



CONSTRUCTION PERMIT APPLICATION

Applicant Completes: Sections I, II, III (optional), IV, VI, and VII

18-0043607**I. IDENTIFICATION**

1. Proposed Work Site at: Ocean Medical 425 Jack Martin Blvd
2. Name of Owner in Fee: Hackensack Meadows Corp
Tel. (722) 836-4077 e-mail Fredrick.Zingales@HackensackMeadows.com
Address 425 Jack Martin Blvd street municipality zip code
3. Ownership in Fee: Public _____ Private ✓
4. Principal Contractor: Superior Conditioning Tel. (732) 739-9015
Address 120 Francis St e-mail John.Sisto@SuperiorConditioning.com
KEYPORT NJ 07735
- License No. OR, if new home, Builder Reg. No. 194C00170900 Exp. Date 6/20
- Home Improvement Contractor Registration No. or Exemption Reason (if applicable): _____
- Federal Emp. ID No. 22-2494501 FAX: (732) 739-9850
5. Architect or Engineer N/A Contact _____
Address _____ e-mail _____
Tel. () _____ FAX: () _____
6. Responsible Person in Charge once Work has Begun John Sisto
Tel. (732) 739-9015 FAX: (732) 739-9850

V. FEE SUMMARY (for office use only)

		Update	Update
1. Building	\$ <u>2000</u>	✓	
2. Electrical	\$ <u>1500</u>	✓	
3. Plumbing	\$ <u>1500</u>	✓	
4. Fire Protection			
5. Elevator Devices			
6. Subtotal			
7. Less 20% for State Plan Review	\$		
8. Subtotal	\$		
9. State Permit Surcharge Fee	\$ <u>210</u>		
10. Subtotal	\$		
11. Cert. of Occupancy			
12. Other			
13. TOTAL	\$ <u>3570</u>		

VI. BUILDING/SITE CHARACTERISTICS

	(office use only)
1. Number of Stories	
2. Height of Structure	ft.
3. Area — Largest Floor	sq. ft.
4. New Building Area	sq. ft.
5. Volume of New Structure	cu. ft.
6. Max. Live Load	
7. Max. Occupancy Load	
8. If Industrialized Building: State Approved	NO
9. Total Land Area Disturbed	sq. ft.
10. Flood Hazard Zone	
11. Base Flood Elevation	ft.
12. Wetlands yes _____ no _____	

IIa. PROPOSED WORK

- ☐ Minor Work ☐ New Building ☐ Addition ☐ Demolition
- ☐ Repair ☐ Alteration ☐ Renovation ☐ Reconstruction
- ☐ Asbestos Abat. -Subch. 8 ☐ Lead Hazard Abatement ☐ Radon Remediation ☐ Annual Permit

IIb. SUBCODES

(Check all that apply)

- ☐ Building
- ☒ Electrical
- ☐ Plumbing
- ☐ Fire Protection
- ☐ Elevator

FOR OFFICE USE ONLY (Optional)

Est. Cost	Plans Rec'd by	Date Rec'd	Rejection Date	Approval Date	Re-viewer	Resubmission Dates Approval	Rejection	Re-viewer
				01/04/19	WCH			
5700				11/30/18	DS			
6,500				12-5-18	DS			

TOTAL COST 70,100**VII. DESCRIPTION OF BUILDING USE****A. RESIDENTIAL (primary use)**

1. State Specific Use: _____
2. Use Group, Proposed: _____
3. Change in Use Group, Indicate Present: _____
4. No. of dwelling units: Total Units Income-restricted
- | | |
|----------------|--|
| Gained, Sale | |
| Gained, Rental | |
| Lost, Sale | |
| Lost, Rental | |

B. NON-RESIDENTIAL (primary use)

1. State Specific Use: _____
2. Use Group, Proposed: _____
3. Change in Use Group, Indicate Present: _____
- C. MIXED USE -List secondary use(s): _____
- D. Construct. Classification: Present _____ Proposed _____

III. PLAN REVIEW (optional)**DO YOU WANT:**

1. ☐ Partial Releases
2. ☐ Prototype Processing

IV. DOES OR WILL YOUR BUILDING CONTAIN ANY OF THE FOLLOWING?

1. ☐ Elevators/Escalators/Lifts/Dumbwaiters/Moving Walks
2. ☐ High Pressure Boilers
3. ☐ Pressure Vessels
4. ☐ Refrigeration Systems
5. ☐ Cross-Connections/Backflow Preventers
6. ☐ Hazardous Uses/Places of Assembly
7. ☐ Sprinklers/Standpipes
8. ☐ Smoke Control Systems in Open Wells
9. ☐ Underground Storage Tanks
10. ☐ Swimming Pools, Spas and Hot Tubs
11. ☐ LPGas Tanks
12. ☐ Fire Alarm

CERTIFICATION IN LIEU OF OATH

I. OWNER SECTION (to be completed if the applicant is the owner in fee)

I hereby certify that I am the owner in fee of the property listed on Page 1.

Mark the following applicable boxes:

- A. ☐ I further certify that a new home (private residence) will be constructed on this property for my own use and occupancy. This dwelling is to be occupied by myself and is not to be used for any purpose other than single family residential use. I attest that all construction, plumbing, or electrical work will be done, in whole or in part, by me or by subcontractors under my supervision, in accordance with all applicable laws; and, I further acknowledge that said new home is not covered under the New Home Warranty and Builders Registration Act (N.J.S.A. 46:3B-1 et seq.) and that such fact shall be disclosed to any person purchasing this property within ten years of the date of issuance of a certificate of occupancy.

I UNDERSTAND THAT IN MARKING BOX A, I ACKNOWLEDGE THAT I AM ASSUMING RESPONSIBILITY FOR THE WORK DONE ON SAID PROPERTY, THE CONDITION OF THE PROPERTY PRIOR TO, DURING, AND AFTER ANY WORK PERFORMED, AND FOR THE PERFORMANCE OF THE SUBCONTRACTORS I HIRE, EMPLOY, OR OTHERWISE CONTRACT OR WITH WHOM I MAKE AGREEMENTS TO PERFORM WORK. I AM VOLUNTARILY AND KNOWINGLY ASSUMING THIS RESPONSIBILITY.

- B. ☐ I further certify the following as required by the New Jersey Uniform Construction Code, N.J.A.C. 5:23-2.15(f)1.ix:

I personally prepared the plans submitted for: 1) the new home referred to in A.; or, 2) an addition, alteration, renovation, or repair to an existing single family residence owned and occupied by myself and located on the property listed on Page 1; or, 3) a new structure that will be physically separate from, but that will be deemed part of, an existing single family residence that is owned and occupied by myself and located on the property listed on Page 1.

- C. ☐ I further certify that I will perform or supervise the following work:

C.1. ☐ Building C.2. ☐ Fire Protection

I further certify that I will perform the following work:

C.3. ☐ Electrical C.4. ☐ Plumbing

- D. ☐ I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I understand that if any of the above statements are willfully false, I am subject to punishment.

Signature _____ Date _____

II. AGENT SECTION (to be completed if the applicant is not the owner in fee)

I hereby certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(d): the proposed work is authorized by the owner in fee; and I have been authorized by the owner in fee to make this application as his agent.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I understand that if any of the above statements are willfully false, I am subject to punishment.

☒ Check if contractor:

Agent Name John Sisto SUPREMA CONSTRUCTION

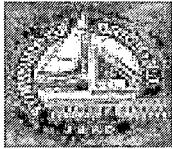
Address 120 FRANCIS ST
KEEPORT VT 07735

Telephone 232-739-9015

Signature [Signature]

- III. ☐ LEAD HAZARD ABATEMENT: Include Homeowner or Building Owner Affidavit as per N.J.A.C. 5:17.

- IV. ☐ HOME ELEVATION: Include Home Elevation Contractor Certification as per N.J.S.A. 52:27D-123.16.



Brick Township
401 Chambersbridge Rd
Brick, NJ 08723

Date Issued 6/5/2019
Control Number C-18-004367
Permit Number 19-0117
Permit Issue Date 1/15/2019
Certificate Number 19-0117

Certificate

Construction Code Division
(Certificate of Approval)

Identification

Work Site Location: 425 JACK MARTIN BLVD. Brick Township, NJ Block: 1170 Lot: 18 Qual: _____
Owner in Fee: OCEAN MEDICAL CENTER %MERIDIAN
Owner Address: 1350 CAMPUS PKWY STE 1500 NEPTUNE NJ 07753
Telephone: _____
Contractor SUPREME CONDITIONING INC
Address 120 FRANCIS STREET KEYPORT NJ 07735
Telephone: (732) 739-9015 Fax: _____
License Number or Builders Registration Number: _____ Federal Emp. Number: _____

Home Warranty Number: _____

Type of Warranty Plan: ☐ State ☐ Private

Use Group: I-2 Construction Classification: _____

Maximum Live Load: 0 Maximum Occupancy Load: 0

Description of Work/Use: ALTERATION - COMMERCIAL - ...REPLACEMENT OF EXIST'G COOLING TOWER

Certificate Comments:

☐ Certificate of Occupancy

This serves notice that said building or structure has been constructed in accordance with the New Jersey Uniform Construction Code and is approved for occupancy.

☒ Certificate of Approval

This serves notice that the work completed has been constructed or installed in accordance with the New Jersey Uniform Construction Code and is approved. If the permit was issued for minor work, this certificate was based upon what was visible at the time of inspection.

☐ Certificate of Continued Occupancy

This serves notice that based on a general inspection of the visible parts of the building there are no imminent hazards and the building is approved for continued occupancy.

☐ Temporary Certificate of Compliance

The following conditions must be met no later than or the owner will be subject to fine or order to vacate:
This certificate has an expiration date of:
Conditions to be met:

☐ Certificate of Clearance - Lead Abatement 5:17

This serves notice that based on written certification, lead abatement was performed as per NJAC5:17 to the following extent.

- ☐ Total removal of lead-based paint hazards in scope of work
- ☐ Partial or limited time period (years); see file

☐ Certificate of Clearance - Asbestos Abatement

This serves notice that based on written certification, asbestos abatement was performed to the following extent.

- ☐ Total removal of asbestos hazards in scope of work
- ☐ Partial or limited time period (years); see file

☐ Certificate of Compliance

This serves notice that said potentially hazardous equipment has been installed and/or maintained in accordance with the New Jersey Uniform Construction Code and is approved for use until

☐ Temporary Certificate of Occupancy

The following conditions must be met no later than: or the owner will be subject to fine or order to vacate:
This certificate has an expiration date of:
Conditions to be met:

Construction Official

Fee: \$0.00
Check Number: _____
Collected By: _____

1/7/19 Called con. (cm) Rg. Qu



Date Received
Date Issued
Control #
Permit #

1/15/19
19-0117

Block 1170 Lot 18
 Work Site Location Ocean Medical Center
425 JACK MANTON BLVD BARK
 Owner in Fee HACKER SACK MARINA - Corp
 Address 425 JACK MANTON BLVD
BARK
 Tele. 772 536-40717
 Contractor SUPREMA Conditioning Inc.
 Address 10 FRANK ST
KEYPORT NJ 07735
 Tele. 732-739-9015 Fax 732-739-9850
 Lic. No. 22-249-45015
 Federal Emp. No. 194C 00176900 1120

Use Group	Present		Proposed	
Building Sewer Size	_____	Public Sewer	_____	Private Septic
Water Service Size	_____	Public Water	_____	Private Well
Est. Cost of Plumbing Work	\$ 105,000			

Approved by:

TCO

Other

1000

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Signature — Contractor's Seal

☐ Licensed Plumbing Contractor ☐ Exempt Applicant

U.C.C. F130
(rev 3/25)

NJ Permits, Inc.



ELECTRICAL SUBCODE TECHNICAL SECTION



Date Received
Control #

1/15/19

Date Issued
Permit #

19-0117

A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 1170 Lot 18 Qualification Code _____

Work Site Location OCFA - Madison Center

425 Jack Manti - Blvd Bank

Owner in Fee: Manidia - Health Corp

Tel. (132) 836-4077 e-mail Frederick.Zingales@Manidia.com

Address 425 Jack Manti - Blvd
street municipality zip code

Contractor: Electrical Installation & Construction, LLC Tel. (732) 415-4020

Address 919 Route 33 Unit 28 e-mail info@eicllc.net

Freehold, NJ 07728

Contractor License No. 16242 Exp. Date 3/2021

Home Improvement Contractor Registration No. or Exemption Reason (if applicable): 13VH04728200

Federal Emp. ID No. 22-3978735 FAX: (732) 415-3790

B. ELECTRICAL CHARACTERISTICS

Use Group Present _____ Proposed _____

[] Pole/Pad # _____ [] Temporary [] Other _____

Building Occupied as _____ Utility Co. _____

Est. Cost of Elec. Work \$ 5100.00

JOB SUMMARY (Office Use Only)

PLAN REVIEW		INSPECTIONS		Dates (Month/Day)	
[] No Plans Required		Type:	Failure	Failure	Approval Initial
[] Partial -Underslab Utilities Approved		Rough			
Date: _____ Approved by: _____		Barrier-Free			
[✓] Electric Plans Approved <u>SPECS</u>		Trench			
Date: <u>11/30/18</u> Approved by: <u>PT</u>		Temp. Serv.			
		Constr. Serv.			
Joint Plan Review Required:		TCO			
[] Bldg. [] Plumb. [] Fire. [] Elev.		Other			
SUBCODE APPROVAL for PERMIT		Service			
Date: <u>11/30/18</u>		Final			
Approved by: _____		Barrier-Free			
SUBCODE APPROVAL for CERTIFICATE		Temp. Cut-in Card Date Issued			
[] CO [] CCO [] CA		Final Cut-in Card Date Issued			
Date: <u>5/29/19</u>		Annual Pool Inspection			
Approved by: _____		Date of Grounding and Bonding			
		Certification			

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Applicant's Signature/Contractor's Seal and Signature

[✓] Licensed Elec. Contractor [] Certif'd Landscape Irrigation Contr. [] Exempt Applicant

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK

Replace cooling towers

QTY.	SIZE	ITEMS	FEE (Office Use Only)
		Lighting Fixtures	
		Receptacles	
		Switches	
		Detectors	
		Light Poles	
		Motors—Fract. HP	
		Emergency & Exit Lights	
		Communications Points	
		Alarm Devices/F.A.C. Panel	
		TOTAL NUMBERS	\$ _____
		Pool Permit/with UW Lights	
		Storable Pool/Spa/Hot Tub	
		KW Elec. Range/Receptacle	
		KW Oven/Surface Unit	
		KW Elec. Water Heater	
		KW Elec. Dryer/Receptacle	
		KW Dishwasher	
		HP Garbage Disposal	
		KW Central A/C Unit	
		HP/KW Space Heater/Air Handler	
		KW Baseboard Heat	
2	40	HP Motors 1/+ HP	
		KW Transformer/Generator	
		AMP Service	
		AMP Subpanels	
		AMP Motor Control Center	
		KW Elec. Sign/Outline Light	

Administrative Surcharge \$ _____
Minimum Fee \$ _____
State Permit Surcharge Fee \$ _____
TOTAL FEE \$ _____



CONSTRUCTION PERMIT

Date Issued 1/15/19
Control # C-18-004367
Permit # 19-0117

IDENTIFICATION Block: 1170 Lot: 18 Qualifier _____
Work Site Location: 425 JACK MARTIN BLVD. Brick Township, NJ Contractor SUPREME CONDITIONING INC
Owner in Fee OCEAN MEDICAL CENTER %MERIDIAN Address 120 FRANCIS STREET KEYPORT NJ 07735
1350 CAMPUS PKWY STE 1500 NEPTUNE NJ Telephone: (732) 739-9015
07753 Lic. No. or Bldrs. Reg. No. 19HC00170900 19HC00170900
Telephone: _____ Federal Employee. No. 19HC00170900

Is hereby granted permission to perform the following work:

- ☒ BUILDING ☒ PLUMBING ☐ LEAD HAZARD ABATEMENT
☒ ELECTRICAL ☐ FIRE PROTECTION ☐ DEMOLITION
☐ ELEVATOR DEVICES ☐ ASBESTOS ABATEMENT (Subchapter 8 only) ☐ OTHER

DESCRIPTION OF WORK:

ALTERATION - COMMERCIAL...REPLACEMENT OF EXIST'G COOLING TOWER

Note: If construction does not commence within one (1) year of date of issuance, or if construction ceases for a period of six (6) months, this permit is void.
Estimated Cost of Work \$110,100

Construction Official [Signature]

Date 1/7/19

U.C.C. F170
equiv (rev 1/04)

1 WHITE - INSPECTOR

2 CANARY - OFFICE

3 PINK - TAX ASSESSOR

4 GOLD - APPLICANT

PAYMENTS (Office Use Only)

Building	\$2,000
Electrical	\$150
Plumbing	\$150
Fire Protection	\$0
Elevator Devices	\$0
Other	\$0.00
DCA Training Fee	\$210
CO Fee	
Other	\$0
Total	\$2,510
Check No.	<u>11218</u>
Cash	\$0
Credit	\$0
Collected By	<u>CW</u>

REQUIRED INSPECTIONS

Construction work must be inspected in accordance with the State Uniform Construction Code Regulations N.J.A.C. 5:23-2.18. This agency will carry out such periodic inspections during the progress of work as are necessary to insure that the work installed conforms with the requirements of the Uniform Construction Code.

