

OASIS

The Smallest Recirculating Chiller on the Planet



Product Manual

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CE Declaration of Conformity

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

declare under our sole responsibility that the

Oasis (All Models)

meets the provisions of the directives:

2004/108/EC
 2006/95/EC


EMC Directive
 Voltage Directive

EN 61326-1: 2006
 EN 61000-3-2: 2006
 EN 61000-3-3: 2008

Emissions and Immunity
 Harmonics Emissions
 Voltage Fluctuations and Flicker

EN 61010-1: 3rd Edition

Safety:
 Low Voltage Directive Safety requirements for electrical
 equipment for measurement, control, and laboratory use.

Lloyd F Wright Chief Technology Officer	
Date	October 22, 2013

SAFETY PRECAUTIONS AND SYMBOLS



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! Risk of electric shock. Disconnect the power cord prior to servicing. This includes opening the cover for any reason.

CAUTION

- * Never disassemble the chiller as irreparable damage may occur.
 - * Never store the chiller over 60 °C.
 - * Never operate the chiller in ambient temperatures of 40 °C or greater.
 - * Never operate the chiller within 2 °C of the coolant's freezing point.
 - * Never use alcohol (methanol, ethanol or isopropanol) based coolants.
 - * Always use only proper coolants as specified in manual. Solid State Cooling Systems recommends Koolance LIQ-702CL-B (27% propylene glycol and water)
 - * Never ship the chiller with coolant inside the liquid cold plate as freezing temperatures may be encountered which would damage the unit. Always pump all coolant out of the chiller prior to shipping.
 - * Always match wetted materials (metal) to the wetted materials in your system. If your system has aluminum cold plates/tubing, use the standard Oasis. If your system has copper cold plates/tubing, select the Oasis copper models. Stainless steel may be used with either material.
-

Symbols Used in this Manual



CAUTION

The red CAUTION equilateral triangle symbol appears throughout the manual. Please follow the important instructions accompanying this symbol to avoid significant damage to the chiller.



WARNING

The red WARNING equilateral triangle symbol appears throughout the manual accompanying certain maintenance and repair activities. Please follow the important instructions accompanying this symbol to avoid situations that could cause injury to the operator or other personnel.



OASIS 160/170/180/190 THERMOELECTRIC CHILLER

PRODUCT

Manual

SECTION 1 INTRODUCTION

The Oasis recirculating chiller utilizes thermoelectric technology to deliver between 160 and 190 Watts of cooling capacity without the use of compressors or refrigerants. With fewer moving parts, the system is highly reliable and energy efficient.

As the world's smallest, air cooled recirculating chiller, Oasis is the ideal solution for a variety of applications, including precision lasers, analytical equipment, medical equipment, lab equipment, low-light CCD cameras, microtiter testing, or any other application requiring precise, point of use temperature control. Oasis provides 500 ml/min of constant temperature coolant with a stability of $\pm 0.1^{\circ}\text{C}$.

The system is versatile and simple to operate. 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.

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

- (1) Oasis Recirculating Liquid Chiller
- (1) 200 watt 13.5 VDC Table Top Power Supply
- (1) AC Line Cord
- (1) 250 ml Squirt Bottle
- (2) Valve quick disconnect fittings, 1/8th inch hose barb

SECTION 2**SPECIFICATIONS**

Operating Range (Set Point):	160/180 model: 2°C to 45°C 170/190 model: 10°C to 45°C
Ambient Temperature Range:	10°C to 40°C non-condensing
Stability / Repeatability:	±0.1°C with constant load (even near ambient)
Cooling Capacity (typical ¹):	160 model: 160 Watts @ 20°C in 20°C ambient air 170 model: 170 Watts @ 20°C in 20°C ambient air 180 model: 180 Watts @ 20°C in 20°C ambient air 190 model: 190 Watts @ 20°C in 20°C ambient air
Noise Level (at 1 meter):	< 63 dBA
Coolant / Process Fluid:	Koolance (27% propylene glycol / water mix) or 27-50% ethylene glycol / water mix (contact SSCS for advice on other fluids)
Process Fluid Fittings:	1/8" female CPC quick connect with shut-off valve
Process Fluid Flow Rate:	~0.45 lpm @ 10 psi
Pump:	Compact magnetically coupled gear pump with brushless DC motor
Tank Volume:	75 ml with level sensor (optional sealable tank cap)
Wetted Materials:	Aluminum + polymers or Copper + polymers
Dimensions (L x W x H):	7.5" x 5" x 7" (19cm x 13cm x 18cm)
Weight:	8 lbs (3.5 kg) [10 lbs (4.5 kg) with copper]
Power Input (external supply):	Universal: 100-240 VAC, 50/60 Hz, 2.8 amps max
Electrical Connections:	Plug in AC adaptor on 2 pin male connector
Power Consumption:	less than 200 Watts
Operating Voltage:	13.5 VDC, 15 amps max (less than 200W power consumption)
Controls:	Digital PID controller for heating and cooling
Communications:	Keypad or RS232 interface
Alarms	Temperature, fluid level, system or component failure (display, RS232 and dry contact)
Standards	TUV listed to UL, CAN/CSA and EN 61010-1, CE 61010-1, (optional upgrade for RoHS compliance)
Warranty	1 year

Note 1: Cooling capacities shown are typical. Actual cooling capacity may vary with configuration.

