



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

**APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

APPLICATION #: OSP – 0481 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Evapco

Manufacturer's Technical Representative: Scott Nevins

Mailing Address: 5151 Allendale Ln, Taneytown, MD 21787

Telephone: 410-756-2600 Email: snevins@evapco.com

Product Information

Product Name: AXS

Product Type: Cooling Towers

Product Model Number: See Attachment

(List all unique product identification numbers and/or part numbers)

General Description: Cross flow cooling tower constructed of galvanized or stainless steel with seismic
enhancements.

Mounting Description: Base mounted - rigid & isolated

Applicant Information

Applicant Company Name: TRU Compliance, LLC

Contact Person: Matthew Tobolski, PhD, SE

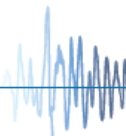
Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

Telephone: 844.878.0200 Email: mtobolski@trucompliance.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: 09/28/2016

Title: President Company Name: TRU Compliance, LLC





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION**

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

Company Name: TRU Compliance, LLC

Name: Matthew Tobolski, PhD, SE California License Number: S5648

Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

Telephone: 844.878.0200 Email: mtobolski@trucompliance.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): _____

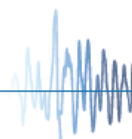
Testing Laboratory

Company Name: Lab1: Pacific Earthquake Engineering Research Center (PEER)
Lab2: ERDC-CERL

Contact Name: Lab1: Clement B. Barthes
Lab2: James Wilcoski

Mailing Address: Lab1: 1301 South 46th St., Bldg. 420, Richmond, CA 94804
Lab2: 2902 Newmark Drive, Champaign, IL 61822

Telephone: Lab1: (510) 642-3437 Lab1: peer_center@berkeley.edu
Lab2: (217) 373-6763 Email: Lab2: james.wilcoski@usace.army.mil





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Seismic Parameters

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

Design Basis of Equipment or Components (F_p/W_p) = 4.5

S_{DS} (Design spectral response acceleration at short period, g) = 2.0g @ z/h = 1; 3.2g @ z/h = 0

a_p (In-structure equipment or component amplification factor) = 2.5 (isolated mount); 2.5 (rigid mount)

R_p (Equipment or component response modification factor) = 2.0 (isolated mount); 3.0 (rigid mount)

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0; 0

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): Attachment A

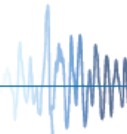
OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature:  Date: April 21, 2017

Print Name: Ali Sumer Title: DSE

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

Condition of Approval (if applicable): _____



SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 15050



Manufacturer: Evapco	TABLE 1.1
Model Line: AXS	

Certified Product Construction Summary:

Carbon or stainless steel enclosure and basin. Interior and exterior cross-bracing. Upgraded seismic construction. Integral sump or remote sump. Inlet: Top, Side, End, Bottom. Outlet: Side, End Bottom. Equalizer: Side, Bottom, None. Bypass: Side, Bottom, None
 Motor HP designator: G=5, H=7.5, I=10, J=15, K=20, L=25, M=30, N=40, O=50, P=60, Q=75, R=100, & S=125 hp

Certified Options Summary:

Access: Ext. service platform, Int. drive access platform; Int. walkway; Motor davit; Perimeter handrails; Ladder, Safety cage; Safety gates; **Fan :** Belt or Gear Drive; Cylinder extension $\leq 36"$; Vel. recovery stack; SS gear and motor mount; SS fan shaft; SS fan guard; Fan access door; **Non-Active Options:** Flume plate & cover; Air intake screens; Cold water basin end cover; Extn. oil fill and drain; Extn. oil sight glass; SS remote sump trash screen; SS Trash screens; Double drift eliminators; SS outlet strainer; Sump sweeper piping, Carbon, SS or PVC internal pipe

Mounting Configuration:

Base mounted - rigid & isolated

Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2016	Seismic Certification Limits:	$S_{DS} = 2.0g$	$z/h = 1.0$	$I_P = 1.5$
		$S_{DS} = 3.2g$	$z/h = 0.0$	

