

Bonneville Dam Impact Documents for Research Activities Proposed to be conducted  
by University of Idaho and NOAA Fisheries Personnel during 2014

United States Army, Corps of Engineers, Portland District

Bonneville Lock and Dam

Cascade Locks, OR 97014

(541) 374-8801

January 2014

## **Background**

Adult salmon and lampreys migrating to their natal streams in tributaries of the Columbia River must pass up to nine dams and their reservoirs, four each in the lower Columbia and Snake rivers and five in the mid-Columbia River. Stress, delays, and losses during migration at each hydroelectric project and associated reservoir should be minimized to succeed in maintaining the native runs of fish and to achieve the recovery goals outlined by the Northwest Power Planning Council (NWPPC) and by NOAA Fisheries.

Most of the work proposed to be conducted during 2014 was developed in response to requests for preliminary proposals issued by the U.S. Army Corps of Engineers (CORPS) in September 2013. The proposed work addresses concerns of the CORPS, the NWPPC in the Columbia River Basin Fish and Wildlife Program, and NMFS in the Proposed Recovery Plan for Snake River Salmon, and the Biological Opinion issued in 2008.

## **Objectives**

Most of the proposed 2014 studies are AFEP-related and their primary objectives include:

- 1) Evaluate lamprey flume systems by collecting and half-duplex (HD) pit-tagging 600 adult lampreys. Lampreys will be trapped at the AFF, and powerhouse 2 auxiliary water supply. They will be anesthetized, weighed, measured, assessed for lipid content using a Fat-meter, HD pit-tagged, and released into the tailrace of Bonneville Dam.
- 2) Estimate passage metrics at Bonneville, The Dalles, John Day, McNary and Snake River dams using radiotelemetry (RT) and half-duplex PIT (HDX-PIT) technologies using lamprey tagged for Objective 1, and visual and LPS counts. Six hundred lampreys will be trapped, anesthetized, HD-pit and radio-tagged, and released downstream (Tanner Creek, and Hamilton boat ramp) from Bonneville Dam.
- 3) Evaluate any effects of turbulence, flow, and orifice size on lamprey swimming performance. Three hundred adult lampreys will be used in flume trials in the AFF. They will be HD-pit tagged, held for as long as 48 hours, and released into Bonneville Reservoir at the Stevenson boat ramp.
- 4) Evaluate the frequency of fallback events by radio-tagged lamprey exiting the Cascades Island LPS. An exit by which adult lamprey may volitionally exit into the forebay has recently been installed.
- 5) Evaluate lamprey behavior near fishway openings using DIDSON imagery.
- 6) Evaluate any effects of the recent modifications to Bonneville powerhouse 2 fishway openings (i.e., the lamprey flume system) and the north fishway at John Day Dam (i.e., lamprey passage system) on salmonid passage. We propose to trap, anesthetize, weigh, measure, and radio-tag a maximum of 600 adult Chinook salmon, 300 jack salmon, 400

sockeye salmon, and 800 adult steelhead. Tagged animals will be released approximately eight kilometers downstream from Bonneville Dam at Skamania and Dodson boat ramps.

7) Estimate passage metrics and monitor migration behavior of adult American shad. Up to three hundred shad will be trapped, measured, and tagged with JSATS transmitters. Up to an additional 500 shad will be trapped, measured, and FD-pit tagged. Tagged shad will be released back into the fish ladder at the AFF.

8) Collect and transport adult lamprey collected at the terminus of the new lamprey flume system at the NDE of Powerhouse 2. Lamprey will be released into Bonneville Reservoir at the Stevenson boat ramp.

## **Methods**

1) Adult Pacific lampreys will be collected from May through September using dip nets and the trap located in the Bonneville north-shore ladder. A maximum of 600 lampreys will be outfitted with half-duplex pit-tags and released downstream from Bonneville Dam at Hamilton Island boat ramp. We propose evaluating passage efficiencies of tagged lamprey past lamprey passage systems in the Bradford Island auxiliary water supply (AWS) channel, the Cascades Island fishway, and near the newly-installed lamprey flume system near the NDE of powerhouse 2. This testing will use the existing monitoring equipment (half duplex PIT detectors) to provide information on the types of structures that are most effective.

2) Use JSATS arrays/nodes to monitor the movements of adult lampreys (acoustic-tagged in 2013) near Bonneville Dam. JSATS-tagged lamprey will also be HD-pit-tagged so their movements at the dam will be monitored using HD technology.

3) Use as many as 300 adult lampreys to observe behavior and evaluate their swimming performance using an experimental flume channel in the AFF. Tests will primarily be conducted at night during May-September.

4) Deploy DIDSON cameras at Washington-shore north downstream entrance (NDE) and problematic areas in the lower fishway sections of Washington-shore and Bradford Island B-Branch transition area and routinely download recorded images for interpretation and analysis.

5) Trap, anesthetize, weigh, measure, and radio-tag a maximum of 600 adult Chinook salmon, 300 jack Chinook salmon, 400 sockeye salmon, and 800 adult steelhead at the AFF from April to October. Tagged animals will be released approximately eight kilometers downstream from Bonneville Dam at Skamania Landing and Dodson boat ramps. Movements of tagged salmon will be monitored to evaluate any effects of the recent modifications to the powerhouse 2 NDE fishway openings (i.e., the lamprey flume system) and John Day north fishway opening. Additional evaluations of any effects of the spillwall at The Dalles Dam on salmonid passage will be made.

6) Estimate passage metrics and monitor migration behavior of adult American shad. Up to three hundred shad will be trapped, measured, and tagged with JSATS transmitters. Up to an additional 500 shad will be trapped, measured, and FD-pit tagged. Tagged shad will be collected from the flume at the AFF and released back into the fish ladder immediately after tagging.

### **Justification of the Proposed Study Area**

The studies proposed address research priorities related to improving passage and survival of adult lamprey identified by the Corps of Engineers, state and tribal fish agencies, and NOAA Fisheries. Bonneville Dam is the best location for the proposed work because it is the most-downstream dam on the Columbia River and it has an adult fish collection facility. Fish can be collected, tagged, and released at this location. Bonneville, The Dalles, and John Day dams have recently been re-outfitted with radio antennas and receivers. Half-duplex PIT tag detectors have also been installed at the dam to monitor lamprey passage.

### **Schedule**

We aspire to begin collecting adult lamprey from the bypass ladder during night hours in May and proceeding into late September. Christopher Caudill, U. Idaho, is a co-principal investigator along with Mary Moser, NOAA Fisheries. Kinsey Frick will be responsible for supervising the HD-pit lamprey passage evaluations. Steve Corbett, who has worked at Bonneville Dam in previous years, will assist her with those studies. Charles Boggs, U. Idaho, will be responsible for downloading and maintaining the half-duplex PIT-tag receivers and antennas. Eric Johnson, U. Idaho, will be responsible for radio-tagging lamprey and for the DIDSON evaluations. A graduate student at U. Idaho, Mark Kirk, will be responsible for conducting the flume trials in the AFF. Steve Lee, U. Idaho, will be responsible for coordinating the radio-tagging of adult and jack salmonids, which will begin in April and end in October (Table 1).

Downloading of all receivers at Bonneville will continue in the same fashion as in previous years. This work cannot always be done during working hours but as in past years, powerhouse operators will be notified when needed. Antenna upkeep and repairs will be made to antennas if they are damaged. All repairs will be coordinated with project personnel so they have a minimum impact on project operations. Messrs. Jeffrey Garnett, Charles Boggs, and Les Layng will be responsible for downloading and maintaining radio/PIT receivers and antennas.

Table 1. Anticipated dates of tagging and required access to the Bonneville AFF.

	<b>Sample size</b>	<b>Tagging start date</b>	<b>Tagging end date</b>
<b>Salmonids</b>	2100	01 April	31 October
<b>Pacific lamprey</b>	1500	15 May	15 October
<b>American shad</b>	800	01 May	31 August
<b>LFS-LPS operation</b>	n/a	01 May	31 October

Copies of all appropriate state and federal permits to conduct the proposed research have, or will be presented to Corps Biologists prior to initiating any work.

## **Facilities and Equipment Requirements**

We request permission to access sites where receiver sites are located, access to electrical outlet in areas where radio receivers are installed, permission to use the adult fish collection facility from March through October, and an office in which we may store equipment and perform office work. Finally, we would like to be able to park boats and trailers outside the AFF.

## **PROJECT IMPACTS**

### **Project Services**

Half-duplex PIT tag detectors were installed at Bonneville Dam in January 2005 and additional antennas were installed in February 2006 and 2009. Radio receivers and antennas have been re-deployed for work conducted during 2013. To this extent, we do not anticipate requiring assistance from project personnel at this time. Still, 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 U. Idaho and NOAA 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 receiver sites to download telemetry data and access to the adult fish collection facility to collect, tag and release fish. Areas of work will include Washington shore adult fish collection facility, Washington shore ladder, Washington shore collection channel, Cascade Island ladder, spillway area, Bradford Island ladder, and associated Powerhouse 1 collection channel.

All U. Idaho and NOAA Fisheries personnel listed on the ensuing page are U.S. citizens. We have no current plans to conduct research work in the Boat Restricted Zone (BRZ) during 2014 but would like to park boats outside the AFF which will be used to conduct mobile-tracking surveys in Bonneville pool upstream from the BRZ and downstream from the tailrace BRZ.

### **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. UI and NOAA 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.

1. Fish tagging and tracking: 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 UI/NOAA personnel involved with the proposed gear/trap transfer will be properly trained to work with suspended objects. The crane will also be required to raise and lower the collection pool bulkhead for trapping adult Chinook salmon. The AFF bridge crane will also be required to lift the fish hauling trailer into and out of the AFF on a daily basis. University of Idaho personnel have participated in specific, on-site, training with this crane. All UI/NOAA 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.

2. Lamprey LFS-LPS: Care will be taken to eliminate any slippery areas near the make-up water channels and LPSs where employees must walk. Care will be taken to not walk outside of approved walkways after dark. Provisions for adequate lighting will be made for working near the lamprey passage structures during the night.

3. AFF Lamprey Flume Trials: Personnel will receive training in operation of water valves and AFF overhead crane prior to beginning tests. Personnel will call in and out to operator on duty when working outside normal daytime business hours. Designated catwalks will be used when working above experimental flume channel. Care will be used when working near or above water.

4. Downloading receivers: Powerhouse operators will be notified when downloaders enter the dam area. Downloading will occur when it does not interfere with ongoing work at the dam. No activity will take place outside of safety railings except by personnel using approved safety harnesses and approved fall-protection devices.

5. Antenna repairs. Safety procedures and hazard analysis will be followed when specific repairs are needed. All safe work practices will be followed during repairs. Project personnel will be notified before work proceeds on unscheduled repairs.

A list of personnel and the expiration dates of their First Aid and CPR 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 2014. We have also provided a list of MSDSs for items we will be using at Bonneville Dam (Appendices A-I).

## Job Safety Analysis

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS (FROM EM 385-1-1)
<p>1. Downloading receivers/DIDSON cameras and maintaining antennas</p>	<p>Working in severe weather.</p> <p>Potential for being struck by falling objects causing head injury or foot injury.</p> <p>Lifting heavy equipment causing the potential for back strain.</p>	<p>Be alert to and prepare for severe weather. Wear several layers of warm clothing for protection from the cold and, as the weather indicates, a waterproof over-garment for protection from the rain (*06.J).</p> <p>Always wear hard hats and steel-toed boots. Be aware, at all times, of the location of the crane and the crane boom (*05.D.01, 02, 04, 05,A.08, and 08.A-.B).</p> <p>Never attempt to lift a heavy object by yourself. Use a back brace. Use safe lifting techniques such as lifting with your legs rather than with your back.</p>
<p>2. Tagging fish and conducting AFF flume trials</p>	<p>Potential for skin puncture from hypodermic needles used to insert PIT tags in salmonids.</p> <p>Potential for eye injury due to working with power tools.</p> <p>Exposure to noise.</p> <p>In using power tools, potential for electric shock.</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.</p> <p>Tripping hazards.</p>	<p>Keep hypodermic needles stuck in foam when not in use or in sterilizing solution (ETOH).</p> <p>Always use safety goggles when using a power drill or other power tool that could send debris flying (*05.B.01, 02, 06).</p> <p>Use ear protection devices when using power tools and working in the AFF.</p> <p>Inspect tools to ensure there are no frayed cords or other obvious defects. When working with electrical equipment in damp areas, wear boots with soles of rubber or other insulating materials.</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).</p> <p>Use earplugs or other hearing protection equipment (*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>



## Lists of Personnel, Vehicles, and Boats

### Personnel

NAME	AGENCY	ACTIVITY	1 <sup>ST</sup> AID EXP. DATE	CPR EXP. DATE
Moser, Mary	NOAA Fisheries	AFF, Brad. Is. & Cascade Is. MWCs	n/a	n/a
Corbett, Steve	NOAA Fisheries	AFF Brad. Is. & Cacade Is. MWCs	Feb., 2014	Feb., 2014
Layng, Les	U of Idaho	AFF – salmon collection and tagging	n/a	n/a
Garnett, Jeff	U of Idaho	AFF – salmon collection and tagging	n/a	n/a
Lee, Steve	U of Idaho	AFF – salmon collection and tagging	n/a	n/a
Noyes, Christopher	U of Idaho	AFF, salmon and lamprey collection and tagging	n/a	n/a
Boggs, Charles	U of Idaho	AFF–downloading and maintaining PIT-tag detectors	n/a	n/a
Caudill, Christopher	U of Idaho	AFF, salmon and lamprey collection and tagging	n/a	n/a
Johnson, Eric	U of Idaho	AFF– lamprey collection and tagging, Didson maintenance	n/a	n/a
Joosten, Daniel	U of Idaho	AFF– Chinook collection and tagging	n/a	n/a
Knoff, Matt	U of Idaho	Receiver maintenance and downloading	n/a	n/a
Tillson, Theresa	U of Idaho	AFF – salmon collection and tagging	n/a	n/a

Steve Lee, Dan Joosten, Eric Johnson, Charles Boggs received fall protection training in January 2008. Chris Noyes received fall protection training in 2012. Many of the personnel listed above took crane training April 2013.

