Facilities Development Division www.oshpd.ca.gov/fdd
400 R Street. Suite 200, Sacramento, California 95811-6213 Phone (916) 440-8300 Fax (916) 654-2973

APPLICATION FOR PREAPPROVAL

SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.

OSP – 0049-10

Check whether application is: NEW [ ] RENEWAL [X]

1.0

Emerson Network Power	Ron Spangler
Manufacturer	*Manufacturer's Technical Representative*

1050 Dearborn Drive, Columbus, OH 43085
Mailing Address

(614) 841-5940	Ron.Spangler@Emerson.com
Telephone	*E-mail Address*

2.0

Liebert CW Precision Cooling Unit	Airside HVAC for Computer Rooms
Product Name	*Product Type*

CW026 through CW181, Upflow and Downflow configurations with or without floor stands. (maximum floor stand height = 36 inches)
Product model No

General Description: Liebert CW series includes upflow and downflow configurations with STD and VFD centrifugal fan options, and EC fans. Humidifier is also optional. OSP is valid for units with internal seismic bracing equivalent to units tested. OSP is valid for installation **without** spring isolators only. The unit base shall be welded to the floor stands (with 1/8" neoprene pads) or to angle clips in accordance with manufacturer drawings. The floor stands or angle clips shall be bolted to building/structure.

3.0

Emerson Network Power	Ron Spangler
Applicant Company Name	*Contact Person*

1050 Dearborn Drive	Columbus, OH 43085

Mailing Address

(614) 841-5940	Ron.Spangler@Emerson.com
Telephone	*E-mail Address*

I hereby agree to reimburse the Office of Statewide Health Planning and Development for the actual costs incurred by the department for review, up to the prepayment amount of $5,000.

Ronald T Spangler	November15, 2010
Signature of Applicant	*Date*

Senior Product Manager	Emerson Network Power
Title	*Company Name*

Registered Design Professional Preparing the Report

4.0

Buehler and Buehler Structural Engineers, Inc
Company Name

Ali Sumer
Contact Name

72785 / Civil
California License Number

600 Q St. Suite 200, Sacramento, CA 95811
Mailing Address

(916) 443-0303
Telephone

asumer@bbse.com
E-mail Address

California Licensed Structural Engineer Review and Acceptance of the Report

5.0

Buehler and Buehler Structural Engineers, Inc
Company Name

Scott R. Hooker
Contact Name

3937 / Structural
California License Number

600 Q St. Suite 200, Sacramento, CA 95811
Mailing Address

(916) 443-0303
Telephone

shooker@bbse.com
E-mail Address

Anchorage Pre-Approval

6.0

☐ *Anchorage is pre-approved under OPA-*
(Separate application for anchorage pre-approval is required)

☒ Anchorage is not Pre-approved

Certification Method

70. ☒ *Testing in accordance with:* ☒ *ICC-ES AC-156* ☐ *Other (Please Specify):*

☐ *Analysis*

☐ *Experience data*

☐ *Combination of Testing, Analysis, and/or Experience Data (Please Specify):*

Testing Laboratory (if applicable)

8.0

Curtiss Wright Flow Control Company – (TRENTEC)
Clark Dynamic Test Laboratory – (CLARK)
Company Name

Marie S. Nemier (TRENTEC)
John R. Antenucci (CLARK)
Contact Name

4600 East Tech Drive, Cincinnati, Ohio 45245 *(TRENTEC)*
1801 Route 51, Jefforson Hills, Pennsylvania 15025 (CLARK)
Mailing Address

(513) 528-7900 (TRENTEC)
(412) 387-1001 (CLARK)
Telephone

mnemier@CURTISSWRIGHT.com
jrantenucci@clarkdynamic.com
E-mail:

Approval Parameters

9.0

Design in accordance with ASCE 7-05 Chapter 13: ☒ Yes ☐ No
Design Basis of Equipment or Components (F_p/W_p) = 1.5g

S_{DS} *(Spectral response acceleration at short period) =2.0g*

a_p *(In-structure equipment or component amplification factor) = 2.5*

R_p *(Equipment or component response modification factor) = 6.0*

I_p *(Importance factor) = 1.5*

z/h (Height factor ratio)=1

Equipment or Component fundamental period(s) =See attachment Table 1

Building period limits (if any) = N/A

Overall dimensions and weight (or range thereof) = See attachment Table 2, 3, and 4.

