

ElectraCOOL L-A 400

User's Manual



400 Watt Liquid-to-Air
Thermoelectric Chillers

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Toll Free Technical Assistance 1 (866) 665-5434

1. INTRODUCTION:

ElectraCOOL™ brand recirculating liquid chillers, are designed to provide liquid cooling, heating or temperature stabilization for a wide range of applications such as Medical Equipment, Laser/ Electro-Optics, Semiconductor, Laboratory, Aquariums and any other use that requires the efficient movement of heat to or from something greater than forced convection or other methods can provide.

The cooling capacity of our line of chillers ranges from 150 to 800 watts, sufficient to meet a variety of cooling requirements. Each is designed to work in “close loop” systems, which separate the coolant within the “loop” from ambient influences so that the object or item/s that are cooled, heated or stabilized quite precisely, are done so by a clean pure liquid coolant. All **ElectraCOOL™** brand chillers are compact and quiet.

This Operations and Maintenance Manual (OMM) provides the necessary information for the proper installation, operation and maintenance of your new ElectraCOOL™ LA400 chiller. We also make recommendations on how to operate your chiller most efficiently. Failure to comply with any part of this Manual could result in voiding the warranty (see section 9)

Symbols Used on the **ElectraCOOL L-A 400**



Attention: See accompanying Documents:



WARNING: Electrical Shock Hazard



Type B Applied Part



Protection by Ground

2. INCOMING INSPECTION:

Our chillers are designed, built and packaged to withstand the shock and vibration normally associated with shipment by common carrier. Occasionally improper handling during shipment causes damage to the contents. This can include anything from excessive vibration, crushing, puncturing the box, etc. so a thorough inspection should be conducted upon receipt of every shipment. Any packaging tears, dents, scratches and loose articles are signs of damage and should be noted on carrier's shipping documents accompanying the shipment. Packages should be opened promptly and units inspected for concealed damage. **An immediate claim must be filed with the freight carrier and an inspection requested.** Retain all packing materials. Advanced Thermoelectric cannot be responsible for Consignee's failure to file a timely freight claim. If possible save the box and shipping materials your chiller arrives in should service be required in the future.

3. PRODUCT HANDLING:**DO NOT OPERATE YOUR CHILLER BEFORE READING THIS MANUAL**

Read MSDS for the coolant used in your system and follow all safety precautions listed in the MSDS prior to connecting the LA400 with coolant tubing or opening the fill cap as this could result in contact with the coolant inside.

Before operating your new Chiller be certain that:

1. Unit is placed in the proper upright (vertical) position.
2. Liquid reservoir (and line to object cooled) is/are filled with coolant.
3. The chiller should have at least 12" free air space for air intake and exhaust.
4. Make sure that proper input voltage is supplied to the unit. In general US line voltage is 115 VAC and Europe is 230 VAC but check with your facilities manger.

WARNING Electrical Shock Hazard

1. **PLUG UNIT INTO GROUNDED ELECTRICAL OUTLET ONLY**
2. **DO NOT OPERATE UNIT WITHOUT COOLANT IN THE SYSTEM**
3. **MAKE SURE THAT LINE CIRCUIT BREAKER COINCIDES WITH NAMEPLATE MAXIMUM FUSE RATING**

Failure to follow the above precautions could result in electrical shock, fire, personal injury or damage to the unit, and will void warranty.

