APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0384

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Baltimore Aircoil Company, Inc.

Manufacturer's Technical Representative: Linfeng Chen, Principal Engineer

Mailing Address: 7600 Dorsey Run Rd., Jessup, MD, 20794

Telephone: 410-799-6481 Email: lchen@baltimoreaircoil.com

Product Information

Product Name: S1500 Open Cooling Tower

Product Type: Open Cooling Tower

Product Model Number: See attached
(List all unique product identification numbers and/or part numbers)

General Description: Evaporative cooling towers with upgraded seismic structural bracing. Seismic enhancements made to the test units required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigid and spring isolated base mount

Applicant Information

Applicant Company Name: The VMC Group

Contact Person: John Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: 973-838-1780 Email: john.giuliano@thevmcgroup.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant: _____ Date: 4/16/19

Title: President Company Name: The VMC Group

California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: The VMC Group

Name: Kenneth Tarlow California License Number: SE-2851

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: 973-838-1780 Email: ken.tarlow@thevmcgroup.com

Supports and Attachments Preapproval

☐ Supports and attachments are preapproved under OPM-
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)

☒ Supports and attachments are not preapproved

Certification Method

☒ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify):

Testing Laboratory

Company Name: Construction Engineering Research Laboratory (CERL)

Contact Name: James Wilcoski, Lab Manager

Mailing Address: 2902 Newmark Dr., Champaign, IL 61822

Telephone: 217-373-6763 Email: james.wilcoski@usace.army.mil

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 3.00 for rigid, 4.50 for isolated

S_{DS} (Design spectral response acceleration at short period, g) = 2.00

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

R_p (Equipment or component response modification factor) = 3.0 for rigid, 2.0 for isolated

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1

Equipment or Component Natural Frequencies (Hz) = See attachment

Overall dimensions and weight (or range thereof) = See attachment

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) =

S_{DS} (Design spectral response acceleration at short period, g) =

S_{D1} (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient) =

Ω_0 (System overstrength factor) =

C_d (Deflection amplification factor) =

I_p (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2015: ☐ Yes ☒ No

List of Attachments Supporting Special Seismic Certification

☐ Test Report(s) ☐ Drawings ☐ Calculations ☐ Manufacturer's Catalog

☐ Other(s) (Please Specify):

OSHPD Approval (For Office Use Only) – **Approval Expires on December 31, 2025**

Signature: Date: March 3, 2021

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to: S_{DS} (g) = 2.00 z/h = 1

Condition of Approval (if applicable):

Table 1: Certified Components

Base Model No.[1,2,3,4]	Nominal Tonnage[5]	No. of Fans	Motor HP/Fan	Total HP	Fan Diam. (in)	Shipping Weight[6] (lbs)	Operating Weight[6,7] (lbs)	Unit Length (in)	Unit Width (in)	Height to Fan Deck (in)	Certification Basis[8]
XES15E-0809-06DE	106	3	1.0	3.0	32	3,875	7,485	107.75	94.25	100.75	Tested - UUT A1,A2,A3,A4
XES15E-0809-06EE	120	3	1.5	4.5	32	3,875	7,485	107.75	94.25	100.75	Interpolated
XES15E-0809-06FE	134	3	2.0	6.0	32	3,935	7,545	107.75	94.25	100.75	
S15E-0809-06GE	152	3	3.0	9.0	32	4,025	7,635	107.75	94.25	100.75	
S15E-0809-06HE	181	3	5.0	15.0	32	4,055	7,665	107.75	94.25	100.75	
XES15E-0812-06DE	114	3	1.0	3.0	32	4,675	9,995	143.75	94.25	100.75	
XES15E-0812-06EE	131	3	1.5	4.5	32	4,675	9,995	143.75	94.25	100.75	
XES15E-0812-06FE	146	3	2.0	6.0	32	4,735	10,055	143.75	94.25	100.75	
S15E-0812-06GE	166	3	3.0	9.0	32	4,825	10,145	143.75	94.25	100.75	
S15E-0812-06HE	198	3	5.0	15.0	32	4,855	10,175	143.75	94.25	100.75	
S15E-0812-06JE	221	3	7.5	22.5	32	5,005	10,325	143.75	94.25	100.75	
XES15E-1012-06EE	136	2	1.5	3.0	54	5,420	11,300	143.75	118	100.75	
