



Appendix "E"

TECHNICAL SPECIFICATIONS & PLANS



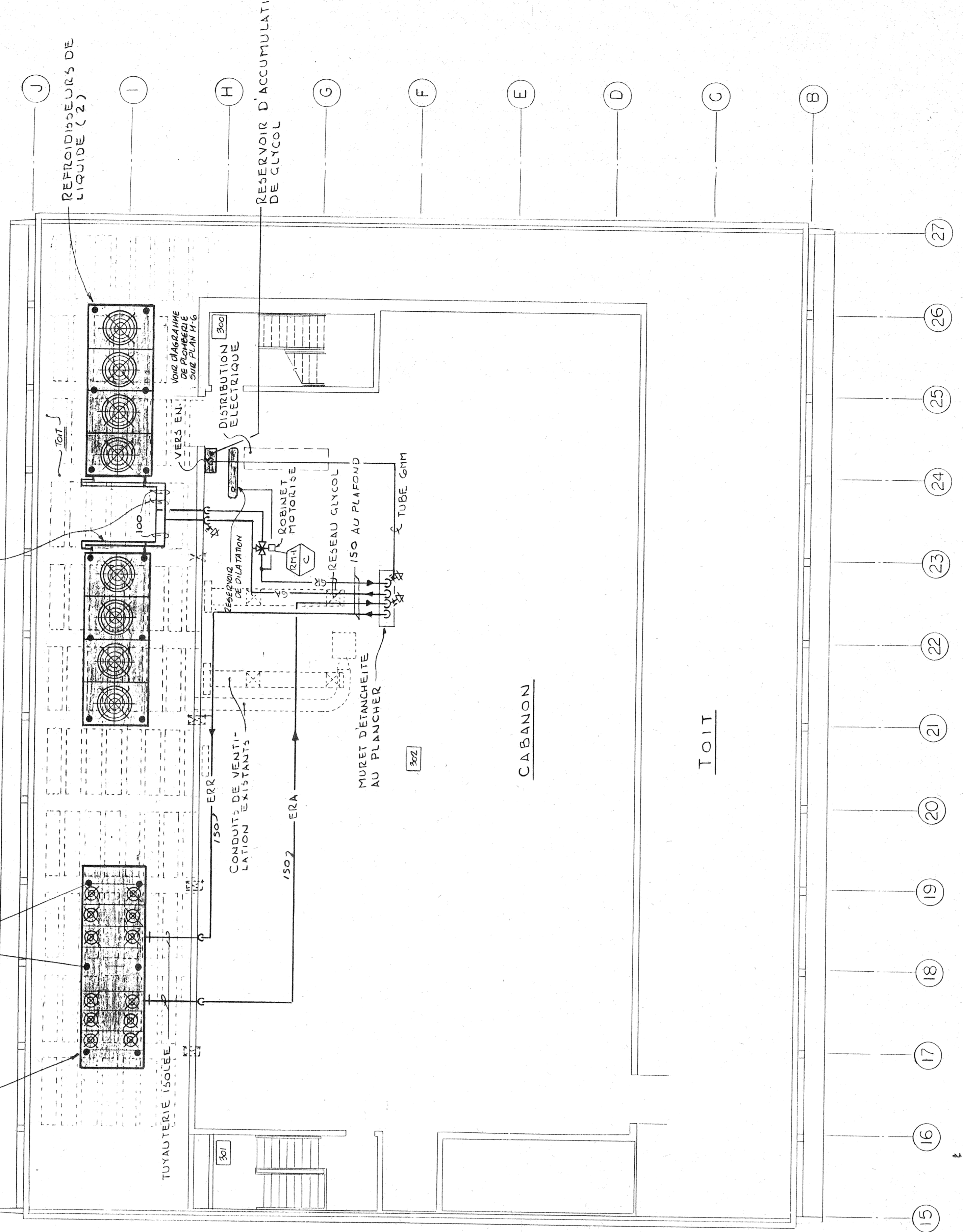
Travaux publics et
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Canada

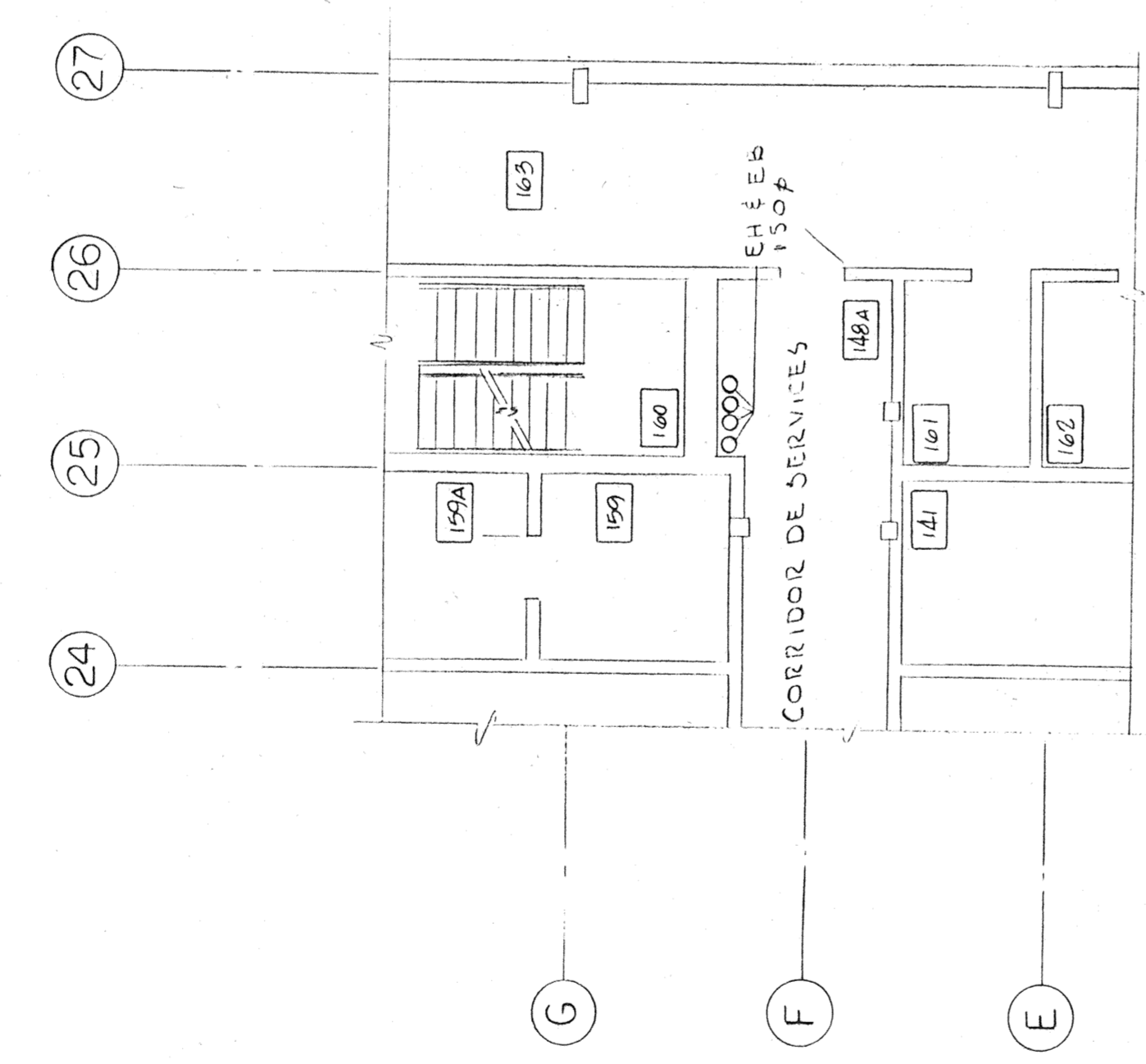
APPENDIX 1

Plans for the Optimization Work for Energy Efficiency Project, 1984

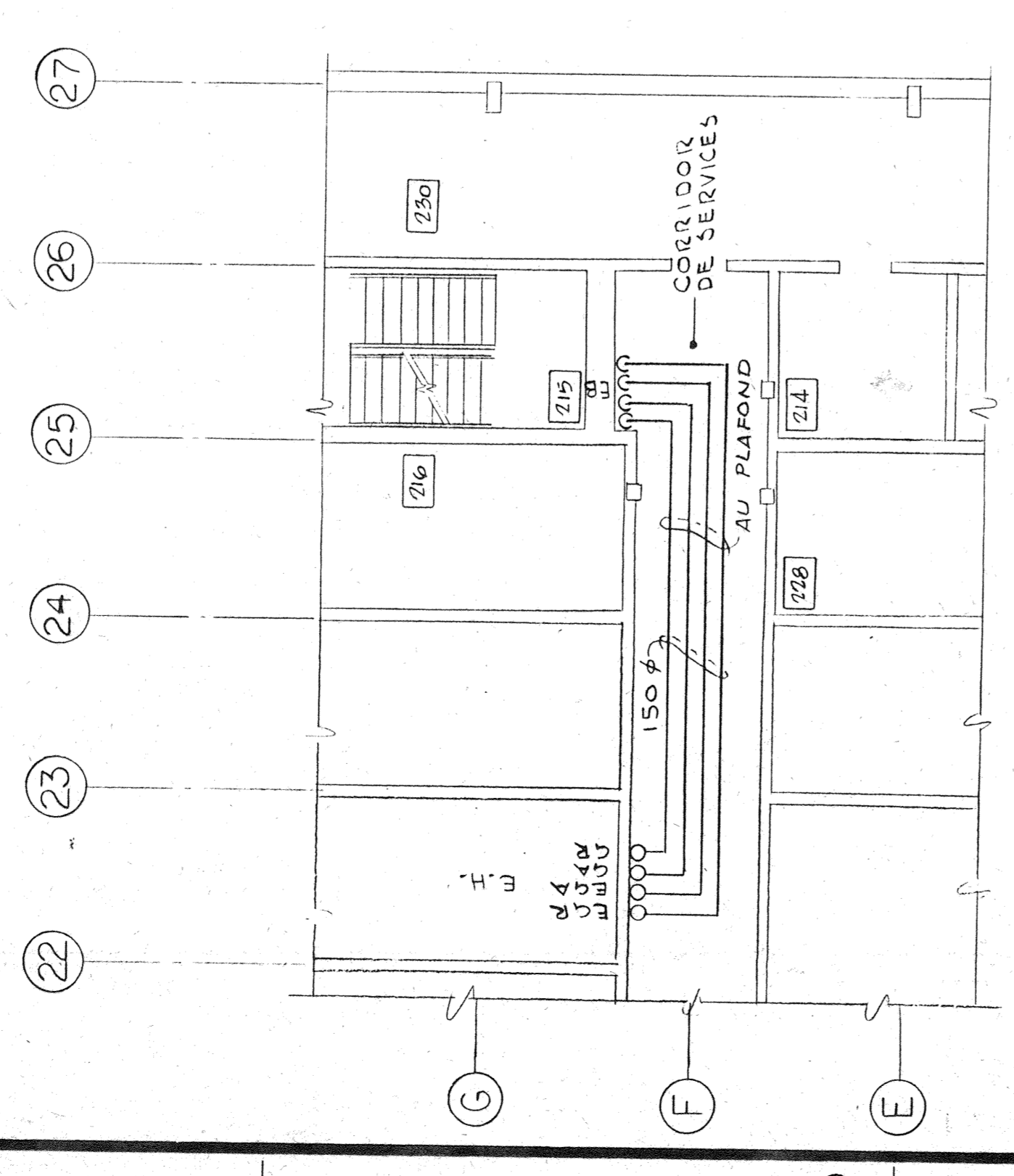
TYPIQUE POINTS D'APPUI
SUR LA TOITURE EXISTANTE
REFROIDISSEUR D'EAU
AVEC CONDENSEUR A L'AIR



3.1EME ETAGE



2.1EME ETAGE - PARTIEL
ECHELLE 1:100



2.1EME ETAGE - PARTIEL
ECHELLE 1:100

TABLEAU DES CONTROLES EXISTANTS / SYST. #1

IDENTIFICATION	NUMERO DU CONTROLE	IDENTIFICATION	DESCRIPTION
(C6) (C7) (C7)	HP 904 A 1058	(M2) (M3)	HOTEUR PNEUMATIQUE AVEC DELAIS D'ASSER- VISEMENT.
(C6) (C8)	R 482 C 1006	(C2)	RELAYS ELECTRIQUE
(M4)	L 480 G 1002	(T2)	BASSE LIMITE
(M5) (M6) (M7)	3/1048 D	(S3) (S4) (S5)	CONTROLEUR ELECTRIQUE
(L4)	3/1860 D	(V1)	SOUPAPE
(L4) (L5)	HP 904 A 1058	(V2)	SOUPAPE
(L4) (L5) (L6)	HP 904 B 1058	(M4)	SOUPAPE + POSITIONNEUR
(L4) (L5) (L6)	HP 904 C 1058	(M5)	SOUPAPE
(L4) (L5) (L6)	HP 904 D 1058	(M6)	SOUPAPE
(L4) (L5) (L6)	HP 904 E 1058	(M7)	SONDE D'HUMIDITE RELATIVE
(L4) (L5) (L6)	HP 904 F 1058	(M8)	RELAYS PNEUMATIQUE / ELECTRIQUE