The owner or other responsible person in charge of work must notify this agency when work is ready for any required inspections specified below. Requests for inspections must be made at least 24 hours prior to the time the inspection is desired. Inspections will be performed within three business days of the time for which they are requested. The work must not proceed in a manner which will preclude the inspection until it has been made and approval granted.

☐ Required inspections for all subcodes for one- and two-family dwellings are as follows:

1. The bottom of footing trenches before placement of footings, except that in cases of pile foundations, inspections shall be made in accordance with the requirements of the building subcode.
2. Foundations and all walls up to grade level prior to back filling.
3. All structural framing, connections, wall and roof sheathing and insulation; electrical rough wiring, panel and service installation; rough plumbing. The framing inspection shall take place after the rough electrical and plumbing inspections and after the installation of the heating, ventilation and /or air conditioning duct system. The insulation inspection shall be performed after all other subcode rough inspections and prior to the installation of any interior finish material.
4. Installation of all finished materials, sealings of exterior joints, plumbing piping, trim and fixtures; electrical wiring, devices and fixtures; mechanical systems equipment.

Additional required inspections for all subcodes of construction, for other than one- and two-family dwellings, are fire suppression systems, heat producing devices and Barrier Free subcode accessibility, if applicable.

☐ Required special inspections. The applicant by accepting the permit will be deemed to have consented to these requirements:

☒ A final inspection is required for each applicable subcode area before a final Certificate of Occupancy or Approval may be issued. The final inspections include the installation of all interior and exterior finish materials, sealing of exterior joints, mechanical system and other required equipment; electrical wiring, devices and fixtures; plumbing pipes, trim and fixtures; tests required by any provision of the adopted subcodes, Barrier Free accessibility, if applicable; and verification of compliance with NJAC 5:23-3.5, "Posting structures".

☒ A complete copy of released plans must be kept on the job site.

If you do not understand any of this information, please ask.

SPECIFICATIONS

Drive Input Power

Input voltage, 3 phase.....	200–240, or 380–460, or 525–600 VAC
Input voltage range for full output	Nominal $\pm 10\%$
Undervoltage trip point.....	164, 313 VAC, or 394 VAC
Overvoltage trip point.....	299, 538, or 690 (792 for 100 HP and above) VAC
Input frequency	50 or 60 Hz, ± 2 Hz
Displacement Power factor.....	0.98 or greater at all speeds and loads
Total Power factor.....	0.90 or greater at full load and nominal motor speed

Drive Output Power

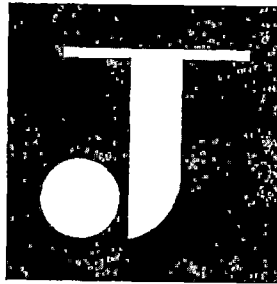
Output frequency	Selectable 0 to 120 Hz
Motor voltages	200, 208, 220, 230; 380, 400, 415, 440, 460; 550 or 575 VAC
Continuous output current	100% rated current
Output current limit setting.....	Adjustable to 110% of drive rating
Current limit timer	0 to 60 seconds or infinite
Adjustable maximum speed	From minimum speed setting to 120 Hz
Adjustable minimum speed	From maximum speed setting to 0 Hz
Acceleration time	To 3,600 seconds to base speed
Deceleration time	To 3,600 seconds from base speed
Breakaway torque time	0.0 to 0.5 seconds (1.6 times motor nameplate current)
Start voltage.....	0 to 10%
DC braking time	0 to 60 seconds
DC braking start.....	0 to maximum frequency
DC braking current.....	0 to 50% of rated motor current

Environmental limits:

Efficiency.....	97% or greater at full load and nominal motor speed
Ambient operating temperature	14°F to 113°F (–10°C to 45°C) frames A2–C2; 14°F to 104°F (–10°C to 40°C) frames D1–E1
Humidity	< 95%, non-condensing
Altitude: maximum without derating.....	3,300 ft. (1,000 m)
Drive and options enclosure(s)	NEMA/UL Types 1 and 12; as noted

Software

Lost speed reference action	Selectable to go to a preset speed, go to maximum speed, stay at last speed, stop, turn off, or stop and trip
Time delay for lost speed reference action.....	1 to 99 seconds
Adjustable auto restart time delay.....	0 to 600 seconds
Automatic restart attempts.....	0 to 20 or infinite
Automatic restart time delay	0 to 600 seconds between each attempt
Relay ON delay and relay OFF delay.....	0 to 600 seconds
Maximum number of preset speeds	16
Maximum number of frequency stepovers	4
Maximum stepover width.....	100 Hz
Maximum number of accel rates	4
Maximum number of decel rates	4
Delayed Start	0 to 120 seconds



TOWNSHIP OF BRICK		
RELEASED FOR PERMIT	INITIAL	DATE
Building Subcode	_____	
Plumbing Subcode	_____	
Fire Subcode	_____	
Electrical Subcode	AJC 11/30/18	
Plan Reviewer	_____	
Plans Released	_____	
Construction Official	_____	

ENGINEERING REPORT

October 29, 2018

Eric Strelko, PE
VP HVAC Products Group
Dyna-Tech
55 Columbia Road
Branchburg, NJ 08876

FILE COPY

Re: Structural Review of Existing Cooling Tower Dunnage (Tower 2)
Ocean Medical Center
425 Jack Martin Boulevard
Brick, NJ
Project #: 1800_15

Dear Mr. Strelko,

Pursuant to your request, we performed a site visit on February 21, 2018 to review the existing steel dunnage supporting a cooling tower. It is our understanding the existing cooling tower will be decommissioned and replaced with similar type equipment; as a result, you have requested our office review the condition and structural capacity of the existing steel dunnage.

STEEL DUNNAGE:

The existing dunnage consisted of W12 steel beams and girders. All of the steel dunnage appeared to be in good condition with minimal signs of rust and deterioration. The steel framing was supported on cast-in-place concrete piers. The footings were concealed at the time of our visit; however, we did not observe any signs of structural issues with the steel dunnage or concrete piers to suspect there are structural issues with the existing foundations.

MECHANICAL EQUIPMENT:

Based on the specifications provided to our office, the existing cooling tower will be replaced with Marley Model NC8405TAS Cooling Tower, with an operating weight of 41,880 lbs. Based on the specifications, the new equipment will be located on the existing steel dunnage similarly to the original cooling tower. Connection of the equipment to the steel dunnage shall be in accordance with the manufacturer's specifications.

CONCLUSION:

Based on our structural review and calculations performed by our office, the existing steel dunnage has sufficient structural capacity to support the proposed replacement cooling tower. At this time, no further structural reinforcement is required.

Please reference the attached photographs depicting the existing steel dunnage and cooling tower layout.

If you have any questions or need clarification, please do not hesitate to contact us.

Sincerely,

Jason Tarantino, P.E.
Principal Engineer

JT Engineering

321 Brunswick Avenue, Lawrence Township, New Jersey 08648
T: 609-303-0236 • F: 609-303-0237 • www.jt-pe.com

APPENDIX

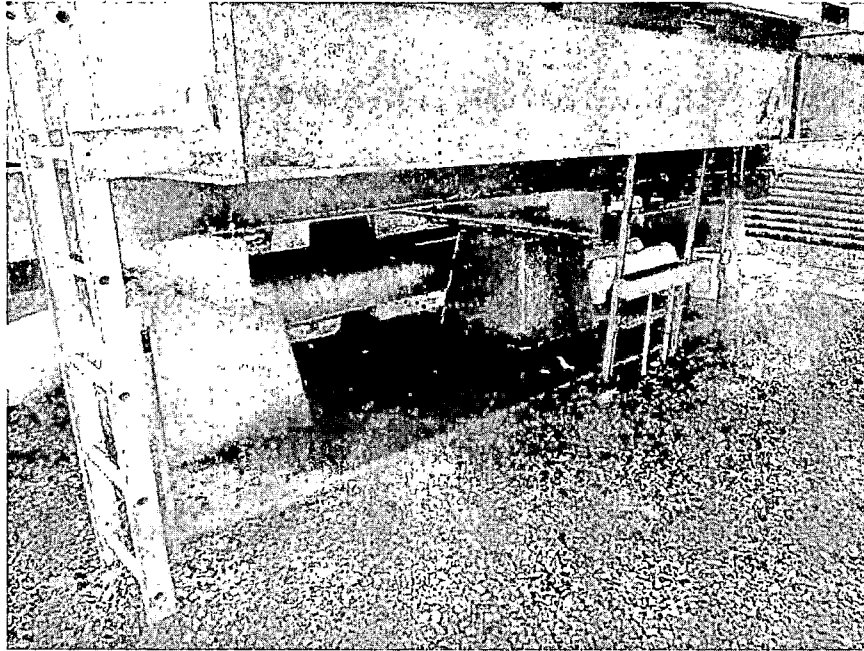


Figure 1 - Existing steel dunnage

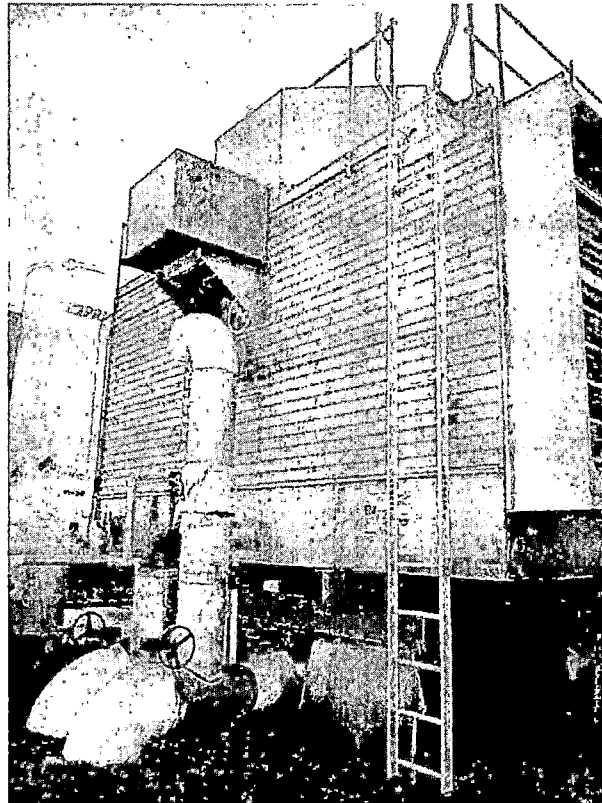


Figure 2 - Existing Steel Dunnage & Cooling Tower

Submittal to:
Supreme Conditioning

Project:
Ocean Medical TWR1

Engineer:

Opportunity / Quote No. (Ver): ERIC STRELKO_180511_123555795 / ERIC STRELKO_181101_105253945 (1)
Rep Quote No.: MT4223-18

November 1, 2018

TOWER MODEL	PERFORMANCE CONDITIONS	MOTOR DATA	TOWER DIMENSIONS	WEIGHTS
Quantity of (1) Marley NC Class model NC8405TAS factory assembled 2-Cell crossflow cooling tower	Per 2-cell tower: 3,420 gpm 95.0 °F Hot Water 85.0 °F Cold Water 77.9 °F Entering WB	NEMA 40 HP 1 speed / 1 wind 3 phase / 60 Hz / 230/460v 1.15sf / TEFC 1800 RPM Premium Efficiency Inverter duty nameplated	Each cell: (without options) Length 9' - 10 3/4" Width 19' - 11" Height 16' - 5 3/4" Per 2-cell tower: (with options) Length 20' - 1" Width 26' - 3 3/4" Height 16' - 5 3/4"	Per cell: Shipping: 10,171 lb Operating: 20,967 lb Per 2-cell tower: Shipping: 20,342 lb Operating: 41,934 lb

Quantities shown below are per tower.

Base Tower Construction/Equipment:

Galvanized Steel casing.
Galvanized Steel structure.
Galvanized Steel collection basin.
Galvanized Steel distribution basin.
Custom anchorage design to fit customer's grillage at 435.50 in spacing.
Low Sound fan with aluminum blades.
Marley designed Geareducer® with 5-year warranty.
PVC film fill with integral louvers and drift eliminators designed and manufactured by Marley.
Published sound data is independently verified by a CTI licensed test agency.
CTI certification per STD-201.
Fiberglass fan stack.

Collection Basin Connections and Accessories:

All flanges are to Class 125 ANSI B16.1 standard.
All threads are to American Standard Pipe Taper Thread.
(2) 10 in (254 mm) diameter bevel and groove cased face outlet(s) with trash screen(s).
Galvanized interconnecting flume(s) for water flow and equalization between cells
Cased face drain and overflow in each cell
1 1/2 in (38.1 mm) additional drain with plug in each cell
(2) 1 in (25.4 mm) water make-up float valve(s)
Probe type electronic water level sensor with the following events: make-up, low-alarm, high-alarm

Distribution Basin Inlet and Accessories:

(1) self-balancing 10 in (254 mm) diameter PVC side inlet connection per cell.
All internal piping is PVC. External piping is PVC.
Variable flow nozzles.

Maintenance & Maintenance Access Features:

Tower is designed in accordance with OSHA safety standards.
This quotation includes features that will allow safe access on the fan deck while the fan is still operating.
External lube line with dipstick
Convenient access to the collection basin and plenum area is provided via a large access door located on each endwall
Easy fitting perimeter guardrail, kneerail & toeboard
(2) Louver face ladders
Ladder(s) extended 48 in below base of tower
Easy fitting ladder safety cage(s)
Self closing safety gate(s) included at the top of the access ladder(s)

Control Systems:

Danfoss NEMA 12 VFDs with 2C Bypass (per cell) – field installed by others

Field Installed Equipment:

The field installed portion of the equipment will require approximately 44.4 man-hours of installation time after the tower arrives at the jobsite (based on USA experienced crew). The price to install these components is NOT included in the total price.

Please advise if the drawing type you need has not been supplied. These are the available drawing types:

- PDF 2D documents - These documents display the tower geometry with dimensions, notes and annotations.
- DWG 2D AutoCAD layouts – This 2D layout is a full scale electronic representation of the tower to insert into your own AutoCad layout. The .dwg contains no text so should be accompanied by the PDF files.
- JT 3D solid model files - These lightweight 3D solids may be used by solid model programs such as NX (Unigraphics), I-DEAS, Solid Edge, Catia, Pro/Engineer, and Autodesk Inventor 2009, among others. A free JT viewer can be found at www.jt2go.com. JT is not compatible with Revit; however, the JT file can be converted to DWG using Autodesk Inventor and then imported into Revit. This results in a heavy Revit file thus not suitable for all applications.
- Revit – Configuration specific Revit files are not yet available. However, a lightweight Revit part family showing the basic tower may be downloaded from our website. Go to <http://spxcooling.com/revit>.

