

# OASIS THERMOELECTRIC CHILLER MANUAL



**Solid State**  
COOLING  SYSTEMS  
*Temperature Control...Precisely.*



## SYMBOLS USED ON THE OASIS 160/190

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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 60 °C.
  - \* Never operate the Oasis Chiller in ambient temperatures of 40 °C or greater.
  - \* Never operate the Oasis Chiller within 2 °C of the coolants freezing point.
  - \* 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.
-

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 160/190 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


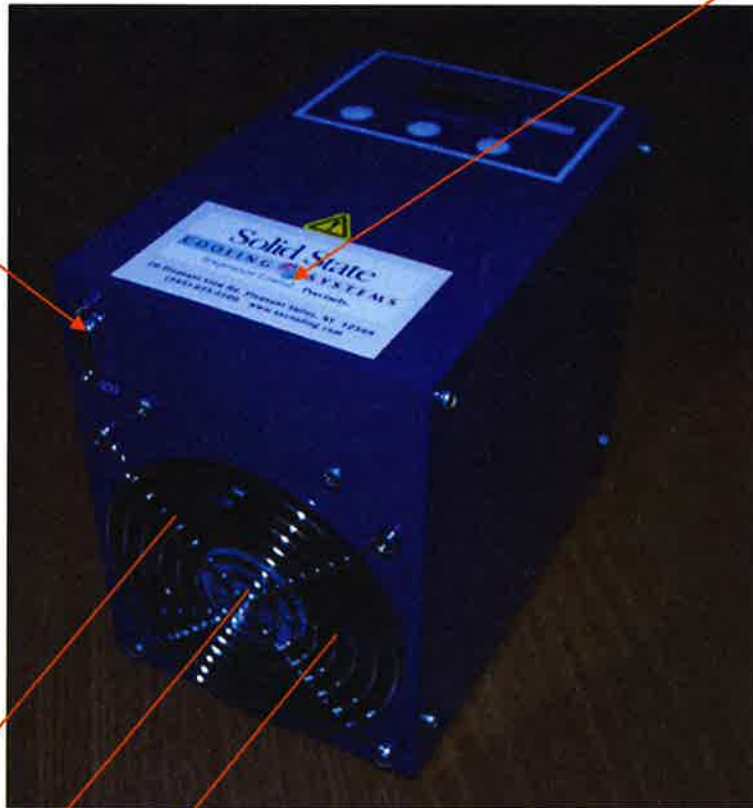
Lloyd F Wright Chief Technology Officer	
Date	February 8, 2008



Figure 3

Tank  
(Under Magnet Cover)

9-pin Dsub  
For RS-232 &  
Dry Contact Alarms



Airflow Outlet

### 3.3 AIR CONSIDERATIONS

Restricting airflow into or out of the Oasis 160/190 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 160/190) to fill reservoir prior to starting unit.

## SECTION 4 START UP

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### 4.1 START UP

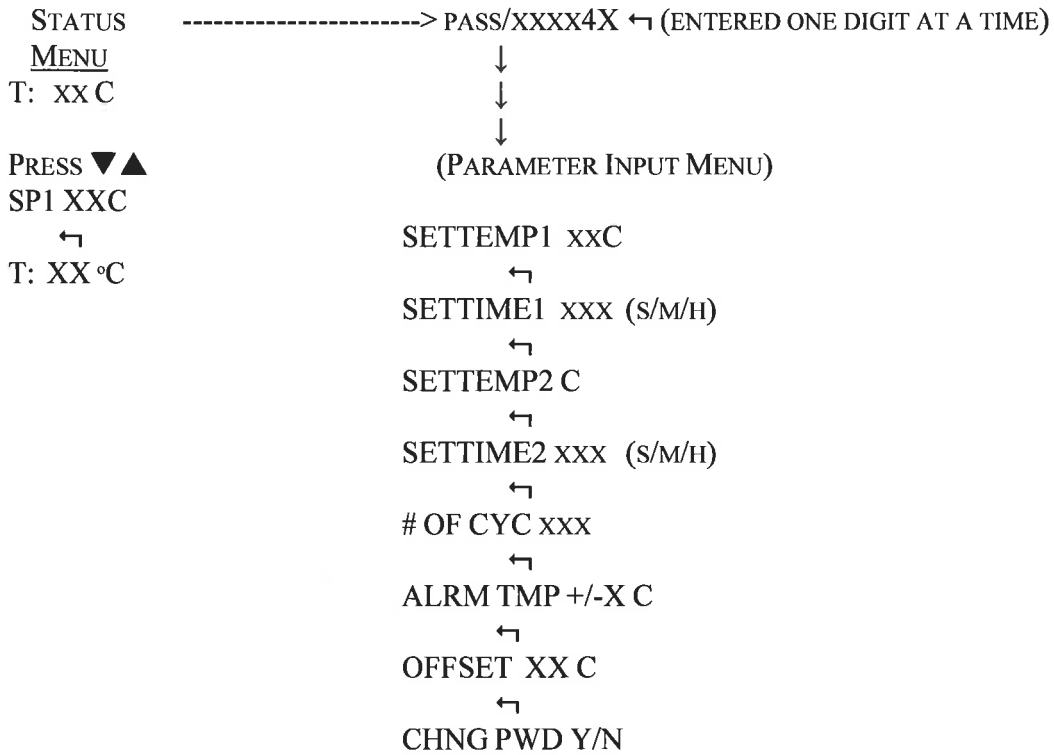
Start-up the Oasis using the following steps:

- 1) Connect 1/8”ID hose to fluid connections located on the back side, labeled Coolant Supply and Coolant 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 13.5 VDC power to the 4-pin DIN connector (wired 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 160/190 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 160/190 tank is filled above the bottom of its neck, coolant can leak out the top when the cap is closed.

