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MONSANTO CHEMICAL COMPANY

Monsanto Chemical Company is one of the largest, most diversified manufacturers of chemicals, plastics and petroleum products in America. The company is "basic" in phosphorus and phosphates, plastics, petroleum petrochemicals and many other organic chemicals . . . relying on no other company for raw materials. Further, Monsanto makes most of its major products at several locations, additional assurance of steady, dependable deliveries.

Monsanto invites your inquiries on chemical compounds, plastics, resins and petroleum products. Hundreds of Monsanto products serve virtually every industry . . . as raw materials for formulation, as building blocks in other chemicals manufacturing, as processing aids for many industries. If you don't see it listed, ask us anyway.

Monsanto products are sold through the following divisions:

Agricultural Chemicals Division
Inorganic Chemicals Division
Lion Oil Company Division
Organic Chemicals Division
Overseas Division
Plastics Division

Products are identified by division. For additional information, consult the nearest sales office or Monsanto in St. Louis. A complete list of Monsanto offices appears in the back of this catalog.

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Actamer® (2,2'-thiobis-(4,6-dichlorophenol)	Inorganic	356C
Chloramine-T, N. F. (N-sodium-N-chloro-para-toluenesulfonamide)	Organic	356C
Monsanto Penta® (Pentachlorophenol, Technical)	Organic	356D
Santobrite® (Sodium Pentachlorophenate, Technical)	Organic	356D
Santophen® 1 Germicide (ortho-benzyl-para-chlorophenol)	Organic	356D
Santophen® 1 Solution (75% Santophen 1, 25% iso-propyl alcohol)	Organic	356D
TCC (3,4,4', Trichlorocarbanilide)	Organic	356D

CHEMICAL SPECIALTY CATALYSTS

Vanadium Sulfuric Acid Catalyst	Eng. Sales Inorganic	356D

CURING AGENTS

Catalysts	Plastics	356E

FLAVORINGS

Ethavan (Ethylvanillin)	Organic	356E
Methyl Salicylate	Organic	356E
Saccharin, U.S.P.	Organic	356E
Saccharin, Sodium, U.S.P.	Organic	356E
Vanillin	Organic	356E

METAL PROCESSING COMPOUNDS

Bone Ash	Inorganic	356E
NPH 80 and 85 (for Aluminum Bright Dipping)	Inorganic	356E

ODORANTS

Coumarin	Organic	356F
Methyl Salicylate	Organic	356F
Santomask® II Odor-Masking Agent	Organic	356F
Vanillin	Organic	356F

PAINT/COATING INGREDIENTS

Benthal® Alkyd Resin Intermediate	Organic	356F
Defoamer PC-1341	Organic	356F
D.P. Solution® (Dibutylamine Pyrophosphate)	Inorganic	356F
Lampblack	Inorganic	356F
Lytron 621	Plastics	344
Maleic Anhydride	Organic	356G
Merlone® WR-4 Precoat for Reproduction Papers	Inorganic	356G
Phthalic Anhydride	Organic	356G
Resimene®	Plastics	346
Resimene® Melamine	Plastics	346
Resinox® Phenolic Varnishes	Plastics	346
Santocel® Silica Aerogel for Industrial Applications	Inorganic	356B
Santomask® II Odor-Masking Agent	Organic	356B

PAPER CHEMICALS

	Division	Page
Aluminum Sulfate Commercial Dry	Organic	356G
Aluminum Sulfate Commercial Liquid	Organic	356G
Aluminum Sulfate Iron Free	Organic	356G
Merrizet® Paper Sizing Agent	Organic	356G
Scriptite® 33	Organic	356G
Scriptite® 40	Organic	356G
Santosite® Sodium Sulfite Anhydrous	Organic	356G

In addition to the above, Monsanto supplies papermakers with Salt Cake; Sulfur Dioxide; a variety of surfactants and wetting agents; and, "Scriptites"® 31, 45, 50, 52, 54 and 55, a series of paper coating, surface sizing and stabilizing resins.

SWEETENERS

Saccharin, U.S.P.	Organic	356H
Saccharin, Sodium, U.S.P.	Organic	356H

TANNING AGENTS

Santotan® KR Basic Chrome Sulfate	Inorganic	356H
Zinc Oxide, Technical	Inorganic	356H

TEXTILE CHEMICALS

Resloom® E-50	Plastics	356H
Stymer® Vinyl Styrene	Plastics	356H

WOOD PRESERVATIVE

Monsanto Penta® (Pentachlorophenol, Technical)	Organic	356H

SURFACE ACTIVE AGENTS, DETERGENTS AND BLEACHES

ANIONIC SURFACE ACTIVE AGENTS

DDBSA (Dodecylbenzene Sulfonic Acid)	Inorganic	356I
DDBSA-96	Inorganic	356I
Santomerse® Alkyl Aryl Sulfonates	Inorganic	356I

NONIONIC SURFACE ACTIVE AGENTS

Sterox® AJ		
Sterox® AJ-100	Inorganic	356I
Sterox® AP		
Sterox® AP-100	Inorganic	356I
Sterox® CD	Inorganic	356I
Sterox® DF	Inorganic	356I
Sterox® DJ	Inorganic	356I
Sterox® NJ	Inorganic	356I
Sterox® NL	Inorganic	356J
Sterox® SK	Inorganic	356J
Sterox® No. 6	Inorganic	356J

