Safety Data Sheet

Section 1: Identification

Product identifier

Product Name • **Chlorine**

CAS Number • 7782-50-5

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Disinfectant and/or algecide; manufacturing process

Details of the supplier of the safety data sheet

Manufacturer • Axiall, LLC

1000 Abernathy Rd. NE, Suite 1200
Atlanta, GA 30328
United States
www.axiall.com
msdsinfo@axiall.com

Telephone (General) • +1 225-685-1240

Emergency telephone number

Manufacturer • +1 304-455-6882

Section 2: Hazard Identification

United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Oxidizing Gases 1
Liquefied Gas
Skin Corrosion 1A
Serious Eye Damage 1
Acute Toxicity Inhalation 2
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation

Label elements

OSHA HCS 2012

DANGER

Hazard statements • May cause or intensify fire; oxidizer
Contains gas under pressure; may explode if heated
Causes severe skin burns and eye damage.
Causes serious eye damage

Fatal if inhaled
May cause respiratory irritation

Precautionary statements

Prevention

- Keep/Store away from clothing and other combustible materials.
Keep reduction valves free from grease and oil.
Do not breathe gas/mist/vapours/spray.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Wear respiratory protection.
In case of inadequate ventilation wear respiratory protection.

Response

- In case of fire: Stop leak if safe to do so.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Specific treatment is urgent (see supplemental first aid instructions on this label).
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Storage/Disposal

- Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Protect from sunlight.
Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to: WHMIS

Classification of the substance or mixture

WHMIS

- Compressed Gas - A
Corrosive - E
Very Toxic - D1A

Label elements

WHMIS

- Compressed Gas - A
Corrosive - E
Very Toxic - D1A

Other hazards

WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

Substances

Composition				
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive
Chlorine	**CAS:**7782-50-5	>= 99.5%	NDA	**OSHA HCS 2012:** Press. Gas - Liq.; Ox. Gas 1; Eye Dam. 1; Skin Corr. 1A; Acute Tox. 2 (inhl)

Mixtures

- Material does not meet the criteria of a mixture.

Section 4: First-Aid Measures

Description of first aid measures

Inhalation

- If inhaled: After properly protecting yourself, move person to fresh air. Contact a poison control center, emergency room or physician as soon as possible as further treatment will be necessary. If person is not breathing, call 911 or an ambulance, then give artificial respiration immediately. Trained personnel should administer humidified oxygen.

Skin

- If on Skin or Clothing (contact with liquid chlorine): Use emergency shower immediately for at least 15 minutes. Remove contaminated clothing under the shower. Call a Poison Control Center or doctor for treatment advice. If on skin (contact with gaseous chlorine): Immediately change contaminated clothing and wash contaminated area with soap and water. Refer to a physician if irritation persists or if the skin is blistered or broken.

Eye

- If in Eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. If contact lenses are present, remove the lenses after the first 5 minutes, then continue rinsing eye. Call a Poison Control Center or doctor for treatment advice.

Ingestion

- If swallowed, rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Do not use mouth-to-mouth method if victim ingested the substance. Obtain medical attention immediately if ingested. Contact 304-455-6882 or your Poison Control Center for 24-hour emergency medical treatment information. Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

- Symptoms may become more severe up to 36 hours after exposure including pulmonary edema. Excellent warning properties force rapid escape from chlorine gas. Exposure to high concentrations for a short time can result in acute respiratory failure with later complications being tracheobronchopneumonitis and pulmonary edema. A person with a severe inhalation exposure should be hospitalized and treated as a respiratory emergency. Any chlorine exposure in an individual with compromised pulmonary function (COPD) should be regarded as a severe inhalation and as a respiratory emergency.

Section 5: Fire-Fighting Measures

Extinguishing media

Suitable Extinguishing Media

- In case of fire use media as appropriate for surrounding fire.

Unsuitable Extinguishing Media

- None known.

Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards

- Containers may explode when heated.
Ruptured cylinders may rocket.
Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices.
Vapors from liquefied gas are initially heavier than air and spread along ground.
May ignite combustibles (wood, paper, oil, clothing, etc.)
Chlorine will support combustion. It reacts readily with hydrocarbons, alcohols, ethers, and some metals, possibly with explosive violence. It will react with (burn) steel containers at temperatures above 450°F (232°C).
These are strong oxidizers and will react vigorously or explosively with many materials including fuels.