Figure 1
Oasis Cooling Capacity in 20°C Ambient

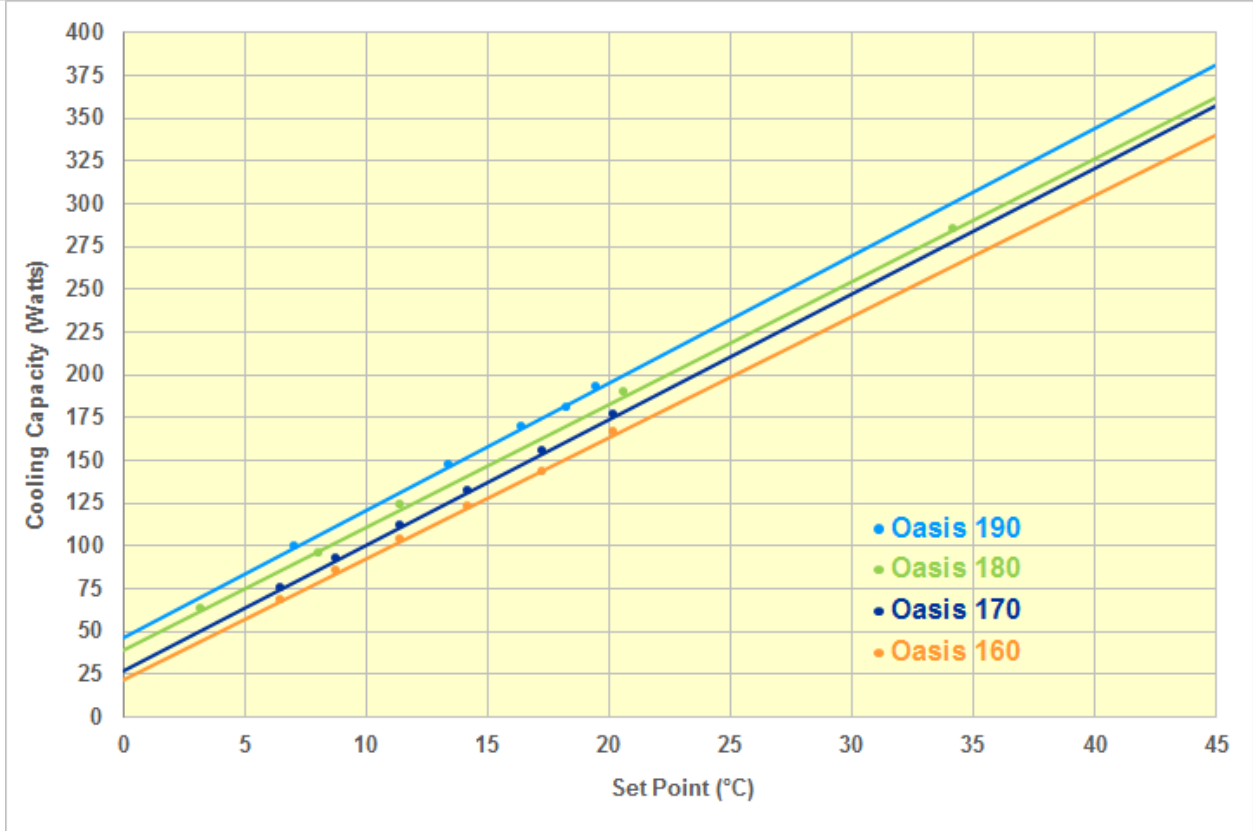
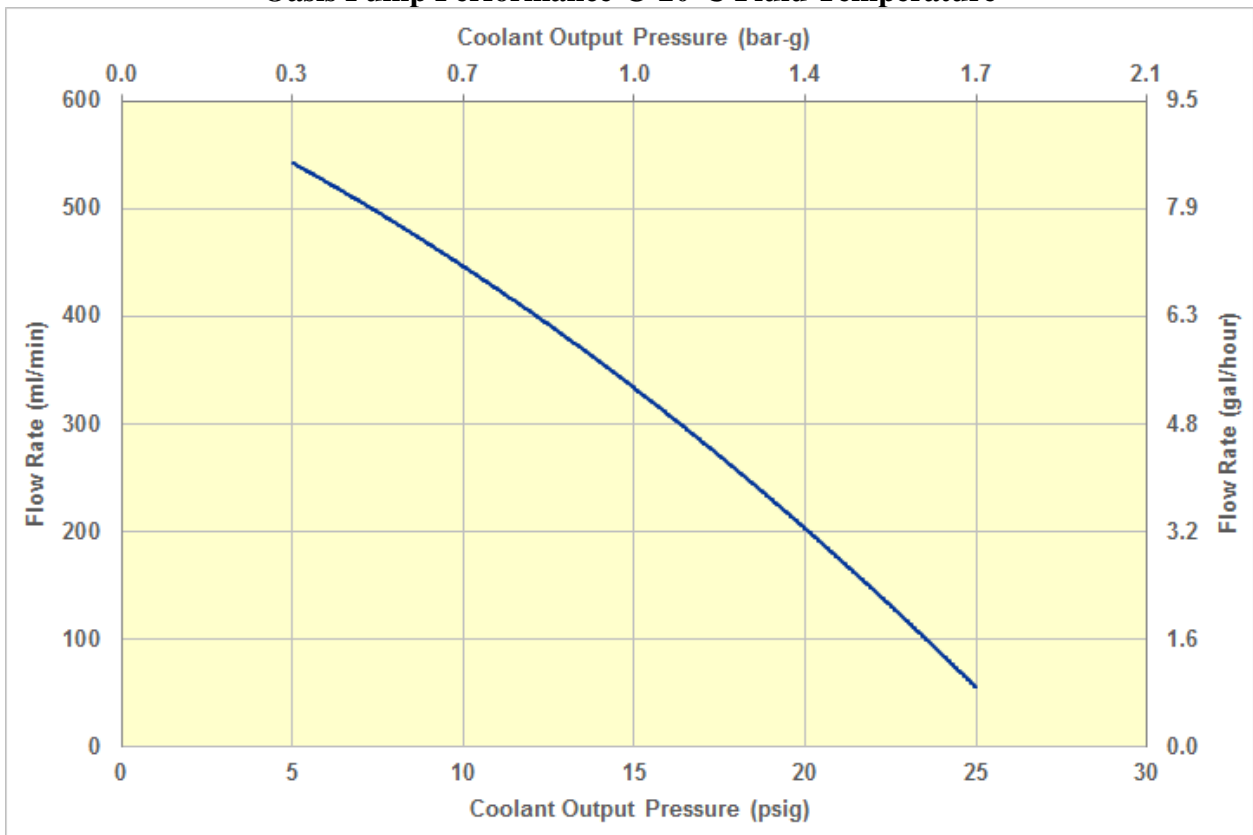