4. TECHNICAL DATA: 115V & 230V Input Versions

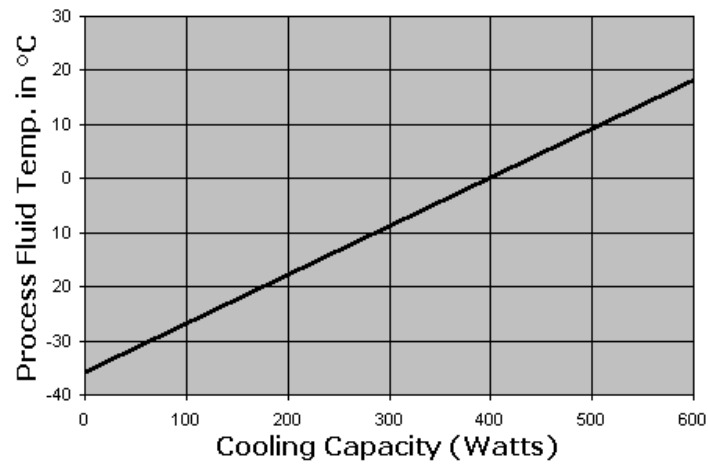
Model	LA400-115	LA400-230
Input Voltage, VAC	115	230
Running Current, Amps	7.0	3.5
Frequency, Hz	50/60	50/60
Min. Ambient, °F/°C*	14 / -10	14 / -10
Max. Ambient, °F/°C*	122/50	122/50
Cooling Capacity, BTUH/Watt**	1023/300	1354/400
Max. flow rate, GPM/LPM***	1.6/6.0	1.6/6.0
Max. pressure, PSI	14.7	14.7
Chiller fluid capacity, Gallons/ml	0.197/750	0.197/750
Control Temperature Range, *	+14 to 113 °F (-10 to +45°C)	+14 to 113 °F (-10 to +45°C)
Control Accuracy, °F or °C	+/-0.1	+/-0.1
Reservoir Capacity, Gallons/ml	0.132/500	0.132/500
Heating Capacity, Max. Watts/Btuh	500 / 1705	500 / 1705

* For Higher or Lower Ambient or Control Temperatures consult Advanced Thermoelectric.

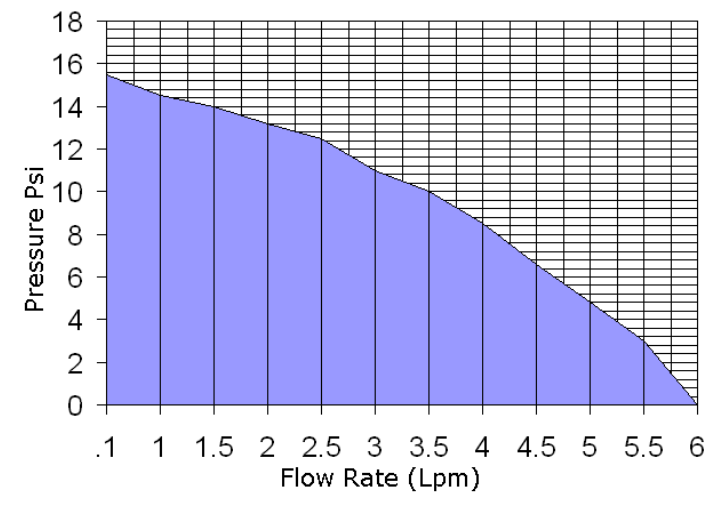
** Capacity rating at 77°F/25°C for both ambient and outlet fluid temperature.

*** For more information see Pumping Capacity chart on the respective chiller Technical Data Sheet.

ElectraCOOL L-A 400 Cooling Capacity Curve (Figure 1)



ElectraCOOL L-A 400 Flow Rate vs. Pressure Drop Curve (Figure 2)



Overall Dimensions :

Height, inches / mm 13.5 / 330
 Width, inches / mm 7.75 / 196.8
 Depth, inches / mm 11.0 / 279

Weight :

26 Lbs./ 11.7Kg

Standard Features:

- Programmable digital PID system controller
- Temperature control accuracy $\pm 0.10^{\circ}\text{C} / \pm 0.18^{\circ}\text{F}$
- Leak-proof fluid inlet and outlet with quick disconnect valves
- Highly reliable, environmentally safe thermoelectric cooling elements
- Efficient seal-less centrifugal magnetic drive pump (45,000 hours MTBF) with brushless DC motor

Quiet high performance fans 50 dBA
CustomChill300: Approved for medical use: UL 2601-1 and Canadian:
CSA C22.2 No 601.1