BLEACHING COMPOUNDS

ACL® 59 (Potassium Dichloroisocyanurate)	Inorganic	356J
ACL® 70 (Dichloroisocyanuric Acid)	Inorganic	356J
ACL® 85 (Trichloroisocyanuric Acid)	Inorganic	356J

DETERGENT INTERMEDIATES

Alkylate 122 — Dodecyl Benzene	Inorganic	356J
Alkylate 130 — Alkyl Benzene	Inorganic	356J
Dodecylphenol	Inorganic	356J
Nonylphenol	Inorganic	356J
Tridecylbenzene	Inorganic	356J

When product literature is indicated as available, address requests to:

MONSANTO CHEMICAL COMPANY
Department C
800 North Lindbergh Boulevard
St. Louis 66, Missouri

0557493

TOWOLDMON0041228

STOP SCALD* FRUIT SPRAY

AGRICULTURAL CHEMICALS DIVISION

FORMULA: $C_{18}H_{22}NO$

ANALYSIS:

*Active Ingredient:
1,2-dihydro-6-ethoxy-2,2,4-trimethylquinoline.....70%
Inert Ingredients:.....30%

*Equal to 6 pounds of ethoxyquin per gallon

STANDARD FORM: Liquid.

USE: Mixed with water and used as either a spray or a dip. *Stop Scald* prevents common scald of apples in storage.

SHIPPING INFORMATION: Chemicals N.O.I.B.N. 1 gallon and 5 gallon containers.

ELECTRONIC MATERIALS

COOLANOL* 35

ORGANIC DIVISION

Coolanol 35 is a coolant-dielectric fluid for cooling electronic equipment in ground, shipboard and airborne applications. Chemically and operationally similar to *Coolanol* 45, *Coolanol* 35 is especially suited for low-temperature applications, with an operating range of −60° to 400°F.

COOLANOL* 45 DIELECTRIC COOLANT FOR ELECTRONIC EQUIPMENT

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid.

PROPERTIES: A clear, amber liquid with dielectric, heat transfer and hydraulic properties—over a −65°F. to 400°F. temperature range.

USES: Dielectric coolant for both airborne and ground environmental electronic equipment. Also utilized in hydraulic applications in electronic equipment.

SHIPPING INFORMATION: Chemicals NOIBN, 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. drums.

GALLIUM ARSENIDE *Electronic Grade*

INORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Polycrystal ingots with semi-circular cross section approximately 3.0 centimeters wide and weighing several hundred grams.

PURITY: Available in various ranges of carrier concentrations, resistivities, mobilities and Hall coefficients. Also available doped to various levels and as gradient freeze, Czochralski, and float-zone single crystal.

USES: Ultra-high purity gallium arsenide for use in the manufacture of electronic semi-conductor devices such as rectifiers, transistors, standard diodes and tunnel diodes.

SHIPPING INFORMATION: Special containers according to form and quantity. Individual ingots packaged in polyethylene sleeves with data sheet.

INDIUM ARSENIDE—ELECTRONIC GRADE

INORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Polycrystal ingots with rectangular cross section approximately 1.5 x 2.0 centimeters and weighing several hundred grams.

PURITY: Available in various ranges of carrier concentrations, resistivities, mobilities and Hall coefficients.

USES: Ultra-high purity indium arsenide for use in the manufacture of electronic semi-conductor devices such as Hall generators, standard diodes and tunnel diodes.

SHIPPING INFORMATION: Special containers according to form and quantity. Individual ingots packaged in polyethylene sleeves with data sheet.

INDIUM PHOSPHIDE *Electronic Grade*

INORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Polycrystal ingots with semi-circular cross section approximately 2.0 centimeters wide and weighing approximately 75 grams.

PURITY: Available in various ranges of carrier concentrations, resistivities, mobilities and Hall coefficients.

USES: Ultra-high purity indium phosphide for use in the manufacture of electronic semi-conductor devices such as rectifiers, transistors, standard diodes and tunnel diodes.

SHIPPING INFORMATION: Special containers according to form and quantity. Individual ingots packaged in polyethylene sleeves with data sheet.

OS-45* TYPE III HIGH TEMPERATURE AIRCRAFT HYDRAULIC FLUID.

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid

PROPERTIES: A clear, amber liquid with outstanding hydraulic properties over a −65°F. to 550°F. temperature range.

USES: High temperature hydraulic for both airborne and ground environmental applications.

SHIPPING INFORMATION: Chemicals NOIBN, 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. drums.

OS-45* TYPE IV HIGH TEMPERATURE AIRCRAFT HYDRAULIC FLUID.

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid

PROPERTIES: A clear, amber liquid with outstanding hydraulic properties over a −65°F. to 550°F. temperature range.

USES: High temperature hydraulic for both airborne and ground environmental applications.

SHIPPING INFORMATION: Chemicals NOIBN, 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. drums.

SILICON—ELECTRONIC GRADE

NORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Single-crystal cylindrical rods. Polycrystal rods or chunks.