Figure 2
Oasis Pump Performance @ 20°C Fluid Temperature



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

SECTION 3

HOOK UP

Figure 3A: Top View

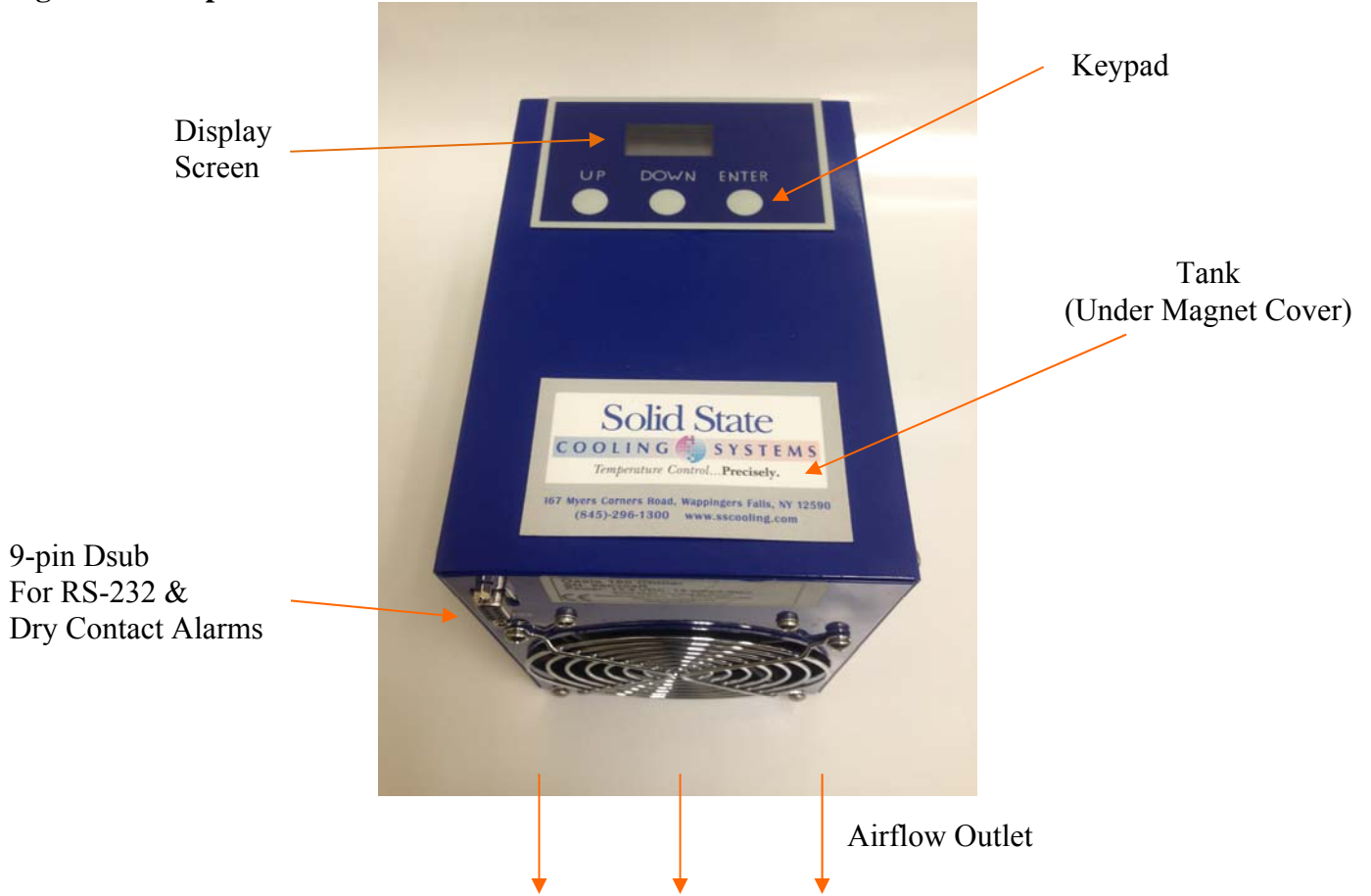
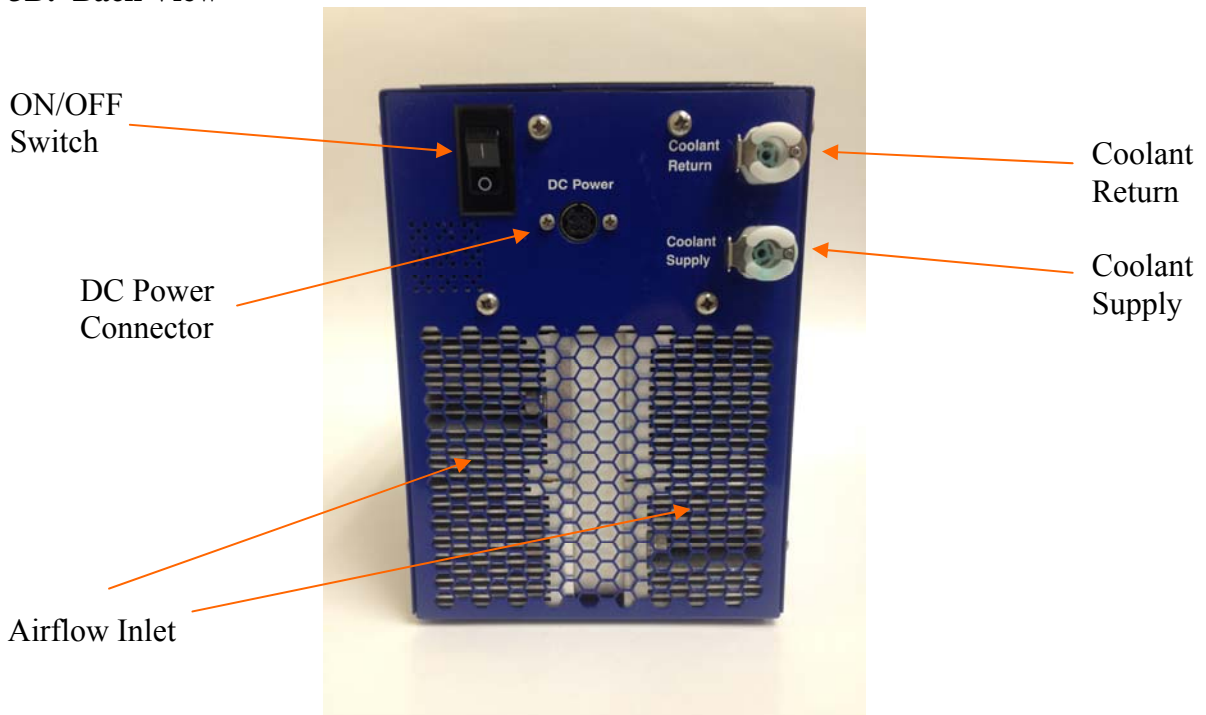


Figure 3B: Back View



3.1 ELECTRICAL CONNECTIONS (SEE FIGURES 3A AND 3B)



WARNING

Electrical Shock
Hazard: Never Plug
in a Line Cord with
Wet Hands

Power: Oasis comes with a 200w 13.5VDC bench top power supply. Plug the DC output connector into the Oasis as shown in figure 3B.

The Kycon KPPX-4P has the following pin configuration:

Pin 1	13.5 VDC (+)
Pin 2	13.5 VDC (-)
Pin 3	13.5 VDC (+)
Pin 4	13.5 VDC (-)

A wide variety of power cords are available to support universal power operation:

Country / Region	Part Number
USA/Canada	22-22333-1
Europe	22-22333-2
Japan	22-22333-3
UK	22-22333-4
Israel	22-22800-1
Australia	22-23213-1
Korean	22-23526-1
China (3 prong)	22-23661-1
NEMA 6-15 208 US Straight	16-23918-1
NEMA L6-15 208 US Twist	16-23918-2

Alarms: 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: Oasis 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 3A AND 3B)



CAUTION

Always match wetted materials to avoid potentially corroding your system or clogging the cold plates

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

IMPORTANT NOTE: Always match wetted materials (metal) to the wetted materials in your system. If your system has aluminum cold plates/tubing, use the standard Oasis. If your system has copper cold plates/tubing, select the Oasis copper models. Stainless steel may be used with either material. Using copper/brass and aluminum in the same system with water coolants may result in corroded metals and clogging of the cold plates in the Oasis unit or system being controlled.

