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 – 0195-10

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

1.0

Twin City Fan Companies, Ltd.	Jason Emiliusen
Manufacturer	*Manufacturer's Technical Representative*
5959 Trenton Lane North	Minneapolis, MN 55442-3237
Mailing Address	
763-551-7614	jemiliusen@tcf.com
Telephone	*E-mail Address*

2.0

BCV, BCVU5, BCVU2, BCVSH, BAV, BCJ, BCJU5 and BCJU2	Utility Centrifugal Ventilating Fans
Product Name	*Product Type*

See Attachment # 2.

Product model No (List all unique product identification numbers and/or serial numbers)

General Description: Utility Centrifugal Ventilating Fans base mounted with spring isolators & snubbers. See Attachment # 2 for full description.

3.0

Twin City Fan Companies, Ltd.	*Jason Emiliusen*
Applicant Company Name	*Contact Person*
5959 Trenton Lane North	*Minneapolis, MN 55442-3237*
Mailing Address	
763-551-7614	jemiliusen@tcf.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.

Jason Emiliusen	May 26, 2011
Signature of Applicant	*Date*
Commercial Products Manager	Twin City Fan Companies, Ltd.
Title	*Company Name*

Registered Design Professional Preparing the Report

4.0

Rice Engineering	
Company Name	
Bradley J. Kuehl	66394
Contact Name	*California License Number*
105 School Creek Trail	Luxemburg, WI 54217
Mailing Address	
920-845-1042	*bradkuehl@rice-inc.com*
Telephone	*E-mail Address*

California Licensed Structural Engineer Review and Acceptance of the Report

5.0

Arches Engineering, LLC	
Company Name	
Ruth Miller	S4657
Contact Name	*California License Number*
P.O. Box 3852	Grand Junction, CO 81502
Mailing Address	
970-255-6788	ruth@archesengineering.com
Telephone	*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

Environ Laboratories	*Kent L. Erickson*
Company Name	*Contact Name*
9725 Girard Avenue South	Minneapolis, MN 55431
Mailing Address	
952-888-7795	*kle@environlab.com*
Telephone	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) = 4.32g

S_{DS} (Spectral response acceleration at short period) =1.92g

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

R_p (Equipment or component response modification factor) =2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio)=1.0

Equipment or Component fundamental period(s) =See Attachment #1.

Building period limits (if any) =N/A

Overall dimensions and weight (or range thereof) =See Attachment #2.

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):*

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

8/10/2011	**December 31, 2016**
Signature & Date	*Approval Expiration Date*
M. R. Karim, SHFR	S_{DS} (g) = **1.92** z/h = **1.0**
Name & Title	*Special Seismic Certification Valid Up to*

Condition of Approval (if any):

Attachment 1 - UUT Summary

Fans & Blowers Twin City	Utility Centrifugal Ventilating Sets	UUT 1

UUT Product Data

Manufacturer	Serial Number	Model	Size	Overall Dimensions (in)			Weight (lb)	Construction	Accessories/Subcomponent Summary
				Length	Width	Height			
Twin City Fan	11-020750-5-1	BCVSH	365	60.50	70.06	73.63	1716	Steel Wheel, Steel Housing, Belt Driven, Arrangement 10, Horizontal Shaft Rotation Axis	Bolted Access Door, Drain, Inlet Flange, Outlet Flange, Inlet Screen, Outlet Screen, Weather Cover, High Temperature Package, Extended Lube Lines, Mounted Disconnect Switch, Carbon Steel Painted Finish, UL Smoke & Heat

UUT Test Data

Building Code	Test Criteria	Lowest Natural Frequency (Hz)			S_{DS}	z/h	I_p	Horizontal		Vertical	
		F-B	S-S	V				A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
~~IBC 2009~~ CBC 2010	ICC-ES AC 156	2.4	10.5	10.1	1.92	1.0	1.5	~~3.98 g~~ 3.67 g	~~2.99 g~~ 2.59 g	~~2.66 g~~ 1.28 g	~~0.67 g~~ 0.52 g

Test Mounting Details

Mounted on spring isolators with snubbers manufactured by the VMC Group

Fans & Blowers Twin City

Utility Centrifugal Ventilating Sets

UUT 2

UUT Product Data

Manufacturer	Serial Number	Model	Size	Overall Dimensions (in)			Weight (lb)	Construction	Accessories/Subcomponent Summary
				Length	Width	Height			
Twin City Fan	11-020750-4-1	BAV	365	60.50	70.06	73.63	1644	Steel Wheel, Steel Housing, Belt Driven, Arrangement 10, Horizontal Shaft Rotation Axis	Hinged Access Door, Drain with Plug, Inlet Flange, Outlet Flange, Inlet Screen, Backdraft Damper, Weather Cover, High Temperature Package, Extended Lube Lines, Mounted Disconnect Switch, Carbon Steel Painted Finish