PURITY: Less than 0.2 parts per billion base boron content

GENERAL INFORMATION: Ultra-high purity silicon for use in the manufacture of electronic semi-conductor devices such as diodes, rectifiers and transistors. Available in various electrical resistivity ranges, conductivity types, diameters and lengths according to individual customer requirements.

USES: Single-crystal rods used directly in the manufacture of semi-conductor devices. polycrystal rods used for zone refining to produce single-crystal form and polycrystal chunks used for single-crystal growing techniques.

SHIPPING INFORMATION: Silicon Metal, Electronic Grade. Special containers according to form and quantity. Rods packaged in polyethylene sleeves with data sheet.

FUNCTIONAL FLUIDS: AIRBORNE, INDUSTRIAL, SPECIALTY

AROCLOR* FLUIDS

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquids, resins or solids.

PROPERTIES: Chlorinated aromatic hydrocarbons varying from water-white mobile liquids and pale yellow viscous oils to light amber resins and opaque crystalline solids. Refractive indices above 1.6. Dielectric constants available on request at 150°C.; not affected by boiling with sodium in xylene solution. (The light oils can be distilled at atmospheric pressure without appreciable decomposition and the heavy oils and resins can be distilled under reduced pressure at temperatures.

0557494

TOWOLDMON0041229

GENERAL INFORMATION: Most *Aroclor* materials flux readily with resinous and pitch-like materials to give products having a decreased fire hazard. Viscous oils and resins do not support combustion when heated to 400°C. and have a flash point of 343°C. or higher. Aroclors have a low power factor and a high dielectric constant as compared with mineral oils. The oils and resins are easily soluble in most common organic solvents and drying oils; hard crystalline materials are, in general, less soluble; all are insoluble in water. The more viscous oils and resins have excellent adhesive properties. All forms are thermoplastic, apparently without further condensation or hardening upon repeated melting and cooling. Nondrying: when exposed to air for noticeable oxidation or hardening takes place. The oils and resins have rather low vaporization losses: at 65.8°C. (150°F.) less than 0.04 gm. per sq. in. of surface per month.

USES: Liquid *Aroclors* are used as dielectrics for condensers or capacitors and transformers. Solid *Aroclors* are used to impregnate carbon resistors, and when combined with other plastic materials, the *Aroclors* are excellent softeners or impregnating agents for a variety of electrical products. Wire coatings and tapes, *Aroclors* are used as plasticizers and resins in lacquers including nitrocellulose, ethyl cellulose and cellulose acetate butyrate to extend nitrocellulose and oils and as plasticizer and resin extenders for rubber-base paints, including chlorinated rubber styrene, butadiene and vinyls. In these protective coatings for metal, masonry and wood, *Aroclors* impart acid, corrosive agent, moisture, salt, fungus and mildew resistance. They are incorporated in oil paints to improve electrical insulation properties, curb odors and reduce flammability. They function as sealers in waterproofing compounds, and as plasticizers in formulations for caulking compounds and putty. Employed in asphaltic siding materials and cellulose products impregnated or laminated with asphaltic materials, the *Aroclors* plasticize the asphalt, reduce flammability and increase durability. For printing inks; in precision-casting waxes, floor waxes and other wax products. Used widely in synthetic adhesives including ethyl cellulose, styrene, vinyls and rubber-base materials. *Aroclors* improve adhesion and resistance against corrosive influences. Selected liquid *Aroclors* are used as nonflammable hydraulic fluids for die-casting machines. They are used as actuating media for interrupters. *Aroclors* are useful in cutting oils as extreme pressure lubricants, as high-temperature lubricants and as quenching fluids. *Aroclor* 1248 is employed as a nonflammable, liquid-phase, heat-transfer medium for continuous operation in closed systems at temperatures up to 330°C. and at normal atmospheric pressure.

SHIPPING INFORMATION: Resin Synthetic NOIBN without filler, 600-lb. steel drums; 500-lb. net fiber drums; 100-lb. net bags.

COOLANOL 45* DIELECTRIC COOLANT FOR ELECTRONIC EQUIPMENT

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid.

PROPERTIES: A clear, amber liquid with dielectric, heat transfer and hydraulic properties—over a −65°F. to 400°F. temperature range.

USES: Dielectric coolant for both airborne and ground environmental electronic equipment. Also utilized in hydraulic applications in electronic equipment.

SHIPPING INFORMATION: Chemicals NOIBN, 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. drums.

OS-45* TYPE III HIGH TEMPERATURE AIRCRAFT HYDRAULIC FLUID.

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid

PROPERTIES: A clear, amber liquid with outstanding hydraulic properties over a −65°F. to 40 F. temperature range.

USES: High temperature hydraulics for both airborne and ground environmental applications.

SHIPPING INFORMATION: Chemicals NOIBN, 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. drums.

OS-45* TYPE IV HIGH TEMPERATURE AIRCRAFT HYDRAULIC FLUID.

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid

PROPERTIES: A clear, amber liquid with outstanding hydraulic properties over a −65 F. to 550 F. temperature range.

USES: High temperature hydraulic for both airborne and ground environmental applications.

SHIPPING INFORMATION: Chemicals NOIBN, 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. drums.

