SAFETY DATA SHEET

Agilent Technologies

OQ/PV Standards Kit-2 for UV-VIS Holmium Oxide - Perchloric Acid, Part Number 5063-6521

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

1.1 Product identifier

Product name : OQ/PV Standards Kit-2 for UV-VIS Holmium Oxide - Perchloric Acid, Part Number 5063-6521

Part no. (chemical kit) : 5063-6521

Part no. :

Holmium Oxide in 10% Perchloric Acid Solution	5063-6521-1
Perchloric Acid Solution (10% v/v)	5063-6521-2

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

Material uses : Reagents and Standards for Analytical Chemistry Laboratory Use

Holmium Oxide in 10% Perchloric Acid Solution	1 x 10 ml
Perchloric Acid Solution (10% v/v)	1 x 10 ml

1.3 Details of the supplier of the safety data sheet

Agilent Technologies Manufacturing GmbH & Co. KG
Hewlett-Packard-Str. 8
76337 Waldbronn
Germany
0800 603 1000

e-mail address of person responsible for this SDS : pdl-msds_author@agilent.com

1.4 Emergency telephone number

Emergency telephone number (with hours of operation) : CHEMTREC®: +(44)-870-8200418

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition :

Holmium Oxide in 10% Perchloric Acid Solution	Mixture
Perchloric Acid Solution (10% v/v)	Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Holmium Oxide in 10% Perchloric Acid Solution

H272	OXIDISING LIQUIDS - Category 2
H314	SKIN CORROSION/IRRITATION - Category 1

Perchloric Acid Solution (10% v/v)

H272	OXIDISING LIQUIDS - Category 2
H314	SKIN CORROSION/IRRITATION - Category 1

SECTION 2: Hazards identification

Ingredients of unknown toxicity	:	Holmium Oxide in 10% Perchloric Acid Solution	Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 1 - 10% Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 1 - 10% Percentage of the mixture consisting of ingredient(s) of unknown oral toxicity: 1 - 10%
Ingredients of unknown ecotoxicity	:	Holmium Oxide in 10% Perchloric Acid Solution	Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 3.6%

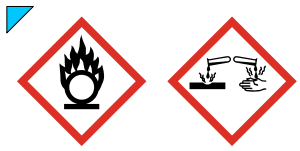
See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :

Holmium Oxide in 10% Perchloric Acid Solution



Perchloric Acid Solution (10% v/v)

Signal word	:	Holmium Oxide in 10% Perchloric Acid Solution	Danger
		Perchloric Acid Solution (10% v/v)	Danger
Hazard statements	:	Holmium Oxide in 10% Perchloric Acid Solution	H272 - May intensify fire; oxidiser. H314 - Causes severe skin burns and eye damage.
		Perchloric Acid Solution (10% v/v)	H272 - May intensify fire; oxidiser. H314 - Causes severe skin burns and eye damage.

Precautionary statements

Prevention	:	Holmium Oxide in 10% Perchloric Acid Solution	P280 - Wear protective gloves. Wear protective clothing. Wear 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.
		Perchloric Acid Solution (10% v/v)	P280 - Wear protective gloves. Wear protective clothing. Wear 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.
Response	:	Holmium Oxide in 10% Perchloric Acid Solution	P304 + P340 + P310 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. P301 + P310 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. 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 physician. P305 + P310 - IF IN EYES: Immediately call a POISON CENTER or physician.
		Perchloric Acid Solution (10% v/v)	P304 + P340 + P310 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician.

SECTION 2: Hazards identification

			P301 + P310 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. 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 physician. P305 + P310 - IF IN EYES: Immediately call a POISON CENTER or physician.
Storage	:	Holmium Oxide in 10% Perchloric Acid Solution	P405 - Store locked up.
		Perchloric Acid Solution (10% v/v)	P405 - Store locked up.
Disposal	:	Holmium Oxide in 10% Perchloric Acid Solution	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
		Perchloric Acid Solution (10% v/v)	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazardous ingredients	:	Holmium Oxide in 10% Perchloric Acid Solution	- perchloric acid
		Perchloric Acid Solution (10% v/v)	- perchloric acid
Supplemental label elements	:	Holmium Oxide in 10% Perchloric Acid Solution	Not applicable.
		Perchloric Acid Solution (10% v/v)	Not applicable.
Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	:	Holmium Oxide in 10% Perchloric Acid Solution	Not applicable.
		Perchloric Acid Solution (10% v/v)	Not applicable.
Special packaging requirements			
Tactile warning of danger	:	Holmium Oxide in 10% Perchloric Acid Solution	Not applicable.
		Perchloric Acid Solution (10% v/v)	Not applicable.