Figure 4 MENU STRUCTURE:



NOMENCLATURE:

▲UP

▼Down

↵ Press Enter Momentarily

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

SETTEMP1	2 TO 45 °C
SETTIME1	0 TO 999 SEC/MIN/HR
SETTEMP2	2 TO 45 °C
SETTIME2	0 TO 999 SEC/MIN/HR
# 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

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



## SECTION 6

### SYSTEM ALARMS/TROUBLESHOOTING

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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.*



# Oasis RS232 Communication Protocol

## Definitions in this document -

- SOT: start of text '\*' (2A hex)
  - EOT: end of text '^' (5E hex)
  - LB: low byte
  - MB: middle byte
  - HB: high byte
  - LS bit: least significant bit
- h: hex  
d: decimal  
na: not applicable

## Data Type and Formatting -

All commands and data passed between the Host PC and the Oasis are binary (Hex) numbers - i.e. non ASCII except for one; the "Get SW Version" D7(hex) command which returns the sixteen character software version in ASCII (see Table 3).

Except for the "Get SW Version" command, data passed between the Host and the Oasis is from one to three bytes with the first byte always the command byte. Note the decimal and integer formats in the table below. If the data format has a decimal point (XX.X) then the Oasis will interpret the resolution of the Least Significant Bit as 0.1 (a tenth) of the parameter unit specified. Otherwise if the data is XX or XXX then it is an integer value.

NOTE: The Oasis responds to every Host communiqué with at least an echo of the command sent followed by data - if applicable to the parameter.

## Command Byte Specification:

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 tables 2 & 3

## Data Byte(s) Specification

Data consists of 1 to 3 bytes following the command byte. See Tables 2 and 3.

If the data format in the table below is "XX.X", then the Oasis interprets the LS bit as being 0.1 (a tenth) of the unit specified.

Example for Setpoint, Thermistor temperature, and Proportional (P) parameters:

<u>High Byte</u>	<u>Low Byte</u>	<u>Hex</u>
00000000	00000001 = 0.1	00 01
00000000	00001010 = 1.0	00 0A
00000000	10110100 = 18.0	00 B4
00000001	10010000 = 40.0	01 90

See the specific parameter for interpretation of other data formats: "X", "XX", and "XXX".

## 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.
- 5) ASCII bytes = software part number and revision. For Oasis 300L = 60-12663-2 revXX. Where XX = software revision level.
- 6) % Cool or Heat command: a positive value implies heating and a negative value (2's compliment) implies cooling.

## SECTION 8 TECHNICAL SUPPORT

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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](mailto:info1@sscooling.com)

**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

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**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

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

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/m<sup>3</sup> 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.

\* 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

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.

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

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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.

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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

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TOXIC SUBSTANCES CONTROL ACT (TSCA):

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

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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

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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:** CH<sub>2</sub>OHCH<sub>2</sub>OH

**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<sup>(tm)</sup> 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

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



**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.

Ethylene Glycol (107-21-1) Yes Yes Yes Yes

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

--Canada--

Ingredient Korea DSL NDSL Phil.

Ethylene Glycol (107-21-1) Yes Yes No Yes

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

-SARA 302- -----SARA 313-----

Ingredient RQ TPQ List Chemical Catg.

Ethylene Glycol (107-21-1) No No Yes No

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

-RCRA- -TSCA-

Ingredient CERCLA 261.33 8(d)

Ethylene Glycol (107-21-1) 5000 No No

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

**Australian Hazchem Code:** 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

## WARRANTY POLICY

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**THIS OASIS 160/190 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.

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**Torques for Tower**

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**From :** Paul Brink <pbrink@stanford.edu>

Mon, Dec 08, 2014 02:22 PM

**Subject :** Torques for Tower**To :** Marco Oriunno <oriunno@slac.stanford.edu>, Astrid Tomada <atomada@stanford.edu>, Paul Brink <pbrink@slac.stanford.edu>, Gary L. Godfrey <godfrey@slac.stanford.edu>, Tsuguo Aramaki <tsuguo@slac.stanford.edu>**Cc :** Richard Partridge <richp@slac.stanford.edu>, Ken Fouts <kfouts@slac.stanford.edu>, Matthew R. Swift <mswift@slac.stanford.edu>

Hi Marco

one question that came up in CHAT meeting today was the torques for the screws holding the trusses on the tower.

I have found the following info for what was used for the copper cans for the fridge at the SUF tunnel and old tower cold hardware which can serve as a starting point - they are a bit extreme and the screws would need replacement after a few uses

**Stainless-Steel Metric**

M3 15 in-lb or 11 in-lb

M4 35 in-lb

M5 45 in-lb or 40 in-lb

**Brass**

#0-80 against copper or copper-clad cirlex 20 in-oz or 24 in-oz

#0-80 against bare cirlex or bare kapton 14 in-oz

See [http://cdms.berkeley.edu/cdms\\_restricted/coldhardware/Procedures/Fasteners/fasteners.html](http://cdms.berkeley.edu/cdms_restricted/coldhardware/Procedures/Fasteners/fasteners.html)**Brass Metric**

M3 5 in-lb

M4 12 in-lb

M5 20 in-lb

M6 40 in-lb

Paul

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