COOLING TOWER SUBMITTAL

Drawings & Data

<i>Transmittal Code</i>	<i>Approval Code</i>	<i>No. of Copies</i>	<i>Drawing Number /Rev/Date</i>	<i>Description</i>
E	SFA	1	11.1.2018	Submittal Package for Tower #1 Replacement

Transmittal Codes:

E = Enclosed Herewith
S = Sent Separately
F = Sent via Fax
O = Other

Other Codes:

P = Print
R = Reproducible
D = Reduced Copy

Approval Codes:

SFA = Approval Document. Equipment is held for Approval and Release.
AFC = Certified Document. Equipment has been Approved for Construction.
Changes made after this point may result in price adds and/or delays.
INF = Information Document. Submitted for Information only.
RFA = Corrected Document. Re-submitted for Approval and Release
OTH = Other

Shipment Lead-Time After Drawing Approval: 35 business days

November 1, 2018

For: SPX Cooling Technologies

By: Dyna-Tech Sales Corp - Philadelphia

Eric Strelko

Job Information

Selected By

Dyna-Tech Sales Corp
55 Columbia Road
Branchburg, NJ 08876
estrelko@dynatechsales.net

Eric Strelko
Tel 908-541-1010 ext 226
Fax 908-541-1011

Cooling Tower Definition

Manufacturer	Marley	Fan Motor Speed	1800 rpm
Product	NC Steel	Required Fan Motor Output per cell *	39.64 BHp
Model	NC8405TAS2	Required Fan Motor Output total *	79.28 BHp
Cells	2	Fan Motor Capacity per cell	40.00 Hp
CTI Certified	Yes	Fan Motor Output per cell	40.00 BHp
Fan	9.000 ft, 6 Blades	Fan Motor Output total	80.00 BHp
Fan Speed	433 rpm, 12243 fpm	Air Flow per cell	147600 cfm
Fans per cell	1	Air Flow total	295200 cfm
Fill Type	MX75	Static Lift	12.338 ft
		Distribution Head Loss	0.000 ft
		ASHRAE 90.1 Performance	51.7 gpm/Hp

Model Group Standard Low Sound (A)

* Required Fan Motor Output assumes VFD operation

Conditions

Tower Water Flow	3420 gpm	Air Density In	0.07097 lb/ft³
Hot Water Temperature	95.00 °F	Air Density Out	0.07084 lb/ft³
Range	10.00 °F	Humidity Ratio In	0.01702
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.03126
Approach	7.15 °F	Wet-Bulb Temp. Out	90.07 °F
Wet-Bulb Temperature	77.85 °F	Estimated Evaporation	35 gpm
Relative Humidity	50.0 %	Total Heat Rejection	17040000 Btu/h
Capacity	100.3 %		

- This selection satisfies your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	8950 lb	17900 lb
Heaviest Section	8950 lb	
Max Operating Weight	19750 lb	39490 lb
Width	19.920 ft	19.920 ft
Length	9.900 ft	20.087 ft
Height	16.480 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	9.201 ft
50 % Open Wall	6.723 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file 8405_ALS.dxf

Cold Weather Operation

Heater Sizing (to prevent freezing in the collection basin during periods of shutdown)

Heater kW/Cell	18.0	15.0	12.0	9.0	7.5	6.0	4.5
Ambient Temperature °F	-17.12	-6.95	3.22	13.39	18.47	23.56	28.64

Job Information

Selected By

Dyna-Tech Sales Corp
55 Columbia Road
Branchburg, NJ 08876
estrelko@dynatechsales.net

Eric Strelko
Tel 908-541-1010 ext 226
Fax 908-541-1011

Cooling Tower Definition

Manufacturer	Marley	Fan Speed (100.0 %)	433 rpm
Product	NC Steel	Fan Tip Speed (100.0 %)	12243 fpm
Model	NC8405TAS2	Fan Motor Speed (100.0 %)	1800 rpm
Cells	1	Fan Motor Capacity per cell	40.00 Hp
Fan	9.00 ft, 6 Blades	Fan Motor Output per cell	40.00 BHp
Fans per cell	1	Fan Motor Output total	40.00 BHp

Model Group Standard Low Sound (A)

Sound » Independently Verified

1-Cell sound data for an unobstructed environment.

Sound Pressure Level (SPL) expressed in dB (re: 20x10⁻⁶ Pa)

Sound Power Level (PWL) expressed in dB (re: 1x10⁻¹² watts)

Distance	Location	Octave Band Center Frequency (Hz)								Overall
		63	125	250	500	1000	2000	4000	8000	
5.00 ft	Air Inlet Face SPL	88	88	84	82	79	75	67	56	84
5.00 ft	Cased Face SPL	82	78	76	72	68	64	58	51	74
5.00 ft	Fan Discharge SPL	88	86	86	85	82	80	77	70	88
	Tower PWL	110	107	104	102	99	95	90	81	104

Notes

- Sound levels have been independently verified by a CTI-licensed sound test agency to ensure validity and reliability of the published values.
- Measurement and analysis of the sound levels were conducted by a certified Professional Engineer in Acoustical Engineering.
- Sound pressure levels were measured and recorded on various models in the acoustic near-field and far-field locations using ANSI S1.4 Type 1 precision instrumentation.
- Sound pressure levels were measured and recorded in full conformance with CTI ATC-128 test code published by the Cooling Technology Institute (CTI).

CERTIFICATE OF INDEPENDENT SOUND VALIDATION



SPX Cooling Technologies, Inc. | 7401 West 129 Street | Overland Park, KS 66213 | 913 664 7400 | spxcooling.com

MARLEY NC[®] 8400 COOLING TOWER

This document certifies that published sound data for the Marley NC8400 Cooling Tower line has been independently verified, and complies with CTI ATC-128, Test Code for Measurement of Sound for Water-Cooling Towers.

Sound testing was conducted on various Marley NC 8400 models and configurations by an independent CTI-licensed sound test agency using certified and calibrated Type 1 precision sound test instruments per the test standards. Sound pressure levels were recorded in the acoustic near-field and far-field locations as specified in the CTI ATC-128 test procedure for Sound Measurements on Small Towers. Testing and analysis was conducted by a certified Professional Engineer in Acoustical Engineering from SSA Acoustics, LLP.

SSA Acoustics, LLP is a CTI licensed sound test agency and industry leader in acoustical engineering. CTTAI and SSA Acoustics hold a joint CTI sound test agency license.

LICENSED CTI SOUND TESTING BY:

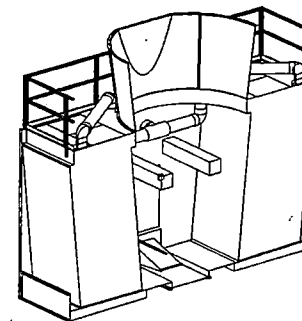
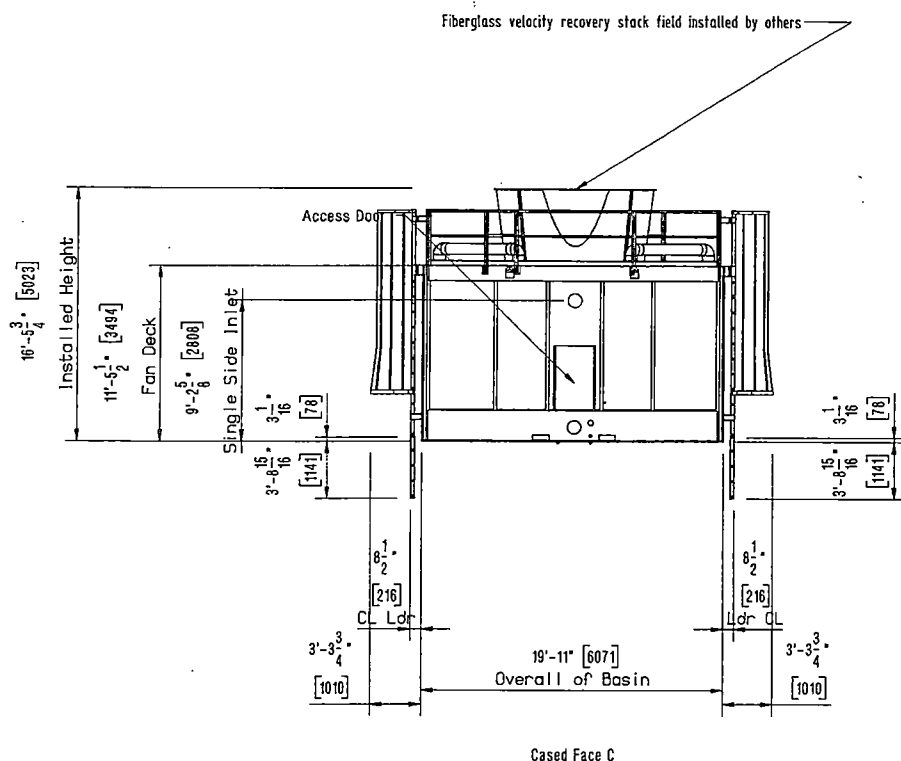


Erik Miller-Klein
Erik Miller-Klein, P.E.
SSA Acoustics, LLP



Nick Stich
Nick Stich
Cooling Tower Test Associates





Interior View

NOTES

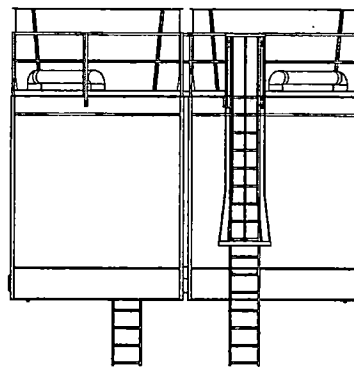
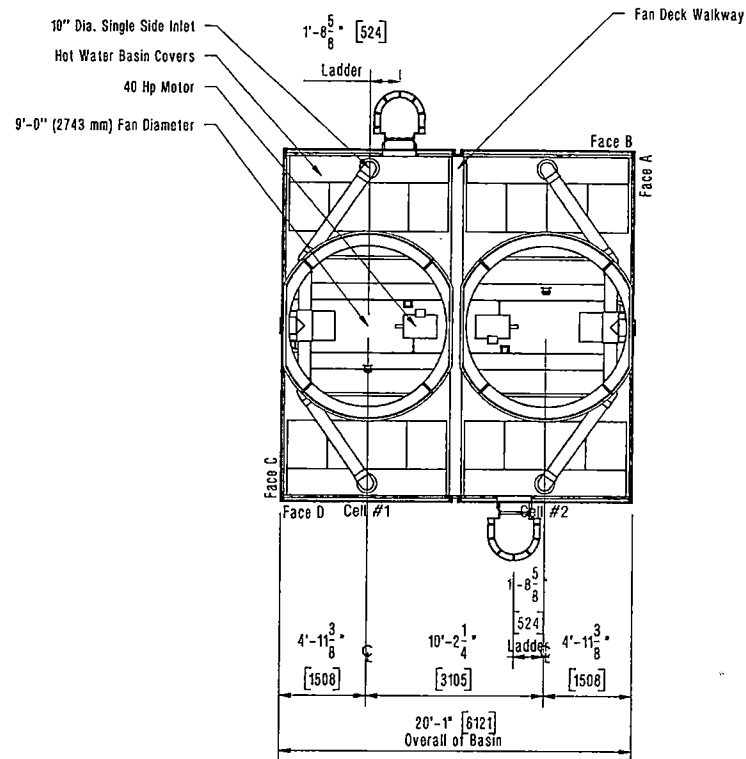
1. The fan motor must be locked out and inoperable before entering the tower. This warning has been placed on the access door.
2. The internal inlet piping, including flat face flange gaskets, which starts at the face of the inlet connection is provided by SPX CT. The piping external to the tower and its supports are provided by others. The external piping may not be supported from the tower.
3. The external inlet piping at the top of the tower is provided by SPX CT and installed in the field by others. This piping can be an obstacle to personnel on top of the tower. The installation detail drawings are included in the Literature Package shipped with the tower.
4. Multi-cell towers should include provisions to balance flow between cells.
5. An incoming riser and manifold must allow clearance for entry to the tower access doors. 4'-2" (1270 mm) is the minimum clearance needed to clear the optional access door or motor access platform.
6. To ensure maximum thermal performance the cooling tower must be installed level and plumb. Both of the air inlet faces must have adequate air supply. If obstructions exist, consult your SPX CT representative.
7. Contact your SPX CT sales engineer for the required pump head for this inlet arrangement.
8. Hoisting clips are provided for ease of unloading and positioning. For overhead lifts or where additional safety precautions are prudent, add slings beneath the tower. Adequate space has been provided for removal of the shackles and the 5 1/4" (133 mm) long pins from the hoist clips between the cells of a multi-cell tower. If the pin used is longer than 5 1/4" (133 mm), the cell may be slid into its final position by using come-alongs at the base of the unit, after removal of shackle pins. See Hoisting Details drawing.
9. Flanged connections conform to Class 125 ANSI B16.1 specification. The bolt holes straddle the centerlines.
10. Construction of the ladder and guardrail: The guardrail is fabricated from galvanized structural tubing. Top rail, middle rail and posts are 1 1/2" (38 mm) square tube 1/8" (3 mm) thick. Toeboards are 12 gauge heavy mill galvanized steel. The ladder is aluminum 3" (76 mm) x 1 1/8" (29 mm) I-beam side rails and 1 1/4" (32 mm) serrated rungs.
11. The ladder and guardrail are field installed by others. The tower is shop modified to accept this option. The clips and hardware are provided by SPX CT for the field installation. The installation detail drawings are included in the literature package shipped with the tower.
12. Ladder extensions are provided in nominal lengths of 5' (1524mm) and 11' (4572mm) only. Field modification by others is required for extensions of different lengths. Anchorage of the bottom of the ladder extension for proper stability is by others.
13. O.S.H.A. standards recommend the use of a Safety Cage when the length of a single ladder exceeds 20'-0" (6096 mm).
14. O.S.H.A. standards recommend the use of an Access Door Platform if the door is 4'-0" (1219 mm) or higher above grade.
15. Single inlet options (side or bottom inlet) - This piping can be an obstacle to personnel on top of the tower.
16. The tower assembly tolerance applicable to all dimensions is + or - 1/8" (3 mm). Consult suppliers of supporting structure for construction tolerances.
17. The units of measure are in IP (SI) units unless otherwise noted.

NC8405TAS2GGF - Schematic Cased Elevation and Notes
Ocean Medical TWR1
United States

MARLEY

ORDER 0

DRAWN BY	CHECKED	REV BY	REV OR	DATE	APPROVED	DRAWING NUMBER	REV
ERIC STRELKO_181101.105253945 V1	QTC			11/01/18	SYS	ES687944M	



NOTES

1. The tower assembly tolerance applicable to all dimensions is + or - 1/8" (3 mm). Consult suppliers of supporting structure for construction tolerances.
2. The units of measure are in IP (SI) units unless otherwise noted.
3. See Schematic Cased Elevation and Notes drawing for additional notes.

