



Material Safety Data Sheet

MSDS/SDS Number: 00000001MSDS
Latest Revision Date: October 7, 2009
Revision: G

SECTION 1 IDENTIFICATION OF THE SUBSTANCE OR PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Name: Millipore Chlorine Tablets
Catalogue Number(s): ZWCL01F50
Chemical Name: Sodium Dichloroisocyanurate, Dihydrate and Adipic Acid with additives not classified as hazardous chemicals.
Synonyms: None
Intended Product Use: Tablets for sanitizing water purification equipment.

Manufacturer/Distributor: Millipore Corporation (Corporate Headquarters) Millipore Australia Pty. Limited ACN number: ACN 001 239 818
Postal Address: 290 Concord Road Billerica MA, USA 9A Byfield Street, Locked Bag, 1670 North Ryde, NSW, 2113 Australia
Telephone Number: +1-978-715-1335 (02)-9888-8999 or 1-800-222-111 24 hours (Fax: (02) 9878 0788)
Hours of Operation: 9:00 am to 4:00 pm ET (GMT -4) After hours these calls will be diverted to an answering machine that will provide telephone numbers of on-call staff.

Email: msds@millipore.com
Worldwide Offices: <http://www.millipore.com/offices/cp3/officeshome>
CHEMTREC Emergency Telephone Number: International +1-703-527-3887 (collect)
North America 1-800-424-9300 (toll free)

SECTION 2 HAZARDS IDENTIFICATION

Statement of Hazardous Nature: Sodium Dichloroisocyanurate dihydrate is on the List of Designated Hazardous Substances [NOHSC:10005(1999)] and, therefore, is Hazardous according to the criteria of Worksafe Australia.

GHS Hazard Class:



Hazardous to the Aquatic Environment – Acute Hazard: Category 1



Acute Toxicity: Category 4 (oral)
Serious Eye Damage/Eye Irritation: Category 2A
Specific Target Organ Toxicity - Single Exposure: Category 3

Signal Word and Hazard Statement: Warning: Very Toxic to Aquatic Life. (H400)
 Warning: Harmful if swallowed. (H301)
 Warning: Causes serious eye irritation. (H318)
 Warning: May cause respiratory irritation. (H335)

EU Hazard Symbol Pictogram:



N (R50)



Xi (R36/37)

Xn (R22, R37)

SECTION 3 COMPOSITION/INFORMATION ON INGREDIENTS

Identification of Dangerous Components: This product contains the substances listed below, which are defined as dangerous substances or hazardous chemicals as defined in European Community Directives 67/548/EEC or 1999/45/EC, and Hazard Communication Standard 29 CFR 1910.1200.

Dangerous Component	EINECS or ELINCS No.	CAS No.	Content (weight percent)	EU Hazard Symbol Letters*†	R Phrases** †
Sodium Dichloroisocyanurate, Dihydrate:	220-767-7	51580-86-0	50-100%	Xn N	R22 R31 R36/37 R50/53
Adipic Acid:	204-673-3	124-04-9	2.5-10%	Xi	R36

* Symbol letters and categories of danger: **T+** = Very toxic, **T** = Toxic, **C** = Corrosive, **Xn** = Harmful, **Xi** = Irritant, **E** = Explosive, **F+** = Extremely flammable, **F** = Very flammable, **N** = Dangerous for the environment, **O** = Oxidising.

** The full text of each R phrase is listed in Section 15.

† Symbols letters and R Phrases are assigned to each dangerous component for the highest concentration range as defined in 67/548/EEC and 1999/45/EC.

SECTION 4 FIRST AID MEASURES

	Treatment Measures:	Symptoms of Exposure:
Contact with Eyes:	If the product contacts the eyes, promptly wash (irrigate) the eyes with large amounts of tepid water for at least 15 minutes, occasionally lifting the lower and upper lids. Seek medical attention immediately.	Possible eye irritation, redness, swelling, and vision impairment.
Ingestion:	Seek medical attention immediately. Never give an unconscious person anything by mouth. Do not induce vomiting. If conscious give large quantities of water.	Possible gastrointestinal irritation causing nausea and vomiting bleeding and/or tissue destruction.

