Material Safety Data Sheet

Date of issue 26 October 2013
Version 1

1 . Product and company identification

Product name : TRI113 - Trichloroethylene High Purity
Code : 01546
Synonym : Trichloroethene; Trichlorethylene; Trichlor; C_2HCl_3
Supplier : Axiall, LLC
115 Perimeter Center Place
Suite 460
Atlanta, GA 30346
USA
Emergency telephone number : +1 304-455-6882
Technical Phone Number : 1-800-243-6774 (C/A) 8am-5pm Eastern time

2 . Hazards identification

Emergency overview : DANGER!

CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF INHALED OR SWALLOWED. ASPIRATION HAZARD. CAN ENTER LUNGS AND CAUSE DAMAGE. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CAN CAUSE CANCER.

Do not ship lightly stabilized grades in aluminum trailers.

Do not ship in containers made of zinc, aluminum, or copper due to product incompatibility.

Do not swallow. Do not breathe vapor or mist. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Irritating to respiratory system. Can irritate eyes, nose, mouth and throat. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : May be harmful if swallowed. Can cause central nervous system (CNS) depression. Aspiration hazard if swallowed. Can enter lungs and cause damage. Irritating to mouth, throat and stomach.

Skin : Causes skin irritation. Defatting to the skin.

Eyes : Causes serious eye irritation.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
irritation
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness
death

Ingestion :

2 . Hazards identification

Adverse symptoms may include the following:
irritation
nausea or vomiting
headache
dizziness/vertigo
unconsciousness
Aspiration hazard if swallowed.
pulmonary edema
chemical pneumonitis

Skin : Adverse symptoms may include the following:
irritation
redness
dryness
cracking

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
trichloroethylene	79-01-6	>99
(stabilized)		

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Seek medical attention if irritation persists.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Seek medical attention.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do NOT induce vomiting.

Notes to physician : Only administer adrenaline after careful consideration following overexposure. Increased sensitivity of the heart to adrenaline may be caused by overexposure to this product. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 . Fire-fighting measures

Flammability of the product : Emits toxic fumes under fire conditions. Vapors are heavier than air and may spread along floors. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Vapor concentration in a confined or poorly ventilated area can be ignited upon contact with a high energy spark, flame, or high intensity source of heat. This can occur at concentrations ranging between the upper and lower explosion limits (by volume). In a fire or if heated, a pressure increase will occur and the container may burst. This material is toxic to aquatic life. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous combustion products : Depending on conditions, decomposition products may include the following materials:
carbon oxides
halogenated compounds
carbonyl halides

When this product is involved in fires, it can decompose to hydrogen chloride and possible traces of phosgene.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Stay upwind/keep distance from source. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. Toxic to aquatic life with long lasting effects. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.)

Avoid contamination of water supplies. Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected. If area of spill is porous, remove as much earth and gravel, etc. as necessary and place in closed containers for disposal.

Large spill : Stop leak if without risk. Eliminate all ignition sources. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Small spill :

6 . Accidental release measures

Stop leak if without risk. Eliminate all ignition sources. Move containers from spill area. Absorb spill with inert material (e.g. dry sand or earth) and place in a chemical waste container. Dispose of via a licensed waste disposal contractor.

Reference to other sections : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not swallow. Do not get in eyes or on skin or clothing. Do not ingest. Do not breathe vapor or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and possible traces of phosgene. Do not use cutting or welding torches on drums that contained this product unless properly purged and cleaned. Do not ship lightly stabilized grades in aluminum trailers.

Storage : Do not store above the following temperature: 35°C (95°F). Do not store or stack aluminum in contact with this product to prevent possible solvent decomposition (stacking corrosion). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Keep away from incompatible materials. Liquid oxygen or other strong oxidants may form explosive mixtures with this product. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	IPEL
trichloroethylene	TWA STEL	10 ppm 25 ppm	100 ppm Z 200 ppm Z C 300 ppm Z A	10 ppm 25 ppm	100 ppm 200 ppm	5 ppm Not established

Key to abbreviations

A	=	Acceptable Maximum Peak	S	=	Potential skin absorption
ACGIH	=	American Conference of Governmental Industrial Hygienists.	SR	=	Respiratory sensitization
C	=	Ceiling Limit	SS	=	Skin sensitization
F	=	Fume	STEL	=	Short term Exposure limit values
IPEL	=	Internal Permissible Exposure Limit	TD	=	Total dust
OSHA	=	Occupational Safety and Health Administration.	TLV	=	Threshold Limit Value
R	=	Respirable	TWA	=	Time Weighted Average
Z	=	OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances			

Consult local authorities for acceptable exposure limits.