### Vehicles

LICENSE	STATE	DESCRIPTION	COLOR	AGENCY	OWNER	POC/CREW
X2044	ID	FORD F250 PU Truck	GREY	U OF I	U OF I	Johnson, Eric
X3112	ID	FORD F-150	SILVER	U OF I	U OF I	Boggs, Charles
X3262	ID	FORD SUPER DUTY F250 PU Truck	GREY	U OF I	U OF I	Johnson, Eric
X3278	ID	CHEVROLET S10 PU Truck	WHITE	U OF I	U OF I	Johnson, Eric

X3380	ID	F250 SUPER DUTY PU Truck	BROWN	U OF I	U OF I	Johnson, Eric
X3582	ID	SUBARU OUTBACK Wagon	GREEN	U OF I	U OF I	Johnson, Eric
X 3874	ID	CHEVROLET SILVERADO 4X4 PU Truck	BLUE	U OF I	U OF I	Johnson, Eric
X 2728	ID	FORD F250 4X4 PU Truck	GREY	U OF I	U OF I	Johnson, Eric
X3977	ID	Ford Ranger 4x4 PU Truck	Red	U of I	U of I	Dick, Travis
X4123	ID	Chevy 4x4 Colorado Crew Cab	Blue	U of I	U of I	Johnson, Eric

### Boats

REG.	NAME	LENGTH (ft)	AGENCY	ACTIVITY	POC
ID 0061AR	Cutthroat	20	U of Idaho	Parked or tracking upstream or downstream from BO BRZ	Lee, Steve

### Trailer

REG.	NAME	LENGTH (ft)	AGENCY	ACTIVITY	POC
ID A7760	Cargo Trailer	16	U. of Idaho	Parked outside AFF – used for hauling materials between Moscow and BO	Lee, Steve

**APPENDIX A – MSDS for silicone sealant**

Division of Facilities Services

<<http://www.fs.cornell.edu>>

DOD Hazardous Material Information (ANSI Format)  
For Cornell University Convenience Only

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**100% SILICONE SEALANT - CLEAR, 00684**  
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Section 1 - Product and Company Identification <#Section1>   Section 9 -  
Physical & Chemical Properties <#Section9>  
Section 2 - Composition/Information on Ingredients <#Section2>       Section  
10 - Stability & Reactivity Data <#Section10>  
Section 3 - Hazards Identification Including Emergency Overview  
<#Section3>       Section 11 - Toxicological Information <#Section11>  
Section 4 - First Aid Measures <#Section4>   Section 12 - Ecological  
Information <#Section12>  
Section 5 - Fire Fighting Measures <#Section5>       Section 13 - Disposal  
Considerations <#Section13>  
Section 6 - Accidental Release Measures <#Section6>       Section 14 - MSDS  
Transport Information <#Section14>  
Section 7 - Handling and Storage <#Section7>       Section 15 - Regulatory  
Information <#Section15>  
Section 8 - Exposure Controls & Personal Protection <#Section8>       Section  
16 - Other Information <#Section16>

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this information to a particular use or situation.  
Cornell University does not in any way warrant or imply the  
applicability, viability or use of this information to any person or for  
use in any situation.  
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Section 1 - Product and Company Identification  
100% SILICONE SEALANT - CLEAR, 00684

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Product Identification: 100% SILICONE SEALANT - CLEAR, 00684  
Date of MSDS: 11/10/1994 Technical Review Date: 02/04/1998  
FSC: 8030 NIIN: LIIN: 00N082327  
Submitter: N EN  
Status Code: C  
MFN: 01  
Article: N  
Kit Part: N

Manufacturer's Information

**APPENDIX A (cont.)**

Manufacturer's Name: DOW CORNING CORP  
Manufacturer's Address1: SOUTH SAGINAW RD  
Manufacturer's Address2: MIDLAND, MI 48686  
Manufacturer's Country: US  
General Information Telephone: 517-496-6000; 517-496-5813  
Emergency Telephone: 517-496-5900;800-424-9300(CHEMTREC)  
Emergency Telephone: 517-496-5900;800-424-9300(CHEMTREC)  
MSDS Preparer's Name: N/P  
Proprietary: N  
Reviewed: N  
Published: Y  
CAGE: 5D028  
Special Project Code: N

Contractor Information

Contractor's Name: DOW CORNING CORP  
Post Office Box: 997  
Contractor's Address1: 3901 S SAGINAW RD  
Contractor's Address2: MIDLAND, MI 48686-0997  
Contractor's Telephone: 517-496-6000/517-496-6315  
Contractor's CAGE: 5D028

Contractor Information

Contractor's Name: DOW CORNING CORP  
Contractor's Address1: 2200 W SALZBURG RD  
Contractor's Address2: AUBURN, MI 48611  
Contractor's Telephone: 517-496-4388  
Contractor's CAGE: 71984

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Section 2 - Composition/Information on Ingredients  
100% SILICONE SEALANT - CLEAR, 00684

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Ingredient Name: ETHYLTRIAACETOXYSILANE  
Ingredient CAS Number: 17689-77-9 Ingredient CAS Code: M  
RTECS Number: RTECS Code: X  
=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
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% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: 2  
% Environmental Weight:  
Other REC Limits: N/K  
OSHA PEL: N/K (FP N) OSHA PEL Code: M

**APPENDIX A (cont.)**

OSHA STEL: OSHA STEL Code:  
ACGIH TLV: N/K (FP N) ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical: N

Ingredient Name: ING 5: CLEANED BEFORE REUSE. CHEM PROT GLOVES ARE  
RECOMD. USE NIOSH APPRVD RESP PROT UNLESS ADEQ LOCAL EXHAUST (ING 7)

Ingredient CAS Number: Ingredient CAS Code: X  
RTECS Number: 999999ZZ RTECS Code: M

=WT: =WT Code:  
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>WT: >WT Code:  
>Volume: >Volume Code:  
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% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: N/K  
% Enviromental Weight:  
Other REC Limits: N/K

OSHA PEL: NOT APPLICABLE OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: NOT APPLICABLE ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical:

Ingredient Name: ING 6: VENT IS PROVIDED OR AIR SAMPLING DATA SHOWS  
EXPOSURES ARE W/IN RECOMD EXPOSURE GUIDELINES. INDUSTRIAL (ING 8)

Ingredient CAS Number: Ingredient CAS Code: X  
RTECS Number: 999999ZZ RTECS Code: M

=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: N/K  
% Enviromental Weight:  
Other REC Limits: N/K

OSHA PEL: NOT APPLICABLE OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: NOT APPLICABLE ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

**APPENDIX A (cont.)**

DOT Reporting Quantity:

Ozone Depleting Chemical:

Ingredient Name: ING 7: HYGIENE PERSONNEL CAN ASSIST IN JUDGING THE ADEQUACY OF EXISTING ENGINEERING CONTROLS.

Ingredient CAS Number: Ingredient CAS Code: X

RTECS Number: 9999999ZZ RTECS Code: M

=WT: =WT Code:

=Volume: =Volume Code:

>WT: >WT Code:

>Volume: >Volume Code:

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<Volume: <Volume Code:

% Low WT: % Low WT Code:

% High WT: % High WT Code:

% Low Volume: % Low Volume Code:

% High Volume: % High Volume Code:

% Text: N/K

% Environmental Weight:

Other REC Limits: N/K

OSHA PEL: NOT APPLICABLE OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: NOT APPLICABLE ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

DOT Reporting Quantity:

Ozone Depleting Chemical:

Ingredient Name: POLYDIMETHYLSILOXANE; (DIMETHYL SILOXANE, HYDROXY-TERMINATED)

Ingredient CAS Number: 70131-67-8 Ingredient CAS Code: M

RTECS Number: RTECS Code: X

=WT: =WT Code:

=Volume: =Volume Code:

>WT: >WT Code:

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% Text: 86

% Environmental Weight:

Other REC Limits: N/K

OSHA PEL: N/K (FP N) OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: N/K (FP N) ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

DOT Reporting Quantity:

Ozone Depleting Chemical: N

Ingredient Name: RESP PROT: ADEQUACY OF EXISTING ENGINEERING CONTROLS.

**APPENDIX A (Cont.)**

Ingredient CAS Number: Ingredient CAS Code: X

RTECS Number: 999999ZZ RTECS Code: M

=WT: =WT Code:

=Volume: =Volume Code:

>WT: >WT Code:

>Volume: >Volume Code:

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% High WT: % High WT Code:

% Low Volume: % Low Volume Code:

% High Volume: % High Volume Code:

% Text: N/K

% Environmental Weight:

Other REC Limits: N/K

OSHA PEL: NOT APPLICABLE OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: NOT APPLICABLE ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

DOT Reporting Quantity:

Ozone Depleting Chemical:

Ingredient Name: SILANE, METHYLTRIACETOXY-; (METHYLTRIACETOXYSILANE)

Ingredient CAS Number: 4253-34-3 Ingredient CAS Code: M

RTECS Number: VV4500000 RTECS Code: M

=WT: =WT Code:

=Volume: =Volume Code:

>WT: >WT Code:

>Volume: >Volume Code:

<WT: <WT Code:

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Other REC Limits: N/K

OSHA PEL: N/K (FP N) OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: N/K (FP N) ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

DOT Reporting Quantity:

Ozone Depleting Chemical: N

Ingredient Name: SILICA, AMORPHOUS FUMED; (SILICA, AMORPHOUS)

Ingredient CAS Number: 112945-52-5 Ingredient CAS Code: M

RTECS Number: VV7310000 RTECS Code: M

=WT: =WT Code:

=Volume: =Volume Code:

>WT: >WT Code:

>Volume: >Volume Code:

**APPENDIX A (Cont.)**

<WT: <WT Code:

<Volume: <Volume Code:

% Low WT: % Low WT Code:

% High WT: % High WT Code:

% Low Volume: % Low Volume Code:

% High Volume: % High Volume Code:

% Text: 8

% Environmental Weight:

Other REC Limits: N/K

OSHA PEL: 6 MG/M3 OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: 10 MG/M3 ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

DOT Reporting Quantity:

Ozone Depleting Chemical: N

Ingredient Name: SUPDAT: AT MEALTIME & END OF SHIFT. CONTAMD CLTHG & SHOES SHOULD BE REMOVED AS SOON AS PRACTICAL & THOROUGHLY (ING 6)

Ingredient CAS Number: Ingredient CAS Code: X

RTECS Number: 999999ZZ RTECS Code: M

=WT: =WT Code:

=Volume: =Volume Code:

>WT: >WT Code:

>Volume: >Volume Code:

<WT: <WT Code:

<Volume: <Volume Code:

% Low WT: % Low WT Code:

% High WT: % High WT Code:

% Low Volume: % Low Volume Code:

% High Volume: % High Volume Code:

% Text: N/K

% Environmental Weight:

Other REC Limits: N/K

OSHA PEL: NOT APPLICABLE OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: NOT APPLICABLE ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

DOT Reporting Quantity:

Ozone Depleting Chemical:

-----  
Section 3 - Hazards Identification, Including Emergency Overview  
100% SILICONE SEALANT - CLEAR, 00684

-----  
Health Hazards Acute & Chronic: ACUTE: EYES: DIRECT CONTACT IRRITATES MODERATELY WITH REDNESS AND SWELLING. SKIN: A SINGLE SHORT EXPOSURE (LESS THAN 24 HOURS) MAY IRRITATE. REPEATED PROLONGED CONTACT (24 TO 48 HOURS) MAY IRRITATE MODERATELY. INHALATION: VAPOR OVEREXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. INGESTION: SMALL AMOUNTS (EFTS OF OVEREXP)



Signs & Symptoms of Overexposure:

**APPENDIX A (Cont.)**

HLTH HAZ: TRANSFERRED TO THE MOUTH BY FINGERS DURING USE, ETC, SHOULD NOT INJURE. SWALLOWING LARGE AMOUNTS MAY CAUSE DIGESTIVE DISCOMFORT. CHRONIC: NONE KNOWN.

Medical Conditions Aggravated by Exposure:  
NONE SPECIFIED BY MANUFACTURER.

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route of Entry Indicators:

Inhalation: YES  
Skin: YES  
Ingestion: YES

Carcinogenicity Indicators

NTP: NO  
IARC: NO  
OSHA: NO

Carcinogenicity Explanation: NOT RELEVANT

-----  
Section 4 - First Aid Measures

100% SILICONE SEALANT - CLEAR, 00684

-----  
First Aid:

INGEST: CALL MD IMMEDIATELY (FP N). EYES: IMMEDIATELY FLUSH WITH WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION. SKIN: REMOVE FROM SKIN AND WASH THOROUGHLY WITH SOAP AND WATER OR WATERLESS CLEAN SER. GET MEDICAL ATTENTION IF IRRITATION OR OTHER ILL EFFECTS DEVELOP OR PERSIST. INHAL: REMOVE TO FRESH AIR. COMMENTS: TREAT ACCORDING TO PERSON'S CONDITION AND SPECIFICS OF EXPOSURE.

-----  
Section 5 - Fire Fighting Measures

100% SILICONE SEALANT - CLEAR, 00684

-----  
Fire Fighting Procedures:

USE NIOSH APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire or Explosion Hazard:

NONE. HAZ DECOMP PRODS: THERMAL BREAKDOWN OF THIS PROD DURING FIRE/VERY HIGH HEAT CNDTNS MAY EVOLVE FOLLOWING DECOMP PRODS: SILICON DIOXIDE. CARBON (SUPDAT)

Extinguishing Media:

CARBON DIOXIDE (CO\*2). WATER. WATER FOG (OR SPRAY). DRY CHEMICAL. FOAM.

Flash Point: Flash Point Text: N/A

Autoignition Temperature:

Autoignition Temperature Text: N/A  
Lower Limit(s): N/K  
Upper Limit(s): N/K

-----

Section 6 - Accidental Release Measures

**APPENDIX A (Cont.)**

100% SILICONE SEALANT - CLEAR, 00684

-----  
Spill Release Procedures:

DISPOSAL OF COLLECTED PROD, RESIDUES & CLEANUP MATLS MAY BE GOVERNMENTALLY REGULATED. OBSERVE ALL APPLIC LOCAL, STATE & FED WASTE MANAGEMENT REGS. SCRAPE UP & CONTAIN FOR SALVAGE OR DISPOSAL. OBSERVE ALL PERSONAL PROT EQUIP RECOMS. LOCAL, (SUPDAT)

-----  
Section 7 - Handling and Storage

100% SILICONE SEALANT - CLEAR, 00684

-----  
Handling and Storage Precautions:

Other Precautions:

-----  
Section 8 - Exposure Controls & Personal Protection

100% SILICONE SEALANT - CLEAR, 00684

-----  
Respiratory Protection:

USE NIOSH APPROVED RESPIRATORY PROTECTION (ORGANIC VAPOR TYPE) UNLESS ADEQ LOCAL EXHAUST VENT IS PROVIDED OR AIR SAMPLING DATA SHOWS EXPOS ARE W/IN RECOMD EXPOS GUIDELINES. INDUSTRIAL HYGIENE PERSONNEL CAN ASSIST IN JUDGING THE (ING 9)

Ventilation:

NONE SPECIFIED BY MANUFACTURER.

Protective Gloves:

CHEMICAL PROT GLOVES (SILVER SHIELD).

Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).

Other Protective Equipment: ANSI APPROVED EYE WASH & DELUGE SHOWER (FP N).

Work Hygenic Practices: WASH AT MEALTIME & END OF SHIFT. REMOVE CONTAMD CLTHG & SHOES AS SOON AS POSS & THOROUGHLY CLEAN BEFORE REUSE.

Supplemental Health & Safety Information: EXPLO HAZ: OXIDES & TRACES OF INCOMPLETELY BURNED CARBON CMPDS. FORMALDEHYDE. SPILL PROC: STATE & FED REPORTING REQS MAY APPLY TO SPILLS OR RELS OF THIS MATL INTO ENVIRONMENT. SEE APPLIC REGULATORY COMPLIANCE INFO. PERSONAL PROT EQUIP FOR SPILLS: USE PROPER EYE PROT - ANSI APPRVD SFTY GLASSES AS MINIMUM. WASH (ING 5)

-----  
Section 9 - Physical & Chemical Properties

100% SILICONE SEALANT - CLEAR, 00684

-----  
HCC:

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: N/A

Melting/Freezing Point: Melting/Freezing Text: N/K

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: N/A Vapor Density: N/A

Percent Volatile Organic Content:

**APPENDIX A (Cont.)**

Specific Gravity: 1.02

Volatile Organic Content Pounds per Gallon:

pH: N/A

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/K

Solubility in Water: NONE

Appearance and Odor: COLORLESS PASTE; ACETIC ACID ODOR.

Percent Volatiles by Volume: N/A

Corrosion Rate: N/K

-----  
Section 10 - Stability & Reactivity Data

100% SILICONE SEALANT - CLEAR, 00684

-----  
Stability Indicator: YES

Materials to Avoid:

OXIDIZING MATEIAL CAN CAUSE A REACTION.

Stability Condition to Avoid:

NONE.

Hazardous Decomposition Products:

ACETIC ACID IS FORMED UPON CONTACT WITH WATER OR HUMID AIR.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

NOT RELEVANT

-----  
Section 11 - Toxicological Information

100% SILICONE SEALANT - CLEAR, 00684

-----  
Toxicological Information:

N/P

-----  
Section 12 - Ecological Information

100% SILICONE SEALANT - CLEAR, 00684

-----  
Ecological Information:

N/P

-----  
Section 13 - Disposal Considerations

100% SILICONE SEALANT - CLEAR, 00684

-----  
Waste Disposal Methods:

DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS (FP N). CALL DOW CORNING ENVIRONMENTAL MGMT 517-496-6315 IF MORE INFORMATION IS DESIRED.