SKYDROL* 500-A FIRE RESISTANT JET AIRCRAFT HYDRAULIC FLUID

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid.

TYPICAL ANALYSIS: Moisture .20% max.; neutralization number 0.10 max.; Sp. Gr. 25°/25°C. 1.060-1.066; viscosity at 100 F. 11.7 ±0.4 cs.

PROPERTIES: A clear, purple, fire-resistant hydraulic fluid with excellent lubricity. Operational at −65°F.

USES: Hydraulic fluid for hydraulic systems in turbo jet and turbo prop aircraft, which must be operational at −65°F.

SHIPPING INFORMATION: Hydraulic system fluids other th a petroleum. 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. dru s.

SKYDROL* 7000 FIRE RESISTANT AIRCRAFT HYDRAULIC FLUID

ORGANIC DIVISION—LITERATURE AVAILABLE

TYPICAL ANALYSIS: Cloud point below 0°F.; moisture 0.2 % max.; neutralization number 0.2 max.; Sp. Gr. 1.0 to 1. 6 at 25°/25°C.; pour point −70 F. or lower.

PROPERTIES: A clear, green fire-resistant hydraulic fluid w h outstanding lubricity, stability, non-corrosiveness, excel t viscosity-temperature characteristics, and resistance o oxidation.

USES: Hydraulic fluid in aircraft cabin superchargers, exp - sion turbines for air-conditioning systems and the aircr t hydraulic system itself.

SHIPPING INFORMATION: Hydraulic system fluids other th n petroleum. 1-qt. cans; 1-gal. cans; 5-gal. cans; 54-gal. drums.

PYDRAUL* AC COMPRESSOR LUBRICANT

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid.

TYPICAL ANALYSIS: Viscosity at 100°F.—405 SSU, 210°F.—42 SSU; moisture—0.15% max.; neutralization number (acid)—0.15 max.; sp. gr. at 25°/25°C.—1.310-1.360.

PROPERTIES: A light amber, mobile straight synthetic fire resistant air compressor lubricant with excellent lubricity; non-corrosive, extremely stable to heat and air, designed as a shear stable fluid with a two-fold purpose—to eliminate carbon deposits on valves and cylinder walls, thereby lowering maintenance costs; and to provide safety from air compressor fires and explosions.

USES: A fire and explosion resistant lubricant for air compressors, such as those used in air separation plants, plant air systems, ammonia synthesis plants, gas transmission booster stations and other type processing plants.

SHIPPING INFORMATION: Chemicals NOIBN, 54-gal. steel drums; 5-gal. cans.

PYDRAUL* F-9 HYDRAULIC FLUID

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid.

TYPICAL ANALYSIS: Viscosity at 100°F.—245 SSU, 210°F.—45 SSU; moisture—0.20 % max.; neutralization number (acid)—0.15 max.; sp. gr. at 25°/25°C.—1.070-1.090.

PROPERTIES: A light, amber, cloudy liquid; straight synthetic fire resistant fluid with excellent lubricity and pumping characteristics; non-corrosive, extremely stable to both heat and air; recoverable by filtration; designed for long service life.

USES: Fire resistant hydraulic fluid in die-casting machines, hydraulic presses, automatic welding machines and similar applications requiring a medium viscosity fluid.

SHIPPING INFORMATION: Hydraulic system fluids other than petroleum. 55-ga , steel drums and 5-gal. cans.

PYDRAUL* 60 HYDRAULIC FLUID

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid.

TYPICAL ANALYSIS: Viscosity at 100°F.—60 SSU, 210°F—34 SSU; moisture—0.10 % max.; neutralization number (acid)—0.12 max.; sp. gr. at 25°/25°C.—1.055-1.091.

PROPERTIES: A clear blue, oily, straight synthetic fire resistant hydraulic fluid with excellent lubricating and pumping characteristics; highly resistant to oxidation and breakdown; inert to common metals of construction; an excellent fluid for low temperature operations.

USES: A fire resistant hydraulic fluid in systems requiring extremely low viscosity. Low viscosity is a must in high speed, precision equipment. Suitable for machine tools and temperature properties suited for many outdoor operations.

SHIPPING INFORMATION: Hydraulic system fluids other than petroleum. 54-gal. steel drums and 5-gal. cans.

0557495

TOWOLDMON0041230

METHYL SALICYLATE U.S.P. *Synthetic.*

ORGANIC DIVISION—LITERATURE AVAILABLE

SPECIFICATIONS: Colorless [illegible] assay, 99.0% min.; odor APHA 10 max.; odor, clear; [illegible] refractive index at 20°C., 1.535 to 1.538; Sp. Gr. at 25°/25°C., 1.180 to 1.185; heavy metals, 20 ppm max.; meets all requirements of U.S.P.

USES: Widely used in sprays; insecticides; mouth washes; perfumes; pharmaceuticals; in masking gummed tape and paper; as an odor principle in polishes, printing and copying inks, pastes and glues; and as a flavoring agent in food, candy, lozenges, chewing gum and root beer.

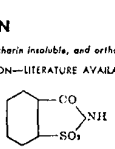
SHIPPING INFORMATION: Methyl Salicylate (Essential Oil NOIBN) 500-lb. drums—returnable; 500 and 50-lb. drums—non-returnable.

