



Material Safety Data Sheet

HCS Risk Phrases	
HCS CLASS: DANGEROUS MAY CAUSE CANCER based on Chlorendic acid. HCS CLASS: Irritating substance. HCS CLASS: Sensitizing substance.	

Section 1. Chemical Product and Company Identification			
Common Name/ Trade Name	Chlorendic Anhydride PE1+	In Case of Emergency	In the continental U.S.A. call CHEMTREC 800-424-9300 (24 hours) Outside the continental U.S.A. call CHEMTREC 703-527-3887 (24 hours)
Supplier	Velsicol Chemical LLC 10400 W. Higgins Road Rosemont, Illinois 60018 USA Phone: (847) 813-7888 Fax: (847) 298-9015	Manufacturer	Jiangsu Anpon Electrochemical Co., Ltd 30 Huagong Road, Huaian, Jiangsu, China Tel: 0517-83556373 Fax: 0517-83635571 Email: Wangsk@anpon.com
Synonym	4,5,6,7,8,8-Hexachloro-3a,4,7,7a-tetrahydro-4, 7-methanoiso benzofuran-1, 3-dione	Material Uses	Industrial applications: Hardener for epoxy resins, paints, and coatings. Other non-specified industry: Flame retardant in unsaturated polyester resins.
Chemical Name	1,4,5,6,7,7-hexachloro-8,9,10-trinorborn-5-ene-2,3-dicarboxylic anhydride		
Chemical Family	Chlorinated Bicyclic Anhydride	Chemical Formula	C9 H2 Cl6 O3

Section 2. Hazards Identification			
Emergency Overview	White to yellowish fine crystalline solid. No distinctive odor. WARNING! MAY BE HARMFUL IF SWALLOWED. CAUSES EYE IRRITATION MAY CAUSE SKIN AND RESPIRATORY TRACT IRRITATION MAY CAUSE ALLERGIC SKIN REACTION. ATTENTION! POSSIBLE CANCER HAZARD. CONTAINS CHLORENDIC ACID WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA Risks of cancer depends on duration and level of exposure.		
GHS Regulation	Classification: Skin Mild Irritation 3 Skin Sensitization 1 Eye Irritation 2A Carcinogen 2 STOT Repeated Exposure 2 Aquatic Acute 3	Labeling: H316, H317, H319, H351, H373, H413 P260, P262, P273, P280, P332, P305+P351+P338 Signal Word: Warning	Pictograms:  GHS08  GHS07
OSHA Regulatory Status	Not regulated.		
Potential Health Effects	Inhalation and skin contact are expected to be the primary routes of occupational exposure to Chlorendic Anhydride PE1+. This material is irritating to the eyes, skin and respiratory tract. Allergic skin reaction may occur in susceptible individuals. Chlorendic Anhydride PE1+ is considered, on the basis of single exposure (acute) animal tests, to be slightly toxic after ingestion (swallowing), practically non-toxic after inhalation and skin contact, severely irritating to eyes and practically non-irritating to skin. Chlorendic Anhydride PE1+ will slowly degrade to chlorendic acid in the presence of water and/or sunlight. The National Toxicology Program (NTP) has concluded that there is clear evidence of carcinogenicity (cancer) in a feeding study of rats and mice using chlorendic acid.		

	International Agency for Research on Cancer (IARC) has given chlorendic acid an overall evaluation of 2B (possibly carcinogenic).
Potential Environmental Effects	See Section 12

Section 3. Composition / Information on Ingredients

Name	CAS#	% by Weight
1) Chlorendic Anhydride	115-27-5	> 95.0
2) Chlorendic Acid	115-28-6	< 3.0
3) Maleic anhydride	108-31-6	< 1.0
4) Chlorobenzene	108-90-7	< 5.0

Section 4. First Aid Measures

Eye Contact	Immediately flush with plenty of water for at least 15 minutes. Get medical attention immediately.
Skin Contact	Immediately wash skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated shoes.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion	If swallowed, induce vomiting as directed by medical personnel. Get medical attention. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.
Note to Physicians	No additional remark

Section 5. Fire Fighting Measures

Flammability Properties	Non-flammable.
Suitable Extinguishing Media	Use dry chemical, alcohol foam or CO ₂ . Water or foam may cause frothing.
Unsuitable Extinguishing Media	Not available
Specific Hazards Arising From Chemical	Not considered to present risks of explosion. However, contains up to 5% occluded chlorobenzene, which can present a fire hazard if sufficient oxygen and a source of ignition is present. Ground containers and equipment to avoid static charge accumulation and/or use an inert atmosphere to prevent combustion.
Protective Equipment and Precautions for Firefighters	Non-flammable.

