

Product name: Q/PV Standards Kit-2 for UV-VIS Holmium Oxide - Perchloric Acid
Part no.: 5063-6521

This product is composed of the following:

Kit Components, Reagents

Box/Module Part number	Box/Module Name	Kit Component Part Number	Kit Component Name	Qty Units	GHS
-	-	5063-6521-1	Holmium Oxide in 10% Perchloric Acid Solution	1	Yes
-	-	5063-6521-2	Perchloric Acid Solution (10% v/v)	1	Yes

Article SDSs, if maintained, are available on www.agilent.com. We recommend using the article product code when searching. SDSs are only available for a limited set of countries.

Transport Information for the Kit:

Dangerous Goods classification for: 5063-6521

DOT	IMDG	IATA
UN1802, Perchloric acid solution, 8 (5.1), II	UN1802, PERCHLORIC ACID solution, 8 (5.1), II	UN1802, Perchloric acid solution, 8(5.1), II

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Perchloric Acid Solution (10% v/v).....	15

SDSs for each individual Kit component follow this cover sheet.

SAFETY DATA SHEET

Holmium Oxide in 10% Perchloric Acid Solution

Section 1. Identification

GHS product identifier : Holmium Oxide in 10% Perchloric Acid Solution
Part no. : 5063-6521-1

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

Identified uses : Reagents and Standards for Analytical Chemistry Laboratory Use
1 x 10 ml

Supplier/Manufacturer : Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

Emergency telephone number (with hours of operation) : CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

H272 OXIDIZING LIQUIDS - Category 2
H314 SKIN CORROSION - Category 1
H318 SERIOUS EYE DAMAGE - Category 1
H373 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 3.6%

GHS label elements

Hazard pictograms : 

Signal word : Danger

Hazard statements : H272 - May intensify fire; oxidizer.
H314 - Causes severe skin burns and eye damage.
H373 - May cause damage to organs through prolonged or repeated exposure. (thyroid)
Corrosive to the respiratory tract.

Precautionary statements

Prevention : P280 - Wear protective gloves, protective clothing and eye or face protection.
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.
P260 - Do not breathe vapor.

Section 2. Hazards identification

- Response** : P304 + P310 - IF INHALED: Immediately call a POISON CENTER or doctor.
P301 + P310, P330, P331 - IF SWALLOWED: Immediately call a POISON CENTER or doctor. Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353, P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Immediately call a POISON CENTER or doctor.
P363 - Wash contaminated clothing before reuse.
P305 + P351 + P338, P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor.
- Storage** : Not applicable.
- Disposal** : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Supplemental label elements** : Keep container tightly closed. Do not breathe vapor or spray. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.
- Other hazards**
- Hazards not otherwise classified** : Causes digestive tract burns.
- Hazards identified when used** : No known significant effects or critical hazards.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	Synonyms	%	Identifiers
Perchloric acid	-	≥10 - ≤30	CAS: 7601-90-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
- Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Get medical attention immediately. Call a poison center or physician. Rinse immediately contaminated clothing and skin with plenty of water. Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Section 4. First aid measures

- Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : Corrosive to the respiratory tract. Causes burns.
- Skin contact** : Causes severe burns.
- Ingestion** : May cause burns to mouth, throat and stomach. Corrosive to the digestive tract. Causes burns.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
- Ingestion** : Adverse symptoms may include the following:
stomach pains

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

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Oxidizing material. May intensify fire. In a fire or if heated, a pressure increase will occur and the container may burst.

Section 5. Fire-fighting measures

- Hazardous thermal decomposition products** : Decomposition products may include the following materials: halogenated compounds
- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Methods for cleaning up** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. The spilled material may be neutralized with sodium carbonate, sodium bicarbonate or sodium hydroxide. Do not absorb in sawdust or other combustible material. It may lead to a fire risk when it dries out. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from clothing, incompatible materials and combustible materials. Keep away from alkalis. Keep away from heat. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Separate from alkalis. Separate from reducing agents and combustible materials. Store away from grease and oil. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Perchloric acid	None.