SACCHARIN

Also known as saccharin insoluble, and orthosulfobenzimide.

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA:



MOLECULAR WEIGHT: 183.18

STANDARD FORM: Powder and coarse powder.

SPECIFICATIONS: White crystalline powder; assay 98% min.; M.P. 227.0°C. min.; moisture 0.50% max.; solubility in 10% Na_2CO_3 (1:5) complete; ash 0.2% max.; heavy metals 20 ppm max.

USES: Sweetener for tooth pastes, mouth washes and pharmaceutical preparations. Approximately 500 times the sweetening power of sugar.

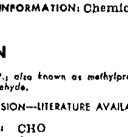
SHIPPING INFORMATION: Chemicals NOIBN. 100-lb. fiber drums.

VANILLIN

Vanillin U. S. P.; also known as methylprotocatechuic aldehyde and 3-methoxy-4-hydroxybenzaldehyde.

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA:



MOLECULAR WEIGHT: 152.14

STANDARD FORM: Fine crystals.

SPECIFICATIONS: Fine, white crystalline needles; M.P. 81.6°C. min.; no foreign flavor (in sugar solution); moisture 0.00% max.; solubility in alcohol (1:2) complete.

USES: As a flavoring agent in foodstuffs and beverages and as an odorant in rubber.

SHIPPING INFORMATION: Chemicals NOIBN. 100-lb. fiber drums; 25-lb. fiber drums.

[illegible]

ACL*

INORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Powder and granular. A series of solid, organic chlorine liberating compounds, useful as active ingredients in household and commercial laundry bleaches, scouring cleansers, machine dishwashing compounds, sanitizing agents, etc.

PRODUCT DESCRIPTION:

ACL Grade	Chemical Name	Typical % Available Chlorine
85	Trichloroisocyanuric Acid	90
70	Dichloroisocyanuric Acid	70
59	Potassium dichloroisocyanurate	60

SHIPPING INFORMATION: Fiber drums with polyethylene bag liner. ACL*-85 and ACL*-59 [illegible] ACL*-70 [illegible]

AROCLOR* POLYCHLORINATED POLYPHENYLS

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquids, resins or solids.

PROPERTIES: Chlorinated aromatic hydrocarbons varying [illegible] water-white mobile liquids and pale yellow viscous [illegible] light amber resins and opaque crystalline solids. Refractive indices above 1.6125. In general are stable up to 300°C.; not affected by boiling with sodium hydroxide solution. The light oils can be distilled at reduced pressure without appreciable decomposition and the [illegible] oils and resins distill readily under vacuum. Viscous oils and resins almost odorless and tasteless at ordinary temperatures.

GENERAL INFORMATION: Most *Aroclor* materials fuse or mix with resinous and pitch-like materials to give products having a decreased fire hazard. Viscous oils and resins do not support combustion when heated above their respective boiling points—temperatures above 300°C. Have high dielectric characteristics, high dielectric strength and resistivity, low power factor; certain of the liquids have high dielectric constant as compared with mineral oils. Oils and resins easily soluble in most common organic solvents and drying oils; hard crystalline materials are soluble or less soluble and resins are insoluble in [illegible] and resins are inherently [illegible] thermoplastic, apparently undergo no further condensation or hardening upon repeated melting and cooling. Normally when exposed to air no noticeable oxidation or [illegible] takes place. The clear resins have rather low vaporization losses; at 65.8°C. (150°F.) less than 0.01 gm. per sq. in. of surface per month.

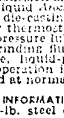
USES: Liquid *Aroclors* are used as dielectrics for condensers or capacitors and transformers. Solid *Aroclors* are used to impregnate carbon resistors, and when combined with oils, plastic materials, the *Aroclors* are excellent coatings and impregnating agents for a variety of electrical applications, wire coatings and tape. *Aroclors* are used as plasticizers and resins in lacquers including nitrocellulose, ethyl cellulose and cellulose acetate butyrate; to extend varnish resins and oils and as plasticizer and resin extenders for rubber-base paints, including chlorinated rubber, styrene, butadiene and vinyls. In these protective coatings for metal, masonry and wood, *Aroclors* impart adhesion, resistance to moisture, acids, alkalies or other corrosive influence and they improve electrical insulating properties, durability and reduce flammability. They function as sealers in waterproofing compounds, wood preservative formulations, caulking compounds and putty. Employed in asphaltic sealing materials and cellulose products impregnated or laminated with asphaltic materials, the *Aroclors* plasticize the product, reduce flammability and improve durability. For resistance inks; in precision-casting waxes, floor waxes and electrical products. Used widely in synthetic adhesives particularly ethyl cellulose, styrene, vinyls and diene-based materials. *Aroclors* improve adhesion and resistance against corrosive influences. Selected liquid *Aroclors* are used as noninflammable hydraulic fluids for die-casting machines. They are used as metallizing media for thermostats. *Aroclors* are useful in cutting oils as extreme pressure lubricants, as high-temperature lubricants and as grinding fluids. *Aroclor* 1248 is employed as a noninflammable, liquid-phase, heat-transfer medium for continuous operation in closed systems at temperatures up to 300°C. at 1 at normal atmospheric pressure.

