

STANDARD MANUFACTURING PROCESS

AROCOR 1016

DEPARTMENT 246

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738309

MONSANTO INDUSTRIAL CHEMICALS COMPANY
SPECIALTY PRODUCTS GROUP

STANDARD MANUFACTURING PROCESS

FOR

AROCLOR 1016

Department 246

Supercedes: Tentative Process on MCS-1016,
Report No. P-1579, dated 10/7/70,
written by J. E. Silver.

Prepared by: R. M. McCutchan

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Issued: September 1972.

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Section IVComments On Process (Contd.)Appendix JSafety and Toxicity DataII. 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) 8/5/70 - See Attached informal investigation report.
 - 2) 12/2/68 - Refer to formal investigation report L-17-20-68.
- C. Minor injuries.

<u>Year</u>	<u>Injuries</u>	<u>No. of Men</u>
1969	12	20
1970	12	20
1971	13	24
1972-thru May	4	18

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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Section IVComments On Process(Contd.)Appendix JSafety and Toxicity Data

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: Cl_2
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 from 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 initial irritation

Section IVComments On Process(Contd.)Appendix JSafety and Toxicity Data

III. B. 5. (Cont'd)

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, Chlorophydric 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 the anhydrous form since the droplets have no dehydrating effect.
7. See Hygienic Guide Series on "Hydrogen Chloride".

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Section IVComments On Process (Contd.)Appendix JSafety and Toxicity Data

III. (Cont'd)

D. Ferric Chloride (Code 33500)

1. Description: Granular solid.
2. Formula: FeCl_3 (Anhydrous)
3. Constants: Mol. Wgt. = 166.22, Meltin 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 Local: Irritant 1
 - Chronic Systemic: U
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.
7. Handling: Dust respirator, adequate protective clothing, including rubber coated gloves, optional rubber full cover apron and full cover plastic goggles should

Section IV

Comments On Process(Contd.)

Appendix J

Safety and Toxicity Data

E. 7. (Cont'd)

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
3. Constants: ²Mol.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.