XES15E-1012-06FE	152	2	2.0	4.0	54	5,460	11,340	143.75	118	100.75	
XES15E-1012-06GE	172	2	3.0	6.0	54	5,520	11,400	143.75	118	100.75	
S15E-1012-06HE	211	2	5.0	10.0	54	5,540	11,420	143.75	118	100.75	
S15E-1012-06JE	234	2	7.5	15.0	54	5,640	11,520	143.75	118	100.75	
S15E-1012-06KE	261	2	10.0	20.0	54	5,670	11,550	143.75	118	100.75	
XES15E-1012-09EE	167	2	1.5	3.0	54	7,232	14,812	143.75	118	150.625	
XES15E-1012-09FE	186	2	2.0	4.0	54	7,272	14,852	143.75	118	150.625	
XES15E-1012-09GE	211	2	3.0	6.0	54	7,332	14,912	143.75	118	150.625	
XES15E-1012-09HE	259	2	5.0	10.0	54	7,352	14,932	143.75	118	150.625	
S15E-1012-09JE	287	2	7.5	15.0	54	7,452	15,032	143.75	118	150.625	
S15E-1012-09KE	320	2	10.0	20.0	54	7,482	15,062	143.75	118	150.625	
S15E-1012-09L1	340	2	15.0	30.0	54	7,732	15,312	143.75	118	150.625	
S15E-1012-09LE	361	2	15.0	30.0	54	7,732	15,312	143.75	118	150.625	
XES15E-1012-10EE	171	2	1.5	3.0	54	7,604	15,464	143.75	118	166.625	
XES15E-1012-10FE	191	2	2.0	4.0	54	7,644	15,504	143.75	118	166.625	
XES15E-1012-10GE	216	2	3.0	6.0	54	7,704	15,564	143.75	118	166.625	
XES15E-1012-10HE	266	2	5.0	10.0	54	7,724	15,584	143.75	118	166.625	
S15E-1012-10JE	295	2	7.5	15.0	54	7,824	15,684	143.75	118	166.625	
S15E-1012-10KE	328	2	10.0	20.0	54	7,854	15,714	143.75	118	166.625	
S15E-1012-10L1	350	2	15.0	30.0	54	8,104	15,964	143.75	118	166.625	
S15E-1012-10LE	374	2	15.0	30.0	54	8,104	15,964	143.75	118	166.625	
XES15E-1018-09EE	251	3	1.5	4.5	54	11,162	23,952	215.75	118	159	
XES15E-1018-09FE	280	3	2.0	6.0	54	11,222	24,012	215.75	118	159	
XES15E-1018-09GE	318	3	3.0	9.0	54	11,312	24,102	215.75	118	159	
XES15E-1018-09HE	390	3	5.0	15.0	54	11,342	24,132	215.75	118	159	
S15E-1018-09JE	433	3	7.5	22.5	54	11,492	24,282	215.75	118	159	
S15E-1018-09KE	481	3	10.0	30.0	54	11,532	24,322	215.75	118	159	
S15E-1018-09LE	543	3	15.0	45.0	54	11,912	24,702	215.75	118	159	
XES15E-1018-10EE	257	3	1.5	4.5	54	11,663	25,103	215.75	118	175	
XES15E-1018-10FE	287	3	2.0	6.0	54	11,723	25,163	215.75	118	175	
XES15E-1018-10GE	326	3	3.0	9.0	54	11,813	25,253	215.75	118	175	
XES15E-1018-10HE	401	3	5.0	15.0	54	11,843	25,283	215.75	118	175	
S15E-1018-10JE	444	3	7.5	22.5	54	11,993	25,433	215.75	118	175	
S15E-1018-10KE	494	3	10.0	30.0	54	12,033	25,473	215.75	118	175	
S15E-1018-10LE	563	3	15.0	45.0	54	12,413	25,853	215.75	118	175	
XES15E-1285-06EN	92	1	1.5	1.5	66	4,389	9,179	101.75	142	100.75	
XES15E-1285-06FN	101	1	2.0	2.0	66	4,409	9,199	101.75	142	100.75	
XES15E-1285-06GN	117	1	3.0	3.0	66	4,439	9,229	101.75	142	100.75	
XES15E-1285-06HN	138	1	5.0	5.0	66	4,449	9,239	101.75	142	100.75	
S15E-1285-06JN	158	1	7.5	7.5	66	4,499	9,289	101.75	142	100.75	
S15E-1285-06KN	173	1	10.0	10.0	66	4,509	9,299	101.75	142	100.75	
S15E-1285-06LN	198	1	15.0	15.0	66	4,639	9,429	101.75	142	100.75	
XES15E-1285-07EN	101	1	1.5	1.5	66	4,769	9,799	101.75	142	116.75	
XES15E-1285-07FN	111	1	2.0	2.0	66	4,789	9,819	101.75	142	116.75	
XES15E-1285-07GN	128	1	3.0	3.0	66	4,819	9,849	101.75	142	116.75	
XES15E-1285-07HN	150	1	5.0	5.0	66	4,829	9,859	101.75	142	116.75	
XES15E-1285-07JN	174	1	7.5	7.5	66	4,879	9,909	101.75	142	116.75	
S15E-1285-07KN	189	1	10.0	10.0	66	4,899	9,929	101.75	142	116.75	
S15E-1285-07LN	217	1	15.0	15.0	66	5,019	10,049	101.75	142	116.75	
S15E-1285-07MN	236	1	20.0	20.0	66	5,079	10,109	101.75	142	116.75	
XES15E-1285-09FN	131	1	2.0	2.0	74	6,119	12,109	101.75	142	150.625	
XES15E-1285-09GN	151	1	3.0	3.0	74	6,149	12,139	101.75	142	150.625	
XES15E-1285-09HN	178	1	5.0	5.0	74	6,159	12,149	101.75	142	150.625	
XES15E-1285-09JN	204	1	7.5	7.5	74	6,209	12,199	101.75	142	150.625	
S15E-1285-09KN	223	1	10.0	10.0	74	6,229	12,219	101.75	142	150.625	
S15E-1285-09LN	253	1	15.0	15.0	74	6,349	12,339	101.75	142	150.625	
S15E-1285-09MN	276	1	20.0	20.0	74	6,409	12,399	101.75	142	150.625	
XES15E-1285-10FN	137	1	2.0	2.0	74	6,429	12,899	101.75	142	166.625	
XES15E-1285-10GN	158	1	3.0	3.0	74	6,459	12,929	101.75	142	166.625	
XES15E-1285-10HN	186	1	5.0	5.0	74	6,469	12,939	101.75	142	166.625	
XES15E-1285-10JN	213	1	7.5	7.5	74	6,519	12,989	101.75	142	166.625	
XES15E-1285-10KN	233	1	10.0	10.0	74	6,539	13,009	101.75	142	166.625	
S15E-1285-10LN	264	1	15.0	15.0	74	6,659	13,129	101.75	142	166.625	

