

OASIS THERMOELECTRIC CHILLER MANUAL



Solid State
COOLING SYSTEMS

Temperature Control...Precisely.

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SYMBOLS USED ON THE OASIS 150



Read the MSDS for the coolant used and follow **all** safety precautions listed in the MSDS prior to removing coolant tubes or opening the fill cap as this could result in contact with the coolant inside.

CAUTION

- * Never disassemble the Oasis unit as irreparable damage may occur.
 - * Never store the Oasis Chiller over 100 °C.
 - * Never operate the Oasis Chiller in ambient temperatures of 40 °C or greater.
 - * Always use only proper coolants as specified in manual. SSCS recommends Koolance LIQ-702CL-B (27% Propylene Glycol and water)
 - * Never ship the chiller with water inside the liquid cold plate as freezing temperatures may be encountered which would damage the unit. Always pump all water out of the Oasis chiller prior to shipping.
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OASIS 150

THERMOELECTRIC CHILLER

PRODUCT

Manual

SECTION 1

INTRODUCTION

The Oasis 150 is a thermoelectric temperature control system with full PID control of both heating and cooling. It provides 500 ml/min of constant temperature coolant for controlling the operating temperatures of lasers, medical equipment, semiconductor equipment, or any process requiring temperature control. It also has a cycling feature where two different temperature set points may be entered with a soak time at each temperature and the number of cycles desired. It does not use Freon or any other replacement gas. From conception, this chiller has been designed for long life and ease of use.

The Oasis 150 ships with the items listed below. Please locate them prior to discarding the shipping box.

- (1) Oasis 150 Recirculating Liquid Chiller
- (2) 100 watt 12 VDC Table Top Power Supply
- (1) AC Line Cord
- (1) 250 ml Squirt Bottle
- (2) Valve quick disconnect fittings, 1/8th inch hose barb

EC Declaration of Conformity

Solid State Cooling Systems
 167 Myers Corners Road
 Wappingers Falls, NY 12590
 USA

We declare under sole responsibility that the Oasis 150 Thermoelectric Chiller meets the intent of Directive 89/336/EEC and amendments 92/31/EEC, 93/68/EEC for Electromagnetic Compatibility and the Low Voltage Directive 2006/95/EEC. Compliance was demonstrated to the following specifications as listed in the official Journal of the European Communities:

Emissions: EN55011 Group 1 Class A


EN 55011: 97 + A1:1999 + A2:2002 Radiated Emissions, Group 1 Class A
 EN 55011: 97 + A1:1999 + A2:2002 Conducted Emissions, Group 1 Class A
 EN 61000-3-2: 2006 Harmonics
 EN 61000-3-3: 1995 + A1:2001 Flicker Meter

Immunity: IEC 60601-1-2

EN 61000-4-2: 1995 + A1 1998 + A2:2001 Electrostatic Discharge
 EN 61000-4-3 +A1: 2002 Radiated Susceptibility (RF)
 EN 61000-4-4: 2004 Electrical Fast Transient (EFT)
 EN 61000-4-5: 1995 + A1:2001 Surge Susceptibility
 EN 61000-4-6: 1996 + A1:2001 Conducted Disturbances Induced by RF Fields
 EN 61000-4-8: 1993 + A1:2001 Power Frequency Magnetic Field Immunity
 EN 61000-4-11: 12004 Voltage Dips and Interference (VDI)

Safety:

EN 61010-1: 2nd Edition (2001), Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use - Part 1: General

