

Bonneville Dam impact documents for research activities proposed to be conducted by Confederated Tribes of Warm Springs Reservation during
2016

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Lock and Dam, Cascade Locks, OR 97014 (541) 374-8801

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Background

The Confederated Tribes of Warm Springs Reservation of Oregon (CTWSRO) Fisheries Research Program has conducted Pacific lamprey studies in Fifteenmile Creek and Hood River since 2009 as part of a Bonneville Power Administration Accords (BPA project 2011-014-00). Primary objectives of these studies are to estimate lamprey spawner escapement upstream of Cushing Falls on Fifteenmile Creek and to document re-establishment of lamprey in Hood River upstream of the old Powerdale Dam site. Both studies use half-duplex PIT tags and antenna arrays as data collection tools. Therefore, lamprey that were PIT tagged by University of Idaho (UI) and released at Bonneville Dam were useful to CTWSRO studies as UI tagged lamprey would recruit into the pool of marked fish in Fifteenmile Creek for the mark-recapture abundance estimate and some would become detected in antenna arrays operated by CTWSRO in Hood River. In some years more than 50% of the pool of marked fish were lamprey tagged by UI. However, 2014 was the last year that UI PIT tagged lamprey at Bonneville Dam. The CTWSRO proposes continuing implanting adult Pacific lamprey at Bonneville Dam using the same methods as UI for the purpose of increased detections in Fifteenmile Creek and Hood River. In 2015, the CTWSRO worked with CRITFC to capture and tag 349 lamprey at Bonneville Dam and release them upstream.

Objectives

Increase the number of PIT tagged lamprey in the vicinity of Hood River and Fifteenmile Creek to assist mark-recapture and range expansion studies.

Methods

Adult Pacific lamprey will be collected from mid-May through September using two lamprey traps in the Bonneville north-shore ladder. Traps will be lowered and raised by winches on fixed booms at trap sites. Traps will be fished during nights. A maximum of three percent of the lamprey run, distributed through the summer, will be implanted with HDX PIT tags (23-mm ISO 11784/11785 compatible, Oregon RFID, Portland, Oregon). Tagged lamprey will be transported in a tote and released at boat launches upstream of Bonneville Dam (Stevenson, Cascade Locks, or Wyeth).

Justification of the Proposed Study Area

The proposed tagging activity is an additional work element under an existing BPA funded research project (BPA project 2011-014-00). Increasing the number of PIT tagged lamprey in the Columbia River near existing study sites in Fifteenmile Creek and Hood River will result in PIT tag antenna detections that will be used in mark-recapture abundance estimates and to document range extension. Bonneville Dam is the best location for the proposed work because it is just downstream of CTWSRO study sites and previous work by UI to PIT tag lamprey has been essential to studies conducted by CTWSRO. The CTWSRO operates and maintains eight HDX antennas in Fifteenmile Subbasin, one in Mill Creek, and three in Hood River Subbasin.

Schedule

Fisheries technicians working with Columbia River Inter-Tribal Fish Commission (CRITFC) will collect adult lamprey from lamprey traps in bypass ladder during night hours, Monday through Friday, beginning in May and continuing into late September. CTWSO staff that will perform PIT tagging of lamprey at Bonneville Dam are located in The Dalles Field Office, include Andy Johnsen, Project Leader, Rachelle Begay, technician, and an additional technician that will be hired soon. Cyndi Baker is CTWSRO Interim Fisheries Research Supervisor, and is located in Warm Springs. The Dalles Field Office staff will be assisting CRITFC staff with collection, but will implant PIT tags and release lamprey upstream of Bonneville Dam on their own. The CTWSRO staff will be working with Mr. Brian McIlraith, CRITFC Pacific Lamprey Project Leader, who coordinates collection of lamprey at Bonneville Dam for Tribal Fisheries research and translocation projects.

Facilities and Equipment Requirements

Access to the Washington shore fish ladder and Adult Fish Facility (AFF) will be required May through September. The CTWSO will drive in from the Oregon side and park at the AFF. The CTWSRO will be duplicating the PIT tagging effort done by UI so will use existing equipment currently sitting in the AFF, including lamprey traps and holding tanks. We will deploy the traps in the same location as UI using the winches and booms in the bypass fish ladder.

PROJECT IMPACTS

Project Services

An existing adult lamprey trap, used by UI, will be operated by CTWSRO staff. We do not anticipate requiring assistance from project personnel. However, we would like to be able to request assistance from project personnel if/when it is needed. We will notify the Project Fishery Biologist of any requests for assistance with as much forewarning as possible.

