1. PRODUCT & COMPANY IDENTIFICATION

1.1	Product Name:	**MICROLOK® AO**
1.2	Chemical Name:	Oxalic Acid Solution
1.3	Synonyms:	590051, 590058 590050
1.4	Trade Names:	MicroLok® AO
1.5	Product Use:	Aluminum Oxide Solution for Iron & Steel
1.6	Distributor's Name:	Birchwood Laboratories LLC
1.7	Distributor's Address:	7900 Fuller Road, Eden Prairie, MN 55344 USA
1.8	Emergency Phone:	**ChemTrec +1 (800) 424-9300 / +1 (703) 527-3887** or **Poison Control Center +1 (855) 281-1742**
1.9	Business Phone / Fax:	+1 (952) 937-7900 / +1 (952) 937-7979

2. HAZARDS IDENTIFICATION

2.1	Hazard Identification:	Prepared in accordance with UN Globally Harmonized standards. Intended to comply with OSHA 29 CFR 1910.1200. Canadian WHMIS and Australian Work Health and Safety. **WARNING! HARMFUL IF SWALLOWED OR IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION.** Classification: Acute Tox. (oral) 4, Acute Tox. (dermal) 4, Eye Irrit. 2A
2.2	Label Elements:	Hazard Statements (H): H302+H312 – Harmful if swallowed or in contact with skin. H319 – Causes serious eye irritation. Precautionary Statements (P): P264 – . P501 - Dispose of contents/container to licenses treatment, storage and disposal facility (TSDF). 
2.3	Other Warnings:	In the event of an exposure or medical inquiry involving this product, please contact a physician or local poison control center, who may seek advice from the U.S. manufacturer, and show them this SDS. **KEEP OUT OF REACH OF CHILDREN**.

3. COMPOSITION & INGREDIENT INFORMATION

					EXPOSURE LIMITS IN AIR (mg/m³)								
					ACGIH		NOHSC			OSHA			
					ppm		ppm			ppm			
CHEMICAL NAME(S)	CAS No.	RTECS No.	EINECS No.	%	TLV	STEL	ES-TWA	ES-STEL	ES-PEAK	PEL	STEL	IDLH	OTHER
WATER	7332-18-5	ZC0110000	231-791-2	60-100	NE	NE	NF	NF	NF	NE	NE	NE	
OXALIC ACID	144-62-7	RO2450000	205-634-3	7-13	(1)	(2)	(1)	(2)	NF	(1)	NA	(500)	
	Acute Tox. (oral) 4; Acute Tox. (dermal) 4; H302, H312												
ALUMINUM SULFATE	10043-01-3	BD1700000	233-135-0	1-5	(2)	NA	NF	NF	NF	(2)	NA	NA	
	Metal Corr. 1; Eye Dam. 1; H290, H318												

4. FIRST AID MEASURES

4.1	First Aid:	Ingestion:	DO NOT INDUCE VOMITING. Contact SafetyCall +1 (855) 281-1742 or the nearest Poison Control Center or local emergency telephone number for assistance and instructions. Seek immediate medical attention. If vomiting occurs spontaneously, keep victim's head lowered (forward) to reduce the risk of aspiration.
		Eyes:	If product gets in the eyes, flush eyes thoroughly with copious amounts of water for at least 15 minutes, holding eyelid(s) open to ensure complete flushing. If the eyes or face become swollen during or following use, consult a physician or emergency room immediately.
		Skin:	Remove contaminated clothing and wash affected areas with soap and water. If discomfort persists and/or the skin reaction worsens, contact a physician immediately. Do not wear contaminated clothing until after it has been properly cleaned.
		Inhalation:	Remove victim to fresh air at once. Under extreme conditions, if breathing stops, perform artificial respiration. Seek immediate medical attention.
4.2	Effects of Exposure:	Ingestion:	Severe burns of mouth, throat and stomach. Possible symptoms include nausea, vomiting, abdominal pain. May cause damage to kidneys, resulting in blood in urine.
		Eyes:	Severe or permanent eye damage.
		Skin:	Severe irritation and possible burns.
		Inhalation:	If sprayed, severe irritation of respiratory tract and mucous membranes; coughing, difficulty breathing.