Table 1: Certified Components (continued)

Base Model No.[1,2,3,4]	Nominal Tonnage[5]	No. of Fans	Motor HP/Fan	Total HP	Fan Diam. (in)	Shipping Weight[6] (lbs)	Operating Weight[6,7] (lbs)	Unit Length (in)	Unit Width (in)	Height to Fan Deck (in)	Certification Basis[8]
S15E-1285-10MN	289	1	20.0	20.0	74	6,719	13,189	101.75	142	166.625	
S15E-1285-10NN	310	1	25.0	25.0	74	6,749	13,219	101.75	142	166.625	
XES15E-1212-07EE	166	2	1.5	3.0	66	6,346	14,196	143.75	142	116.75	
XES15E-1212-07FE	184	2	2.0	4.0	66	6,386	14,236	143.75	142	116.75	
XES15E-1212-07GE	208	2	3.0	6.0	66	6,446	14,296	143.75	142	116.75	
XES15E-1212-07HE	254	2	5.0	10.0	66	6,466	14,316	143.75	142	116.75	
S15E-1212-07JE	280	2	7.5	15.0	66	6,566	14,416	143.75	142	116.75	
S15E-1212-07KE	311	2	10.0	20.0	66	6,596	14,446	143.75	142	116.75	
S15E-1212-07L1	330	2	15.0	30.0	66	6,846	14,696	143.75	142	116.75	
XES15E-1212-09EE	193	2	1.5	3.0	66	8,353	17,063	143.75	142	150.625	
XES15E-1212-09FE	214	2	2.0	4.0	66	8,393	17,103	143.75	142	150.625	
XES15E-1212-09GE	241	2	3.0	6.0	66	8,453	17,163	143.75	142	150.625	
XES15E-1212-09HE	294	2	5.0	10.0	66	8,473	17,183	143.75	142	150.625	
S15E-1212-09JE	324	2	7.5	15.0	66	8,573	17,283	143.75	142	150.625	
S15E-1212-09KE	358	2	10.0	20.0	66	8,603	17,313	143.75	142	150.625	
S15E-1212-09L1	381	2	15.0	30.0	66	8,853	17,563	143.75	142	150.625	
S15E-1212-09LE	398	2	15.0	30.0	66	8,853	17,563	143.75	142	150.625	
XES15E-1212-10EE	202	2	1.5	3.0	66	8,758	17,818	143.75	142	166.625	
XES15E-1212-10FE	224	2	2.0	4.0	66	8,798	17,858	143.75	142	166.625	
XES15E-1212-10GE	253	2	3.0	6.0	66	8,858	17,918	143.75	142	166.625	
XES15E-1212-10HE	308	2	5.0	10.0	66	8,878	17,938	143.75	142	166.625	
XES15E-1212-10JE	340	2	7.5	15.0	66	8,978	18,038	143.75	142	166.625	
S15E-1212-10KE	376	2	10.0	20.0	66	9,008	18,068	143.75	142	166.625	
S15E-1212-10L1	400	2	15.0	30.0	66	9,258	18,318	143.75	142	166.625	
S15E-1212-10LE	418	2	15.0	30.0	66	9,258	18,318	143.75	142	166.625	
S15E-1212-10ME	460	2	20.0	40.0	66	9,378	18,438	143.75	142	166.625	
XES15E-1212-11EE	209	2	1.5	3.0	66	9,163	18,733	143.75	142	182.625	
XES15E-1212-11FE	232	2	2.0	4.0	66	9,203	18,773	143.75	142	182.625	
XES15E-1212-11GE	261	2	3.0	6.0	66	9,263	18,833	143.75	142	182.625	
XES15E-1212-11HE	318	2	5.0	10.0	66	9,283	18,853	143.75	142	182.625	
XES15E-1212-11JE	351	2	7.5	15.0	66	9,383	18,953	143.75	142	182.625	
S15E-1212-11KE	388	2	10.0	20.0	66	9,413	18,983	143.75	142	182.625	
S15E-1212-11LE	431	2	15.0	30.0	66	9,663	19,233	143.75	142	182.625	
S15E-1212-11ME	481	2	20.0	40.0	66	9,783	19,353	143.75	142	182.625	
XES15E-1212-12EE	216	2	1.5	3.0	66	9,613	19,183	143.75	142	198.625	
XES15E-1212-12FE	240	2	2.0	4.0	66	9,653	19,223	143.75	142	198.625	
XES15E-1212-12GE	271	2	3.0	6.0	66	9,713	19,283	143.75	142	198.625	
XES15E-1212-12HE	330	2	5.0	10.0	66	9,733	19,303	143.75	142	198.625	Interpolated
XES15E-1212-12JE	363	2	7.5	15.0	66	9,833	19,403	143.75	142	198.625	
S15E-1212-12KE	402	2	10.0	20.0	66	9,863	19,433	143.75	142	198.625	
S15E-1212-12LE	446	2	15.0	30.0	66	10,113	19,683	143.75	142	198.625	
S15E-1212-12ME	496	2	20.0	40.0	66	10,233	19,803	143.75	142	198.625	
XES15E-1218-07EE	250	3	1.5	4.5	66	9,686	23,476	215.75	142	125.125	
XES15E-1218-07FE	277	3	2.0	6.0	66	9,746	23,536	215.75	142	125.125	
XES15E-1218-07GE	313	3	3.0	9.0	66	9,836	23,626	215.75	142	125.125	
XES15E-1218-07HE	382	3	5.0	15.0	66	9,866	23,656	215.75	142	125.125	
S15E-1218-07JE	421	3	7.5	22.5	66	10,016	23,806	215.75	142	125.125	
S15E-1218-07KE	467	3	10.0	30.0	66	10,056	23,846	215.75	142	125.125	
S15E-1218-07L1	499	3	15.0	45.0	66	10,436	24,226	215.75	142	125.125	
XES15E-1218-09EE	289	3	1.5	4.5	66	12,469	27,559	215.75	142	159	
XES15E-1218-09FE	321	3	2.0	6.0	66	12,529	27,619	215.75	142	159	
XES15E-1218-09GE	362	3	3.0	9.0	66	12,619	27,709	215.75	142	159	
XES15E-1218-09HE	441	3	5.0	15.0	66	12,649	27,739	215.75	142	159	
S15E-1218-09JE	486	3	7.5	22.5	66	12,799	27,889	215.75	142	159	
S15E-1218-09KE	538	3	10.0	30.0	66	12,839	27,929	215.75	142	159	
S15E-1218-09L1	572	3	15.0	45.0	66	13,219	28,309	215.75	142	159	
S15E-1218-09LE	601	3	15.0	45.0	66	13,219	28,309	215.75	142	159	
XES15E-1218-10EE	302	3	1.5	4.5	66	13,037	28,917	215.75	142	175	
XES15E-1218-10FE	335	3	2.0	6.0	66	13,097	28,977	215.75	142	175	
XES15E-1218-10GE	378	3	3.0	9.0	66	13,187	29,067	215.75	142	175	
XES15E-1218-10HE	461	3	5.0	15.0	66	13,217	29,097	215.75	142	175	
XES15E-1218-10JE	508	3	7.5	22.5	66	13,367	29,247	215.75	142	175	
S15E-1218-10KE	562	3	10.0	30.0	66	13,407	29,287	215.75	142	175	
S15E-1218-10L1	597	3	15.0	45.0	66	13,787	29,667	215.75	142	175	
S15E-1218-10LE	624	3	15.0	45.0	66	13,787	29,667	215.75	142	175	
S15E-1218-10ME	695	3	20.0	60.0	66	13,967	29,847	215.75	142	175	
XES15E-1218-11EE	318	3	1.5	4.5	66	13,615	29,755	215.75	142	191	
XES15E-1218-11FE	349	3	2.0	6.0	66	13,675	29,815	215.75	142	191	
XES15E-1218-11GE	394	3	3.0	9.0	66	13,765	29,905	215.75	142	191	
XES15E-1218-11HE	480	3	5.0	15.0	66	13,795	29,935	215.75	142	191	
XES15E-1218-11JE	529	3	7.5	22.5	66	13,945	30,085	215.75	142	191	
S15E-1218-11KE	585	3	10.0	30.0	66	13,985	30,125	215.75	142	191	
S15E-1218-11L1	622	3	15.0	45.0	66	14,365	30,505	215.75	142	191	
S15E-1218-11LE	650	3	15.0	45.0	66	14,365	30,505	215.75	142	191	
S15E-1218-11ME	723	3	20.0	60.0	66	14,545	30,685	215.75	142	191	

Table 1: Certified Components (continued)