NC8405TAS2GGF - Schematic Plan and Louver Elevation
Ocean Medical TWR1
United States

MARLEY

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DRAWN BY
ERIC STRELKO_181101_105253945 V1

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QTC

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REV OK

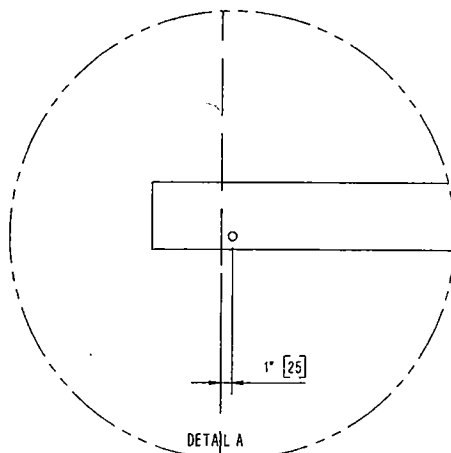
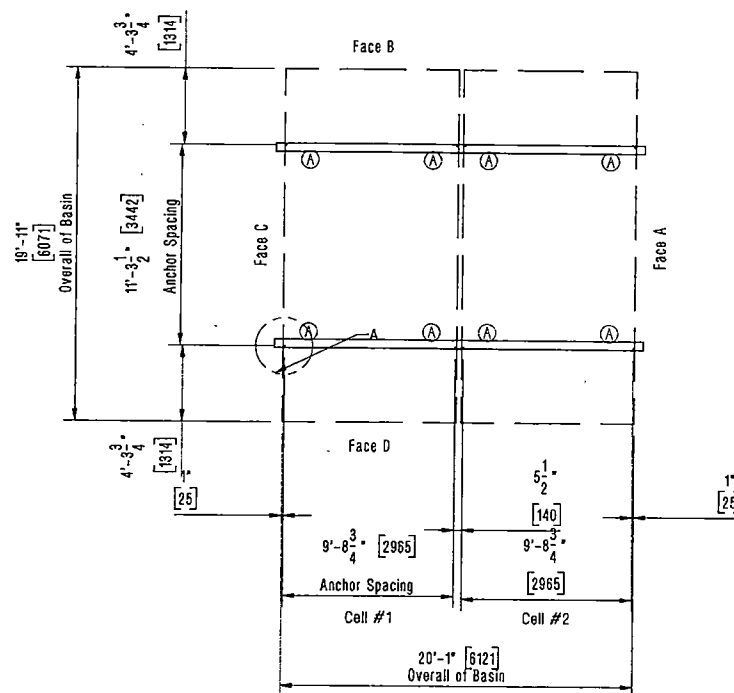
DATE
11/01/18

APPROVED
SYS

DRAWING NUMBER
ES687944S

Shipping Weight		Design Operating Loads			Wind Load		Seismic Load	
per Tower	per Cell	per Tower	per Cell	at A	Vert. Reaction at A	Horiz. Reaction at A	Vert. Reaction at A	Horiz. Reaction at A
20342 lb (9227 kg)	10171 lb (4613 kg)	41934 lb (19021 kg)	20967 lb (9510 kg)	5750 lb (2608 kg)	82.94 x P lb (7.71 x P kgf)	62.55 x P lb (5.61 x P kgf)	5924 x G lb (2687 x G kgf)	5414 x G lb (2456 x G kgf)

(4) 3/4" ASTM A307 or M20 Grade 4.6 anchor bolts are required per cell. These anchor bolts are capable of resisting 63 psf (3016 N/m²) wind load or 0.65 G seismic load applied to the tower. Wind and Seismic capacities are un-factored loads as determined by ASCE7-10. Determination of the site specific design wind and seismic loads are by others.



NOTES

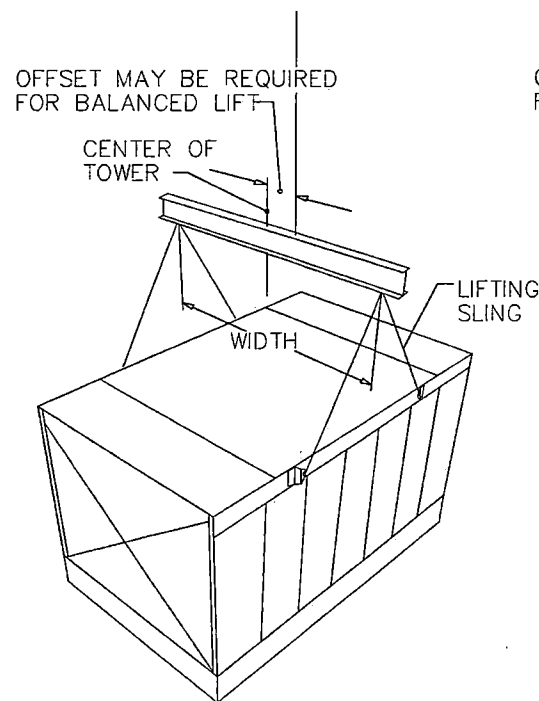
- SUPPORTING STEEL:** The supporting steel is to be designed, constructed and furnished by the customer. It shall include customer supplied anchor bolts to suit the general dimensions of this drawing and of the Outlet Piping Plan drawing. The top surface of the supporting steel must be framed flush and level. The maximum beam deflection shall be limited to 1/360 of span, not to exceed 1/2" (13 mm) at the anchor bolts in order to assure that the cooling tower is level and plumb.
- DESIGN OPERATING LOADS:** The design operating loads shown in the above table are based upon the volume of water in the collection basin at shutdown. The shutdown water level has been sized to accommodate the maximum allowable flow rates. The design loads are shown for your use as a quick reference. The actual operating load is variable, and dependent upon the design flow rate per cell. Design loads are all based upon the recommended operating water level. Operating levels in excess of that recommended will result in loads exceeding the values stated. Consult a SPX CT representative for greater detail on this or any other subject.
- WIND & SEISMIC LOADS:** Reactions shown are the result of the wind/seismic load being applied perpendicular to the face of the tower structure. Loads are additive to the operating loads. Wind reactions can be calculated by multiplying by P, which is the wind pressure in psf for Imperial units and kgf/m² for metric units. Seismic reactions can be calculated by design G.
- SHIPPING WEIGHTS AND MAXIMUM OPERATING LOADS:** Values shown in table include the optional equipment weights.
- NON-STANDARD ANCHORAGE LOCATION:** The anchor bolt dimension shown can be varied upon request. Consult a SPX CT representative for specifics and to ensure that the appropriate modifications are added to the structure.
- PIER SUPPORTS:** The tower may be supported from piers at each anchor bolt location as an alternate. A pier should be at least 6" (152 mm) x 6" (152 mm).
- VIBRATION ISOLATORS:** The towers may be supported on vibration isolators. The isolators must be placed UNDER the supporting steel beams and not between the support beams and the tower.
- The tower assembly tolerance applicable to all dimensions is + or - 1/8" (3 mm). Consult suppliers of supporting structure for construction tolerances.
- The units of measure are in IP (SI) units unless otherwise noted.

NC8405TAS2GGF - Supporting Steel Plan and Details
Ocean Medical TWR1
United States

MARLEY

ORDER 0

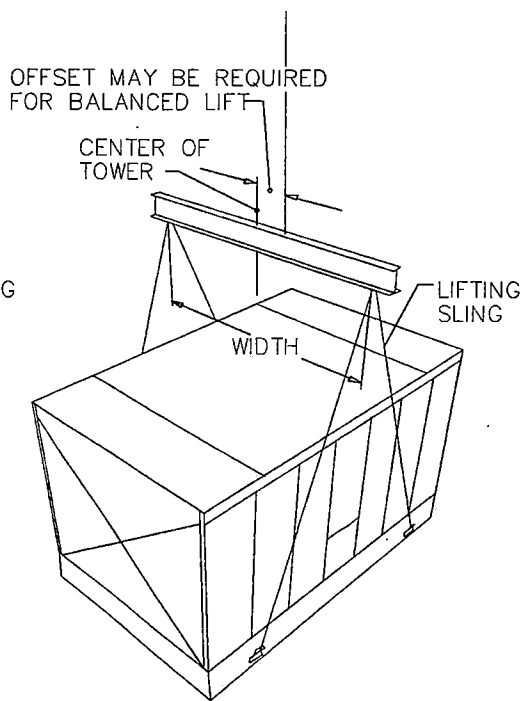
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ERIC STRELKO_181101_105253945 V1	QTC			11/01/18	SYS	ES687944G	



TOWER UNITS WITH
HOISTING CLIPS AT THE TOP

8401 THRU 8407

TOP MODULE OF 8410, 8411, 8412, 8413 & 8414



TOWER UNITS WITH
HOISTING CLIPS AT THE BOTTOM

8409

BOTTOM MODULE OF 8410, 8411, 8412, 8413 & 8414

TOWER MODEL	TOWER WIDTH	MINIMUM SLING LENGTH
8401	6'-7" [2007]	5'-6" [1676]
8402	8'-6" [2591]	6'-0" [1829]
8403	8'-6" [2591]	8'-0" [2438]
8405	10'-0" [3048]	8'-0" [2438]
8407	12'-0" [3658]	8'-6" [2591]
8409	14'-0" [4267]	17'-6" [5334]
8410 TOP	12'-0" [3658]	9'-0" [2743]
8410 BOTTOM	12'-0" [3658]	16'-6" [5029]
8411 TOP	12'-0" [3658]	9'-0" [2743]
8411 BOTTOM	12'-0" [3658]	16'-6" [5029]
8412 TOP	14'-0" [4267]	9'-0" [2743]
8412 BOTTOM	14'-0" [4267]	16'-6" [5029]
8413 TOP	12'-0" [3658]	9'-0" [2743]
8413 BOTTOM	12'-0" [3658]	16'-6" [5029]
8414 TOP	14'-0" [4267]	9'-0" [2743]
8414 BOTTOM	14'-0" [4267]	16'-6" [5029]

NOTES:

1. ALL HOISTING CLIP HOLES ARE 1 1/4" [32].
2. OVERALL LENGTH OF SHACKLE PIN SHOULD NOT EXCEED 5 1/4" [133].
3. FOR OVERHEAD LIFTS OR WHERE ADDITIONAL SAFETY IS REQUIRED, ADD SLINGS BENEATH THE TOWER UNIT.
4. ALL DIMENSIONS SHOWN INSIDE OF BRACKETS [] ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

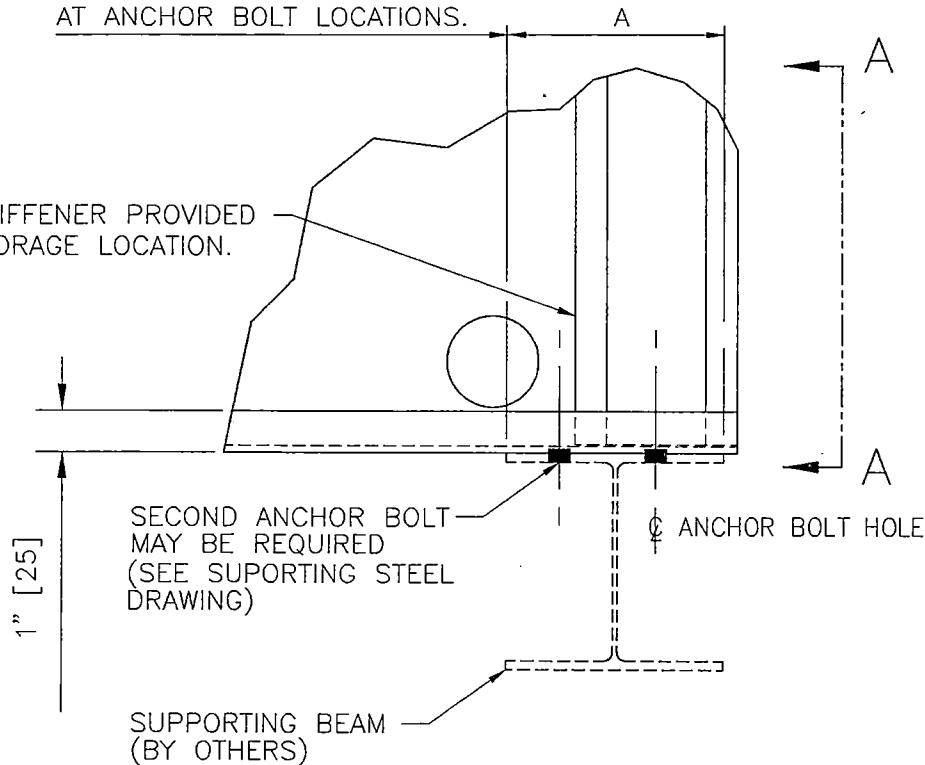
I-P [SI] Units

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DRAWN BY MA_STD	DRAWN DATE 01/22/2016	HOISTING DETAILS 8401 THRU 8414 TOWERS					
CHECKED BY ABDULFATTAH	CHECKED DATE 01/27/2016						
RELEASED BY ABDULFATTAH	RELEASED DATE 01/27/2016	ECM NUMBER 20945	ORDER NUMBER -/-	FORMAT ANSI B	PLOT 1=1	DRAWING NUMBER Z0628615	REV. A

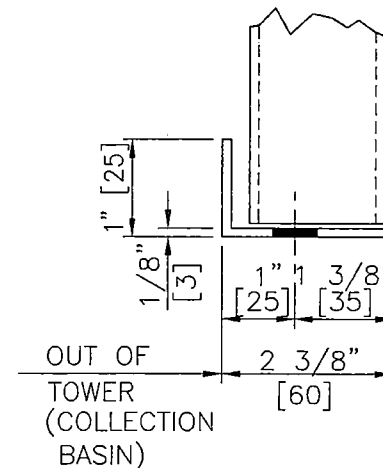
MINIMUM BEARING WIDTH
MAY BE PROVIDED BY BEAM
FLANGE OR BEARING PLATE
AT ANCHOR BOLT LOCATIONS.

BASIN STIFFENER PROVIDED
AT ANCHORAGE LOCATION.



SUPPORT BEARING DETAILS

(PARTIAL CASED FACE A OR C ELEVATION)



SECTION A-A

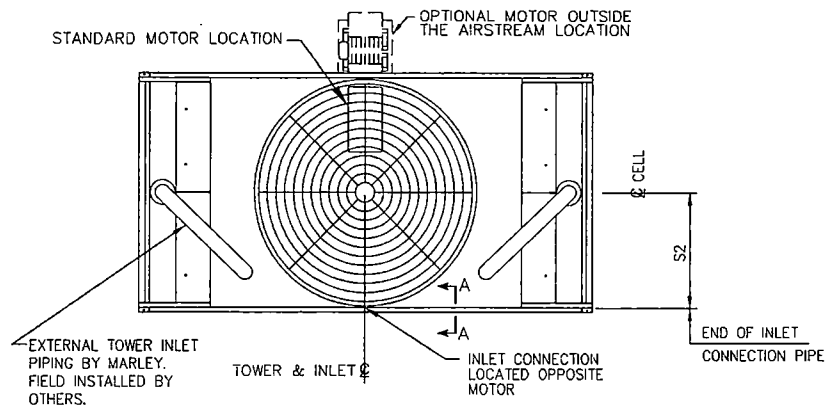
(LOUVER FACE B OR D)

GENERAL NOTES

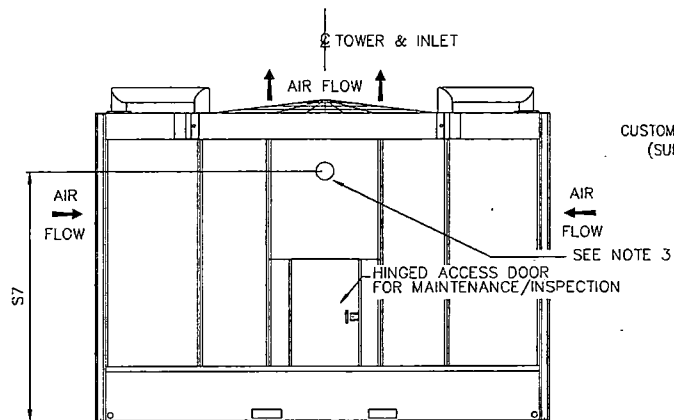
1. TOLERANCE APPLICABLE TO DIMENSIONS SHOWN ARE DEPENDENT UPON FABRICATION, ASSEMBLY AND CONSTRUCTION TOLERANCES. FABRICATION TOLERANCE IS $\pm 1/16$ " [2] & ASSEMBLY TOLERANCE IS $\pm 1/8$ " [3]. CONSULT SUPPLIERS OF SUPPORTING STRUCTURE FOR CONSTRUCTION TOLERANCE. ALL OF THE DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS SHOWN INSIDE OF BRACKETS [] ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

I-P [SI] UNITS

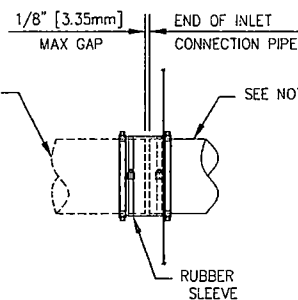
DRAWN BY SCHENK_STD	DRAWN DATE 07/20/2016	SUPPORT BEARING DETAILS NC8401 THRU NC8422 TOWERS				MARLEY	
CHECKED BY	CHECKED DATE						
RELEASED BY JENKINS_STD	RELEASED DATE 07/28/2016	ECM NUMBER 21681	ORDER NUMBER -/-	FORMAT ANSI A	PLOT 1=1	DRAWING NUMBER Z0628641	REV. A