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
AXS	12-19I22	142	273	232	37,350		Extrap.
	12-19J22	142.0	273.0	232.0	37,450		Extrap.
	12-19K22	142.0	273.0	232.0	37,510		Extrap.
	12-19L22	142.0	273.0	232.0	37,540		Extrap.
	12-19M22	142.0	273.0	232.0	37,590		Extrap.
	12-19N22	142.0	273.0	232.0	37,780		Extrap.
	12-19O22	142.0	273.0	232.0	37,890		Extrap.
	12-19P22	142.0	273.0	232.0	38,120		Extrap.
	12-19Q22	142.0	273.0	232.0	38,230		Extrap.
AXS	12-22I22	142.0	273.0	270.9	39,770		Extrap.
	12-22J22	142.0	273.0	270.9	39,870		Extrap.
	12-22K22	142.0	273.0	270.9	39,930		Extrap.
	12-22L22	142.0	273.0	270.9	39,960		Extrap.
	12-22M22	142.0	273.0	270.9	40,010		Extrap.
	12-22N22	142.0	273.0	270.9	40,200		Extrap.
	12-22O22	142.0	273.0	270.9	40,310		Extrap.
	12-22P22	142.0	273.0	270.9	40,540		Extrap.
	12-22Q22	142.0	273.0	270.9	40,650		Extrap.
	12-22R22	142.0	273.0	270.9	41,790	UUT: Carbon steel	3

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 15050



Manufacturer: Evapco Model Line: AXS		Table Description: Fans			TABLE 1.2	
Building Code: CBC 2016		Seismic Certification Limits:			$S_{DS} = 2.0g \quad z/h = 1.0$ $S_{DS} = 3.2g \quad z/h = 0.0$	
					$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	Notes	UUT	
Fan	Cofimco	132D-5B-A-165	Alum., 132"-Dia., 5-Bld., App. 165lbs	Limited to $S_{DS}=1.69g @ z/h=1.0$ $S_{DS}=2.45g @ z/h=0.0$	7	
		132D-6B-A-190	Alum., 132"-Dia., 6-Bld., App. 190lbs		Interp.	
		132D-7B-A-210	Alum., 132"-Dia., 7-Bld., App. 210lbs		3	
		132D-6B-A-340	Alum., 132"-Dia., 6-Bld., App. 340lbs		Interp.	
		132D-7B-A-380	Alum., 132"-Dia., 7-Bld., App. 380lbs		Interp.	
		132D-8B-A-415	Alum., 132"-Dia., 8-Bld., App. 415lbs		Interp.	
		156D-5B-A-330	Alum., 156"-Dia., 5-Bld., App. 330lbs		Interp.	
		156D-6B-A-375	Alum., 156"-Dia., 6-Bld., App. 375lbs		Interp.	
		156D-7B-A-415	Alum., 156"-Dia., 7-Bld., App. 415lbs		Interp.	
		156D-8B-A-460	Alum., 156"-Dia., 8-Bld., App. 460lbs		6	
	Fan TR	132D-4B-F-575	FRP., 132"-Dia., 4-Bld., App. 575lbs	Extrap.		
		156D-4B-F-620	FRP., 156"-Dia., 4-Bld., App. 620lbs	Extrap.		
		132D-5B-F-720	FRP., 132"-Dia., 5-Bld., App. 720lbs	Extrap.		
		156D-5B-F-775	FRP., 156"-Dia., 5-Bld., App. 775lbs	5		

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 15050



Manufacturer: Evapco Model Line: AXS		Table Description: Motors			TABLE 1.3	
Building Code: CBC 2016		Seismic Certification Limits:			$S_{DS} = 2.0g \quad z/h = 1.0$ $S_{DS} = 3.2g \quad z/h = 0.0$	
					$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	Notes	UUT	
Motor	WEG	184T	5hp, 1800 rpm		Extrap.	
		213T/215T	5-10hp, 1200-1800 rpm		Extrap.	
		254T	7.5-15hp, 1200-1800 rpm		Extrap.	
		256T	10-20hp, 1200-1800 rpm		Extrap.	
		284T	15-25hp, 1200-1800 rpm	UUT: 25 HP	7	
		286T	20-30hp, 1200-1800 rpm		Interp.	
		324T	25-40hp, 1200-1800 rpm		Interp.	
		326T	30-50hp, 1200-1800 rpm		Interp.	
		364T/365T	40-75hp, 1200-1800 rpm	UUT: 60 HP	6	
		404T/405T	60-100hp, 1200-1800 rpm		Interp.	
	444T/445T	125hp, 1800 rpm	UUT: 125 HP	5		
	Nidec	404T/405T	60-100hp, 1200-1800 rpm	UUT: 100 HP	3	

