CHLOROSULPHONIC ACID

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

CHLOROSULPHONIC ACID

OTHER NAMES

Cl-H-O3-S, Cl-SO2-OH, "chlorosulphonic acid (with or without sulfur trioxide)", "chlorosulfuric acid", "monochlorosulfuric acid", "sulfonic acid, monochloride", "sulphuric chlorohydrin"

PROPER SHIPPING NAME

CHLOROSULPHONIC ACID (with or without sulphur trioxide)
CHLOROSULPHONIC ACID

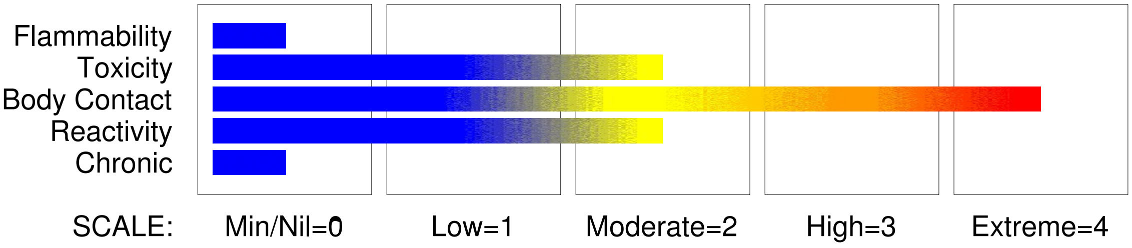
PRODUCT USE

Used in production of synthetic detergents, pharmaceuticals, sulfonating agent for dyes, pesticides, intermediates, ion-exchange resins, anhydrous hydrogen chloride and smoke producing chemicals.

SUPPLIER

Company: S D FINE- CHEM LIMITED
Address:
315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,
MUMBAI- 400030.INDIA.
technical@sdfine.com
Telephone: 91- 22- 24959898
Telephone: 91- 22- 24959899
Fax: 91- 22- 24937232

HAZARD RATINGS



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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Oral) Category 2
Metal Corrosion Category 1
Skin Corrosion/Irritation Category 1A

EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by using GHS criteria:
H300 H290 H314
Fatal if swallowed
May be corrosive to metals
Causes severe skin burns and eye damage

PRECAUTIONARY STATEMENTS

Prevention

Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.
Wear protective gloves/clothing and eye/face protection.
Wash hands thoroughly after handling.
Do not breathe dust or mist.

Response

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Immediately call a POISON CENTER or doctor/physician.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
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.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Absorb spillage to prevent material damage.
If on skin or hair: remove/take off immediately all contaminated clothing. Rinse with water/shower.
Specific treatment: refer to Label or MSDS.

Storage

Store locked up.
Store in a corrosive resistant container with a resistant inliner.

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Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
chlorosulfonic acid	7790-94-5	>99
reacts with atmospheric moisture to form		
hydrochloric acid	7647-01-0	
and		
sulfuric acid	7664-93-9	

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:
- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.

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- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjuctival cul-de-sacs. Irrigation should last at least 20-30 minutes. DO NOT use neutralising agents or any other additives. Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology].

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).

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- DO NOT use water on fires.

CAUTION: If only water available, use flooding quantities of water or withdraw personnel.

- DO NOT allow water to enter containers.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- If fire gets out of control withdraw personnel and warn against entry.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Will not burn but increases intensity of fire.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Heat affected containers remain hazardous.
- Contact with combustibles such as wood, paper, oil or finely divided metal may produce spontaneous combustion or violent decomposition.
- May emit irritating, poisonous or corrosive fumes.

Other decomposition products include: chlorine, hydrogen chloride and sulfur oxides (SOx).
Reacts with metals producing flammable / explosive hydrogen gas.

Personal Protective Equipment

Breathing apparatus.
Gas tight chemical resistant suit.
Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Clean up all spills immediately.
- No smoking, naked lights, ignition sources.
- Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
- Avoid breathing dust or vapours and all contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with dry sand, earth, inert material or vermiculite.
- DO NOT use sawdust as fire may result.
- Scoop up solid residues and seal in labelled drums for disposal.
- Neutralise/decontaminate area.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- No smoking, flames or ignition sources.
- Increase ventilation.
- Contain spill with sand, earth or other clean, inert materials.
- NEVER use organic absorbents such as sawdust, paper, cloth; as fire may result.
- Avoid any contamination by organic matter.