PLAN VIEW



SIDE ELEVATION



SECTION A-A
(INLET CONNECTION)

TOWER MODEL	DIMENSIONS		
	S1	S2	S7
8401	6"	3'-3 1/16" [992]	7'-6 7/16" [2297]
8402	8"	4'-1 3/4" [1264]	7'-6 5/8" [2302]
8403	8"	4'-2 1/8" [1273]	9'-3 9/16" [2834]
8405	10"	4'-11 1/4" [1505]	9'-2 9/16" [2808]
8407	10"	5'-11 3/8" [1813]	9'-1 11/16" [2786]
8409	10"	6'-9 5/16" [2065]	9'-2 1/8" [2797]
8410	12"	5'-11 1/4" [1810]	13'-3 1/2" [4051]
8411	12"	5'-11 1/4" [1810]	16'-1 9/16" [4916]
8412	12"	6'-11 3/8" [2118]	16'-1 9/16" [4916]
8413	12"	5'-11 1/4" [1810]	19'-10 5/8" [6061]
8414	12"	6'-11 3/8" [2118]	19'-10 5/8" [6061]

NCWD	S1	S2	S7
8413	12"	5'-11 1/4" [1810]	19'-11 1/2" [6083]

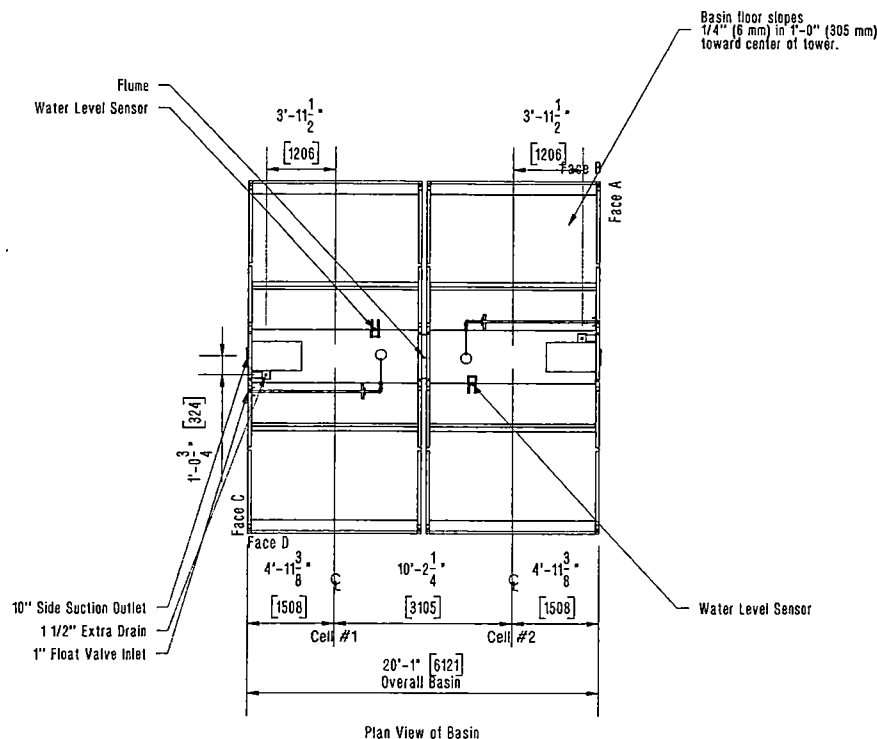
NOTES

1. ALL INTERNAL INLET PIPING TO THE FACE OF THE INLET CONNECTION, INCLUDING RUBBER SLEEVE IS SUPPLIED WITH THE COOLING TOWER. EXTERNAL PIPING AND SUPPORTS BEYOND THE INLET CONNECTION IS BY OTHERS. EXTERNAL PIPING MAY NOT BE SUPPORTED FROM THE TOWER.
2. ASSEMBLY TOLERANCE IS $\pm 1/8"$ [3]. CONSULT SUPPLIERS OF SUPPORTING STRUCTURE FOR CONSTRUCTION TOLERANCE. ALL OF THE DIMENSIONS SHOWN ARE IN I-P (INCH-POUND) UNITS UNLESS OTHERWISE NOTED.
3. S1 DIAMETER INLET CONNECTION USES A FIELD INSTALLED (SUPPLIED WITH TOWER) RUBBER SLEEVE WITH DOUBLE CLAMPS AT EACH PIPE.
4. USE THIS DRAWING IN CONJUNCTION WITH THE SCHEMATIC DETAIL DRAWINGS.
5. MULTI-CELL TOWERS SHOULD INCLUDE PROVISIONS TO BALANCE FLOW BETWEEN CELLS.
6. CONTACT YOUR SALES ENGINEER FOR THE REQUIRED PUMP HEAD FOR THIS ARRANGEMENT.
7. ALL DIMENSIONS SHOWN INSIDE OF BRACKETS [] ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

I-P [SI] UNITS

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DRAWN BY HOLMES_STD	DRAWN DATE 05/25/2017	SIDE SINGLE INLET CONNECTION DETAILS NC8401-14					
CHECKED BY ONG_STD	CHECKED DATE 05/30/2017						
RELEASED BY ONG_STD	RELEASED DATE 05/30/2017	ECM NUMBER 22693	ORDER NUMBER -/-	FORMAT ANSI B	PLOT 1=1	DRAWING NUMBER Z0628332	REV. B



NOTES

1. Flanged connections conform to Class 125 ANSI B16.1 specification. The bolt holes straddle the centerlines.
2. All piping supports are by others. Do NOT support outlet piping from the tower.
3. The collection basin piping accessories shown on this drawing are furnished by SPX CT.
4. The design operating loads shown in the table on the Grillage Details drawing are based upon the volume of water in the collection basin at shutdown. The shutdown water level has been sized to accommodate the maximum allowable flow rates. The actual operating load is variable, and is dependent upon the design flow rate per cell. Design loads are all based upon the recommended operating water level. Operating levels in excess of that recommended can result in loads exceeding values stated. Consult a SPX CT representative for greater detail on this or any other subject.
5. Basin flumes are shipped inside the tower and are to be field installed by others. The connecting collars are shop installed.
6. The electric water level probes are cut to length and assembled with the probe holder, stilling chamber, and support in the factory. This sub-assembly is field installed by others to the factory installed support clip.
7. The electric water level relay box and it's wiring is field installed by others. Customer's installation should meet the requirements of the latest National Electrical Code as well as applicable local codes.
8. All standard electric water level control components are UL or CSA listed.
9. An electric water level with a single relay system is one solid state relay. A multi-relay system is two or more solid state relays connected to a terminal strip.
10. The tower assembly tolerance applicable to all dimensions is + or - 1/8" (3 mm). Consult suppliers of supporting structure for construction tolerances.
11. The units of measure are in IP (SI) units unless otherwise noted.

NC8405TAS2GGF - Piping Plan
Ocean Medical TWR1
United States

MARLEY

ORDER 0

DRAWN BY
ERIC STRELKO_181101_105253945 V1

CHECKED
QTC

REV BY

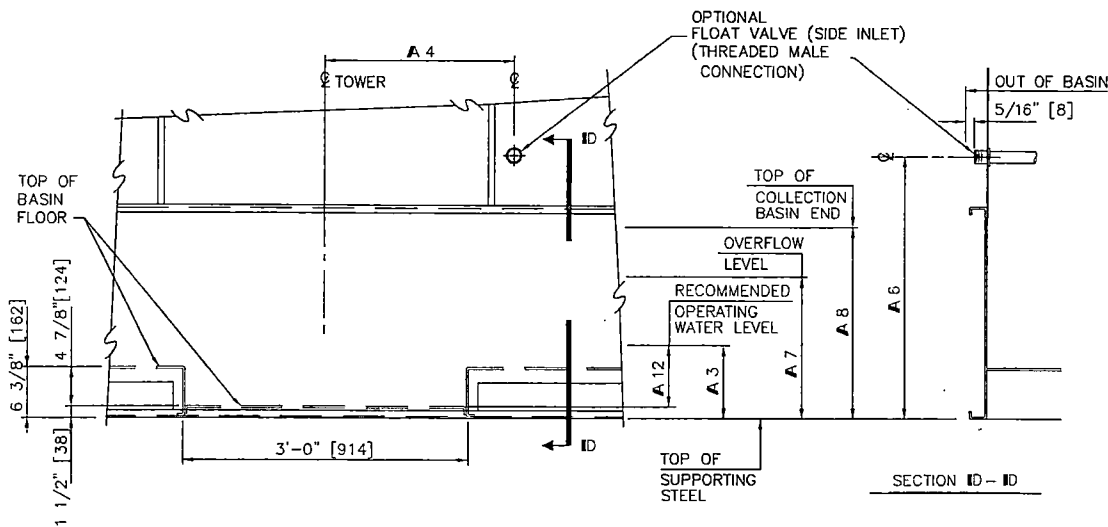
REV CNK

DATE
11/01/18

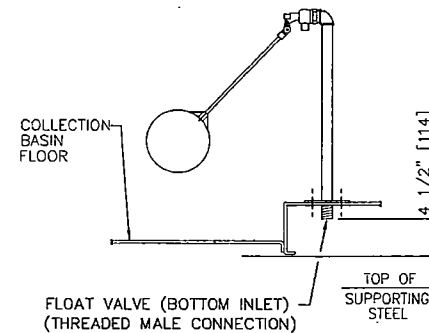
APPROVED
SYS

DRAWING NUMBER
ES687944P

REV.



EXTERIOR CELL ELEVATION
(FACES "A" OR "C")



OPTIONAL FLOAT VALVE
(BOTTOM INLET)

SEE "OUTLET PIPING PLAN" DRAWING FOR FLOAT VALVE LOCATION, SIZE & TYPE

TOWER MODEL	DIMENSIONS						
	A3	A4	A6		A7	A8	A12
			1" DIAMETER	2" DIAMETER			
8401	8 1/2" [216]	1'-6 3/16" [462]	2'-3 11/16" [703]	2'-4 3/16" [716]	1'-3" [381]	1'-8" [508]	7" [178]
8402	8 1/2" [216]	1'-10 1/2" [572]	2'-3 11/16" [703]	2'-4 3/16" [716]	1'-3" [381]	1'-8" [508]	7" [178]
8403	8 1/2" [216]	2'-4 3/8" [721]	2'-6 7/8" [784]	2'-7 3/8" [797]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	7" [178]
8405	8 1/2" [216]	1'-11 7/8" [606]	2'-6 7/8" [784]	2'-7 3/8" [797]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	7" [178]
8407	9 1/2" [241]	2'-2 3/8" [670]	2'-6 7/8" [784]	2'-7 3/8" [797]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	8" [203]
8409	9 1/2" [241]	2'-2 3/8" [670]	2'-6 7/8" [784]	2'-7 3/8" [797]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	8" [203]
8410	9 1/2" [241]	2'-5 3/4" [755]	2'-9 15/16" [862]	2'-10 7/16" [875]	1'-7 3/8" [492]	2'-2 1/4" [667]	8" [203]
8411	9 1/2" [241]	2'-5 3/4" [755]	2'-9 15/16" [862]	2'-10 7/16" [875]	1'-9 1/4" [540]	2'-2 1/4" [667]	8" [203]
8412	9 1/2" [241]	2'-5 3/4" [755]	2'-9 15/16" [862]	2'-10 7/16" [875]	1'-9 1/4" [540]	2'-2 1/4" [667]	8" [203]
8413	9 1/2" [241]	2'-5 3/4" [755]	2'-9 15/16" [862]	2'-10 7/16" [875]	1'-11 1/4" [591]	2'-2 1/4" [667]	8" [203]
8414	9 1/2" [241]	2'-5 3/4" [755]	2'-9 15/16" [862]	2'-10 7/16" [875]	1'-11 1/4" [591]	2'-2 1/4" [667]	8" [203]

* 1'-6 1/2" [470] ON TOWERS WITH 12" OR 14" DIA. SIDE SUCTION OUTLET

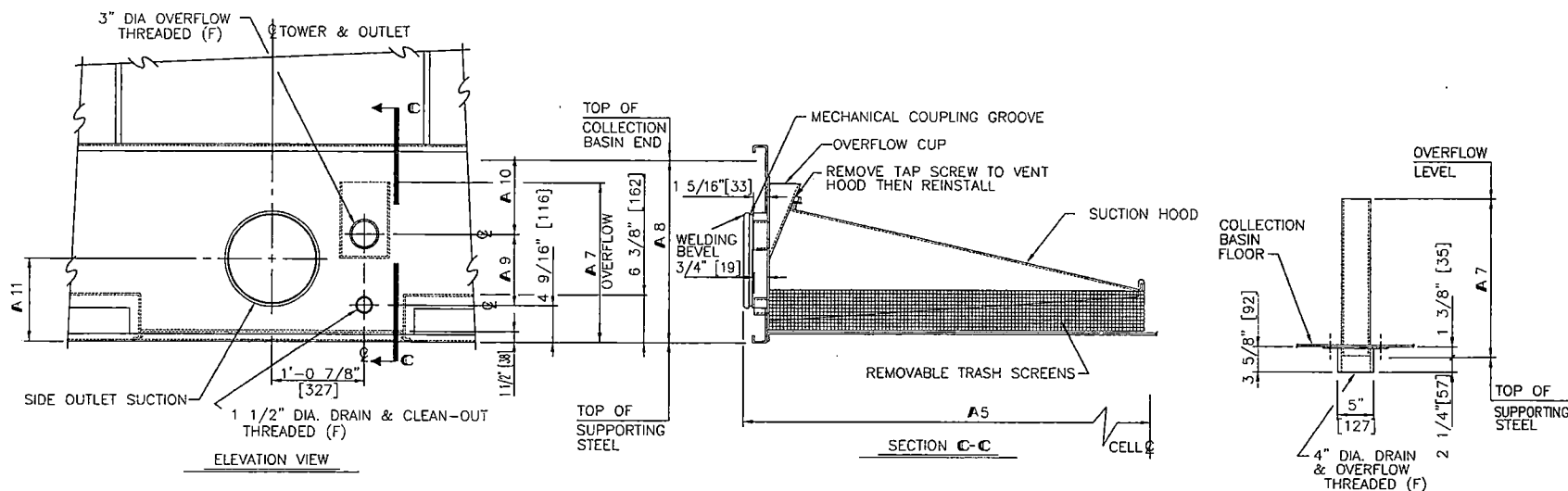
GENERAL NOTES

- FOR FLOAT VALVE INLET DIAMETER SIZING INFORMATION, SEE DWG. 98-22969 [98-22970].
- TOLERANCE APPLICABLE TO DIMENSIONS SHOWN ARE DEPENDENT UPON FABRICATION, ASSEMBLY AND CONSTRUCTION TOLERANCES. FABRICATION TOLERANCE IS $\pm 1/16"$ [2] AND ASSEMBLY TOLERANCE IS $\pm 1/8"$ [3]. CONSULT SUPPLIERS OF SUPPORTING STRUCTURE FOR CONSTRUCTION TOLERANCE. ALL OF THE DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE NOTED.
- ON THE 8401, IF A SUMP OR BOTTOM OUTLET OPTION IS SUPPLIED WITH AN ANTI-VORTEX PLATE, A FLOAT VALVE MAY NOT BE IN THE SAME CELL.
- ALL DIMENSIONS SHOWN INSIDE OF BRACKETS [] ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
- REFER TO SUPPORTING STEEL DRAWING FOR DESIGN OPERATING LOADS.
- THE RECOMMENDED WATER LEVEL IS FOR CELLS WITH OUTLETS. THE OPERATING WATER LEVEL IN ADJACENT CELLS MAY BE GREATER DEPENDING ON THE GPM, NUMBER OF OUTLES AND FLUME ARRANGEMENT.