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 15050



Manufacturer: Evapco		Table Description: Active Accessories			TABLE 1.4
Model Line: AXS					
Building Code: CBC 2016		Seismic Certification Limits:		$I_p = 1.5$	
		$S_{DS} = 2.0g \quad z/h = 1.0$			
		$S_{DS} = 3.2g \quad z/h = 0.0$			
Component Type	Manufacturer	Model	Description	Notes	UUT
Water Level Control	Gems Sensors ASCO	3 probe	ABS housing stainless; brass valve		5
		5 probe	ABS housing stainless; brass valve		5
Basin Heater	Chromalox	2 kW	Cu element, FRP enclosure		5
		20 kW	Cu element, FRP enclosure		5
Float Switch	M-Tech	Float Switch	Polypropylene		5
Vibration Switch	Metrix	5550	Cast aluminum case, mechanical		5
	Balmac	550	Cast aluminum case, electronic		5
Mechanical Makeup	Evapco	1" makeup	Brass valve, polystyrene float ball		5
		2" makeup	Brass valve, polystyrene float ball		5
Motor Space Heater	WEG	N/A-Motor Option	FRP, silicone rubber housing		5
Shaft Ground Ring	WEG	N/A-Motor Option	Aluminum		5
Gears	Amarillo	90 lb rating	Cast iron		Extrap.
		195 lb rating	Cast iron		Extrap.
		325 lb rating	Cast iron		Extrap.
		500 lb rating	Cast iron		6
		675 lb rating	Cast iron		Interp.
		825 lb rating	Cast iron		5
Zero RPM Duty	Amarillo	N/A-Gear Option	Zero RPM duty option		5,6

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 15050



UUT 3

Manufacturer: Evapco
Model Line: AXS
Model Number: AXS 12-22R22 (rigid)

Product Construction Summary:
 Carbon steel enclosure and basin. Exterior channel cross-bracing. Interior tube cross-bracing. Upgraded seismic construction. Integral sump. Inlet: Top. Outlet: Side. Equalizer: Side. Bypass: Side.

Options/Subcomponent Summary:
Fan: 132D-6B-A-335; **Drive:** Belt; **Motor:** 404T/405T 100HP (Nidec); **Non-Active Options:** None; **Active Options:** None

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
41,790	142	273	271	5.9	3.2	8.5

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _P	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2016	ICC-ES AC156	2.0g	1.0	1.5	3.20	2.40	2.14	0.86
		3.2g	0.0	1.5				

Test Mounting Details:



Unit-to-Unit Fixture: (16) 5/8" A325 bolts; For rigid base mounting, the isolators are locked through blocking at fixtures. Unit maintained structural integrity and remained functional per manufacturer requirement. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 15050



Manufacturer: Evapco
Model Line: AXS
Model Number: AXS 14-22S24

UUT 5

Product Construction Summary:
Stainless steel enclosure and basin. Exterior channel cross-bracing. Interior tube cross-bracing. Upgraded seismic construction. Integral sump. Inlet: Bottom. Outlet: Bottom. Pipe: 1/2 Carbon steel, 1/2 Stainless steel. Equalizer: Bottom. Bypass: Bottom.

Options/Subcomponent Summary:
Fan: 156D-5B-F-740; 36" cylinder extension; SS gear and motor mount; SS fan shaft; SS fan guard; Mechanical vibration switch; Electronic vibration switch; **Drive:** Gear; 825 lb rating; **Motor:** 444T/445T 125 HP (WEG); Shaft grounding; **Access:** Int. drive access platform; Int. walkway; Motor davit; Perimeter handrails; Ladder; Safety cage; Safety gate; **Non-Active Options:** Flume plate & cover; Air intake screens; Cold water basin end cover; Extnd. oil fill and drain; Extnd. oil sight glass; SS remote sump trash screens; SS trash screens; Double drift eliminators; SS outlet strainer; Sump sweeper piping; **Active Options:** Water level control; Basin heater; Float switch; Mechanical makeup; Fan motor space heater

