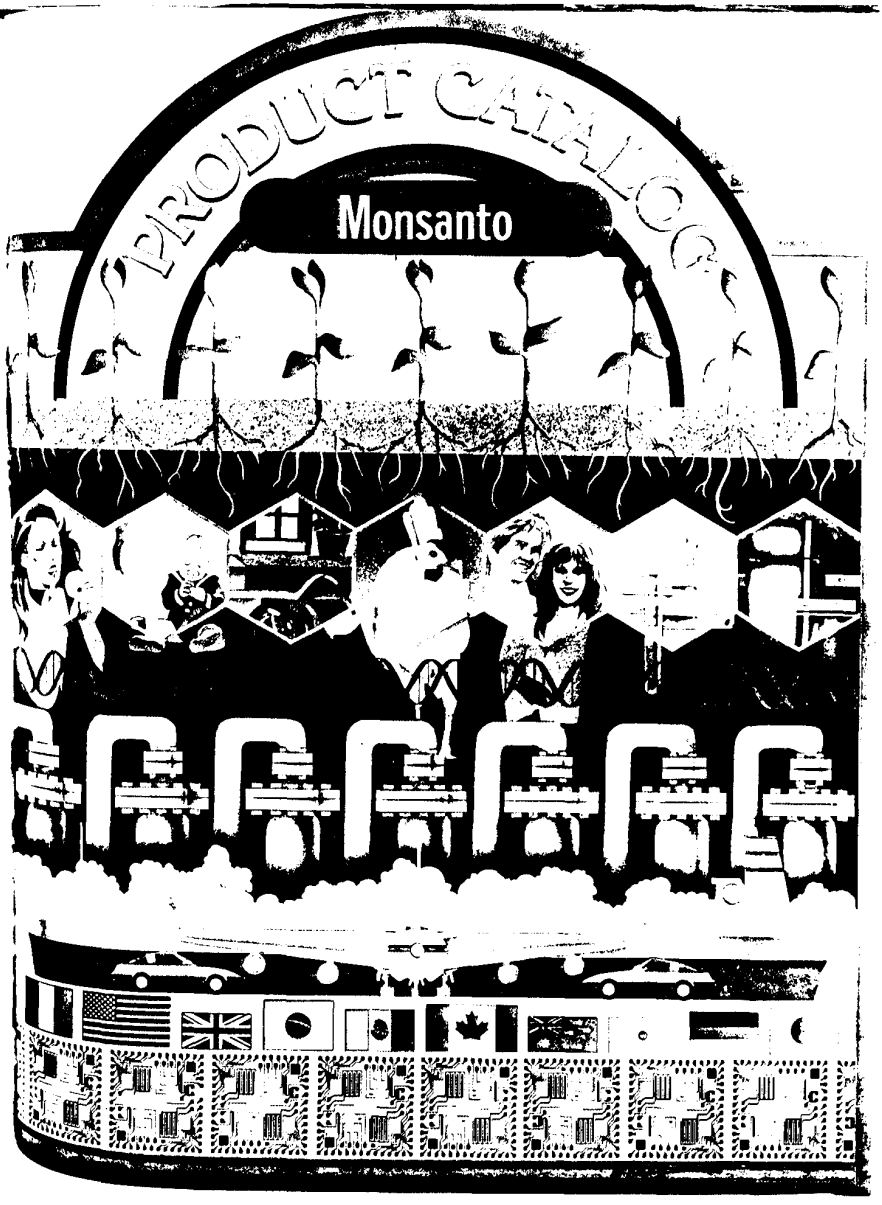

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THIS CATALOG LISTS MANY OF THE MORE THAN 1000 PRODUCTS OR SERVICES PRODUCED OR PROVIDED BY MONSANTO AND ITS MAJOR SUBSIDIARIES.

FOR ADDITIONAL INFORMATION ON THESE PRODUCTS AND SERVICES, REFER TO OUR SALES OFFICE INDEX IN THE "GREEN" SECTION.

IF YOU'RE NOT CERTAIN WHERE TO CALL. . .

IF YOU'RE NOT CERTAIN WHAT PRODUCT YOU'RE LOOKING FOR. . .

IF YOU CAN'T FIND A PRODUCT LISTED IN THE CATALOG. . .

OR

IF YOU JUST NEED HELP. . .

. . .CALL THE CUSTOMER INQUIRY CENTER AT THE WORLD HEADQUARTERS IN ST. LOUIS, MISSOURI
***** (314) 694-1000 ****

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GUIDE TO CONTENTS

The products manufactured and sold by Monsanto's operating companies, Monsanto International and its major subsidiaries are listed on the following pages. In order to help you locate products, the catalog is divided into the following sections.

COMPANY ORGANIZATION *(See page ii)*

A brief resume of Monsanto's organization, describing the broad areas of company interest and the specific interests of the operating companies, Monsanto International and subsidiaries.

TRADEMARKS *(See page v)*

The word *Monsanto* and the *Monsanto Block M* are Monsanto's most important trademarks. They are registered in the U.S. Patent office and in most countries throughout the world. Indices used in this catalog also contain other trademarks owned by Monsanto and its subsidiaries. Trademarks which are registered in the U.S. Patent and Trademark Office are followed by the ®. Unregistered trademarks and those for which registration is pending are followed by an asterisk.

ALPHABETICAL PRODUCT INDEX

See BLUE pages. Includes products and their uses, refers to the page where specific product descriptions may be found, and to the Sales Office Index which tells where you may place an order or obtain additional product information.

PRODUCT USE INDEX

See YELLOW pages. All products are listed by the way they can be used. For example, as Agricultural and Farm Products or as Paint/Coating Ingredients. This index refers to the page where the product description may be found.

SALES OFFICE INDEX

See GREEN pages. Shown at the lower right of each product description. It works like this: If you need additional information on Adipic Acid, Food (F.C.C.) Grade, Sales Office Index 31a refers to the marketing offices that handle this product. Thus, if you are located in the western part of the U.S., our Newport Beach office would be most convenient for you.

MARKETING OFFICES OUTSIDE THE UNITED STATES

Following Sales Office Index.

Published by

CUSTOMER INQUIRY CENTER
MARKETING COMMUNICATIONS & INFORMATION DEPARTMENT
800 NORTH LINDBERGH BLVD.
ST. LOUIS, MISSOURI 63167

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MONSANTO COMPANY is a diversified producer of chemicals, plastics, agricultural products, man-made fibers, and specialized electronic and process control systems. The company has investments, either directly or through affiliated companies, in 149 manufacturing plants and 20 laboratories or technical centers in 20 nations. Monsanto has worldwide marketing representation through sales offices or sales agents in 65 countries selling to approximately 100 nations. In the United States, Monsanto has more than 100 sales, merchandising and warehousing locations.

MONSANTO AGRICULTURAL PRODUCTS COMPANY

This operating unit is a recognized leader in the development, manufacturing and marketing of high technology herbicides used to improve world food production. Other company businesses include insecticides, plant growth regulators, fertilizer materials and blasting agents.

Monsanto crop chemicals, used to control many annual and perennial weeds in major world crops, include *Lasso®*, *Lasso®* plus atrazine package mix, *Bronco®*, *Ramrod®*, *Roundup®*, *Avadex®*, *Far-Go®* and *Machete®* herbicides. *Rodeo®* and *Roundup®* herbicides are useful in non-crop vegetation control. Insecticides based on parathion manufactured by Monsanto also protect food and fiber crops from destructive pests, such as the boll weevil in cotton. *Polaris®* and *Polado®*, the first of a family of plant growth regulators under extensive investigation by the company, help cane producers maximize yields by increasing the sucrose content of sugarcane.

MONSANTO FIBERS AND INTERMEDIATES COMPANY

Nylon, acrylic and modacrylic fibers as well as textile intermediates such as acrylonitrile, hexamethylenediamine and adipic acid are manufactured by Monsanto Fibers and Intermediates Company.

The man-made Fibers serve apparel, hosiery, home furnishings, carpet and tire markets. Increasing quantities of Monsanto fibers are used in *Wear-Dated®* apparel, home furnishings and carpet. Monsanto's various new acrylic fibers—*Pa-Qel®*, *Bi-Loft®*, *So-Lara®*, *Remember®*, *Fi-Lana®*—are fast becoming the premier fibers for the sweater and craft yarn markets, while *Acrilan®* acrylic is widely used in other apparel applications. *Ultron®* nylon carpet fiber, with antistatic and soil-hiding properties, is preferred by quality mills. In many constructions, *SEF®* modacrylic fiber results in fabrics with flame retardant characteristics for use in apparel and home furnishings. *Cerex®* spunbonded nylon fabric is used as a durable scrim for carpeting and in quilted fabric liners, air and liquid filters, and disposal hospital garments.

The textile intermediates manufactured by MFI are the key raw materials for making fibers. The company also maintains an extensive research and development program directed at increasing its eminent position in manufacturing technology. As a result of its successful R & D program, the company's technology is licensed around the world.

MONSANTO INDUSTRIAL CHEMICALS COMPANY

Monsanto Industrial Chemicals Company produces hundreds of commodity and specialty chemicals. Many of these products provide Monsanto with market and technology leadership positions throughout the world.

The household and industrial detergent industry is among the major markets for the company's surfactants and builders. This unit also produces germicides for disinfectants and cleaners, as well as bacteriostats for the bar soap industry. Phosphorus derivatives produced by this company also find their way into uses as diverse as metal treatment and dentifrice ingredients.

Monsanto Industrial Chemicals has long been a major supplier to the pharmaceutical business. The company is the world's largest producer of bulk aspirin. It also markets acetaminophen, found in popular analgesic formulations, and other pharmaceutical raw materials.

The company produces a broad line of *ACL®* compounds used in swimming pool chlorination, household bleaches and dishwashing detergents. *Dequest®* water treatment compounds are used in industrial water treatment to prevent scale formation.

Skydrol® fire-resistant hydraulic fluid is used on jet aircraft throughout the commercial aviation industry. *Pydraul®* hydraulic fluid is used in die casting machines, rolling mill systems and offshore drilling operations. *Therminol®* heat transfer fluids are used for indirect heating and cooling in chemical processing, on offshore oil and gas platforms, in tanker and barge construction and in solar heating.

Process chemicals from this company are used by other manufacturers to make countless industrial

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and consumer products. This unit is the world's largest producer of maleic anhydride, which is used in fiberglass, agricultural herbicides and oil additives.

Monsanto Industrial Chemicals maintains an active growth function with research projects as diverse as asbestos replacements to developing new ingredients for detergent formulations.

MONSANTO POLYMER PRODUCTS COMPANY

Monsanto Polymer Products Company is composed of three divisions—Plastics, Resin Products and Rubber Chemicals and Instruments. Products within the Plastics Division include *Lustran*® ABS, *Lustran*® SAN and *Lustrex*® polystyrene, three styrene-based plastics used in a variety of household, automotive, construction and appliance applications. *Vydyne*® nylon and *Vydyne*® R reinforced nylon are used in the electrical, appliance and transportation industries. A product family of thermoplastic rubbers for high-temperature is suitable for high-temperature environments, such as under-the-hood automotive use.

The Resin Products Division produces *Saflex*® polyvinyl butyral film, the plastic interlayer used in automotive windshields and laminated glass and specialty resins for paints, coatings, adhesives and paper. Plasticizers are used in a wide range of applications. These products add flexibility and other desirable properties to vinyl products such as food wrap, sheet flooring, wire and cable insulation and automotive upholstery. Flame retardants and other resin modifiers complement the plasticizer product line.

Monsanto is the world's leading producer of rubber chemicals for controlling vulcanization and protecting tires and other rubber products from degradation. Also produced are specialized testing and quality control instruments and equipment for the rubber processing industry, such as X-ray equipment for tire inspection.

ANIMAL AND PLANT PRODUCTS DIVISION

The Animal and Plant Products Division is one of the world's largest suppliers of ammonium nitrate. Used as a nitrogen-rich fertilizer, ammonium nitrate helps farmers maintain the soil nutrient level necessary for high crop yields. Ammonium nitrate also is the key ingredient for efficient, low-cost blasting agents used by the mining and construction industries.

ELECTRONICS DIVISION

The Electronics Division is the world's largest and finest quality producer of electronic-grade silicon, a substrate material on which the fast-growth semiconductor industry is based. Monsanto silicon is used in semi-conductors for making computers, calculators, digital displays and military electronics.

ENGINEERED PRODUCTS DIVISION

The Engineered Products Division was organized to cultivate and nuture growth businesses in Monsanto.

The Division consists of four families of products, including the Separations Business Group, Fabricated Products, Monsanto Enviro-Chem Systems, Inc., and Radiation Dynamics, Inc.

The Fabricated Products Division produces custom-designed and stock blow-molded containers, polyethylene film for greenhouses, *AstroTurf*® recreational surfaces, *AstroTurf*® H-D heavy-duty matting and roll goods, *Spray Guard*® rain flaps for controlling splash and spray from large vehicles on wet pavement, and *Fome-Cor*® board used as sheathing in manufactured housing, for headliners in automobiles, as a mounting and backing board in the graphic arts industry and as an underlayment product in the home improvement industry.

The Separation Business Group develops and manufactures a proprietary system that uses hollow fiber technology to separate hydrogen and other gases from process and waste gas streams. These systems of *PRISM*® separators have gained worldwide acceptance in the refining, petrochemical and ammonia industries.

Enviro-Chem Systems, Inc., is a Monsanto subsidiary which is a world leader in design and construction of sulfuric acid plants, catalysts, and anodically passivated acid coolers as well as fiber bed mist eliminators for pollution control.

Radiation Dynamics, Inc., is a Melville, N.Y.-based subsidiary which is a leader in the manufacture and use of electron beam radiation devices, tradename *Dynamitrons*®, for industrial purposes, sterilization of healthcare materials and plastic processing. The goal of RDI is to make electron beam radiation technology available to any company that needs it through machinery developed by RDI, service centers, and proprietary products such as heat shrink fabricated articles. RDI has high-powered accelerators in use world-wide for such diverse applications as upgrading insulation or wire and cable, vulcanizing rubber

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products, cross-linking plastics, polymerization of monomers and modifying the molecular weight of polymers. For more information on radiation process equipment, contact J. P. Rutt, (516) 752-1660, ext. 222. For more information on heat shrink fabricated articles, contact R. B. MacCallum, (516) 752-1660, ext. 262.

NUTRITION CHEMICALS DIVISION

Products for the animal nutrition and human food industries are manufactured by Nutrition Chemicals Division. Amino acid feed supplements and preservatives for poultry and swine feed are the cornerstone products in Monsanto's animal nutrition business. The human food market is supplied with preservatives, food phosphates, acidulants and flavors.

MONSANTO INTERNATIONAL

Monsanto International coordinates operations outside the U.S. in conjunction with the four operating companies and manages joint ventures worldwide.

Monsanto International has local management responsibility wherever the Company conducts business outside the U.S. These operations are organized into three major world areas: Europe-Africa, Canada-Latin America and Asia-Pacific. Area and regional headquarters are located in Brussels, London, Paris, Dusseldorf, Tokyo, Singapore, Melbourne, Toronto, Mexico City, Sao Paulo and Buenos Aires.

FISHER CONTROLS INTERNATIONAL, INC.

This self-contained company, jointly owned by Monsanto Company and The General Electric Company Limited (GEC) of the United Kingdom, manufactures automatic control equipment and valves and markets to the worldwide process control market. Fisher Controls' products include a wide range of control valves and regulators and a line of electronic and pneumatic field instrumentation, control room instrumentation, and digital control systems. These products are applied throughout a broad spectrum of energy and processing industries, including chemical, petrochemical, pulp and paper, power, metal processing, oil and gas production, and refining.

MONSANTO OIL COMPANY

A wholly-owned subsidiary, Monsanto Oil Company, finds, develops, and acquires oil and gas reserves and produces and sells crude oil, natural gas, and natural gasoline plant liquids. Current production is located in the United States and Canada. Exploration is active in the U.S., United Kingdom North Sea, and Colombia, South America. Opportunities in other world areas are being considered.

MONSANTO RESEARCH CORPORATION

Monsanto Research Corporation is a wholly owned subsidiary engaged principally in government contract work. It operates Mound Facility, in Miamisburg, Ohio, for the United States Department of Energy. Its Dayton Laboratory at Dayton, Ohio provides custom synthesis and interim chemical manufacture for commercial organizations. It also manufactures radioactive sources for worldwide sale.

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All products are listed alphabetically by chemical, generic or trademark name. Where a product falls into more than one group category, such as FOOD INGREDIENTS and ORGANIC CHEMICALS, the product is cross referenced to the page number where the actual write-up appears. For example, look up Adipic Acid, Food (F.C.C.) Grade in the Alphabetical Product Index (blue pages) - see portion shown below. If you want to place an order or talk to a Sales Representative, you may go directly to the Sales Office Index (green pages) and look up 31a. If you want to see the Product Write-up, turn to page 13 in the Product Description section (white pages). Examples of Group Category, Product Write-up by Group, Product Write-up, Sales Organizations, Sales Office Index and Cross Reference are shown below:

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PRODUCT WRITE-UP → **ADIPIC ACID, FOOD (F.C.C.) GRADE**

Adipic acid is a white crystalline powder which has been declared GRAS (generally recognized as safe) for use in foods by the F.D.A. It can be used in any nonstandardized food as an acidulant replacing citric and tartaric acid or potassium bitartrate.

SALES ORGANIZATION → NUTRITION CHEMICALS DIVISION

SALES OFFICE INDEX → Sales Office Index 31a

FUMARIC ACID, FOOD (F.C.C.) GRADE

A white odorless crystalline organic food acid. It is used in such products as pie fillings, fruit juice drinks, gelatin desserts, wine, refrigerated biscuit doughs, jelling aids, and sour rye bread.

NUTRITION CHEMICALS DIVISION Sales Office Index 31a

CROSS REFERENCE → **H.T.[1] MONOCALCIUM PHOSPHATE** *monohydrate*
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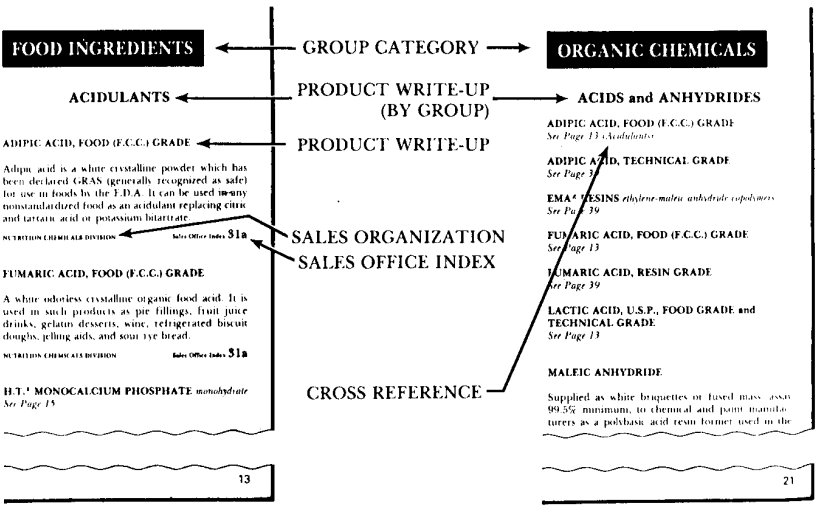

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Sterox® DJ Surfactant 55
Sterox® ND Surfactant 55
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Sterox® DJ Surfactant 55
Sterox® NJ Surfactant 55
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WILDFIRE CONTROL CHEMICALS

Phos-Chek® *fire retardant* 12

0684413

TOWOLDMON0042497

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ADHESIVES and ADHESIVES COMPONENTS

ADHESIVES

PHENOLIC and RESORCINOL RESINS

Supplied as liquids, various grades of phenolic and resorcinol resins are available for bonding applications demanding an extremely high degree of water resistance. Bonds can withstand continuous boiling. The resins are used as glues for plywood, hardboard, particle board bonding and general woodworking. They can be cured by hot and cold press laminating or radio frequency.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63c**

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See Page 39

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GELVA® RESIN SOLUTION
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SCRIPSET® RESINS
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See Page 30

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See Page 35

AGRICULTURAL and FARM PRODUCTS

FEED ADDITIVES

AFLABAN® *feed preservative*
See Page 4

ALIMET® METHIONINE HYDROXY ANALOG
feed supplement
See Page 4

LACTIC ACID, U.S.P., FOOD GRADE and TECHNICAL GRADE
See Page 13

MHA® METHIONINE HYDROXY ANALOG
calcium feed supplement
See Page 4

PHOSPHORIC ACID, TECHNICAL GRADE *75, 80 and 85%*
See Page 30

SANTOQUIN® *feed preservative (technical ethoxyquin)*
See Page 4

FERTILIZERS

AMMONIA, ANHYDROUS

Compressed gas that is stored, transported and handled as a clear liquid. Monsanto anhydrous ammonia fertilizer grade contains 0.25-0.50% water; commercial and industrial grade contains 5 ppm maximum oil and only trace amounts of iron and chlorine and 0.25-0.50% water.

ANIMAL & PLANT PRODUCTS DIVISION Sales Office Index **21a**

TOWOLDMON0042498

DIAMMONIUM PHOSPHATE (DAP)
See Page 28

E-2® AMMONIUM NITRATE FERTILIZER PRILLS

Supplied as a dense, free-flowing, spherical prill material especially sized for fertilizer blending.

ANIMAL & PLANT PRODUCTS DIVISION Sales Office Index **21a**

MONOAMMONIUM PHOSPHATE (MAP)
See Page 29

MONOPOTASSIUM PHOSPHATE
See Page 30

PHOSPHORIC ACID, TECHNICAL GRADE 75, *80 and 85%*
See Page 30

TRICALCIUM PHOSPHATE, INDUSTRIAL GRADE (TCP-IG)
See Page 29

GREENHOUSE COVERS

POLYETHYLENE PROTECTIVE SHEETING and TAPE
See Page 10

HERBICIDES

AVADEX®

A proprietary herbicide supplied in liquid and granular form for controlling infestations of wild oats in sugarbeet, flax and certain other crops. Liquid contains 4 lbs./gallon; granules, 10% active (2,3-dichloroallyl) diisopropylthiocarbamate. Applied as ground or aerial spray.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

BRONCO®

A proprietary herbicide available as a 4 lb. per gallon (active ingredient) emulsion formulation. The active ingredients in this product are 2.6 pounds of 2-chloro-2',6'-diethyl-N-(methoxymethyl) acetanilide and 1.4 pounds of the isopropylamine salt of glyphosate per U.S. gallon. *Bronco* is labeled for the pre-emergence and post-emergence control of many annual grasses and broadleaf weeds in soybeans and corn grown under NO-TILL or other minimum tillage practices, as well as reduced competition from certain emerged perennial weeds. *Bronco* is available in 2½ gallon plastic containers.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

FAR-GO® and AVADEX® BW

A proprietary herbicide supplied in liquid and granular form for control of wild oat infestations in barley, spring wheat, winter wheat, durum wheat and certain other crops. Liquid contains 4 lbs./gallon; granules, 10% active 2,3,3-trichloroallyl diisopropylthiocarbamate. Applied as ground or aerial spray and as granular solids.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

LASSO®

A proprietary herbicide available as a 4 lb. per gallon (active ingredient) emulsifiable concentrate and a 15% (active ingredient) granule. The active ingredient is 2-chloro-2',6'-diethyl-N-(methoxymethyl) acetanilide. *Lasso* is used for selective weed control in corn, soybeans, milo, peanuts, cotton, potatoes, other labeled crops, and ornamentals. Available in 50 lb. bags, 2.5 gallon plastic jubs, 5 gallon cans, 55 gallon drums and bulk quantities of greater than 1000 gallons.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

LASSO® & ATRAZINE

A proprietary herbicide pre-mix available as a 4 lb. per gallon (active ingredient) flowable formulation. The active ingredients in this product are 2.5 pounds of 2-chloro-2',6'-diethyl-N-(methoxymethyl) acetanilide and 1.5 pounds of (2-chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine and related compounds per U.S. gallon. Pre-mixed *Lasso* & atrazine is labeled for the pre-emergence and early post-emergence control of many annual grasses and broadleaf weeds in corn and milo. Pre-mixed *Lasso* & atrazine is available in bulk and 2½ gallon plastic containers.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

0684415

TOWOLDMON0042499

MACHETE®

A proprietary herbicide supplied in liquid and granular form for control of a wide range of weeds in rice and barley. *Machete* has been sold in the United States under a state emergency exemption in Arkansas, Texas, Mississippi and Louisiana. Available in 30 gallon drums, 200 liter drums and 5 gallon cans.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

RAMROD®

Ramrod herbicide is available as a 20% active granule and as a 4 lb. per gallon flowable formulation. The active ingredient is 2-chloro-N-isopropylacetanilide. *Ramrod* is used for selective weed control in corn, grain sorghum (milo) and processing green peas.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

RAMROD® & ATRAZINE

A preblended herbicide mixture available as a 4 lb. per gallon flowable formulation. The active ingredients are 2-chloro-N-isopropylacetanilide (48.1%) and 2-chloro-4-ethylamino-6-isopropylamino-s-triazine (20.9%). *Ramrod* and atrazine is used for selective weed control in corn and grain sorghum (milo).

