

11/16/07
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SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 11/07/2007
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Version 1.80

Section 1 - Product and Company Information

| | | | |
|-------------------------|---|-------------------------|--------------|
| Product Name | Acrylonitrile, 99+% | | |
| Product Number | 110213 | | |
| Brand | Aldrich Chemical | | |
| Company Address | Sigma-Aldrich 3050 Spruce Street SAINT LOUIS, MO 63103 US | | |
| Technical Phone: | 800-325-5832 | Emergency Phone: | 314-776-6555 |
| Fax: | 800-325-5052 | | |

Section 2 - Composition/Information on Ingredient

| <u>Substance Name</u> | <u>CAS #</u> | <u>SARA 313</u> | <u>EC no</u> | <u>Annex I Index Number</u> |
|-----------------------|--------------|-----------------|--------------|-----------------------------|
| ACRYLONITRILE | 107-13-1 | Yes | 203-466-5 | 608-003-00-4 |

Formula C3H3N
Synonyms Acritet, Acrylnitril (German, Dutch), Acrylon, Acrylonitrile (ACGIH:OSHA), Acrylonitrile monomer, Akrylonitril (Czech), Akrylonitryl (Polish), Carbacryl, Cianuro di vinile (Italian), Cyanoethylene, Cyanure de vinyle (French), ENT 54, Furnigrain, Miller's furnigrain, Nitrile acrilico (Italian), Nitrile acrylique (French), Propenenitrile, 2-Propenenitrile, RCRA waste number U009, TL 314, VCN, Ventox, Vinyl cyanide, Vinylcyanide (OSHA), Vinylykanid (Czech)

Section 3 - Hazards Identification

Emergency Overview
 Flammable (USA) Highly Flammable (EU). Highly Toxic (USA) Very Toxic (EU).
 Toxic in contact with skin and if swallowed. Very toxic by inhalation. Causes burns. May cause cancer.
 Danger: Lachrymator. Vesicant. Severe skin irritant. Target organ(s): Kidneys. Eyes. Probable Carcinogen (US). Calif. Prop. 65 carcinogen.

HMIS Rating
 Health: 3* Flammability: 3 Reactivity: 1

NFPA Rating
 Health: 3 Flammability: 3 Reactivity: 1

*additional chronic hazards present.

Section 4 - First Aid Measures

Oral Exposure
 If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

Inhalation Exposure
 If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
 In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

Eye Exposure
 In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

Flammable Hazards Yes

Explosion Hazards
 Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

Flash Point: 23 °F -5 °C

Explosion Limits: **Lower:** 3 % **Upper:** 17 %

Autoignition Temp: 481 °C **Flammability:** Yes

Extinguishing Media
Suitable
 Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting
Protective Equipment
 Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s)
 Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
 Evacuate area. Shut off all sources of ignition.

Procedure(s) of Personal Precaution(s)
 Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up
 Cover with dry-lime, sand, or soda ash. Place in covered containers using nonsparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling
User Exposure
 Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

Storage
Suitable
 Keep tightly closed. Keep away from heat, sparks, and open flame.

Incompatible Materials
 Copper, Copper alloys

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11092007
1593

Special Requirements

Heat and light sensitive.

Section 8 - Exposure Controls / PPE**Engineering Controls**

Safety shower and eye bath. Use nonsparking tools. Use only in a chemical fume hood.

Personal Protective Equipment**Respiratory**

Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a fullface respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a fullface supplied air respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures

Wash contaminated clothing before reuse. Wash thoroughly after handling.

Special Precautions

For protection and handling requirements consult CFR title 29 part 1910.

Special Precautions

For protection and handling requirements consult CFR title 29 part 1910.

Exposure Limits

| Country | Type | Value |
|---------|-------|----------|
| Poland | NDS | 2 MG/M3 |
| Poland | NDSch | 10 MG/M3 |
| Poland | NDSP | - |

Exposure Limits, RTECS

| Country | Source | Type | Value |
|-------------|-------------------|--------------------------|--------------------------|
| USA | ACGIH | TWA | 2 PPM |
| USA | MSHA Standard-air | TWA | 20 PPM (45 MG/M3) (SKIN) |
| New Zealand | OEL | | |
| USA | NIOSH | TWACeiling concentration | 1 PPM 10 PPM/15M (SK) |

Section 9 - Physical/Chemical Properties

| Appearance | Physical State | Color |
|------------|----------------|-----------|
| | Clear liquid | Colorless |

