

STANDARD MANUFACTURING PROCESS
AROCLORS (TAKE-OVER DISTILLED)
DEPARTMENT 246

NEV 024922



738177

Dept. 246 - Standard Manufacturing Process

AROCLOR

APPENDIX J

SAFETY AND TOXICITY DATA

I. SAFETY EQUIPMENT

A. Fire Extinguishers

1. Carbon dioxide - 1st floor, NE of lean-to
2. Dry chemical - 1st floor, SE of lean-to
3. Dry chemical - 2nd floor, west wall
4. Dry chemical - 2nd floor, west wall

B. Gas Masks

1. 1st floor, outside west wall of repair room
2. 2nd floor, on west wall
3. Control room, east wall
4. 3rd floor, on handrail by #1 chlorinator
5. 4th platform, Aroclor column (4)

C. Scott Air Pak

1. Outside west wall of lean-to

D. Emergency Clothing

1. Box on 2nd floor, west wall.

E. Safety Showers With Eye Wash

1. Batch department, 1st floor
2. Batch department, 2nd floor
3. Batch department, 3rd floor
4. Continuous department, 1st floor
5. Continuous department, 2nd floor
6. Continuous department, 3rd floor
7. West side of tank farm (alarm in control room)
8. Control room (eye bath only).
9. Mezzanine level between #1 and #2 Still furnaces

F. Personal Safety Equipment

1. Hard hat
2. Safety glasses
3. Safety shoes
4. Goggles
5. Rubber or canvas gloves
6. Rubber overshoes

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SAFETY AND TOXICITY DATA (Cont'd)

II. DEPARTMENT SAFETY RECORD (246/259)

- A. Lost time accidents - Last occurred on January 28, 1948.
- B. Serious injuries - The last two serious injuries were:
1. 4/12/73 - Fractured finger when tank car lid dropped on it.
 2. 2/15/72 - Lacerated finger on tank car clamp dome.
- C. Minor injuries

<u>Year</u>	<u>Injuries</u>	<u>No. of Men</u>
1973	2	20
1974	6	20
1975	7	20

III. TOXICITY

The following toxic rating code will be used in describing the toxicity of these materials:

0 - none
1 - slight
2 - moderate
3 - high
U - unknown

A. Biphenyl (Code 82601)

1. Synonyms: Diphenyl
2. Description: White flakes or solid off white mass; somewhat pleasant odor.
3. Constants: Mol. Wt. 154.2; M.P. 69°C.; B.P. 255°C.; Density .9910 @ 75°/4°C.
4. Flash Point: 235° F. (C.C.)
5. Auto Ignition Temperature: 1004°F
6. Toxic Hazard Rating:
Acute Local: U
Acute Systematic: Ingestion 3, Inhalation 3
Chronic Local: U
7. Fire Hazard: Definitely when exposed to heat or flame; can react with oxidizing materials.
8. Fire Fighting: CO2 or dry chemical.
9. Formula: C6H5C6H5

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SAFETY AND TOXICITY DATA (Cont'd)

III. (Cont'd)

A. (Cont'd)

10. Biphenyl vapors are irritating to the upper respiratory tract. Workers should not be exposed to vapor levels throughout their shift in excess of the threshold limit value of 1 milligram per cubic meter of air (or about 0.2 ppm). The compound, or organic solutions of the compound can absorb through the intact skin; therefore, repeated skin contact should be avoided.
11. See Hygienic Guide Series on "Diphenyl".

B. Chlorine (Code 81059)

1. Description: Greenish yellow gas.
2. Formula: Cl₂
3. Constants: Mol. Wt. 70.914; M.P.=101°C.; B.P. - 34.5°C.; Density 1.47 @ 0°C.
4. Toxic Hazard Rating:
 - Acute local: Irritant 3; Inhalation 3
 - Acute systemic: 0
 - Chronic local: U
 - Chronic systemic: U
 - M.A.C. - 1 PPM in air per 8 hour day
5. Toxicology: Chlorine is extremely irritating to the mucous membranes of the eyes and respiratory tract. It combines with moisture to liberate nascent oxygen and form hydrochloric acid.

Both of these substances, if present in quantity, cause inflammation of the tissues with which they come in contact. If the lung tissues are attacked, pulmonary edema may result. A concentration of 3.5 ppm produces a detectable odor; 15 PPM causes immediate irritation of the throat. Concentrations of 50 PPM are dangerous for even short exposures. 1000 PPM may be fatal even when the exposure is brief.

Because of its intensely irritating properties, severe industrial exposure seldom occurs, as the workman is forced to leave the area before he can be seriously affected. In cases where this is impossible, the

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III. (Cont'd)

B. 5. (Cont'd)

irritation of the eyes and mucous membranes of the nose and throat is followed by cough, a feeling of suffocation and later pain and a feeling constriction in the chest. If exposure has been severe, pulmonary edema may follow with rales being heard over the chest.

6. Fire Hazard: Moderate - can react to cause fire or explosion upon contact with turpentine, ether, ammonia gas, illuminating gas, hydrocarbons, hydrogen and powdered metals.
7. Explosion Hazard: Present by reaction with reducing agents.
8. Disaster Control: Dangerous; emits highly toxic fumes; will react with water to form toxic and corrosive fumes of HCl; is heavier than air - gas will hug the ground. People without adequate protection should go across wind until out of the affected area.