Security

All CTWSRO Fisheries personnel will carry Bonneville Dam ID badges and will notify project personnel when they enter and leave Bonneville Dam. Project security issues involve access to the adult fish collection facility to collect, tag and release fish. Areas of work will include Washington shore adult fish collection facility and Washington shore ladder.

All CTWSRO Fisheries personnel listed on the ensuing page are U.S. citizens.

Safety

All personnel will wear hard hats and safety shoes while on the dam. Other suitable work clothing will include long pants and no tank tops, suitable hand covering, and cold weather/rain gear will be used as necessary. All personnel will follow procedures provided in USACE Safety and health requirements Manual, EM 385-1-1. CTWSRO personnel will conduct weekly safety

meetings. Notes, or a list of topics covered at these meetings, will be provided to the Project Biologist on a monthly basis.

Only personnel approved by Corps of Engineers will operate the overhead crane. We have a need to use the crane within the AFF for installing (one day in May) and removing (one day in October) the adult lamprey trap. All CTWSRO personnel involved with the proposed gear/trap transfer will be properly trained to work with suspended objects. All CTWSRO personnel will participate in specific, on-site, training with this crane and any other training required by Corps of Engineers. All CTWSRO personnel will become familiar with and become proficient at using industry-standard hand signals. Personnel will be advised to always watch out for overhead objects and stay clear of lift areas unless conducting the actual physical work involved in the lift. Areas around overhead lifting will be made visible and partitioned with use of reflective cones and caution tape where needed. Restrictive signs will be deployed to warn onlookers of hazards if necessary. Gloves and personal protective gear will be worn to protect from pinch points.

Care will be taken to eliminate any slippery areas where employees must walk. Protective hearing devices will be worn where and when necessary. Care will be taken to not walk outside of approved walkways after dark. Material Data Safety Sheets (MSDS) will be provided for all substances requiring them and care will be taken to follow MSDS requirements. If any radio tracking by foot or car is done after normal working hours, powerhouse operators will be notified. All personnel will be familiar with locations of phones and the locations of phone lists in case of an emergency. Personnel will become familiar with the locations of fire extinguishers near their work areas.

A list of personnel scheduled to attend First Aid and CPR training is presented below. We will ensure that two members of the on-site AFF tagging crew are currently certified in CPR and First Aid techniques while conducting research activities during 2015. We have also provided a list of MSDSs for items we will be using at Bonneville Dam.

Job Safety Analysis

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS (FROM EM 385-1-1)
Tagging fish	<p>Potential for skin puncture from hypodermic needles/scalpal used to insert PIT tags in lamprey.</p> <p>Exposure to noise.</p> <p>Potential for back strain or other muscle or ligament strain from working in an awkward position.</p> <p>Exposure to noise from rushing water in ladder.</p> <p>Potential for head and foot injury from working around industrial equipment. Tripping hazards.</p>	<p>Keep hypodermic needles stuck in foam when not in use or in sterilizing solution (ETOH).</p> <p>Use ear protection devices when working in the AFF.</p> <p>Use care in moving around and handling equipment. Obtain help in lifting or handling equipment that is heavy or awkward to handle. When necessary, use lifting devices (*14D.A.01-06). Use ear protection devices (*05.C.01, 04, 07).</p> <p>Wear hardhat and steel-toed boots at all times (*05.D.01, 02, 04, 05 and A.08.).</p> <p>Practice good housekeeping in keeping work area uncluttered. Be aware of potential tripping hazards that cannot be removed (*14.C.01-04, 08).</p>

Personnel List (all personnel are scheduled to received First Aid/CPR training)

NAME	ACTIVITY	1ST AID EXP. DATE	CPR EXP. DATE
Andy Johnsen	AFF – lamprey collection and tagging	3/2017	3/2017
Rachelle Begay	AFF – lamprey collection and tagging .	6/2017	6/2017
Technician TBD	AFF – lamprey collection and tagging	--	--

GSA Vehicles used by CTWSRO personnel

LICENSE	DESCRIPTION	COLOR	POC/CREW.
G 63 1172P	2014 Dodge 2500	brown	Andy Johnsen
G 63 2533M	2013 Chevy Silverado 2500HD	blue	Andy Johnsen