Base Model No.[1,2,3,4]	Nominal Tonnage[5]	No. of Fans	Motor HP/Fan	Total HP	Fan Diam. (in)	Shipping Weight[6] (lbs)	Operating Weight[6,7] (lbs)	Unit Length (in)	Unit Width (in)	Height to Fan Deck (in)	Certification Basis[8]
XES15E-1218-12EE	326	3	1.5	4.5	66	14,254	30,914	215.75	142	207	
XES15E-1218-12FE	361	3	2.0	6.0	66	14,314	30,974	215.75	142	207	
XES15E-1218-12GE	408	3	3.0	9.0	66	14,404	31,064	215.75	142	207	
XES15E-1218-12HE	497	3	5.0	15.0	66	14,434	31,094	215.75	142	207	
XES15E-1218-12JE	548	3	7.5	22.5	66	14,584	31,244	215.75	142	207	
S15E-1218-12KE	606	3	10.0	30.0	66	14,624	31,284	215.75	142	207	
S15E-1218-12L1	644	3	15.0	45.0	66	15,004	31,664	215.75	142	207	
S15E-1218-12LE	673	3	15.0	45.0	66	15,004	31,664	215.75	142	207	
S15E-1218-12ME	748	3	20.0	60.0	66	15,184	31,844	215.75	142	207	
XES15E-1212-07EN	167	2	1.5	3.0	66	6,346	14,196	143.75	142	116.75	
XES15E-1212-07FN	183	2	2.0	4.0	66	6,386	14,236	143.75	142	116.75	
XES15E-1212-07GC	197	2	3.0	6.0	66	6,446	14,296	143.75	142	116.75	
XES15E-1212-07GN	208	2	3.0	6.0	66	6,446	14,296	143.75	142	116.75	
XES15E-1212-07HC	226	2	5.0	10.0	66	6,466	14,316	143.75	142	116.75	
XES15E-1212-07HN	247	2	5.0	10.0	66	6,466	14,316	143.75	142	116.75	
S15E-1212-07JN	282	2	7.5	15.0	66	6,566	14,416	143.75	142	116.75	
S15E-1212-07KN	309	2	10.0	20.0	66	6,596	14,446	143.75	142	116.75	
S15E-1212-07LC	332	2	15.0	30.0	66	6,846	14,696	143.75	142	116.75	
XES15E-1212-09EN	195	2	1.5	3.0	66	8,353	17,063	143.75	142	150.625	
XES15E-1212-09FN	213	2	2.0	4.0	66	8,393	17,103	143.75	142	150.625	
XES15E-1212-09GC	229	2	3.0	6.0	66	8,453	17,163	143.75	142	150.625	
XES15E-1212-09GN	243	2	3.0	6.0	66	8,453	17,163	143.75	142	150.625	
XES15E-1212-09HC	263	2	5.0	10.0	66	8,473	17,183	143.75	142	150.625	
XES15E-1212-09HN	287	2	5.0	10.0	66	8,473	17,183	143.75	142	150.625	
S15E-1212-09JN	328	2	7.5	15.0	66	8,573	17,283	143.75	142	150.625	
S15E-1212-09KN	358	2	10.0	20.0	66	8,603	17,313	143.75	142	150.625	
S15E-1212-09LC	383	2	15.0	30.0	66	8,853	17,563	143.75	142	150.625	
S15E-1212-09LN	401	2	15.0	30.0	66	8,853	17,563	143.75	142	150.625	
XES15E-1212-10EN	204	2	1.5	3.0	66	8,758	17,818	143.75	142	166.625	
XES15E-1212-10FN	224	2	2.0	4.0	66	8,798	17,858	143.75	142	166.625	
XES15E-1212-10GC	241	2	3.0	6.0	66	8,858	17,918	143.75	142	166.625	
XES15E-1212-10GN	255	2	3.0	6.0	66	8,858	17,918	143.75	142	166.625	
XES15E-1212-10HC	276	2	5.0	10.0	66	8,878	17,938	143.75	142	166.625	
XES15E-1212-10HN	302	2	5.0	10.0	66	8,878	17,938	143.75	142	166.625	
XES15E-1212-10JN	344	2	7.5	15.0	66	8,978	18,038	143.75	142	166.625	
S15E-1212-10KN	376	2	10.0	20.0	66	9,008	18,068	143.75	142	166.625	
S15E-1212-10LC	402	2	15.0	30.0	66	9,258	18,318	143.75	142	166.625	
S15E-1212-10LN	421	2	15.0	30.0	66	9,258	18,318	143.75	142	166.625	Interpolated
S15E-1212-10MN	459	2	20.0	40.0	66	9,378	18,438	143.75	142	166.625	
XES15E-1212-11EN	211	2	1.5	3.0	66	9,163	18,733	143.75	142	182.625	
XES15E-1212-11FN	231	2	2.0	4.0	66	9,203	18,773	143.75	142	182.625	
XES15E-1212-11GC	248	2	3.0	6.0	66	9,263	18,833	143.75	142	182.625	
XES15E-1212-11GN	263	2	3.0	6.0	66	9,263	18,833	143.75	142	182.625	
XES15E-1212-11HC	285	2	5.0	10.0	66	9,283	18,853	143.75	142	182.625	
XES15E-1212-11HN	311	2	5.0	10.0	66	9,283	18,853	143.75	142	182.625	
XES15E-1212-11JN	355	2	7.5	15.0	66	9,383	18,953	143.75	142	182.625	
S15E-1212-11KN	387	2	10.0	20.0	66	9,413	18,983	143.75	142	182.625	
S15E-1212-11LC	414	2	15.0	30.0	66	9,663	19,233	143.75	142	182.625	
S15E-1212-11LN	434	2	15.0	30.0	66	9,663	19,233	143.75	142	182.625	
S15E-1212-11MN	478	2	20.0	40.0	66	9,783	19,353	143.75	142	182.625	
XES15E-1212-12EN	218	2	1.5	3.0	66	9,613	19,183	143.75	142	198.625	
XES15E-1212-12FN	239	2	2.0	4.0	66	9,653	19,223	143.75	142	198.625	
XES15E-1212-12GC	257	2	3.0	6.0	66	9,713	19,283	143.75	142	198.625	
XES15E-1212-12GN	272	2	3.0	6.0	66	9,713	19,283	143.75	142	198.625	
XES15E-1212-12HC	295	2	5.0	10.0	66	9,733	19,303	143.75	142	198.625	
XES15E-1212-12HN	323	2	5.0	10.0	66	9,733	19,303	143.75	142	198.625	
XES15E-1212-12JN	368	2	7.5	15.0	66	9,833	19,403	143.75	142	198.625	
S15E-1212-12KN	401	2	10.0	20.0	66	9,863	19,433	143.75	142	198.625	
S15E-1212-12LC	429	2	15.0	30.0	66	10,113	19,683	143.75	142	198.625	
S15E-1212-12LN	449	2	15.0	30.0	66	10,113	19,683	143.75	142	198.625	
S15E-1212-12MN	495	2	20.0	40.0	66	10,233	19,803	143.75	142	198.625	
XES15E-1218-07EN	252	3	1.5	4.5	66	9,686	23,476	215.75	142	125.125	
XES15E-1218-07FN	277	3	2.0	6.0	66	9,746	23,536	215.75	142	125.125	
XES15E-1218-07GN	318	3	3.0	9.0	66	9,836	23,626	215.75	142	125.125	
XES15E-1218-07HN	373	3	5.0	15.0	66	9,866	23,656	215.75	142	125.125	
S15E-1218-07JN	427	3	7.5	22.5	66	10,016	23,806	215.75	142	125.125	
S15E-1218-07KN	466	3	10.0	30.0	66	10,056	23,846	215.75	142	125.125	
S15E-1218-07LC	501	3	15.0	45.0	66	10,436	24,226	215.75	142	125.125	
XES15E-1218-09EN	291	3	1.5	4.5	66	12,469	27,559	215.75	142	159	
XES15E-1218-09FN	319	3	2.0	6.0	66	12,529	27,619	215.75	142	159	
XES15E-1218-09GN	366	3	3.0	9.0	66	12,619	27,709	215.75	142	159	
XES15E-1218-09HN	430	3	5.0	15.0	66	12,649	27,739	215.75	142	159	
S15E-1218-09JN	490	3	7.5	22.5	66	12,799	27,889	215.75	142	159	
S15E-1218-09KN	535	3	10.0	30.0	66	12,839	27,929	215.75	142	159	
S15E-1218-09LC	572	3	15.0	45.0	66	13,219	28,309	215.75	142	159	

