BCEHS | BC Emergency Health Services

Paramedic Specialist

Chemical Response Data Sheet

Chlorine 2018 1.0

Chemical Name: Chlorine (CL2)

Identifying Data: UN # 1017 CAS # 7782-50-5
Classification: Poison gas

Placard

NFPA Rating

WHMIS 2015 symbols

Physical Properties:

Colour	Greenish Yellow gas
Vapour Density	2.44 (Heavier then air)
Solubility	Moderate (May absorb with water fog and body sweat, mucous membranes)
Boiling Point	-34C (May cause thermal burns to skin)
Expansion ratio	High/ 460@20c
Vapor Pressure	99.9 psi/6.8 atm./ 5168 mmHg (High) >40mmHg = Inhalation risk
IP	11.48 (Requires 11.7 lamp)

General Description:
A toxic green/yellowish gas heavier than air with suffocating pungent odor. Liquid leaks will result in large gas releases due to its liquid to gas expansion ratio. Moderately water soluble which allows inhalation deeper into the lungs.

Commonly Found:

- Pulp and Paper Mills
- Pools for chlorination
- Water treatment facilitates
- Chemtrade / Production/N. Vancouver
- Transport (cylinders, tonne containers, and Rail cars
- Chemical Production
- Pharmaceutical Production

Work Safe BC Permissible Limits

TWA 0.5 ppm **STEL/Ceiling** 1ppm **IDLH** 10ppm *(SCBA must be worn at or above this level)*

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Emergency Procedures to Consider for Paramedic Specialist

- **Do initial Size-up of incident.**
- Evacuate immediate area and further as situation dictates. **See ERG evacuation distance recommendations.** ***High Vapour pressure and Toxic.***
- Fire Departments may *consider Turnout gear or Coveralls with SCBA for immediate emergency rescue for viable patients. Decon patients and DO NOT remove SCBA until rescuer has been thru Decon in order to prevent inhalation injury. *** This level of skin protection with SCBA may result in skin burns to rescuer in heavy concentrations. Consider Risk vs Benefit.****
- Advise operations to Shut off pumps, and isolate pipe and tank valves, padding air etc., from remote locations if possible.
- Roll cylinder leak so leak is in vapour space if possible and wearing appropriate PPE (SCBA).
- Capping Chlorine vessels will require Chlorine Institute Capping Kit A, B or C kits.
- Avoid direct water contact to leaking container surface.
- Provide Shelter in Place Instructions if requested:
  - * Stay indoors (unless evacuation has been called by local authorities)
  - * Close all windows and doors, seal with duct tape or wet towels
  - * Shut off furnace, exhaust fans, fireplaces, and air conditioners
  - * Wait for and follow advice from local police or authorities.
  - * If the smell is very strong, breathe through a wet cloth and turn on any nearby showers to absorb airborne vapor

ERG 2016 Recommended Evacuation

Small Spills < 200L

Isolate in all Directions	Protect Down wind	
	Day	Night
60M	0.4km	1.5km

Large Spills >200 L

		First Isolate	Then Protect Downwind (KM)					
			Day			Night		
Low wind	*<10kph*		Low wind	Mod. Wind	High Wind	Low wind	Mod. Wind	High Wind
Moderate wind	*10-20Kph*							
High wind	*> 20Kph*							
Rail Tank car		1000M	11+	9	5.5	11+	11	7.1
Hwy Tank truck or trailer		1000M	10.6	3.5	2.9	11+	5.5	4.2
Multiple Ton Cylinders		400M	4.0	1.5	1.1	7.9	2.7	1.5
Multiple small Containers Or single Ton cylinder		250M	2.6	1.0	0.8	5.6	1.8	0.8

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(See also)

TDG Reference: Guide 124

Emergency Decontamination:

- Decon of skin not usually required unless liquid involved or skin symptomatic.
- **Have patient self-Decon with direction as needed from safe distance.** Assist removing clothing if needed with appropriate PPE to prevent secondary contamination and injury.
- Use water for decontamination. Large volume/low pressure. Tepid if Immediately available.
- Eyes take precedence.
- Goal is to begin Decon within 1 minute of contact if possible (Time = Tissue).
- Ensure patient is fully decontaminated. Do not forget skinfolds, armpits, groin, buttocks and feet.
- Do not cause hypothermia. Focus on symptomatic areas (pain, visible burns).
- No concerns of off gassing via inhalation or digestive tract.
- See Pre-Hospital Care below for further information.

