 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.; conforms to N.F. test for heavy metals.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

## GLYCEROPHOSPHORIC ACID (Solution)

$H_2C_3H_5(OH)_2PO_4$

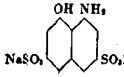
**STANDARD FORM:** Solution 35%.

**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.; conforms to N.F test for heavy metals.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

## "GUANTAL" (See Accelerators, Rubber)

## H ACID (Monosodium-1-Amino-8-Naphtol-3,6-Disulfonate)




Mol. Wt. 341.29 86.3 %
$3H_2O$ 54 13.7 %
395

**TYPICAL ANALYSIS:** White powder; 86-88% monosodium salt; trace of NaCl and $Na_2SO_4$; solubility in water, complete.

**R. R. CLASSIFICATION:** Dye Intermediate NOIBN.

**GENERAL INFORMATION:** Used as an intermediate in the manufacture of dyestuffs.



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WATER_PCB-00025878

## "HB-40"

**PROPERTIES:** A clear, mobile, high-boiling hydrocarbon; almost colorless, oily liquid, with faint, pleasant odor; density 1.004 ±0.003 at 25°/15.6°C. (8.37 lbs. per gal. average); refractive index 1.5675±0.0075 at 25°C.; distillation range 338°-396°C. (640°-745°F.) (corr.); flash point 345 ±10°F.; flame point 385 ±10°F.; pour point, minus 28 ±2°C. (-18°F.). HB-40 is not soluble in water but is miscible in all proportions at room temperature with a number of solvents and oils; viscosity at 100°F., 144 ±20 SUS, at 210°F., 39 ±1.

**GENERAL INFORMATION:** Suggested uses as plasticizer for polystyrene, polyvinyl acetate and methacrylate plastics and emulsions; as a neutral solvent and fixative for essential oils; as a textile lubricant and softener.

**AVAILABLE LITERATURE:** Technical Bulletin P-104 "HB-40."

## HEMISODIUM PHOSPHATE (See Sodium Phosphate, Hemibasic)

## "HIBITITE"* (Acid Inhibitor)

**STANDARD FORMS:** Hibitite.
Hibitite A: A commercial blend having half the strength of regular Hibitite.

**PROPERTIES:** Derivative of an organic base; reddish-brown powder; soluble in concentrated sulfuric and muriatic acids.

**R. R. CLASSIFICATION:** Iron or Steel Cleaning NOIBN.

**GENERAL INFORMATION:** Hibitite is widely employed in acids used for pickling and cleaning ferrous metals. It protects the metal by inhibiting the attack of the acid and by reducing the possibility of embrittlement caused by hydrogen penetration. Hibitite A is similar in action to Hibitite with the exception that it is more readily dispersed than Hibitite in making up the acid solutions.

Sulfuric acid containing Hibitite is used for pickling tin plate, wire, alloy steels, sheets for galvanizing; for cleaning steel drums and sand filters; for preparing articles for vitreous enameling; for removing metal coatings. Muriatic acid containing Hibitite is used for cleaning boilers, economizers, heat exchangers, pipe lines, condensers, tanks, tubes, coils, screens, pans, drums and similar equipment.

For steel pickling acid containing Hibitite, see Inhibited Acid.

**AVAILABLE LITERATURE:** 4-page bulletin, "Hibitite and Its Uses."
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## HYDROCHLORIC ACID, C. P.

HCl Mol. Wt. 36.46

(*Continued*)



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**SPECIFICATIONS:** Colorless liquid free from suspended matter, strength 37.0-38.5%; non-volatile matter 0.0005% max.; sulfate 0.0002% max. free chlorine 0.0002% max.; sulfite 0.003% max.; arsenic 0.00001% max. iron 0.0001% max.; heavy metals (as lead) 0.0005% max.; meets A.C.S. specifications.

**R. R. CLASSIFICATION:** Muriatic Acid. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Laboratory reagent.

## HYDROCHLORIC ACID (Muriatic Acid)

HCl

**GRADES:** 18°Bé.; 20°Bé.; 22°Bé.

**TYPICAL ANALYSIS:** 18°Bé., 27.9% HCl; 20°Bé., 31.5% HCl; 22°Bé., 35.2% HCl.

**R. R. CLASSIFICATION:** Muriatic Acid.

**GENERAL INFORMATION:** Used extensively in the starch, glucose, gelatin, steel galvanizing, paper, leather and glass industries. (*See table in general data section*)

## 2-HYDROXY-3-METHOXY BENZALDEHYDE, TECHNICAL

(Also known as *ortho*-vanillin)




Mol. Wt. 152.14

**CHARACTERISTICS:** Yellowish crystalline solid; crystallizing point, 40.0°C. min.; density, 1.20 at 60°C.; wt. per gal., 10.0 lbs.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as an antioxidant and as an intermediate in chemical synthesis.

## INHIBITED ACIDS

**GRADES:** These acids are solutions of Hibitite in Monsanto's commercial grades of 60°Bé. sulfuric acid, 66°Bé. sulfuric acid, 18°Bé. hydrochloric acid and 20°Bé. hydrochloric acid.

**GENERAL INFORMATION:** Addition of Hibitite to sulfuric and hydrochloric acids results in a decreased rate of attack of the acid but does not retard the action of the acid on surface scale on the metal.

Inhibited sulfuric acid is used for pickling tin plate stock, pickling sheets for galvanizing, preparing articles for vitreous enamel, pickling wire, pickling high carbon steel, removing metal coatings, cleaning steel drums and cleaning sand filters.

Inhibited hydrochloric acid is used for pickling alloy wire and cleaning boiler tubes, condensers, pipes, heater coils and drums.



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WATER_PCB-00025880

## INHIBITORS (See Hibitite)

## INKS, LACQUER BASE

**GENERAL INFORMATION:** Lacquer inks are rapid drying, waterproof, greaseproof, adherent, flexible and resistant to abrasion. Colors are light, fast and opaque, glossy or dull. Adapted for printing or coating cellophane, glassine, foil and other wrapper stock. Application is by intaglio photo engraved roll printing *only*, print roll being cleared by doctor blade.

**R. R. CLASSIFICATION:** Lacquer.

## INSECTICIDES

**ortho-Dichlorobenzene** (See under D)
**"Santobane"** (See under S)
**"Santochlor"** (See under S)

## "INSOLUBLE SULFUR 60"

**SPECIFICATIONS:** 100% through 50 mesh; heat loss not over 0.50%; $CS_2$ insoluble—not less than 50.0%.

## IRON CHLORIDE (See Ferric Chloride)

## IRON GLYCEROPHOSPHATE (See Glycerophosphate, Ferric)

## IRON NITRATE (See Ferric Nitrate)

## IRON PHOSPHATE (See Ferric Phosphate)

## IRON PHOSPHIDE (See Ferrophosphorus)

## IRON GLYCEROPHOSPHATE, N.F. (See Glycerophosphates)

## IRON SULFATE (See Ferric Sulfate and Ferrisul)

## ISOAMYL ACID PYROPHOSPHATE, DI

**PROPERTIES:** Sp. g. 1.149 at 25°C.



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## ISOAMYL OCTYL PHOSPHATE

**PROPERTIES:** Sp. g. 1.008 at 25°C.; viscosity 210 cps. at 25°C.; 75 cps. at 50°C.; soluble in alcohol, acetone, ether, toluene, carbon tetrachloride; insoluble in water.

## LACQUERS

For information on special lacquers and related products offered by Monsanto see the following listings elsewhere in this catalog: Acetone; Aircraft Finishes; Amyl Acetate; Belt Cement; Bronzing Liquids; Butyl Acetate; Butyl Alcohol; Cable Lacquers; Cellulose Nitrate Solutions; Cements; Diacetone Alcohol; Ethyl Acetate; Inks, Lacquer Base; Leather Dopes and Lacquers; Mersol (Solvent Alcohol); Mertec; Textile Coating Lacquers; Textile Printing Lacquers; Thinners.

**R. R. CLASSIFICATION:** Lacquers.

**GENERAL INFORMATION:** Monsanto lacquers and protective coatings are produced from modern base finishing materials such as nitrocellulose, cellulose acetate, cellulose aceto-butyrate, ethyl cellulose, chlorinated rubber, synthetic alkyd, phenolic, urea formaldehyde, melamine formaldehyde; polyvinyl butyral and other polyvinyl resins.

The lacquers are designed for all industrial methods of application, automatic spray, dip, machine coating by spreader, gasket, die, roll, etc. Practically all the finishes have rapid drying or curing characteristics. Monsanto lacquers are serving a wide range of industries and war agencies. Important industries served are aircraft, munition, textile, paper, leather, rubber, electrical, metal working, furniture and woodworking. Special properties are innumerable such as adhesion to special surfaces, cold flexibility, heat resistance, dielectric strength, weathering, chemical corrosion resistance, infra-red reflectivity, heat sealing, waterproofness, color retention, flammability, etc.

**AVAILABLE LITERATURE:** Bulletin 58, "Butyral M Lacquers" and Bulletin 71A "*Interior Engine Lacquer*, Baking Type."

## LACQUER EMULSIFYING AGENTS

(See Areaklene and Santomerse)

## LAMINATING PLASTIC (See Plastics, Saflex)

## LAMINATING RESIN, LOW PRESSURE

(See Plastics, Thalid X-500 Resins)



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WATER_PCB-00025882

## LAMPBLACK

**GRADES:** Nine grades are available which vary in free carbon, oil absorption, etc., as listed below:

**TYPICAL ANALYSIS:**

| *Grade Black* | % *Free Carbon* | *Oil/#Black Oil Absorption* | *Tinting Strength** | *Under Tone* | *Top Tone* |
|---|---|---|---|---|---|
| *1 | 99.57 | 1.14 | 238 | Blue | Black |
| AA | 87.97 | 1.65 | 225 | Blue<br>Blue-Brown | Brown<br>Brown-Black |
| *2 | 99.42 | 1.32 | 208 | Blue | Gray-Black |
| *8 | 91.71 | 1.54 | 205 | Blue | Brown<br>Brown-Black |
| S-100 | 93.98 | 1.55 | 170 | Blue | Black |
| BTA | 95.57 | 1.50 | 160 | Blue | Blue-Black |
| B-16 | 96.17 | 1.48 | 150 | 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 AA Lampblack means that this black is 2¼ times as intense as No. 10 Lampblack.

**R. R. CLASSIFICATION:** Lampblack NOIBN when wt. per cu. ft. is under 17 lbs.; Lampblack Compressed when wt. per cu. ft. is 17 lbs. or over.

**GENERAL INFORMATION:** Used as pigment in paints, varnishes, enamels, inks, leather finishes, stencils, crayons, polishes; in pressed forms as electrical conductors and electrodes.

**AVAILABLE LITERATURE:** Booklet, "Monsanto Lampblack."

## LATEX PENETRANTS (See Aresklene and Santomerse)

## LATEX STABILIZERS (See Aresklene and Santomerse)

## "LAUXTEX" (See Coatings)

## "LAUXTOL" (See Wood Preservatives)

## "LAUXTOX" (See Wood Preservatives)



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## LEAD METAPHOSPHATE

$Pb(PO_3)_2$ Mol. Wt. 365.17

**PROPERTIES:** Dense white powder or granular material; m. p. approx. 700°C.; very slightly soluble in water.

**GENERAL INFORMATION:** Used as raw material for lead-bearing phosphate glasses, etc.

## LEAD ORTHOPHOSPHATE, MONO

$Pb(H_2PO_4)_2$

**PROPERTIES:** White hygroscopic powder; soluble in acid; hydrolyzes in water to form a more basic phosphate.

## LEAD ORTHOPHOSPHATE, DI

$PbHPO_4$ Mol. Wt. 303.20

**PROPERTIES:** White non-hygroscopic powder; soluble in acids; hydrolyzes in water to form a more basic lead phosphate.

## LEAD ORTHOPHOSPHATE, TRI

| | | | |
|---|---|---|---|
| Essentially $Pb_3(PO_4)_2$; | %PbO | 81.8 | |
| | $\%P_2O_5$ | 18.0 | Mol. Wt. 811.59 |
| | $\%H_2O$ | 0.2 | |

**PROPERTIES:** White, dense micro-crystalline powder; insoluble in water.

**GENERAL INFORMATION:** Suggested as a pigment.

## LEAD PYROPHOSPHATE, TETRA

$Pb_2P_2O_7$ Mol. Wt. 588.38

**PROPERTIES:** White powder; insoluble in water.

**GENERAL INFORMATION:** Suggested as a pigment for white paints. 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.

## LEATHER DOPES AND LACQUERS

**GENERAL INFORMATION:** Leather dopes are cellulose nitrate solutions specially formulated for the incorporation of plasticizer and pigment for use in finishing split, patent and artificial leather. (See Cellulose Nitrate Solutions.) Leather lacquers used in spray finishing shoe, garment, bag and novelty leathers are available in colors, also clear and matte topcoat lacquers, glazing lacquers, topping lacquers, flexible clear and pigmented priming coats.

**R. R. CLASSIFICATION:** Lacquer.



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WATER_PCB-00025884

## LITHIUM METAPHOSPHATE

$LiPO_3$

**PROPERTIES:** White granular powder; insoluble in water.

**GENERAL INFORMATION:** Suggested for special glass or ceramic composition

## LITHIUM SALICYLATE N. F. (See Salicylates)

## "LUSTRON" (See Plastics)

## MAGNESIUM AMMONIUM PHOSPHATE

(Also known as magnesium ammonium *ortho*-phosphate)

$MgNH_4PO_4 \cdot 6H_2O$ Mol. Wt. 245.44

**STANDARD FORM:** White powder.

**GRADE:** Technical.

**PROPERTIES:** Soluble in acids; insoluble in water; decomposes on heating.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**PRINCIPAL USES:** As an ingredient in fire-retarding paints for theater scenery and curtains.

**GENERAL INFORMATION:** A hexahydrate and a monohydrate form exist. At ordinary temperatures disassociation of the hexahydrate to the monohydrate takes place without appreciable loss of ammonia. Above 60°C. the monohydrate loses $NH_3$ forming $MgHPO_4 \cdot H_2O$.

## MAGNESIUM GLYCEROPHOSPHATE (See Glycerophosphates)

## MAGNESIUM METAPHOSPHATE

$Mg(PO_3)_2$

**PROPERTIES:** White crystalline powder; insoluble in water.

**GENERAL INFORMATION:** Suggested as a constituent of glass, glazes and porcelain enamels.

## MAGNESIUM PHOSPHATE, MONO

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

$MgH_4(PO_4)_2$ Mol. Wt. 218.31

**STANDARD FORM:** White Crystals.

**GRADE:** Technical.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in pharmaceutical preparations.



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WATER_PCB-00025885

## MAGNESIUM PHOSPHATE, DI

$MgHPO_4 \cdot 3H_2O$

**PROPERTIES:** White crystals; soluble in acids; slightly soluble in water.

**GENERAL INFORMATION:** Suggested as an opacifying agent for enamels and frits.

## MAGNESIUM PHOSPHATE, TRI

(Also known as neutral magnesium phosphate)

$Mg_3(PO_4)_2 \cdot 5H_2$ Mol. Wt. 353.00

**STANDARD FORM:** White crystalline powder.

**GRADE:** Technical.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in pharmaceutical products as an antacid.

## MAGNESIUM PYROPHOSPHATE

$Mg_2P_2O_7$ Mol. Wt. 222.60

**PROPERTIES:** White crystalline powder; m. p. 1383°C.; soluble in acids; insoluble in water.

**GENERAL INFORMATION:** Suggested for use in ceramic industry as constituent of porcelains and enamels.

## MAGNESIUM SALICYLATES (See Salicylates)

## MALEIC ANHYDRIDE



Mol. Wt. 98.06

**STANDARD FORM:** Cast Solid.

**SPECIFICATIONS:** White flakes; crystallizing point 52.0°C. min.; water solution (4 gms. in 10 ml.), clear and colorless; glyceromaleate resin, clear with slight amber color; iron 0.0005% max.

**R. R. CLASSIFICATION:** Maleic Anhydride.

**GENERAL INFORMATION:** Used alone or in combination with other acids in the manufacture of alkyd type resins; a versatile intermediate for chemical synthesis.

## MANGANESE GLYCEROPHOSPHATE

(See Glycerophosphates)



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## MANGANOUS PHOSPHATE, MONO

$Mn(H_2PO_4)_2 \cdot 2H_2O$

**PROPERTIES:** Pink crystals; soluble in water and acids; insoluble in alcohol.

**GENERAL INFORMATION:** Suggested for rustproofing steel.

## MANGANOUS PYROPHOSPHATE, TETRA

$Mn_2P_2O_7$

**PROPERTIES:** Brownish, pink powder; soluble in acids; insoluble in water.

**GENERAL INFORMATION:** Suggested as raw material for special glass compositions.

## MELAMINE FORMALDEHYDE RESINS AND MOLDING MATERIALS (See Plastics, Resimene)

## MELAMINE, METHYLOL (See Resloom M-75, Resloom NC-50)

## "MERCLOR"* (Sodium Hypochlorite)

NaOCl

**STANDARD FORM:** Liquid.

**TYPICAL ANALYSIS:** 22°Bé.; 12% available chlorine by volume.

**R. R. CLASSIFICATION:** Sodium Hypochlorite Solution.

**GENERAL INFORMATION:** Merclor is used as an oxidizing agent for bleaching of vegetable fibers and as a chlorinating agent for water, organic compounds and wool. *(See table in general data section)*

*Trade Mark Reg. U. S. Pat. Off.

## "MERSIZE"*

**STANDARD FORM:** An alkaline water dispersion containing 50% Mersize.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Mersize is an engine sizing agent used in conjunction with rosin. The use of 10 to 50% Mersize on the weight of the rosin makes it possible to get harder sizing with appreciably less rosin than can be obtained with *any* amount of rosin alone. Alum requirements are not normally affected.

Mersize offers the following specific advantages:

*(Continued)*



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WATER_PCB-00025887

1. Increases the maximum engine sizing obtainable with rosin and less rosin is required to do this.

2. It is possible to obtain the same degree of engine sizing with as little as 25% as much rosin.

3. It offers a greater range of obtainable engine sizing to take care of normal sizing variations.

4. It is possible to get good engine sizing with low percentages of rosin in cases where high percentages of rosin are detrimental to the paper.

5. It is possible to obtain the same degree of engine sizing at a lower cost, and in many cases, a substantial increase in sizing at no additional cost.

For further information regarding the specific application of Mersize to any particular problem, please write to the Merrimac Division, Everett Station, Boston 49, Massachusetts.

**AVAILABLE LITERATURE:** Reprint, "Effect of Pulp Bond Density on Engine Sizing" and Bulletin, "Mersize for Paper Sizing."

*Trade Mark Reg. U. S. Pat. Off.

## "MERSOL"*

**TYPICAL ANALYSIS:** Water-white liquid; sp. g. not more than 0.8146 at 60°/60°F.; non-residual; distillation range, 74°-80°C.; acidity, less than 0.005% as acetic acid.

**COMPOSITION:**

| | |
|---|---|
| Alcohol, Special Denatured No. 1 | 100 gals. |
| Methyl isobutyl ketone | 1 gal. |
| Ethyl acetate, denatured with methyl isobutyl ketone | 1 gal. |
| Gasoline | 1 gal. |

**R. R. CLASSIFICATION:** Denatured Alcohol Solvent.

**GENERAL INFORMATION:** Mersol, a proprietary solvent alcohol, is formulated to have the advantages of Special Denatured Alcohol No. 1 without the necessity and burden of purchasing and operating under a government permit. It has the mild odor of alcohol and no residual. Mersol may be used for most industrial purposes where SDA No. 1 is indicated; as a solvent for shellac and soft manila gums; in lacquer thinners, cleaners, removers, polishes, dressings, inks, adhesives, celluloid, softeners, brighteners; and as a fuel and dye and stain solvent.

**AVAILABLE LITERATURE:** 68-page booklet, "Nealco Industrial Alcohol."

*Trade Mark Reg. U. S. Pat. Off.

## "MERTANOL"*

**GRADES:** Mertanol SS; Mertanol L; Mertanol 7L; Mertanol D; Mertanol 7D.

(*Continued*)



0683335

TOWOLDMON0041419
WATER_PCB-00025888

**TYPICAL ANALYSIS:**

| *Mertanol* | *Density* | *Sulfonic Acid Equivalent* | *Total Solids* | *Non-Tans* | *Tans* |
|---|---|---|---|---|---|
| Mertanol SS | 9.8#/gal. | 2.7% $H_2SO_4$ | 30 | 12 | 18 |
| Mertanol L | 10.1#/gal. | Approx. 5% $H_2SO_4$ | 46 | 16 | 30 |
| Mertanol 7L | 10.15#/gal. | Neutral (pH 6-8) | 49 | 19 | 30 |
| Mertanol D | 10.2#/gal. | Approx. 5% $H_2SO_4$ | 50 | 19 | 31 |
| Mertanol 7D | 10.3#/gal. | Neutral (pH 6-8) | 53 | 22 | 31 |
| Mertanol 7AN | 25#cu. ft. | Neutral (pH 5-7) | 98 | 38 | 60 |

Inorganic salts of liquid products crystallize out at temperatures below 40°F. This applies to all except Mertanol 7AN which is a powder.

**R. R. CLASSIFICATION:** Tanning Extract NOIBN Liquid or Dry.

**GENERAL INFORMATION:** Mertanol is a synthetic tanning agent consisting of a napthalene sulfonic acid condensation product in liquid and dry forms. The free sulfuric acid acidity has been completely neutralized and the sulfonic acidity neutralized to a definite acidity.

Used in the manufacture of leather for bleaching of chrome tanned leather; bleaching base stock for making pastel leathers; for pre-tanning pickled stock before regular tan in order to maintain a lighter colored leather throughout the tannage; in vegetable tanning as an aid to penetration of the extracts and solubilization of non-tans; in dyeing to give even dyeing and increased penetration of the dye; and as a mordant in the dyeing of chrome tanned and other leathers. Mertanol 7L is also used as a pitch-controlling agent in paper making.

**AVAILABLE LITERATURE:** Mimeographed Bulletins, "Mertanol for the Leather Industry," and "Mertanol 7L for Pitch Control in Papermaking."

*Trade Mark Reg. U. S. Pat. Off.

## MERTEC* (Corrosion-Resistant Paint)

Mertec is a corrosion-resistant paint designed for use as a protective finish under severe acid and alkaline conditions. It is formulated on a chemically inert base and gives remarkable protection against acid fumes and caustic alkali attack. Mertec is primarily for use on metal, but the inert base makes it a practical finish for concrete. It may also be used on wood surfaces. It gives a tough, glossy, oil and water-resistant finish. Fire resistance is excellent; the paint does not support flame travel. Heat resistance in continuous service is good up to about 200°F. Mertec is supplied in gray, rust, black, white and clear. Coverage is about 300 sq. ft. per gal.

**Pigmented Mertec R-3311 Grey 359** has the most desirable general properties. It is flexible and adheres well to almost any reasonably clean surface. It should cover satisfactorily in one coat, particularly the gray color which is recommended for general mill use on exposed metal.

**Clear Mertec R-3300** is inferior to the pigmented type in weather resistance. It is also slightly less effective as a protective coating, and is recommended only where a pigmented finish is impractical. As a vehicle for aluminum,

(Continued)



0683336

TOWOLDMON0041420
WATER_PCB-00025889

use about 1½ pounds aluminum powder to a gallon of Clear Mertec R-3300. A ready mixed product, Aluminum Mertec R-3457, can be supplied. For outside exposure a prime coat of R-3137 Gray 328 is recommended.

**Clear Mertec Topcoat R-3311** is a special type for application over ordinary painted surfaces to give resistance to corrosion. Clear Mertec Topcoat also imparts greater resistance to corrosion when used over the Pigmented Mertec, and is especially recommended for use over Clear Mertec R-3300.

**Pigmented Mertec R-3799** is a special type for concrete floors. No priming coats or special preparation of the surface is necessary other than cleaning off loose grit and dirt and any accumulation of oil and grease. The surface should preferably be dry but damp surfaces can be successfully finished. From the standpoint of durability under traffic the concrete surface should be smooth.

**R R. CLASSIFICATION:** Lacquer.

**AVAILABLE LITERATURE:** Bulletin, "Maintenance Paints."

## META-CHLOROANILINE (See meta-Chloroaniline under C)

## META-CRESOL (See meta-Cresol under C)

## METAL LACQUERS AND PRIMERS

**GENERAL INFORMATION:** Cellulose Nitrate base finishes are available for all metal surfaces in clear and colors. The great diversity in required properties makes necessary a complete line of specially designed finishes for adhesion, flexibility, gloss, corrosion resistance, weathering, method of application, etc. In order to make specific recommendations, detailed information as to requirements should be covered in inquiries.

## META-NITROCHLOROBENZENE

(See meta-Nitrochlorobenzene under N)

## META-SULFOBENZOIC ACID

(See meta-Sulfobenzoic Acid under S)

## "METHASAN" (See Accelerators, Rubber)

## METHYL PHOSPHORIC ACID (See Alkyl Phosphoric Acids)

## METHYL PHTHALYL ETHYL GLYCOLLATE (See Santicizer M-17)



0683337

TOWOLDMON0041421
WATER_PCB-00025890

**METHYL SALICYLATE U. S. P.** (See Salicylates)

**METHYL SODIUM PHOSPHATE**

PROPERTIES: Water-white liquid; concentration 60%; pH 6.9-7.2; sp. g. 1.361-1.364 at 25°C.

**MIXED ACID** (See Nitrating Acid)

**MOLDING COMPOUNDS** (See Plastics)

**MONOALUMINUM PHOSPHATE**
(See Aluminum Phosphate, Mono)

**MONOAMMONIUM PHOSPHATE**
(See Ammonium Phosphate, Mono)

**MONOCALCIUM PHOSPHATE**
(See Calcium Phosphate, Mono)

**MONOCHLOROBENZENE** (See Chlorobenzene)

**MONOFERRIC ORTHOPHOSPHATE**
(See Ferric Orthophosphate, Mono)

**MONOHYDRATE** (See Sulfuric Acid)

**MONOLEAD ORTHOPHOSPHATE**
(See Lead Orthophosphate, Mono)

**MONOMAGNESIUM PHOSPHATE**
(See Magnesium Phosphate, Mono)

**MONOMANGANOUS PHOSPHATE**
(See Manganous Phosphate, Mono)

**MONOPOTASSIUM PHOSPHATE**
(See Potassium Phosphate, Mono)



0683338

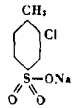
TOWOLDMON0041422
WATER_PCB-00025891

## MONOSILVER ORTHOPHOSPHATE

(See Silver Orthophosphate, Mono)

## "MONSANTO SALT" (*ortho*-Chloro-*para*-Toluene Sodium Sulfonate)

(Also known as 3-chloro-4-methyl benzene sodium sulfonate)



Mol. Wt. 228.63

**CHARACTERISTICS:** Light gray to light tan powder; assay (from Cl content), 97.0-100.5%; NaCl, 0.5% max.; moisture ($H_2O$), 1.0% max.

**R. R. CLASSIFICATION:** Dye Intermediate.

**GENERAL INFORMATION:** Used in dyestuff synthesis.

## "MONTAR"*

**PROPERTIES:** A series of related brown to black resins of the following typical characteristics:

| | *Softening Point* | *%Cl* | *% CaO* | *%Fe* | *Penetration-250 gm. Cm x 10-2 5 sec.* |
|---|---|---|---|---|---|
| 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. |

*Trade Mark Reg. U. S. Pat. Off.

## MURIATIC ACID (See Hydrochloric Acid)

## "NEALCO"* ANTI-FREEZE

**GENERAL INFORMATION:** 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 nor attack hose connections.

**R. R. CLASSIFICATION:** Denatured Alcohol.

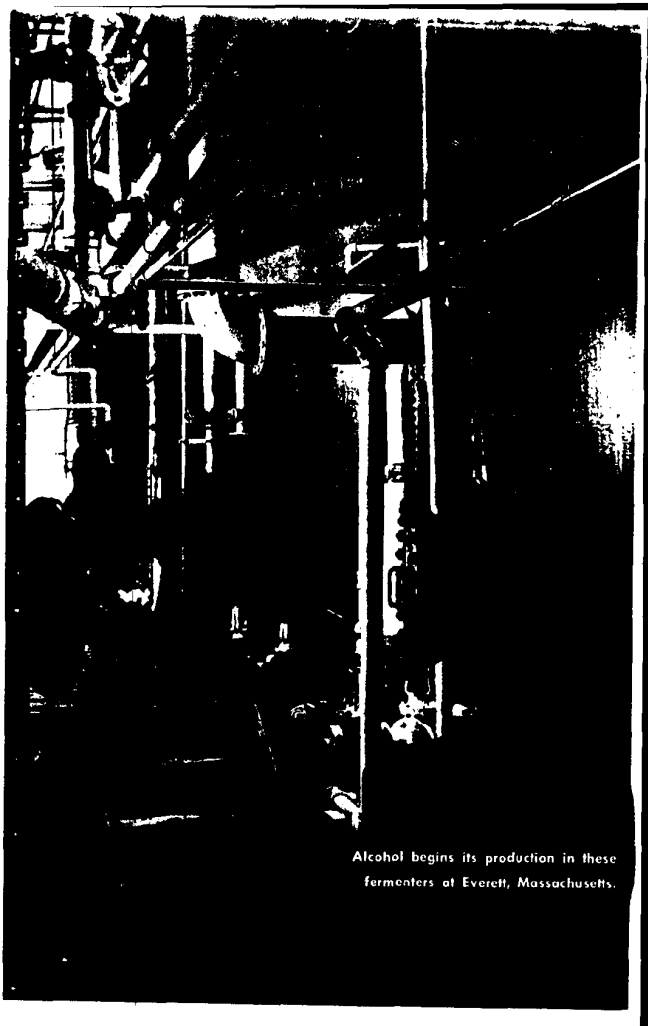
*Trade Mark Reg. U. S. Pat. Off.

## NITRATE OF IRON, COPPERAS (See Ferric Sulfate)



0683339

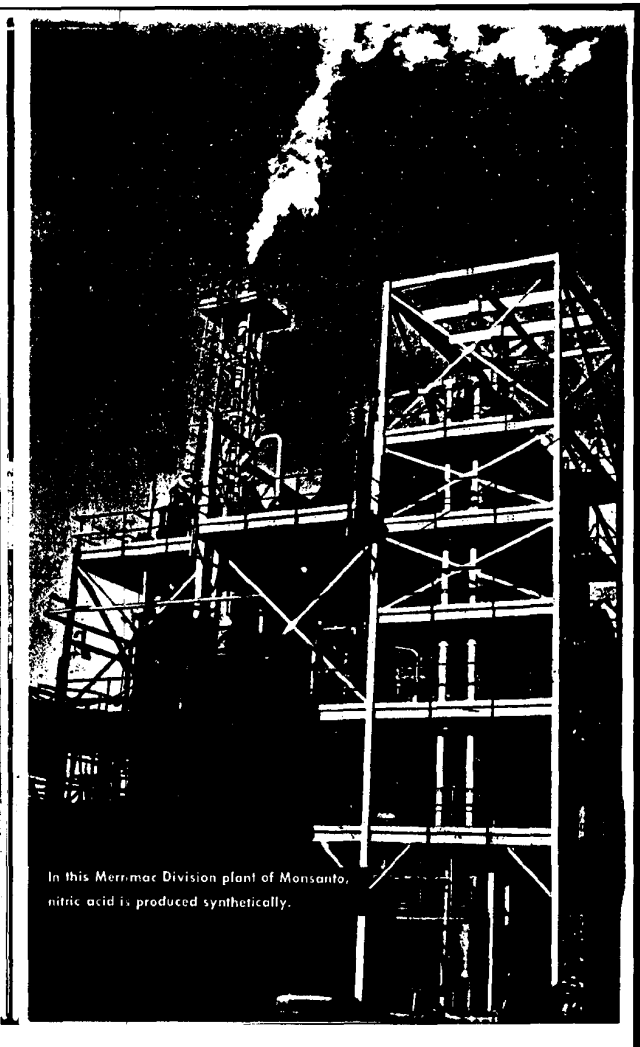
TOWOLDMON0041423
WATER_PCB-00025892



Alcohol begins its production in these fermenters at Everett, Massachusetts.

0683340

TOWOLDMON0041424
WATER_PCB-00025893



In this Merrimac Division plant of Monsanto, nitric acid is produced synthetically.

0683341

TOWOLDMON0041425
WATER_PCB-00025894

## NITRATE OF IRON, TRUE (See Ferric Nitrate)

## NITRATING ACID (Mixed Acid)

**TYPICAL ANALYSIS:**

| | *80-15* | *85-12* |
|---|---|---|
| Nitric Acid ($HNO_3$) | 80.0% | 85.0% |
| Sulfuric Acid ($H_2SO_4$) | 15.0% | 12.0% |
| Oxides of Nitrogen ($N_2O_3$) | 0.25% | 0.25% |

**R. R. CLASSIFICATION:** Nitrating Acid. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Mixed acid is used for nitrating in the chemical industry, particularly in the manufacture of explosives and dyestuffs. Special mixtures can be furnished to meet individual requirements. *See table in general data section*)

## NITRE CAKE (See Sodium Bisulfate)

## NITRIC ACID

$HNO_3$

**STANDARD FORMS:** 36° Bé., 38° Bé., 40° Bé., and 42° Bé.

**TYPICAL ANALYSIS:** %$HNO_3$: 36°Bé., 52.3%; 38°Bé., 56.5%; 40°Bé., 61.4%; 42°Bé., 67.2%. Sp. g. will not vary more than 0.5° terms of Bé. $H_2SO_4$ 0.05% max.; HCl 0.002% max. For higher strengths refer to Merrimac Division Sales Office.