Optional features include:

PID with RS232/RS485 communications port
Heating option to 500 or 600 Watts
Low fluid level indicator or dry contact closure
Low Flow Alarm (light or sound) or Low Flow Alarm with specific set-point
Temperature alarm (light or sound)
Super Quiet Fan <45 dBA

Class I, Type B equipment

5. INSTALLATION AND OPERATION INSTRUCTION

1. Install **ElectraCOOL™ LA400** Chiller on a relatively leveled surface, capable of supporting the 26 Lbs. (11.7Kg) weight of the Unit. Allow for 12" clearance around the air inlet and outlet areas to insure proper air circulation and ventilation.

If obstacles are blocking airflow, the Unit may overheat. This reduces performance, and may lead to early module failure.

2. Fill Reservoir 2/3 full with fluid.
3. Plug the chiller into a grounded electrical outlet.
4. Connect the chiller to the System, which you intend to cool/control.
5. Turn the Unit Power Switch ON. Purge air from the System as described in **Section 6** of this manual and add fluid if necessary.
6. Set Digital Controller to the Temperature desired, as instructed in **Section 7**.
7. Run the Unit, check for possible leaks.
8. Unit is ready for continuous operation.

Note 1: When operating the unit with outlet fluid temperature above 35°F/2°C, 100% pure distilled water is recommended.

Note 2: If operating the unit with outlet fluid temperature below 35°F/2°C, a solution of 75% distilled water and 25% glycol, alcohol or other appropriate brand of antifreeze is recommended.

6. PURGING THE FLUID SYSTEM

1. Connect system tubing to the Chiller quick-connect input and output valves.
2. Fill reservoir 2/3 full with appropriate coolant solution.
3. Plug unit to electrical outlet with appropriate voltage.
4. Turn power switch ON for 2-3 seconds and then turn OFF. Repeat two to four times.
5. Check fluid level in the reservoir and add more fluid if necessary to 2/3 level.
6. Turn power switch ON and run the Chiller.
7. If possible, raise the system above the chiller reservoir level for a few seconds to enable air to gather at the highest point. Then lower system below chiller fluid inlet and outlet connections for a few seconds to allow air to travel to chiller reservoir.

8. If it is not possible to raise system, then lower and raise chiller as instructed above for the system.
9. Repeat this operation if there is any doubt that air still remains in the system. When purging is complete, check fluid level and fill reservoir to the top.

7. DIGITAL CONTROLLER

- A. The Factory Set Point (fluid outlet temperature) default is 5°C (41° F) or at the value requested by customer when ordering.
 1. To display Set point: Press "P" button for one second and release. The display will now show the Set point value.
 2. To enter new Set point: Press and release "P" button. When Set point value appears on display press ? UP button to increase or ? DOWN button to decrease the value you want. Push the "P" button once again to secure that setting.
- B. Operation Mode
Because of complexity of programming the controller we do not recommend or advise customers to change any operational mode or to access the controllers Programming Mode. We are happy to make any modifications for you prior to shipment.
- C. Programming Mode
Warning: All 'programmable parameters' are Factory set with respect to safe and efficient Chiller operation. Any changes to Factory settings are done so at the Customer's risk and may void the warrantee.

To reprogram Controller follow the Controller Manual, included with every chiller.

Note: * Default Temperatures (see "rou" in the User's Manual Parameter Table) are factory set in degrees Centigrade (°C). If it is desired to have temperature units in °F, please inform factory when entering the order.

8. SERVICE GUIDE

No special maintenance is required for day-to-day use of **ElectraCOOL™** brand Thermoelectric Recirculating Liquid Chillers. Your chiller utilizes a state-of-the art efficient seal-less centrifugal magnetic drive pump with 45,000 hours MTBF and a brushless DC motor. If your pump fails contact us to arrange replacement. The thermoelectric assembly uses high quality fans with 75,000 hours MTBF. If you have a fan failure, contact us to arrange replacement. **Attempting to repair or replace these parts will void the warrantee.**

For the most efficient performance and to maximize the life of the chiller and components within, it is recommended to clean heat sinks periodically, using compressed air. If unit doesn't perform properly, use the following troubleshooting guide to find the problem, or consult the factory.