Lloyd F Wright Chief Technology Officer	
Date	February 8, 2008

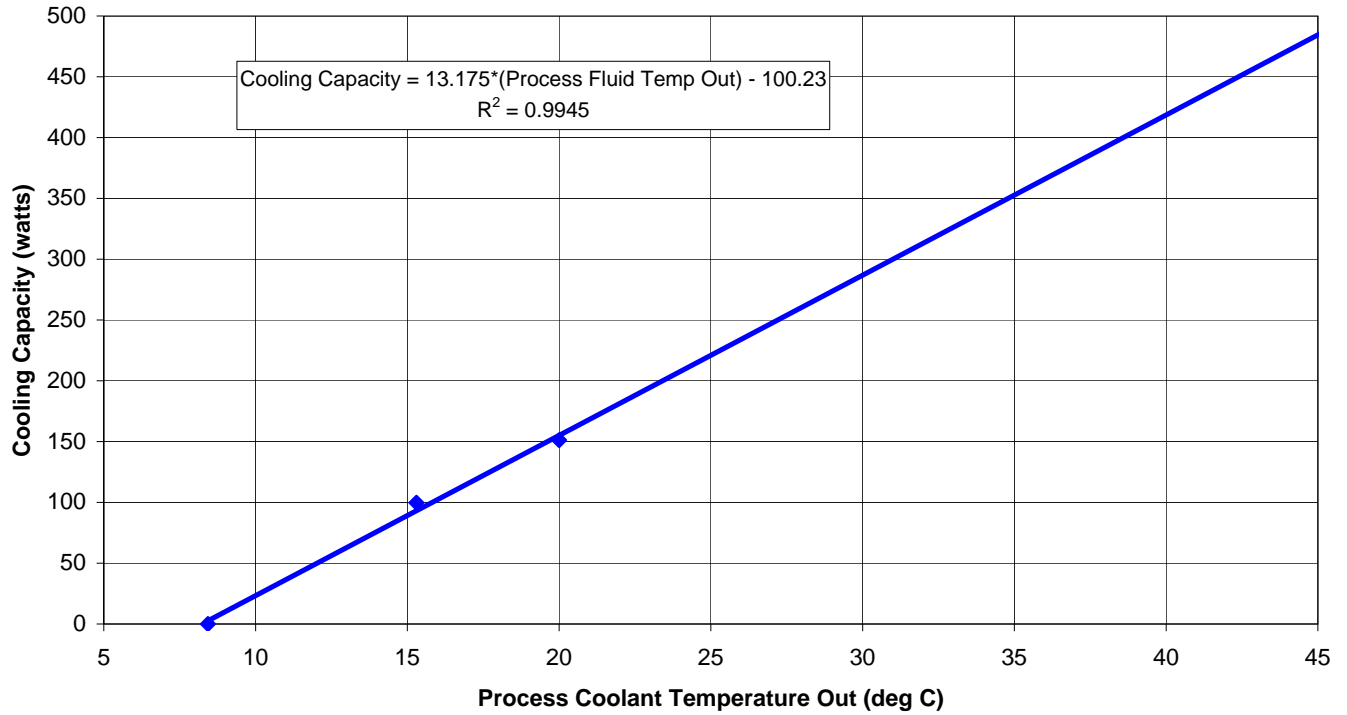
SECTION 2

SPECIFICATIONS

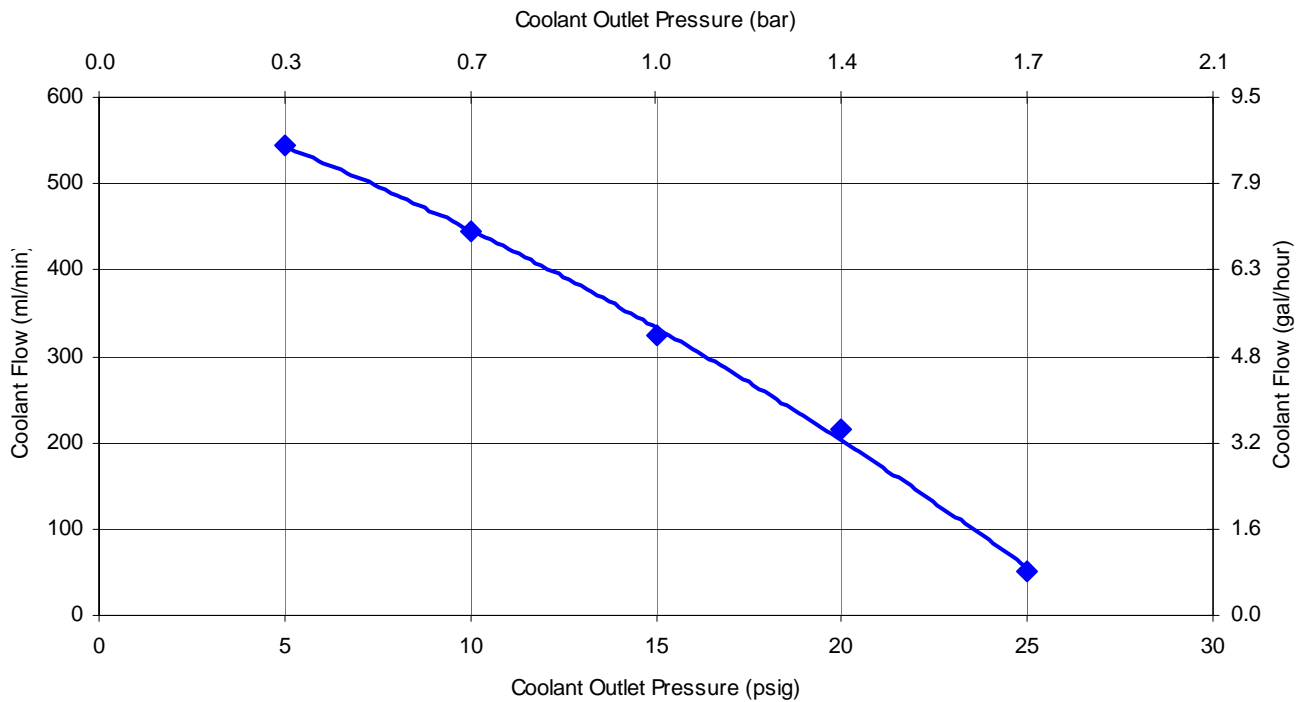
Coolant Operating Temperature Range:	10 to +45 °C
Set Point Range:	10 to +45 °C
Control Accuracy:	± 0.2 °C
Coolant Type:	25% Propylene Glycol and Water recommended to prevent bacterial growth and minimizing pump noise. (Note: propylene glycol is non-toxic). SSCS Recommends Koolance <u>LIQ-702CL-B</u> coolant. Ethylene Glycol and Water mixtures are also acceptable. Note: Methanol, Ethanol, or Isopropyl Alcohol may not be used as coolants, either by themselves or in water mixtures; use of these coolants voids the Oasis warranty.
Nominal Cooling Capacity:	150 Watts @ 20 °C in a 20 °C ambient (See Figure 1 for chart).
Operating Voltage:	12VDC, 8 amps max
Optional AC/DC Power Supply:	100 watt, 12 VDC; 85-265 VAC input
Safety Certifications:	CE/NRTL (ETL)
Coolant Pump:	500ml/min brushless DC magnetically driven gear (See Figure 2 for chart)
Maximum Coolant Outlet Pressure:	25 psig (1.72 bar)
System Proof Pressure:	50 psig (3.36 bar)
Coolant Fluid Connections:	1/8" Colder quick disconnect with shut-off valves
Tank Volume:	75 ml
Noise:	<56dB with 25% propylene glycol/water
Dimensions:	7.5" x 5" x 7" (L x W x H, plus fittings)
Weight:	6.5 lbs. (3 kg.)

This Unit Serial Number: _____

**Figure 1: Oasis Cooling Capacity
(20 C Ambient)**



Oasis Pump Curve



Note: Pump to pump variation is +/- 10%.

SECTION 3

HOOK UP

3.1 ELECTRICAL CONNECTIONS (SEE FIGURE 3)

Power: Connect 12 VDC power (8 amps) to the 2-pin circular connector provided, (Conxall#6382-2SG-3DC), as follows:

12 VDC (+): Pin 1
 12 VDC (-): Pin 2

Note: The 12 VDC power supply comes with this connector pre-wired to the power supply.

Alarms: The Oasis has one 250 VAC 1 amp dry contact relay to indicate a system alarm or temperature out of range. Connect to this dry contact on the 9-pin dsub connector as follows:

System/Temp Alarm: Pin 1
 Alarm Signal Return: Pin 6

RS 232: The Oasis 150 comes with a RS-232 communication link. Connections are made via a 9-pin dsub connector as follows:

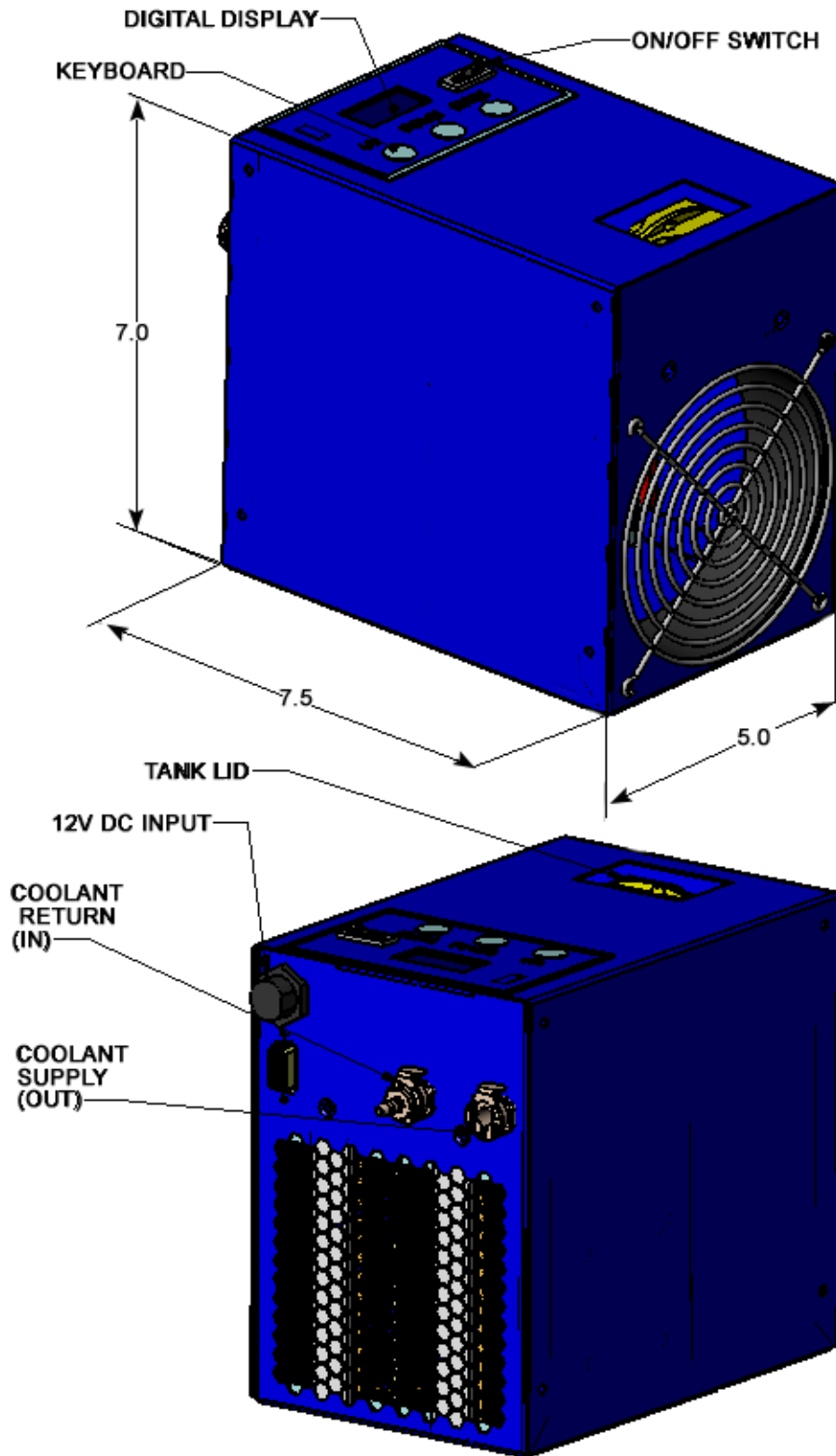
9 Pin D-Sub Pin#	RS-232 Signal Description
2	Transmit Data (TXD)
3	Receive Data (RXD)
5	Ground

3.2 PLUMBING CONNECTIONS (SEE FIGURE 3)

The Oasis 150 has two Colder Products 1/8" valved quick disconnect coolant fittings. Two mating valved quick disconnect inserts are provided with 1/8" ID hose barb fittings for convenience.

Important: The operator of the Oasis 150 should place a 74 micron, or finer, filter on the coolant return (IN) line to remove any particulate material from the coolant stream that could damage the pump.

FIGURE 3



3.3 AIR CONSIDERATIONS

Restricting airflow into or out of the Oasis 150 will impair performance. Maintain at least 3” of clearance around the air inlet and outlet to ensure no restriction of airflow.

3.4 COOLANT FILL

The water fill cap is located at the top of the unit. Lift up the yellow spring-loaded cap to open. Use the 250 ml water bottle (shipped with the Oasis 150) to fill reservoir prior to starting unit.

SECTION 4 START UP

Start-up the Oasis using the following steps:

- 1) Connect 1/8”ID hose to fluid connections located on the back side, labeled Process Out (supply) and Process In (return).
- 2) Open the reservoir cap on top; using the 250 ml bottle provided, fill the reservoir to just below the bottom of its neck with clean water, a propylene-glycol/water mixture, or an ethylene-glycol/water mixture.
- 3) Connect 12 VDC power to the 2-pin circular connector as per section 3.1.
- 4) Optional: connect the alarm signal to the 9-pin dsub connector as per section 3.1.
- 5) Turn on switch located to the left of the display. The front display should read the current coolant temperature. If the front display reads “TANK LOW”, add coolant to the reservoir until the display changes to read the coolant temperature.

Important Notes:

- 1) The Oasis 150 performs a self-diagnostic check for 10 seconds after turn-on. If the tank level low alarm persists, or if another alarm is displayed, consult section 6.0 of this manual.
- 2) If the Oasis 150 tank is filled above the bottom of its neck, coolant can leak out the top when the cap is closed.

SECTION 5

OPERATION

The Oasis is operated via the control panel located on the front panel. The control panel has an 8-character LCD display and three input keys: UP, DOWN, and ENTER. These keys work as follows:

Key	Action
UP	Pressing the UP key raises the parameter value displayed.
DOWN	Pressing the DOWN key lowers the parameter value displayed
ENTER	Pressing the ENTER key momentarily enters the parameter changed.
ENTER	Pressing and holding the ENTER key for 3 seconds changes the LCD display menu.

5.1 SIMPLE OPERATION

The Oasis comes with preset operating parameters that will work well for most applications. If temperature control at one temperature is desired, follow the steps below.

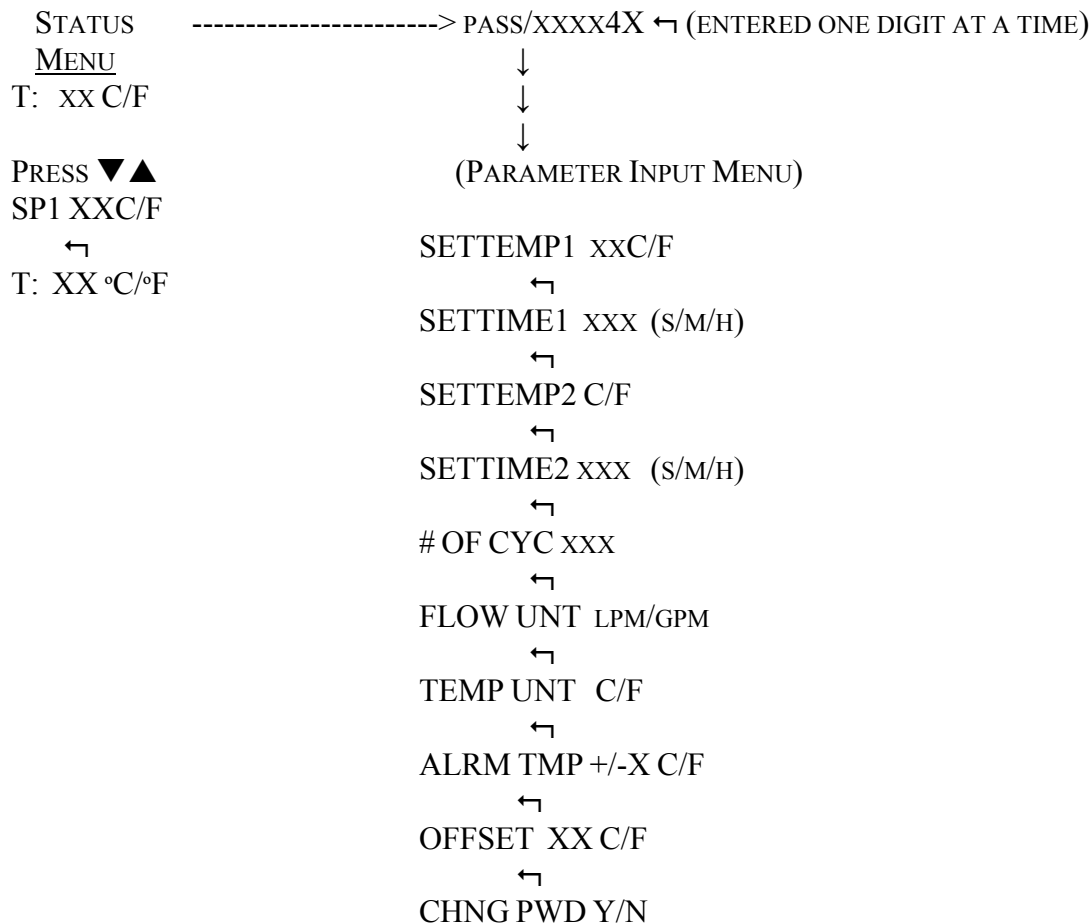
- 1) Turn on Oasis and wait for display to read T XX C or F.
- 2) Press the UP or DOWN keys to change SET 1 to the desired set point.
- 3) Press the ENTER key.