PPE:

- SCBA Turnout/Coveralls for Emergency grab and remove of viable victims.
- Respiratory protection. NIOSH approved respirator and cartridges for Chlorine vapour. PF of 10 < 5ppm. PF >50 5-9ppm; PF 10,000 = or > 10ppm (IDLH)
- Face shield with non-vented safety goggles if exposure to gas or liquid may occur.
- Gloves/Boots; Chemical resistant to Chlorine (Butyl rubber, Neoprene, Teflon, Viton)
- Utilize chemical compatibility charts for permeation and degradation times to determine optimum PPE protection to be worn.
- Long sleeve clothing or chemical protective clothing to protect skin if working in concentrations at or above IDLH, or potential for release of gas or liquid exists.
- Consider utilizing class A, B Personal Protective Clothing (PPC) in higher or IDLH concentrations.

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Toxidrome: Irritant gas Watery eyes, coughing, SOB, chest tightness, possible skin irritation/burns.

Primary route of exposure: Inhalation/ Skin at high concentrations or close to liquid release

Primary Targets of Toxicity: Airway and Breathing

- Caused by corrosive local toxic effects on mucous membranes of upper and lower airways.
- When chlorine combines with water in mucus membranes and lungs forms hypochlorous acid and hydrochloric acid.
- Moderately soluble. Affects deeper airways and alveoli resulting in NCPE.
- Frost bite may occur at source of liquid leak.
- Will affect skin at higher concentrations or if skin is moist.
- Any Cardiovascular (Tachycardia, Bradycardia, hypotension) and/or Neurologic symptoms (confusion/DLOC/seizures) may be secondary due to hypoxia.

Pre - Hospital Care:

- Remove victim from hazardous area utilizing appropriate PPE for hazard.
- Remove all contaminated clothing from victim(s)
- Decontamination of skin not usually required unless liquid involved or skin symptomatic. Flush with water as per training for chemical burns.
- Frostbitten skin must be flushed with tempid water for 3-5 minutes.
- Do not attempt to open eye lids that are frozen shut. Warm with tempid water and gently open.
- Do not remove clothing that is frozen to skin, thaw first with tempid water.
- Apply High flow 02 with NRB if required. Assist ventilations with BVM if required.
- Treat patient following support of ABC's as per training.
- Severely exposed patients with NCPE may require intubation with the addition of PEEP.
- Exposed patients with underlying lung disease (Asthma. COPD) may become symptomatic at lower concentrations then healthy individuals. Utilize their prescribed inhalers as required or treat with bronchodilators.
- Contact BC Poison Control at 1-800- 567-8911 or 604-682-5050 for Physician advisement on patient care.

Fire and Reactivity:

- Non-Flammable, Oxidizer (supports combustion)
- Combines with water to form Hydrochloric and Hypochlorous acid (Do not spray water streams directly on leaking containers)
- Flammable gases and vapors form explosive mixtures with chlorine.
- Contact between chlorine and many combustible substances (such as gasoline and petroleum products, hydrocarbons, turpentine, alcohols, acetylene, hydrogen, ammonia, and sulfur), reducing agents, and finely divided metals may cause fires and explosions.

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References:

WISER (Wireless Information System for Emergency Responders)

AHLS Provider Manual/4th edition.

https://www.ccohs.ca

WorkSafe BC/Exposure Limits

Canutec ERG 2016