- Inhalation:** If a person inhales large amounts of the product move the exposed person to fresh air at once. If breathing is difficult or stops seek immediate medical attention. Possible respiratory tract and mucous membrane irritation, coughing, wheezing, runny or bloody nose, sneezing, lung edema (fluid in the lung), which can result in shortness of breath, wheezing, choking, chest pain, and impairment of lung function.
- Skin Contact:** If the product contacts the skin, immediately flush the contaminated skin with mild soap and water. If this chemical penetrates clothing immediately remove the clothing and flush the skin with water. Seek medical attention immediately. Possible skin irritation, redness, swelling, and scab formation.

SECTION 5 FIRE FIGHTING MEASURES

- Suitable Extinguishing Media:** Use extinguishing media appropriate for the surrounding fire. This product is compatible with commercially available extinguishing media.
- Special Protective Equipment for Firefighters:** This product does not require the use of any additional fire fighting equipment beyond what is appropriate to the surrounding fire.

SECTION 6 ACCIDENTAL RELEASE MEASURES

- Personal Precautions:** Wear chemical resistant boots, clothing, eye protection, and gloves to prevent skin contact. (See Section 8)
- Small Spills:** Identify the spilled material(s). Barricade the spill area and notify others in the surrounding areas. Control all sources of ignition if the substance is flammable. Don the appropriate personal protective equipment (See section 8). Control the movement of the spilled product (into drains, soil, across floors etc.) with absorbent spill materials. Collect contaminated spill material and place in container meeting appropriate U.N. packaging requirements. Decontaminate used equipment and affected spill area appropriately.
- Large Spills:** In addition to small spill precautions, determine personnel evacuation distances. Notify appropriate authorities if necessary.
- Environmental Precautions:** Collect and dispose of contaminated materials according to international, federal, state and local regulations. Keep away from surface and ground water, drains, and soil.

SECTION 7 HANDLING AND STORAGE

- Handling:** Seek appropriate training to safely handle this product under normal conditions. Use the recommended personal protective equipment (See Section 8) to prevent chemical exposures. Wash hands with soap and water before eating, drinking, or touching common items (phone, computer, etc.) to prevent cross contamination. Use this product with adequate ventilation. See product technical data sheet for details.
- Storage:** See product technical data sheet for details.
- Specific use:** See product technical data sheet for details.

SECTION 8 EXPOSURE CONTROL AND PERSONAL PROTECTION

Exposure Limit Values:	OSHA PEL	NIOSH REL	ACGIH TLV	Other
Sodium Dichloroisocyanurate, Dihydrate:	Not Listed	Not Listed	Not Listed	None
Adipic Acid:	Not Listed	Not Listed	5 mg/m ³ (TWA)	See Below
Denmark:	TWA 5 mg/m ³ , OCT 2002			
The Netherlands:	MAC-TGG 5 mg/m ³ , 2003			
Russia:	STEL 4 mg/m ³ , JUN 2003			
	Normal Handling Conditions		Emergency Response Conditions	
Engineering Controls:	General room ventilation is adequate for the use of this product.		Provide negative pressure ventilation.	
Respiratory Protection	Use appropriate respiratory protection.		Use appropriate respiratory protection.	
Eye Protection:	Safety glasses with side shields.		Chemical splash goggles or other face protection as appropriate.	
Skin Protection:	Laboratory coat, adequate chemical-resistant gloves.		Chemically resistant boots, clothes, and impermeable gloves as appropriate.	
Environmental Exposure Controls:	Not available.		Not available.	
Other Equipment:	Safety shower, eyewash stations, and hand washing equipment should be available close to the work area as needed.			