UUT Test Data

Building Code	Test Criteria	Lowest Natural Frequency (Hz)			S_{DS}	z/h	I_P	Horizontal		Vertical	
		F-B	S-S	V				A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
~~IBC 2009~~ CBC 2010	ICC-ES AC 156	3.5	3.8	9.3	1.92	1.0	1.5	~~3.98 g~~ 3.07g	~~2.99 g~~ 2.33g	~~2.68 g~~ 1.29g	~~0.67 g~~ 0.53g

Test Mounting Details

Mounted on spring isolators with snubbers manufactured by the VMC Group

Fans & Blowers
Twin City

Utility Centrifugal Ventilating Sets

UUT 3

UUT Product Data

Manufacturer	Serial Number	Model	Size	Overall Dimensions (in)			Weight (lb)	Construction	Accessories/Subcomponent Summary
				Length	Width	Height			
Twin City Fan	11-020750-2-1	BCV	365	60.50	70.06	73.63	1644	Steel Wheel, Steel Housing, Belt Driven, Arrangement 10, Horizontal Shaft Rotation Axis	Hinged Access Door, Drain with Plug, Inlet Flange, Outlet Flange, Inlet Screen, Backdraft Damper, Weather Cover, High Temperature Package, Extended Lube Lines, Mounted Disconnect Switch, Carbon Steel Painted Finish, UL 762

UUT Test Data

Building Code	Test Criteria	Lowest Natural Frequency (Hz)			S_{DS}	z/h	I_p	Horizontal		Vertical	
		F-B	S-S	V				A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
~~IBC 2009~~	ICC-ES AC 156	2.4	4.8	9.4	1.92	1.0	1.5	~~3.98 g~~ 3.079	~~2.99 g~~ 2.39	~~2.66 g~~ 1.249	~~0.67 g~~ 0.529

Test Mounting Details

Mounted on spring isolators with snubbers manufactured by the VMC Group

Attachment 1 - UUT Summary

Fans & Blowers Twin City	Utility Centrifugal Ventilating Sets	UUT 4

UUT Product Data

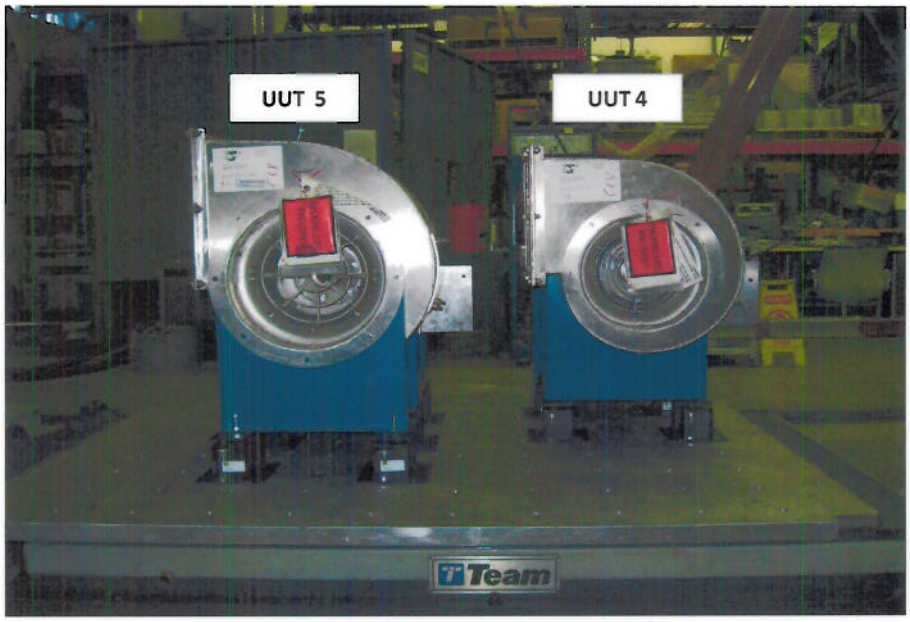
Manufacturer	Serial Number	Model	Size	Overall Dimensions (in)			Weight (lb)	Construction	Accessories/Subcomponent Summary
				Length	Width	Height			
Twin City Fan	11-020750-1-1	BCJ 090	90	18.56	26.44	26.63	67	Aluminum Wheel, Aluminum Housing, Belt Driven, Arrangement 10, Horizontal Shaft Rotation Axis	Bolted Access Door, Drain, Inlet Flange, Outlet Flange, Inlet Screen, Outlet Screen, Belt Guard, Spark Resistant Construction, Extended Lube Lines, Mounted Disconnect Switch, UL 705