**R. R. CLASSIFICATION:** Nitric Acid. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used in the manufacture of insecticides, dyestuffs, drugs, pharmaceuticals, explosives, photo engravings, nitrates and other nitro products. (*See table in general data section*)

## NITRIC ACID C. P.

$HNO_3$ Mol. Wt. 63.02

**TYPICAL ANALYSIS:** Colorless liquid, free from suspended matter; strength ($HNO_3$), 70.0 to 71.5%; non-volatile matter, 0.0005% max.; sulfate ($SO_4$) 0.0002% max.; chloride (Cl), 0.00007% max.; arsenic (As), 0.000003% max.; heavy metals (as lead), 0.0005% max.; heavy metals (as iron), 0.0001% max.; meets A.C.S. specifications.

**R. R. CLASSIFICATION:** Nitric Acid. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Laboratory reagent.



0683342

TOWOLDMON0041426
WATER_PCB-00025895

## 1-NITRO-2,5-DICHLOROBENZENE

(Also known as 2, 5-dichloronitrobenzene)



Mol. Wt. 192.01

**STANDARD FORM:** Cast solid.

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

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in the preparation of dyestuffs. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*

## *ortho*-NITROANILINE

(Also known as *ortho*-aminonitrobenzene and 1-amino-2-nitrobenzene)



Mol. Wt. 138.12

**STANDARD FORMS:** Powder; powder with 0.5% tricalcium phosphate.

**SPECIFICATIONS:** Yellow to orange powder; m.p. 70.0°C. min. Assay: powder, 98.70% min.; powder with tricalcium phosphate, 98.50% min. Ash: powder, 0.25% max.; powder with tricalcium phosphate, 0.75% max.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Ortho-nitroaniline powder 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. Ortho-nitroaniline is used as an intermediate in the preparation of dyestuffs and in the manufacture of medicinals. *CAUTION: This product is toxic. Avoid breathing its dust and avoid contact with the skin.*

## *ortho*-NITROANISOLE

(Also known as *ortho*-nitrophenylmethylether and 1-methoxy-2-nitrobenzene)



Mol. Wt. 153.13

**STANDARD FORM:** Liquid.

(*Continued*)



0683343

TOWOLDMON0041427
WATER_PCB-00025896

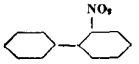
**SPECIFICATIONS:** Light reddish or light amber liquid; crystallizing point, 9.6°C. min., dry basis Distillation range: first drop 270.0°C. min.; 95% 2.0°C. max.; dry point 273.0°C. max.; nitrophenol 0.05% max.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Ortho-nitroanisole is used in the production of such dye intermediates as ortho-anisidine and dianisidine. It is also used in various organic syntheses. *CAUTION: This product is toxic. Avoid breathing its vapors and avoid contact with the skin.*

## *ortho*-NITROBIPHENYL, TECHNICAL

(Also known as *ortho*-nitrodiphenyl)




Mol. Wt. 199

**CHARACTERISTICS:** Light yellow to reddish crystalline solid; crystallizing point 34.5°C. min.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate in chemical synthesis where it is useful in some applications as an alternate for substituted nitrobenzenes and as a plasticizer in plastics. May be partially reduced and rearranged to give 2,2-biphenyl benzidine ($NH_2 = 1$).

## NITROCELLULOSE SOLUTIONS

(See Cellulose Nitrate Solutions)

## *meta*-NITROCHLOROBENZENE

(Also known as *meta*-chloronitrobenzene and 1 chloro-3-nitrobenzene)




Mol. Wt. 157.56

**STANDARD FORM:** Cast solid.

**SPECIFICATIONS:** Greenish-yellow crystalline mass; clear when melted; crystallizing point 43.9°C. min.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Used for conversion into various dyestuff intermediates, chloroanilines 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).



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TOWOLDMON0041428
WATER_PCB-00025897

## *ortho*-NITROCHLOROBENZENE

(Also known as *ortho*-chloronitrobenzene and 1-chloro-2-nitrobenzene



Mol. Wt. 157.56

**STANDARD FORM:** Cast solid.

**SPECIFICATIONS:** Greenish-yellow crystalline mass; crystallizing point 31.7°C. (on sample as received).

**I. R. CLASSIFICATION:** Dye Intermediate.

**GENERAL INFORMATION:** Used in the 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).

## *para*-NITROCHLOROBENZENE

(Also known as *para*-chloronitrobenzene and 1-chloro-4-nitrobenzene)



Mol. Wt. 157.56

**STANDARD FORM:** Flakes.

**SPECIFICATIONS:** Light greenish-yellow flaked solid; can also be supplied in fused form; crystallization point 82.5°C. min.

**I. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Para-nitrobenzene is used in the 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).

## "NITRON" (See Plastics)

## *para*-NITROPHENOL

(Also known as *para*-hydroxynitrobenzene and 1-hydroxy-4-nitrobenzene



Mol. Wt. 139.11

**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.

(*Continued*)



0683345

TOWOLDMON0041429
WATER_PCB-00025898

**R. R. CLASSIFICATION:** Dye Intermediate.

**GENERAL INFORMATION:** Para-nitrophenol has the following uses: as an intermediate in the production of dyestuffs and photographic chemicals such as para-aminophenol and methyl para-aminophenol; as a 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.*

## OCTACHLORO DIPHENOQUINONE

$C_{12}Cl_8O_2$

**PROPERTIES:** Orange colored powder; soluble in alcohol; insoluble in water.

**GENERAL INFORMATION:** Suggested as an insecticide.

## OIL ANTIOXIDANTS (See Santolube)

## OIL OF VITRIOL (See Sulfuric Acid)

## OLEUM (See Sulfuric Acid)

## ORTHO-AMINO BICYCLOHEXYL
(See ortho-Aminobicyclohexyl under A)

## ORTHO-AMINOBIPHENYL
(See ortho-Aminobiphenyl under A)

## ORTHO-AMINOBIPHENYL PHOSPHATE, PRIMARY
(See ortho-Aminobiphenyl Phosphate, Primary, under A)

## ORTHO-AMINOBIPHENYL PHOSPHATE, SECONDARY
(See ortho-Aminobiphenyl Phosphate, Secondary, under A)

## ORTHO-AMINOBIPHENYL PHOSPHATE, TERTIARY
(See ortho-Aminobiphenyl Phosphate, Tertiary, under A)

## ORTHO-ANISIDINE (See ortho-Anisidine under A)

## ORTHO-BIPHENYL BIGUANIDE (See SA-326)



0683346

TOWOLDMON0041430
WATER_PCB-00025899

**ORTHO-CHLOROANILINE** (See ortho-Chloroaniline under C)

**ORTHO-CHLORO-PARA-TOLUENE-SODIUM-SULFONATE**
(See Monsanto Salt)

**ORTHO-CHLOROPHENOL** (See ortho-Chlorophenol under C)

**ORTHO-CRESOL** (See ortho-Cresol under C)

**ORTHO-DICHLOROBENZENE TECHNICAL**
(See ortho-Dichlorobenzene Technical under D)

**ORTHO-NITROANILINE** (See ortho-Nitroaniline under N)

**ORTHO-NITROANISOLE** (See ortho-Nitroanisole under N)

**ORTHO-NITROBIPHENYL** (See ortho-Nitrobiphenyl under N)

**ORTHO-NITROCHLOROBENZENE**
(See ortho-Nitrochlorobenzene under N)

**ORTHO-PHENETIDIN** (See ortho-Phenetidin under P)

**"OXYNONE"** (See Antioxidants, Rubber)

**PAINT, acid and alkali-resistant for plant maintenance**
(See Mertec)

**PAINT ANTISKINNING MATERIALS, available to fit varied trade requirements** (See Santovar A)



0683347

TOWOLDMON0041431
WATER_PCB-00025900

## PAPER COATING LACQUERS

Cellulose nitrate coatings are standard finishes for book cover and box papers, plain and embossed. These finishes can be applied by knife, roll, gravure or spray. They air-dry rapidly. Available in colors, clear and matte. Further applications are as overprint, wall paper, fiber board, etc.

Cellulose acetate butyrate and polyvinyl resin base coatings are available for U. S. Army Ordnance greaseproof and waterproof heat-seal wrapping for overseas shipment. Inquiries on Specification AXS-840 are invited.

Ethyl cellulose base coatings are well adapted for waterproof and greaseproof wrappings, heat-sealing tapes, etc.

**PARA-AMINOBIPHENYL** (See para-Aminobiphenyl under A)

**PARA-ANISIDINE** (See para-Anisidine under A)

**PARA-CHLOROANILINE** (See para-Chloroaniline under C)

**PARA-CHLORO-META-CRESOL**
(See para-Chloro-meta-Cresol under C)

**PARA-CHLORO-META-XYLENOL**
(See para-Chloro-meta-Xylenol under C)

**PARA-CHLOROPHENOL** (See para-Chlorophenol under C)

**PARA-CRESOL** (See para-Cresol under C)

**PARA-NITROCHLOROBENZENE**
(See para-Nitrochlorobenzene under N)

**PARA-NITROPHENOL** (See para-Nitrophenol under N)

**PARA-PHENETIDIN** (See para-Phenetidin under P)

**PARA-TERPHENYL** (See para-Terphenyl under T)



0683348

TOWOLDMON0041432
WATER_PCB-00025901

## PARA-TOLUENESULFONAMIDE
(See para-Toluenesulfonamide under T)

## PENETRATING AGENTS
(See Areskap, Aresket, Aresklene, Santomerse)

## PENTACHLOROPHENOL (See Santophen 20 and Permasan)

## PERCHLORIDE OF IRON (See Ferric Chloride Solution)

## "PERFLECTOL X" (See Antioxidants, Rubber)

## "PERMASAN"*

**CHARACTERISTICS:** An oil solution of the preservative chemical, pentachlorophenol, contains 5% technical pentachlorophenol, a non-volatile solvent to prevent crystallization of pentachlorophenol on the surfaces of the treated wood and a mobile petroleum solvent which penetrates the wood and carries the preservative with it. Flash point: about 130°F. Pensky-Martins closed cup method); sp. g. approx. 0.86 at 60°F.; wt. per gal., 7.2 lbs.; color, clear reddish-brown; odor, characteristic petroleum.

**R. R. CLASSIFICATION:** Liquid Wood Preservative NOIBN.

**GENERAL INFORMATION:** Used for preservation of wood against termites, *Lyctus* (powder-post) beetles, decay, and a wide range of other wood-attacking insects and organisms. Does not adversely affect the feel and appearance of wood, and surfaces properly treated may be satisfactorily glazed, painted or otherwise finished. Permasan conforms with the specifications of the Western Pine Association's Bulletin No. 6 (revised) and is accepted by the National Door Manufacturers Association.

Permasan is irritating to the skin and mucous membrances if sufficient contact is permitted. The precautions for handling given in literature listed below should be observed.

**AVAILABLE LITERATURE:** Monsanto Technical Bulletin 0-20, "Permasan for the Preservation of Seasoned Wood." Monsanto Technical Bulletin 0-14, "Permasan for *Lyctus* (Powder-Post) Beetle Control." Monsanto Technical Bulletin 0-13, "Chemicals for Termite Control."

## "PERMASAN 116"*

**CHARACTERISTICS:** Consists of 5% technical pentachlorophenol, min., and 95% mixture of water repellents, organic solvents and diluents; light amber color, less than 4.5 NPA; mild, not unpleasant odor; flash point,

(*Continued*)



0683349

TOWOLDMON0041433
WATER_PCB-00025902

100°F. min. (Tagliabue closed cup method); sp. g. approx. 0.84 at 60°F.; wt. per gal., 7.0 lbs.

**R. R. CLASSIFICATION:** Liquid Wood Preservative NOIBN.

**GENERAL INFORMATION:** Used same as ordinary Permasan (see above) except gives added advantages of water repellency. Conforms with specifications of Western Pine Association's Bulletin No. 6 (revised).

Permasan is irritating to the skin and mucous membranes if sufficient contact is permitted. The precautions for handling given in literature listed below should be observed.

**AVAILABLE LITERATURE:** Monsanto Technical Bulletin 0-21, "Permasan 116 - A Water-Repellent Preservative for Wood."

*Trade Mark Reg. U. S. Pat. Off.

## PETROLEUM CHEMICALS (See Santolubes, Santopoid, Santopour)

## PHENACETIN (See Acetophenetidin)

## *ortho*-PHENETIDIN

(Also known as *ortho*-aminophenylethylether, *ortho*-aminophenetole, and 1-amino-2-ethoxybenzene)




Mol. Wt 137.18

**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. min.; solubility in HCl, complete.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Ortho-phenetidin is used as an intermediate in the production of dyestuffs. *CAUTION: This product is toxic. Avoid breathing its vapors and contact with the skin.*

## *para*-PHENETIDIN

(Also known as *para*-aminophenylethylether, *para*-aminophenetole, and 1-amino-4-ethoxybenzene)




Mol. Wt. 137.18

**STANDARD FORM:** Liquid.

(*Continued*)



0683350

TOWOLDMON0041434
WATER_PCB-00025903

**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.

**R. R. CLASSIFICATION:** Dye Intermediate. "Poison" label required.

**GENERAL INFORMATION:** Para-phenetidin is used as an intermediate in the production of dyestuffs and pharmaceuticals. *CAUTION: This product is toxic. Avoid breathing its vapors and contact with the skin.*

## PHENOL

(Also known as carbolic acid and hydroxybenzene)




Mol. Wt. 94.11

**STANDARD FORMS:** Crystalline solid, U.S.P.; liquid 85%; liquid 88%.

**SPECIFICATIONS OF CRYSTALLINE SOLID, U.S.P.:** White crystalline solid; melt, colorless mobile liquid; solution in water (1:15), clear and colorless; non-volatile residue (100°C.), 0.01% 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.

**SPECIFICATIONS OF LIQUIDS:** Colorless mobile liquids; assay: liquid 85%, 85.0-86.0%; liquid 88%, 88.0-89.0%.

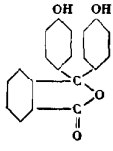
**R. R. CLASSIFICATION:** Phenol. "Poison" label required.

**GENERAL INFORMATION:** Used as an intermediate for the production of dyestuffs; in production of resins for molding and in the preparation of varnishes, enamels, lacquers and paints; as a selective solvent in the manufacture of lubricating oils; as a disinfectant; in textile printing; in the production of explosives, synthetic tanning materials, pharmaceuticals and medicinals, antiseptics, germicides and preservatives, deodorants, soaps, embalming fluid, vermin exterminators, rubber compounds and photographic chemicals.

**AVAILABLE LITERATURE:** 12-page booklet, "Safe Handling of Phenol."

## PHENOL-FORMALDEHYDE (See Plastics, Resinox)

## PHENOLPHTHALEIN, U.S.P.




Mol. Wt. 318.31

**STANDARD FORM:** Powder.

*(Continued)*



0683351

TOWOLDMON0041435
WATER_PCB-00025904

**SPECIFICATIONS:** White powder; m. p. 259.0°C. min.; solubility in alcohol (1:15), complete; acidity (cc's N/1000 NaOH 2 gm. sample), 3.0 cc. max.; ash 0.05% max.; arsenic 0.001% max.; conforms to U.S.P. test for fluorane and heavy metals; trace max. retained on 100 mesh; 21.0% max on 325 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in pharmaceutical preparations.

## 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 (cc's N/1000 sodium hydroxide per 2 gm. sample), 5.0 cc. max.; solution in ethyl alcohol 95% (1:15), clear; sp. g. (appar.) 0.500-0.6000; none retained on 20 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in pharmaceutical preparations.

## PHENOL SULFIDE, POLYALKYLATED (See Santowhite)

## PHENOL SULFONIC ACID 65%

$HO{\cdot}C_6H_4{\cdot}SO_3H$ Mol. Wt. 266.36

**STANDARD FORM:** Light brown to black liquid or crystalline mass depending upon the temperature.

**PROPERTIES:** Assays 65% and contains small amounts of free sulfuric acid, phenols and sulfones.

**R. R. CLASSIFICATION:** Liquid Acid NOIBN.

**GENERAL INFORMATION:** Used as an intermediate in chemical manufacture.

## PHENYL CYCLOHEXANE

$C_6H_5C_6H_{11}$

**PROPERTIES:** Clear mobile liquid; aromatic odor; freezing point 4.8°C.; sp. g. 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.; soluble in organic solvents; insoluble in water.

**GENERAL INFORMATION:** Suggested as a high-boiling solvent, plasticizer, intermediate for syntheses, dielectric.



0683352

TOWOLDMON0041436
WATER_PCB-00025905

## PHENYL MERCAPTOBENZOTHIAZOLE (*ortho*-Phenyl-Mercaptobenzothiazole)

**SPECIFICATIONS:** Yellow powder melting at not less than 180°C.; ash content less than 1%; moisture content not over 1%.

## PHENYL SALICYLATE (See Salicylates)

## PHOSILAGE (See Phosphoric Acid)

## PHOSPHATES (See under the listings given below)

Aluminum Metaphosphate
Aluminum Phosphate
Aluminum Phosphate, Mono
Aluminum Pyrophosphate
ortho - Aminobiphenyl Phosphate, Primary, Secondary, Tertiary (See under A)
Aminobutanyl Ethyl Phosphate
Aminomethylpropanyl Ethyl Phosphate
Ammonium Alkyl Phosphates
Ammonium Diphenyl Phosphate
Ammonium Ethyl Phosphate.
Ammonium Phosphate, Mono, Di, Hemibasic
Ammonium Metaphosphate
Ammonium Pyrophosphate, Di, Tetra
Ammonium Tetraphosphate, Di, Tri
Barium Metaphosphate
Barium Phosphate, Di
Barium Pyrophosphate, Tetra
Beryllium Phosphate
Butyl Acid Pyrophosphate
Calcium Acid Pyrophosphate
Calcium Ammonium (Acid Orthophosphate
Calcium Orthophosphate
Calcium Phosphate, Mono, Di, Tri
Calcium Magnesium Pyrophosphate
Calcium Metaphosphate
Calcium Phosphate X-C
Calcium Pyrophosphate
Calcium Sesqui Pyrophosphate
Calcium Sodium Acid Pyrophosphate
Calcium Sodium Pyrophosphate
Cobaltous Phosphate, Di, Tri
Copper Orthophosphate
Copper Pyrophosphate
Diamylammonium Dihydrogen Phosphate
Diethyl Acid Pyrophosphate
Diethyl Diammonium Pyrophosphate
Ethyl Acid Pyrophosphate
Ethyl Alkali Phosphates
Ethyl Di (β-Ethanol) Ammonium Phosphate
Ethyl Metaphosphate
Ethyl Potassium Phosphate
Ethyl Potassium Sodium Phosphate
Ethyl Tri (β-Ethanol) Ammonium Phosphate
Ferric Acid Pyrophosphate
Ferric Metaphosphate
Ferric Orthophosphate
Ferric Orthophosphate, Mono, Tri
Ferric Pyrophosphate, Tetra
Isoamyl Acid Pyrophosphate, Di
Isoamyl Octyl Phosphate
Lead Metaphosphate
Lead Orthophosphate, Mono, Di, Tri
Lead Pyrophosphate, Tetra
Lithium Metaphosphate
Magnesium Ammonium Phosphate

(*Continued*)



0683353

TOWOLDMON0041437
WATER_PCB-00025906

Magnesium Phosphate, Mono, Di, Tri
Magnesium Pyrophosphate
Manganous Phosphate, Mono
Manganous Pyrophosphate, Tetra
Methyl Sodium Phosphate
Plastic Metaphosphate
Potassium Acid Pyrophosphate
Potassium Ammonium Phosphate
Potassium Metaphosphate
Potassium Phosphate, Mono, Di, Tri
Potassium Pyrophosphate, Tetra
Potassium Sodium Pyrophosphate
Silver Metaphosphate
Silver Orthophosphate, Mono
Silver Pyrophosphate, Tetra
Sodium Acid Pyrophosphate
Sodium Calcium Phosphate
Sodium Ferric Pyrophosphate
Sodium Metaphosphate
Sodium Monohydrogen Pyrophosphate, Tri
Sodium Phosphate, Mono, Di, Hemibasic, Tri
Sodium Pyrophosphate, Tetra
Sodium Sulfato-Phosphate
Sodium Trimetaphosphate
Sodium Triphosphate (Tripolyphosphate)
Strontium Metaphosphate
Tributyl Phosphate
Tricresyl Phosphate
Triethyl Phosphate
Trimethyl Phosphate
Triphenyl Phosphate
Urea Phosphates
Zinc Ammonium Phosphate
Zinc Metaphosphate
Zinc Orthophosphate, Tri

## PHOSPHORIC ACID (Orthophosphoric Acid)

$H_3PO_4$ Mol. Wt. 98.004

**STANDARD FORMS:** 50%, 75% and 85% $H_3PO_4$. Other concentrations supplied on request.

**SPECIFICATIONS:** Clear, water-white liquid miscible with water in all proportions.

**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; *special*.

**R. R. CLASSIFICATION:** Phosphoric Acid.

**GENERAL INFORMATION:** Principal uses—*Ceramics:* To increase translucency and improve the color of porcelains; as a vitrifying agent and flux. *Chemicals and Intermediates:* In manufacture of sodium phosphates, calcium phosphates and other phosphates; in manufacture of ethylene gas; in making albumin derivatives; as a drying agent in the synthesis of various intermediate chemicals. *Dyes:* As a drying agent in the synthesis of various dyes. *Engraving:* In process engraving and litho trades. *Envelopes:* As a penetrant to aid in the absorption of the gum. *Fertilizers:* In manufacture of double and triple superphosphates; in manufacture of ammonium phosphate. *Gelatin:* In manufacture of gelatin. *Glass:* As opacifier. *Jelly and Preserves:* As a substitute for tartaric and citric acids. *Metals:* For pickling and cleaning. *Pharmaceuticals:* In manufacture of certain pharmaceuticals chemicals; in making dental cements; in manufacture and purification of hydrogen peroxide; in manufacturing of glycerophosphates. *Rope and Twine:* For brightening the finish. *Rubber:* As a coagulant of rubber latex.

*(Continued)*



0683354

TOWOLDMON0041438
WATER_PCB-00025907

*Rust Proofing:* In the manufacture of rust-proofing compounds. *Silage:* For silage preservation. *Soft Drinks:* As a substitute for tartaric and citric acids. *Sugar:* As a defecating and clarifying agent. *Textiles:* In brightening the color of silk; in the dyeing of cotton; in calico printing. *Water treatment:* In water softening and correction of alkalinity.

Density and Composition of water solutions of Orthophosphoric Acid @ $\frac{15°C.}{4°}$

| 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 | 31.61 |

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 $\frac{15°C.}{4°} = 1.874 + 0.0171\ (\%P_2O_5 - 72.43)$.

## PHOSPHORIC ACID (Tetraphosphoric Acid)

**PROPERTIES:** Clear, water-white viscous liquid; $P_2O_5$ content 83-84%; does not crystallize at −50°C.; sp. g. 2.060 at 20°C., 1.983 at 100°C., 1.960 at 125°C.

**R. R. CLASSIFICATION:** Phosphoric Acid.

**GENERAL INFORMATION:** Used for industrial applications where a high-strength phosphoric acid is desired and as a drying agent.

## PHOSPHORIC ANHYDRIDE (See Phosphorus Pentoxide)



0683355

TOWOLDMON0041439
WATER_PCB-00025908

## PHOSPHORUS, ELEMENTAL

(Also known as yellow phosphorus and white phosphorus)

**GRADE:** Monsanto process of manufacture provides over 99.9% purity.

**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 bisulfide; insoluble in water.

**R. R. CLASSIFICATION:** Phosphorus, Yellow. Toxic and inflammable (yellow label required).

**GENERAL INFORMATION:** Used in manufacture of phosphorus alloys, phosphoric anhydride, phosphorus compounds, phosphoric acid, rodent poisons, flares, smoke screens, etc.

## PHOSPHORUS OXYCHLORIDE

(Also known as phosphoryl chloride)

$POCl_3$ Mol. Wt. 153.35

**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.; $PCl_5$, 0.20% max.; $PCl_3$, trace max.; $H_3PO_4$, 0.30% max.; HCl, 0.50% max.; free chlorine, trace max.; iron, 0.0005% max.

**R. R. CLASSIFICATION:** Phosphorus Oxychloride. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used as a chlorinating agent and catalyst in the preparation of various intermediates, dyestuffs, medicinals and as a 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.*

## PHOSPHORUS PENTOXIDE

(Also known as phosphoric anhydride; phosphoric oxide; solid $P_4O_{10}$)

$P_2O_5$ Mol. Wt. 141.96

**STANDARD FORM:** White amorphous powder.

**CHARACTERISTICS:**

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) | $\text{Log}_{10}p$ = | $9.792-(5000/T)$ |
| *B* (high temperature form) | $\text{Log}_{10}p$ = | $11.113-(7930/T)$ |
| *L* (liquid) | $\text{Log}_{10}p$ = | $6.809-(4320/T)$ |

Atmospheric sublimation temperature: 358.9°C.

(*Continued*)



0683356

TOWOLDMON0041440
WATER_PCB-00025909

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: $P_4O_{10}$

**R. R. CLASSIFICATION:** Phosphoric Anhydride.

**GENERAL INFORMATION:** Used in the manufacture of organic and phosphorus compounds and as a catalyst. It is a vigorous drying and dehydrating agent.

## PHOSPHORUS TRICHLORIDE

$PCl_3$ Mol. Wt. 137.35

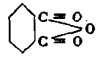
**STANDARD FORM:** Liquid.

**SPECIFICATIONS:** Water-white liquid; sp. g. 1.582-1.587 at 15.5°/15.5°C Distillation range: first drop, 74.5°C. min.; dry point, 79.0°C. max.; total range, 3.0°C. max.

**R. R. CLASSIFICATION:** Phosphorus Trichloride. *Corrosive liquid (white label required).*

**GENERAL INFORMATION:** *Used as a chlorinating agent and catalyst in the preparation of various intermediates and dyestuffs; as a reagent in the preparation of acetic anhydride, organic phosphates, germicides and medicinals; in the manufacture of phosphorus oxychloride and phosphorus pentachloride; and 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.*

## PHTHALIC ANHYDRIDE



Mol. Wt. 148.11

**STANDARD FORM:** Flakes.

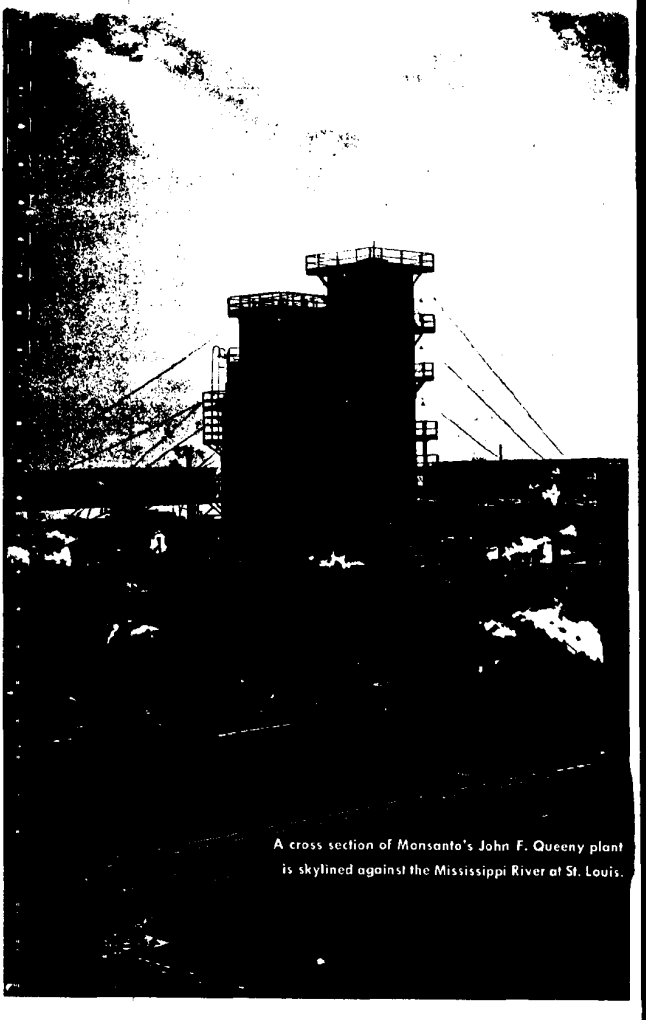
**SPECIFICATIONS:** White flakes; ash 0.03% max.; assay essentially 100%.

**GENERAL INFORMATION:** Uses: As an intermediate in the production of dyestuffs, perfume bases, alcohol denaturants, pharmaceuticals products, plasticizers—such as dibutyl phthalate, dimethyl phthalate, diethyl phthalate, phthalyl glycollates and alkyd resins.



0683357

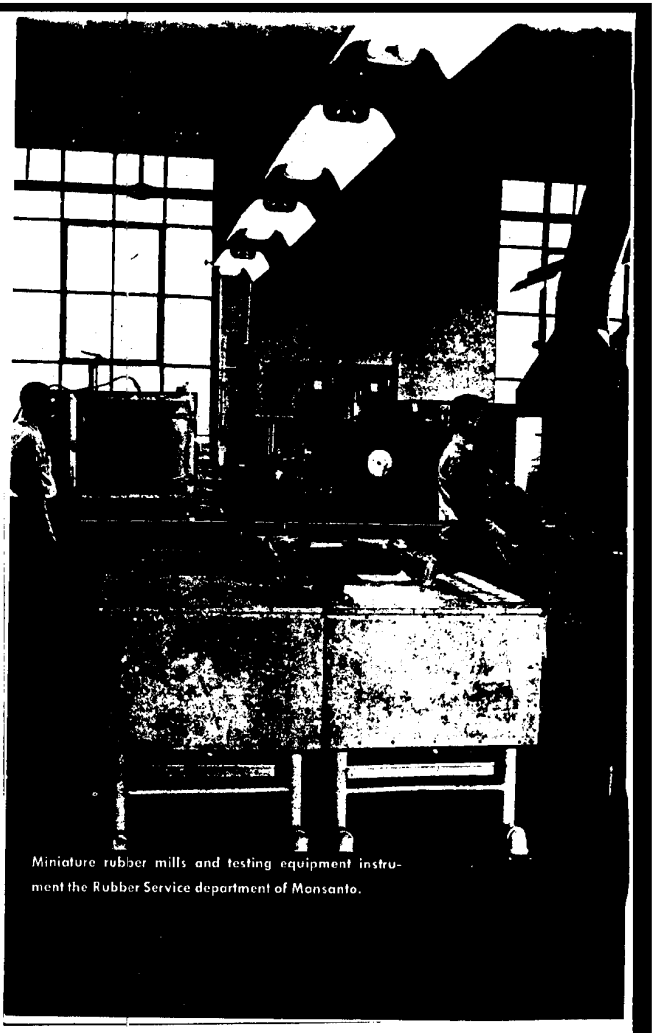
TOWOLDMON0041441
WATER_PCB-00025910



A cross section of Monsanto's John F. Queeny plant is skylined against the Mississippi River at St. Louis.

0683358

TOWOLDMON0041442
WATER_PCB-00025911



Miniature rubber mills and testing equipment instrument the Rubber Service department of Monsanto.

0683359

TOWOLDMON0041443
WATER_PCB-00025912

## PHTHALYL CHLORIDE



Mol. Wt. 203.03

**STANDARD FORM:** Liquid.

**CHARACTERISTICS:** Yellowish liquid; assay, 95.0% min.; crystallizing point, 7.5°C. min.

**R. R. CLASSIFICATION:** Chemicals NOIBN. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used in the manufacture of plasticizers and resins.

## PICKLER'S ACID *(See Inhibited Acid)*

## PIPERIDINE

(Also known as hexahydropyridine)



Mol. Wt. 85.14

**STANDARD FORM:** Liquid.

**SPECIFICATIONS:** Clear, water-white liquid of characteristic odor; assay, 98% min.; pyridine, 1.0% max.; sp. g. 0.860-0.003 at 25°/25°C.; distillation range, 104.0°C. min. start; 107.0°C. max. dry point.

**R. R. CLASSIFICATION:** Chemicals NOIBN. Inflammable material (red label required).

**GENERAL INFORMATION:** Used as an intermediate in the manufacture of pharmaceuticals, wetting agents and germicides.

## "PIP-PIP" (See Accelerators, Rubber)

## PLASTIC METAPHOSPHATE

$K_2Na_4(PO_3)_6$ or $KNa_5(PO_3)_6$

**PROPERTIES:** White powder; dissolves in water to form neutral, high viscosity solutions; attrition action necessary to break gel surface film to make it dissolve rapidly in water; solubility up to 30% solution readily obtained; 30% solution has a viscosity similar to honey when freshly made; viscosity decreases on standing; thin films of the solution air dry to transparent films. These films are hygroscopic in high humidities.

