AFROX

MATERIAL SAFETY DATA SHEET

Hydrogen Chloride - HCL

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Hydrogen chloride

Trade Names: Hydrogen chloride

Company Identification:

African Oxygen Limited

23 Webber Street

Johannesburg

Tel No: (011) 490 0400

Fax No: (011) 490 0506

2. COMPOSITION /INFORMATION ON INGREDIANTS

Product Name Hydrogen chloride

Other Name Anhydrous hydrochloric acid

Formula HCL

Product Code 160, 166

UN No: 1050

ERG No: 125

Dangerous Goods: 2.3, 8

Hazchem Code: 2RE

Poisons schedule: 6

Use: Chemical reagent Application method: Gas withdrawal: regulator of suitable pressure and flow rating fitted to cylinder or manifold with low-pressure gas distribution to equipment.

Physical and Chemical Properties

Appearance: Clear to light yellow gas or liquid, pungent irritating odour, will fume in moist air.

Boiling point/range (deg. C at 101.32 kPa): -85

Vapour pressure (at 25 deg C): 4,660 kPa

Relative density (0 deg C, 1013 kPa, Air = 1): 1.27

Water solubility (101.32 kPa 20 deg C): miscible, high heat of solution.

Flashpoint (deg C): Non-flammable

Lower flammability limit (%): Non-flammable

Upper flammability limit (%): Non-flammable

Liquefiable gas, critical temperature deg. C: 51.4

Critical pressure kPa: 8258

Odour threshold: 1 volume ppm

Cylinder valve safety device: None allowed.

Material compatibility: Corrodes most materials when moist.

CAS Nr. 7647-01-0

Proportion (%): Technical

3. HAZARD IDENTIFICATION

Emergency Overview: Colourless to light yellow liquid with pungent odour.

Danger: Corrosive. Extended contact with concentrated liquid or vapours can cause severe burns and permanent tissue damage. Inhalation of acid aerosols causes irritation to upper respiratory tract.

Likely Routes of Exposure: Eye and skin contact, inhalation.

Eye: Low concentrations of mists or vapours can be irritating, causing redness. Concentrated mists, vapours or splashed liquid can cause severe irritation, burns and possibly permanent blindness.

Skin: Contact may produce severe irritation or corrosive skin damage, depending upon the length of contact and amount of acid. Effects range from dermatitis, redness, swelling, pain, and permanent scarring, to death.

Inhalation: Inhalation of acid aerosols including mists, vapours, gas, fog, and other airbone forms of any particles size causes irritation of the upper respiratory tract with coughing and discomfort. High or prolonged inhalation exposure may lead to corrosion of mucous membranes with temporary lung irritation and cough, difficult in breathing, shortness of breath and/or pulmonary edema (fluid accumulation in the lungs). Prolonged inhalation may also lead to

dental erosion. Fatality may occur from overexposure.

Ingestion: Ingestion may cause severe acid burns to the mouth, throat, oesophagus, and stomach. Gross ingestion may cause death.

Potential Environmental Effects: Acutely toxic to aquatic life.

4. FIRST-AID MEASURES

Rescue personnel are advised to use self-contained breathing apparatus and wear protective clothing when entering confined spaces and poorly ventilated areas.

Swallowed: Conscious patient should drink large volumes of water to dilute the acid. Do not induce vomiting. Urgent seek medical advice.

Eyes: Keep patient calm. Immediately hold eyelids apart and irrigate entire eyeball with gentle flow of water for 15 to 20 minutes. Urgently seek eye specialist attention while continuing irrigation.

Skin: Flush affected area with copious quantities of water. Use an emergency shower for large areas. Remove affected clothing as quickly as possible. Cold burns: irrigate with tap or tepid water for 15 to 30 minutes. Apply sterile dressing and treat as thermal burn. Immerse large areas or limbs in tap water or tepid water for 15 to 30 minutes. Do not apply any form of direct heat. Seek medical attention.