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

RANDOX®

A proprietary herbicide supplied in liquid and granular form for controlling infestations of many annual grasses in onion and certain other crops. Liquid contains 4 lbs./gallon; granules, 20% active 2-chloro-N,N-diallylacetamide.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

RODEO®

A proprietary herbicide available as a liquid formulation containing 5.4 lbs/U.S. gallon glyphosate in the form of its isopropylamine salt (active ingredient) or 4 lbs/U.S. gallon of the acid, glyphosate. *Rodeo* offers effective post-emergent control of a broad spectrum of emerged grasses, broadleaf weeds and brush growing in and around aquatic sites. Available in 2½ gallon plastic containers.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

ROUNDUP®

A proprietary herbicide, available as a liquid formulation, containing 4 lbs./gallon glyphosate in the form of its isopropylamine salt. Offers effective post-emergent control of many emerged annual and perennial broadleaves and grasses. Available in quarts, 1 gallon containers, 5 gallon cans and 30 gallon drums.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

INSECTICIDES

ETHYL PARATHION

A technical grade material supplied to formulators who manufacture their own trademarked ethyl parathion products. Ethyl formulations are registered for use in controlling a wide spectrum of insect pests in all the major commercial agricultural crops such as alfalfa, wheat and sorghum. Poison emblem and antidote are required on labels. Ethyl parathion is a restricted use insecticide.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

METHYL PARATHION

A technical grade material supplied to formulators who manufacture their own trademarked methyl parathion products. Methyl is typically combined in formulations with other insecticidal materials such as EPN and toxaphene. Methyl parathion formulations are widely used for broad-spectrum insect control in cotton, soybeans, sunflowers and many other fruit crops. Poison emblem and antidote are required on labels. Methyl parathion is a restricted use insecticide.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

MOLD INHIBITOR

MP-11* MOLD INHIBITOR

A mixture of ingredients generally recognized as safe (GRAS) by the U.S. Food and Drug Administration used to protect raisin grapes against spoilage during field drying. It is a water-soluble, white, granular product.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

TOWOLDMON0042500

PLANT GROWTH REGULATORS

POLADO®

A proprietary plant growth regulator for ripening sugarcane. It has been effective in hastening maturity early in the harvest season when sucrose levels are low and natural ripening conditions are adverse. A water soluble product, containing 75% active ingredient.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

POLARIS®

A proprietary plant growth regulator for ripening sugarcane. It has been effective in hastening maturity early in the harvest season when sucrose levels are low and natural ripening conditions are adverse. A water soluble product, containing 85% active ingredient.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

RELATED PRODUCTS/SERVICES

GELVATOL® RESINS
See Page 38

POLYETHYLENE PROTECTIVE SHEETING and TAPE
See Page 10

SEED PROTECTANTS

SCREEN®

A proprietary seed protectant available as a 4 lb. per gallon (active ingredient) flowable formulation. The active ingredient in this product is 4 pounds of flurazole. *Screen* is labeled for application on grain sorghum seed to protect germinating seeds from herbicidal injury from *Lasso®* herbicide.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

ANIMAL NUTRITION PRODUCTS

AMINO ACIDS

ALIMET® METHIONINE HYDROXY ANALOG
feed supplement

A liquid source of amino acid (methionine) activity for poultry and other animal feeds. *Alimet* is nutritionally equivalent to L-methionine and DL-methionine and metabolizes *in vivo* to serve as a supplemental source of this essential amino acid.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

MHA® METHIONINE HYDROXY ANALOG
calcium feed supplement

A dry, granular source of amino acid (methionine) activity for poultry and other animal feeds. *MHA* is nutritionally equivalent to L-methionine and DL-methionine and metabolizes *in vivo* to serve as a supplemental source of this essential amino acid.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

PRESERVATIVES

AFLABAN® *feed preservative*

Aflaban feed preservative is based on sorbic acid and has been shown to be an effective growth inhibitor for a wide variety of 150 different molds, yeasts and bacteria in animal feeds. It is available both as *Aflaban* Dust Free and the water-soluble form *Aflaban* KSG. Both are white free flowing crystalline material.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

SANTOQUIN® *feed preservative (technical ethoxyquin)*

A feed grade antioxidant added to animal feed and feed ingredients to prevent oxidative destruction of fat soluble nutrients including Vitamins "A" and E, natural carotene, and xanthophyll. *Santoquin* is supplied as liquid; as *Santoquin* Mixture 6 (66.6), a dry granular product form, and as *Santoquin* Emulsion (70%).

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

0684417

TOWOLDMON0042501

DEQUEST® 2060 *phosphonate*
See Page 57

DEQUEST® 2066 *phosphonate*
See Page 57

DEQUEST® XK *phosphonate*
See Page 57

ANTICAKING FLOW CONDITIONERS

TRICALCIUM PHOSPHATE, FOOD GRADE
See Page 29

TRICALCIUM PHOSPHATE, INDUSTRIAL GRADE (TCP-IG)
See Page 29

ANTIFOAMING AGENTS

LIMIT* 33 *defoamer*
See Page 26

PC-1244® *defoamer*

PC-1244 is an additive used in low concentrations to suppress foaming tendencies in lubricating oil formulations. It is an oil-dispersible solution of a non-metallic compound in petroleum distillate.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

PC-1344* *defoamer*

Used as a defoamer in nonaqueous hydrocarbon and solvent systems.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

ANTIFOULANTS

DEQUEST® 2000 *phosphonate*
See Page 56

DEQUEST® 2006 *phosphonate*
See Page 56

DEQUEST® 2010 *phosphonate*
See Page 57

DEQUEST® 2041 *phosphonate*
See Page 57

DEQUEST® 2051 *phosphonate*
See Page 57

DEQUEST® 2054 *phosphonate*
See Page 57

ANTIOXIDANTS

SANTONOX® and SANTONOX® R *4,4'-thiobis (6-tert-butyl-m-cresol)*

Santonox and *Santonox R* are used as antioxidants for polyethylene and other plastic resins.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTOQUIN® *feed preservative (technical ethoxyquin)*
See Page 4

SANTOWHITE® POWDER *antioxidant, 4,4'-butylidenebis (6-tert-butyl-m-cresol)*

Santowhite Powder is an antioxidant for polypropylene, polyethylene, nylon molding powders and other polymer resins.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

BACTERIOSTATS/ DISINFECTANTS/ FUNGICIDES/FUNGISTATS/ GERMICIDES

ACL® 56, 59, 60, 90 PLUS SANITIZER and BLEACHING COMPOUNDS
See Page 54

2,4-DICHLOROPHENOL
See Page 24

0684418

TOWOLDMON0042502

BACTERIOSTATS, etc. (Cont'd)

SANTOPHEN® 1 GERMICIDE
ortho-benzyl-parachlorophenol

Santophen 1 is an off-white solid used as a broad spectrum germicidal active for formulating disinfectant and disinfectant-cleaner products intended for use on inanimate objects. *Santophen* 1 possesses high bactericidal and fungicidal activity, low odor when formulated, and low toxicity to higher animals.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SANTOPHEN® 1 GERMICIDE SOLUTION *75%*
Santophen 1 (ortho-benzyl-parachlorophenol), 25% isopropanol

Santophen 1 solution is used as a broad spectrum germicidal active for disinfectant and disinfectant-cleaner products intended for use on inanimate objects. *Santophen* 1 possesses high bactericidal and fungicidal activity, low odor when formulated, and low toxicity to higher animals.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

TCC® BACTERIOSTATIC AGENT *3,4,4'*
trichlorocarbanilide

TCC is a bacteriostatic agent that is supplied to the bar soap industry for use only in antimicrobial soaps and deodorant bars.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

BINDERS

RESIMENE® MELAMINE and UREA RESIN POWDERS
See Page 35

RESINOX® PHENOLIC LIQUID
See Page 37

RESINOX® PHENOLIC RESIN COMPOUND
See Page 37

GELVA® RESIN EMULSIONS
See Page 38

GELVA® RESIN SOLUTION
See Page 38

GELVATOL® RESINS
See Page 38

LYTRON® LATICES
See Page 41

BLASTING MATERIALS

BLASTING AGENTS

Bulk and packaged ammonium nitrate based blasting agents for use in mining, quarrying and construction. Products are sold under the trademarks *M•Pel®, M•Pak®, M•Powr® and M•Pulz®.*

ANIMAL & PLANT PRODUCTS DIVISION Sales Office Index **22b**

BLASTING SUPPLIES

Detonating cord, cast primers and other explosive materials.

ANIMAL & PLANT PRODUCTS DIVISION Sales Office Index **22b**

M•PAK® 106 BLASTING AGENT

M•Pak blasting agents are medium energy explosives designed to meet specific blasting needs in conditions requiring limited water resistance. Available in durable poly textile packages for use in surface coal and metal mining.

ANIMAL & PLANT PRODUCTS DIVISION Sales Office Index **22b**

M•PEL® 000, 600, 650 BLASTING AGENTS

M•Pel blasting agents are free flowing ammonium nitrate based explosives providing the mining industry with reliable, low cost blasting agents where blasthole conditions are dry. They are available in a variety of densities and energies to meet specific blasting requirements.

ANIMAL & PLANT PRODUCTS DIVISION Sales Office Index **22b**

M•POWR® 1106, 1506, 1606, 1656 BLASTING AGENTS

M•Powr blasting agents are packaged explosives in rugged waterproof containers in a variety of densities and energies. The unique, waterproof package feature of *M•Powr* combined with a wide choice of energies is the proven solution to wet, severe blasting conditions.

ANIMAL & PLANT PRODUCTS DIVISION Sales Office Index **22b**

0684419

TOWOLDMON0042503

M•PULZ® 1240, 1260, 1666 BLASTING AGENTS

M•Pulz blasting agents are specific high energy formulations designed for ANFO boostering and as column loads for severe blasting conditions. *M•Pulz* blasting cartridges perform well as column loads in specialized situations such as hole instability, severe tow conditions and thin seams where vibrations limitations demand close control of amount of powder per charge.

ANIMAL & PLANT PRODUCTS DIVISION — Sales Office Index **22b**

BOARD, GRAPHIC ARTS

FOME-COR® BOARDS
See Page 10

CARPETING, INDOOR/OUTDOOR

ASTROTURF®-8 STADIUM SURFACE
See Page 44

CHEMICAL PROCESS EQUIPMENT

SULFURIC ACID COOLERS *design and construction*

Custom-designed stainless steel shell and tube heat exchangers that incorporate anodic corrosion control. The coolers are used in sulfuric acid manufacturing plants.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81h**

CHEMICAL PROCESSES

DISODIUM PHOSPHATE, ANHYDROUS, TECHNICAL GRADE
See Page 30

C

SULFURIC ACID PLANTS *process and construction*

Custom-engineered to convert various sources of SO_2 to sulfuric acid. The plants are constructed to use either the single or interpass absorption contact process.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81h**

CHEMICAL SPECIALTY CATALYSTS

Monsanto Enviro-Chem supplies the following catalysts for converting sulfur dioxide to sulfur trioxide. These are highly efficient, poison-resistant catalysts designed for durability under the operating conditions in the service designated.

SULFURIC ACID PLANT CATALYST

Supplied as yellow to orange Rashig Rings in 50 liter drums for use in contact sulfuric acid plants.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81h**

CONSTRUCTION FILM

MONSANTO® POLYETHYLENE SHEETING
See Page 10

CONSUMER PRODUCTS

ASTROTURF® DOORMATS

A line of integrally-made, one piece polyethylene doormats in various sizes and colors, some with decorative plastic flowers. Available at retail stores throughout the United States.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81a**

TOWOLDMON0042504

CONSUMER PRODUCTS (Cont'd)

ASTROTURF® *H-D heavy-duty matting*

Monsanto offers a complete line of heavy-duty mats and roll goods composed of a durable network of polyethylene grasslike blades joined together by a durable network of reinforced structural ribs. These heavy-duty mats are available through sanitary supply distributors in the U.S.A. for commercial, industrial, institutional and janitorial uses to include entrance and walk-off mats, runners, antifatigue mats and other specialty purposes.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81a**

STEROX® ND SURFACTANT
See Page 55

STEROX® NJ SURFACTANT
See Page 55

STEROX® NK SURFACTANT
See Page 55

CONTAINERS

PLASTIC BOTTLES and CONTAINERS-BLOWNWARE

Monsanto offers custom-designed blow-molded packaging containers in a variety of shapes and sizes, rigid or flexible, to meet specific product market requirements. A large range of stock sizes and shapes of blow-molded plastic bottles are supplied direct and through a nationwide distributor network. Decorating services for both custom and stock containers are provided at three strategically-located facilities.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81b**

CORROSION INHIBITORS

DEQUEST® 2000 *phosphonate*
See Page 56

DEQUEST® 2006 *phosphonate*
See Page 56

DEQUEST® 2010 *phosphonate*
See Page 57

DEQUEST® 2041 *phosphonate*
See Page 57

DEQUEST® 2051 *phosphonate*
See Page 57

DEQUEST® 2054 *phosphonate*
See Page 57

DEQUEST® 2060 *phosphonate*
See Page 57

DEQUEST® 2066 *phosphonate*
See Page 57

DEQUEST® XK *phosphonate*
See Page 57

CUSTOM CHEMICAL SYNTHESIS SERVICES

Process and product development and scale-up service, including development of analytical methods, product characterization, and production ranging from marketing samples to multiton quantities. Also produce laboratory reagents.

MONSANTO RESEARCH CORPORATION — Sales Office Index **111a**

DENTIFRICE ABRASIVES

CALCIUM PYROPHOSPHATE
See Page 29

DICALCIUM PHOSPHATE, ANHYDROUS
See Page 29

DICALCIUM PHOSPHATE, DIHYDRATE
See Page 29

INSOLUBLE SODIUM METAPHOSPHATE
See Page 31

LUSTRE-PHOS® *dentifrice abrasive*
See Page 29

0684421

TOWOLDMON0042505

DISPERSANTS

DEQUEST® 2000 *phosphonate*
See Page 56

DEQUEST® 2006 *phosphonate*
See Page 56

DEQUEST® 2010 *phosphonate*
See Page 57

DEQUEST® 2041 *phosphonate*
See Page 57

DEQUEST® 2051 *phosphonate*
See Page 57

DEQUEST® 2054 *phosphonate*
See Page 57

DEQUEST® 2060 *phosphonate*
See Page 57

DEQUEST® 2066 *phosphonate*
See Page 57

DEQUEST® XK *phosphonate*
See Page 57

SODIUM TRIMETAPHOSPHATE (STMP)
See Page 31

SODIUM TRIPOLYPHOSPHATE (STP), TECHNICAL GRADE
See Page 31

TETRAPOTASSIUM PYROPHOSPHATE
See Page 30

TETRASODIUM PYROPHOSPHATE, TECHNICAL GRADE
See Page 32

ELECTRONIC MATERIALS

COOLANOL® 20, 25R, 35R, 45R *dielectric coolants and heat transfer media*
See Page 16

OS-59* *dielectric heat transfer fluid*
See Page 16

ENVIRONMENTAL CONTROL

SILICON *semiconductor grade*

Czochralski products are available either as *Yield Max** or *MQS** polished Silicon wafers. Both are offered in (111) or (100) orientations and in standard diameters. The *Yield Max* Silicon line is custom designed for specific processes requiring exacting Silicon parameters and where yield improvement is desired. *MQS* Silicon products are oriented toward more stable, established processes where yield improvement is not a major consideration. *MON-X®* Silicon rods and wafers which are (111) or (100) oriented, are available in standard and customer sizes. Wafers are available with as-cut, lapped, etched or polished surfaces on either or both sides.

ELECTRONICS DIVISION — Sales Office Index **71a**

D

E

ENVIRONMENTAL CONTROL

ENVIRONMENTAL SERVICES

Hazardous waste sampling and analysis; groundwater monitoring; water and wastewater sampling; wastewater treatability studies; stack and ambient air sampling; and complete instrument analytical supporting services.

MONSANTO RESEARCH CORPORATION — Sales Office Index **111a**

Enviro-Chem equipment, developed by Monsanto Enviro-Chem Systems, Inc., is supplied to the chemical processing and other industries through an engineering sales service that custom-designs, engineers, and constructs a variety of units for special tasks as follows:*

MONSANTO® ASPHALT VENT PACKAGE

Collects condensed hydrocarbon vapors from vent streams from various asphalt handling and storage systems with efficiencies of up to 99.5%. Package is pre-engineered and contains a mist elimination section and air motive section. Capacities range from 100 ACFM up to 1500 ACFM.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81h**

TOWOLDMON0042506

MONSANTO® MIST ELIMINATOR/FILTER

Custom-engineered fiber beds in several types of required support materials and configurations for removing very fine liquid mists and soluble solids from gas streams at efficiencies up to 99.9+% depending on design at low initial pressure drop. Recommended for removal and/or collection of liquid mists or soluble solids that may be valuable, toxic, or contaminating.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81h**

MONSANTO® OLEUM VENT PACKAGE

Converts sulfur trioxide vapor into sulfuric acid mists which are removed in a high efficiency *Monsanto* mist eliminator. Package is pre-engineered, contains an optional hydrolysis system, mist elimination section and air motive section. Capacities range from 100 up to 1500 ACFM.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81h**

MONSANTO® ORGANIC PACKAGE

Collects organic emissions from asphalt, plastics, textile, and other process exhaust stacks. Package is pre-engineered and contains heat exchange section, mist elimination section, and air motive section. Capacities range from 6,000 to 33,000 ACFM.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81h**

EXTRUDED PRODUCTS

EMBOSSED POLYETHYLENE FILM *diaper film*

White, low density polyethylene film designed for economical and efficient convertibility for use as disposable diaper backing.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81c**

FOME-COR® BOARDS

Manufactured Housing *Fome-Cor* Sheathing Board: A light-weight, rigid board made of extruded polystyrene foam securely bonded between two layers of tough kraft linerboard. *Fome-Cor* sheathing board helps reduce heat loss, sound, moisture and air infiltration. It is supplied in ¼" thickness in widths of 6', 7', 7½' and 8', accordian folded in a length of 420'.

Home Improvement *Fome-Cor* Board: Similar construction as above; also available with a perforated aluminum foil facing on one side with Kraft linerboard on the other side; is used as an underlayment board prior to the residing of an existing residential dwelling. It is supplied in ¼" thickness in a width of 4', accordian folded in a length of 50'.

Automotive *Fome-Cor* Board: A similar sandwich construction as described above, supplied in ⅛" thickness and sizes for use as a substrate for headliners, but also suitable for door panels, quarter panels and package trays. Product is lightweight, self-supporting, easily die-cut, embossed and may be formed or scored for use in these applications.

Graphic Arts *Fome-Cor* Board: Supplied with clay coated white and natural brown kraft facings in thicknesses of ⅛" to 5/16" for die-cutting, embossing, silk screening or mounting. May be scored and folded for exhibits and point-of-purchase displays, and used for mounting and backing of pictures and photographs.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81d**

MONSANTO® POLYETHYLENE SHEETING

Supplied as moisture vapor barrier material in gauges .001" to .010", 1' to 40' width, in 60' to 100' length rolls in natural or black. Used under concrete slabs, over studding, concealed flashing, for weather-protecting materials, closing in unfinished construction, lining crawl spaces, and covering fresh concrete.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81c**

POLYETHYLENE PROTECTIVE SHEETING and TAPE

Supplied in gauges ranging from .001" to .010", 3' to 40' widths, 100' to 4000' rolls of natural or black polyethylene. Tape is supplied in 2" x 100' rolls. Used for strip mulching, greenhouse covers, fumigation covers, row covers, pond liners, and protective tarpaulins.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81c**

0684423

TOWOLDMON0042507

FABRICS, MAN-MADE

CEREX® *spunbonded nylon fabrics*

Cerex spunbonded nylon is an extraordinarily tough and durable nonwoven fabric. In the spunbonded process, nylon fibers are self-bonded (no adhesive used) to give a stable fabric that is 100% nylon 6/6, and therefore, mildew and rot resistant. The fiber bonding is permanent. The dimensional stability, tensile strength, stitch strength and tear resistance are extremely high. The fabric has the high-heat resistance of the nylon polymer. *Cerex* nylon can be used in interlining applications, as a quilting medium, as a reinforcing agent, a substrate for coating thermoplastic resins, a strength-giving web for tissue laminates, and a filtration media. It can be readily bonded to itself or to other materials with standard adhesives, dyed to any shade with nylon dyes or printed with multicolor designs.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41b**

FIBERS, MAN-MADE

ACRILAN® *acrylic fibers*

Available in 1.2-15 denier in a variety of staple lengths and tow suitable for a full range of woven, knit, and tufted textile and industrial applications. The standard product has excellent whiteness and high resilience, and is available in types designed for the cotton, woolen, and modified-worsted spinning systems. Types especially tailored to excel in certain end uses include: bicomponent fibers (for sweaters, handcraft yarns and carpets), producer-colored fibers (for deep-pile apparel and carpets).

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

BI-LOFT® *acrylic fibers*

Acrilan® yarn with a content of 35% or more high bulk component. Developed specifically for use in sweaters and half-hose where bulk is a desirable property. Comes in a range of deniers from 2 to 5 to achieve products offering unique hand and exceptional consumer appeal.

MONSANTO FIBERS & INTERMEDIATESCO. Sales Office Index **41a**

FI-LANA® *premium ultra soft acrylic fibers*

A fine denier acrylic blend that replicates the luxurious softness of cashmere. Yarns are hi-bulk worsted spun and can be skein dyed or piece dyed.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

FILAMENT NYLON YARNS

Available in 3-18 denier per filament products in a full range of weaving, knitting, and tufting multifilament yarns for apparel, carpet, home furnishings, industrial, military, and tire applications, as well as monofils for hosiery. Types specially engineered for high performance in certain end uses are: *Ultron®* and *Ultron®* Z static-resist, low-soiling, advanced-generation carpet yarns in bright and wool-like classic lusters. High tenacity nylon filament yarns are available in yarn deniers from 30 to 1890 for use in applications requiring high strength and durability such as tire reinforcement, conveyer belt fabrics, high pressure hose, broad and narrow woven industrial fabrics, rope and cordage, and industrial sewing threads.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

NYLON STAPLE

Available in 10, 15 and 18 denier per filament products as regular and advanced-generation *Ultron®* static-resist and low-soiling carpet yarns in bright and wool-like classic luster.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

PA-QEL® *bicomponent acrylic fibers*

An exceptionally soft bicomponent fiber for sweaters that bulks in finishing, and retains its hand and shape through home machine washing and drying. Available in 6.0, 3.5 and 2.0 denier staple and tow.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

REMEMBER® *bicomponent acrylic fibers*

A third generation bicomponent acrylic fiber engineered for the craft yarn market — ideal for knitting and crocheting. *Remember* has a built-in memory for excellent shape retention after machine washing and drying. In addition, *Remember* is soft and resilient and works up easily with good stitch clarity and bulk in the knitted and crocheted fabric.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

TOWOLDMON0042508

SEF® *modacrylic fibers*

Available in 2.2, 3, 5, or 8 denier fiber in popular staple lengths for use in children's sleepwear, draperies, and area rugs. In proper constructions, such items will meet federal and other applicable flammability standards. Also available in 3 denier, uncrimped tow for use in battery separators. This fiber combines the excellent aesthetic and processing characteristics of acrylics with the flame-retardant* qualities of conventional modacrylics to yield an acrylic-like modacrylic of broad utility in apparel and home furnishings applications.