UUT Test Data

Building Code	Test Criteria	Lowest Natural Frequency (Hz)			S_{DS}	z/h	I_p	Horizontal		Vertical	
		F-B	S-S	V				A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
~~IBC 2009~~ 2012 IBC	ICC-ES AC 156	4.1	3.7	7.9	1.92	1.0	1.5	~~3.98 g~~ 3.879	~~2.99 g~~ 2.329	~~2.06 g~~ 1.289	~~0.87 g~~ 0.529

Test Mounting Details

Mounted on spring isolators with snubbers manufactured by the VMC Group



Attachment 1 - UUT Summary

Fans & Blowers Twin City	Utility Centrifugal Ventilating Sets	UUT 5

UUT Product Data

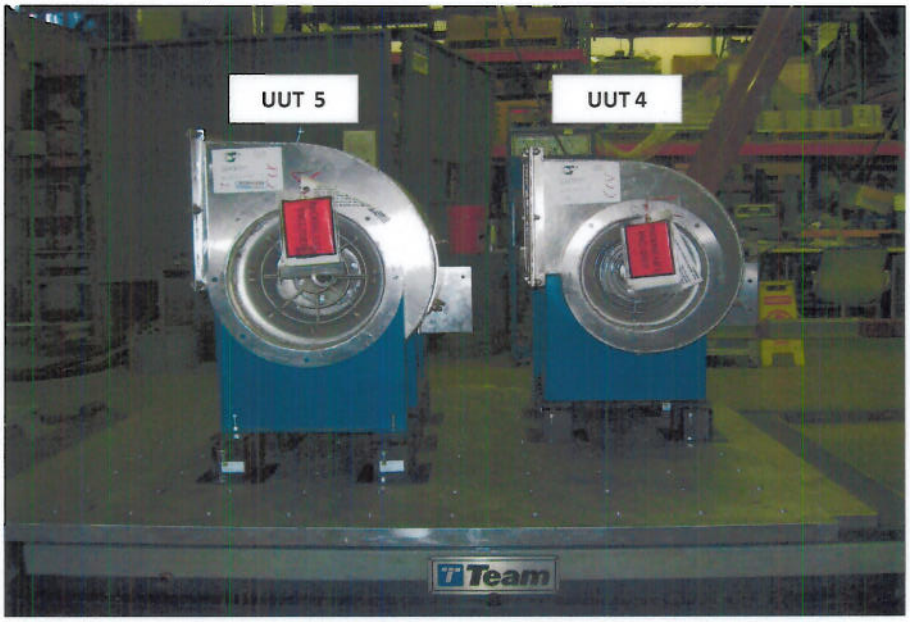
Manufacturer	Serial Number	Model	Size	Overall Dimensions (in)			Weight (lb)	Construction	Accessories/Subcomponent Summary
				Length	Width	Height			
Twin City Fan	11-020750-3-1	BAV	122	20.34	28.19	28.44	142	Aluminum Wheel, Aluminum Housing, Belt Driven, Arrangement 10, Horizontal Shaft Rotation Axis	Bolted Access Door, Drain, Inlet Flange, Outlet Flange, Inlet Screen, Outlet Screen, Belt Guard, Extended Lube Lines, Mounted Disconnect Switch

UUT Test Data

Building Code	Test Criteria	Lowest Natural Frequency (Hz)			S_{DS}	z/h	I_P	Horizontal		Vertical	
		F-B	S-S	V				A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
~~IBC 2009~~ CBC 2010	ICC-ES AC 156	5.7	5.6	15.5	1.92	1.0	1.5	~~3.98 g~~ 3.87 g	~~2.99 g~~ 2.32 g	~~2.66 g~~ 1.28 g	~~0.67 g~~ 0.52 g