Biological exposure indices

No exposure indices known.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Section 8. Exposure controls/personal protection

- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

- Physical state** : Liquid.
- Color** : Not available.
- Odor** : Not available.
- Odor threshold** : Not available.
- pH** : <2
- Melting point/freezing point** : Not available.
- Boiling point or initial boiling point and boiling range** : Not available.
- Flash point** : Not available.
- Evaporation rate** : Not available.
- Flammability** : Not applicable.
- Lower and upper explosion limit/flammability limit** : Not available.
- Vapor pressure** :

Ingredient name	Vapor Pressure at 20°C			Vapor pressure at 50°C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
water	17.5	2.3	-	92.258	12.3	-
Perchloric acid	0.53255	0.071	-	-	-	-

- Relative vapor density** : Not available.

- Relative density** : Not available.

Media	Result
water	Soluble

- Miscible with water** : Yes.

- Partition coefficient: n-octanol/water** : Not applicable.

- Auto-ignition temperature** : Not available.

- Decomposition temperature** : Not available.

- Viscosity** : Dynamic (room temperature): Not available.
Kinematic (room temperature): Not available.
Kinematic (40°C (104°F)): Not available.

Particle characteristics

- Median particle size** : Not applicable.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Hazardous reactions or instability may occur under certain conditions of storage or use. Conditions may include the following: contact with combustible materials Reactions may include the following: risk of causing or intensifying fire
Conditions to avoid	: Drying on clothing or other combustible materials may cause fire.
Incompatible materials	: Attacks many metals producing extremely flammable hydrogen gas which can form explosive mixtures with air. Reactive or incompatible with the following materials: alkalis combustible materials reducing materials
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	
Perchloric acid	Rat - Oral - LD50	1100 mg/kg
Conclusion/Summary [Product]	: Not available.	

Skin corrosion/irritation

Conclusion/Summary [Product]	: Not available.
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Serious eye damage/eye irritation

Conclusion/Summary [Product]	: Not available.
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Respiratory corrosion/irritation

Conclusion/Summary [Product]	: Not available.
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Respiratory or skin sensitization

Skin

Conclusion/Summary [Product]	: Not available.
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Respiratory

Conclusion/Summary [Product]	: Not available.
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Section 11. Toxicological information

Germ cell mutagenicity

Conclusion/Summary [Product] : Not available.

Carcinogenicity

Not available.

Conclusion/Summary [Product] : Not available.

Reproductive toxicity

Conclusion/Summary [Product] : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Result
Perchloric acid	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (thyroid) - Category 2

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

Potential acute health effects

Eye contact	: Causes serious eye damage.
Inhalation	: Corrosive to the respiratory tract. Causes burns.
Skin contact	: Causes severe burns.
Ingestion	: May cause burns to mouth, throat and stomach. Corrosive to the digestive tract. Causes burns.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Adverse symptoms may include the following: pain watering redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing
Skin contact	: Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion	: Adverse symptoms may include the following: stomach pains

Section 11. Toxicological information

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Conclusion/Summary [Product] : Not available.

General : May cause damage to organs through prolonged or repeated exposure.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
Holmium Oxide in 10% Perchloric Acid Solution	7281.0	N/A	N/A	N/A	N/A
Perchloric acid	1100	N/A	N/A	N/A	N/A

Section 12. Ecological information

Toxicity

Product/ingredient name

Result

Perchloric acid

Acute - EC50 - Fresh water

>100 mg/l [48 hours]

Conclusion/Summary [Product] : Not available.

Persistence and degradability

Conclusion/Summary [Product] : Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Perchloric acid	-	0.039	Low

Mobility in soil

Soil/Water partition coefficient : Not available.











Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN number	UN1802	UN1802	UN1802	UN1802	UN1802
UN proper shipping name	Perchloric acid solution	PERCHLORIC ACID solution	ÁCIDO PERCLÓRICO solution	PERCHLORIC ACID solution	Perchloric acid solution
Transport hazard class(es)	8 (5.1)  	8 (5.1)  	8 (5.1)  	8 (5.1)  	8 (5.1)  
Packing group	II	II	II	II	II
Environmental hazards	No.	No.	No.	No.	No.