4. FIRST AID MEASURES – cont'd

4.3	Symptoms of Overexposure:	Eyes: Redness, burning, irritation, and swelling around eyes Skin: Redness, burning, itching, rash, blistering of skin. Ingestion: Nausea, vomiting, severe abdominal pain. Inhalation: Coughing, wheezing, swelling of throat, irritation in mucous membranes, difficulty breathing.
4.4	Acute Health Effects:	May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if swallowed. Causes burns. May be harmful if absorbed through skin.
4.5	Chronic Health Effects:	May damage the nervous system, kidney and/or liver.
4.6	Target Organs:	Eyes, Skin, Lungs (Corrosive), Kidneys.
4.7	Medical Conditions Aggravated by Exposure:	Pre-existing dermatitis, other skin conditions, and disorders of the target organs (eyes, skin, and respiratory system) or impaired kidney function may be more susceptible to the effects of this substance.

HEALTH	2
FLAMMABILITY	0
PHYSICAL HAZARDS	0
PROTECTIVE EQUIPMENT	B

EYES | SKIN

5. FIREFIGHTING MEASURES

5.1	Fire & Explosion Hazards:	Non-flammable. May react with metals to release hydrogen gas, which can form explosive mixtures with air.
5.2	Extinguishing Methods:	Use fire-extinguishing media appropriate for surrounding materials.
5.3	Firefighting Procedures:	As with any fire, firefighters should wear appropriate protective equipment including a MSHA/NIOSH approved or equivalent self-contained breathing apparatus (SCBA) and protective clothing. Fight fires as for surrounding materials. Hazardous decomposition products may be released. Thermal degradation may produce oxides of carbon, and/or nitrogen, hydrocarbons and/or derivatives. Fire should be fought from a safe distance. Keep containers cool until well after the fire is out. Use water spray to cool fire-exposed surfaces and to protect personal. Fight fire upwind. Prevent runoff from fire control or dilution from entering sewers, drains, drinking water supply, or any natural waterway.

6. ACCIDENTAL RELEASE MEASURES

6.1	Spills:	Before cleaning any spill or leak, individuals involved in spill cleanup must wear appropriate Personal Protective Equipment (PPE). Use safety glasses or safety goggles and face shield; use gloves and other protective clothing (e.g., apron, boots, etc.) to prevent skin contact. Small Spills: Wear appropriate protective equipment including gloves and protective eyewear. Use a non-combustible, inert material such as vermiculite or sand to soak up the product and place into a container for later disposal. Large Spills: Keep incompatible materials (e.g., organics such as oil) away from spill. Stay upwind and away from spill or release. Isolate immediate hazard area and keep unauthorized personnel out of area. Stop spill or release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant. Recover as much free liquid as possible and collect in acid-resistant container. Use absorbent to pick up residue. Avoid discharging liquid directly into a sewer or surface waters.

7. HANDLING & STORAGE INFORMATION

7.1	Work & Hygiene Practices:	Avoid breathing mists or spray. Avoid eye and skin contact. Wear protective equipment when handling product. Keep out of the reach of children. Do not eat, drink or smoke when handling this product. Wash thoroughly after handling. Do not expose to heat and flame. Use only in ventilated areas. Keep out of the reach of children. Immediately clean-up and decontaminate any spills or residues.
7.2	Storage & Handling:	Use and store in a cool, dry, well-ventilated location (e.g., local exhaust ventilation, fans) away from heat and direct sunlight. Store in acid-resistant containers. Keep containers covered when not in use. Avoid temperatures above 40 °C (120 °F). Keep away from incompatible substances (See Section 10). Protect containers from physical damage.
7.3	Special Precautions:	Empty containers may retain hazardous product residues.

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

8.1 Exposure Limits: ppm (mg/m^3)

	ACGIH		NOHSC			OSHA			OTHER
CHEMICAL NAME(S)	TLV	STEL	ES-TWA	ES-STEL	ES-PEAK	PEL	STEL	IDLH	
OXALIC ACID	(1)	(2)	(1)	(2)	NF	(1)	NA	(500)	

8.2	Ventilation & Engineering Controls:	Use local or general exhaust ventilation to effectively remove and prevent buildup of vapors or mist generated from the handling of this product. Ensure appropriate decontamination equipment is available (e.g., sink, safety shower, eye-wash station).
8.3	Respiratory Protection:	In instances where vapors or sprays of this product are generated, and respiratory protection is needed, use only protection authorized by 29 CFR §1910.134, applicable U.S. State regulations, or the Canadian CAS Standard Z94.4-93 and applicable standards of Canadian Provinces, EC member States, or Australia.
8.4	Eye Protection:	Safety glasses with side shields must be used when handling or using this product. A protective face shield is also recommended.