Table 1: Certified Components (continued)

Base Model No.[1,2,3,4]	Nominal Tonnage[5]	No. of Fans	Motor HP/Fan	Total HP	Fan Diam. (in)	Shipping Weight[6] (lbs)	Operating Weight[6,7] (lbs)	Unit Length (in)	Unit Width (in)	Height to Fan Deck (in)	Certification Basis[8]
S15E-1218-09LN	606	3	15.0	45.0	66	13,219	28,309	215.75	142	159	
XES15E-1218-10EN	305	3	1.5	4.5	66	13,037	28,917	215.75	142	175	
XES15E-1218-10FN	335	3	2.0	6.0	66	13,097	28,977	215.75	142	175	
XES15E-1218-10GN	385	3	3.0	9.0	66	13,187	29,067	215.75	142	175	
XES15E-1218-10HN	451	3	5.0	15.0	66	13,217	29,097	215.75	142	175	
XES15E-1218-10JN	514	3	7.5	22.5	66	13,367	29,247	215.75	142	175	
S15E-1218-10KN	561	3	10.0	30.0	66	13,407	29,287	215.75	142	175	
S15E-1218-10LC	600	3	15.0	45.0	66	13,787	29,667	215.75	142	175	
S15E-1218-10LN	629	3	15.0	45.0	66	13,787	29,667	215.75	142	175	
S15E-1218-10MN	694	3	20.0	60.0	66	13,967	29,847	215.75	142	175	
XES15E-1218-11EN	318	3	1.5	4.5	66	13,615	29,755	215.75	142	191	
XES15E-1218-11FN	348	3	2.0	6.0	66	13,675	29,815	215.75	142	191	
XES15E-1218-11GN	401	3	3.0	9.0	66	13,765	29,905	215.75	142	191	
XES15E-1218-11HN	470	3	5.0	15.0	66	13,795	29,935	215.75	142	191	Interpolated
XES15E-1218-11JN	536	3	7.5	22.5	66	13,945	30,085	215.75	142	191	
S15E-1218-11KN	584	3	10.0	30.0	66	13,985	30,125	215.75	142	191	
S15E-1218-11LC	625	3	15.0	45.0	66	14,365	30,505	215.75	142	191	
S15E-1218-11LN	655	3	15.0	45.0	66	14,365	30,505	215.75	142	191	
S15E-1218-11MN	722	3	20.0	60.0	66	14,545	30,685	215.75	142	191	
XES15E-1218-12EN	329	3	1.5	4.5	66	14,254	30,914	215.75	142	207	
XES15E-1218-12FN	361	3	2.0	6.0	66	14,314	30,974	215.75	142	207	
XES15E-1218-12GN	415	3	3.0	9.0	66	14,404	31,064	215.75	142	207	
XES15E-1218-12HN	486	3	5.0	15.0	66	14,434	31,094	215.75	142	207	
XES15E-1218-12JN	555	3	7.5	22.5	66	14,584	31,244	215.75	142	207	
S15E-1218-12KN	605	3	10.0	30.0	66	14,624	31,284	215.75	142	207	
S15E-1218-12LC	647	3	15.0	45.0	66	15,004	31,664	215.75	142	207	
S15E-1218-12LN	678	3	15.0	45.0	66	15,004	31,664	215.75	142	207	
S15E-1218-12MN	747	3	20.0	60.0	66	15,184	31,844	215.75	142	207	Tested - UUT B1,B2

Notes:

1. Actual unit model number may include a suffix "-2" or "-3" designating the number of cells per unit (e.g., S15E-1212-07JE-3 for a three cell unit). Each cell of multi-cell units is a structurally independent cooling tower. All tabulated values are provided per cell.
2. Models listed are for standard fan option. Actual unit model number may include a suffix "/L" designating low sound fan option (e.g., S15E-1212-07JE/L) or a suffix "/W" designating whisper quiet fan option (e.g., S15E-1212-07JE-2/W).
3. Actual unit model number may include a suffix "/E" designating two sets of drift eliminators (e.g., S15E-1212-07JE/E).
4. Actual unit model number may include a suffix "/X" designating non-Cooling Technology Institute (CTI) certified (e.g., S15E-1212-07JE-3/X).
5. Nominal tonnage represents 3 USGPM of water from 95°F to 85°F at 78°F entering wet-bulb temperature.
6. Weights are base unit weights. Actual weights may include weight added for certified access options (see Table 9) and certified accessories (see Table 10).
7. Operating weights at overflow water level. UUT test weight at operating water level.
8. Cooling tower material of construction options (i.e., structural frame and basins) are listed in Table 3.

Table 2: Certified Materials of Construction (MOC)

Structural Frame and Basin MOC Option[1,2]	MOC of Structural Members	MOC of Hot Water Basin	MOC of Cold Water Basin	Certification Basis
Galvanized Steel	Galvanized Steel	Galvanized Steel	Galvanized Steel	Tested - UUT A1,A2,A3,A4
Galvanized Steel with Stainless Steel Cold Water Basin	Galvanized Steel	Galvanized Steel	Stainless Steel	Interpolated
Galvanized Steel with Stainless Steel Hot Water Basin and TriArmor® Cold Water Basin	Galvanized Steel	Stainless Steel	Galvanized Steel	
Galvanized Steel with TriArmor® Cold Water Basin	Galvanized Steel	Galvanized Steel	Galvanized Steel	
BALTIBOND® Construction	Galvanized Steel	Galvanized Steel	Galvanized Steel	
BALTIBOND® Construction with Stainless Steel Cold Water Basin	Galvanized Steel	Galvanized Steel	Stainless Steel	
Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Tested - UUT B1,B2

Notes:
1. BALTIBOND® and TriArmor® are coating systems. Base material is Galvanized Steel.
2. Structural frames and basins are manufactured by Baltimore Aircoil Company.