I-P [SI] UNITS

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DRAWN BY MA_STD	DRAWN DATE 01/22/2016	COLLECTION BASIN WATER LEVEL DETAILS 8401 THRU 8414 TOWERS					
CHECKED BY ABDULFATTAH	CHECKED DATE 01/26/2016						
RELEASED BY ABDULFATTAH	RELEASED DATE 01/27/2016	ECM NUMBER 20945	ORDER NUMBER -/-	FORMAT ANSI B	PLOT 1=1	DRAWING NUMBER Z0341072	REV. A



SIDE SUCTION WITH OPTIONAL SIDE DRAIN & OVERFLOW [3]

SEE "OUTLET PIPING PLAN" DRAWING FOR OUTLET DIAMETER

GENERAL NOTES

1. THE COLLECTION BASIN PIPING ACCESSORIES SHOWN ON THIS DRAWING ARE FURNISHED WITH THE COOLING TOWER.
2. ALL PIPING SUPPORTS ARE BY OTHERS. DO NOT SUPPORT PIPING FROM TOWER.
3. ON ONE CELL TOWERS THE OPTIONAL CASING FACE DRAIN AND OVERFLOW IS LOCATED ON FACE "A" ONLY. ON TWO CELL TOWERS THE OPTIONAL CASING FACE DRAIN AND OVERFLOW IS LOCATED ON FACES "A" AND "C". USE OF OPTIONAL CASING FACE DRAIN AND OVERFLOW IS NOT OFFERED FOR THREE CELL TOWERS.
4. TOLERANCE APPLICABLE TO DIMENSIONS SHOWN ARE DEPENDENT UPON FABRICATION, ASSEMBLY AND CONSTRUCTION TOLERANCES. FABRICATION TOLERANCE IS $\pm 1/16"$ [2] AND ASSEMBLY TOLERANCE IS $\pm 1/8"$ [3]. CONSULT SUPPLIERS OF SUPPORTING STRUCTURE FOR CONSTRUCTION TOLERANCE. ALL OF THE DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS SHOWN INSIDE OF BRACKETS [] ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

I-P[S] UNITS

TOWER MODEL	DIMENSIONS					
	A5	A7	A8	A9	A10	A11
8401	3'-4 1/8" [1019]	1'-3" [381]	1'-8" [508]	8 1/8" [206]	7 1/4" [184]	10" [254]
8402	4'-3 3/8" [1305]	1'-3" [381]	1'-8" [508]	8 1/8" [206]	7 1/4" [184]	10" [254]
8403	4'-3 3/8" [1305]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	8 15/16" [227]	8 3/4" [222]	11 1/4" [286]
8405	5'-0 3/8" [1534]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	8 15/16" [227]	8 3/4" [222]	11 1/4" [286]
8407	6'-0 3/8" [1838]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	8 15/16" [227]	8 3/4" [222]	11 1/4" [286]
8409	7'-0 3/8" [2143]	* 1'-5 1/4" [438]	1'-10 1/4" [565]	8 15/16" [227]	8 3/4" [222]	11 1/4" [286]
8410	6'-0 3/8" [1838]	1'-7 3/8" [492]	2'-2 1/4" [667]	11 1/2" [292]	10 3/16" [259]	11 1/4" [286]
8411	6'-0 3/8" [1838]	1'-9 1/4" [540]	2'-2 1/4" [667]	13 5/16" [338]	8 3/8" [213]	11 1/4" [286]
8412	7'-0 3/8" [2143]	1'-9 1/4" [540]	2'-2 1/4" [667]	13 5/16" [338]	8 3/8" [213]	11 1/4" [286]
8413	6'-0 3/8" [1838]	1'-11 1/4" [591]	2'-4 1/4" [718]	13 5/16" [338]	10 3/8" [264]	11 1/4" [286]
8414	7'-0 3/8" [2143]	1'-11 1/4" [591]	2'-4 1/4" [718]	13 5/16" [338]	10 3/8" [264]	11 1/4" [286]

* 1'-6 1/2" [470] ON TOWERS WITH 12" OR 14" DIA. SIDE SUCTION OUTLET

DRAWN BY MA_STD	DRAWN DATE 01/22/2016	SIDE SUCTION OUTLET W/ SIDE DRAIN & OVERFLOW 8401 THRU 8414 TOWERS			
CHECKED BY ABDULFATTAH	CHECKED DATE 01/26/2016				
RELEASED BY ABDULFATTAH	RELEASED DATE 01/27/2016	ECM NUMBER 20945	ORDER NUMBER -/-	FORMAT ANSI B	PLOT 1=1
		DRAWING NUMBER ZO341070		REV. A	

MARLEY

accessories

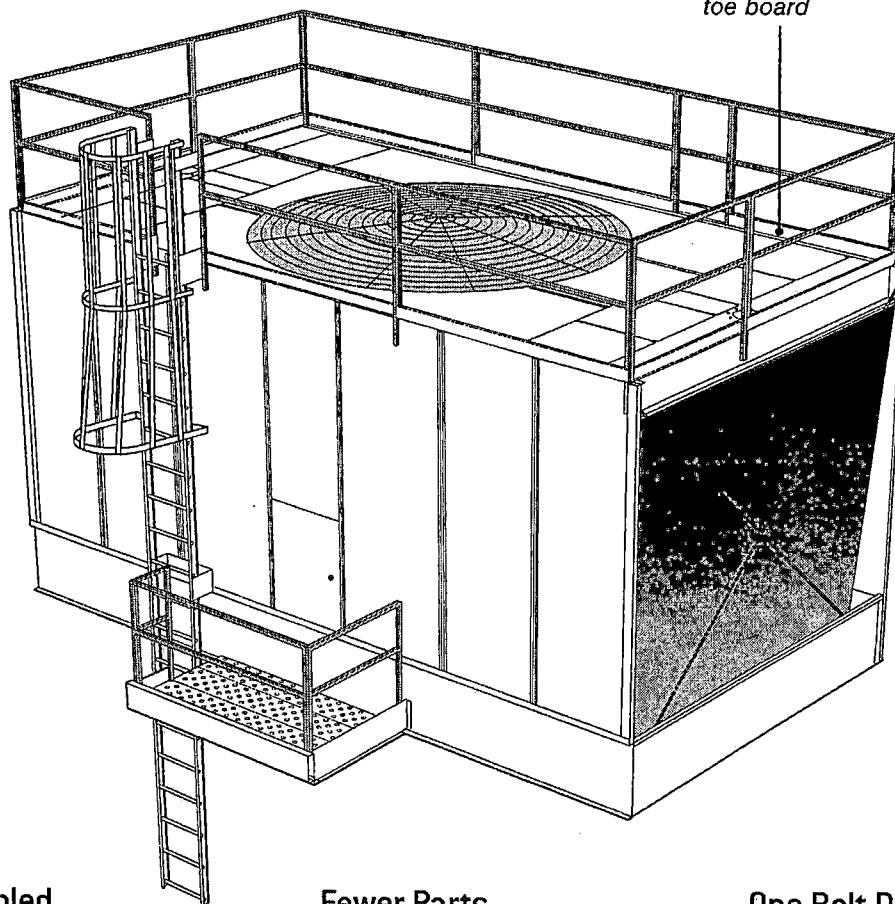
NC[®] easy-fit guardrail and safety cage

The new guardrail system for NC towers offers faster assembly and easier maintenance. A significant reduction in parts and clear instructions ensure that your guardrails are assembled accurately and securely.

Pre-assembled parts make installation easy

Complies with OSHA standards

Integrated toe board



Pre-Assembled

Guardrails are shipped as large welded sections that are self fixturing for easy and simple installation.

Fewer Parts

With 130 fewer parts to contend with, you save both time and effort.

One Bolt Diameter

No more switching tools. Install your rails quickly without searching for the right tool for a variety of bolt sizes.

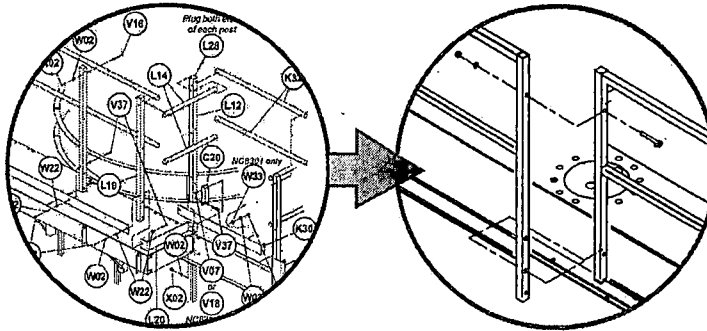
easy-fit guardrail and safty cage

Clear Instructions

User-friendly installation instructions take the guesswork out of assembling your guardrails.

Go from this...

to this.



Simpler is Safer

A significant reduction in parts and new clear instructions ensure that your easy fit guardrails are assembled accurately and securely.

Guardrail single cell example

Element	Old Design	New Design	Reduction
Steel parts total	41	11	73%
Plastic plugs total	56	0	100%
Hardware pieces total	262	132	50%
Number of unique pieces	8	4	50%
Number of bolt diameters	2	1	50%

Safety cage example

Element	Old Design	New Design	Reduction
Cage pieces total	27	4	85%
Hardware pieces total	274	128	53%
Number of unique pieces	7	3	57%
No. of bolt/screw diameters	2	1	50%

SPX COOLING TECHNOLOGIES, INC.

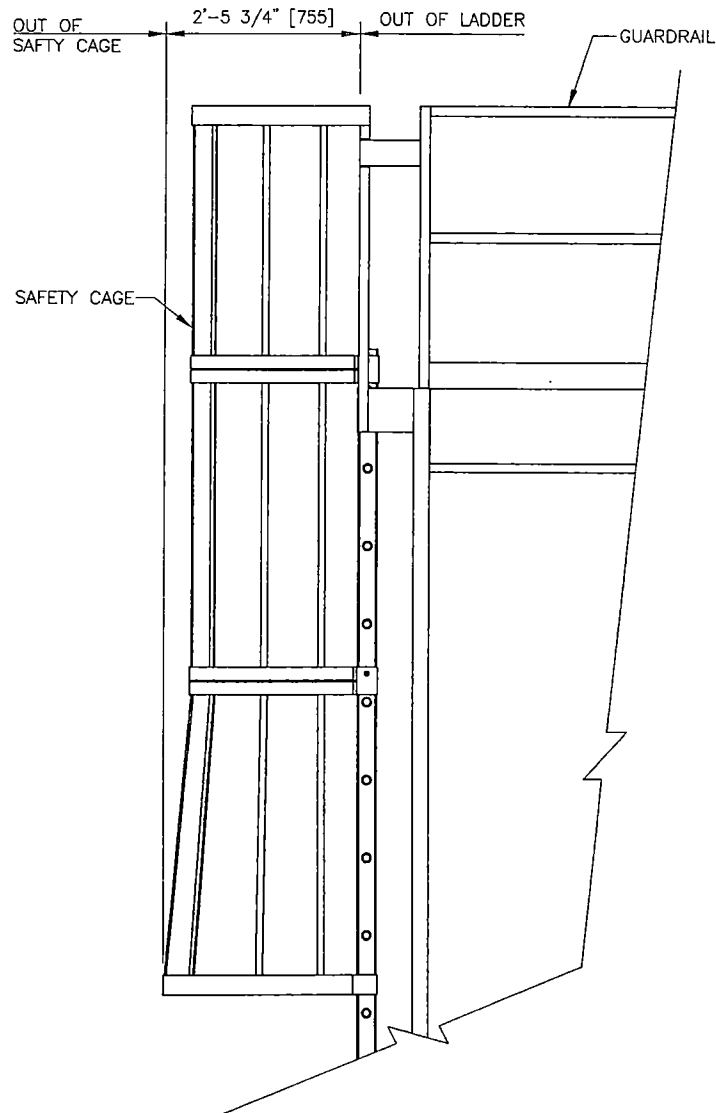
7401 WEST 129 STREET
OVERLAND PARK, KS 66213 USA
913 664 7400 | spxcooling@spx.com
spxcooling.com

ACC-NC-2B | ISSUED 11/2016

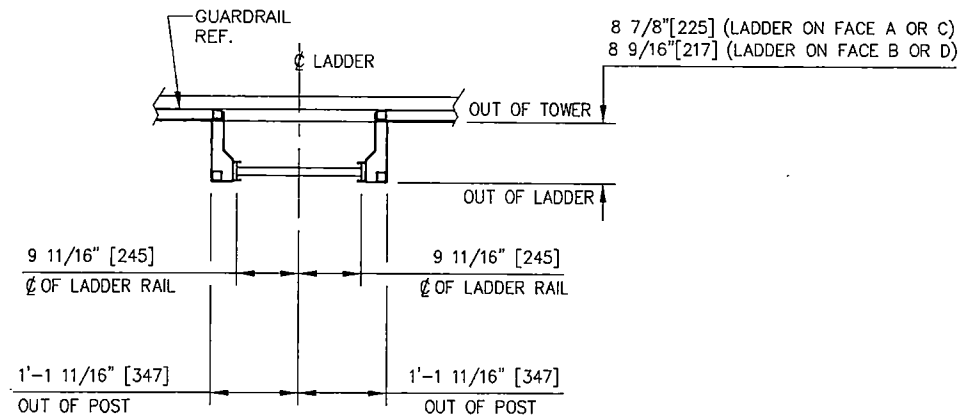
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LADDER WITH CAGE ELEVATION



LADDER DETAIL
(PLAN VIEW)

NOTES

1. THE COOLING TOWER FAN DECK IS NOT CONSIDERED AN ELEVATED WORKING PLATFORM SINCE NORMAL RECOMMENDED MAINTENANCE PROCEDURES ARE LESS THAN THE FREQUENCY OF MAN-HOURS THAT OSHA DEFINES FOR SUCH A PLATFORM, PER OSHA'S 1984 INTERPRETATION OF THEIR REGULATIONS. THIS OPTION AND OTHERS ARE AVAILABLE FOR THOSE CUSTOMERS WHO PREFER THE EXTRA DEGREE OF PROTECTION IT PROVIDES.
2. NORMAL TOWER MAINTENANCE DOES NOT REQUIRE PERSONNEL TO BE ON TOP OF THE TOWER. IF ACCESS TO TOP OF THE TOWER IS NEEDED, THEN LADDER AND HANDRAIL OPTION IS RECOMMENDED.
3. LADDER IS ALL ALUMINUM CONSTRUCTION CONSISTING OF 3" [76] X 1 1/8" [29] I-BEAM SIDE RAILS AND 1 1/4" [32] DIAMETER SERRATED RUNGS.
4. TOWER IS MODIFIED FOR LADDER AND HANDRAIL WITH ALL ATTACHING CLIPS AND HARDWARE PROVIDED WITH THE COOLING TOWER. LADDER AND HANDRAIL ARE ASSEMBLED AND INSTALLED IN THE FIELD BY OTHERS. INSTALLATION DETAILS ARE SHIPPED WITH THE TOWER.
5. TOLERANCE APPLICABLE TO DIMENSIONS SHOWN ARE DEPENDENT UPON FABRICATION, ASSEMBLY AND CONSTRUCTION TOLERANCES. FABRICATION TOLERANCE IS $\pm 1/16"$ [2] & ASSEMBLY TOLERANCE IS $\pm 1/8"$ [3]. CONSULT SUPPLIERS OF SUPPORTING STRUCTURE FOR CONSTRUCTION TOLERANCE. ALL OF THE DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE NOTED.
6. PER O.S.H.A. STANDARDS, SAFETY CAGE IS RECOMMENDED WHEN THE DIFFERENCE IN ELEVATION BETWEEN TOWER FAN DECK AND GRADE EXCEEDS 20' [6096].
7. LADDER EXTENSION IS PROVIDED IN A NOMINAL LENGTH OF 11' [3353]. FIELD MODIFICATION, BY OTHERS, IS REQUIRED FOR AN EXTENSIONS OF A DIFFERENT LENGTH. PER O.S.H.A. STANDARDS, AN ACCESS DOOR PLATFORM IS RECOMMENDED IF TOWER IS ELEVATED.
8. THE ACTUAL LADDER EXTENSION LENGTH (BASE OF TOWER TO GRADE) MUST BE SPECIFIED TO ASSURE THE PROPER BOTTOM ELEVATION OF SAFETY CAGE.
9. ALL DIMENSIONS SHOWN INSIDE OF BRACKETS [] ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

