MATHESON
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Safety Data Sheet

Material Name: CHLORINE **SDS ID: 00233315**

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product Identifier

Material Name

CHLORINE

Synonyms

MTG MSDS 22; CHLORINE MOLECULAR; DIATOMIC CHLORINE; DICHLORINE; MOLECULAR CHLORINE; UN 1017; Cl2

Chemical Family

halogens

Product Use

Industrial and Specialty Gas Applications.

Restrictions on Use

None known.

Supplier Information

MATHESON GAS PRODUCT KOREA

91-1 Samgeo-ri; Umbong-myun

Asan City, Korea

Phone: 041-539-7400 (day)

Emergency Phone #: 041-539-7488 (night/weekend/holiday)

Department in charge: SHE

SECTION 2: Hazards identification

Hazard/Risk Classification

Oxidizing Gases - Category 1

Gases Under Pressure - Liquefied gas

Acute Toxicity - Inhalation - Gas - Category 2

Skin Corrosion/Irritation - Category 1

Serious Eye Damage/Eye Irritation - Category 1

Specific Target Organ Toxicity - Single Exposure - Category 3

Specific Target Organ Toxicity - Repeated Exposure - Category 2 (kidneys , respiratory system , teeth)

Hazardous to the Aquatic Environment - Acute - Category 1

Hazardous to the Aquatic Environment - Chronic - Category 1

Safety Data Sheet

Material Name: CHLORINE **SDS ID: 00233315**

Label elements

Hazard symbols

Signal word

Danger

Hazard/Risk Statement

H270 May cause or intensify fire; oxidizer.

H280 Contains gas under pressure; may explode if heated.

H330 Fatal if inhaled.

H314 Causes severe skin burns and eye damage.

H335 May cause respiratory irritation.

H373 May cause damage to organs through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

P220 Keep/Store away from clothing/combustible materials

P244 Keep valves and fittings free from oil and grease

P260 Do not breathe dust/fume/gas/mist/vapors/spray

P273 Avoid release to the environment

P280 Wear protective gloves/protective clothing/eye protection/face protection

Response

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P310 Immediately call a POISON CENTER or doctor

P320 Specific treatment is urgent (see label)

P391 Collect spillage

Storage

P403+P233 Store in a well-ventilated place. Keep container tightly closed

Disposal

None needed according to classification criteria.

Potential Environmental Effects

No information available for the product.

Other Hazards Which Do Not Result in Classification

May cause frostbite upon sudden release of liquefied gas.

SECTION 3: Composition / information on ingredients

CAS	Chemical name	Other Names	Percent
7782-50-5	CHLORINE	--	100

Impurities and stabilizing additives contributing to the GHS Classification

None

SECTION 4: First aid measures

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Skin contact

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse.

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Ingestion

If swallowed, get medical attention.

Most Important Symptoms/Effects

Symptoms: Immediate

respiratory tract burns, skin burns, eye burns

Symptoms: Delayed

kidney damage, respiratory system effects, tooth erosion

Indication of any immediate medical attention and special treatment needed

For inhalation, consider oxygen.

SECTION 5: Firefighting measures

Suitable extinguishing media

Water, Large fires: Flood with fine water spray.

Unsuitable Extinguishing Media

Do not use dry chemicals, carbon dioxide or halogenated extinguishing agents.

Specific hazards arising from the chemical

Oxidizer. May ignite or explode on contact with combustible materials. Containers may rupture or explode if exposed to heat.

Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. For small fires, contain and let burn. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Evacuation radius: 800 meters (1/2 mile).

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear personal protective clothing and equipment, see Section 8.

Environmental precautions

Avoid release to the environment. Keep out of water supplies and sewers.

Methods for Containment

Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so. Reduce vapors with water spray. Stop leak if safe to do so - Prevent entry into waterways,

drains, or confined areas. Do not touch spilled material. Eliminate all ignition sources if safe to do so. Keep unnecessary people away, isolate hazard area and deny entry.

Cleanup Methods

Ventilate closed spaces before entering. Damaged cylinders should be handled only by specialists.

SECTION 7: Handling and storage

Precautions for safe handling

Keep away from clothing and other combustible materials. Do not breathe gas. Do not eat, drink or smoke when using this product. Keep reduction valves free from grease and oil. Wear respiratory protection. Wear suitable protective clothing, gloves and eye/face protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Store in a well-ventilated place.

