

Section 1: Identification

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TRADE NAME: Inconel / Superalloy Etchant


CHEMICAL FAMILY: CORROSIVE LIQUIDS, OXIDIZING, N.O.S. (Hydrochloric Acid, Nitric Acid, Hydrogen Peroxide Mixture)

HMIS RATING: HEALTH: 4 FLAMMABILITY: 0 REACTIVITY: 3 OTHER: Oxidizer

HAZARD RATING:

LEAST: 0 SLIGHT: 1 MODERATE: 2 HIGH: 3 EXTREME: 4

Section 2: Hazard(s) Identification

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)	Oxidizing liquids (Category 1), H271 Corrosive to metals (Category 1), H290 Acute toxicity, Oral (Category 4), H302 Skin corrosion (Category 1A), H314 Serious eye damage (Category 1), H318 Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335 Acute aquatic toxicity (Category 3), H402
PICTOGRAM(s):	
SIGNAL WORD:	Danger
HAZARD STATEMENTS:	Hazard Statement(s): H271- May cause fire or explosion; strong oxidizer H290 - May be corrosive to metals H302- Harmful if swallowed H314- Causes severe skin burns and eye damage

	<p>H318 - Causes serious eye damage H335- May cause respiratory irritation H402- Harmful to aquatic life</p>
<p>PRECAUTIONARY STATEMENTS:</p>	<p>Precautionary Statement(s):</p> <p>Preventions: P210- Keep away from heat/sparks/open flames/hot surfaces. — No smoking. P220- Keep/Store away from clothing combustible materials. P221- Take any precaution to avoid mixing with combustibles. P234- Keep only in original container. P260- Do not breathe dust/fume/gas/mist/vapors/spray. P261-Avoid breathing dust/fume/gas/mist/vapors/spray. P264- Wash skin thoroughly after handling. P270- Do not eat, drink or smoke when using this product. P271-Use only outdoors or in a well-ventilated area. P273- Avoid release to the environment. P280- Wear protective gloves/protective clothing/eye protection/face protection. P283- Wear fire/flammable resistant/retardant clothing.</p> <p>Response: P301+312- IF SWALLOWED: call a POISON CENTER or doctor/physician IF you feel unwell. P301+P330+P331- IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P304+P340- IF INHALED: Remove victim to fresh air and Keep at rest in a position comfortable for breathing. P305+P351+P338- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P306+P360- IF ON CLOTHING: Rinse Immediately contaminated CLOTHING and SKIN with plenty of water before removing clothes. P310- Immediately call a POISON CENTER or doctor/physician. P312-Call a POISON CENTER or doctor/physician if you feel unwell. P321- Specific treatment (see Section 4 SDS). P330- Rinse mouth. P370+P378- In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction. P371+P380+P375- In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. P390- Absorb spillage to prevent material damage.</p> <p>Storage: P403+P233- Store in a well-ventilated place. Keep container tightly closed. P405- Store locked up. P406- Store in corrosive resistant/... container with a resistant inner liner.</p> <p>Disposal: P501- Dispose of contents/container to Federal, State and Local Regulations.</p>

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. STRONG

**OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.
INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.**

Health Rating: 4 - Extreme (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 3 - Severe (Oxidizer)

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;
PROPER GLOVES

Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:

Corrosive! Vapors are corrosive and irritating to the respiratory tract. Inhalation of mist may burn the mucous membrane of the nose and throat. In severe cases, exposures may result in pulmonary edema and death.

Ingestion:

Corrosive and irritating to the mouth, throat, and abdomen. Large doses may cause symptoms of abdominal pain, vomiting, and diarrhea as well as blistering or tissue destruction. Stomach distention (due to rapid liberation of oxygen), and risk of stomach perforation, convulsions, pulmonary edema, coma, possible cerebral edema (fluid on the brain), and death are possible.

Skin Contact:

Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a white, yellow or yellow-brown color.

Eye Contact:

Corrosive! Vapors are very corrosive and irritating to the eyes. Symptoms include pain, redness and blurred vision. Splashes can cause permanent tissue destruction. may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.

Chronic Exposure:

Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the substance.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, eye problems or impaired respiratory function, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

Section 3: Composition/Information on Ingredients

HAZARD INGREDIENTS

CHEMICAL	CAS NUMBER	% PRESENT	Hazardous
Hydrogen Peroxide	7722-84-1	10-20%	Yes
Hydrogen Chloride	7647-01-0	20-40%	Yes

Nitric Acid	7697-37-2	10-30%	Yes
Water	7732-18-5	10-50%	No

Section 4: First-Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse. If allowed to dry on clothing, evaporation leads to concentration and increased possibility of ignition. Get medical attention immediately.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Pulmonary edema may be delayed for 24 to 72 hours keep under observation. Gastric lavage may be necessary if swallowed. Analysis of body fluids (particularly gastric aspirates) using the titanium chloride reaction, if done immediately, will reveal peroxides.

Section 5: Fire-Fighting Measures

Fire:

Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Can react with metals to release flammable hydrogen gas. Increases the flammability of combustible, organic and readily oxidizable materials.

Explosion:

Reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive mixtures with air.

Fire Extinguishing Media:

Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.