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Bright white solid (tablet)		
Odor:	Mild chlorine		
Odor Threshold:	0.08 ppm (chlorine)		
pH:	6.0 @ 25 °C (1% solution)		
Melting Point/Freezing point:	240-250 °C (464-482 °F)		
Initial boiling point and boiling range:	Not Available		
Flash Point:	Not Available		
Evaporation Rate, 20 °C:	Not Available		
Flammability (Solid/Gas):	Non Flammable		
Explosive Limits:	UEL: Not Available	LEL: Not Available	
Vapor Pressure:	None @ 25 °C		
Vapor Density, 20 °C:	Not Available		
Relative Density (Water = 1.0):	0.9 – 1.0 g/cc		

Solubility:	25%
Partition coefficient (n-octanol/water):	Not Available
Auto Ignition Temperature (ASTM D1929):	Not Available
Decomposition temperature:	76 °C (170 °F)
Oxidizing Properties:	Strong Oxidizing Agent
Viscosity, centipoise:	Not Available

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability:	Product is stable under normal operating conditions and use as described in the product technical data sheet.
Conditions to Avoid:	Avoid generating dust, temperatures above 90 °C, high humidity.
Incompatible Materials to Avoid:	Moisture, flammable liquids, combustible materials, oxidizing or chlorinating agents, organic materials, ammonia, ammonium salts, hydrated salts, non-ionic surface active agents, acids and bases.
Hazardous Decomposition Products:	Chlorine and carbon dioxide.

SECTION 11 TOXICOLOGICAL INFORMATION

Toxicology Data: Toxicological information for this product as a whole does not exist, below is data for the individual components.

Sodium Dichloroisocyanurate, Dihydrate: RTECS #XZ1910000

Adipic Acid: RTECS #AU8400000

	Toxicity Test	Exposure Route	Dose	Observed Effect	
Acute Toxicity:	Sodium Dichloroisocyanurate, Dihydrate:	LD ₅₀ (Rat)	Oral	1,420 mg/kg	Behavioral: Somnolence (general depressed activity)
					Lung, Thorax, or Respiration: Acute pulmonary edema Liver: Other changes ⁴
					Gastrointestinal: Ulceration or bleeding from stomach ¹
	Adipic Acid:	LD ₅₀ (Mouse)	Oral	1,900 mg/kg	Gastrointestinal: Other changes ²
		LD ₅₀ (Mouse)	Intravenous	680 mg/kg	Behavioral: Convulsions or effect on seizure threshold Blood: Hemorrhage ¹

Skin Corrosion/Irritation:

Sodium Dichloroisocyanurate, Dihydrate:	Skin Irritation (Rabbit)	Skin	500 mg/24 hour	Moderate ³
Serious Eye Damage/Eye Irritation:				
Adipic Acid:	Eye Irritation (Rabbit)	Eye	20 mg/24 hour	Moderate ⁴
Sodium Dichloroisocyanurate, Dihydrate:	Eye Irritation (Rabbit)	Eye	100 mg/24 hour	Mild ⁵
Respiratory or Skin Sensitization:	Not Available			
Germ Cell Mutagenicity:	Not Available			
Reproductive Toxicity:	Not Available			
STOST-Single Exposure:	Not Available			
STOST-Repeated Exposure:	Not Available			
Aspiration Hazard:	Not Available			
Carcinogenicity:	Carcinogenetic information for this product as a whole does not exist, below is data for the individual components.			
Research Agency:	OSHA:	NTP:	IARC:	
Sodium Dichloroisocyanurate, Dihydrate:	Not Listed	Not Listed	Not Listed	
Adipic Acid:	Not Listed	Not Listed	Not Listed	
Medical Conditions Aggravated by Exposure:	Asthma, emphysema, and other respiratory diseases.			