Inhaled: Quickly remove from exposure. Remove contaminated clothing, check there is no obstruction to the airway if breathing is weak or has ceased and give artificial respiration, preferably using an oxygen resuscitator. Allow inhalation of fresh air. Further treatment should be symptomatic and supportive. Consult doctor and recommend admission to hospital for observation.

Advice to Doctor: Management of pulmonary edema, cold and chemical burns.

First Aid Facilities: Emergency shower and eye wash basin. Rescue personnel should use self-contained breathing apparatus and a full chemical suit or full cover overalls. Water or sterile saline solution for irrigation.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Use extinguishing media compatible with acid and appropriate for the burning fire.

Fire Fighting Instructions: Keep personnel removed and upwind of fire. Use water spray to cool containers and control vapours. Runoff from fire control may cause pollution. Neutralize with sodium bicarbonate or soda ash to prevent corrosion of metals and formation of hydrogen. For potential exposure to acid or fumes, wear full protective clothing with hood and breathing air supply.

Hazardous Combustion Products: May generate flammable, potentially explosive hydrogen gas on contact with most metals. Explosive concentrations of hydrogen may accumulate inside metal equipment. Hydrochloric acid fumes may be released from heating under fire conditions.

Temperatures in a fire may cause cylinders to rupture. There are no hazardous decomposition products but other reactions may occur. Cool cylinders exposed to fire by applying water from a protected location. Do not approach cylinders suspected of being hot. Remove cool cylinders from the path of the fire. Evacuate the area if unable to keep cylinders cool.

6. ACCIDENTIAL RELEASE MEASURES

Personal precautions: Use personal protective equipment. Evacuate personnel to safe areas. Do not breathe vapours or spray mist. Ensure adequate ventilation.

Spills and disposal: Always ensure regulator is set to deliver a pressure below equipment pressure rating and any relief valve setting. Released liquid will vaporize readily.

In an emergency allow gas to escape to escape to atmosphere, preferably in a well ventilated, remote area. Monitor concentration in confined spaces.

Contact nearest BOC/Afrox Gases center for guidance. Leak checking may be done by pressure drop test or by gas detector tubes at joints and outlets. Shut cylinder valve to stop gas leaks from

equipment if possible and safe to do so. If cylinder or cylinder valve is leaking then shut the cylinder valve, depressurize the equipment, disconnect cylinder from equipment and move the cylinder to a well ventilated area, preferably outdoors, and allow gas to escape. Never attempt to repair a leaking or damaged cylinder valve. Notify the nearest BOC/ AFROX Gases center that you will be returning a faulty cylinder. Residual product will be disposed of when the cylinder is returned.

7. HANDLING AND STORAGE

Handling: Keep away from heat, sources of ignition. Do not puncture or drop container.

Storage: Keep containers tightly closed in a cool, well ventilated place. Store in cool well shaded area. In case of insufficient ventilation wear suitable respiratory equipment.

Cylinders should be stored upright, prevented from falling, in a secure area away from flammable or combustible materials Store below 45 deg Celsius, in a dry, well ventilated area constructed of noncombustible
materials with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits. Replace outlet seals after use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Standards: Work-safe exposure standard TLV TWA is 5 vpm peak limitation.

Engineering measures to reduce exposure:

Securely connect regulator or manifold having suitable pressure and flow rating with connection to match cylinder valve outlet. Never allow oil or grease on cylinder valves. Cylinders and manifolds should be positioned in a well ventilated areas, preferably outside a building with low pressure gas piped to equipment. Hydrogen chloride compatible materials are required. Do not trap liquid between closed valves and provide a relief valve in each pipework section which can be isolated. Connect all safety relief devices to a safe location having a good natural ventilation. Mechanical lifting devices and trolleys should be used to lift and move cylinders. Personal injury and mechanical damage to cylinder valve and connected equipment may result from falling cylinders: secure cylinders against falling at all times, especially when in use. Protection against suck-back of a liquid should be provided when there is a possibility of the gas phase dissolving in a liquid to create a negative pressure in a pipework and equipment.