3.3 AIR CONSIDERATIONS

Restricting airflow into or out of the Oasis unit 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



WARNING

Read the Coolant MSDS Prior to filling the

The coolant fill cap (or optional sealable tank plug) is located at the top of the unit. Twist and remove the cap (or plug) then use the 250 ml bottle (shipped with the chiller) to fill reservoir prior to starting unit.

Solid State Cooling Systems recommends Koolance LIQ-702CL-B (27% propylene glycol and water) with corrosion inhibitors and algaecides. (Note: propylene glycol is non-toxic). This coolant has the added benefit of extending the Oasis chiller's pump life.



CAUTION

Use only recommended coolants

Water or ethylene glycol/water mixtures are also acceptable as coolants. Note that algae growth can occur when water is used without at least 25% propylene or ethylene glycol.

IMPORTANT NOTE: Use of methanol, ethanol or isopropanol as coolants, either by themselves or in water mixtures will damage the Oasis pump.

SECTION 4

START UP



WARNING

Electrical Shock Hazard:
Never Plug in a Line Cord
with Wet Hands

Start-up the chiller using the following steps:

- 1) Connect 1/8" ID hose to fluid connections located on the back side, labeled Coolant Supply and Coolant Return.
- 2) Open the reservoir cap on top (or remove optional sealable plug). Using the 250 ml bottle provided, fill the reservoir to just below the bottom of its neck with coolant.
- 3) Plug in the 13.5 VDC table top power supply or connect 13.5 VDC power to the DIN connector (wired as shown in section 3.1).
- 4) Optional: connect the alarm signal to the 9-pin dsub connector as shown in 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 system 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 chiller tank is filled above the bottom of its neck, coolant can leak out the top when the cap is closed (unless the optional sealable tank plug is being used).

SECTION 5

OPERATION

The chiller is operated via the control panel located on the top of the unit. 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

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 chiller and wait for display to read TEMP: XX.X°C
- 2) Press the UP or DOWN keys to change SETTEMP1 to the desired set point.
- 3) Press the ENTER key.

The chiller will now control to the set point temperature. To change the set point temperature just press the UP or DOWN keys again to change SETTEMP1 to the new set point, followed by the ENTER key.

5.2 ADVANCED OPERATION

Oasis 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 or Increase Value

▼Down or Decrease Value

↵ Press Enter Momentarily

—————▶ Press & Hold Enter Key 3 Sec

SIMPLE OPERATION		ADVANCED OPERATION
(STATUS MENU)	press and hold enter key	(PARAMETER INPUT MENU)
TEMP: XX.X°C (current temp)	—————▶	PASSWORD XXXX ^(see notes 1+2)
PRESS ▼OR ▲ (change set point)		↵
SETTEMP1 XX.X°C		SETTEMP1 XX.X°C
↵		↵
TEMP: XX.X°C (current temp)		SETTIME1 XXXX (in minutes ⁴)
		↵
		SETTEMP2 XX.X°C
		↵
		SETTIME2 XXX (in minutes ⁴)
		↵
		# CYC XXX ^(see note 3)
		↵
		ALRM TMP +/-X.X°C
		↵
		OFFSET +/-X.X°C
		↵
		CHNG PWD Y/N (change password)

Allowable Value Ranges:

SETTEMP1	2 TO 45 °C
SETTIME1	0 TO 999 minutes
SETTEMP2	2 TO 45 °C
SETTIME2	0 TO 999 minutes
# OF CYC	0 TO 999
ALRM TMP	1 TO 9 °C in 0.1°C increments
OFFSET	-5 °C TO 5 °C in 0.1°C increments
CHNG PWD	Y OR N

NOTES:

1. When entering the PASSWORD, enter one digit at a time
2. The default password is 0000, until changed by the user
3. If continuous control at one set-point temperature is desired, set # OF CYCLES to zero.
4. Time units may be preset or reset to seconds or hours (contact SSCS for instructions how)

Status Menu: The status menu displays the current coolant temperature in °C 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 chiller will control at temperature SETTEMP1.

ALRM TMP = +/- Alarm temperature set point.

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

OFFSET = 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 sensor.

Also adjusts RS-232 temperature reported.

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

5.3 ALARM SIGNAL

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



WARNING

Electrical Shock Hazard:
Always unplug the unit
before removing the
cover.