MSDS for eugenol



Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Eugenol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Eugenol	Contact Information:
Catalog Codes: SLE1156	Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396
CAS#: 97-53-0	US Sales: 1-800-901-7247 International Sales: 1-281-441-4400
RTECS: SJ4375000	Order Online: ScienceLab.com
TSCA: TSCA 8(b) inventory: Eugenol	CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300
CI#: Not available.	International CHEMTREC, call: 1-703-527-3887
Synonym: Hydroxy-1-methoxy-2-allyl-4-benzene	For non-emergency assistance, call: 1-281-441-4400
Chemical Formula: C10H12O2	

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Eugenol	97-53-0	100

Toxicological Data on Ingredients: Eugenol: ORAL (LD50): Acute: 1930 mg/kg [Rat]. 3000 mg/kg [Mouse]. 2130 mg/kg [Guinea pig].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

MSDS for eugenol (cont.)

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: OPEN CUP: 104°C (219.2°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

MSDS for eugenol (cont.)

Instability Temperature: Not available.
Conditions of Instability: Not available.
Incompatibility with various substances: Not available.
Corrosivity: Non-corrosive in presence of glass.
Special Remarks on Reactivity: Not available.
Special Remarks on Corrosivity: Not available.
Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.
Toxicity to Animals: Acute oral toxicity (LD50): 1930 mg/kg [Rat].
Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, mucous membranes.
Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).
Special Remarks on Toxicity to Animals: Not available.
Special Remarks on Chronic Effects on Humans: Not available.
Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.
BOD5 and COD: Not available.
Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.
Special Remarks on the Products of Biodegradation: May decompose on exposure to moist air and water.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).
Identification: Not applicable.
Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Eugenol

MSDS for eugenol (cont.)

supportively. Section 5 - Fire Fighting Measures

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R22- Harmful if swallowed. R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:31 PM

Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet



Air

Section 1. Chemical product and company identification

Product name	: Air
Supplier	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Product use	: Synthetic/Analytical chemistry.
Synonym	: Compressed Air ; Breathing Quality Air ; synthetic air, reconstituted air, medical air, medical air USP.
MSDS #	: 001002
Date of Preparation/Revision	: 5/28/2013.
In case of emergency	: 1-866-734-3438

Section 2. Hazards identification

Physical state	: Gas.
Emergency overview	: WARNING! CONTENTS UNDER PRESSURE.MAY ACCELERATE COMBUSTION. COMPRESSED AIR IS A COLORLESS, ODORLESS, TASTELESS GAS AT NORMAL TEMPERATURE AND PRESSURE. Do not puncture or incinerate container. Contact with rapidly expanding gases can cause frostbite.
Routes of entry	: Inhalation
Potential acute health effects	
Eyes	: Contact with rapidly expanding gas may cause burns or frostbite.
Skin	: Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation	: "None expected"
Ingestion	: Ingestion is not a normal route of exposure for gases
Medical conditions aggravated by over-exposure	: None known.
See toxicological information (Section 11)	

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Nitrogen	7727-37-9	76.5 - 80.5	Oxygen Depletion [Asphyxiant]
Oxygen	7782-44-7	19.5 - 23.5	

Section 4. First aid measures

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.

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: None expected.
Frostbite	: Try to warm up the frozen tissues and seek medical attention.
Inhalation	: None expected.
Ingestion	: As this product is a gas, refer to the inhalation section.

MSDS for oxygen (cont.)

Air

Section 5. Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : Decomposition products may include the following materials:
nitrogen oxides
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.
- Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.
- Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- 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** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Storage** : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

- Engineering controls** : Not applicable
- Personal protection**
- Eyes** : 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 or dusts.
- Skin** : 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.
- Respiratory** : No special protection is required. However, air supplied respirators are required while working in oxygen deficient atmospheres such as confined spaces.
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : 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.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name

Nitrogen
Oxygen

Oxygen Depletion [Asphyxiant]

Consult local authorities for acceptable exposure limits.

MSDS for oxygen (cont.)

Air

Section 9. Physical and chemical properties

Boiling/condensation point : -194.3°C (-317.7°F)
Melting/freezing point : -216.2°C (-357.2°F)
Critical temperature : Lowest known value: -146.9°C (-232.4°F) (Nitrogen).
Vapor density : Highest known value: 1.1 (Air = 1) (Oxygen). Weighted average: 1 (Air = 1)
Gas Density (lb/ft³) : 0.0749

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.
Incompatibility with various substances : Not considered to be reactive according to our database.
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Chronic effects on humans : None known.
Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.
Specific effects
Carcinogenic effects : No known significant effects or critical hazards.
Mutagenic effects : No known significant effects or critical hazards.
Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity



Not available.