Ensure cylinder valve is shut and equipment depressurized and purged with inert gas before commencing maintenance and repairs. Check for leaks prior to use.

Personal Protection: Avoid contact with escaping gas or liquid. Only experienced and properly trained people should use this product. Wear safety goggles, safety shoes, use rubber gloves when moving, connecting and operating cylinders. Open cylinder valve slowly to avoid pressure shock and close when not in use.

Eye/Face Protection: Contact lenses should not be worn; they could contribute to severe eye damage. Wear close fitting chemical splash goggles as a minimum. Where splash hazard to face is present, also wear a full- length transparent face shield.

Skin Protection: Use skin protective clothing impervious to acid such as neoprene or polyvinyl chloride (PVC). Use precautions to ensure all potentially affected body parts are covered are covered such as taping sleeves and pant legs to gloves and boots, respectively, and buttoning clothing to the neck. Selection of specific items such as gloves, coats, pants, boots, aprons, or full-body suits will depend on operations to be performed. Launder contaminated clothing before re-use. Dispose of contaminated leather articles. Safety shower should be located in immediate work area.

Respiratory Protection When exposure levels could exceed 5 ppm, a NIOSH approved air-purifying respirator with acid gas cartridge(s) in combination with a high-efficiency particulate filter is recommended.

When exposure levels could exceed 50 ppm, a self-contained breathing apparatus with a full face-piece is recommended.

General Hygiene Considerations: Follow good industrial hygiene practices including but not limited to: (1) avoid breathing vapours; (2) wear appropriate safety equipment; (3) launder contaminated clothing before reuse; and (4) wash thoroughly after handling.

10. STABILITY AND REACTIVITY

Stability: stable at normal condition

Conditions to Avoid: Keep away from heat, sparks or flames. DO NOT store or mix with incompatible materials.

Incompatible Materials: Incompatible with most metals, hydroxides, amines, alkalis, cynades, sulfides, strong oxdizers, carbonates, hypochlorites and formaldehyde. May react violently with incompatible substances, releasing toxic and/or flammable gases. Considerable amounts of heat may be evolved.

Hazardous Decomposition Products: Heat can cause evolution of gaseous hydrogen chloride.

Possibility of Hazardous Reactions: Will not occur.

11. TOXICOLOGICAL INFORMATION

Health Effects: LC_{50} rat 5666 vpm 30 minutes.

Causes severe burns. Irritating to respiratory system.

Reported Human Effects: Full destruction of tissue with prolonged contact.

12. ECOLOGICAL INFORMATION

General toxic to water organisms.

96 hour LC50 – Mosquito fish: 282mg/l (slightly toxic).

48 hour LC_{50} – Bluegill: 3.6 mg/l

13. DISPOSAL CONSIDERATION

If this product as supplied becomes a waste, it meets the criteria of a hazardous waste, that is, corrosivity, EPA hazardous waste.

Waste from residues/unused products: Offer surplus and non-recyclable solutions to an established disposal company. In accordance with local and national regulations. S59 – Refer to manufacture/supplier for information on recovery/recycling.

Dispose of in accordance with local, Provincial/State laws and regulations.

Contaminated packaging: Do not reuse containers. Empty pressure vessels should be returned to the supplier.

14. TRANSPORT INFORMATION

Ensure cylinder is separated from driver and that outlets of relief device is not obstructed.

Shipping name: Hydrogen chloride, anhydrous.

Proper shipping name: Hydrochloric acid

Identification number: UN 1789

Hazard Class: 8 (Corrosive)

Packing Group: II

Transport E.P.G. card: 2B8.

15. REGULATORY INFORMATION

OSHA: Anhydrous hydrochloric acid is listed by OSHA as a highly hazardous chemical. A process that involves anhydrous acid at or above the specified threshold quantity may be subject to OSHA's Process Safety Management requirements.

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

16. OTHER INFOMATION

Ensure all national/ regulations are observed.

Keep container in well-ventilated place. Do not breathe the gas. Users of breathing apparatus must be trained. Contact with liquid may cause cold burns/frostbite.

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

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