WARNING

Do not attempt to service or
repair the unit beyond the
troubleshooting checks
described in this section
without first contacting
Solid State Cooling Systems

Oasis has two 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 (or plug) and add more process fluid 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 chiller 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 underside of the cover. If the connector is firmly attached, contact SSCS for an 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 fittings on the Oasis. If the coolant lines are not blocked, contact SSCS for an RMA number to return the unit for pump replacement.*

IMPORTANT NOTE: The tank level low alarm will automatically reset when the tank is filled. The RTD failure alarm will not reset until the system power is turned off.

OTHER ISSUES:

COOLING CAPACITY INSUFFICIENT: *If the chiller 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 845-296-1300.*

SECTION 7

RS-232 COMMUNICATION

Oasis comes with a modified (pin-out) RS232 communication port. The chiller uses this port to communicate a comprehensive set of control parameters with a Host PC - these parameters are outlined in Section 7.2. This port is a 9-pin female d-sub connector and is found on the front of the chiller (see Figure 3A).

Note also that pins 1 and 6 on this port are connected to a dry contact relay and thus the RS-232 connecting cable must be customized. This relay is "closed" when the unit is functioning properly and the RTD temperature is within the Alarm Range. The relay is "open" when the RTD temperature is outside the Alarm Range or any other fault exists.

7.1 COMMUNICATION SPECIFICATION

Wiring: Proper wiring depends upon whether the equipment being cooled (the Host) is wired as Data Computer Equipment (DCE) or Data Terminal Equipment (DTE)

Table 1A: Signal definition and wiring for Host wired as DCE

Host / Master (DCE) 9-Pin D-sub Pin #	Oasis / Slave (DTE) 9-Pin Female D-sub Pin#
2 (Receive – RXD)	2 (Transmit – TXD)
3 (Transmit – TXD)	3 (Receive – RXD)
5 (Ground)	5 (Ground)

Table 1B: Signal definition and wiring for Host wired as DTE

Host / Master (DTE) 9-Pin D-sub Pin #	Oasis / Slave (DTE) 9-Pin Female D-sub Pin#
2 (Transmit – TXD)	3 (Receive – RXD)
3 (Receive – RXD)	2 (Transmit – TXD)
5 (Ground)	5 (Ground)

Specification

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

7.2 COMMUNICATION PROTOCOL

Table 2: Command and Data Bytes

	Bit Position	Description	Bit =1	Bit = 0
Command Byte	Bit 7 (MSB)	Set Remote Control	remote control	local control (chiller)
	Bit 6	Remote On/Off	chiller On	chiller in standby
	Bit 5	Communication Direction	remote to chiller (command from master)	chiller to remote (status from chiller)
	Bits 4 – 0	Parameters being communicated (see table 2)		
Data Bytes	1 or 2 bytes depending on parameter (see tables 3 and 4)			

Timing: Oasis can accept a maximum of three commands per second

Table 3: Control Parameter

Bits 4 – 0	Parameter	No of Data Bytes
00001	Chiller set point temperature	2
01001	Current temperature at chiller coolant output	2
01000	Faults from chiller (fan, RTD failure, etc.)	1

Table 4: Temperature Data Bytes (2 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:

Temperature (examples)	High Byte	Low Byte	Hexadecimal
0.1 °C	00000000	00000001	0001
1.0 °C	00000000	00001010	000A
10.0 °C	00000000	01100100	0064
20.0 °C	00000000	11001000	00C8
30.0 °C	00000001	00101100	012C
40.0 °C	00000001	10010000	0190

Table 5: Faults Data Byte (1 byte)

0 = OK, 1 = Fault

Bit Position	Fault Assigned	Hex value when fault is present
7 (MSB)	Temperature below alarm range	80
6	unassigned	N/A
5	unassigned	N/A
4	RTD fault	10
3	unassigned	N/A
2	Temperature above alarm range	04
1	unassigned	N/A
0	Tank Level Low	01

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.

7.3 RS232 COMMUNICATION EXAMPLES

Example	Communications Sequence
1) Send set point of 25°C to chiller	Host sends command byte = E1 (hex)
	Host sends LOW data byte = FA (hex)
	Host sends HIGH data byte = 00 (hex)
	Chiller sends command byte = E1 (hex)
2) Read chiller set point	Host sends command byte = C1 (hex)
	Chiller sends command byte = C1 (hex)
	Chiller sends LOW data byte = set point value in hex (LB)
3) Read the actual temperature	Chiller sends HIGH data byte = set point value in hex (HB)
	Host sends command byte = C9
	Chiller sends command byte = C9
4) Read the faults table	Chiller sends LOW data byte = actual temp in hex (LB)
	Chiller sends HIGH data byte = actual temp in hex (HB)
	Host sends command byte = C8
	Chiller sends command byte = C8
	Chiller sends faults data byte = fault data in hex

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

Koolance MSDS – LIQ-702 Coolant Fluid



Manufacturer Safety Data Sheet

Last Updated: Jul, 2013

LIQ-702 Coolant Fluid

1. Product and Manufacturer Information

Company: Koolance Korea
 Address: RM801, Dongyoung Venturastel 3rd, Anyang City, Kyunggi-Do, Korea 730-728
 Telephone: (U.S.) +01 253-249-7669
 Fax: (U.S.) +01 253-249-7453

Appearance: Liquid for cooling systems. Available in various colors and shipped in plastic bottles or containers.
 Usage: For use in cooling systems only. Do not use in foodstuffs, beverages, or in other applications.