*(Continued)*



0683360

TOWOLDMON0041444
WATER_PCB-00025913

**GENERAL INFORMATION:** 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; in flotation work, as agent for increasing viscosity.

**PLASTICIZERS** (See Santicizers, Dibutyl Phthalate, Diethyl Phthalate, Dimethyl Phthalate, Diphenyl Phthalate, Tricresyl Phosphate, Triphenyl Phosphate)

**PLASTICS** (See individual materials below)

## PLASTICS

### CELLULOSE ACETATE (See Plastics, Fibestos)

### CELLULOSE NITRATE (See Plastics, Nitron)

### CEREX*

Cerex is the designation of a series of new thermoplastic compounds with markedly improved heat resistance. Parts molded of Cerex to close dimensional tolerances maintain dimensions and mechanical strength during prolonged exposure at temperatures over the boiling point of water. Cerex may be injection molded on standard machines and may be sterilized in boiling water or used at ambient temperatures in a range hitherto restricted to thermosetting plastics.

The mechanical strength of Cerex is comparable to Lustron (Monsanto polystyrene) although pilot plant data indicates somewhat higher impact and flexural values. In addition, Cerex retains the excellent acid and alkali resistance of Lustron and is also resistant to carbon tetrachloride and aliphatic hydrocarbons.

The electrical loss properties of Cerex at high frequencies are very good, although not comparable to Lustron. In many applications where extremely low-loss properties are desirable, polystyrene has been eliminated from consideration because of thermal demands necessitating the use of mica-filled phenolics as a compromise. Cerex materials are suitable to replace mica-filled phenolics by reason of improved insulating performance and adaptability to injection molding.

(*Continued*)



0683361

TOWOLDMON0041445
WATER_PCB-00025914

Surgical instruments, electronic instruments parts, sterilizable combs and plumbing hardware are typical of the projected uses of the material. In general, Cerex should be considered for any application where injection molding is desirable but where standard thermoplastics are unsuitable because of low heat resistance of the moldings.

**PROPERTIES:**

| | |
|---|---|
| Injection molding temp.: | |
| Cylinder | 370°-450°F. |
| Mold | 170°-250°F. |
| Specific gravity | 1.07 |
| Flexural strength p.s.i. | 13,000 |
| Deflection | 0.169 in. |
| Impact strengths: | |
| Charpy-notched | 0.46 ft. lb./in. |
| Izod-notched | 0.40 ft. lb./in. |
| Izod-unnotched | 3.48 ft. lb./in. |
| Distortion temp. std. | 212°-257°F. |
| Rockwell hardness | M-100 |
| Dielectric strength | 510 v./mil. |
| Dielectric constant: | |
| 60 cycles | ——— |
| 1000 cycles | 2.72 |
| 1 megacycle | 2.76 |
| Power factor | |
| 60 cycles | ——— |
| 1000 cycles | 0.0024 |
| 1 megacycle | 0.0024 |
| Arc resistance | 69 sec. |
| Burning rate | slow |
| Water absorption (ASTM) 24 hrs. | 0.30% |
| Effect of: | |
| Weak acids | None |
| Strong acids | Oxidizing acids attack |
| Weak bases | None |
| Strong bases | |
| Solubility | Soluble in arom. & chlorinated hydrocarbons |
| Clarity | Amber transparent |
| Color possibilities | Extensive |

Values determined under appropriate ASTM test methods.

**AVAILABLE LITERATURE:** Bulletins, "Cerex" and "Molding of Cerex."

*Trade Mark Reg. U. S. Pat. Off.

## DIVINYL BENZENE SOLUTION

Monsanto X425 divinyl benzene solution is an organic fluid which copolymerizes with styrene monomer to form a thermoset resin having greater thermal stability and solvent resistance than polystyrene. It is

(*Continued*)



0683362

TOWOLDMON0041446
WATER_PCB-00025915

composed of a mixture of the isomers of diethyl, ethyl vinyl and divinyl benzene in which the total unsaturates calculated as divinyl benzene equal 25-30%.

**PROPERTIES:** Viscosity at 25°C., 0.90 cps.; boiling range at 50 mm. of mercury, 90°-105°C.; sp. g., 0.87-0.885 gms./cc.; flash point, 138°F.; fire point, 147°F.; lbs. per gal., 7.3; colorless to pale straw; odor, mild aromatic.

**AVAILABLE LITERATURE:** Bulletin, "Monsanto Divinyl Benzene Solution."

## FIBESTOS* (Cellulose Acetate)

Cellulose acetate is distinguished by a flexible range of properties and formulations. In the form of molding compounds, Fibestos is adapted to either compression or injection molding. Sheets, rods, tubes and continuous length rolls are other forms in which it is produced by Monsanto.

**MECHANICAL PROPERTIES:**

| | |
|---|---|
| Specific gravity | 1.27-1.37 |
| Specific volume, cu. in. 1 lb. | 21.8-20.2 |
| Refractive index $N_D$ | 1.49-1.50 |
| Tensile strength, lbs./sq. in. | 4,500-10,000 |
| Elongation, per cent | 25-70 |
| Bursting strength (rupture) lbs./sq. in./mil. | 18-35 |
| Modulus of elasticity, lbs./sq. in. x $10^5$ | 1-3 |
| Impact strength, Izod, ft. lbs./in. of notch (ASTM) | 1.0-5.0 |
| Brinell hardness, 2.5 mm. ball kg. load | 1.5-12.0 |
| Rockwell hardness | up to M95 |
| Machining qualities | Good |

**MOLDING PROPERTIES:**

| | |
|---|---|
| Type | Thermoplastic |
| Molding qualities | Excellent |
| Molding Temperature °F. | |
| Compression | 210-350 |
| Injection | 300-440 |
| Molding Pressure lbs./sq. in. | |
| Compression | 500-5000 |
| Injection | 8000-30000 |
| Preforming | Very good |
| Tendency to cold flow | Slight |
| Molding methods applicable | Compression, injection, extrusion, swaging |
| Mold shrinkage, inches/inch: Positive | 0.001-0.005 |
| Semi-positive | 0.002-0.008 |
| Flash | 0.008-0.009 |
| Extruding quality | Excellent |

**THERMAL PROPERTIES:**

| | |
|---|---|
| Burning rate, in./min. (0.060") | 1.5-2.0 |
| | Slow burning |

(*Continued*)



0683363

TOWOLDMON0041447
WATER_PCB-00025916

| | |
|---|---|
| Thermal conductivity, 10—⁴ calories sec. sq. cm./ °C./cm. | 4.5-7.8 |
| Specific heat, calories/°C./gm. | 0.3-0.45 |
| Thermal expansion, 10—⁵/°C. | 8-16 |
| Resistance to heat, °F. (continuous) | 150-212 |
| Softening point, °F. | 140-260 |
| Effect of heat, dry | Little or none |
| moist | Slight swelling |
| Heat distortion, °F. (ASTM) | 130-212 |

**ELECTRICAL PROPERTIES:**

| | |
|---|---|
| Volume resistivity, ohms-cms. (50%R.H. and 25°C.) | ($10^{16}$-$10^{18}$) |
| Breakdown voltage, 60 cycles volts/mil. | 600-1,800 |
| Dielectric constant, 60 cycles | 3.5-7.5 |
| $10^6$ cycles | 2.0-5.0 |
| Power factor, 60 cycles | 0.01-0.06 |
| $10^6$ cycles | 0.01-0.05 |

**CHEMICAL AND PHYSICAL PROPERTIES:**

| | |
|---|---|
| Odor | None to mild aromatic |
| Taste | None |
| Effect of age | Slight |
| Effect of sunlight | Gradually become brittle—some colors fade |
| Effect of ultra-violet light | Gradually become brittle—some colors fade |
| Effect of metal inserts | None |
| Effect of weak mineral acids | Fair resistance |
| Effect of strong acids | Decomposes |
| Effect of weak alkalies | Slight |
| Effect of strong alkalies | Decomposes |
| Water absorption 24 hours | 2.0-4.0% |
| Solubility: Softens in | Alcohols, esters |
| Swells in | Chlorinated hydrocarbons |
| Insoluble in | Aromatic and aliphatic hydrocarbons, animal, mineral, and vegetable oils, ethers |

**COLOR:** Available in an extremely wide variety of transparent, translucent, pastel and opaque colors, as well as in many mottles, pearls and decorative figurations.

**FORMS:** Sheets, rods, tubes and molding compounds.

*Trade Mark Reg. U. S. Pat. Off.

## "LUSTRON"* (Polystyrene Molding Compounds)

Lustron is Monsanto's formulation of polystyrene molding compound. The rapid expansion of uses for Lustron since its introduction in 1939 is

(*Continued*)



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TOWOLDMON0041448
WATER_PCB-00025917

excellent proof of its versatility and broad range of useful properties. It is unexcelled among thermoplastics for electrical characteristics, chemical resistance, low moisture absorption and dimensional stability as the following table of properties indicates.

| | |
|---|---|
| Molding quality | Excellent |
| Compression molding temperature, °F. | 275-350 |
| Compression molding pressure, lbs. sq. in. | 1000-5000 |
| Injection molding temperature, °F. | 300-500 |
| Injection molding pressure, lbs./sq. in. | 10,000 and up |
| Compression ratio | 2.0-2.3 |
| Mold shrinkage | Compression 0.002-0.005 in. per in. Injection 0.002-0.008 in. per in. |
| Specific gravity | 1.054-1.070 |
| Specific volume, cu. in./lb. | 26.3-25.9 |
| Refractive index | 1.59 |
| Tensile strength, lbs./sq. in. | 6000-7000 |
| Elongation, % | 2-3 |
| Modulus of elasticity, in tension, lbs./sq. in. | $1.7\text{-}4.7 \times 10^5$ |
| Compressive strength, lbs./sq. in. | 11,500-15,000 |
| Flexural strength, lbs./sq. in. | 8,000-10,000 |
| Impact strength, Izod, ft. lbs./in. of notch (ASTM) | 0.35-0.40 ft. lbs. in. of notch |
| Brinell hardness (2.5 mm. ball, 25 kg. load) | 20-30 |
| Rockwell hardness | M80-M95 |
| Light transmission, % | 88-92 |
| Thermal conductivity, cal./sec./sq. cm./°C./cm. | $1.9 \times 10^{-4}$ |
| Specific heat, cal./°C./gm. | 0.32 |
| Thermal expansion, °C. | $(6\text{-}8) \times 10^{-5}$ |
| Softening point, °F. | 190-230 |
| Distortion under heat, °F. (ASTM) | 168-176 |
| Tendency to cold flow | Slight |
| Volume resistivity, ohm-cms. (50% R. H. and 25°C.) | $10^{17}\text{-}10^{19}$ |
| Dielectric strength, short time, ⅛ in. thickness volts/mil. | 500-700 |
| Dielectric constant, 60 cycles | 2.5-2.6 |
| Dielectric constant, $10^3$ cycles | 2.5-2.6 |
| Dielectric constant, $10^6$ cycles | 2.5-2.6 |
| Power factor, 60 cycles | 0.0001-0.0003 |
| Power factor, $10^3$ cycles | 0.0001-0.0003 |
| Power factor, $10^6$ cycles | 0.0001-0.0003 |
| Water absorption, immersion 24 hrs. | 0.04-0.06 |
| Burning rate | Moderate |
| Effect of age | Very slight |
| Effect of sunlight | Yellows slightly |
| Effect of weak acids and strong acids | None |
| Effect of weak alkalies and strong alkalies | None |

(*Continued*)



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TOWOLDMON0041449
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| | |
|---|---|
| Effect of organic solvents | Soluble in aromatic and chlorinated hydrocarbons |
| Machining qualities | Fair to good |
| Color possibilities | Unlimited |
| Effect on metal inserts | None |

**AVAILABLE LITERATURE:** 16-page booklet, "Lustron—A Monsanto Plastic."

*Trade Mark Reg. U. S. Pat. Off.

## "NITRON"* (Cellulose Nitrate Sheets, Rods, Tubes)

Nitron is 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 in Nitron plastics is unlimited. It is easy to fabricate and can be molded, drawn or blown.

**MECHANICAL PROPERTIES:**

| | |
|---|---|
| Specific gravity | 1.35-1.60 |
| Specific volume, cu. in./lb. | 19.8-20.5 |
| Refractive index $N_D$ | 1.48-1.58 |
| Ultimate tensile strength, lbs./sq. in. | 5,000-10,000 |
| Elongation, % | 10-50 |
| Modulus of elasticity, in tension lbs./sq. in. | 200,000-400,000 |
| Impact strength, Charpy, ft. lbs./in. of notch (ASTM) | 3-12 |
| Brinell hardness, 2.5 mm. ball, 10 kg. load | 8-11 |
| Rockwell hardness | M25-M40 |
| Machining qualities | Very good |

**MOLDING PROPERTIES:**

| | |
|---|---|
| Type | Thermoplastic |
| Molding quality | Good, not suitable for injection |
| Compression molding temperature | 185-250°F. |
| Compression molding pressure, lbs./sq. in. | 100-5,000 |
| Preforming | Very good |
| Tendency to cold flow | Slight |
| Molding methods applicable | Swaging, shearing, blowing |

**THERMAL PROPERTIES:**

| | |
|---|---|
| Burning rate | Rapid |
| Thermal conductivity, B.T.U./hr./sq. ft./°F. temp. diff./in. thickness | 0.90-1.48 |
| Specific heat, calories/°C./gm. | 0.34-0.38 |
| Thermal expansion, $10^{-4}$/°F. | 6.5-8.9 |
| Resistance to heat, °F. (continuous) | Approximately 140 |
| Softening point, (ASTM) | 160°-195°F. Decomposes at 272°F. in 30 minutes |
| Effect of heat, dry | Discolors on continued heating at 212°F. |

(*Continued*)



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TOWOLDMON0041450
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**ELECTRICAL PROPERTIES:**

| | |
|---|---|
| Volume resistivity ohms-cms. (50% R. H. and 25°C) | (2-30) x $10^{16}$ |
| Dielectric strength, 60 cycles, volts/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 |

**CHEMICAL AND PHYSICAL PROPERTIES:**

| | |
|---|---|
| Odor | None or camphorous |
| Taste | Tasteless to slight |
| Effect of age | Slight hardening |
| Effect of sunlight | Discolors and becomes brittle |
| Effect of ultra-violet light | Yellows and decomposes on extended exposure |
| Effect of weak mineral acids | Good resistance |
| Effect of strong acids | Poor resistance, decomposes |
| Effect of weak alkalies | Very slowly decomposes |
| Effect of strong alkalies | Decomposes |
| Water absorption 24 hours immersion | 0.6-2.0% |
| Effect of hot water | Softens, slight shrinkage |
| Effect of cold water | None |
| Effect on metal inserts | None |
| **SOLUBILITY:** Soluble in | Alcohols, ketones, esters |
| Insoluble in | Aromatic and aliphatic hydrocarbons, mineral, animal and vegetable oils |

**COLOR:** Available in an extremely wide variety of transparent, crystal, translucent, pastel, and opaque colors, as well as in many mottles, pearls and ornamental configurations.

**FORMS:** Available in sheets, rods, tubes and special shapes..

*Trade Mark Reg. U. S. Pat. Off.

## POLYVINYL BUTYRAL RESINS

Compounds of polyvinyl butyral resins were developed as elastomers for fabric coatings, free film, and in molded and extruded products. Their use in fabric coatings has expanded widely in such articles as military waterproof clothing, flotation gear and lister bags. Applications such as hospital sheeting, baby pants, upholstery coatings, sportswear, free film and many others await only greater availability.

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

(*Continued*)



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TOWOLDMON0041451
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products. They can be compounded to any color including a clear colorless transparent.

Polyvinyl butyral 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 all common solvents. It also allows the rubber processor to employ the plastic in his usual operations in virtually the same way as rubber.

Unlike resins containing chlorine, polyvinyl butyral ages well and when properly compounded, does not discolor in light over a long period of time and has excellent resistance to oxidation. Similarly there is no known record of deterioration of fabric caused by butyrals. No record of dermatitis incurred by individuals handling or using the material has been reported.

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. Thermoplastic film cannot be washed in any more rigid conditions than warm water and soap and should be dusted with talcum powder after washing.

**PHYSICAL PROPERTIES OF TYPICAL THERMOSETTING POLYVINYL BUTYRAL COMPOUND:**

| | |
|---|---|
| Tensile strength lbs./sq. in. | 1470 |
| % Elongation (ASTM Method D-412) | 300 |
| Tear strength lbs./in. (ASTM Method D-624) | 120 |
| Permanent set % 25°C. | 27 |
| 71°C. | 25 |
| (ASTM Method D-395—constant deflection) | |
| Brittle temperature °C. (ASTM Method D-746) | —40 |
| Modulus of elasticity in flexure, lbs./sq. in. | |
| +25°C. | about 200 |
| —35°C. | 68,000 |
| —57°C. | 222,300 |
| (ASTM Method D-747) | |
| Water absorption, % 24 hrs. at 25°C. (ASTM Method D-570) | 2.2 |
| Plasticizer loss after water absorption test, % | 0.2 |
| Plasticizer loss after heating 72 hrs. at 82°C., % | 1.6 |
| Abrasion resistance, du Pont abrader cc. per hr. p. hr. | 107 |
| Chemical resistance—7 days immersion at 25°C. | |
| 3% sodium chloride solution—2.1% absorption | no effect |
| 10% sodium hydroxide solution—7.4% absorption | color darkened |

(*Continued*)



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30% sulfuric acid solution—3.4% absorption.....color darkened
100% octane gasoline—9.2% absorption.....slight stiffening after drying
Toluene—67% absorption.....bad softening

**AVAILABLE LITERATURE:** Bulletin, "Applications of Monsanto Vinyl Butyral."

## "REINFORCED VUELITE"* (Cellulose Acetate)

(Laminated with Wire Screen for Protective Use)

Reinforced Vuelite was 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. It consists of 16-mesh wire screen (other types on special order) approximately 0.011 inch thick laminated between two sheets of clear cellulose acetate and can be furnished in various thickness. Postwar uses include glazing for greenhouses, farm buildings, skylights and many other installations where glass breakage is a problem or where the material's high ultra-violet transmission and excellent insulating qualities would be advantageous.

Tested under vacuum-shock conditions, Reinforced Vuelite stood up without appreciable damage under a 28-inch vacuum, while clear glass shattered at 15 inches and heavy, wire-reinforced glass at 26 inches of vacuum. In further official tests, a quarter-pound ball dropped from a height of 20 inches smashed ordinary glass while it took a two-pound ball from the height of 42 inches to penetrate a pane of Reinforced Vuelite. Even then, the missile left a clean-cut hole.

Expansion and contraction through the full range of humidity and a temperature range from −40°F. to 150°F. is less than 1%. The material remains flexible at −40°F. and can be bent over a 3-inch 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 |
|---|---|---|---|---|
| 0.020 | 20x50 | 6.944 | 0.291 | 2.02 lbs. |
| 0.020 | 24x52 | 8.667 | 0.291 | 2.52 lbs. |
| 0.030 | 20x50 | 6.944 | 0.359 | 2.49 lbs. |
| 0.030 | 24x52 | 8.667 | 0.359 | 3.11 lbs. |

Note: 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.

Pieces can be furnished as flat panes cut to the size needed or made with a ¼ inch bent-up flange all around to facilitate stapling to the frame, if this method of installation is planned.

*Trade Mark "Vuelite" Reg. U. S. Pat. Off.



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TOWOLDMON0041453
WATER_PCB-00025922

## "RESIMENE"*

(Monsanto Melamine Formaldehyde Resins and Molding Materials)

Resimene is the designation of a new series of thermosetting resin products. As a class, these materials are marked by high-water resistance, extremely high-arc resistance, resistance to weathering and ability to be produced in colorless base resins and light-colored molding or impregnating compounds.

**PHYSICAL PROPERTIES**

| | |
|---|---|
| Specific gravity | 1.44-1.46 |
| Water absorption | 0.51% |
| Mold shrinkage (no preheat) | 8 mils./in. |
| After shrinkage (8 hrs. at 220°F.) | 2 mils./in. |
| Flexural strength | 9,000 p.s.i. |
| Deflection | 0.066 in. |
| Compressive strength | 32,700 p.s.i. |
| Deformation | 0.130 in. |
| Izod impact | 0.34 ft. lbs. in. notch |
| Abrasion resistance (Taber) | 6.8 x gen. purpose phenolic |
| ASTM heat distortion value | 300°F. |

**ELECTRICAL PROPERTIES:**

| | |
|---|---|
| Dielectric strength 60 cycles S/T | 390 v.p.m. |
| S/S | 320 v.p.m. |
| Arc resistance (ASTM-D495-41) | 120 sec. |
| Volume resistivity | 6.7 x $10^{10}$ ohm-cm. |
| Surface resistivity | 6.0 x $10^{10}$ ohms |
| Power factor: 1 K. C. | 0.034 |
| 50 K. C. | 0.026 |
| 1 M. C. | 0.060 |
| Dielectric constant: 1 K. C. | 8.0 |
| 50 K. C. | 6.7 |
| 1 M. C. | 4.7 |

**AVAILABLE LITERATURE:** Bulletins on various types of Resimene.

*Trade Mark Reg. U. S. Pat. Off.

## "RESINOX"* (Phenol Formaldehyde Molding Compounds)

Over a period of years the range of Resinox molding materials has grown to encompass almost every important industrial demand. Shortages of metals and the extremely exacting requirements of the nation's armed forces have stimulated the development of new types of Resinox materials having particularly high impact strengths. Since fillers vary the properties of Resinox, the following table gives the range attained by the most common fillers of wood flour, cut fabric, cotton flock, chopped tire cord, mica and asbestos.

(*Continued*)



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| | |
|---|---|
| Molding quality | Fair-excellent |
| Compression molding temperature, °F. | 290-400 |
| Compression molding pressure, lbs./sq. in. | 2000-4500 |
| Compression ratio (bulk factor) | 2.02-10.0 |
| Mold shrinkage, inches per inch | 0.004-0.010 |
| Specific gravity | 1.25-1.75 |
| Specific volume, cu. in./lb. | 22.0-28.7 |
| Tensile strength, lbs./sq. in. | 4200-8000 |
| Modulus of elasticity, lbs./sq. in x $10^5$ | 8-45 |
| Compressive strength, lbs. sq. in. | 20,000-35,000 |
| Flexural strength lbs./sq. in. | 8,000-15,000 |
| Impact strength, ft. lbs./in. of notch, Izod (ASTM) | 0.26-8.00 |
| 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, $10^{-5}$/°C. | 2.0-7.5 |
| Resistance to heat °F. (continuous) | 250-400 |
| 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., ⅛ in. thickness | 250-500 |
| Dielectric strength, step-by-step, volts/mil., ⅛ in. thickness | 200-400 |
| Dielectric constant, 60 cycles | 5-20 |
| Dielectric constant, $10^3$ cycles | 4-20 |
| Dielectric constant, $10^6$ cycles | 4.5-20 |
| Power factor 60 cycles | 0.04-0.30 |
| Power factor $10^3$ cycles | 0.04-0.20 |
| Power factor $10^6$ cycles | 0.005-0.10 |
| Water absorption, immersion 48 hours (%) | 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 |

**AVAILABLE LITERATURE:** 12-page booklet, "Resinox—A Monsanto Plastic."

*Trade Mark Reg. U. S. Pat. Off.





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TOWOLDMON0041455
WATER_PCB-00025924

## "SAFLEX"* (Laminating Plastic)

Saflex is a polyvinyl butyral sheet plastic used as the interlayer in making "Hi-Test" laminated safety glass.

The Saflex plastic sheet, 0.015 gauge, acts as the bonding agent holding the two sheets of glass firmly together and prevents scattering of the glass in case one or both surfaces of the glass are broken. The tough, elastic Saflex interlayer gives full protection at all temperature ranges encountered in winter or summer driving.

For military vehicles and aircraft, multiple-layer laminations of Saflex and glass give protection against small-caliber bullets, bomb or shell fragments and flying debris.

*Trade Mark Reg. U. S. Pat. Off.

## "STYRAMIC"*

Monsanto Styramic is a polystyrene base-molding compound for extrusion, injection and compression. It is particularly suitable for electrical insulation purposes in the radio and television fields over the entire range of frequencies encountered. Styramic will machine readily and can be compression molded.

It combines non-inflammability and excellent form stability at temperatures up to 185°F. with the superior electrical characteristics, moisture resistance and moldability of Lustron..

**GENERAL PROPERTIES:**

| | |
|---|---|
| Formulations and colors | Styramic 28 Gray<br>Styramic 20 Natural |
| Granulations, ins. | ¼ |
| Screen analysis limits, %, through 3 mesh | 100 |
| through 14 mesh | 3 |
| Recommended molding method | Inj., ext. and comp. |
| Compression ratio | 2.5-2.8 |
| Injection molding temperature, °F. | 325-450 |
| Compression molding temperature, °F. | 300-350 |
| Injection molding pressure, lbs. | 10,000 and up |
| Compression molding pressure, lbs./sq. in. | 500 to 5,000 |
| Specific gravity, 25°/25°C. | 1.358 |
| Specific volume, cu. ins./lb. | 20.4 |
| Mold and age shrinkage, ins./in. | 0.0025 after 6 mos. |
| Heat distortion, °F. | 184-187 |
| Flow temperature, °F. | 280 |
| Water absorption, 24 hrs., % | 0.046 |
| Burning rate | Chars slightly but will not burn |
| Tensile strength, lbs./sq. in. | 3,000-3,500 |
| Flexural strength, lbs./sq. in. | 6,000-7,000 |
| Compressive strength, lbs./sq. in. | 10,000-12,000 |

(*Continued*)



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TOWOLDMON0041456
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| | |
|---|---|
| Young's Modulus, in tension | $3.34 \times 10^5$ |
| Impact strength, Izod, ft. lbs./in. of notch | 0.3 |
| Rockwell hardness | M72 |
| Dielectric constant, 300 kc. dry | 2.55 |
| Dielectric constant, 300 kc., 96 hrs. water immersion | 2.60 |
| Power factor, 300 kc. dry | 0.0004 |
| Power factor, 300 kc. 96 hrs. water immersion | 0.0004 |
| Loss factor, 300 kc. dry | 0.001 |
| Loss factor, 300 kc. 96 hrs. water immersion | 0.001 |

The above values except where otherwise noted are determined on samples conditioned and tested at 25°C. (77°F.) and 50% R. H.

## "STYRAMIC HT"*

Styramic HT is projected as a material of high-heat resistance with electrical characteristics somewhat better than polystyrene, enabling its use in ultra-high frequency and super-high frequency insulating parts. The curve of power factor remains virtually flat throughout the frequency range. Data on such applications is restricted and cannot be published at present. The material has excellent color possibilities, being basically a clear transparent, although its applications are not likely to be those where color or appearance is of prime importance.

**PROPERTIES:**

| | *Styramic HT* | *Polystyrene* |
|---|---|---|
| Moldability in injection molds | Very good* | Excellent |
| Injection molding temperatures °F. | 475-550 | 400-450 |
| Compression molding temperatures °F. | 360-400 | 325-350 |
| Machining qualities | Very good | Very good |
| Specific gravity | 1.38 | 1.05-1.07 |
| Water absorption 24 hrs. % D570-42 | 0.03 | 0.05 |
| Flammability in./min. D568-41T D-635 | Self extinguishing | 1.0 |
| Heat distortion point °F. D-648-41T | 236 | 168-176 |
| Rockwell hardness D-229 | M103 | M80-M90 |
| Dielectric constant 1000 cycles D150-42T | 2.62 | 2.5-2.6 |
| Power factor 1000 cycles D150-42T | 0.0002 | 0.0001-0.000 |
| Dielectric constant 1,000,000 cycles D150-42T | 2.62 | 2.5-2.6 |
| Power factor, 1,000,000 cycles D150-42T | 0.0002 | 0.0001-0.000 |

*Moldability in extrusion machines is excellent. (Reference numbers refer to ASTM test methods.)

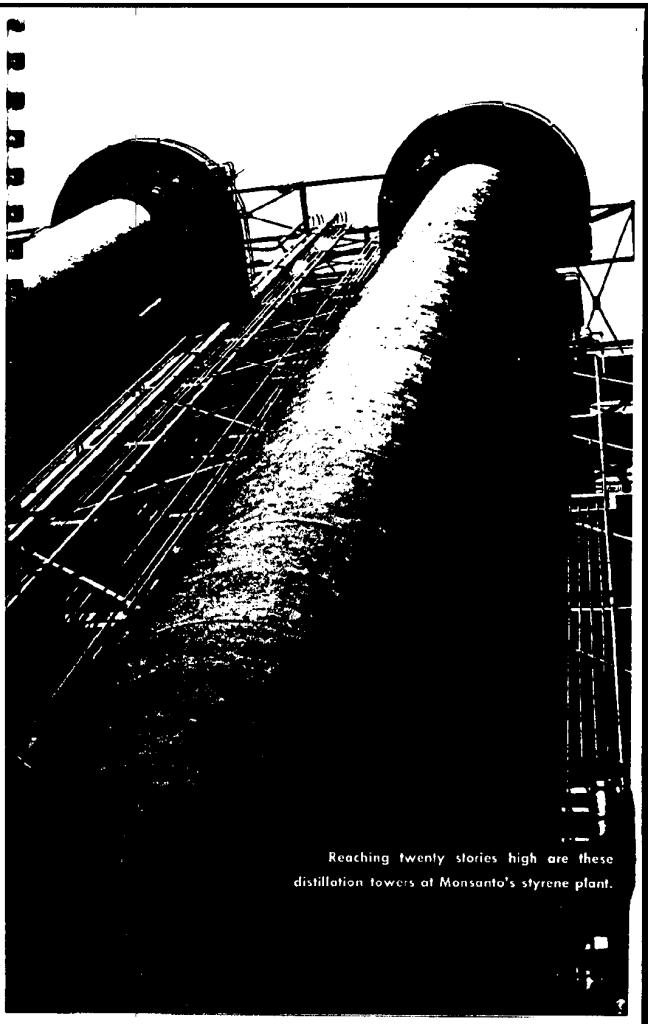
**AVAILABLE LITERATURE:** Bulletin, "Styramic HT."

*Trade Mark Reg. U. S. Pat. Off.



0683373

TOWOLDMON0041457
WATER_PCB-00025926



Reaching twenty stories high are these distillation towers at Monsanto's styrene plant.

0683374

TOWOLDMON0041458
WATER_PCB-00025927



A Monsanto molder removes a completed casting from an opened experimental press.

0683375

TOWOLDMON0041459
WATER_PCB-00025928

## THALID X-100"* RESINS (Casting Sealant)

Thalid X-100 series casting sealants are thermosetting impregnating solutions which combine maximum efficiency in sealing porosity in metal castings with ease of handling in the plant or foundry. They have been used on magnesium, aluminum and to a lesser extent on iron.

AVAILABLE LITERATURE: Bulletin, "Monsanto Casting Sealant."

*Trade Mark Reg. U. S. Pat. Off.

## THALID X-500"* RESINS (For Impression Molding)

Thalid X-500 resins are completely reactive thermosetting resins used for producing high-strength laminates under low or contact pressure. A hard, rigid panel is produced in a short-curing cycle. The components are mixed and applied to the fabric, which is then molded without drying or further treatment. They can be used to bond glass, cotton fabric or paper and may be impression molded or cured in a platen press to produce curved parts or flat panels.

Thalid X500 series are furnished in a syrup form with a viscosity of approximately 18 poises. A catalyst and, in some instances, suitably inhibited styrene monomer is supplied separately.

The following formulations are available:

| | Parts X-525 | Parts XR-502* | Parts Catalyst |
|---|---|---|---|
| X-525 | 100 | 0 | 0.8% lauroyl peroxide |
| X-526 | 100 | 12 | 0.8% lauroyl peroxide |
| X-527 | 100 | 15 | 0.8% lauroyl peroxide |

*XR-502 is specially inhibited styrene monomer. N-99 is not suitable.

AVAILABLE LITERATURE: Bulletins, "Thalid Resins for Impression Molding."

*Trade Mark Reg. U. S. Pat. Off.

## VUELITE"* (Embossed Shields for Fluorescent Lighting)

Vuelite is the trade name for 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 more than a six-inch radius are fitted with diffusing panels by slipping flat sheets into position. Smaller sizes and intricate shapes are formed without expensive

(*Continued*)



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TOWOLDMON0041460
WATER_PCB-00025929

molds or tools while punching, drilling and cutting operations are carried out with ordinary tools.

Vuelite sheets are 20"x50" 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 |
| 56B | No. 5174 | 0.050" | 20x49 | Both ways |
| 66B | Large Crackle | 0.040" | 20x49 | Both ways |

*Trade Mark Reg. U. S. Pat. Off.

## "VUEPAK"* (Rigid Transparent Packaging Material)

Vuepak is produced as a clear transparent sheet plastic in continuous length rolls 31½ inches wide. It is extensively used in the manufacture of durable rigid transparent containers, packages and displays for all types of consumer goods products. Originally used chiefly for luxury items, Vuepak containers have now become a successful packaging medium for food products, candies, household appliances, beverages and dry bulk 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.

The properties of Vuepak are covered by the properties of Fibestos cellulose acetate materials in the preceding table.

Standard gauges of Vuepak are 0.005", 0.0075", 0.010", 0.0125", 0.015" and 0.020". In addition to continuous length rolls, Vuepak is sold in standard size sheets or in pieces cut to order.

