Monsanto MATERIAL SAFETY DATA

NOTE:
NO REPRESENTATION IS MADE AS TO THE ACCURACY OF THE INFORMATION AND RECOMMENDATIONS HEREIN. SEE PAGE 4 FOR CONDITIONS UNDER WHICH DATA ARE FURNISHED.

MONSANTO PRODUCT NAME

POLYCHLORINATED BIPHENYLS—PCB's*

*See page 4 for definition and notes

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO. 63166
EMERGENCY PHONE NO.
(CALL COLLECT)
(314) 694-1000

PRODUCT IDENTIFICATION

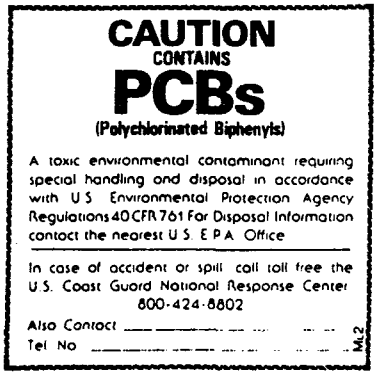
Synonyms	Trade Names (Commonly used Monsanto products)
PCB's	Askarel**
Chlorodiphenyl (__% Cl)	Aroclor®[1] Series 1016, 1221, 1232, 1242, 1248, 1254, 1260
Chlorinated biphenyl	Pyranol®[2] Series
Polychlorinated biphenyl	Inerteen®[3] Series
Chlorinated biphenyls (approx. __% Cl)	Therminol®[1] FR Series

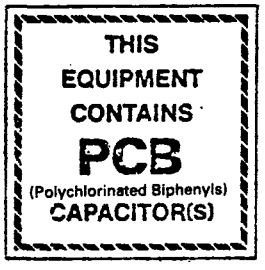
*See page 4 for notes

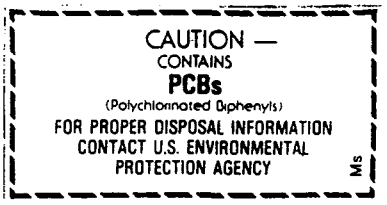
CAS No. 001336363, 053469219, 021672296, 01109769, 011096825 and others

WARNING STATEMENTS

Federal regulations under the Toxic Substances Control Act require PCB's and PCB items to be marked. (Check regulations for details.*)







EMERGENCY AND FIRST AID PROCEDURES

Ingestion—Consult a physician. Do not induce vomiting or give any oily laxatives.
NOTE TO PHYSICIAN—If large amounts ingested, gastric lavage is suggested.

Skin—If liquid or solid PCB's are splashed or spilled on skin, contaminated clothing should be removed and the skin washed thoroughly with soap and water.
NOTE TO PHYSICIAN—Hot PCB's may cause thermal burns.

Eyes—Eyes should be irrigated immediately with copious quantities of running water for at least 15 minutes if liquid or solid PCB's get into them. A petrolatum-based ophthalmic ointment may be applied to the eye to relieve the irritating effects of PCB's.

Inhalation—Remove to fresh air. If skin rash or respiratory irritation persists, consult a physician. NOTE TO PHYSICIAN—If electrical equipment arcs over, PCB's or other chlorinated hydrocarbon dielectric fluids may decompose to produce HCl, hydrochloric acid, a respiratory irritant.

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OCCUPATIONAL CONTROL PROCEDURES

Inhalation—Workplace exposure should be maintainted below the OSHA eight-hour, time-weighted average Threshold Limit Value (TLV). At room temperatures, the hazard of inhalation is considered slight or absent. Chemical cartridge respirators or gas masks approved for protection against organic vapors are recommended in the event of spills or leaks of hot fluids. These will provide good protection up to the concentrations shown on the approval labels and the odor will give ample warning if it comes through the device. Self-contained breathing apparatus should be worn when PCB's are encountered in an enclosed space.

Threshold Limit Value (TLV)—Chlorodiphenyl (42% chlorine) 1.0 mg/cu.m.
Chlorodiphenyl (54% chlorine) 0.5 mg/cu.m.

Skin Contact—Avoid prolonged or repeated skin contact. Where employees may come into direct contact with PCB's, protective clothing impervious to PCB's should be worn. Gloves, boots, overshoes and bib-type aprons that cover the boot tops should be used when necessary. This protective equipment should be regularly inspected for defects and to ensure that it is in clean and satisfactory working condition. Contaminated clothing, gloves, etc., should be disposed of as prescribed by regulations.

Eye Contact—Eye protection should be used where there is a possibility of liquid splashes.

Ingestion—Ingestion of these materials is generally not a problem in industry.

PHYSIOLOGICAL EFFECTS SUMMARY:

Skin Contact—Can be absorbed through intact skin. Local action on skin is similar to that of common organic solvents where contact leads to removal of natural fats and oils with subsequent drying and cracking of the skin. A potential exists for the contracting of chloracne.