-----  
Section 14 - MSDS Transport Information

100% SILICONE SEALANT - CLEAR, 00684

-----

Transport Information:

**APPENDIX A (cont.)**

N/P

-----  
Section 15 - Regulatory Information  
100% SILICONE SEALANT - CLEAR, 00684

-----  
SARA Title III Information:  
N/P  
Federal Regulatory Information:  
N/P  
State Regulatory Information:  
N/P

-----  
Section 16 - Other Information  
100% SILICONE SEALANT - CLEAR, 00684

-----  
Other Information:  
N/P  
HAZCOM Label Information

Product Identification: 100% SILICONE SEALANT - CLEAR, 00684  
CAGE: 5D028  
Assigned Individual: N  
Company Name: DOW CORNING CORP  
Company PO Box: 997  
Company Street Address1: 3901 S SAGINAW RD  
Company Street Address2: MIDLAND, MI 48686-0997 US  
Health Emergency Telephone: 517-496-5900;800-424-9300(CHEMTREC)  
Label Required Indicator: Y  
Date Label Reviewed: 02/04/1998  
Status Code: C  
Manufacturer's Label Number:  
Date of Label: 02/04/1998  
Year Procured: N/K  
Organization Code: G  
Chronic Hazard Indicator: N  
Eye Protection Indicator: YES  
Skin Protection Indicator: YES  
Respiratory Protection Indicator: YES  
Signal Word: WARNING  
Health Hazard: Slight  
Contact Hazard: Moderate  
Fire Hazard: None  
Reactivity Hazard: None

-----  
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## APPENDIX B – MSDS for Argentyne disinfectant

Division of Facilities Services

<<http://www.fs.cornell.edu>>

DOD Hazardous Material Information (ANSI Format)

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---

### ARGENTYNE

---

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Physical & Chemical Properties <#Section9>  
Section 2 - Composition/Information on Ingredients <#Section2> Section  
10 - Stability & Reactivity Data <#Section10>  
Section 3 - Hazards Identification Including Emergency Overview  
<#Section3> Section 11 - Toxicological Information <#Section11>  
Section 4 - First Aid Measures <#Section4> Section 12 - Ecological  
Information <#Section12>  
Section 5 - Fire Fighting Measures <#Section5> Section 13 - Disposal  
Considerations <#Section13>  
Section 6 - Accidental Release Measures <#Section6> Section 14 - MSDS  
Transport Information <#Section14>  
Section 7 - Handling and Storage <#Section7> Section 15 - Regulatory  
Information <#Section15>  
Section 8 - Exposure Controls & Personal Protection <#Section8> Section  
16 - Other Information <#Section16>

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applicability, viability or use of this information to any person or for  
use in any situation.

---

Section 1 - Product and Company Identification

ARGENTYNE

---

Product Identification: ARGENTYNE

Date of MSDS: 10/19/1988 Technical Review Date: 05/21/1996

FSC: 6810 NIIN: LIIN: 00N047826

Submitter: N EN

Status Code: C

MFN: 01

Article: N

Kit Part: N

**APPENDIX B (cont.)**

Manufacturer's Information

Manufacturer's Name: ARGENT CHEMICAL LABS  
Manufacturer's Address1: 8702 152ND AVE N.E.  
Manufacturer's Address2: REDMOND, WA 98052  
Manufacturer's Country: US  
General Information Telephone: 206-885-3777  
Emergency Telephone: 206-885-3777  
Emergency Telephone: 206-885-3777  
MSDS Preparer's Name: N/P  
Proprietary: N  
Reviewed: N  
Published: Y  
CAGE: 0LX87  
Special Project Code: N

Contractor Information

Contractor's Name: ARGENT CHEMICAL LABS  
Contractor's Address1: 8702 152ND AVE N.E.  
Contractor's Address2: REDMOND, WA 98052  
Contractor's Telephone: 206-885-3777  
Contractor's CAGE: 0LX87

-----  
Section 2 - Composition/Information on Ingredients  
ARGENTYNE

-----  
Ingredient Name: POLY (1-(2-OXO-1-PYRROLIDINYL)ETHYLENE) IODINE COMPLEX.  
LD50:(ORAL MOUSE) 3400 MG/KG/24HRS  
Ingredient CAS Number: 25655-41-8 Ingredient CAS Code: M  
RTECS Number: TR1579600 RTECS Code: M  
=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: N/K  
% Environmental Weight:  
Other REC Limits: N/K  
OSHA PEL: N/K (FP N) OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: N/K (FP N) ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical: N

## APPENDIX B (Cont.)

Ingredient Name: SODIUM BICARBONATE (1:1). LD50 (ORAL RAT) 4220 MG/KG

Ingredient CAS Number: 144-55-8 Ingredient CAS Code: M

RTECS Number: VZ0950000 RTECS Code: M

=WT: =WT Code:

=Volume: =Volume Code:

>WT: >WT Code:

>Volume: >Volume Code:

<WT: <WT Code:

<Volume: <Volume Code:

% Low WT: % Low WT Code:

% High WT: % High WT Code:

% Low Volume: % Low Volume Code:

% High Volume: % High Volume Code:

% Text: N/K

% Environmental Weight:

Other REC Limits: N/K

OSHA PEL: N/K (FP N) OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: N/K (FP N) ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity:

DOT Reporting Quantity:

Ozone Depleting Chemical: N

-----  
Section 3 - Hazards Identification, Including Emergency Overview  
ARGENTYNE

-----  
Health Hazards Acute & Chronic: DIRECT CONTACT WITH EYES MAY BE  
IRRITATING. AVOID PROLONGED OR EXCESSIVE CONTACT WITH SKIN. IRRITATION.  
DO NOT INGEST.

Signs & Symptoms of Overexposure:  
IRRITATION OF EYES UPON DIRECT CONTACT. SKIN IRRITATION.

Medical Conditions Aggravated by Exposure:  
NONE KNOWN.

LD50 LC50 Mixture: SEE INGREDIENTS

Route of Entry Indicators:

Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Indicators

NTP: NO

IARC: NO

OSHA: NO

Carcinogenicity Explanation: NOT RELEVANT.  
-----

Section 4 - First Aid Measures

**APPENDIX B (Cont.)**

ARGENTYNE

-----  
First Aid:

INHAL:REMOVE TO FRESH AIR. SUPPORT BREATHING (GIVE O\*2/ARTF RESP) (FP N). EYES:FLUSH WITH RUNNING WATER FOR AT LEAST 15 MINUTES. CALL PHYS. SKIN:WASH WITH SOAP AND WATER. INGEST:CALL PHYSICIAN IMMEDIA TELY.

-----  
Section 5 - Fire Fighting Measures

ARGENTYNE

-----  
Fire Fighting Procedures:

USE NIOSH/MSHA APPROVED SCBA & FULL BUNKER GEAR TO MINIMIZE CONTACT WITH SKIN, EYES, AND RESPIRATORY TRACT.

Unusual Fire or Explosion Hazard:

NONE KNOWN.

Extinguishing Media:

WATER SPRAY, CO\*2, DRY CHEMICAL, FOAM.

Flash Point: Flash Point Text: NON-FLAM SOLN

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/A

Upper Limit(s): N/A

-----  
Section 6 - Accidental Release Measures

ARGENTYNE

-----  
Spill Release Procedures:

DIKE UP AND USE ABSORBANTS TO SOAK UP. PLACE ABSORBANTS INTO DOT-APPROVED CONTAINER & HOLD FOR DISPOSAL. WEAR GOGGLES AND GLOVES. SODIUM THIOSULFATE, PENTAHYDRATE MAY BE USED TO REDUCE TO A COLORLESS SODIUM IODATE SOLUTION.

-----  
Section 7 - Handling and Storage

ARGENTYNE

-----  
Handling and Storage Precautions:

Other Precautions:

-----  
Section 8 - Exposure Controls & Personal Protection

ARGENTYNE

-----  
Respiratory Protection:

NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation:



GENERAL.

**APPENDIX B (Cont.)**

Protective Gloves:

CHEMICAL RESISTANT GLOVES.

Eye Protection: ANSI APPVD CHEM WORK GOGG (FP N).

Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.

Work Hygenic Practices: WASH THOROUGHLY AFTER HANDLING.

Supplemental Health & Safety Information: NONE SPECIFIED BY MANUFACTURER.

-----  
Section 9 - Physical & Chemical Properties

ARGENTYNE

-----  
HCC: N1

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: 212F,100C

Melting/Freezing Point: Melting/Freezing Text: N/A

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: N/A Vapor Density: N/A

Percent Volatile Organic Content:

Specific Gravity: 1.1 (H\*20=1)

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: NOT APPLICABLE

Solubility in Water: SOLUBLE

Appearance and Odor: DARK BROWN-RED LIQUID-NO ODOR

Percent Volatiles by Volume: N/K

Corrosion Rate: N/K

-----  
Section 10 - Stability & Reactivity Data

ARGENTYNE

-----  
Stability Indicator: YES

Materials to Avoid:

NONE KNOWN.

Stability Condition to Avoid:

STORE AWAY FROM HEAT.

Hazardous Decomposition Products:

NONE KNOWN.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

NOT RELEVANT.

-----  
Section 11 - Toxicological Information

ARGENTYNE

-----  
Toxicological Information:

N/P

-----  
Section 12 - Ecological Information

ARGENTYNE

**APPENDIX B (Cont.)**

Ecological Information:

N/P

-----  
Section 13 - Disposal Considerations

ARGENTYNE

Waste Disposal Methods:

DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS.

-----  
Section 14 - MSDS Transport Information

ARGENTYNE

-----  
Transport Information:

N/P

-----  
Section 15 - Regulatory Information

ARGENTYNE

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

-----  
Section 16 - Other Information

ARGENTYNE

-----  
Other Information:

N/P

HAZCOM Label Information

Product Identification: ARGENTYNE

CAGE: 0LX87

Assigned Individual: N

Company Name: ARGENT CHEMICAL LABS

Company PO Box:

Company Street Address1: 8702 152ND AVE N.E.

Company Street Address2: REDMOND, WA 98052 US

Health Emergency Telephone: 206-885-3777

Label Required Indicator: Y

Date Label Reviewed: 02/02/1994

Status Code: C

Manufacturer's Label Number:

Date of Label: 02/02/1994

Year Procured: N/K

Organization Code: G

Chronic Hazard Indicator: N

Eye Protection Indicator: YES

Skin Protection Indicator: YES

Respiratory Protection Indicator: YES

Signal Word: CAUTION

Health Hazard: Slight

Contact Hazard: Slight

Fire Hazard: None

Reactivity Hazard: None

-----

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**APPENDIX C – MSDS for Compressed Air**

Division of Facilities Services

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DOD Hazardous Material Information (ANSI Format)  
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-----  
**AIR, COMPRESSED AIR, BREATHING QUALITY**  
-----

Section 1 - Product and Company Identification <#Section1> Section 9 -  
Physical & Chemical Properties <#Section9>  
Section 2 - Composition/Information on Ingredients <#Section2> Section  
10 - Stability & Reactivity Data <#Section10>  
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<#Section3> Section 11 - Toxicological Information <#Section11>  
Section 4 - First Aid Measures <#Section4> Section 12 - Ecological  
Information <#Section12>  
Section 5 - Fire Fighting Measures <#Section5> Section 13 - Disposal  
Considerations <#Section13>  
Section 6 - Accidental Release Measures <#Section6> Section 14 - MSDS  
Transport Information <#Section14>  
Section 7 - Handling and Storage <#Section7> Section 15 - Regulatory  
Information <#Section15>  
Section 8 - Exposure Controls & Personal Protection <#Section8> Section  
16 - Other Information <#Section16>

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use in any situation.  
-----

Section 1 - Product and Company Identification  
AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Product Identification: AIR,COMPRESSED AIR,BREATHING QUALITY  
Date of MSDS: 02/23/1981 Technical Review Date: 04/19/1991  
FSC: 4240 NIIN: 01-250-8768  
Submitter: D DG  
Status Code: C  
MFN: 01  
Article: N  
Kit Part: N

## APPENDIX C (Cont.)

### Manufacturer's Information

Manufacturer's Name: AIR PRODUCTS AND CHEMICALS INC.  
Manufacturer's Address1: 7201 HAMILTON BLVD  
Manufacturer's Address2: ALLENTOWN, PA 18195-1501  
Manufacturer's Country: US  
General Information Telephone:  
Emergency Telephone: 800-523-0374  
Emergency Telephone: 800-523-0374  
MSDS Preparer's Name: N/P  
Proprietary: N  
Reviewed: Y  
Published: Y  
CAGE: 00742  
Special Project Code: N

### Item Description

Item Name: BREATHING APPARATUS,SELF-CONTAINED  
Item Manager: S9T  
Specification Number: NK  
Type/Grade/Class: NK  
Unit of Issue: EA  
Unit of Issue Quantity: 1  
Type of Container: CYLINDER

### Contractor Information

Contractor's Name: AIR PRODUCTS AND CHEMICALS INC  
Contractor's Address1: 7201 HAMILTON BLVD  
Contractor's Address2: ALLENTOWN, PA 18195-1501  
Contractor's Telephone: 800-345-3148/610-481-4911  
Contractor's CAGE: 00742

### Contractor Information

Contractor's Name: ALL-SAFE INC  
Post Office Box: 116  
Contractor's Address1: 4767 LANGTON RD  
Contractor's Address2: HILLIARD, OH 43026  
Contractor's Telephone: 614-876-4041  
Contractor's CAGE: 2X264

-----  
Section 2 - Composition/Information on Ingredients  
AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Ingredient Name: AIR, REFRIGERATED LIQUID; AIR COMPRESSED (UN1002, DOT);  
AIR REFRIGERATED LIQUID (CRYOGENIC LIQUID) (UN1003) (DOT)  
Ingredient CAS Number: Ingredient CAS Code: X

RTECS Number: AX5271000 RTECS Code: M

**APPENDIX C (Cont.)**

=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: 100  
% Environmental Weight:  
Other REC Limits: NONE SPECIFIED  
OSHA PEL: NOT ESTABLISHED OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: NOT ESTABLISHED ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical:

-----  
Section 3 - Hazards Identification, Including Emergency Overview  
AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Health Hazards Acute & Chronic: ACUTE: NONE AT ATMOSPHERIC PRESSURES.  
CHRONIC: NONE.

Signs & Symptoms of Overexposure:  
NONE

Medical Conditions Aggravated by Exposure:  
NONE

LD50 LC50 Mixture: LD50 (ORAL RAT) IS NOT APPLICABLE.

Route of Entry Indicators:  
Inhalation: N/P  
Skin: N/P  
Ingestion: N/P

Carcinogenicity Indicators  
NTP: NO  
IARC: NO  
OSHA: NO

Carcinogenicity Explanation: NONE OF THE COMPOUNDS IN THIS PRODUCT IS LISTED BY IARC, NTP, OR OSHA AS A CARCINOGEN.

-----  
Section 4 - First Aid Measures  
AIR,COMPRESSED AIR,BREATHING QUALITY  
-----

First Aid:

**APPENDIX C (Cont.)**

NOT APPLICABLE.

-----  
Section 5 - Fire Fighting Measures  
AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Fire Fighting Procedures:  
WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A FULL FACED SELF CONTAINED BREATHING APPARATUS. EVACUATE AREA. COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.  
Unusual Fire or Explosion Hazard:  
COMBUSTION OR HEAT OF FIRE MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS AND VAPORS.  
Extinguishing Media:  
USE WATER FOG, CARBON DIOXIDE, FOAM, OR DRY CHEMICAL AS APPROPRIATE FOR SURROUNDINGS. MATERIAL IS NOT FLAMMABLE.  
Flash Point: Flash Point Text: N/R

Autoignition Temperature:  
Autoignition Temperature Text: N/R  
Lower Limit(s): N/R  
Upper Limit(s): N/R

-----  
Section 6 - Accidental Release Measures  
AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Spill Release Procedures:  
EVACUATE ALL PERSONNEL FROM RELEASE AREA.

-----  
Section 7 - Handling and Storage  
AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Handling and Storage Precautions:

Other Precautions:

-----  
Section 8 - Exposure Controls & Personal Protection  
AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Respiratory Protection:  
NOT APPLICABLE  
Ventilation:  
NOT APPLICABLE  
Protective Gloves:  
WORK GLOVES FOR HANDLING CYLINDERS.  
Eye Protection: APPROVED SAFETY GLASSES OR FACE SHIELD.  
Other Protective Equipment: SAFETY SHOES AND HEARING PROTECTION.  
Work Hygenic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND

**APPENDIX C (Cont.)**

RECOMMENDED PROCEDURES. USE PROPER CARE WHEN HANDLING AND STORING CYLINDERS.