SHIPPING INFORMATION: Resin Synthetic NOIBN without filler, 600-lb. steel drums; 500-lb. net fiber drums; 100-lb. net bags.

BENZYL CHLORIDE *Also known as alpha-Chlorotoluene.*

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA: CH_2Cl



MOLECULAR WEIGHT: 126.58

STANDARD FORM: Liquid.

SPECIFICATIONS: Clear to slightly turbid, colorless to yellow liquid; Sp. Gr. 1.103–1.110 at 15.5°/15.5° C. Boiling range at 760 mm 2°C. max. including 179.4 C.

USES: A highly reactive aralkyl halide used in the production of the following: dyestuffs; perfumes; esters such as benzyl alcohol, acetate and other esters; plasticizers; [illegible] acids; germicides; rubber accelerators; [illegible] inhibitors; benzyl benzoate; and pharmaceuticals (A.M.A.). This product irritates the skin and eyes; avoid contact and breathing its vapors. Benzyl Chloride should not be stored with metals and their derivatives, especially iron, and due care must be exercised in handling, storage and processing of Benzyl Chloride.

SHIPPING INFORMATION: Chemicals NOIBN. Corrosive liquid (white label required). 475-lb. lined drums; 2000 gal. [illegible] [illegible]

0557496

TOWOLDMON0041231

ADIPIC ACID

ORGANIC DIVISION

FORMULA: $HOOC(CH_2)_4COOH$

MOLECULAR WEIGHT: 146.14

STANDARD FORM: White powder.

SPECIFICATIONS: Assay 99.7% min.; M.P. 152.0°C. min.; ash 12 ppm max.; color 20 grams in 100 ml methanol) APHA 10 max.; water 0.2% max.; iron 2 ppm max.

USES: A resin intermediate in the surface-coating and polyester industries where it is used for viscosity control and to impart softness and flexibility to the cured resins. Other fields for which adipic acid serves as an intermediate include: low-temperature flexibilizing plasticizers for vinyls, cellulosics and rubber; hot-melt and thermosetting adhesives; yarn sizings and textile finishes; and synthetic fabric tanning oils and greases. Saturated polyesters made by processing adipic acid with diols or triols are the basic resins for making isocyanate materials such as polyurethane foams, coatings, adhesives and elastomers.

SHIPPING INFORMATION: Acid, NOIBN, dry (Adipic Acid). 50-lb. bags.

DIBUTYL FUMARATE

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA: $H\text{-}C\text{-}CO_2(CH_2)_3CH_3$

$CH_3(CH_2)_3O_2C\text{-}C\text{-}H$

MOLECULAR WEIGHT: 248

STANDARD FORM: Liquid.

SPECIFICATIONS: Acidity .020 meq/100 grams max.; Color 75 APHA max.; Crystallizing Point −20.0°C. min.; Moisture (KF in methanol) 0.10% max.; Sp. Gr. 25°/25°C. 0.982-0.986.

USES: Internal plasticizing resin former for copolymerizing with vinyl acetate and vinyl chloride for adhesives, textile, paint and paper coatings. Intermediate for chemical synthesis.

SHIPPING INFORMATION: Resin Plasticizer, 55-gal., 18-gauge steel drums with tight heads, 2-inch and ¼-inch openings in the head. Gross weight: 498 lbs. Also tankcars or tank trucks 2,000-gal. minimum.

DIBUTYL MALEATE

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA: $H\text{—}C\text{—}CO_2(CH_2)_3CH_3$

$H\text{—}C\text{—}CO_2(CH_2)_3CH_3$

MOLECULAR WEIGHT: 248

USES: The standard fire-retarding plasticizer for nitrocellulose and vinyls. Being a solvent for nitrocellulose, it has a high retentivity and can be used in large proportions without danger of sweating or separation. Widely used in vinyl resins, particularly in electrical applications; has good electrical properties and imparts flame resistance to the composition. Compatible with most lacquer resins and gives firm, tough, flexible films of excellent weathering qualities.

SHIPPING INFORMATION: Resin Plasticizer, 500-lb. and 45-lb. steel drums; tank cars, tank trucks wherever possible.

MALEIC ANHYDRIDE

ORGANIC DIVISION

FORMULA:



MOLECULAR WEIGHT: 98.06

STANDARD FORM: Briquettes, fused mass.

SPECIFICATIONS: White briquettes or fused mass, crystallizing point (as produced) 52.5 C. min.; water solution (4 gms. in 10 ml); clear and colorless; assay 99.5% min.; color of melt 20 APHA max.

USES: Used alone or in combination with other acids in the manufacture of alkyd and polyester resins; a versatile intermediate for chemical synthesis. Also used for production of paper and textile sizes, agricultural chemicals and ester comonomers for internal plasticization.

SHIPPING INFORMATION: Maleic Anhydride, 50 lb. bags; 750-lb. fiber drums; tank cars.

PHTHALIC ANHYDRIDE

ORGANIC DIVISION

FORMULA:



MOLECULAR WEIGHT: 148.11

STANDARD FORM: White flakes or fused mass.

SPECIFICATIONS: Solubility in benzene (1:20) clear. Assay 99.5% min.; C.P. 130.8 C. min.

