Section 1 - Product and Company Information

Product Name                  1,1,1-TRICHLOROETHANE, ACS, STAB.
Product Number               91099
Brand                        FLUKA

Company                      Sigma-Aldrich
Address                      3050 Spruce Street
SAINT LOUIS MO 63103 US
Technical Phone:             800-325-5832
Fax:                         800-325-5052
Emergency Phone:             314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name                          CAS #                 SARA 313
1,1,1-TRICHLOROETHANE, STABILIZED       71-55-6               Yes

Ingredient Name                         CAS #       Percent   SARA 313
LOW ALKYL EPOXIDE                       None        0.05      No

Formula         C2H3Cl3
Synonyms        Aerothene TT * CF 2 * Chloroform, methyl-* 
                Chlorothene * Chloroethene (inhibited) * 
                Chlorothene NU * Chlorothene SM * Chlorothene VG 
                * Chlorton * Ethana NU * F 140a * HCC 140a * 
                ICI-CF 2 * Inhibisol * Methylchloroform * Methyl 
                chloroform (ACGIH:OSHA) * Methyltrichloromethane 
                * NCI-C04626 * RCRA waste number U226 * Solvent 
                111 * alpha-T * Tafclean * 1,1,1-Trichloorethaan 
                (Dutch) * 1,1,1-Trichloraethan (German) * 
                Trichloro-1,1,1-ethane (French) * 
                1,1,1-Trichloroethane (DOT:OSHA) * 
                1,1,1-Tricloroetano (Italian) * 
                Trichloromethylmethane

RTECS Number:   KJ2975000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Harmful. Dangerous for the environment.
Harmful by inhalation. Irritating to eyes, respiratory system and 
skin. Dangerous for the ozone layer.
Target organ(s): Liver. Kidneys.

HMIS RATING
HEALTH: 3*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING
HEALTH: 3
FLAMMABILITY: 0
Section 4 - First Aid Measures

**ORAL EXPOSURE**
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

**INHALATION EXPOSURE**
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

**DERMAL EXPOSURE**
In case of contact, immediately wash skin with soap and copious amounts of water.

**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

**FLASH POINT**
N/A

**EXPLOSION LIMITS**
Lower: 7.5 %  Upper: 15 %

**AUTOIGNITION TEMP**
537 °C

**FLAMMABILITY**
N/A

**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): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

**PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL**
Evacuate area.

**PROCEDURE(S) OF PERSONAL PRECAUTION(S)**
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

**METHODS FOR CLEANING UP**
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.
Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

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 full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>STEL</td>
<td>450 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>350 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard-air</td>
<td>TWA</td>
<td>350 PPM (1900 MG/M3)</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA.</td>
<td>PEL</td>
<td>8H TWA 350 PPM (1900 MG/M3)</td>
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</table>

New Zealand OEL
Remarks: check ACGIH TLV

USA    NIOSH Ceiling co350 PPM/15M

EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td></td>
<td>300 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td></td>
<td>600 MG/M3</td>
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<tr>
<td>Poland</td>
<td>NDSP</td>
<td></td>
<td>-</td>
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</table>

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
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</thead>
<tbody>
<tr>
<td>Physical State: Clear liquid</td>
<td>Molecular Weight</td>
<td>133.41 AMU</td>
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</tr>
<tr>
<td>Color: Colorless</td>
<td>pH</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BP/BP Range</td>
<td>72.0 - 75.0 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MP/MP Range</td>
<td>- 35.0 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Freezing Point</td>
<td>N/A</td>
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</tr>
<tr>
<td></td>
<td>Vapor Pressure</td>
<td>100 mmHg</td>
<td>20 °C</td>
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<tr>
<td></td>
<td>Vapor Density</td>
<td>4.6 g/l</td>
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<tr>
<td></td>
<td>Saturated Vapor Conc.</td>
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<tr>
<td></td>
<td>SG/Density</td>
<td>1.336 g/cm3</td>
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</tr>
<tr>
<td></td>
<td>Bulk Density</td>
<td>N/A</td>
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<tr>
<td></td>
<td>Odor Threshold</td>
<td>N/A</td>
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</tbody>
</table>
Volatile% N/A
VOC Content N/A
Water Content N/A
Solvent Content N/A
Evaporation Rate N/A
Viscosity N/A
Surface Tension N/A
Partition Coefficient N/A
Decomposition Temp. N/A
Flash Point N/A
Explosion Limits Lower: 7.5 %
Upper: 15 %
Flammability N/A
Autoignition Temp 537 °C
Refractive Index 1.438
Optical Rotation N/A
Miscellaneous Data N/A
Solubility N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Reactions to Avoid: Reacts violently with:
Materials to Avoid: Potassium, Strong oxidizing agents, Sodium,
Magnesium, Zinc, Strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide,
Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: Harmful if inhaled. Material is irritating to mucous
membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

SIGNS AND SYMPTOMS OF EXPOSURE
Damage to the kidneys. Damage to the liver. Narcotic effect.
Symptoms of exposure may include burning sensation, coughing,
wheezing, laryngitis, shortness of breath, headache, nausea, and
vomiting. Exposure to and/or consumption of alcohol may increase
toxic effects. Prolonged exposure can cause:

TOXICITY DATA

Oral Rat
9600 mg/kg LD50
Remarks: Cardiac: Pulse rate. Nutritional and Gross
Metabolic: Weight loss or decreased weight gain.