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- Use spark-free and explosion-proof equipment.
- Collect any recoverable product into labelled containers for possible recycling.
- DO NOT mix fresh with recovered material.
- Collect residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- Decontaminate equipment and launder all protective clothing before storage and re-use.
- If contamination of drains or waterways occurs advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:
chlorosulfonic acid 30 mg/m^3

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
chlorosulfonic acid 10 mg/m^3

other than mild, transient adverse effects without perceiving a clearly defined odour is:
chlorosulfonic acid 2 mg/m^3

The threshold concentration below which most people will experience no appreciable risk of health effects:
chlorosulfonic acid 1.43 mg/m^3

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

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SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

+: May be stored together
O: May be stored together with specific preventions
X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

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- Use in a well-ventilated area.
- Avoid contact with moisture.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER

Packaging as recommended by manufacturer.
- Check that containers are clearly labelled.

Keep containers securely sealed.
Glass container.
Plastic container.
Polylined drum.
DO NOT use unlined metal containers.

STORAGE INCOMPATIBILITY

Avoid reaction with oxidising agents.
Avoid strong acids, bases.
Acyl halides tend to react violently with protic organic solvents, water, and the aprotic solvents, dimethylformamide and dimethyl sulfoxide. Their facile reaction with ethers is also potentially dangerous. In the absence of diluent or other effective control of reaction rate, sulfoxides may react violently or explosively with certain acyl halides. These violent reactions may be explained in terms of exothermic polymerisation of formaldehyde which is formed under a variety of conditions by interaction of the sulfoxide with reactive halides.
BRETHERICK L.: Handbook of Reactive Chemical Hazards.
Avoid storage with organic and combustible materials, metals, nitrates, chlorates, carbides, sulfides and cyanides.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed as supplied.
- Store in a cool, well ventilated area.
- Keep dry.
- Store under cover and away from sunlight.
- Store away from flammable or combustible materials, debris and waste. Contact may cause fire or violent reaction.
- Store away from incompatible materials and foodstuff containers.
- DO NOT stack on wooden floors or pallets.
- Protect containers from physical damage.
- Check regularly for leaks.
- Observe manufacturer's storage and handling recommendations.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

• chlorosulfonic acid:	CAS:7790- 94- 5 CAS:127529- 03- 7
• hydrochloric acid:	CAS:7647- 01- 0 CAS:7698- 05- 7
• sulfuric acid:	CAS:7664- 93- 9

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
hydrochloric acid		50
sulfuric acid	15	

ODOUR SAFETY FACTOR (OSF)

OSF=1.3 (hydrochloric acid)

Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted
C	1- 26	As " A" for less than 50% of persons being distracted
D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

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MATERIAL DATA

ES TWA: 0.209 ppm, 1 mg/m3

OES TWA: 1 mg/m3

CEL TWA: 0.3 ppm, 1.3 mg/m3 measured or calculated as chlorosulfonic acid (compare WEEL-TWA)

Chlorosulfonic acid readily reacts with moisture to form hydrochloric and sulfuric acids. Because these substances produce similar toxic effects, their additive effects should be considered. The TLV-C is 5 ppm (7 mg/m3) for HCl and 1 mg/m3 for H2SO4. Because 1 mg/m3 H2SO4 is equivalent to

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0.35 mg/m3 HCl which in turn is equivalent to 1.3 mg/m3 chlorosulfonic acid, a workplace environmental exposure limit (WEEL) has been recommended by the AIHA. This level will control H2SO4 to its TLV and HCl to below its TLV.

INGREDIENT DATA

HYDROCHLORIC ACID:

Odour Threshold Value: 0.262 ppm (detection), 10.06 ppm (recognition)
NOTE: Detector tubes for hydrochloric acid, measuring in excess of 1 ppm, are available commercially.

Hydrogen chloride is a strong irritant to the eyes, mucous membranes and skin. Chronic exposure produces a corrosive action on the teeth. Reports of respiratory irritation following short-term exposure at 5 ppm have lead to the recommended TLV-C. There is no indication that skin contact with hydrogen chloride elicits systemic poisoning and a skin designation has not been applied.

Exposure of humans to hydrogen chloride at 50 to 100 ppm for 1 hour is reported to be barely tolerable; 35 ppm caused irritation of the throat on short exposure and 10 ppm was the maximal concentration for prolonged exposure. It has been stated that hydrogen chloride at concentrations of 5 ppm is immediately irritating.

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Toxic effects of hydrochloric acid

Concentration	Clinical effects
0.067 - 0.267 ppm	Reported range of odour thresholds and changes in respiratory pattern
5 ppm	No organic damage
10 ppm	Irritation; work undisturbed
10-50 ppm	Work difficult but possible
35 ppm	Short exposure irritation of the throat
50-100 ppm	Exposure for 1 h barely tolerable
1000-2000 ppm	Brief exposure dangerous; laryngospasm
1300-2000 ppm	Lethal after a few minutes

SULFURIC ACID:

NOTE: Detector tubes for sulfuric acid, measuring in excess of 1 mg/m3, are commercially available.

