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 – 0223-10

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

1.0

Greenheck Fan Corporation	Brian Mleziva
Manufacturer	*Manufacturer's Technical Representative*

1100 Greenheck Drive, Schofield, WI 54476
Mailing Address

(715) 841-8712	Brian.Mleziva@greenheck.com
Telephone	*E-mail Address*

2.0

QEI, QEID, and VK-H	Mixed Flow and Lab Exhaust Fans
Product Name	*Product Type*

Various product lines are included in this listing: See Certified Product Matrix
Product model No (List all unique product identification numbers and/or serial numbers)

General Description: Air handling fans including mixed flow and centrifugal, inline and rooftop, supply and exhaust fans. All modifications made to the tested units before and during the tests and modifications required to address the anomalies observed during the tests shall be incorporated into the certified units.

3.0

Greenheck Fan Corporation	Tim Kuski
Applicant Company Name	*Contact Person*

1100 Greenheck Drive, Schofield, WI 54476
Mailing Address

715-355-2232	Tim.Kuski@Greenheck.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.

Signature of Applicant	11/01/11
Signature of Applicant	*Date*
General Manager, CVI	Greenheck Fan Corporation
Title	*Company Name*

Registered Design Professional Preparing the Report

4.0

ANCO Engineers, Inc.
Company Name

John C. Stoessel | C 37259
Contact Name | *California License Number*

1965-A 33rd St., Boulder, CO 80301
Mailing Address

(818) 591-9001 | john@ancoengineers.com
Telephone | *E-mail Address*

California Licensed Structural Engineer Review and Acceptance of the Report

5.0

Tobolski Watkins Engineering Inc.
Company Name

Derrick Watkins | S 5257
Contact Name | *California License Number*

3170 Ruffin Road, San Diego, CA 92123
Mailing Address

(858) 381-5843 | dwatkins@tobolskiwatkins.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

ANCO Engineers, Inc. | Paul Ibanez
Company Name | *Contact Name*

1965-A 33rd Street, Boulder, CO 80301
Mailing Address

(303)443-7580 x239 | paul@ancoengineers.com
Telephone | E-mail:

9.0 ***Approval Parameters***

Design in accordance with ASCE 7-05 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = **5.1 (Iso. Floor), 1.7 (Rigid Curb), 4.1(Hung Iso.)**

S_{DS} (Spectral response acceleration at short period) = **2.28g**

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

R_p (Equipment or component response modification factor) = **2.0 (Iso. Floor), 6.0 (Rigid Curb), 2.5 (Hung Iso.)**

I_p (Importance factor) = **1.5**

z/h (Height factor ratio)= **1.0**

Equipment or Component fundamental period(s) = **See UUT Specification and Data Sheets**

Building period limits (if any) = none

Overall dimensions and weight (or range thereof) =**See Certified Product Matrix**

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):* Certified and Tested Unit Descriptions

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

4/24/2012	**December 31, 2016**
Signature & Date	*Approval Expiration Date*
M. R. Karim, SHFR	S_{DS} (g) = **2.28** z/h = **1.0**
Name & Title	*Special Seismic Certification Valid Up to*

Condition of Approval (if any):

Special Seismic Certification Certified Product Matrix

Inline Mixed Flow Fans For Special Seismic Certification									
Model	**Fan Arrangement**	**Testing Scope**	**Mounting**	**Options/Accessories**	**Level/Construction**	**Length***	**Width***	**Height***	**Weight***
QEI-9	9	Interpolated	Horizontal Discharge Base Mounted on Vibration Isolators with Motor in Positions A, C, G (for Arrangement 9) and Direct Drive (Arrangement 4) Suspended From Spring Isolators with Motor in Positions E, C, and G (for Arrangement 9) and Direct Drive (Arrangement 4)	UL-762, UL-705 HT-UL, Spark B & C Resistance Construction, Sure-Aire, Motor Cover, Mounting Rails, Access Door, Inlet Flange, Outlet Flange, Inlet & Outlet Companion Flanges, Belt Tube, Belt Guard, Inlet Guard, Outlet Guard, Copper Lube Lines, Extended Life Bearings	Belt & Direct Drive, Class I & II, Steel, Spark B & C Resistant Construction Steel and Aluminum Wheel, Steel Housing	28.5	34.7	40.25	180
QEI-12	9	UUT #9, #6				30.13	34.7	40.25	190
QEID-12	4	UUT#7				25	18.63	22.88	110
QEI-15	Arr. 4 & 9 (Direct and Belt Driven)	Interpolated				31	39.2	47.63	220
QEID-15						25	21.25	26.13	140
QEI-16						34	41.2	50.25	250
QEID-16						26	23.75	28.5	170
QEI-18						39.5	44.2	55.13	320
QEID-18						29	25.38	30.63	200
QEI-20						41.5	46.2	57.25	370
QEID-20						34	27.13	32.75	250
QEI-22						44	49.2	59.88	430
QEID-22						35.5	29.38	35.38	370
QEI-24						49	53.2	66.5	550
QEID-24						41.5	32.63	40.13	480
QEI-27						53	56.2	69.5	680
QEID-27						45	35.13	43	570
QEI-30						60.5	68.5	77.5	1100
QEID-30						50	45.63	47.88	860
QEI-33						64.5	71.5	81.5	1200
QEID-33						54	49.75	51.88	1140
QEI-36						69	76.5	87	1500
QEID-36						58	54.5	57.38	1360
QEI-40						75.5	88.9	96	2000
QEID-40						61	60.75	63.38	1650
QEI-44						80.5	95.6	104	2400
QEID-44						70	66.63	69.38	2190
QEI-49						86.5	101.6	111.5	3100
QEID-49						80.5	72.88	75.5	2700
QEI-54						93.5	109.6	121.75	3700
QEID-54	4	UUT #10				83	81.13	83.63	3130
QEI-60	9	UUT #5, #8				102.4	117.6	126.5	4200

Note: Weight is less motor and accessories. Size depends on motor size and location.