The Oasis will now control to the set point temperature. To change the set point temperature just press the UP or DOWN keys again to change SET 1 to the new set point, followed by the ENTER key.

5.2 ADVANCED OPERATION

The Oasis controller has two menus: the Status Menu and the Parameter Input Menu. The Status Menu shows the current temperature of coolant leaving the chiller (see Figure 4). The Status Menu also allows input of new coolant temperature set points when the cycling feature is off. The Parameter Input Menu allows input of set point temperatures; soak times, number of cycles if cycling between two temperatures, an alarm temperature, a temperature offset, and a password to enter the Parameter Input Menu. (The default password is 0000 until changed by the user.) Press and hold the enter key for 3 seconds to enter the parameter menu.

Note: While in the Parameter Input Menu, if no keys are pressed for 30 seconds the display will revert to the status menu.

Figure 4 MENU STRUCTURE:

NOMENCLATURE:

▲UP

▼Down

↵ Press Enter Momentarily

-----> Press & Hold Enter Key 3 Sec

SETTEMP1	4 TO 45 °C
SETTIME1	10 TO 999 SEC/MIN/HR
SETTEMP2	4 TO 45 °C
SETTIME2	10 TO 999 SEC/MIN/HR
# OF CYC	0 TO 999
FLOW UNT	LPM/GPM
TEMP UNT	C OR F
ALRM TMP	1 TO 9 °C in 1°C increments
OFFSET	0 TO 9 °C in 0.1°C increments
CHNG PWD	Y OR N

NOTE: If continuous control at one set-point temperature is desired, set # OF CYCLES to zero.

Status Menu: The status menu displays the current coolant temperature in °C or °F or will display an alarm type should an alarm occur.

Pressing the UP or DOWN keys with # of cycles set to zero will change the set point temperature upon pressing the START key.

Parameter Input Menu: The parameter input menu allows input of operating temperatures, soak times, number of cycles desired, temperature units desired, time units desired, the alarm temperature range and an offset temperature to change the displayed temperature.

SETTEMP1 = Set point of first control temperature. If # OF CYCLES is set to zero, this is the control temperature.

SETTIME1 = Soak time at temperature 1. Not used if # OF CYCLES is set to zero.

SETTEMP2= Set point of second control temperature. Not used if # OF CYCLES is set to zero.

SETTIME2 = Soak time at temperature 2. Not used if # OF CYCLES is set to zero.

OF CYC = Number of cycles between temperature1 and temperature2. If set to zero, the Oasis 150 will control at temperature SP1.

ALRM TMP = +/- Alarm temperature set point. If the current temperature is outside of the set point +/- the dry contact alarm will open.

TEMP UNT = Temperature Units shown on display, °C or °F

TIME UNT= Time units shown on display s=seconds, m=minutes, h=hours

OFFSET = °C or °F Used to adjust the current temperature displayed. Entering 5 °C will increase the displayed temperature by 5 °C. Typically used to match temperatures with an external temperature sensor.

CHG PWD = Y/N Entering Y allows user to change the password allowing entry into the parameter input menu.

5.3 ALARM SIGNAL

The Oasis chiller has one normally closed dry contact alarm for temperature out of range or system failure, located on pins 1 & 6 of the 9-pin CPC connector.

A list of system failures causing the dry contact alarm to open can be found in Section 6. In the event of a failure, the alarm type will be shown on the front display.

SECTION 6

SYSTEM ALARMS/TROUBLESHOOTING

The Oasis has three system alarms that when triggered will show on the display. When an alarm is displayed the system will not attempt to heat or cool the coolant.

TANK LOW: Liquid reservoir level is too low. *Unless filling for the first time, check all outside plumbing lines for leaks. Once all leaks are sealed, remove the cap and add more water until the alarm disappears. Note: If the tank becomes empty the display will read pump fail.*

RTD OPEN or RTD SHORT: The temperature sensor has failed or its connector has come loose. *Turn off the Oasis and disconnect the DC power cord. Open the cover and check if the 3-pin connector is firmly attached to the controller board located on the under side of the cover. If the connector is firmly attached, contact SSCS for a RMA number to return the unit for RTD replacement.*

PUMP FAIL: The pump motor speed is not within normal limits, indicating no coolant is flowing and/or the pump is damaged. *Either the pump has failed, or the external coolant lines are blocked. Check that there are no obstructions/closed valves or kinks in the coolant lines. Also check that the coolant lines are fully inserted into the CPC shut-off valves on the Oasis. If the coolant lines are not blocked, contact SSCS for a RMA number to return the unit for pump replacement.*

Important: The tank level low alarm will automatically reset when the tank is filled. The RTD and Pump failure alarms will not reset until the system power is turned off.

OTHER ISSUES:

COOLING CAPACITY INSUFFICIENT: *If the Oasis is not providing sufficient cooling, check that the air inlet and outlet are not restricted and that the fan is running. If airflow is not restricted, contact SSCS technical support.*

RS-232 COMMUNICATION NOT WORKING: *If the RS-232 communications does not seem to be working try cycling the power to reset the communications. If the problem persists, call SSCS technical support.*

SECTION 7

OASIS RS-232 COMMUNICATION

The Oasis 150 comes with a RS232 communication port. The Oasis can receive a remote set point, return the current temperature, and signal an alarm has occurred. The RS232 signals are located on the 9-pin d-subminiature connector located on the top of the Oasis cover.