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15: ☐ Yes ☒ No
Design Basis of Equipment or Components (V/W) =

S_{DS} *(Spectral response acceleration at short period) =*

S_1 *(Spectral response acceleration at 1 second period) =*

R (Response modification coefficient)=1.0

Ω_0 *(System overstrength factor) =1.0*

C_d *(Deflection amplification factor) =1.0*

I_p *(Importance factor) =1.5*

Height to Center of Gravity above base =

Equipment or Component fundamental period(s) = Sec

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2007: ☐ Yes ☒ No

10.0 ***List of attachments supporting the special seismic certification of equipment or components:***

☒ *Test Report* ☒ *Drawings* ☒ *Manufacturer's Catalog*
☐ *Calculations* ☒ *Others (Please Specify): Operability test letters*

11.0 ***OSHPD Approval*** *(For Office Use Only)*

11/23/2010	**December 31, 2016**
Signature & Date	*Approval Expiration Date*
Chris Tokas, SHFR	S_{DS} (g) = **2.0** z/h = **1.0**
Name & Title	*Special Seismic Certification Valid Up to*

Condition of Approval (if any): **Approval is limited to units and components listed in attached Tables # 2, # 3, and # 4.**

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Network Power

Liebert CW

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structural engineers

Table 1. UUT Specimen Data

UUT	Specimen Model	Length (in)	Width (in)	Height (in)	Weight (lbs)	Excitation Direction	Frequency (Hz)	Mounted Configuration	Test Report
1	CW026DCS	50	36	72	760	F-B	6.6	Welded to the 12" floorstand. The floorstand is bolted to the table.	Trentec - Q0031.0 (Rev 1)
						S-S	11.4		
						V	None		
2	CW114DC1	122	36	76	2090	F-B	4.3	Welded to the 36" floorstand. The floorstand is bolted to the table.	
						S-S	5.9		
						V	12.9		
3	CW114UCS	122	36	76	1925	F-B	5.3	No floorstand. The unit is welded to an angle clip. The angle clip is bolted to the table. Top mounted 36" plenum.	
						S-S	3.7		
						V	None		
4	CW181DC1	122	47	94	2600	F-B	5.6	Welded to the 36" floorstand. The floorstand is welded to the table.	Clark Dynamic - EL:9375
						S-S	6.4		
						V	14.1		

* Unit dimensions include panels.

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Liebert CW Downflow Models

Table 2. Seismically Qualified Products

	Downflow Models									
	48"Wide x 33" Deep x 72" Tall [Frame only]			72"Wide x 33" Deep x 72" Tall		97"Wide x 33" Deep x 72" Tall		120"Wide x 33" Deep x 76" Tall		
	CW026	CW038	CW041	CW051	CW060	CW076	CW084	CW089	CW106	CW114
Test #	UUT # 1	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated
Weight - *lbs.*	760	795	855	1090	1115	1320	1420	1785	1785	1925
Configuration	Top Return	Top Return		Top Return		Top Return		Top Return		
		Cutdown		Cutdown		Cutdown		Cutdown		
Piping	3W SP	2W SP		2W SP		2W SP		2W SP		
		2W SP BV		2W SP BV		2W SP BV		2W SP BV		
		3W SP		3W SP		3W SP		3W SP		
		3W SP BV		3W SP BV		3W SP BV		3W SP BV		
		3W SP FS		3W SP FS		3W SP FS		3W SP FS		
		3W SP BVFS		3W SP BVFS		3W SP BVFS		3W SP BVFS		
		2W HP		2W HP		2W HP		2W HP		
		2W HP BV		2W HP BV		2W HP BV		2W HP BV		
		3W HP		3W HP		3W HP		3W HP		
		3W HP BV		3W HP BV		3W HP BV		3W HP BV		
		3W HP FS		3W HP FS		3W HP FS		3W HP FS		
		3W HP BV FS		3W HP BV FS		3W HP BV FS		3W HP BV FS		
Motor HP	5	≤5		≤7.5		≤10		≤15		
Blowers	Standard	Standard		Standard		Standard		Standard		
Humidifier	Infrared	Infrared		Infrared		Infrared		Infrared		
		None		None		None		None		
Reheat	Electric	Electric		Electric		Electric		Electric		
		None		None		None		None		

