



**Liebert Products & Service**

---

**World Headquarters**

**United States**

1050 Dearborn Drive, P.O. Box 29186  
Columbus, Ohio 43229  
Telephone: 614-888-0246  
Facsimile: 614-841-6973

---

**Europe**

Via Leonardo Da Vinci 8  
Zona Industriale Tognana  
35028 Piove Di Sacco  
Italy  
Telephone: 39-049-9719-111  
Facsimile: 39-049-5841-257

---

**Asia**

29/F, The Orient Square Building  
F. Ortigas Jr. Road, Ortigas Center  
Pasig City 1605  
Philippines  
Telephone: 63 2 687 6615  
Facsimile: 63 2 730 9572

# Liebert Heat Rejection Air Cooled Drycooler

Job Name	NAU Country Financial
Model	DDNL225A16
Quantity	One (1)
Date	October 18, 2012
DCSI Job#	1836245
Purchaser	Graybar
P.O. #	4510769551
Tag #	
Submitted By	Data Center Systems, Inc. – Don Ewers



**DATA CENTER SYSTEMS, INC.**  
*Providing Solutions to Critical Problems*

# **ATTENTION:**

## **Startup and Warranty Procedures**

**For Liebert to properly warranty this equipment, it is necessary to complete and return the start-up papers attached to the unit to:**

**Data Center Systems Inc.  
12140 Nicollet Avenue S.  
Burnsville, MN 55337**

**Without these forms Liebert will NOT recognize your warranties.**

**~Thank you~**

# DRYCOOLER SPECIFICATION SHEET GLYCOL

Project Name NAU Country Insurance  
 DCSI Project Number 1836245  
 Model Number DDNL225A16-A  
 Quantity One (1)  
 Date October 18, 2012

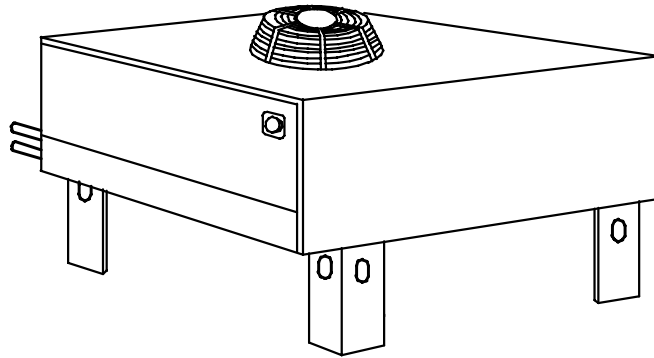


## Electrical Supply Requirements

Drycooler Only 460 Volt, 3 Phase, 60 Hertz, 3.4 FLA, 3.8 WSA / MCA, 15.0 OPD

<b>Cabinet</b>	<input checked="" type="checkbox"/> Standard	<input type="checkbox"/> Quiet-line	
<b>Heat Rejection</b>	Fan Motor Horsepower (kW)		3/4 HP
	Quantity		Two (2)
	Air Volume - CFM (l/s)		12,177
	Total Heat Rejection		202,734
	Entering Air Temperature - °F		35.0°F
	Leaving Air Temperature - °F		50.3°F
	Entering Fluid Temperature - °F		60.0°F
	Leaving Fluid Temperature - °F		46.3°F
<b>Pump</b>	<input type="checkbox"/> Single Pump	<input type="checkbox"/> Dual Pump	
	<input checked="" type="checkbox"/> No Pump		
<b>Glycol Piping Requirements</b>	Flow Rate - GPM / Percent of Glycol		32 / 30% Ethylene Glycol
	Pump Horsepower / Total Head Pressure - Ft. of Water		N/A
	Drycooler Pressure Drop - Ft. of Water		19.4'
	Drycooler Design Ambient - °F		35.0°F
	Head Available for Piping Loss		N/A
<b>Control Section</b>	<input type="checkbox"/> DSO Singlr Pump Control	<input type="checkbox"/> DNC No Control	
	<input type="checkbox"/> DDO Dual Pump Control	<input checked="" type="checkbox"/> DNL Main Control	
	<input type="checkbox"/> DSF Fan Speed Control	<input type="checkbox"/> DNT Fan Control	
	<input type="checkbox"/> DDF Fan Speed Control		
<b>Optional Equipment</b>	<input checked="" type="checkbox"/> Locking Disconnect		
	<input type="checkbox"/> Phenolic Coated Coil		
	<input type="checkbox"/> Opt. Extended Leg Height _____"		
	<input type="checkbox"/> 1st Year Labor Warranty		
	<input type="checkbox"/> Factory Test, Check, & Start-Up		
<b>Remarks</b>	<input type="checkbox"/>		