Section 6. Accidental Release Measures

Personal Precautions	Chemical resistant coveralls, gloves and boot covers. Shoes/boots. A full-face piece respirator with dual organic vapor and particulate matter cartridge is recommended.
Environmental Precautions	Not available
Methods for Containment	Use appropriate tools to put the spilled solid in a convenient waste disposal container.
Methods for Clean-Up	Stop the leak if possible. Ventilate the area involved. Sweep up the material and place in container for later disposal.

Section 7. Handling and Storage

Handling	Do not taste or swallow. Avoid breathing dust. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
Storage	Store in ventilated area away from sources of ignition.

Section 8. Exposure Controls/Personal Protection

Personal Protective Equipment	Chemical resistant coveralls, gloves and boot covers. Shoes/boots. A full-face piece respirator with dual organic vapor and particulate matter cartridge is recommended. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Engineering Controls	Investigate engineering techniques to reduce exposures. Provide ventilation if necessary to minimize exposure. If practical use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Exposure Limits:	<i>Maleic anhydride</i> : CAS# 108-31-6: United Kingdom, WEL - TWA: 1 mg/m ³ TWA, WEL - STEL: 3 mg/m ³ STEL United States: TWA: 0.25 ppm from OSHA/NIOSH; TWA: 0.25 ppm from ACGIH.	
DNEL-values	Chlorendic Anhydride: DNEL (Derived No Effect Level) for Worker	
	DNEL type	DNEL value
	DNEL acute dermal, short-term (local)	1 mg/cm ³
	DNEL acute dermal, short-term (systemic)	43 mg/kg bw/day
	DNEL long-term dermal (systemic)	3.7 mg/kg bw/day
	DNEL long-term dermal (local)	0.56 mg/cm ³
	DNEL acute inhalation (local)	299 mg/m ³
	DNEL acute inhalation (systemic)	299 mg/m ³
	DNEL long-term inhalation (local)	33.23 mg/m ³
	DNEL long-term inhalation (systemic)	15 mg/m ³
	Chlorendic Anhydride: DNEL (Derived No Effect Level) for the general population	
	DNEL type	DNEL value
	DNEL acute dermal, short-term (local)	0.5 mg/cm ³
	DNEL acute dermal, short-term (systemic)	21 mg/kg bw/day
	DNEL long-term dermal (systemic)	3 mg/kg bw/day
	DNEL long-term dermal (local)	0.28 mg/cm ³
	DNEL acute inhalation (local)	0.042 mg/m ³
	DNEL acute inhalation (systemic)	149 mg/m ³
	DNEL long-term inhalation (local)	16.62 mg/m ³
	DNEL long-term inhalation (systemic)	12 mg/m ³

Section 9. Physical and chemical properties			
Appearance	Fine, crystalline solid.	Odor	No distinctive odor.
Molecular Weight	371	Color	White to yellowish.
pH (1% soln/water)	Not Available.	Boiling Point	Not available.
Melting Point	235°C (455°F)	Critical Temperature	Not available.
Relative Density	1.73 (Water = 1)	Vapor Pressure	2 mm of Hg (@ 20°C)
Vapor Density	13 (Air = 1)	Volatility	Not available
Evaporation Rate	Not available.	Viscosity	Not available.
Ionicity (In Water)	Not available.	Dispersion Properties	Not available.
Flash Point	Not available.	Auto Ignition Temp.	Not available.
Partition Coefficient Log n-Octanol/Water	Octanol/water = 1.39; 1,2-dichlorobenzene/water = 0.49		
Solubility	Easily soluble in acetone. Soluble in methanol, diethyl ether, n-octanol. Insoluble in cold water, hot water		
Flammability	Non-flammable. However, contains up to 5% occluded chlorobenzene, which can present a fire hazard if sufficient oxygen and a source of ignition is present. Ground containers and equipment to avoid static charge accumulation and/or use an inert atmosphere to prevent combustion.		
Explosive Properties	Not considered to present risks of explosion.		
Oxidising Properties	Not available.		