8 . Exposure controls/personal protection

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Chemical splash goggles.

Hands : 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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Gloves : Impervious gloves. Viton®. Silver Shield® gloves. Polyvinyl alcohol (degrades in water).

Respiratory : Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

9 . Physical and chemical properties

Physical state : Liquid.

Flash point : None (by DOT test method).

Auto-ignition temperature : 420°C (788°F)

Explosion limits : Lower: 7.8%
Upper: 52%

Material supports combustion. : Yes.

Color : Colorless.

Odor : Ethereal.

Molecular weight : 131.39

pH : 9 .0 to 10.0

Boiling/condensation point : 86.4 to 87.5°C (187.5 to 189.5°F)

Melting/freezing point : -86.4°C (-123.5°F)

Specific gravity : 1.466 to 1.47 [at 20°C]

Vapor pressure : 7.7 kPa (57.8 mm Hg) [20°C]

9 . Physical and chemical properties

Vapor density : 4.54 [Air = 1]
Volatility : 100% (v/v), 100% (w/w)
Evaporation rate : 0.28 (ether (anhydrous) = 1)
Viscosity : 0.55 cP @ 25°C
Solubility : 0.11 % at 20°C
Water Solubility at room temperature : 0.11 g/l
Partition coefficient: n-octanol/water : 2.42
% Solid. (w/w) : 0

10 . Stability and reactivity

Stability : Stable under recommended storage and handling conditions (see Section 7).
Conditions to avoid : Keep away from ignition sources such as heat/sparks/open flame. - No smoking. When exposed to high temperatures may produce hazardous decomposition products.

When this product is involved in fires, it can decompose to hydrogen chloride and possible traces of phosgene.
Materials to avoid : Keep away from the following materials to prevent strong exothermic reactions: oxidizing agents, strong alkalis, strong acids. Avoid contamination with caustic soda, caustic potash or oxidizing materials Shock sensitive compounds may be formed.
Hazardous decomposition products : Depending on conditions, decomposition products may include the following materials: carbon monoxide, carbon dioxide, Hydrogen chloride (HCl). Phosgene gas.
Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
trichloroethylene	LD50 Oral LD50 Dermal LC50 Inhalation	Rat Rabbit Rat	4920 mg/kg >20 g/kg 140700 mg/m3	- - 1 hours

Conclusion/Summary : May be harmful if swallowed or if inhaled. Aspiration hazard if swallowed. Can enter lungs and cause damage. Can cause central nervous system (CNS) depression.

Chronic toxicity

Conclusion/Summary : Prolonged exposure may result in liver and kidney damage as well as immunological effects. One immunological effect that has been reported in several studies linked occupational trichloroethylene exposure to a rare but severe immunological skin disorder and accompanying hepatitis (such as Stevens-Johnson syndrome) especially in people of Asian descent. The clinical features associated with these disorders include generalized severe dermatitis and shedding of the skin, fever, abnormal liver function, jaundice, and sometimes death due to liver failure and infection. The science involved in the understanding of this association between exposure to trichloroethylene and these severe immunological skin disorders is ongoing. Prudent handling practices should be followed to minimize human exposure.

Irritation/Corrosion

Skin : Causes skin irritation.
Eyes : Causes serious eye irritation.
Respiratory : Irritating to respiratory system.

Sensitization

11 . Toxicological information

Skin : In a guinea pig maximization test, trichloroethylene was shown to produce skin sensitization. However, there is no evidence that trichloroethylene is a human skin sensitizer as sensitization has not been observed in workers in the occupational environment with many years of use.

Respiratory : Not available.