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Store in a cool, dry place. Keep separated from incompatible substances.

Incompatible Materials

combustible materials, bases, metals, halogens, metal salts, reducing agents, amines, metal carbide, metal oxides, oxidizing materials, halo carbons, acids, arsenic, calcium, iodine, mercuric oxide, ethers, fluorine

SECTION 8: Exposure controls/personal protection

Exposure Guidelines

Component Exposure Limits

CHLORINE	**7782-50-5**
Korea:	1 ppm STEL
	0.5 ppm TWA
ACGIH:	0.1 ppm TWA

	0.4 ppm STEL

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

There are no biological limit values for any of this product's components.

Appropriate engineering controls

Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Eye/face protection

Eye/face protection must be selected in accordance with Korea Occupational Safety and Health Agency certification. Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection

Protective clothing must be selected in accordance with Korea Occupational Safety and Health Agency certification. Wear suitable protective clothing such as coveralls or long sleeve shirt and pants.

Hand protection

Gloves must be selected in accordance with Korea Occupational Safety and Health Agency certification. For the gas: Protective clothing is not required, but recommended. For the liquid: Wear chemical resistant, insulated gloves.

Protective Materials

If there is a possibility of direct contact or exposure to the substance, wear respiratory and eye protection and/or protective clothing, as applicable, which has received Korea Occupational Safety and Health Agency Certification.

Respiratory Protection

Respiratory protection must be selected in accordance with Korea Occupational Safety and Health Agency certification. Any powered, air-purifying respirator with cartridge(s) providing protection against this substance. Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.

Further information

No data available.

SECTION 9: Physical and chemical properties

Appearance	yellow or green gas
Physical State	gas
Physical Form	gas
Color	yellow or green
Odor	distinct odor ,irritating odor
Odor Threshold	0.01 ppm
pH	Not available
Melting Point	-101 °C (-150 °F)
Freezing point	Not available
Boiling Point	-35 °C (-31 °F)
Boiling Point Range	Not available
Flash Point	Not applicable
Evaporation Rate	Not available
Flammability (solid, gas)	Not flammable
Upper Explosive Limit	Not available
Lower Explosive Limit	Not available
Vapor Pressure	5168 mmHg @ 21 °C
Solubility (Other)	Not available
Water Solubility	1.46 % (@ 0 °C)

Vapor Density (air=1)	2.49
Specific Gravity (water=1)	1.5649 at -35 °C
Partition coefficient: n-octanol/water	Not available
Autoignition Temperature	Not available
Decomposition temperature	Not available
Viscosity	0.01327 cp
Molecular Weight	70.906
Density	3.214 g/L at 0 °C
Molecular Formula	Cl2

Solvent Solubility

Soluble

alkali, chlorides, alcohols

SECTION 10: Stability and reactivity

Reactivity

May intensify fire; oxidizer.

Chemical stability

Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to avoid

Avoid contact with combustible materials. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers. May ignite or explode on contact with combustible materials.

Materials to Avoid (Incompatibilities)

combustible materials, bases, metals, halogens, metal salts, reducing agents, amines, metal carbide, metal oxides, oxidizing materials, halo carbons, acids, arsenic, calcium, iodine, mercuric oxide, ethers, fluorine

Hazardous Decomposition Products

Chlorine

Water or Moisture

hypochlorous acid, hydrochloric acid

SECTION 11: Toxicological information

Information on Likely Routes of Exposure

Inhalation

burns, difficulty breathing, headache, dizziness, bluish skin color, lung damage, chest pain, hyperactivity, emotional disturbances, death, vomiting, lung congestion, lack of sense of smell, tooth decay

Skin

burns, frostbite

Eye

burns, frostbite

Ingestion

ingestion of a gas is unlikely

Health Hazards

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

CHLORINE (7782-50-5)

Oral LD50 Rat 5800 mg/kg (females)

Inhalation LC50 Rat 293 ppm 1 h

Acute Toxicity Estimate

Inhalation - Gas	146.5 ppm
Oral	> 2000 mg/kg

Immediate Effects

respiratory tract burns, skin burns, eye burns

Delayed Effects

respiratory tract burns, skin burns, eye burns, kidney damage, tooth erosion, respiratory system effects

Skin corrosive/irritant

No data available.

Serious eye damage/irritation

No data available.