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DRAWN BY QIAN_STD		DRAWN DATE 12/12/2017		LADDER DETAILS WITH SAFETY CAGE					
CHECKED BY Morby		CHECKED DATE 01/15/2018							
RELEASED BY Morby		RELEASED DATE 01/15/2018		ECM NUMBER 23298	ORDER NUMBER -/-	FORMAT ANSI A	PLOT 1=30	DRAWING NUMBER Z0628293	REV. A



No.:

Date: 18-DEC-2015

DATA SHEET**Three-phase induction motor - Squirrel cage rotor**

Customer :
Product line : W22 Cooling Tower Motors: NEMA Premium - TEFC

Frame : 324T
Output : 40 HP
Frequency : 60 Hz
Poles : 4
Full load speed : 1775
Slip : 1.39 %
Voltage : 208-230/460 V
Rated current : 104-94.2/47.1 A
Locked rotor current : 575/287 A
Locked rotor current (I_L/I_N) : 6.1
No-load current : 32.0/16.0 A
Full load torque : 117 lb.ft
Locked rotor torque : 220 %
Breakdown torque : 240 %
Design : B
Insulation class : F
Temperature rise : 80 K
Locked rotor time : 20 s (hot)
Service factor : 1.25
Duty cycle : S1
Ambient temperature : -20°C - +40°C
Altitude : 1000
Degree of Protection : IP55
Approximate weight : 492 lb
Moment of inertia : 9.1624 sq.ft.lb
Noise level : 66 dB(A)

	D.E.	N.D.E.
Bearings	6312 2RS-C3	6212 2RS-C3
Regreasing interval	---	---
Grease amount	---	---

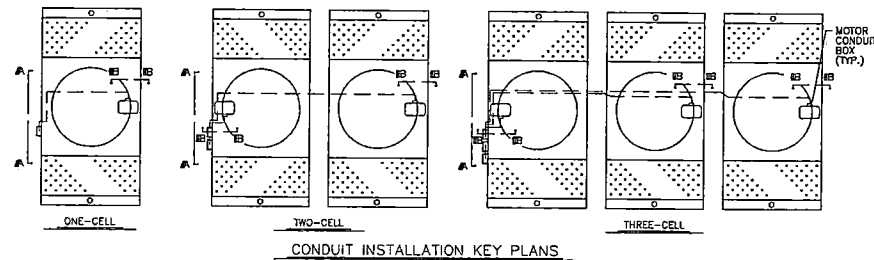
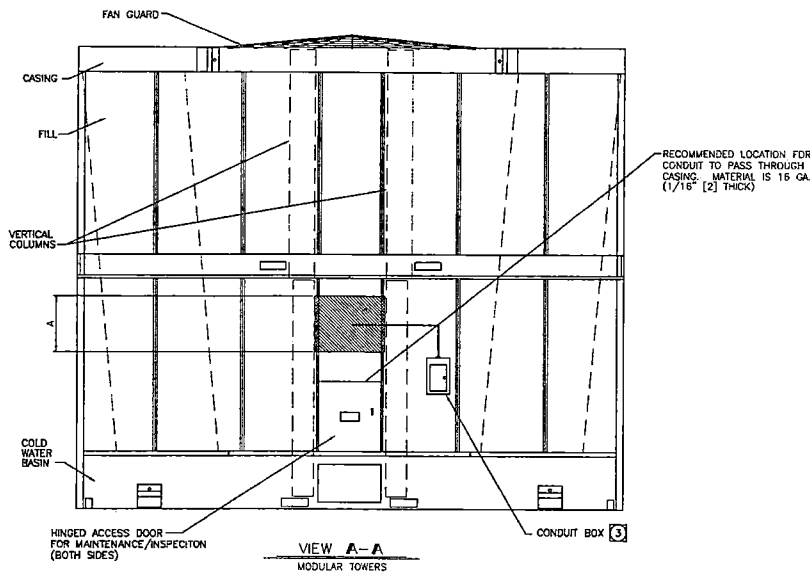
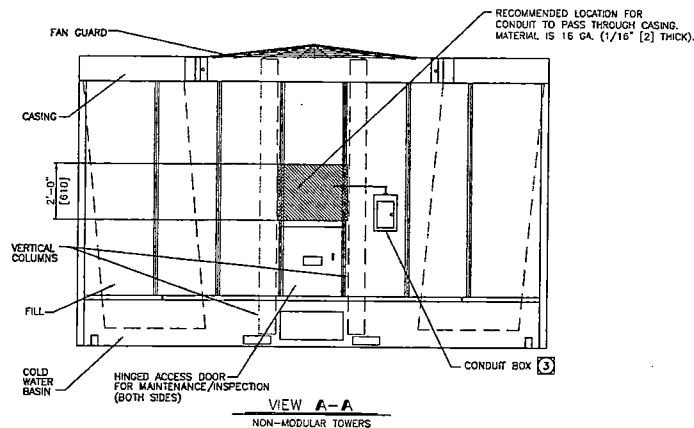
Load	Power factor	Efficiency (%)
100%	0.85	94.1
75%	0.80	94.1
50%	0.72	93.6

Notes:

Typical Motor Data Sheet

Performed by

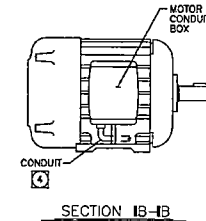
Checked



GENERAL NOTES

- ALL CONDUIT, CONNECTIONS, SUPPORTING CLIPS, HANGERS, AND SAFETY SWITCHES ARE SUPPLIED BY OTHERS.
- ALL WIRING MUST CONFORM TO LOCAL AND NATIONAL CODES.
- NON-FUSED SAFETY DISCONNECT SWITCHES ARE RECOMMENDED: THREE-POLE FOR SINGLE SPEED MOTORS, SIX-POLE FOR TWO SPEED MOTORS, WITH VOLTAGE AND HORSEPOWER RATED FOR FAN MOTOR. LOCATED IN A NEMA 3 OR 4 WEATHERPROOF ENCLOSURE. ATTACH ENCLOSURE TO EXTERIOR OF TOWER USING VERTICAL FLANGES OF CASING. CONDUIT BOX MUST BE LOCATED AT A LOWER ELEVATION THAN MOTOR.
- CONDUIT SHOULD BE SUPPORTED APPROXIMATELY EVERY TEN FEET [3048], EXCEPT WHERE NOTED BELOW. IMPORTANT! CONDUIT MUST BE PITCHED DOWN TO ALLOW CONDENSATION TO DRAIN AWAY FROM MOTOR AND OUT OF CONDUIT. CONDUIT MUST BE WATERTIGHT. CONDUIT SHOULD BE RIGID EXCEPT AS NOTED BELOW.
 - APPROXIMATELY 2 FEET [610] OF FLEXIBLE STEEL CONDUIT (SEALTIGHT OR EQUIVALENT) SHOULD BE USED AT THE MOTOR CONDUIT BOX.
 - A CONDUIT SUPPORT SHOULD BE LOCATED WITHIN 3 FEET [914] OF ALL CONDUIT BOXES.
 - IF MOISTURE CANNOT DRAIN OUT OF MOTOR CONDUIT BOX, A SMALL (3/16" [5] ~ 1/4" [6]) DRAIN HOLE MUST BE DRILLED IN BOTTOM OF CONDUIT BOX.
- CONDUIT MAY BE SUPPORTED ON THE SIDE OF THE INTERIOR BOX BEAMS OR SUSPENDED FROM BOTTOM OF THE BEAM. SEE KEY PLANS AND VIEW A-A FOR LOCATION AT WHICH TO RUN CONDUIT THROUGH TOWER CASING.
- HOLE(S) CUT IN CASING FOR CONDUIT SHOULD NOT BE FLAME CUT, AND SHOULD NOT BE LARGER THAN NECESSARY TO ACCOMMODATE CONDUIT FITTINGS. SEAL HOLES WITH WATERPROOF CAULKING.
- TOWERS WITH NO LADDER AND HANDRAIL:
 - ONE CELL TOWERS MAY HAVE DISCONNECT SWITCH LOCATED ON MOTOR FACE OF TOWER.
 - MULTI-CELL TOWERS SHOULD HAVE DISCONNECT SWITCHES LOCATED TOGETHER. SEPARATE CONDUIT IS REQUIRED FOR EACH MOTOR. ROUTE CONDUIT THROUGH CASING AND ACROSS ADJACENT CELLS AS SHOWN ON INSTALLATION KEY PLAN.
- TOWERS WITH LADDER AND HANDRAIL: DISCONNECT SWITCHES SHOULD BE LOCATED ON LADDER SIDE OF TOWER FOR EASE OF ACCESSIBILITY. SEPARATE CONDUIT IS REQUIRED FOR EACH MOTOR. ROUTE CONDUIT THROUGH CASING AND ACROSS ADJACENT CELLS AS SHOWN IN INSTALLATION KEY PLAN.
- ALL OF THE DIMENSIONS SHOWN INSIDE BRACKET[] ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

1-P [9] UNITS



TOWER MODEL	DIMENSIONS
	A
8410	3 5/8" [92]
8411	2' [610]
8412	2' [610]
8413	2' [610]
8414	2' [610]

DRAWN BY MA STD	DRAWN DATE 01/26/2016	RECOMMENDED CONDUIT INSTALLATION			
CHECKED BY ABDULFATTAH	CHECKED DATE 01/26/2016	CON NUMBER 20945	ORDER NUMBER -/-	FORMAT ANSI B	PLOT 1=1
RELEASED BY ABDULFATTAH	RELEASED DATE 01/27/2016	CON NUMBER 20945	ORDER NUMBER -/-	ANSI B	PLOT 1=1
				DRAWING NUMBER Z0628795	REV A

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VLT® HVAC Drive & EMB Submittal

TO: Ocean Medical Center

DATE: 11.01.18

PROJECT NAME: Cooling Tower #1 Replacement

CONTRACTOR: _____

ENGINEER: _____

DANFOSS SALES OFFICE: _____

SUBMITTAL FOR: _____

RECORD

☒

APPROVAL

APPROVED BY: _____

RELEASED FOR

MANUFACTURING AND SHIPMENT: _____

HOLD FOR RELEASE: _____

APPROVED: _____

APPROVED AS NOTED: _____

DISAPPROVED: _____

EXPLANATION: _____

PLEASE RETURN APPROVED DRAWINGS TO:

Dyna-Tech Sales Corp

ATTENTION: _____

SUBMITTED BY: _____



460 Volt EMB Bypass Packages – NEMA 12 INDOOR with bypass

Qty.	Tag Numbers	HP	Frame Size NEMA1/12	VLT Model	Nominal Voltage	Max. Amps Output	Option Card
2	VFD 1 & 2	40	B2	FC-102P30KT4	460	52	n/a



ELECTRO-MECHANICALLY CONTROLLED BYPASS (EMB) FEATURES

General Features

All optional features shall be built, mounted and tested by Danfoss. The factory warranty will apply to the entire assembly as shipped. All options will carry a UL / C-UL Enclosed Industrial Control Panel label. All optional devices will be factory tested as assembly.

Bypass Power Features

- *Contactor bypass* will be provided that allows operation of the motor via line power in the event of a failure of the VFD. Motor control selection shall be through either a VFD output contactor or a bypass contactor that is interlocked to ensure that both contactors are not energized simultaneously.
- *Main input disconnect* will be provided that removes power from both the bypass and VFD.
- *VFD-only, fast acting input fuses* will be provided.
- *Overload protection* will be supplied in bypass mode.
 - Adjustable current setting for complete motor protection when operating on line power.
 - Overload protection shall include phase loss and phase imbalance protection.
 - Visual indication of an overload trip condition shall be displayed on the VFD keypad.
 - Resetting an overload trip condition shall not require the opening of the enclosure door for safety reasons and shall be accomplished via a digital input, door mounted device (drive keypad), or over the serial communications.
- ▼All panels shall be marked for 100,000 amp short circuit current rating.

Bypass Interface and Control Features

- *Bypass or VFD selection* shall be via a *DRIVE – OFF –BYPASS selector switch*.
- A *BYPASS* pilot light will illuminate when operating in bypass mode.
- Selection of Bypass or VFD operation will be by any one of the following: Manually via the VFD keypad, remotely via a contact closure from the BMS system, commanded over the communication network or automatic bypass operation based on VFD programming.
- Bypass package will include an *External Safety* interlock that will disable motor operation in either bypass or VFD mode when open.
- ▼**EMB2** control package will be provided. This package includes the following features:
 - There shall be complete *Common Start/Stop command* when operating in either Bypass or VFD mode. While operating in Bypass mode, the keypad shall allow the selection of Hand or Remote motor starting. In Hand and Bypass modes, pushing the keypad start button shall initiate motor operation via line power. When in Remote and Bypass modes are selected, the motor shall start just as it would have in VFD and Remote mode. This start source can be via either a hardwired start command, the VFD's real time clock or a command over BAS communication. This feature allows energy savings over standard bypass packages by allowing nighttime shutdown schedules and load shedding even with a VFD failure. Bypass packages that only allow common remote start / stop command when this command is hardwired to the package are not acceptable.
 - Selectable *Run Permissive* logic shall operate in either VFD or bypass operation. When activated, any command to start the motor, in either Hand Bypass, Remote Bypass, Hand VFD or Remote VFD shall not start the motor, but instead close a relay contact that is used to initiate operation of another device, such as an outside air damper. A contact closure from this device shall confirm that it is appropriately actuated and the motor shall then start.
 - *Firemode* operation input shall be available. When closed, the motor will run in bypass mode regardless of operating mode selected and will ignore calls to stop. These include the opening of the external safety interlock circuit or the tripping of the motor overload.

Additional Protective features

In addition to the power and operational protective features listed above, each bypass will include the following:

- Low voltage contactor operation shall be maintained to 70% of the package's nominally rated voltage. This will ensure VFD operation on low voltage conditions that would otherwise be interrupted due to contactor dropout.

The VFD shall be able to operate the motor at a reduced load with the loss of any one of the three phases of power. Contactors shall remain closed regardless of which phase is lost. This will ensure VFD operation on single-phase conditions that would otherwise be interrupted due to contactor dropout.

WARRANTY

The VLT HVAC Drive packages for this project carry an 18-month on-site warranty from the date of shipment. This warranty includes parts, labor, travel, and expenses.

DRIVE FEATURES – OPERATOR INTERFACE

The VLT®HVAC Drive

The VLT HVAC Drive Series is a microprocessor-based, high frequency IGBT-based, PWM AC drive with control functions and software designed solely for the unique needs of HVAC systems. The VLT HVAC Drive uses state-of-the-art Voltage Vector Control to supply full rated motor voltage at rated load and frequency, full motor performance without derating, high efficiency for both drive and motor, and a nearly perfect output sine wave. The diode-bridge rectifier and DC-link reactor provide a high displacement power factor at all speeds and loads and minimize power line harmonics. The VLT HVAC Drive utilizes a common user interface for all units.

Fully Graphic, Multilingual Display

The VLT HVAC Drive uses a large, bright, backlit graphic display to provide complete drive information at a glance. The logical arrangement of all elements simplifies the setup, operation and monitoring of the drive. Choose from 25 different items to display, including input reference, motor current, hours run, output frequency, horsepower, kW or kWh. Or select from custom units, such as GPM or HP and calibrate the maximum value to the maximum frequency of the unit. After programming one drive, the keypad can be used to transfer the same settings to all other drives. Drive can run without the keypad in place to assure tamper-proof operation. Drive status is shown even with the keypad removed.

LED Indication

Three LEDs are provided on the VLT HVAC Drive for indication of power applied, warning and fault. Upon power up, all LEDs will briefly light as a lamp test.

Alarm – Will flash red when the drive has registered a fault condition which has caused the drive to shut down.

Warning – Will flash yellow to indicate a situation exists that exceeds the normal drive/system parameters, and if that condition continues, a trip may be imminent.

On – Will glow green to indicate that the VFD is connected to AC power (line voltage is present).