**See note on this page under "FIRE SAFETY"*

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

SO-LARA® *sweater yarn*

Bright producer-dyed acrylic specifically engineered for a broad range of apparel 3.0 denier constructions — knits, wovens, half-hose, pile, etc. The high luster and bright clear colors can be fabricated, or blended into two-tone heathers or multihued marls. Wide range of colors available. Contact your Monsanto representative for latest shade listing.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

WEAR-DATED® *textile products*

The Monsanto warranty program for consumer products made from its *Acrilan®* acrylic, nylon and modacrylic yarns and fibers was launched in 1962. Manufacturers of apparel, carpet and home furnishings whose merchandise meets Monsanto quality standards are licensed to use the *Wear-Dated* trademark. *Wear-Dated* products are warranted to give normal wear for the specified period of time (one year for apparel and certain home furnishings fabrics, five years for carpet, and two to five years for other home furnishings fabrics, depending on the product and its intended use) or Monsanto will refund the purchase price or replace the item when returned with the hang tag fixed to the *Wear-Dated* product and sales slip. In the case of *Wear-Dated* upholstered fabrics, only the sales slip and the filled-out hang tag is returned and the upholstery fabric is repaired or replaced after home inspection verified failure to give normal wear within two years from date of purchase. *Wear-Dated* carpeting also requires home inspection after the hang tag and sales slip are submitted with the claim.

Textile products submitted for licensing under this warranty program are tested for fiber content, colorfastness, construction and various other criteria before the license and tags are issued. Merchandise carrying the *Wear-Dated* trademark can, therefore, be depended upon to offer good value and dependable performance. In the United States there are more than 300 categories of *Wear-Dated* textile products.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **41a**

FIRE SAFETY, PRODUCTS TO IMPROVE

NOTE: *Materials designated in this Product Catalog as "fire resistant" or "flame retardant" generally are more difficult to ignite, or once ignited burn at a slower rate than corresponding conventional materials. These terms do not mean that fire resistant or flame retardant materials will not burn. However, when properly used, Monsanto's fire resistant or flame retardant products are useful in helping customers meet their fire safety requirements.*

DIAMMONIUM PHOSPHATE (DAP)
See Page 28

MONOAMMONIUM PHOSPHATE (MAP)
See Page 29

PHOS-CHEK® *fire retardant*

A group of ammonium phosphate formulations containing corrosion inhibitors, thickeners and flow conditioners for use by fire services in retarding forest, brush and wildfires, from aircraft and ground tankers.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52c**

PHOS-CHEK® P/30 *fire retardant*

Phos-Chek P/30 is a catalyst used in intumescent coatings including mastics and latex and alkyd paints. Other applications include use to help meet flammability requirements for rigid and flexible polyurethane foams.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

0684425

TOWOLDMON0042509

PYDRAUL® 230C, 312C *hydraulic fluids*
See Page 16

PYDRAUL® 10E, 29E LT, 50E, 65E, 90E, 115E
hydraulic fluids
See Page 17

SANTICIZER® 141 *plasticizer*
See Page 34

SANTICIZER® 143 *plasticizer (modified triaryl phosphate)*
See Page 34

SANTICIZER® 148 *plasticizer*
See Page 34

SANTICIZER® 154 *plasticizer (triaryl phosphate)*
See Page 34

SEF® *modacrylic fibers*
See Page 12

SKYDROL® *fire resistant hydraulic fluids*
See Page 16

TETRATHAL® *tetrachlorophthalic anhydride*

A versatile, low-cost flame retardant for polyester resins used in building construction, transportation, chemical and food preparation equipment manufacture. In addition, polyols based on *Tetrathal* are used in urethane foams, alkyd and epoxy surface coatings to help these products meet flame retardancy specifications.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

TRICALCIUM PHOSPHATE, INDUSTRIAL GRADE (TCP-IG)
See Page 29

TRIPHENYL PHOSPHATE (TPPA)
See Page 35

FOAM INGREDIENTS - RESINOUS POLYOL

STYRENE-ALLYL ALCOHOL RESINS
See Page 41

TRICALCIUM PHOSPHATE, FOOD GRADE
See Page 29

FOOD INGREDIENTS

ACIDULANTS

ADIPIC ACID, FOOD (F.C.C.) GRADE

Adipic acid is a white crystalline powder which has been declared GRAS (generally recognized as safe) for use in foods by the F.D.A. It can be used in any nonstandardized food as an acidulant replacing citric and tartaric acid or potassium bitartrate.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

FUMARIC ACID, FOOD (F.C.C.) GRADE

A white odorless crystalline organic food acid. It is used in such products as pie fillings, fruit juice drinks, gelatin desserts, wine, refrigerated biscuit doughs, jelling aids, and sour rye bread.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

H.T.® MONOCALCIUM PHOSPHATE *monohydrate*
See Page 15

LACTIC ACID, U.S.P., FOOD GRADE and TECHNICAL GRADE

Supplied as food grade and technical grade, lactic acid is a colorless, odorless liquid supplied in 50% and 88% minimum assay concentrations. Food grade lactic acid is used as a food acidulant in green olives, process cheese, jams, jellies, frozen desserts, and as an ingredient in food emulsifiers.

Technical grade material is used to adjust pH in leather tanning and textile finishing processes and as an intermediate for making the acid's esters and salts.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

MONOAMMONIUM PHOSPHATE (MAP)
See Page 29

MONOSODIUM PHOSPHATE (MSP), FOOD GRADE

PHOSPHORIC ACID, FOOD GRADE *75, 80 and 85%*
See Page 30

TOWOLDMON0042510

BUFFERING AGENTS/ COAGULANTS/EMULSIFIERS/ NUTRITION SUPPLEMENTS/ PROTEIN INTERACTANTS

ADIPIC ACID, FOOD (F.C.C.) GRADE
See Page 13 (Acidulants)

DIAMMONIUM PHOSPHATE (DAP)
See Page 28

DICALCIUM PHOSPHATE, ANHYDROUS
See Page 29

DICALCIUM PHOSPHATE, DIHYDRATE
See Page 29

DISODIUM PHOSPHATE, ANHYDROUS, FOOD GRADE
See Page 30

DISODIUM PHOSPHATE, DUOHYDRATE
See Page 30

EMULSI-PHOS® *cheese emulsifier*
See Page 30

FUMARIC ACID, FOOD (F.C.C.) GRADE
See Page 13 (Acidulants)

H.T.® MONOCALCIUM PHOSPHATE *monohydrate*
See Page 15

LACTIC ACID, U.S.P., FOOD GRADE and TECHNICAL GRADE
See Page 13

MONOAMMONIUM PHOSPHATE (MAP)
See Page 29

MONOPOTASSIUM PHOSPHATE
See Page 30

MONOSODIUM PHOSPHATE (MSP), FOOD GRADE
See Page 31

PHOSPHORIC ACID, FOOD GRADE *75, 80 and 85%*
See Page 30

SODIUM ACID PYROPHOSPHATE, FOOD GRADE (SAPP)
See Page 15

SODIUM HEXAMETAPHOSPHATE
See Page 31

SODIUM TRIPOLYPHOSPHATE (STP), FOOD GRADE
See Page 32

TETRASODIUM PYROPHOSPHATE, FOOD GRADE
See Page 32

TRICALCIUM PHOSPHATE, FOOD GRADE
See Page 29

TRIPOTASSIUM PHOSPHATE
See Page 30

TRISODIUM PHOSPHATE, ANHYDROUS (TSP/A), FOOD GRADE
See Page 32

TRISODIUM PHOSPHATE, CRYSTALLINE, FOOD GRADE
See Page 32

FLAVORINGS

ETHAVAN® *ethyl vanillin*

Ethavan is a rich vanilla-like flavor. It has approximately three times the flavoring power of vanillin. It is commonly used by flavor manufacturers to replace part of the vanillin to give bouquet to the finished flavor or fragrance. Because of its higher volatilizing point it is used in baked goods.

NUTRITION CHEMICALS DIVISION — Sales Office Index 31a

METHYL SALICYLATE, N.F., F.C.C.

Synthetic oil of wintergreen. A man-made product free of the often erratic fluctuations in odor and flavor of the natural product. It is used in food and beverages as a flavoring. In pharmaceuticals as a medicant, and masking agent for disagreeable tasting drugs. Additional uses include, as a flavor in mouth washes, cough syrups, and dentifrices.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index 51b

0684427

TOWOLDMON0042511

VANILLIN MONSANTO*, N.F., F.C.C.

Vanillin is a white crystalline powder used as a synthetic vanilla flavoring in flavor extracts, baked goods, confections, soft drinks and ice cream.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

LEAVENING AGENTS

H.T.® MONOCALCIUM PHOSPHATE *monohydrate*

H.T. is a leavening agent for cookies and used also as the fast reacting component of double acting leavening systems in baking powders and prepared mixes. It is useful in acidic products requiring calcium enrichment and as an ingredient in yeast food and dough improvers.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

LEVN-LITE® *sodium aluminum phosphate*

A special leavening agent used in cake, pancake and biscuit mixes. *Levn-Lite* promotes the formation of unusually white and resilient crumb in white cakes.

NUTRITION CHEMICAL DIVISION Sales Office Index **31a**

PAN-O-LITE® *sodium aluminum phosphate*

Pan-O-Lite is a two-stage leavening agent specially formulated for cake mixes, pancake and waffle mixes. It imparts lightness and resiliency to baked products by means of a delayed leavening action which promotes stability and extends the shelf life of cake batters.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

PY-RAN® *anhydrous monocalcium phosphate*

Py-Ran is a stabilized anhydrous monocalcium phosphate used as an acid component in leavening agents for self-rising flours, corn meal, cake mixes and baking powders.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

SODIUM ACID PYROPHOSPHATE, FOOD GRADE (SAPP)

A food grade phosphate used as a leavening agent in prepared cake and doughnut mixes, refrigerated doughs, as an antidarkening agent for potatoes. SAPP prevents struvite crystals in canned tuna and crab meat.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

STABIL-9® *sodium aluminum phosphate*

Supplied as an all-purpose, high stability leavening agent for self-rising flour, corn meal and prepared mixes.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

PRESERVATIVES

MONOSODIUM PHOSPHATE (MSP), FOOD GRADE
See Page 31

PHOSPHORIC ACID, FOOD GRADE *75, 80 and 85%*
See Page 30

SORBIC ACID and POTASSIUM SORBATE, F.C.C.

Sorbic acid can be extracted from nature, specifically from the oil of the rowanberry. Sorbic acid, or its water-soluble potassium salt, is a broad spectrum preservative for human and animal food, and to a lesser extent, for drugs and cosmetics.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

TETRASODIUM PYROPHOSPHATE, FOOD GRADE
See Page 32

FRAGRANCES

AMYL SALICYLATE, F.C.C.

Amyl salicylate (a balanced mixture of isomeric amyl esters) is supplied for use in floral perfumes.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

BENZYL ACETATE, F.C.C.

Benzyl acetate is a natural constituent of jasmine and is used in soap perfumes.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

TOWOLDMON0042512

FRAGRANCES (Cont'd)

BENZYL SALICYLATE, F.C.C.

Benzyl salicylate occurs naturally in essential oils of carnation and ylang-ylang. It is used as a fixative in floral perfumes, as a solvent for artificial musks, and in soap fragrances. Since it absorbs ultraviolet light it can be used as a sunscreen in creams and lotions.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

ETHAVAN® *ethyl vanillin*
See Page 14

METHYL SALICYLATE, N.F., F.C.C.
See Page 14

VANILLIN MONSANTO®, N.F., F.C.C.
See Page 15

FUNCTIONAL FLUIDS

AIRBORNE and SPECIALTY

SKYDROL® *fire resistant* hydraulic fluids*

Skydrol fluids are engineered from a series of fire resistant, highly stable phosphate ester base stocks specially-processed under rigorous quality control standards. The operating temperatures, viscosity characteristics, pumpability of each are designed for varying types of service. These include: *Skydrol* "500B-4" and "LD-4" grades for jet aircraft. *Skydrol* fluids require compatible construction materials in seals, packings, paints, and wiring. Monsanto's technical service support assists customers in designing these items. *Skydrol* fluids are distributed worldwide to commercial airlines.

**See note on page 12 under "FIRE SAFETY"*

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

DIELECTRIC HEAT TRANSFER FLUIDS

COOLANOL® 20, 25R, 35R, 45R *dielectric coolants and heat transfer media*

A series of formulated silicate ester fluids used for a wide range of heat transfer, dielectric and hydraulic fluid applications. The four *Coolanol* fluids span an operating-temperature range of -90°F to 700°F and are used primarily in aerospace and advanced electronic hardware as a coolant/dielectric.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

OS-59* *dielectric heat transfer fluid*

OS-59 is a silicate ester fluid used in electronic equipment as a coolant/dielectric.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

HEAT TRANSFER FLUIDS

THERMINOL® 44, 55, 60, 66, 88 *heat transfer fluids*
See Page 17

THERMINOL® VP-1 *heat transfer fluid*
See Page 17

HYDRAULIC FLUIDS

PYDRAUL® 230C, 312C *hydraulic fluids*
See Page 16 (Industrial)

PYDRAUL® 10E, 29E LT, 50E, 65E, 90E, 115E *hydraulic fluids*
See Page 17 (Industrial)

SKYDROL® *fire resistant hydraulic fluids*
See Page 16

INDUSTRIAL

OS-124* *polyphenyl ether*

OS-124 is a mixed isomeric five-ring polyphenyl ether fluid developed for use in high temperature hydraulic, heat transfer, lubricant, electronic contact lubricant, and other fluid applications.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

PYDRAUL® 230C, 312C *hydraulic fluids*

Pydraul C-series (phosphate ester/hydrocarbon blends) are low cost, fire-resistant fluids for industrial hydraulic applications. *Pydraul* 230C and *Pydraul* 312C offer a broad viscosity range for diecast machines, continuous casters, rolling mill systems, etc.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

0684429

TOWOLDMON0042513

PYDRAUL® 10E, 29E LT, 50E, 65E, 90E, 115E *hydraulic fluids*

Pydraul E-series (straight phosphate ester) fluids offer a combination of fire resistance* and lubrication in industrial hydraulic and air compressor applications. These fluids allow users to select from a wide viscosity range for diecast machines, continuous casters, rolling mill systems, offshore drilling operations, etc.

*See note on page 12 under "FIRE SAFETY"

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

SANTOTRAC® LUBRICANTS *synthetic hydrocarbons*
See Page 21

PROCESS

BIPHENYL *also known as diphenyl and phenylbenzene*

Biphenyl is widely used as a raw material for dye carriers in the textile industry, as a deodorant and mildew preventative, and as a chemical intermediate.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

DIPHENYL OXIDE

Diphenyl oxide is used as a chemical intermediate or functional product. Typical uses as an intermediate include the manufacture of brominated fire retardants, alkylated surfactants, and hydrazide foam blowing agents. Other uses include dye carrier, fragrance, and as a process aid.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

SANTOSOL® 150 and 340 *dye solvents*

Santosol 150 and 340 are used as the microencapsulation dye solvent portion of the specialized coating used in the manufacture of carbonless copy paper.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

SANTOWAX® R *mixed isomeric terphenyls*

Santowax R is a mixture of ortho-, meta-, and paraterphenyls. These high melting hydrocarbons show unusual stability towards heat, acids and alkalis.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

THERMINOL® 44, 55, 60, 66, 88 *heat transfer fluids*

Therminol fluids in this series are liquid phase, low pressure heat transfer media with an operating temperature range spanning -60° to 750°F. Diverse applications for *Therminol* 44, *Therminol* 55, *Therminol* 60, *Therminol* 66, and *Therminol* 88 include indirect heating and cooling in chemical processing, tanker and barge construction, offshore oil and gas platforms, petroleum refining, synthetic fiber manufacturing and finishing, etc.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

THERMINOL® VP-1 *heat transfer fluid*

Therminol VP-1 is a high temperature heat transfer medium used in vapor phase or liquid phase systems in the range of 60° to 750°F.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

VACUUM PUMP FLUID

SANTOVAC® 5 *vacuum diffusion pump fluid, polyphenyl ether*

Santovac 5 is a specially refined vacuum diffusion pump fluid supplied to pump manufacturers and laboratory and industrial users.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

FURNACE LINER EROSION MONITOR

NUCLEAR INSTRUMENTATION

A nuclear instrument system incorporating electronics and radioactive sources monitors liner erosion in commercial phosphorus furnaces. The system is adaptable to other furnaces. Complete design, engineering, and licensing assistance is provided with the system.

MONSANTO RESEARCH CORPORATION Sales Office Index **111a**

TOWOLDMON0042514

GAS SEPARATORS

PRISM® SEPARATORS

A device which separates industrial gases through the use of gas permeable hollow fiber membranes. The separators can be used to recover usable hydrogen, from process or waste gas streams in the ammonia, petrochemical and refining industries plus control the composition of process streams. Hydrogen purity as high as 99% and recoveries above 95% can be obtained. The devices can also be used to separate carbon dioxide from methane for such applications as enhanced oil recovery, natural gas upgrading and landfill gas upgrading.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81f**

HEADLINER SUBSTRATES

FOME-COR® BOARDS *automotive board*
See Page 10

HEAVY CHEMICALS

CAUSTIC POTASH

Used in formulating liquid soaps and detergents, in the manufacture of many organic and inorganic potassium salts, petroleum refining and in the fertilizer industry.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **52a**

CHLOROSULFONIC ACID

Colorless, corrosive liquid used as a sulfonation agent in the production of synthetic detergents, pharmaceuticals, dyes, ion exchange resins and a variety of specialty chemicals.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **52a**

MURIATIC ACID *hydrochloric acid*

Supplied as 20° Be., 22° Be. and 23° Be. acid assaying 31.5%, 35.2% and 37.1% HCl. It is widely used in the manufacture of starch, glucose, gelatin, paper, leather, and in the steel industry and for pH control.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **52a**

NITRIC ACID 55.0-56.5% (37.5-38.0 Be.)

Supplied as a water-white to slightly yellow solution with the odor of nitrogen dioxide.

ANIMAL & PLANT PRODUCTS DIVISION — Sales Office Index **21a**

NITRIC ACID *concentrated*

Supplied as a light yellow to reddish brown fuming liquid minimum 97.5% (HNO_3).

ANIMAL & PLANT PRODUCTS DIVISION — Sales Office Index **21a**

PHOSPHORIC ACID, TECHNICAL GRADE *75, 80 and 85%*
See Page 30

SULFURIC ACID and OLEUM

Monsanto supplies sulfuric acid, and oleum, in numerous specification ranges. Sulfuric acid and oleum are essential industrial acids used in chemical, paint, metals, and fertilizer manufacturing, and for dehydration, sulfonation and petroleum refining processes.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **52a**

HERBICIDES

AVADEX®
See Page 2

AVADEX® BW
See Page 2

BRONCO®
See Page 2

FAR-GO®
See Page 2

LASSO®
See Page 2

LASSO® & ATRAZINE
See Page 2

MACHETE®
See Page 3

RAMROD®
See Page 3

0684431

TOWOLDMON0042515

RAMROD® & ATRAZINE
See Page 3

RANDOX®
See Page 3

RODEO®
See Page 3

ROUNDUP®
See Page 3

INDOOR/OUTDOOR CARPETING

ASTROTURF®-8 STADIUM SURFACE
See Page 44

INSTRUMENTS

ELECTRONIC INSTRUMENTS

NUCLEAR INSTRUMENTATION
See Page 17

PROCESS CONTROL EQUIPMENT

INSTRUMENTATION, ANALOG PROCESS CONTROL
See Page 42

INSTRUMENTATION, ANALOG PROCESS MEASUREMENT
See Page 42

INSTRUMENTATION, DIGITAL PROCESS CONTROL
See Page 42

INSTRUMENTATION, DISTRIBUTED PROCESS CONTROL
See Page 42

INSTRUMENTATION, PNEUMATIC and ELECTRONIC
See Page 43

REGULATORS, GAS
See Page 43

VALVE ACTUATORS and ACCESSORIES
See Page 43

VALVES
See Page 43

VALVES, NOISE ABATEMENT
See Page 43

RUBBER TESTING INSTRUMENTS

MONSANTO® AUTOMATIC CAPILLARY RHEOMETER
See Page 20 (Test and Measurement)

MONSANTO® CONE-RHEOMETER
See Page 49

MONSANTO® DENSITRON
See Page 50

MONSANTO® DIE SWELL DETECTOR, AUTOMATIC
See Page 50

MONSANTO® DURATRON
See Page 50

MONSANTO® DUROLAB
See Page 50

MONSANTO® FATIGUE-TO-FAILURE TESTER
flex tester
See Page 50

MONSANTO® MELT INDEXER
See Page 20 (Test and Measurement)

MONSANTO® MODULAR DATA SYSTEM
See Page 50

MONSANTO® MOONEY VISCOMETER
See Page 50

MONSANTO® OSCILLATING DISK RHEOMETER, MODELS R-100, R-900/750, R-100S
See Page 51

MONSANTO® POWER INTEGRATOR
See Page 51

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TOWOLDMON0042516

INSTRUMENTS (Cont'd)

MONSANTO® PROCESSABILITY TESTER
See Page 51

MONSANTO® STRESS RELAXATION PROCESSABILITY TESTER
See Page 51

MONSANTO® TENSOMETER, MODEL T-500 *tensile tester*
See Page 51

MONSANTO® TENSOMETER, MODEL W *tensile tester*
See Page 51

MONSANTO® X-RAY UNIT *(three different units available)*
See Page 51

TEST and MEASUREMENT

MONSANTO® AUTOMATIC CAPILLARY RHEOMETER

Monsanto® automatic capillary rheometer (ACR) is a constant stress capillary instrument used for measuring flow properties of thermoplastics, thermosets and other selected viscous materials. Testing is completely automatic and results are displayed on digital readouts. Flow properties can be obtained over a wide range of shear rates (10^1 to 10^6 sec^{-1}) thus simulating typical processing conditions. The unit is designed for use in quality control, as well as research applications.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® MELT INDEXER

A quality control instrument for the rapid, accurate measurement of the melt index of thermoplastics according to the ASTM D-1238 method.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

INSULATION, SHEATHING

FOME-COR® BOARDS
See Page 10

METAL PROCESSING COMPOUNDS

BONE ASH (NATURAL)

Supplied as finely divided powder $[Ca_5OH\ (PO_4)_3]$ for use as a mold coating for casting copper wire bars and for coating cast iron molds, trays, and tools used to produce stainless steel, bronze, and aluminum and for use in chinaware products.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

DISODIUM PHOSPHATE, ANHYDROUS, TECHNICAL GRADE
See Page 30

FERROPHOSPHORUS *iron phosphide*

This phosphorus by-product from Columbia, Tennessee contains approximately 22 to 23% phosphorus and 69 to 70% iron. It is used in the manufacture of steel, in foundries and as a dense aggregate.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

LoSilPhos* *ferrophosphorus briquettes*

Ferrophosphorus briquettes used in steelmaking for their phosphorus content. *LoSilPhos* briquettes assist in minimizing silicon contamination. All active ingredients are in prepackaged briquettes. *LoSilPhos* briquettes are used in producing low-silicon rephosphorized steel.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

MONOSODIUM PHOSPHATE (MSP), TECHNICAL GRADE
See Page 31

MOULD COAT *synthetic bone ash*

A synthetic bone ash used as mold coating for casting copper bars and for coating cast iron molds, trays and tools used in the processing of stainless steel, bronze, brass, and aluminum and for use in chinaware products.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

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TOWOLDMON0042517

NFB® PHOSPHORIC ACIDS *80% and 85%*
See Page 29

PHOSPHORIC ACID, TECHNICAL GRADE *75, 80 and 85%*
See Page 30

SODIUM ACID PYROPHOSPHATE, TECHNICAL GRADE (SAPP-X)
See Page 31

SODIUM TRIPOLYPHOSPHATE (STP), TECHNICAL GRADE
See Page 31

STEROX® DJ SURFACTANT
See Page 55

STEROX® NJ SURFACTANT
See Page 55

TETRASODIUM PYROPHOSPHATE, TECHNICAL GRADE
See Page 32

TRISODIUM PHOSPHATE, ANHYDROUS (TSP/A), TECHNICAL GRADE
See Page 32

TRISODIUM PHOSPHATE, CRYSTALLINE, TECHNICAL GRADE
See Page 32

VANILLIN TECHNICAL
See Page 23

ODORANTS

ETHAVAN® *ethyl vanillin*
See Page 14

METHYL SALICYLATE, N.F., F.C.C.
See Page 14

VANILLIN MONSANTO®, N.F., F.C.C.
See Page 15

OILS-LUBRICATING

SANTOTRAC® LUBRICANTS *synthetic hydrocarbons*

Santotrac 30, 40, 50 and 70 lubricating oils and *Santotrac* EP-2 lubricating greases. *Santotrac* is a series of unique, synthetic hydrocarbon lubricants for use in traction drives, ball bearings, roller clutches and other varied industrial, automotive and aircraft applications. It is similar chemically to mineral oils and is, therefore, generally compatible with the same seals and paints. *Santotrac* offers uniquely high traction, extended bearing life and long operating life at high temperatures.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

ORGANIC CHEMICALS

ACIDS and ANHYDRIDES

ADIPIC ACID, FOOD (F.C.C.) GRADE
See Page 13 (Acidulants)

ADIPIC ACID, TECHNICAL GRADE
See Page 39

EMA® RESINS *ethylene-maleic anhydride copolymers*
See Page 39

FUMARIC ACID, FOOD (F.C.C.) GRADE
See Page 13

FUMARIC ACID, RESIN GRADE
See Page 39

LACTIC ACID, U.S.P., FOOD GRADE and TECHNICAL GRADE
See Page 13

MALEIC ANHYDRIDE

Supplied as white briquettes or fused mass, assay 99.5% minimum, to chemical and paint manufacturers as a polybasic acid resin former used in the production of alkyd and polyester resins and a versatile intermediate in chemical synthesis.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

TOWOLDMON0042518

PHTHALIC ANHYDRIDE

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

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SALICYLIC ACID, INDUSTRIAL

Monsanto produces salicylic acid, industrial, which is used as a raw material for the production of pharmaceutical salicylates; in the textile industry as a coupling agent in dye intermediates; in the foundry industry as a curing agent in the production of shell molding compounds; and in the rubber industry as a retarder in the vulcanization process.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

SORBIC ACID and POTASSIUM SORBATE, F.C.C.