SECTION 12 ECOLOGICAL INFORMATION

Ecotoxicity: Ecotoxicity information for this product as a whole does not exist, below is data for the individual components:

Sodium Dichloroisocyanurate, Dihydrate:	LC ₅₀ (Lepomis Macrochirus) 460.0 ug/L 96 hours ⁶
	LC ₅₀ (Oncorhynchus Mykiss) 250.0 ug/L 96 hours ⁶
Adipic Acid:	LC ₅₀ (Pimephales Promelas) 114,000 ug/L 48 hours ⁷
	LC ₅₀ (Lepomis macrochirus) 330,000 ug/L 24 h ⁸

Mobility:

Adipic Acid: Terrestrial Fate: Based on a recommended classification scheme⁹, an estimated Koc value of 26(SRC), determined from a measured log Kow of 0.08¹⁰ and a recommended regression-derived equation¹¹, indicates that adipic acid is expected to have very high mobility in soil(SRC). Volatilization of adipic acid is not expected to be important from moist soil surfaces(SRC) given an estimated Henry's Law constant of 4.7X10⁻¹² atm-cu m/mole(SRC) from its extrapolated vapor pressure, 7.4X10⁻⁷ at 30 deg C¹², and measured water solubility, 3.0X10⁺⁴ mg/l at 30 deg C¹³. Adipic acid is not expected to volatilize from dry soil surfaces based on its extrapolated vapor pressure¹². Biodegradability screening tests indicate that adipic acid is readily biodegradable(SRC). An 84% conversion of adipic acid's carbon content to

carbon dioxide was observed after 30 days aerobic incubation in soil biometer flasks at an initial adipic acid concn of 1 mg/g soil¹⁴.

Aquatic Fate: Based on a recommended classification scheme³, an estimated Koc value of 26(SRC), determined from a measured log Kow of 0.08⁴ and a recommended regression-derived equation¹¹ indicates that adipic acid is not expected to adsorb to suspended solids and sediment in water(SRC). Adipic acid is not expected to volatilize from water surfaces(3,SRC) based on an estimated Henry's Law constant of 4.7X10⁻¹² atm-cu m/mole(SRC) from its extrapolated vapor pressure, 7.4X10⁻⁷ mm Hg at 30 deg C¹², and measured water solubility, 3.0X10⁺⁴ mg/l at 30 deg C¹³. Adipic acid's pKa's of 4.44 and 5.4¹⁵ indicate that adipic acid will exist predominately in the ionized form under environmental pHs(SRC). Volatilization of the ionized form from water surfaces is not expected to be an important fate process(SRC). According to a classification scheme¹⁶, an estimated BCF value of 0.68(3,SRC), from a measured log Kow⁴, suggests that bioconcentration in aquatic organisms is low(SRC). Biodegradability screening tests indicate that adipic acid is readily biodegradable(SRC). Adipic acid was rapidly degraded in a river die-away test using Main River (Germany) water; 50% and 90% degradation being achieved in 3.5 and 7 days, respectively, at concn levels of 700 mg/l¹⁷.

Atmospheric Fate: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere¹⁸, adipic acid, which has an extrapolated vapor pressure of 7.4X10⁻⁷ mm Hg at 30 deg C¹², will exist in both the vapor and particulate phases in the ambient atmosphere. Vapor-phase adipic acid is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals(SRC); the half-life for this reaction in air is estimated to be about 2.9 days(3,SRC). Particulate-phase adipic acid may be physically removed from the air by wet and dry deposition(SRC).

Persistence and Degradation:

Adipic Acid: Adipic acid is readily biodegradable^{17,19,20,21,22}. In four biodegradability screening tests that were designed as models for degradability in surface water, the results ranged from 92% of theoretical BOD in 14 days to 83% in 30 days^{19,20}. In 5 tests designed to simulate treatment plants, results ranged from 99% DOC removal in 1 day to 92% of theoretical BOD in 14 days^{19,20,22}. A screening procedure that was systematically applied to a large number of organic chemicals typified adipic acid as being "completely biodegraded in a short time by general microorganisms"²¹. After a 5-10 hr lag, 50-75% of theoretical BOD was obtained in 90-100 hr²¹. Adipic acid was rapidly degraded in a river die-away test using Main River (Germany) water; 50% and 90% degradation being achieved in 3.5 and 7 days, respectively, at concentration levels of 700 mg/l²². A test designed to simulate degradation in polluted river water, the AFNOR test, gave a 5 day BOD of 36% of theoretical²². Adipic acid, present at a concentration of 100 mg/l, reached 68 to 90% of its theoretical BOD in 2 weeks using an activated sludge inoculum²³.