Products of degradation : Products of degradation: nitrogen oxides (NO, NO₂ etc.).
Environmental fate : Not available.
Environmental hazards : No known significant effects or critical hazards.
Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1002	Air, compressed	2.2	Not applicable (gas).		-
TDG Classification	UN1002	Air, compressed	2.2	Not applicable (gas).		Explosive Limit and Limited Quantity Index 0.125

MSDS for oxygen (cont.)

Air

Section 16. Other information

United States

Label requirements

: CONTENTS UNDER PRESSURE.MAY ACCELERATE COMBUSTION.
COMPRESSED AIR IS A COLORLESS, ODORLESS, TASTELESS GAS AT NORMAL
TEMPERATURE AND PRESSURE.

Canada

Label requirements

: Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	0

National Fire Protection Association (U.S.A.)

	0	Flammability
Health	0	Instability
		Special

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MSDS for Isopropanol



Health	2
Fire	3
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Isopropyl Alcohol, 70% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Isopropyl Alcohol, 70%	Contact Information:
Catalog Codes: SLI1669	Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396
CAS#: Mixture.	US Sales: 1-800-901-7247 International Sales: 1-281-441-4400
RTECS: Not applicable.	Order Online: ScienceLab.com
TSCA: TSCA 8(b) inventory: Isopropyl alcohol; Water	CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300
CI#: Not available.	International CHEMTREC, call: 1-703-527-3887
Synonym: 2-Propanol, 70%; Isoprpanol, 70%; Isopropyl Rubbing Alcohol	For non-emergency assistance, call: 1-281-441-4400
Chemical Name: Not applicable.	
Chemical Formula: Not applicable.	

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Isopropyl alcohol	67-63-0	70
Water	7732-18-5	30

Toxicological Data on Ingredients: Isopropyl alcohol: ORAL (LD50): Acute: 5045 mg/kg [Rat]. 3600 mg/kg [Mouse]. 6410 mg/kg [Rabbit]. DERMAL (LD50): Acute: 12800 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, . Slightly hazardous in case of skin contact (sensitizer, permeator). Non-corrosive for skin. Non-corrosive to the eyes. Non-corrosive for lungs.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [Isopropyl alcohol]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol]. The substance may be toxic to kidneys, liver, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

MSDS for isopropanol (cont.)

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: The lowest known value is 399°C (750.2°F) (Isopropyl alcohol).

Flash Points: CLOSED CUP: 18.3°C (64.9°F) - 24 deg. C (75 deg. F)

Flammable Limits: The greatest known range is LOWER: 2% UPPER: 12.7% (Isopropyl alcohol)

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Flammable in presence of oxidizing materials. Non-flammable in presence of shocks

Explosion Hazards in Presence of Various Substances:

Slightly explosive in presence of open flames and sparks, of heat. Non-explosive in presence of shocks.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Vapor may travel considerable distance to source of ignition and flash back. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME. Hydrogen peroxide sharply reduces the autoignition temperature of Isopropyl alcohol. After a delay, Isopropyl alcohol ignites on contact with dioxgenyl tetrafluorborate, chromium trioxide, and potassium tert-butoxide. When heated to decomposition it emits acrid smoke and fumes. (Isopropyl alcohol)

Special Remarks on Explosion Hazards:

Secondary alcohols are readily autooxidized in contact with oxygen or air, forming ketones and hydrogen peroxide. It can become potentially explosive. It reacts with oxygen to form dangerously unstable peroxides which can concentrate and explode during distillation or evaporation. The presence of 2-butanone increases the reaction rate for peroxide formation. Explosive in the form of vapor when exposed to heat or flame. May form explosive mixtures with air. Isopropyl alcohol +

MSDS for isopropanol (cont.)

phosgene forms isopropyl chloroformate and hydrogen chloride. In the presence of iron salts, thermal decomposition can occur, which in some cases can become explosive. A homogeneous mixture of concentrated peroxides + isopropyl alcohol are capable of detonation by shock or heat. Barium perchlorate + isopropyl alcohol gives the highly explosive alkyl perchlorates. It forms explosive mixtures with trinitromethane and hydrogen peroxide. It produces a violent explosive reaction when heated with aluminum isopropoxide + crotonaldehyde. Mixtures of isopropyl alcohol + nitroform are explosive. (Isopropyl alcohol)

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Isopropyl alcohol TWA: 983 STEL: 1230 (mg/m³) [Australia] TWA: 200 STEL: 400 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 980 STEL: 1225 (mg/m³) from NIOSH TWA: 400 STEL: 500 (ppm) from NIOSH TWA: 400 STEL: 500 (ppm) [United Kingdom (UK)] TWA: 999 STEL: 1259 (mg/m³) [United Kingdom (UK)] TWA: 400 STEL: 500 (ppm) from OSHA (PEL) [United States] TWA: 980 STEL: 1225 (mg/m³) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Alcohol like.