Signal connections:

9 Pin D-Sub Pin#	Oasis RS-232 Signal Description
2	Transmit Data (TXD)
3	Receive Data (RXD)
5	Ground

Wiring:

Host/Master 9-Pin D-sub Pin#	Host/Master RS-232 Signal Description	Oasis 9-Pin D-sub Pin#
2	Receive Data (RXD)	2
3	Transmit Data (TXD)	3
5	Ground	5

SPECIFICATION:

Speed:	9600 baud
Data Flow Control:	Manually set RTS (no “hardware handshaking”)
Data Format:	8-bit serial
Number of Stop bits:	1
Transmission Breakdown:	One command byte followed by zero, one, or two data bytes depending on data type.
Master/Slave:	The Oasis is always the SLAVE
Interrupts Reported:	None, must be polled for status
Transmission Length:	≤ 15 meters

Code Breakdown:(All bytes are hexadecimal)

Command Byte: Bit 7 (MSB) remote control active (1 = remote control, 0 = local control)
 Bit 6 remote on/off (1 = Oasis running, 0 = Oasis in standby mode)
 Bit 5 communication direction (1 = remote to Oasis [command from master],
 0 = Oasis to remote [status from Oasis])
 Bits 4 thru 0 parameter being communicated per table

Data Bytes: 1 or 2 data bytes depending on parameter (see table).

Timing:

Parameter Table:

Bits 4 thru 0	Parameter	No of Bytes
00001	Oasis set-point 1 temperature	2
01001	Current Oasis coolant out temperature	2
01000	Faults (fan, pump, RTD failures etc.)	1

Temperature Data bytes:

The 2 data bytes for the temperature set point and transmission of the current temperature represent the value of the temperature in 0.1° C increments.

For example:

<u>High Byte</u>	<u>Low Byte</u>	
00000000	00000001	= 0.1 °C
00000000	00001010	= 1.0 °C
00000000	01100100	= 10.0 °C
00000000	11001000	= 20.0 °C
00000001	00101100	= 30.0 °C
00000001	10010000	= 40.0 °C

SYSTEM FAULTS DATA BYTE ASSIGNMENTS:

0 = OK, 1 = FAULT

Bit No:	Fault Assigned:	Hex Value When Fault Present
0	Tank Level Low	01
1	spare	02
2	Temperature above alarm range	04
3	spare	N/A
4	RTD Fault	10
5	Pump Current Fault	20
6	Unassigned	N/A
7	Temperature below alarm range	80

RS232 COMMUNICATIONS EXAMPLE

(all bytes given in hex) H=Host, O=Oasis

Send set point of 25 degrees C

H: send command byte E1
H: send LOW data byte: in this case, the hex code FA
H: send HIGH data byte: in this case, the hex code 00
O: send command byte E1

Read Oasis set point

H: send command byte C1
O: send command byte C1
O: send LOW data byte: in this case, the hex code FA
O: send HIGH data byte: in this case, the hex code 00

Read the actual temperature

H: send command byte C9
O: send command byte C9
O send LOW data byte: FA for 25 °C
O send HIGH data byte: 00 for 25 °C

Read the faults table

H: send command byte C8
O: send command byte C8
O: send faults byte

Notes

- 1) The Oasis can store 8 bytes of transmission. It is recommended that the transmissions be limited to 1 data exchange of one, two, or three bytes (depending upon the data being communicated), until the master has received the acknowledgement from the Oasis.
- 2) An acknowledgement of the transmission will be sent back to the master when the Oasis reads the data. In the case of data transmitted to the Oasis Controller only, the acknowledgement will be the command byte. In the case of data requested by the master, the acknowledgement will be the command byte plus the data byte(s) requested.
- 3) For software that requires data types to be specified:
Format of command bytes: number, "word", unsigned, MSB first
Format of sent data bytes: number, "word", unsigned, LSB first
Format of received data bytes: variable length string
- 4) If RS-232 communications does not seem to be functioning, cycle the main power to reset.

SECTION 8**TECHNICAL SUPPORT**

Delighting our customers is our highest priority. Please contact us immediately for technical assistance whenever you have questions or concerns.

Hours: 8 a.m. to 5 p.m. Eastern Time, weekdays

Telephone: (845) 296-1300

Fax: (845) 296-1303

E-mail: info1@sscooling.com

SECTION 9

MSDS FOR COOLANTS

MSDS FOR PROPYLENE GLYCOL

Material Safety Data sheet Propylene glycol



1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

24-Hour Emergency Phone Number: 989-636-4400

Product: DOWFROST* HD 25 HEAT TRANSFER FLUID, DYED

Product Code: 44030

Effective Date: 08/03/04

Date Printed: 08/04/04

MSD: 004984

The Dow Chemical Company, Midland, MI 48674

Customer Information Center: 800-258-2436

2. COMPOSITION/INFORMATION ON INGREDIENTS

Propylene glycol		CAS#	
000057-55-6	25%		
Dipotassium phosphate		CAS#	007758-11-4
<5%			
Deionized water		CAS#	
007732-18-5	<75%		

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

* Clear yellow liquid. Odorless. Avoid temperatures above 350 F, *

* (177 C). *

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: May cause slight temporary eye irritation. Corneal injury is unlikely.

SKIN: Prolonged contact is essentially nonirritating to skin. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated contact may cause flaking and softening of skin.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

INHALATION: At room temperature, exposure to vapor is minimal due to low volatility. Mist may cause irritation of upper respiratory tract (nose and throat).

* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

Product: DOWFROST* HD 25 HEAT TRANSFER FLUID, DYED

Product Code: 44030

Effective Date: 08/03/04 Date Printed: 08/04/04 MSD: 004984

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

CANCER INFORMATION: Did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): Contains component(s) which did not cause birth defects or any other fetal effects in lab animals. The component(s) is/are propylene glycol.

REPRODUCTIVE EFFECTS: Contains component(s) which did not interfere with reproduction in animal studies. Contains component(s) which did not interfere with fertility in animal studies. The component(s) is/are propylene glycol.

4. FIRST AID

EYES: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: No emergency medical treatment necessary.

INHALATION: Move person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: None

METHOD USED: TCC

AUTOIGNITION TEMPERATURE: Not determined

FLAMMABILITY LIMITS

LFL: Not determined

UFL: Not determined

HAZARDOUS COMBUSTION PRODUCTS: Under fire conditions some components of this product may decompose. The smoke may contain

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Unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to carbon monoxide, carbon dioxide.

OTHER FLAMMABILITY INFORMATION: This material will not burn until the water has evaporated. Residue can burn. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the auto ignition temperatures possibly resulting in spontaneous combustion.

EXTINGUISHING MEDIA: To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively.

MEDIA TO BE AVOIDED: Do not use direct water stream.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical, or foam. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of re-ignition has passed. Immediately withdraw all personnel from area in case of rising sound from venting safety device or discoloration of the container. Move container from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls/Personal Protection.

PROTECT THE ENVIRONMENT: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological

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Information.

CLEAN-UP: See Section 13, Disposal Considerations.

7. HANDLING AND STORAGE HANDLING: See Section 8, Exposure Controls/Personal Protection. STORAGE: See Section 10, Stability and Reactivity.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed. Use gloves chemically resistant to this material.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. In dusty or misty atmospheres, use an approved particulate respirator.