2.3 Other hazards

Other hazards which do not result in classification	:	Holmium Oxide in 10% Perchloric Acid Solution	Causes digestive tract burns.
		Perchloric Acid Solution (10% v/v)	Causes digestive tract burns.

SECTION 3: Composition/information on ingredients

3.1 Substances : Holmium Oxide in 10% Perchloric Acid Solution — Mixture

Perchloric Acid Solution (10% v/v) — Mixture

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
Holmium Oxide in 10% Perchloric Acid Solution				
Perchloric acid	EC: 231-512-4 CAS: 7601-90-3 Index: 017-006-00-4	≥10 - ≤25	Ox. Liq. 1, H271 Skin Corr. 1A, H314	[1]
Perchloric Acid Solution (10% v/v)				
Perchloric acid	EC: 231-512-4 CAS: 7601-90-3	≥10 - ≤25	Ox. Liq. 1, H271 Skin Corr. 1A, H314	[1]

SECTION 3: Composition/information on ingredients

	Index: 017-006-00-4		**See Section 16 for the full text of the H statements declared above.**	

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

Type

[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit
[3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
[4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
[5] Substance of equivalent concern
[6] Additional disclosure due to company policy

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact

: Holmium Oxide in 10% Perchloric Acid Solution

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.

Perchloric Acid Solution (10% v/v)

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

: Holmium Oxide in 10% Perchloric Acid Solution

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.

Perchloric Acid Solution (10% v/v)

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.

SECTION 4: First aid measures

Skin contact	:	Holmium Oxide in 10% Perchloric Acid Solution	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.
		Perchloric Acid Solution (10% v/v)	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	:	Holmium Oxide in 10% Perchloric Acid Solution	Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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.
		Perchloric Acid Solution (10% v/v)	Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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.
Protection of first-aiders	:	Holmium Oxide in 10% Perchloric Acid Solution	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.
		Perchloric Acid Solution (10% v/v)	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

SECTION 4: First aid measures

water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact	:	Holmium Oxide in 10% Perchloric Acid Solution	Causes serious eye damage.
		Perchloric Acid Solution (10% v/v)	Causes serious eye damage.
Inhalation	:	Holmium Oxide in 10% Perchloric Acid Solution	No known significant effects or critical hazards.
		Perchloric Acid Solution (10% v/v)	No known significant effects or critical hazards.
Skin contact	:	Holmium Oxide in 10% Perchloric Acid Solution	Causes severe burns.
		Perchloric Acid Solution (10% v/v)	Causes severe burns.
Ingestion	:	Holmium Oxide in 10% Perchloric Acid Solution	Corrosive to the digestive tract. Causes burns.
		Perchloric Acid Solution (10% v/v)	Corrosive to the digestive tract. Causes burns.

Over-exposure signs/symptoms

Eye contact	:	Holmium Oxide in 10% Perchloric Acid Solution	Adverse symptoms may include the following: pain watering redness
		Perchloric Acid Solution (10% v/v)	Adverse symptoms may include the following: pain watering redness
Inhalation	:	Holmium Oxide in 10% Perchloric Acid Solution	No specific data.
		Perchloric Acid Solution (10% v/v)	No specific data.
Skin contact	:	Holmium Oxide in 10% Perchloric Acid Solution	Adverse symptoms may include the following: pain or irritation redness blistering may occur
		Perchloric Acid Solution (10% v/v)	Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion	:	Holmium Oxide in 10% Perchloric Acid Solution	Adverse symptoms may include the following: stomach pains
		Perchloric Acid Solution (10% v/v)	Adverse symptoms may include the following: stomach pains

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	:	Holmium Oxide in 10% Perchloric Acid Solution	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		Perchloric Acid Solution (10% v/v)	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