If using any kind of coolant solution or *antifreeze*, it is recommended to periodically check the concentration. This can be relatively easily checked by measuring specific gravity of a coolant sample using a Hydrometer. From time to time you may want to flush the system.

TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Unit will not start, when power switch is turned ON, Controller's display doesn't light up.	No power supplied to the Unit	Check unit is plugged in. Confirm power supply is correct for your line voltage.
Unit runs for a period of time, and then shuts OFF. Controller display shuts OFF	Line circuit breaker tripped due to overload	Ensure line circuit breaker matches maximum fuse size on nameplate. Check that there are no other electrical components on this line.
Unit is running, but does not maintain desired coolant temperature	1. Heat load is too high	Check and correct heat load if possible
	2. Controller has incorrect temperature setting	Enter correct Set point value, according to Digital Controller Programming Instruction, included in this Manual
	3. Digital Temperature Controller doesn't operate properly	Contact Advanced Thermoelectric
Unit is running. Low Fluid indicator Red light lights up	Insufficient fluid level in reservoir	Fill up reservoir following air purge instructions detailed in section 6 of this Manual
Unit runs but liquid level in reservoir decreases. Liquid spots visible under or around the Unit	Unit or System has a Leak	Check the System for leaks. Fix if possible. If leak found within the Unit, shut the Unit OFF and disconnect from Electrical line. Contact Advanced Thermoelectric for possible replacement
Unit runs, but there is no coolant flow. Red Light on the front of the Unit does not light up. Actual Temperature displayed is high (equal or slightly below ambient temperature)	System coolant line is clogged	Check your System for valves turned OFF or kinks in tubing to resolve the problem
	Fluid froze in heat exchanger This situation is very serious and may indicate that the liquid in the thermoelectric assembly is frozen. This can cause permanent damage! Turn the chiller off and allow it to sit for an hour or so then take the corrective action in the column to the right.	Change Temperature Set Point to the highest available on the Temperature Controller. Let Unit run until it is a visual coolant flow in reservoir. Reset Set point several degrees higher than coolant freezing point. Check fluid concentration, correct if possible
	Unit pump is not running	Contact Advanced Thermoelectric

Caution: It is Customer's responsibility to advise Advanced Thermoelectric if the chiller needs to be set for 230V AC. The wrong voltage selection can cause permanent Chiller damage, and will void the Warranty.

9. WARRANTY

Your satisfaction is important to us. ADVANCED THERMOELECTRIC provides a one year, full parts and labor warranty on *ElectraCOOL* and CustomChill brand chillers:

At our discretion we will REPAIR OR REPLACE defective products at no charge including parts and labor, if necessary, provided that work is performed by Advanced Thermoelectric or an authorized service center for Advanced Thermoelectric. Contact us to determine who should repair your chiller when seeking and RMA (see section 11).

Buyer may also return PARTS that are defective with the prior consent of Advanced Thermoelectric. We will replace defective parts at no charge. Labor charges incurred by others during the inspection, removal and replacement of parts are not covered by this warranty.

FREIGHT CHARGES for shipment to and from Advanced Thermoelectric or its authorized representative is the responsibility of the Buyer.

WARRANTY CLAIMES must be made directly by the Buyer and in accordance with our Return Policy outlined in our Operations and Maintenance (O&M) Manual. Unauthorized returns are not accepted for repair under warrantee. Product must then be received, inspected and if necessary tested by Advanced Thermoelectric and a product is deemed covered by our warrantee only when Advanced Thermoelectric or its authorized representative is reasonably satisfied that all conditions in the warranty have been met.