MSDS for isopropanol (cont.)

Taste: Not available.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Neutral.

Boiling Point: The lowest known value is 82.5°C (180.5°F) (Isopropyl alcohol). Weighted average: 87.75°C (189.9°F)

Melting Point: May start to solidify at -88.5°C (-127.3°F) based on data for: Isopropyl alcohol.

Critical Temperature: The lowest known value is 235°C (455°F) (Isopropyl alcohol).

Specific Gravity: Weighted average: 0.84 (Water = 1)

Vapor Pressure: The highest known value is 4.4 kPa (@ 20°C) (Isopropyl alcohol). Weighted average: 3.77 kPa (@ 20°C)

Vapor Density: The highest known value is 2.07 (Air = 1) (Isopropyl alcohol). Weighted average: 1.63 (Air = 1)

Volatility: Not available.

Odor Threshold: The highest known value is 22 ppm (Isopropyl alcohol)

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility: Easily soluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, flame, ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Reacts violently with hydrogen + palladium combination, nitroform, oleum, COCl₂, aluminum triisopropoxide, oxidants
Incompatible with acetaldehyde, chlorine, ethylene oxide, isocyanates, acids, alkaline earth, alkali metals, caustics, amines, crotonaldehyde, phosgene, ammonia. Isopropyl alcohol reacts with metallic aluminum at high temperatures. Isopropyl alcohol attacks some plastics, rubber, and coatings. Vigorous reaction with sodium dichromate + sulfuric acid. (Isopropyl alcohol)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation.

Toxicity to Animals:

Acute oral toxicity (LD50): 5143 mg/kg (Mouse) (Calculated value for the mixture). Acute dermal toxicity (LD50): 18286 mg/kg (Rabbit) (Calculated value for the mixture).

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [Isopropyl alcohol]. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol]. Contains material which may cause damage to the following organs: kidneys, liver, skin, central nervous system (CNS).

MSDS for isopropanol (cont.)

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (sensitizer, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive/teratogenic effects (fertility, fetotoxicity, developmental abnormalities (developmental toxin)) based on animal studies. Detected in maternal milk in human. (Isopropyl alcohol)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause mild skin irritation, and sensitization. Eyes: Can cause eye irritation.

Inhalation: Breathing in small amounts of this material during normal handling is not likely to cause harmful effects. However, breathing large amounts may be harmful and may affect the respiratory system and mucous membranes (irritation), behavior and brain (Central nervous system depression - headache, dizziness, drowsiness, stupor, incoordination, unconsciousness, coma and possible death), peripheral nerve and sensation, blood, urinary system, and liver. Ingestion: Swallowing small amounts during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. Swallowing large amounts may cause gastrointestinal tract irritation with nausea, vomiting and diarrhea, abdominal pain. It also may affect the urinary system, cardiovascular system, sense

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Isopropanol, solution (Isopropyl alcohol) UNNA: 1219 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Isopropyl alcohol Illinois toxic substances disclosure to employee act: Isopropyl alcohol Rhode Island RTK hazardous substances: Isopropyl alcohol Pennsylvania RTK: Isopropyl alcohol Florida: Isopropyl alcohol Minnesota: Isopropyl alcohol Massachusetts RTK: Isopropyl alcohol New Jersey: Isopropyl alcohol New Jersey spill list: Isopropyl alcohol TSCA 8(b) inventory: Isopropyl alcohol; Water TSCA 4(a) final testing order: Isopropyl alcohol TSCA 8(a) IUR: Isopropyl alcohol TSCA 8(d) H and S data reporting: Isopropyl alcohol: Effective date: 12/15/86 Sunset Date: 12/15/96 TSCA 12(b) one time export: Isopropyl alcohol SARA 313 toxic chemical notification and release reporting: Isopropyl alcohol 70%

MSDS for isopropanol (cont.)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R11- Highly flammable. R36- Irritating to eyes. S2- Keep out of the reach of children. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves (impervious). Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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