See Page 15

TETRATHAL® *tetrachlorophthalic anhydride*

See Page 13

AMINES

AMINE HEADS

A stream containing hexamethylenediamine, hexamethylenetriamine, hexamethylenimine and diaminocyclohexane. Used as an economical substitute for other pure amines.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

BISHEXAMETHYLENETRIAMINE (BHMT)

Versatile, inexpensive amine used in polyamide resin manufacture. Also used in oil well drilling additives.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

para-CHLOROANILINE (PCA)

Organic intermediate used in the manufacture of dyestuffs, medicinals, and insecticides.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

3,4-DICHLOROANILINE (3,4-DCA)

Organic intermediate used in the manufacture of agricultural chemicals and biologically active compounds.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

DODECYLANILINE

See Page 23 (Intermediates)

ortho- and para-NITROANILINE

See Page 23 (Intermediates)

HALOGEN-CONTAINING COMPOUNDS

ACL® 56, 59, 60 90 PLUS SANITIZER and BLEACHING COMPOUNDS

See Page 54

BENZYL CHLORIDE *alpha-chlorotoluene*

A colorless liquid used in the production of benzyl alcohol, dibenzyl disulfide, perfume intermediates, dyestuffs, pharmaceuticals, plasticizers and quaternary ammonium compounds.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

ortho- and para-DICHLOROBENZENE

See Page 23 (Intermediates)

ortho- and para-NITROCHLOROBENZENE

See Page 23 (Intermediates)

SANTOPHEN® 1 GERMICIDE

See Page 6

SANTOPHEN® 1 GERMICIDE SOLUTION

See Page 6

TCC® BACTERIOSTATIC AGENT

3,4,4'-trichlorocarbanilide

See Page 6

TETRATHAL® *tetrachlorophthalic anhydride*

See Page 13

0684435

TOWOLDMON0042519

INTERMEDIATES

ACRYLONITRILE
See Page 27

AROMATIC CHEMICAL INTERMEDIATES

Monsanto supplies a wide variety of benzene derivatives to chemical manufacturers as raw materials which are used in the manufacture of dyes, pharmaceuticals, agricultural chemicals, pesticides, photographic chemicals, leather tanning compounds and others. These chemical building blocks include:

ortho- and para-DICHLOROBENZENE

DODECYLANILINE

ortho- and para-NITROANILINE

ortho- and para-NITROCHLOROBENZENE

Para-PHENETIDINE*

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**
SYNTHETIC CHEMICALS DIVISION

para-CHLOROANILINE (PCA)
See Page 22 (Amines)

para-CHLOROPHENOL
See Page 24

3,4-DICHLOROANILINE (3,4-DCA)
See Page 22 (Amines)

2,4-DICHLOROPHENOL
See Page 24

FORMALDEHYDE
See Page 27

METHANOL *methyl alcohol*
See Page 28

para-TOLUENESULFONAMIDE
para-TOLUENESULFONYL CHLORIDE

These basic building blocks are used by a variety of manufacturers for the final conversion into such end uses as dyes, pharmaceuticals, photographic materials, synthetic tanning aids, plating products and others.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

TOLUENESULFONYL CHLORIDE, MIXED

Mixed TSCl is used in the treatment of crude oil and kerosene to help in purification. It is also used as a chemical intermediate in a variety of specialty end uses.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

PHARMACEUTICALS

ACETAMINOPHEN (APAP)

Acetaminophen (APAP) is a nonaspirin analgesic. It has the benefits of being an effective antipyretic and pain reliever. It is used singly and in combination with other pharmaceutical and proprietary formulations in tablet, powder, capsule and other special forms.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

ACETYLSALICYLIC ACID *aspirin*

Aspirin is the largest selling analgesic in the world with added benefits of being an effective antipyretic and anti-inflammatory. It is used singly and in combination with other ingredients in pharmaceutical and proprietary formulations in tablet, powder, capsule and other special forms.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

BENZYL BENZOATE, U.S.P., F.C.C.

Benzyl benzoate is used primarily as a fixative and as a diluent in perfume formulations. It is also used in the treatment of scabies. Additionally, benzyl benzoate is used in textile dye intermediate formulations.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

L-DOPA *L-dihydroxyphenylaline, U.S.P.*

L-Dopa is a white powder, effective in the treatment of the symptoms of Parkinson's disease.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

METHOTREXATE, U.S.P.

This potent folic acid antagonist is supplied as high purity yellow crystals, suitable for parenteral applications. It is used in treatment of neoplasms and psoriasis, and as an immunosuppressant and antimetabolite.

MONSANTO RESEARCH CORPORATION Sales Office Index **111a**

VANILLIN TECHNICAL

Vanillin technical is a white crystalline powder used as a pharmaceutical intermediate and in some metal plating applications.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

TOWOLDMON0042520

PHENOLS

para-CHLOROPHENOL

Organic intermediate used in the manufacture of dyestuffs, primarily hydroquinone and anthraquinone vat dyes. Other potential applications are for the manufacture of specific germicides, coccidiostats and miticides.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

2,4-DICHLOROPHENOL

Organic intermediate used in the manufacture of agricultural chemicals, bacteriostats, fungistats, germicides, and dyestuffs.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

DIDODECYL PHENOL *crude*

A coproduct of the manufacture of dodecylphenol, didodecyl phenol is commonly ethoxylated for use as a specialty surfactant in oil treating.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

DINONYL PHENOL *crude*

A coproduct of the manufacture of nonylphenol, dinonyl phenol is commonly ethoxylated for use as a specialty chemical in oil treating and agricultural emulsifiers.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

DODECYLPHENOL *alkyl phenol*

Reactive dodecylphenol is specifically designed for use in the manufacture of chemical intermediates - principally in surfactants and oil additives. Typical reactions with dodecylphenol are ethoxylation, condensations with aldehydes, etherification, esterification, halogenation, mercuration, nitration, polymerization, and sulfonation.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

para-NITROPHENOL

Supplied in tan to greenish brown flake or granular form, assay 99.0% minimum, molecular weight 139.11. The compound is highly toxic. It is used by chemical manufacturers as an intermediate for making dyestuffs, insecticides, photographic chemicals, leather tanning compounds and pharmaceuticals.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

NONYLPHENOL *alkyl phenol*

Reactive nonylphenol is specifically designed for use in the manufacture of chemical intermediates - principally in surfactants and oil additives. Typical reactions with nonylphenol are ethoxylation, condensations with aldehydes, etherification, esterification, halogenation, mercuration, nitration, polymerization, and sulfonation.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

PHENOL
See Page 27

SULFONIC ACIDS

CHLOROSULFONIC ACID
See Page 18

para-TOLUENESULFONAMIDE
See Page 23

para-TOLUENESULFONYL CHLORIDE
See Page 23

TOLUENESULFONYL CHLORIDE, MIXED
See Page 23

SULFUR-CONTAINING COMPOUNDS

ETHYL PCT *O,O-diethyl phosphorochloridothioate*

Intermediate chemicals used in the manufacture of biological toxicants. Supplied as light yellow liquids, ethyl PCT will add the dialkyl thiophosphoryl group into any other intermediate compound with a suitable reactive site.

MONSANTO AGRICULTURAL PRODUCTS CO. Sales Office Index **11a**

SANTOLITE® MHP RESIN
See Page 41

SANTONOX® and SANTONOX® R *antioxidant*
See Page 5

0684437

TOWOLDMON0042521

OTHER ORGANIC CHEMICALS

CYANURIC ACID

Cyanuric acid stabilizes chlorine against loss from ultraviolet light degradation. Its primary use is in swimming pools.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

CYCLOHEXANOL

An intermediate used in making plasticizers; dry cleaning, dyebath and textile finishing formulations; and in the manufacture of cyclohexanone and adipic acid.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

ETHYL ACETATE

Monsanto® ethyl acetate is available at ester assays of 99.5%, 95-98%, and 85-88%. All grades are clear, sediment-free and the color does not exceed 5 (APHA). The water content is 0.05% max. and the characteristic odor is nonresidual. The products are suitable for coating resin-solvents, cellophane lacquers, and miscellaneous solvent uses in the paint and plastic industries.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

PROPIONITRILE

Converted into propionic acid and di-*n*-propylamine.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

PAINT/COATING INGREDIENTS

BUTVAR® RESINS
See Page 38

ETHYL ACETATE
See Page 25

FILTROS® *gum rosin*

Naturally-occurring gum rosin produced by distillation of pine tree pitch for use in paints, varnishes and lacquers.

®Trademark of FRP Company

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **64d**

FORMVAR® RESINS
See Page 39

GELVA® MULTIPOLYMER RESIN SOLUTIONS
See Page 37

GELVA® RESIN EMULSIONS
See Page 38

GELVA® RESIN SOLUTION
See Page 38

GELVATOL® RESINS
See Page 38

HB-40® *partially hydrogenated terphenyl*
See Page 33

LYTRON® LATICES
See Page 41

MALEIC ANHYDRIDE
See Page 21

MODAFLOW® *resin modifier*

Modaflow is an additive for improving flow, leveling and adhesion properties of surface coating formulations - especially enamels, vinyls, epoxies and polyesters.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

MODAFLOW® POWDER II *resin modifier*

Modaflow Powder II is the first commercial additive specifically designed to reduce surface imperfections for powder coatings. Because of its fine, uniform particle size, it is easily incorporated into powder coatings.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

TOWOLDMON0042522

MULTIFLOW® *resin modifier*

Multiflow resin modifier is a unique additive for nonaqueous industrial coatings. It improves flow, reduces pinholes and craters, and improves substrate wetting.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

PHOS-CHEK® P/30 *fire retardant*
See Page 12

PHTHALIC ANHYDRIDE
See Page 22

RESIMENE® MELAMINE-FORMALDEHYDE
RESIMENE® UREA-FORMALDEHYDE RESINS
coatings
See Page 36

RESINOX® PHENOLIC RESIN VARNISH
See Page 37

SANTICIZER® 8 *plasticizer (mixture of N-ethyl-ortho-and para-toluenesulfonamides)*
See Page 33

SANTICIZER® 9 *plasticizer (mixture of ortho-and para-toluenesulfonamides)*
See Page 33

SANTICIZER® 97 *plasticizer (di(n-heptyl, n-nonyl)adipate)*
See Page 33

SANTICIZER® 141 *plasticizer (alkylaryl phosphate)*
See Page 34

SANTICIZER® 160 *plasticizer (butyl benzyl phthalate)*
See Page 34

SANTICIZER® 261 *plasticizer*
See Page 34

SANTICIZER® 278 *plasticizer*
See Page 34

SANTICIZER® 409 *plasticizer*
See Page 34

SANTOLITE® MHP RESIN
See Page 41

SANTOLITE® MS 80% RESIN
See Page 41

SODIUM ACID PYROPHOSPHATE, TECHNICAL GRADE (SAPP-X)
See Page 31

STYRENE-ALLYL ALCOHOL RESINS
See Page 41

TETRAPOTASSIUM PYROPHOSPHATE
See Page 30

TETRATHAL® *tetrachlorophthalic anhydride*
See Page 13

PAPER CHEMICALS

BUTVAR® RESINS
See Page 38

GELVA® MULTIPOLYMER RESIN SOLUTIONS
See Page 37

GELVA® RESIN EMULSIONS
See Page 38

GELVA® RESIN SOLUTION
See Page 38

GELVATOL® RESINS
See Page 38

LIMIT* 33 *defoamer*

Limit 33 is a specially formulated defoamer for the paper industry to be used at the size press to defoam starch and mixtures of starch and *Scripset®* resins.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

LYTRON® LATICES
See Page 41

MERSIZE® *paper sizing agent*

Mersize TFL, *Mersize* ExCL and *Mersize* RM Dry are forms of chemically fortified rosin-based sizes that are ready to use in a paper mill to reduce sizing costs, improve resistance to ink, water and other aqueous solutions, give better feathering resistance and more uniform dependable sizing.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

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TOWOLDMON0042523

MONSIZE® *paper sizing agent*

A highly efficient wet-end sizing agent supplied as a liquid. It is approximately twice as efficient as paste rosin size which allows maximum sizing with minimum sizing solids in the sheet. *Monsize* sizing agent functions well over a pH range of 4.0 to 6.8.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

SANTOFLOC® RESIN

A water solution of a highly cationic nonthermosetting resin, used as a retention aid.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

SANTO-RES® 21 & 31 *wet strength paper resins*

Santo-Res 21 is a cationic retention aid, useful for retaining dispersed rosin sizes, improving drainage and retaining fines. It is also used to impart a high degree of strength to unbleached paper and board when wet, and to extend life of paper products exposed to weather.

Santo-Res 31 is a caustic activatable polymer solution designed to impart high levels of wet strength to paper products made from bleached or reclaimed pulp. It also is effective as a Yankee drier coating aid.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

SANTO-RES® CM *wet strength paper resin*

Santo-Res CM is a new generation wet strength resin designed primarily for use in corrugating medium and linerboard paper products. It does not require caustic activation for optimum performance in unbleached grades of paper.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

SCRIPSET® 500, 700, 800 and 900 SERIES *paper coating and specialty coating resins*

Scripset resins are styrene-maleic anhydride copolymers and are supplied in a variety of grades convenient for the papermaker's process and handling. The *Scripset* 500 resins are film-formers for surface treating paper and paperboard to improve printability, create good surface qualities and impart water resistance. The *Scripset* 700 series resins are new improved liquid variations of the dry 500 series resins. *Scripset* 808 may be formulated in aqueous systems down to 5.3 pH. *Scripset* 910 is a film-former with oil and grease resistance.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

STEROX® DF SURFACTANT
See Page 54

STEROX® DJ SURFACTANT
See Page 55

STEROX® NJ SURFACTANT
See Page 55

PETROCHEMICALS

MONOMERS

ACETIC ACID *glacial and commercial*

Supplied in commercial grades and as glacial acetic, assay minimum 99.8% acetic acid. Shipped with color less than 15 Pt-Co units. Used as a chemical intermediate in the manufacture of vinyl acetate resins, cellulose, agricultural products, and in the textile industry.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

ACRYLONITRILE

A monomer used in the manufacture of acrylic textile fibers, ABS plastics, nitrile rubber, copolymer latices, and as a chemical intermediate.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

FORMALDEHYDE

Supplied in grades with a choice of assay: 37%, 44%, 50% and 52% (methanol-free) and 37% and 44% inhibited with 7% and 15% methanol. Used as a preservative, disinfectant and an intermediate in the manufacture of melamine and phenolic resins.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

PHENOL *carbolic acid*

A major basic chemical intermediate, phenol is a key ingredient of phenolic resins used for lacquers and varnishes, plywood and particle board adhesive, binders for glass fiber insulation, and for molding compounds used in the automotive, appliance and electrical industries. Another major application is in the manufacture of bisphenol A for epoxy and polycarbonate engineering plastics. Phenol is also used in the manufacture of germicides, antiseptics, preservatives, insecticides, photographic chemicals, dyestuffs, and as a selective solvent in petroleum refining. Supplied in crystalline form.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

TOWOLDMON0042524

STYRENE MONOMER

An aromatic hydrocarbon with an aliphatic side chain supplied as a colorless liquid inhibited with TBC. Styrene monomer is used to make polystyrene plastics, copolymer resins, SBR synthetic rubber and latices, ion exchange resins, polyesters, and styrene-modified oils and alkyds for surface coatings.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

OTHER PETROCHEMICALS

ACETONE

Supplied as a liquid, APHA color 5 maximum and 0.5% moisture maximum. It is used widely as a commercial solvent and as an intermediate in chemical manufacturing.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

ACETOPHENONE

A commercial grade organic intermediate chemical supplied as a liquid assaying typically 40-60% by weight.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

CUMENE CONCENTRATE

A hydrocarbon containing typically 60% cumene, and less than 5% acetone. It is supplied to blenders as an aromatic gasoline blend stock.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

DIISOPROPYLBENZENE

An industrial grade hydrocarbon that typically assays 60-65% mixed isomers. It is used as an aromatic gasoline blend stock.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

ETHYLBENZENE

A liquid organic compound supplied to chemical manufacturers for conversion to styrene monomer. It is also used as a resin solvent.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

METHANOL *methyl alcohol*

Commercial methyl alcohol supplied to the chemical processing industries and used as an intermediate, for making formaldehyde and acetic acid, as an antifreeze, a solvent, and a denaturant.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

alpha-METHYLSTYRENE *crude*

A commercial chemical raw material typically containing 70-75% *alpha*-methylstyrene, 14-17% cumene; used by chemical manufacturers in making plastics, surface coatings and synthetic rubber.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

PHENOLIC TARS

A heavy petroleum residue from phenol manufacture supplied to blenders and used in low sulfur fuel oil.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61b**

PHOSPHORUS and PHOSPHORUS DERIVATIVES

AMMONIUM PHOSPHATES

DIAMMONIUM PHOSPHATE (DAP)

Technical grade diammonium phosphate (DAP) is used as a fire retardant for cellulosic materials such as wood, paper, cotton; as a source of nitrogen and phosphorus in soluble specialty fertilizers; and as an intermediate in the production of phosphors and as a bonding agent in refractories.

Food grade is used in making yeast and in dough conditioners or yeast foods to promote yeast leavening. Its nutrient value is also used for antibiotic production, bacterial starters and metabolic processes in general. It is approved for use as pH control agent and processing aid in alcoholic beverages, non-alcoholic beverages, condiments and relishes, and gelatins and puddings.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

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TOWOLDMON0042525

MONOAMMONIUM PHOSPHATE (MAP)

Technical grade monoammonium phosphate (MAP) is a fire retardant useful in paper, wood, textiles and other cellulose based products; is the major ingredient in ABC type fire extinguishers; is used as an acidulant in dye baths; is a source of nitrogen and phosphorus in soluble specialty fertilizer products and a bonding agent in refractories.

Food grade monoammonium phosphate (MAP) is used in making yeast and in dough conditioners or yeast foods to promote yeast leavening. Its nutrient value is also used for antibiotic production, bacterial starters and metabolic processes in general.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

CALCIUM PHOSPHATES

BONE ASH (NATURAL)
See Page 20

CALCIUM PYROPHOSPHATE

Food grade phosphate salt for use as a dentifrice polishing agent; for food enrichment; and as an ingredient in pharmaceutical preparations. It is also used in manufacture of bone white china.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

DICALCIUM PHOSPHATE, ANHYDROUS

A food grade phosphate salt used as a high abrasive polishing agent in toothpastes and powders; as a mineral supplement in prepared foods and cereals, and in pharmaceutical preparations.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

DICALCIUM PHOSPHATE, DIHYDRATE

A food grade phosphate used primarily as a polishing agent in toothpastes and powders; as a mineral supplement; and in pharmaceutical preparations.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

H.T.® MONOCALCIUM PHOSPHATE *monohydrate*
See Page 15

LUSTRE-PHOS® *dentifrice abrasive*

Lustre-Phos is a white tasteless crystalline powder used in dentifrices as a controlled abrasive to impart optimum cleaning and polishing of the teeth.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

MOULD COAT *synthetic bone ash*
See Page 20

PY-RAN® *anhydrous monocalcium phosphate*
See Page 15

TRICALCIUM PHOSPHATE, FOOD GRADE

A food grade phosphate used as a flow conditioner and anticaking agent in granular and powdered products; as a mineral supplement in food and pharmaceutical preparations; and as a suspending agent in the manufacture of polystyrene.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

TRICALCIUM PHOSPHATE, INDUSTRIAL GRADE (TCP-IG)

Industrial grade tricalcium phosphate (TCP-IG) is used as a flow conditioning and anticaking agent with application in dry powder fire extinguishers, glues and resins in the manufacture of plywood, and granulated fertilizers.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

PHOSPHORIC ACIDS

NFB® PHOSPHORIC ACIDS *80% and 85%*

Modified grades of phosphoric acids are used in chemical polishing of aluminum, often called bright-dipping. The bright-dipping process consists basically of four steps: cleaning, bright-dipping, anodizing and sealing. *NFB* phosphoric acids contain a component which effectively reduces or eliminates nitrogen dioxide fumes which are produced when aluminum is treated in the usual bright-dip bath. The *NFB* acid formulation also includes optimum amounts of copper, the most effective aluminum brightener. On special request, *NFB* phosphoric acids can be processed to include a stable surfactant.

Bright-dipped aluminum, because of its corrosion resistance, has been widely adopted by the automotive and appliance industries as well as the specialty decorative industry.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

TOWOLDMON0042526

PHOSPHORIC ACID, FOOD GRADE *75, 80 and 85%*

Food grade phosphoric acid is used as an acidulant for soft drinks, particularly colas. It is used in the manufacture of gelatin, cottage cheese, some processed cheeses, fats, shortenings, sugarcane refining, jellies and preserves, soya protein processing, nutrient in yeast production, control of bacterial growth in selected processed foods, and in the manufacture of food grade phosphate salts.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

PHOSPHORIC ACID, TECHNICAL GRADE *75, 80 and 85%*

Technical grade phosphoric acid is used in the manufacture of phosphate salts; for metal cleaning and treating; as a binder in refractory products; as a clarifying agent in sugar processing; in the electropolishing and pickling of steel; as a catalyst in various processes; in industrial and institutional cleaning products; in liquid fertilizer compositions; as a nutrient in industrial waste treatment; as a corrosion inhibitor in antifreeze; and in rustproofing and phosphatizing compositions.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

POTASSIUM PHOSPHATES

MONOPOTASSIUM PHOSPHATE

Technical, food and NF grade phosphate salt used to control pH of culture media in penicillin manufacture and pesticides for crops; for special medicinal purposes; and soluble fertilizers.

The food grade is also approved for use as a nutrient supplement, pH control agent and sequestrant in non-alcoholic beverages, imitation dairy products, egg products, processed fruits and soft candy.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

TETRAPOTASSIUM PYROPHOSPHATE

A technical grade phosphate salt used in liquid detergent formulations; as a processing aid in synthetic (cold) rubber manufacture; as an ingredient for synthetic resin emulsion paints; as a dispersant of pigments and delustering agents in textile dyeing; as a deflocculant in oil drilling muds, cement manufacture, and clay slurries for paper coating. It is also used as a water softener, conditioner, and emulsifier for oils and greases.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

TRIPOTASSIUM PHOSPHATE

The technical grade phosphate salt used as a processing aid in synthetic (cold) rubber manufacture; as a hydrogen sulfide scavenger in petroleum processes; as a water softener in boiler water conditioning; and as a component in liquid cleaning products.

The food grade is cleared for use in pesticides for crops, adhesives, and as a nutrient supplement, pH control agent and sequestrant in non-alcoholic beverages and imitation dairy products.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SODIUM PHOSPHATES

DISODIUM PHOSPHATE, ANHYDROUS, FOOD GRADE

A food grade is supplied for use in process cheese, quick cooking cereal products, evaporated milk and pharmaceutical applications.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

DISODIUM PHOSPHATE, ANHYDROUS, TECHNICAL GRADE

A technical grade phosphate salt used for boiler water treatment; in making glazes for potteries, porcelains and chinaware; in various chemical processes; in the preparation of enamels; in tinning; 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.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

DISODIUM PHOSPHATE, DUOHYDRATE

A food grade phosphate used for preventing coagulation during processing of condensed milk and as an emulsifying agent in processing cheese.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

EMULSI-PHOS® *cheese emulsifier*

A food grade phosphate specially designed for use in process cheese, cheese food and cheese spreads.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

0684443

TOWOLDMON0042527

INSOLUBLE SODIUM METAPHOSPHATE

An insoluble food grade phosphate salt that is used primarily as a polishing ingredient in toothpaste and powders.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

LEVN-LITE® *sodium aluminum phosphate*
See Page 15

MONOSODIUM PHOSPHATE (MSP), FOOD GRADE

A food grade is supplied for use as a mineral supplement, a pharmaceutical ingredient, as an acidulant in powdered beverages, processed meat products and frozen egg preservation.

