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U.S. DEPARTMENT OF LABOR

Form No. OSHA-20
May, 1971

81102

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: MONSANTO COMPANY
EMERGENCY TELEPHONE NO.: (314) 694-1000
ADDRESS (Number, Street, City, State, and ZIP Code): 800 North Lindbergh Boulevard, St. Louis, Missouri 63166
CHEMICAL NAME AND SYNONYMS: Mixture
TRADE NAME AND SYNONYMS: Aroclor 1248
CHEMICAL FAMILY: Chlorinated aromatic
FORMULA: Mixture

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS	—	
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III PHYSICAL DATA

BOILING POINT (°F.) 760 mm	385-385°C	SPECIFIC GRAVITY (H_2O = 1) (25/25°C)	1.445
VAPOR PRESSURE (mm Hg.) 165-210°C	3 mm	PERCENT VOLATILE BY VOLUME (%)	N.A.
VAPOR DENSITY (AIR = 1) Not Avail		EVAPORATION RATE (Butyl Acetate = 1)	<1
SOLUBILITY IN WATER 20°C negligible	Ko oil		
APPEARANCE AND ODOR colorless to yellow oil		aromatic odor	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used) C.O.C. 196°C	FLAMMABLE LIMITS	LEL N.A.	UEL N.A.

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES
Respiratory protection when fighting fires where exposure to vapor or gases is possible:

UNUSUAL FIRE AND EXPLOSION HAZARDS
Highly toxic gases (chlorides and chlorine) can be evolved in fires of this product.

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Aroclor 1221 SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Not Available
EFFECTS OF OVEREXPOSURE	Skin irritation in the form of chloracne, systematic intoxication leads to nausea, vomiting, loss of weight, edema and abdominal pain
EMERGENCY AND FIRST AID PROCEDURES	Remove from exposure. Remove contaminated clothing. Wash contacted area with large amounts of water and soap. Refer to physician.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS	CO, CO_2, smoke, soot, chlorides and chlorine		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Absorb on clay, sawdust or other absorbant material. Place in drums. Bury in approved chemical landfill in accordance with local and state regulations.
WASTE DISPOSAL METHOD	Burn in an approved incinerator in accordance with local and state regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify)	Bureau of Mines approved respirator for organic vapors.		
VENTILATION	LOCAL EXHAUST Yes - for vapors	SPECIAL	
	MECHANICAL (General)	OTHER	
PROTECTIVE GLOVES	rubber	EYE PROTECTION	chemical goggles
OTHER PROTECTIVE EQUIPMENT			

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Avoid skin and eye contact. Avoid inhalation of vapors.
OTHER PRECAUTIONS	PRR 002801

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

JAG:HOH:JTG:WBP

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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-hose 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—8.66 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.

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FIRE PROTECTION INFORMATION

Fire and Explosion: PCBs are fire-resistant compounds. They may decompose to form CO, CO_2, HCl, phenolics, aldehydes and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

At temperatures in the range of 600-650°C in the presence of excess oxygen PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do *not* produce polychlorinated dibenzo-p-dioxins (PCDDs).

PCBs in electrical equipment have been reported to produce both chlorinated dioxins (PCDDs) and furans (PCDFs) during fire situations. These combustion products may result all, or in part, from non-PCB components of the dielectric fluids or other combusted materials. Consult the equipment manufacturer for information regarding composition of the dielectric fluids in electrical apparatus.

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

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state, and local regulations.

REACTIVITY DATA

PCBs are very stable, fire-resistant compounds.

HEALTH EFFECTS SUMMARY

Skin Contact: PCBs 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 PCBs can impair reproductive functions 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.

(Health Effects Summary Continued On Next Page)

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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°	1.30-1.38 x-25°	1.40-1.41 x-68°	1.48-1.50 x-68°	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	186-240	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 containers, 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.

WATER_PCB-SD0000029168

Monsanto

St. Louis - General Office

March 17, 1969

SUBJECT: REGIONAL WATER QUALITY CONTROL BOARD

REFERENCE: Their letter to you of March 7 from Mr. Fred H. Dierker

cc

TO

TO H. S. Bergen - HBERG

About Aroclor used in the dielectric area, we respond to items 4, 5, 6, and 7 of Mr. Dierker's letter as follows:

4) The solubility of Aroclor in tap water at 25°C. is as follows:

Product	Solubility in Water
Aroclor 1242	203 ± 10 ppm
Aroclor 1248	106 ± 14 ppm
Aroclor 1254	50 ± 2 ppm

Although the solubility of Aroclor 1260 has not been determined, the above data certainly serves to indicate that the more highly chlorinated Aroclors such as 1260 are the least soluble in water. Accordingly, it is quite reasonable to say that the solubility of Aroclor 1260 in water would be significantly lower than 50 ppm.

5) Aroclor 1242 and a small amount of Aroclor 1254 are used in hermetically sealed capacitors. The hermetically sealed can construction is of aluminum, mild steel, and stainless steel. These capacitors are used imbedded in asphalt in fluorescent lighting systems. They are used for power factor correction on utility lines. They are also used as motor run capacitors for air conditioning systems.

Attached are the specifications for Aroclors 1242, 1254, 1248, and 1260, which describes the physical properties of these materials.

Aroclor 1260, and to a lesser extent Aroclors 1242 and 1254, are used as components in transformer fluids of the askarel type. In general, the amount of Aroclor used in the transformers fluid ranges from 45 percent to 60 percent.

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On the West Coast in 1968, about 300,000 pounds of Aroclor was contained in the transformer askarel fluid used in that region to make transformers.

These askarel transformers are also hermetically sealed, non-breathing apparatus. Very little of the fluid is used to replace spent fluid. Askarel transformer failure that would require replacement of the fluid is very rare. For example, the Edison Electric Institute found that the incident of such failure is in the range of 0.05 percent.

6) No Aroclor capacitors are made on the West Coast.

Transformer manufacturers on the West Coast who handle Aroclor containing fluid include:

Federal Pacific - Santa Clara, California
Hill Magnetics - Redwood City, California
H. K. Porter - Bellmont, California
Sierra Transformer - Redwood City, California
Spokane Transformer - Spokane, Washington

7) In the normal use of capacitor or transformer fluid containing Aroclor, Monsanto advises the capacitor and transformer manufacturers to avoid breathing vapors that would be emitted from the fluid if it were heated to elevated temperatures. Monsanto also advises the user of the fluids to avoid continuous contact with the skin. If clothing becomes saturated, the workman is advised to launder it before wearing it again. If there has been spillage on the skin, it should be removed by washing with soap and water. Normal, ordinary good housekeeping practice is recommended.

Normal filtration of the fluid as done in the electrical industry has not presented health hazard provided that ordinary normal cleanliness is followed.

PAR 004870

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