# LIEBERT GLYCOL COOLED DIRECT DRIVE DRYCOOLERS



## STANDARD FEATURES

**COIL** Liebert **manufactured** coil is constructed of copper tubes in a staggered tube pattern. Tubes are expanded into continuous, rippled aluminum type fins. The fins have full depth fin collars completely covering the copper tubes which are connected to heavy wall type L headers. Inlet coil connector tubes pass through relieved holes in the tube sheet for maximum resistance to piping strain and vibration. Coils are **factory leak tested** at a minimum of 300 PSIG, dehydrated, then filled and sealed with a nitrogen holding charge for shipment.

**FAN(S)** Blades are constructed of zinc plated steel or aluminum with a maximum diameter of 30 inches and secured to the fan shaft by a heavy duty hub with set screw. Fan guards are heavy gauge, close meshed, steel wire with corrosion resistant finish. Fans are **factory balanced and tested** before shipment.


**FAN MOTOR(S)** Are provided with rain slingers, permanently lubricated bearings, and individual built-in overload protection. Motors are rigidly mounted on die-formed galvanized steel supports.

**HOUSING** The Drycooler housing is constructed of bright **aluminum sheet** and divided into individual fan sections by full width baffles. Structural support members, including coil support frame, motor, and drive support, are **galvanized steel** for strength and corrosion resistance. Aluminum legs are provided with rigging holes for hoisting the unit into position.

**FLUID TEMPERATURE CONTROL SYSTEM (Fan Cycling)** Is complete with aquastats and electrical control circuit factory wired in the integral control panel. Aquastats cycle fans to maintain fluid temperature as outdoor air temperature changes. Head pressure is controlled by the fluid regulating valve in the Liebert indoor unit.

**FAN SPEED CONTROL SYSTEM** Is complete with solid state fan speed control transducers operating variable speed fans and is factory wired in the integral control panel. This is available on single fan Drycoolers only.

