

Safety Data Sheet

Product name: Hydrochloric acid

CAS No.: 7647-01-0

Prepared in accordance with GB/T 16483, GB/T 17519

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

>Product identifier

- Product name: Hydrochloric acid
- CBnumber: CB7421538
- CAS: 7647-01-0
- EINECS Number: 231-595-7
- Synonyms: HCl, Hydrochloric Acid

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

- Relevant identified uses: For R&D use only. Not for medicinal, household or other use.
- Uses advised against: none

>Company Identification

- Company: Linyi Tuohui New Materials Co., Ltd.
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- Telephone: +86 176 6460 5089 (Manager Niu) / +86 130 4664 1786 (Manager Li)
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SECTION 2: Hazards identification

>GHS Label elements, including precautionary statements

- Symbol(GHS)



- Signal wordWarning

Precautionary statements

P234 Keep only in original container.

P390 Absorb spillage to prevent material damage.

Hazard statements

H290 May be corrosive to metals

SECTION 3: Composition/information on ingredients

>Substance

- Product name: Hydrochloric acid
- Synonyms: HCl, Hydrochloric Acid
- CAS: 7647-01-0
- EC number: 231-595-7
- MF: ClH
- MW: 36.46

SECTION 4: First aid measures

>General advice

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

>If inhaled

After inhalation: fresh air. Call in physician.

>In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

>In case of eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

>If swallowed

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

>Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11

>Protection of first-aiders

For personal protection see section 8.

>Notes to physician

No data available

SECTION 5: Firefighting measures

>Suitable extinguishing media

Water Foam Carbon dioxide (CO₂) Dry powder

>Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

>Specific hazards during fire fighting

Combustible. Vapors are heavier than air and may spread along floors. Forms explosive mixtures with air at elevated temperatures. Development of hazardous combustion gases or vapours possible in the event of fire.

>Hazardous combustion products

Carbon oxides Hydrogen chloride gas

>Specific extinguishing methods

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

>Special protective equipment for fire-fighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

>NFPA 704

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SECTION 6: Accidental release measures

>Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger

area, observe emergency procedures, consult an expert. Advice for emergency responders: For personal protection see section 8.

>Environmental precautions

Do not let product enter drains. Risk of explosion.

>Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb). Dispose of properly. Clean up affected area.

SECTION 7: Handling and storage

>Handling

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Avoidance of contact

Oxidizing agents Soluble carbonates and phosphates Hydroxides Metals Peroxides permanganates, for example potassium permanganate Amines Alcohols Bases Alkali metals Fluorine hexalithium disilicide Metals

>Storage

Conditions for safe storage

No metal containers.

Further information on storage conditions

Keep container tightly closed in a dry and wellventilated place. Keep away from heat and sources of ignition.

Storage class

3, Flammable liquids

Recommended storage temperature

Recommended storage temperature see product label.

Further information on

hygroscopic storage stability

Packaging material

Suitable material: Poly Drum

SECTION 8: Exposure controls/personal protection

>control parameter

Hazard composition and occupational exposure limits

Does not contain substances with occupational exposure limits.

>Engineering measures

No data available

>Personal protective equipment

Respiratory protection

required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type

Filter type ABEK

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Tightly fitting safety goggles

Skin and body protection

Flame retardant antistatic protective clothing.

Hand protection

Material

butyl-rubber

Break through time

480 min

Glove thickness

0.3 mm

Protective index

Full contact

Manufacturer

Butoject (KCL 897 / Aldrich Z677647, Size M)

Material

Nitrile rubber

Break through time

30 min

Glove thickness

0.11 mm

Protective index

Splash contact

Manufacturer

(KCL 740 / Aldrich Z677272, Size M)

