CATO Research Chemicals Inc.
3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou
Web: www.cato-chem.com
Tel: +86-20-81960175 Fax: +86-20-81717260 E-mail: info@cato-chem.com

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.1
Creation Date: July 15, 2019
Revision Date: April 18, 2024

SECTION 1: Identification

1.1 GHS Product identifier

Product name Reference Material for Perchloric Acid Titration Solution

1.2 Other means of identification

Product number CPRM3709
Other names acid by mass [Forbidden];perchloric cid;hydrogen tetraoxochlorate(VII)

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.
Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.
Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou
Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175
Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Oxidizing liquids, Category 1
Skin corrosion, Sub-category 1A

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger
Hazard statement(s) H271 May cause fire or explosion; strong oxidizer
H314 Causes severe skin burns and eye damage

Precautionary statement(s)
Prevention P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220 Keep away from clothing and other combustible materials.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P283 Wear fire resistant or flame retardant clothing.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash ... thoroughly after handling.

Response	P306+P360 IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes. P371+P380+P375 In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. P370+P378 In case of fire: Use ... to extinguish. P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P363 Wash contaminated clothing before reuse. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P316 Get emergency medical help immediately. P321 Specific treatment (see ... on this label). P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Storage	P420 Store separately. P405 Store locked up.
Disposal	P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Reference Material for Perchloric Acid Titration Solution	Perchloric acid	7601-90-3	231-512-4	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention. See Notes.

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

Inhalation of vapors or mist causes burning sensation of nose and throat, and lung irritation with coughing; prolonged or excessive exposure could cause vomiting and severe coughing. Ingestion causes blistering and burns of mouth and stomach. Contact with eyes or skin causes blistering and burns. (USCG, 1999)
Excerpt from ERG Guide 140 [Oxidizers]: Inhalation, ingestion or contact (skin, eyes) with vapors or substance may cause severe injury, burns or death. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may cause pollution. (ERG, 2016)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

no data available

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Combat fires from safe distance or protected location. flood discharge area with water. cool exposed containers with water. aqueous soln

5.2 Specific hazards arising from the chemical

Behavior in Fire: Above 160°C (320°F) will react with combustible material and increase intensity of fire. Containers may explode. (USCG, 1999)
Excerpt from ERG Guide 140 [Oxidizers]: These substances will accelerate burning when involved in a fire. Some may decompose explosively when heated or involved in a fire. May explode from heat or contamination. Some will react explosively with hydrocarbons (fuels). May ignite combustibles (wood, paper, oil, clothing, etc.). Containers may explode when heated. Runoff may create fire or explosion hazard. (ERG, 2016)

5.3 Special protective actions for fire-fighters

In case of fire in the surroundings: water in large amounts, water spray. In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.

SECTION 6: Accidental release measures

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT absorb in saw-dust or other combustible absorbents. Absorb liquid in sand or inert absorbent. Then store and dispose of according to local regulations. Cautiously neutralize remainder. Do NOT wash away into sewer.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT absorb in saw-dust or other combustible absorbents. Absorb liquid in sand or inert absorbent. Then store and dispose of according to local regulations. Cautiously neutralize remainder. Do NOT wash away into sewer.