NOTE : TOUS LES CONTROLES EXISTANTS SONT DE 'HONEYWELL CONTROLS'

REVISIONS

no.	date	m	no.	date	m	no.	description
A	11/04/84						APPROBATION
O	1/04/84						POUR SOUMISSION

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TRAVAUX D'OPTIMISATION
RELIÉS AUX ÉCONOMIES D'ÉNERGIE

titre
1ER 2.1EME ET 3.1EME ETAGE

spécialité
MECANIQUE

dessiné 6L
vérifié AD
date AVRIL 84
échelle 1:100

dossier no.
81-076-002.00

dessin no.
M-3 de 6

rev. no.
0

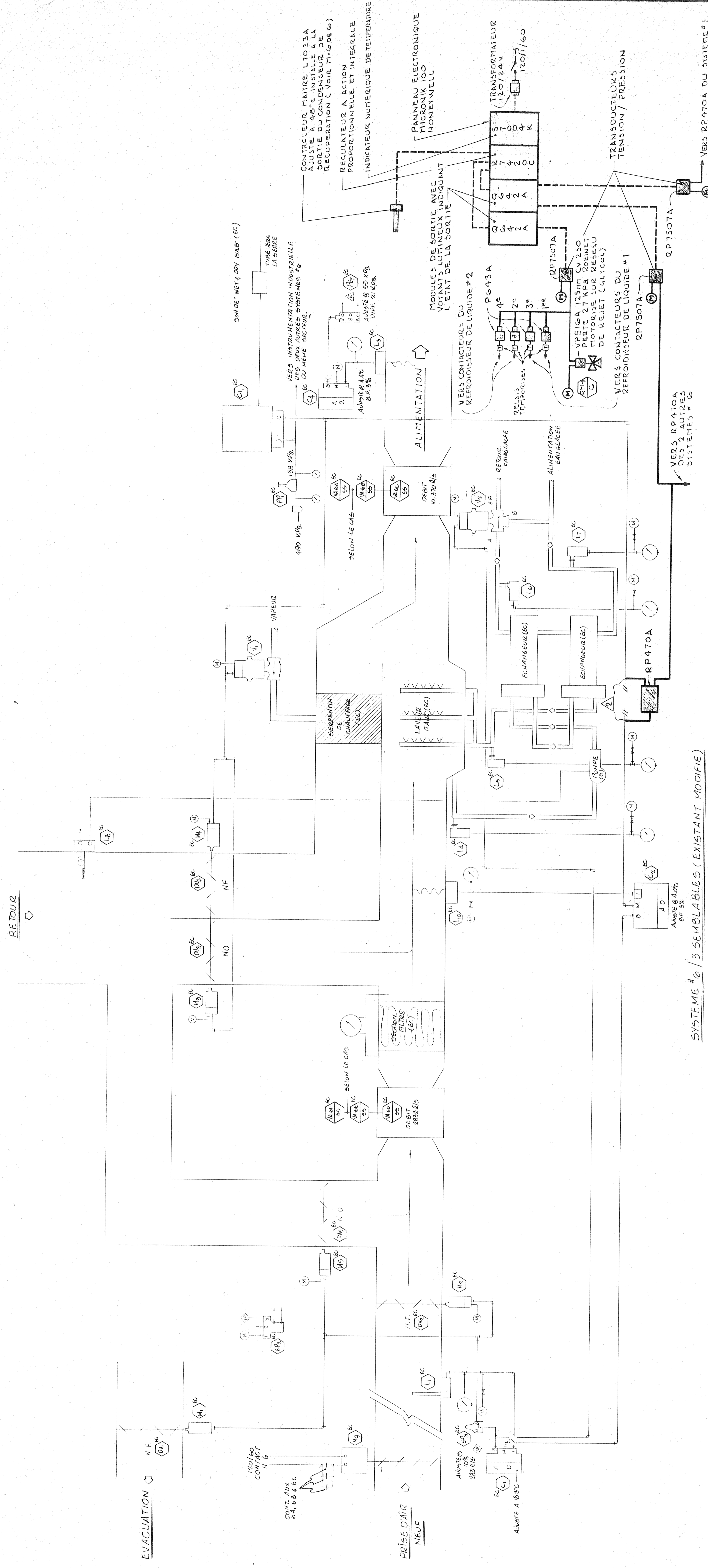


TABLEAU DES CONTROLES EXISTANTS / SYST #6

IDENTIFICATION	NUMERO DU CONTROLE	DESCRIPTION	IDENTIFICATION	NUMERO DU CONTROLE	DESCRIPTION
(M1)	HP 909 B 1007	MOTEUR PNEUMATIQUE	(C1)	Y 602 P01	CONTROLEUR TEMP. SECHE ET HUMIDE (1/85)
(C1)	PC43 A 1007	RELAIS PNEUMATIQUE ELECTRIQUE	(L6)	H 600A (80%)	HAUTE-LIMITE
(C2)	PP 902A 1009	REGULATEUR DE PRESSION CIA FILTRE			
(C3)	SP 93A 1005	INDICATEURS, MANOMETRES			
(L1)	MP 904A	CONTROLEUR PNEUMATIQUE			
(L2)	LP 914A 1003	MOTEUR PNEUMATIQUE AVEC POSITIONNEUR			
(L3)	LP 914A 1050	SOUAPE + POSITIONNEUR			
(L4)	LP 915 A 1044	SOUAPE + POSITIONNEUR			
(L5)	LP 915 A 1044	SOUAPE + POSITIONNEUR			

SYSTEME #6 / 3 SEMBLABLES (EXISTANT MODIFIE)
 LIGES DE PROPAGATION (BLOC C)

NOTE: TOUTS LES CONTROLES EXISTANTS SONT DE HONEYWELL CONTROLS

revisions

no	date	description	m	no	date	description	m
A	7/11/83	POUR AFFIRMATION					
O	1/20/84	POUR SOUMISSION					

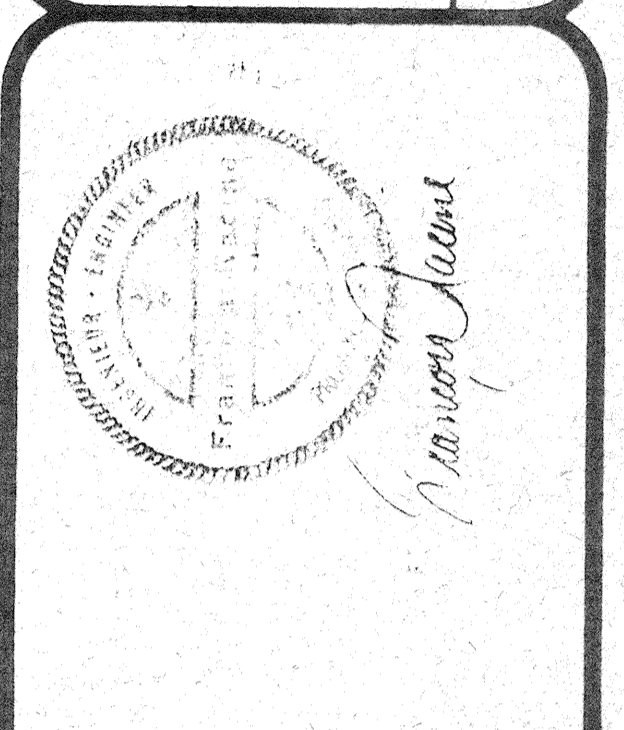
NOTE: LES NOUVELLES COMPOSANTES DE CONTROLE SERONT INSTALLEES DANS DES COFFRETS MODULAIRES.

AGRICULTURE CANADA
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TRAVAUX D'OPTIMISATION RELIES AUX ECONOMIES D'ENERGIE

titre: CONTROLES DES SYST. # 6
 ET DU SYST. DE RECUPERATION

dessin no: M5 de 6
 rev. no: 0



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CONSERVE ENERGY SERVICES
 Canat

spécialité: MECANIQUE
 dessin: GL
 vérifié: AD
 date: AVRIL 84
 échelle:

no. date description m. no. date description m.



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APPENDIX 2

Minimum Characteristics of the New 210-Tonne-Capacity Chiller

Tag Data - Water Cooled Helical Rotary Chillers (Duplex) (Qty: 1)

Tag(s)	Qty	Description	Model Number
RTWD-220 5 .5	1	RTWD Series R(TM) 70-250 Ton Water-Cool	RTWD220G2**2A1C1AA2A1A1Y1B0D000000100 00070A-00E000000003000

Product Data - Water Cooled Helical Rotary Chillers (Duplex)**Item: A1 Qty: 1 Tag(s): RTWD-220 5.5**

RTWD - water cooled chiller Series R

Startup Included - Trane Service must start equipment for warranty to be honored

575 volt 3 phase 60 hertz

220 nominal tons

High efficiency/performance

Water-water heat pump

UL listed to U.S. and Canadian safety standards

Non-compliant

AHRI certified

ASME pressure vessel code

Single relief valve

Grooved pipe connection

Full factory refrigerant charge (134a)

Skid + shrink wrap

Internal and external enhanced evaporator copper tube

2 pass evaporator

150 psi/10 bar evap water pressure

Standard cooling

Fluid type = water

Enhanced fin - copper

150 psi/10 bar cond water pressure

Fluid type = ethylene glycol

Wye-delta closed transition starter

Single point power connection

Mech disconnect switch

Cond leaving hot water temp control

Factory installed proof flow evap/cond

Sound reduction - factory installed

Performance Data - Water Cooled Helical Rotary Chillers (Duplex)

Tags	RTWD-220 5.5
Integrated Part (kW/ton)	0.611
Sound pressure (dBA)	79
Refrigerant charge circuit 1 (lb)	178.6
Refrigerant charge circuit 2 (lb)	185.2
Oil charge circuit 1 (gal)	3.10
Oil charge circuit 2 (gal)	3.10
Evap fouling factor (hr-sq ft-deg F/Btu)	0.00010
Evap fluid freeze point (F)	32.00
Max evap flow rate (gpm)	772.00
Pressure drop at max evap flow (ft H2O)	39.40
Cond fouling factor (hr-sq ft-deg F/Btu)	0.00025
Cond fluid concentration (%)	40.00
Max cond flow rate (gpm)	895.00
Pressure drop-max cond flow (ft H2O)	39.40
RLA - compressor A (A)	97.00
LRA - compressor A (A)	205.00
RLA - compressor B (A)	116.00
LRA - compressor B (A)	229.00
Single point power MCA (A)	244.00
Single point power MOP (A)	350.00
Short circuit current rating (A)	5000.00
Number of compressors (Number)	2.00
Number of circuits (Number)	2.00
Shipping weight (lb)	8994.9
Operating weight (lb)	9493.1
Length (in)	147.870
Width (in)	47.758
Height (in)	76.972
Water connections evaporator (in)	6.000
Water connections condenser (in)	6.000
AHRI selection certification	AHRI certified selection
Heating mode cooling capacity (tons)	163.70
Heating mode cooling efficiency (kW/ton)	1.221
Heating mode cooling efficiency 2 (EER)	9.8
Heating mode heating capacity (MBh)	2646.20
Heating mode heating efficiency (COP)	3.88
Heating mode unit power (kW)	199.80
Heating mode IPLV (kW/ton)	0.611
Heating mode IPLV 2 (EER)	19.7
Heating mode evap entering temp (F)	56.00
Heating mode evap leaving temp (F)	42.00
Heating mode evap flow rate (gpm)	279.40
Heating mode evap press drop (ft H2O)	6.70
Heating mode evap min flow rate (gpm)	211.00
Heating mode evap press drop min flow (ft H2O)	4.00
Heating mode saturated evap ckt 1 (F)	41.40
Heating mode saturated evap ckt 2 (F)	38.90
Heating mode cond entering temp (F)	115.00
Heating mode cond leaving temp (F)	125.00
Heating mode cond flow rate (gpm)	580.50
Heating mode cond press drop (ft H2O)	17.80
Heating mode cond min flow rate (gpm)	245.00
Heating mode cond press drop min flow (ft H2O)	3.50
Heating mode saturated cond ckt 1 (F)	128.50
Heating mode saturated cond ckt 2 (F)	130.00

Cooling mode cooling capacity (tons)	176.90
Cooling mode cooling efficiency (kW/ton)	1.038
Cooling mode cooling efficiency 2 (EER)	11.6
Cooling mode unit power (kW)	183.60
Cooling mode heating capacity (MBh)	2749.00
Cooling mode heating efficiency (EER)	15.0
Cooling mode NPLV (kW/ton)	0.677
Cooling mode NPLV 2 (EER)	17.7
Cooling mode evap entering temp (F)	56.00
Cooling mode evap leaving temp (F)	42.00
Cooling mode evap flow rate (gpm)	301.90
Cooling mode evap press drop (ft H2O)	7.80
Cooling mode evap min flow rate (gpm)	211.00
Cooling mode evap press drop min flow (ft H2O)	3.90
Cooling mode saturated evap ckt 1 (F)	41.20
Cooling mode saturated evap ckt 2 (F)	38.70
Cooling mode cond entering temp (F)	105.00
Cooling mode cond leaving temp (F)	115.00
Cooling mode cond flow rate (gpm)	604.00
Cooling mode cond press drop (ft H2O)	19.70
Cooling mode cond min flow rate (gpm)	245.00
Cooling mode cond press drop min flow (ft H2O)	3.50
Cooling mode saturated cond ckt 1 (F)	118.80
Cooling mode saturated cond ckt 2 (F)	120.30

Mechanical Specifications - Water Cooled Helical Rotary Chillers (Duplex)

Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

General

Exposed metal surfaces are painted with air-dry beige, direct-to-metal, single-component paint. Each unit ships with full operating charges of refrigerant and oil.