Vuepak can be drawn, scored, beaded, folded or stitched. With suitable inks the surface of Vuepak can be readily printed in one or more colors.

For special requirements Vuepak containers can be made with metal bottoms and in lids or in combinations with box-board, paper, wire frames or wood.

*Trade Mark Reg. U. S. Pat.Off.

## POLYSTYRENE (See Plastics, Lustron, Styramic, Styramic HT)

## POLYVINYL BUTYRAL LACQUERS
(See Lacquers, Textile Coating Lacquers, Paper Coating Lacquers)



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WATER_PCB-00025930

## POLYVINYL BUTYRAL RESINS (See Plastics)

## POLYVINYL BUTYRAL SHEET (See Plastics, Saflex)

## POTASSIUM ACID PYROPHOSPHATE

$K_2H_2P_2O_7$

**PROPERTIES:** White crystals; very soluble in water; pH of 1% solution, approx. 4.2.

**GENERAL INFORMATION:** Suggested for applications in which an acid pyrophosphate having high solubility in water is required.

## POTASSIUM AMMONIUM PHOSPHATE

(Also known as ammonium potassium phosphate)

$KNH_4H_4(PO_4)_2$ Mol. Wt. 251.128

**STANDARD FORM:** White crystals.

**GRADE:** Technical crystals.

**R. R. CLASSIFICATION:** Potassium Salts NOIBN.

**GENERAL INFORMATION:** Used in pharmaceutical products for special medicinal purposes and in the fermentation of wines.

## POTASSIUM AMYL XANTHATE

**R. R. CLASSIFICATION:** Potassium Xanthate.

**GENERAL INFORMATION:** Flotation agent used principally in the mining industry.

## POTASSIUM ETHYL XANTHATE

**R. R. CLASSIFICATION:** Potassium Xanthate.

**GENERAL INFORMATION:** Flotation agent used principally in the mining industry.

## POTASSIUM GLYCEROPHOSPHATE (75% Solution)

(See Glycerophosphates)

## POTASSIUM METAPHOSPHATE

$KPO_3$ Mol. Wt. 118.076

**PROPERTIES:** White powder; m. p. approx. 810°C.; practically insoluble in water; insoluble in alcohol.

**GENERAL INFORMATION:** Suggested for ceramic glazes; phosphate glasses; polishing agent.



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## POTASSIUM PHOSPHATE, MONO

(Also known as potassium diphosphate and potassium biphosphate)

$KH_2PO_4$ Mol. Wt. 136.09

**STANDARD FORM:** White crystals.

**TYPICAL ANALYSIS:** $P_2O_5$, 51.69%; $K_2O$, 34.31%; Ign. loss, 13.24%; $SO_4$, none; pH 4.6.

**R. R. CLASSIFICATION:** Potassium Salts.

**GENERAL INFORMATION:** Used to control pH of culture media in penicillin manufacture and for special medicinal purposes.

## POTASSIUM PHOSPHATE, DI

$K_2HPO_4$ Mol. Wt. 174.18

**STANDARD FORMS:** Anhydrous solid; 60% solution in water.

**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.

60% solution; bluish, odorless liquid; sp. g. 1.7 at 25°C.; 14.6 lbs. per gal.; pH 9.9-10.3; viscosity 33 cps. at 25°C.; water solubility 71 gms. $K_2HPO_4$ per 100 gms. solution.

**GENERAL INFORMATION:** Used as a humectant; as an antistatic agent for wool; in fermentation; for correcting salt balance in evaporated milk, nutrient solutions.

## POTASSIUM PHOSPHATE, TRI

$K_3PO_4$ Mol. Wt. 212.27

**GRADES:** Hydrated or anhydrous.

**PROPERTIES:** White powder (anyhdrous form); soluble in water; insoluble in alcohol; very hygroscopic.

## POTASSIUM PYROPHOSPHATE, TETRA

$K_4P_2O_7$ Mol. Wt. 330.34

**PROPERTIES:** White powder, hygroscopic in air; pH value in 1% solution at 25°C., 10.6; solubility, 190 gms. in 100 gms. water at 25°C.

**R. R. CLASSIFICATION:** Cleaning Compound.

**GENERAL INFORMATION:** Used for incorporation in textile oils and soaps to increase emulsifying values and to prevent formation of insoluble hard water soaps; as clarifying agent and to improve cleansing action of soaps.

**AVAILABLE LITERATURE:** Technical Bulletin P-23, "Tetra Potassium Pyrophosphate."



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## POTASSIUM SALICYLATE (See Salicylates)

## POTASSIUM SODIUM PYROPHOSPHATE

$K_4P_2O_7 \cdot Na_4P_2O_7$

**PROPERTIES:** White powder or granular material; water-soluble; more soluble than the corresponding $Na_4P_2O_7$; less hygroscopic than $K_4P_2O_7$; pH of 1% solution—10.3-10.6.

**GENERAL INFORMATION:** Suggested as a soap builder, clarifier for liquid soaps, etc.

## *n*-PROPYL PHOSPHORIC ACID
(See Alkyl Phosphoric Acids)

## "PYRANO"

**PROPERTIES:** A substantially neutral ammonium phosphate in crystalline form; quickly soluble in water.

**GENERAL INFORMATION:** Suggested for fireproofing textiles, paper and wood.

**PYRIDINE** pure water-white liquid; used as a solvent and chemical reagent, as a denaturant for alcohol, and in special medicinals; made by Monsanto Chemicals Limited.

## PYROXYLIN CEMENTS
(See Celluloid Cements and Belt Cements)

## "R-2" CRYSTALS (See Accelerators, Rubber)

## "REINFORCED VUELITE" (See Plastics)

## REODORANTS, RUBBER (See Vanillin and Coumarin)

Monsanto provides, but does not manufacture, the following types of rubber reodorants for the convenience of its customers.

**CURODEX NO. 19**—Pale yellow liquid; deodorizes; per cent used in 100 lbs. of rubber, 1.15-0.20; standard package, 5-lb. bottle.

**CURODEX NO. 188**—Pale yellow liquid; odor, lily; per cent used in 100 lbs. of rubber, 0.20-0.50; standard package, 5-lb. bottle.

**CURODEX NO. 198**—Pale yellow liquid; odor, musk; per cent used in 100 lbs. of rubber, 0.20-0.50; standard package, 5-lb. bottle.



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## "RESIMENE" (See Plastics)

## RESINS (See Santolites and Plastics)

## "RESINOX" (See Plastics)

## "RESLOOM M-75"*

**FORM:** Water solution—60% resin.

**PROPERTIES:** A clear, colorless, water-soluble methylol melamine in concentrated water solution. Density: 1.19 approx.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** This resin is specially developed for shrinkproofing woolens and worsteds, and for stabilizing cottons and rayons.

*Trade Mark Reg. U. S. Pat. Off.

## "RESLOOM NC-50"*

**STANDARD FORM:** Water solution—50% resin.

**PROPERTIES:** A clear, colorless, water-soluble methylol melamine in concentrated water solution; density, 1.15 approx.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** This resin is especially developed for stabilizing and finishing cottons and rayons, and for imparting a durable glaze to fabrics.

**AVAILABLE LITERATURE:** Technical Bulletin M-82, "Resloom NC-50."

*Trade Mark Reg. U. S. Pat. Off.

## "REZ" (See Wood Preservatives)

## "REZITE" (See Wood Preservatives)

## RUBBER LACQUERS

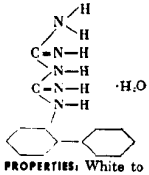
**GENERAL INFORMATION:** Available in matte colors for calender coating rubberized cloth. Applied by knife coating on uncured stock. Also lacquers for footwear and molded rubber articles.



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## "SA-326" (*ortho*-Biphenyl Biguanide)



·$H_2O$ Mol. Wt. 253.30

**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% |

**GENERAL INFORMATION:** SA-326 is 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. It is particularly valuable in preventing discoloration of refined toilet soaps.

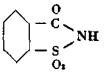
**AVAILABLE LITERATURE:** Technical Bulletin P-101, "SA-326."

## SACCHARIN MONSANTO"

Saccharin Monsanto is available in the so-called insoluble form (complies with U.S.P. requirements for saccharin) and in the soluble or sodium form (complies with U.S.P. requirements for saccharin, sodium). Descriptions of both forms are given below.

## ACCHARIN, U.S.P.

(Also known as saccharin insoluble; ortho-sulfobenzimide)



Mol. Wt. 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% $Na_2CO_3$ (1:5), complete.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Saccharin has approximately 500 times the sweetening power of sugar. Used as a sweetener in tooth pastes, mouth washes, and pharmaceutical preparations, and in beverages and food in place of sugar for diabetics.

**AVAILABLE LITERATURE:** Folder, "Saccharin."

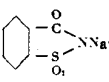


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WATER_PCB-00025935

## SACCHARIN, SODIUM, U.S.P.

(Also known as soluble saccharin; sodium *ortho*-sulfobenzimido)



$NNa \cdot 2H_2O$ Mol. Wt. 241.20

**STANDARD FORMS:** Crystals; powder.

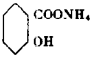
**SPECIFICATIONS:** White crystals or powder; solubility in water (1:3), complete. Loss on drying at 125°C.: crystals 14.0% min. —14.35% max.; powder, 5.3% min. —5.8% max.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** See under Saccharin, U.S.P.

## "SAFLEX" (See Plastics)

## SALICYLATE, AMMONIUM, N.F.



$COONH_4$ Mol. Wt. 155.15

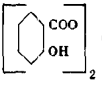
OH **STANDARD FORM:** Powder, 80 mesh.

**SPECIFICATIONS:** White crystalline powder; assay, 98.0% min.; solubility in water (1:5), complete, colorless; solubility in ethyl alcohol 95% (1:15), complete; conforms to N. F. test for heavy metals; no powder retained on 80 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## SALICYLATE, CALCIUM



$Ca$ Mol. Wt. 314.30

**STANDARD FORM:** Powder.

**SPECIFICATIONS:** Fine white powder; solubility in water (1:50), complete, colorless; free salicylic acid, 0.25% max.; conforms to U.S.P. test for heavy metals.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.



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## SALICYLATE, LITHIUM, N.F.



Mol. Wt. 144.05

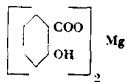
**STANDARD FORM:** Powder.

**SPECIFICATIONS:** White or slightly grayish powder; assay, 98.5% min.; solubility in water (1:20), complete, colorless; conforms to N. F. test for heavy metals.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## SALICYLATE, MAGNESIUM



Mol. Wt. 298.54

**STANDARD FORM:** Powder.

**SPECIFICATIONS:** Fine white powder; solubility in water (1:10), complete; conforms to U.S.P. test for heavy metals.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## SALICYLATE, METHYL, U.S.P.



Mol. Wt. 152.14

**STANDARD FORM:** Liquid.

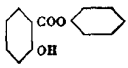
**SPECIFICATIONS:** Clear, colorless liquid; assay, 98.0% min.; solubility in 70% ethyl alcohol (1:7), complete; solubility in N KOH (1:10), complete; sp. g. 1.180-1.185 at 25°/25°C; free phenols., 0.05% max.; conforms to U.S.P. test for heavy metals.

**R. R. CLASSIFICATION:** Oil of Wintergreen.

**GENERAL INFORMATION:** Used as a pharmaceutical product, as a flavoring agent in foodstuffs and beverages and as an odorant in printing inks and insecticides.

**AVAILABLE LITERATURE:** Folder, "Methyl Salicylate Monsanto."

## SALICYLATE, PHENYL, U.S.P. (Salol)



Mol. Wt. 214.21

(*Continued*)



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TOWOLDMON0041468
WATER_PCB-00025937

**STANDARD FORMS:** Crystals; powder, 80 mesh.

**SPECIFICATIONS:** White crystals or powder; solubility in ethyl alcohol 95% (1:6), complete; m. p. 41.0°C. min.; conforms to U.S.P. tests for chloride, sulfate, free acid, free phenol and free salicylic acid; powder 1.0% max. retained on 80 mesh.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## SALICYLATE, POTASSIUM



Mol. Wt. 176.21

**STANDARD FORM:** Powder.

**SPECIFICATIONS:** White or very slightly pinkish powder; assay (dry basis), 99.0% min.; solubility in water (1:10), complete; conforms to U.S.P. test for heavy metals; free alkali, negative.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Pharmaceutical product.

## SALICYLATE, SODIUM, U.S.P.



Mol. Wt. 160.11

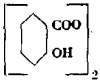
**STANDARD FORMS:** Powder, crystals.

**SPECIFICATIONS:** White powder or crystals; assay (as received) 99.5% min.; solubility in water, (1:10), complete; solubility in ethyl alcohol 95% (1:10), complete, colorless or nearly colorless; 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.

**R. R. CLASSIFICATION:** Sodium Salts.

**GENERAL INFORMATION:** Pharmaceutical product.

## SALICYLATE, STRONTIUM, N.F.



Mol. Wt. 397.88

**STANDARD FORM:** Powder.

**SPECIFICATIONS:** White crystalline powder; assay (as dihydrate), 99.0% min.; solution in water (1:30), complete; conforms to N. F. test for heavy metals and barium.

**R. R. CLASSIFICATION:** Chemicals NOIBN.



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## SALICYLIC ACID, (*ortho*-Hydroxybenzoic Acid)




Mol. Wt. 138.12

**GRADES:** U.S.P. and "B" Grade.

**SPECIFICATIONS OF U.S.P. GRADE:** White needles or powder, 100 mesh; assay, 99.5% min.; m. p., 158.0°C. min.; conforms to U.S.P. test for carbonizable substances; ash, 0.05% max.; powder trace, max. retained on 100 mesh.

**SPECIFICATIONS OF "B" GRADE:** White needles; assay, 98.75% min.; m. p. 158.0°C. at start.

**R. R. CLASSIFICATION:** Salicylic Acid.

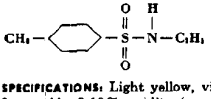
**GENERAL INFORMATION:** Used in the manufacture of medicinals and dyestuffs, as an industrial preservative and as an intermediate in many organic syntheses.

## SALOL (See Salicylate, Phenyl)

## SALT CAKE (See Sodium Sulfate, Technical)

## "SANTICIZER 8"*

(Mixture of *ortho*- and *para*-toluene ethyl sulfonamides)




Mol. Wt. 199.26

**SPECIFICATIONS:** Light yellow, viscous liquid; odor, slight, characteristic; free amide, 9-13%; acidity (as acetic acid) 0.1% max.

**R. R. CLASSIFICATION:** Lacquer Solvents NOIBN.

**GENERAL INFORMATION:** This plasticizer is readily miscible with all common organic solvents except the petroleum hydrocarbons in which it is only very slightly soluble. It is soluble in castor oil, slightly soluble in china wood oil and insoluble in linseed oil. In water it is soluble to the extent of about 0.13% at 23°C. and 0.21% at 45°C. Its solubility in water is decreased by the presence of ammonia but is increased by other alkalies. Its retentivity in acetyl cellulose is about 90 parts by weight to 100 of acetate, and it imparts a high degree of plasticity. It is a solvent for both nitrocellulose and acetyl cellulose. Santicizer 8 is an excellent plasticizer for cellulose acetate, giving a brilliance and polish not obtainable with other plasticizers. This product, being practically insoluble in petroleum hydrocarbons, is a

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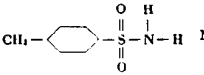
valuable plasticizer for coatings designed to withstand gasoline and related products. Santicizer 8 has some plasticizing action on such protein compounds as casein, glue, soybean protein and corn protein. It may be used alone or in conjunction with other materials such as glycerin or similar compounds. Santicizer 8 greatly increases the flexibility of shellac, having at the same time a considerable softening effect.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTICIZER 9"*

(Mixture of *ortho*- and *para*-toluenesulfonamides)



Mol. Wt. 171.21

**SPECIFICATIONS:** Fine granular particles; m. p., 105°C. min.; melt, clear and light yellow; acidity, pH 4.6 min. in dilute acetone (2 gm. sample in 15 cc. A. R. Acetone and 35 cc. of $CO_2$ free distilled water).

**R. R. CLASSIFICATION:** Lacquer Solvent NOIBN.

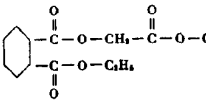
**GENERAL INFORMATION:** Solubility of this plasticizer is quite low in coal-tar hydrocarbons and negligible in petroleum hydrocarbons. It is readily soluble in most other solvents, and in hot linseed, china wood and castor oils. It is soluble in water to the extent of only about 1.0% at 34°C., but this is increased by the presence of alkali. It is the least soluble of the Monsanto plasticizers in ethylene dichloride and in benzene, its solubility in ethylene dichloride being about 4% and in benzene about 1.5%, each at 30°C.

Santicizer 9 differs greatly from other plasticizers in its action. Relatively small amounts impart a gloss to polished articles and give smooth working and uniform curing of molded products. It blends readily with most synthetic resins and does not impart the softening action of liquid plasticizers. It is particularly valuable to the makers of molding compositions. In some phenol-aldehyde 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, it has a temporary plasticizing action on protein compounds such as corn protein and soybean protein.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTICIZER E-15"* (Ethyl Phthalyl Ethyl Glycollate)



Mol. Wt. 280.27

(*Continued*)



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TOWOLDMON0041471
WATER_PCB-00025940

**SPECIFICATIONS:** Color (APHA), 20 max; sp. g. 1.180 ±0.005 at 25°/25°C.; refractive index 1.498 ±0.002 at 25°C.; acidity (as acetic acid), 0.02% max.; odor, slight; sulfur (copper strip test), negative.

**R. R. CLASSIFICATION:** Lacquer Solvent NOIBN.

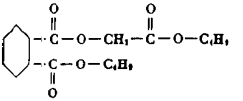
**GENERAL INFORMATION:** This plasticizer is miscible with the common organic solvents except the petroleum hydrocarbons. It is miscible with vegetable oils when heated but partially separates on cooling. Its solubility in water is 0.0175% at 30°C.

Santicizer E-15 is a solvent for both nitrocellulose and acetyl cellulose and for most resins. It is light-fast, and does not evaporate even from the thinnest films. With both acetyl and nitrocellulose it gives clear, tough flexible films which have greatly increased resistance to moisture penetration. It is highly recommended for use with cellulose acetate and vinyl resins.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTICIZER B-16"* (Butyl Phthalyl Butyl Glycollate)



Mol. Wt. 336.37

**SPECIFICATIONS:** Color (APHA), 45 max.; sp. g. 1.097 ±0.005 at 25°/25°C.; refractive index 1.490 ±0.002 at 25°C.; acidity (as acetic acid), 0.02% max.; odor, essentially odorless; sulfur (copper strip test), negative.

**R. R. CLASSIFICATION:** Lacquer Solvent NOIBN.

**GENERAL INFORMATION:** Santicizer B-16 is a practically colorless liquid plasticizer which boils at 219°C. at 5 mm. and does not crystallize at temperatures as low as —35°C. Its water solubility is 0.0012% at 30°C. It is extremely light-stable. It darkens upon heating above 290°C.

Santicizer B-16 is a solvent for nitrocellulose and is compatible with most resins, imparting good flexibility. It probably embodies more desirable properties than any other single nitrocellulose plasticizer, fire-retarding action being about the only property it does not have. Santicizer B-16 is a solvent for, and imparts plasticity to, many resins both synthetic and natural. It has especially interesting properties when used with resins of the glycerol-phthalate and phenol-aldehyde types in which it may be incorporated at various stages of resin formation. It is miscible with castor, linseed and china wood oils and somewhat retards gel formation in the latter on heating. It swells crepe rubber but appears to have no effect on vulcanized rubber. It is an excellent plasticizer for chlorinated rubber, from 10 to 25 parts per 100 usually being required. It is an exceptionally good plasticizer for polystyrene. Mixtures of Santicizer B-16 and Santolite resins may be used to plasticize casein and corn protein.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins".

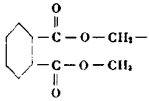
*Trade Mark Reg. U. S. Pat. Off.



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TOWOLDMON0041472
WATER_PCB-00025941

## "SANTICIZER M-17"* (Methyl Phthalyl Ethyl Glycollate)



Mol. Wt. 266.24

**SPECIFICATIONS:** Color (APHA), 20 max.; sp. g. 1.220 ±0.005 at 25°/25°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.

**R. R. CLASSIFICATION:** Lacquer Solvent NOIBN.

**GENERAL INFORMATION:** Santicizer M-17 is a solvent for both nitrocellulose and acetyl cellulose. It imparts a high degree of plasticity which is maintained undiminished even in extremely thin films exposed to air current for a long time. It is very light-stable and may be used in transparent or tinted articles without danger of yellowing. This product is not miscible with castor, linseed, or china wood oils or with petroleum hydrocarbons but is readily miscible with other organic solvents. Its solubility in water is 0.09% at 30°C. but it imparts a considerable degree of resistance to moisture penetration to both nitrocellulose and acetyl cellulose films.

Santicizer M-17 is probably the best cellulose acetate plasticizer available. It 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.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins".

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOBANE"* (Monsanto's Dichloro-Diphenyl-Trichloroethane, Technical) (2,2-bis (parachlorophenyl) 1,1,1-trichloroethane)

**STANDARD FORM:** Powder.

**SPECIFICATIONS:** Fine or medium granular powder with a white to cream color; crystallizing point, 89.0°C. min.; chlorine, 48.0-51.0%; ash, 0.5% max.; water-soluble material, 0.25% max.; water-insoluble, steam volatile material, 0.1 ml./20 gms. max.; chloral hydrate, 0.025% max.; pH of water extract, 6.0-8.0; pH of filtrate, 6.0-8.0.

**R. R. CLASSIFICATION:** Insecticides NOIBN, other than agricultural. Requires Class B "poison" label.

**GENERAL INFORMATION:** An insecticide base conforming to specifications of Jersey City Quartermaster Depot (Technical Grade) No. 1005A 12-29-44. Used in dusting powders, emulsions, suspensions and solutions for the control of various insects.

*Trade Mark Reg. U. S. Pat. Off.



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TOWOLDMON0041473
WATER_PCB-00025942

## SANTOBRITE"* (Sodium Pentachlorophenate Technical)

**STANDARD FORMS:** Powder; 1-oz. briquettes.

**CHARACTERISTICS:** Light tan in color; comparatively odorless; stable under dinary atmospheric conditions when stored in a dry place; true density .00 gms. per cc.; bulking value, 52 lbs. per cu. ft. for briquettes and 25 lbs. .er cu. ft. for powder. Solubility in water expressed as per cent Santo-brite on weight of solutions: 4°C. (39.2°F.) 20.8%; 25°C. (77°F.) 23.1%; 35°C. (95°F.) 28.0%. Relatively inert toward organic compounds; solutions are non-corrosive to iron, steel, copper and brass. Can be supplied as substantially neutral material containing from 0.5 to 0.9% free alkali and as a more alkaline product containing 3 to 4% free alkali.

**U. S. CLASSIFICATION:** Agricultural Insecticide or Fungicide NOIBN.

**GENERAL INFORMATION:** A water-soluble industrial preservative and fungicide. 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, control of slime and algae, manufacture of herbicides, as a fermentation disinfectant and for the control of sap stain in green lumber.

Santobrite and its solutions may be irritating to the skin and mucous membranes of some individuals, and they are somewhat toxic to man and the higher animals. For detailed information on uses and methods of handling, write for literature listed below.

**AVAILABLE LITERATURE:**

Technical Bulletin 0-1, "Santobrite for the Preservation of Adhesives."
Technical Bulletin 0-2, "Santobrite and Santophen 20 for Paint Preservation."
Technical Bulletin 0-5, "Santobrite for Microorganism Control in the Pulp and Paper Industry."
Technical Bulletin 0-15, "Santobrite for the Control of Slime and Algae."
Technical Bulletin 0-17, "Santobrite for the Preservation of Rubber Latex."
Technical Bulletin 0-19, "Santobrite in the Tanning Industry."
Technical Bulletin 0-22, "Santobrite—Methods of Handling and Application."
Technical Bulletin 0-23, "Santobrite."
Technical Bulletin 0-24, "Determination of Chlorphenols and Their Salts in Impregnated Materials."
"Sap Stain Control by Monsanto." 24 pages.
"Preservation of Cellulose Insulating Materials by Monsanto," 24 pages.

## SANTOCEL"*

**GRADES:** Santocel 45
Modifications: Santocel 45 Fine
Santocel 45 Micropulverized
Santocel 45 Devolatilized

(*Continued*)



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TOWOLDMON0041474
WATER_PCB-00025943

**GRADES:** Santocel 58
Modifications: Santocel 58 Fine
Santocel 58 Micropulverized

Santocel "0"
Modifications: None

**CHEMICAL CONSTITUTION:** The following is the approximate analysis for all grades and modifications except for Santocel 0 and devolatilized modifications.

| | |
|---|---|
| $SiO_2$ | 81.5% to 90% |
| Volatile* | 7% to 10% |
| $Na_2SO_4$ | 8.5% to 9.5% |
| $Al_2O_3$ and $Fe_2O_3$ | 1% |

Santocel O and devolatilized modifications are volatile free. Santocel O contains added silicon as opacifier for radiated heat.
*Volatile in water, alcohol and acetaldehyde.

**PHYSICAL PROPERTIES:** Density: Santocel 45 Fine and Santocel 58 Fine have dry bulk density of 8.0 to 9.0 lbs. per cu. ft. Micropulverized modifications have a dry bulk density of 6.5 to 7.5 lbs. per cu. ft. Santocel O has a dry bulk density of 8.75 to 9.75 lbs. per cu. ft. The wet bulk or absolute density of all modifications of grades 45 and 58 is about 17.2 lbs. per gal.

**PARTICLE SIZE DISTRIBUTION:**

Screen Analysis

| *45 Fine and 58 Fine* | | *45 Micropulverized and 58 Micropulverized* | |
|---|---|---|---|
| On 20 mesh | 5.0% | On 100 mesh | 1.2% |
| Through 20 on 60 mesh | 24.0% | Through 100 mesh on 200 mesh | 19.5% |
| Through 60 on 100 mesh | 18.0% | | |
| Through 100 on 200 mesh | 17.0% | | |
| Through 200 mesh | 36.0% | Through 200 mesh | 79.3% |

**SANTOCEL APPLICATIONS**

| | Grade and Modification | | | | | |
|---|---|---|---|---|---|---|
| | 45 Fine | 45 Micro-pulver-ized | 58 Fine | 58 Micro-pulver-ized | 45 De-volatil-ized | Santo-cel O |
| Flatting Lacquers | X | X | X | X | | |
| Flatting Vinyl Resins and Rubber | X | X | X | X | | |
| Flatting Synthetics and Varnish | | | X | X | | |
| Block Resisting Top Coats | X | X | X | X | | |
| Printing Inks | X | X | | | | |
| Thermal Insulation Below 100°F. | | | | | X | |
| Thermal Insulation Above 100°F. | | | | | | X |

(*Continued*)



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TOWOLDMON0041475
WATER_PCB-00025944

| | Grade and Modification | | | | | |
|---|---|---|---|---|---|---|
| | 45 Fine | 45 Micro-pulverized | 58 Fine | 58 Micro-pulverized | 45 De-volatilized | Santocel O |
| Thermal Insulation Liquid Oxygen | | | | | X | |
| Dry Bulk Extender | X | X | | | | |
| Thickener for Non-Aqueous Liquids | | X | | | | |
| Free Flow Agent for Powder | X | X | | | | |
| Anti-Caking Agent | X | X | | | | |
| Rubber Reinforcement | | | | X | | |
| Absorbent for Liquids | X | | | | | |

**GENERAL INFORMATION:** Used for thermal insulation;* flatting agent for coating compositions,* in printing inks;* as a thickening agent for liquids; to increase flow of dry powder, and as an anti-caking agent.

*These uses are described in detail in separate bulletins which are available on request.

Santocel 45M and 58M are used as flatting agents for paints, varnishes, and lacquers where it is desirable that the time of grinding be reduced.

Santocel 45D is used in insulation and in other uses where it is undesirable to have volatiles present.

**AVAILABLE LITERATURE:**

Merrimac Literature 50, "Miscellaneous Uses in U. S. Government Specification Finishes."
Technical Bulletin M-73, "Santocel—A Flatting Agent for Lacquers."
Technical Bulletin M-74, "Santocel—A Flatting Agent for Synthetic Resins and Oleoresinous Varnishes."
Merrimac Literature 51-A, "Santocel for Thermal Insulation."
Merrimac Literature 30-A, "Santocel—General Information."
Technical Bulletin M-75, "Santocel in Printing Inks."
Merrimac Literature 59, "Santocel Topcoats for Flexible Coatings."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOCHLOR"* (*para*-Dichlorobenzene)

(Also known as 1,4-dichlorobenzene)




Mol. Wt. 147.01

**CHARACTERISTICS:** White crystals; crystallizing point, 52.8°C. min.

(*Continued*)



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TOWOLDMON0041476
WATER_PCB-00025945

**STANDARD CRYSTAL SIZES:**

No. 1 (large)— For shaker top cans.

No. 0 (small)—For peach tree borers and for insecticide and miscellaneous uses.

No. 34 (medium)—A combination of two uniformly sized crystals. For shaker top cans and for compressing into cakes.

Fines—Under 12 mesh.

**I. R. CLASSIFICATION:** Paradichlorobenzene.

**GENERAL INFORMATION:** Para-dichlorobenzene is used as an intermediate in the production of dyestuffs; as a deodorant; mothicide, larvacide, and in control of peach tree borers.

**AVAILABLE LITERATURE:** Technical Bulletin 0-18, "Santochlor for the Control of Peach Tree and Stone Fruit Borers."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOCURE" (See Accelerators)

## "SANTOFLEX B" (See Antioxidants, Rubber)

## "SANTOFLEX BX" (See Antioxidants, Rubber)

## "SANTOLITE K"*

**SPECIFICATIONS:** Clear, light yellow sticky resin; color, not more than No. 2.5 by Monsanto Santolite K Standard (comparable in depth of color but not in shade to No. 5 of the Gardner 1933 standard); acid number, 10 max.; refractive index 1.5330 to 1.5390 at 50°C.

**I. R. CLASSIFICATION:** Synthetic Resin Compound.

**GENERAL INFORMATION:** Santolite K is a resinous condensation product of toluene sulfonamide, formaldehyde and alkyd resins. It is a soft sticky resin with the qualities of both the sulfonamide and alkyd types. It is compatible with cellulose esters and ethers. Santolite K has plasticizing properties itself but for most purposes additional plasticizer is desirable and Santocizer M-17 is recommended, although others may be used advantageously. Santolite K is soluble in practically all common organic solvents except the petroleum hydrocarbons. It is not compatible with drying oils so cannot be used in oil varnishes. Santolite K has a better light stability than the other Santolites and is of special value for increasing the resistance to moisture penetration of cellulose ester compositions.

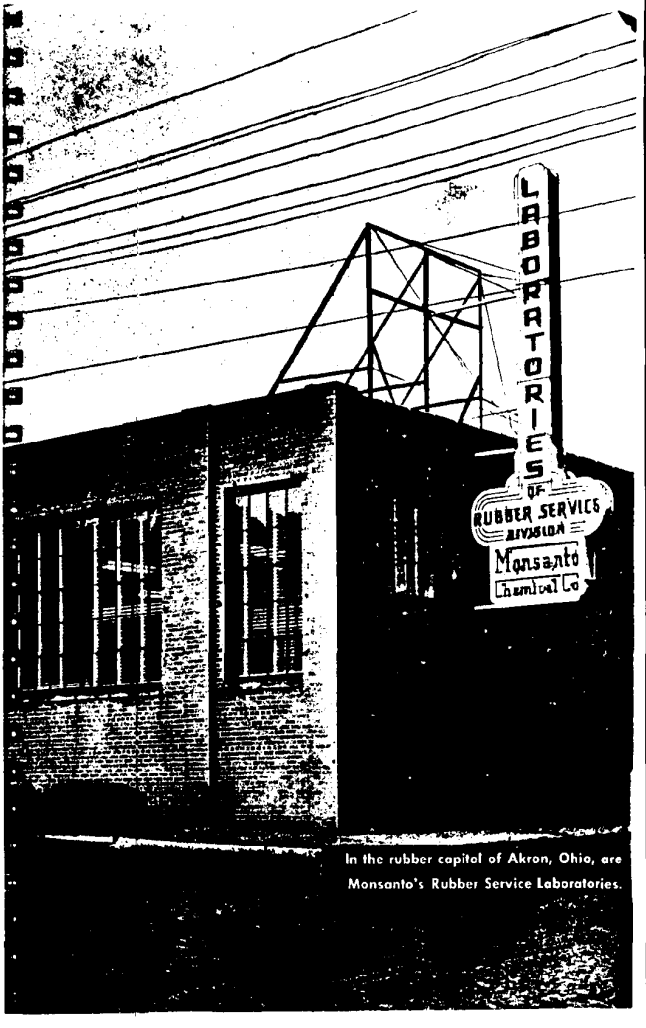
**AVAILABLE LITERATURE:** 40- page booklet, "Plasticizers and Resins."

*Trade Mark Reg. U. S. Pat. Off.