SHIPPING DAMAGES, both concealed and unconcealed are not covered under warrantee. All shipping claims are the responsibility of the Buyer and we recommend they be made immediately with the carrier. Where possible, returns should be sent back in their original carton and packing to avoid subsequent shipping damages.

SPECIFICALLY NOT COVERED by this warrantee is any damage caused to the product occurring during, but not limited to, such events as improper installation, storage, or usage occurring during a situation specifically cautioned against or noted in the product manual.

Specific situations, which invalidate the warranty, include (but are not limited to):

- Removing the serial number label.
- Any disassembly (partial or complete) of a heat exchanger, loosening or removing the bolts, or separating the heat sinks.
- Subjecting a heat exchanger to temperatures below the freezing point of the heat transfer fluid contained inside the unit.
- Subjecting a heat exchanger to unfiltered water.
- Subjecting any product to temperature, voltage, current, or pressure (internal or external) greater than that specified in the product manual.
- Operation with any replacement components. As well as voiding the warranty, this will also void the CE Mark
- Any actions prohibited in the "Caution" section of the product manual.

Advanced Thermoelectric or it's authorized agents shall not be liable for any incidental or consequential damages for breach or any express or implied warranty on this product, except to the extent prohibitive by applicable law, and implied warranty of merchantability of fitness for a particular purpose on this product is limited in duration to the duration of this warranty.

10. RETURN POLICY

All products or parts returning to Advanced Thermoelectric or an authorized agent, whether for warranty consideration, repair, restocking, etc. requires a Return Material Authorization number (RMA#)

Customer must first contact Advanced Thermoelectric Customer Service Department at: (866) – 665-5434 – Phone, or (603) – 724-6740 – Fax, and have the following information available:

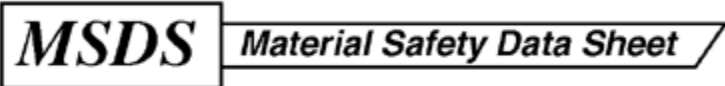

1. Advanced Thermoelectric model, part and serial numbers, along with product description.
2. Advanced Thermoelectric's Invoice number, Customer's PO number and shipment date of original order.
3. Reason for Return. For warranty claims, a detailed failure analysis is required.
4. Contact name, phone and fax numbers and or email address.

All returns should be packed securely (in original shipping carton and packing when possible) to prevent shipping damage.

- All shipping cartons must have the RMA# clearly marked in large bold numerals on the outside of the box.
- All returns must be sent in freight prepaid. Collect shipments will be refused.
- In some causes such as warranty consideration, it may be necessary to have someone qualified discuss the failure in detail with our technical staff, before we can issue and RMA#.
- After and RMA# is assigned, we ask that the Customer give us an approximate arrival date of the return to our factory.

11. MSDS for Coolants:

ETHYLENE GLYCOLMSDS Number: **E5125** * * * * * *Effective Date: 03/15/04* * * * * * *Supersedes: 11/02/01*

	24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
	National Response in Canada CANUTEC: 613-996-6666
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	
NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.	
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.	

ETHYLENE GLYCOL**1. Product Identification****Synonyms:** 1,2-Ethanediol; glycol; 1,2-Dihydroxyethane; Ethylene Alcohol; Ethylene Dihydrate**CAS No.:** 107-21-1**Molecular Weight:** 62.07**Chemical Formula:** CH₂OHCH₂OH**Product Codes:**

J.T. Baker: 5387, 5845, 9140, 9298, 9300, 9346, 9356, L715

Mallinckrodt: 5001, 5037

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethylene Glycol	107-21-1	99 - 100%	Yes

3. Hazards Identification**Emergency Overview**

WARNING! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life)

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

ADVANCED THERMOELECTRIC • PO Box 7091 • Nashua, NH 03060

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Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:

Vapor inhalation is generally not a problem unless heated or misted. Exposure to vapors over an extended time period has caused throat irritation and headache. May cause nausea, vomiting, dizziness and drowsiness. Pulmonary edema and central nervous system depression may also develop. When heated or misted, has produced rapid, involuntary eye movement and coma.