NUTRITION CHEMICALS DIVISION Sales Office Index **31a**

MONOSODIUM PHOSPHATE (MSP), TECHNICAL GRADE

A technical grade phosphate salt used in metal cleaners, water conditioning, as an electroplating solution buffer, and as a textile dyeing aid.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

OILFOS® *glassy sodium phosphate*

Oilfos is a glassy polyphosphate used exclusively for controlling viscosity of oil well drilling muds.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

PAN-O-LITE® *sodium aluminum phosphate*
See Page 15

SODIUM ACID PYROPHOSPHATE, FOOD GRADE (SAPP)
See Page 15

SODIUM ACID PYROPHOSPHATE, TECHNICAL GRADE (SAPP-X)

A technical grade phosphate salt used in metal cleaner formulations, iron phosphatizing and cleaning compounds, and dairy cleaner formulations. The product also finds utility in imparting required flow properties to water-based oil well drilling muds and in the wetting and dispersion of pigments in water-based paints.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SODIUM HEXAMETAPHOSPHATE

A technical grade phosphate salt used as a water softener for bath beads and laundry boosters; to disperse dyes and prevent redeposition unwanted salts in textile dyeing; to sequester undesirable metals in the development of photographic film, potable water, and boiler water and to deflocculate kaolin clay and oil drilling muds.

The food grade is approved for use as a dietary supplement, to decrease the amount of cooked out juices in processed pork products, as a hog scald, and to control scale in meat processing plant potable, cooling and retort water. It is approved for use as a curing agent, dough strengthener, emulsifier, firming agent, flavor enhancer, flavoring agent, nutrient supplement, pH control agent, processing aid, sequestrant, stabilizer and thickener, surface active agent, synergist and texturizer in numerous food applications.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SODIUM TRIMETAPHOSPHATE (STMP)

Sodium trimetaphosphate is sold primarily in the export market under the trademark *IP-61®* to licensees of Monsanto's patented "Fluff" process. Using this process detergent manufacturers produce a detergent with density comparable to spray dried products. The STMP converts to sodium tripolyphosphate in situ.

A "Purified" grade of STMP is now available. This grade meets FCC specifications on arsenic and heavy metals but is not certified as food grade. "Purified" STMP is used as a precursor in the production of products that ultimately may require food certification.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SODIUM TRIPOLYPHOSPHATE (STP), TECHNICAL GRADE

The technical grade of STP is used as a builder for consumer and industrial cleaning products, including laundry detergents, dishwashing detergents, water conditioners, and hand surface cleaners; as a water softener in bath beads; as a deflocculant in kaolin clays and cement manufacture; for pitch control in wood pulping; as a flotation agent in mining; for water treatment, soil stabilization and textile dyeing.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

TOWOLDMON0042528

SODIUM TRIPOLYPHOSPHATE (STP), FOOD GRADE

The food grade STP, sold under the trademark *Nutrifos*®, is used in curing hams and related meat products.

NUTRITION CHEMICALS DIVISION — Sales Office Index **31a**

STABIL-9® *sodium aluminum phosphate*
See Page 15

TETRASODIUM PYROPHOSPHATE, FOOD GRADE

A food grade is supplied for use in meat curing compounds, in instant puddings, as a stabilizer for protein foams, and an antidarkening agent for potatoes.

NUTRITION CHEMICALS DIVISION — Sales Office Index **31a**

TETRASODIUM PYROPHOSPHATE, TECHNICAL GRADE

A technical grade phosphate salt used as a detergent builder; for conditioning oil drilling muds; to formulate household and industrial cleaners and detergents; as a pigment dispersant and dye bath additive and for metal cleaning; as a deflocculant in clay processing and paper coating and filling; as a water softener in water treatment; as pitch control agent in wood pulping and for soil stabilization.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **51a**

TRISODIUM PHOSPHATE, ANHYDROUS (TSP/A), FOOD GRADE

A food grade is supplied for use as a basic emulsifier in process cheese and as cooking-speed promoter in quick-cook cereals.

NUTRITION CHEMICALS DIVISION — Sales Office Index **31a**

TRISODIUM PHOSPHATE, ANHYDROUS (TSP/A) TECHNICAL GRADE

A technical grade phosphate salt used in household and institutional cleaners, concrete floor cleaners and heavy duty industrial metal cleaning; water treatment for softening and conditioning; and for alkalinity in paint removers and textile scouring and bleaching baths.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **51a**

TRISODIUM PHOSPHATE, CRYSTALLINE, FOOD GRADE

A food grade is supplied for use in process cheese, cheese food and cheese spreads as a potent emulsifier.

NUTRITION CHEMICALS DIVISION — Sales Office Index **31a**

TRISODIUM PHOSPHATE, CRYSTALLINE, TECHNICAL GRADE

A technical grade phosphate salt used in household and institutional cleaners, heavy duty concrete floor cleaners and for industrial metal cleaners; water treatment for softening and conditioning and to impart alkalinity in paint removers and textile scouring and bleaching baths.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **51a**

OTHER PHOSPHORUS and PHOSPHORUS DERIVATIVES

FERROPHOSPHORUS *iron phosphide*
See Page 20

LoSilPhos* *ferrophosphorus briquettes*
See Page 20

PHOSPHORUS, ELEMENTAL

A pale yellow to deep straw colored waxy solid used as an intermediate in the production of phosphoric acid and organophosphorus compounds, and as an alloying agent in copper alloys.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **51a**

PHOSPHORUS OXYCHLORIDE

Used by chemical manufacturers as a chlorinating agent and catalyst in making various intermediates, medicinals, dyestuffs and a reagent for making acetic anhydride and organic phosphates.

MONSANTO INDUSTRIAL CHEMICALS CO. — Sales Office Index **52a**

0684445

TOWOLDMON0042529

PHOSPHORUS PENTASULFIDE

Supplied as a distillation-purified light greenish-yellow powder in both high and low reactive grades. It is used in the manufacture of lubricating oil additives, thiophosphate insecticidal compounds, salts for ore flotation; as an intermediate for organic synthesis.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

PHOSPHORUS TRICHLORIDE

Supplied as a liquid, it is used by chemical manufacturers variously as a chlorinating agent, catalyst, and reagent in making acid and alkyd chlorides, organic phosphates, germicides, medicinals and in producing iridescent metallic deposits.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

SANTICIZER® 141 *plasticizer (alkylaryl phosphate)*
See Page 34

SANTICIZER® 143 *plasticizer (modified triaryl phosphate)*
See Page 34

SANTICIZER® 148 *plasticizer (alkyl diaryl phosphate)*
See Page 34

SANTICIZER® 154 *plasticizer (triaryl phosphate)*
See Page 34

TRIPHENYL PHOSPHATE (TPPA)
See Page 35

PLASTICIZERS

DI(2-ETHYLHEXYL)ADIPATE (DOA) *dioctyl adipate*

Dioctyl adipate is a high quality plasticizer for imparting low temperature flexibility to polyvinyl chloride and synthetic rubber compositions.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

DIUNDECYL PHTHALATE (DUP)

DUP is a high molecular weight phthalate plasticizer for PVC resin, offering the best low temperature properties and lowest volatility among the phthalate plasticizers. DUP finds use in PVC wire insulation and PVC automotive interior components because of its excellent performance.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

HB-40® *partially hydrogenated terphenyl*

HB-40 is a plasticizer for vinyl sheeting, films and fabric or paper coatings, and for vinyl protective coatings and adhesives. Used to plasticize vinyl profile extrusions, tubing, wire coating and injection- and slush-molding compounds. Plasticizer for styrene-water dispersion paints, paper coatings, adhesives, styrene casting resins, and polysulfide sealants. Solvent for hot melt adhesives.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 8 *plasticizer (mixture of N-ethyl-ortho- and para-toluenesulfonamides)*

Santicizer 8 is one of the best plasticizers known for synthetic polyamides such as nylon and related resins. It is an excellent plasticizer for cellulose acetate, giving a brilliance and polish not obtainable with other plasticizers. Being practically insoluble in petroleum hydrocarbons, it is a valuable plasticizer for coatings designed to withstand gasoline and related products.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 9 *plasticizer (mixture of ortho- and para-toluenesulfonamides)*

Santicizer 9 differs greatly from other plasticizers in its action. Relatively small amounts impart a gloss to polished articles, can give smooth working and uniform curing of molded thermosetting products. Blends readily with most synthetic resins, does not impart the softening action of liquid plasticizers. Particularly valuable to the makers of molding compositions.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 97 *plasticizer (di(n-heptyl, n-nonyl)adipate)*

Santicizer 97 is an adipate plasticizer designed to give polyvinyl chloride film, sheet, and coatings extreme low temperature flexibility. In all three applications, *Santicizer* 97 imparts good hand and drape. *Santicizer* 97 is FDA regulated for use in food contact applications.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

TOWOLDMON0042530

SANTICIZER® 141 *plasticizer (alkylaryl phosphate)*

Excellent for use in polyvinyl chloride films, sheets, extrusions, moldings, organosols and plastisols. Also, *Santicizer* 141 is a flame retardant* and may help meet flammability requirements. *Santicizer* 141 is regulated by the Food & Drug Administration (FDA) for use in food packaging films, protective coatings and adhesives.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 143 *plasticizer (modified triaryl phosphate)*

Santicizer 143 exhibits the plasticizing efficiency of the alkyl diaryl phosphates while retaining the flame-retardant* efficiency of the triaryl phosphates. *Santicizer* 143 is compatible with polyvinyl chloride, vinyl nitrile elastomers, latex emulsions and cellulosic materials.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 148 *plasticizer (alkyl diaryl phosphate)*

Santicizer 148 is a flexibilizing, flame-retarding* phosphate particularly useful as a plasticizer for polyvinyl chloride resins for use in wall coverings, film and sheeting and drapery backings which must meet specific fire performance specifications. It imparts excellent low temperature flexibility and provides lower smoke generation characteristics in several formulations. *Santicizer* 148 is also excellent as a plasticizer for rubber, particularly the vinyl nitriles.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 154 *plasticizer (triaryl phosphate)*

Santicizer 154 is a flame-retardant* triaryl phosphate plasticizer suitable for use in a variety of polymer systems. It is compatible with a number of resins including polyvinyl chloride and vinyl nitrile rubber, vinyl acetate emulsions and cellulosics. *Santicizer* 154 is an ideal replacement for tricresyl phosphate and cresyl diphenyl phosphate.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

*See note on page 12 under "Fire Safety"

SANTICIZER® 160 *plasticizer (butyl benzyl phthalate)*

Santicizer 160 is a general purpose plasticizer for polyvinyl chloride and is widely used in the flooring industry for its high degree of plasticizing efficiency, stain resistance and adhesive migration resistance. *Santicizer* 160 is also compatible with a wide range of other resin systems including acrylics, urethanes, polyvinyl acetate, cellulose (ethyl and nitro), etc.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 261 *plasticizer*

Santicizer 261 is a fast fusing monomeric plasticizer that offers high performance, comparable to low molecular weight polymerics, yet still retains the easy processing features of monomeric plasticizers. It finds application in film and sheeting, coated fabrics, plastisols, organisols, vinyl foams, acrylic coatings and polysulfide systems.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 278 *plasticizer*

Santicizer 278 is a fast fusing, extremely low volatile monomeric plasticizer that offers a high degree of permanence comparable to polymerics, yet retains the excellent processing characteristics of monomerics in vinyl systems. The extremely low volatility and permanence of *Santicizer* 278 makes it one of the products of choice for polysulfide systems.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 409 *plasticizer*

Santicizer 409 is a permanent plasticizer used in wire coatings and tapes. It is also widely used in high-quality film and sheeting (adhesive backed), organosol fabric coatings, refrigerator gasketing and in other applications requiring a high degree of permanence and resistance to extraction.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 411 *plasticizer*

Santicizer 411 is a permanent polymeric plasticizer used in outerwear, baby pants, coated cloth (for automobile and furniture upholstery, etc.), wall covering, wire coatings, modified plastisols and organosols, vinyl-metal laminates, and high density foam vinyl.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

0684447

TOWOLDMON0042531

SANTICIZER® 412 *plasticizer*

Santicizer 412 is a permanent plasticizer used in wire and cable compounds, and vinyl plastisols.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 429 *plasticizer*

Santicizer 429 is a highly efficient permanent plasticizer which provides a good overall balance of permanent properties, particularly suited for refrigerator gasketing.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTICIZER® 711 *plasticizer (di(heptyl, nonyl, undecyl)phthalate)*

Santicizer 711 is a general purpose plasticizer for PVC resin which outperforms DOP (dioctyl phthalate) in the critical areas of low temperature flexibility, volatility and plastisol viscosity stability. Often, *Santicizer* 711 is used to replace DOP and adipate plasticizer blends.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTONOX® and SANTONOX® R *antioxidant*
See Page 5

SANTOWEB® W TREATED FIBER

A treated cellulosic short fiber for use in vinyl compositions as a reinforcing material.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWHITE® POWDER *antioxidant*
See Page 5

TRIPHENYL PHOSPHATE (TPPA)

Triphenyl phosphate is primarily used as a flame retardant plasticizer for cellulosics. It also is of interest in heat sealing coatings and adhesives. Triphenyl phosphate is compatible with and acts as a flame retardant for high resilient flexible urethane foams.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

PLASTICS and RESINS

FORMALDEHYDE RESINS

RESIMENE® MELAMINE-FORMALDEHYDE
RESIMENE® UREA-FORMALDEHYDE RESINS
coatings
See Page 36 (Melamine and Urea Resins)

SALICYLIC ACID, INDUSTRIAL
See Page 22

MELAMINE and UREA RESINS

FORMALDEHYDE
See Page 27

RESIMENE® MELAMINE and UREA RESIN POWDERS

Resimene melamine-formaldehyde spray-dried resin powders are used in either solution or dry form for a variety of applications including paper based decorative laminates, glass cloth based industrial laminates, molded products such as school furniture and wood adhesives. *Resimene* spray-dried urea-formaldehyde powders are used as binders in adhesives, molded products and foundry cores. *Resimene* resin powders provide many useful properties including hard, durable surfaces, color stability, heat resistance, high arch resistance and chemical resistance.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

TOWOLDMON0042532

RESIMENE® MELAMINE-FORMALDEHYDE RESIMENE® UREA-FORMALDEHYDE RESINS
Coatings

Supplied in solution form in organic solvents, *Resimene* resins are used to formulate baked on surface coatings. Available as high solids content solutions, *Resimene* resins impart improved surface hardness, weather resistance, and resistance to alkali and chalking. They promote fast cure and excellent color retention. Water soluble grades are also available. The formulated coatings are used on appliances, automotive products, and fabricated industrial parts.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

NYLON RESINS

ANALAM® METAL PLASTIC LAMINATE

Analam is a developmental product of Monsanto Polymer Products Company. It is a stampable aluminum/nylon/aluminum laminate for use as automotive body panels. Designed to be as stiff as cold rolled steel sheet with ⅓ the weight, it is also corrosion resistant, dent resistant and durable.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

NYRIM® *prepolymer and catalyst*

Nyrim prepolymer and catalyst are used in a nylon block copolymer system for reaction injection molding. The two Monsanto components, when combined with caprolactam monomer, are capable of yielding a broad range of polymeric products from stiff and rigid materials to flexible elastomers. Polymerization cycles are also adjustable for casting or resin transfer molding techniques. Parts made with the nylon block copolymer system exhibit very good high and low temperature resistance, are easily reinforced with glass fiber, flake or particulate minerals and can be produced with integral pastels or deep colors. The good heat resistance of parts made from *Nyrim* permits painting in automotive paint ovens. Izod impact strength is excellent in the 12-13 foot pounds per inch range. Color concentrates for *Nyrim* are available.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

VYDYNE® *nylon and nylon copolymer resins*

Vydyne nylon and nylon copolymer resins are a family of 66, 66/6 copolymers, 69, and specialty nylon resins designed for a wide variety of molding and extrusion applications. Grades include general purpose, nucleated, heat stabilized, color stabilized, and high viscosity types and a grade with flame retardant additives.[1] They are supplied in natural pellets and salt and pepper pellet blends. Typical applications include fasteners, connectors, insulators, electrical systems and fuel system parts, gears, bearings, films, and filaments in such industries as appliances, automotive and transportation, electrical/electronic, industrial and machinery, packaging, hardware, and textile.

[1]The expression "with flame retardant additives" is not intended to reflect performance presented by these or any other materials under actual fire conditions. Each end user should determine whether potential fire hazards are associated with his finished product and whether this Monsanto product is suitable for the particular use.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

VYDYNE® R *reinforced nylon resins*

A family of mineral-reinforced, glass/mineral-reinforced and glass reinforced polyamide engineering thermoplastics designed primarily for molding applications. *Vydyne* R offers high rigidity and tensile strength, resistance to creep under load, and high heat distortion temperature. Processing features include fast cycling (high productivity) and minimum sink mark development. Grades include general engineering and heat stabilized types. They are supplied in natural and black pellets. Used for performance parts including replacement of die cast metals, complex metal assemblies, and more expensive engineering plastics. Suggested applications include appliance, electrical/electronic, industrial, textile, and transportation industry parts.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

0684449

TOWOLDMON0042533

PHENOLIC RESINS

FORMALDEHYDE
See Page 27

PHENOLIC and RESORCINOL RESINS
See Page 1

RESINOX® PHENOLIC LIQUID

Resinox liquids are water solutions of phenolic resin. They provide excellent bond strength, heat resistance, chemical resistance and water resistance when cured. They are used for impregnating and bonding a variety of materials such as glass fibers, rock wool, organic fibers, paper, cloth, wood and inorganic fillers. End uses include thermal and acoustical insulation, battery separators, industrial filters, laminated products, abrasive products and foundry sand molds.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

RESINOX® PHENOLIC RESIN COMPOUND

Supplied in powder form, *Resinox* resin compounds provide excellent bond strength, heat resistance and chemical resistance when cured. They are compounded with fillers such as wood flour, glass fibers and fabric for molding applications. Other uses include the manufacture of bonded fiber pads, grinding wheels, brake linings and foundry sand molds.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

RESINOX® PHENOLIC RESIN VARNISH

Resinox resin varnishes are alcohol solutions of phenolic resin. They are used for impregnating, laminating and coating various substrates and filler materials. End uses include electrical and mechanical grade industrial laminates, decorative laminates and automotive filters. Special heat resistant varnishes are available for use in aerospace components and other high performance systems. Varnishes designed for use in surface coatings impart chemical and solvent resistance in baking finishes for metal surfaces.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

TRICALCIUM PHOSPHATE, INDUSTRIAL GRADE (TCP-IG)
See Page 29

POLYIMIDE RESINS

SKYBOND® RESINS

Skybond polyimide resin varnishes are designed for structural, electrical and specialty applications where extended exposure to high temperature is required. They provide heat resistance, high mechanical strength, excellent electrical properties, fire resistance and low smoke. They are used with reinforcement such as glass cloth or graphite fiber for aircraft components, radome construction and filament winding. *Skybond* also is used in high heat resistant adhesives and foams.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

POLYVINYL ACETATES

GELVA® MULTIPOLYMER RESIN EMULSIONS

Supplied as aqueous dispersions of various acrylic monomers that produce, upon drying, clear, permanently tacky films. These emulsions can be used on a wide variety of substrates that require a pressure sensitive adhesive such as tapes, labels, decals, wall coverings, decorative vinyl and medical attachments.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

GELVA® MULTIPOLYMER RESIN SOLUTIONS

Supplied as water-white or slightly yellow solvent solutions, the amounts of *Gelva* resin solids range from 30 to 55% in solvents consisting of ester-aliphatic hydrocarbon blends or alcohol. The resins in *Gelva* multipolymer resin solutions are based on vinyl acetate, acrylic, and other comonomers. Solution viscosities range from 500 to 40,000 cps @ 25°C. The acrylic-containing grades dry to permanently tacky films. The films from all grades are water resistant. *Gelva* multipolymer resin solutions are used to make pressure sensitive coatings and laminating adhesives for difficult-to-bond surfaces. They are also used in formulating surface coatings and for specialty paper coatings.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

TOWOLDMON0042534

GELVA® RESIN EMULSIONS

Supplied as milk-white aqueous dispersions of PVAc copolymers that provide a choice of viscosity, particle size, molecular weight, emulsifying system, and film forming properties. Emulsions are available that are borax stable, dextrine compatible and with a range of solvent tolerance. They are widely compatible with plasticizers, other film formers, fillers, and colorants. Films and coatings produced by *Gelva* resin emulsions offer a range of useful properties including excellent adhesion, high tensile strength, hardness, range of heat-sealing temperatures, water resistance and others. They are used broadly as film formers for paints, coatings, binders, adhesives, impregnants.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

GELVA® RESIN SOLUTION

Viscous solvent solution of polyvinyl acetate. *Gelva* V7-M50 in methyl alcohol. Viscosity 2,500 cps. Total solids 50%. Films and coatings produced from the solution have excellent gloss, clarity and water resistance. It is also noncorrosive and neutral. Used for bonding paper, wood, glass, leather, textiles, ceramics, metal foil and many plastic materials; in shoe cements; in laminating metal foil to cellophane; for preparing plastic wall tile adhesives; and in the paper industry to produce transparent, light and oxygen stable high gloss coatings. Also used as overprint varnishes, greaseproof coatings and pigment binders.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

POLYVINYL ALCOHOL RESINS

GELVATOL® RESINS

White high bulk density powdered resins supplied in a large number of grades in varying degrees of polymerization, percent hydrolysis and residual acetate content. Resins are water soluble. Viscosities of 4% aqueous solutions range from approximately 2 cps for *Gelvatol* 40-10 to 45 cps for *Gelvatol* 20-90. The resins make clear solutions in water, and cast films are extremely tough with excellent solvent, oil and grease resistance, high tensile strength, and a high degree of impermeability to most gases. Typical applications include dry mix adhesives and building products; textile sizing and finishing; paper coating and sizing; as protective colloids for emulsion polymerization; as binders for china, ceramics, etc.; photosensitive coatings on stencil screens and printing plates; and as water soluble films for packaging soaps, detergents, chemicals, seed, etc.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

POLYVINYL BUTYRALS

BUTVAR® RESIN DISPERSION BR

A milk-white aqueous dispersion of plasticized polyvinyl butyral resin, *Butvar* Dispersion BR has a viscosity of 1500 cps and contains 40 parts plasticizer per 100 parts resin. Air-dried films cast from it are tough, colorless, transparent, dry at room temperature and are unaffected by boiling water. The films are strong and adhere well to a range of surfaces; they resist degradation by water, heat and sunlight. *Butvar* Dispersion BR is used in the textile industry to impart abrasion resistance, durability, strength, slippage control and reduced color crocking to a variety of materials; as abrasion resistant finishes for automobile seat belts and parachute harnesses; as a soft, full-bodied finish for rayon, cotton, or nylon; as a durable, nonraveling finish for filament yarns; and as a finish for curtain and drapery fabrics, glass fabrics, upholstery goods, webbing, awnings, canvas and duck. The resin is also suitable for rug backing, and as greaseproof, washable coatings for wallpaper, window shades and packaging materials. It can be formulated for strippable coatings on metal and other substrates.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

BUTVAR® RESINS

Butvar polyvinyl butyral resins are white, free-flowing powders supplied in seven resin types or grade forms with various hydroxyl content whose solutions provide a range of viscosities. (Viscosity of a 10% ethanol solution of *Butvar* B-79 is 55 cps; of "B-72", is 1570 cps). *Butvar* resins are generally soluble in alcohols, glycol esters, and certain mixtures of polar and nonpolar solvents. They are compatible with phthalate and phosphate plasticizers, castor oil, and other flexibilizers. The films are colorless and transparent. *Butvar* resins offer a variety of outstanding performance properties: film clarity, adhesion, flexibility, abrasion and water resistance. They are recommended for formulating metal and wood primers; structural and hot melt adhesives; printing inks; and waterproof textile coatings. In surface coatings, *Butvar* resins improve intercoat adhesion, flexibility, impact and abrasion resistance and flow properties. They are recommended for upgrading the coating performance of thermosetting phenolics, ureas, melamines, epoxies, alkyds, polyurethanes and polyesters.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

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SAFLEX® POLYVINYL BUTYRAL FILM

Saflex polyvinyl butyral is a continuous adhesive film - supplied in clear, translucent, tinted or gradated color - for the plastic interlayer in laminated safety glass. It is a tough and resilient laminating material with excellent optics and adhesion to glass. The functional properties provided by *Saflex* include impact energy absorption, glare control and sound reduction. *Saflex* is used as the interlayer in the manufacture of high-penetration resistant windshields. Other applications include glazings for aircraft and for architectural glass.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

POLYVINYL FORMAL RESINS

FORMVAR® RESINS

Formvar polyvinyl formal resins are white, free-flowing powders supplied in several grades that offer a range of solubility characteristics and solution viscosities. A 5% ethylene chloride solution of *Formvar* 5/95E ranges from 5-11 cps; "15/95E" from 50-80 cps. *Formvar* resins are soluble in phenols, alcohol mixtures, aromatic hydrocarbons and some chlorinated hydrocarbons. They can be plasticized with phthalate, phosphate, glycolate, and many other plasticizers. Each grade has particularly useful properties. *Formvar* 15/95E, for example, is excellent for making tough, heat-resistant enamels for wire used in hermetic systems. The enamels are solderable, bondable, and have high resistance to burn-out and cut-through and excellent solvent resistance to common refrigerants. *Formvar* resins are also suitable for formulating structural adhesives, wash primers, can and drum linings, and wood and knot sealers.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

RESIN MATERIALS

ACETIC ACID *glacial and commercial*
See Page 27

ADIPIC ACID, TECHNICAL GRADE

Technical grade adipic acid is used by chemical manufacturers as an intermediate in making nylon, plasticizers, surfactants, detergents, waxes, paper finishes and polyester resins.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

EMA® RESINS *ethylene-maleic anhydride copolymers*

EMA linear grade resins function as dispersing agents, film formers and chemical intermediates for use in capsule walls, liquid detergents and drilling muds. Cross-linked resins are used as thickening agents in textile print pastes and cosmetics.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52b**

FUMARIC ACID, RESIN GRADE

Resin grade fumaric acid, assay 99.6% minimum, is a polybasic acid used in the manufacture of alkyd, polyester and paper resins.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **52a**

MALEIC ANHYDRIDE
See Page 21

MODAFLOW® *resin modifier*
See Page 25

MODAFLOW® POWDER II *resin modifier*
See Page 25

MULTIFLOW® *resin modifier*
See Page 26

PHTHALIC ANHYDRIDE
See Page 22

STYRENE MONOMER
See Page 28

TETRATHAL® *tetrachlorophthalic anhydride*
See Page 13

STYRENE PLASTICS/RESINS

CADON* *engineering thermoplastics*

Cadon engineering thermoplastics are a family of impact-modified styrene-maleic anhydride terpolymers developed to offer an outstanding balance of heat resistance and impact strength combined with ease of processability. A number of commercial formulations are available including standard grades for injection molding and extrusion plating and a grade

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with flame retardant additives.[1] These products offer heat distortion temperatures in the range of 100-120 degrees centigrade, measured at 264 psi. Izod impact is in the 5½ to 6 foot pounds per inch range, superior to high heat ABS products and similar to competitive ETP's such as modified polyphenylene oxide resins.