Ancilary

Plenum	None	20" thru 36" Tall	20" thru 36" Tall	20" thru 36" Tall	20" thru 36" Tall
Floorstand Non-Isolated	48"Wide x 33" Deep x 12" Tall	48"Wide x 33" Deep x 12" Tall thru 48" Tall	72" x 33" x 12" thru 48" Tall	97" x 33" x 12" thru 48" Tall	120" x 33" x 12" thru 48" Tall

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Liebert CW Upflow Models

BUEHLER & BUEHLER
structural engineers

Table 3. Seismically Qualified Products

	Upflow Models									
	48"Wide x 33" Deep x 72" Tall [Frame only]			72"Wide x 33" Deep x 72" Tall		97"Wide x 33" Deep x 72" Tall		120"Wide x 33" Deep x 76" Tall		
	CW026	CW038	CW041	CW051	CW060	CW076	CW084	CW089	CW106	CW114
Test #	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	UUT #3
Weight - *lbs.*	760	795	855	1090	1115	1320	1420	1785	1785	1925
Configuration	Front Return			Front Return		Front Return		Front Return		Front Return
	Rear Return			Rear Return		Rear Return		Rear Return		
	Cutdown			Cutdown		Cutdown		Cutdown		
Piping	2W SP			2W SP		2W SP		2W SP		3W SP
	2W SP BV			2W SP BV		2W SP BV		2W SP BV		
	3W SP			3W SP		3W SP		3W SP		
	3W SP BV			3W SP BV		3W SP BV		3W SP BV		
	3W SP FS			3W SP FS		3W SP FS		3W SP FS		
	3W SP BVFS			3W SP BVFS		3W SP BVFS		3W SP BVFS		
	2W HP			2W HP		2W HP		2W HP		
	2W HP BV			2W HP BV		2W HP BV		2W HP BV		
	3W HP			3W HP		3W HP		3W HP		
	3W HP BV			3W HP BV		3W HP BV		3W HP BV		
	3W HP FS			3W HP FS		3W HP FS		3W HP FS		
	3W HP BV FS			3W HP BV FS		3W HP BV FS		3W HP BV FS		
Motor HP	≤5			≤7.5		≤10		≤15		15
Blowers	Standard			Standard		Standard		Standard		Standard
Humidifier	Infrared			Infrared		Infrared		Infrared		Infrared
	None			None		None		None		
Reheat	Electric			Electric		Electric		Electric		Electric
	None			None		None		None		

Ancilary

Plenum	None	20" thru 36" Tall	20" thru 36" Tall	20" thru 36" Tall	20" thru 36" Tall	36" Tall
Floorstand Non-Isolated	48"Wide x 33" Deep x 12" Tall	48"Wide x 33" Deep x 12" Tall thru 48" Tall	72" x 33" x 12" thru 48" Tall	97" x 33" x 12" thru 48" Tall	120" x 33" x 12" thru 48" Tall	None

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Liebert CW Downflow EC Fan Models

Table 4. Seismically Qualified Products

	Downflow EC Models												
	48"Wide x 33" Deep x 72" Tall [Frame only]			72"Wide x 33" Deep x 72" Tall		97"Wide x 33" Deep x 72" Tall		120"Wide x 33" Deep x 76" Tall			120"Wide x 45" Deep x 94" Tall	
	CW026	CW038	CW041	CW051	CW060	CW076	CW084	CW089	CW106	CW114	CW146	CW181
Test #	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	Interpolated	UUT #2	Interpolated	UUT #4
Weight - *lbs.*	810	845	895	1140	1210	1390	1490	1950	1950	2090	2500	2600
Configuration	Top Return			Top Return		Top Return		Top Return		Top Return	Top Return	Top Return
	Cutdown			Cutdown		Cutdown		Cutdown			Cutdown	
Piping	2W SP			2W SP		2W SP		2W SP		3W SP	2W SP	3W SP
	2W SP BV			2W SP BV		2W SP BV		2W SP BV			2W SP BV	
	3W SP			3W SP		3W SP		3W SP			3W SP	
	3W SP BV			3W SP BV		3W SP BV		3W SP BV			3W SP BV	
	3W SP FS			3W SP FS		3W SP FS		3W SP FS			3W SP FS	
	3W SP BVFS			3W SP BVFS		3W SP BVFS		3W SP BVFS			3W SP BVFS	
	2W HP			2W HP		2W HP		2W HP			2W HP	
	2W HP BV			2W HP BV		2W HP BV		2W HP BV			2W HP BV	
	3W HP			3W HP		3W HP		3W HP			3W HP	
	3W HP BV			3W HP BV		3W HP BV		3W HP BV			3W HP BV	
	3W HP FS			3W HP FS		3W HP FS		3W HP FS			3W HP FS	
	3W HP BV FS			3W HP BV FS		3W HP BV FS		3W HP BV FS			3W HP BV FS	
Blowers	Standard EC			Standard EC		Standard EC		Standard EC		Standard EC	Standard EC	Standard EC
Humidifier	Infrared			Infrared		Infrared		Infrared		Infrared	Infrared	Infrared
	None			None		None		None			None	
Reheat	Electric			Electric		Electric		Electric		Electric	Electric	Electric
	None			None		None		None			None	