Hazardous Combustion Products

- Decomposition products may include the following materials: halogenated compounds.

Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
Wear positive pressure self-contained breathing apparatus (SCBA).
Move containers from fire area if you can do it without risk.
LARGE FIRES: Cool containers with flooding quantities of water until well after fire is out.
LARGE FIRES: Dike fire-control water for later disposal.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Ventilate the area before entry. Do not walk through spilled material. Wear a self-contained breathing apparatus and appropriate Personal Protective Equipment (PPE) Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. If you have not donned special protective clothing approved for this material, do not expose yourself to any risk of this material touching you.

Emergency Procedures

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Do not get water inside container. Ventilate closed spaces before entering.

Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Stop leak if you can do it without risk.
Do not direct water at spill or source of leak.
If possible, turn leaking containers so that gas escapes rather than liquid.
Use water spray to reduce vapors or divert vapor cloud drift.
Avoid allowing water runoff to contact spilled material.
Dike to collect large liquid spills.
Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Section 7 - Handling and Storage

Precautions for safe handling

Handling

- Use only in well ventilated areas. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe gas, mist, vapors, spray. Do not get in eyes, on skin, or on clothing. Personnel near or handling chlorine should at all times, carry a

NIOSH approved chemical cartridge type escape respirator and be trained in its use. High pressure gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Never, place a leaking container in water or spray leaking container with water. Never tamper with fusible plugs or safety devices on containers; never manifold containers from liquid valves. Make sure piping is dry and free of contamination of any type before admitting chlorine. Use only dry, oil-free air (-40°F dew point minimum) or oil-free nitrogen for purging, testing for leaks, or padding. Toxic to aquatic life. Keep out of waterways. Axiall ships chlorine in bulk tank cars, tank trucks, barges and by pipeline. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

Conditions for safe storage, including any incompatibilities

Storage

- Keep container tightly closed. Store in a cool, dry, well-ventilated place. Keep away from heat and moisture. Heating could melt plugs on cylinders and ton tanks and cause safety valves on tank cars to vent, causing leaks. Moisture (more than 150 ppm or water) and chlorine can form hydrochloric and hypochlorous acids, which are corrosive. Do not store near combustible materials.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines						
	Result	**ACGIH**	**Canada British Columbia**	**Canada Ontario**	**Canada Quebec**	**NIOSH**
Chlorine (7782-50-5)	STELs	1 ppm STEL	1 ppm STEL	1 ppm STEL	1 ppm STEV; 2.9 mg/m3 STEV	Not established
	TWAs	0.5 ppm TWA	0.5 ppm TWA	0.5 ppm TWA	0.5 ppm TWAEV; 1.5 mg/m3 TWAEV	Not established
	Ceilings	Not established	Not established	Not established	Not established	0.5 ppm Ceiling (15 min); 1.45 mg/m3 Ceiling (15 min)

Exposure Limits/Guidelines (Con't.)		
	Result	**OSHA**
Chlorine (7782-50-5)	Ceilings	1 ppm Ceiling; 3 mg/m3 Ceiling

Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

- 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. 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.

Eye/Face

- Wear chemical splash goggles and face shield.

Skin/Body

- 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. 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.

Environmental Exposure Controls

- Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
STEL = Short Term Exposure Limits are based on 15-minute exposures
STEV = Short Term Exposure Value
TWAEV = Time-Weighted Average Exposure Value
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas under ambient conditions or liquid under pressure	Appearance/Description	Gas under ambient conditions or liquid under pressure. Gas is yellowish to green in color. Liquid is amber in color. Pungent odor.
Color	Gas is yellowish to green in color. Liquid is amber in color.	Odor	Pungent odor.
Odor Threshold	0.2 to 0.4 ppm (in air)		
General Properties			
Boiling Point	-34 C(-29.2 F)	Melting Point	-101 C(-149.8 F)
Decomposition Temperature	No data available	pH	acidic
Specific Gravity/Relative Density	= 1.47	Water Solubility	Slightly Soluble
Viscosity	No data available		
Volatility			
Vapor Pressure	4996 mmHg (torr) @ 20 C(68 F)	Vapor Density	2.67 Air=1
Evaporation Rate	No data available	VOC (Wt.)	100 %
Volatiles (Wt.)	100 %		
Flammability			
Flash Point	Not relevant	UEL	No data available
LEL	No data available	Autoignition	No data available
Flammability (solid, gas)	Not relevant.		
Environmental			
Octanol/Water Partition coefficient	No data available		

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under recommended storage and handling conditions.