Inhalation
Rat
18,000 ppm
LC50

Intraperitoneal
Rat
3593 MG/KG
LD50

Oral
Mouse
6000 mg/kg
LD50
Remarks: Nutritional and Gross Metabolic: Weight loss or decreased weight gain. Cardiac: Pulse rate.

Inhalation
Mouse
3,911 ppm
LC50

Intraperitoneal
Mouse
2568 MG/KG
LD50

Subcutaneous
Mouse
16 GM/KG
LD50

Oral
Dog
750 mg/kg
LD50

Intraperitoneal
Dog
3100 MG/KG
LD50
Remarks: Liver: Liver function tests impaired.

Inhalation
Cat
24,400 mg/m3
LC50

Oral
Rabbit
5660 mg/kg
LD50

Oral
Guinea pig
9470 mg/kg
LD50
IRRITATION DATA

Eyes
Man
450 ppm
8H

Skin
Rabbit
5,000 mg
12D
Remarks: Mild irritation effect

Skin
Rabbit
20 mg
24H
Remarks: Moderate irritation effect

Eyes
Rabbit
100 mg
Remarks: Mild irritation effect

Eyes
Rabbit
2 mg
24H
Remarks: Severe irritation effect

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC CARCINOGEN LIST
Rating: Group 3

NTP CARCINOGEN LIST
Rating: Inadequate studies
Species: Mouse/rat
Route: Gavage

ACGIH CARCINOGEN LIST
Rating: A4

CHRONIC EXPOSURE - TERATOGEN
Result: Laboratory experiments have shown teratogenic effects.

Species: Rat
Dose: 43 MG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG/21D POST)
Result: Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Species: Rat
Dose: 2100 PPM/6H
Route of Application: Inhalation  
Exposure Time: (1-20D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

CHRONIC EXPOSURE - MUTAGEN  
Result: Laboratory experiments have shown mutagenic effects.

Species: Rat  
Dose: 99 UMOL/L  
Cell Type: Embryo  
Mutation test: Morphological transformation.

Species: Mouse  
Dose: 31300 UG/L (+S9)  
Cell Type: lymphocyte  
Mutation test: Mutation in microorganisms

Species: Mouse  
Dose: 20 MG/L  
Cell Type: Embryo  
Mutation test: Morphological transformation.

Species: Hamster  
Dose: 562 MG/L  
Cell Type: kidney  
Mutation test: Morphological transformation.

Species: Hamster  
Dose: 100 UL/PLATE  
Cell Type: Embryo  
Mutation test: Morphological transformation.

Species: Hamster  
Dose: 160 MG/L  
Cell Type: ovary  
Mutation test: Cytogenetic analysis

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD  
Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Species: Rat  
Dose: 7000 PPM/3H  
Route of Application: Inhalation  
Exposure Time: (13-19D PREG)  
Result: Effects on Newborn: Behavioral. Effects on Newborn: Live birth index (# fetuses per litter; measured after birth).  
Maternal Effects: Other effects.

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish  
Species: Pimephales promelas (Fathead minnow)  
Time: 96 h  
Value: 53 mg/l

ODC (OZONE DEPLETING CHEMICAL) - CAA602  
Ozone Depletion Class: I  
Ozone Depletion Group: V
Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: 1,1,1-Trichloroethane
UN#: 2831
Class: 6.1
Packing Group: Packing Group III
Hazard Label: Toxic Substance
PIH: Not PIH

IATA
Proper Shipping Name: 1,1,1-Trichloroethane
IATA UN Number: 2831
Hazard Class: 6.1
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xn-N
Indication of Danger: Harmful. Dangerous for the environment.
R: 20-59
Risk Statements: Harmful by inhalation. Dangerous for the ozone layer.
S: 24/25-59-61
Safety Statements: Avoid contact with skin and eyes. Refer to manufacturer/supplier for information on recovery/recycling. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Harmful. Dangerous for the environment.
Risk Statements: Irritating to eyes, respiratory system and skin. Harmful by inhalation. Dangerous for the ozone layer.
Safety Statements: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. Refer to manufacturer/supplier for information on recovery/recycling. Avoid release to the environment. Refer to special instructions/safety data sheets.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all 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. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or 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.