Compressor and Oil Management

The unit is equipped with two semi-hermetic, direct-drive, 3600 rpm, rotary compressors that include a load/unload valve, rolling element bearings, oil filtration device and heater. The motor is a suction gas-cooled, hermetically sealed, two-pole squirrel cage induction motor.

Oil separator device is provided separate from the compressor. Check valves are provided on the compressor discharge and lube oil system. A solenoid valve in the lube system is also provided.

The chiller is configured with an oil management system that ensures proper oil circulation throughout the unit. The key components of the system include an oil separator, oil filter and gas pump. All compressors are factory tested to confirm operation prior to shipment.

Refrigerant Circuit

Each unit has two refrigerant circuits, with one rotary screw compressor per circuit. Each refrigerant circuit includes compressor suction and discharge service valves, removable core filter, charging port, sight glass and an electronic expansion valve. The unit also includes liquid line isolation valves and refrigerant pressure relief valves installed on each circuit of both the evaporator and condenser. Modulating compressors and electronic expansion valves provide variable capacity modulation over the entire building load and maintain proper refrigerant flow.

Agency Listing

Chiller is UL listed to U.S. and Canadian safety standards.

Pressure Vessel Code

Chiller complies with ASME Pressure Vessel Code. ASME nameplates are attached to applicable pressure vessels including oil separators.

Unit Application

Optimized compressors, oil cooler and high current control panel allows for leaving condenser water temperatures up to 140.0 F. This option is required for entering condenser temperatures above 95.0 F.

Condenser

Dual circuited, shell and tube condenser designed with seamless internally/externally finned tubes expanded into tubesheets and mechanically fastened to tube supports. All tubes can be individually replaced.

Shells and tube sheets are made of carbon steel. The condenser is designed for refrigerant-side/working-side pressure of 300.00 psi. Condenser is designed for 150.00 psi waterside working pressure. Waterside shall be hydrostatically tested at 225.00 psi.

Condenser tubes are 3/4" diameter.

Water side has single left-hand inlet and outlet piping connection.

Evaporator Application

Standard evaporator allows for minimum leaving water temperature of 38.0 F.

Evaporator

Dual circuited, shell and tube falling film evaporator design is used. Seamless internally finned, copper tubes are mechanically expanded into tube sheets and mechanically fastened to tube supports. All tubes can be individually replaced.

Shells and tube sheets are made of carbon steel. The evaporator is designed for refrigerant-side/working-side pressure

of 200.00 psi. Evaporator is designed for 150.00 psi waterside working pressure. Waterside shall be hydrostatically tested at 225.00 psi.

Evaporator tubes are 3/4" diameter.

Water connections are on the left side of the unit when facing control panel. Water enters at the bottom connection and exits at the top connection.

Connection Type

Condenser and evaporator water boxes are cast with standard grooved pipe connections. Cast boxes should not be welded.

Pressure Relief Valve

Unit comes with a single relief valve.

Unit Mounted Starter

The enclosure has top power-wiring access and three-phase, overload protection. A factory-installed, factory-wired 820 VA control power transformer provides all unit control power (120 VAC secondary), Trane CH530 module power (24 VAC secondary), and water regulating valve power (110 VAC - field installed).

Starter is a wye-delta configuration designed to provide a reduced inrush. It is factory-mounted and fully pre-wired to the compressor motor and control panel.

The control cabinet is built per UL 1995.

Power Connection

Unit is provided with single point electrical power connection.

Starter Disconnect

A non-fused molded case disconnect switch, factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Control Panel

The microprocessor-based control panel is factory-installed and factory-tested. The control system is powered by a pre-wired control power transformer, and will load and unload the chiller through adjustment of the compressor slide valve. Microprocessor-based chilled water reset based on return water is standard.

The Trane CH530 utilizing the Adaptive Control (TM) microprocessor automatically unloads the compressor to prevent unit shutdown due to abnormal operating conditions associated with low evaporator refrigerant temperature, high condensing temperature, and/or motor current overload. If an abnormal operating condition continues and the protective limit is reached, the machine should shut down.

The panel includes machine protection shutdown requiring manual reset for the following conditions: low evaporator refrigerant temperature and pressure, high condenser refrigerant pressure, low oil flow, critical sensor or detection circuit faults, motor current overload, high compressor discharge temperature, lost communication between modules, electrical distribution faults: phase loss, phase imbalance, or phase reversal, external and local emergency stop, and starter transition failure.

The panel also includes machine protection shutdown with automatic reset for the following correctable conditions: momentary power loss, under/over voltage, and loss of evaporator or condenser water flow.

When a fault is detected, the control system conducts more than 100 diagnostic checks and will hold up to 60 diagnostics in memory. The display will identify the fault, indicate date, time, and operating mode at time of occurrence, and provide type of reset required and a help message. The historic diagnostic report will display the last 20 diagnostics with their times and dates of occurrence.

Operator Interface

Factory-mounted to the control panel door, the operator interface has an LCD touch-screen display for operator input and information output. This interface provides access to the following information: evaporator report, condenser report, compressor report, operator settings, service settings, service tests, and diagnostics. Some service settings and tests are accessed through the TechView service tool.

All diagnostics and messages are displayed in clear language.

Data contained in available reports includes: setpoints, water and air temperatures, refrigerant levels and temperatures, oil pressure, flow switch status, EXV position, head pressure control command, compressor starts and run-time, and line phase percent RLA, amps, and volts.

ASHRAE Guideline 3 report is available.

Condenser Leaving Water Temperature Control

Enables the unit to use the leaving condenser water temperature to load and unload the chiller relative to the leaving condenser water setpoint, based on a 0-10 Vdc signal. The control system allows for a condenser leaving temperature range of 80.0 F to 140.0 F with a water to water heat pump.

Variable Evaporator Flow Compensation

This feature varies the evaporator leaving water temperature control gains to provide stability of the evaporator leaving water temperature relative to setpoint. It uses the EXV position and pressure drop across the EXV as inputs to calculate the evaporator waterside temperature drop. The evaporator water flow rate can then be calculated from the temperature drop and can be used as an input to varying the leaving water temperature control gains. This new feature is available as standard.

Flow Switch

The flow switches are factory installed for the evaporator and condenser.

Sound Reduction Package

Acoustical treatment for compressors is factory installed.

Shipment Packaging

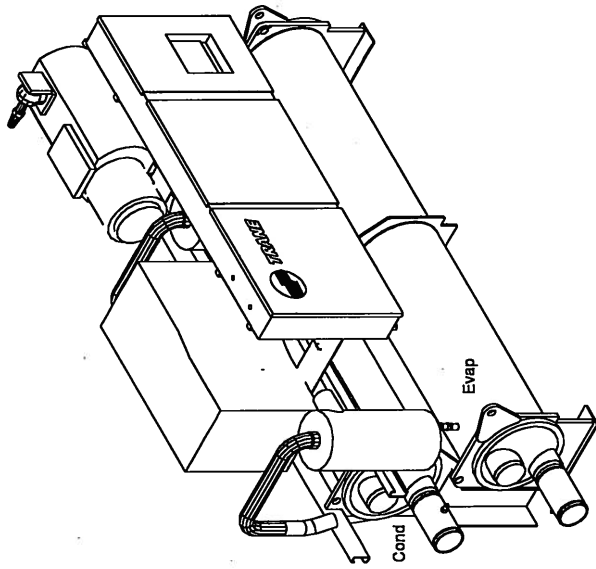
Unit is provided with shrink-wrap opaque plastic, with UV protection and rust inhibitor around the entire unit, and a heat-treated wood skid attached to base of unit, for shipment. The wooden skid meets standard ISPM 15.

Unit Dimensions - Water Cooled Helical Rotary Chillers (Duplex)

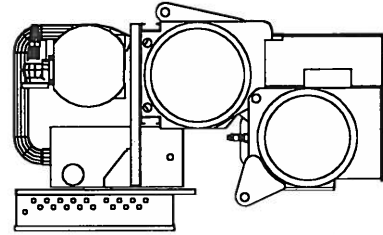
Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

- NOTES:
1. Dimensional Tolerances +/- 1/4" (6.35mm)
 2. Evaporator and Condenser Entering Fluid Connection is the Bottom Connection, where applicable. Evaporator and Condenser Leaving Fluid Connection is the Top Connection, where applicable.

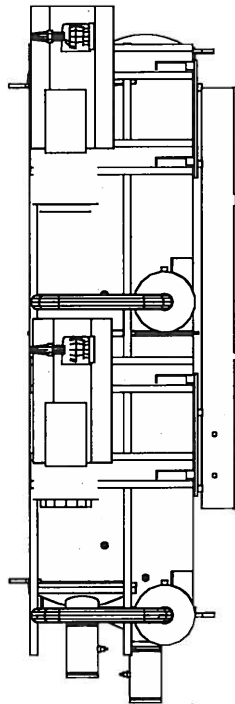
Evaporator Water Connection Size	6 In (152.4 mm)	NPS Pipe Size
Condenser Water Connection Size	6 In (152.4 mm)	NPS Pipe Size
Evaporator Water Volume	29 Gal/ 110 Liters	
Condenser Water Volume	31 Gal/ 117 Liters	