Initial commercial applications for *Cadon* resins are in automotive interior and exterior parts. However, the special features of *Cadon* engineering thermoplastics offer special benefits for applications such as business machines and appliance housings, electrical equipment, electronic parts, plumbing and industrial parts.

[1] *The expression "with flame retardant additives" is not intended to reflect performance presented by these or any other materials under actual fire conditions. Each end user should determine whether potential fire hazards are associated with his finished product and whether this Monsanto product is suitable for the particular use.*

MONSANTO POLYMER PRODUCTS CO. Sales Offie Index **61a**

LUSTRAN® ABS *molding and extrusion resins*

Lustran ABS acrylonitrile-butadiene-styrene thermoplastics are supplied in a full range of molding and extrusion grades that offer optimum processing characteristics and a range of physical property values in the finished product. *Lustran* plastics are high impact materials with special values for quality applications such as refrigerator inner liners, business machine and appliance housings, automotive parts and industrial components.

MOLDING MATERIALS: Supplied in a wide range of balanced rigidity and resilience, grades are available in medium to high impact strength with commensurate rigidity, good gloss, high tensile strength, and abuse resistance. Special grades with unique surface characteristics are available to make "platable" products; the materials provide adhesion of the metal plating and good resistance to thermal cycles. Grades with flame retardant additives and ratings up to UL94-5V are available.[1]

EXTRUSION COMPOUNDS: Supplied in a series of grades that provide a range of flexibility, resilience, tensile strength, elongation, and abrasion resistance. A special grade is available for extruding low gloss sheet with equivalent other physical properties. In addition a grade which meets UL 94 V-O rating is offered.[1]

[1] *The expression "with flame retardant additives" and the before mentioned UL ratings are not intended to reflect performance presented by these or any other materials under actual fire conditions. Each end user should determine whether potential fire hazards are associated with his finished product and whether this Monsanto product is suitable for the particular use.*

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

LUSTRAN® SAN *molding resins*

Lustran SAN styrene-acrylonitrile molding resins are clear rigid thermoplastics for molding high quality articles requiring transparency, brilliant surface, chemical resistance and stiffness. Supplied as Grade 31 general purpose SAN copolymer offering outstanding processability and clarity; Grade 31-7042 which is UV stabilized; Grade 33, a soft flow product; and Grade 35, a high performance grade.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

LUSTRAN® ULTRA ABS *resins*

New technology ABS molding grades are extremely easy to mold and have superior molded part appearance and gloss. ULTRA HX and MX offer an excellent balance of properties for high quality, consistent finished goods. Their wider molding temperature latitude and easy flow can translate to reduced cycles, energy savings and fewer operator complaints. Typical applications might include: telephones, appliances, video cassettes, power tool housings, office equipment, toys, sporting goods and lawn and garden equipment.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

LUSTREX® POLYSTYRENE *extrusion resins*

Supplied in pellet form for extruding into sheet, film, or profile shapes. Available in several commercial grades ranging from crystal polystyrene through rubber-modified medium and high impact materials. A typical use of the extruded products is thermoformed containers, trays, cups and lids.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

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LUSTREX® POLYSTYRENE *molding resins*

A broad range of products suitable for molding into articles requiring sharp design detail, high surface luster, good color, dimensional stability, hardness, rigidity and toughness. Supplied in pellet form ranging from transparent crystal polystyrene through rubber-modified materials. The molded articles are widely used in packaging, toy, appliance, photographic, furniture, audio cassette, medical and houseware markets.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **61a**

LYTRON® LATICES

Lytron emulsion latices are aqueous dispersions of polystyrene that are used as pigments, binders, saturants or coatings. They are used as opacifiers for liquid detergent systems, bowl cleaners, pharmaceutical products, and related items; in textile saturating for making shoe components such as box toes and shoe counters; for stiffening foam rubber; in binding of glass fiber mats; and in water-based paints, specialty paper coatings, pigment vehicles and adhesives. They are also used as plastic pigments in paper coating.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

SCRIPSET® RESINS

Styrene-maleic anhydride copolymer resins in powder and liquid form used as protective colloids and film formers. *Scripset* resins promote adhesion and stabilize, harden and thicken aqueous systems. They are alkali-soluble or solvent-soluble for use in adhesives, coatings, and as stabilizers, emulsifying agents, protective colloids and pigment dispersants. *Scripset* resins are used by adhesives manufacturers, textile processors, surface coating manufacturers, and producers of emulsion floor waxes and detergents.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

STYMER® COPOLYMER RESINS
See Page 56

STYRENE-ALLYL ALCOHOL RESINS

These resins supplied in flake form are low molecular weight copolymers of styrene-allyl alcohol. *RJ-100®* and *RJ®101* resins can be used directly as hard resin additives or converted to esters, ester-adducts, ester emulsions. They impart excellent chemical and corrosion resistance to both organic solvent and aqueous coatings. The resin's derivatives are used as latex modifiers for exterior paints, in industrial primer vehicles, in printing inks, and in alkyd and polyester resin manufacture. As a resinous polyol component of polyurethane coatings and rigid foams, SAA offers excellent cost/performance values.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

TRICALCIUM PHOSPHATE, FOOD GRADE
See Page 29

SULFONAMIDE RESINS

SANTOLITE® MHP RESIN

An aryl sulfonamide-formaldehyde resin used in spraying, dipping or brushing lacquers to make clear, colorless, odorless coatings of good gloss and adhesion. It does not materially increase the viscosity of the solution and permits the building up of a high solids content in the lacquer. Compatible with all the common plasticizers.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

SANTOLITE® MS RESIN *80% industrial resin*

Soft, colorless resin made by the condensation of formaldehyde's aromatic sulfonamides. *Santolite* MS like *Santolite* MHP, is compatible with both nitrocellulose and cellulose acetate; as a solvent for both, it can be used in any proportion. Forms brittle compositions with both resins but the addition of a plasticizer makes such combinations permanently flexible.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63a**

TOWOLDMON0042538

PRINTING INK PRODUCTS

BUTVAR® RESINS
See Page 38

FILTREZ® RESINS

Modified rosin resins designed for use in printing inks, coatings and adhesives. *Filtrez* resins offer a wide range of properties for the various printing ink applications.

® Trademark of ERP Company

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **64d**

RESIMENE® MELAMINE-FORMALDEHYDE RESIMENE® UREA-FORMALDEHYDE RESINS
coatings
See Page 36

STYRENE-ALLYL ALCOHOL RESINS
See Page 41 (Styrene Plastics/Resins)

PROCESS CONTROL EQUIPMENT

INSTRUMENTATION, ANALOG PROCESS CONTROL

The *ac²®* analog instrumentation includes a complete line of controllers, computing elements, computer-compatible instruments, signal converters, decision instruments, accessory stations, annunciators, recorders and power supplies with cases, cabinets and field junction boxes. Instrumentation is available for both integral architecture and split architecture configurations. The system features high reliability and compact displays with control-by-exception indication. Unique color-coded field and control room wiring simplifies installation. The complete line of maintenance equipment includes a portable, simple to use, go/no-go tester. Single-unit signal converters and alarms for surface and rack-mounting are also available.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

INSTRUMENTATION, ANALOG PROCESS MEASUREMENT

A broad line of over 16 types of transmitters for measuring pressure, differential pressure, square root differential pressure, liquid level, solids level, density, temperature, and differential temperature are available. Features include rugged construction, easy range change and calibration, 2-wire output, and intrinsically safe ratings when used with a series of intrinsic safety barriers that are also available.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

INSTRUMENTATION, DIGITAL PROCESS CONTROL

The *dc²®* digital control center performs supervisory control, direct digital control, data reduction, batch sequencing, and data logging and alarming in real-time, process control applications. The *PRoVOX®* family of prewritten software programs virtually eliminates special user programming. This program family, featuring color CRT and dynamic graphics, includes data acquisition, continuous control, and batch and batch sequencing control programs. The *dc²* features a 16-bit minicomputer with fixed-point and floating-point multiply and divide logic, plus a full line of peripheral devices.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

INSTRUMENTATION, DISTRIBUTED PROCESS CONTROL

PRōVOX® instrumentation—a family of all-digital distributed control instrumentation—provides improved operations through improved control systems, improved operator interface, and improved management information. Five building blocks comprise the major elements of this instrumentation family: controllers, multiplexers, communications devices, operator consoles, and general purpose computers. A hierarchy of controllers allows the user to select only the degree of control capability needed, ranging from single loop control for individual control loops to interactive control among as many as eight loops. Both preformatted and custom-graphics consoles are available.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

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INSTRUMENTATION, PNEUMATIC and ELECTRONIC

Wizard® pneumatic, field-mounted controllers and transmitters are suited to the control of temperature and positive, compound differential, and vacuum pressures. On-off, proportional only, or proportional-plus-reset controller action available. Pressure sensing to 20,000 psig depending upon construction. Standard 3 to 15 psig or 6 to 30 psig output signal range.

Level-Trol® pneumatic controllers and transmitters utilize the displacement sensing principle to control the level of a liquid in a vessel. Produces a standard 3 to 15 psig or 6 to 30 psig output signal range. Suited to liquid level, liquid-to-liquid interface level, and density measurement applications.

Temperature transmitters in the PM500 series offer high resistance to vibration, in-place calibration, proportional mA output, high accuracy, choice of thermocouples and resistance elements.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

REGULATORS, GAS

Gas regulators for distribution systems, residential and commercial.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

VALVE ACTUATORS and ACCESSORIES

Valve actuators (pneumatic diaphragm or piston; electric; electrohydraulic), positioners (pneumatic; electro-pneumatic), controllers, transducers.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

VALVES

Pressure relief valves (all ranges) and pressure control valves (globe, angle, 3-way, ball and butterfly styles; ratings to ANSI class 2500).

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

VALVES, NOISE ABATEMENT

Control valve noise abatement products and technology. Field-proven control valve noise prediction techniques. Control valves with *Whisper Trim*® flow control cages reduce aerodynamic noise levels as much as 30 decibles. *Cavitrol*® trim enables valves to effectively control hydrodynamic noise and cavitation. Also available are diffusers, in-line and vent silencers.

FISHER CONTROLS INTERNATIONAL, INC. Sales Office Index **91a**

RADIOISOTOPE SOURCES

NUCLEAR ENGINEERING SERVICES

Design, analysis, and technical support service covering designing, specifying, and building radiation devices, equipment, and facilities, including health physics in support of operations safety.

MONSANTO RESEARCH CORPORATION Sales Office Index **111a**

NUCLEAR INSTRUMENTATION

See Page 17

RADIOACTIVE SOURCES

Radioactive sources, including alpha, beta, gamma, neutron and heat sources, are available for use in reactor start-up, oil well logging, industrial gauging, education, medical applications and research, and many other applications. Both standard and custom-designed nuclear sources are supplied.

MONSANTO RESEARCH CORPORATION Sales Office Index **111a**

SHIPPING CONTAINERS

A complete range of containers for rental or sale for shipping radioisotope materials around the world. Containers conform to DOT requirements for Type A and Type B packaging. Type B casks, specially-designed for atomic power plant start-up source rods, are available.

MONSANTO RESEARCH CORPORATION Sales Office Index **111a**

RAIN FLAPS

SPRAY GUARD® RAIN FLAPS

Monsanto manufactures a line of rain flaps for heavy duty vehicles. Made with a low density polyethylene grass-like surface on a stiff high density

TOWOLDMON0042540

RAIN FLAPS (Continued)

polyethylene backing, the rain flaps are designed to significantly reduce the splash and spray thrown from the tires of large vehicles operating on wet pavement.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81g**

RECREATIONAL SURFACES

ASTROTURF®-8 STADIUM SURFACE

An all-weather, synthetic grass-like recreational surface consisting of nylon facing ribbon with weather resistant backing bonded to a shock-absorbing underpad. This system, installed by Monsanto, is ideal for football, baseball, soccer, lacrosse, and other field sports.

Material remnants are available in 15 foot widths.

Handling and Maintenance Equipment Machines for handling and maintaining *AstroTurf* surfaces may be special-ordered: line striper, Grasshopper*, Astro Zamboni* water removal machine, water brush, and tote-a-roll.

ENGINEERED PRODUCTS DIVISION — Sales Office Index **81e**

RUBBER PROCESSING CHEMICALS

ACCELERATORS FOR NATURAL and SYNTHETIC RUBBERS

A-1* THIOCARBANILIDE VULCANIZATION ACCELERATOR *1,3-diphenyl-2-thiourea or N,N'-diphenylthiourea*

Accelerator for fast-curing repair stocks. Accelerator for neoprene latex, natural rubber latex, and cements and an activator for thiazole accelerators. Can be used as accelerator for neoprene. Relatively non-discoloring and may be used in light colored goods.

MONSANTO POLYMER PRODUCTS CO. — Sales Office Index **62a**

BUTASAN® VULCANIZATION ACCELERATOR *zinc dibutyldithiocarbamate*

Used as a secondary accelerator in natural rubber and SBR. Frequently used as a non-blooming primary accelerator in EPDM. Functions as a non-discoloring stabilizer in non-curing applications and in butyl rubber.

MONSANTO POLYMER PRODUCTS CO. — Sales Office Index **62a**

DPG VULCANIZATION ACCELERATOR *diphenylguanidine*

Secondary accelerator in natural and synthetic rubbers with *Santocure, Thiofide* and *Thiotax* accelerators. Slow curing primary accelerator for natural rubber.

MONSANTO POLYMER PRODUCTS CO. — Sales Office Index **62a**

ETHYLTHIURAD* VULCANIZATION ACCELERATOR *tetraethylthiuram disulfide*

Sulfur bearing accelerator and vulcanizing agent. Used as a secondary accelerator with *Santocure* accelerators. Used as a vulcanizing agent in combination with *Thiurad* to minimize blooms. Also used as a cure modifier for neoprene.

MONSANTO POLYMER PRODUCTS CO. — Sales Office Index **62a**

METHASAN® VULCANIZATION ACCELERATOR *zinc dimethyldithiocarbamate*

Used as a secondary accelerator for *Thiofide* and *Santocure* accelerators. Gives strong cure activation.

MONSANTO POLYMER PRODUCTS CO. — Sales Office Index **62a**

MONO THIURAD® VULCANIZATION ACCELERATOR *tetramethylthiuram monosulfide*

Primarily a secondary accelerator for *Thiofide, Thiotax* and *Santocure* accelerators. Frequently used in retread rubber, or in other applications where extended storage of uncured stock is required.

MONSANTO POLYMER PRODUCTS CO. — Sales Office Index **62a**

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SANTOCURE® VULCANIZATION ACCELERATOR

N-cyclohexyl-2-benzothiazolesulfenamide

A delayed action accelerator used alone or with a small quantity of secondary accelerator in natural and synthetic tire treads, sidewalls, etc. *Santocure* gives a shorter scorch delay than *Santocure* NS. Slight discoloration in light or white articles at high concentrations. Nonstaining.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

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SANTOCURE® IPS VULCANIZATION ACCELERATOR

n,n-diisopropyl-2-benzothiazole-sulfenamide

A delayed action accelerator which exhibits an extended induction period and slower cure rate compared to other sulfenamides in natural and synthetic rubber. Slight discoloration in light or white articles at high concentrations. Nonstaining.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

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SANTOCURE® MOR VULCANIZATION ACCELERATOR *2-(morpholinothio)benzothiazole*

An excellent accelerator where extended processing safety is required. Used in thick treads and extrusions, stocks with high loadings of furnace blacks such as ISAF or SAF; stocks which are to be stored for long periods such as retread rubber. Slight discoloration in light or white articles at high concentrations. Nonstaining.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

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SANTOCURE® NS VULCANIZATION ACCELERATOR

N-tert-butyl-2-benzothiazolesulfenamide

A delayed action fast-curing accelerator used alone or with a small quantity of secondary accelerator in natural and synthetic rubber. *Santocure* NS gives processing safety intermediate between *Santocure* and *Santacure* MOR accelerators. Slight discoloration in light or white articles at higher concentrations. Nonstaining.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

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THIOFIDE® MBTS VULCANIZATION ACCELERATOR *2,2'-dithiobis(benzothiazole); benzothiazyl disulfide*

Thiofide gives flat, moderately fast cures in both natural rubber and synthetics. It is particularly useful in white or very bright colored stocks. Secondary acceleration is usually required for synthetic rubbers. Nondiscoloring and nonstaining.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

THIOTAX* MBT VULCANIZATION ACCELERATOR *2-mercaptobenzothiazole*

Thiotax gives flat, fast cures over a wide range of curing temperatures in both natural and synthetic rubbers. *Thiotax* is a good secondary accelerator for butyl and EPDM compounds. Nondiscoloring and nonstaining.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

THIURAD® VULCANIZATION ACCELERATOR

bis(dimethylthiocarbamyl)disulfide; tetramethylthiuram disulfide

Sulfur bearing accelerator used as a secondary accelerator with *Santocure* or *Thiofide* accelerators in a wide range of products. It is used in sulfurless cures with *Sulfasan* R vulcanizing agent to obtain heat resistant compounds with nitrile stocks. Will cause surface bloom at high use levels.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

VOCOL® VULCANIZATION ACCELERATOR

zinc-o,o-di-n-butylphosphorodithioate

Low-cost, nonblooming, fast-curing accelerator for EPDM elastomers. Can be used in combination with *Thiofide* accelerator in natural rubber to improve reversion and aging resistance. Nondiscoloring and nonstaining.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

VOCOL® S VULCANIZATION ACCELERATOR

62% Vocol on 38% inert carrier

A solid form of *Vocol*, 62% active.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index 62a

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ANTIOXIDANTS, ANTIOZONANTS and ANTIDEGRADANTS

FLECTOL® H ANTIOXIDANT *polymerized 1,2-dihydro-2,2,4-trimethylquinoline*

One of the best all-purpose antioxidants, where a slight buff discoloration of the product can be tolerated. Powerful and nonblooming; resists effect of heat deterioration and normal aging. Combats product degradation promoted by copper and other heavy metals. Suitable for dry rubber and latex.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

FLECTOL® ODP ANTIOXIDANT *an octylated diphenylamine*

For protection of rubber against heat deterioration and normal aging. It causes less discoloration than most other full-power antioxidants. It is a good antioxidant for neoprene.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

FLECTOL® PASTILLES ANTIOXIDANT *polymerized 1,2-dihydro-2,2,4-trimethylquinoline*

Has a lower softening point than *Flectol* H. Used in tires, belts, hose, retread rubber and general mechanicals.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® AW ANTIOXIDANT *6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline*

Moderate activity antiozonant/antioxidant for both natural and synthetic rubber. Used as a flex-cracking inhibitor, particularly in tire and belting compounds. Strong staining and discoloration.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® DD ANTIOXIDANT *6-dodecyl-1,2-dihydro-2,2,4-trimethylquinoline*

An excellent antioxidant and flex-cracking inhibitor especially for dynamic applications in tire compounds, belting, retread rubber, hose, mechanicals, and footwear. Also an efficient stabilizer and gel suppressant for SBR stocks during mixing and storage.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® IP ANTIOZONANT *N-isopropyl-N'-phenyl-p-phenylenediamine*

An efficient antiozonant, antioxidant, flex-cracking and fatigue inhibitor. Used in tires, sidewalls, cushion gums, carcass stocks, retread rubber, belting, hose, cables, mountings, buffers and mechanical products exposed to static, dynamic and intermittent-dynamic operating conditions.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® LC ANTIDEGRADANT *an antidegradant blend*

An antiozonant blend used in retread rubber to provide excellent low cost protection against oxygen, heat, ozone, and fatigue or flex-cracking.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® 13 ANTIOZONANT *N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine*

Outstanding antidegradant for all commonly used elastomers. In both natural and synthetic rubber it is a highly effective antioxidant/antiozonant, and flex-cracking inhibitor. Serves as an excellent polymer stabilizer while retaining carryover activity as an antiozonant/antioxidant.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® 77 ANTIOZONANT *N,N'-bis(1,4-dimethylpentyl)-p-phenylenediamine*

An antiozonant for all commonly used elastomers and particularly effective for static applications where it can replace undesirably high loadings of wax. Gives good short-term dynamic protection.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® 134 ANTIOZONANT *an alkylaryl-p-phenylenediamine mixture*

For stabilizing SBR in emulsion polymers and particularly oil extended and oil/black masterbatches where the stabilizer is added with the oil. Effective general purpose antidegradant for tire stocks.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

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SANTOFLEX® 134-D ANTIDEGRADANT *a mixture of Santoflex 134 and Santoflex DD*

A low cost antidegradant blend used to give effective oxygen/ozone protection in tire stocks and general mechanicals. Efficient stabilizer for synthetic elastomers. Staining and discoloring.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOFLEX® 715 ANTIOZONANT *a blend of Santoflex 13 and Santoflex 77 class antidegradants*

A blended antiozonant used in natural and synthetic rubber to achieve effective resistance to ozone fatigue and aging in products submitted to static, dynamic and intermittent-dynamic service conditions.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOVAR® A ANTIOXIDANT
2,5-di(tert-amyl)hydroquinone

For the protection of uncured rubber against oxidation; retains tack in uncured films and tapes.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWHITE® PC ANTIOXIDANT
2,2'-methylenebis(4-methyl-6-tert-butylphenol)

Antioxidant for all white and light colored natural and synthetic compounds. Also used in natural and neoprene latices.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWHITE® CRYSTALS ANTIOXIDANT
4,4'-thiobis(6-tert-butyl-m-cresol)

For the protection of light colored rubber from oxidation. It is also useful in any rubber product used in contact with surfaces such as lacquer or enamel which are subject to staining by ordinary antioxidants. *Santowhite* Crystals provide excellent protection against normal aging.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWHITE® POWDER ANTIOXIDANT
4,4'-butylidenebis(6-tert-butyl-m-cresol)