Ingestion:

Initial symptoms in massive dosage parallel alcohol intoxication, progressing to CNS depression, vomiting, headache, rapid respiratory and heart rate, lowered blood pressure, stupor, collapse, and unconsciousness with convulsions. Death from respiratory arrest or cardiovascular collapse may follow. Lethal dose in humans: 100 ml (3-4 ounces).

Skin Contact:

Minor skin irritation and penetration may occur.

Eye Contact:

Splashes may cause irritation, pain, eye damage.

Chronic Exposure:

Repeated small exposures by any route can cause severe kidney problems. Brain damage may also occur. Skin allergy can develop. May damage the developing fetus.

Aggravation of Pre-existing Conditions:

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

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:

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

Note to Physician:

Give sodium bicarbonate intravenously to treat acidosis. Urinalysis may show low specific gravity, proteinuria, pyuria, cylindruria, hematuria, calcium oxide, and hippuric acid crystals. Ethanol can be used in antidotal treatment but monitor blood glucose when administering ethanol because it can cause hypoglycemia. Consider infusion of a diuretic such as mannitol to help prevent or control brain edema and hemodialysis to remove ethylene glycol from circulation.

5. Fire Fighting Measures

Fire:

Flash point: 111C (232F) CC

Autoignition temperature: 398C (748F)

Flammable limits in air % by volume:

lel: 3.2; uel: 15.3

Slight to moderate fire hazard when exposed to heat or flame.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Containers may explode when involved in a fire.

Fire Extinguishing Media:

Dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Toxic gases and vapors may be released if involved in a fire.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from acids and oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):
50 ppm Ceiling

-ACGIH Threshold Limit Value (TLV):
50 ppm Ceiling (vapor)

Ventilation System:

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

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear oily liquid.

Odor:

Odorless.

Solubility:

Miscible in water.

Specific Gravity:

1.1 @20C/4C

pH:

No information found.

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

100

Boiling Point:

197.6C (388F)

Melting Point:

-13C (9F)

Vapor Density (Air=1):

2.14

Vapor Pressure (mm Hg):

0.06 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition. May produce acrid smoke and irritating fumes when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizing agents. Reacts violently with chlorosulfonic acid, oleum, sulfuric acid, perchloric acid. Causes ignition at room temperature with chromium trioxide, potassium permanganate and sodium peroxide; causes ignition at 212F(100C) with ammonium dichromate, silver chlorate, sodium chloride and uranyl nitrate.

Conditions to Avoid:

Heat, flames, ignition sources, water (absorbs readily) and incompatibles.

11. Toxicological Information

Toxicological Data:

Oral rat LD50: 4700 mg/kg; skin rabbit LD50: 9530 mg/kg.

Irritation - skin rabbit: 555mg(open), mild; eye rabbit: 500mg/24H, mild.

Investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

Has shown teratogenic effects in laboratory animals.

-----\Cancer Lists\-----

---NTP Carcinogen---

Ingredient	Known	Anticipated	IARC Category
Ethylene Glycol (107-21-1)	No	No	None

12. Ecological Information

Environmental Fate:

When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is not expected to evaporate significantly. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. When released into water, this material is not expected to evaporate significantly. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

The LC50/96-hour values for fish are over 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
-----	---	---	---	-----
Ethylene Glycol (107-21-1)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
--Canada--				
Ingredient	Korea	DSL	NDSL	Phil.
-----	----	---	----	-----
Ethylene Glycol (107-21-1)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
-SARA 302- -----SARA 313-----				
Ingredient	RQ	TPQ	List	Chemical Catg.
-----	---	----	---	-----
Ethylene Glycol (107-21-1)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
-RCRA- -TSCA-			
Ingredient	CERCLA	261.33	8(d)
-----	-----	-----	-----
Ethylene Glycol (107-21-1)	5000	No	No

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

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS:

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

16. Other Information

NFPA Ratings: Health: 1 Flammability: 1 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

Label Precautions:

Do not breathe vapor or mist.
Use only with adequate ventilation.
Keep container closed.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.