Supplemental Health & Safety Information: SECURE CYLINDERS AT ALL TIMES.

NEVER USE A DIRECT FLAME TO HEAT CYLINDER CONTENTS.

-----  
Section 9 - Physical & Chemical Properties

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
HCC: G3

NRC/State License Number: N/R

Net Property Weight for Ammo: N/R

Boiling Point: Boiling Point Text: -318F,-194C

Melting/Freezing Point: Melting/Freezing Text: N/K

Decomposition Point: Decomposition Text: UNKNOWN

Vapor Pressure: N/K Vapor Density: 0.0752

Percent Volatile Organic Content:

Specific Gravity: 1.00 AIR=1

Volatile Organic Content Pounds per Gallon:

pH: N/R

Volatile Organic Content Grams per Liter:

Viscosity: N/K

Evaporation Weight and Reference: N/K

Solubility in Water: 1.87

Appearance and Odor: GASEOUS AIR IS ODORLESS AND COLORLESS

Percent Volatiles by Volume: 100

Corrosion Rate: UNKNOWN

-----  
Section 10 - Stability & Reactivity Data

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Stability Indicator: YES

Materials to Avoid:

AVOID USE OF OIL IN SYSTEMS AT FULL CYLINDER PRESSURE

Stability Condition to Avoid:

HIGH HEAT WHICH WOULD CAUSE EXCESSIVE PRESSURE IN GAS CYLINDER

Hazardous Decomposition Products:

NONE

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

NOT APPLICABLE

-----  
Section 11 - Toxicological Information

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Toxicological Information:

N/P

-----  
Section 12 - Ecological Information

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
**APPENDIX C (cont.)**

Ecological Information:

N/P

-----  
Section 13 - Disposal Considerations

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Waste Disposal Methods:

MOVE LEAKY CYLINDER TO OUTDOORS OR VENTILATED HOOD. ALLOW GAS TO DISCHARGE AT MODERATE RATE. REMOVE ALL FLAMMABLE MATERIALS FROM VICINITY. DISPOSAL SHOULD BE MADE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.

-----  
Section 14 - MSDS Transport Information

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Transport Information:

N/P

-----  
Section 15 - Regulatory Information

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

-----  
Section 16 - Other Information

AIR,COMPRESSED AIR,BREATHING QUALITY

-----  
Other Information:

N/P

HMIS Transportation Information

Product Identification: AIR,COMPRESSED AIR,BREATHING QUALITY

Transportation ID Number: 118359

Responsible Party CAGE: 00742

Date MSDS Prepared: 02/23/1981

Date MSDS Reviewed: 01/16/1996

MFN: 01/16/1996

Submitter: D DG

Status Code: C

Container Information

Unit of Issue: EA

Container Quantity: 1

Type of Container: CYLINDER

Net Unit Weight: N/K



Article without MSDS: N

**APPENDIX C (cont.)**

Technical Entry NOS Shipping Number: COMPRESSED AIR

Radioactivity:

Form:

Net Explosive Weight:

Coast Guard Ammunition Code:

Magnetism: N/P

AF MMAC Code:

DOD Exemption Number:

Limited Quantity Indicator:

Multiple Kit Number: 0

Kit Indicator: N

Kit Part Indicator: N

Review Indicator: Y

Additional Data:

Department of Transportation Information

DOT Proper Shipping Name: AIR, COMPRESSED

DOT PSN Code: AGJ

Symbols:

DOT PSN Modifier:

Hazard Class: 2.2

UN ID Number: UN1002

DOT Packaging Group:

Label: NONFLAMMABLE GAS

Special Provision(s): 78

Packaging Exception: 306

Non Bulk Packaging: 302

Bulk Packaging: 302

Maximum Quantity in Passenger Area: 75 KG

Maximum Quantity in Cargo Area: 150 KG

Stow in Vessel Requirements: A

Requirements Water/Sp/Other:

IMO Detail Information

IMO Proper Shipping Name: AIR, COMPRESSED

IMO PSN Code: ALN

IMO PSN Modifier:

IMDG Page Number: 2103

UN Number: 1002

UN Hazard Class: 2(2.2)

IMO Packaging Group: -

Subsidiary Risk Label: -

EMS Number: 2-04

Medical First Aid Guide Number: NON

IATA Detail Information

IATA Proper Shipping Name: AIR, COMPRESSED

IATA PSN Code: AOP

IATA PSN Modifier:

IATA UN Id Number: 1002

IATA UN Class: 2.2

Subsidiary Risk Class:

**APPENDIX C (cont.)**

UN Packaging Group:  
IATA Label: NON-FLAMMABLE GAS  
Packaging Note for Passengers: 200  
Maximum Quantity for Passengers: 75KG  
Packaging Note for Cargo: 200  
Maximum Quantity for Cargo: 150 KG  
Exceptions:  
AFI Detail Information

AFI Proper Shipping Name: AIR, COMPRESSED  
AFI Symbols:  
AFI PSN Code: AOP  
AFI PSN Modifier:  
AFI UN Id Number: UN1002  
AFI Hazard Class: 2.2  
AFI Packing Group: -  
AFI Label:  
Special Provisions: P5  
Back Pack Reference: A6.3, A6.6  
HAZCOM Label Information

Product Identification: AIR,COMPRESSED AIR,BREATHING QUALITY  
CAGE: 00742  
Assigned Individual: N  
Company Name: AIR PRODUCTS AND CHEMICALS INC  
Company PO Box:  
Company Street Address1: 7201 HAMILTON BLVD  
Company Street Address2: ALLENTOWN, PA 18195-1501 US  
Health Emergency Telephone: 800-523-0374  
Label Required Indicator: Y  
Date Label Reviewed: 04/19/1991  
Status Code: C  
Manufacturer's Label Number: N/R  
Date of Label: 04/19/1991  
Year Procured: 1991  
Organization Code: F  
Chronic Hazard Indicator: N  
Eye Protection Indicator: N/P  
Skin Protection Indicator: N/P  
Respiratory Protection Indicator: N/P  
Signal Word: CAUTION  
Health Hazard: None  
Contact Hazard: Slight  
Fire Hazard: None  
Reactivity Hazard: None

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**APPENDIX D – MSDS for Compressed Air**

Division of Facilities Services

<<http://www.fs.cornell.edu>>

DOD Hazardous Material Information (ANSI Format)  
For Cornell University Convenience Only

-----  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY  
-----

Section 1 - Product and Company Identification <#Section1> Section 9 -  
Physical & Chemical Properties <#Section9>  
Section 2 - Composition/Information on Ingredients <#Section2> Section  
10 - Stability & Reactivity Data <#Section10>  
Section 3 - Hazards Identification Including Emergency Overview  
<#Section3> Section 11 - Toxicological Information <#Section11>  
Section 4 - First Aid Measures <#Section4> Section 12 - Ecological  
Information <#Section12>  
Section 5 - Fire Fighting Measures <#Section5> Section 13 - Disposal  
Considerations <#Section13>  
Section 6 - Accidental Release Measures <#Section6> Section 14 - MSDS  
Transport Information <#Section14>  
Section 7 - Handling and Storage <#Section7> Section 15 - Regulatory  
Information <#Section15>  
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16 - Other Information <#Section16>

-----  
The information in this document is compiled from information maintained  
by the United States Department of Defense (DOD). Anyone using this  
information is solely responsible for the accuracy and applicability of  
this information to a particular use or situation.  
Cornell University does not in any way warrant or imply the  
applicability, viability or use of this information to any person or for  
use in any situation.  
-----

Section 1 - Product and Company Identification  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Product Identification: P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY  
Date of MSDS: 03/01/1990 Technical Review Date: 03/27/1992  
FSC: 4240 NIIN: 01-248-8035  
Submitter: D DG  
Status Code: C  
MFN: 01  
Article: N  
Kit Part: N

## APPENDIX D (Cont.)

### Manufacturer's Information

Manufacturer's Name: MINE SAFETY APPLIANCES CO  
Manufacturer's Address1: 3880 MEADOWBROOK RD  
Manufacturer's Address2: MURRYSVILLE, PA 15668-1753  
Manufacturer's Country: US  
General Information Telephone: 412-967-3000  
Emergency Telephone: 412-967-3000  
Emergency Telephone: 412-967-3000  
MSDS Preparer's Name: N/P  
Proprietary: N  
Reviewed: Y  
Published: Y  
CAGE: 55799  
Special Project Code: N

### Item Description

Item Name: MASK,OXYGEN  
Item Manager: S9T  
Specification Number: NONE  
Type/Grade/Class: NONE  
Unit of Issue: EA  
Unit of Issue Quantity: 1  
Type of Container: UNKNOWN

### Contractor Information

Contractor's Name: MINE SAFETY APPLIANCES CO DBA MSA  
Contractor's Address1: 3880 MEADOWBROOK RD  
Contractor's Address2: MURRYSVILLE, PA 15668-1753  
Contractor's Telephone: 724-733-9272  
Contractor's CAGE: 55799

-----  
Section 2 - Compositon/Information on Ingredients  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Ingredient Name: NITROGEN  
Ingredient CAS Number: 7727-37-9 Ingredient CAS Code: M  
RTECS Number: QW9700000 RTECS Code: M  
=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:

% Text: 79

**APPENDIX D (Cont.)**

% Environmental Weight:  
Other REC Limits: NONE SPECIFIED  
OSHA PEL: NOT ESTABLISHED OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: ASPHYXIAN; 9192 ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical: N

Ingredient Name: OXYGEN  
Ingredient CAS Number: 7782-44-7 Ingredient CAS Code: M  
RTECS Number: RS2060000 RTECS Code: M  
=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: 21

% Environmental Weight:  
Other REC Limits: NONE SPECIFIED  
OSHA PEL: NOT ESTABLISHED OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: NOT ESTABLISHED ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical: N

-----  
Section 3 - Hazards Identification, Including Emergency Overview  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Health Hazards Acute & Chronic: ACUTE: PHYSICAL INJURY DUE TO  
RUPTURE/EXPLOSION OF CONTAINER. INJECTION OF COMPRESSED AIR INTO THE  
BLOOD STREAM.

Signs & Symptoms of Overexposure:  
NONE

Medical Conditions Aggravated by Exposure:  
NONE

LD50 LC50 Mixture: LD50 (ORAL RAT) IS NOT APPLICABLE.

Route of Entry Indicators:  
Inhalation: N/P

Skin: N/P

**APPENDIX D (cont.)**

Ingestion: N/P

Carcinogenicity Indicators

NTP: NO  
IARC: NO  
OSHA: NO

Carcinogenicity Explanation: NONE OF THE COMPOUNDS IN THIS PRODUCT IS LISTED BY IARC, NTP, OR OSHA AS A CARCINOGEN.

-----  
Section 4 - First Aid Measures  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
First Aid:  
GET IMMEDIATE MEDICAL CARE FOR THOSE INJURED BY EXPLODING CYLINDERS OR IF AIR IS SUSPECTED TO HAVE BEEN INJECTED INTO THE BLOOD STREAM.

-----  
Section 5 - Fire Fighting Measures  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Fire Fighting Procedures:  
WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A FULL FACED SELF CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.  
Unusual Fire or Explosion Hazard:  
CONTAINS AIR UNDER 2200 PSI. CONTAINERS EXPOSED TO HEAT MAY RUPTURE OR EXPLODE.  
Extinguishing Media:  
PRODUCT IS NON FLAMMABLE. EXTINGUISH FIRE WITH MEDIA APPROPRIATE FOR SOURCE OF FIRE.  
Flash Point: Flash Point Text: NON-FLAMMABLE

Autoignition Temperature:  
Autoignition Temperature Text: N/R  
Lower Limit(s): UNKNOWN  
Upper Limit(s): UNKNOWN

-----  
Section 6 - Accidental Release Measures  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Spill Release Procedures:  
NONE

-----  
Section 7 - Handling and Storage  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Handling and Storage Precautions:

Other Precautions:

**APPENDIX D (cont.)**

-----  
Section 8 - Exposure Controls & Personal Protection  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY  
-----

Respiratory Protection:

NOT APPLICABLE

Ventilation:

NOT APPLICABLE

Protective Gloves:

WORK GLOVES FOR HANDLING CYLINDERS.

Eye Protection: APPROVED SAFETY GLASSES OR FACE SHIELD.

Other Protective Equipment: SAFETY SHOES AND HEARING PROTECTION.

Work Hygenic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES. USE PROPER CARE WHEN HANDLING AND STORING CYLINDERS.

Supplemental Health & Safety Information: THIS IS BREATHING AIR WHICH MEETS THE SPECIFICATIONS G-7.1, TYPE I. GRADE D OF THE COMPRESSED GAS ASSOCIATION.

-----  
Section 9 - Physical & Chemical Properties  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY  
-----

HCC: G3

NRC/State License Number: N/R

Net Property Weight for Ammo: N/R

Boiling Point: Boiling Point Text: -318F,-194C

Melting/Freezing Point: Melting/Freezing Text: UNKNOWN

Decomposition Point: Decomposition Text: UNKNOWN

Vapor Pressure: UNKNOWN Vapor Density: 1.0

Percent Volatile Organic Content:

Specific Gravity: UNKNOWN

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: UNKNOWN

Evaporation Weight and Reference: UNKNOWN

Solubility in Water: 1.87%

Appearance and Odor: COLORLESS, ODORLESS GAS

Percent Volatiles by Volume: 100

Corrosion Rate: UNKNOWN

-----  
Section 10 - Stability & Reactivity Data  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY  
-----

Stability Indicator: YES

Materials to Avoid:

NOT RELAVENT

Stability Condition to Avoid:

HIGH HEAT, OPEN FLAMES

Hazardous Decomposition Products:

NONE

**APPENDIX D (cont.)**

Hazardous Polymerization Indicator: NO  
Conditions to Avoid Polymerization:  
NOT APPLICABLE

-----  
Section 11 - Toxicological Information  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Toxicological Information:  
N/P

-----  
Section 12 - Ecological Information  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Ecological Information:  
N/P

-----  
Section 13 - Disposal Considerations  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Waste Disposal Methods:  
RELEASE PRESSURE SAFELY BEFORE DISPOSAL OF CYLINDER. DISPOSEM I/A/W  
FEDERAL,STATE,LOCAL REGULATIONS.

-----  
Section 14 - MSDS Transport Information  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Transport Information:  
N/P

-----  
Section 15 - Regulatory Information  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
SARA Title III Information:  
N/P  
Federal Regulatory Information:  
N/P  
State Regulatory Information:  
N/P

-----  
Section 16 - Other Information  
P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY

-----  
Other Information:  
N/P  
HMIS Transportation Information

Product Identification: P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY



Transportation ID Number: 118208

**APPENDIX D (Cont.)**

Responsible Party CAGE: 55799  
Date MSDS Prepared: 03/01/1990  
Date MSDS Reviewed: 03/27/1992  
MFN: 03/27/1992  
Submitter: D DG  
Status Code: C

Container Information

Unit of Issue: EA  
Container Quantity: 1  
Type of Container: UNKNOWN  
Net Unit Weight:

Article without MSDS: N  
Technical Entry NOS Shipping Number:  
Radioactivity:  
Form:  
Net Explosive Weight:  
Coast Guard Ammunition Code:  
Magnetism: N/P  
AF MMAC Code:  
DOD Exemption Number:  
Limited Quantity Indicator:  
Multiple Kit Number: 0  
Kit Indicator: N  
Kit Part Indicator: N  
Review Indicator: Y  
Additional Data:  
ITEM CONSISTS OF MASK PLUS CYLINDER OF COMPRESSED BREATHABLE AIR.