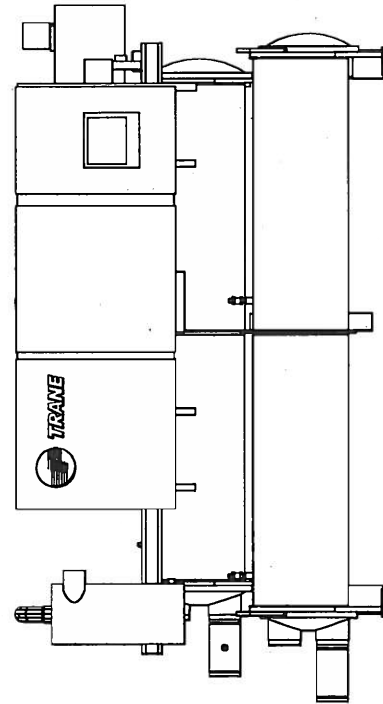
ISOMETRIC VIEW



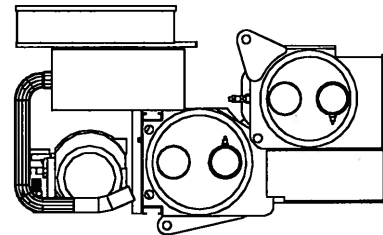
RIGHT END VIEW



PLAN VIEW



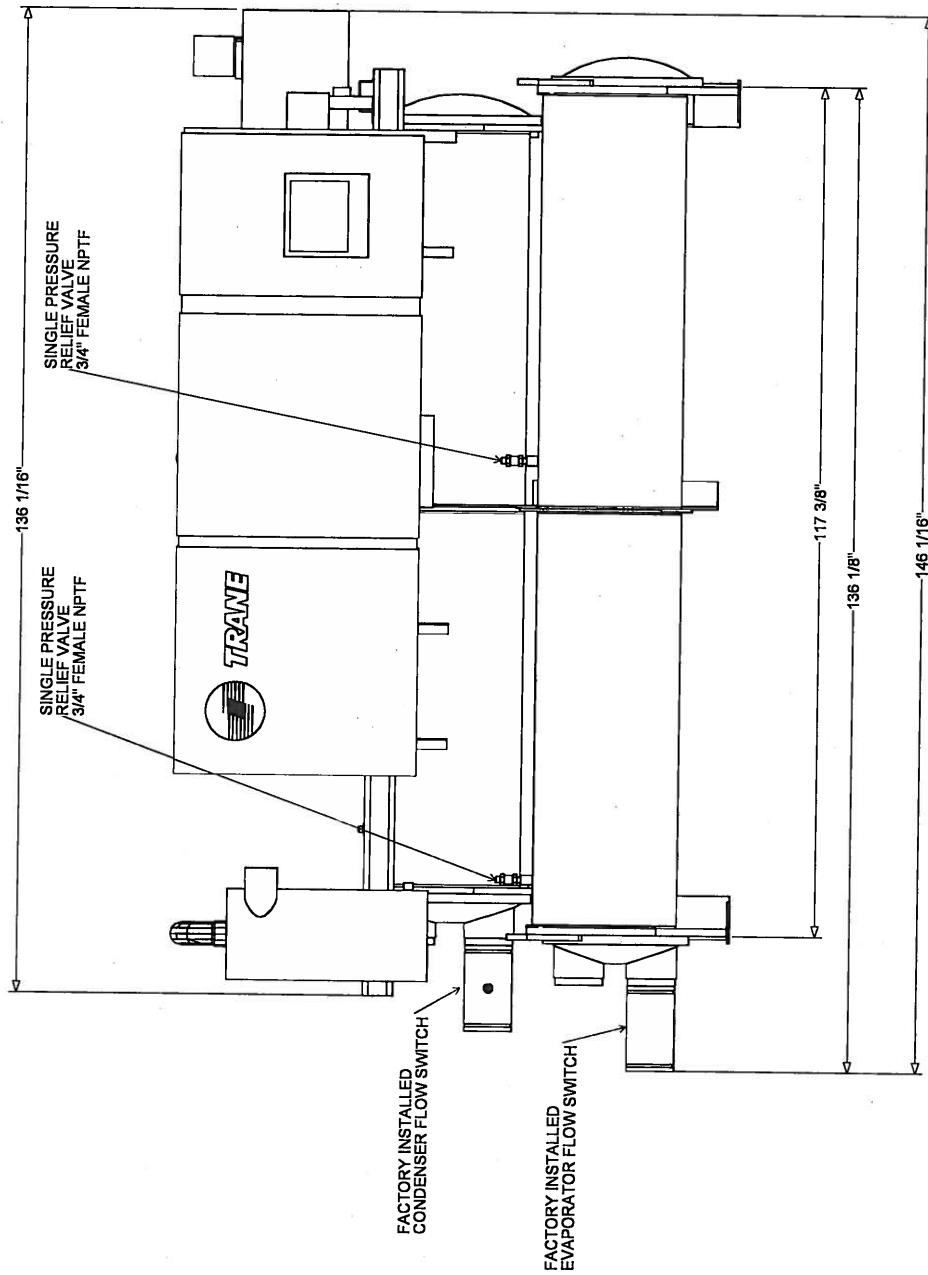
FRONT VIEW



LEFT END VIEW

Unit Dimensions - Water Cooled Helical Rotary Chillers (Duplex)

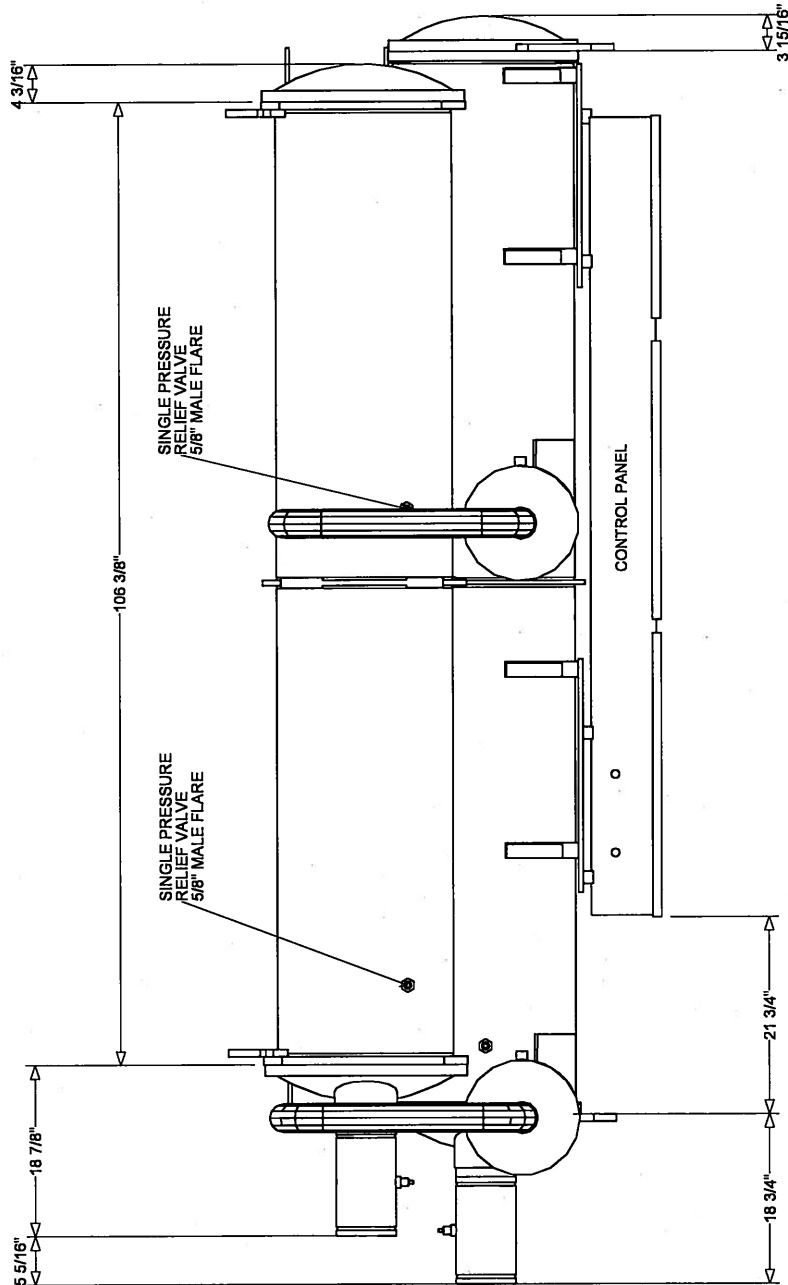
Item: A1 Qty: 1 Tag(s): RTWD-220 5.5



FRONT VIEW

Unit Dimensions - Water Cooled Helical Rotary Chillers (Duplex)

Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

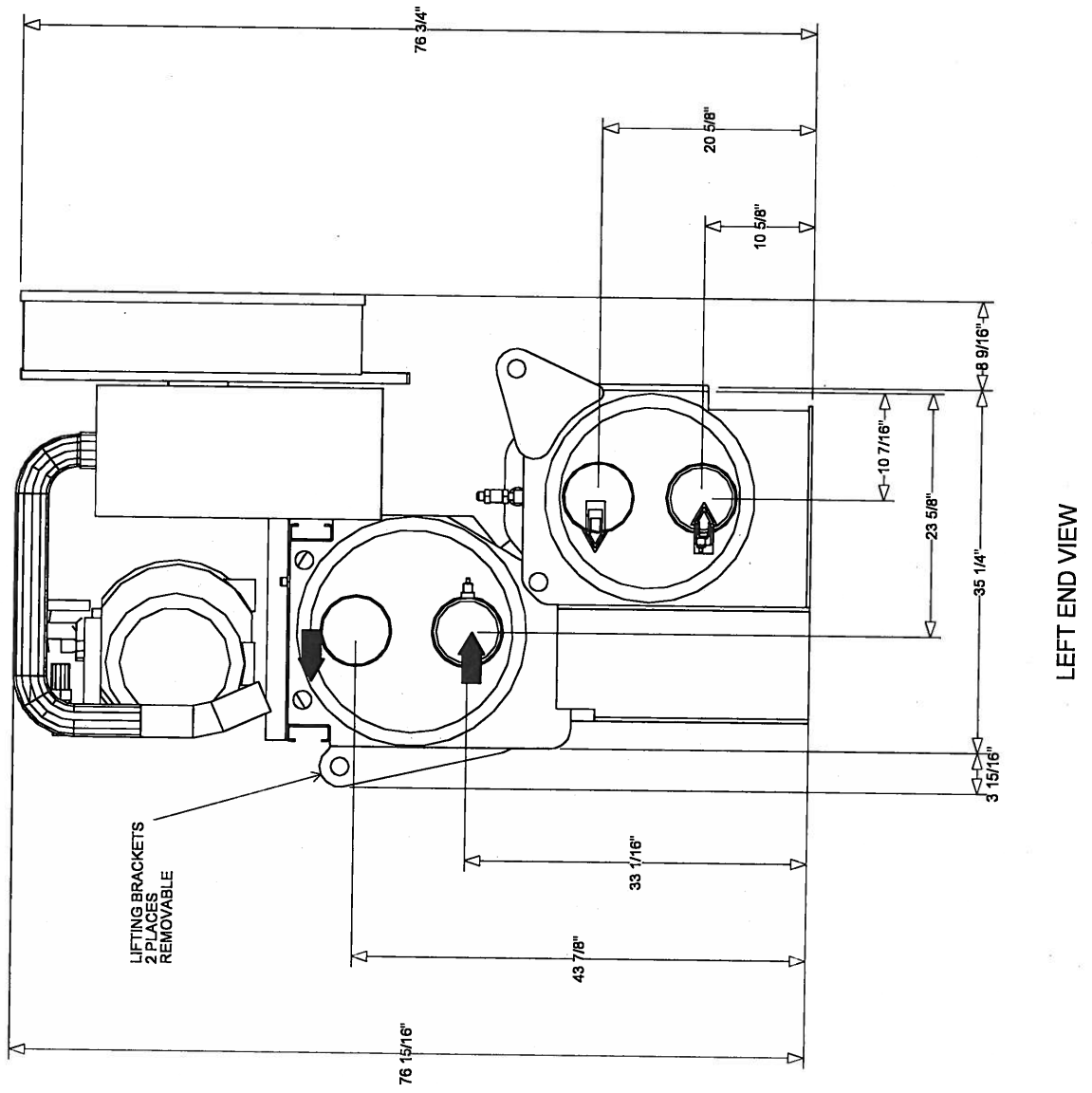


PLAN VIEW

COMPRESSORS AND SOUND BOXES WHEN
PRESENT REMOVED FOR CLARITY IN THIS VIEW

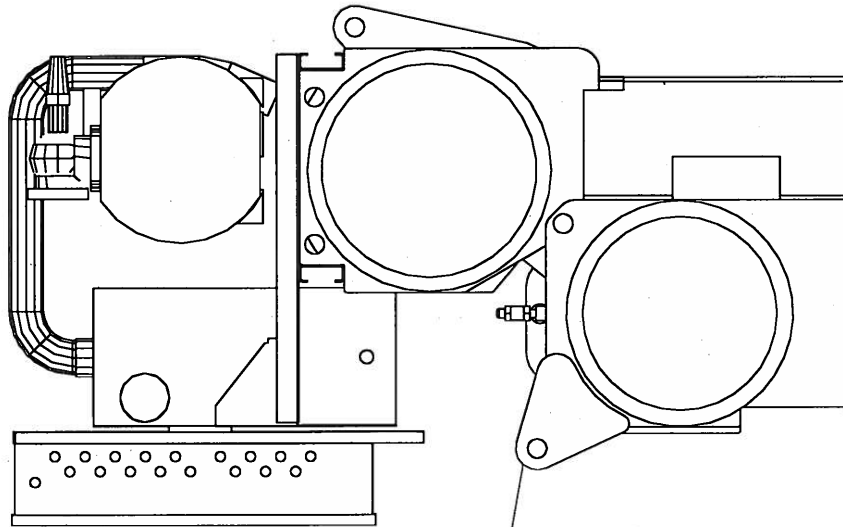
Unit Dimensions - Water Cooled Helical Rotary Chillers (Duplex)

Item: A1 Qty: 1 Tag(s): RTWD-220 5.5



Unit Dimensions - Water Cooled Helical Rotary Chillers (Duplex)