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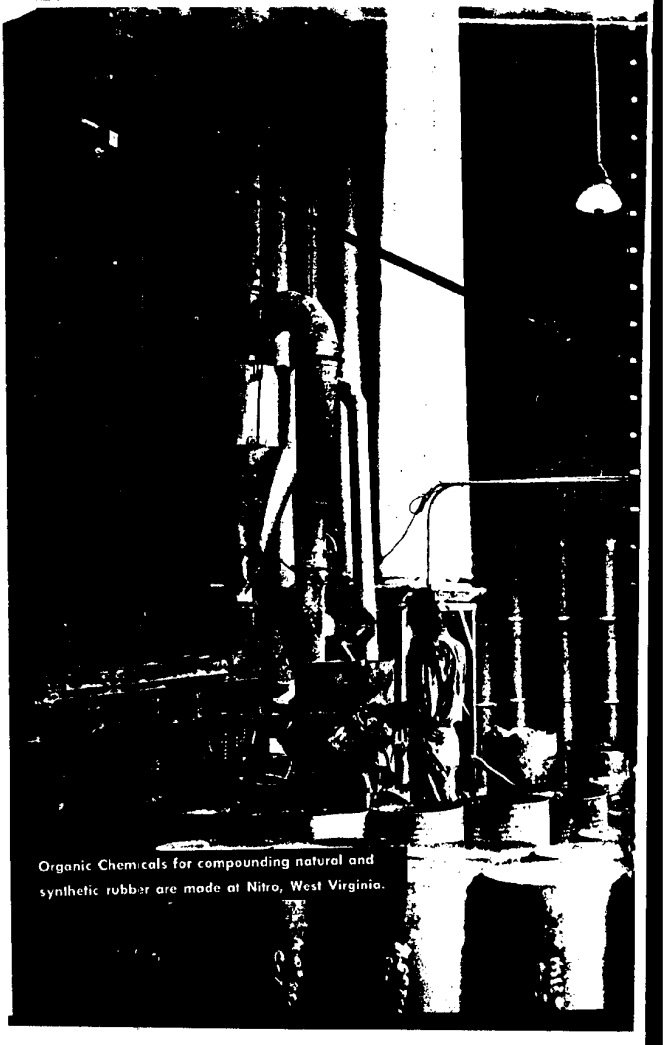
TOWOLDMON0041477
WATER_PCB-00025946




In the rubber capitol of Akron, Ohio, are Monsanto's Rubber Service Laboratories.

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TOWOLDMON0041478
WATER_PCB-00025947



Organic Chemicals for compounding natural and synthetic rubber are made at Nitro, West Virginia.

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TOWOLDMON0041479
WATER_PCB-00025948

## "SANTOLITE K5"*

**GENERAL INFORMATION:** A modification of Santolite K having the same general characteristics except that it is harder.

**R. R. CLASSIFICATION:** Synthetic Resin Compound.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOLITE MHP"*

**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.

**R. R. CLASSIFICATION:** Synthetic Resin Compound.

**GENERAL INFORMATION:** Santolite MHP is an aryl sulfonamide-formaldehyde resin and is similar to Santolite MS in characteristics, except that it is much harder, softening at about 62°C. and being brittle at normal temperatures. It is nearly colorless and is well adapted to specialty 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, and its extreme compatibility with plasticizers and cellulose esters removes much of the danger of blushing, sweating and separation. Santolite MHP 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. It is compatible with all the common plasticizers.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOLITE MS"*

**STANDARD FORMS:** Viscous resin; 80% solution.

**SPECIFICATIONS OF VISCOUS RESIN:** Pale yellow viscous resin; solution in benzene (1:5), clear; solution in benzene (4:6), no crystalline deposit in 24 hrs.; refractive index 1.5690-1.5720 at 50°C.; color of benzene solution (25 gms. in 50 cc.), APHA 70 max.

**SPECIFICATIONS OF 80% SOLUTION:** Light-colored, viscous liquid; free flowing at temperatures above 20°C.; composition 80% Santolite MS, 20% normal butyl acetate.

**R. R. CLASSIFICATION:** Synthetic Resin Compound.

**GENERAL INFORMATION:** Santolite MS is a soft, practically colorless resin

*(Continued)*



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TOWOLDMON0041480
WATER_PCB-00025949

made by the condensation of formaldehyde with aromatic sulfonamides. Like all the Santolites it is compatible with both nitrocellulose and acetyl cellulose and, being a solvent for both, it can be used in any proportion. It forms brittle compositions with both these esters but the addition of a plasticizer makes such combinations permanently flexible. It is readily miscible with all the common organic solvents and thinners except petroleum hydrocarbons. It is not miscible with varnish and paint oils. Santolite MS is 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.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOLUBE 31"*

**SPECIFICATIONS:** Sp. g., 1.03 at 60°/60°F.; color NPA, 4 max.; phosphorus, 5.5-6.0%; nitrogen, 0.17-0.27%; chlorine, 0.05% max.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** A phosphite ester of alkylated phenol. An oxidation and corrosion inhibitor and oiliness agent for medium and low temperature service.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOLUBE 203-A"*

**R. R. CLASSIFICATION:** Petroleum Lubricating Oil.

**GENERAL INFORMATION:** This is a detergent additive for use in crankcase lubricating oils together with Santolube 394-C. Blends of the two additives are marketed as Santolube 204 and 205. These have extremely high detergent properties, suitable for use in all types of base oils. Certain blends have received both Army 2-104B and Navy 9,000 Series approval.

**AVAILABLE LITERATURE:** Technical Bulletin O-31, "Santolubes 203-A, 204 and 205."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOLUBE 303-A"*

**R. R. CLASSIFICATION:** Petroleum Lubricating Oil.

**GENERAL INFORMATION:** This is a detergent additive for use in crankcase lubricating oils together with Santolube 394-C. It has moderate detergent properties, suitable for use in all types of base oils. Certain blends have received approval under Army 2-104B Specification.

**AVAILABLE LITERATURE:** Technical Bulletin O-29, "Santolube 303-A and 570-X-4."

*Trade Mark Reg. U. S. Pat. Off.



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TOWOLDMON0041481
WATER_PCB-00025950

## "SANTOLUBE 394-C"*

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** This is an antioxidant type additive for crankcase lubricating oils and is particularly effective in keeping down acid, varnish and lacquer formation and in preventing bearing corrosion in engines.

**AVAILABLE LITERATURE:** Technical Bulletin O-30, "Santolube 394-C."

*Trade Mark Reg. U. S. Pat Off.

## "SANTOLUBE 570-X-4"*

**R. R .CLASSIFICATION:** Petroleum Lubricating Oil.

**GENERAL INFORMATION:** Santolube 570-X-4 is a blend of four parts of Santolube 303-A and one part Santolube 394-C. This blend has Army 2-104B approval in a dosage of 3.75%. It has proved extremely effective for a medium duty detergency for varied commercial service.

**AVAILABLE LITERATURE:** Technical Bulletin O-29, "Santolube 303-A and 570-X-4."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOMASK"*

**SPECIFICATIONS:** Clear, light yellow liquid; faint vanilla-like odor; sp. g. 1.04-1.06 at 25°/25°C.

**ADDITIONAL PROPERTIES:** Flash point, 210°F. (Cleveland open cup method); flow point, below 0°C.; lbs. per gal., 8.7.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** 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.

**AVAILABLE LITERATURE:** Technical Bulletin O-16, "Santomask for After-Odor Control of Interior Paint, Printing Inks and Some Other Odoriferous Formulations."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOMERSE"*

**STANDARD FORMS:** The Santomerses are highly efficient surface-active wetting agents and detergents. The Santomerse series consists of six products. Each is distinctive in character and has been developed to meet a certain industrial need.

(*Continued*)



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TOWOLDMON0041482
WATER_PCB-00025951

Santomerse D—neutral powder, 100% active.
Santomerse S—30% aqueous solution of Santomerse D.
Santomerse No. 1—neutral flakes.
Santomerse No. 3—neutral powder, 100% active.
Santomerse No. 3—paste (75% Santomerse No. 3 in water).
Santomerse No. 55—neutral flakes, 55% active.

**R. R. CLASSIFICATION:** Washing Compound NOIBN.

**GENERAL INFORMATION:** The Santomerses are the salts of a homologous series of substituted aromatic sulfonic acids. They are used as wetting, spreading, penetrating, emulsifying agents and detergents 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.

**AVAILABLE LITERATURE:** 32-page booklet, "Santomerse."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOMERSE B"* (Sulfonated Ester)

**PROPERTIES:** Soft white flakes of low toxicity.

**GENERAL INFORMATION:** Used as a tasteless, sudsing, synthetic detergent in dentifrices, and for wetting-back dehydrated foodstuffs.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOPHEN 7"* (ortho and para-Benzyl Phenol)

**STANDARD FORM:** Cast solid.

**SPECIFICATIONS:** Light yellow, semi-crystalline mass; faint phenolic odor; sp. g., 1.088-1.098 at 55°/55°C.; refractive index, 1.579-1.589 at 55°C.; crystallizing point, 40°C. min.

**R. R. CLASSIFICATION:** Disinfectant other than medicinal, NOIBN.

**GENERAL INFORMATION:** Santophen 7 is used as the active ingredient in disinfectants and antiseptic formulations; as an industrial preservative and as an enhancing agent for coal tar and cresylic acid disinfectants. It is highly toxic to bacteria. *CAUTION: This product is toxic. Avoid contact with the skin.*

**AVAILABLE LITERATURE:** Monsanto Technical Bulletin O-3, "Santophen 7 - A Germicide and Industrial Preservative."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOPHEN 20"* (Pentachlorophenol Technical)

**CHARACTERISTICS:** Dark grayish flakes; chlorophenolic odor; crystallizing point, 174.5°-175.5°C.; bulking value, 45.5 lbs. per cu. ft.; slightly dispersi-

(*Continued*)



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TOWOLDMON0041483
WATER_PCB-00025952

ble in soaps and sulfonated oils; stable under ordinary atmospheric conditions; relatively unreactive chemically.

**R. R. CLASSIFICATION:** Agricultural Insecticide other than liquid NOIBN.

**GENERAL INFORMATION:** Santophen 20 is highly toxic to fungi and many bacteria and is used industrially where such growths must be prevented or controlled. Frequently used in oil solution (see Permasan) or as the sodium salt (see Santobrite).

SOLUBILITY OF PURE PENTACHLOROPHENOL

| Solvent | Per Cent Pentachlorophenol on Weight of Solution at Indicated Temperature | | | |
|---|---|---|---|---|
| | 0°C. | 20°C. | 30°C. | 60°C. |
| Water | 0.0005 | 0.0014 | 0.0019 | 0.0053 |
| Methanol | 40.5 | 57.0 | 65.5 | 77.5 |
| Diacetone alcohol | 39.5 | 56.5 | 62.5 | 73.5 |
| Diethyl ether | ... | 52.9 | 60.3 | ... |
| Ethanol (95%) | 39.0 | 47.5 | 52.0 | 65.5 |
| Pine oil | 24.5 | 32.0 | 35.5 | 46.5 |
| Diethylene glycol | ... | 27.5 | 52.5 | ... |
| Cellosolve | 8.0 | 27.0 | 37.5 | ... |
| Acetone | ... | 21.5 | 33.4 | ... |
| Xylene | 8.5 | 14.0 | 17.5 | 34.0 |
| Corn oil | 3.5 | 14.8 | 17.3 | ... |
| Linseed oil (raw) | ... | 13.9 | 15.4 | ... |
| Toluene | 6.0 | 11.5 | 15.0 | 31.0 |
| Soya bean oil | ... | 12.4 | 14.9 | ... |
| Benzene | ... | 11.0 | 14.0 | 31.5 |
| Orthodichlorobenzene | 5.5 | 8.5 | 11.5 | 26.0 |
| Ethylene glycol | ... | 6.0 | 11.5 | 38.5 |
| Engine distillate | ... | 3.6 | 5.0 | ... |
| Diesel oil | 1.9 | 3.1 | 4.0 | 11.3 |
| Gas oil | 0.3 | 2.4 | 3.7 | 9.3 |
| Carbon tetrachloride | ... | 2.0 | 3.1 | ... |
| Stoddard solvent | ... | 1.5 | 2.5 | 7.5 |

VAPOR PRESSURE OF PURE PENTACHLOROPHENOL

| Temp. °C. | mm. of mercury |
|---|---|
| 20 | 0.00011 |
| 50 | 0.0023 |
| 100 | 0.12 |
| 180 | 11.21 |

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.

**AVAILABLE LITERATURE:** Technical Bulletin 0-25, "Santophen 20."

*Trade Mark Reg U. S. Pat. Off.



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TOWOLDMON0041484
WATER_PCB-00025953

## "SANTOPOID S"*

**SPECIFICATIONS:** Dark brown, oily liquid; sp. g. 1.15 approx.; flash point °F. (Cleveland open cup), 250 min.; Saybolt viscosity at 100°F., 340 approx.; % sulfur, 10-15; % chlorine, 30-35.

**R. R. CLASSIFICATION:** Petroleum Oil NOIBN.

**GENERAL INFORMATION:** Used up to 10% mixed with mineral oil to form extreme-pressure lubricants for hypoid and other gears. Approved for use in Army 2-105 Specification and F. S. VV-L-761.

**AVAILABLE LITERATURE:** Application Data Bulletin 117, "Santopoid S-Santopoid A," 28 pages.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOPOUR"*

**SPECIFICATIONS:** Gravity, °A.P.I., 29.5; flash point, 400°F; pour point, +10°F.; viscosity, SUS at 210°F., 60; color NPA (85 and 15), 4-4.5; neutralization number, 0.15.

**R. R. CLASSIFICATION:** Petroleum Lubricating Oil.

**GENERAL INFORMATION:** An earlier form of pour point depressant and still available to those desiring it.

**AVAILABLE LITERATURE:** Application Data Bulletin 120-A, "Santopour-Santopour B," 20 pages.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOPOUR B"*

**SPECIFICATION:** Gravity, °A.P.I., 28.5; flash point, 400°F.; pour point, 0°F., viscosity, SUS at 210°F., 75; color NPA (85 and 15), 5; neutralization number, 0.15.

**R. R. CLASSIFICATION:** Petroleum Lubricating Oil.

**GENERAL INFORMATION:** An improved pour point depressant for lubricating oils. Lowers the pour point of wax-bearing oils as much as 50°F. Stable under extreme service conditions.

**AVAILABLE LITERATURE:** Application Data Bulletin 120-A, "Santopour-Santopour B," 20 pages.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOSITE"* (Sodium Sulfite Anhydrous, Technical)

**SPECIFICATIONS:** Tan to slightly pink crystalline powder; assay $Na_2SO_3$, 93.0% min.; foreign odor, very faint, max.; filtrate from a 10% solution in water not darker than APHA 250 max.

(*Continued*)



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TOWOLDMON0041485
WATER_PCB-00025954

**R. R. CLASSIFICATION:** Sodium Sulfite Anhydrous, Technical.

**GENERAL INFORMATION:** Used as a depressant in ore flotation and rubber, paper and cordage manufacture; as a reducing agent for removing oxygen from boiler feed water, tanning leather, processing dehydrated food, manufacture of alcohol by new fermentation process, and desulfurizing wool grease.

**AVAILABLE LITERATURE:** Technical Bulletin O-26, "Santosite for Removing Oxygen from Boiler Feed Water."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOTAN-KR"* (Basic Chrome Sulfate)

Contains approx. 50% of $Cr_2(SO_4)_2(OH)_2$

**STANDARD FORM:** Crystals.

**SPECIFICATIONS:** Dark green crystals; solution in water (5:500), clear; basicity ($Cr_2O_3/SO_3$), 101-105; basicity (Schorlemmer), 37.3-39.7%; chromium as $Cr_2O_3$, 23.9% min.

**R. R. CLASSIFICATION:** Dry Tanning Extract NOIBN.

**GENERAL INFORMATION:** Used in chrome tanning of calf, cow and horse hides, and sheepskins.

**AVAILABLE LITERATURE:** Booklet, "Chemicals for the Tanning Industry."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOVAR O" (See under Antioxidants, Rubber)

## "SANTOWAX,"* REGULAR

**STANDARD FORM:** Yellow waxy solid.

**PROPERTIES:** Boiling range: first drop, 365°C.; 80%, 402°C. Freezing point: primary hold point, 140°C.; secondary hold point, 56°C. Appar. sp. g., 1.10 (approx.) at 25°C., slightly soluble in alcohol and more soluble in benzene.

**R. R. CLASSIFICATION:** Coal Tar Resin.

**GENERAL INFORMATION:** Used as a plasticizer and resin in print formulations.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX DO"*

**PROPERTIES:** Light mobile oil; mixture of diphenyl and ortho-terphenyl with probably some metaterphenyl; insoluble in water; miscible with aromatic hydrocarbons and petroleum solvents.

**GENERAL INFORMATION:** Suggested as an ingredient of vehicle for paints; plasticizer.

*Trade Mark Reg. U. S. Pat. Off.



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## "SANTOWAX M"*

**STANDARD FORM** Yellow waxy solid.

**PROPERTIES:** Micro-crystalline hydrocarbon of unusual stability toward heat; m. p., 83°-85°C.; flash point, 207°C.; hardness (ASTM D-5-25) 250 gm. load, 0.23 mm.

**R. R. CLASSIFICATION:** Coal Tar Resin.

**GENERAL INFORMATION:** Used in waxing citrus fruit.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX MH"* (Hydrogenated Santowax M)

$C_{15}H_{32}$

**PROPERTIES:** White crystalline solid; m. p. about 50°C. (literature gives m. p. for pure compound as 62.5°-63.5°C.); soluble in acetone, benzene and ethanol; insoluble in water.

**GENERAL INFORMATION:** Suggested as a plasticizer.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX O"*

**PROPERTIES:** Oily, crystalline hydrocarbon; hold point, less than 50°C.; flash point, 171°C.; flame point, 193°C. Hardness (ASTM D-5-25): 50 gm. load, 0.13 mm.; 150 gm. load, 0.40 mm.; 250 gm. load. 1.07 mm.

**R. R. CLASSIFICATION:** Coal Tar Resin.

**GENERAL INFORMATION:** Semi-solid plasticizer for soft wax or resin compositions, and in waxing citrus fruit.

**AVAILABLE LITERATURE:** Technical Bulletin P-103, "The Hydrocarbon Santowaxes."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX OM"* (Eutectic)

71% o-terphenyl and 29% m-terphenyl.

**PROPERTIES:** A yellow crystalline solid; freezing point 38°C.; soluble in benzene, acetone and ethanol; insoluble in water.

**GENERAL INFORMATION:** Suggested as a plasticizer.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX OSA"*

**PROPERTIES:** A synthetic waxy solid; sp. g. 0.99 at 29°C.; softening point 59°-59.2°C.; crystallization point 50°-52.2°C.; flash point 246°C.; fire

(*Continued*)



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point 279°C.; decomposition point, 232°C.; acid number 4.7; soluble in benzene, trichlorobenzene, naphtha and turpentine; only slightly soluble in ethanol; insoluble in water.

**GENERAL INFORMATION:** Santowax OSA has good gloss characteristics. It is suggested for use in polishes, wax finishes, paints, cosmetics and paper.

**AVAILABLE LITERATURE:** Technical Bulletin P-107, "The Amide Santowaxes."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX P"*

**STANDARD FORM:** Flaky crystals.

**PROPERTIES:** Nearly white, crystalline high-melting hydrocarbon; first crystals, 209°-210°C.; flash point, 207°C.; flame point, 238°C.; hardness (ASTM D-5-25) 250 gm. load, 0.33 mm.

**R. R. CLASSIFICATION:** Coal Tar Resins.

**GENERAL INFORMATION:** Used as a high-melting wax coating for papers.

**AVAILABLE LITERATURE:** Technical Bulletin P-103, "The Hydrocarbon Santowaxes."

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX PH"* (Hydrogenated Santowax P)

$C_{11}H_{12}$

**PROPERTIES:** White crystalline solid; freezing point 160°C.; soluble in benzene and ethanol; insoluble in water.

**GENERAL INFORMATION:** Suggested as an opacifying agent for molded paraffin articles; as a plasticizer.

*Trade Mark Reg. U. S. Pat. Off.

## "SANTOWAX PSA"*

**PROPERTIES:** A high-melting, synthetic waxy solid; refractive index, 1.58; density, 1.04 at 29°C.; crystallization point, 135.5°-138°C.; flash point, 268°C.; fire point, 318°C.; decomposition point, 193°-204°C.; acid number 0.1; soluble in hot benzene or trichlorobenzene; only slightly soluble in hot ethanol, naphtha and turpentine; insoluble in water.

**GENERAL INFORMATION:** Santowax PSA yields good gloss. It is suggested for use in polishes, wax finishes, paints and on paper.

**AVAILABLE LITERATURE:** Technical Bulletin P-107, "The Amide Santowaxes."

*Trade Mark Reg. U. S. Pat. Off.



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WATER_PCB-00025957

## "SANTOWHITE"

**SPECIFICATIONS:** Polyalkylated phenol sulfide; sp. g. 1.07 at 25°C.; soft brown resin at 25°C.; soluble in $CCl_4$, benzene, ether, $CS_2$, acetone and alcohol; insoluble in water.

**GENERAL INFORMATION:** Suggested as a non-discoloring antioxidant for natural and synthetic rubbers.

## SILICA AEROGEL (See Santocel)

## SILICA SOL (See Syton W-20)

## SILVER METAPHOSPHATE

$AgPO_3$

**PROPERTIES:** White granular material or powder; insoluble in water; stable to light.

## SILVER ORTHOPHOSPHATE, MONO

$AgH_2PO_4$

**PROPERTIES:** Light buff-colored powder; slightly soluble in water.

## SILVER PYROPHOSPHATE, TETRA

$Ag_4P_2O_7$

**PROPERTIES:** Light brown powder; insoluble in water; darkens upon exposure to the light.

## SODIUM ACETATE

| | |
|---|---|
| $CH_3COONa$ | Mol. Wt. 82.04 |
| $CH_3COONa \cdot 3H_2O$ | Mol. Wt. 136.09 |

**STANDARD FORMS:** Crystals, 60%, N. F.; anhydrous (not N. F.).

**SPECIFICATIONS OF N. F. GRADE:** White crystals or granules; assay (as trihydrate), 99.5-104.0%; solubility in water (1:2), complete; alkalinity (as $Na_2CO_3$), 0.025% max., conforms to N. F. test for heavy metals; no crystals retained on 10 mesh.

**SPECIFICATIONS OF ANHYDROUS (NOT N. F.):** White or grayish crystalline material; assay, 99.0% min.; solubility in water (1:2), complete; carbonate (as $Na_2CO_3$), 0.5% max.

**R. R. CLASSIFICATION:** Sodium Acetate.

**GENERAL INFORMATION:** Used in the manufacture of dyestuffs as a condensing component and buffing agent in coupling reactions; in dyeing operations as a mordant; in the manufacture of pharmaceuticals; in the soap and tanning industries; and as a photographic chemical.



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## SODIUM ACID PYROPHOSPHATE

(Also known as disodium dihydrogen pyrophosphate and acid sodium pyrophosphate)

$Na_2H_2P_2O_7$ Mol. Wt. 221.97

**GRADES:** Food and commercial. Food grade meets all U. S. Pure Food Law requirements.

**PROPERTIES:** White powder, soluble in water and having min. neutralizing value of 74; pH of 1% solution, 4.2.

**R. R. CLASSIFICATION:** Sodium Phosphate.

**GENERAL INFORMATION:** Used in oil well drilling muds and as a leavening agent in baking powder and flour.

## SODIUM ALUMINATE

$Na_2Al_2O_4$ Mol. Wt. 164.2

**STANDARD FORM:** White soluble powder; contains 90% soluble sodium aluminate.

**PROPERTIES:** Readily soluble in water and extremely low in iron and insoluble material. Solutions up to 10% concentration have good stability.

**R. R. CLASSIFICATION:** Sodium Aluminate.

**GENERAL INFORMATION:** Used in papermaking: with aluminum sulfate for sizing at higher pH's.; also to help set color and filler and to improve paper formation. In treatment of municipal and industrial water: with aluminum sulfate as a coagulant; in the lime-soda softening process for silica removal and floc formation. Miscellaneous: as an alkaline source of alumina in the manufacture of certain pigments, catalysts and casein paints; in processing glycerin lyes; in chrome tanning; in cleaning solutions; to aid set of the frit in vitreous enameling.

**AVAILABLE LITERATURE:** Technical Bulletin M-78, "Sodium Aluminate for Water Treatment."

## SODIUM AMMONIUM PHOSPHATE

(Also known as microcosmic salt, sodium ammonium hydrogen phosphate, salt of phosphorus, phosphorous salt, fusible salt of urine)

$NaNH_4HPO_4 \cdot 4H_2O$ Mol. Wt. 209.09

**STANDARD FORM:** Crystals.

**PROPERTIES:** Transparent, white effervescent, monoclinic crystals; gives off water and ammonia on heating, leaving $NaPO_3$; contains above 32% $P_2O_5$, 7.5% $NH_3$ and 14% $Na_2O$.

**GRADE:** Commercial.

**R. R. CLASSIFICATION:** Disodium Phosphate.

**PRINCIPAL USES:** Used principally in analytical laboratories for standardizing uranium solution; determination of Mg and Mn; as a reagent in blow pipe analysis.



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## SODIUM BENZOATE



Mol. Wt. 144.11

**GRADES:** U.S.P. and Technical.

**SPECIFICATIONS OF U.S.P. GRADE:** Thin white flakes or white powder; solubility in water (1.0:1.8 at 25°C.), complete; solubility in 90% ethyl alcohol (1:50), complete; N/10 alkali or acid per 2 gm. sample, 0.2 cc. max.; pH 6.8-10.4; loss on drying at 110°C., 0.50% max.; assay, 99.0% min.; chlorides (as NaCl), 0.05% max.; organic chlorine, none; sulfates (as $Na_2SO_4$), 0.05% max.

**SPECIFICATIONS OF TECHNICAL GRADE:** White or slightly tinted powder; assay, 99.0% min. (dry basis); solution in water (1:18), 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.; heavy metals, none.

**R. R. CLASSIFICATION:** U.S.P. Food Preserving Compound. Technical—Chemicals NOIBN.

**GENERAL INFORMATION:** Used for preserving foods, tobacco and medicinal preparations.

## SODIUM BISULFATE (Nitre Cake)

**STANDARD FORMS:** Bulk; globular.

**TYPICAL ANALYSIS:** 35% $H_2SO_4$ available.

**R. R. CLASSIFICATION:** Nitre Cake.

**GENERAL INFORMATION:** Used to replace either sulfuric acid or combination of sulfuric acid and Glauber's salt. One hundred lbs. of nitre cake is approximately equivalent to 35 lbs. of 66° sulfuric acid and 141 lbs. of 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-bath tan solutions; as an acid scour for household use; in agriculture for disinfecting soil; as a bowl cleaner in sanitary trade

## SODIUM BISULFITE

**STANDARD FORMS:** 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 |

(*Continued*)



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**R. R. CLASSIFICATION:** Sodium Bisulfite Dry or Sodium Bisulfite Liquid

**GENERAL INFORMATION:** Used 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 of ground wool, 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)*

## SODIUM FERRIC PYROPHOSPHATE

$Na_xFe_x(P_2O_7)_x \cdot xH_2O$

**PROPERTIES:** A finely subdivided powder; soluble in hydrochloric acid; insoluble in water; contains min. of 15.5% iron.

**GENERAL INFORMATION:** Used in food fortification as a mineral supplement. It does not induce rancidity in cereal products.

## SODIUM GLYCEROPHOSPHATE (See Glycerophosphates

## SODIUM HYDROXIDE (See Caustic Soda)

## SODIUM HYPOCHLORITE (See Merclor)

## SODIUM METAPHOSPHATE (Insoluble)

**PROPERTIES:** White powder, generally stated to be the monometaphosphate —$NaPO_3$; soluble in hot concentrated $H_2SO_4$; insoluble in water.

**GENERAL INFORMATION:** Suggested as a mild abrasive; has mild polishing power; softens hard water, probably by base ion exchange method.

## SODIUM METAPHOSPHATE, LOW pH

$(NaPO_3)_6$

**PROPERTIES:** Clear, water-soluble glass; very hygroscopic—pH of 1% solution —2.2.

**GENERAL INFORMATION:** Suggested for leather tanning.

## SODIUM META SULFO CETYL BENZOATE

**PROPERTIES:** White, waxy flakes; soluble in water.

**GENERAL INFORMATION:** Suggested as a detergent for neutral or moderately acid solutions.



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WATER_PCB-00025961

## SODIUM MONOHYDROGEN PYROPHOSPHATE, TRI

$Na_2HP_2O_7$

**PROPERTIES:** Colorless, crystalline solid varying in water of composition from the anhydrous salt to $9H_2O$; very soluble in water; pH of 1% solution —7.4; water-softening properties about equal to tetrasodium pyrophosphate.

**GENERAL INFORMATION:** Suggested as a water softener in conjunction with organic detergents. Standard buffer for pH control.

## SODIUM PENTACHLOROPHENATE (See Santobrite)

## SODIUM PHOSPHATE, MONO

(Also known as sodium phosphate, monobasic; sodium dihydrogen phosphate; sodium biphosphate; monosodium ortho phosphate; acid sodium phosphate)

$NaH_2PO_4$ Mol. Wt. 119.993

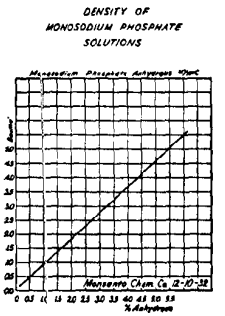
**STANDARD FORM:** White powder.

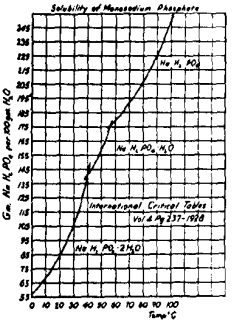
**PROPERTIES:** Contains not less than 58% $P_2O_5$; pH value of 1% solution, 4.5.

**GRADES:** Food; commercial.

**R. R. CLASSIFICATION:** Sodium Phosphate.

**GENERAL INFORMATION:** Used for conditioning boiler water and in electroplating.






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TOWOLDMON0041493
WATER_PCB-00025962

# SODIUM PHOSPHATE, DI

(Also known as phosphate of soda; sodium phosphate dibasic; secondary sodium phosphate; exsiccated sodium phosphate)

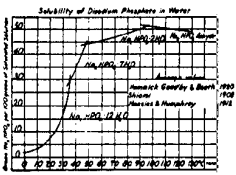
$Na_2HPO_4$ Mol. Wt. 141.982

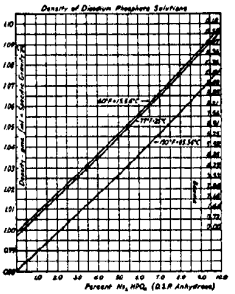
**PROPERTIES:** Soluble in water, insoluble in alcohol; on exposure to air will absorb 2 to 7 mols $H_2O$ depending on humidity and temperature; loses molecular water at 240°C. forming tetrasodium pyrophosphate; pH of 1% solution at 25°C., 8.8. One lb. anhydrous product is equivalent to 2.5 lbs. of crystalline (dodecahydrate).

**GRADES TECHNICAL:** Food, (Granular and Powdered); Medicinal, U.S.P.

**R. R. CLASSIFICATION:** Disodium Phosphate.

**GENERAL INFORMATION:** Used in making glazes for potteries, porcelains and china ware; as an emulsifier in making process cheese; in various chemical processes; in manufacture of dyestuffs such as Schnitzler'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; conditioning boiler water; medicinal.

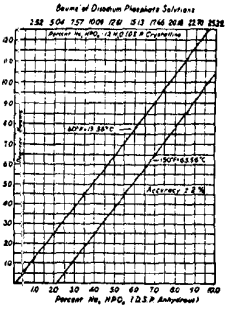


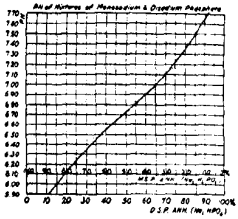






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## SODIUM PHOSPHATE, HEMIBASIC

$(NaH_5(PO_4)_2)$.

**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. 1½8°C.

**GENERAL INFORMATION:** Suggested for treating silage; as a strong phosphoric acid in solid form; metal cleaning.

## SODIUM PHOSPHATE, TRI

(Also known as normal sodium phosphate; sodium phosphate, tribasic; tertiary sodium phosphate; T.S.P.)

$Na_3PO_4 \cdot 12H_2O$ Mol. Wt. 380.16

**SPECIFICATIONS:** White crystalline material, uniformly sized; quickly soluble in water giving an alkaline reaction; pH value of 1% solution, 11.8.

**R. R. CLASSIFICATION:** Trisodium Phosphate.

**GENERAL INFORMATION:** Used principally in cleaners and detergents for both household and industrial use. Fruit Cleaning: To remove insecticide sprays and inhibit growth of fruit mold. Water Treatment: For softening and conditioning water.

**AVAILABLE LITERATURE:** Leaflet, "T.S.P."



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TOWOLDMON0041495
WATER_PCB-00025964

## SODIUM PHOSPHATE, TRI, ANHYDROUS

$Na_3PO_4$ Mol. Wt. 163.97

**STANDARD FORM:** White powder.

**PROPERTIES:** Soluble in water; 1 lb. is equivalent in $Na_3PO_4$ content to 2.12 lbs. of trisodium phosphate crystalline.