SECTION 4: First aid measures

Specific treatments	:	Holmium Oxide in 10% Perchloric Acid Solution	No specific treatment.
		Perchloric Acid Solution (10% v/v)	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	Holmium Oxide in 10% Perchloric Acid Solution	Use an extinguishing agent suitable for the surrounding fire.
		Perchloric Acid Solution (10% v/v)	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	Holmium Oxide in 10% Perchloric Acid Solution	None known.
		Perchloric Acid Solution (10% v/v)	None known.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	:	Holmium Oxide in 10% Perchloric Acid Solution	Oxidising material. May intensify fire. In a fire or if heated, a pressure increase will occur and the container may burst.
		Perchloric Acid Solution (10% v/v)	Oxidising material. May intensify fire. In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous combustion products	:	Holmium Oxide in 10% Perchloric Acid Solution	Decomposition products may include the following materials: halogenated compounds
		Perchloric Acid Solution (10% v/v)	Decomposition products may include the following materials: halogenated compounds

5.3 Advice for firefighters

Special precautions for fire-fighters	:	Holmium Oxide in 10% Perchloric Acid Solution	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.
		Perchloric Acid Solution (10% v/v)	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	:	Holmium Oxide in 10% Perchloric Acid Solution	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
		Perchloric Acid Solution (10% v/v)	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: Holmium Oxide in 10% Perchloric Acid Solution	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 spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	Perchloric Acid Solution (10% v/v)	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 spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: Holmium Oxide in 10% Perchloric Acid Solution	If specialised 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".
	Perchloric Acid Solution (10% v/v)	If specialised 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".
6.2 Environmental precautions	: Holmium Oxide in 10% Perchloric Acid Solution	Avoid dispersal of spilt 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).
	Perchloric Acid Solution (10% v/v)	Avoid dispersal of spilt 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).

6.3 Methods and material for containment and cleaning up

Methods for cleaning up	: Holmium Oxide in 10% Perchloric Acid Solution	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.
	Perchloric Acid Solution (10% v/v)	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.

6.4 Reference to other sections : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures	:	Holmium Oxide in 10% Perchloric Acid Solution	Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. 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.
		Perchloric Acid Solution (10% v/v)	Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. 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	:	Holmium Oxide in 10% Perchloric Acid Solution	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.
		Perchloric Acid Solution (10% v/v)	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.

7.2 Conditions for safe storage, including any incompatibilities

Storage	:	Holmium Oxide in 10% Perchloric Acid Solution	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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
		Perchloric Acid Solution (10% v/v)	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 unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for

SECTION 7: Handling and storage

incompatible materials before handling or use.

Danger criteria

Category	Notification and MAPP threshold	Safety report threshold
Holmium Oxide in 10% Perchloric Acid Solution P8	50	200
Perchloric Acid Solution (10% v/v) P8	50	200

7.3 Specific end use(s)

Recommendations	:	Holmium Oxide in 10% Perchloric Acid Solution	Industrial applications, Professional applications.
		Perchloric Acid Solution (10% v/v)	Industrial applications, Professional applications.
Industrial sector specific solutions	:	Holmium Oxide in 10% Perchloric Acid Solution	Not applicable.
		Perchloric Acid Solution (10% v/v)	Not applicable.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

No exposure limit value known.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

No DNELs/DMELs available.

PNECs

No PNECs available

8.2 Exposure controls

Appropriate engineering controls : If user operations generate dust, fumes, gas, vapour 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.

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.

SECTION 8: Exposure controls/personal protection

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.

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.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	:	Holmium Oxide in 10% Perchloric Acid Solution	Liquid.
		Perchloric Acid Solution (10% v/v)	Liquid.
Colour	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Colourless.
Odour	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Odourless.
Odour threshold	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
pH	:	Holmium Oxide in 10% Perchloric Acid Solution	<2
		Perchloric Acid Solution (10% v/v)	<2
Melting point/freezing point	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.

SECTION 9: Physical and chemical properties

Initial boiling point and boiling range	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Flash point	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Evaporation rate	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Flammability (solid, gas)	:	Holmium Oxide in 10% Perchloric Acid Solution	Not applicable.
		Perchloric Acid Solution (10% v/v)	Not applicable.
Upper/lower flammability or explosive limits	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Vapour pressure	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Vapour density	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Relative density	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Solubility(ies)	:	Holmium Oxide in 10% Perchloric Acid Solution	Easily soluble in the following materials: cold water and hot water.
		Perchloric Acid Solution (10% v/v)	Easily soluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/water	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Auto-ignition temperature	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Decomposition temperature	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Viscosity	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.
Explosive properties	:	Holmium Oxide in 10% Perchloric Acid Solution	Not available.
		Perchloric Acid Solution (10% v/v)	Not available.