C. HCl Off-Gas (Code 828.51)

1. Synonyms: Muriatic acid, Chlorohydric Acid, Hydrogen Chloride
2. Description: Colorless gas
3. Formula: HCl
4. Toxic Hazard Rating:
 - Acute local: Irritant 3, Ingestion 3, Inhalation 3
 - Acute Systemic: U
 - Chronic local: Irritant 2
 - Chronic Systemic: U
5. M.A.C.: 5 ppm in air for 8 hr. day
6. Toxicology: Hydrogen chloride is an irritant to the mucous membranes of the eyes and respiratory tract. Concentration of 35 ppm causes irritation of the throat after short exposure. Concentrations of 50 to 100 ppm are tolerable for 1 hour. More serious exposures result in pulmonary edema and often laryngeal spasm. Concentrations of 1000 to 2000 ppm are dangerous even for brief exposures. Mists of HCl are considered less harmful than they anhydrous form since the droplets have no dehydrating effect.
7. See Hygienic Guide Series on "Hydrogen Chloride".

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SAFETY AND TOXICITY DATA (Cont'd)

III. (Cont'd)

D. Ferric Chloride (Code 33500)

1. Description: Granular solid
2. Formula: FeCl_3 (Anhydrous)
3. Constants: Mol. wgt. = 166.22, Melting Pt. = sublimes, solubility in H_2O = very soluble with heat rise.
4. Toxic Hazard Rating:
Acute Local: Irritant 1; Ingestion 1
Acute Systemic: U
Chronic Systemic: U
Chronic Local: Irritant 1
5. Fire Hazard: There is no fire hazard under normal conditions, but it will emit toxic fumes at high temperatures.
6. Handling: Protect the skin with approved protective clothing, avoid the breathing of FeCl_3 dust, wear approved respirator with adequate cartridge, and protect the eyes with approved goggles. There are no storage regulations; however, it should be stored in a dry place as heat is released upon solution in water and wet ferric chloride will not catalyze the chlorination reaction.

E. Lime (Code 38800) (Calcium Oxide)

1. Description: Fine white or slightly gray powder, Rhomeric Trigonal crystals.
2. Formula: CaO .
3. Toxic Hazard Rating:
Acute local: Irritant 3; Ingestion 1; Inhalation 3
Acute Systemic: Ingestion 2; Inhalation 3; skin absorption 0.
Chronic local: Irritant 3; Inhalation 2
Chronic Systemic: Ingestion 2; Inhalation 3; Skin absorption 0.
4. Toxicology:
Has a caustic reaction and, therefore, is irritating to the skin. As a dust it can cause dermatitis and irritation of the eyes and mucous membranes. It is a general nuisance type of dust.
5. Fire Hazard: None
6. Explosion Hazard: Virtually none

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E. (Cont'd)

7. Handling: Dust respirator, adequate protective clothing, including rubber coated gloves, optional rubber full cover apron and full cover plastic goggles should be used when handling lime (dust). Adequate ventilation and dust removal equipment should be used in the handling area.

Lime is added to the stills to neutralize any liberated HCl and prevent sublimation of the FeCl_3 catalyst. It is handled in 50# bags.

F. Nitrogen (Code 43099)

1. Description: Colorless gas
2. Formula: N_2
3. Constants: Mol. Wt. 28.02; M.P. - 210°C ; B.P. - 195.8°C .; Density 1.2506 gr/liter at 0°C .
4. Toxicity: None. In high concentrations it is an asphyxiant.

G. Aroclors

1. Recommended maximal atmospheric concentrations (MAC for eight hours):
 - a. Aroclor 1242 - 1.0 mg per cubic meter of air
 - b. Aroclor 1254 - 0.5 mg per cubic meter of air
2. Hazards and Control
 - a. Inhalation: Absorption is chiefly by inhalation. Concentrations in the workroom atmosphere should be maintained below the recommended levels. Where the chlorinated diphenyls are used at room temperatures, the hazard of inhalation is considered slight or absent. When these materials are subjected to elevated temperatures, the process either should be completely enclosed or other adequate mechanical exhaust ventilation must be provided to reduce concentrations to safe levels.
 - b. Skin contact: Operations and handling procedures should be such as to avoid the possibility of prolonged or repeated skin contact. Contaminated clothing must be laundered before reuse.

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G. 2. (Cont'd)

c. Eye contact: Goggles or face shield should be used where there is a possibility of liquid splashes.

3. Emergency Treatment: Skin surfaces exposed to chlorodiphenyls should be thoroughly washed with soap and water at once. If clothing has been contaminated it should be removed promptly.

If exposure to a high vapor concentration occurs, as in the case of spills at elevated temperatures, the patient should be moved from exposure and kept at rest until seen by a physician. Oxygen should be administered if breathing is difficult.

Eyes contaminated with chlorodiphenyl should be irrigated with water for at least 15 minutes and the patient should be seen by a physician.

Special procedures: Persons who are regularly or repeatedly exposed to chlorodiphenyls should be examined periodically to detect early evidence of skin irritation and/or liver damage. Persons with known liver disease should not be exposed to repeated contact with the chlorodiphenyls.