Molecular Weight 53.06 AMU

| | | |
|------------------------------|-------------------------|-------|
| pH | N/A | |
| BP/BP Range | 77 - 78 °C | |
| MP/MP Range | -83 °C | |
| Freezing Point | N/A | |
| Vapor Pressure | 86 mmHg | 20 °C |
| Vapor Density | 1.83 g/l | |
| Saturated Vapor Conc. | N/A | |
| SG/Density | 0.806 g/cm ³ | |

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Page 3

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| | | |
|------------------------------|---------------|-------|
| Bulk Density | N/A | |
| Odor Threshold | 21.4 ppm | |
| Volatile% | N/A | |
| VOC Content | N/A | |
| Water Content | N/A | |
| Solvent Content | N/A | |
| Evaporation Rate | N/A | |
| Viscosity | 0.34 Pas | 25 °C |
| Surface Tension | 27.3 mN/m | 24 °C |
| Partition Coefficient | Log Kow: 0.25 | |
| Decomposition Temp. | N/A | |
| Flash Point °F | 23 °F | |
| Flash Point °C | -5 °C | |

Method: closed cup
Method: closed cup

| | |
|-------------------------|-------------|
| Explosion Limits | Lower: 3 % |
| | Upper: 17 % |

| | |
|--------------------------|--------|
| Flammability | N/A |
| Autoignition Temp | 481 °C |
| Refractive Index | 1.391 |
| Solubility | |

Solubility in Water: Soluble.**Other Solvents:** ISOPROPANOL, ETHER, ACETONE, BENZENE

N/A = not available

Section 10 - Stability and Reactivity**Stability****Conditions to Avoid**

Heat. May polymerize on exposure to light.

Materials to Avoid

Oxidizing agents, Copper, Copper alloys

Hazardous Decomposition Products**Hazardous Decomposition Products**

Carbon monoxide, Carbon dioxide, Nitrogen oxides

Hazardous Polymerization**Hazardous Polymerization**

May occur.

Section 11 - Toxicological Information**Route of Exposure****Skin Contact**

Causes burns.

Skin Absorption

Toxic if absorbed through skin.

Eye Contact

Causes burns.

Inhalation

Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

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Page 4

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Ingestion

Toxic if swallowed.

Target Organ(s) or System(s)

Liver. Central nervous system. Cardiovascular system. Kidneys.

Signs and Symptoms of Exposure

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. May be partially metabolized to cyanide in the body. CNS depression. Ataxia. Symptoms may be delayed.

RTECS Number: AT5250000

Toxicity DataInhalation - Man: 1,000 mg/m³ (LCLO)

Remarks: Behavioral: Somnolence (general depressed activity).

Gastrointestinal: Hypermotility, diarrhea.

Gastrointestinal: Nausea or vomiting.

Skin - Child: 2015 mg/kg (LDLO)

Remarks: Behavioral: General anesthetic.

Lungs, Thorax, or Respiration: Cyanosis.

Gastrointestinal: Nausea or vomiting.

Oral - Rat: 78 mg/kg (LD50)

Remarks: Behavioral: Convulsions or effect on seizure threshold.

Lungs, Thorax, or Respiration: Dyspnea.

Gastrointestinal: Changes in structure or function of salivary glands.

Inhalation - Rat: 333 ppm (LC50)

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Lacrimation.

Behavioral: Tremor.

Lungs, Thorax, or Respiration: Dyspnea.

Skin - Rat: 148 mg/kg (LD50)

Intraperitoneal - Rat: 65 MG/KG (LD50)

Subcutaneous - Rat: 75 MG/KG (LD50)

Remarks: Peripheral Nerve and Sensation: Spastic paralysis with or without sensory change.

Behavioral: Convulsions or effect on seizure threshold.

Lungs, Thorax, or Respiration: Cyanosis.

Oral - Mouse: 27 mg/kg (LD50)

Remarks: Behavioral: Convulsions or effect on seizure threshold.

Lungs, Thorax, or Respiration: Dyspnea.

Gastrointestinal: Changes in structure or function of salivary glands.

Intraperitoneal - Mouse: 46 MG/KG (LD50)

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Corneal damage.

Behavioral: Ataxia.

Lungs, Thorax, or Respiration: Dyspnea.

Subcutaneous - Mouse: 25 MG/KG (LD50)

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Other.

Behavioral: Change in motor activity (specific assay).

Gastrointestinal: Hypermotility, diarrhea.

Skin - Rabbit: 63 mg/kg (LD50)

Remarks: Behavioral: Somnolence (general depressed activity).