Department of Transportation Information

DOT Proper Shipping Name: AIR, COMPRESSED  
DOT PSN Code: AGJ  
Symbols:  
DOT PSN Modifier:  
Hazard Class: 2.2  
UN ID Number: UN1002  
DOT Packaging Group:  
Label: NONFLAMMABLE GAS  
Special Provision(s): 78  
Packaging Exception: 306  
Non Bulk Packaging: 302  
Bulk Packaging: 302  
Maximum Quantity in Passenger Area: 75 KG  
Maximum Quantity in Cargo Area: 150 KG  
Stow in Vessel Requirements: A  
Requirements Water/Sp/Other:  
IMO Detail Information

IMO Proper Shipping Name: AIR, COMPRESSED  
IMO PSN Code: ALN  
IMO PSN Modifier:

IMDG Page Number: 2103

**APPENDIX D (Cont.)**

UN Number: 1002  
UN Hazard Class: 2(2.2)  
IMO Packaging Group: -  
Subsidiary Risk Label: -  
EMS Number: 2-04  
Medical First Aid Guide Number: NON  
IATA Detail Information

IATA Proper Shipping Name: AIR, COMPRESSED  
IATA PSN Code: AOP  
IATA PSN Modifier:  
IATA UN Id Number: 1002  
IATA UN Class: 2.2  
Subsidiary Risk Class:  
UN Packaging Group:  
IATA Label: NON-FLAMMABLE GAS  
Packaging Note for Passengers: 200  
Maximum Quantity for Passengers: 75KG  
Packaging Note for Cargo: 200  
Maximum Quantity for Cargo: 150 KG  
Exceptions:  
AFI Detail Information

AFI Proper Shipping Name: AIR, COMPRESSED  
AFI Symbols:  
AFI PSN Code: AOP  
AFI PSN Modifier:  
AFI UN Id Number: UN1002  
AFI Hazard Class: 2.2  
AFI Packing Group: -  
AFI Label:  
Special Provisions: P5  
Back Pack Reference: A6.3, A6.6  
HAZCOM Label Information

Product Identification: P/N 473579, MODEL 5-447-1 COMPRESSED AIR CY  
CAGE: 55799  
Assigned Individual: N  
Company Name: MINE SAFETY APPLIANCES CO DBA MSA  
Company PO Box:  
Company Street Address1: 3880 MEADOWBROOK RD  
Company Street Address2: MURRYSVILLE, PA 15668-1753 US  
Health Emergency Telephone: 12-967-3000  
Label Required Indicator: Y  
Date Label Reviewed: 12/16/1998  
Status Code: C  
Manufacturer's Label Number:  
Date of Label: 12/16/1998  
Year Procured: N/K  
Organization Code: G  
Chronic Hazard Indicator: N/P  
Eye Protection Indicator: N/P  
Skin Protection Indicator: N/P

Respiratory Protection Indicator: N/P

**APPENDIX D (Cont.)**

Signal Word: N/P

Health Hazard:

Contact Hazard:

Fire Hazard:

Reactivity Hazard:

-----  
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BOC GASES, A DIVISION OF BOC -- AIR COMPRESSED OR COMPRESSED OXYGEN AND NITRO

=====  
MSDS Safety Information  
=====

FSC: 4240

NIIN: 01-377-5422

MSDS Date: 06/07/1996

MSDS Num: CKNDD

Product ID: AIR COMPRESSED OR COMPRESSED OXYGEN AND NITROGEN MIXTURE

MFN: 01

Responsible Party

Cage: 80382

Name: BOC GASES, A DIVISION OF THE BOC GROUP, INC

Address: 575 MOUNTAIN AVENUE

City: MURRAY HILL NJ 07974

Info Phone Number: 908-464-8100

Emergency Phone Number: (800)424-9300

Preparer's Name: NOT PROVIDED

Chemtrec IND/Phone: (800)424-9300

Review Ind: Y

Published: Y

=====  
Contractor Summary  
=====

Cage: 80382

Name: BOC GASES, A DIVISION OF THE BOC GROUP, INC

Address: 575 MOUNTAIN AVENUE

City: MURRAY HILL NJ 07974

Phone: 908-464-8100

=====  
Item Description Information  
=====

Item Manager: S9T

Item Name: VALVE,CYLINDER,RESPIRATOR

Specification Number: NONE

Type/Grade/Class: NONE

Unit of Issue: EA

UI Container Qty: 0

Type of Container: CYLINDER

=====  
Ingredients  
=====

Cas: 7727-37-9

RTECS #: QW9700000

Name: NITROGEN

**APPENDIX D (cont.)**

% low Wt: 2.  
% high Wt: 98.  
Other REC Limits: NOT PROVIDED  
OSHA PEL: SIMPLE ASPHYXIAN  
ACGIH TLV: SIMPLE ASPHYXIAN

-----  
Cas: 7782-44-7  
RTECS #: RS2060000  
Name: OXYGEN  
% low Wt: 2.  
% high Wt: 98.  
Other REC Limits: NOT PROVIDED  
OSHA PEL: NOT AVAILABLE  
ACGIH TLV: NOT AVAILABLE

=====  
Health Hazards Data  
=====

LD50 LC50 Mixture: NOT AVAILABLE  
Carcinogenicity Inds - NTP: NO  
IARC: NO  
OSHA: NO  
Effects of Exposure: EYE EFFECTS: NONE KNOWN. SKIN EFFECTS: NONE KNOWN.  
INGESTION EFFECTS: NONE KNOWN. INHALATION EFFECTS: AIR IS NONTOXIC AND  
NECESSARY TO SUPPORT LIFE. MIXTURES WITH LESS THAN 19.5% OXYGEN ACT AS AN  
ASPH YXIAN. EFFECTS MAY INCLUDE HEADACHES, DIZZINESS AND LOSS OF  
CONSCIOUSNESS. NOT TO BE USED AS BREATHING AIR.  
Explanation Of Carcinogenicity: NONE  
Signs And Symptoms Of Overexposure: MIXTURES WITH LESS THAN 19.5% OXYGEN ACT  
AS AN ASPHYXIAN. EFFECTS MAY INCLUDE HEADACHES, DIZZINESS AND LOSS OF  
CONSCIOUSNESS. NOT TO BE USED AS BREATHING AIR.  
Medical Cond Aggravated By Exposure: NOT PROVIDED  
First Aid: EYES: NONE REQUIRED. SKIN: NONE REQUIRED. INGESTION: NONE REQUIRED.  
INHALATION: NOT TO BE USED AS BREATHING AIR. PROMPT MEDICAL ATTENTION IS  
MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SH OULD BE  
EQUIPPED  
WITH SELF-CONTAINED BREATHING APPARATUS. VICTIM SHOULD BE ASSISTED TO AN  
UNCONTAMINATED AREA AND INHALE FRESH AIR. QUICK REMOVAL FROM THE  
CONTAMINATED  
IS MOST IMPROTANT. UNCONSCIOUS P ERSON SHOULD BE REMOVED TO AN  
UNCONTAMINATED  
AREA. IF NOT BREATHING, ADMINISTER ARTIFICIAL RESPIRATION. FURTHER  
TREATMENT  
SHOULD BE SYMPTOMATIC AND SUPPORTIVE.

=====  
Handling and Disposal  
=====

Spill Release Procedures: EVACUATE ALL PERSONNEL FROM AFFECTED AREA. USE  
APPROPRIATE PROTECTIVE EQUIPMENT. IF LEAK IS IN USER'S EQUIPMENT, BE CERTAIN  
TO PURGE PIPING WITH AN INERT GAS PRIOR TO ATTEMPTING REPAIRS. IF LEAK IS IN  
CONTAINER OR CONTAINER VALVE, CONTACT THE APPROPRIATE EMERGENCY  
TELEPHONE  
NUMBER LISTED OR CALL YOUR CLOSEST BOC LOCATION.  
Neutralizing Agent: NOT RELEVANT

Waste Disposal Methods: DO NOT ATTEMPT TO DISPOSE OF RESIDUAL WASTE OR UNUSED  
**APPENDIX D (cont.)**

QUANTITIES. RETURN IN THE SHIPPING CONTAINER PROPERLY LABELED, WITH ANY VALVE

OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE TO BO C GASES

OR AUTHORIZED DISTRIBUTOR FOR PROPER DISPOSAL.

Handling And Storage Precautions: PROTECT CYLINDERS FROM PHYSICAL DAMAGE. STORE IN COOL, DRY, WELL VENTILATED AREA AWAY FROM HEAVILY TRAFFICKED AREAS AND

EMERGENCY EXITS. DO NOT ALLOW THE TEMPERATURE WHERE CYLINDERS ARE STORED TO

EXCE ED 130F/54C. CYLINDERS SHOULD BE STORED UPRIGHT AND FIRMLY SECURED. POST

"NO SMOKING/OPEN FLAMES".

Other Precautions: NEVER CARRY A COMPRESSED GAS CYLINDER IN AN ENCLOSED SPACE SUCH AS A CAR TRUNK, VAN OR STATION WAGON. VALVE PROTECTION CAPS MUST REMAIN

IN PLACE UNLESS CONTAINER IS SECURED. DO NOT DRAG, SLIDE OR ROLL CYLINDERS. USE A SUITABLE HAND TRUCK FOR CYLINDER MOVEMENT. DON'T HEAT CYLINDER BY ANY

MEANS TO INC REASE DISCHARGE RATE

=====  
Fire and Explosion Hazard Information  
=====

Flash Point Text: NONE

Autoignition Temp Text: NONE

Lower Limits: NONE

Upper Limits: NONE

Extinguishing Media: WATER SPRAY TO KEEP CYLINDERS COOL.

Fire Fighting Procedures: IF POSSIBLE, STOP THE FLOW OF GAS WHICH IS SUPPORTING THE FIRE.

Unusual Fire/Explosion Hazard: HIGH OXYGEN CONCENTRATIONS VIGOROUSLY ACCELERATE COMBUSTION.

=====  
Control Measures  
=====

Respiratory Protection: NOT PROVIDED

Ventilation: NOT PROVIDED

Protective Gloves: PROTECTIVE GLOVES MADE OF ANY SUITABLE MATERIAL.

Eye Protection: SAFETY GLASSES OR GOGGLES

Other Protective Equipment: SAFETY SHOES, SAFETY SHOWER AND EYE BATH.

Work Hygienic Practices: NOT PROVIDED

Supplemental Safety and Health: AT CONCENTRATIONS GREATER THAN 22.5% OXYGEN, THIS PRODUCT IS CLASSIFIED AS COMPRESSED GASSES, OXIDIZING, N.O.S. AND HCC = G4.

=====  
Physical/Chemical Properties  
=====

HCC: G3

NRC/State LIC No: GET MEDICAL ATT

Boiling Point: =-194.C, -317.2F

M.P/F.P Text: NOT AVAILABLE

Decomp Text: NOT RELEVANT

Vapor Pres: NOT PROVIDED

Vapor Density: 1.0

**APPENDIX D (Cont.)**

Spec Gravity: NOT AVAILABLE  
PH: NOT RELEVANT  
Viscosity: NOT RELEVANT  
Evaporation Rate & Reference: GAS  
Solubility in Water: SLIGHT  
Appearance and Odor: ODORLESS, COLORLESS GAS  
Percent Volatiles by Volume: GAS  
Corrosion Rate: NOT PROVIDED

=====  
Reactivity Data  
=====

Stability Indicator: YES  
Stability Condition To Avoid: NOT PROVIDED  
Materials To Avoid: ALL FLAMMABLE MATERIALS.  
Hazardous Decomposition Products: NONE  
Hazardous Polymerization Indicator: NO  
Conditions To Avoid Polymerization: NONE

=====  
Toxicological Information  
=====

Toxicological Information: OXYGEN DEFICIENCY DURING PREGNANCY HAS PRODUCED DEVELOPMENTAL ABNORMALITIES IN HUMAN AND EXPERIMENTAL ANIMALS. OXYGEN CONCENTRATIONS BETWEEN 20 TO 95% HAVE PRODUCED GENETIC CHANGES IN MAMMALIAN CELL ASSAY TEST SYSTEMS. HIGH PRESSURE EFFECTS (GREATER THAN TWO ATMOSPHERES OF OXYGEN) ARE ON THE CENTRAL NERVOUS SYSTEM. IMPROPER DECOMPRESSION RESULTS IN THE ACCUMULATION OF NITROGEN IN THE BLOOD. NOTE: COMPRESSED AIR IS NOT INTENDED FOR BREATHING USE, SINCE ITS OXYGEN CONTENTS MAY BE BELOW THAT WHICH SUPPORTS LIFE.

=====  
Ecological Information  
=====

Ecological: NO DATA GIVEN.

=====  
MSDS Transport Information  
=====

Transport Information: PROPER SHIPPING NAME: AIR COMPRESSED OR COMPRESSED GASES, N.O.S. (OXYGEN, NITROGEN) OR COMPRESSED GASES, OXIDIZING N.O.S. (OXYGEN, NITROGEN). HAZARD CLASS: 2.2. DOT ID NUMBER: UN 1002 OR UN 1956 OR UN 3156. AT CONCENTRATIONS GREATER THAN 22.5% OXYGEN, THIS PRODUCT IS CLASSIFIED AS COMPRESSED GASSES, OXIDIZING, N.O.S. AT CONCENTRATIONS LESS THAN OR EQUAL TO 22.5%, THIS PRODUCT IS CLASSIFIED AS COMPRESSED GASSES, N.O.S.

=====  
Regulatory Information  
=====

Sara Title III Information: SARA TITLE III - HAZARD CLASSES: SUDDEN RELEASE OF PRESSURE HAZARD.  
Federal Regulatory Information: NOT PROVIDED  
State Regulatory Information: NOT PROVIDED

=====

**APPENDIX D (Cont.)**

=====

Other Information

=====

Other Information: COMPRESSED GAS CYLINDERS SHALL NOT BE REFILLED WITHOUT THE EXPRESS WRITTEN PERMISSION OF THE OWNER. SHIPMENT OF A COMPRESSED GAS CYLINDER WHICH HAS NOT BEEN FILLED BY THE OWNER OR WITH HIS/HER (WRITTE N) CONSENT IS A VIOLATION OF TRANSPORTATION REGULATIONS.

=====

Transportation Information

=====

Responsible Party Cage: 80382  
Trans ID NO: 153369  
Product ID: AIR COMPRESSED OR COMPRESSED OXYGEN AND NITROGEN MIXTURE  
MSDS Prepared Date: 06/07/1996  
Review Date: 06/06/2000  
MFN: 1  
Net Unit Weight: UNKNOWN  
Multiple KIT Number: 0  
Unit Of Issue: EA  
Container QTY: 0  
Type Of Container: CYLINDER  
Additional Data: PROPER SHIPPING NAME PER CTDF.

=====

Detail DOT Information

=====

DOT PSN Code: AGJ  
DOT Proper Shipping Name: AIR, COMPRESSED  
Hazard Class: 2.2  
UN ID Num: UN1002  
Label: NONFLAMMABLE GAS  
Special Provision: 78  
Packaging Exception: 306  
Non Bulk Pack: 302  
Bulk Pack: 302  
Max Qty Pass: 75 KG  
Max Qty Cargo: 150 KG  
Vessel Stow Req: A

=====

Detail IMO Information

=====

IMO PSN Code: ALN  
IMO Proper Shipping Name: AIR, COMPRESSED  
IMDG Page Number: 2103  
UN Number: 1002  
UN Hazard Class: 2(2.2)  
IMO Packaging Group: -  
Subsidiary Risk Label: -  
EMS Number: 2-04  
MED First Aid Guide NUM: NON

=====

Detail IATA Information

=====

IATA PSN Code: AOP  
IATA UN ID Num: 1002

IATA Proper Shipping Name: AIR, COMPRESSED

**APPENDIX D (Cont.)**

IATA UN Class: 2.2  
IATA Label: NON-FLAMMABLE GAS  
Packing Note Passenger: 200  
Max Quant Pass: 75KG  
Max Quant Cargo: 150 KG  
Packaging Note Cargo: 200

=====  
Detail AFI Information  
=====

AFI PSN Code: AOP  
AFI Proper Shipping Name: AIR, COMPRESSED  
AFI Hazard Class: 2.2  
AFI UN ID NUM: UN1002  
AFI Packing Group: -  
Special Provisions: P5  
Back Pack Reference: A6.3, A6.6

=====  
HAZCOM Label  
=====

Product ID: AIR COMPRESSED OR COMPRESSED OXYGEN AND NITROGEN MIXTURE  
Cage: 80382  
Company Name: BOC GASES, A DIVISION OF THE BOC GROUP, INC  
Street: 575 MOUNTAIN AVENUE  
City: MURRAY HILL NJ  
Zipcode: 07974  
Health Emergency Phone: (800)424-9300  
Label Required IND: Y  
Date Of Label Review: 06/06/2000  
Status Code: A  
MFG Label NO: NOT PROVIDED  
Origination Code: F  
Eye Protection IND: YES  
Skin Protection IND: YES  
Signal Word: CAUTION  
Respiratory Protection IND: NO  
Health Hazard: Slight  
Contact Hazard: None  
Fire Hazard: None  
Reactivity Hazard: None  
Hazard And Precautions: TARGET ORGANS: N/P. EYES: NONE REQUIRED. SKIN: NONE  
REQUIRED. INGESTION: NONE REQUIRED. INHALATION: NOT TO BE USED AS BREATHING  
AIR. PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE.  
RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING  
APPARATUS.  
VICTIM SHOULD BE ASSISTED TO AN UNCONTAMINATED AREA AND INHALE FRESH AIR.  
QUICK REMOVAL FROM THE CONTAMINATED IS MOST IMPR OTANT. UNCONSCIOUS  
PERSON  
SHOULD BE REMOVED TO AN UNCONTAMINATED AREA. IF NOT BREATHING,  
ADMINISTER  
ARTIFICIAL RESPIRATION. FURTHER TREATMENT SHOULD BE SYMPTOMATIC AND  
SUPPORTIVE.