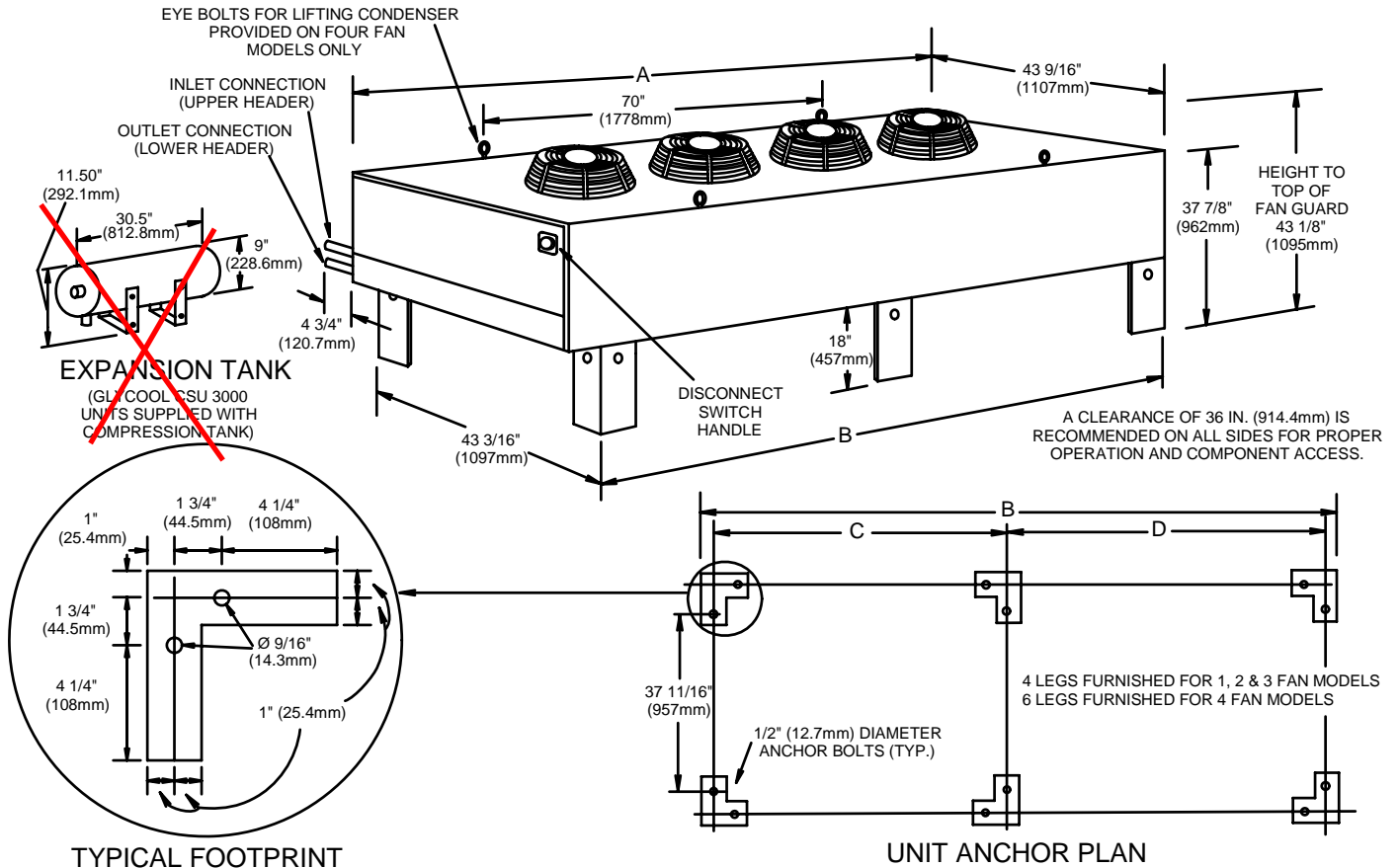
## OPTIONAL FEATURES

 **UNIT DISCONNECT SWITCH** A locking disconnect factory installed and wired in enclosed control section (Standard with DSO, DDO & DSF Drycoolers).

**PUMP CONTROLS** Factory wired in the integral control panel. Single power feed to Drycooler supplies power to both Drycooler and pumps (electric service connection). Single pump (DSO/DSF) and dual pump (DDO/DDF) control options are available. DDO/DDF Drycooler keeps one pump in active mode and the other in standby mode. Switchover between pumps activated by factory-supplied pump selector switch or by contact closure on field-installed flow switch.

# CABINET & ANCHOR DIMENSIONAL DATA

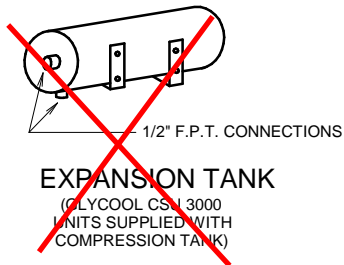
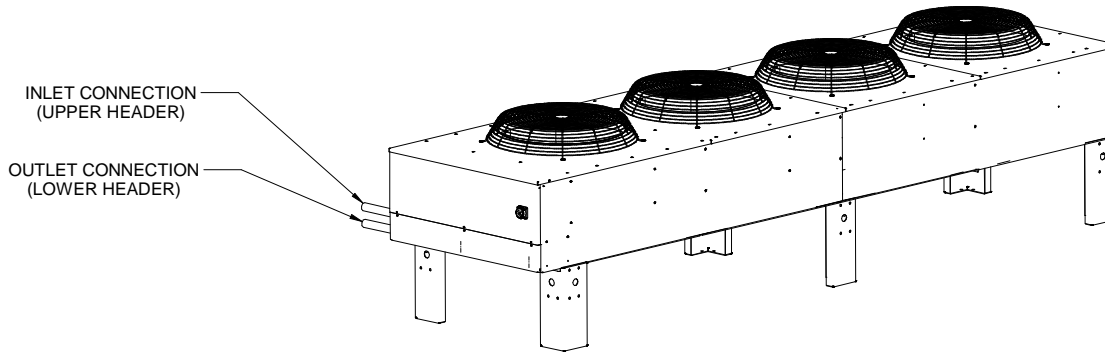
## DIRECT DRIVE DRYCOOLER