Skin and Appendages: Skin: After systemic exposure: Dermatitis, other

Intravenous - Rabbit: 69 MG/KG (LD50)

Remarks: Peripheral Nerve and Sensation: Flaccid paralysis with appropriate anesthesia.

Behavioral: Tremor.

Behavioral: Convulsions or effect on seizure threshold.

Oral - Guinea pig: 50 mg/kg (LD50)

Skin - Guinea pig: 202 mg/kg (LD50)

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Subcutaneous - Guinea pig: 130 MG/KG (LD50)

Remarks: Peripheral Nerve and Sensation: Flaccid paralysis with appropriate anesthesia.

Behavioral: Tremor.

Behavioral: Convulsions or effect on seizure threshold.

Irritation Data

Skin - Human: 500 mg

Skin - Rabbit: 500 mg

Remarks: Severe irritation effect

Eyes - Rabbit: 100 mg

Remarks: Moderate irritation effect

Chronic Exposure - Carcinogen

Result: This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Rat - Oral: 18200 MG/KG 52W C

Result: Tumorigenic: Carcinogenic by RTECS criteria. Brain and Coverings: Tumors.

Rat - Inhalation: 5 PPM 52W I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Rat - Inhalation: 20 PPM 4H/52W I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Brain and Coverings: Tumors.

Rat - Inhalation: 40 PPM 4H/52W I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Brain and Coverings: Tumors.

Rat - Oral: 3640 MG/KG 52W C

Result: Tumorigenic: Neoplastic by RTECS criteria. Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Ear: Tumors. Gastrointestinal: Tumors.

Rat - Oral: 2490 MG/KG 2Y C

Result: Tumorigenic: Carcinogenic by RTECS criteria. Brain and Coverings: Other degenerative changes.

Gastrointestinal: Tumors.

OSHA Carcinogen ListRating

cancer hazard

IARC Carcinogen ListRating

Group 2B

NTP Carcinogen ListRating

Anticipated to be a carcinogen.

ACGIH Carcinogen ListRating

A2

Chronic Exposure - Teratogen

| <u>Species</u> | <u>Dose</u> | <u>Route of Application</u> | <u>Exposure Time</u> |
|----------------|--|-----------------------------|----------------------|
| Rat | 650 MG/KG | Oral | (6-15D PREG) |
| | Result: Specific Developmental Abnormalities: Musculoskeletal system. | | |
| | Specific Developmental Abnormalities: Cardiovascular (circulatory) system. | | |
| Rat | 80 PPM/6H | Inhalation | (6-15D PREG) |
| | Result: Specific Developmental Abnormalities: Musculoskeletal system. | | |
| Rat | 25 PPM/6H | Inhalation | (6-20D PREG) |
| | Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). | | |
| Hamster | 641 MG/KG | Intraperitoneal | (8D PREG) |
| | Result: Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord). | | |
| | Effects on Embryo or Fetus: Cytological changes (including somatic cell genetic material). | | |
| | Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). | | |

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Hamster 641 MG/KG Intraperitoneal (8D PREG)
 Result: Specific Developmental Abnormalities: Central nervous system.
 Specific Developmental Abnormalities: Musculoskeletal system.

Chronic Exposure - Mutagen

| Species | Dose | Route | Cell Type | Mutation test |
|---------|----------------|-------|------------------|--------------------------------------|
| Human | 40 MG/L (+S9) | | lymphocyte | Mutation in microorganisms |
| Human | 200 MG/L | | Other cell types | DNA damage |
| Human | 150 MG/L | | Other cell types | Sister chromatid exchange |
| Human | 25 MG/L | | lymphocyte | Mutation in mammalian somatic cells. |
| Rat | 46500 UG/KG | Oral | | DNA |
| Rat | 46500 UG/KG | Oral | | Other mutation test systems |
| Rat | 16500 UMOL/L | | liver | DNA |
| Rat | 16500 UMOL/L | | liver | Other mutation test systems |
| Rat | 1 MMOL/L | | liver | Unscheduled DNA synthesis |
| Rat | 50 MG/KG | Oral | | Unscheduled DNA synthesis |
| Rat | 30 MG/KG | | S. typhimurium | Body fluid assay |
| Mouse | 161 MG/L (+S9) | | lymphocyte | Mutation in microorganisms |
| Mouse | 50 MG/L (+S9) | | Embryo | Mutation in microorganisms |
| Mouse | 8800 UG/L | | Embryo | Morphological transformation. |
| Mouse | 6300 UG/L | | fibroblast | Morphological transformation. |
| Mouse | 30 MG/KG | | S. typhimurium | Body fluid assay |
| Mouse | 12500 NL/L | | lymphocyte | Mutation in mammalian somatic cells. |
| Hamster | 100 MMOL/L | | ovary | Micronucleus test |
| Hamster | 2 MG/L | | Embryo | Morphological transformation. |
| Hamster | 3710 MG/L | | ovary | DNA damage |
| Hamster | 200 MG/L | | Embryo | DNA damage |
| Hamster | 4 MMOL/L | | ovary | Cytogenetic analysis |
| Hamster | 6250 UG/L | | lung | Cytogenetic analysis |
| Hamster | 2500 UG/L | | liver | Cytogenetic analysis |
| Hamster | 2 MMOL/L | | ovary | Sister chromatid exchange |
| Mammal | 68 MMOL/L | | lymphocyte | DNA |