Manufacturer

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de,
test method: EN374

Remarks

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

SECTION 9: Physical and chemical properties

>Information on basic physicochemical properties

- Solubility H_2O : soluble

- Physical state liquid
- Dielectric constant 4.6 (20°C)
- Viscosity 1.7 mm²/s
- Appearance liquid
- Color Light Yellow
- Odor Sharp, irritating odor detectable at 0.25 to 10 ppm
- Odor Threshold No data available
- pH 3.01(1 mM solution); 2.04(10 mM solution); 1.08(100 mM solution);
- Melting point/ range No data available
- Boiling point/boiling range >100 °C (lit.)
- Flash point 40 °C
- Evaporation rate No data available
- Flammability (solid, gas) No data available
- Flammability (liquids) No data available
- Burning rate No data available
- Upper explosion limit / Upper flammability limit 2-13.4% (v/v) 2-Propanol)
- Lower explosion limit / Lower flammability limit 2-13.4% (v/v) 2-Propanol)
- Vapor pressure 613 psi (21.1 °C)
- Relative vapor density 1.3 (vs air)
- Relative density 1.2 g/mL at 25 °C (lit.)
- Density 1.092 g/mL (25 °C)
- Water solubility miscible
- Partition coefficient: n-octanol/water No data available
- Autoignition temperature No data available
- Decomposition temperature No data available
- Viscosity, dynamic No data available
- Viscosity, kinematic No data available
- Flow time No data available
- Explosive properties Not classified as explosive.
- Oxidizing properties none
- Molecular weight 36.46 g/mol
- Particle characteristics Particle size No data available

SECTION 10: Stability and reactivity

>Reactivity

Vapor/air-mixtures are explosive at intense warming.

>Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

>Possibility of hazardous reactions

No data available

>Conditions to avoid

Heating.

>Incompatible materials

Oxidizing agents Soluble carbonates and phosphates Hydroxides Metals Peroxides permanganates, for example potassium permanganate Amines Alcohols Bases Alkali metals Fluorine hexalithium disilicide Metals

>Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

>11.1 Information on toxicological effects

Mixture Acute toxicity

Oral: No data available

Acute toxicity estimate Oral - 3,425 mg/kg (Calculation method)

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Dermal: No data available

Skin corrosion/irritation

Remarks: Causes burns.

Serious eye damage/eye irritation

Remarks: Risk of serious damage to eyes.

Respiratory or skin sensitization

Classified based on available data. For more details, see section 2

Germ cell mutagenicity

Carcinogenicity

Reproductive toxicity

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure

Aspiration hazard

>11.2 Additional Information

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache,

Nausea, Vomiting, Ingestion or inhalation of concentrated acetic acid causes damage to tissues of the respiratory and digestive tracts. Symptoms include: hematemesis, bloody diarrhea, edema and/or perforation of the esophagus and pylorus, pancreatitis, hematuria, anuria, uremia, albuminuria, hemolysis, convulsions, bronchitis, pulmonary edema, pneumonia, cardiovascular collapse, shock, and death.

Direct contact or exposure to high concentrations of vapor with skin or eyes can cause: erythema, blisters, tissue destruction with slow healing, skin blackening, hyperkeratosis, fissures, corneal erosion, opacification, iritis, conjunctivitis, and possible blindness., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Components acetic acid

Acute toxicity

LD50 Oral - Rat - 3,310 mg/kg

Remarks: (RTECS)

LC50 Inhalation - Mouse - 4 h - 2,819 mg/l - vapor

Remarks: (RTECS)

Dermal: No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Causes burns. - 4 h (OECD Test Guideline 404)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Causes burns. - 4 h (OECD Test Guideline 405)

Remarks: (IUCLID)

Remarks: Causes serious eye damage.

Respiratory or skin sensitization

Germ cell mutagenicity

Test Type: Ames test

Test system: Salmonella typhimurium

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Chinese hamster ovary cells

Result: negative

Method: Mutagenicity (micronucleus test)

Species: Rat - male and female - Bone marrow

Result: negative

Carcinogenicity

Reproductive toxicity

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure

Aspiration hazard

Hydrochloric Acid Acute toxicity

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Inhalation: Cough Difficulty in breathing

Symptoms: mucosal irritations, Cough, Shortness of breath, Inhalation may lead to the formation of oedemas in the respiratory tract., Possible damage- es:, damage of respiratory tract, tissue damage

Dermal: No data available

Skin corrosion/irritation

Skin - reconstructed human epidermis (RhE)

Result: Corrosive (OECD Test Guideline 431)

Serious eye damage/eye irritation

Eyes - Bovine cornea

Result: Causes serious eye damage. - 10 min (OECD Test Guideline 437)

Respiratory or skin sensitization

Maximization Test - Guinea pig

Result: negative (OECD Test Guideline 406)

Germ cell mutagenicity

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster ovary cells

Result: Positive results were obtained in some in vitro tests.