USES: An intermediate in the production of alkyd and polyester resins; dyestuffs; perfume bases; alcohol denaturants; pharmaceuticals; and plasticizers such as octyl phthalate, dibutyl phthalate, butoxyethyl phthalate, diethyl phthalate and phthalyl glycollates.

SHIPPING INFORMATION: Phthalic Anhydride, 80-lb. bags; tank cars; tank trucks.

STYRENE MONOMER (SEE PAGE 356A)

VINYL CHLORIDE MONOMER (SEE PAGE 330)

UREA, INDUSTRIAL GRADE UNCOATED PELLETS

INORGANIC DIVISION

FORMULA: NH_2CONH_2

STANDARD FORM: Urea pelleted form without coating agent.

ANALYSIS:

Nitrogen (Min.)	46.0%
Moisture (Max.)	1%
Biuret (Max.)	1.0%

USES: Urea Formaldehyde resins for adhesives, plastics, paper and textiles; chemical intermediate, cosmetics, detergents, explosive stabilizer, paints, dentifrice, fermentation, laminates.

SHIPPING INFORMATION: Urea, 50-lb. multiwall paper bags with polyethylene lining. Also in bulk.

AROCLOR* COMPOUNDS

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquids, resins or solids.

PROPERTIES: Chlorinated aromatic hydrocarbons varying from water-white mobile liquids and pale yellow viscous oils to light amber resins and opaque crystalline solids having softening indices above 160°C. In general the oils are soluble in benzene at 150 G.; not affected by boiling with caustic hypochlorite solution. (The light oils can be distilled at atmospheric pressure without appreciable decomposition and the viscous oils and solid resins can be distilled by blowing with steam.) Oils and resins almost odorless and tasteless at ordinary temperatures.

GENERAL INFORMATION: Most *Aroclor* materials can be readily with resinous and plastic materials to give products having a decreased fire hazard, Aroclors oils used [illegible] do not support combustion when [illegible] of boiling points [illegible] above 300°C. All have excellent electrical characteristics, high dielectric strength, high resistivity, low power factor, a stable dielectric constant as compared with mineral oil, [illegible] and resins easily soluble in most [illegible] and drying oils; hard crystalline [illegible] less solubility and are [illegible] Resins and resins have excellent [illegible] thermoplastic, applied [illegible] or hardening upon [illegible] when exposed to air no [illegible] takes place. The clear resins have rather low [illegible] losses; at 65.8 C. (150 F.) less than 0.01 mm. [illegible] surface per month.

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USES: Liquid *Aroclors* are used as dielectrics for condensers or capacitors and transformers. Solid *Aroclors* are used to [illegible] in liquids for electrical insulation; also in cellulose acetate butyrate; to extend varnish resins and oils and as plasticizer and resin extenders for rubber-base paints, including chlorinated rubber systems, butadiene and vinyls. In these protective coatings for metal, masonry and wood, *Aroclors* impart adhesion, resistance against moisture, acids, alkalies or other corrosive influences and they improve electrical insulating properties, durability and reduce flammability. They function as sealers in waterproofing compositions, wood preservative formulations, caulking compounds and putty. Employed in asphaltic coating materials and cellulose products impregnated or laminated with asphaltic materials, the *Aroclors* plasticize the asphalt, reduce flammability and improve durability. For printing inks; in precision-casting waxes, floor waxes and other wax products. Used widely in synthetic adhesives including ethyl cellulose, styrene, vinyls and rubber-base materials, *Aroclors* improve adhesion and resistance against corrosive influences. Selected liquid *Aroclors* are used as nonflammable hydraulic fluids for die-casting machines. They are used as actuating media for chemicals. *Aroclors* are useful in cutting oils at extreme pressure lubricants, as high-temperature lubricants and as grinding aids. *Aroclor* 1248 is employed as a nonflammable, liquid-phase, heat-transfer medium for continuous operation in closed systems at temperatures up to 300° C. and at normal atmospheric pressure.

SHIPPING INFORMATION: Resin Synthetic NOIBN without filler, 600-lb. steel drums; 500-lb. net fiber drums; 100-lb. net bags.

DI-2-ETHYLHEXYL ADIPATE (DOA)

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA: $(CH_2)_4(COOCH_2CH(C_2H_5)C_4H_9)_2$

MOLECULAR WEIGHT: 370.56

STANDARD FORM: Liquid.

SPECIFICATIONS: Clear oily liquid; color APHA 25 max.; odor mild; acidity (as adipic acid) 0.02% max.; Sp. Gr. 0.924 ±0.003 at 25°/25°C.

USES: A primary plasticizer which imparts excellent low temperature flexibility to polyvinyl chloride resins and synthetic rubbers. Used in conjunction with DOP and Santicizer 160 to make quality vinyl garden hose. Imparts low viscosity to vinyl plastisols for cloth coating, wire coating, etc. Imparts excellent heat and light stability and superior softness to vinyl film and upholstery.

SHIPPING INFORMATION: Resin Plasticizer, 55 and 5-gal. drums; tank cars, tank trucks wherever possible.

DI-2-ETHYLHEXYL PHTHALATE (DOP)

ORGANIC DIVISION- LITERATURE AVAILABLE

FORMULA:



MOLECULAR WEIGHT: 390.54 (Pure compound)

STANDARD FORM: Liquid.