2. Hazard Identification

Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

- Physical Hazard: Not applicable
- Health Hazard: Skin Irritation – Category 2
Eye Irritation – Category 2
- Environmental Hazard: Not applicable

Label elements including precautionary statements.

Symbol:



Signal word: Warning

Hazard statement: H315 – May cause irritation to the skin.
H319 – May cause serious irritation to the eyes.

Prevention: P264 - Wash thoroughly after handling
P280 - Wear protective gloves, clothing, and eye protection.

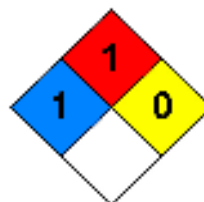
Responses:

- P302+P352 If on skin: Wash exposure area with plenty of water and soap.
- P337+P313: If skin irritation persists, seek medical attention immediately.
- P305+P351+P338 If in eyes: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.
- P337+P313: If eye irritation persists, seek medical attention immediately.
- P362: Remove contaminated clothing and wash before reuse.

Storage / Disposal: P501: Refer to all federal, provincial, state, and local regulation prior to disposition of container and unused contents by reuse, recycle, or disposal.

NFPA Rating (estimated)

Health: 1
 Flammability: 1
 Reactivity: 0
 Water Reactivity: 0



3. Composition / Information on Ingredients

Ingredients	CAS No.	EINECS No.	Conc. %
Distilled Water	7732-18-5	231-791-2	70 – 75
Propylene glycol	57-55-6	200-338-0	25 – 30
Others (Proprietary)	-	-	0.2 – 2.0

1 of 5

4. First Aid Measures

- In case of eye contact: Rinse thoroughly with plenty of water for at least 20 minutes. If irritation remains, consult a medical doctor immediately.
- In case of skin contact: Remove contaminated clothing. Wash with soap and plenty of water for at least 20 minutes. If irritation remains, consult a medical doctor immediately.
- If inhaled: Move person to fresh air. If not breathing, give artificial respiration and immediately contact emergency medical assistance.
- If ingested: Never give anything by mouth to an unconscious person. Rinse mouth with water and consult a medical doctor immediately.

Other medical attention: Medical persons should be aware of protective measures for handling.
Potential health effects: May be harmful if swallowed.

5. Fire-Fighting Measures

- Flash Point: 118°C (Cleveland open cup)
- Suitable extinguishing media: Water spray, alcohol-resistant foam, dry chemical, carbon dioxide
- Specific hazards arising from the chemical: No data available
- Special protective equipment for fire fighters:
 - Use water spray to cool unopened containers.
 - Fire fighters should enter area wearing respiratory protection and protective equipment.

6. Accidental Release Measures

Personal Precautions:

- Ensure adequate ventilation.
- Remove all sources of ignition.
- Avoid contact with skin and eyes.
- Avoid inhalation of vapor, mist, or gas.

Environmental Precautions:

- Follow local regulations.

Methods and materials for containment and clean-up:

- Collect with non-combustible absorbent materials (sand and soil).

7. Handling and Storage

Precautions for safe handling:

- Wear protective gloves, clothing, and eye/face protection.
- Do not spray on an open flame or other ignition source.
- Provide forced air ventilation in tanks and confined spaces.
- Avoid contact with skin and eyes.
- Avoid inhalation of vapor, mist, or gas.
- Keep away from sources of ignition. No smoking.

Conditions for safe storage:

- Keep container tightly closed.
- Keep in a dry and well-ventilated place.
- Keep cool.
- Avoid direct sunlight, heat sources, and strong oxidizing agents.

8. Exposure Control / Personal Protection

Conditions for safe storage:

- KOSHA: No data available
- US ACGIH: No data available

Appropriate engineering controls:

- Respiratory protection: Approved respirator equipped with cartridge for organic vapors
- Eye protection: Protective goggles
- Hand protection: Chemical resistant gloves

9. Physical and Chemical Properties

- State: Liquid at 20°C
- Flash Point: 118°C (Cleveland open cup). No flash occurred under 93°C (Tag closed cup)
- pH: 7.0 – 8.0 at 20°C; Sample H₂O = 1:5 (V/V)
- Viscosity: 2.3 mPa x s (cP) at 20°C
- Density: 1.003 at 20°C
- Water solubility: Soluble at 20°C
- Explosive properties: No self-reaction hazard; UN TDG test & criteria – Test E3
- Autoignition temperature: No spontaneous combustion under 300°C
- Boiling point (initial): >98°C
- Melting range: No data available
- Vapor pressure: No data available
- Oxidizing properties: No data available
- Partition coefficient (n-octanol/water): No data available
- Evaporation rate: No data available
- Decomposition temperature: No data available
- Lower explosion limit / Upper explosion limit: No data available

10. Stability and Reactivity

Chemical stability:

Stable under recommended storage conditions.

Conditions to avoid:

Direct sunlight, heat, flames, and sparks. Vapors may form explosive mixture with air.