Additional information

Remarks: Excepted Quantity

DOT Classification : **Limited quantity** Yes.
Packaging instruction Exceptions: 154. Non-bulk: 202. Bulk: 243.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 30 L.
Special provisions IB2, N41, T7, TP2

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.40-2.42 (Class 8), 2.23-2.25 (Class 5).
Explosive Limit and Limited Quantity Index 1
ERAP Index 3000
Passenger Carrying Road or Rail Index Forbidden

IMDG : **Emergency schedules** F-H, S-Q

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Packaging instructions: Forbidden. Cargo Aircraft Only: 30 L. Packaging instructions: 855. Limited Quantities - Passenger Aircraft: Forbidden. Packaging instructions: Forbidden.
Special provisions A1

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 14. Transport information

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations

TSCA 12(b) - Chemical export notification

Not applicable.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : OXIDIZING LIQUIDS - Category 2
SKIN CORROSION - Category 1
SERIOUS EYE DAMAGE - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
HNOC - Corrosive to digestive tract

Composition/information on ingredients

Name	%	Classification
Perchloric acid	≥10 - ≤30	OXIDIZING LIQUIDS - Category 1 CORROSIVE TO METALS - Category 1 ACUTE TOXICITY (oral) - Category 4 SKIN CORROSION - Category 1A SERIOUS EYE DAMAGE - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 HNOC - Corrosive to digestive tract

State regulations

Massachusetts : The following components are listed: PERCHLORIC ACID

New York : None of the components are listed.

New Jersey : The following components are listed: PERCHLORIC ACID

Pennsylvania : The following components are listed: PERCHLORIC ACID

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Section 15. Regulatory information

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia	: All components are listed or exempted.
Canada	: At least one component is not listed in DSL but all such components are listed in NDSL.
China	: All components are listed or exempted.
Japan	: Japan inventory (CSCL) : All components are listed or exempted. Japan inventory (ISHL) : All components are listed or exempted.
New Zealand	: All components are listed or exempted.
Philippines	: Not determined.
Republic of Korea	: All components are listed or exempted.
Taiwan	: All components are listed or exempted.
Thailand	: All components are listed or exempted.
Turkey	: Not determined.
United States	: All components are active or exempted.
Viet Nam	: All components are listed or exempted.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
OXIDIZING LIQUIDS - Category 2	Expert judgment
SKIN CORROSION - Category 1	On basis of test data
SERIOUS EYE DAMAGE - Category 1	On basis of test data
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2	Calculation method

History

Date of issue/Date of revision : 07/25/2025

Date of previous issue : No previous validation

Version : 1

Key to abbreviations :

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- DOT = Department of Transportation
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- IMO = International Maritime Organization
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- N/A = Not available

Section 16. Other information

SGG = Segregation Group
TDG = Transportation of Dangerous Goods
UN = United Nations

📌 Indicates information that has changed from previously issued version.

[Notice to reader](#)

Disclaimer: The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

SAFETY DATA SHEET

Perchloric Acid Solution (10% v/v)

Section 1. Identification

GHS product identifier : Perchloric Acid Solution (10% v/v)

Part no. : 5063-6521-2

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

Identified uses : Reagents and Standards for Analytical Chemistry Laboratory Use
1 x 10 ml

Supplier/Manufacturer : Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

Emergency telephone number (with hours of operation) : CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

H272 OXIDIZING LIQUIDS - Category 2

H314 SKIN CORROSION - Category 1

H318 SERIOUS EYE DAMAGE - Category 1

H373 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H272 - May intensify fire; oxidizer.
H314 - Causes severe skin burns and eye damage.
H373 - May cause damage to organs through prolonged or repeated exposure. (thyroid)
Corrosive to the respiratory tract.

Precautionary statements

Prevention :

P280 - Wear protective gloves, protective clothing and eye or face protection.
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.
P260 - Do not breathe vapor.

Response :

P304 + P310 - IF INHALED: Immediately call a POISON CENTER or doctor.
P301 + P310, P330, P331 - IF SWALLOWED: Immediately call a POISON CENTER or doctor. Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353, P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Immediately call a POISON CENTER or doctor.
P363 - Wash contaminated clothing before reuse.
P305 + P351 + P338, P310 - IF IN EYES: Rinse cautiously with water for several

Section 2. Hazards identification

	minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.
Storage	: Not applicable.
Disposal	: P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements	: Keep container tightly closed. Do not breathe vapor or spray. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.
Other hazards	
Hazards not otherwise classified	: Causes digestive tract burns.
Hazards identified when used	: No known significant effects or critical hazards.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	Synonyms	%	Identifiers
Perchloric acid	-	≥10 - ≤30	CAS: 7601-90-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
Inhalation	: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	: Get medical attention immediately. Call a poison center or physician. Rinse immediately contaminated clothing and skin with plenty of water. Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Section 4. First aid measures

