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# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

MSDS Number 30000005309  
Print Date 02/15/2014

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## 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Trans-LC

Chemical formula : C<sub>2</sub>H<sub>2</sub> Cl<sub>2</sub>

Synonyms : trans-1,2-dichloroethylene; trans-dichloroethylene acetylene, dichloride, Dioform

Product Use Description : Semiconductor Processing

Manufacturer/Importer/Distributor : Air Products and Chemicals, Inc  
7201 Hamilton Blvd.  
Allentown, PA 18195-1501  
GST No. 123600835 RT0001  
QST No. 102753981 TQ0001

Telephone : 1-610-481-4911 Corporate  
1-800-345-3148 Chemicals Cust Serv  
1-800-752-1597 Gases/Electronics Cust Serv

Emergency telephone number (24h) : 800-523-9374 USA  
+1 610 481 7711 International

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## 2. HAZARDS IDENTIFICATION

### Emergency Overview

Keep away from heat and sources of ignition.  
May be a static accumulator – Sparks may ignite liquid and vapor  
Immediate fire and explosion hazard exists when mixed with air at concentrations exceeding the lower flammability limit (LFL).  
Components of the product may affect the nervous system.  
Flammable.  
Mild eye irritant.  
Mild respiratory tract irritant.  
Mild skin irritant.

### Potential Health Effects

Inhalation : May cause central nervous system effects, such as headache, nausea, dizziness, confusion, breathing difficulties. Severe cases of overexposure can result in respiratory failure. May cause nose, throat, and lung irritation. Inhalation of vapors and/or aerosols in high concentration may cause irritation of respiratory system.

# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

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- Eye contact : Contact with eyes may cause irritation.
- Skin contact : If absorbed through the skin, may cause central nervous system effects, such as headache, nausea, dizziness, confusion, breathing difficulties. Mild skin irritation.
- Chronic Health Hazard : This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater. Chronic exposure may cause damage to the lung, li ver and kidneys. Tests have shown non-mutagenicity.

## Exposure Guidelines

- Target Organs : Eyes.  
Respiratory system.  
Skin.  
Kidney.  
Liver.  
Central nervous system.  
Mucous membranes.
- Symptoms : Repeated and/or prolonged exposure to low concentrations of vapors and/or aerosols may cause: Sore throat. Headache. Nausea. Dizziness. Tremors. Incoordination. Vomiting. Drowsiness.

## Aggravated Medical Condition

Kidney disorders. Neurological disorders Liver disorders.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Weight)
trans-Dichloroethylene	156-60-5	100 %

Concentration is nominal. For the exact product composition, please refer to Air Products technical specifications. Contains no other components or impurities which will influence the classification of the product.

## 4. FIRST AID MEASURES

- General advice : Seek medical advice. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately.
- Eye contact : Rinse immediately with plenty of water also under the eyelids for at least 20 minutes. Remove contact lenses.
- Skin contact : Wash off immediately with plenty of water for at least 20 minutes. Wash off with soap and water. Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay.
- Ingestion : Never give anything by mouth to an unconscious person. If a person vomits when lying on his back, place him in the recovery position. Do not induce vomiting. Prevent aspiration of vomit. Turn victim's head to the side.

# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

MSDS Number 30000005309  
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Inhalation : If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Move to fresh air.

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## 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Alcohol-resistant foam.  
Carbon dioxide (CO<sub>2</sub>).  
Dry chemical.  
Dry sand.  
Limestone powder.

Specific hazards : Burning produces noxious and toxic fumes. In the event of fire, cool tanks with water spray . Downwind personnel must be evacuated. Fire or intense heat may cause violent rupture of packages. Flash back possible over considerable distance. May form explosive mixtures in air. Ignitable by static electricity.

Special protective equipment for fire-fighters : Use personal protective equipment. Wear self contained breathing apparatus for fire fighting if necessary.

Further information : Do not allow run-off from fire fighting to enter drains or water courses., Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

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## 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Wear suitable protective clothing, gloves and eye/face protection. Use self-contained breathing apparatus and chemically protective clothing. Remove all sources of ignition. Evacuate personnel to safe areas.