Materials to avoid:

Strong oxidizing agents.

Hazardous decomposition products:

Carbon oxides

11. Toxicological Information

- Acute toxicity (Calculated):

Oral	rat	LD50 : 5,155 mg/kg
Skin	rabbit	LD50 : 32,000 mg/kg
Inhalation	rat	LC50 : 95 mg/kg
- Skin irritation: Irritating (Calculated, Category 2)
- Eye irritation: Irritating (Calculated, Category 2)
- Respiratory sensitization: No data available
- Skin sensitization: No data available
- Germ cell mutagenicity: No data available
- Carcinogenicity: Not classifiable; from IARC / EC ESIS
- Reproductive Toxicity: No data available
- Specific target organ toxicity – single exposure (GHS): No data available
- Specific target organ toxicity – repeated exposure (GHS): No data available
- Aspiration hazard: No data available

12. Ecological Information

- Acute toxicity (Calculated):

Fish	LC50 : 760mg/l 96hr Pimephales promelas
Crustacean	LC50: 1,024mg/l 48hr Daphnia magna
Bird	EC50: 686mg/l 96hr Selenastrum capricomutum
- Persistence and degradability: No data available
- Bioaccumulative potential: No data available
- Mobility in soil: No data available
- Other adverse effects: No data available

13. Disposal Considerations

Disposal consideration:

Observe all environmental regulations.

Disposal precaution:

Avoid disposing in the environment.

14. Transport Information

- TSCA: All ingredients are listed on the TSCA inventory
- DOT Classification: Not a DOT controlled material (U.S.)
- UN TDG: Not dangerous goods
- IMDG: Not dangerous goods
- IATA: Not dangerous goods
- Marine pollution: Not applicable
- Special precaution:
 - Fire EmS Guide: F-E (Recommendation)
 - Spillage EmS Guide: Not dangerous goods

15. Regulatory Information

- Korea Industrial Safety and Health Act (GHS): Eye irritation – Category 2
- Korea Industrial Safety and Health Act (GHS): Skin irritation – Category 2
- Korea Hazardous Materials Safety Control Act: Not hazardous material
- Korea Toxic Chemicals Control Act: Not a toxic chemical
- Korea Persistent Organic Pollutants Control Act: Not applicable
- US OSHA Hazards (GHS): Eye irritation
- US OSHA Hazards (GHS): Skin irritation

16. Other Information

References:

- GHS Classification: EC ESIS, US NLM
- Physical and chemical properties: EC ESIS, US NLM
- Transport information: EC ESIS, US NLM
- Toxic and ecological information: OECD SIDS, IUCLID, US NLM, IARC, EC ESIS, CCRIS

Acronyms and Websites:

- EC ESIS : European chemical Substances Information System,
<http://esis.jrc.ec.europa.eu/>
- IUCLID : International Uniform Chemical Information Database,
<http://esis.jrc.ec.europa.eu/>

- US NLM : U.S. National Library of Medicine, <http://chem.sis.nlm.nih.gov/chemidplus/>
- HSDB : US Hazardous Substances Data Bank, <http://toxnet.nlm.nih.gov/>
- CCRIS : US Chemical Carcinogenesis Research Information System, <http://toxnet.nlm.nih.gov/>
- IARC : International Agency for Research on Cancer, <http://monographs.iarc.fr>

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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:

lcl: 3.2; ucl: 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.

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

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

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	--Canada--			
	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: 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:

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WARRANTY POLICY

The Oasis Chiller is covered under a one-year parts and labor warranty from the date of shipment, assuming proper use and maintenance of the unit. All warranty work shall be performed at Solid State Cooling Systems' facility, currently located in Wappingers Falls, NY, USA and requires pre-authorization by SSCS. Malfunctioning products should be returned to Solid State Cooling Systems by the method described below. Solid State Cooling Systems will provide a Failure Analysis Report to the customer and will determine if the problem is covered under the warranty.

Warranty Coverage:

Products with defects in components or manufacturing which are reported to Solid State Cooling Systems before the end of the warranty period will be repaired or replaced at no cost (see below for reporting requirements). The warranty period begins on the date the product was initially shipped from Solid State Cooling Systems' factory.

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 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 the product.
- Changing any components of the product.
- Subjecting the product to temperatures below the freezing point of the coolant used.
- 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.

Returned Goods Procedure and Reporting Requirements

Before a failed product is returned to the factory, a Returned Materials Authorization (RMA) number must be obtained from Customer Service at (845) 296-1300. The date the RMA is requested will be the reporting date noted and relevant to the warranty. Products, which have received an RMA, must be received at SSCS's factory, within 30 days or the reporting date will be moved ahead 30 days and a new 30-day waiting period will begin. Customers shall pay shipping cost of returning any unit to SSCS and SSCS shall pay shipping cost of returning any unit repaired under warranty to the customer.

All out of warranty returned goods will require an evaluation purchase order prior to receipt at Solid State Cooling Systems. The evaluation costs will depend on product model and will be deducted from the cost of any repairs required.