Section 10. Stability and Reactivity Data	
Chemical Stability	The product is stable.
Conditions to Avoid	No additional remark.
Incompatible Materials	Highly reactive with oxidizing agents, organic materials. Slightly reactive to reactive with reducing agents, acids, alkalis. Very slightly to slightly reactive with metals.
Hazardous Decomposition Products	Not available
Possibility of Hazardous Reactions	Not available

Section 11. Toxicological Information	
Toxicity to Animals	<i>115-27-5, Chlorendic Anhydride</i> : Acute oral toxicity (LD50): 1138-3130 mg/kg, Slightly toxic (Rat) Acute dermal toxicity (LD50): > 10000 < 20000 mg/kg (Rabbit), practically non-toxic. Acute inhalation toxicity (LC50): > 203 mg/l 1-hour exposure, > 65 mg/l 4-hour exposure (Rat), practically non-toxic. Eye Irritation: Severely irritating (Rabbit)



	<p>Skin Irritation: Practically non-irritating 0.8/8.0 (Rabbit)</p> <p>Allergic skin reaction was reported in guinea pigs after repeated skin application. Repeated skin contact produced skin irritation, stomach lesions, diarrhea, nasal and eye discharge, decreased activity, anorexia and dehydration in rats. Decreased body weights, decreased food consumption and changes in heart, liver, kidney and spleen weights were reported after repeated dietary administration to rats. Repeated inhalation of dust produced nasal and eye irritation, salivation, hair loss, decreased body weight gain, liver and thyroid changes, lesions in the lung and stomach and cellular changes in the respiratory tract and stomach. No birth defects were reported in the offspring of rats given Chlorendic anhydride orally during fetal development. No genetic changes were reported in standard tests using animals and animal and bacterial cells. Genetic changes were reported in a standard test using human cells.</p> <p><i>108-31-6, Maleic anhydride in RTECS (#ON3675000):</i> Dermal, guinea pig: LD50 = >20 gm/kg; Draize test, rabbit, eye: 1% Severe; Oral, mouse: LD50 = 465 mg/kg; Oral, rabbit: LD50 = 875 mg/kg; Oral, rat: LD50 = 400 mg/kg; Skin, rabbit: LD50 = 2620 mg/kg.</p> <p><i>115-28-6, Chlorendic Acid in RTECS (#RB9000000):</i> Draize test, rabbit, eye: 250 ug/24H Severe; Draize test, rabbit, skin: 500 mg/24H Mild.</p> <p>The National Toxicology Program (NTP) has concluded that there is clear evidence of carcinogenicity (cancer) in a feeding study of rats and mice using Chlorendic acid. International Agency for Research on Cancer (IARC) has given Chlorendic acid an overall evaluation of 2B (possibly carcinogenic).</p> <p><i>108-90-7, Chlorobenzene:</i> Oral, LD50, Rat: 1110 mg/kg; Mouse: 2300 mg/kg.</p>
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Section 12. Ecological Information								
Ecotoxicology	<i>115-27-5, Chlorendic Anhydride:</i> 48-hour LC50: 110.7 ppm Daphnia magna, practically non-toxic 96-hour LC50: 422.7 ppm Bluegill sunfish, practically non-toxic 96-hour LC50: 422.7 ppm Rainbow trout, practically non-toxic							
PNEC-values	Chlorendic Anhydride: Predicted No Effect Concentration (PNEC)							
	Fresh water	Marine water	Intermittent release	Sediment (fresh water)	Sediment (marine water)	Soil (Terrestrial)	STP (sewage treatment plant)	Oral (mammals)
	0.097 mg/L	0.0097 mg/L	0.97 mg/L	0.097 mg/kg dw	0.0097 mg/kg dw	0.106 mg/kg dw	16.23 mg/L	2.51 mg/kg food
Chemical Fate	Chlorendic anhydride is not likely to bioconcentrate. It is rapidly degraded by light to Chlorendic acid. The half-life is 140+/-37 days.							

Section 13. Disposal Considerations	
Waste Disposal	Recycle to process, if possible. Consult your local or regional authorities for disposal options.