Remarks: (ECHA)

Test Type: mitotic recombination assay

Test system: *Saccharomyces cerevisiae*

Result: negative

Remarks: (ECHA)

Test Type: Ames test

Test system: mouse lymphoma cells

Result: positive

Remarks: (ECHA)

Carcinogenicity

Reproductive toxicity

Specific target organ toxicity - single exposure

May cause respiratory irritation. - Respiratory system

Acute oral toxicity - If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath,

Inhalation may lead to the formation of oedemas in the respiratory tract.,

Possible damages: , damage of respiratory tract, tissue damage

Specific target organ toxicity - repeated exposure

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

No aspiration toxicity classification

SECTION 12: Ecological information

>Ecotoxicity

Toxicity to fish

Remarks: No data available

>Components:

>acetic acid:

Toxicity to fish

LC50 (Oncorhynchus mykiss (rainbow trout)): > 1,000 mg/l End point: mortality Exposure time: 96 h Test Type: semi-static test Method: OECD Test Guideline 203 GLP: yes

Toxicity to daphnia and other aquatic invertebrates

EC50 (Daphnia magna (Water flea)): > 1,000 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 202 GLP: yes

Toxicity to algae/aquatic plants

EC50 (Skeletonema costatum): > 1,000 mg/l Exposure time: 72 h Test Type: static test Method: ISO 10253 GLP: yes

Toxicity to microorganisms

EC5 (Pseudomonas putida): 2,850 mg/l Exposure time: 16 h Remarks: neutral (maximum permissible toxic concentration) (Lit.) EC50 (Photobacterium phosphoreum): 11 mg/l Exposure time: 15 min Test Type: microtox test Remarks: (IUCLID)

>Hydrochloric Acid:

Toxicity to fish

LC50 (Gambusia affinis (Mosquito fish)): 282 mg/l Exposure time: 96 h Remarks: (IUCLID)

>Persistence and degradability

Biodegradability

>Components:

>acetic acid:

Biodegradability

Result: Readily biodegradable. Biodegradation: 99 % Exposure time: 30 d Method: OECD Test Guideline 301D Remarks: (HSDB) Result: Readily eliminated from water Biodegradation: 95 % Exposure time: 5 d Method: OECD Test Guideline 302B

Biochemical Oxygen Demand (BOD)

880 mg/g Incubation time: 5 d Remarks: (Lit.)

BOD/ThOD

76 % Remarks: (IUCLID)

>Hydrochloric Acid:

Biodegradability

Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

>Bioaccumulative potential

Bioaccumulation

>Components:

>acetic acid:

Partition coefficient: noctanol/water

log Pow: -0.17 (25 °C) pH: 7 Method: (experimental) Remarks: Bioaccumulation is not expected. (ECHA)

>Hydrochloric Acid:

Partition coefficient: noctanol/water

Remarks: Not applicable for inorganic substances

>Mobility in soil

Stability in soil

>Other adverse effects

>Components:

>acetic acid:

Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

>Hydrochloric Acid:

Results of PBT and vPvB assessment

Additional ecological information

May be harmful to aquatic organisms due to the shift of the pH. Do not empty into drains. Harmful effect due to pH shift. Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

>Disposal methods

Waste from residues

Offer surplus and non-recyclable solutions to a licensed disposal company.

SECTION 14: Transport information

>International Regulations

>IATA-DGR

UN/ID No. : UN 2920

Proper shipping name : Corrosive liquid, flammable, n.o.s.

(Hydrochloric Acid, acetic acid)

Class : 8

Subsidiary risk : 3

Packing group : II

Labels : Class 8 - Corrosive substances, Class 3 - Flammable liquids

Packing instruction (cargo aircraft) : 855

Packing instruction (passenger aircraft) : 851

>IMDG-Code

UN number : UN 2920

Proper shipping name : CORROSIVE LIQUID, FLAMMABLE, N.O.S.

(Hydrochloric Acid, acetic acid)

Class : 8

Subsidiary risk : 3

Packing group : II

Labels : 8 (3)

EmS Code : F-E, S-C

Marine pollutant : no

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

Not applicable for product as supplied.

National regulation GB 6944/12268

UN number : UN 2920

Proper shipping name : CORROSIVE LIQUID, FLAMMABLE, N.O.S.