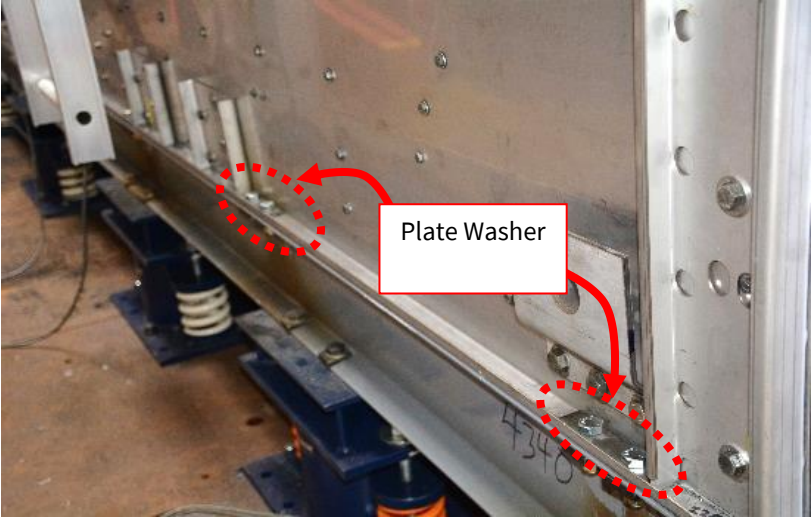
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
52,200	167	297	307	1.9	3.3	3.1

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _P	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2016	ICC-ES AC156	2.0g	1.0	1.5	3.20	2.40	2.14	0.86
		3.2g	0.0	1.5				

Test Mounting Details:



Unit-to-Unit Fixture: (24) 5/8" diameter ASTM Grade 5 bolts. **Unit Fixture-to-Isolators:** (2) 3/4" diameter ASTM Grade 5 bolts (20 total). **Isolators:** (4) Mason SLFADA-600-2-109 at corners, (6) Mason SLFADA-600-2-111 (evenly spaced-3 per side); **Isolators-to-Table:** (2) 3/4" ASTM Grade 8 bolts (20 total). Unit maintained structural integrity and remained functional per manufacturer requirement. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 15050



UUT 6

Manufacturer: Evapco
Model Line: AXS
Model Number: 14X Fan Module

Product Construction Summary:
Carbon steel enclosure. Exterior channel cross-bracing.

Options/Subcomponent Summary:
Fan: 156D-8B-A-460; **Drive:** Gear; 500 lb rating; **Motor:** 364T/365T 60 HP (WEG)

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6,000	167	181	62	6.7	12.2	3.6

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2016	ICC-ES AC156	1.69g	1.0	1.5	2.70	2.03	1.64	0.66
		2.45g	0.0	1.5				

Test Mounting Details:



Unit-to-Unit Fixture: (36) 3/8" ASTM Grade 5 bolts. **Unit Fixture-to-Isolators:** (2) 3/4" diameter ASTM Grade 8 bolts (8 total). **Isolators:** (4) Mason SLFADA-600-2-109; **Isolators-to-Table:** (2) 3/4" ASTM Grade 8 bolts (8 total). Unit maintained structural integrity and remained functional per manufacturer requirement. Contents were included in testing per operating conditions. Seismic level shown is the equivalent seismic level at base of unit (motions applied to fan section are amplified)

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 15050



UUT 7

Manufacturer: Evapco
Model Line: AXS
Model Number: 12X Fan Module

Product Construction Summary:
 Carbon steel enclosure. Exterior channel cross-bracing.

Options/Subcomponent Summary:
Fan: 132D-5B-A-165; Velocity Recovery Stack; **Drive:** Belt; **Motor:** 284T 25 HP (WEG)

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6,000	142	157	62	10.0	8.1	5.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _P	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2016	ICC-ES AC156	2.0g	1.0	1.5	3.20	2.40	2.14	0.86
		3.2g	0.0	1.5				

Test Mounting Details:



Flexible Unit Fixture

Isolator

Unit-to-Unit Fixture: (34) 3/8" ASTM Grade 5 bolts. **Unit Fixture-to-Isolators:** (2) 3/4" diameter ASTM Grade 8 bolts (8 total). **Isolators:** (4) Mason SLFADA-600-2-109; **Isolators-to-Table:** (2) 3/4" ASTM Grade 8 bolts (8 total). Unit maintained structural integrity and remained functional per manufacturer requirement. Contents were included in testing per operating conditions. Seismic level shown is the equivalent seismic level at base of unit (motions applied to fan section are amplified)