SECTION 9: Physical and chemical properties

Oxidising properties

Holmium Oxide in 10% Perchloric Acid Solution	Not available.
Perchloric Acid Solution (10% v/v)	Not available.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

Holmium Oxide in 10% Perchloric Acid Solution	No specific test data related to reactivity available for this product or its ingredients.
Perchloric Acid Solution (10% v/v)	No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

Holmium Oxide in 10% Perchloric Acid Solution	The product is stable.
Perchloric Acid Solution (10% v/v)	The product is stable.

10.3 Possibility of hazardous reactions

Holmium Oxide in 10% Perchloric Acid Solution	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
Perchloric Acid Solution (10% v/v)	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

10.4 Conditions to avoid

Holmium Oxide in 10% Perchloric Acid Solution	Drying on clothing or other combustible materials may cause fire.
Perchloric Acid Solution (10% v/v)	Drying on clothing or other combustible materials may cause fire.

10.5 Incompatible materials

Holmium Oxide in 10% Perchloric Acid Solution	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
Perchloric Acid Solution (10% v/v)	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

10.6 Hazardous decomposition products

Holmium Oxide in 10% Perchloric Acid Solution	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Perchloric Acid Solution (10% v/v)	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Holmium Oxide in 10% Perchloric Acid Solution				
Perchloric acid	LD50 Oral	Rat	1100 mg/kg	-
Perchloric Acid Solution (10% v/v)				
Perchloric acid	LD50 Oral	Rat	1100 mg/kg	-

Acute toxicity estimates

Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on likely routes of exposure :

Holmium Oxide in 10% Perchloric Acid Solution	Routes of entry anticipated: Oral, Dermal, Inhalation.
Perchloric Acid Solution (10% v/v)	Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Inhalation :

Holmium Oxide in 10% Perchloric Acid Solution	No known significant effects or critical hazards.
Perchloric Acid Solution (10% v/v)	No known significant effects or critical hazards.

Ingestion :

Holmium Oxide in 10% Perchloric Acid Solution	Corrosive to the digestive tract. Causes burns.
Perchloric Acid Solution (10% v/v)	Corrosive to the digestive tract. Causes burns.

Skin contact :

Holmium Oxide in 10% Perchloric Acid Solution	Causes severe burns.
Perchloric Acid Solution (10% v/v)	Causes severe burns.

SECTION 11: Toxicological information

Eye contact : Holmium Oxide in 10% Perchloric Acid Solution: Causes serious eye damage.

Perchloric Acid Solution (10% v/v): Causes serious eye damage.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation : Holmium Oxide in 10% Perchloric Acid Solution: No specific data.

Perchloric Acid Solution (10% v/v): No specific data.

Ingestion : Holmium Oxide in 10% Perchloric Acid Solution: Adverse symptoms may include the following:

stomach pains

Perchloric Acid Solution (10% v/v): Adverse symptoms may include the following:

stomach pains

Skin contact : Holmium Oxide in 10% Perchloric Acid Solution: Adverse symptoms may include the following:

pain or irritation
redness
blistering may occur

Perchloric Acid Solution (10% v/v): Adverse symptoms may include the following:

pain or irritation
redness
blistering may occur

Eye contact : Holmium Oxide in 10% Perchloric Acid Solution: Adverse symptoms may include the following:

pain
watering
redness

Perchloric Acid Solution (10% v/v): Adverse symptoms may include the following:

pain
watering
redness

Delayed and immediate effects as well as 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

General : Holmium Oxide in 10% Perchloric Acid Solution: No known significant effects or critical hazards.

Perchloric Acid Solution (10% v/v): No known significant effects or critical hazards.

Carcinogenicity : Holmium Oxide in 10% Perchloric Acid Solution: No known significant effects or critical hazards.

Perchloric Acid Solution (10% v/v): No known significant effects or critical hazards.