EXPOSURE GUIDELINES: Propylene glycol: AIHA WEEL is 10 mg/m³ for total vapor and aerosol.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE: Clear yellow liquid

ODOR: Odorless

VAPOR PRESSURE: 17 mmHg @ 20C, 68F

VAPOR DENSITY: >1

BOILING POINT: 214 deg F

SOLUBILITY IN WATER/MISCIBILITY: Complete

SPECIFIC GRAVITY OR DENSITY: 1.025 @ 25/25C

10. STABILITY AND REACTIVITY CHEMICAL STABILITY: Thermally stable at typical use temperatures.

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Product: DOWFROST* HD 25 HEAT TRANSFER FLUID, DYED

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CONDITIONS TO AVOID: Avoid temperatures above 350 F (177 C).

Some components of this product can degrade at elevated temperatures.

INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with oxidizing materials. Avoid contact with strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Hazardous decomposition products depend upon temperature, air supply and the presence of other materials.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1)

SKIN: The LD50 for skin absorption in rabbits in >10,000 mg/kg.

INGESTION: The oral LD50 for female rats is 20,300 mg/kg.

MUTAGENICITY: In vitro mutagenicity studies were negative. Animal mutagenicity studies were negative.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: Based largely or completely on data for major component(s). Bioconcentration potential is low (BCF less than 100 or Log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).

DEGRADATION & PERSISTENCE: Based largely or completely on data for major component(s). Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Degradation is expected in the atmospheric environment within minutes to hours.

ECOTOXICITY: Based largely or completely on data for major component(s). Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in most sensitive species).

13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

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Product Code: 44030

Effective Date: 08/03/04 Date Printed: 08/04/04 MSD: 004984

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and

that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): For D.O.T. regulatory information, if required, consult transportation regulations, product shipping papers or contact your Dow representative.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATIONS =====

* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

Product: DOWFROST* HD 25 HEAT TRANSFER FLUID, DYED

Product Code: 44030

Effective Date: 08/03/04 Date Printed: 08/04/04 MSD: 004984

----- REGULATORY INFORMATION (CONTINUED)

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

----- TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME CAS NUMBER LIST

1,2-PROPANEDIOL 000057-55-6 PA1

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD:

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

16. OTHER INFORMATION

* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

Product: DOWFROST* HD 25 HEAT TRANSFER FLUID, DYED

Product Code: 44030

Effective Date: 08/03/04 Date Printed: 08/04/04 MSD: 004984

MSDS STATUS: Revised Section 8 (Exposure Guidelines).

* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult The Dow Chemical Company For Further Information.

MSDS FOR ETHYLENE GLYCOL**ETHYLENE GLYCOL****MSDS Number: E5125 --- Effective Date: 02/25/99****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, 9349, 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**

-----!
**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.
 J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your
 convenience)**

Health Rating: 2 - Moderate

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

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

Storage Color Code: Orange (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, and 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 oxalate, 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:

l_{el}: 3.2; u_{el}: 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-face piece 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 sawdust. 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.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
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

Ingredient	-----\Chemical Inventory Status - Part 1\-----			
	TSCA	EC	Japan	Australia

Ethylene Glycol (107-21-1)	Yes	Yes	Yes	Yes
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-----\Chemical Inventory Status - Part 2\-----

--Canada--

Ingredient	Korea	DSL	NDSL	Phil.
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Ethylene Glycol (107-21-1)	Yes	Yes	No	Yes
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-----\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)
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Ethylene Glycol (107-21-1)	5000	No	No
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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: No information found.

Poison Schedule: No information found.

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 includes: 8.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

MSDS FOR ETHYL ALCOHOL

Aldrich Chemical Co., Inc.

Valid 08/2001 - 10/2001

1001 West St. Paul
Milwaukee, WI 53233 USA
Tel: 414-273-3850

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1. ----- CHEMICAL IDENTIFICATION-----

CATALOG #: 187380
NAME: ETHYL ALCOHOL, DENATURED

SECTION 2. ----- COMPOSITION/INFORMATION ON INGREDIENTS -----

CAS #: 64-17-5
MF: C₂H₆O
EC NO: 200-578-6

ADDITIONAL INFORMATION

CONTAINS METHYL ALCOHOL, CHEMICAL ABSTRACTS REGISTRY NUMBER 67-56-1.
CONTAINS ETHYL ACETATE, CHEMICAL ABSTRACTS REGISTRY NUMBER 141-78-6.
CONTAINS 4-METHYL-2-PENTANONE, CHEMICAL ABSTRACTS REGISTRY NUMBER 108-10-1.
CONTAINS HEPTANE, CHEMICAL ABSTRACTS REGISTRY NUMBER 142-82-5.

SYNONYMS

ABSOLUTE ETHANOL * AETHANOL (GERMAN) * AETHYLALKOHOL (GERMAN) *
ALCOHOL * ALCOHOL, ANHYDROUS * ALCOHOL DEHYDRATED * ALCOOL ETHYLIQUE
(FRENCH) * ALCOOL ETILICO (ITALIAN) * ALGRAIN * ALKOHOL (GERMAN) *
ALKOHOLU ETYLOWEGO (POLISH) * ANHYDROL * COLOGNE SPIRIT * ETANOLO
(ITALIAN) * ETHANOL (ACGIH:OSHA) * ETHYL ALCOHOL (DOT:OSHA) * ETHYL
ALCOHOL ANHYDROUS * ETHYL HYDRATE * ETHYL HYDROXIDE * ETYLOWY
ALKOHOL
(POLISH) * FERMENTATION ALCOHOL * GRAIN ALCOHOL * JAYSOL * JAYSOL S *
METHYLCARBINOL * MOLASSES ALCOHOL * NCI-C03134 * POTATO ALCOHOL * SD
ALCOHOL 23-HYDROGEN * SPIRITS OF WINE * SPIRT * TECSOL *

SECTION 3. ----- HAZARDS IDENTIFICATION -----

LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
TOXIC
HARMFUL BY INHALATION AND IF SWALLOWED.
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
TARGET ORGAN(S):
NERVES
EYES
LIVER, KIDNEYS
KEEP CONTAINER TIGHTLY CLOSED.
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

TAKE PRECAUTIONARY MEASURES AGAINST STATIC DISCHARGES.

DO NOT BREATHE VAPOR.

WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.

KEEP TIGHTLY CLOSED.

HYGROSCOPIC

SECTION 4. ----- FIRST-AID MEASURES-----

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.

WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. ----- FIRE FIGHTING MEASURES-----

EXTINGUISHING MEDIA

CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS.

FLAMMABLE LIQUID.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.

SECTION 6. ----- ACCIDENTAL RELEASE MEASURES-----

SHUT OFF ALL SOURCES OF IGNITION.

EVACUATE AREA.

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.

USE NONSPARKING TOOLS.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. ----- HANDLING AND STORAGE-----

REFER TO SECTION 8.

SECTION 8. ----- EXPOSURE CONTROLS/PERSONAL PROTECTION-----

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

USE ONLY IN A CHEMICAL FUME HOOD.

SAFETY SHOWER AND EYE BATH.

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

KEEP TIGHTLY CLOSED.

KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.

STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

PHYSICAL PROPERTIES

BOILING POINT: 78 C

MELTING POINT: -130 C

FLASHPOINT 48F
8.88C

EXPLOSION LIMITS IN AIR:

UPPER 24.5%

LOWER 3.3%

AUTOIGNITION TEMPERATURE: 683 F

VAPOR PRESSURE: 44.6MM 20 C

SPECIFIC GRAVITY: 0.789

VAPOR DENSITY: 1.59

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

STABILITY

STABLE.

INCOMPATIBILITIES

OXIDIZING AGENTS

PEROXIDES

ACIDS

ACID CHLORIDES

ACID ANHYDRIDES

ALKALI METALS

AMMONIA

MOISTURE

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS

HARMFUL IF INHALED OR SWALLOWED.

MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN.

VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER
RESPIRATORY TRACT.

CAUSES SKIN IRRITATION.

CAN CAUSE CNS DEPRESSION.

EXPOSURE CAN CAUSE:

NAUSEA, DIZZINESS AND HEADACHE

GASTROINTESTINAL DISTURBANCES

MAY CAUSE CONVULSIONS.

ANEMIA

NARCOTIC EFFECT

CONTACT WITH EYES CAN CAUSE REDNESS, TEARING, AND BLURRED VISION.

PROLONGED OR REPEATED CONTACT WITH SKIN CAN CAUSE DEFATTING AND
DERMATITIS.

CHRONIC EFFECTS

TARGET ORGAN(S):

NERVES

EYES

LIVER

KIDNEYS

BLOOD

HEART

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: KQ6300000

ETHYL ALCOHOL

IRRITATION DATA

SKN-RBT 400 MG OPEN MLD	UCDS** 7/22/1970
SKN-RBT 20 MG/24H MOD	85JCAE -,189,1986
EYE-RBT 500 MG SEV	AJOPAA 29,1363,1946
EYE-RBT 500 MG/24H MLD	85JCAE -,189,1986
EYE-RBT 100 MG/4S RINSE MOD	FCTOD7 20,573,1982

OXICITY DATA

ORL-CHD LDLO:2 GM/KG	ATXKA8 17,183,1958
ORL-HMN LDLO:1400 MG/KG	NPIRI* 1,44,1974
SCU-INF LDLO:19440 MG/KG	AJCPAI 5,466,1935
ORL-RAT LD50:7060 MG/KG	TXAPA9 16,718,1970
IHL-RAT LC50:20000 PPM/10H	NPIRI* 1,44,1974
IPR-RAT LD50:3600 UG/KG	PHMGBN 2,27,1969
IVN-RAT LD50:1440 MG/KG	TXAPA9 18,60,1971
IAT-RAT LD50:11 MG/KG	TXAPA9 18,60,1971
ORL-MUS LD50:3450 MG/KG	GISAAA 32(3),31,1967
IHL-MUS LC50:39 GM/M3/4H	GTPZAB 26(8),53,1982
IPR-MUS LD50:528 MG/KG	STRAAA 127,245,1965
SCU-MUS LD50:8285 MG/KG	FAONAU 48A,99,1970
IVN-MUS LD50:1973 MG/KG	HBTXAC 1,128,1955
ORL-RBT LD50:6300 MG/KG	HBTXAC 1,130,1955
IPR-RBT LD50:963 MG/KG	EVHPAZ 61,321,1985
IVN-RBT LD50:2374 MG/KG	EVHPAZ 61,321,1985
ORL-GPG LD50:5560 MG/KG	JIHTAB 23,259,1941
IPR-GPG LD50:3414 MG/KG	EVHPAZ 61,321,1985
IPR-HAM LD50:5068 MG/KG	EVHPAZ 61,321,1985
IPR-MAM LD50:4300 MG/KG	TXAPA9 13,358,1968

TARGET ORGAN DATA

BEHAVIORAL (SLEEP)

BEHAVIORAL (CHANGE IN MOTOR ACTIVITY)

BEHAVIORAL (ATAXIA)

BEHAVIORAL (ANTIPSYCHOTIC)

BEHAVIORAL (HEADACHE)

BEHAVIORAL (CHANGE IN PSYCHOPHYSIOLOGICAL TESTS)

LUNGS, THORAX OR RESPIRATION (CHRONIC PULMONARY EDEMA OR CONGESTION)

LUNGS, THORAX OR RESPIRATION (DYSPPNAE)

LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)

GASTROINTESTINAL (ALTERATION IN GASTRIC SECRETION)

GASTROINTESTINAL (HYPERMOTILITY, DIARRHEA)

GASTROINTESTINAL (NAUSEA OR VOMITING)

GASTROINTESTINAL (OTHER CHANGES)

LIVER (FATTY LIVER DEGENERATION)
LIVER (TUMORS)
ENDOCRINE (CHANGE IN GONADOTROPINS)
ENDOCRINE (OTHER CHANGES)
BLOOD (OTHER CHANGES)
BLOOD (LYMPHOMA INCLUDING HODGKIN'S DISEASE)
PATERNAL EFFECTS (TESTES, EPIDIDYMIS, SPERM DUCT)
EFFECTS ON FERTILITY (FEMALE FERTILITY INDEX)
EFFECTS ON FERTILITY (MALE FERTILITY INDEX)
EFFECTS ON FERTILITY (POST-IMPLANTATION MORTALITY)
EFFECTS ON FERTILITY (OTHER MEASURES OF FERTILITY)
EFFECTS ON EMBRYO OR FETUS (EXTRA EMBRYONIC STRUCTURES)
EFFECTS ON EMBRYO OR FETUS (CYTOLOGICAL CHANGES)
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)
EFFECTS ON EMBRYO OR FETUS (FETAL DEATH)
EFFECTS ON EMBRYO OR FETUS (OTHER EFFECTS TO EMBRYO OR FETUS)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (EYE, EAR)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (CRANIOFACIAL)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (RESPIRATORY SYSTEM)
EFFECTS ON NEWBORN (GROWTH STATISTICS)
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR
COMPLETE INFORMATION.

SECTION 12. ----- ECOLOGICAL INFORMATION -----
DATA NOT YET AVAILABLE.

SECTION 13. ----- DISPOSAL CONSIDERATIONS -----
BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND
SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY
FLAMMABLE.

OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. ----- TRANSPORT INFORMATION -----
CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. ----- REGULATORY INFORMATION -----

EUROPEAN INFORMATION
EC INDEX NO: 603-002-00-5
HIGHLY FLAMMABLE

TOXIC

R 11

HIGHLY FLAMMABLE.

R 20/22

HARMFUL BY INHALATION AND IF SWALLOWED.

S 7

KEEP CONTAINER TIGHTLY CLOSED.

S 16

KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.

S 24

AVOID CONTACT WITH SKIN.

S 45

IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

TLV AND SOURCE

FOR METHYL ALCOHOL - SKIN:

ACGIH TLV-TWA: 200 PPM (260 MG/M3); STEL: 250 PPM (310 MG/M3).

OSHA PEL: 8 H TWA 200 PPM (260 MG/M3); STEL: 250 PPM (310 MG/M3).

FOR ETHYL ACETATE:

ACGIH TLV-TWA: 400 PPM (1440 MG/M3).