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Component Carcinogenicity

CHLORINE	**7782-50-5**
ACGIH:	A4 - Not Classifiable as a Human Carcinogen

Mutagenic Data

No data available.

Reproductive Effects Data

No data available.

Specific Target Organ Toxicity - Single Exposure

respiratory tract

Specific Target Organ Toxicity - Repeated Exposure

kidneys, teeth, respiratory system respiratory tract.

Aspiration hazard

Not applicable.

Medical Conditions Aggravated by Exposure

heart problems

SECTION 12: Ecological information

Ecotoxicity

Very toxic to aquatic life with long lasting effects.

Component Analysis - Aquatic Toxicity

CHLORINE	**7782-50-5**
Fish:	LC50 96 h Lepomis macrochirus 0.44 mg/L [flow-through]; LC50 96 h Oncorhynchus mykiss 0.014 mg/L [flow-through]; LC50 96 h Oncorhynchus mykiss 0.014 mg/L; LC50 96 h Oncorhynchus mykiss 0.104 - 0.168 mg/L [static]; LC50 96 h Pimephales promelas 0.08 mg/L [flow-through]; LC50 96 h Pimephales promelas 0.1 mg/L
Invertebrate:	LC50 48 h Daphnia magna 0.017 mg/L IUCLID

Abiotic degradation

Rapidly undergoes disproportionation in water to form hypochlorous acid and chloride ion.

Persistence and degradability

No information available for the product.

Bioaccumulative Potential

No information available for the product.

Mobility in soil

No information available for the product.

Other adverse effects

No additional information available.

SECTION 13: Disposal considerations

Disposal Methods

Dispose of contents/container in accordance with the regulations outlined in the Waste Management Act.

Disposal Precaution

Empty containers may contain product residue. Dispose of contents/container in accordance with the regulations outlined in the Waste Management Act.

SECTION 14: Transport information

IATA Information:

UN#: UN1017

Shipping Name: CHLORINE

Hazard Class: 2.3

Required Label(s): 2.3, 5.1, 8

Packing Group: Not applicable

Forbidden by Air

Marine pollutant: Marine pollutant

ICAO Information:

UN#: UN1017

Shipping Name: CHLORINE

Hazard Class: 2.3

Required Label(s): 2.3, 5.1, 8

Packing Group: Not applicable

Forbidden by Air

Marine pollutant: Marine pollutant

IMDG Information:

UN#: UN1017

Shipping Name: CHLORINE

Hazard Class: 2.3

Required Label(s): 2.3, 5.1, 8, P

Packing Group: Not applicable

Marine pollutant: Marine pollutant

International Bulk Chemical Code

This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Special precautions

No additional information available for the product.

SECTION 15: Regulatory information

Korea Regulations

Industrial Safety and Health Act

CHLORINE	**7782-50-5**
Hazardous Substances Subject to Control:	
Gas Phase Substances:	>=1 % mixture

Harmful Agents Subject to Work Environment Monitoring (Measurement Cycle: 6 months):	
Gas Phase Substances:	>=1 % mixture (Measurement cycle: 6 months)
Harmful Agents Subject to Workers Requiring Health Examination (Diagnostic cycle : 12 Months):	
Gas Phase Substances:	>=1 % mixture (Diagnostic cycle: 12 months)
Matters subject to Submission of Process Safety Reports (PSM):	
Manufacturing or Handling	Yes
Storage	Yes
Occupational exposure limit values:	
TWA.	0.5 ppm TWA Serial No. 420
STEL	1 ppm STEL Serial No. 420

Chemicals Control Act (CCA)

The following component(s) of this material are listed:

CHLORINE	**7782-50-5**
Accident Precaution Chem. - Quantity Lmt. Man./Use:	450000 kg/yr
Accident Precaution Chem. - Quantity Lmt. Custody/Storage:	10000 kg/yr
Accident Precaution Chemicals:	25 %

Dangerous Materials Safety Control Act

This product is not regulated under the Dangerous Materials Safety Control Act.

Waste Management Act

Not applicable

Other requirements in domestic and other countries

No data available.

Component Analysis - Inventory

CHLORINE (7782-50-5)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	No	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
No	Yes	Yes	Yes	Yes	Yes	Yes

SECTION 16: Other information

Information sources and references

Available upon request.

Preparation Date

Reformat: 18 July 2016

Revision date

Issue Date

18 July 2016

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU -

European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

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