8. EXPOSURE CONTROLS & PERSONAL PROTECTION – cont'd

8.5	Hand Protection:	Wear protective, chemical-resistant gloves (e.g., neoprene) when using or handling this product.	
8.6	Body Protection:	A chemical resistant apron and/or protective clothing are recommended when handling or using this product.	

9. PHYSICAL & CHEMICAL PROPERTIES

9.1	Appearance:	Clear, light yellow to green liquid
9.2	Odor:	Odorless
9.3	Odor Threshold:	NA
9.4	pH:	~ 2.0
9.5	Melting Point/Freezing Point:	NA
9.6	Initial Boiling Point/Boiling Range:	> 100 °C (> 212 °F)
9.7	Flashpoint:	NA
9.8	Upper/Lower Flammability Limits:	NA
9.9	Vapor Pressure:	NA
9.10	Vapor Density:	NA
9.11	Relative Density:	1.109
9.12	Solubility:	Complete (water)
9.13	Partition Coefficient (log P_{ow}):	NA
9.14	Autoignition Temperature:	NA
9.15	Decomposition Temperature:	NA
9.16	Viscosity:	NA
9.17	Other Information:	Evaporation Rate: > 1.0 (ethyl ether = 1.0)

10. STABILITY & REACTIVITY

10.1	Stability:	Stable.
10.2	Hazardous Decomposition Products:	Contact with metals such as aluminum and zinc may produce hydrogen gas.
10.3	Hazardous Polymerization:	Will not occur.
10.4	Conditions to Avoid:	Incompatible substances.
10.5	Incompatible Substances:	Water-reactive substances, metals (e.g. aluminum, zinc) strong acids, oxidizers.

11. TOXICOLOGICAL INFORMATION

11.1	Routes of Entry:	Inhalation:	YES	Absorption:	YES	Ingestion:	NO
11.2	Toxicity Data:	Oxalic Acid: LD_{50} (oral, rat) = 375 mg/kg; Oxalic Acid: LD_{50} (dermal, rabbit) = 20,000 mg/kg					
11.3	Acute Toxicity:	See Section 4.4					
11.4	Chronic Toxicity:	See Section 4.5					
11.5	Suspected Carcinogen:	NA					
11.6	Reproductive Toxicity:	This product is not reported to cause reproductive toxicity in humans.					
	Mutagenicity:	This product is not reported to produce mutagenic effects in humans.					
	Embryotoxicity:	This product is not reported to produce embryotoxic effects in humans.					
	Teratogenicity:	This product is not reported to cause teratogenic effects in humans.					
	Reproductive Toxicity:	This product is not reported to cause reproductive effects in humans.					
11.7	Irritancy of Product:	See Section 4.2					
11.8	Biological Exposure Indices:	NE					
11.9	Physician Recommendations:	Treat symptomatically.					

12. ECOLOGICAL INFORMATION

12.1	Environmental Stability:	Oxalic Acid: 89% - readily biodegradable
12.2	Effects on Plants & Animals:	No data available
12.3	Effects on Aquatic Life:	Mixture may be toxic to aquatic life with long lasting effects. Oxalic Acid: LC_{50} (Leuciscuc idus melanotus, 48h) – 160 mg/L; Oxalic Acid: EC50 (Daphnia magna, 48h) – 162.2 mg/L; Aluminum Sulfate: LC_{50} (fathead minnow, 96h) – 33.9 mg/L; Aluminum Sulfate: LC_{50} (Daphnia magna, 48h) – 38.2 mg/L.

13. DISPOSAL CONSIDERATIONS

13.1	Waste Disposal:	Review current local, state and federal laws, codes, statutes and regulations to determine current status and appropriate disposal method for the ingredients listed in Section 2. Any disposal practice must be in compliance with local, state, and federal laws and regulations. Contact the appropriate agency for specific information. Treatment, transport, storage and disposal of hazardous waste must be provided by a licensed facility or waste hauler.
13.2	Special Considerations:	U.S. EPA Hazardous Waste – Characteristic - Corrosive (D002)

14. TRANSPORTATION INFORMATION

The basic description (ID Number, proper shipping name, hazard class & division, packing group) is shown for each mode of transportation. Additional descriptive information may be required by 49 CFR, IATA/ICAO, IMDG and the CTDGR.