Potential chronic health effects : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Defatting irritant : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Target organs : Contains material which may cause damage to the following organs: kidneys, the nervous system, liver, heart, brain, upper respiratory tract, skin, eyes, central nervous system (CNS).

Carcinogenicity

Conclusion/Summary : Chronic exposure to trichloroethylene primarily produced renal toxicity and tumors in rats and liver and lung tumors in mice, with some reports of tumors at other sites. Extensive epidemiologic cohort studies of Trichloroethylene-exposed workers do not indicate significant increases in cancer incidence, but case–control studies suggest that prolonged exposure to high concentrations of Trichloroethylene can increase the incidence of renal cancer.

Carcinogenicity : Can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	NTP	OSHA
trichloroethylene	A2	1	Reasonably anticipated to be a human carcinogen.	-

Carcinogen Classification code:
ACGIH: A1, A2, A3, A4, A5
IARC: 1, 2A, 2B, 3, 4
NTP: Proven, Possible
OSHA: +
Not listed or regulated as a carcinogen: -

Mutagenicity

Conclusion/Summary : When activated with microsomal enzymes, trichloroethylene has been shown to be weakly positive in certain microbial mutagen test systems.

Mutagenicity : Suspected of causing genetic defects.

Reproductive toxicity

Conclusion/Summary : Trichloroethylene has not been shown to produce female reproductive toxicity. Damage to the epididymis and sperm integrity has been observed in male mice exposed to high levels of trichloroethylene (≥ 1000 ppm); however, there is very limited evidence existing for any male reproductive effect in rats or humans.

12 . Ecological information

Environmental effects : This product shows a low bioaccumulation potential. Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

12 . Ecological information

Product/ingredient name	Result	Species	Exposure
trichloroethylene	Acute EC50 21900 to 28500 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	Acute LC50 52000 to 64000 ug/L Marine water	Fish - Sheepshead minnow - Cyprinodon variegatus	96 hours
	Acute LC50 18000 to 26000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Acute EC50 390000 ug/L Fresh water	Algae - Green algae - Selenastrum sp.	96 hours
	Chronic NOEC 2200 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

Conclusion/Summary : Toxic to aquatic life. Harmful to aquatic life with long lasting effects.

Biodegradability

Conclusion/Summary : According to EC criteria: Not expected to be readily biodegradable

Partition coefficient: n-octanol/water : 2.42

Bioconcentration factor : The BCF for Trichloroethylene (79-01-6) ranged from 4.3, 17, 39 and up to 302, in carp, bluegill sunfish, rainbow trout, and green algae respectively.

Other adverse effects : Do not allow to enter drains or watercourses.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	1710	TRICHLOROETHYLENE	6.1	III	-
IMDG	1710	TRICHLOROETHYLENE	6.1	III	-
DOT	1710	TRICHLOROETHYLENE	6.1	III	**Reportable quantity** 100.01 lbs / 45.406 kg [8.171 gal / 30.931 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: trichloroethylene: 100 lbs. (45.4 kg);

Do not ship in containers made of zinc, aluminum, or copper due to product incompatibility.

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : All components are listed or exempted.
Korea inventory (KECI) : All components are listed or exempted.
New Zealand (NZIoC) : All components are listed or exempted.
Philippines inventory (PICCS) : All components are listed or exempted.

United States

U.S. Federal regulations :

SARA 302/304: No products were found.
CERCLA: Hazardous substances.: trichloroethylene: 100 lbs. (45.4 kg);

Do not ship in containers made of zinc, aluminum, or copper due to product incompatibility.

SARA 311/312 SDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
trichloroethylene	**79-01-6**	Y	Y	N	N	N
Product as-supplied :		Y	Y	N	N	N

SARA 313	Chemical name	CAS number	Concentration
Supplier notification :	trichloroethylene	79-01-6	> 99

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 0 **Health** : 2 **Reactivity** : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 2 * **Flammability** : 0 **Physical hazards** : 0
(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 2 **Flammability** : 0 **Instability** : 0

Date of previous issue : **No previous validation.**

Organization that prepared the MSDS : EHS

16 . Other information

Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by Axiall, LLC; and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.