**GRADE:** Commercial.

**R. R. CLASSIFICATION:** Trisodium Phosphate.

**PRINCIPAL USES:** Used for the same purposes as crystalline T.S.P.; in the manufacture of compounds containing caustic soda it permits the production of dry mixtures.

## SODIUM POTASSIUM AMYL PHOSPHATE

(Mixture of sodium and potassium salts of the amyl phosphoric acids)

**STANDARD FORM:** 60% solution in water.

**PROPERTIES:** Straw-colored liquid with slight pentasol odor; sp. g. 1.339; wt. per gal. 11.2 lbs.; pH 7.0-7.3; slightly hygroscopic; anhydrous form gelatinous.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as ingredient in vat printing pastes and as a spinning agent for wool.

## SODIUM PYROPHOSPHATE, TETRA

(Also known as sodium pyrophosphate, pyrophosphate of soda, normal pyrosodium phosphate, alkaline sodium pyrophosphate and TSPP)

**GRADES:** Crystalline and anhydrous.

**PROPERTIES:** White crystalline material or white granular powder; pH value of 1% solution, 10.2.

**R. R. CLASSIFICATION:** Sodium Phosphate.

**GENERAL INFORMATION:** Used in bleaching, especially for straw, and as an ink eradicator; 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; oil drilling muds; as emulsifier in process cheese manufacture; soap builder; degumming textiles.

**AVAILABLE LITERATURE:** Technical Bulletin P-24, "Phosphotex."

## SODIUM SALICYLATE (See Salicylates)



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TOWOLDMON0041496
WATER_PCB-00025965

## SODIUM SULFATE, ANHYDROUS

$Na_2SO_4$ Mol. Wt. 142.05

**TYPICAL ANALYSIS:** White granular crystals; 99% $Na_2SO_4$ available.

**R. R. CLASSIFICATION:** Sodium Sulfate.

**GENERAL INFORMATION:** 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. Used for diluting dry dyestuffs and in tanning. Other uses same as for Glauber's salt.

For crude Sodium Sulfate, see Sodium Sulfate, Technical.

## SODIUM SULFATE, CRYSTAL (Glauber's Salt)

$Na_2SO_4 \cdot 10H_2O$

**STANDARD FORM:** Crystals and Glauboids.

**TYPICAL ANALYSIS:** 43% $Na_2SO_4$ available.

**R. R. CLASSIFICATION:** Glauber's Salt.

**GENERAL INFORMATION:** Used principally 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.

## SODIUM SULFATE, TECHNICAL (Salt Cake)

$Na_2SO_4$ Mol. Wt. 142.05

**TYPICAL ANALYSIS:** 94-95% $Na_2SO_4$ available.

**R. R. CLASSIFICATION:** Salt Cake.

**GENERAL INFORMATION:** Used in the manufacture of sulfate pulp, glass, sodium sulfide, and for treatment of boiler feed waters.

For refined sodium sulfate, see Sodium Sulfate, Anhydrous.

## SODIUM SULFATO-PHOSPHATE

$Na_2SO_4 \cdot HPO_3 \cdot H_2O$

**STANDARD FORM:** Hygroscopic, white granular powder.

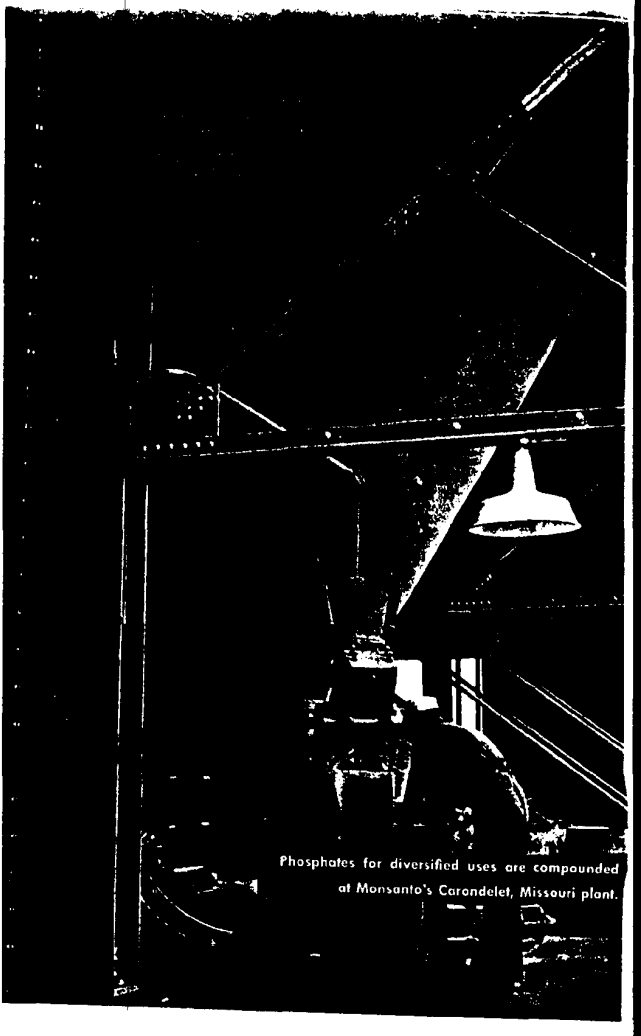
**TYPICAL ANALYSIS:** $P_2O_5$, 29.76%; $SO_3$, 32.04%.

**GENERAL INFORMATION:** Suggested as an acidulant in powdered soft drinks.



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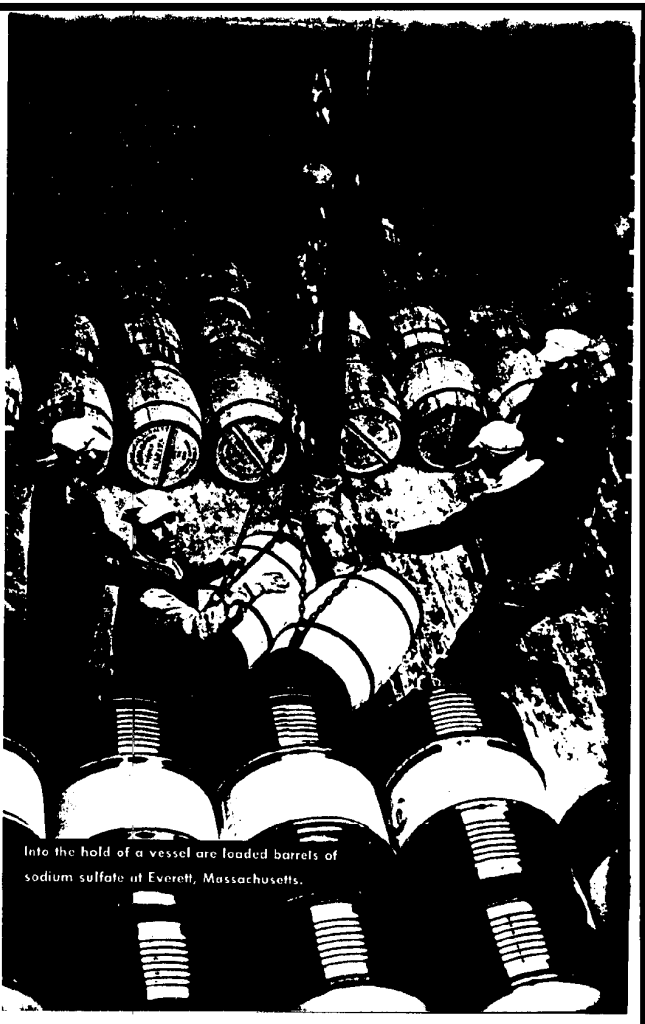
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WATER_PCB-00025966



Phosphates for diversified uses are compounded at Monsanto's Carondelet, Missouri plant.

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TOWOLDMON0041498
WATER_PCB-00025967



Into the hold of a vessel are loaded barrels of sodium sulfate at Everett, Massachusetts.

0683415

TOWOLDMON0041499
WATER_PCB-00025968

## SODIUM SULFHYDRATE*

$NaHS$ Mol. Wt. 56.06

**STANDARD FORM:** 33 ½% NaHS, liquid.

**R. R. CLASSIFICATION:** Sodium Sulfhydrate.

**GENERAL INFORMATION:** Sodium sulfhydrate is chemically similar to sodium sulfide. Where a sulfide with a lower caustic content is desirable sodium sulfhydrate may be used. The main application for sodium sulfhydrate is in dehairing leather where its lower caustic alkalinity makes it more desirable than sodium sulfide for certain leathers. A lower caustic alkalinity causes less swelling of the hides or skins, thus producing leather with a finer, smoother grain. It can be said that sodium sulfhydrate affords a means of controlling plumping (swelling). Unlike sodium sulfide, sodium sulfhydrate will not dehair by itself. Lime must be used with it to give a sufficiently high pH for dehairing.

*Not manufactured by us, but furnished for the convenience of our customers.

**AVAILABLE LITERATURE:** Bulletin, "Sodium Sulfhydrate for Tannery Use."

## SODIUM SULFIDE*

**STANDARD FORMS:** Crystals ($Na_2S \cdot 9H_2O$); concentrated — flakes, ($Na_2S \cdot xH_2O$).

**TYPICAL ANALYSIS:** Crystals, 31% $Na_2S$; concentrated, 60-62% $Na_2S$.

**R. R. CLASSIFICATION:** Sodium Sulfide.

**GENERAL INFORMATION:** Sodium sulfide is a salt of the weak acid, hydrogen sulfide, and the strong alkali, caustic soda, and consequently its solutions are strongly alkaline. Reacts with metal salts to form metal sulfides, nearly all of which are colored. Reacts with acids, precipitating sulfur and liberating hydrogen sulfide. It is a reducing agent and solutions are ready solvents of sulfur to form polysulfides.

Principal use is in tanning to remove hair from calfskins and cowhides, and from sheepskins from which the wool has already been removed. Other uses are in the manufacture and application of sulfur dyes, degumming of silk, denitrating of nitrocellulose rayon, sodium polysulfide solutions, leaching gold ore tailings, dissolving cresols from coal tar oils, boiling out linen and depositing mineral pigments on cotton.

*Not manufactured by us but furnished for the convenience of our customers.

## SODIUM SULFITE (See Santosite)



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TOWOLDMON0041500
WATER_PCB-00025969

## SODIUM TRIMETAPHOSPHATE

$(NaPO_3)_3$

**PROPERTIES:** White powder; neutral, water-soluble salt; non-hygroscopic.

**GENERAL INFORMATION:** Suggested as a modifying agent for rate of set of plaster.

## SODIUM TRIPHOSPHATE

$Na_5P_3O_{10}$

**PROPERTIES:** White granular solid; water-soluble, with excellent water-softening and detergent properties. The material is a calcium sequestering agent and also has a high binding power for most of the metals of Group II and Group IV. In a 1% solution the pH is 9.3-9.5.

**GENERAL INFORMATION:** Suggested as a detergent and water softener.

## SOLVENTS FOR CELLULOSE ESTERS AND ETHERS

(See Acetone, Amyl, Butyl and Ethyl Acetates and Diacetone Alcohol, Technical)

## "SOPANOX"*

**GENERAL INFORMATION:** Sopanox is 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. Our experience shows that Sopanox satisfies the exacting demands of manufacturers of soaps produced from animal or vegetable oils, filled or unfilled. It is particularly valuable in preventing discoloration of refined toilet soaps.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**AVAILABLE LITERATURE:** Technical bulletin P-100, "Sopanox."

*Trade Mark Reg. U. S. Pat. Off.

## "SOPET"* (Sodium Potassium Ethyl Phosphate Solution)

Mixture of sodium and potassium salts of the ethyl phosphoric acids

**STANDARD FORM:** 60% solution in water.

**PROPERTIES:** Water-white liquid with slight ester odor; 11.4 lb. per gal.; sp. g. 1.37 at 25°C.; pH 7.0-7.4 in 60% solution; viscosity, 128 cps. at 25°C.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as fiber lubricant in spinning of wool. Being water soluble, is easily removed from yarn or cloth without soap scouring.

*Trade Mark Reg. U. S. Pat. Off.



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TOWOLDMON0041501
WATER_PCB-00025970

## SPREADING AGENTS (See Areskap, Aresket, Aresklene, Santomerse)

## STEEL PICKLING INHIBITORS (See Hibitite)

## STRONTIUM METAPHOSPHATE

$Sr(PO_3)_2$

**PROPERTIES:** Gray powder; insoluble in water.

**GENERAL INFORMATION:** Suggested as constituent of glasses, porcelains, and enamels.

## STRONTIUM SALICYLATE N.F. (See Salicylates)

## STYRAMIC (See Plastics)

## STYRAMIC HT (See Plastics)

## SUCCINIC ANHYDRIDE



Mol. Wt. 100.07

**STANDARD FORM:** Crystals.

**SPECIFICATIONS:** White crystalline material; unsaturated acids (as maleic acid) 0.75% max.; crystallizing point 118.0°C. min.; assay 99.0% min.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in the manufacture of pharmaceuticals and alkyd resins.

## SULFANILAMIDE, U.S.P. (*para*-Aminobenzene Sulfonamide)



Mol. Wt. 172.20

**STANDARD FORMS:** Crystals, 30-80 mesh; powder, 100 mesh.

(*Continued*)



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TOWOLDMON0041502
WATER_PCB-00025971

**SPECIFICATIONS:** White crystals or powder; assay (dry basis), 99.5% min.; m. p., 165.0°C. min.; solution in N/2HCl (2:30), clear; ash, 0.05% max.; chlorides (as HCl), 0.014% max.; sulfate (as $H_2SO_4$), 0.04% max.; conforms to U.S.P. test for heavy metals.

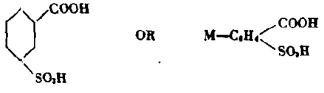
| *MESH:* Retained on— | *30-80 mesh* | *100 mesh* |
|---|---|---|
| 30-mesh screen | Trace | |
| 60-mesh screen | | 0.8% max. |
| 80-mesh screen | 90.0% min. | |
| 100-mesh screen | | 10.0% max. |
| 140-mesh screen | | 25.0% max. |
| 200-mesh screen | | 20.0% min. to 40.0% max. |

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in pharmaceutical preparations and veterinary medicines. *CAUTION: Sulfanilamide should be administered only under supervision of a competent physician or veterinarian.*

## SULFATE OF IRON (See Ferric Sulfate and Ferrisul)

## meta-SULFOBENZOIC ACID




**PROPERTIES:** Light gray, crystalline solid; m. p. approx. 140°C.; very hygroscopic and water soluble; forms dihydrate; strong acid; very easily esterified on the carboxyl group.

**GENERAL INFORMATION:** Suggested as an intermediate for chemical synthesis.

## SULFOPHTHALIC ANHYDRIDE

**PROPERTIES:** Dark brown super-cooled liquid which may crystallize on standing; strong acid; becomes flowable at 70°C.; very hygroscopic and water soluble.

**GENERAL INFORMATION:** Suggested as an intermediate for chemical synthesis; oil addition agent.



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TOWOLDMON0041503
WATER_PCB-00025972

## SULFUR

99.5% pure sulfur.

**GRADES:** Commercial rubbermakers, commercial flour, 90% through 80 mesh; dusting, 93-95% through 325 mesh.

**R. R. CLASSIFICATION:** Sulfur.

**GENERAL INFORMATION:** Sulfur is a brilliant yellow crystalline substance, approximately twice as heavy as water and melting at about 248°F. This ready fusibility permits casting into various shapes. It is highly acid resisting and is a poor conductor of heat and electricity. It combines with rubber to form polysulfides.

Sulfur is used as a source of sulfur vapor for manufacture of carbon bisulfide and sublimed sulfur; as a source of sulfur dioxide for fumigating, bleaching and manufacture of sulfuric acid; sulfite and bisulfite for paper manufacturing; in formation of sulfides and polysulfides for oil refining, vulcanization of rubber, smelting and manufacture of calcium sulfide and sodium polysulfide; as an acid-resistant bonding material for brick-lined acid tanks; as a water-resistant material for water pipe joints; as a nonconductor for the manufacture of insulators; as a fungicide; in manufacture of fireworks and railway signals; in grain mixtures for poultry; as a soil disinfectant.

## SULFUR DIOXIDE

Mol. Wt. 64.06

**SPECIFICATIONS:** Colorless; non-volatile residue, 0.0025% max.; moisture ($H_2O$), 0.005% max.

**R. R. CLASSIFICATION:** Sulfur Dioxide.

**GENERAL INFORMATION:** Used in leather tanning, oil refining, refrigeration, air conditioning, antichlor in textiles, hydrosulfite in textiles, diluent in manufacture of sulfuric acids, sugar refineries, manufacture of sulfuryl chloride, fruit preservation, wine making, manufacture of gelatin and corn products.

**AVAILABLE LITERATURE:** 12-page booklet, "The Safe Handling of Sulfur Dioxide."

## SULFUR, INSOLUBLE (See Insoluble Sulfur 60)

## SULFURIC ACID

$H_2SO_4$ Mol. Wt. 98.07

**STANDARD STRENGTHS:** 52°Bé.; 58°Bé.; 60°Bé.; 66° Bé.; 98% $H_2SO_4$; oleum 52° Bé: 65.13% freezing point—monohydrate 39°F.

(*Continued*)



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TOWOLDMON0041504
WATER_PCB-00025973

**TYPICAL ANALYSIS:** 58° Bé; 74.36% $H_2SO_4$; freezing point, below —40°F. 60°Bé.: 77.67% min. $H_2SO_4$; freezing point, + 12.6°F. Approx. 66°Be.: 93.2% min. $H_2SO_4$; freezing point, —29° F. Monohydrate: min. 100% $H_2SO_4$; freezing point, 50°F. Approx. 98.0% min. $H_2SO_4$; freezing point, 38° F. approx.

Oleum—20% $SO_3$: 104.50% min. $H_2SO_4$; freezing point, 22°F.
25% $SO_3$: 105.6% min. $H_2SO_4$; freezing point, 49°F.
35% $SO_3$: 107.88% min. $H_2SO_4$; freezing point, 82°F.
40% $SO_3$: 109.00% min. $H_2SO_4$; freezing point, 91°F.
65% $SO_3$: 114.6% $H_2SO_4$; freezing point, 38°F.

Oleum freezing point data based on Manufacturing Chemists Association curve, 1941.

**R. R. CLASSIFICATION:** Sulfuric Acid. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used extensively in steel mills, enameling works, oil refineries, pigment works, by-product gas plants, fertilizer plants, tanneries and many other industries. *(See tables in general data section)*

## SULFURIC ACID, C.P.

$H_2SO_4$ Mol. Wt. 98.08

**SPECIFICATIONS:** Colorless liquid; assay, 95.5-97.0%; non-volatile material, 0.0005% max.; chloride (Cl), 0.00006% max.; nitrate ($NO_3$), 0.0002% max.; ammonium ($NH_4$), 0.0003% max.; reducing matter (as $SO_2$), 0.0005% max.; arsenic, 0.000003% max.; heavy metals (as Pb), 0.0005% max.; heavy metals (as Fe), 0.0001% max.; meets A. C. S. specifications.

**R. R. CLASSIFICATION:** Sulfuric Acid. Corrosive liquid (white label required .

**GENERAL INFORMATION:** Used as a laboratory reagent and where an extremely pure material is required.

## SULFURIC CONTACT CATALYST

(See Vanadium Sulfuric Acid Catalyst)

## SULFURYL CHLORIDE

$SO_2Cl_2$ Mol. Wt. 134.97

**STANDARD FORM:** Liquid.

**CHARACTERISTICS:** Light yellow liquid (may deposit precipitate on standing); sp. g. 1.67-1.71 at 15.5°/15.5°C.; distillation range: first drop, 50.0°C. min.; dry point, 70.0°C.; 20-100% range, 2.0°C. max.; total condensation, 95% min.

**R. R. CLASSIFICATION:** Chemicals NOIBN. Corrosive liquid (white label required).

**GENERAL INFORMATION:** Used as a chlorinating and condensing agent. *CAUTION: Explosive mixture is formed when water is introduced.*



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TOWOLDMON0041505
WATER_PCB-00025974

## SYNTANS (See Mertanol)

## SYTON W-20*

**STANDARD FORM:** Solution.

**CHARACTERISTICS:** 15% colloidal dispersion of silica in water; odorless; non-toxic.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Syton W-20, a new resin for textile finishing, is a colloidal dispersion of silica particularly useful for delustering and reducing slippage and snagging of rayons, acetates and nylons.

**AVAILABLE LITERATURE:** Technical Bulletins, "Syton W-20, A New Inorganic Resin for Textile Finishing" and "Syton W-20 in the Slashing Operation."

*Trade Mark Reg. U. S. Pat. Off.

## *meta*-TERPHENYL (Santowax M)

$C_{18}H_{14}$ Mol. Wt. 230.29

**PROPERTIES:** 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 at 99.8°C.-39.3 SUS, at 155° C.-32.4 SUS; soluble in benzene; slightly soluble in alcohol; insoluble in water.

**GENERAL INFORMATION:** Used as a high-melting plasticizer.

**AVAILABLE LITERATURE:** Technical Bulletin P-106, "The Terphenyls."

## *ortho*-TERPHENYL (Santowax O)

$C_{18}H_{14}$ Mol. Wt. 230.29

**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 at 60°C.-104.4 SUS, at 99.8°C.-40.6 SUS; soluble in alcohol; very soluble in benzene, turpentine and petroleum solvents; insoluble in water.

**GENERAL INFORMATION:** Used as a plasticizer and softening agent.

**AVAILABLE LITERATURE:** Monsanto Technical Bulletin P-106, "The Terphenyls."

## *para*-TERPHENYL (Santowax P)

$C_{18}H_{14}$ Mol. Wt. 230.29

**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.;

*(Continued)*



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TOWOLDMON0041506
WATER_PCB-00025975

viscosity at 225°C.-28.8 SUS; slightly soluble in benzene, turpentine and petroleum solvents; insoluble in water.

**GENERAL INFORMATION:** Used for coating paper and to reduce tack in polyvinyl butyral plastics.

**AVAILABLE LITERATURE:** Technical Bulletin P-106, "The Terphenyls."

## TERPHENYL, MIXED ISOMERIC (Santowax R)

$C_{18}H_{14}$ Mol. Wt. 230.29

**PROPERTIES:** Yellow solid; density, 1.133 at 25°C.; boiling range, 364°-418°C. (corr.) flash point, 191°C.; flame point, 238°C.; viscosity at 155°C.-32.4 SUS, at 225°C.-28.5 SUS; slightly soluble in alcohol; moderately soluble in benzene, turpentine and petroleum solvents; insoluble in water.

**GENERAL INFORMATION:** Used in high temperature lubricants; as plasticizer for marine paints.

**AVAILABLE LITERATURE:** Technical Bulletin P-105, "Mixed Isomeric Terphenyls."

## TETRAMMONIUM PYROPHOSPHATE
(See Ammonium Pyrophosphate, Tetra)

## TETRABARIUM PYROPHOSPHATE
(See Barium Pyrophosphate, Tetra)

## TETRAFERRIC PYROPHOSPHATE
(See Ferric Pyrophosphate, Tetra)

## TETRALEAD PYROPHOSPHATE
(See Lead Pyrophosphate, Tetra)

## TETRAMANGANOUS PHOSPHATE
(See Manganous Phosphate, Tetra)

## TETRAPHOSPHORIC ACID
(See Phosphoric Acid)

## TETRAPOTASSIUM PYROPHOSPHATE
(See Potassium Pyrophosphate, Tetra)

## TETRASILVER PYROPHOSPHATE
(See Silver Pyrophosphate, Tetra)



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TOWOLDMON0041507
WATER_PCB-00025976

## TETRASODIUM PYROPHOSPHATE

(See Sodium Pyrophosphate, Tetra)

## TEXTILE COATING LACQUERS

**GENERAL INFORMATION:** Cellulose nitrate coatings are standard for artificial leather. Special formulations, pigmented and clear, are available for book cover stock, shoe linings, waterproof sheeting, box toe fabric, shoe stay, tracing cloth, novelty luggage, etc.

Cellulose acetate, aceto-butyrate and ethyl cellulose base coatings are required where important factors are heat and flame resistance, light fastness, ultra-violet transparency, low temperature flexibility and special solvent or vapor resistance.

Polyvinyl butyral coatings have been outstandingly successful as a replacement for rubber in military waterproof garment cloth, both single and double texture. The thermosetting type of butyral coating is preferred for garment fabric. The application is according to usual practice for rubber spreader stocks. Faster curing types are a more recent development. The thermoplastic type of butyral coatings has proved valuable as heat-sealing finishes for metal foil and as air-drying coatings for tapes. Other polyvinyl base coatings are finding application as heat-sealing and waterproof cements. All the butyral finishes are available in colors, clear, gloss and matte finishes.

**R. R. CLASSIFICATION:** Lacquer.

## TEXTILE CHEMICALS

A complete line of chemicals for use in bleaching, dyeing, printing and finishing. For a particular product and a special problem, write to the Textile Service Department, Merrimac Division, Everett Station, Boston 49, Mass.

## TEXTILE PRINTING LACQUERS

**GENERAL INFORMATION:** Pigmented lacquers for engraved roll and stencil printing on finished fabrics, cotton, silk, celanese, rayon taffetas, crepes and voiles.

**R. R. CLASSIFICATION:** Lacquer.

## TEXTILE RESINS

A series of the water-soluble and water-dispersed resins for textile application, developed for use under mill conditions on worsteds, woolens, rayons and cottons. Included are melamine and styrene resins, developed

*(Continued)*



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TOWOLDMON0041508
WATER_PCB-00025977

as colorless, light-stable products. These resins are of particular interest for shrinkproofing, water resistance, crush resistance, slip resistance and permanent luster and finish. For a particular resin or plastic for a special problem, write to the Textile Service Department, Merrimac Division, Everett Station, Boston 49, Mass.

## "THALID" (See Plastics)

## THINNERS

**GENERAL INFORMATION:** Thinners are supplied for reducing all lacquer products to required viscosity for spraying, dipping and machine coating. Can be adjusted to meet special requirements for flow-out, drying time, moisture resistance and solvent power. Retarding thinners, cleaning thinners, stripping thinners, removers, resins and dye solvents are also available.

**R. R. CLASSIFICATION:** Lacquer Thinning Compound.

## THIOCARBANILIDE (See under Accelerators)

## THIOUREA

(Also known as thiocarbamide, sulfocarbamide, and sulfourea)

$NH_2 \cdot CS \cdot NH_2$ Mol. Wt. 76.12

**STANDARD FORM:** Crystals.

**SPECIFICATIONS:** White, free-flowing crystals; moisture, 0.50% max.; ash, 0.05% max.; solution (10% water at 25°C.), very slightly turbid.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in manufacture of thioglycollic acid; as an intermediate in the production of pharmaceuticals; in the manufacture of vulcanization accelerators; as an ingredient of insecticidal compositions; moth-proofing agent in treating furs, feathers, skins and fabrics; and as an intermediate in the production of resins and waxes.

**AVAILABLE LITERATURE:** Development Department Bulletin 28, "Thiourea."

## TIN TETRAPHENYL

$(C_6H_5)_4Sn$

## "THIOFIDE" (See Accelerators, Rubber)

## "THIOTAX" (See Accelerators, Rubber)



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TOWOLDMON0041509
WATER_PCB-00025978

## "THIURAD" (See Accelerators, Rubber)

## TOLUENE ETHYL SULFONAMIDE (See Sanctizer 8)

## *para*-TOLUENESULFONAMIDE

(Also known as *para*-toluenesulfonic acid amide, *para*-sulfonamidotoluene, and 4-sulfonamidotoluene)




Mol. Wt. 171.21

**STANDARD FORM:** Crystalline powder.

**SPECIFICATIONS:** Light brownish, crystalline powder; crystallizing point (dried material), 135.0°C. min.; ash, 0.60% max.; alcohol insoluble material, 0.60% max.; loss on drying, 0.50% max.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as an intermediate in the production of active chlorine-bearing compounds; as an intermediate in the production of dyestuffs; as a plasticizer; and as a base in the production of plasticizers, and resins. Also see Santicizer 9, a mixture of ortho and para-toluenesulfonamides.

## *para*-TOLUENESULFONCHLORIDE




Mol. Wt. 190.64

**STANDARD FORM:** Crystals.

**CHARACTERISTICS:** Grayish-white or yellowish crystals; assay, 95% min.; crystallizing point, 65.5°C. min.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a condensing agent and as an intermediate in dyestuff synthesis.

## TOLUENESULFONIC ACID, TECHNICAL




Mol. Wt. 172.19

(*Continued*)



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TOWOLDMON0041510
WATER_PCB-00025979

**GRADES:** 85%; 94%

**CHARACTERISTICS OF 85% GRADE:** Brown to black crystalline solid; toluenesulfonic acid, 85.0% min. (approx. 85.0% para; 15.0% ortho); $H_2SO_4$, 8.0% max.; contains up to 8.0% water; may contain 1.0-2.0% toluene.

**CHARACTERISTICS OF 94% GRADE:** Viscous liquid or semi-crystalline solid having a greenish to black color; toluenesulfonic acid, 91.0% min. 80.0% para; 20.0% ortho); $H_2SO_4$, 1.0% max.; water 2.0% max.; toluene 0.2% max.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used in the manufacture of dyestuff intermediates and as a catalyst in certain organic reactions.

## TRIAMMONIUM TETRAPHOSPHATE

(See Ammonium Tetraphosphate, Tri)

## TRIBUTYL PHOSPHATE

$(CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2)_3PO_4$ Mol. Wt. 266.36

**STANDARD FORM:** Liquid.

**CHARACTERISTICS:** Water-white liquid; moisture, 0.40% max.; acidity as $H_3PO_4$, 0.03% max.; refractive index 1.4185-1.4245 at 25°C.; sp. g. 0.9755 ±0.003 at 25°/25°C.

**R. R. CLASSIFICATION:** Lacquer Solvent.

**GENERAL INFORMATION:** Used as a plasticizer for cellulose esters and synthetic resins; as an anti-foaming agent.

## TRICALCIUM PHOSPHATE (See Calcium Phosphate, Tri)

## TRICHLOROBENZENE, TECHNICAL

$C_6H_3Cl_3$ Mol. Wt. 181.46

Mixture of 1,2,3- and 1,2,4-trichlorobenzene

**STANDARD FORM:** Liquid.

**CHARACTERISTICS:** Practically clear, colorless to light yellow liquid; sp. g. 1.460-1.477 at 15.5°/15.5°C.; acidity as HCl, 0.01% max.; crystallizing point, 10.0°C. max. Distillation range: first drop, 205.0°C. min.; 50%, 213.0°C. min.; 90%, 216.0°C. min.; dry point, 250.0°C. max.; flash point 100°C.; fire point, none.

**R. R. CLASSIFICATION:** Trichlorobenzene.

**GENERAL INFORMATION:** Used in organic synthesis, as a solvent, and as an insecticide.



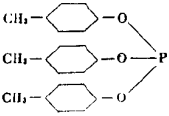
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## TRICOBALTOUS PHOSPHATE

(See Cobaltous Phosphate, Tri)

## TRICRESYL PHOSPHATE



Mol. Wt. 368.36

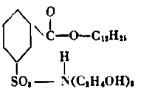
**SPECIFICATIONS:** Clear practically colorless liquid; sp. g. 1.160 ±0.005 at 25°/25°C.; acidity (as $H_3PO_4$), 0.01% max; potassium permanganate test, no change after 30 minutes.

**R. R. CLASSIFICATION:** Lacquer Solvents NOIBN.

**GENERAL INFORMATION:** Tricresyl phosphate is used principally as a plasticizer. It has a high-boiling point and is relatively non-volatile, the evaporation loss in 100 hours at 100°C. being less than 0.10%. The refractive index is about 1.556 at 20°C. Viscosity increases rapidly at temperatures below normal until at about —35°C. the product is a solid transparent mass without crystalline structure. Is is miscible with all the common solvents and thinners, and with linseed, china wood, and castor oils. Its solubility in water is less than 0.002% at 85°C. and it imparts good moisture resistance to nitrocellulose films. Being a solvent for nitrocellulose, it has a high retentivity and can be used in large proportions without danger of sweating or separation. Tricresyl phosphate is the standard fire-retarding plasticizer for nitrocellulose. It is compatible with most lacquer resins and gives firm, tough, flexible films of excellent weathering qualities. 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.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

## TRIETHANOL AMINE SALT OF SULFO LAURO-ALKYL BENZOATE



**PROPERTIES:** Dark, amber-colored liquid; soluble in water, ethanol, benzene and carbon tetrachloride.

**GENERAL INFORMATION:** Suggested as liquid detergent, for shampoo formulations.



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TOWOLDMON0041512
WATER_PCB-00025981

## TRIETHYL PHOSPHATE

$(C_2H_5)_3O_4PO$ Mol. Wt. 182.16

**STANDARD FORM:** Liquid.

**CHARACTERISTICS:** Water-white liquid; acidity (cc. n/100 NaOH per 5 cc.), 3.0 cc. max.; moisture, 0.20% max. Distillation range: first drop, 200°C. min.; dry point, 220°C. max.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a catalyst in chemical synthesis.