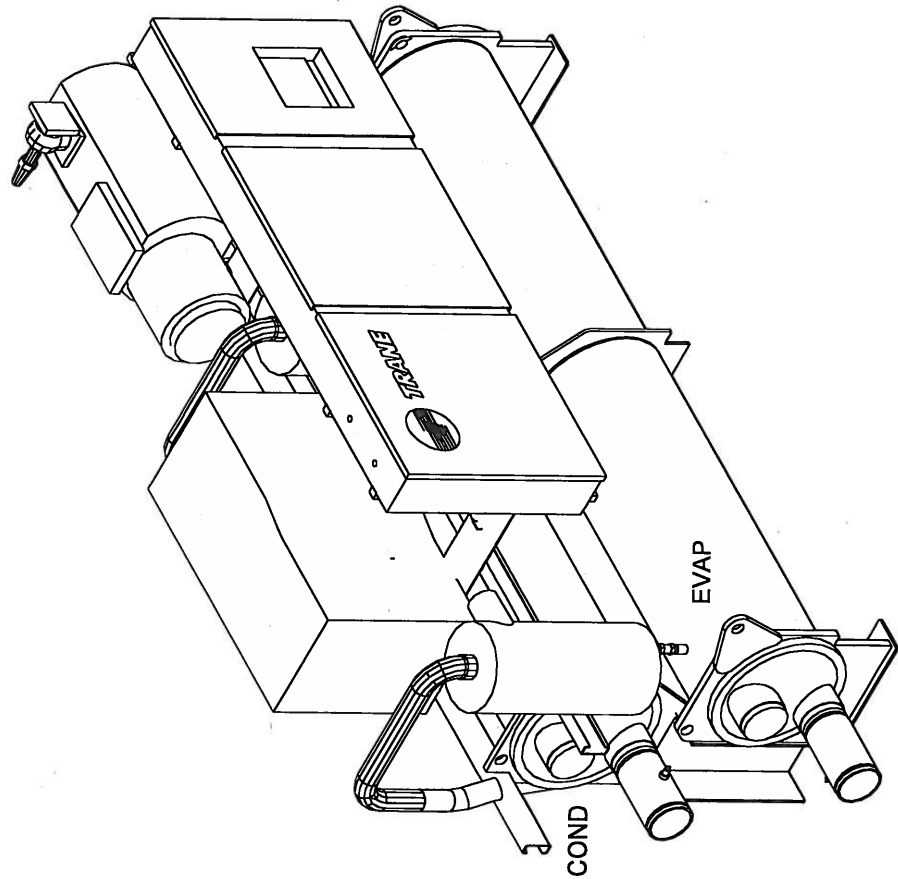
Item: A1 Qty: 1 Tag(s): RTWD-220 5.5



LIFTING BRACKET
2 PLACES
REMOVABLE

RIGHT END VIEW

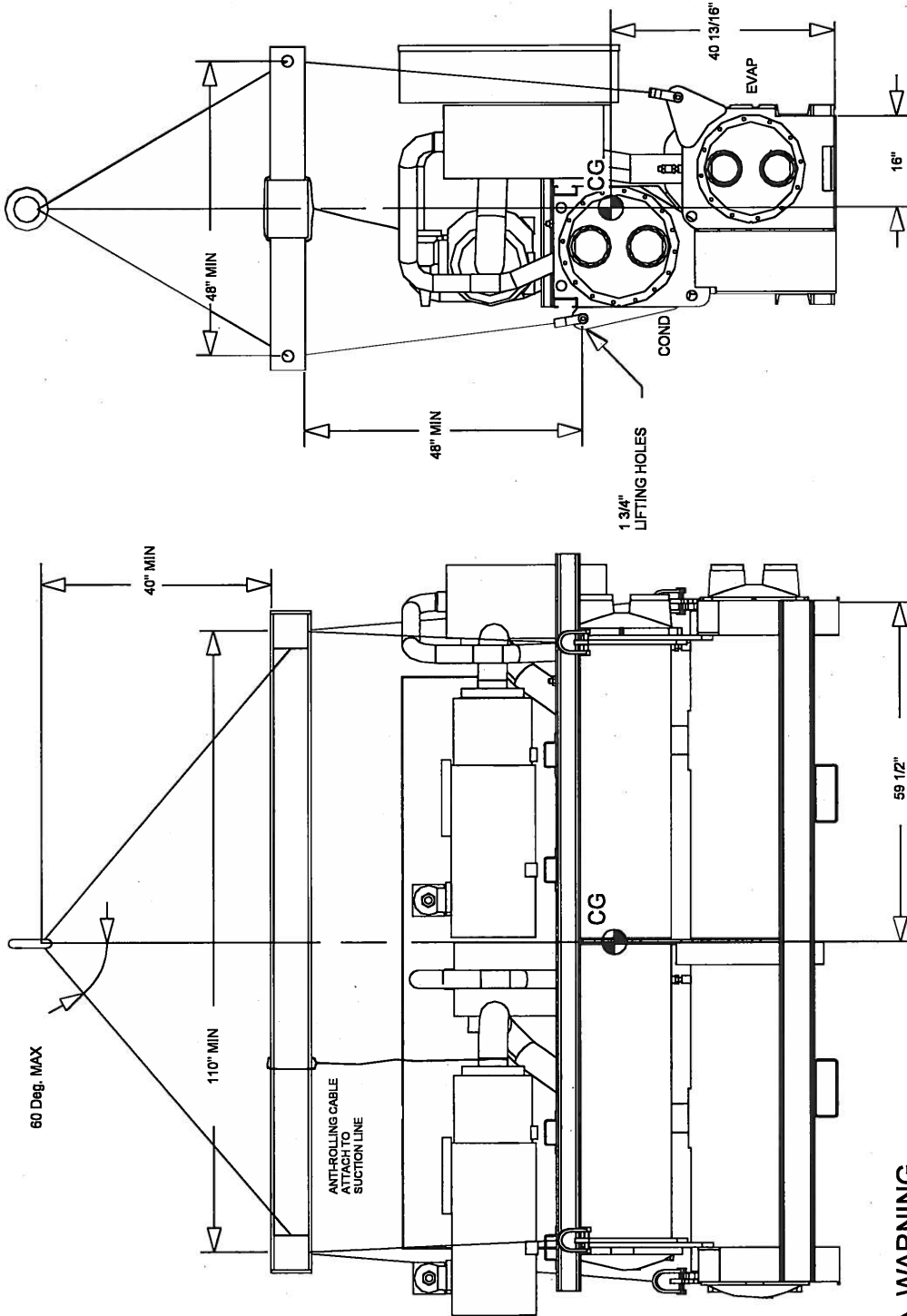
Unit Dimensions - Water Cooled Helical Rotary Chillers (Duplex)
Item: A1 Qty: 1 Tag(s): RTWD-220 5.5



ISOMETRIC VIEW

Weight, Clearance & Rigging Diagram - Water Cooled Helical Rotary Chillers (Duplex)
 Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

WEIGHTS/RIGGING/CLEARANCE PAGE 1 OF 2



NOTE: APPROXIMATE LOCATION OF CENTER OF GRAVITY SHOWN IN DIAGRAMS

NOTE:
 IF UNIT IS DISASSEMBLED, SEE SERVICE BULLETIN FOR LIFTING AND RIGGING OF COMPONENTS.

DO NOT USE FORK LIFT TO MOVE OR LIFT UNIT UNLESS UNIT HAS LIFTING BASE WITH LOCATIONS MARKED BY CAUTION LABELS INSTALLED. OTHER LIFTING ARRANGEMENTS COULD RESULT IN DEATH, SERIOUS INJURY OR EQUIPMENT DAMAGE.

WARNING

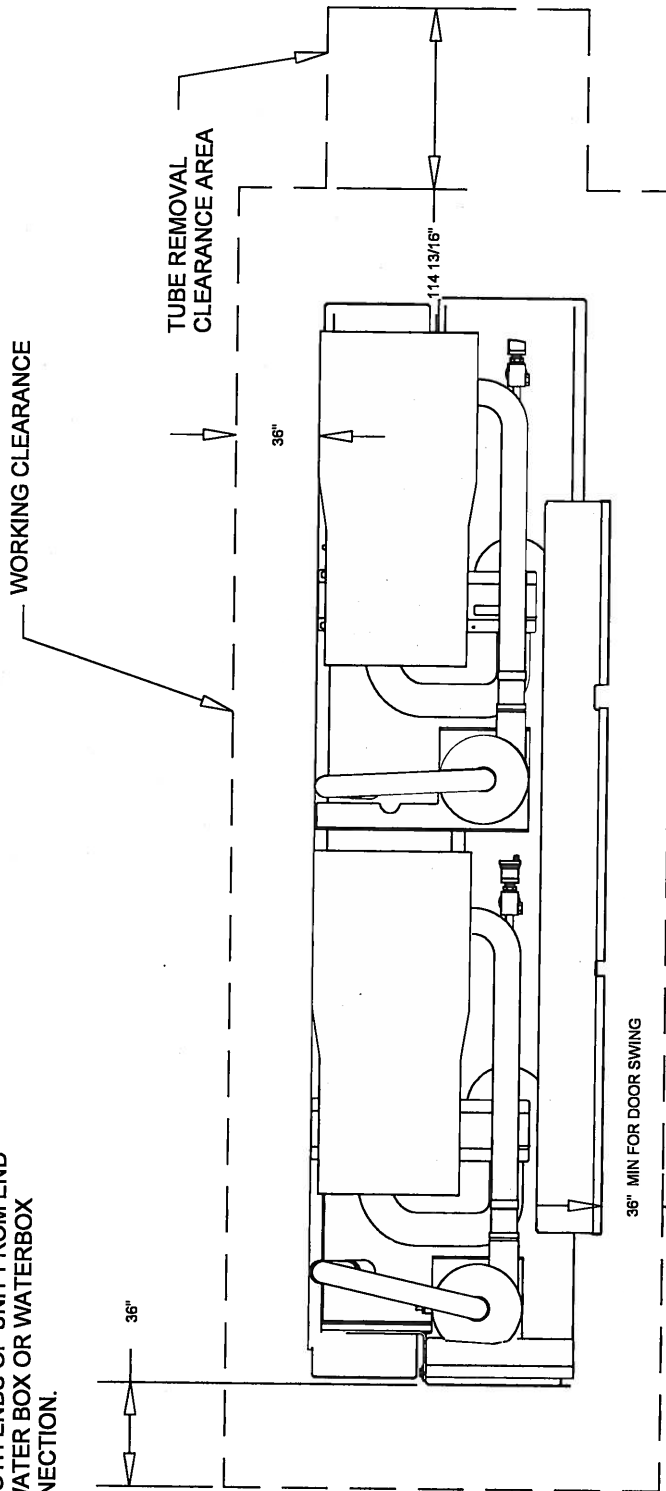
IMPROPER LIFTING AND MOVING

DO NOT USE CABLES (CHAINS OR SLINGS) EXCEPT AS SHOWN. LIFTING BEAM CROSSBARS MUST BE POSITIONED SO LIFTING CABLES DO NOT CONTACT THE SIDES OF THE UNIT. EACH OF THE CABLES (CHAINS OR SLINGS) USED TO LIFT THE UNIT MUST BE CAPABLE OF SUPPORTING THE ENTIRE WEIGHT OF THE UNIT. TEST LIFT UNIT AT MINIMAL HEIGHT TO VERIFY EVEN LEVEL LIFT. LIFTING CABLES (CHAINS OR SLINGS) MAY NOT BE OF THE SAME LENGTH. ADJUST AS NECESSARY FOR EVEN LEVEL LIFT. THE HIGH CENTER OF GRAVITY ON THIS UNIT REQUIRES THE USE OF AN ANTI-ROLLING CABLE (CHAIN OR SLING) TO PREVENT UNIT FROM ROLLING. ATTACH CABLE (CHAIN OR SLING) WITH NO TENSION AND MINIMAL SLACK AROUND COMPRESSOR SUCTION PIPE AS SHOWN.

Weight, Clearance & Rigging Diagram - Water Cooled Helical Rotary Chillers (Duplex)
 Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

WEIGHTS/RIGGING/CLEARANCE PAGE 2 OF 2

NOTE: END CLEARANCE REQUIRED ON BOTH ENDS OF UNIT FROM END OF WATER BOX OR WATERBOX CONNECTION.



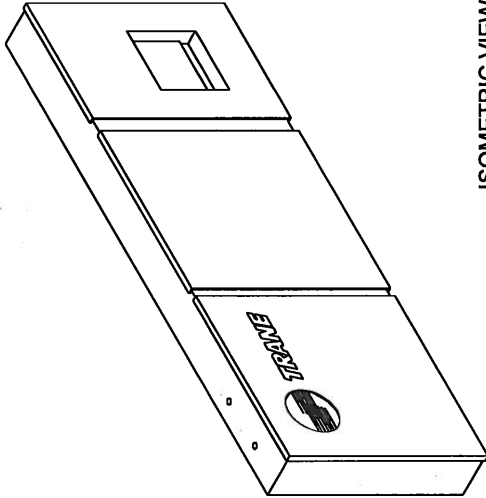
NOTE: FOR CONTROL PANEL SIDE CLEARANCE, 42" (1067mm) CLEARANCE IS REQUIRED TO OTHER GROUNDED PARTS. TWO UNITS WITH PANELS FACING EACH OTHER OR OTHER LIVE PARTS, REQUIRE A CLEARANCE OF 48" (1220mm). ALLOW 36" OF CLEARANCE ABOVE THE STARTER ELECTRICAL CONNECTION DOOR.