SECTION 11: Toxicological information

Mutagenicity	:	Holmium Oxide in 10% Perchloric Acid Solution	No known significant effects or critical hazards.
		Perchloric Acid Solution (10% v/v)	No known significant effects or critical hazards.
Teratogenicity	:	Holmium Oxide in 10% Perchloric Acid Solution	No known significant effects or critical hazards.
		Perchloric Acid Solution (10% v/v)	No known significant effects or critical hazards.
Developmental effects	:	Holmium Oxide in 10% Perchloric Acid Solution	No known significant effects or critical hazards.
		Perchloric Acid Solution (10% v/v)	No known significant effects or critical hazards.
Fertility effects	:	Holmium Oxide in 10% Perchloric Acid Solution	No known significant effects or critical hazards.
		Perchloric Acid Solution (10% v/v)	No known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
Holmium Oxide in 10% Perchloric Acid Solution			
Perchloric acid	Acute EC50 >100 mg/l	Daphnia	48 hours
Perchloric Acid Solution (10% v/v)			
Perchloric acid	Acute EC50 >100 mg/l	Daphnia	48 hours

12.2 Persistence and degradability

Not available.

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Holmium Oxide in 10% Perchloric Acid Solution			
Perchloric acid	-	0.039	low
Perchloric Acid Solution (10% v/v)			
Perchloric acid	-	0.039	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Mobility : Not available.

12.5 Results of PBT and vPvB assessment

PBT : Not applicable.

vPvB : Not applicable.

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

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimised 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.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste.

Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : 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 spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	ADR/RID	IMDG	IATA
14.1 UN number	UN1802	UN1802	UN1802
14.2 UN proper shipping name	PERCHLORIC ACID solution	PERCHLORIC ACID solution	Perchloric acid solution
14.3 Transport hazard class(es)	8 (5.1) 	8 (5.1) 	8 (5.1) 
14.4 Packing group	II	II	II
14.5 Environmental hazards	No.	No.	No.

Additional information

Remarks: Excepted Quantity

ADR/RID : **Hazard identification number** 85
Limited quantity 1 L
Special provisions 522
Tunnel code (E)

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

14.6 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

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code : Not available.

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	:	Holmium Oxide in 10% Perchloric Acid Solution	Not applicable.
		Perchloric Acid Solution (10% v/v)	Not applicable.

Other EU regulations

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Seveso Directive

This product is controlled under the Seveso Directive.

Danger criteria

Category
Holmium Oxide in 10% Perchloric Acid Solution P8 **Perchloric Acid Solution (10% v/v)** P8

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

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.

SECTION 15: Regulatory information

China : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan : **Japan inventory (ENCS)**: All components are listed or exempted.
Japan inventory (ISHL): All components are listed or exempted.

Malaysia : Not determined.

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 : Not determined.

Turkey : Not determined.

United States : All components are listed or exempted.

Viet Nam : Not determined.

15.2 Chemical safety assessment : This product contains substances for which Chemical Safety Assessments might still be required.

SECTION 16: Other information

Indicates information that has changed from previously issued version.

Abbreviations and acronyms : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DNEL = Derived No Effect Level
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Holmium Oxide in 10% Perchloric Acid Solution	
Ox. Liq. 2, H272	Expert judgment
Skin Corr. 1, H314	On basis of test data
Perchloric Acid Solution (10% v/v)	
Ox. Liq. 2, H272	Expert judgment
Skin Corr. 1, H314	On basis of test data

Full text of abbreviated H statements

Holmium Oxide in 10% Perchloric Acid Solution	
H271	May cause fire or explosion; strong oxidiser.
H272	May intensify fire; oxidiser.
H314	Causes severe skin burns and eye damage.
Perchloric Acid Solution (10% v/v)	
H271	May cause fire or explosion; strong oxidiser.
H272	May intensify fire; oxidiser.
H314	Causes severe skin burns and eye damage.

Full text of classifications [CLP/GHS]

SECTION 16: Other information

Holmium Oxide in 10% Perchloric Acid Solution	
Ox. Liq. 1, H271	OXIDISING LIQUIDS - Category 1
Ox. Liq. 2, H272	OXIDISING LIQUIDS - Category 2
Skin Corr. 1, H314	SKIN CORROSION/IRRITATION - Category 1
Skin Corr. 1A, H314	SKIN CORROSION/IRRITATION - Category 1A
Perchloric Acid Solution (10% v/v)	
Ox. Liq. 1, H271	OXIDISING LIQUIDS - Category 1
Ox. Liq. 2, H272	OXIDISING LIQUIDS - Category 2
Skin Corr. 1, H314	SKIN CORROSION/IRRITATION - Category 1
Skin Corr. 1A, H314	SKIN CORROSION/IRRITATION - Category 1A

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