Table 3: Certified Water Inlet and Outlet Configurations

Water Inlet and Outlet Configuration Option	Inlet Location	Outlet Location	Certification Basis
Top Inlet - End Outlet - Pump Suction	Top	End	Tested - UUT A1,A2,A3,A4,B1,B2
Top Inlet - End Outlet - Remote Sump	Top	End	Interpolated
Top Inlet - Face C Outlet - Pump Suction	Top	Side	
Top Inlet - Face C Outlet - Remote Sump	Top	Side	
Top Inlet - Bottom Outlet - Pump Suction	Top	Bottom	
Top Inlet - Bottom Outlet - Remote Sump	Top	Bottom	Tested - UUT B1,B2

Notes:

1. Water inlet materials of construction match the MOC of the hot water basin. Water outlet materials of construction match the MOC of the cold water basin.
2. Water inlet and outlet connections are manufactured by Baltimore Aircoil Company.

Table 4: Certified Subcomponents - Equalizer and Bypass Configurations

Equalizer or Bypass Connection Option	Connection Location	Certification Basis
End Equalizer	End	Tested - UUT A1,A2,A3,A4
End Bypass	End	Interpolated
Bottom Equalizer	Bottom	
Bottom Bypass	Bottom	
Face C Equalizer	Side	
Face C Bypass	Side	Tested - UUT B1,B2

Notes:

1. Equalizer and bypass materials of construction match the MOC of the cold water basin.
2. Equalizer and bypass connections are manufactured by Baltimore Aircoil Company.

Table 5: Certified Subcomponents - Fan Motors

Model Number	Manufacturer	Material of Construction	Drive Type	HP	Voltage[1]	Approximate Weight (lbs)	Certification Basis
22QDD	Nidec	Cast Iron	Direct	1	200, 230, 230/460, 460	70	Tested - UUT A3,A4
22QED	Nidec	Cast Iron	Direct	1.5		100	Interpolated
22QFD	Nidec	Cast Iron	Direct	2		110	
22QGD	Nidec	Cast Iron	Direct	3		160	
22QHD	Nidec	Cast Iron	Direct	5		175	Tested - UUT A1,A2
22QDB	Nidec	Cast Iron	Belt	1		50	Extrapolated
22QEB	Nidec	Cast Iron	Belt	1.5		50	Extrapolated
22QFB	Nidec	Cast Iron	Belt	2		70	Tested - UUT B1,B2
22QGB	Nidec	Cast Iron	Belt	3		100	Interpolated
22QHB	Nidec	Cast Iron	Belt	5		110	
22QIB	Nidec	Cast Iron	Belt	7.5		160	
22QJB	Nidec	Cast Iron	Belt	10		175	
22QKB	Nidec	Cast Iron	Belt	15		300	
22QLB	Nidec	Cast Iron	Belt	20		360	
22QMB	Nidec	Cast Iron	Belt	25		390	Tested - UUT B1,B2
22FDD	WEG	Cast Iron	Direct	1		70	Tested - UUT A1,A2,A3,A4
22FED	WEG	Cast Iron	Direct	1.5		100	Interpolated
22FFD	WEG	Cast Iron	Direct	2		110	
22FGD	WEG	Cast Iron	Direct	3		160	
22FHD	WEG	Cast Iron	Direct	5		175	Tested - UUT A1,A2,A3,A4
22FDB	WEG	Cast Iron	Belt	1		50	Extrapolated
22FEB	WEG	Cast Iron	Belt	1.5		50	Tested - UUT B1,B2
22FFB	WEG	Cast Iron	Belt	2		70	Interpolated
22FGB	WEG	Cast Iron	Belt	3		100	
22FHB	WEG	Cast Iron	Belt	5		110	
22FIB	WEG	Cast Iron	Belt	7.5		160	
22FJB	WEG	Cast Iron	Belt	10		175	
22FKB	WEG	Cast Iron	Belt	15		300	
22FLB	WEG	Cast Iron	Belt	20		360	
22FMB	WEG	Cast Iron	Belt	25		390	Tested - UUT B1,B2

Note:

1. Tested motors were 230/460V dual voltage rated.

Table 6: Certified Subcomponents - Fans

Model Number	Manufacturer	Blade Material of Construction[1,2]	Diameter (in)	No. of Blades	Approximate Weight (lbs)	Certification Basis
32/5/FRP/M	Multi-Wing	Glass Fiber Reinforced Plastic	32	5	12	Tested - UUT A1,A2,A3,A4
54/6/FRP/M	Multi-Wing	Glass Fiber Reinforced Plastic	54	6	37	Interpolated
66/8/FRP/M	Multi-Wing	Glass Fiber Reinforced Plastic	66	8	59	Tested - UUT B1,B2
74/5/FRP/M	Multi-Wing	Glass Fiber Reinforced Plastic	74	5	99	Extrapolated
32/5/ALM/C	Cofimco	Aluminum	32	5	40	Tested - UUT A1,A2,A3,A4
54/7/ALM/C	Cofimco	Aluminum	54	7	90	Interpolated
66/8/ALM/C	Cofimco	Aluminum	66	8	99	Tested - UUT B1,B2
74/5/ALM/C	Cofimco	Aluminum	74	5	181	Extrapolated
32/3/FRP/H	Howden	Glass Fiber Reinforced Plastic	32	3	44	Tested - UUT A1,A2,A3,A4
54/3/FRP/H	Howden	Glass Fiber Reinforced Plastic	54	3	97	Interpolated
66/3/FRP/H	Howden	Glass Fiber Reinforced Plastic	66	3	115	Tested - UUT B1,B2
74/3/FRP/H	Howden	Glass Fiber Reinforced Plastic	74	3	154	Extrapolated

Note:

1. Fan cylinder (housing) material of construction matches the structural member material of construction (galvanized steel or stainless steel) from Table 3.

2. Standard fan guard material of construction is galvanized steel. Optional fan guard material of construction is stainless steel. Galvanized fan guards tested on UUT A. Stainless steel fan guards tested on UUT B.

Table 7: Certified Subcomponents - Electric Basin Heaters

Model Number	Manufacturer	Heater Element Material of Construction	kW	Voltage	Approximate Weight (lbs)	Certification Basis
6/460/3/60/15/C	Indeeco	Copper	6	460V	13	Tested - UUT A1,A2,A3,A4
8/460/3/60/19.5/C	Indeeco	Copper	8		14	Interpolated
10/460/3/60/24/C	Indeeco	Copper	10		15	
12/460/3/60/28.5/C	Indeeco	Copper	12		15	
14/460/3/60/38.25/C	Indeeco	Copper	14		16	
16/460/3/60/37.75/C	Indeeco	Copper	16		17	
18/460/3/60/41.75/C	Indeeco	Copper	18		17	
20/460/3/60/46/C	Indeeco	Copper	20		18	
24/460/3/60/56/C	Indeeco	Copper	24		18	Tested - UUT B1.B2