NOTE:
 1. SUBTRACT 300lbs (663kg) FOR UNITS WITHOUT BASE RAIL FORKLIFT OPTION.
 2. ADD 137lbs (62kg) FOR UNITS WITH SOUND ATTENUATOR OPTION.
 3. WEIGHTS ARE TYPICAL FOR UNITS WITH R134A CHARGE AND OIL CHARGE.

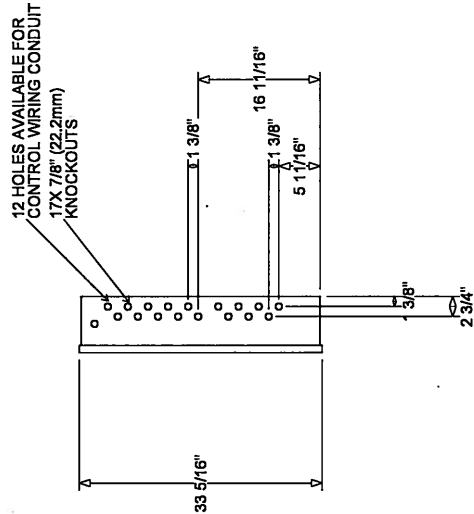
UNIT SIZE	SHIPPING WEIGHT
220	8894.9 lb

Accessory - Water Cooled Helical Rotary Chillers (Duplex)
Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

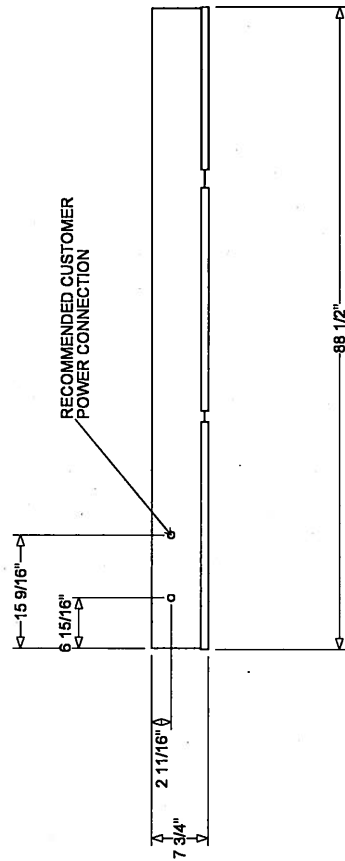
CUSTOMER WIRE SELECTION TABLE	
POWER WIRE SELECTION TO DISCONNECT SWITCH(1Q1)	
UNIT SIZE	VOLTAGE
220	575
UNIT EFF	
HIGH	
LUG WIRE SIZE RANGE (PER PHASE)	SHORT CIRCUIT RATING: (RMS SYMMETRICAL AMPS)
CIR 1 & 2 (SINGLE PT POWER)	5000.00 A
(1) #1-250 MCM (3) #10-500 MCM	



ISOMETRIC VIEW



RIGHT END VIEW



TOP VIEW

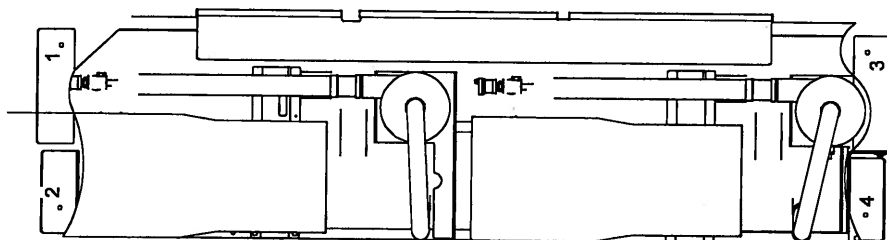
Accessory - Water Cooled Helical Rotary Chillers (Duplex)

Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

UNIT SIZE	UNIT EFF	MOUNTING LOCATIONS AND POINT LOAD WEIGHTS				TOTAL OPERATING WEIGHT
220	HIGH	1	2	3	4	9493.1 lb
		2171.0 lb	2515.0 lb	2226.0 lb	2579.0 lb	
MOUNTING LOCATIONS AND ISOLATOR PART NUMBER						
		1	2	3	4	MAX LOAD
NOTE: NO ISOLATORS HAVE BEEN SELECTED. POINT LOADS ARE SUPPLIED FOR CUSTOMER REFERENCE ONLY.						

NOTE: NO ISOLATORS HAVE BEEN SELECTED. POINT LOADS ARE SUPPLIED FOR CUSTOMER REFERENCE ONLY.

STARTER/CONTROL PANEL THIS SIDE OF UNIT



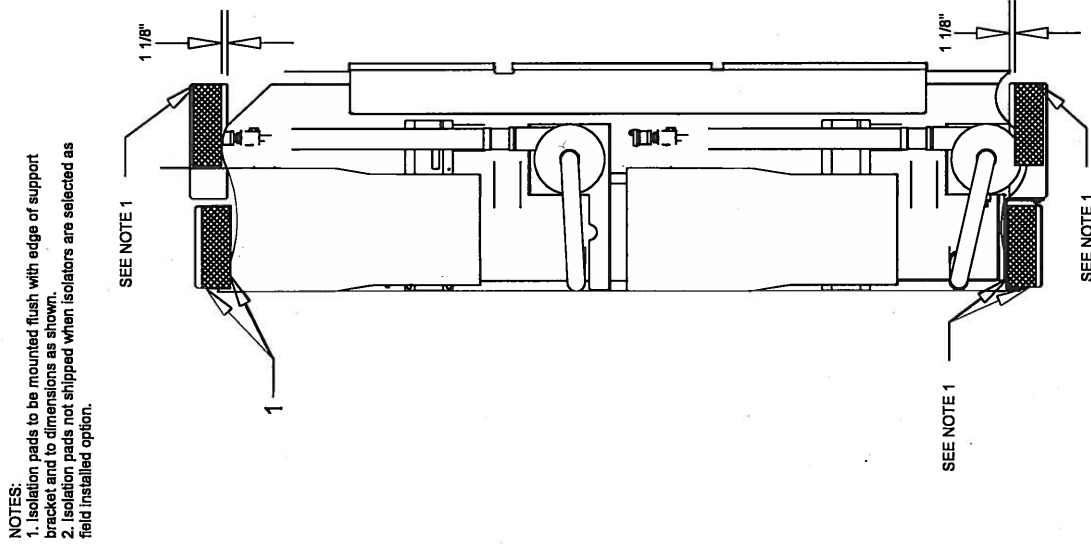
Accessory - Water Cooled Helical Rotary Chillers (Duplex)

Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

STARTER/CONTROL PANEL THIS SIDE OF UNIT

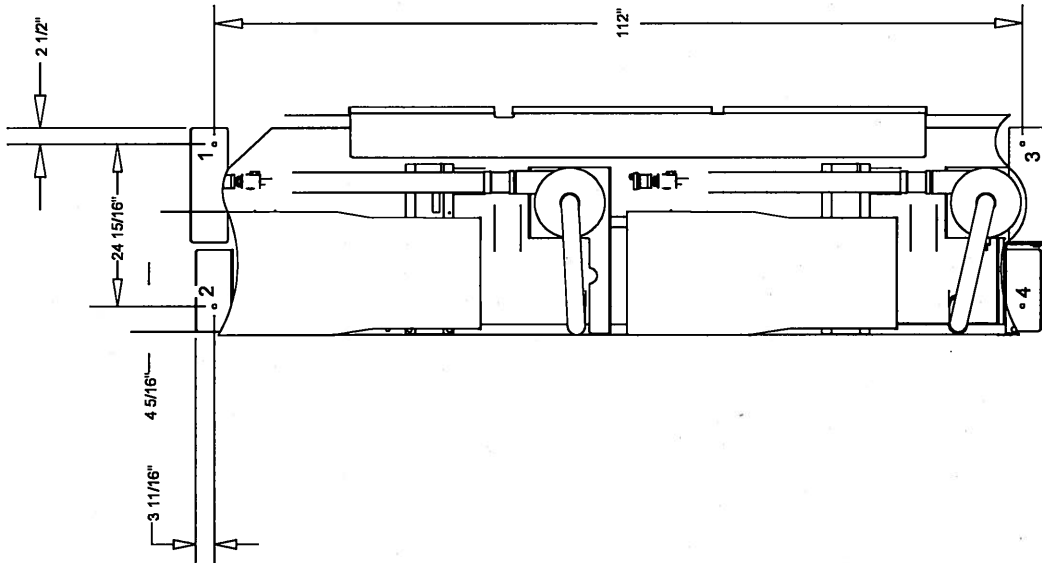
MOUNTING LOCATIONS

TOP VIEW
(ISOLATION PAD LOCATION)



- NOTES:
1. Isolation pads to be mounted flush with edge of support bracket and to dimensions as shown.
 2. Isolation pads not shipped when isolators are selected as field installed option.

TOP VIEW
(ISOLATOR MOUNTING LOCATION)



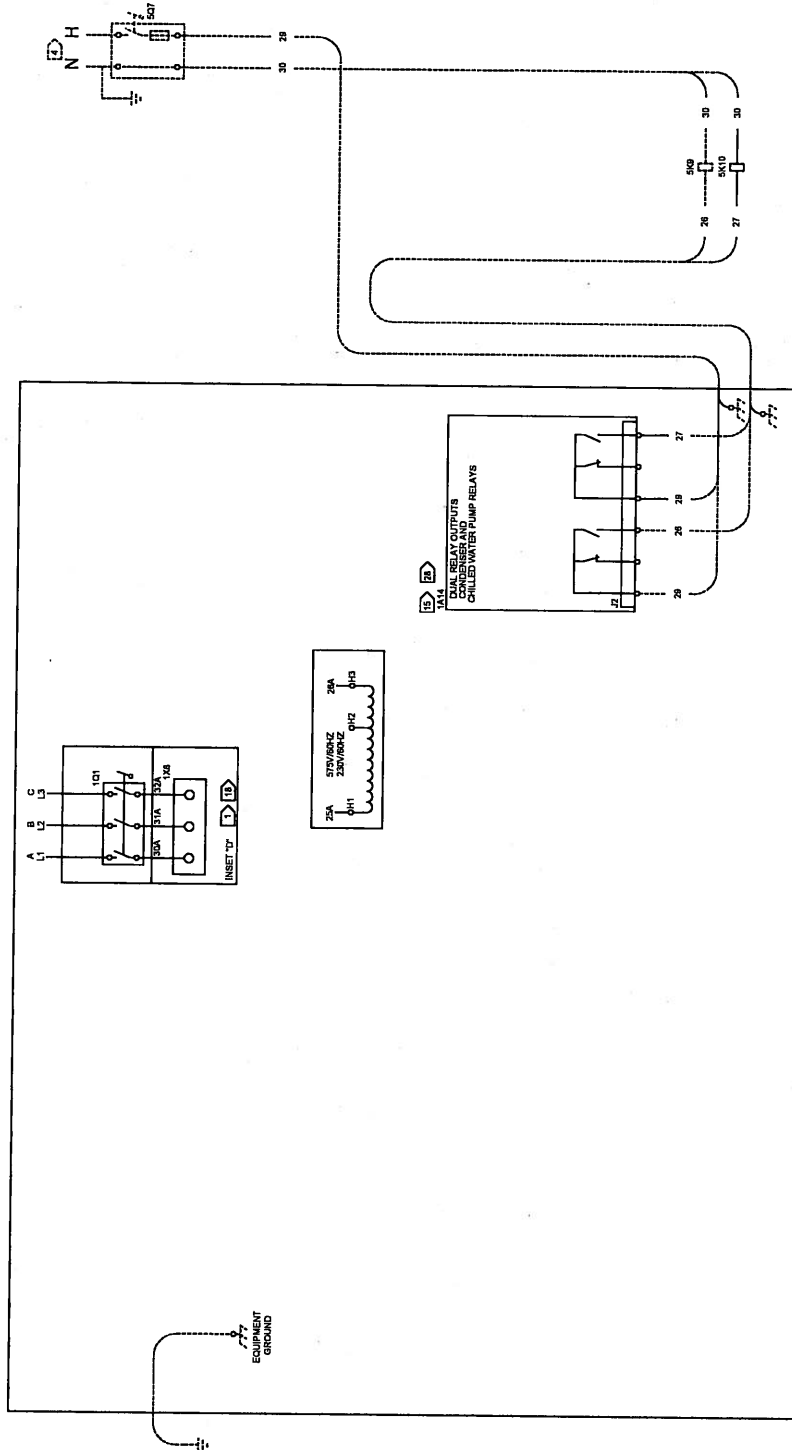
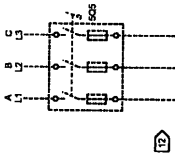
MOUNTING HOLE DIAMETER 5/8"

Field Wiring - Water Cooled Helical Rotary Chillers (Duplex)

Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

WARNING
 HAZARDOUS VOLTAGE!
 DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED VARIABLE SPEED DRIVE. REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.
 FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.