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : Corrosive to the respiratory tract. Causes burns.
- Skin contact** : Causes severe burns.
- Ingestion** : May cause burns to mouth, throat and stomach. Corrosive to the digestive tract. Causes burns.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
- Ingestion** : Adverse symptoms may include the following:
stomach pains

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

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Oxidizing material. May intensify fire. In a fire or if heated, a pressure increase will occur and the container may burst.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
halogenated compounds

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Section 5. Fire-fighting measures

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Methods for cleaning up** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. The spilled material may be neutralized with sodium carbonate, sodium bicarbonate or sodium hydroxide. Do not absorb in sawdust or other combustible material. It may lead to a fire risk when it dries out. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from clothing, incompatible materials and combustible materials. Keep away from alkalis. Keep away from heat. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Separate from alkalis. Separate from reducing agents and combustible materials. Store away from grease and oil. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Perchloric acid	None.

Biological exposure indices

No exposure indices known.

Appropriate engineering controls

: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls

: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection

: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection

: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection

: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

: Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

Physical state	: Liquid.
Color	: Colorless.
Odor	: Odorless.
Odor threshold	: Not available.
pH	: <2
Melting point/freezing point	: Not available.
Boiling point or initial boiling point and boiling range	: Not available.
Flash point	: Not available.
Evaporation rate	: Not available.
Flammability	: Not applicable.
Lower and upper explosion limit/flammability limit	: Not available.
Vapor pressure	:

Ingredient name	Vapor Pressure at 20°C			Vapor pressure at 50°C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
water	17.5	2.3	-	92.258	12.3	-
Perchloric acid	0.53255	0.071	-	-	-	-

Relative vapor density : Not available.

Relative density : Not available.

Solubility(ies)	:	<table><tr><th>Media</th><th>Result</th></tr><tr><td>water</td><td>Soluble</td></tr></table>	Media	Result	water	Soluble
	Media	Result				
water	Soluble					

Miscible with water : Yes.

Partition coefficient: n-octanol/water : Not applicable.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Dynamic (room temperature): Not available.
Kinematic (room temperature): Not available.
Kinematic (40°C (104°F)): Not available.

Particle characteristics

Median particle size : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Hazardous reactions or instability may occur under certain conditions of storage or use.
Conditions may include the following:
contact with combustible materials
Reactions may include the following:
risk of causing or intensifying fire

Section 10. Stability and reactivity

- Conditions to avoid** : Drying on clothing or other combustible materials may cause fire.
- Incompatible materials** : Attacks many metals producing extremely flammable hydrogen gas which can form explosive mixtures with air.
Reactive or incompatible with the following materials:
alkalis
combustible materials
reducing materials
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	
Perchloric acid	Rat - Oral - LD50	1100 mg/kg
Conclusion/Summary [Product]	: Not available.	

Skin corrosion/irritation

Conclusion/Summary [Product]	: Not available.
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Serious eye damage/eye irritation

Conclusion/Summary [Product]	: Not available.
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Respiratory corrosion/irritation

Conclusion/Summary [Product]	: Not available.
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Respiratory or skin sensitization

Skin

Conclusion/Summary [Product]	: Not available.
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Respiratory

Conclusion/Summary [Product]	: Not available.
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Germ cell mutagenicity

Conclusion/Summary [Product]	: Not available.
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Carcinogenicity

Not available.

Conclusion/Summary [Product]	: Not available.
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Section 11. Toxicological information

Reproductive toxicity

Conclusion/Summary : Not available.
[Product]

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Result
Perchloric acid	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (thyroid) - Category 2

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.

Potential acute health effects

Eye contact	: Causes serious eye damage.
Inhalation	: Corrosive to the respiratory tract. Causes burns.
Skin contact	: Causes severe burns.
Ingestion	: May cause burns to mouth, throat and stomach. Corrosive to the digestive tract. Causes burns.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Adverse symptoms may include the following: pain watering redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing
Skin contact	: Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion	: Adverse symptoms may include the following: stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Section 11. Toxicological information

Potential chronic health effects

Conclusion/Summary [Product] : Not available.