Bio Accumulative Potential:

Adipic Acid: An estimated BCF value of 0.68 was calculated for adipic acid(SRC), using a measured log Kow of 0.08¹⁰ and a recommended regression-derived equation¹¹. According to a classification scheme¹⁶, this BCF value suggests that bioconcentration in aquatic organisms is low(SRC).

Results of PBT Assessment: Not Available

Other adverse effects: Not Available

SECTION 13 DISPOSAL INFORMATION

Substance: Dispose of unused contents in accordance with international, federal, state, and local regulations.

Contaminated Packaging: Dispose of container in accordance with international, federal, state and local requirements.

SECTION 14 TRANSPORTATION INFORMATION

UN Number: UN3077
Class: 9
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
Packing Group: III
Marine Pollutant: Not Listed
Other Applicable Information: None

SECTION 15 REGULATORY INFORMATION

Australia: Hazchem Code: 2ZE
Poisons Schedule Number: S2

California: Proposition 65 Listed: Not Listed

Canada: WHMIS: C, D2B

European Union: REACH: Chemical Safety Assessment for the substance or substances in the preparation not required.

Substances of Very High Concern (SVHC) - October 28th, 2008: This product does not contain SVHC's in concentrations above 0.1% weight/weight.

Category of danger: Xn: Harmful
Xi: Irritant
N: Dangerous for the environment

Risk phrases: R22: Harmful if swallowed
R31: Contact with acids liberates toxic gas
R37: Irritating to respiratory system.
R36/37: Irritating to eyes and respiratory system.
R50: Very toxic to aquatic organisms.
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases: S7/9: Keep container tightly closed and in a well-ventilated place.
 S20/21: When using do not eat, drink or smoke.
 S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 S27/28: After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of soap and tepid water.
 S29/35: Do not empty into drains; dispose of this material and its container in a safe way.
 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

OECD/High Production Volume (HPV) chemicals: Not Listed

RoHS: This product does not contain RoHS listed substances in concentrations above the established thresholds.

Japan: Poisonous and Deleterious Substances Control Law: Not Listed

United Kingdom Control of Substances Hazardous to Health Regulations 2002 (COSHH) Rating: Not Listed

SECTION 16 ADDITIONAL INFORMATION

Training Advice: Seek effective chemical handling training to reduce the hazards associated with this product prior to use.

Technical Contact: <http://www.millipore.com/support>

Abbreviations Used

ACGIH	American Conference of Government Industrial Hygienists
ADR	European agreement on the international carriage of dangerous goods on road
CAS	Chemical Abstract Service
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EPA	United States Environmental Protection Agency
IARC	International Agency for Research in Cancer.
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMDG	Regulations regarding the transportation of dangerous goods on ocean-going vessels issued by the International Maritime Organization.
LC ₅₀	Lethal Concentration 50% is the concentration of a chemical which kills 50% of a sample population
LD ₅₀	Lethal Dose 50% is the dose of a chemical which kills 50% of a sample population.
LD _{Lo}	Lowest observed lethal dose
LEL	Lower Explosive Limit

MSFU	Manufacture, Formulation, Supply and Use (Section 13)
NIOSH	National Institute of Occupational Safety and Health (US)
NTP	National Toxicology Program (US)
OSHA	United States Occupational Safety and Health Administration
RID	International regulations concerning the international carriage of dangerous goods by rail.
RTECS	Registry of Toxic Effects of Chemical Substances (US)
STOST	Specific Target Organ Systemic Toxicity
UEL	Upper Explosive Limit
WHMIS	Workplace Hazardous Materials Information System (Canada)

This safety data sheet has been prepared to comply with the requirements of the European Union regulation on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) 1906/2006 and ANSI standard Z400.1-1998.