Table 8: Certified Subcomponents - Access Options

Access Option	Manufacturer	Material of Construction	Certification Basis
Internal Walkway	Baltimore Aircoil Company	Galvanized Steel	Tested - UUT A1,A2,A3,A4
Internal Walkway	Baltimore Aircoil Company	Stainless Steel	Tested - UUT B1,B2
Internal Service Platform with Guardrails, Ladder, and Safety Gate			
Platform Supports	Baltimore Aircoil Company	Galvanized Steel	
Platform Supports	Baltimore Aircoil Company	Stainless Steel	
Platform Grating	Creative Pultrusions	Glass Fiber Reinforced Plastic	
Guardrails	Baltimore Aircoil Company	Galvanized Steel	
Toeboards	Baltimore Aircoil Company	Galvanized Steel	
Toeboards	Baltimore Aircoil Company	Stainless Steel	
Ladder	Louisville Ladder	Aluminum	
Safety Gate	PS Doors	Galvanized Steel	
Louver Face Platform with Guardrails, Ladder, Safety Cage, and Safety Gate			
Platform Supports	Baltimore Aircoil Company	Galvanized Steel	
Platform Supports	Baltimore Aircoil Company	Stainless Steel	
Platform Grating	Creative Pultrusions	Glass Fiber Reinforced Plastic	
Guardrails	Baltimore Aircoil Company	Galvanized Steel	
Toeboards	Baltimore Aircoil Company	Galvanized Steel	
Toeboards	Baltimore Aircoil Company	Stainless Steel	
Ladder	Louisville Ladder	Aluminum	
Safety Cage	Baltimore Aircoil Company	Galvanized Steel	
Safety Gate	PS Doors	Galvanized Steel	
Hot Water Basin Platform with Guardrails, Ladder, Safety Cage, and Safety Gate			
Platform	Baltimore Aircoil Company	Galvanized Steel	
Platform	Baltimore Aircoil Company	Stainless Steel	
Guardrails	Baltimore Aircoil Company	Galvanized Steel	
Toeboards	Baltimore Aircoil Company	Galvanized Steel	
Toeboards	Baltimore Aircoil Company	Stainless Steel	
Ladder	Louisville Ladder	Aluminum	
Safety Cage	Baltimore Aircoil Company	Galvanized Steel	
Safety Gate	PS Doors	Galvanized Steel	

Access Option Details

Figure 1:

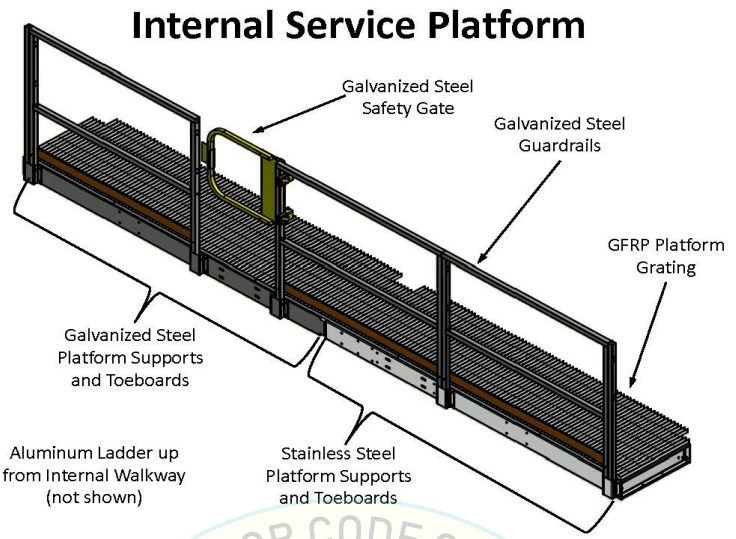


Figure 2:

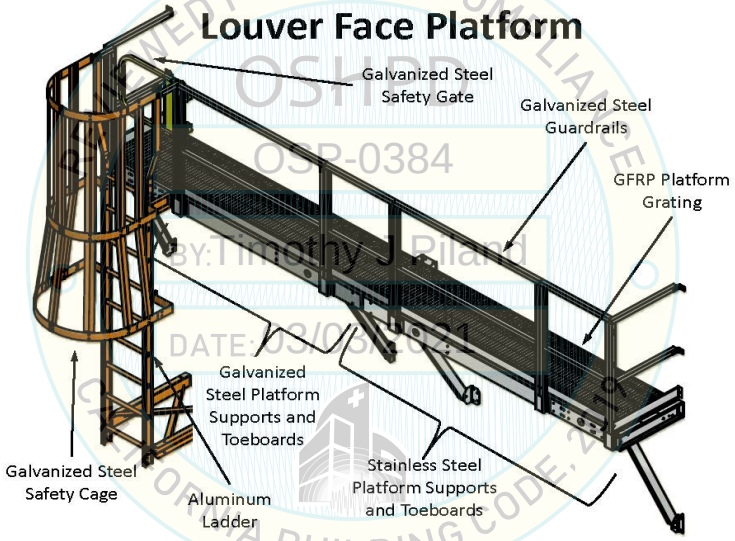


Figure 3:

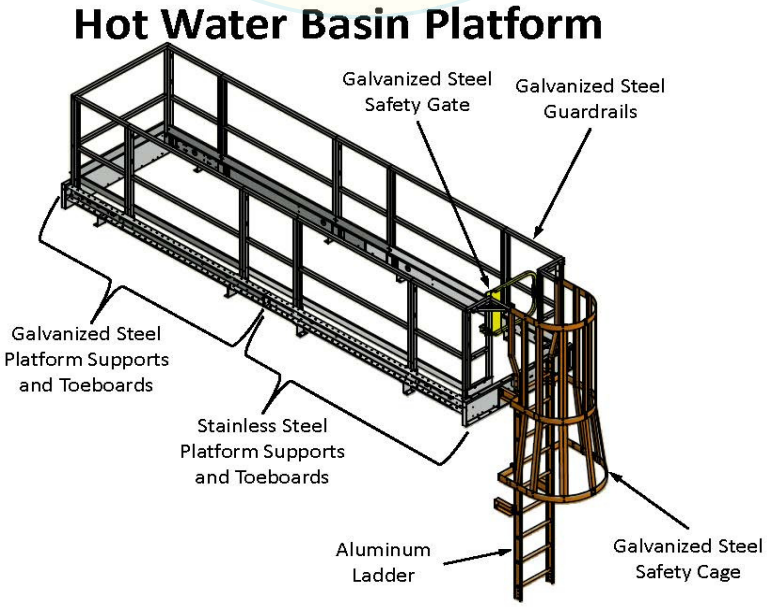


Table 9: Certified Subcomponents - Accessories

Accessory	Certification Basis
11 5/8" Fan Cylinder Extension[1]	Extrapolated
1'-11 1/4" Fan Cylinder Extension[1]	Tested - UUT A1,A2,A3,A4,B1,B2
Vibration Cutout Switches	Tested - UUT B1,B2
Mechanical Makeup[2]	Tested - UUT A1,A2,A3,A4
Electric Water Level Control (EWLC) with Solenoid Valve	
Penn F63 Float Switches	

Note:

1. Fan Cylinder Extension material of construction matches the structural member material of construction (galvanized steel or stainless steel) from Table 3.