Special Information:

Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

Section 6: Accidental Release Measures

CAUTION! Caustic material. Causes fires with organic material. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Hydrogen Peroxide may be neutralized with sodium metabisulfite or sodium sulfite after diluting to 5-10% peroxide. This oxidizing material can increase the flammability of adjacent combustible materials. Empty containers should be rinsed with water before discarding. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

Section 7: Handling and Storage

Store in a cool (< 35C), well-ventilated dark area separated from combustible substances, reducing agents, strong bases, and organics. Do not store on wooden shelves or floors. Suggest rotation of stock. Containers must be vented, but check periodically for bulging containers which can burst from pressure. Protect containers from physical damage, contamination, heat and incompatibles.. Contamination from any source (dust, metals) may cause rapid decomposition with generation of large quantities of oxygen gas and high pressures. Rinse empty containers thoroughly with clean water. Glass, polyethylene, stainless steel and aluminum are recommended materials for storage containers. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present.

Section 8: Exposure Controls/ Personal Protection

Hydrochloric Acid-

Airborne Exposure Limits:

- OSHA Permissible Exposure Limit (PEL):

5 ppm (Ceiling)

- ACGIH Threshold Limit Value (TLV):

2 ppm (Ceiling), A4 Not classifiable as a human carcinogen

Nirtic Acid-

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

2 ppm (TWA), 4 ppm (STEL)
-ACGIH Threshold Limit Value (TLV):
2 ppm (TWA); 4 ppm (STEL)

Hydrogen Peroxide-

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):
1 ppm (TWA).
-ACGIH Threshold Limit Value (TLV):
1 ppm (TWA), A3: Animal carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Section 9: Physical and Chemical Properties

Appearance:

Colorless to yellowish liquid.

Odor:

Pungent, suffocating, acrid odor.

Solubility:

Infinitely soluble.

Density:

1.1-1.4

pH:

1.0

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

101 - 103C (214 - 217F)

Melting Point:

No information found.

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

Section 10: Stability and Reactivity

Stability:

Normally stable if uncontaminated, but slowly decomposes to release oxygen. Unstable with heat, may result in dangerous pressures. A strong oxidizer, reacts violently upon contact with many organic substances, particularly textile and paper. Avoid light and keep in a closed but vented container to prevent evaporation (concentration) and contamination.

Hazardous Decomposition Products:

When heated to decomposition, emits toxic hydrogen chloride fumes, toxic nitrogen oxides fumes and hydrogen nitrate, and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

A strong mineral acid, strong bases, metals, metal oxides, hydroxides, amines, carbonates, other alkaline materials, carbides, hydrogen sulfide, turpentine, other combustible organics, heat, reducing agents, organic materials, dirt, alkalis, rust, and many metal. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.

Conditions to Avoid:

Heat, direct sunlight contact with combustible or organic materials.

Section 11: Toxicological Information

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Hydrogen Peroxide (7722-84-1)	No	No	None
Hydrogen Chloride (7647-01-0)	No	No	None
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

Section 12: Ecological Information

Environmental Fate:

When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.

Environmental Toxicity:

This material is expected to be toxic to aquatic life.

Section 13: Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Section 14: Transportation Information

Domestic (Land, D.O.T.)

Proper Shipping Name: CORROSIVE LIQUIDS,. OXIDIZING, N.O.S.

(Hydrochloric Acid, Nitric Acid, Hydrogen Peroxide Mixture)

Hazard Class: 8

UN/NA: UN 3093

Packing Group: I

Packaging instruction: 173.201

Label Codes: 8, 5.1

International (Air, I.C.A.O.)

Proper Shipping Name: CORROSIVE LIQUIDS,. OXIDIZING, N.O.S.

(Hydrochloric Acid, Nitric Acid, Hydrogen Peroxide Mixture)

Hazard Class: 8

UN/NA: UN 3093

Packing Group: I

Label Codes: 8, 5.1

Cargo aircraft only: (max. 2.5 liters)

Section 15: Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	Australia
Hydrogen Peroxide (7722-84-1)	Yes	Yes	Yes	Yes
Hydrochloric Acid (7647-01-0)	Yes	Yes	Yes	Yes
Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Hydrogen Peroxide (7722-84-1)	Yes	Yes	No	Yes
Hydrochloric Acid (7647-01-0)	Yes	Yes	No	Yes
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Hydrogen Peroxide (7722-84-1)	No	No	No	No
Hydrochloric Acid (7647-01-0)	5000	500	Yes	No
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8 (d)
Hydrogen Peroxide (7722-84-1)	No	No	No
Hydrogen Chloride (7647-01-0)	5000	No	No
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: Yes TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: Yes (Mixture / Liquid)

Australian Hazchem Code: 2R

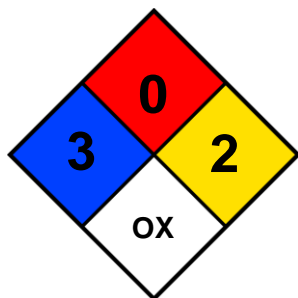
Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Section 16: Other Information

16.1 NFPA 704



Top, Flammability: 0 – Minimal Hazard

Left, Health Hazard: 3 – Severe Hazard

Right, Reactivity: 2 – Moderate Hazard

Bottom, Special Notice: OX – Oxidizer

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

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