14.1	49 CFR (GND):	UN3265, CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (OXALIC ACID), 8, III LTD QTY (IP VOL ≤ 5.0 L)
14.2	IATA (AIR):	UN3265, CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (OXALIC ACID), 8, III, LTD QTY (IP VOL ≤ 0.5 L), PI Y841
14.3	IMDG (OCN):	UN3265, CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (OXALIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L)
14.4	TDGR (Canadian GND):	UN3265, CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (OXALIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L)
14.5	ADR/RID (EU):	UN3265, CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (OXALIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L)
14.6	SCT (MEXICO):	UN3265, LIQUIDOS CORROSIVOS, ACIDO, ORGANICO, N.E.P. (ACIDO OXALICO), 8, III, CANTIDAD LIMITADA (IP VOL ≤ 5.0 L)
14.7	ADGR (AUS):	UN3265, CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (OXALIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L)

15. REGULATORY INFORMATION

15.1	SARA Reporting Requirements:	This product does not contain any substances subject to SARA Title III, Sections 302 or 313 reporting requirements.
15.2	SARA TPQ:	There are no specific Threshold Planning Quantities for the components of this product.
15.3	TSCA Inventory Status:	The components of this product are listed on the TSCA Inventory.
15.4	CERCLA Reportable Quantity:	Aluminum Sulfate: 5,000 lbs (2,270 kg)
15.5	Other Federal Requirements:	NA
15.6	Other Canadian Regulations:	This product has been classified according to the hazard criteria of the HPR and the SDS contains all of the information required by the HPR. The components of this product are listed on the DSL/NDSL. None of the components of this product are listed on the Priorities Substances List. WHMIS Class E (corrosive material). WHMIS Class D2B (materials causing other toxic effects).
15.7	State Regulatory Information:	Oxalic Acid is found on the following state criteria lists: Florida Toxic Substances List (FL), Massachusetts Hazardous Substances List (MA), Minnesota Hazardous Substances List (MN), New Jersey Right-to-Know List (NJ), Pennsylvania Right-to-Know List (PA), and Washington Permissible Exposures List (WA). Aluminum Sulfate is found on the following state criteria lists: MA, NJ, PA. No other ingredients in this product, present in a concentration of 1.0% or greater, are listed on any of the following state criteria lists: California Proposition 65 (CA65), Delaware Air Quality Management List (DE), Florida Toxic Substances List (FL), Massachusetts Hazardous Substances List (MA), Michigan Critical Substances List (MI), Minnesota Hazardous Substances List (MN), New Jersey Right-to-Know List (NJ), New York Hazardous Substances List (NY), Pennsylvania Right-to-Know List (PA), Washington Permissible Exposures List (WA), Wisconsin Hazardous Substances List (WI). This product does not contain any chemicals known to the State of California to cause cancer or other reproductive harm. For more information go to www.P65Warnings.ca.gov.
15.8	Other Requirements:	This product is found on the following inventory lists: Australia - AICS, China – IECSC, Europe – ELINCS/EINEC, Japan – ENCS; Korea – KECI; New Zealand – NZIoC; {Philippines – PICCS; USA – TSCA.

16. OTHER INFORMATION

16.1	Other Information:	**WARNING! HARMFUL IF SWALLOWED OR IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION.** Wash with soap and water thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear protective gloves/ protective clothing/eye protection/face protection. IF SWALLOWED: Get medical help. Rinse mouth. IF ON SKIN: Wash with plenty of soap and water. Get medical help. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persist: Get medical help. Specific treatment see section 4 (first aid) of this SDS or container label. Take off contaminated clothing and wash it before reuse. **KEEP OUT OF REACH OF CHILDREN.**
16.2	Terms & Definitions:	See last page of this Safety Data Sheet.
16.3	Disclaimer:	This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR §1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of ShipMate's & Birchwood Technologies' knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type, either expressed or implied, are provided. The information contained herein relates only to the specific product(s). If this product(s) is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.
16.4	Prepared for:	**Birchwood Technologies** 7900 Fuller Road Eden Prairie, MN 55344 USA Tel: +1 (952) 937-7900 Fax: +1 (952) 937-7979 http://www.birchwoodtechnologies.com
16.5	Prepared by:	**ShipMate, Inc.** P.O. Box 787 Sisters, Oregon 97759-0787 USA Tel: +1 (310) 370-3600 Fax: +1 (310) 370-5700 http://www.shipmate.com

DEFINITION OF TERMS

A large number of abbreviations and acronyms appear on a SDS. Some of these that are commonly used include the following:

GENERAL INFORMATION:

CAS No.	Chemical Abstract Service Number
RTECS No.	Registry of Toxic Effects of Chemical Substances Number
EINECS No.	European Inventory of Existing Commercial Chemical Substances Number

EXPOSURE LIMITS IN AIR:

ACGIH	American Conference on Governmental Industrial Hygienists
IDLH	Immediately Dangerous to Life and Health
NOHSC	National Occupational Health and Safety Commission (Australia)
OSHA	U.S. Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average

FIRST AID MEASURES:

CPR	Cardiopulmonary resuscitation - method in which a person whose heart has stopped receives manual chest compressions and breathing to circulate blood and provide oxygen to the body.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: HMIS

HEALTH, FLAMMABILITY & REACTIVITY RATINGS:

0	Minimal Hazard
1	Slight Hazard
2	Moderate Hazard
3	Severe Hazard
4	Extreme Hazard

HEALTH
FLAMMABILITY
PHYSICAL HAZARDS
PERSONAL PROTECTION

PERSONAL PROTECTION RATINGS:

A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
X	**Consult your supervisor or SOPs for special handling directions.**

Safety Glasses	**Splash Goggles**	**Face Shield & Protective Eyewear**	**Gloves**
Boots	**Protective Apron**	**Protective Clothing & Full Suit**	**Dust Respirator**
Full Face Respirator	**Dust & Vapor Half-Mask Respirator**	**Full Face Respirator**	**Airline Hood/Mask or SCBA**

OTHER STANDARD ABBREVIATIONS:

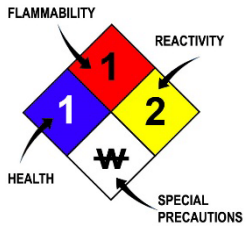
Carc	Carcinogenic
Irrit	Irritant
NA	Not Available
NR	No Results
ND	Not Determined
NE	Not Established
NF	Not Found
SCBA	Self-Contained Breathing Apparatus
Sens	Sensitization
STOT RE	Specific Target Organ Toxicity – Repeat Exposure
STOT SE	Specific Target Organ Toxicity – Single Exposure

NATIONAL FIRE PROTECTION ASSOCIATION: NFPA

FLAMMABILITY LIMITS IN AIR:	
Autoignition Temperature	Minimum temperature required to initiate combustion in air with no other source of ignition
LEL	Lower Explosive Limit - lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source
UEL	Upper Explosive Limit - highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source

HAZARD RATINGS:

0	Minimal Hazard
1	Slight Hazard
2	Moderate Hazard
3	Severe Hazard
4	Extreme Hazard
ACD	Acidic
ALK	Alkaline
COR	Corrosive
~~W~~	Use No Water
OX	Oxidizer
TREFOIL	Radioactive



TOXICOLOGICAL INFORMATION:

LD_{50}	Lethal Dose (solids & liquids) which kills 50% of the exposed animals
LC_{50}	Lethal concentration (gases) which kills 50% of the exposed animal
ppm	Concentration expressed in parts of material per million parts
TD_{lo}	Lowest dose to cause a symptom
TCLo	Lowest concentration to cause a symptom
TD_{lo}, LD_{lo}, & LD_o or TC, TC_o, LC_{lo}, & LC_o	Lowest dose (or concentration) to cause lethal or toxic effects
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
RTECS	Registry of Toxic Effects of Chemical Substances
BCF	Bioconcentration Factor
TL_m	Median threshold limit
log K_{OW} or log K_{OC}	Coefficient of Oil/Water Distribution

REGULATORY INFORMATION:

WHMIS	Canadian Workplace Hazardous Material Information System
DOT	U.S. Department of Transportation
TC	Transport Canada
EPA	U.S. Environmental Protection Agency
DSL	Canadian Domestic Substance List
NDSL	Canadian Non-Domestic Substance List
PSL	Canadian Priority Substances List
TSCA	U.S. Toxic Substance Control Act
EU	European Union (European Union Directive 67/548/EEC)
WGK	Wassergefährdungsklassen (German Water Hazard Class)

WORKPLACE HAZARDOUS MATERIALS IDENTIFICATION (WHMIS) SYSTEM:

Class A	**Class B**	**Class C**	**Class D1**	**Class D2**	**Class D3**	**Class E**	**Class F**
Compressed	Flammable	Oxidizing	Toxic	Irritation	Infectious	Corrosive	Reactive

CLP/GHS (1272/2008/EC) PICTOGRAMS:

GHS01	**GHS02**	**GHS03**	**GHS04**	**GHS05**	**GHS06**	**GHS07**	**GHS08**	**GHS09**
Explosive	Flammable	Oxidizer	Pressurized	Corrosive	Toxic	Harmful Irritating	Health Hazard	Environment