



MATERIAL SAFETY DATA SHEET

HMIS Rating	NFPA Rating	EC Classification	WHMIS (Canada)	Transportation
HEALTH 0 FLAMMABILITY 1 REACTIVITY 0		Not classified	Not classified as hazardous	Not regulated

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Citroflex® 2		
Chemical Name:	1,2,3-Propanetricarboxylic acid, 2-hydroxy-, ethyl ester, Triethyl Citrate TEC; C-2	Chemical Family:	Ester
Synonyms:		CAS Number:	77-93-0
Manufacturer Information:	Vertellus Performance Materials Inc. 2110 High Point Road Greensboro, North Carolina 27403 USA	Emergency Phone Number (24 hr.):	(317) 247-8141
Non-Emergency Phone Number:	(336) 292-1781	CHEMTREC Phone Number (24 hr.):	(800) 424-9300 (collect calls accepted)
Non-Emergency Fax Number:	(336) 834-4974	International CHEMTREC (24 hr.):	(703) 527-3887 (collect calls accepted; 011 prefix not needed)

SECTION 2: HAZARDS IDENTIFICATION

Emergency Overview:

A clear, oily liquid with essentially no odor. This product does not present an immediate concern for emergency personnel.

(See Section 11 for detailed toxicological information.)

Signs and Symptoms of Potential Overexposure:	Contact with this material may cause skin irritation. Contact with eyes may cause slight irritation. May be harmful if ingested in sufficient quantities. High gas, vapor, or mist concentrations may be harmful if inhaled.
Primary Route(s) of Exposure:	Skin contact, Eye contact, Ingestion, Inhalation.
Medical Conditions Aggravated by Exposure:	No data found

SECTION 3: COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient	CAS Number	Concentration (%)	EINECS / ELINCS	EU Symbol	Risk Phrases
Triethyl Citrate	77-93-0	100	201-070-7	N/A	N/A

NOTE: See Section 8 of this MSDS for exposure limit data for these ingredients.
See Section 16 of this MSDS for the full text of the R-phrases above.



MATERIAL SAFETY DATA SHEET

SECTION 4: FIRST AID MEASURES

Skin Contact:	Wash thoroughly after skin contact.
Eye Contact:	Immediately flush the eyes with plenty of water for at least 15 minutes. Call a physician.
Inhalation:	Remove from exposure. If not breathing, give artificial respiration and call a physician.
Ingestion:	If swallowed, do not induce vomiting. Get prompt medical attention.
Thermal Exposure:	Not applicable.
Delayed Effects:	None known.

SECTION 5: FIRE FIGHTING MEASURES

Flash Point:	311°F (155°C)	Method:	COC	Auto-ignition Temperature:	Not available.
Flammable (Explosive) Limits:		Upper:	Not available	Lower:	Not available
Flammability Classification (OSHA):	Combustible Liquid - Class III B				
Hazardous Products of Combustion:	As with other organic materials, combustion will produce carbon monoxide and carbon dioxide.				
Potential for Dust Explosion:	Not applicable.				
Special Flammability Hazards:	Not applicable.				
Appropriate Extinguishing Media:	Foam. Dry chemical. Carbon dioxide. Water spray.				
Basic Fire Fighting Guidance:	Wear self-contained breathing apparatus and protective clothing. Normal firefighting procedures may be used.				

SECTION 6: ACCIDENTAL RELEASE MEASURES

Containment Techniques and Clean-up Procedures:	Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. For small spills, use suitable absorbent material and collect for later disposal. For large spills, the area may require diking to contain the spill. Material can then be collected (e.g., suction) for later disposal. After collection of material, flush area with water. Dispose of the material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable federal, state or local laws.
Evacuation Procedures:	Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Special Instructions:	Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.
Special Reporting Requirements:	Notify appropriate authorities if required by regulation. See Section 15 for additional information.

SECTION 7: HANDLING AND STORAGE

Storage Precautions & Recommendations:	This product should be stored at ambient temperature in a dry, well-ventilated location. Keep container closed when not in use.
Practices to Minimize Risk:	Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material.
Special Handling Equipment:	Not applicable.