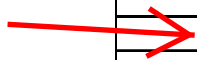
LIEBERT MODEL Note 2, 3, 4	NO. FANS	A		B		C		D		CFM (l/s) 60 HZ Note 1	CFM (l/s) 50 HZ Note 1	INTERNAL VOLUME GAL. (LITERS)	NET WEIGHT LBS. (KG)
		IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.				
-033	1	51 1/2	1308	44	1118	42	1067	--	--	7200 (3398)	6000 (2932)	1.2 (4.6)	390 (177)
-069	1	51 1/2	1308	44	1118	42	1067	--	--	6866 (3240)	5722 (2700)	2.4 (9.2)	410 (186)
-092	1	51 1/2	1308	44	1118	42	1067	--	--	6633 (3130)	5527 (2609)	3.7 (13.9)	430 (195)
-109	1	51 1/2	1308	44	1118	42	1067	--	--	6322 (2984)	5268 (2486)	4.9 (18.6)	450 (204)
-112	1	51 1/2	1308	44	1118	42	1067	--	--	6088 (2873)	5074 (2394)	5.8 (22.0)	470 (213)
-139	2	91 1/2	2324	84	2134	82	2083	--	--	13732 (6481)	11443 (5401)	4.8 (18.2)	565 (256)
-174	2	91 1/2	2324	84	2134	82	2083	--	--	13265 (6261)	11054 (5217)	6.9 (26.2)	605 (274)
-197	2	91 1/2	2324	84	2134	82	2083	--	--	12645 (5968)	10535 (4973)	9 (34)	645 (293)
-225	2	91 1/2	2324	84	2134	82	2083	--	--	12177 (5748)	10147 (4789)	11.1 (42.1)	685 (310)
-260	3	131 1/2	3340	124	3150	122	3099	--	--	19898 (9392)	16582 (7827)	10.0 (37.8)	826 (375)
-310	3	131 1/2	3340	124	3150	122	3099	--	--	18965 (8951)	15804 (7459)	13.1 (50.0)	886 (402)
-350	3	131 1/2	3340	124	3150	122	3099	--	--	17398 (8212)	14499 (6843)	19.4 (73.3)	946 (429)
-352	4	171 1/2	4356	164	4166	82	2083	80	2032	24800(11705)	20667 (9755)	13.1 (49.6)	1040 (471)
-419	4	171 1/2	4356	164	4166	82	2083	80	2032	23650 (11163)	19708 (9302)	17.4 (65.9)	1120 (508)
-466	4	171 1/2	4356	164	4166	82	2083	80	2032	22770 (10747)	18975 (8956)	22.0 (83.3)	1150 (522)
-491	4	171 1/2	4356	164	4166	82	2083	80	2032	21700 (10242)	18083 (8535)	26.3 (99.6)	1200 (544)

- All drycooler fan motors are 3/4 H.P.
- DSO model prefix indicates control section in drycooler includes controls for a single pump package. DDO model prefix indicates control section in drycooler includes controls for a dual pump package. DSF model prefix indicates control section in drycooler includes controls for a single pump package on a fan speed control drycooler.
- DNT prefix indicates a single circuit with fan cycling but no pump controls.
- DNC prefix indicates a single circuit with no fan or pump controls.