Possibility of hazardous reactions

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

Conditions to avoid

- Excess heat. Incompatible materials.

Incompatible materials

- Reactive or incompatible with the following materials: organic materials, hydrocarbons, alcohols, ethers, amines, water, ammonia, Hydrogen source.

Hazardous decomposition products

- Moisture (more than 150 ppm or water) and chlorine can form hydrochloric and hypochlorous acids, which are corrosive.

Section 11 - Toxicological Information

Information on toxicological effects

Components		
Chlorine (>= 99.5%)	7782-50-5	**Acute Toxicity:** Inhalation-Rat LC50 • 293 ppm 1 Hour(s); Inhalation-Rat TDLo • 1330 ppm 15 Minute(s); *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Lungs, Thorax, or Respiration*:**Acute pulmonary edema**; *Lungs, Thorax, or Respiration*:**Pleural thickening**; **Multi-dose Toxicity:** Inhalation-Rat TCLo • 26 mg/m³ 6 Hour(s) 6 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Structural or functional change in trachea or bronchi**; **Mutagen:** Sperm Morphology • Ingestion/Oral-Mouse • 20 mg/kg 5 Day(s)-Continuous; Cytogenetic analysis • Unreported Route-Human • Lymphocyte (Somatic cell) • 20 ppm; **Reproductive:** Ingestion/Oral-Rat TDLo • 565 mg/kg (8W male/2W pre-3W post); *Reproductive Effects:Effects on Newborn*:**Biochemical and metabolic**; **Tumorigen / Carcinogen:** Ingestion/Oral-Rat TDLo • 5047 mg/kg 103 Week(s)-Continuous; *Tumorigenic*:**Equivocal tumorigenic agent by RTECS criteria**; *Blood*:**Leukemia**

GHS Properties	Classification
Acute toxicity	**OSHA HCS 2012** • Acute Toxicity - Inhalation 2
Aspiration Hazard	**OSHA HCS 2012** • Data lacking
Carcinogenicity	**OSHA HCS 2012** • Data lacking
Germ Cell Mutagenicity	**OSHA HCS 2012** • Data lacking
Skin corrosion/Irritation	**OSHA HCS 2012** • Skin Corrosion 1A
Skin sensitization	**OSHA HCS 2012** • Data lacking
STOT-RE	**OSHA HCS 2012** • Data lacking
STOT-SE	**OSHA HCS 2012** • Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
Toxicity for Reproduction	**OSHA HCS 2012** • Data lacking
Respiratory sensitization	**OSHA HCS 2012** • Data lacking
Serious eye damage/Irritation	**OSHA HCS 2012** • Serious Eye Damage 1

Route(s) of entry/exposure

- Inhalation, Skin, Eye, Ingestion

Potential Health Effects

Inhalation

Acute (Immediate)

- Fatal if inhaled. May cause respiratory irritation.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive fumes may cause bronchial irritation with chronic cough.

Skin

Acute (Immediate)
- Causes severe skin burns.

Chronic (Delayed)
- Repeated or prolonged exposure to corrosive materials will cause dermatitis.

Eye

Acute (Immediate)
- Causes serious eye damage. Direct contact with the eyes can cause irreversible damage, including blindness.

Chronic (Delayed)
- Repeated or prolonged exposure to corrosive materials or fumes may cause conjunctivitis.

Ingestion

Acute (Immediate)
- May cause irreversible damage to mucous membranes.

Chronic (Delayed)
- Repeated or prolonged exposure to corrosive materials or fumes may cause gastrointestinal distrubances.