OSHA PEL: 8H TWA 400 PPM (1400 MG/M3).

FOR 4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE):

ACGIH TLV-TWA: 50 PPM; STEL: 75 PPM.

OSHA PEL FINAL: 8H TWA 50 PPM (205 MG/M3); STEL: 75 PPM (300 MG/M3).

FOR HEPTANE:

ACGIH TLV-TWA: 400 PPM (1640 MG/M3); STEL: 500 PPM (2050 MG/M3).

OSHA PEL: 8H TWA 400 PPM; STEL: 500 PPM.

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

ACGIH TLV-NOT CLASSIFIABLE AS A HUMAN CARCINOGEN DTLVS* TLV/BEI,1999

ACGIH TLV-TWA 1000 PPM DTLVS* TLV/BEI,1999

IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE IMEMDT 44,35,1988

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION

FEREAC 54,7740,1989

MSHA STANDARD-AIR:TWA 1000 PPM (1900 MG/M3)

DTLVS* 3,103,1971

OSHA PEL (GEN INDU):8H TWA 1000 PPM (1900 MG/M3)

CFRGBR 29,1910.1000,1994

OSHA PEL (CONSTRUC):8H TWA 1000 PPM (1900 MG/M3)

CFRGBR 29,1926.55,1994

OSHA PEL (SHIPYARD):8H TWA 1000 PPM (1900 MG/M3)

CFRGBR 29,1915.1000,1993

OSHA PEL (FED CONT):8H TWA 1000 PPM (1900 MG/M3)

CFRGBR 41,50-204.50,1994

OEL-AUSTRALIA: TWA 1000 PPM (1900 MG/M3), JAN1993

OEL-AUSTRIA: MAK 1000 PPM (1900 MG/M3), JAN1999

OEL-BELGIUM: TWA 1000 PPM (1880 MG/M3), JAN1993

OEL-DENMARK: TWA 1000 PPM (1900 MG/M3), JAN1999

OEL-FINLAND: TWA 1000 PPM (1900 MG/M3), STEL 1250 PPM (2400 MG/M3),

JAN1999 OEL-FRANCE: VME 1000 PPM (1900 MG/M3), VLE 5000 PPM, JAN1999

OEL-GERMANY: MAK 1000 PPM (1900 MG/M3), JAN1999

OEL-HUNGARY: TWA 1000 MG/M3, STEL 3000 MG/M3, JAN1993

OEL-THE NETHERLANDS: MAC-TGG 500 PPM (950 MG/M3), JAN1999

OEL-NORWAY: TWA 500 PPM (950 MG/M3), JAN1999

OEL-THE PHILIPPINES: TWA 1000 PPM (1900 MG/M3), JAN1993

OEL-POLAND: MAC(TWA) 1000 MG/M3, MAC(STEL) 3000 MG/M3, JAN1999

OEL-RUSSIA: STEL 1000 MG/M3, JAN1993

OEL-SWEDEN: NGV 500 PPM (1000 MG/M3), KTV 1000PPM (1900 MG/M3), JAN1999

OEL-SWITZERLAND: MAK-W 1000 PPM (1900 MG/M3), JAN1999
OEL-THAILAND: TWA 1000 PPM (1900 MG/M3), JAN1993
OEL-TURKEY: TWA 1000 PPM (1900 MG/M3), JAN1993
OEL-UNITED KINGDOM: TWA 1000 PPM (1950 MG/M3), SEP2000
OEL IN ARGENTINA, BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV;
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV
NIOSH REL TO ETHYL ALCOHOL-AIR:10H TWA 1000 PPM
NIOSH* DHHS #92-100,1992
NOHS 1974: HZD 31500; NIS 430; TNF 157709; NOS 242; TNE 2088926
NOES 1983: HZD 31500; NIS 334; TNF 86077; NOS 222; TNE 2069125; TFE
1014002
EPA GENETOX PROGRAM 1988, POSITIVE: RODENT DOMINANT LETHAL
EPA GENETOX PROGRAM 1988, NEGATIVE: ASPERGILLUS-FORWARD MUTATION;
SHE-CLONAL ASSAY
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO
EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO CYTOGENETICS-NONHUMAN;
MAMMALIAN MICRONUCLEUS
EPA GENETOX PROGRAM 1988, NEGATIVE: N CRASSA-ANEUPLOIDY; HISTIDINE
REVERSION-AMES TEST
EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO SCE-HUMAN LYMPHOCYTES; IN
VITRO SCE-HUMAN
EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO SCE-NONHUMAN; SPERM
MORPHOLOGY-MOUSE
EPA GENETOX PROGRAM 1988, NEGATIVE/LIMITED: CARCINOGENICITY-MOUSE/RAT
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 2001
NIOSH ANALYTICAL METHOD, 1994: ETHANOL IN BLOOD, 8002
NIOSH ANALYTICAL METHOD, 1994: ALCOHOLS I, 1400
NTP CARCINOGENESIS STUDIES; ON TEST (TWO YEAR STUDIES), OCTOBER 2000
U.S. INFORMATION
4.7% METHANOL 67-56-1
1.0% METHYL ISOBUTYL KETONE 108-10-1
THESE PRODUCTS ARE SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.
SECTION 16. ----- OTHER INFORMATION-----
THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO
BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. SIGMA, ALDRICH,
FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING
OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR
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WARRANTY POLICY

THIS OASIS 150 CHILLER IS COVERED UNDER A ONE-YEAR PARTS AND LABOR WARRANTY.

WARRANTY COVERAGE:

Products with defects in components or manufacturing which are reported to Solid State Cooling Systems (SSCS) before the end of the warranty period will be repaired or replaced at no cost (see "How to Obtain Service" below). The warranty period begins on the date the product was initially shipped from SSCS's factory. SSCS will provide a Failure Analysis Report when the product is returned.

Excluded from Warranty:

Excluded from warranty is any damage caused to the product occurring during, but not limited to, such events as shipment, installation, storage, or non-normal usage, or usage in 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 the Oasis chiller.
- Subjecting the Oasis to temperatures over 60 °C or operating it in ambient temperatures greater than 40 °C.
- Subjecting a heat exchanger to unfiltered water or coolants not specified in the manual.
- Subjecting any product to temperature, voltage, current, or pressure (internal or external) greater than that specified in the product manual.
- Any actions prohibited in the "Caution" section of the product manual.
- Using voltages above 14 VDC.

How To Obtain Service

1. Note the product's serial number and call Customer Service at 845-296-1300 during business hours, 8 a.m. to 5 p.m. weekdays. Please note that the serial number is mandatory to receive warranty service.
2. Customer Service will collect the serial number and contact and shipping information and provide an RMA number.
3. For units in warranty: The customer is responsible for paying shipping of the Oasis to SSCS. SSCS will pay return shipping of all units in warranty.
4. For units out of warranty: A standard repair price quote will be issued. The chiller may be shipped to SSCS under the assigned RMA number; however, repair work cannot begin until a purchase order is received at SSCS. A ship date for the repaired chiller will be acknowledged within 48 hours of receiving the customer purchase order.