Chronic Exposure - Reproductive Hazard

| Species | Dose | Route of Application | Exposure Time | Result |
|---------|-----------|----------------------|---------------|--|
| Rat | 650 MG/KG | Oral | (6-15D PREG) | Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus) Specific Developmental Abnormalities: Musculoskeletal system. |
| Rat | 644 MG/KG | Oral | (2W MALE) | Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects: Testes, epididymis, sperm duct. |
| Rat | 650 MG/KG | Oral | (6-15D PREG) | Result: Maternal Effects: Other effects Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system. |
| Rat | 40 PPM/6H | Inhalation | (6-15D PREG) | Result: Maternal Effects: Other effects. Nutritional and Gross Metabolic: Weight loss or decreased weight gain. |
| Mouse | 600 MG/KG | Oral | (60D MALE) | Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects: Testes, epididymis, sperm duct. Paternal Effects: Other effects on male. |
| Mouse | 32 MG/KG | Intraperitoneal | (5D PREG) | Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). |
| Hamster | 641 MG/KG | Intraperitoneal | (8D PREG) | Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Central nervous system. |

Section 12 - Ecological Information

Acute Ecotoxicity Tests

| Test Type | Species | Time | Value |
|--------------|--------------------------------|--------|----------------|
| EC50 Daphnia | Daphnia magna | 48.0 h | 7.4 - 10 mg/l |
| LC50 Fish | Lepomis macrochirus (Bluegill) | 96.0 h | 8 - 12 mg/l |
| LC50 Fish | Cyprinus carpio | 96.0 h | 18 - 21.4 mg/l |

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material.
 Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.
 Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Acrylonitrile, inhibited
UN#: 1093
Class: 3
Packing Group: Packing Group I
Hazard Label: Flammable liquid
Hazard Label: Toxic substances.
PIH: Not PIH

IATA

Proper Shipping Name: Acrylonitrile, stabilized
IATA UN Number: 1093
Hazard Class: 3
Packing Group: I
Not Allowed - Aircraft: Cargo aircraft only. Not permitted on passenger aircraft.

Section 15 - Regulatory Information

EU Directives Classification

Symbol of Danger: F T N
Indication of Danger
 Highly Flammable. Toxic. Dangerous for the environment.
Risk Statements **R:** 45 11 23/24/25 41 43 37/38 51/53
 May cause cancer. Highly flammable. Toxic by inhalation, in contact with skin and if swallowed. Risk of serious damage to eyes.
 May cause sensitization by skin contact. Irritating to respiratory system and skin. Toxic to aquatic organisms, may cause longterm adverse effects in the aquatic environment.

Safety Statements S: 53 9 16 45 61

Restricted to professional users. Attention- Avoid exposure - obtain special instructions before use. Keep container in a well ventilated place. Keep away from sources of ignition- no smoking. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

US Classification and Label Text

Indication of Danger

Flammable (USA) Highly Flammable (EU). Highly Toxic (USA) Very Toxic (EU).

Risk Statements

Toxic in contact with skin and if swallowed. Very toxic by inhalation. Causes burns. May cause cancer.

Safety Statements

Avoid exposure - obtain special instructions before use. Keep container tightly closed. Keep away from sources of ignition- no smoking. Do not breathe vapor. Avoid contact with skin. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Take precautionary measures against static discharges. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Statements

Danger: Lachrymator. Vesicant. Severe skin irritant. Target organ(s): Kidneys. Eyes. Probable Carcinogen (US). Calif. Prop. 65 carcinogen.

United States Regulatory Information

SARA Listed: Yes

Deminimis: 0.1 %

Notes: This product is subject to SARA section 313 reporting requirements.

TSCA Inventory Item: Yes

United States - State Regulatory Information

California Prop - 65

This product is or contains chemical(s) known to the state of California to cause cancer.

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. SigmaAldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.