Test Mounting Details

Mounted on spring isolators with snubbers manufactured by the VMC Group



Attachment 2A - Seismically Qualified Products

Fans & Blowers
Twin City

Utility Centrifugal Ventilating Sets - Twin City Fan										
Manufacturer	Approved Model	Size	Max Dimensions (in)			Max Weight* (lb)	Testing Scope	Mounting	Construction	Accessories/Subcomponent Summary
			Length	Width	Height					
Twin City Fan	BCJ/BCJU5/BCJU2	90	18.56	26.44	26.63	113	UUT 4	Spring Isolators with Snubbers	Steel/Aluminum Wheels Steel/Aluminum Housings Belt Driven Arrangement 10 Horizontal Shaft Rotation Axis	Bolted/Hinged Access Door Standard Drain/Drain with Plug Inlet/Outlet Flange Inlet/Outlet Screen Weather Cover Belt Guard Gravity/Motorized Damper High Temperature Package Extended Lube Lines Mounted Disconnect Switch Carbon Steel Painted Finish UL Smoke & Heat UL 762 UL 705
		105	18.56	26.44	26.63	134	Interpolated			
	BCV/BCVU5/BCVU2	122	20.31	33.94	31.57	335				
		135	22.38	37.56	34.38	395				
		150	24.82	39.19	36.19	429				
		165	27.26	40.44	37.76	476				
		182	30.19	47.69	42.44	599				
		200	33.12	49.06	45.13	690				
		222	36.75	50.82	50.25	733				
		245	40.50	52.56	55.13	855				
		270	44.63	57.38	60.56	1056				
		300	49.56	59.94	60.75	1260				
		330	54.63	66.32	66.56	1588				
		365	60.50	69.06	73.63	1834	UUT 3			
	BAV	122	20.31	33.94	31.57	335	UUT 5			
		135	22.38	37.56	34.38	395	Interpolated			
		150	24.82	39.19	36.19	429				
		165	27.26	40.44	37.76	476				
		182	30.19	47.69	42.44	599				
		200	33.12	49.06	45.13	690				
		222	36.75	50.82	50.25	733				
		245	40.50	52.56	55.13	855				
		270	44.63	57.38	60.56	1056				
		300	49.56	59.94	60.75	1260				
		330	54.63	66.32	66.56	1588				
		365	60.50	69.06	73.63	1834	UUT 2			
	BCVSH	122	20.31	33.94	31.57	335	Interpolated			
		135	22.38	37.56	34.38	399				
		150	24.82	39.19	36.19	432				
		165	27.26	40.44	37.76	477				
		182	30.19	47.69	42.44	608				
		200	33.12	49.06	45.13	699				
		222	36.75	50.82	50.25	740				
		245	40.50	52.56	55.13	864				
		270	44.63	57.38	60.56	1071				
		300	49.56	59.94	60.75	1273				
		330	54.63	66.32	66.56	1610				
		365	60.50	69.06	73.63	1854	UUT 1			

*Max Weight Includes largest motor and accessories

Attachment 2B - Seismically Qualified Products

Utility Centrifugal Ventilating Sets - Aerovent Branded											
Manufacturer	Approved Model	Size	Max Dimensions (in)			Max Weight* (lb)	Twin City Fan Model	Twin City Fan Size	Mounting	Construction	Accessories/Subcomponent Summary
			Length	Width	Height						
Aerovent	BIUJ/BIUJU5/BIUBU2	90	18.56	26.44	26.63	113	BCJ/BCJU5/BCJU2	90	Spring Isolators with Snubbers	Steel/Aluminum Wheels Steel/Aluminum Housings Belt Driven Arrangement 10 Horizontal Shaft Rotation Axis	Bolted/Hinged Access Door Standard Drain/Drain with Plug Inlet/Outlet Flange Inlet/Outlet Screen Weather Cover Belt Guard Gravity/Motorized Damper High Temperature Package Extended Lube Lines Mounted Disconnect Switch Carbon Steel Painted Finish UL Smoke & Heat UL 762 UL 705
		105	18.56	26.44	26.63	134		105			
	BIUB/BIUBU5/BIUBU2	122	20.31	33.94	31.57	335	BCV/BCVU5/BCVU2	122			
		135	22.38	37.56	34.38	395		135			
		150	24.82	39.19	36.19	429		150			
		165	27.26	40.44	37.76	476		165			
		182	30.19	47.69	42.44	599		182			
		200	33.12	49.06	45.13	690		200			
		222	36.75	50.82	50.25	733		222			
		245	40.50	52.56	55.13	855		245			
		270	44.63	57.38	60.56	1056		270			
		300	49.56	59.94	60.75	1260		300			
		330	54.63	66.32	66.56	1588		330			
		365	60.50	69.06	73.63	1834		365			
	CBASW	122	20.31	33.94	31.57	335	BAV	122			
		135	22.38	37.56	34.38	395		135			
		150	24.82	39.19	36.19	429		150			
		165	27.26	40.44	37.76	476		165			
		182	30.19	47.69	42.44	599		182			
		200	33.12	49.06	45.13	690		200			
		222	36.75	50.82	50.25	733		222			
		245	40.50	52.56	55.13	855		245			
		270	44.63	57.38	60.56	1056		270			
		300	49.56	59.94	60.75	1260		300			
		330	54.63	66.32	66.56	1588		330			
		365	60.50	69.06	73.63	1834		365			
	BIUBSH	122	20.31	33.94	31.57	335	BCVSH	122			
		135	22.38	37.56	34.38	399		135			
		150	24.82	39.19	36.19	432		150			
		165	27.26	40.44	37.76	477		165			
		182	30.19	47.69	42.44	608		182			
		200	33.12	49.06	45.13	699		200			
		222	36.75	50.82	50.25	740		222			
		245	40.50	52.56	55.13	864		245			
		270	44.63	57.38	60.56	1071		270			
		300	49.56	59.94	60.75	1273		300			
		330	54.63	66.32	66.56	1610		330			
		365	60.50	69.06	73.63	1854		365			

*Max Weight Includes largest motor and accessories