Based on controlled inhalation studies the TLV-TWA is thought to be protective against the significant risk of pulmonary irritation and incorporates a margin of safety so as to prevent injury to the skin and teeth seen in battery workers acclimatised to workplace concentrations of 16 mg/m3. Experimental evidence in normal unacclimated humans indicates the recognition, by all subjects, of odour, taste or irritation at 3 mg/m3 or 5 mg/m3. All subjects reported these levels to be objectionable but to varying degrees.

PERSONAL PROTECTION

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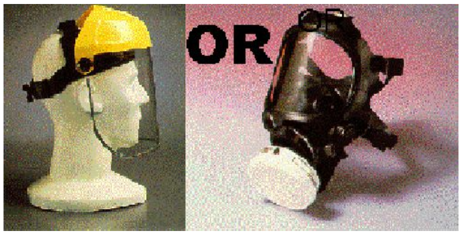

EYE
- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET
Neoprene gloves.
PVC gloves.
Nitrile gloves.
Impervious, gauntlet length gloves.
PVC boots.
PVC safety gumboots.

OTHER
PVC apron.
Acid-resistant overalls.
- PVC protective clothing.
- Barrier cream.
- Eyewash unit.

Ensure there is ready access to a safety shower.

GLOVE SELECTION INDEX
Glove selection is based on a modified presentation of the:
" Forsberg Clothing Performance Index" .
The effect(s) of the following substance(s) are taken into account in the computer- generated selection: chlorosulfonic acid

Protective Material:

SARANEX- 23	A
TEFLON	A

A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion

continued...

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

RESPIRATOR

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.
Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	BE- AUS P	-	BE- PAPR- AUS P
50 x ES	-	BE- AUS P	-
100 x ES	-	BE- 2 P	BE- PAPR- 2 P ^

^ - Full-face.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.
An approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25- 0.5 m/s (50- 100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5- 1 m/s (100- 200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

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Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear, colourless to light yellow fuming, watery liquid with pungent, suffocating odour. Very corrosive. Decomposes violently in water to sulfuric and hydrochloric acid and evolves hydrogen chloride, an irritating and corrosive gas, apparent as white fumes. Strong oxidiser. Decomposed by alkalis and acids.

PHYSICAL PROPERTIES

Liquid.
Corrosive.
Acid.
Contact with water liberates toxic gas.
Reacts violently with water.

Molecular Weight: 116.52	Boiling Range (°C): 151- 152
Melting Range (°C): - 80	Specific Gravity (water=1): 1.76- 1.77
Solubility in water (g/L): Decomposes.	pH (as supplied): < 1
pH (1% solution): < 1	Vapour Pressure (kPa): 0.13 @ 25 C.
Volatile Component (%vol): 100	Evaporation Rate: <1 BuAc=1
Relative Vapour Density (air=1): 4.0	Flash Point (°C): Not combustible
Lower Explosive Limit (%): Not applicable.	Upper Explosive Limit (%): Not applicable.
Autoignition Temp (°C): Not available.	Decomposition Temp (°C): Not available
State: Liquid	

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Contact with water liberates toxic gases.

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Presence of incompatible materials.
Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.
Considered an unlikely route of entry in commercial/industrial environments.

EYE
The material can produce severe chemical burns to the eye following direct contact.
Vapours or mists may be extremely irritating.
When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.
The material may produce severe irritation to the eye causing pronounced inflammation.
Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN
The material can produce severe chemical burns following direct contact with the skin.
The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

INHALED
Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation.
The material may produce respiratory tract irritation. Symptoms of pulmonary irritation may include coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and a burning sensation.
Unlike most organs, the lung can respond to a chemical insult or a chemical agent, by first removing or neutralising the irritant and then repairing the damage (inflammation of the lungs may be a consequence).
The repair process (which initially developed to protect mammalian lungs from foreign matter and antigens) may, however, cause further damage to the lungs (fibrosis for example) when activated by hazardous chemicals. Often, this results in an impairment of gas exchange, the primary function of the lungs. Therefore prolonged exposure to respiratory irritants may cause sustained breathing difficulties.

CHRONIC HEALTH EFFECTS
Principal routes of exposure are usually by inhalation of vapour/mist and skin/eye contact.
Chronic exposure to vapour may cause dental erosion.

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Section 11 - TOXICOLOGICAL INFORMATION

TOXICITY AND IRRITATION

No significant acute toxicological data identified in literature search.