Section 14. Transport information			
ADR	IMDG	IATA	Special Provisions for Transport
Not controlled.			
Customs Classification	International HTS# 2917.20.0000		

Section 15. Other Regulatory Information and Pictograms	
Federal and State Regulations	<p>All components of this product are in compliance with the following Inventories:</p> <p>United States (TSCA), Canada (DSL), Australia (AICS), China (IECSC), European Union (EINECS), Japan (ENCS), Korea (ECI), New Zealand (NZIoC), Philippines (PICCS)</p>

	This product contains a chemical known to the State of California to cause cancer (Chlorendic Acid).				
EU Directive 67/548/EEC	Classification: Xi; Xn; T R/20/21/22 R36/37/38, R42/43, R45, R48, R52/53		Labeling: Xn; T Symbol R20/21/22, 36/37/38, 42/43, 45, 48, 52/53 S24/25, 26, 36/37/39, 45, 61		Symbol:  Xn  T
	<p>Xi, Xn, T Symbol; R20/21/22 – Harmful by inhalation, in contact with skin and if swallowed R36/37/38 – Irritating to eyes, respiratory system and skin. R42/43 – May cause sensitization by inhalation and skin contact. R45 – May cause cancer R48 – Danger of serious damage to health by prolonged exposure R52/53 – Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.</p> <p>S22 – Do not breathe dust. S24/25 – Avoid contact with skin and eyes. S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39 – Wear suitable protective clothing, gloves and eye/face protection. S45 – In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S61 – Avoid release to the environment. Refer to special instructions/Safety data sheets.</p>				
Other Classifications	WHMIS (Canada) class D-2B: Material causing other toxic effects (TOXIC)				
	Germany: Ordinance on the Classification of Water-Endangering Substances. This substance has been assigned WGK Class: 2 (water endangering); WGK Identification Number: None; assigned by Velsicol Chemical LLC, pending further evaluation. EU: chemical safety assessment has been carried out for Chlorendic anhydride by the supplier.				
HMIS (U.S.A.)	Health Hazard	1*	National Fire Protection Association (U.S.A.)	Health	1
	Fire Hazard	1		Fire Hazard	1
	Reactivity	1		Reactivity	1
	Personal Protection			Specific Hazard	

Section 16. Other information		
GHS Regulation	Classification	Hazard Statement
	Skin Mild Irritation 3	H316: Causes mild skin irritation
	Skin Sensitization 1	H317: May cause an allergic skin reaction
	Eye Irritation 2A	H319: Causes serious eye irritation
	Carcinogen 2	H351: Suspected of causing cancer though oral exposure
	STOT Repeated Exposure 2	H373: May cause damage to lungs, stomach, heart and liver through prolonged or repeated exposure to oral, dermal and inhalation.
	Aquatic Acute 3	H413: May cause long lasting harmful effects to aquatic life.
	GHS Pictograms	
	GHS08: health hazard; GHS07: exclamation mark	
	Precautionary statements	
	P202: Do not handle until all safety precautions have been read and understood. P260: Do not breathe dust/fume/gas/mist/vapors/spray. P262: Do not get in eyes, on skin, or on clothing. P264: Wash ... thoroughly after handling. P272: Contaminated work clothing should not be allowed out of the workplace. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection. P332: If skin irritation occurs: wash affected area with soap and water and seek medical advice. P308 + P313: IF exposed or concerned: Get medical advice/attention. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	

	<p>P314: Get medical advice/attention if you feel unwell. P363: Wash contaminated clothing before reuse. P403+P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up. P501: Dispose of contents/container in accordance with local/regional/national/international regulation</p>	
References	<ul style="list-style-type: none"> -REGISTRY Database, Chemical Abstract Service -CHEMLIST Database, Chemical Abstract Service -Registry of Toxic Effects of Chemical Substances (RTECS) -Hazardous Substance Data Bank (HSDB), National library of Medicine, #2920 -LOLI Database -ICRMS North American Database, Ariel Research Corporation -ICRMS European Database, Ariel Research Corporation -ICRMS Inventories Database, Ariel Research Corporation -Product Information Bulletin, Velsicol Chemical LLC -Material Safety Data Sheet, Velsicol Chemical LLC -Velsicol Chemical LLC, unpublished studies 	
Contact Information	<p>SDS or Regulatory information, contact:</p> <p>Dawei Li Velsicol Chemical LLC 1199 Warford Street Memphis, TN 38108 Phone: 901-323-6226, ext. 124 Fax: 901-324-5897 dli@velsicol.com</p>	<p>Technical or Product Support Information, contact:</p> <p>Sherman Friedman Velsicol Chemical LLC 10400 W. Higgins Road Rosemont, IL 60018 U.S.A. Phone: 847-635-3486 Fax: 847-298-9018 Email: sfriedman @velsicol.com</p>
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