SPECIFICATIONS: Color APHA 25 max.; odor, very slight characteristic; Sp. Gr. 0.980-0.985 at 25°/25°C.; refractive index 1.4840-1.4868 at 25°C.; acidity (as phthalic) 0.01% max.

PROPERTIES: Di (2-EthylHexyl) Phthalate (DOP) is the largest volume plasticizer consumed in polyvinyl-chloride resin. It imparts very good low temperature flexibility, low volatility and good heat and light stability to a vinyl composition. It is often used with *Santowhite* 141 to give a composition of improved light stability, resistance to embrittlement and aging, flame resistance and ease of processing. In vinyl electrical compositions, DOP imparts excellent electrical characteristics with good aging properties.

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

SHIPPING INFORMATION: Resin Plasticizer, 55-gal. (445-lb.) and 5-gal. (40-lb.) black iron drums; tank cars, tank trucks wherever possible.

DI-N-OCTYL, N-DECYL ADIPATE (DNODA)

ORGANIC DIVISION—LITERATURE AVAILABLE

STANDARD FORM: Liquid.

SPECIFICATIONS: Appearance, clear oily liquid; color, APHA 50 max.; Sp. Gr. 25°/25°C., 0.912-0.920; refractive index, 25°C., 1.448-1.417; moisture, 0.10% max.; acidity, 0.05 meq/gm max.

PROPERTIES: DNODA is a primary plasticizer for polyvinyl chloride and imparts excellent low temperature flexibility and efficiency along with softness, superior heat and light stability, permanence, water resistance, heat and light stability. It has the best balance of properties of all adipates and on a cost performance basis is the first choice of all low temperature flexibilizing plasticizers.

USES: The major use of DNODA is as a low temperature flexibilizer, specialty plasticizer used with basic type esters such as DOP. It lends well-spread use in film, sheeting and coated fabrics. It will improve flexibility and efficiency in extrusion compounds and improve low temperature exposure characteristics of electrical jacketing formulas. It is especially useful in vinyl dispersions where its low mutual solvency and excellent shelf life characteristics are most desirable. In addition to being a primary plasticizer for polyvinyl chloride and chloride acetate copolymers, it is compatible and useful with nitrocellulose, ethyl cellulose, chlorinated rubber, GRS and Buna N rubbers. It is also effective with polyvinyl butyral, cellulose acetate butyrate, polystyrene methacrylate and damar resins.

SHIPPING INFORMATION: Resin Plasticizer, 55-gal. (415-lb.) and 5-gal. (39-lb.) black iron drums; tank cars, tank truck wherever possible.

DIBUTYL PHTHALATE

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA:



MOLECULAR WEIGHT: 278.34

STANDARD FORM: Liquid.

SPECIFICATIONS: Clear, oily liquid; color APHA 20 max.; odor slight; acidity (as phthalic acid) 0.01% max.; Sp. Gr. 1.0445-1.0465 at 25°/25°C.; refractive index 1.4895-1.4915 at 25°C.; assay (ester content) 99% min.; sulfur (copper-strip test) negative.

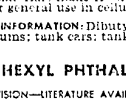
USES: One of the most widely used plasticizers for nitrocellulose and polyvinyl acetate; miscible with all the common organic solvents and with oils; soluble in water only to 0.01% at 30°C.; excellent light stability which permits its use in colorless, white or delicately tinted products. The stability of dibutyl phthalate and its high solvent power for most plastic materials make it one of the most acceptable plasticizers for general use in cellulosics and vinyl acetate.

SHIPPING INFORMATION: Dibutyl Phthalate, 475-lb. steel drums; 40-lb. drums; tank cars; tank trucks.

DICYCLOHEXYL PHTHALATE (DCHP)

ORGANIC DIVISION—LITERATURE AVAILABLE

FORMULA:



MOLECULAR WEIGHT: 330

STANDARD FORM: White solids.

SPECIFICATIONS: Appearance, white solid; color of melt, 100 APHA max.; odor, moderate aromatic, slight phthalic; moisture in methanol, 0.1% maximum; melting point, 63°C. minimum; acidity (as phthalic acid), 0.01% max.; ester content 99.0% min.

PROPERTIES: Dicyclohexyl Phthalate is an excellent primary plasticizer for ethyl cellulose, polystyrene, alkyds and chlorinated rubber. It is partially compatible with cellulose acetate butyrate, polyvinyl butyral, polyvinyl chloride and incompatible with cellulose acetate.

USES: This plasticizer is widely used as a plasticizer for nitrocellulose lacquers where it contributes adhesion, oil resistance, heat sealability and hardness. It is also used in combination with liquid plasticizers for plasticizing polyvinyl acetate to make heat sealing adhesives. Dicyclohexyl Phthalate is a processing aid for polyvinyl chloride semi-rigid and rigid films. It serves as a liquid plasticizer at process temperature, but has little or no softening or flexibilizing effect at room temperature. This is especially useful in structural films for floor coverings, wall coverings, automobile door panels, etc.

SHIPPING INFORMATION: Resin Plasticizer, 350-lb. metal containers.

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