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- ¹ "Toxicology of Drugs and Chemicals," Deichmann, W.B., New York, Academic Press, Inc., 1969
 - ² Journal of Agricultural and Food Chemistry. (American Chemical Soc., Distribution Office Dept. 223, POB 57136, West End Stn., Washington, DC 20037) V.1- 1953-
 - ³ Monsanto Co. Toxicity Information. (Monsanto Industrial Chemicals Co., Bancroft Bldg., Suite 204, 3411 Silverside Rd., Wilmington, DE 19810)
 - ⁴ "Prehled Prumyslove Toxikologie; Organicke Latky," Marhold, J., Prague, Czechoslovakia, Avicenum, 1986
 - ⁵ National Technical Information Service. (Springfield, VA 22161) Formerly U.S. Clearinghouse for Scientific & Technical Information.
 - ⁶ Office of Pesticide Programs, Pesticide Ecotoxicity Database (Formerly: Environmental Effects Database (EEDB)), Environmental Fate and Effects Division, U.S.EPA, Washington, D.C., 2000.
 - ⁷ Mattson, V.R., J.W. Arthur, and C.T. Walbridge, Acute Toxicity of Selected Organic Compounds to Fathead Minnows, EPA-600/3-76-097, U.S.EPA, Duluth, MN :12 p., 1976.
 - ⁸ Dowden, B.F., and H.J. Bennett, Toxicity of Selected Chemicals to Certain Animals, J.Water Pollut.Control Fed. 37(9):1308-1316, 1965.
 - ⁹ Swann RL et al; Res Rev 85: 23 (1983)
 - ¹⁰ Hansch C et al; Exploring QSAR. Hydrophobic, Electronic, and Steric Constants. ACS Prof Ref Book. Heller SR (consult ed) Washington,DC: Amer Chem Soc p 23 (1995)
 - ¹¹ Lyman WJ et al; Handbook of Chemical Property Estimation Methods. Washington,DC: Amer Chem Soc pp. 4-9 (1990)
 - ¹² Yaws CL; Handbook of Vapor Pressure, Vol 2 C5 to C7 Compounds, Houston,TX: Gulf Publ Co. p. 391 (1994)
 - ¹³ Yalkowsky SH, Dannenfelser RM; Aquasol Database of Aqueous Solubility. Version 5. College of Pharmacy, Univ of Ariz - Tucson, AZ. PC Version (1992)
 - ¹⁴ Sharabi NED, Bartha R; Appl Environ Microbiol 59: 1201-5 (1993)
 - ¹⁵ Serjeant EP, Dempsey B; Ionisation Constants of Organic Acids in Aqueous Solution IUPAC Chemical Data Series NO.23 NY,NY: Pergamon Press. p. 989 (1979)
 - ¹⁶ Franke C et al; Chemosphere 29: 1501-14 (1994)
 - ¹⁷ Zahn R, Wellens H; Z Wasser Abwasser Forsch 13: 1-7 (1980)
 - ¹⁸ Bidleman TF; Environ Sci Technol 22: 361-367 (1988)
 - ¹⁹ Gerike P, Fischer WK; Ecotox Environ Safety 3: 159-73 (1979)
 - ²⁰ Zahn R, Huber W; Tenside Deterg 12: 266-70 (1975)
 - ²¹ Urano K, Kato Z; J Hazardous Materials 13: 147-59 (1986)
 - ²² Dore M et al; Trib Cebedeau 28: 3-11 (1975)
 - ²³ Chemicals Inspection and Testing Institute; Biodegradation and Bioaccumulation Data of Existing Chemicals Based on the CSCL Japan. Japan Chemical Industry Ecology-Toxicology and Information Center. ISBN #4-89074-101-1 p. 2-78 (1992)