Eye Contact—The liquid products and their vapors are moderately irritating to eye tissues.

Ingestion—The acute oral toxicities of the undiluted compounds are: LD_{50} rats—8.65 gm/kg for 42% chlorinated, and 11.9 gm/kg for 54% chlorinated—"slightly toxic."

Inhalation—Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

Other—There are literature reports that PCB's can impair reproduction function in monkeys. A study reported in the literature with female rats using Aroclor® 1260 stated that Aroclor 1260 caused liver cancers. Monsanto sponsored animal feeding studies of Aroclor 1242, 1254 and 1260. These compounds, fed to both sexes of rats, did not produce cancers. The National Cancer Institute performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254 was not carcinogenic under the conditions of their bioassay.

The consistent finding in animal studies with PCB's is that they produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than that alleged to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

FIRE PROTECTION INFORMATION

Fire and Explosion—Chlorodiphenyls are essentially non-combustible compounds. They may decompose to form CO, CO_2, HCl, phenolics and aldehydes under severe conditions such as exposure to flame or hot surfaces. No phosgene is formed.

Standard fire fighting wearing apparel and self-contained breathing apparatus should be worn when fighting fires that involve possible exposure to chlorodiphenyls. Fire fighting equipment must be thoroughly cleaned and decontaminated after use.

PHYSICAL DATA

TABLE I—Properties of Selected Aroclors®

Property	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	—	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	—	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Viscosity (100°F)	71-81	38-41	44-51	82-92	185-240	1400-2500	—

REACTIVITY DATA

PCB's are very stable, fire-resistant compounds.

SPILL, LEAK & DISPOSAL INFORMATION

If PCB's leak or are spilled, the following steps should be taken immediately:

All non-essential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed.

Personnel trained in the emergency procedures and protected against the attendant hazards should shut off sources of PCB's, clean up spills, control and repair leaks and fight fires in PCB areas.

All wastes and residues containing PCB's (e.g., wiping cloths, absorbent material, used disposable protective gloves, clothing, etc.) should be collected, placed in proper containters, marked and disposed of in the manner prescribed by EPA regulations (40 CFR 761).

Various federal and state regulations may require reporting of PCB spills. Consult your attorney or appropriate regulatory officials for information relating to spill reporting.

NOTE:
ALTHOUGH THE INFORMATION AND RECOMMENDATIONS SET FORTH IN THIS SHEET ARE BELIEVED TO BE CORRECT AS OF THE DATE HEREOF, MONSANTO COMPANY MAKES NO REPRESENTATION AS TO THE COMPLETENESS OR ACCURACY OF SUCH INFORMATION AND RECOMMENDATIONS. MONSANTO COMPANY SHALL IN NO EVENT BE RESPONSIBLE FOR ANY DAMAGES OF WHATSOVER NATURE DIRECTLY OR INDIRECTLY RESULTING FROM THE PUBLICATION OR USE OF OR RELIANCE UPON SUCH INFORMATION AND RECOMMENDATIONS.

NO WARRANTY, EITHER EXPRESS OR IMPLIED, OR MERCHANTABILITY OR FITNESS OR OF ANY OTHER NATURE WITH RESPECT TO THE PRODUCT OR TO THE INFORMATION AND RECOMMENDATIONS HEREIN IS MADE HEREUNDER.

This form has been approved by the Occupational Safety and Health Administration as "equivalent to" OSHA Form 20.

*POLYCHLORINATED BIPHENYLS

For regulatory purposes, under the Toxic Substances Control Act the term "PCB's" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain 50 ppm (on a dry weight basis) or greater of such substance (40 CFR 761).

Chemically, however, PCB's are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination and possibly according to batch.

The mixture generally used contains an average of 3 atoms chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They are used as dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic and other industrial fluids, plasticizers, carbonless paper, paints, inks and adhesives. "Federal regulations now specify that non-totally enclosed PCB activities are permitted only if specifically exempted or authorized." (40 CFR 761 see FEDERAL REGISTER, Vol. 44, P. 31514, May, 31, 1979)

CAS No. 001336363: For general class of compounds

TRADE NAMES

**ASKAREL—Generic name for a broad class of fire-resistant synthetic chlorinated hydrocarbons used as dielectric fluids.

®1 Registered trademark of Monsanto Company
®2 Registered trademark of General Electric Company
®3 Registered trademark of Westinghouse Electric Corporation

This list of trade names is representative of several commonly used Monsanto products (or formulated with Monsanto products). Many other trademarked products were marketed by Monsanto and other chemical manufacturers. PCB's were also manufactured and sold by several European and Japanese producers. Contact the manufacturer of the trademarked product directly, if not in this listing, to determine if the formulation contained PCB's.

DATE September 15, 1980 REVISED [X] SUPERCEDES All prior to 9/15/80

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

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MATERIAL SAFETY DATA Monsanto