=====  
Disclaimer (provided with this information by the compiling agencies): This



information is formulated for use by elements of the Department of Defense.

**APPENDIX D (Cont.)**

The United States of America in no manner whatsoever expressly or implied warrants, states, or intends said information to have any application, use or viability by or to any person or persons outside the Department of Defense nor any person or persons contracting with any instrumentality of the United States of America and disclaims all liability for such use. Any person utilizing this instruction who is not a military or civilian employee of the United States of America should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation regardless of similarity to a corresponding Department of Defense or other government situation.

# APPENDIX E – MSDS for AQUI-S® E

AQUI-S New Zealand Ltd



## MATERIAL SAFETY DATA SHEET

### AQUI-S® 20E

#### Section 1: IDENTIFICATION OF THE SUBSTANCE & SUPPLIER

**Product Name:** AQUI-S® 20E  
**Recommended use:** Aquatic Anaesthetic  
**Company details:** AQUI-S New Zealand Ltd  
Unit 5, 6 Aglionby Street  
P O Box 44-269  
Lower Hutt, New Zealand  
  
**Phone:** (64) (4) 587 0389  
**Fax:** (64) (4) 587 0388  
**Website:** [www.aqui-s.com](http://www.aqui-s.com)  
**Hours** 8am – 5pm, Mon – Fri  
**Date of Preparation:** November 2010

#### Section 2: HAZARD IDENTIFICATION

**US DOT Hazard Classification:** Not regulated as a hazardous substance

**Hazard classifications:** May be harmful if swallowed  
May cause skin irritation  
May cause eye irritation  
May cause an allergic skin reaction

**Primary identifiers** **Keep out of reach of children.**  
**For animal treatment only.**

#### Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Concentration
Eugenol	97-53-0	~ 10%
Other ingredients determined not to be hazardous	-	~ 90%

#### Section 4: FIRST AID MEASURES

<b>Necessary First Aid Measures:</b>	<b>SKIN CONTACT:</b> If skin contact occurs, remove contaminated clothing and wash the affected area with soap and water. If irritation occurs or persists, seek medical attention.  <b>EYE CONTACT:</b> In case of eye contact, immediately rinse eyes thoroughly with plenty of water. If wearing contact lenses, remove only after initial rinse, and continue rinsing eyes for at least 15 minutes. If irritation occurs or persists, consult a doctor.  <b>INGESTION:</b> Give up to two glasses of water or milk. Seek medical advice immediately.  <b>INHALATION:</b> If inhaled, move the victim to fresh air immediately. If irritation occurs or persists, seek medical attention. For advice contact the National Poisons Centre 0800 POISON (0800 764 766) or a doctor.
<b>Required instructions:</b>	Emergency showers and eyewashes may be warranted depending on quantity and type of use.
<b>Workplace facilities:</b>	Avoid ingestion, inhalation and contact with skin and eyes. Do not eat, drink or smoke while using this product. Wash hands and exposed skin before eating, drinking or smoking and after work. Wash any protective clothing after use.
<b>Hygiene instructions:</b>	Treat symptomatically.
<b>Notes for Medical Personnel:</b>	

#### Section 5: FIRE FIGHTING MEASURES

<b>Flammability:</b>	Do not use close to ignition sources.
<b>Extinguishing media &amp; Methods:</b>	Use Foam, carbon dioxide or dry chemical extinguishers.
<b>Recommended protective clothing:</b>	This product is not very flammable but toxic vapours may be released during fire. Wear full protective clothing and self-contained breathing apparatus (SCBA).
<b>Hazchem code:</b>	None allocated

#### Section 6: ACCIDENTAL RELEASE MEASURES

<b>Emergency procedures:</b>	Personnel involved in clean-up should wear appropriate personal protective equipment to minimise exposure. This may include the use of eye protection, chemically resistant gloves, boot and/or overalls. Evacuate the spill area and deny entry to unnecessary and unprotected personnel.  Prevent further spillage & prevent material from entering surface water drains or waterways. If a significant quantity of material enters drains, advise emergency services.
<b>Spill Procedure:</b>	Small spills can be wiped up with cloth or paper. Standard absorbants (sand, sawdust, vermiculite, etc) can be used to contain large spills. Wash area with water after mop up.  Remove all ignition sources.

#### Section 7: HANDLING & STORAGE

<b>Precautions for Safe Handling:</b>	Avoid contact with skin, & eyes. Keep containers adequately sealed during material transfer, transport, or when not in use.
<b>Regulatory Requirements:</b>	Not applicable.
<b>Handling Practices:</b>	Change work clothes regularly. Avoid ingestion, inhalation and contact with skin and eyes. Do not eat, drink or smoke while using this product.  Wash hands and exposed skin before eating, drinking or smoking and after handling.
<b>Approved Handlers:</b>	Not required.
<b>Conditions for Safe Storage:</b>	Keep out of reach of children.
<b>Storage Site Requirements:</b>	Store in original container & keep tightly sealed when not in use. Store below 30°C (Room Temperature) in a cool dry area, away from direct heat or direct sunlight.
<b>Packaging:</b>	HDPE containers.

#### Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>Workplace Exposure Standards:</b>	No WES have been set for this substance.
<b>Application in the Workplace:</b>	Ensure adequate ventilation. Keep container sealed when not in use.
<b>Exposure Standards Outside the Workplace:</b>	No TEL is set for this substance at this time. EEL – Not applicable.
<b>Engineering Controls:</b>	Engineering controls should be used as the primary means to control exposures. Use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.
<b>Personal Protection:</b>	Wear chemical resistant gloves, overalls, & a face-shield or safety glasses. A respirator may be required if using in confined or poorly ventilated conditions.

#### Section 9: PHYSICAL & CHEMICAL PROPERTIES

<b>Appearance:</b>	Clear viscous yellow liquid
<b>Odour:</b>	Floral carnation, clove
<b>Boiling Point:</b>	Not available
<b>Vapour Pressure:</b>	Not available
<b>Specific Gravity:</b>	1.085
<b>Flash Point:</b>	Not available
<b>Flammability Limits:</b>	Not available, combustible
<b>Solubility:</b>	Dispersible and slightly soluble in water. Soluble in ethanol

#### Section 10: STABILITY & REACTIVITY

**Stability of the Substance:** Stable under normal temperatures and pressures  
**Conditions to Avoid:** Avoid high temperatures  
**Material to Avoid:** Strong oxidisers  
**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide

#### Section 11: TOXICOLOGICAL INFORMATION

**Oral:** Eugenol - LD50 (rats) = 1930 mg/kg;  
Eugenol - LD50 (mice) = 3000 mg/kg;  
Eugenol - LD50 (guinea pigs) = 2130 mg/kg  
**Dermal:** Eugenol - Human, skin: 40 mg/48H mild irritation  
Rabbit, skin: 100 mg/24H severe irritation  
**Other Toxicity Info:** Not Available

#### Section 12: ECOLOGICAL INFORMATION

**Ecotoxicity:**

<i>Tricoplusia ni</i>	Owlit moth caterpillar (24h)	LC <sub>50</sub> (ppm) 63,000
<i>Ochlerotatus caspius</i>	Mosquito larvae (24h)	LC <sub>50</sub> (mg/L) 7.53
* <i>Oncorhynchus mykiss</i>	Rainbow trout (96h)	LC <sub>50</sub> (mg/L) 9.0
* <i>Silurus glanis</i>	European catfish (96h)	LC <sub>50</sub> (mg/L) 18.4
* <i>Penaeus semisulcatus</i>	Tiger Prawn (24h)	LC <sub>50</sub> (mg/L) 30.0
<i>Biomphalaria alexandrina</i>	Aquatic snail (Time not reported)	LC <sub>50</sub> (mg/L) 28.0

\* These studies were carried out with clove oil

#### Section 13: DISPOSAL CONSIDERATIONS

**Disposal:** Incineration or landfill in accordance with local authority & Government regulations.

#### Section 14: TRANSPORT INFORMATION

**Relevant Information:** No special transport requirements necessary.

#### Section 15: REGULATORY INFORMATION

**HSNO Approval No:** HSR003486  
**HSNO Controls:** See <http://www.ermanz.govt.nz/search/registers.html> for controls.  
**ACVM Reg. Number:** Not available  
**ACVM Controls:** Not available

#### Section 16: OTHER INFORMATION

**Additional Information:** AQUI-S® is a registered trademark of AQUI-S New Zealand Ltd. AQUI-S NZ Ltd urges each user or recipient of this MSDS to read the entire data sheet to become aware of the potential hazards associated with this material. This MSDS summarizes, at the date of issue, our best knowledge of the health and safety hazard information. Although reasonable care has been taken in the preparation of this document, AQUI-S NZ Ltd extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequence of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

## APPENDIX F – MSDS for Oxygen

Division of Facilities Services

<<http://www.fs.cornell.edu>>

DOD Hazardous Material Information (ANSI Format)  
For Cornell University Convenience Only

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### OXYGEN

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Physical & Chemical Properties <#Section9>  
Section 2 - Composition/Information on Ingredients <#Section2> Section  
10 - Stability & Reactivity Data <#Section10>  
Section 3 - Hazards Identification Including Emergency Overview  
<#Section3> Section 11 - Toxicological Information <#Section11>  
Section 4 - First Aid Measures <#Section4> Section 12 - Ecological  
Information <#Section12>  
Section 5 - Fire Fighting Measures <#Section5> Section 13 - Disposal  
Considerations <#Section13>  
Section 6 - Accidental Release Measures <#Section6> Section 14 - MSDS  
Transport Information <#Section14>  
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Information <#Section15>  
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The information in this document is compiled from information maintained  
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information is solely responsible for the accuracy and applicability of  
this information to a particular use or situation.  
Cornell University does not in any way warrant or imply the  
applicability, viability or use of this information to any person or for  
use in any situation.

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Section 1 - Product and Company Identification  
OXYGEN

---

Product Identification: OXYGEN  
Date of MSDS: 09/08/1995 Technical Review Date: 08/14/1997  
FSC: 6830 NIIN: LIIN: 00D006825  
Submitter: D DG  
Status Code: C  
MFN: 01  
Article: N  
Kit Part: N

**APPENDIX F (Cont.)**

Manufacturer's Information

Manufacturer's Name: NORLAB DIV OF NORCO, INC  
Manufacturer's Address1: 1121 W. AMITY  
Manufacturer's Address2: BOISE, ID 83705  
Manufacturer's Country: US  
General Information Telephone: 208-336-1643  
Emergency Telephone: 208-336-1643  
Emergency Telephone: 208-336-1643  
MSDS Preparer's Name: UNKNOWN  
Proprietary: N  
Reviewed: Y  
Published: Y  
CAGE: 6E195  
Special Project Code: N

Preparer Information

Preparer's Name: NORLAB DIV OF NORCO, INC  
Preparer's Address1: 1121 W. AMITY  
Preparer's Address2: BOISE, ID 83705  
Preparer's CAGE: 6E195  
Assigned Individual: N

Contractor Information

Contractor's Name: NO VENDOR HAS BEEN NAMED FOR THIS LINE.  
Post Office Box: UNKNOW  
Contractor's Address1: UNKNOWN  
Contractor's Address2: UNKNOWN, NK 00000  
Contractor's Telephone: UNKNOWN  
Contractor's CAGE: NO672

Contractor Information

Contractor's Name: NORLAB DIV OF NORCO, INC  
Contractor's Address1: 1121 W. AMITY  
Contractor's Address2: BOISE, ID 83705  
Contractor's Telephone: 208-336-1643  
Contractor's CAGE: 6E195

-----  
Section 2 - Compositon/Information on Ingredients  
OXYGEN

-----  
Ingredient Name: OXYGEN  
Ingredient CAS Number: 7782-44-7 Ingredient CAS Code: M  
RTECS Number: RS2060000 RTECS Code: M  
=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:

**APPENDIX F (Cont.)**

>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: 100  
% Enviromental Weight:  
Other REC Limits: NONE RECOMMENDED  
OSHA PEL: NOT ESTABLISHED OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: NOT ESTABLISHED ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical: N

-----  
Section 3 - Hazards Identification, Including Emergency Overview  
OXYGEN

-----  
Health Hazards Acute & Chronic: CONCENTRATIONS >75% CAUSES SYMPTOMS OF HYPEROXIA. HYPEROXIA LEADS TO PNEUMONIA. CONCENTRATIONS OF 25-75% PRESENT A RISK OF INFLAMMATION OF ORGANIC MATTER IN THE BODY.

Signs & Symptoms of Overexposure:  
CRAMPS, NAUSEA, DIZZINESS, HYPOTHERMIA, AMBYLOPIA, RESPIRATION DIFFICULTIES, BRADYCARDIA, FAINTING SPELLS, CONVULSIONS CAPEABLE OF LEADING TO DEATH.

Medical Conditions Aggravated by Exposure:  
MFR GAVE NO INFORMATION OF MSDS.

LD50 LC50 Mixture: PRODUCT'S LD50 (ORAL RAT) WAS NOT STATED

Route of Entry Indicators:  
Inhalation: YES  
Skin: YES  
Ingestion: NO

Carcenogenicity Indicators  
NTP: NO  
IARC: NO  
OSHA: NO

Carcinogenicity Explanation: MFR GAVE THE ABOVE LISTINGS ON THE MSDS BUT NO OTHER COMMENTS ABOUT CARCINOGENICITY WERE RECORDED.

-----  
Section 4 - First Aid Measures  
OXYGEN



**APPENDIX F (Cont.)**

First Aid:

SKIN:TREAT FOR FROSTBITE. GET IMMEDIATE MEDICAL ATTENTION. EYES:REMOVE FROM AREA. OPEN LIDS TO ALLOW LIQUID TO EVAPORATE. REFER TO OPHTHALMOLOGIST FOR TREATMENT & FOLLOW-UP. INHALED:REMOVE TO FRESH AIR. GET PROMPT MEDICAL ATTENTION. RESCUEPERSONNEL SHOULD BE EQUIPPED WITH SCBA. GIVE ARTIFICIAL RESPIRATION.

-----  
Section 5 - Fire Fighting Measures  
OXYGEN

-----  
Fire Fighting Procedures:

IF POSSIBLE, STOP THE FLOW OF OXYGEN WHICH IS SUPPORTING THE FIRE.

Unusual Fire or Explosion Hazard:

MFR GAVE NO INFORMATION OF MSDS.

Extinguishing Media:

USE COPIOUS AMOUNTS OF WATER (OR AGENT FOR THE COMBUSTIBLE MATERIAL) FOR FIRES W/OXYGEN AS THE OXIDIZER.