## TRIFERRIC ORTHOPHOSPHATE

(See Ferric Orthophosphate, Tri)

## TRILEAD ORTHOPHOSPHATE

(See Lead Orthophosphate, Tri)

## TRIMAGNESIUM PHOSPHATE

(See Magnesium Phosphate, Tri)

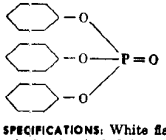
## TRIMETHYL PHOSPHATE

$(CH_3)_3PO_4$

**PROPERTIES:** Clear, mobile liquid; boiling point, 67°-68°C. at 6-7 mm., 197°C. at 760 mm.; sp. g. 1.197 at 19.5°/0°C.; slowly hydrolyzed by water.

**GENERAL INFORMATION:** Suggested as a component of hydraulic fluids; methylating agent; oil addition agent.

## TRIPHENYL PHOSPHATE



Mol. Wt. 326.38

**SPECIFICATIONS:** White flakes, faintly aromatic; m. p. 48.5°C. min. start; solution in alcohol (10 gms. in 50 cc.), not more than faintly opalescent; permanganate test, distinct purple color to be present after 30 minutes; acidity (as $H_3PO_4$), 0.003% max.

**R. R. CLASSIFICATION:** Lacquer Solvents NOIBN.

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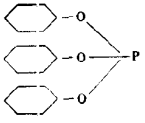
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TOWOLDMON0041513
WATER_PCB-00025982

**GENERAL INFORMATION:** The chief uses of triphenyl phosphate are as a plasticizer and fire retarder. It is miscible with the common solvents and thinners and with vegetable oils. Its solubility in water is 0.001% at 34°C. and 0.002% at 54°C. and it imparts some moisture resistance to cellulose acetate films. Its retentivity in cast cellulose acetate films is nearly 80%; that is, it can be incorporated in the proportion of 8 parts to 10 of acetate without causing separation and blooming. It imparts good flexibility and gives clear, tough compositions without tendency toward tackiness. *Triphenyl phosphate is toxic and should not be used in articles such as foil, 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 an amount of triphenyl phosphate equal to 20% of the cellulose acetate weight produces films which will not support combustion.

**AVAILABLE LITERATURE:** 40-page booklet, "Plasticizers and Resins."

## TRIPHENYL PHOSPHITE



Mol. Wt. 310.38

**SPECIFICATIONS:** A crystalline solid at slightly below room temperature; at higher temperatures is an oily liquid weighing 9.85 lbs. per gal.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a color stabilizer in pale-bodied alkyds.

## TRIPOLYPHOSPHATE (See Sodium Triphosphate)

## TRIPOTASSIUM PHOSPHATE
(See Potassium Phosphate, Tri)

## TRISODIUM MONOHYDROGEN PYROPHOSPHATE
(See Sodium Monohydrogen Pyrophosphate, Tri)

## TRISODIUM PHOSPHATE (See Sodium Phosphate, Tri)

## TRIZINC ORTHOPHOSPHATE
(See Zinc Orthophosphate, Tri)



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TOWOLDMON0041514
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## UREA PHOSPHATE

**GENERAL INFORMATION:** A series of urea compounds of pyro-, tri-, tetr and metaphosphoric acids. Urea metaphosphate is a white crystalline sol that melts with some decomposition at 162°C. The other compounds i this series vary in consistency from viscous liquids to thick sticky paste These materials are soluble in water but insoluble in organic solvent. Aqueous solutions are quite acid.

## "UREKA", "UREKA BLEND B", "UREKA C"

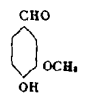
(See under Accelerators, Rubber)

## VANADIUM SULFURIC ACID CATALYST

**GENERAL INFORMATION:** Used in manufacture of sulfuric acid by con tact process. (Not suitable for other purposes.)

## VANILLIN, ETHYL (See Ethavan)

## "VANILLIN MONSANTO" (Vanillin U.S.P.)




Mol. Wt. 152.14

**STANDARD FORM:** Fine Crystals.

**SPECIFICATIONS:** Fine, white crystalline needles; m. p., 81.5°C. min.; no foreign flavor (in sugar solution); loss on drying, 0.03% max.; solubility in alcohol (1:2), complete.

**R. R. CLASSIFICATION:** Chemicals NOIBN.

**GENERAL INFORMATION:** Used as a flavoring agent in foodstuffs and beverages and as an odorant in rubber.

**AVAILABLE LITERATURE:** Leaflet, "Vanillin Monsanto."

## VARNISH ANTISKINNING AGENTS (See Santovar 0

## "VELLO" (See Coatings)

## "VUELITE" (See Plastics)

## "VUEPAK" (See Plastics)



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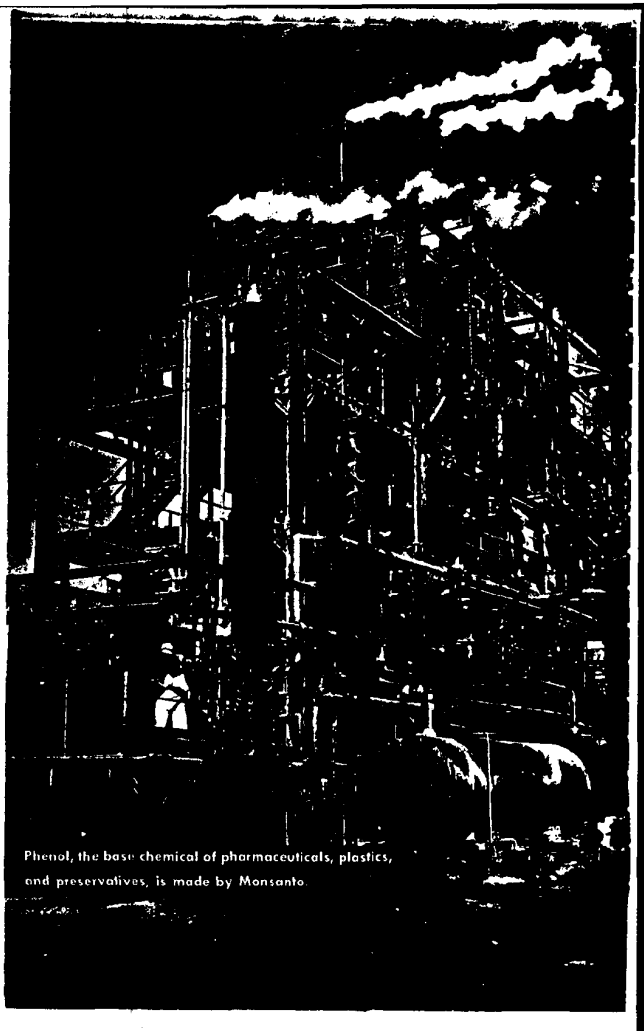
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This sulfuric acid plant of Monsanto, utilizes the company's own vanadium catalyst.

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Phenol, the base chemical of pharmaceuticals, plastics, and preservatives, is made by Monsanto.

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## WATER-TREATING CHEMICALS

(See Aluminum Sulfate, Ammonia, Chlorine, Ferrisul, Merclor, Santobrite, Santosite, Sodium Aluminate, Sodium Sulfate)

## WETTING AGENTS (See Areskap, Aresket, Aresklene, Santomerse)

## WOOD LACQUERS AND UNDERCOATS

**GENERAL INFORMATION:** Cellulose nitrate and synthetic resin finishes are available for all wood, plywood and fiber board surfaces. Undercoats include water-repellent and sanding sealers and sanding surfacers. Clear lacquers are offered for machine and hand dipping of wood turnings and spray application on furniture. The matte clear lacquers are characterized by exceptional depth and smoothness. Lacquer enamels are offered in colors and properties to meet all conditions. Topcoat lacquers are tough and alcohol resistant.

## WOOD PRESERVATIVES

## WOOD PRESERVATIVES, INDUSTRIAL

See individual wood preservatives for descriptions and uses.

**R. R. CLASSIFICATION:** Liquid Wood Preservatives.

**AVAILABLE LITERATURE:** "Laucks Wood Preservatives."

## 'FUNGISEALS"*

*Water-repellent toxic sealers for wood. Used for the preservation of* plywood, crating, pontoon lumber, doors, etc., against decay and a wide variety of wood-attacking insects and organisms. They do not adversely affect the appearance of the wood, are deep penetrating and paintable. Fungiseal No. 17 consists of 5% pentachlorophenol and 10% water-repellent solids in petroleum distillate. Fungiseal No. 32 consists of 5% pentachlorophenol and 12% water-repellent solids in petroleum distillate. Fungiseal No. 28 consists of 5% pentachlorophenol and 16% water-repellent solids in petroleum distillate. Fungiseal is also made for use on ships and is colored Marine Blue. It will pass BUSHIPS Specifications.

*Trade Mark Reg. U. S. Pat. Off.

## "LAUXTOL A"

Used for the preservation of wooden tent poles, fence posts and lumber. It is a concentrated material that thins 12 gallons diesel oil to 1 gallon Lauxtol A. The thinned solution contains 5% pentachlorophenol in petroleum distillate. Lauxtol A is toxic against decay, stain and insects. *CAUTION: This product is toxic.*



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## "LAUXTOX NO. 2"

Lauxtox No. 2 is a ready-to-use copper naphthenate preservative in petroleum distillate for use on all wooden parts of ships. Water repellents are 40% or more effective.

## "REZ"*

Synthetic resin sealer for use on all types of wood. Amber clear liquid. Particularly effective on plywood as it controls grain raise.

*Trade Mark Reg. U. S. Pat. Off.

## "REZITE NO. 2 AND NO. 3"*

Water-repellent sealers for wood. Used to control dimension of all types of lumber—doors, plywood, sash, etc. They do not adversely affect the feel and appearance of wood, and surfaces properly treated may be painted or glazed. Rezite No. 2 contains 12% water-repellent solids in petroleum distillate, and Rezite No. 3 contains 16% water-repellent solids in petroleum distillate. The materials are packed in ready-to-use form or as a concentrate which thins 2:1 with mineral spirits.

*Trade Mark Reg. U. S. Pat. Off.

## "REZITE TR57 AND REZITE TR31"*

These materials are specially approved Douglas Fir Plywood Association sealers supplied to the fir and pine plywood industry. TR57, *toxic*, contains 5% pentachlorophenol and 12% water-repellent solids in petroleum distillate. Meets specifications for hutment grade plywood. Rezite TR31 contains 5% pentachlorophenol, 16% water-repellent solids in petroleum distillate, and meets specifications for both fir and pine plywood.

*Trade Mark Reg. U. S. Pat. Off.

## XANTHATES

(See Potassium Amyl Xanthate and Potassium Ethyl Xanthate)

## ZINC AMMONIUM PHOSPHATE

$ZnNH_4PO_4$ Mol. Wt. 178.40

**PROPERTIES:** White crystalline powder; soluble in acids and ammoniacal solutions; insoluble in water; decomposes with loss of $NH_3$ when heated.

**GENERAL INFORMATION:** Used as water-insoluble, flame-retardant agent for textiles, paper and paints.



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## ZINC CHLORIDE

**GRADE:** 52° Bé. solution.

**R. R. CLASSIFICATION:** Zinc Chloride Liquid.

**GENERAL INFORMATION:** Used as a flux in galvanizing and soldering since it has the acid properties of muriatic acid without being volatile at the temperature used.

## ZINC METAPHOSPHATE

$Zn(PO_3)_2$ Mol. Wt. 223.34

**PROPERTIES:** White powder; m. p. approx. 920°C.; slowly soluble in acids; insoluble in water; has a very low thermal coefficient of expansion.

**GENERAL INFORMATION:** Suggested for use as a constituent of glasses, porcelains and enamels.

## ZINC ORTHOPHOSPHATE, TRI

$Zn_3(PO_4)_2$ Mol. Wt. 386.10

**PROPERTIES:** White crystalline powder; soluble in acids and ammoniacal solutions; insoluble in water.

**GENERAL INFORMATION:** Suggested as a constituent of phosphate rust-proofing compositions.

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The following products are made by Monsanto Chemicals Limited, London, England, and are not at present available for sale by Monsanto in the United States.

**"ACROSYL"**
**ANTHRACENE OIL**
**AURINE**
**BENZENE**
**BENZENE ABSORBING OIL**
**COUMARONE RESIN**
**CRESOTE**
**NAPHTHA, HIGH FLASH**
**NAPHTHA, SOLVENT**
**NAPHTHALENE**
**PITCH**
**TAR ACID OIL**
**TOLUENE**



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# MONSANTO LITERATURE

**ACCELERATORS, RUBBER.** "El Sixty." 20-page file size booklet containing use and test data.

**ACCELERATORS RUBBER.** "Santocure." 52-page file size booklet giving properties, uses and comparative data.

**ALCOHOL.** "Nealco Industrial Alcohol." 70-page booklet giving chemical and physical data on ethyl alcohol, completely denatured alcohol, antifreeze and specially denatured alcohols. Also includes government regulations pertaining to alcohols.

**AMMONIA.** "Monsanto Ammonia for Refrigeration." 12-page reference booklet for operators of refrigerating machines. Contains property tables for anhydrous ammonia and calcium chloride and instructions for handling ammonia and ammonia cylinders.

**AROCLORS.** "The Aroclors." 20-page file size booklet covering physical and chemical properties, uses and applications.

**CHLORINE.** "Monsanto Chlorine." 20-page file size illustrated booklet, giving properties of chlorine and information on containers, care of equipment and safe handling.

**COUMARIN.** "Coumarin Monsanto." Pocket-size folder giving properties and uses.

**CYCLOHEXYLAMINE.** "Cyclohexylamine and Dicyclohexylamine." Development Department Bulletin No. 27. 8-page file size bulletin.

**ETHAVAN.** "Ethavan—Superior Flavoring Material." Pocket-size folder giving properties and uses.

**FERRISUL.** "Ferrisul for Metal Treatment." 12-page file size booklet giving properties and directions for use of Ferrisul for pickling stainless steel and copper for etching articles preparatory to galvanizing.

**FERRISUL.** "Ferrisul for Pickling Cartridge Cases (Brass)." Merrimac Literature No. 48. 2-page file size bulletin.

**FERRISUL.** "Ferrisul for Treatment of Water, Sewage and Industrial Wastes." 16-page file size booklet, giving properties and directions for use of Ferrisul for treatment of municipal water supplies, sewage and industrial wastes and for other industrial uses.

**FERRISUL.** "Pickling Copper and Its Alloys with Ferrisul." Merrimac Literature No. 72. 6-page file size bulletin giving current pickling processes and directions for use of Ferrisul.

**FERRISUL.** "Pickling Copper-Clad or Brass-Clad Steel with Ferrisul Plus Inhibited Sulfuric Acid." Merrimac Literature No. 65. 4-page file size bulletin.

**FERRISUL.** "Pickling Steel Cartridge Cases with Ferrisul." Merrimac Literature No. 56. 2-page file size bulletin.

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**FERRISUL.** "Recommendations for the Use of Ferrisul for Pickling 18-8 Stainless Steel Wire." Merrimac Literature No. 4360-9. 2-page file size bulletin.

**FERRISUL.** "Recommendations for the Use of Ferrisul for Pickling 18-8 Stainless Steel Annealed After Drawing or Spinning Operations." Merrimac Literature No. 4360-10. 2-page file size bulletin.

**FERROPHOSPHORUS.** "Phosphorus-Iron Alloys, Bulletin No. 1." 36-page file size booklet containing a report of general exploratory research upon influence of phosphorous in low carbon, low alloy steel. Based on work done at Battelle Memorial Institute.

**FERROPHOSPHORUS.** "Phosphorus-Iron Alloys, Bulletin No. 2." 64-page file size booklet. A report of experimental research investigation on corrosion and mechanical influences on alloying elements in low alloy steel.

**FERROPHOSPHORUS.** "Phosphorus-Iron Alloys, Bulletin No. 3." 56-page file size booklet in two parts. Part one: Digest of U. S. Patents relating to phosphorus as an alloying element. Part two: List of U. S. patents relating to steel production and treatment.

**FERROPHOSPHORUS.** "Phosphorus-Iron Alloys, Bulletin No. 4." 20-page file size booklet containing reports of experimental investigations on the influence of phosphorus in Cr-Mo steels and steels in high temperature service.

**GLUES.** "Laucks Glues." 14-page illustrated booklet.

**HB - 40.** "HB-40." Monsanto Technical Bulletin No. P-104. 6-page file size bulletin giving properties and suggested uses.

**HIBITITE.** "Hibitite and Its Uses." 4-page file-size bulletin.

**LACQUERS.** "Butyral M Lacquers." Merrimac Literature No. 58. 4-page file size bulletin on low temperature rapid-cure butyral coatings.

**LACQUERS.** "Heat Sealing Paper Coatings." Technical Bulletin No. M-81. 4-page file size bulletin.

**LACQUERS.** "Interior Engine Lacquer, Baking Type." Merrimac Literature No. 71A. 2-page file size bulletin.

**LAMPBLACK.** "Monsanto Bear Lampblack, Properties and Principal Uses." 12-page pocket size booklet giving description and analyses of the various grades of Monsanto Lampblack.

**MERSIZE.** "Effect of Pulp Bond Density on Engine Sizing." 6-page reprint covering the practical application of Mersize.

**MERSIZE.** "Mersize for Paper Sizing." Monsanto Technical Bulletin No. M-57A. 4-page file size bulletin.

**MERTANOL.** "Mertanol for the Leather Industry." 3-page file size bulletin on Monsanto synthetic tanning agent.

**MERTANOL.** "Mertanol 7L for Pitch Control in Papermaking." Merrimac Literature No. 67. 1-page mimeographed bulletin.

**MERTEC.** "Maintenance Paints." Mimeographed bulletin.

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**METHYL SALICYLATE.** "Methyl Salicylate U.S.P. Monsanto." Pocket size folder giving specifications and uses.

**MONSANTO CHEMICALS.** "Monsanto Chemicals of the Phosphate Division." 47-page pocket size booklet giving a brief description of the products of the Phosphate Division.

**NEW PRODUCTS.** Monsanto Technical Bulletin No. P-25. File size bulletin giving properties and suggested uses for over 100 new products of the Phosphate Division.

**PENTACHLOROPHENOL.** "Determination of Chlorphenols and Their Salts in Impregnated Materials." Monsanto Technical Bulletin No. 0-24. 11-page file size bulletin.

**PERMASAN.** "Monsanto Permatol 'A' for Lyctus (Powder-Post) Beetle Control." Monsanto Technical Bulletin No. O-14. 5-page file size bulletin.

**PERMASAN.** "Permasan for the Preservation of Seasoned Wood." Monsanto Technical Bulletin No. O-20. 6-page file size bulletin.

**PERMASAN 116.** "Permasan 116, A Water Repellent Preservative for Wood." Monsanto Technical Bulletin No. O-21. 8-page file size bulletin.

**PHENOL.** "Safe Handling of Phenol." 10-page file size booklet giving information on correct method of unloading phenol from tank cars and drums.

**PHOSILAGE.** "Grass Silage for More Profitable Livestock Farming—How to Make it and How to Feed it." 32-page pocket size booklet describing procedure for making and feeding grass silage in which Phosilage is used as the preservative.

**PHOSPHORIC ACID.** "Alkyl Phosphoric Acids." Monsanto Technical Bulletin No. P-120. 4-page file size bulletin.

**PLASTICIZERS AND RESINS.** "Plasticizers and Resins, Specifications and Application Data." 40-page file size booklet giving comprehensive data on properties and applications of Monsanto plasticizers and resins, which include the Santicizers, phthalates, phosphates, Santolites and Aroclors.

**PLASTICS.** "Applications of Vinyl Butyral." Plastics Development Bulletin No. 1000-3. 10-page file size bulletin.

**PLASTICS.** "Cerex." Plastics Development Bulletin No. X200-3. 2-page file size bulletin giving properties and uses.

**PLASTICS.** "How Vuepak Helped 20 Manufacturers to Package for Greater Sales." 30-page booklet, giving case studies of sales gains resulting from use of Vuepak.

**PLASTICS.** "Lustron, A Monsanto Plastic." 16-page illustrated booklet describing properties, manufacture, molding and uses of Lustron, Monsanto polystyrene.

**PLASTICS.** "Lustron 2020." Plastics Development Bulletin 1200-1. 3-page file size bulletin.

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PLASTICS. "Lustron 2020—Data Sheet." Plastics Development Bulletin 1200-2. 2-page file size bulletin.

PLASTICS. "Molding of Cerex." Plastics Development Bulletin No. X200-1. 2-page file size bulletin.

PLASTICS. "Monsanto Casting Sealant." Plastics Development Bulletin No. X100-2. 4-page file size bulletin.

PLASTICS. "Monsanto Divinyl Benzene Solution." Plastics Development Bulletin X400-1. 2-page file size bulletin.

PLASTICS. "Monsanto Vinyl Butyral." Plastics Development Bulletin No. 1000-1. 10-page file size bulletin.

PLASTICS. "Monsanto Vinyl Butyral Dispersion T-1000." Plastics Development Bulletin 1000-4. 2-page file size bulletin.

PLASTICS. "Resimene 806." Plastics Development Bulletin 800-10. 1-page file size bulletin.

PLASTICS. "Resimene 812 and 814." Plastics Development Bulletin 800-9. 2-page file size bulletin.

PLASTICS. "Resimene 803-A." Plastics Development Bulletin No. 800-5. 2-page file size bulletin.

PLASTICS. "Resimene 803-A." Plastics Development Bulletin No. X800-1. 2-page file size bulletin.

PLASTICS "Resimene- (Melamine Molding Coumpounds and Resins.)" Plastics Development Bulletin X800-6. 4-page file size bulletin.

PLASTICS. "Resinox, A Monsanto Plastic." 12-page illustrated booklet describing properties, manufacture, molding and uses of Resinox, a phenol-formaldehyde plastic.

PLASTICS. "Resinox 410, General Purpose Phenolic Adhesive." Plastics Development Bulletin 1300-1. 2-page file bulletin.

PLASTICS. "Resinox 230, Low Temperature Phenolic Adhesives." Plastics Development Bulletin 1300-2. 2-page file size bulletin.

PLASTICS. "Styramic HT." Plastics Development Bulletin X300-1. 2-page file size bulletin giving properties and uses of polydichlorostyrene.

PLASTICS. "Tentative Specifications—Resimene 812 and 814." Plastics Development Bulletin 800-8. 1-page file size bulletin.

PLASTICS. "Thalid Impression (Contact Pressure) Molding Resins." X500 Series: Plastics Development Bulletin X500-5. 4-page file size bulletin.

PLASTICS. "Thalid Resins for Impression Molding." Plastics Development Bulletin No. X500-1. 5-page file size bulletin giving fabric information.

PLASTICS. "Thalid for Impression Molding." Plastics Development Bulletin No. X500-4. File size bulletin giving application information.

PLASTICS. "Thalid X-526S. Impression (Contact Pressure) Molding Resin." Plastics Development Bulletin X500-6. 1-page file size bulletin.

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**PLASTICS.** "Thalid X-525S. Impression (Contact Pressure) Molding Resin." Plastics Development Bulletin X500-7. 1-page file size bulletin.

**PLASTICS.** "Thalid XR535. Impression Molding Resin." Plastics Development Bulletin X500-8. 2-page file size bulletin.

**PLASTICS.** "The Family of Monsanto Plastics, A Guide for Product Designers." 24-page illustrated booklet describing the properties, manufacture, molding and some of the wartime uses of the main groups of Monsanto plastics.

**POTASSIUM PYROPHOSPHATE, TETRA.** "Tetra Potassium Pyrophosphate." Monsanto Technical Bulletin No. P-23. 4-page file size bulletin.

**RESLOOM.** "Resloom NC-50, Melamine Type Resin for Application on Cottons and Rayons." Technical Bulletin M-82. 8-page file size bulletin.

**RUBBER CHEMICALS.** "Monsanto Chemicals for the Rubber Industry." 34-page file size booklet giving properties and general characteristics and uses of Monsanto accelerators, antioxidants, softeners and miscellaneous materials for the rubber industry.

**SA-326.** "SA-326—An Antioxidant for Soap." Monsanto Technical Bulletin No P-101. 3-page file size bulletin giving properties and directions for use of SA-326; also methods of testing soap for oxidation and rancidity.

**SANTOBRITE.** "Santobrite and Santophen 20 for Paint Preservation." Monsanto Technical Bulletin No. O-2. 3-page file size bulletin.

**SANTOBRITE.** "Santobrite for the Preservation of Adhesives." Monsanto Technical Bulletin No. O-1. 6-page file size bulletin.

**SANTOBRITE.** "Santobrite for Microorganism Control in the Pulp and Paper Industry." Monsanto Technical Bulletin No. O-5. 8-page file size bulletin.

**SANTOBRITE.** "Santobrite for the Control of Slime and Algae." Monsanto Technical Bulletin No. O-15. 6-page file size bulletin, describing the use of Santobrite for the control of slime and algae in industrial cooling systems.

**SANTOBRITE.** "Santobrite for the Preservation of Rubber Latex." Monsanto Technical Bulletin No. O-17. 8-page file size bulletin describing the use of Santobrite for preventing biological deterioration of raw latex and latex products.

**SANTOBRITE.** "Santobrite in the Tanning Industry." Monsanto Technical Bulletin No. O-19. 6-page file size bulletin describing the use of Santobrite for preserving hides, tanned leather and tanning materials from mold and biological deterioration.

**SANTOBRITE.** "Santobrite—Methods of Handling and Application." Monsanto Technical Bulletin No. O-22. 8-page file size bulletin.

**SANTOBRITE.** "Santobrite." Monsanto Technical Bulletin No. O-23. 10-page file size bulletin.

**SANTOBRITE.** "Sap Stain Control by Monsanto." 24-page illustrated file size booklet describing the use of Santobrite for controlling sap stain and mold in green lumber.

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**SANTOBRITE.** "Preservation of Cellulose Insulating Materials by Monsanto." File size booklet.

**SANTOCEL.** "Miscellaneous Uses in U. S. Government Specification Finishes." Merrimac Literature No. 50. 5-page file size bulletin.

**SANTOCEL.** "Santocel—A Flatting Agent for Lacquers." Monsanto Technical Bulletin No. M-73. 4-page file size bulletin.

**SANTOCEL.** "Santocel—A Flatting Agent for Synthetic Resin and Oleoresinous Varnishes." Monsanto Technical Bulletin No. M-74. 6-page file size bulletin.

**SANTOCEL.** "Santocel for Thermal Insulation." Merrimac Literature No. 51-A. 6-page file size bulletin.

**SANTOCEL.** "Santocel—General Information." Merrimac Literature No. 30-A. 4-page file size bulletin describing the various grades of Santocel and their uses.

**SANTOCEL.** "Santocel in Printing Inks." Monsanto Technical Bulletin No. M-75. 3-page file size bulletin.

**SANTOCEL.** "Santocel Topcoats for Flexible Coatings." Merrimac Literature No 59. 3-page file size bulletin, describing use of Santocel for coating textiles and paper.

**SANTOCHLOR.** "Santochlor for the Control of Peach Tree and Stone Fruit Borers." Monsanto Technical Bulletin No. O-18. 3-page file size bulletin

**SANTOLUBE.** "Santolube 203-A, 204 and 205." Technical Bulletin No. O-31. 6-page file size bulletin.

**SANTOLUBE.** "Santolube 303-A and 570-X-4." Monsanto Technical Bulletin No. O-29. 5-page file size bulletin giving technical information on the use of these additives in compounding lubricating oils.

**SANTOLUBE.** "Santolube 394-C." Monsanto Technical Bulletin No. O-30. 6-page file size bulletin giving technical information on the use of this additive in compounding lubricating oils.

**SANTOMASK.** "Santomask for After-Odor Control of Interior Paint, Printing Inks and Some Other Odoriferous Formulations." Monsanto Technical Bulletin No. O-16. 1-page file size bulletin giving properties and directions for use.

**SANTOMERSE.** "Santomerse." Application Data Bulletin No. P-114. 32-page file size booklet giving physical and chemical properties and applications of Santomerse as a detergent and wetting, spreading, penetrating, cleaning and dispersing agent.

**SANTOMERSE.** "Santomerse No. 1." Pocket size leaflet.

**SANTOPHEN 7.** "Santophen 7, A Germicide and Industrial Preservative." Monsanto Technical Bulletin No. O-3. 5-page file size bulletin giving properties and application data.

**SANTOPHEN 20.** "Santophen 20." Monsanto Technical Bulletin No. O-25. 11-page file size bulletin.

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**SANTOPOID.** "Santopoid A—Santopoid S." Application Data Bulletin No. 117. 28-page file size bulletin describing the use of all-purpose, E. P additive in compounding gear lubricants.

**SANTOPOUR.** "Santopour . Santopour B." Application Data Bulletin No. 120-A. 20-page printed bulletin describing the use of these materials in various lubricating oils.

**SANTOSITE.** "Santosite for Removing Oxygen from Boiler Feed Water." Monsanto Technical Bulletin No. O-26. 15-page file size bulletin.

**SANTOWAX.** "The Amide Santowaxes." Monsanto Technical Bulletin No. P-107. 22-page file size bulletin giving properties of Santowax OSA and PSA and suggested formulations.

**SANTOWAX.** "The Hydrocarbon Santowaxes." Monsanto Technical Bulletin P-103. 18-page file size bulletin giving properties and suggested uses of Santowax O, M and P.

**SANTOWAX.** "Santowax R." Monsanto Technical Bulletin No. P-102. 8-page file size bulletin giving properties and suggested uses.

**SILICA SOL.** "Silica Aquasol S-20W." Monsanto Technical Bulletin No. M-76. 3-page file size bulletin.

**SILICA SOL.** Silica Organosol S-20C." Monsanto Technical Bulletin No. M-77. 2-page file size bulletin.

**SODIUM ALUMINATE.** "Sodium Aluminate for Water Treatment." Monsanto Technical Bulletin No. M-73. 5-page file size bulletin.

**SODIUM PHOSPHATE, TRI.** "T. S. P." Pocket size leaflet on uses of Tri Sodium Phosphate.

**SODIUM PYROPHOSPHATE, TETRA.** "Phosphotex." Monsanto Technical Bulletin No. P-24. 6-page file size bulletin showing properties and applications of T. S. P. P., particularly in the soap industry.

**SODIUM SULFHYDRATE.** "Sodium Sulfhydrate for Tannery Use." 4-page mimeographed bulletin.

**SOPANOX.** "Sopanox—An Antioxidant for Soaps." Monsanto Technical Bulletin No. P-100. 3-page file size bulletin giving properties and directions for use of Sopanox, also methods of testing soap for oxidation and rancidity.

**SULFUR DIOXIDE.** "The Safe Handling of Sulfur Dioxide." 12-page booklet giving information on correct methods of handling sulfur dioxide in tank cars and cylinders.

**SYTON.** "Syton W-20, A New Inorganic Resin for Textile Finishing." Merrimac Literature M-69A. 3-page file size bulletin.

**SYTON.** "Syton W-20 in the Slashing Operation." Monsanto Technical Bulletin No. M-80. 2-page file size bulletin.

**TERPHENYLS.** "Mixed Isomeric Terphenyls." Monsanto Technical Bulletin No. P-105. 4-page file size bulletin giving properties with graphs attached.

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**TERPHENYLS.** "The Terphenyls." Monsanto Technical Bulletin No. P-106. 4-page file size bulletin giving properties with graphs attached.

**THIOUREA.** "Thioureas." Development Department Bulletin No. 28. 4-page file size bulletin.

**VANILLIN.** "Vanillin Monsanto." Pocket-size leaflet giving properties and uses.

**WETTING AGENTS.** "Areskap—Aresket—Aresklene." 5-page file size bulletin.

**WOOD PRESERVATIVES.** "Chemicals for Termite Control." Monsanto Technical Bulletin No. O-13. 6-page file size bulletin describing recommended chemicals for treatment of soil and wood.

**WOOD PRESERVATIVES.** "Lauck's Wood Preservatives."



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# GENERAL DATA

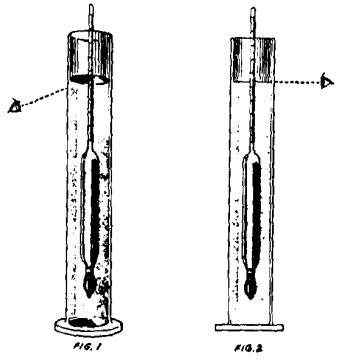
## TESTING LIQUIDS WITH THE BAUMÉ HYDROMETER

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.




**Method of Reading Baumé Hydrometer**

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).

*U. S. Bureau of Standards, Circ. No. 57



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WATER_PCB-00025998

In case the liquid is not sufficiently clear to allow the reading to be made as above described, it will be necessary to 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*

$$\text{Degrees Twaddell} = (\text{Sp. G.} - 1)200$$

$$\text{Sp. G.} = \frac{\text{Deg. Tw.} + 200}{200}$$

$$\text{Degrees Baumé} = 145 - \frac{145}{\text{Sp. G.}}$$

$$\text{Sp. G.} = \frac{145}{145 - \text{Deg. Bé.}}$$

*Light Liquids*

$$\text{Degrees Baumé} = \frac{140}{\text{Sp. G.}} - 130$$

$$\text{Sp. G.} = \frac{140}{130 + \text{Deg. Bé.}}$$



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WATER_PCB-00025999

# 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 substract 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.

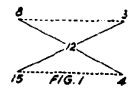


FIG. 1

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.

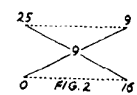


FIG. 2

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 208 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.