# PIPING: DIRECT DRIVE DRYCOOLERS



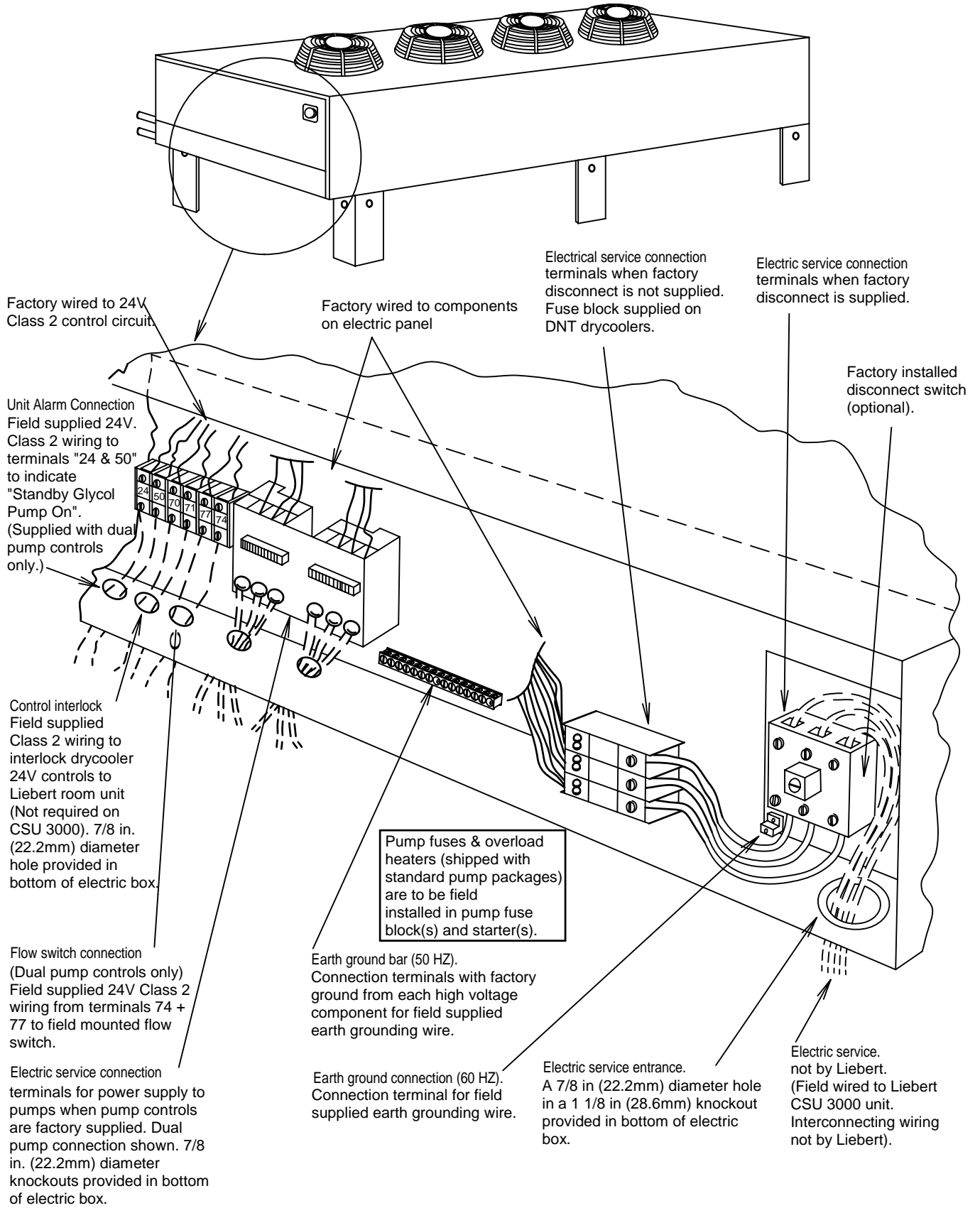
DRYCOOLER PIPING CONNECTION SIZES (O.D. Cu)		
DRYCOOLER MODEL NUMBER	NUMBER OF COIL CIRCUITS	INLET & OUTLET PIPE DIAMETER (INCHES)
-033	4*	1 3/8
-069	4, 8*	1 3/8
-092	6, 12*, 16	1 5/8
-109	8	1 3/8
-109	16*	2 1/8
-112	8	1 3/8
-112	16*, 26	2 1/8
-139	8, 16*	2 1/8
-174	8, 16*, 24	2 1/8
-197	8	1 3/8
-197	16*, 32	2 1/8
-225	16, 26*	2 1/8
-260	16, 24*	2 1/8
-310	16, 32*	2 1/8
-350	16, 32*	2 1/8
-350	48	2 5/8
-352	16, 24*	2 1/8
-419	16, 32*	2 1/8
-466	26	2 1/8
-466	40*	2 5/8
-491	16, 32	2 1/8
-491	48*	2 5/8



-FOR MODEL PREFIX DESIGNATION. REFER TO "CABINET & ANCHOR DIMENSIONAL DATA" PAGE.

# ELECTRICAL FIELD CONNECTIONS

## FLUID TEMPERATURE CONTROL DIRECT DRIVE DRYCOOLERS



NOTE: Refer to specification sheet for full load amp. and wire size amp. ratings.