CAUTION
 USE COPPER CONDUCTORS ONLY!
 UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
 FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.



FIELD WIRING PAGE 1 OF 3
 CONTINUED ON NEXT PAGE

Field Wiring - Water Cooled Helical Rotary Chillers (Duplex)

Item: A1 Qty: 1 Tag(s): RTWD-220 5.5

FIELD WIRING NOTES SECTION

- 14. ALL CUSTOMER CONTROL CIRCUIT WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM INSULATION RATING OF 300 VOLTS. EXCEPT AS NOTED, ALL CUSTOMER WIRING CONNECTIONS ARE MADE TO CIRCUIT BOARD MOUNTED BOX LUGS WITH A WIRE RANGE OF 14 TO 18 AWG.
- 15. UNIT PROVIDED DRY CONTACTS FOR THE CONDENSER/CHILLED WATER PUMP CONTROL. RELAYS ARE RATED FOR 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, OR 1/3 HP, 7.2 FLA AT 120 VOLTS 60 HZ. CONTACTS ARE RATED FOR 5 AMPS GENERAL PURPOSE DUTY 240 VOLTS.
- 16. CUSTOMER SUPPLIED CONTACTS FOR ALL LOW VOLTAGE CONNECTIONS MUST BE COMPATIBLE WITH DRY CIRCUIT 24 VOLTS DC FOR A 12 mA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS RECOMMENDED.

1. SINGLE SOURCE POWER IS PROVIDED AS STANDARD ON THESE PRODUCTS. DUAL SOURCE POWER IS OPTIONAL. FIELD CONNECTIONS FOR SINGLE SOURCE POWER ARE MADE TO TX1, 1Q1, OR 1Q2. WHEN THE OPTIONAL DUAL SOURCE POWER IS SELECTED THE FIELD CONNECTIONS FOR CIRCUIT #2 ARE MADE TO 1X2, 1Q3, OR 1Q4.

2. FOR VOLTAGES 200V/60 HZ, 220V/50HZ, 380V/50HZ, 460V/50HZ, WIRE 26A SHALL BE CONNECTED TO H2. FOR VOLTAGES 230V/60HZ & 575V/60HZ, WIRE 26A SHALL BE CONNECTED TO H3. 400V/50HZ UNIT IS FACTORY WIRES WITH 26A CONNECTED TO H3 - RECONNECT WIRE 26A TO H2 FOR 380V/50HZ OR H4 FOR 415V/50HZ. H4 IS ONLY AVAILABLE WITH 400V/50HZ PANELS.

4. CUSTOMER SUPPLIED POWER 115/60/1 OR 220/50/1 TO POWER RELAYS. MAX. FUSE SIZE IS 15 AMPS. GROUND ALL CUSTOMER SUPPLIED POWER SUPPLIES AS REQUIRED BY APPLICABLE CODES. GREEN GROUND SCREWS ARE PROVIDED IN UNIT CONTROL PANEL.

11. REFER TO RTWD ELECTRICAL SCHEMATIC FOR SPECIFIC ELECTRICAL CONNECTION INFORMATION AND NOTES PERTAINING TO WIRING INSTALLATION.

12. ALL UNIT POWER WIRING MUST BE 600 VOLT COPPER CONDUCTORS ONLY AND HAVE A MINIMUM TEMPERATURE INSULATION RATING OF 90 DEGREE C. REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION DEVICE. PROVIDE AN EQUIPMENT GROUND IN ACCORDANCE WITH APPLICABLE ELECTRIC CODES. REFER TO WIRE RANGE TABLE FOR LUG SIZES.

13. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE AND LOCAL REQUIREMENTS.

WARNING
 HAZARDOUS VOLTAGE!
 INCLUDING ELECTRICAL SHOCK OR FIRE HAZARD.
 FOLLOW ALL SAFETY PROCEDURES AND LABELS.
 DO NOT TOUCH ANY PARTS OF THE UNIT.
 STORED VOLTAGE. UNIT PARTS
 TO OPERATE IMMEDIATELY FOR
 OPERATOR'S PROTECTION.
 FAILURE TO FOLLOW THESE INSTRUCTIONS
 COULD RESULT IN DEATH OR
 SERIOUS INJURY.

CAUTION
 USE COPPER CONDUCTORS ONLY!
 OTHER TYPES OF CONDUCTORS
 MAY CAUSE DAMAGE TO THE
 EQUIPMENT.
 FAILURE TO DO SO MAY CAUSE DAMAGE TO THE
 EQUIPMENT.

20. ALL RTWD UNITS (SYSTEMS WITH A REMOTE CONDENSER) REQUIRE CHILLED WATER PUMPS BE CONTROLLED BY THE TRANE CH530 TO AVOID CATASTROPHIC DAMAGE TO THE EVAPORATOR DUE TO FREEZING. IT IS STRONGLY RECOMMENDED THAT CHILLED WATER PUMP CONTROL ALSO BE USED ON RTWD TO PROVIDE PROPER UNIT OPERATION.



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APPENDIX 3

Minimum Characteristics of the New Air-Cooled Liquid Chiller



NATIONAL REFRIGERATION AND AIR CONDITIONING CANADA CORP.
 159 ROY BLVD, PO BOX 2020
 BRANTFORD, ON
 CANADA N3T 5Y6

KFL27A510V-T5A-A55

LARGE FLUID COOLER

PURCHASER : Dessau	SUBMITTED BY :
PROJECT : Agriculture Canada	DATE : 15 Oct 2014
ORDER # : -A00	ITEM # : 0
QUOTE # :	ID # :
PURCHASER'S PO # :	TAGGING :

MODEL FEATURES

- Fan Guard
- Fan motors are inherently protected with internal overloads
- Full collar aluminum plate fins on expanded seamless copper tubes ensure optimum heat transfer efficiency
- Rugged heavy-gauge galvanized steel rail motor mount / support
- THERMOSPAN coil design feature eliminates tube failure on tube sheets
- All fan sections individually baffled with full height partitions and clean out ports
- Heavy guage galvanized steel cabinet construction assembled with zink plated huck bolts supported on heavy-duty legs
- Zinc Plated Huck Bolts

MODEL OPTIONS (* = Shipped Loose)

DESIGN DATA

- 230V Control Circuit
- 115V Control Circuit
- 24V Control Circuit
- Headers 4-1/8" Dia
- 1 Headers 6-1/8" Dia

EXTENDED LEG KIT

- 36 in.
- 48 in.

FAN CYCLING

- Ambient Temp Control
- 1 with Aquastats

COIL COATING

- ElectroFin Coating

FIN AND MATERIAL

- Gold Coat Fins

FLANGE SET

- 6 in. Headers
- 1 Individual Fan Motor Fusing
- NON FUSED DISCONNECT**
- 1 40A
- 80A

VOLTAGE	AIR FLOW	CAPACITY
575/3/60	CFM	1388541 BTUH

FANS			HEATERS			CIRCUIT TOTAL			
QTY	POWER	FLA/FAN	TYPE	QTY	AMPS	AMPS	WATTS	MCA†	MOP‡
14	1HP	2.1				29.4	12600	36.8	40

LIQUID	SOUND	REC CAPACITY	APPROVALS
SUCTION	WEIGHT	REF CHARGE	
	5550 lb	89 lb	

NOTES:
 † MCA.. Minimum Circuit Ampacity, ‡ MOP.. Maximum Overcurrent Protection

APPROVED BY :	DATE :
----------------------	---------------

Approval of this drawing signifies that the equipment is acceptable under the provision of the job specifications. Any change made hereon by any person whomsoever subject to acceptance by NATIONAL REFRIGERATION at its home office.



**NATIONAL REFRIGERATION AND
AIR CONDITIONING CANADA CORP.**
159 ROY BLVD, PO BOX 2020
BRANTFORD, ON
CANADA N3T 5Y6

KFL27A510V-T5A-A55

**LARGE
FLUID COOLER**

PURCHASER : Dessau	SUBMITTED BY :
PROJECT : Agriculture Canada	DATE : 15 Oct 2014
ORDER # : -A00	ITEM # : 0
QUOTE # :	ID # :
PURCHASER'S PO # :	TAGGING :

ENTERED DESIGN REQUIREMENTS

Site Altitude 200 ft	Line Frequency 60Hz
Fluid Type ETHYLENE GLYCOL/WATER	Fluid Concentration 40%
Fluid Fouling Factor 0.0005 h.ft².°F/Btu	Fluid Temperature Range -13 °F to 220 °F
Air Inlet Temperature 95 °F	
Fluid Inlet Temperature 115 °F	Fluid Flow Rate 302 USGPM
Fluid Outlet Temperature 104.8 °F	Required Capacity / Unit 1372886 BTUH

SELECTED MODEL DETAILS

Fan Configuration 2 x 7	Tubes 280
Voltage 575/3/60	Tube Configuration 1/2 x 1.5 x 1.299 in
Motor 850 RPM	Tube Rows 5
Fin Style 0.0055 in Aluminum Sine Wave	Tubes Per Row 56
Fins Per Inch 10	Fin Block Dimensions 385 x 84 x 6 1/2 in
Air Flow Direction Vertical	Air Flow 105633 CFM

CALCULATED DETAILS

Feeds 140	Tubes Per Feed 2
Face Area 224.6 ft²	Blank Tubes 0
Internal Volume 14.5 ft³	Connection Size 6 1/8 in Same End
Model Capacity 1388541 BTUH	Calculated Fluid Flow Rate 302 USGPM
Capacity Variance +1.1 %	Fluid Velocity 3.7 ft/s
Actual Fluid Outlet Temperature 104.7 °F	Fluid Pressure Drop 5.4 psi
Air Outlet Temperature 106.8 °F	Actual Fluid ΔT 10.3 °F

**THE VALUES CONTAINED HERIN ARE BASED ON LABORATORY FINDINGS
AND THE INITIAL CONDITIONS ENTERED BY THE USER.**

Approval of this drawing signifies that the equipment is acceptable under the provision of the job specifications. Any change made hereon by any party is given gratis and the manufacturer assumes no obligation or liability for actual results obtained. **INFORMATION IS GIVEN GRATIS AND THE MANUFACTURER ASSUMES NO**



**NATIONAL REFRIGERATION AND
AIR CONDITIONING CANADA CORP.**

159 ROY BLVD, PO BOX 2020
BRANTFORD, ON
CANADA N3T 5Y6

KFL27A510V-T5A-A55

**LARGE
FLUID COOLER**

PURCHASER : Dessau	SUBMITTED BY :
PROJECT : Agriculture Canada	DATE : 15 Oct 2014
ORDER # : -A00	ITEM # : 0
QUOTE # :	ID # :
PURCHASER'S PO # :	TAGGING :

SELECTED OPTION DESCRIPTIONS

Design Data - 115V Control Circuit

Control circuit used to power factory installed electrical components only. Not to be used as a power source outside of the unit.

Design Data - Headers 6-1/8" Dia

Inlet and outlet connections are ODF Copper

Individual Fan Motor Fusing

Current limiting time delay Class CC fuses CCMR or LPCC or equivalent. 600 VAC. One fuse block and one set of fuses per fan motor (2 for single phase, 3 for three phase motors)

Non Fused Disconnect - 40A

ABB OT or equivalent with lockable handle.

Approval of this drawing signifies that the equipment is acceptable under the provision of the job specifications. Any change made hereon by any person whomsoever subject to acceptance by NATIONAL REFRIGERATION at its home office.



NATIONAL REFRIGERATION AND AIR CONDITIONING CANADA CORP.
 159 ROY BLVD, PO BOX 2020
 BRANTFORD, ON
 CANADA N3T 5Y6

Order Item No: 0
KFL27A510V-T5A-A55
LARGE FLUID COOLER

NATIONAL REFRIGERATION will furnish equipment in accordance with this drawing and specifications, and subject to its published warranty. Approval of this drawing signifies that the equipment is acceptable under the provision of the job specifications. Any change made hereon by any person whomsoever subject to acceptance by NATIONAL REFRIGERATION at its home office.