High activity antioxidant suitable for all white or light colored products where color is critical; also suitable for latex compounding.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

PLASTICIZERS

DI(2-ETHYLHEXYL)ADIPATE (DOA) *plasticizer (dioctyl adipate)*
See Page 33

DIUNDECYL PHTHALATE (DUP)
See Page 33

SANTICIZER® 97 *plasticizer (di(n-heptyl,n-nonyl)adipate)*
See Page 33

SANTICIZER® 141 *plasticizer (alkylaryl phosphate)*
See Page 34

SANTICIZER® 143 *plasticizer (modified triaryl phosphate)*
See Page 34

SANTICIZER® 148 *plasticizer (alkyl diaryl phosphate)*
See Page 34

SANTICIZER® 154 *plasticizer (triaryl phosphate)*
See Page 34

SANTICIZER® 160 *plasticizer (butyl benzyl phthalate)*
See Page 34

SANTICIZER® 261 *plasticizer*
See Page 34

SANTICIZER® 278 *plasticizer*
See Page 34

SANTICIZER® 409 *plasticizer*
See Page 34

SANTICIZER® 411 *plasticizer*
See Page 34

SANTICIZER® 412 *plasticizer*
See Page 35

SANTICIZER® 429 *plasticizer*
See Page 35

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TOWOLDMON0042544

SANTICIZER® 711 *plasticizer (di(heptyl, nonyl, undecyl)phthalate)*
See Page 35

TRIPHENYL PHOSPHATE (TPPA)
See Page 35

RETARDERS

SALICYLIC ACID, INDUSTRIAL
See Page 22

SANTOGARD® PVI PREVULCANIZATION INHIBITOR *N-(cyclohexylthio)phthalimide*

Santogard PVI is a prevulcanization inhibitor for natural and synthetic rubber. It is used with all sulfenamide or thiazole accelerators to control processing safety with minimal changes in curing characteristics or vulcanizate properties. *Santogard* PVI improves green stock storage stability and can be used to recover scorchy stocks. Useful in a wide variety of applications otherwise temperature limited, such as faster extrusion, hotter processing and single-stage mixing.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SPECIAL MATERIALS

ACRYLONITRILE
See Page 27

INSOLUBLE SULFUR 60

Used to retard sulfur bloom on all in-process articles awaiting further processing - e.g., retread rubber, tire carcass plies, tire repair materials. Can replace all or part of normal sulfur depending on degree of blooming experienced.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOPRENE® THERMOPLASTIC RUBBER

A family of thermoplastic rubbers for engineered industrial rubber applications including mechanical rubber goods, hose, under-the-hood automotive products, wire and cable, and sheeting. *Santoprene* thermoplastic rubber offers an economic alternative to conventional thermosetting EPDM and neoprene rubbers. They offer the high performance characteristics of vulcanized rubber with the processing economics of thermoplastics.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWEB® D TREATED FIBER

A treated cellulosic short fiber for use in unsaturated elastomers as a reinforcing material. Used in combination with conventional rubber reinforcing fillers to increase stiffness and engineering properties of rubber compounds.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWEB® DX TREATED FIBER

A treated cellulosic short fiber for use in unsaturated elastomers as a reinforcing material. Used in combination with conventional rubber reinforcing fillers to increase stiffness and engineering properties of rubber compounds.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWEB® H TREATED FIBER

A treated cellulosic short fiber for use in low unsaturated elastomers, specifically EPDM. Used in combination with conventional rubber reinforcing fillers to increase stiffness and engineering properties of rubber compounds. May be chemically bonded to the elastomer.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

SANTOWEB® K TREATED FIBER

A treated cellulosic short fiber for use in nitrile rubbers. Used in conjunction with conventional rubber reinforcing fillers to increase stiffness and engineering properties of rubber compounds. May be chemically bonded to the elastomer.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

STYRENE MONOMER
See Page 28

0684461

TOWOLDMON0042545

SULFASAN® R VULCANIZING AGENT
4,4'-dithiodimorpholine

Vulcanizing agent for natural and synthetic rubbers. Stable at processing temperatures but liberates sulfur at curing temperatures. *Sulfasan* R is used as either a total or partial sulfur replacement to produce compounds with excellent heat aging properties and freedom from bloom.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62a**

TRIPOTASSIUM PHOSPHATE
See Page 30

RUBBER PROCESSING EQUIPMENT

MONSANTO® COLD FEED EXTRUDER

Monsanto cold feed extruders produce extrusions of rubber hose, sponge, tire components and profiles. Feed stock is in strip or pellet form. Screw diameters between 1.8 and 10 inches are available. Screw speed ranges between 2 and 72 rpm are achieved. Various screw types and extruder L/D ratios are available. Swing dual head design permits ease of die changing with minimal down time.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® COLD FEED VACUUM EXTRUDER

A line of cold feed vacuum extruders produce porosity free extrusions for the manufacture of rubber hose, sponge and profiles. Feed stock is in strip or pellet form. Screw diameters between 1.8 and 8 inches are available; screw speed ranges between 2 and 72 rpm are achieved. Various screw types and extruder L/D ratios are available. Swing dual head design permits ease of die changing with minimal down time.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® HOT AIR VULCANIZING TUNNEL

This unit holds microwave-heated extrusions at uniform vulcanizing temperature for desired level of cure. Operating temperatures as high as 500°F can be employed. Twenty air changes per minute prevent hot spots.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® HOT FEED EXTRUDER

A line of hot feed extruders is available from 2.5 to 10 inch diameters. Dual swing head design permits ease of product change.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® LCM (LIQUID CURING MEDIUM) UNIT

In this *Monsanto* LCM unit, the extrusion is submerged in a constant-temperature bath of molten salt for curing. Multiple zoned electric heaters hold the entire bath at uniform curing temperature and eliminate temperature gradients that can cause poor cures.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® SPRAY COOLING UNIT

Used in Monsanto's rubber extrusion systems, it has multiple cold water nozzles to chill extrusion. Blow-off ring at exit removes water from extrusion.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

RUBBER TESTING INSTRUMENTS

MONSANTO® AUTOMATIC CAPILLARY RHEOMETER
See Page 20

MONSANTO® CONE-RHEOMETER

The *Monsanto* cone-rheometer is a table model rheometer which follows the course of the vulcanization reaction and simultaneously records pressure development associated with the curing and cell development of sponge products. Data are presented on a two-pen strip chart recorder as continuous plots of 1) the stiffness (shear modulus) of the rubber versus time and 2) sample cavity pressure versus time.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

TOWOLDMON0042546

MONSANTO® DENSITRON

The Densitron is a fully automatic instrument which measures the specific gravity of rubber. A cassette is loaded with up to 30 samples and placed in the machine. The samples are automatically picked up, in turn, from the cassette and weighted in air and water. Specific gravity results are printed along with an identification number. The Densitron is designed for repetitive testing of rubber samples for factory quality control and compound development.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® DIE SWELL DETECTOR, AUTOMATIC

The automatic die swell detector precisely measures the cross-sectional width of an extrusion as it exits from the orifice of a capillary rheometer. This measurement of the swell (or memory) of the extrusion indicates the material's elastic response at conditions similar to processing shear rates and temperatures. The measurement is particularly useful in controlling blow molding, film and profile extrusion and other processes where drawdown character or dimensional stability is critical.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® DURATRON

The Duratron is a fully automatic instrument which measures the hardness of rubber samples with high accuracy and freedom from operator error. The hardness is measured in International Rubber Hardness (IRHD) units, according to ASTM procedure D-1415-68. A cassette is loaded with up to 30 samples and placed in the machine. The samples are automatically picked up, in turn, from the cassette and the hardness measured. The results are printed along with an identification number. The Duratron is designed for repetitive testing of rubber samples for factory quality control and compound development.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® DUROLAB

An instrument for determining the hardness of rubber samples with high accuracy and freedom from operator error. Hardness is measured and digitally displayed in International Rubber Hardness (IRHD) units, according to ASTM D-1415-68 method.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® FATIGUE-TO-FAILURE TESTER
flex tester

Bench model fatigue tester which measures the ultimate fatigue life of cured rubber compounds at selected strain amplitude ratios. Data are presented as the number of cycles to failure.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® MELT INDEXER
See Page 20

MONSANTO® MODULAR DATA SYSTEM

The modular data system is designed to collect test results from the rheometer, Mooney, hardness, specific gravity, tensile and processability testing instruments. The components of the MDS are the Modular Data Coupler, Data Concentrator and Data Terminal. The Modular Data Coupler automatically computes final test results for up to four rheometer and Mooney instruments. In addition, it has the capability to make go/no-go evaluations to preselected control limits. The Data Concentrator sequentially channels the final test results from Modular Data Couplers and the other data acquisition instruments into the Data Terminal. The Data Terminal stores the final test results, performs statistical analysis and provides future access of the instrument test results.

The system is designed for laboratory or factory use and provides new information to improve compound control while reducing the cost of testing.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® MOONEY VISCOMETER

Three basic models of shearing disk viscometers designed for operation in accordance with ASTM D 1646, BS 1673 and ISO R 289. All measure plasticity of unvulcanized elastomers and processing performance of compounded elastomers.

The Compact Mooney viscometer offers simplicity of operation, minimum of floor space. Equipped with direct digital readout for viscosity measurements. Strip chart recorder with 10 speeds available.

The Standard Mooney viscometer has flat bed recorder, push-button temperature selector, and solid state components.

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TOWOLDMON0042547

Custom Mooney viscometers are tailored to customer's individual laboratory or factory needs and offers compatibility with existing computers.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® OSCILLATING DISK RHEOMETER, MODELS R-100, R-900/750, R-100S

Table or floor model rheometers measure the curing characteristics of rubber compounds or other materials exhibiting curing abilities. Data is presented as a continuous plot of compound viscosity versus cure time at temperature. Test results obtained from the cure curve, as defined by ASTM D-2084, are viscosity, processing safety, cure rate, cure time and ultimate state of cure. The units are designed for use in quality control testing as well as research and development applications.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® POWER INTEGRATOR

The power integrator is an instrument that continuously measures and displays the total power used by an energy consuming process such as Banbury, mill or other mixing system. Power integration can be used to standardize and control the work input to a batch of rubber. This technique improves batch-to-batch uniformity for better control of factory processing, as well as final product properties.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® PROCESSABILITY TESTER

The processability tester is an advanced design, constant rate capillary rheometer with laser die swell and stress relaxation measurement capability. It is designed primarily for testing of elastomeric materials. A pressure transducer is located in the barrel near the capillary. Due to the unique position of the transducer, pressure loss, common to most capillary rheometers is reduced. The instrument modular package includes a microprocessor, servohydraulic drive and precision temperature control. Tests are conducted at conditions of temperature and shear rate equivalent to those encountered in the actual production process.

Typical uses include viscosity and shear stress characterization, correlative studies of mixing and extruder operation, dimensional stability, homogeneity, carbon black loading analysis, stress relaxation characterization, and scorch determination.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® STRESS RELAXATION PROCESSABILITY TESTER

Developed by the Rubber and Plastics Research Association (RAPRA), the stress relaxation processability tester (SRPT) measures the stress relaxation of unvulcanized rubber compounds and raw polymers. A small cylindrical pellet is compressed between heated platens, after a preheat period, and the resulting stress is measured by a transducer. Stress at a preselected reference time and the time required for the stress to decay by half, are determined electronically. Stress relaxation response reflects molecular composition and processability behavior of elastomers. This device can be used for quality control and compound development.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® TENSOMETER, MODEL T-500 *tensile tester*

A floor model universal tester with variable crosshead drive and comprehensive stress/strain electronic recording system giving results in real engineering terms on a strip chart recorder. Designed to meet the requirements of BS 903, Part A2, 1971; ASTM D 412, ASTM 638, DIN 53504, ISO/R37, etc.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® TENSOMETER, MODEL W *tensile tester*

A table model, horizontal, motor driven tensile tester with load capacity of 4,000 lbs (1814.4 kg). Seven calibrated spring beams are provided for various ranges. A drum type autographic recorder automatically plots stress/strain. A second recorder allows modulus testing.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

MONSANTO® X-RAY UNIT *(three different units available)*

The *Monsanto* air-inflated X-ray system is designed to inspect passenger and light truck tires, bead-to-bead, for all cord materials. The unit employs tire automatic conveyance and sequencing.

The universal tire X-ray system is a manual laboratory system to inspect cured and green tire construction. The Monsanto patented lighthouse X-ray tube enables the operator to inspect the complete tire from bead-to-bead with consistent geometric presentation.

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TOWOLDMON0042548

RUBBER TESTING INSTRUMENTS (Cont'd)

The 1027 tire X-ray is designed for automated production line X-ray inspection of passenger, truck, bus and aircraft tires. The solid state process controller is programmed to automatically optimize tread, bead, and sidewall X-ray geometry viewing for each individual tire size and construction.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **62b**

SCALE INHIBITORS

DEQUEST® 2000 *phosphonate*
See Page 56

DEQUEST® 2006 *phosphonate*
See Page 56

DEQUEST® 2010 *phosphonate*
See Page 57

DEQUEST® 2041 *phosphonate*
See Page 57

DEQUEST® 2051 *phosphonate*
See Page 57

DEQUEST® 2054 *phosphonate*
See Page 57

DEQUEST® 2060 *phosphonate*
See Page 57

DEQUEST® 2066 *phosphonate*
See Page 57

DEQUEST® XK *phosphonate*
See Page 57

SODIUM TRIMETAPHOSPHATE (STMP)
See Page 31

SODIUM TRIPOLYPHOSPHATE (STP), TECHNICAL GRADE
See Page 31

SEQUESTRANTS

DEQUEST® 2000 *phosphonate*
See Page 56

DEQUEST® 2006 *phosphonate*
See Page 56

DEQUEST® 2010 *phosphonate*
See Page 57

DEQUEST® 2041 *phosphonate*
See Page 57

DEQUEST® 2051 *phosphonate*
See Page 57

DEQUEST® 2054 *phosphonate*
See Page 57

DEQUEST® 2060 *phosphonate*
See Page 57

DEQUEST® 2066 *phosphonate*
See Page 57

DEQUEST® XK *phosphonate*
See Page 57

SODIUM TRIMETAPHOSPHATE (STMP)
See Page 31

SODIUM TRIPOLYPHOSPHATE (STP), TECHNICAL GRADE
See Page 31

TETRAPOTASSIUM PYROPHOSPHATE
See Page 30

TETRASODIUM PYROPHOSPHATE, TECHNICAL GRADE
See Page 32

SHEATHING

FOME-COR® BOARDS
See Page 10

SILICON SUBSTRATES

SILICON *semiconductor grade*
See Page 9

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TOWOLDMON0042549

SOLVENTS

ACETONE
See Page 28

ortho- and para-DICHLOROBENZENE
See Page 23

ETHYL ACETATE
See Page 25

ETHYLBENZENE
See Page 28

HB-40* *partially hydrogenated terphenyl*
See Page 33

METHANOL *methyl alcohol*
See Page 28

STABLE ISOTOPES

Monsanto supplies stable isotopes of the noble gases, carbon, sulfur, nitrogen, chlorine, bromine, and oxygen. All of these products are nonradioactive, i.e., stable. For each isotope the degree of enrichment is specified as well as minimum purity. The gaseous products are supplied in glass ampoules and steel cylinders, liquids in glass bottles and solids in plastic bottles.

The following stable isotopes are available for physical, chemical, biological research; for industrial uses in nuclear technology; in medical research and diagnostics; for cryogenics and physics studies; in various nuclear physics devices; and in tracer studies of chemical and biological process, where a radioactive isotope would be undesirable. Further information may be obtained upon request.

Stable ARGON Isotopes (gas purity 99.5%)

Stable Isotope:	Ar-38
Isotopic Enrichment	95%
Purity	99.5%

*Stable BROMINE-79 Isotope and Compounds (purity ≥98%)

Form:	NH_4Br
Isotopic Enrichment:	≥90%

*Stable BROMINE-81 Isotope and Compounds (purity ≥98%)

Form:	NH_4Br
Isotopic Enrichment:	≥90%

**Although chemical purity of these products is not certified, reagent grade chemicals are used in their preparation. Approximate chemical purity levels are noted below along with the minimum enrichment specifications.*

Stable CARBON-12 and Compounds (depleted C-13)

Form:	CO	CO_2
Isotopic Enrichment	99.95%	99.9%
Purity:	95%	99%

Stable CARBON-13 and Compounds

90% Isotopic Enrichment

Form:	C	CO_2	CH_4	$BaCO_3$
Purity:	99.8%	98%	97%	Reag. Grade

98% Isotopic Enrichment

Form:	$BaCO_3$
Purity:	Reag. Grade

99% Isotopic Enrichment

Form:	C	CO	CO_2	CH_4
Purity:	99.8%	99%	≥99%	97%

Stable CHLORINE-35 Isotope and Compounds (purity ≥98%)

Form:	NaCl
Isotopic Enrichment	≥99%

Stable CHLORINE-37 Isotope and Compounds (purity ≥98%)

Form:	NaCl
Isotopic Enrichment	≥95%

Stable HELIUM-3 (gas purity 99.9%)

Isotopic Enrichment	>35%

Stable NITROGEN-14 Compound

Form:	$(NH_4)_2SO_4$ in 40% aqueous solution	NH_4NO_3
Isotopic Enrichment	99.99%	99.99%

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TOWOLDMON0042550

STABLE ISOTOPES (Cont'd)

Stable NITROGEN-15 and Compound

Form:	HNO_3	NH_3	NH_3	$(NH_4)_2SO_4$	HNO_3	KNO_3	N_2
Isotopic Enrichment	10%	10%	98+%	60-98+%	98+%	60-98+%	98+%

Stable OXYGEN-16 Isotope and Compounds (purity 99.5%)

Form:	O_2	H_2O
Isotopic Enrichment	99.98%	99.98%

Stable OXYGEN 17 Isotope and Compounds (purity 99.5%)

Form:	O_2	H_2O
Isotopic Enrichment	20-50+%	20-50+%

Stable OXYGEN-18 Isotope and Compounds (purity 99.5%)

Form:	O_2	H_2O	H_2O
Isotopic Enrichment	95+%	95+%	5-10%

Stable SULFUR-34 Isotope and Compounds (purity ≥98%)

Form:	CS_2	S
Isotopic Enrichment	≥90%	≥90%

Stable XENON Isotopes (gas purity 99.5%)

Stable Isotope: Xe-131

Isotopic Enrichment 80%

MONSANTO RESEARCH CORPORATION Sales Office Index **112a**

SURFACE ACTIVE AGENTS, DETERGENTS and BLEACHES

BLEACHING COMPOUNDS

ACL® 56, 59, 60, 90 PLUS SANITIZER and BLEACHING COMPOUNDS

ACL 56 sodium dichloroisocyanurate dihydrate is a 56% available chlorine product. It is used in detergent applications, bleaches, and pool disinfection.

ACL 59 potassium dichloroisocyanurate is a 59% available chlorine product that is used for swimming pool disinfection and sanitizing. It is also used as an oxidizer in mechanical dishwashing compounds and other detergent applications.

ACL 60 sodium dichloroisocyanurate is a 62% available chlorine product. It is used in detergent applications, bleaches and pool disinfection.

ACL 90 PLUS trichloroisocyanuric acid is a 90% available chlorine product. It is used for pool disinfection in compacted forms, commercial bleaches and scouring powders.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DETERGENT INTERMEDIATES

ALKYLATE 215, 225 and 230
alkylbenzene-biodegradable

These alkylates are supplied as intermediates for the manufacture of anionic liquid and solid detergents. The three grades are monoalkylbenzene mixtures of different molecular weights.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SURFACE ACTIVE AGENTS - ANIONIC

MONSANTO® H-230 AROMATIC NAPHTHA

A coproduct of the manufacture of linear alkylbenzene, *Monsanto* H-230 is a mixture of alkylated benzenes. Available in commercial quantities, the product may be sulfonated and is commonly used for the manufacture of surfactants, oil additives, and other specialty chemicals.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SURFACE ACTIVE AGENTS - NONIONIC

STEROX® DF SURFACTANT *dodecylphenol-ethylene oxide condensate (alkylaryl polyoxyethylene ether)*

Sterox DF is a liquid nonionic surface active agent. It is primarily designed as an intermediate for sulfation to produce a high foaming active ingredient for liquid detergents. It also shows considerable potential as a paper rewetting agent.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

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TOWOLDMON0042551

STEROX® DJ SURFACTANT *dodecylphenol-ethylene oxide condensate (alkylaryl polyoxyethylene ether)*

Sterox DJ is a liquid nonionic surface active agent based on dodecylphenol and 9-10 moles of ethylene oxide. It is a general purpose surfactant with a much lower degree of foaming in comparison to other alkylphenol based nonionics. It is an extremely effective detergent and can be compounded with phosphates and the usual detergent builders for a wide range of applications including textile, paper, leather processing; metal cleaning; emulsifiable toxicant concentrates; latex formulations; and in chemical processing.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

STEROX® ND SURFACTANT *nonylphenol-ethylene oxide condensate*

Sterox ND is a liquid nonionic surface active agent which contains an average of four moles of ethylene oxide. It exhibits excellent oil soluble surfactant properties, and it is highly soluble in nonpolar solvents. *Sterox* ND can be used as an intermediate in the production of sulfated surfactants.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

STEROX® NJ SURFACTANT *nonylphenol-ethylene oxide condensate (alkylaryl polyoxyethylene ether)*

Sterox NJ is a general purpose nonionic surfactant. It has proven effective in a wide range of applications including dry and liquid detergents; in textile, paper, and leather processing; for metal cleaning; and in latex formulations.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

STEROX® NK SURFACTANT *nonylphenol-ethylene oxide condensate (alkylaryl polyoxyethylene ether)*

Sterox NK is a nonionic, general purpose surface active agent containing an average of 10.5 moles of ethylene oxide. *Sterox* NK is an excellent water-soluble wetting agent and finds wide application in textile processing. It is also used to formulate general purpose dry and liquid detergents, household cleaners and industrial cleaners.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51a**

SYNTHETIC PLAYING SURFACES

ASTROTURF®-8 STADIUM SURFACE
See Page 44

TEXTILE CHEMICALS

BIPHENYL *also known as diphenyl and phenylbenzene*
See Page 17

BUTVAR® RESIN DISPERSION BR
See Page 38

BUTVAR® RESINS
See Page 38

DISODIUM PHOSPHATE, ANHYDROUS, TECHNICAL GRADE
See Page 30

GELVA® RESIN SOLUTION
See Page 38

GELVATOL® RESINS
See Page 38

LACTIC ACID, U.S.P., FOOD GRADE and TECHNICAL GRADE
See Page 13

LYTRON® LATICES
See Page 41

MONOSODIUM PHOSPHATE (MSP), TECHNICAL GRADE
See Page 31

SALICYLIC ACID, INDUSTRIAL
See Page 22

SCRIPSET® RESINS
See Page 41

SODIUM TRIPOLYPHOSPHATE (STP), TECHNICAL GRADE
See Page 31

STEROX® DJ SURFACTANT
See Page 55

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TOWOLDMON0042552

STEROX® NJ SURFACTANT
See Page 55

STEROX® NK SURFACTANT
See Page 55

STYMER® COPOLYMER RESINS

Stymer S is a water-soluble removable size used in sizing filament acetates by the textile industry. *Stymer* S is a styrene-maleic anhydride copolymer resin.

MONSANTO POLYMER PRODUCTS CO. Sales Office Index **63b**

TEXTILE INTERMEDIATES

ACRYLONITRILE
See Page 27

ADIPIC ACID, TECHNICAL GRADE
See Page 39

ADIPONITRILE

Adiponitrile is used in the production of hexamethylenediamine.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

AMINE HEADS
See Page 22

BISHEXAMETHYLENETRIAMINE (BHMT)
See Page 22

CYCLOHEXANOL
See Page 25

CYCLOHEXANOL/CYCLOHEXANONE MIXTURE

Used in conversion to adipic acid or separation into cyclohexanol and cyclohexanone.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

HEXAMETHYLENEDIAMINE (HMD)

Supplied to fiber and plastics manufacturers as a basic intermediate used in nylon 6,6 production. Other uses for HMD include manufacture of nylon 6,9, 6,10 and 6,12 resins, polyurethanes via hexamethylenediisocyanate, wet strength resins, boiler feedwater additives and polyamide adhesives.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

HEXAMETHYLENEDIAMMONIUM ADIPATE

Nylon 6,6 salt supplied to fiber and plastics manufacturers as a 50% aqueous solution and used in polymerization to nylon 6,6 polymer.