HYDROCHLORIC ACID:

TOXICITY	IRRITATION
Unreported (man) LDLo: 81 mg/kg	Eye (rabbit): 5mg/30s - Mild
Inhalation (human) LCLo: 1300 ppm/30 min	
Inhalation (human) LCLo: 3000 ppm/5 min	
Inhalation (rat) LC50: 3124 ppm/1h	
Oral (rat) LD50: 900 mg/kg	

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

SULFURIC ACID:

TOXICITY	IRRITATION
Oral (rat) LD50: 2140 mg/kg	Eye (rabbit): 1.38 mg SEVERE
Inhalation (rat) LC50: 510 $mg/m^3/2h$	Eye (rabbit): 5 mg/30sec SEVERE
Inhalation (human) TCLo: 3 $mg/m^3/24w$	

WARNING: For inhalation exposure ONLY: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

Occupational exposures to strong inorganic acid mists of sulfuric acid:

Section 12 - ECOLOGICAL INFORMATION

No data for chlorosulfonic acid.
Refer to data for ingredients, which follows:

HYDROCHLORIC ACID:

Hazardous Air Pollutant:	Yes
Fish LC50 (96hr.) (mg/l):	0.282

Prevent, by any means available, spillage from entering drains or water courses.
DO NOT discharge into sewer or waterways.
Ecotoxicity
Fish LC100 (24 h): trout 10 mg/l
TLm (96 h): mosquito fish 282 ppm (fresh water)
LC50: goldfish 178 mg/l
Shrimp LC50 (48 h): 100 - 330 ppm (salt water)
Starfish LC50 (48 h): 100 - 330 mg/l
Cockle LC50 (48 h): 330 - 1000 mg/l
[Hach]
Hydrogen chloride in water dissociates almost completely, releasing hydrogen and chloride ions; the hydrogen ions are captured by water to produce hydronium ions.
Hydrochloric acid infiltrates soil, the rate dependent on moisture content. During soil transport, hydrochloric acid dissolves soil components.
Drinking water standard:
chloride: 400 mg/l (UK max.)
250 mg/l (WHO guideline)

SULFURIC ACID:

continued...

Prevent, by any means available, spillage from entering drains or water courses.
DO NOT discharge into sewer or waterways.
Sulfuric acid is soluble in water and remains indefinitely in the environment as sulfate.
Large discharges may contribute to the acidification of water and be fatal to aquatic life and soil micro-organisms.
Large discharges may contribute to the acidification of effluent treatment systems and injure sewage treatment organisms. [ICI UK]

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible. Special hazard may exist - specialist advice may be required.
- Consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Treat and neutralise residue at an approved site.
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.
- Puncture containers to prevent re-use and bury at an authorised landfill.

WASTE DISPOSAL PROCEDURES
- Wear protective clothing, eye protection and nitrile rubber gloves to control personal contact. Work in a well ventilated area. Pour the chlorosulfuric acid onto sodium carbonate in a large plastic tray. Once the reaction has finished wash the contents into the drain [Armour 1996].

SPILLAGE DISPOSAL
- Wear protective eye protection, nitrile rubber gloves and protective clothing to control personal contact. Work from behind a heavy body shield. Cover and contain the chlorosulfuric acid with a 1:1:1 mixture by weight of sodium carbonate or calcium carbonate, calcium bentonite and sand. Collect the solid mixture and place in a well ventilated area. Add slowly to a container of cold water. Neutralise with sodium carbonate if necessary. Empty the liquid into the drain with 50 times its volume of water. Dispose of the solid residue as normal refuse. Wash the area of the spill thoroughly with water [Armour 1996].

Section 14 - TRANSPORTATION INFORMATION

Labels Required: CORROSIVE
HAZCHEM: 4WE

UNDG:

Dangerous Goods Class:	8	Subrisk:	None
UN Number:	1754	Packing Group:	I

continued...

Section 14 - TRANSPORTATION INFORMATION

Shipping Name:CHLOROSULPHONIC ACID (with or without sulphur trioxide)

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	1754	Packing Group:	I
EMS Number:	F- A, S- B		

Shipping name:CHLOROSULPHONIC ACID (with or without sulphur trioxide)
CHLOROSULPHONIC ACID

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS:IATA

Section 15 - REGULATORY INFORMATION

REGULATIONS

chlorosulfonic acid (CAS: 7790-94-5) is found on the following regulatory lists;
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

No data available for chlorosulfonic acid as CAS: 127529-03-7.

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
chlorosulfonic acid	7790- 94- 5, 127529- 03- 7

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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