Flash Point: Flash Point Text: N/A.

Autoignition Temperature:

Autoignition Temperature Text: N/K

Lower Limit(s): N/A.

Upper Limit(s): N/A.

-----  
Section 6 - Accidental Release Measures  
OXYGEN

-----  
Spill Release Procedures:

OPERATE STATIONARY CUSTOMER SITE VESSELS I/A/W MANUFACTURER'S & NORCO'S INSTRUCTIONS. DO NOT ATTEMPT TO REPAIR, ADJUST OR MODIFY OPERATION OF THE VESSELS. CONTACT THE CLOSEST NORCO LOCATION IMMEDIATELY IF ANY MALFUNCTION OCCURS.

-----  
Section 7 - Handling and Storage  
OXYGEN

-----  
Handling and Storage Precautions:

Other Precautions:

-----  
Section 8 - Exposure Controls & Personal Protection  
OXYGEN

-----  
Respiratory Protection:

IF ENGINEERING CONTROLS FAIL OR NON-ROUTINE USE OR AN EMERGENCY OCCURS; WEAR AN MSHA/NIOSH APPROVED AN AIR-SUPPLIED RESPIRATOR OR SCBA, AS REQUIRED. USE I/A/W 29CFR1910.134.

Ventilation:

**APPENDIX F (Cont.)**

USE LOCAL EXHAUST TO MAINTAIN EXPOSURE BELOW TLV(S).

Protective Gloves:

PROTECTIVE GLOVES OF ANY MATERIAL.

Eye Protection: SAFETY GLASSES/CHEMICAL SPLASH GOGGLES.

Other Protective Equipment: SAFETY SHOES.

Work Hygienic Practices: WASH HANDS AFTER HANDLING AND BEFORE EATING,  
DRINKING, OR SMOKING. LAUNDRY CONTAMINATED CLOTHES BEFORE REUSE.

Supplemental Health & Safety Information: NONE

-----  
Section 9 - Physical & Chemical Properties

OXYGEN

-----  
HCC: G4

NRC/State License Number: NONE

Net Property Weight for Ammo: NONE

Boiling Point: Boiling Point Text: -297F,-183C

Melting/Freezing Point: Melting/Freezing Text: -361F,-218C

Decomposition Point: Decomposition Text: UNKNOWN

Vapor Pressure: UNKNOWN Vapor Density: 0.97

Percent Volatile Organic Content:

Specific Gravity: UNKNOWN

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: UNKNOWN

Evaporation Weight and Reference: UNKNOWN

Solubility in Water: SLIGHTLY SOLUBLE

Appearance and Odor: COLORLESS, ODORLESS GAS.

Percent Volatiles by Volume: N/K

Corrosion Rate: UNKNOWN

-----  
Section 10 - Stability & Reactivity Data

OXYGEN

-----  
Stability Indicator: YES

Materials to Avoid:

MFR GAVE NO INFORMATION OF MSDS.

Stability Condition to Avoid:

CONTACT W/ALL FLAMMABLE MATERIALS.

Hazardous Decomposition Products:

MFR GAVE NO INFORMATION OF MSDS.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

WILL NOT OCCUR.

-----  
Section 11 - Toxicological Information

OXYGEN

-----  
Toxicological Information:

N/P  
-----

**APPENDIX F (Cont.)**

Section 12 - Ecological Information  
OXYGEN

-----  
Ecological Information:  
N/P

-----  
Section 13 - Disposal Considerations  
OXYGEN

-----  
Waste Disposal Methods:  
DO NOT ATTEMPT TO DISPOSE OF WASTE OR UNUSED QUANTITIES. RETURN IN THE SHIPPING CONTAINER, PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVER PROTECTION CAP IN PLACE. FOR EMERGEN CY DISPOSAL, CALL CLOSEST NORCO DEALER.

-----  
Section 14 - MSDS Transport Information  
OXYGEN

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Transport Information:  
N/P

-----  
Section 15 - Regulatory Information  
OXYGEN

-----  
SARA Title III Information:  
N/P  
Federal Regulatory Information:  
N/P  
State Regulatory Information:  
N/P

-----  
Section 16 - Other Information  
OXYGEN

-----  
Other Information:  
N/P  
HMIS Transportation Information

Product Identification: OXYGEN  
Transporation ID Number: 6588  
Responsible Party CAGE: 6E195  
Date MSDS Prepared: 09/08/1995  
Date MSDS Reviewed: 08/14/1997  
MFN: 08/14/1997  
Submitter: D DG  
Status Code: C

Container Information  
Unit of Issue: NK

**APPENDIX F (Cont.)**

Container Quantity: NK  
Type of Container:  
Net Unit Weight: ADD DATA

Article without MSDS: N  
Technical Entry NOS Shipping Number: NONE  
Radioactivity: N/K  
Form:

Net Explosive Weight: N/K  
Coast Guard Ammunition Code: N/K

Magnetism: N/P  
AF MMAC Code: NK  
DOD Exemption Number: N/K  
Limited Quantity Indicator:

Multiple Kit Number: 0  
Kit Indicator: N

Kit Part Indicator: N  
Review Indicator: Y

Additional Data:  
SUPERVISOR ORDERED NET WEIGHT ON \*ALL\* MSDS'S. THIS COULD NOT BE DONE  
SINCE NO SIZE IS SPECIFIED FOR NON-NSN ITEMS.

Department of Transportation Information

DOT Proper Shipping Name: OXYGEN, COMPRESSED

DOT PSN Code: LEH

Symbols:

DOT PSN Modifier:

Hazard Class: 2.2

UN ID Number: UN1072

DOT Packaging Group:

Label: NONFLAMMABLE GAS, OXIDIZER

Special Provision(s): A52

Packaging Exception: 306

Non Bulk Packaging: 302

Bulk Packaging: 314,315

Maximum Quantity in Passenger Area: 75 KG

Maximum Quantity in Cargo Area: 150 KG

Stow in Vessel Requirements: A

Requirements Water/Sp/Other:

IMO Detail Information

IMO Proper Shipping Name: OXYGEN, COMPRESSED

IMO PSN Code: LBP

IMO PSN Modifier:

IMDG Page Number: 2169

UN Number: 1072

UN Hazard Class: 2(2.2)

IMO Packaging Group: -

Subsidiary Risk Label: OXIDIZING AGENT

EMS Number: 2-04

Medical First Aid Guide Number: NON

IATA Detail Information

**APPENDIX F (Cont.)**

IATA Proper Shipping Name: OXYGEN, COMPRESSED  
IATA PSN Code: SWO  
IATA PSN Modifier:  
IATA UN Id Number: 1072  
IATA UN Class: 2.2  
Subsidiary Risk Class: 5.1  
UN Packaging Group:  
IATA Label: NON-FLAMMABLE GAS & OXIDIZER  
Packaging Note for Passengers: 200  
Maximum Quantity for Passengers: 75KG  
Packaging Note for Cargo: 200  
Maximum Quantity for Cargo: 150KG  
Exceptions:  
AFI Detail Information

AFI Proper Shipping Name: OXYGEN, COMPRESSED  
AFI Symbols:  
AFI PSN Code: SWO  
AFI PSN Modifier:  
AFI UN Id Number: UN1072  
AFI Hazard Class: 2.2  
AFI Packing Group: N/A  
AFI Label: 5.1  
Special Provisions: P5  
Back Pack Reference: A6.3, A6.6  
HAZCOM Label Information

Product Identification: OXYGEN  
CAGE: 6E195  
Assigned Individual: N  
Company Name: NORLAB DIV OF NORCO, INC  
Company PO Box:  
Company Street Address1: 1121 W. AMITY  
Company Street Address2: BOISE, ID 83705 US  
Health Emergency Telephone: 208-336-1643  
Label Required Indicator: Y  
Date Label Reviewed: 08/14/1997  
Status Code: C  
Manufacturer's Label Number: NONE  
Date of Label: 08/14/1997  
Year Procured: 1997  
Organization Code: F  
Chronic Hazard Indicator: N  
Eye Protection Indicator: YES  
Skin Protection Indicator: YES  
Respiratory Protection Indicator: N/P  
Signal Word: CAUTION  
Health Hazard: Slight  
Contact Hazard: Slight  
Fire Hazard: None  
Reactivity Hazard: None

---

8/8/2002 7:37:46 AM

**APPENDIX G – MSDS for Tissue fixative**

Division of Facilities Services

<<http://www.fs.cornell.edu>>

DOD Hazardous Material Information (ANSI Format)  
For Cornell University Convenience Only

-----  
**0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC**  
-----

Section 1 - Product and Company Identification <#Section1> Section 9 -  
Physical & Chemical Properties <#Section9>  
Section 2 - Composition/Information on Ingredients <#Section2> Section  
10 - Stability & Reactivity Data <#Section10>  
Section 3 - Hazards Identification Including Emergency Overview  
<#Section3> Section 11 - Toxicological Information <#Section11>  
Section 4 - First Aid Measures <#Section4> Section 12 - Ecological  
Information <#Section12>  
Section 5 - Fire Fighting Measures <#Section5> Section 13 - Disposal  
Considerations <#Section13>  
Section 6 - Accidental Release Measures <#Section6> Section 14 - MSDS  
Transport Information <#Section14>  
Section 7 - Handling and Storage <#Section7> Section 15 - Regulatory  
Information <#Section15>  
Section 8 - Exposure Controls & Personal Protection <#Section8> Section  
16 - Other Information <#Section16>

-----  
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applicability, viability or use of this information to any person or for  
use in any situation.

-----  
Section 1 - Product and Company Identification  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Product Identification: 0100/3826 TISSUE FIXATIVE & WASH SODIUM  
PHOSPHATE DIBASIC  
Date of MSDS: 12/08/1996 Technical Review Date: 03/13/1998  
FSC: 6550 NIIN: LIIN: 00F055635  
Submitter: F BT  
Status Code: C  
MFN: 02  
Article: N  
Kit Part: Y

## APPENDIX G (Cont.)

### Manufacturer's Information

Manufacturer's Name: ZEUS SCIENTIFIC INC  
Post Office Box: N/K  
Manufacturer's Address1: 200 EVANS WAY  
Manufacturer's Address2: SOMERVILLE, NJ 08876-5000  
Manufacturer's Country: US  
General Information Telephone: 201-526-3744  
Emergency Telephone: 201-526-3744  
Emergency Telephone: 201-526-3744  
MSDS Preparer's Name: MALLINCKRODT BAKER INC  
Proprietary: N  
Reviewed: Y  
Published: Y  
CAGE: 4T047  
Special Project Code: N

### Preparer Information

Preparer's Name: ZEUS SCIENTIFIC INC  
Post Office Box: N/K  
Preparer's Address1: 200 EVANS WAY  
Preparer's Address2: SOMERVILLE, NJ 08876-5000  
Preparer's CAGE: 4T047  
Assigned Individual: N

### Contractor Information

Contractor's Name: MALLINCKRODT BAKER, INC. (FORMERLY J.T. BAKER INC)  
Contractor's Address1: 222 RED SCHOOL LANE  
Contractor's Address2: PHILLIPSBURG, NJ 08865-2219  
Contractor's Telephone: 800-582-2537  
Contractor's CAGE: 70829

### Contractor Information

Contractor's Name: ZEUS SCIENTIFIC INC  
Post Office Box: N/K  
Contractor's Address1: 200 EVANS WAY  
Contractor's Address2: SOMERVILLE, NJ 08876-5000  
Contractor's Telephone: 201-526-3744  
Contractor's CAGE: 4T047

-----  
Section 2 - Composition/Information on Ingredients  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Ingredient Name: SODIUM PHOSPHATE, DIBASIC, ANHYDROUS, DISODIUM PHOSPHATE  
Ingredient CAS Number: 7558-79-4 Ingredient CAS Code: M  
RTECS Number: WC450000 RTECS Code: M

## APPENDIX G (Cont.)

=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: 98-100  
% Environmental Weight:  
Other REC Limits: N/K  
OSHA PEL: N/K OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: N/K ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity: 5000 LBS  
DOT Reporting Quantity: 5000 LBS  
Ozone Depleting Chemical: N

-----  
Section 3 - Hazards Identification, Including Emergency Overview  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Health Hazards Acute & Chronic: INHALATION: HARMFUL, IRRITATION TO THE  
RESPIRATORY TRACT. INGESTION: HARMFUL, CNS EFFETS. PHOSPHATES SLOWLY  
ABSORB & SELDOM RESULT IN SYSTEMIC EFFECTS, BLOOD CHEMISTRY EFFECTS/CNS  
EFFECTS. MAY CAUSE CALCIUM PHOSPHATE DEPOSITS IN THE KIDNEYS & INDUCE  
SYSTEMIC PHOSPHOROUS POISONING. LIVER/KIDNEY DAMAGE. (SEE SUPP)

Signs & Symptoms of Overexposure:  
IRRITATION, COUGHING, SHORTNESS OF BREATH, VOMITING, LETHARGY, DIARRHEA,  
HEART DISTURBANCES, REDNESS, PAIN.

Medical Conditions Aggravated by Exposure:  
PRE-EXISTING SKIN DISORDERS/EYE PROBLEMS, JAW/TOOTH  
ABNORMALITIES/IMPAIRED LIVER, KIDNEY/RESPIRATORY FUNCTION.

LD50 LC50 Mixture: ORAL LD50(RAT): 17 GM/KG

Route of Entry Indicators:  
Inhalation: YES  
Skin: NO  
Ingestion: YES

Carcinogenicity Indicators  
NTP: NO  
IARC: NO  
OSHA: NO

Carcinogenicity Explanation: NONE  
-----



**APPENDIX G (Cont.)**

Section 4 - First Aid Measures

0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
First Aid:

INHALATION: REMOVE TO FRESH AIR. INGESTION: GIVE LARGE AMOUNTS OF WATER TO DRINK. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. SKIN/EYES: FLUSH W/PLENTY OF WATER FOR 15 MINS. OBTAIN MEDICAL ATTENTION IN ALL CASES.

-----  
Section 5 - Fire Fighting Measures

0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Fire Fighting Procedures:

WEAR FULL PROTECTIVE CLOTHING & NIOSH APPROVED SCBA W/FULL FACEPIECE OPERATED IN THE PRESSURE DEMAND/OTHER POSITIVE PRESSURE MODE.

Unusual Fire or Explosion Hazard:

N/K

Extinguishing Media:

USE ANY MEANS SUITABLE FOR EXTINGUISHING SURROUNDING FIRE.

Flash Point: Flash Point Text: N/K

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/K

Upper Limit(s): N/K

-----  
Section 6 - Accidental Release Measures

0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Spill Release Procedures:

VENTILATE AREA OF LEAK. WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT. SWEEP UP & CONTAINERIZE FOR RECLAMATION/DISPOSAL. VACUUMING/WET SWEEPING MAY BE USED TO AVOID DUST DISPERSAL. SMALL AMOUNTS OF RESIDUE MAY BE FLUSHED TO SEWER W/PLENTY OF WATER.

-----  
Section 7 - Handling and Storage

0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Handling and Storage Precautions:

Other Precautions:

-----  
Section 8 - Exposure Controls & Personal Protection

0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Respiratory Protection:

WHERE EXPOSURE IS APPARENT, A HALF-FACE DUST/MIST RESPIRATOR MAY BE

## APPENDIX G (Cont.)

WORN. FOR EMERGENCIES, USE A FULL-FACE POSITIVE-PRESSURE, AIR SUPPLIED RESPIRATOR. WARNING: AIR-PURIFYING RESPIRATORS DON'T PROTECT WORKERS IN OXYGEN-DEFICIENT ATMOSPHERES.

Ventilation:

LOCAL/GENERAL EXHAUST TO KEEP EXPOSURES LOW. LOCAL EXHAUST IS PREFERRED TO CONTROL THE CONTAMINANT AT IT'S SOURCE.

Protective Gloves:

PROTECTIVE

Eye Protection: CHEMICAL SAFETY GOGGLES

Other Protective Equipment: CLEAN BODY COVERING CLOTHING, EYE WASH FOUNTAIN & QUICK DRENCH FACILITIES.

Work Hygenic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING & SHOES BEFORE REUSE.