MATERIAL SAFETY DATA SHEET

Dangerous Incompatibility Reactions: Incompatible with oxidizing materials.
Incompatibilities with Materials of Construction: none known

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits (United States): OSHA PEL: Not established ACGIH TLV: Not established
Respirator Caution: Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
Ventilation: All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.
Other Engineering Controls: All appropriate engineering controls should be used to minimize exposure potential. Use exhaust ventilation to keep airborne concentrations below exposure limits.
Additive or Synergistic Effects: None known.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance, State & Odor (ambient temperature):	Clear, oily liquid		
Molecular Formula:	C ₁₂ H ₂₀ O ₇	Molecular Weight:	276.3
Vapor Pressure:	< 1.00 mm Hg @ 25°C	Evaporation Rate:	< 1 (Butyl Acetate = 1)
Specific Gravity or Density:	1.136	Vapor Density (air = 1):	9.7
Boiling Point:	294 °C (561 °F)	Freezing / Melting Point:	-45 °C / -49 °F
Solubility in Water:	5.5% @ 25°C	Octanol / Water Coefficient:	Not available.
pH:	Not available	Odor Threshold:	Essentially odorless.
Viscosity:	Not available.	Autoignition Temperature:	Not available.
Flash Point and Method:	311°F (155°C) COC	Flammable Limits:	Not available.

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability: Stable
Incompatibilities: Incompatible with oxidizing materials.
Hazardous Decomposition Products: As with other organic materials, combustion will produce carbon monoxide and carbon dioxide.
Hazardous Polymerization: Will not occur.

MATERIAL SAFETY DATA SHEET

SECTION 11: TOXICOLOGICAL INFORMATION

Acute Oral LD ₅₀ :	Oral LD ₅₀ (rat) = 5900 mg/kg Oral LD ₅₀ (cat) = 3500 mg/kg Oral LD ₅₀ (guinea pig) > 25 mL/kg Oral LD ₅₀ (rat) = 7952 mg/kg Oral LD ₅₀ (cat) = 3976 mg/kg
Acute Dermal LD ₅₀ :	Dermal LD ₅₀ (rabbit) > 5 g/kg
Acute Inhalation LC ₅₀ :	Inhalation LC ₅₀ (6h) (rat) = 1300 ppm
Skin / Eye Irritation:	May cause slight irritation. May cause slight irritation.
Target Organs:	Triethyl Citrate was administered to rats in a 6-8 week feeding study, in varying doses up to 50% of the LD ₅₀ value. No gross effects were observed, nor were any changes noted in histological examination and blood counts. In cats treated with daily doses of 5 cc/kg for 8 weeks, no changes were observed in general appearance, behavior, urine or blood chemistry or blood count; body weight declines may be attributable to diarrhea effects observed during treatment. Triethyl citrate administration in cats at 6 and 9 cc/kg (well above the LD ₅₀) was found to cause progressive lowering of blood pressure to shock levels and slowing of the heart rate; however these effects were determined not to be due to any material interference with neuromuscular transmission. Triethyl citrate was found to be a skin sensitizer in the guinea pig maximization test, but has been determined to have no skin sensitizing or irritation effects in humans based on a repeated insult patch test. TDLo (intraperitoneal, mouse) = 4,900 mg/kg/14D-I TDLo (oral, cat) = 15,904 mg/kg/8W-C This material is not listed by IARC, NTP or OSHA as a carcinogen. No test data is available that indicates this material is a carcinogen.
Carcinogenicity:	
Teratogenicity/ Reproductive Effects:	No data available.
Neurotoxicity:	No data available.
Mutagenicity:	This material has been determined to be non-mutagenic in assays involving Salmonella typhimurium and Saccharomyces cerevisiae, both with and without metabolic activation.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:	Not predicted to exhibit significant toxicity to fish.
Environmental Fate:	Not expected to bioaccumulate. Based on environmental modeling, this material is expected to be readily biodegradable.
Additional Information:	No data available.



MATERIAL SAFETY DATA SHEET

SECTION 13: DISPOSAL CONSIDERATIONS

Classification of Waste as
Manufactured: (per US regulations)

Wastes must be tested using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes.

NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations.

Waste Disposal:

Dispose of this material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable national, state or local laws. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: TRANSPORT INFORMATION

DOT/IATA/IMDG Proper Shipping Name: Not regulated

SECTION 15: REGULATORY INFORMATION

OSHA Hazards: Non-hazardous.

WHMIS Classification: Non-Hazardous

Chemical Inventory Status:	TSCA:	Yes	EINECS:	Yes	Canada:	DSL
	Japan:	2-1320X	Korea:	KE-20840	Australia:	Yes
	China:	Yes	Philippines:	Yes	Switzerland:	G-3153

SARA 313: Not listed.

Reportable Quantities: Not listed.

SECTION 16: OTHER INFORMATION

Precautionary Statement: Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

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