Label First Aid:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician if irritation develops or persists. If swallowed, give water or milk to drink and induce vomiting. Never give anything by mouth to an unconscious person. In all cases call a physician.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

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Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

REAGENT ALCOHOL

MSDS Number: **A2028** * * * * * Effective Date: **05/07/03** * * * * * Supercedes: **01/14/02**

MSDS

Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

REAGENT ALCOHOL

1. Product Identification

Synonyms: Doubly denatured ethanol; modified 3A alcohol; alcohol, anhydrous

CAS No.: Not applicable to mixtures.

Molecular Weight: Not applicable to mixtures.

Chemical Formula: Mixture [CH₃CH₂OH, CH₃OH, CH₃CHOHCH₃]

Product Codes:

J.T. Baker: 2986, 9229, 9400, 9401, 9404, A478

Mallinckrodt: 5911, 6183, 7006, 7019

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethyl Alcohol	64-17-5	90 - 95%	Yes
Methyl Alcohol	67-56-1	1 - 5%	Yes
Isopropyl Alcohol	67-63-0	1 - 5%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE! AFFECTS CENTRAL NERVOUS SYSTEM. MAY CAUSE BLINDNESS. CANNOT BE MADE NONPOISONOUS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY AFFECT LIVER, BLOOD, REPRODUCTIVE SYSTEM.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life)

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

ADVANCED THERMOELECTRIC · PO Box 7091 · Nashua, NH 03060

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Toll free: 1 (866) 665-5434 · (603) 888-2467 · fax: (603) 724-6740 · e-mail: sales@americool.com

CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Exposure may cause irritation to the mucous membranes of the upper respiratory tract. Prolonged exposures to high concentrations may cause drowsiness, loss of appetite and inability to concentrate.

Ingestion:

Cause headaches, gastritis, intoxication, blindness and, in acute cases, death.

Skin Contact:

Causes skin irritation, cracking or flaking due to dehydration and defatting action.

Eye Contact:

Can cause eye irritation. Splashes may cause temporary pain and blurred vision.

Chronic Exposure:

Prolonged skin contact causes drying and cracking of skin. May affect the nervous system. May affect liver, blood, reproductive system. Continued ingestion of small amounts could result in blindness.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

Skin Contact:

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:

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

5. Fire Fighting Measures

Fire:

Flash point: 13C (55F) CC

Autoignition temperature: 422C (792F)

Flammable limits in air % by volume:

l_{el}: 3.3; u_{el}: 19

Flammable liquid and vapor!

Dangerous fire hazard when exposed to heat or flame.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated.

Sensitive to static discharge.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water may be ineffective.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray can be used to extinguish fires and cool fire-exposed containers. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

- OSHA Permissible Exposure Limit (PEL):

1000 ppm (TWA) for ethyl alcohol

400 ppm (TWA) for isopropyl alcohol

200 ppm (TWA) for methyl alcohol

- ACGIH Threshold Limit Value (TLV):

1000 ppm (TWA), A4 - not classifiable as a human carcinogen for ethyl alcohol

200 ppm (TWA), 400 ppm (STEL), A4 - not classifiable as a human carcinogen for isopropyl alcohol

200 ppm (TWA), 250 ppm (STEL) skin, for methyl alcohol

Ventilation System:

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

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus.

Skin Protection:

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

Eye Protection:

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

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Mild pleasant whiskey-like odor.

Solubility:

Miscible in water.

Density:

0.79 @ 20C/4C

pH:

No information found.