General : May cause damage to organs through prolonged or repeated exposure.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Reproductive toxicity : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
Perchloric Acid Solution (10% v/v) Perchloric acid	7017.5 1100	N/A N/A	N/A N/A	N/A N/A	N/A N/A

Section 12. Ecological information

Toxicity

Product/ingredient name : Perchloric acid
Result : Acute - EC50 - Fresh water >100 mg/l [48 hours]
Conclusion/Summary [Product] : Not available.

Persistence and degradability

Conclusion/Summary [Product] : Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Perchloric acid	-	0.039	Low

Mobility in soil

Soil/Water partition coefficient : Not available.

Other adverse effects : No known significant effects or critical hazards.











Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered

Section 13. Disposal considerations

when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN number	UN1802	UN1802	UN1802	UN1802	UN1802
UN proper shipping name	Perchloric acid solution	PERCHLORIC ACID solution	ÁCIDO PERCLÓRICO solution	PERCHLORIC ACID solution	Perchloric acid solution
Transport hazard class(es)	8 (5.1)  	8 (5.1)  	8 (5.1)  	8 (5.1)  	8 (5.1)  
Packing group	II	II	II	II	II
Environmental hazards	No.	No.	No.	No.	No.

Additional information

Remarks: Excepted Quantity

DOT Classification

- : **Limited quantity** Yes.
- : **Packaging instruction** Exceptions: 154. Non-bulk: 202. Bulk: 243.
- : **Quantity limitation** Passenger aircraft/rail: Forbidden. Cargo aircraft: 30 L.
- : **Special provisions** IB2, N41, T7, TP2

TDG Classification

- : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.40-2.42 (Class 8), 2.23-2.25 (Class 5).
- : **Explosive Limit and Limited Quantity Index** 1
- : **ERAP Index** 3000
- : **Passenger Carrying Road or Rail Index** Forbidden

IMDG

IATA

- : **Emergency schedules** F-H, S-Q
- : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Packaging instructions: Forbidden. Cargo Aircraft Only: 30 L. Packaging instructions: 855. Limited Quantities - Passenger Aircraft: Forbidden. Packaging instructions: Forbidden.
- : **Special provisions** A1

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations

TSCA 12(b) - Chemical export notification

Not applicable.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : OXIDIZING LIQUIDS - Category 2
SKIN CORROSION - Category 1
SERIOUS EYE DAMAGE - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
HNOC - Corrosive to digestive tract

Composition/information on ingredients

Name	%	Classification
Perchloric acid	≥10 - ≤30	OXIDIZING LIQUIDS - Category 1 CORROSIVE TO METALS - Category 1 ACUTE TOXICITY (oral) - Category 4 SKIN CORROSION - Category 1A SERIOUS EYE DAMAGE - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 HNOC - Corrosive to digestive tract

State regulations

Massachusetts : The following components are listed: PERCHLORIC ACID

New York : None of the components are listed.

New Jersey : The following components are listed: PERCHLORIC ACID

Pennsylvania : The following components are listed: PERCHLORIC ACID

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Section 15. Regulatory information

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia	: All components are listed or exempted.
Canada	: All components are listed or exempted.
China	: All components are listed or exempted.
Japan	: Japan inventory (CSCL) : All components are listed or exempted. Japan inventory (ISHL) : All components are listed or exempted.
New Zealand	: All components are listed or exempted.
Philippines	: All components are listed or exempted.
Republic of Korea	: All components are listed or exempted.
Taiwan	: All components are listed or exempted.
Thailand	: All components are listed or exempted.
Turkey	: Not determined.
United States	: All components are active or exempted.
Viet Nam	: All components are listed or exempted.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
OXIDIZING LIQUIDS - Category 2	Expert judgment
SKIN CORROSION - Category 1	On basis of test data
SERIOUS EYE DAMAGE - Category 1	On basis of test data
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2	Calculation method

History

Date of issue/Date of revision : 07/25/2025

Date of previous issue : No previous validation

Version : 1

Key to abbreviations :

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- DOT = Department of Transportation
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- IMO = International Maritime Organization
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- N/A = Not available
- SGG = Segregation Group
- TDG = Transportation of Dangerous Goods
- UN = United Nations

Indicates information that has changed from previously issued version.

Notice to reader

Section 16. Other information

Disclaimer: The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.