MONSANTO FIBERS & INTERMEDIATES CO. Sales Office Index **42a**

THICKENING AGENTS

EMA® RESINS *ethylene-maleic anhydride copolymers*
See Page 39

GELVATOL® RESINS
See Page 38

WATER TREATING CHEMICALS

DEQUEST® 2000 *phosphonate*

Used in any aqueous system for the prevention of scale formation or to inhibit precipitation in water treating applications. A particularly effective additive in industrial cleaner formulations for the control of extraneous metal ions and to improve soil or scale removal. Used as a scale control agent in oil production.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DEQUEST® 2006 *phosphonate*

Used in neutral or alkaline systems for the prevention of scale or to prevent mineral precipitation. Agent for deflocculating clays, cements, resins, pigments and the like. Effective additive for alkaline cleaners (such as bottle washing formulas or dairy cleaners) or in general-purpose detergents. This product is the sodium salt of *Dequest* 2000.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

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DEQUEST® 2010 *phosphonate*

Used in scale prevention and corrosion inhibition for industrial water treatment, and to control metal ions in aqueous systems.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DEQUEST® 2041 *phosphonate*

Used in scale prevention and corrosion inhibition for industrial water treatment where a solid product is required. Also used for electroplating and peroxide stabilization for the control of extraneous metal ions.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DEQUEST® 2051 *phosphonate*

Used in scale prevention and corrosion inhibition for industrial water treatment where a solid product is required.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DEQUEST® 2054 *phosphonate*

Used in any aqueous system for the prevention of scale formation or to inhibit precipitation in water treating applications, and to control metal ions in aqueous systems.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DEQUEST® 2060 *phosphonate*

Used in any aqueous system for the prevention of scale formation or to inhibit precipitation in water treating applications. A particularly effective additive in industrial cleaner formulations for the control of extraneous metal ions and to improve soil or scale removal. Used as a scale control agent in oil production.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DEQUEST® 2066 *phosphonate*

Used in neutral or alkaline systems for the prevention of scale formation or mineral precipitation. An effective additive for industrial cleaner formulations and peroxide bleaching systems. This product is the sodium salt of *Dequest* 2060.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DEQUEST® XK *phosphonate*

Used for the control of extraneous metal ions in textile bleaching and scouring.

MONSANTO INDUSTRIAL CHEMICALS CO. Sales Office Index **51b**

DISODIUM PHOSPHATE, ANHYDROUS, TECHNICAL GRADE
See Page 30

MONOSODIUM PHOSPHATE (MSP), TECHNICAL GRADE
See Page 31

OILFOS® *glassy sodium phosphate*
See Page 31

SODIUM HEXAMETAPHOSPHATE
See Page 31

SODIUM TRIPOLYPHOSPHATE (STP), TECHNICAL GRADE
See Page 31

TRISODIUM PHOSPHATE, ANHYDROUS (TSP/A), TECHNICAL GRADE
See Page 32

TRISODIUM PHOSPHATE, CRYSTALLINE, TECHNICAL GRADE
See Page 32

WILDFIRE CONTROL CHEMICALS

PHOS-CHEK® *fire retardant*
See Page 12

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THIS CATALOG LISTS MANY OF THE MORE THAN 1000 PRODUCTS OR SERVICES PRODUCED OR PROVIDED BY MONSANTO AND ITS MAJOR SUBSIDIARIES.

FOR ADDITIONAL INFORMATION ON THESE PRODUCTS AND SERVICES, REFER TO OUR SALES OFFICE INDEX IN THE "GREEN" SECTION.

IF YOU'RE NOT CERTAIN WHERE TO CALL. . .

IF YOU'RE NOT CERTAIN WHAT PRODUCT YOU'RE LOOKING FOR. . .

IF YOU CAN'T FIND A PRODUCT LISTED IN THE CATALOG. . .

OR

IF YOU JUST NEED HELP. . .

. . .CALL THE CUSTOMER INQUIRY CENTER AT THE WORLD HEADQUARTERS IN ST. LOUIS, MISSOURI
***** (314) 694-1000 ****

0684471

TOWOLDMON0042555

The following serves as a reference to the sales offices which can provide additional information on products listed in the catalog. For example, if you want "To Place An Order" or if you are interested in obtaining "Information" about *Lustrex*® polystyrene molding and extrusion materials, refer to Sales Office Index 61a. An order can be placed by calling our Customer Service Center in Indian Orchard, Massachusetts. Information can be obtained by contacting any of the sales offices listed: Newport Beach, CA; Atlanta, GA; Rosemont, IL; Indian Orchard, MA; Birmingham, MI; St. Louis, MO; Kenilworth, NJ or Cincinnati, OH.

MONSANTO AGRICULTURAL PRODUCTS COMPANY

11a Crop Chemicals Division

TO PLACE AN ORDER:

Customer Service Center		(800) 325-4330 Ext. 5868
Missouri, St. Louis 63167 800 North Lindbergh Blvd.	*In Missouri*	(800) 392-1700 Ext. 5868

FOR INFORMATION:

California, Fresno 93710 1520 East Shaw Avenue Suite 115	(209) 226-2953
California, Newport Beach 92663 1401 Dove Street Suite 350	(714) 553-7775
California, Sacramento 95825 601 University Avenue Suite 266	(916) 929-8881
Colorado, Denver 80231 9745 E. Hampden Ave. Suite 420	(303) 751-1901
Delaware, Wilmington 19810 3411 Silverside Road	(302) 478-4600
Florida, Altamonte Springs 32701 121 Whooping Loop	(305) 830-7032
Georgia, Atlanta 30339 320 Interstate North Parkway Suite 500	(404) 951-7600
Idaho, Boise 83702 815 Park Blvd. Suite 220	(208) 344-6902
Illinois, Decatur 62521 1900 E. Eldorado Suite 110	(217) 428-5515
Indiana, Carmel 46032 11550 N. Meridan St. Suite 200	(317) 844-7283
Iowa, W. Des Moines 50265 1025 Ashworth Road Suite 535	(515) 225-0412
Iowa, Bettendorf 52722 Northwest Towers - 202 2550 Middle Road	(319) 359-5416
Kansas, Overland Park 66210 8500 W. 110th Suite 240	(913) 648-6420
Kentucky, Louisville 40223 Triad North Suite 231 10401 Linn Station	(502) 426-1156
Louisiana, Baton Rouge 70816 2352 Eastgate Suite F	(504) 293-7730
Michigan, East Lansing 48823 5000 Northwind Drive Suite 142	(517) 337-1748
Minnesota, N. Mankato 56001 360 Pierce Avenue Suite 209	(507) 345-7847
Montana, Great Falls 59405 Poquito Villa Suite 206 1201 10th Avenue South	(406) 727-7071
Nebraska, Omaha 68137 11128 John Galt Blvd. Suite 375	(402) 331-3460
New York, Solvay 13209 S.S.A.C. Building Dwight Park Drive	(315) 451-5965
North Carolina, Raleigh 27625 3117 Poplarwood Court Suite 323	(919) 876-6727
North Dakota, W. Fargo 58078 623 East Main St. Suite 201	(701) 282-6122
North Dakota, Minot 58701 900 N. Broadway Suite 112	(701) 838-3687
Ohio, Bowling Green 43402 735 Haskins Road	(419) 352-8478
South Carolina, Columbia 29210 Brookside Office Park #1 Harbison Way, Suite 120	(803) 732-0925
South Dakota, Sioux Falls 57103 2804 E. 26th St.	(605) 334-6022
Tennessee, Memphis 38117 606 S. Mendenhall Suite 109	(901) 767-2131

TOWOLDMON0042556

Texas, Arlington 76010 (817) 860-9915
1600 E. Pioneer Pkwy.
Suite 560

Texas, Houston 77036 (713) 780-2747
7171 Harwin
Suite 209

Texas, Lubbock 79423 (806) 797-3148
3307 82nd Street
Suite J

Washington, Spokane 99216 (509) 928-9001
E. 12929 Sprague Avenue
Suite 3

Wisconsin, Madison 53719 (608) 833-3300
6601 Grand Teton Plaza

ANIMAL AND PLANT PRODUCTS DIVISION

21a Plant Food Products

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330
Ext. 5872

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5872

FOR INFORMATION:

Missouri, St. Louis 63167 (314) 694-3761
800 North Lindbergh Blvd.

22b Blasting Products

TO PLACE AN ORDER OR FOR INFORMATION:

Missouri, St. Louis 63167 (314) 694-3858
800 North Lindbergh Blvd.

NUTRITION CHEMICALS DIVISION

31a Nutrition Chemicals

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330
Ext. 5806

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5806

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7750
1401 Dove Street
Suite 350

Delaware, Wilmington 19810 (302) 478-4600
3411 Silverside Road

Georgia, Atlanta 30339 (404) 951-7600
320 Interstate North Parkway
Suite 500

Illinois, Rosemont 60018 (312) 823-9050
9701 W. Higgins Rd.
Suite 500

Missouri, St. Louis 63167 (314) 694-5441
800 North Lindbergh Blvd.

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Ohio, Cincinnati 45236 (513) 984-1100
8041 Hosbrook Road
Whitehall Building

MONSANTO FIBERS AND INTERMEDIATES COMPANY

Fibers

41a Fibers

TO PLACE AN ORDER:

Customer Service Center (800) 845-5270

South Carolina, Greenville 29606 *In South Carolina* (803) 242-6700
Box 5564, Station B

FOR INFORMATION:

Apparel

California, Los Angeles 90079 (213) 628-6312
110 East 9th Street
Suite A1313

New York, New York 10036 (212) 382-9600
1460 Broadway

North Carolina, Charlotte 28210 (704) 364-0110
Suite 400
6230 Fairview Road

Carpets

California, Newport Beach 92663 (714) 553-7755
1401 Dove Street
Suite 350

Georgia, Atlanta 30339 (404) 951-7600
320 Interstate North Parkway
Suite 500

Home Furnishings

Georgia, Atlanta 30339 (404) 951-7600
320 Interstate North Parkway
Suite 500

New York, New York 10036 (212) 382-9600
1460 Broadway

North Carolina, Charlotte 28210 (704) 364-0110
Suite 400
6230 Fairview Road

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Industrial

North Carolina, Charlotte 28210 (704) 364-0110
Suite 400
Fairview Road

Tire

Ohio, Akron 44313 (216) 668-8208
260 Springside Drive
Montrose Development Park

41b Nonwovens

TO PLACE AN ORDER:

Customer Service Center (800) 845-5270

South Carolina, Greenville 29606 *In South*
Box 5564, Station B *Carolina* (803) 242-6700

FOR INFORMATION:

Missouri, St. Louis 63167 (314) 694-8332
800 North Lindbergh Blvd.

Intermediates

42a Textile Intermediates

TO PLACE AN ORDER OR FOR INFORMATION:

Customer Service Center (800) 845-5270

South Carolina, Greenville 29606 *In South*
Box 5564, Station B *Carolina* (803) 242-6700

MONSANTO INDUSTRIAL CHEMICALS COMPANY

Detergent Materials

51a Detergents & Phosphates

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330
Ext. 5813

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5813

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7760
1401 Dove Street
Suite 350

Michigan, Birmingham 48010 (313) 645-5420
30100 Telegraph Road
Suite 320

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Missouri, St. Louis 63167 (314) 694-5465
800 North Lindbergh Blvd.

51b Fine Chemicals and Water Treatment

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330
Ext. 5807

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5807

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7760
1401 Dove Street
Suite 350

Michigan, Birmingham 48010 (313) 645-5420
30100 Telegraph Road
Suite 320

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Missouri, St. Louis 63167 (314) 694-5465
800 North Lindbergh Blvd.

Specialty Chemicals

52a Process Chemicals

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330
Ext. 5802

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5802

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7760
1401 Dove Street
Suite 350

Michigan, Birmingham 48010 (313) 645-5420
30100 Telegraph Road
Suite 320

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Missouri, St. Louis 63167 (314) 694-5465
800 North Lindbergh Blvd.

52b Functional Fluids and Other Monomers

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330
Ext. 5804/05

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5804/05

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7760
1401 Dove Street
Suite 350

Michigan, Birmingham 48010 (313) 645-5420
30100 Telegraph Road
Suite 320

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New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Missouri, St. Louis 63167 (314) 694-5465
800 North Lindbergh Blvd.

52c Wildfire Control

TO PLACE AN ORDER OR FOR INFORMATION:

California, Ontario 91761 (714) 983-0772
810 East Main Street

MONSANTO POLYMER PRODUCTS COMPANY

Plastics

61a Plastics

TO PLACE AN ORDER:

Customer Service Center (800) 628-4045

Massachusetts, Indian Orchard 01151
730 Worcester Street *In Massachusetts* (413) 730-2631

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7740
1401 Dove Street
Suite 350

Georgia, Atlanta 30339 (404) 951-7600
320 Interstate North Parkway
Suite 500

Illinois, Rosemont 60018 (312) 823-9050
9701 W. Higgins Rd.
Suite 500

Massachusetts, Indian Orchard 01151 (413) 788-6911
730 Worcester Street

Michigan, Birmingham 48010 (313) 645-5420
30100 Telegraph Road
Suite 320

Missouri, St. Louis 63167 (314) 694-5461
800 North Lindbergh Blvd.

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Ohio, Cincinnati 45236 (513) 984-1100
8041 Hosbrook Road
Whitehall Building

61b Petrochemicals

TO PLACE AN ORDER:

Customer Service Center (800) 231-6570

Texas, Texas City 77590 *In Texas* (713) 945-4431
Box 1311

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7770
1401 Dove St.
Suite 350

Illinois, Rosemont 60018 (312) 823-9050
9701 W. Higgins Rd.
Suite 500

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Ohio, Akron 44313 (216) 666-4111
260 Springside Drive
Montrose Development Park

Texas, Houston 77056 (713) 877-5999
5051 Westheimer Road

Rubber Chemicals and Instruments

62a Rubber Chemicals

TO PLACE AN ORDER:

Customer Service Center (800) 321-3416

Ohio, Akron 44313 *In Ohio* (216) 668-8261
260 Springside Drive
Montrose Development Park

FOR INFORMATION:

Ohio, Akron 44313 (216) 666-4111
260 Springside Drive
Montrose Development Park

62b Rubber Instruments & Equipment

TO PLACE AN ORDER OR FOR INFORMATION:

Ohio, Akron 44314 (216) 745-1641
947 West Waterloo Road

Resins

63a Plasticizers

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330
Ext. 5830/31

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5830/31

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7770
1401 Dove Street
Suite 350

Delaware, Wilmington 19810 (302) 478-4600
3411 Silverside Road

Illinois, Rosemont 60018 (312) 823-9050
9701 W. Higgins Rd.
Suite 500

Ohio, Akron 44313 (216) 666-4111
260 Springside Drive
Montrose Development Park

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63c
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ENGINEERED PRODUCTS DIVISION

81a Consumer Products

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330 Ext. 5845

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5845

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7750
1401 Dove Street
Suite 350

Georgia, Atlanta 30339 (404) 951-7600
320 Interstate North Parkway
Suite 500

Illinois, Rosemont 60018 (312) 823-9050
9701 W. Higgins Rd.
Suite 500

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th Street & Monroe Ave.

Texas, Dallas 75229 (214) 358-5577
2550 Walnut Hill Lane

81b Containers - Blownware

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330 Ext. 4156

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 4156

FOR INFORMATION:

California, Anaheim 92803 (714) 772-2190
Box 3790
611 E. Cerritos Avenue

Illinois, Rosemont 60018 (312) 823-9050
9701 W. Higgins Rd.
Suite 500

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th Street & Monroe Ave.

Ohio, Cincinnati 45236 (513) 984-1100
8041 Hosbrook Road
Whitehall Building

81c Extruded Products - Polyethylene Film

TO PLACE AN ORDER OR FOR INFORMATION:

California, Anaheim 92803 (714) 772-3010
Box 3790
611 E. Cerritos Avenue

California, Santa Clara 95052 (408) 727-0414
2710 Lafayette Street

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th Street & Monroe Ave.

63b Resin Products

TO PLACE AN ORDER:

Customer Service Center (800) 325-4330 Ext. 5825

Missouri, St. Louis 63167 *In Missouri* (800) 392-1700
800 North Lindbergh Blvd. Ext. 5825

FOR INFORMATION:

California, Newport Beach 92663 (714) 553-7770
1401 Dove Street
Suite 350

Georgia, Atlanta 30339 (404) 951-7600
320 Interstate North Parkway
Suite 500

Illinois, Rosemont 60018 (312) 823-9050
9701 W. Higgins Rd.
Suite 500

Massachusetts, Indian Orchard 01151 (413) 788-6911
730 Worcester Street

Michigan, Birmingham 48010 (313) 645-5420
30100 Telegraph Road
Suite 320

New Jersey, Kenilworth 07033 (201) 276-2900
North 8th St. & Monroe Ave.

Ohio, Cincinnati 45236 (513) 984-1100
8041 Hosbrook Road
Whitehall Building

63c Resins for Wood Products Industry

TO PLACE AN ORDER OR FOR INFORMATION:

Oregon, Eugene 97402 (503) 342-7201
855 Seneca Road

64d FRP Company

TO PLACE AN ORDER OR FOR INFORMATION:

Georgia, Baxley 31513 (912) 367-3616
Box 349

ELECTRONICS DIVISION

71a Electronics

TO PLACE AN ORDER OR FOR INFORMATION:

California, Palo Alto 94303 (415) 493-3300
755 Page Mill Road
Box 10128

Massachusetts, Dedham 02026 (617) 329-2530
990 Washington Street
Suite 123

Texas, Dallas 75234 (214) 960-1267
4825 LBJ Freeway, Suite 224

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81d Fome-Cor® Board

TO PLACE AN ORDER:

Customer Service Center — (800) 325-4330 Ext. 5847/48

Missouri, St. Louis 63167, 800 North Lindbergh Blvd. — *In Missouri* (800) 392-1700 Ext. 5847/48

FOR INFORMATION:

Alabama, Birmingham 35216, 200 Vestavia Office Park, Suite 3200 — (205) 822-6611

Indiana, Elkhart 46514, 700 E. Beardsley Ave. — (219) 262-3531

81e Recreational Products

TO PLACE AN ORDER:

Customer Service Center — (800) 325-4330 Ext. 5844

Missouri, St. Louis 63167, 800 North Lindbergh Blvd. — *In Missouri* (800) 392-1700 Ext. 5844

FOR INFORMATION:

Missouri, St. Louis 63167, 800 North Lindbergh Blvd. — (314) 694-5335, (314) 694-5338, (314) 694-3210

81f Separations

TO PLACE AN ORDER OR FOR INFORMATION:

Missouri, St. Louis 63167, 800 North Lindbergh Blvd. — (314) 694-8000

81g Spray-Guard® Rain Flaps

TO PLACE AN ORDER:

Customer Service Center — (800) 325-4330 Ext. 5845

Missouri, St. Louis 63167, 800 North Lindbergh Blvd. — *In Missouri* (800) 392-1700 Ext. 5845

FOR INFORMATION:

Missouri St. Louis 63167, 800 North Lindbergh Blvd. — (314) 694-5330

81h Monsanto Enviro-Chem Systems, Inc.

TO PLACE AN ORDER OR FOR INFORMATION:

Missouri, St. Louis 63178, Box 14547, Corporate Square Office Park — (314) 694-1000

FISHER CONTROLS INTERNATIONAL, INC.

91a Fisher Controls

TO PLACE AN ORDER OR FOR INFORMATION:

Iowa, Marshalltown 50158, 205 South Center Street — (515) 754-3556

MONSANTO RESEARCH CORPORATION

111a Dayton Laboratory

TO PLACE AN ORDER OR FOR INFORMATION:

Ohio, Dayton 45407, Box 8, Station B, 1515 Nicholas Road — (513) 268-3411

CUSTOM CHEMICAL SYNTHESIS/ INTERIM CHEMICAL MANUFACTURE — (513) 268-3411

NUCLEAR PRODUCTS/RESEARCH — (513) 268-6769

112a United States Department of Energy Facility

TO PLACE AN ORDER OR FOR INFORMATION:

Ohio, Miamisburg 45342, Mound Facility, Box 32 — (513) 865-3501

STAPLE ISOTOPE SALES — (513) 865-3501

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TOWOLDMON0042561

MARKETING OFFICES OUTSIDE THE UNITED STATES

Argentina
Monsanto Argentina S.A.I.C.
Avda e Madero 1020
Buenos Aires, Argentina, 1106

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Box 4077 Mail Exchange
Melbourne, Victoria
Australia, 3001

Monsanto Australia Ltd.
P.O. Box 4
Rozelle, NSW
Australia

Monsanto Australia Ltd.
GPO Box 1111
Adelaide, South Australia
Australia, 5001

Monsanto Australia Ltd.
P.O. Box 63, Hamilton Central
Brisbane, Queensland
Australia, 4007

Monsanto Australia Ltd.
P.O. Box 77
Doubleview, West Australia
Australia, 6018

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Monsanto GmbH
Am Stadtpark - Hilton Center
A-1030 Vienna, Austria

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Letter Box 1
B-1150 Brussels, Belgium

Monsanto Europe N.V.
Scheldlaan
B-2040 Antwerp, Belgium

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Industrias Monsanto S.A.
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CEP 01000
Sao Paulo, Brazil

Canada
Monsanto Canada Inc.
205, 610 70th Avenue Southeast
Calgary, Alberta, Canada
T2H 2S6

Monsanto Canada Inc.
425 St. Patrick Street West
LaSalle, Quebec, Canada
H8N 2H3

Monsanto Canada Inc.
Box 787 Streetsville
Postal Station
Mississauga, Ontario, Canada
L5M 2G4

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100 Park Royale, Suite 701
West Vancouver, B.C., Canada
V7T 1A2

Monsanto Canada Inc.
55 Murray Park Road
Winnipeg, Manitoba, Canada
R3J 3W2

Monsanto Canada Inc.
1055 Park Street
Regina, Saskatchewan
Canada S4N 5H4

Chile
Monsanto Chile Commercial e
Industrial Limitada
P.O. Box 337
Santiago, Chile

Colombia
Monsanto Colombiana Inc.
Apartado Aereo 90273
Bogota, Colombia

Costa Rica
Monsanto de Costa Rica S.A.
P.O. Box 987 Centro Colon
San Jose, Costa Rica

Denmark
Monsanto A/S (Ag only)
Naverland 11
DK-2600 Glostrup, Denmark

Monsanto A/S
Fyllasvej 20
DK-8600 Silkeborg, Denmark

Finland
Monsanto Oy
Arkadiankatu 8C 20
SF-00100 Helsinki 10, Finland

France
Societe Monsanto S.A. (Ag only)
P.O. Box 52
F-38290 La Verpilliere, France

Societe Monsanto S.A.
9 rue d'Argenson
F-75008 Paris, France

Societe Monsanto S.A. (Ag only)
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F-38290 La Verpilliere, France

Germany
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Immermannstrasse 3
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Federal Republic of Germany

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Apartado Postal 2360
Guatemala City, Guatemala

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6-8 Hysan Avenue
Hong Kong

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Bombay 400 038, India

Monsanto Chemicals of India Pvt. Ltd
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Madras, 600 001, India

Monsanto Chemicals of India Pvt. Ltd
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New Delhi 110 002, India

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Jakarta, Pusat, Indonesia

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20124 Milan, Italy

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Tokyo 100-91, Japan

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P.O. Box 47686
Nairobi, Kenya

Korea
Chemstrand, Inc. (Korea Branch)
CPO Box 2019
Seoul, Korea

Malaysia
Monsanto Far East Ltd
(Malaysia Branch)
P.O. Box 1043, Jalan Semangat
Petaling Jaya, Selangor, Malaysia

Monsanto (Malysia) Sdn, Bhd
P.O. Box 1042
Jalan Semangat
Petaling Jaya, Selangor, Malaysia

Mexico
Monsanto Comercial S.A. de C.V.
Thiers 248
Mexico 5, D.F., Mexico

Netherlands
Monsanto B.V.
Jan van Nassaustraat 53-55
NL-2596 BP The Hague
Netherlands

TOWOLDMON0042562

New Zealand
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Auckland, New Zealand

Monsanto New Zealand, Ltd.
P.O. Box 13442
Christchurch, New Zealand

Monsanto New Zealand, Ltd.
Private Bag
Johnsonville
Wellington, 4 New Zealand

Nicaragua
Monsanto Agricola de Nicaragua S.A.
P.O. Box 3705
Managua, Nicaragua

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Monsanto Norge A/S
Fred Olsensgate 11
Oslo 1, Norway

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Commercial Center
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Makati
Metro Manila, Philippines

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Monsanto Poland Inc.
P.O. Box 344
00-950 Warsaw, Poland

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Soc. Portuguesa de Desenvolvimento
Quimico de Monsanto Ltda.
Rua de Joao V25, Esq. 1°
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