(Hydrochloric Acid, acetic acid)

Class : 8

Subsidiary risk : 3

Packing group : II

Labels : 8 (3)

>Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15: Regulatory information

>National regulatory information

>Law on the Prevention and Control of Occupational Diseases

>Regulations on Safety Management of Hazardous Chemicals

>Catalogue of Hazardous Chemicals Identification of Major Hazard Installations for Hazardous Chemicals (GB 18218)

Listed

>No. / Code Chemical name / Category Threshold quantity

>W5.4 Flammable liquids 5,000 t

>Hazardous Chemicals for Priority Management

Listed under SAWS

>Regulations on Occupational Labor Protection in the at workplaces where

>Toxic Substances Are Used

>Catalogue of Highly Toxic Chemicals

Not listed

>Regulation of Environmental Management on the First Import of Chemicals and the Import and Export of Toxic Chemicals

>China Severely Restricted Toxic Chemicals for Import and Export

>Regulation on the Administration of Precursor Chemicals

>Catalogue and Classification of Precursor Chemicals

Not listed

SECTION 16: Other information

>Full text of other abbreviations

ACGIH

USA. ACGIH Threshold Limit Values (TLV)

GBZ 2.1-2007

Occupational exposure limits for hazardous agents in the workplace - Chemical hazardous agents.

ACGIH / TWA

8-hour, time-weighted average

ACGIH / STEL

Short-term exposure limit

ACGIH / C

Ceiling limit

GBZ 2.1-2007 / PC-TWA

Permissible concentration - time weighted average

GBZ 2.1-2007 / PC-STEL

Permissible concentration - short term exposure limit

GBZ 2.1-2007 / MAC AIIC - Australian Invent Transport by Land of Bra bw - Body weight;
CMR Standard of the German List (Canada); ECx - Conc associated with x% respo
Chemical Substances (Jap response; ERG - Emerge GLP - Good Laboratory P cer; IATA
- International Construction and Equipm Half maximal inhibitory c tion; IECSC -
Inventory o tional Maritime Dangerou Industrial Safety and H Standardization; KECI - K
tration to 50 % of a test (Median Lethal Dose); MA lution from Ships; n.o.s. No Observed
(Adverse) E fect Level; NOELR - No Norm; NTP - National Toxi icals; OECD - Organizatio
fice of Chemical Safety a and Toxic substance; PIC stances; (Q)SAR - (Quant (EC) No
1907/2006 of th Registration, Evaluation, Accelerating Decompositi Chemical Substance
Inve Thailand Existing Chemicala States); UN - United Nat Transport of Dangerous
WHMIS - Workplace Hazar

Maximum allowable concentration ry of Industrial Chemicals

ANNT - National Agency for il

ASTM - American Society for the Testing of Materials

- Carcinogen, Mutagen or Reproductive Toxicant

DIN nstitute for Standardisation

DSL - Domestic Substances ntration associated with x% response

ELx - Loading rate se

EmS - Emergency Schedule
 ENCS - Existing and New n)
 ErCx - Concentration associated with x% growth rate cy Response Guide
 GHS - Globally Harmonized System
 actice
 IARC - International Agency for Research on Canir Transport Association
 IBC - International Code for the nt of Ships carrying Dangerous Chemicals in Bulk
 IC50 ncentration
 ICAO - International Civil Aviation Organiza- Existing Chemical Substances in China
 IMDG - Interna- Goods
 IMO - International Maritime Organization
 ISHL alth Law (Japan)
 ISO - International Organisation for rea Existing Chemicals Inventory
 LC50 - Lethal Concenopulation
 LD50 - Lethal Dose to 50% of a test population POL - International Convention for the Prevention
 of Pol- Not Otherwise Specified
 Nch - Chilean Norm
 NO(A)EC fect Concentration
 NO(A)EL - No Observed (Adverse) Efbserveable Effect Loading Rate
 NOM - Official Mexican ology Program
 NZIoC - New Zealand Inventory of Chemfor Economic Co-operation and Development
 OPPTS - Ofd Pollution Prevention
 PBT - Persistent, Bioaccumulative S - Philippines Inventory of Chemicals and Chemical Subtative)
 Structure Activity Relationship
 REACH - Regulation European Parliament and of the Council concerning the uthorisation and
 Restriction of Chemicals
 SADT - Selfn Temperature
 SDS - Safety Data Sheet
 TCSI - Taiwan tory
 TDG - Transportation of Dangerous Goods
 TECI s Inventory
 TSCA - Toxic Substances Control Act (United ons
 UNRTDG - United Nations Recommendations on the oods
 vPvB - Very Persistent and Very Bioaccumulative
 ous Materials Information System