Operating Keys

Hand On – Starts the drive regardless of remote start/stop contact (assuming safety interlock is closed). The speed of the drive will generally be controlled manually via the keypad "+" and "-" buttons.

Off – Shuts the drive down regardless of other commands.

Auto/On – The drive will start and stop via the external contact closure (building automation time clock). The speed is generally controlled via the building automation signal (4 to 20 mA, 0 to 10 V DC, etc.).

Reset – Will reset any trip level fault (not trip lock) if the drive is not set for infinite automatic fault resets.

Directional Keys

Right / Left / Up / Down arrows – Used as the electronic potentiometer to manually control the speed in the Hand/Start mode. All four keys are active during operation as well as programming. They provide the ability to move the cursor around the display, or sequence through display values.

Programming Keys

Status – Used to display operational data and status.

Cancel – Used to cancel the last programming command so the change is not carried out.

OK – Used to confirm that the last programming change should be saved to memory.

Back – Used to exit present display or menu to the previous display or menu.

Quick Menu – Used for programming the VLT HVAC Drive for the most typical applications.

Main Menu – Used to access all parameters for programming. It can switch directly from this mode to quick menu.

Alarm Menu – Used to access all fault and warning data.

Info Key – Accesses an on-board manual that gives detailed explanation of a parameter.

PROGRAM OPTIONS

Application-Specific Software

The VLT HVAC Drive was designed specifically for the HVAC market. This specialization has allowed Danfoss to factory program and configure the VLT HVAC Drive to make it ready to use, out of the box. This eliminates the time-consuming and often confusing job of selecting the correct parameters in the field. For the advanced user, the parameters are logically grouped, making modifications simple. Customized text fields are available to show user-specific data. Four independent setups are available for unmatched flexibility.

Menu Structure

Quick Setup Menu – Contains the 14 required setup parameters to easily start the application.

HVAC Application Menu – Easy access to the most relevant parameters for each of the most common HVAC applications.

Personal Menu – Contains up to 20 user-selectable parameters for customized access.

Changes Made Menu – Provides easy access to previously modified parameters

Keypad Features

- Hot-pluggable with upload and download capabilities
- On-screen scroll bars and graphs
- Up to five separate meters displayed simultaneously
- Two-level password protection
- Plain language alarms and warnings
- Remote keypad mounting kits available

USB Connectivity

The VLT HVAC Drive can be remotely commissioned and monitored through a standard USB connection and MCT 10 PC software.

Agency listing:

All drives and option packages are factory built and carry UL and C-UL listings.

All drives and option packages are built in ISO 9000 and 14001 certified facilities.

DRIVE FEATURES – MOTOR AND DRIVE INTERACTION

Constant-Torque Start

The VLT HVAC Drive's constant-torque start mode provides full torque to accelerate different loads until the drive reaches the setpoint. Breakaway current can be set up to 160% for up to 0.5 seconds for starting high friction loads.

Current Limit Circuit

Adjustable from 0 to 110% of the VLT HVAC Drive's rated current (factory set at 110%). If during acceleration the current required to accelerate the load exceeds the current limit, the VLT HVAC Drive will stop accelerating until the motor current is reduced to normal levels, at which time the load will continue to accelerate at the rate set by the acceleration time.

Three-Phase Output Current Measurement

The VLT HVAC Drive's software measures output current on all three phases. Phase grounding is detected instantly. Output contactors may be repeatedly used with no damage to the drive. Multiple motors may be run from one drive.

Advanced Motor Protection

The VLT HVAC Drive features integrated electronic, thermal motor protection. The VFD calculates the motor temperature based on current, frequency, and time. This system allows for changing cooling conditions as speed and load vary. The drive can predict motor overheating and reports a % of thermal load.

Motor Preheat Circuit

This preheat function can be activated to avoid condensation on the motor windings when it is stopped.

Stall Protection

The VLT HVAC Drive provides protection against a stalled motor. When activated, this function can provide a warning or a fault condition caused by excessive motor current at low speeds.

DRIVE FEATURES

DC-Link Reactor

A dual, 5% DC-link reactor on the positive and negative rails of the DC bus is standard equipment on the VLT HVAC Drive. This reactor reduces the level of harmonics reflected back into the building power system without causing a voltage loss at the drive's input and reducing efficiency as an external AC line reactor would. This reactor also improves input power factor. The reactor is non-saturating (linear) to provide full harmonic filtering throughout the entire load range. In performance, the DC-link reactor is equivalent to a 5% AC line reactor.

Power Line Protection

Power line voltage surge protection is provided by means of input Metal Oxide Varistors (MOVs). This protects the diodes in the VLT HVAC Drive's 3-phase full wave diode bridge. The DC-link reactor also acts to reduce input current caused by power line disturbances.

Sleep Mode

Automatically stops the drive when speed drops below set "sleep" level for specified time. Automatically restarts when speed command exceeds set "wake" level. Saves energy and reduces wear on driven equipment.

Run Permissive Circuit

Ability to accept a "system ready" signal assures that dampers or other auxiliary equipment are in the proper state for drive operation. This feature also provides the ability for the drive to send a "start signal applied" signal to the system to notify the auxiliary equipment of the drive's request to start.

Firefighter's Override Mode

Overrides all other commands to provide desired operation. Ignores most alarms including overload, overcurrent, overtemperature, and phase loss. When used with bypass, selectable to run from drive, from bypass, or switch from drive to bypass in the event of a drive failure.

Acceleration / Deceleration Rates

The VLT HVAC Drive can provide four individually controlled sets of acceleration/deceleration rates each from 1 to 3600 seconds. The shape of these curves may be automatically contoured to prevent tripping.

Plenum Rated

The VLT HVAC NEMA 1 or NEMA 12 drive is recognized by UL for installation in air handling compartments.

Auto Restarts

The VLT HVAC Drive can be automatically restarted up to 20 times or infinitely at 0 to 600 second intervals. If the application causes the drive to trip more than the number of trials set, the drive will stop operating and display the fault on the display screen. A manual reset will be required by means of the reset key, a digital input, or EIA-485 command. In cases of severe trips, as a safety feature, the drive's input power may have to be cycled to restart a fault.

Carrier Frequency

By using IGBTs, the VLT HVAC Drive can employ high switching frequencies, so the motor current is practically sinusoidal. Audible motor noise can also be minimized by adjusting the switching frequency. These frequencies can be set or adjust themselves automatically to fit the application.

Input Power

The VLT HVAC Drive is equipped with an automatic sustained power or phase loss circuit. The VLT HVAC Drive will provide a full rated output with an input voltage as low as 90% of the nominal. The drive will continue to operate with reduced output with an input voltage as low as 164 volts for 208/230 volt units, 313 volts for 460 volt units, and 394 volts for 600 volt units.

Automatic Motor Adaptation (AMA)

Knowing motor stator resistance, the drive automatically optimizes performance and efficiency. The motor does not have to be run or decoupled from the load for the AMA setup to be performed.

Automated Frequency Avoidance / Critical Frequency Lockouts

For applications where it may be necessary to avoid specific frequencies due to mechanical resonance problems in the driven equipment, the VLT HVAC Drive, with its Critical Frequency Lockout Function, makes it possible to set up to four different frequency ranges which will be avoided during operation of the drive. This feature can be programmed by simply activating the feature and pushing OK at the top and bottom points that you wish to avoid.

- Each critical frequency setting can avoid a frequency band which is from 1 to 100 Hz wide. If the reference signal defines that the VLT HVAC Drive is to operate within this critical frequency range, the critical frequency lockout function will keep the drive operating continuously within this range.
- When the frequency reference signal rises above the critical frequency maximum limit, the VLT HVAC Drive will allow the motor to accelerate through the critical frequency at the rate set by the acceleration rate.

Automatic Energy Optimization Circuitry

The Automatic Energy Optimization (AEO) function adapts the output of the drive to the specific motor and load connected. This circuit optimizes the system efficiency as system loads change. The AEO function regulates the output voltage on the basis of the reactive current and the effective current. A savings of 3 to 10% in power consumption can be obtained with this function.

Preset Speeds

The VLT HVAC Drive allows for a maximum of 16 programmable preset speeds to be selected from the digital inputs.

Energy Monitoring

Real energy savings are always available without the additional expense of external equipment.

Real-Time Clock

Adds sophisticated performance to basic control schemes for increased comfort and energy savings.

Automatic High Ambient Derate

If the ambient temperature exceeds the normal limit, the drive can be set to warn of its overtemperature and continue to run, keeping the HVAC system functional. To control its temperature, the drive will reduce the output carrier frequency and then, if necessary, reduce the output current.

Preventive Maintenance Scheduling

The VLT HVAC Drive can monitor system usage and notify the operator when preventive maintenance is required.

Intelligent HVAC Controller

Four auto-tuning PIDs control the drive and up to three other devices, eliminating external controllers and reducing cost.

- **Proportional:** The proportional gain dictates the rate at which the deviation between actual and desired feedback signal is corrected. The higher the gain, the faster the response, but too high a gain can cause hunting and a large overshoot.
- **Integral Time:** The integral time continually compares the feedback value with the desired setpoint over time to make sure the setpoint is reached. The greater the integral time, the longer it takes to actually achieve the setpoint, but improves the system stability.
- **Derivative:** The derivative function monitors the rate at which the feedback is closing on the desired setpoint and slows the rate of approach to prevent overshooting. This function allows rapid accurate system control.

Built-in Communications

The VLT HVAC Drive is fully equipped for serial communication (EIA-485). Up to 31 drives can be connected to one serial bus up to 5,000 feet long.

Communicates directly with *Johnson Controls Metasys (N2)*, *Siemens Building Technologies System 600 (FLN*)*, and *Modbus RTU* systems with no hardware changes or additional costs.

Optional communications include *BACnet MS/TP* and *LonWorks* with the addition of an Option A card.

*SIEMENS certification pending. Available 3rd quarter 2008.

Broken Belt, Loss of Load

A minimum motor current value can be set to indicate the motor is not using any more current than to run at idle. This can be used to indicate a broken belt or coupler. This feature can also be used to detect when a motor is disconnected from the drive.

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B

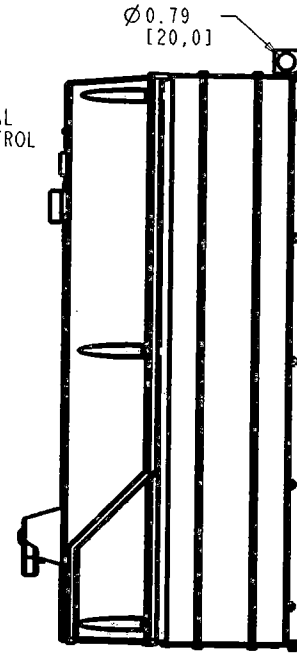
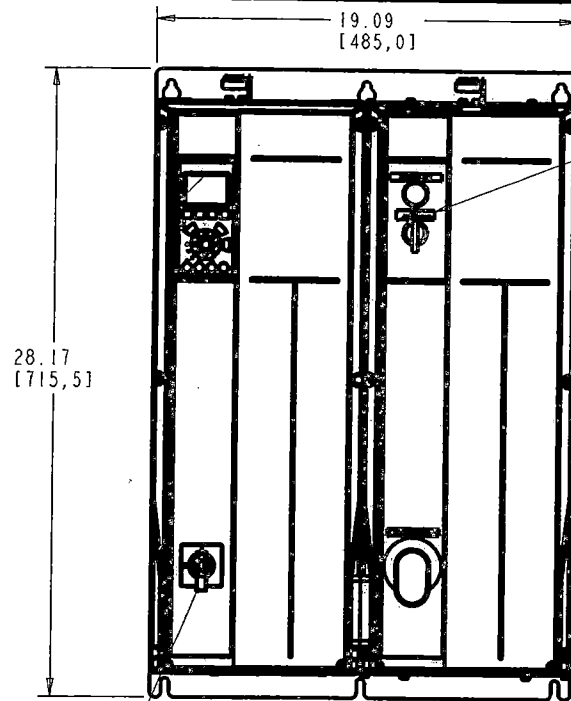
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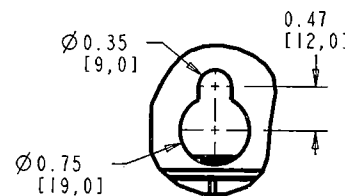
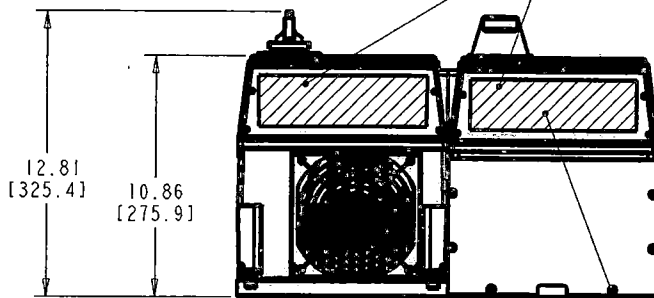
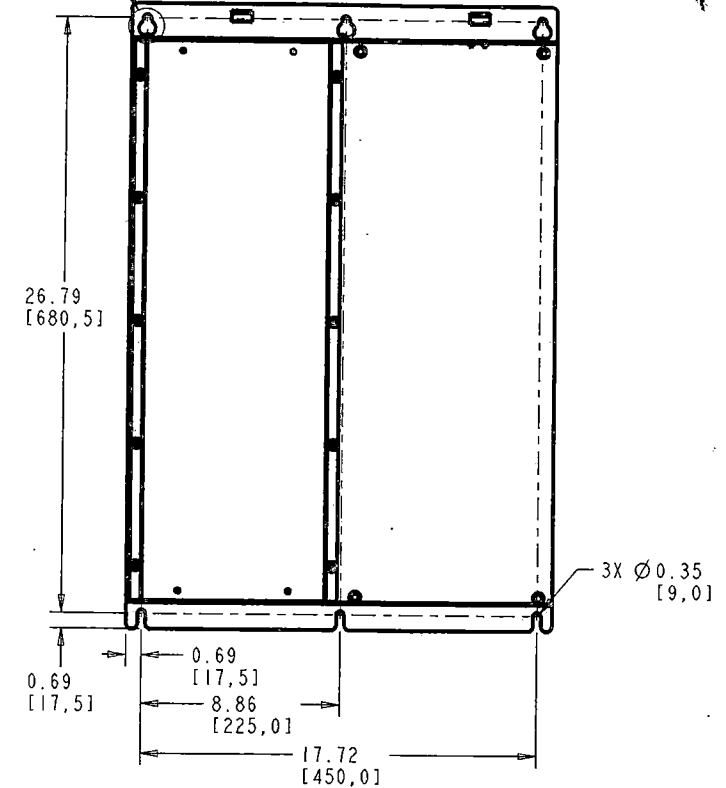
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DETAIL A



DETAIL A

CLEARANCE REQUIREMENT FOR AIR FLOW COOLING:

THE UNIT MUST BE INSTALLED VERTICALLY WITH THE MINIMUM CLEARANCE OF 3.94" [100.0mm] ON THE TOP AND BOTTOM. ALL UL NEMA TYPE 1/1P2I AND NEMA TYPE 12/1P54 UNITS MAY BE MOUNTED SIDE BY SIDE WITH NO MINIMUM SIDE CLEARANCE.

UNIT APPROXIMATE WEIGHT: 105 Lbs [48 Kg]

- NOTICE -

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SAK 03/25/10

PRO-E ENTRY BY/DATE:

KD 2/21/07

DESIGNED BY/DATE:

KD 2/21/07

APPROVAL:

PLOT SCALE:

NONE

CHECKED BY/DATE:

MFG. APPROVAL BY/DATE

ENG. APPROVAL BY/DATE

PRO-E FILE:

APU_BI_MAIN

DANFOSS DRIVES
4401 N. BELL SCHOOL RD., LOVES PARK, ILLINOIS 61111 USA
(815) 639-8800 FAX (815) 639-8000

TITLE:

DWG, REF, SUBMITTAL, B2 T2

SHEET:

1

OF:

1

DRAWING NO.:

176U8475

REV.:

D

FRAME SIZE B2		
VOLTAGE	HP	KW
208/230	15-20	11-15
460/600	30-40	22-30

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