2. Mechanical Makeup consists of large-diameter polystyrene-filled float, adjustable linkage, and make-up valve.

Table 10: Tested Units

Base Model No	Operating Weight (lbs)	Unit Length (in)	Unit Width (in)	Height to Fan Deck (in)	Mounting Configuration	Certification Basis
XES15E-0809-06DE	7,485	107.75	94.25	100.75	Rigid base	UUT A1
	7,485	107.75	94.25	100.75	Isolated base	UUT A2
	7,485	107.75	94.25	100.75	Isolated base	UUT A3
	7,485	107.75	94.25	100.75	Rigid base	UUT A4
XES15E-0809-06DE	31,844	215.75	142	207	Rigid base	UUT B1
	31,844	215.75	142	207	Isolated base	UUT B2

UUT A1

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Baltimore Aircoil Company

Product Line: S1500 Open Cooling Tower

Model Number: XES15E-0809-06DE

Product Construction Summary:

Galvanized Carbon Steel Frame

Options / Component Summary:

WEG 1.0HP, WEG 5.0HP, NIDEC 5.0HP motors with Howden, Multiwing, and Cofimco 32'' diameter fans

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

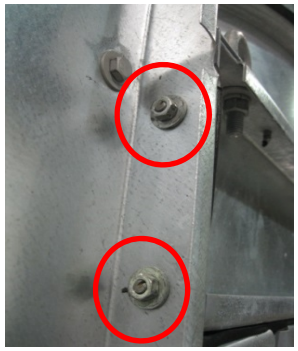
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
7,485	107.75	94.25	118.75	11.2	12.2	>33.3

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.40	0.56

Unit Mounting Description:



Bolt retrofit locations

UUT A1 was rigid base mounted to the shake table interface fixture with (6) 3/4'' diameter, grade 5, bolts. Bolts were spaced at approximately 50'' in length and 92'' in width on center.

UUT A2

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Baltimore Aircoil Company

Product Line: S1500 Open Cooling Tower

Model Number: XES15E-0809-06DE

Product Construction Summary:

Galvanized Carbon Steel Frame

Options / Component Summary:

WEG 1.0HP, WEG 5.0HP, NIDEC 5.0HP motors with Howden, Multiwing, and Cofimco 32'' diameter fans

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

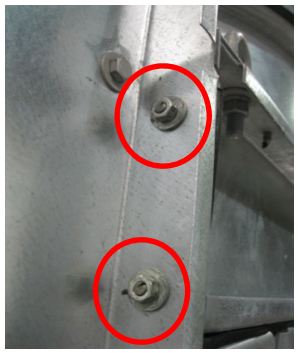
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
7,485	107.75	94.25	118.75	3.0	3.0	5.0

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:



Bolt retrofit locations

UUT A2 was base mounted to an interface fixture with (6) 3/4'' diameter, grade 5, bolts. Bolts were spaced at approximately 50'' in length and 92'' in width on center. The interface fixture was mounted on (4) Mason Industries SLFADA350-SLF-107 isolators.

UUT A3

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Baltimore Aircoil Company

Product Line: S1500 Open Cooling Tower

Model Number: XES15E-0809-06DE

Product Construction Summary:

Galvanized Carbon Steel Frame

Options / Component Summary:

NIDEC 1.0HP, WEG 5.0HP, NIDEC 5.0HP motors with Howden, Multiwing, and Cofimco 32'' diameter fans

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

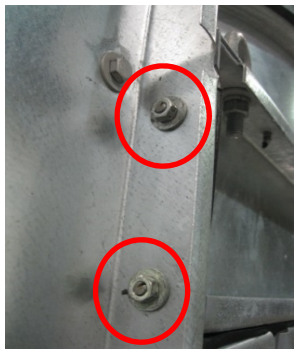
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
7,485	107.75	94.25	118.75	2.0	3.0	4.8

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:



Bolt retrofit locations

UUT A3 was base mounted to an interface fixture with (6) 3/4'' diameter, grade 5, bolts. Bolts were spaced at approximately 50'' in length and 92'' in width on center. The interface fixture was mounted on (4) Mason Industries SLFADA350-SLF-107 isolators.

UUT A4

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Baltimore Aircoil Company

Product Line: S1500 Open Cooling Tower

Model Number: XES15E-0809-06DE

Product Construction Summary:

Galvanized Carbon Steel Frame

Options / Component Summary:

NIDEC 1.0HP, WEG 5.0HP, NIDEC 5.0HP motors with Howden, Multiwing, and Cofimco 32'' diameter fans

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

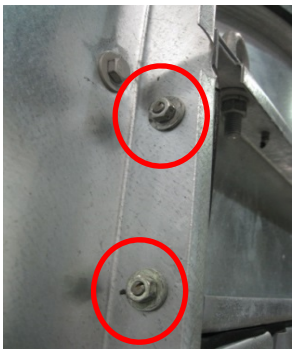
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
7,485	107.75	94.25	118.75	11.2	12.2	>33.3

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.40	0.56

Unit Mounting Description:



Bolt retrofit locations

UUT A1 was rigid base mounted to the shake table interface fixture with (6) 3/4'' diameter, grade 5, bolts. Bolts were spaced at approximately 50'' in length and 92'' in width on center.

UUT B1

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Baltimore Aircoil Company

Product Line: S1500 Open Cooling Tower

Model Number: S15E-1218-12MN

Product Construction Summary:

Stainless Steel Frame

Options / Component Summary:

WEG 1.5HP, NIDEC 2.0HP, WEG 25.0HP, NIDEC 25HP mtoros with Howden, Multiwing, and Cofimco 66'' diameter fans

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
31,844	215.75	142	233.25	4.0	4.5	22.2

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.40	0.56

Unit Mounting Description:

UUT B1 was rigid base mounted to the shake table interface fixture with (12) 3/4'' diameter, grade 5, bolts. Bolts were spaced at approximately 19'' in length and 140'' in width on center.

UUT B2

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Baltimore Aircoil Company

Product Line: S1500 Open Cooling Tower

Model Number: S15E-1218-12MN

Product Construction Summary:

Stainless Steel Frame

Options / Component Summary:

WEG 1.5HP, NIDEC 2.0HP, WEG 25.0HP, NIDEC 25HP mtoros with Howden, Multiwing, and Cofimco 66'' diameter fans

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
31,844	215.75	142	233.25	1.3	1.3	3.5

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:

UUT B1 was base mounted to an interface fixture with (12) 3/4'' diameter, grade 5, bolts. Bolts were spaced at approximately 19'' in length and 140'' in width on center. The interface fixture was mounted to (4) SLFADA600-SLF-109 on the corners and (2) SLFADA600-SLF-111 at the midpoint of the fixture.