Supplemental Health & Safety Information: JAW/TOOTH ABNORMALITIES, BLOOD DISORDERS & CARDIOVASCULAR EFFECTS. SODIUM PHOSPHATE DIBASIC & AMMONIUM SULFATE ARE IN THE FIXATIVE.

-----  
Section 9 - Physical & Chemical Properties

0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
HCC:

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: N/R

Melting/Freezing Point: Melting/Freezing Text: 464F

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: N/K Vapor Density: N/K

Percent Volatile Organic Content:

Specific Gravity: 2.07

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/K

Solubility in Water: COMPLETE

Appearance and Odor: WHITE GRANULAR POWDER/HYGROSCOPIC; ODORLESS

Percent Volatiles by Volume: 0

Corrosion Rate: N/K

-----  
Section 10 - Stability & Reactivity Data

0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Stability Indicator: YES

Materials to Avoid:

ACIDS, ALKALOIDS, LEAD ACETATE, ANTIPYRINE, CHLORAL HYDRATE, RESORCINOL & PYROGALLOL.

Stability Condition to Avoid:

INCOMPATIBLES.

Hazardous Decomposition Products:

SODIUM & PHOSPHORUS OXIDES.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

**APPENDIX G (Cont.)**

N/K

-----  
Section 11 - Toxicological Information  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Toxicological Information:  
N/P

-----  
Section 12 - Ecological Information  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Ecological Information:  
N/P

-----  
Section 13 - Disposal Considerations  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Waste Disposal Methods:  
DISPOSE OF CONTAINER & UNUSED CONTENTS IAW/FEDERAL, STATE & LOCAL  
REGULATIONS. WHATEVER CANNOT BE SAVED FOR RECOVERY/RECYCLING SHOULD BE  
MANAGED IN AN APPROPRIATE & APPROVED WASTE DISPOSAL FACILITY.

-----  
Section 14 - MSDS Transport Information  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Transport Information:  
N/P

-----  
Section 15 - Regulatory Information  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
SARA Title III Information:  
N/P  
Federal Regulatory Information:  
N/P  
State Regulatory Information:  
N/P

-----  
Section 16 - Other Information  
0100/3826 TISSUE FIXATIVE & WASH SODIUM PHOSPHATE DIBASIC

-----  
Other Information:  
N/P  
HAZCOM Label Information

Product Identification: 0100/3826 TISSUE FIXATIVE & WASH SODIUM  
PHOSPHATE DIBASIC  
CAGE: 4T047

**APPENDIX G (Cont.)**

Assigned Individual: N  
Company Name: ZEUS SCIENTIFIC INC  
Company PO Box: N/K  
Company Street Address1: 200 EVANS WAY  
Company Street Address2: SOMERVILLE, NJ 08876-5000 US  
Health Emergency Telephone: 201-526-3744  
Label Required Indicator: Y  
Date Label Reviewed: 10/12/1999  
Status Code: A  
Manufacturer's Label Number:  
Date of Label:  
Year Procured: N/K  
Organization Code: G  
Chronic Hazard Indicator: N/P  
Eye Protection Indicator: N/P  
Skin Protection Indicator: N/P  
Respiratory Protection Indicator: N/P  
Signal Word: N/P  
Health Hazard:  
Contact Hazard:  
Fire Hazard:  
Reactivity Hazard:

## APPENDIX H – MSDS for Finquel

Division of Facilities Services

<<http://www.fs.cornell.edu>>

DOD Hazardous Material Information (ANSI Format)  
For Cornell University Convenience Only

-----  
FINQUEL  
-----

Section 1 - Product and Company Identification <#Section1>   Section 9 -  
Physical & Chemical Properties <#Section9>  
Section 2 - Composition/Information on Ingredients <#Section2>       Section  
10 - Stability & Reactivity Data <#Section10>  
Section 3 - Hazards Identification Including Emergency Overview  
<#Section3>       Section 11 - Toxicological Information <#Section11>  
Section 4 - First Aid Measures <#Section4>   Section 12 - Ecological  
Information <#Section12>  
Section 5 - Fire Fighting Measures <#Section5>       Section 13 - Disposal  
Considerations <#Section13>  
Section 6 - Accidental Release Measures <#Section6>       Section 14 - MSDS  
Transport Information <#Section14>  
Section 7 - Handling and Storage <#Section7>       Section 15 - Regulatory  
Information <#Section15>  
Section 8 - Exposure Controls & Personal Protection <#Section8>       Section  
16 - Other Information <#Section16>

-----  
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applicability, viability or use of this information to any person or for  
use in any situation.  
-----

Section 1 - Product and Company Identification  
FINQUEL  
-----

Product Identification: FINQUEL  
Date of MSDS: 08/18/1988 Technical Review Date: 04/12/1995  
FSC: 6810 NIIN: LIIN: 00N058746  
Submitter: N EN  
Status Code: C  
MFN: 01  
Article: N  
Kit Part: N

## APPENDIX H (Cont.)

### Manufacturer's Information

Manufacturer's Name: ARGENT CHEMICAL LABORATORIES INC  
Manufacturer's Address1: 8702 152ND AVE N E  
Manufacturer's Address2: REDMOND, WA 98052  
Manufacturer's Country: US  
General Information Telephone: 206-885-3777  
Emergency Telephone: 206-885-3777  
Emergency Telephone: 206-885-3777  
MSDS Preparer's Name: N/P  
Proprietary: N  
Reviewed: N  
Published: Y  
CAGE: 0LX87  
Special Project Code: N

### Contractor Information

Contractor's Name: ARGENT CHEMICAL LABS  
Contractor's Address1: 8702 152ND AVE N.E.  
Contractor's Address2: REDMOND, WA 98052  
Contractor's Telephone: 206-885-3777  
Contractor's CAGE: 0LX87

-----  
Section 2 - Compositon/Information on Ingredients  
FINQUEL

-----  
Ingredient Name: BENZOIC ACID, 3-AMINO-, ETHYL ESTER, METHANESULFONATE;  
(TRICAIN METHANE SULFONATE)  
Ingredient CAS Number: 886-86-2 Ingredient CAS Code: M  
RTECS Number: DG2455000 RTECS Code: M  
=WT: =WT Code:  
=Volume: =Volume Code:  
>WT: >WT Code:  
>Volume: >Volume Code:  
<WT: <WT Code:  
<Volume: <Volume Code:  
% Low WT: % Low WT Code:  
% High WT: % High WT Code:  
% Low Volume: % Low Volume Code:  
% High Volume: % High Volume Code:  
% Text: N/K  
% Enviromental Weight:  
Other REC Limits: N/K  
OSHA PEL: N/K (FP N) OSHA PEL Code: M  
OSHA STEL: OSHA STEL Code:  
ACGIH TLV: N/K (FP N) ACGIH TLV Code: M  
ACGIH STEL: N/P ACGIH STEL Code:  
EPA Reporting Quantity:  
DOT Reporting Quantity:  
Ozone Depleting Chemical:

## APPENDIX H (Cont.)

---

### Section 3 - Hazards Identification, Including Emergency Overview FINQUEL

---

Health Hazards Acute & Chronic: MAY BE HARMFUL BY INHALATION, INGESTION OR SKIN ABSORPTION. MAY CAUSE IRRITATION. TO THE BEST OF MFR'S KNOWLEDGE, THE CHEMICAL, PHYSICAL & TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

Signs & Symptoms of Overexposure:  
SEE HEALTH HAZARDS.

Medical Conditions Aggravated by Exposure:  
AVOID FINE DUST.

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

#### Route of Entry Indicators:

Inhalation: YES  
Skin: YES  
Ingestion: YES

#### Carcinogenicity Indicators

NTP: NO  
IARC: NO  
OSHA: NO

Carcinogenicity Explanation: NOT RELEVANT

---

### Section 4 - First Aid Measures FINQUEL

---

#### First Aid:

INGEST:CALL MD IMMEDIATELY (FP N). EYES:IMMEDIATELY FLUSH W/COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SKIN:WASH W/SOAP & WATER. INHAL:REMOVE TO FRESH AIR, IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IF DIFFICULT, GIVE OXYGEN. CALL MD.

---

### Section 5 - Fire Fighting Measures FINQUEL

---

#### Fire Fighting Procedures:

USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).

#### Unusual Fire or Explosion Hazard:

EMITS TOXIC FUMES UNDER FIRE CONDITIONS - NITROGEN OXIDES, SULFUR OXIDES, CARBON MONOXIDE, CARBON DIOXIDE.

#### Extinguishing Media:

WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL, ALCOHOL OR POLYMER FOAM.

Flash Point: Flash Point Text: NOT APPLICABLE

**APPENDIX H (Cont.)**

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/A

Upper Limit(s): N/A

-----  
Section 6 - Accidental Release Measures

FINQUEL

-----  
Spill Release Procedures:

WEAR NIOSH/MSHA APPRVD SCBA/RESP, RUBBER BOOTS & CHEM-RESIST GLOVES.

SWEEP UP SPILLED MATL & HOLD FOR WASTE DISP. AVOID RAISING DUST.

VENTILATE SPILL AREA & WASH AFTER PICK-UP IS COMPLETE.

-----  
Section 7 - Handling and Storage

FINQUEL

-----  
Handling and Storage Precautions:

Other Precautions:

-----  
Section 8 - Exposure Controls & Personal Protection

FINQUEL

-----  
Respiratory Protection:

NIOSH/MSHA APPROVED RESPIRATOR.

Ventilation:

MECHANICAL (GENERAL): REQUIRED.

Protective Gloves:

CHEMICAL RESISTANT GLOVES.

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).

Other Protective Equipment: EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET

ANSI DESIGN CRITERIA (FP N). IMPERVIOUS CLTHG TO MIN PRLNG/RPTD CONTACT.

Work Hygenic Practices: WASH CONTAMINATED CLOTHING BEFORE REUSE. WASH

THOROUGHLY AFTER HANDLING.

Supplemental Health & Safety Information: NONE SPECIFIED BY MANUFACTURER.

-----  
Section 9 - Physical & Chemical Properties

FINQUEL

-----  
HCC:

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: N/A

Melting/Freezing Point: Melting/Freezing Text: 298F,148C

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: N/A Vapor Density: N/A

Percent Volatile Organic Content:



**APPENDIX H (Cont.)**

Specific Gravity: N/A  
Volatile Organic Content Pounds per Gallon:  
pH: N/K  
Volatile Organic Content Grams per Liter:  
Viscosity: N/P  
Evaporation Weight and Reference: NOT APPLICABLE  
Solubility in Water: 1 G/0.8 MLS @ 20C.  
Appearance and Odor: WHITE POWDER W/SLIGHT TO NO ODOR.  
Percent Volatiles by Volume: N/K  
Corrosion Rate: N/K

-----  
Section 10 - Stability & Reactivity Data  
FINQUEL

-----  
Stability Indicator: YES  
Materials to Avoid:  
ACIDS, ACID CHLORIDES, ACID ANHYDRIDES, CHLOROFORMATES, STRONG OXIDIZING AGENTS.  
Stability Condition to Avoid:  
NONE SPECIFIED BY MANUFACTURER.  
Hazardous Decomposition Products:  
HAZARDOUS COMBUSTION PRODUCTS - TOXIC FUMES OF: NITROGEN OXIDES, SULFUR OXIDES, CARBON MONOXIDE & CARBON DIOXIDE.  
Hazardous Polymerization Indicator: NO  
Conditions to Avoid Polymerization:  
NOT RELEVANT

-----  
Section 11 - Toxicological Information  
FINQUEL

-----  
Toxicological Information:  
N/P

-----  
Section 12 - Ecological Information  
FINQUEL

-----  
Ecological Information:  
N/P

-----  
Section 13 - Disposal Considerations  
FINQUEL

-----  
Waste Disposal Methods:  
DISSOLVE OR MIX MATL W/COMBUSTIBLE SOLVENT & BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AFTER-BURNER & SCRUBBER. OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

-----  
Section 14 - MSDS Transport Information  
FINQUEL

**APPENDIX H (Cont.)**

-----  
Transport Information:

N/P  
-----

Section 15 - Regulatory Information

FINQUEL  
-----

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P  
-----

Section 16 - Other Information

FINQUEL  
-----

Other Information:

N/P

HAZCOM Label Information

Product Identification: FINQUEL

CAGE: 0LX87

Assigned Individual: N

Company Name: ARGENT CHEMICAL LABS

Company PO Box:

Company Street Address1: 8702 152ND AVE N.E.

Company Street Address2: REDMOND, WA 98052 US

Health Emergency Telephone: 206-885-3777

Label Required Indicator: Y

Date Label Reviewed: 04/12/1995

Status Code: C

Manufacturer's Label Number:

Date of Label: 04/12/1995

Year Procured: N/K

Organization Code: G

Chronic Hazard Indicator: N

Eye Protection Indicator: YES

Skin Protection Indicator: YES

Respiratory Protection Indicator: YES

Signal Word: WARNING

Health Hazard: Slight

Contact Hazard: Moderate

Fire Hazard: None

Reactivity Hazard: None

Appendix I. – Ethanol (tissue fixative)

# Material Safety Data Sheet

## Ethyl Alcohol, Denatured (A407)

ACC# 08701

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Ethyl Alcohol, Denatured (A407)

**Catalog Numbers:** S73979, S73979-1, S73979-2, S73985, A407 20 001, A407 20 002, A407 20 003, A407 20 004, A407 20 005, A407 20 006, A407 20 007, A407 20 008, A407 20 009, A407 20 010, A407 500 001, A407-1, A407-20, A407-200, A407-4, A407-500, A40720 001, A40720 002, A40720 003, A40720 004, A40720 005, A40720 006, A40720 007, A40720 008, A40720 009, A40720 010, A40720001, A40720002, A40720003, A40720004, A40720005, A40720006, A40720007, A40720008, A40720009, A40720010, A407500 001, A407500001, A407J500, A407OLC, A407P 1GAL, A407P-1GAL, A407P-4, A407P1GAL, A407P4, A407RB115, A407S-4, A407SK-4, BW6100200, NC9754311, S739791, S739792

**Synonyms:** Ethanol denatured, grain alcohol denatured, ethyl hydroxide denatured, ethyl hydrate denatured, algarin denatured

**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
64-17-5	Ethyl Alcohol	85.4-92.	200-578-6
67-56-1	Methyl alcohol	3.6	200-659-6
67-63-0	Isopropyl alcohol	25 ppm	200-661-7
67-64-1	Acetone	2 ppm	200-662-2
71-43-2	Benzene	trace	200-753-7
75-07-0	Acetaldehyde	10 ppm	200-836-8
108-10-1	Methyl isobutyl ketone	1.9	203-550-1
108-88-3	Toluene	0.80%	203-625-9
141-78-6	Ethyl acetate	1.3	205-500-4
7732-18-5	Water	5.0%	231-791-2
64742-89-8	Solvent naphtha (petroleum), light aliphatic	0.72-0.7	265-192-2
308082-09-9	Gasoline, aviation	1	unlisted

**Hazard Symbols:** F

**Risk Phrases:** 11

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Appearance: clear, colorless. Flash Point: 13 deg C. **Danger!** Flammable liquid. Causes severe eye irritation. May cause blindness if swallowed. May be fatal if swallowed. May cause skin irritation. May cause central nervous system depression. May cause liver and kidney damage. May cause reproductive and fetal effects. May be absorbed through intact skin. May form explosive peroxides.

**Target Organs:** Kidneys, central nervous system, liver.

#### Potential Health Effects

**Eye:** Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause painful sensitization to light. Vapors may cause eye irritation.

**Skin:** May cause skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May be absorbed through the skin.

**Ingestion:** May be fatal or cause blindness if swallowed. May cause systemic toxicity with acidosis. May cause liver and kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause respiratory tract irritation. May cause effects similar to those described for ingestion. May cause drowsiness, unconsciousness, and central nervous system depression.

**Chronic:** Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion. Prolonged or repeated skin contact may cause defatting and dermatitis. Prolonged or repeated exposure may cause adverse reproductive effects. May cause fetal effects.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid. Induce vomiting by giving one teaspoon of Syrup of Ipecac.

**Inhalation:** Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor. May form explosive peroxides. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.