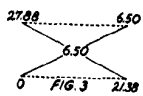


FIG. 3



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# SULFURIC ACID*

By W. C. Ferguson and H. P. Talbot

| Degrees Bé | Specific Gravity 60° 60° F. | Per Cent $H_2SO_4$ | Freezing (Melting Point Deg. F. | Degrees Bé. | Specific Gravity 60° 60° F. | Per Cent $H_2SO_4$ | Freezing Melting Point Deg. F. |
|---|---|---|---|---|---|---|---|
| 0 | 1.0000 | 0.00 | +32.0 | 36 | 1.3303 | 42.63 | 70.0 |
| | | | | 37 | 1.3426 | 43.99 | 60.0 |
| 1 | 1.0069 | 1.02 | +31.2 | 38 | 1.3551 | 45.35 | 53.0 |
| 2 | 1.0140 | 2.08 | +30.5 | 39 | 1.3679 | 46.72 | 47.0 |
| 3 | 1.0211 | 3.13 | +29.8 | 40 | 1.3810 | 48.10 | 41.0 |
| 4 | 1.0284 | 4.21 | +28.9 | | | | |
| 5 | 1.0357 | 5.28 | +28.1 | 41 | 1.3942 | 49.47 | 35.0 |
| | | | | 42 | 1.4078 | 50.87 | 31.0 |
| 6 | 1.0432 | 6.37 | +27.2 | 43 | 1.4216 | 52.26 | 27.0 |
| 7 | 1.0507 | 7.45 | +26.3 | 44 | 1.4356 | 53.66 | 23.0 |
| 8 | 1.0584 | 8.55 | +25.1 | 45 | 1.4500 | 55.07 | +20.0 |
| 9 | 1.0662 | 9.66 | +24.0 | | | | |
| 10 | 1.0741 | 10.77 | +22.8 | 46 | 1.4646 | 56.48 | +14.0 |
| | | | | 47 | 1.4796 | 57.90 | +15.0 |
| 11 | 1.0821 | 11.89 | +21.5 | 48 | 1.4948 | 59.32 | +18.0 |
| 12 | 1.0902 | 13.01 | +20.0 | 49 | 1.5104 | 60.75 | +22.0 |
| 13 | 1.0985 | 14.13 | +18.3 | 50 | 1.5263 | 62.18 | +27.0 |
| 14 | 1.1069 | 15.25 | +16.6 | | | | |
| 15 | 1.1154 | 16.38 | +14.7 | 51 | 1.5426 | 63.36 | +33.0 |
| | | | | 52 | 1.5591 | 65.13 | +39.0 |
| 16 | 1.1240 | 17.53 | +12.6 | 53 | 1.5761 | 66.63 | +49.0 |
| 17 | 1.1328 | 18.71 | +10.2 | 54 | 1.5934 | 68.13 | +59.0 |
| 18 | 1.1417 | 19.89 | + 7.7 | 55 | 1.6111 | 69.65 | † |
| 19 | 1.1508 | 21.07 | + 4.8 | | | | |
| 20 | 1.1600 | 22.25 | + 1.6 | 56 | 1.6292 | 71.17 | † |
| | | | | 57 | 1.6477 | 72.75 | † |
| 21 | 1.1694 | 23.43 | — 1.8 | 58 | 1.6667 | 74.36 | † |
| 22 | 1.1789 | 24.61 | — 6.0 | 59 | 1.6860 | 75.99 | — 7.0 |
| 23 | 1.1885 | 25.81 | —11.0 | 60 | 1.7059 | 77.67 | +12.6 |
| 24 | 1.1983 | 27.03 | —16.0 | | | | |
| 25 | 1.2083 | 28.28 | —23.0 | 61 | 1.7262 | 79.43 | +27.3 |
| | | | | 62 | 1.7470 | 81.30 | +39.1 |
| 26 | 1.2185 | 29.53 | —30.0 | 63 | 1.7683 | 83.34 | +46.1 |
| 27 | 1.2288 | 30.79 | —39.0 | 64 | 1.7901 | 85.66 | +46.4 |
| 28 | 1.2393 | 32.05 | —49.0 | 64¼ | 1.7957 | 86.33 | +43.6 |
| 29 | 1.2500 | 33.33 | —61.0 | 64½ | 1.8012 | 87.04 | +41.1 |
| 30 | 1.2609 | 34.63 | —74.0 | 64¾ | 1.8068 | 87.81 | +37.9 |
| | | | | 65 | 1.8125 | 88.65 | +33.1 |
| 31 | 1.2719 | 35.93 | —82.0 | 65¼ | 1.8182 | 89.55 | +24.6 |
| 32 | 1.2832 | 37.26 | —96.0 | 65½ | 1.8239 | 90.60 | +13.4 |
| 33 | 1.2946 | 38.58 | —97.0 | 65¾ | 1.8297 | 91.80 | — 1.0 |
| 34 | 1.3063 | 39.92 | —91.0 | | | | |
| 35 | 1.3182 | 41.27 | —81.0 | 66 | 1.8354 | 93.19 | —29.0 |

*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.

(*Continued*)



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WATER_PCB-00026001

## SULFURIC ACID—Continued

From the Specific Gravities, the corresponding degrees Baumé were calculated by the following formula: Baumé = 145—145/Sp. G.

### ALLOWANCE FOR TEMPERATURE

At 10° Bé. correction of 0.029° Bé. or 0.00023 Sp. G. for every 1°F.
At 20° Bé. correction of 0.036° Bé. or 0.00034 Sp. G. for every 1°F.
At 30° Bé. correction of 0.035° Bé. or 0.00039 Sp. G. for every 1°F.
At 40° Bé. correction of 0.031° Bé. or 0.00041 Sp. G. for every 1°F.
At 50° Bé. correction of 0.028° Bé. or 0.00045 Sp. G. for every 1°F.
At 60° Bé. correction of 0.026° Bé. or 0.00053 Sp. G. for every 1°F.
At 63° Bé. correction of 0.026° Bé. or 0.00057 Sp. G. for every 1°F.
At 66° Bé. correction of 0.0235° Bé. or 0.00054 Sp. G. for every 1°F.

For temperatures above 60°F., the correction is added to the observed indication; below 60°F. subtracted.

### OLEUM

| Per Cent Oleum | Per Cent Free $SO_3$ | Equiv. Per Cent $H_2SO_4$ | Freezing Point* Deg. F. |
|---|---|---|---|
| 0 | 0 | 100.00 | 51 |
| 10 | 10 | 102.25 | 32 |
| 20 | 20 | 104.49 | 22 |
| 25 | 25 | 105.62 | 49 |
| 30 | 30 | 106.75 | 64 |
| 35 | 35 | 107.88 | 82 |
| 40 | 40 | 109.0 | 91 |
| 50 | 50 | 111.25 | 91 |
| 60 | 60 | 113.5 | 63 |
| 65 | 65 | 114.62 | 38 |
| 70 | 70 | 115.75 | 56 |
| 80 | 80 | 118.0 | 73 |

*The freezing points data rounded off to the closest degree is that adopted by the Manufacturing Chemists' Association.



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TOWOLDMON0041533
WATER_PCB-00026002

# HYDROCHLORIC ACID

## (Muriatic Acid)

By W. C. Ferguson

| Degrees Baumé | Specific Gravity 60°/60°F. | Per Cent HCl | Degrees Baumé | 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 |



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TOWOLDMON0041534
WATER_PCB-00026003

| Degrees Baumé | Specinc 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 | 25.7 | 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:

$$\text{Baumé} = 145 - \frac{145}{\text{Sp. G.}}$$

**ALLOWANCE FOR TEMPERATURE**

At 10° to 15° Bé. correction of 1/40° Bé. or 0.002 Sp. G. for every 1°F.
At 15° to 22° Bé. correction of 1/30° Bé. or 0.003 Sp. G. for every 1°F.
At 22° to 25° Bé. correction of 1/28° Bé. or 0.00035 Sp. G. for every 1°F.



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TOWOLDMON0041535
WATER_PCB-00026004

# NITRIC ACID*

By W. C. Ferguson

| Degrees Baumé | Specific Gravity 60° 60°F. | Per Cent $HNO_3$ | Degrees Baumé | 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 | 28.36 |
| 10.50 | 1.0781 | 13.49 | 21.75 | 1.1765 | 28.72 |
| 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 | 30.49 |
| 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 | 38.06 |
| 17.00 | 1.1328 | 22.04 | 28.25 | 1.2420 | 38.46 |
| 17.25 | 1.1350 | 22.38 | 28.50 | 1.2446 | 38.85 |
| 17.50 | 1.1373 | 22.74 | 28.75 | 1.2473 | 39.25 |
| 17.75 | 1.1395 | 23.08 | 29.00 | 1.2500 | 39.66 |
| 18.00 | 1.1417 | 23.42 | 29.25 | 1.2527 | 40.06 |
| 18.25 | 1.1410 | 23.77 | 29.50 | 1.2554 | 40.47 |
| 18.50 | 1.1462 | 24.11 | 29.75 | 1.2582 | 40.89 |
| 18.75 | 1.1485 | 24.47 | 30.00 | 1.2609 | 41.30 |
| 19.00 | 1.1508 | 24.82 | 30.25 | 1.2637 | 41.72 |
| 19.25 | 1.1531 | 25.18 | 30.50 | 1.2664 | 42.14 |
| 19.50 | 1.1554 | 25.53 | 30.75 | 1.2692 | 42.58 |
| 19.75 | 1.1577 | 25.88 | 31.00 | 1.2719 | 43.00 |
| 20.00 | 1.1600 | 26.24 | 31.25 | 1.2747 | 43.44 |
| 20.25 | 1.1624 | 26.61 | 31.50 | 1.2775 | 43.89 |
| 20.50 | 1.1647 | 26.96 | 31.75 | 1.2804 | 44.34 |
| 20.75 | 1.1671 | 27.33 | 32.00 | 1.2832 | 44.78 |
| 21.00 | 1.1694 | 27.67 | 32.25 | 1.2861 | 45.24 |

(*Continued*)



0683452

TOWOLDMON0041536
WATER_PCB-00026005

| 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:

$$\text{Baumé} = 145 - \frac{145}{\text{Sp. G.}}$$

(*Continued*)



0683453

TOWOLDMON0041537
WATER_PCB-00026006

**ALLOWANCE FOR TEMPERATURE**

At from 10° to 20° Bé. correction of 1.30° Bé. or 0.00029 Sp. G. for every 1° F.
At from 20° to 30° Bé. correction of 1.23° Bé. or 0.00044 Sp. G. for every 1° F.
At from 30° to 40° Bé. correction of 1.20° Bé. or 0.00060 Sp. G. for every 1° F.
At from 40° to 48.5° Be. correction of 1.17° Bé. or 0.00084 Sp. G. for every 1° F.

## ACETIC ACID 60°/60° F

Oudemanns

| Specific Gravity | Per Cent $C_2H_4O_2$ | Specific Gravity | Per Cent $C_2H_4O_2$ | Specific Gravity | Per Cent $C_2H_4O_2$ |
|---|---|---|---|---|---|
| 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 | | |



0683454

TOWOLDMON0041538
WATER_PCB-00026007

# AQUA AMMONIA*

By W. C. Ferguson

| Degrees Baumé | Specific Gravity 60°/60°F. | Per Cent $NH_3$ | Degrees Baumé | Specific Gravity 60°/60°F. | Per Cent $NH_3$ |
|---|---|---|---|---|---|
| 10.00 | 1.0000 | 0.00 | 20.00 | 0.9333 | 17.76 |
| 10.25 | 0.9982 | 0.40 | 20.25 | 0.9318 | 18.24 |
| 10.50 | 0.9964 | 0.80 | 20.50 | 0.9302 | 18.72 |
| 10.75 | 0.9947 | 1.21 | 20.75 | 0.9287 | 19.20 |
| 11.00 | 0.9929 | 1.62 | 21.00 | 0.9272 | 19.68 |
| 11.25 | 0.9912 | 2.04 | 21.25 | 0.9256 | 20.16 |
| 11.50 | 0.9894 | 2.46 | 21.50 | 0.9241 | 20.64 |
| 11.75 | 0.9876 | 2.88 | 21.75 | 0.9226 | 21.12 |
| 12.00 | 0.9859 | 3.30 | 22.00 | 0.9211 | 21.60 |
| 12.25 | 0.9842 | 3.73 | 22.25 | 0.9195 | 22.08 |
| 12.50 | 0.9825 | 4.16 | 22.50 | 0.9180 | 22.56 |
| 12.75 | 0.9807 | 4.59 | 22.75 | 0.9165 | 23.04 |
| 13.00 | 0.9790 | 5.02 | 23.00 | 0.9150 | 23.52 |
| 13.25 | 0.9773 | 5.45 | 23.25 | 0.9135 | 24.01 |
| 13.50 | 0.9756 | 5.88 | 23.50 | 0.9121 | 24.50 |
| 13.75 | 0.9739 | 6.31 | 23.75 | 0.9106 | 24.99 |
| 14.00 | 0.9722 | 6.74 | 24.00 | 0.9091 | 25.48 |
| 14.25 | 0.9705 | 7.17 | 24.25 | 0.9076 | 25.97 |
| 14.50 | 0.9689 | 7.61 | 24.50 | 0.9061 | 26.46 |
| 14.75 | 0.9672 | 8.05 | 24.75 | 0.9047 | 26.95 |
| 15.00 | 0.9655 | 8.49 | 25.00 | 0.9032 | 27.44 |
| 15.25 | 0.9639 | 8.93 | 25.25 | 0.9018 | 27.93 |
| 15.50 | 0.9622 | 9.38 | 25.50 | 0.9003 | 28.42 |
| 15.75 | 0.9605 | 9.83 | 25.75 | 0.8989 | 28.91 |
| 16.00 | 0.9589 | 10.28 | 26.00 | 0.8974 | 29.40 |
| 16.25 | 0.9573 | 10.73 | 26.25 | 0.8960 | 29.89 |
| 16.50 | 0.9556 | 11.18 | 26.50 | 0.8946 | 30.38 |
| 16.75 | 0.9540 | 11.64 | 26.75 | 0.8931 | 30.87 |
| 17.00 | 0.9524 | 12.10 | 27.00 | 0.8917 | 31.36 |
| 17.25 | 0.9508 | 12.56 | | | |
| 17.50 | 0.9492 | 13.02 | 27.25 | 0.8903 | 31.85 |
| 17.75 | 0.9475 | 13.49 | 27.50 | 0.8889 | 32.34 |
| 18.00 | 0.9459 | 13.96 | 27.75 | 0.8875 | 32.83 |
| 18.25 | 0.9444 | 14.43 | 28.00 | 0.8861 | 33.32 |
| 18.50 | 0.9428 | 14.90 | 28.25 | 0.8847 | 33.81 |
| 18.75 | 0.9412 | 15.37 | 28.50 | 0.8833 | 34.30 |
| 19.00 | 0.9396 | 15.84 | 28.75 | 0.8819 | 34.79 |
| 19.25 | 0.9380 | 16.32 | 29.00 | 0.8805 | 35.28 |
| 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.

(*Continued*)



0683455

TOWOLDMON0041539
WATER_PCB-00026008

$$\text{Baumé} = \frac{140}{\text{Sp. G.}} - 130.$$

### ALLOWANCE FOR TEMPERATURE

The coeffficient of expansion for ammonia solutions varying with the temperature, correction must be applied according to the following table:

| Degrees Baumé | 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°Bé. | 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° " | |
| 26° " | 0.053° " | 0.057° " | 0.057° " | 0.059° " | | |



0683456

TOWOLDMON0041540
WATER_PCB-00026009

# ANHYDROUS AMMONIA

| Temp. Deg. F. | Pressure Lbs. per Sq. in. Abs. | Specific Volume of Liquid Cu. Ft. per Lb. | Specific Volume of Sat. Vapor, Cu. Ft. per Lb. | Heat of Vaporization, B.T.U. |
|---|---|---|---|---|
| −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. G. Liquid 0.6364 at 32°F.



0683457

TOWOLDMON0041541
WATER_PCB-00026010

# ALUMINUM CHLORIDE

## 60°/60° F.

Bischoff

| Degrees Baumé | Specific Gravity | Per Cent $Al_2Cl_6$ | Lbs. Per Gal. $Al_2Cl_6$ $+12H_2O$ | Degrees Baumé | Specific Gravity | Per Cent $Al_2Cl_6$ | Lbs. Per Gal. $Al_2Cl_6$ $-12H_2O$* |
|---|---|---|---|---|---|---|---|
| 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 | 2.69 |
| 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 |

*$Al_2Cl_6+12H_2O$, chloride of alumina crystal. For chloride of alumina 32°B4. twice the above pounds per gallon of solution.



0683458

TOWOLDMON0041542
WATER_PCB-00026011

# ALUMINUM SULFATE
## 60°/60° F.
Beveridge

| Degrees Baumé | 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 |

(*Continued*)



0683459

TOWOLDMON0041543
WATER_PCB-00026012

## ALUMINUM SULFATE—Continued

| Degrees Baumé | 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% $Al_2O_3$) |
|---|---|---|---|---|---|
| 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 |



0683460

TOWOLDMON0041544
WATER_PCB-00026013

# SODIUM BISULFITE
## 60°/60° F.

H. B. Bischoff

| Degrees Baumé | Specific Gravity | Per Cent $NaHSO_3$ | Per Cent $SO_2$ Available | Degrees Baumé | Specific Gravity | Per Cent NaHSO | Per Cent $SO_2$ Available |
|---|---|---|---|---|---|---|---|
| 0.00 | 1.0000 | 0.00 | 0.00 | 20.00 | 1.1600 | 21.32 | 13.13 |
| 0.50 | 1.0034 | 0.51 | 0.31 | 20.50 | 1.1647 | 21.88 | 13.46 |
| 1.00 | 1.0069 | 1.02 | 0.63 | 21.00 | 1.1694 | 22.44 | 13.81 |
| 1.50 | 1.0104 | 1.53 | 0.94 | 21.50 | 1.1741 | 23.00 | 14.15 |
| 2.00 | 1.0140 | 2.04 | 1.26 | 22.00 | 1.1789 | 23.57 | 14.50 |
| 2.50 | 1.0175 | 2.55 | 1.57 | 22.50 | 1.1837 | 24.14 | 14.85 |
| 3.00 | 1.0211 | 3.06 | 1.88 | 23.00 | 1.1885 | 24.71 | 15.20 |
| 3.50 | 1.0247 | 3.57 | 2.20 | 23.50 | 1.1934 | 25.28 | 15.55 |
| 4.00 | 1.0284 | 4.08 | 2.51 | 24.00 | 1.1983 | 25.85 | 15.91 |
| 4.50 | 1.0320 | 4.59 | 2.83 | 24.50 | 1.2033 | 26.42 | 16.23 |
| 5.00 | 1.0357 | 5.11 | 3.15 | 25.00 | 1.2083 | 26.99 | 16.60 |
| 5.50 | 1.0394 | 5.63 | 3.47 | 25.50 | 1.2134 | 27.56 | 16.96 |
| 6.00 | 1.0432 | 6.15 | 3.79 | 26.00 | 1.2185 | 28.13 | 17.32 |
| 6.50 | 1.0469 | 6.67 | 4.11 | 26.50 | 1.2236 | 28.70 | 17.66 |
| 7.00 | 1.0507 | 7.19 | 4.43 | 27.00 | 1.2288 | 29.27 | 18.01 |
| 7.50 | 1.0545 | 7.71 | 4.75 | 27.50 | 1.2340 | 29.85 | 18.37 |
| 8.00 | 1.0584 | 8.24 | 5.07 | 28.00 | 1.2393 | 30.43 | 18.73 |
| 8.50 | 1.0623 | 8.77 | 5.40 | 28.50 | 1.2446 | 31.00 | 19.08 |
| 9.00 | 1.0662 | 9.30 | 5.72 | 29.00 | 1.2500 | 31.57 | 19.33 |
| 9.50 | 1.0701 | 9.83 | 6.05 | 29.50 | 1.2554 | 32.14 | 19.78 |
| 10.00 | 1.0741 | 10.36 | 6.38 | 30.00 | 1.2609 | 32.71 | 20.13 |
| 10.50 | 1.0781 | 10.89 | 6.70 | 30.50 | 1.2664 | 33.28 | 20.48 |
| 11.00 | 1.0821 | 11.42 | 7.03 | 31.00 | 1.2719 | 33.86 | 20.83 |
| 11.50 | 1.0861 | 11.95 | 7.36 | 31.50 | 1.2775 | 34.43 | 21.19 |
| 12.00 | 1.0902 | 12.48 | 7.68 | 32.00 | 1.2832 | 35.01 | 21.55 |
| 12.50 | 1.0943 | 13.02 | 8.02 | 32.50 | 1.2889 | 35.62 | 21.92 |
| 13.00 | 1.0985 | 13.56 | 8.35 | 33.00 | 1.2946 | 36.25 | 22.30 |
| 13.50 | 1.1027 | 14.10 | 8.68 | 33.50 | 1.3004 | 36.88 | 22.70 |
| 14.00 | 1.1069 | 14.65 | 9.02 | 34.00 | 1.3063 | 37.51 | 23.08 |
| 14.50 | 1.1111 | 15.20 | 9.36 | 34.50 | 1.3122 | 38.14 | 23.47 |
| 15.00 | 1.1154 | 15.75 | 9.70 | 35.00 | 1.3182 | 38.78 | 23.87 |
| 15.50 | 1.1197 | 16.30 | 10.03 | 35.50 | 1.3242 | 39.42 | 24.27 |
| 16.00 | 1.1240 | 16.85 | 10.37 | 36.00 | 1.3303 | 40.06 | 24.65 |
| 16.50 | 1.1284 | 17.40 | 10.71 | 36.50 | 1.3364 | 40.69 | 25.03 |
| 17.00 | 1.1328 | 17.96 | 11.05 | 37.00 | 1.3426 | 41.30 | 25.41 |
| 17.50 | 1.1372 | 18.52 | 11.39 | 37.50 | 1.3488 | 41.91 | 25.79 |
| 18.00 | 1.1417 | 19.08 | 11.74 | 38.00 | 1.3551 | 42.52 | 26.17 |
| 18.50 | 1.1462 | 19.64 | 12.08 | 38.50 | 1.3615 | 43.12 | 26.54 |
| 19.00 | 1.1508 | 20.20 | 12.43 | 39.00 | 1.3680 | 43.72 | 26.91 |
| 19.50 | 1.1554 | 20.78 | 12.77 | 39.25 | 1.3712 | 44.02 | 27.10 |



0683461

TOWOLDMON0041545
WATER_PCB-00026014

| 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 |



0683462

TOWOLDMON0041546
WATER_PCB-00026015

## WEIGHTS PER GALLON AT 60° F.

| | Pounds |
|---|---|
| Acetic Acid 28% | 8 66 |
| Acetic Acid 56% | 8 90 |
| Acetic Acid Glacial | 8 81 |
| Alcohol Propietary Solvent (Mersol) | 6 792 |
| Aluminum Chloride 32° Bé | 10 70 |
| Amyl Acetate | 7 2 |
| Aqua Ammonia 18° Bé | 7 89 |
| Aqua Ammonia 20° Bé | 7 78 |
| Aqua Ammonia 26° Bé | 7 48 |
| Battery Acid 1.400 | 11 67 |
| Butyl Acetate | 7 3 |
| Diacetone Technical | 7 6 |
| Ethyl Acetate | 7 4 |
| Iron, True Nitrate 47° Bé | 12 30 |
| Iron, Copperas Nitrate 47° Bé | 12 30 |
| Iron, Perchloride 40° Bé | 11 51 |
| Mercior | 9 7 |
| Muriatic Acid 18° Bé | 9 52 |
| Muriatic Acid 20° Bé | 9 67 |
| Muriatic Acid 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.) | 16 84 |
| Phosphoric Acid 75% | 13 2 |
| Sodium Bisulfite 33° Bé | 10 78 |
| Sulfuric Acid 66° Bé | 15 30 |
| Sulfuric Acid 98% | 15 36 |
| Sulfuric Acid 100% (Monohydrate) | 15 41 |
| Zinc Chloride 52° Bé | 13 00 |
| Zinc Chloride 72° Bé | 16 56 |

Weight per gallon = Sp. G. x 8.337
1 Cubic Foot = 7.480 gallons
1 Gallon = 3.785 liters



0683463

TOWOLDMON0041547
WATER_PCB-00026016

| TO CONVERT FROM | MULTIPLY BY | | | | | | |
|---|---|---|---|---|---|---|---|
| | To Cu. In. | To Cu. Ft. | To Cu. Yd. | To Fl. Oz. | To Pint | To Quart | To Gallon |
| Cu. In. | 1.00000 | 0.0$_3$5787 | 0.0$_5$2143 | 0.554112 | 0.034632 | 0.017316 | 0.004329 |
| Cu. Ft. | 1728.00 | 1.00000 | 0.037037 | 957.505 | 59.8442 | 29.9221 | 7.48052 |
| Cu. Yd | 46656.0 | 27.0000 | 1.00000 | 25852.6 | 1615.79 | 807.896 | 201.974 |
| Fl. Oz. | 1.80469 | 0.001044 | 0.0$_3$3868 | 1.00000 | 0.062500 | 0.031250 | 0.007813 |
| Pint | 28.8750 | 0.016710 | 0.0$_3$6189 | 16.0000 | 1.00000 | 0.500000 | 0.125000 |
| Quart | 57.7500 | 0.033420 | 0.001238 | 32.0000 | 2.00000 | 1.00000 | 0.250000 |
| Gallon | 231.000 | 0.133681 | 0.004951 | 128.000 | 8.00000 | 4.00000 | 1.00000 |
| Grain | 0.003954 | 0.0$_4$2288 | 0.0$_6$8475 | 0.002191 | 0.0$_4$1369 | 0.0$_4$6850 | 0.0$_4$1712 |
| Oz. Troy | 1.89805 | 0.001098 | 0.0$_4$4068 | 1.05173 | 0.065733 | 0.032867 | 0.008217 |
| Lb. Troy | 22.7766 | 0.013181 | 0.0$_3$4882 | 12.6208 | 0.788800 | 0.394400 | 0.098600 |
| Oz. Av. | 1.72999 | 0.001001 | 0.0$_3$3708 | 0.958608 | 0.059913 | 0.029957 | 0.007489 |
| Lb. Av. | 27.6799 | 0.016018 | 0.0$_2$5933 | 15.3378 | 0.958611 | 0.479306 | 0.119826 |
| CC. or Gm. | 0.061024 | 0.0$_4$3531 | 0.0$_6$1308 | 0.033814 | 0.002113 | 0.001057 | 0.0$_3$2642 |
| Liter or Kg. | 61.0237 | 0.035315 | 0.001308 | 33.8140 | 2.11337 | 1.05669 | 0.264172 |
| Cu. M. | 61023.7 | 35.3146 | 1.30795 | 33814.0 | 2113.37 | 1056.69 | 264.172 |

NOTE:—The small subnumeral following a zero indicates that the zero is to be taken that number of times, thus 0.0$_4$1428 is equivalent to 0.0001428.

Values used in constructing table:

1 inch = 2.540001 cm.

1 cu. in. = 16.387083 cc. = 16.387083 grams $H_2O$ at 4°C.(39°F.)

1 lb. av. = 453.5926 grams.



0683464

TOWOLDMON0041548
WATER_PCB-00026017

## UNITS OF VOLUME AND WEIGHT

*MULTIPLY BY*

| To Grain | To Oz. Troy | To Lb. Troy | To Oz. Av. | To Lb. Av. | To CC. or G. | To Liter Or Kg. | To Cu. M. |
|---|---|---|---|---|---|---|---|
| 252.891 | 0.526857 | 0.043905 | 0.578037 | 0.036127 | 16.3871 | 0.016387 | 0.0₄1639 |
| 436998 | 910.408 | 75.8674 | 998.848 | 62.4280 | 28316.9 | 28.3169 | 0.028317 |
| 117990 | 24581.0 | 2048.42 | 26968.9 | 1685.56 | 764456 | 764.556 | 0.764556 |
| 456.390 | 0.950813 | 0.079234 | 1.04318 | 0.065199 | 29.5736 | 0.029573 | 0.0₄2957 |
| 7302.23 | 15.2130 | 1.26775 | 16.6908 | 1.04318 | 473.177 | 0.473177 | 0.0₃4732 |
| 1460.45 | 30.4260 | 2.53550 | 33.3816 | 2.08635 | 946.354 | 0.946354 | 0.0₃9463 |
| 58417.9 | 121.704 | 10.1420 | 133.527 | 8.34541 | 3785.42 | 3.78542 | 0.003785 |
| 1.00000 | 0.002083 | 0.0₃1736 | 0.002286 | 0.0₃1428 | 0.064799 | 0.0₄6479 | 0.0₆6479 |
| 480.000 | 1.00000 | 0.083333 | 1.09714 | 0.068571 | 31.1035 | 0.031104 | 0.0₄3110 |
| 5760.00 | 12.0000 | 1.00000 | 13.1657 | 0.822857 | 373.242 | 0.373242 | 0.0₃3732 |
| 437.500 | 0.911457 | 0.075955 | 1.00000 | 0.062500 | 28.3495 | 0.028350 | 0.0₄2835 |
| 7000.00 | 14.5833 | 1.21528 | 16.0000 | 1.00000 | 453.593 | 0.453593 | 0.0₃4536 |
| 15.4323 | 0.032151 | 0.002679 | 0.035274 | 0.002205 | 1.00000 | 0.001000 | 0.000001 |
| 15432.3 | 32.1507 | 2.67923 | 35.2739 | 2.20462 | 1000.00 | 1.00000 | 0.001000 |
| 154320. | 32150.7 | 2679.23 | 35273.9 | 2204.62 | 1000000 | 1000.00 | 1.00000 |

1 lb. av. = 27.679886 cu. in $H_2O$ at 4°C. (39°F.).

1 lb. av. = 7000 grains.

1 gallon = 8.34541 lb.

1 gallon = 58417.8 grains.

231 cu. in. = 1 gal. = 3785.4162 grams.



PRINTED IN U. S. A.

0683465

TOWOLDMON0041549
WATER_PCB-00026018

Monsanto Chemical Company

SPECIFICATIONS FOR NO. .....

Name Phenol U.S.P. Date 4/2/35

Superceding specifications of May 1927 Approved .....

.....

| | |
|---|---|
| Color ..... | APH 10 Max. |
| Turbidity ..... | None |
| Foreign Odor ..... | None |
| Cr.Pt. ..... | 40.0°C Min. |
| Distillation Test: | |
| 1st Drop ..... | 180°C Min. |
| 1st Drop to Dryness ..... | 2.0°C Max. |
| 50 cc. to Dryness ..... | 0.2°C Max. |
| Non-volatile at 100°C ..... | 0.04% Max. |
| Solution in 10% NaOH (1:10).. | Clear & Colorless |
| Solution in water (1:15) .... | Clear & Colorless |
| Sample: | 8 oz. g.g.s. bottle |
| Note: Sp.Gr. at 52/15.5°C.. | Approx. 1.05 |

(Note: For Phenol U.S.P. "Steel Containers" a color of APH 150 is permissible.)

0683466

TOWOLDMON0041550
WATER_PCB-00026019



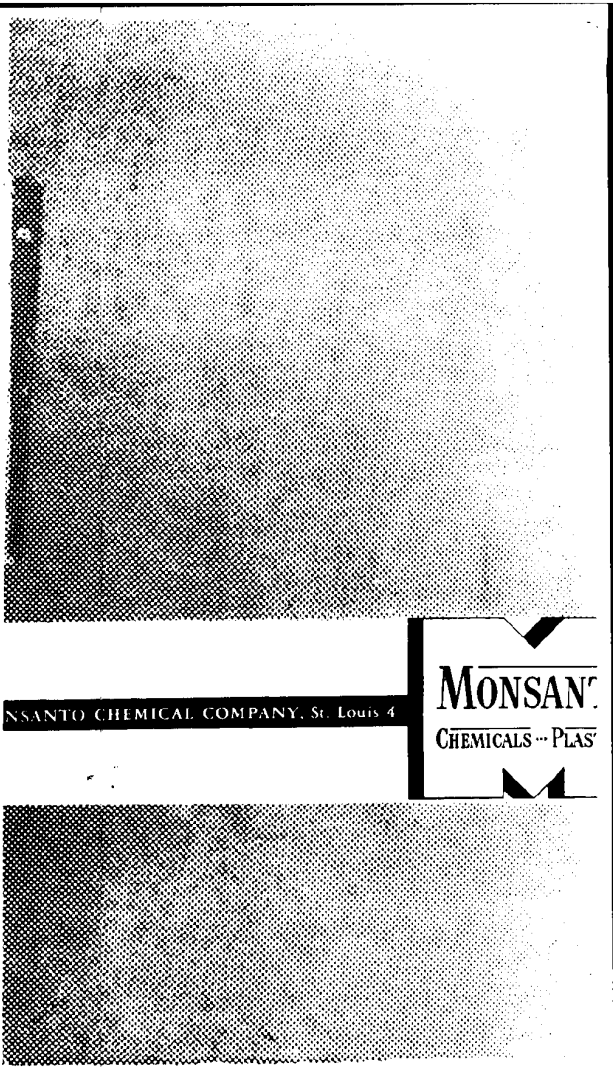
0683467

TOWOLDMON0041551
WATER_PCB-00026020




0683468

TOWOLDMON0041552
WATER_PCB-00026021




0683469

TOWOLDMON0041553
WATER_PCB-00026022