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

100

Boiling Point:

78C (172F) (ethanol)

Melting Point:

-114C (-173F) (ethanol)

Vapor Density (Air=1):

1.6 (ethanol)

Vapor Pressure (mm Hg):

40 @ 19C (66F) (ethanol)

Evaporation Rate (BuAc=1):

ca. 1.4 (CCl4=1) (ethanol)

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidants, silver salts, acid chlorides, alkali metals, metal hydrides, hydrazine, and many other substances.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:

Ethyl alcohol: oral rat LD50: 7060 mg/kg; inhalation rat LC50: 20,000 ppm/10H; Irritation data, eye, rabbit: 500 mg/24H moderate; Investigated as a tumorigen, mutagen, reproductive effector. Methyl alcohol: oral rat LD50: 5628 mg/kg; inhalation rat LC50: 64000 ppm/4H; skin rabbit LD50: 15800 mg/kg; Irritation data, skin, rabbit: 20 mg/24H, Moderate; Investigated as a tumorigen, mutagen, reproductive effector. Isopropyl alcohol: oral rat LD50: 5045 mg/kg; skin rabbit LD50: 12.8 gm/kg; inhalation, rat: 16,000 ppm 8 hr. Investigated as a mutagen, tumorigen, reproductive effector.

Reproductive Toxicity:

Ethanol has been linked to birth defects in humans.

Carcinogenicity:

Ethanol has been linked to cancer in humans. Chronic ethanol ingestion is associated with liver cancer. Most industrial ethanol contains denaturants that render it undesirable to drink.

-----\Cancer Lists\-----

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Ethyl Alcohol (64-17-5)	No	No	None
Methyl Alcohol (67-56-1)	No	No	None
Isopropyl Alcohol (67-63-0)	No	No	3

12. Ecological Information

Environmental Fate:

Following data for ethanol: When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material is expected to readily biodegrade. When released into water, this material may evaporate to a moderate extent. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this

material is expected to be readily removed from the atmosphere by dry and wet deposition. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l.

13. Disposal Considerations

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

14. Transport Information**Domestic (Land, D.O.T.)**

Proper Shipping Name: ALCOHOLS, N.O.S. (ETHANOL, METHANOL, ISOPROPANOL)

Hazard Class: 3

UN/NA: UN1987

Packing Group: II

Information reported for product/size: 350LB

International (Water, I.M.O.)

Proper Shipping Name: ALCOHOLS, N.O.S. (ETHANOL, METHANOL, ISOPROPANOL)

Hazard Class: 3

UN/NA: UN1987

Packing Group: II

Information reported for product/size: 350LB

15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Ethyl Alcohol (64-17-5)	Yes	Yes	Yes	Yes
Methyl Alcohol (67-56-1)	Yes	Yes	Yes	Yes
Isopropyl Alcohol (67-63-0)	Yes	Yes	Yes	Yes

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

Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Ethyl Alcohol (64-17-5)	Yes	Yes	No	Yes
Methyl Alcohol (67-56-1)	Yes	Yes	No	Yes
Isopropyl Alcohol (67-63-0)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Ethyl Alcohol (64-17-5)	No	No	No	No
Methyl Alcohol (67-56-1)	No	No	Yes	No
Isopropyl Alcohol (67-63-0)	No	No	Yes	No

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

-RCRA- -TSCA-

Ingredient	CERCLA	261.33	8(d)
Ethyl Alcohol (64-17-5)	No	No	No
Methyl Alcohol (67-56-1)	5000	U154	No
Isopropyl Alcohol (67-63-0)	No	No	No

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

Australian Hazchem Code: 2[S]E

Poison Schedule: S5

WHMIS:

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

16. Other Information

NFPA Ratings: Health: 1 Flammability: 3 Reactivity: 0

Label Hazard Warning:

POISON! DANGER! MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE! AFFECTS CENTRAL NERVOUS SYSTEM. MAY CAUSE BLINDNESS. CANNOT BE MADE NONPOISONOUS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY AFFECT LIVER, BLOOD, REPRODUCTIVE SYSTEM.

Label Precautions:

Keep away from heat, sparks and flame.
 Do not breathe vapor.
 Avoid contact with eyes, skin and clothing.
 Keep container closed.
 Use only with adequate ventilation.
 Wash thoroughly after handling.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. In all cases call a physician.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 8.

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