Other

Chronic (Delayed)
- Repeated exposures can result in a loss of ability to detect the odor of chlorine. Long-term exposures may cause damage to teeth and inflammation or ulceration of the nasal passages. A study was conducted on diaphragm cell workers at 25 plants manufacturing chlorine in North America where exposures ranged from 0.006 ppm to 1.42 ppm with a mean of 0.146 ppm. The study found that these chlorine workers were not affected in any measurable way by years of exposure to low levels of chlorine. There was no higher incidence of abnormal chest x-rays, abnormal EKG`s or pulmonary function among these workers.

Key to abbreviations

LD = Lethal Dose
MLD = Mild
SEV = Severe
TC = Toxic Concentration
TD = Toxic Dose

Section 12 - Ecological Information

Toxicity

- Material data lacking.

Persistence and degradability

- Material data lacking.

Bioaccumulative potential

- Material data lacking.

Mobility in Soil

- Material data lacking.

Other adverse effects

- Water polluting material. May be harmful to the environment if released in large quantities.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class (es)	Packing group	Environmental hazards
DOT	UN1017	Chlorine	2.3,5.1,8	NDA	NDA
TDG	UN1017	CHLORINE	2.3,8	NDA	NDA
IMO/IMDG	UN1017	CHLORINE	2.3,5.1,8	NDA	Marine Pollutant

Special precautions for user

- Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated. during transportation.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- No data available.

Other information

DOT

- Chlorine is an inhalation hazard zone B

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications

- Acute, Pressure(Sudden Release of)

	Inventory					
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Chlorine	7782-50-5	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Chlorine	7782-50-5	A, D1A, E

Canada - WHMIS - Ingredient Disclosure List

• Chlorine	7782-50-5	1 %

Environment

Canada - 2004 NPRI (National Pollutant Release Inventory)

• Chlorine	7782-50-5	Part 1, Group 1 Substance

Canada - 2005 NPRI (National Pollutant Release Inventory)

• Chlorine	7782-50-5	Part 1, Group 1 Substance

Canada - CEPA - Greenhouse Gases Subject to Mandatory Reporting

• Chlorine	7782-50-5	Not Listed

Canada - CEPA - Priority Substances List

• Chlorine	7782-50-5	Not Listed

Canada - DWQ (Drinking Water Quality) - IMACs

• Chlorine	7782-50-5	Not Listed

Other

Canada - Accelerated Reduction/Elimination of Toxics (ARET)

• Chlorine	7782-50-5	Not Listed

Canada New Brunswick

Environment

Canada - New Brunswick - Ozone Depleting Substances - Schedule A

• Chlorine	7782-50-5	Not Listed

Canada - New Brunswick - Ozone Depleting Substances - Schedule B

• Chlorine	7782-50-5	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Chlorine	7782-50-5	1500 lb TQ

U.S. - OSHA - Specifically Regulated Chemicals

• Chlorine	7782-50-5	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Chlorine	7782-50-5	

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Chlorine	7782-50-5	10 lb final RQ; 4.54 kg final RQ

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Chlorine	7782-50-5	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Chlorine	7782-50-5	10 lb EPCRA RQ

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Chlorine	7782-50-5	100 lb TPQ

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Chlorine	7782-50-5	1.0 % de minimis concentration

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Chlorine	7782-50-5	Not Listed

U.S. - TSCA (Toxic Substances Control Act) - Section 12(b) - Export Notification

• Chlorine	7782-50-5	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Chlorine	7782-50-5	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Chlorine	7782-50-5	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Chlorine	7782-50-5	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Chlorine	7782-50-5	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Chlorine	7782-50-5	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Chlorine	7782-50-5	Not Listed

Section 16 - Other Information

Last Revision Date
- 23/March/2015

Preparation Date
- 09/March/2015

Other Information
- NSF® Standard 60 Drinking Water Treatment Chemicals – Chlorine has Health Effect Listing and is certified for maximum use of 30 mg/l.

Disclaimer/Statement of Liability
- The technical data given herein is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release, and is not to be considered a warranty or quality specification. No guarantee is being given as to the end use performance. The product is sold on the basis that buyers test the product for their specific purposes. This information related to the material designated and may not be valid for such material used in combination with any other materials or in any process.

Key to abbreviations

NDA = No Data Available