6.3 Methods and materials for containment and cleaning up

Neutralizing agents for acids & caustics: flush with water & rinse with dilute sodium bicarbonate or soda ash solution.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO contact with combustible substances or reducing agents. Do NOT expose to friction or shock. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Fireproof. See Chemical Dangers. Well closed.REAGENT BOTTLE--MAX 1-LB, GLASS-STOPPERED, GLASS BOTTLE; KEPT IN A HEAVY GLASS TRAY WITH LARGER CAPACITY. ADDN LAB STORAGE SHOULD BE IN ORIGINAL BOTTLES INSIDE A GLASS CONTAINER PADDED WITH GLASS WOOL & HAVING GREATER CAPACITY THAN THE CONTAINER. CARBOYS & LARGE BOTTLES SHOULD BE STORED ON ACID-RESISTING NONCOMBUSTIBLE SHELVES, IN A NONCOMBUSTIBLE STRUCTURE. ALL STORAGE MUST BE SEPARATED FROM COMBUSTIBLE MATERIALS, ORG MATERIALS, STRONG DEHYDRATING AGENTS, OXIDIZING & REDUCING AGENTS. ...MUST BE STORED WHERE IT WILL NOT FREEZE... PROTECT AGAINST PHYSICAL DAMAGE. ELECTRICAL WIRING...IN STORAGE AREAS MUST BE OF WATERTIGHT TYPE TO PROTECT AGAINST CORROSIVE ACTION OF VAPORS.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection. Use appropriate engineering controls.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Perchloric acid, with more than 50% but not more than 72% acid is a clear colorless odorless aqueous solution. Corrosive to metals and tissue. Closed containers may rupture violently under prolonged exposure to heat.
Colour	COLORLESS, OILY LIQUID
Odour	odorless
Melting point/freezing point	-112°C
Boiling point or initial boiling point and boiling range	39°C
Flammability	Not combustible but enhances combustion of other substances. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.

Lower and upper explosion limit/flammability limit	no data available
Flash point	113°C
Auto-ignition temperature	no data available
Decomposition temperature	19°C
pH	no data available
Kinematic viscosity	no data available
Solubility	MISCIBLE IN COLD WATER
Partition coefficient n-octanol/water	no data available
Vapour pressure	6.8 mm Hg (25 °C)
Density and/or relative density	1.664g/mLat 25°C
Relative vapour density	~2.1 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

May explode on heating. Decomposes on heating. This produces toxic and corrosive fumes. The substance is a strong oxidant. It reacts violently with combustible and reducing materials, organic materials and strong bases. This generates fire and explosion hazard. Attacks many metals. This produces flammable/explosive gas (hydrogen - see ICSC 0001). The acid is unstable if the concentration is over 72%; may explode by shock or concussion when dry or drying. Mixtures with combustible material (such as paper) may ignite spontaneously at room temperature.

10.2 Chemical stability

VOLATILE

10.3 Possibility of hazardous reactions

AQ ACID...MAY DEFLAGRATE IN CONTACT WITH OXIDIZABLE SUBSTANCES. /AQUEOUS SOLN/PERCHLORIC ACID, [> 50% BUT <= 72% STRENGTH] is a solution of a strong oxidizing acid. May react vigorously or deflagrate when mixed with oxidizable material [Merck]. This includes (but is not limited to) alcohols, amines, boranes, dicyanogen, hydrazines, hydrocarbons, hydrogen, nitroalkanes, powdered metals, silanes, or thiols [Bretherick 1979. p.174]. Perchloric acid ignites on contact with sulfinyl chloride. (Bailar, 1973, Vol. 2, 1442).

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Mixtures of.../acetic acid, perchloric acid and acetic anhydride/ have varying degrees of sensitivity to shock. ...addition of acetic anhydride to aq soln of perchloric acid causes formation of acetic acid which can react violently with perchloric acid.

10.6 Hazardous decomposition products

Poisonous gases may be produced in fire. aqueous soln

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

Corrosive. The vapour is very corrosive to the eyes, skin and respiratory tract. Inhalation of the vapour or mist may cause lung oedema. See Notes. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

no data available

Aspiration hazard

No indication can be given about the rate at which a harmful concentration of this substance in the air is reached on evaporation at 20°C.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: no data available
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN1873 (For reference only, please check.)	IMDG: UN1873 (For reference only, please check.)	IATA: UN1873 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass (For reference only, please check.)	IMDG: PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass (For reference only, please check.)	IATA: PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 5.1 (For reference only, please check.)	IMDG: 5.1 (For reference only, please check.)	IATA: 5.1 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: I (For reference only, please check.)	IMDG: I (For reference only, please check.)	IATA: I (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: No	IMDG: No	IATA: No

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Perchloric acid	Perchloric acid	7601-90-3	231-512-4
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date	July 15, 2019
Revision Date	April 18, 2024

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
- HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
- ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
- Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
- ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

DO NOT use perchloric acid in a hood designed for other purposes.The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered.Rinse contaminated clothing with plenty of water because of fire hazard.NEVER pour water into this substance; when dissolving or diluting always add it slowly to the water.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com