Environmental precautions : Prevent spilled product from entering streams or drinking water supplies. Local authorities should be advised if significant spillages cannot be contained. Shut off or remove all ignition sources. Construct a dike to prevent spreading.

Methods for cleaning up : Contact Air Products' Emergency Response Center for advice. Approach suspected leak areas with caution. Absorb with inert absorbent materials such as: Dry sand. Vermiculite. Activated charcoal. Place in appropriate chemical waste container.

Additional advice : Open enclosed spaces to outside atmosphere. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. If possible, stop flow of product.

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## 7. HANDLING AND STORAGE

### Handling

See "Flammable and Combustible Liquid Code" NFPA No. 30, National Fire Protection Association, Boston, MA. Emergency showers and eye wash stations should be readily accessible. Adhere to work practice rules established by government regulations. Handling operations that can promote accumulation of static charges include but are not limited to: mixing, filtering, pumping at high flow rates, splash filling, creating mists or sprays,

# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

MSDS Number 30000005309  
Print Date 02/15/2014

tank and container filling, tank cleaning, sampling, gauging, switch loading, vacuum truck operations. To reduce potential for static discharge, ensure that all equipment is properly grounded, bonded and meets appropriate electrical classification requirements. Use only in well-ventilated areas. Avoid contact with eyes. Avoid breathing vapors and/or aerosols. Use personal protective equipment. When using, do not eat, drink or smoke.

## Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from heat and sources of ignition. Keep in a dry, cool place. Keep away from oxidizers.

## Technical measures/Precautions

Keep away from open flames, hot surfaces and sources of ignition.

Storage Temperature : 32 - 104 °F (0 - 40 °C)

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## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### Engineering measures

- Use explosion-proof equipment.
- Apply process controls to ensure safe operating conditions. Assess potential flammability hazards based on flashpoint and potential ignition sources.
- Provide readily accessible eye wash stations and safety showers.
- Provide natural or explosion-proof ventilation adequate to ensure concentrations are kept below exposure limits.

### Personal protective equipment

- Respiratory protection** : Wear appropriate respirator when ventilation is inadequate. In an emergency or when the airborne concentration is greater than 1000 ppm, use positive pressure self-contained breathing apparatus (SCBA). Use a NIOSH/MSHA full face respirator with organic vapor cartridge(s) when the airborne concentration is less than 1000 ppm.
- Hand protection** : Viton gloves.  
Polyvinyl Alcohol Gloves (PVA).  
Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Eye protection** : Chemical safety glasses.
- Skin and body protection** : Long sleeve shirts and trousers without cuffs.
- Environmental exposure controls** : Prevent spilled product from entering streams or drinking water supplies. Local authorities should be advised if significant spillages cannot be contained. Shut off or remove all ignition sources.
- Special instructions for protection and hygiene** : Wash at the end of each workshift and before eating, smoking or using the toilet.  
Provide readily accessible eye wash stations and safety showers.

# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

MSDS Number 30000005309  
Print Date 02/15/2014

## Exposure limit(s)

trans-Dichloroethylene	Time Weighted Average (TWA): ACGIH	200 ppm	-
trans-Dichloroethylene	Recommended exposure limit (REL): NIOSH	200 ppm	790 mg/m3
trans-Dichloroethylene	PEL: OSHA Z1	200 ppm	790 mg/m3
trans-Dichloroethylene	Time Weighted Average (TWA): OSHA Z1A	200 ppm	790 mg/m3
trans-Dichloroethylene	Time Weighted Average (TWA) Permissible Exposure Limit (PEL): US CA OEL	200 ppm	790 mg/m3
trans-Dichloroethylene	Time Weighted Average (TWA): ACGIH	200 ppm	-

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: Liquid.
Color	: Colorless.
Odor	: Sweet.
Molecular Weight	: 96.94 g/mol
Relative vapor density	: 3.67 (air = 1) Heavier than air.
Relative density	: 1.257 (water = 1)
Vapor pressure	: 265.41 mmHg at 68 °F (20 °C)
Boiling point/range	: 118 °F (48 °C)
Melting point/range	: -58 °F (-50 °C)
Flash point	: 2 °C
Autoignition temperature	: 460 °C
Upper flammability limit	: 16.5 %(V)
Lower flammability limit	: 9 %(V)
Water solubility	: 0.0063 g/l

## 10. STABILITY AND REACTIVITY

Chemical Stability	: Stable under normal conditions.
Conditions to avoid	: Heat, flames and sparks. Exposure to air. Exposure to light. Exposure to moisture.
Materials to avoid	: Oxidizing agents.

# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

MSDS Number 30000005309  
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Alkalies.  
Amines.  
Copper.  
Aluminium.  
Aluminum alloys.  
Reducing agents.  
Strong oxidizing agents.  
Rubber products.  
Plastics.

Hazardous decomposition products : Hazardous combustion products:  
Gaseous hydrogen chloride (HCl).  
Carbon monoxide.  
Phosgene.

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## 11. TOXICOLOGICAL INFORMATION

### Acute Health Hazard

Ingestion : LD50 : > 5,000 mg/kg Species : (Rat)

Inhalation : LC50 (4 h) : 24100 ppm Species : Rat.  
Inhalation may cause nausea, vomiting, weakness, tremors, and epigastric cramps.

Dermal : No data is available on the product itself.

Eye irritation/corrosion : Mild eye irritation.

Skin irritation/corrosion : Mild skin irritation.

### Chronic Health Hazard

Tests show no mutagenic effects. Primarily excreted through the lungs.

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## 12. ECOLOGICAL INFORMATION

### Ecotoxicity effects

Aquatic toxicity : No data is available on the product itself.

Toxicity to other organisms : No data available.

### Persistence and degradability

Biodegradability : No data is available on the product itself.

Mobility : If released to the soil, the material should leach into the groundwater. It will be lost from the water primarily by volatilization (half-life is 3 hours in a model river).

Bioaccumulation : Biodegradation, adsorption to sediment, and bioconcentration (BCF:22) in

# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

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aquatic organisms should not be significant.

## Further information

If released to the atmosphere, it will be lost by reaction with hydroxy radicals (half-life is 3.6 days) or lost to rain, since it is water soluble.

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## 13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products : Contact supplier if guidance is required.

Contaminated packaging : Dispose of container and unused contents in accordance with federal, state, and local requirements.

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## 14. TRANSPORT INFORMATION

### DOT

UN/ID No. : UN1150  
Proper shipping name : 1,2-Dichloroethylene  
Class or Division : 3  
Packing group : II  
Label(s) : 3  
Marine Pollutant : No

### IATA

UN/ID No. : UN1150  
Proper shipping name : 1,2-Dichloroethylene  
Class or Division : 3  
Packing group : II  
Label(s) : 3  
Marine Pollutant : No

### IMDG

UN/ID No. : UN1150  
Proper shipping name : 1,2-DICHLOROETHYLENE  
Class or Division : 3  
Packing group : II  
Label(s) : 3  
Marine Pollutant : No

### TDG

UN/ID No. : UN1150  
Proper shipping name : 1,2-DICHLOROETHYLENE  
Class or Division : 3  
Packing group : II  
Label(s) : 3  
Marine Pollutant : No

### Further Information

# Material Safety Data Sheet

Version 3.2  
Revision Date 09/17/2013

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The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact an Air Products customer service representative.

## 15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s):

None.

OSHA Hazard Communication Standard (29 CFR 1910.1 200) Hazard Class(es)

Flammable. Irritant.

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on EINECS inventory or polymer substance, monomers included on EINECS inventory or no longer polymer.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification

Acute Health Hazard Chronic Health Hazard Fire Hazard.

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level

trans-Dichloroethylene

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

WHMIS Hazard Classification

Very Toxic Material Causing Other Toxic Effects, Toxic Material Causing Other Toxic Effects

## 16. OTHER INFORMATION

### NFPA Rating

Health : 2  
Fire : 3  
Instability : 2

### HMIS Rating

Health : 2  
Flammability : 3  
Physical hazard : 3



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Preparation Date : 02/15/2014

For additional information, please visit our Product Stewardship web site at  
<http://www.airproducts.com/productstewardship/>

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