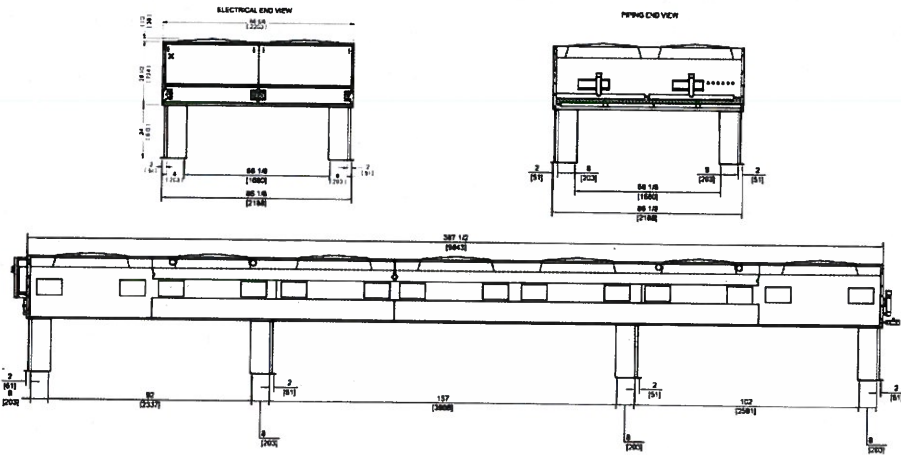
DATE : **15 Oct 2014**
 PURCHASER : **Dessau**
 PROJECT : **Agriculture Canada**
 SUBMITTED BY :

Dimensions shown are for standard unit less options.

DIMENSIONS	
DIMENSION A	
DIMENSION B	
DIMENSION C	
DIMENSION D	
DIMENSION E	
DIMENSION F	
DIMENSION G	
DIMENSION H	

CONNECTIONS	
LIQUID	
SUCTION	
DRAIN	
WATER	
DISCHARGE	
PAN LOOP	
HOT GAS SIDE PORT	
HOT GAS INLET	
HOT GAS OUTLET	
OTHER	
SHIPPING WEIGHT	5550 lb
REFRIGERANT CHARGE	89 lb
RECEIVER CAPACITY	

APPROVALS			



NOTES:



APPENDIX 4

Existing Control System for Chillers #1 and #2 – Screen Shots and Diagram of Controls of Chilled Water Systems

2.75 °C
95.0 %

CONDENSEUR
FAN CONDENSEUR No.1 Off
FAN CONDENSEUR No.2 Off
FAN CONDENSEUR No.3 Off
FAN CONDENSEUR No.4 Off



CONDENSEUR AU TOIT
ROOF CONDENSOR

PRIORITE REF. 125 T. Off
REFROIDISSEUR 125 T. Off
PRIORITY CHILLER 125T OFF
CHILLER 125T OFF



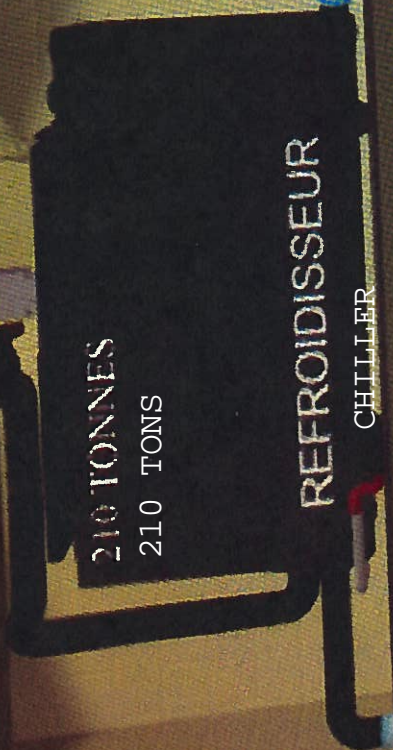
35.0 °C

0.0 %
Off
0.0 Amps

SEQUENCE EAU REF 0.0
CHILLED WATER SEQUENCE



REFROIDISSEUR 210 T. On
210 T CHILLER ON



On
4.1 Amps

PRIORITY PUMP P7/8 1.0
REMAINING TIME
TOTAL TIME

Off
0.0 Amps

P-5

PRIORITY CHILLER 125 T OFF
PRIORITY REF. 125 T. Off

PRIORITE POMPE P7/8 1.0
TEMPS RES. PMP. P7/8 120.2 Hours
TEMPS TOT. PMP. P7/8 200.0 Hours

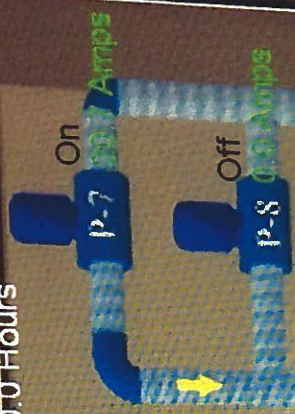
SEQUENCE EAU REF 0.0
CHILLED WATER SEQUENCE 0.0
2VAR168 2.0
2VAR169 22.5 Hours
2VAR170 200.0 Hours

125 T CHILLER OFF
REFROIDISSEUR 125 T. Off



Off
4.6 Amps

P-1

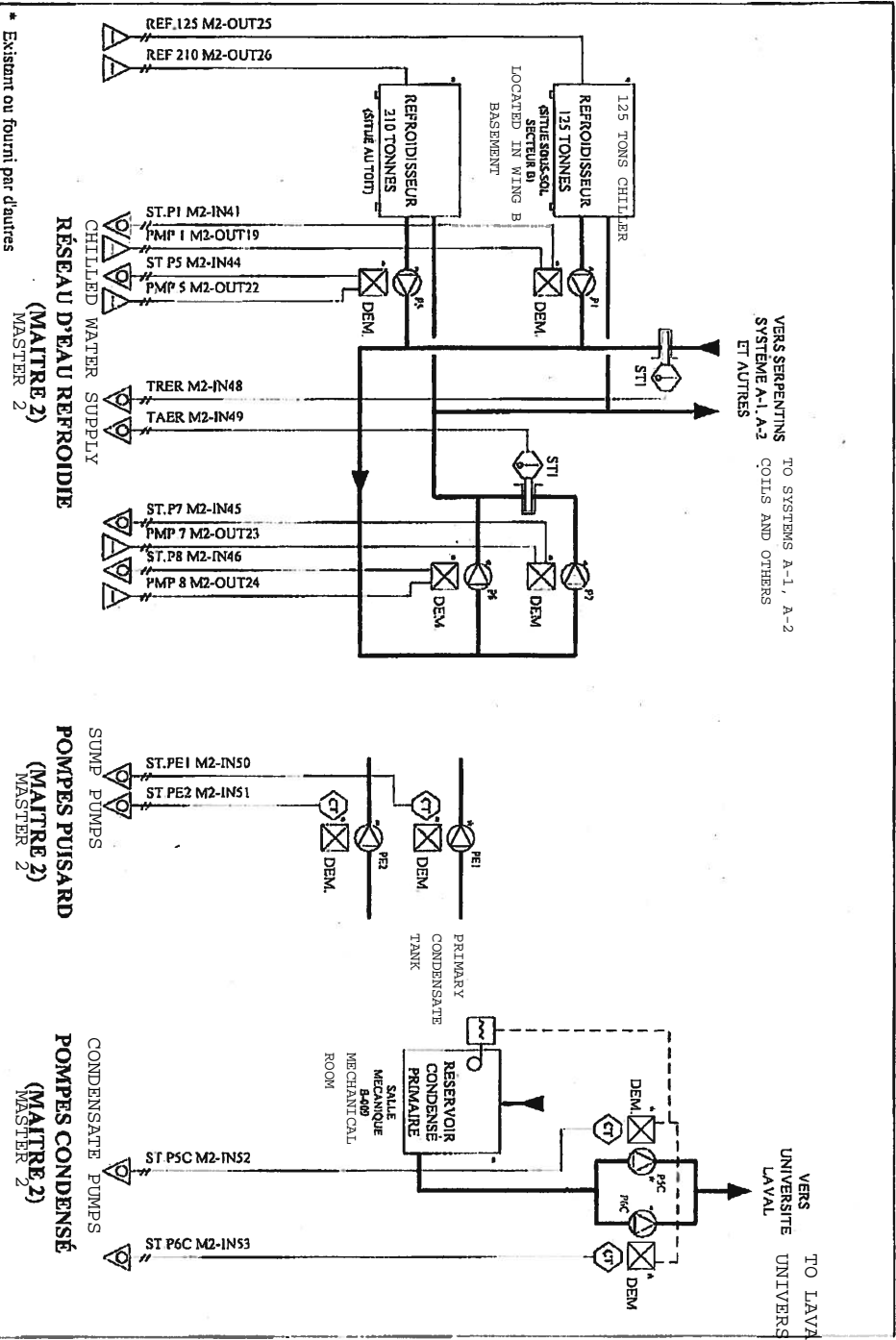


8.0 °C

VERS RESEAU
EAU REFRIGERIE
TO CHILLED WATER
SUPPLY

9.2 °C

RETOUR - RETURN



VERS SERPENTINS
SYSTEME A-1, A-2
ET AUTRES

TO SYSTEMS A-1, A-2
COILS AND OTHERS

VERS
UNIVERSITE
LAVAL

TO LAVAL
UNIVERSITY

* Existants ou fournis par d'autres

535, 21ème Avenue
St-Romald (Québec) G6Y 5M6
Tél: (418) 834-2777 Fax: (418) 834-2329
e-mail: stuc@contrôlestuc.com



PROJET		AGRICULTURE CANADA STE-FOY - PHASE II	
NO PROJET	TITRE	RÉSEAU D'EAU REFRIGÉRIÉE CHILLED WATER SUPPLY	
0	RAUBERT	DESSINE PAR	D.GODBOU
2014-04-07	RAUBERT	FICHER	AG-REF-VSD
		DATE	2004-05-16
		PAGE	50

SUMP PUMPS
(MAITRE 2)
MASTER 2

CONDENSATE PUMPS
(MAITRE 2)
MASTER 2



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APPENDIX 5

Drawings of Existing Facilities Mechanical Room B009



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APPENDIX 6

Characteristics of Existing Equipment



Item of Equipment	Brand	Capacity	Other
Chiller for System #1 (Mechanical Room B009)	Carrier, 30HS160D100 model	125 tonnes	575V/3Ø/60Hz
Air-cooled liquid chillers to be installed on the roof	Dunham-Bush, LS BC 282 model		
Pump P-1	WEG, JM005504W model		575V/3Ø/60Hz, 5HP motor, 5.49A
Pump P-2	US Motor, 315JN model		575V/3Ø/60Hz, 10HP motor, 9.8A
Pump P-3	US Motor, 254JP model		575V/3Ø/60Hz, 15HP motor, 15.7A
System #2 chiller (on the roof)	Carrier, 30GTN-210 model	210 tonnes	575V/3Ø/60Hz



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APPENDIX 7

Results of Asbestos Sample Tests and Analyses

Micral Konios

Laboratoire inc.

Service d'expertise en microscopie analytique

ANALYTICAL MICROSCOPY EXPERTISE SERVICE

RAPPORT suite

REPORT suite

p. 2

Dossier: AIR141024-8966I

FILE

RESULTS

RÉSULTATS:

Sample(s): # and description Échantillon(s): # et description	AMF		Other(s)				
	R	N/D	Chry. (%)	Amos. (%)	Trém. (%)	FMA	Autre(s) (#)
<small>Mech. Room, B007/B009, Chilled Water Elbow</small> 0788-V-01: " Salle méc. B007/B009, coude eau ref. "		X				X	
<small>Mech. Room, B007/B009, Glycol Elbow</small> 0788-V-02: " Salle méc. B007/B009, coude glycol "		X				X	
<small>Mech. Room, B007/B009, Hot Water Elbow</small> 0788-V-03: " Salle méc. B007/B009, coude eau chaude "		X				X	
<small>Mech. Room, B007/B009, Glycol Elbow</small> 0788-V-04: " Salle méc. B007/B009, coude glycol "		X				X	

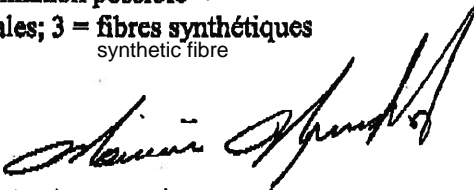
asbestos non detected

LÉGENDE: N/D = amiante non décelé; Chry. = chrysotile; Amos. = amosite; Trém. = trémolite/actinolite

FMA = fibre minérale artificielle; * = contamination possible possible contamination

Autre(s): 1 = fibres végétales; 2 = fibres animales; 3 = fibres synthétiques
vegetable fibre animal fibre synthetic fibre

AMF = artificial mineral fibre



Maurice Hrycak Jr., analyste

661, avenue Desmarchais, Verdun (Québec) H4H 1S7

(514) 762-5855



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APPENDIX 8

Plans for the Refurbishment of Mechanical Systems Project, 2004