Ancilary

Plenum	20" thru 36" Tall	20" thru 36" Tall	20" thru 36" Tall	20" thru 36" Tall	None	None *	None *
Floorstand Non-Isolated	48"Wide x 33" Deep x 12" Tall thru 48" Tall	72" x 33" x 12" thru 48" Tall	97" x 33" x 12" thru 48" Tall	120" x 33" x 12" thru 48" Tall	120" x 33" x 36" Tall	97" x 45" x 12" thru 48" Tall	97" x 45" x 36" Tall

* An 18" filter plenum is part of the base unit on 120 x45 x94" models include

1.0 LIEBERT CW NOMENCLATURE

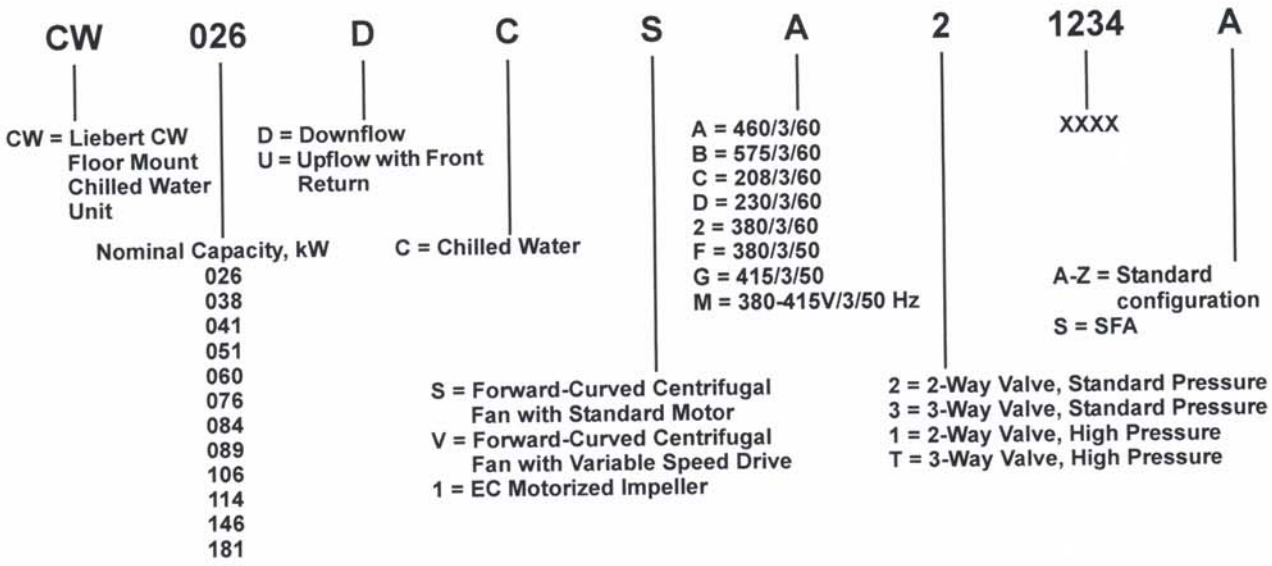

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Figure 1 CW181 Precision Cooling Unit Mounted on Tri-axial Table