Rooftop Lab Exhaust Fans for Special Seismic Certification									
Model	Fan Arrangement	Testing Scope	Mounting	Options/Accessories	Level/Construction	Depth*	Max Width* W/ 3X1 plenum	Height*	Weight* W/ 3X1 plenum
VK-H 9	9	UUT 4	Vertical Upblast Fan Rigid Base Mounted on Roof Curb Bypass Air Plenum Configurations 1x1 2x1 3x1	UL/cUL-705, UL-762, Fan Outlet Nozzle, Attenuating Outlet Nozzle, Access Door, Motor Cover, Bearing Cover, Stack Extension, Sure-Aire, Bypass Air Plenum, Isolation Damper, Bypass Damper, Bypass Damper Weatherhood, Bypass Damper Attenuating Weatherhood, Damper Actuators, Disconnect Switches, Roof Curb	Belt drive Class II Arrangement 9 Spark B Resistance Construction Aluminum Wheel Steel Housing	39	75.38	146	954
VK-H 10		Interpolated				39	75.38	146	954
VK-H 12						39	75.38	146	954
VK-H 13						42	81.38	146.5	1052
VK-H 16						47	93.38	146.5	1217
VK-H 18		UUT 3				53	111.38	146	1517
VK-H 22		Interpolated				60	129.38	145.25	1865
VK-H 24						68	147.38	146	2268
VK-H 30						74	165.38	155.5	2719
VK-H 36		UUT 1 & 2				82	183.38	167	3336

Note: Weight is less motor and accessories. Size depends on motor size and location.

Greenheck Model Line	Motor Manufacturer	Weight (lbs)	HP	Voltage	Drive	Comment	UUT
Mixed Flow (QEI & QEID)	WEG	13	1/3	110V-575V	any	Smallest	
		...					
		1302	100	208/230/460	Belt	Largest	5,8
	Baldor	20	1/3	110V-575V	any	Smallest	
		89	7.5	208/230/460	Belt	Largest on Small Fan	6,9
		99	5	208/230/460	Direct	Largest on Small Fan	7
		...					
		1350	100	110V-575V	any	Largest	
	Marathon Electric	14	1/3	110V-575V	any	Smallest	
		...					
		1400	100	460V	Direct	Largest	10
Lab Exhaust (Vektor-H)	WEG	20	.75	110V-575V	…	Smallest	
		...					
		499	20	208/230/460	Belt	Largest	1 & 2
	Baldor	23	.75	110V-575V	Belt	Smallest	
		57	2	208/230/460	Belt	Largest on Small Fan	4
		...					
		492	20	208/230/460	Belt	Largest	1
	Marathon Electric	20	.75	110V-575V	Belt	Smallest	
		123	5	208/230/460	Belt	Largest on Small Fan	3
		...					
		500	20	230/460	Belt	Largest	1

All motors are available in voltages ranging from 110V to 575V based upon customer request.

UUT Specification and Data Sheets

Item	Unit #	Max Depth (X) [in]	Max Width (Y) [in]	Max Height (Z) [in][a]	Item Weight [lbs]	CG [in][b]	Mounting
Vektor-H Lab Exhaust Fans							
1	VK-H-36-A200-X-3x1	184	87	145.5	6038	91.42324 37.94056 61.70495	Curb Mount
2	VK-H-36-X1	58.25	106	145	2321	28.8 43.15 65.35	Curb Mount
3	VK-H-18-A50-UL762-1x1	38.5	48.25	124.5	667	16.9 21.2 36.3	Curb Mount
4	VK-H-9-M20-X-1x1	27	32.5	123.5	363	11.4 14.8 29.6	Curb Mount
Mixed Flow Inline Ventilation Fans							
5	QEI-60-II-1000-HTUL	106	117.5	101	5678	53.76233 53.62883 53.45892	Spring isolated direct
6	QEI-12-I-75-G	30.5	20.25	36.25	250	14.375 10 23.75	suspended spring iso
7	QEID-12-50-M50-X	31.25	20.25	22.25	199	13.25 10.125 13.325	suspended spring iso
8	QEI-60-II-1000-HTUL	106	117.5	101	5678	53.76233 53.62883 53.45892	suspended spring iso
9	QEI-12-I-75-G	30.5	20.25	36.25	250	14.375 10 23.75	spring isolated direct
10	QEID-54-75-C1000	86.5	82	80	4350	37.95888 40.47299 37.19003	spring isolated direct

a) Curb height not included

b) 1st line = depth, 2nd line = width, 3rd line = height

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UUT # 1

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Vektor-H Lab Exhaust Fans
Model Number:	VK-H-36-A200-X-3x1
Product Construction Summary:	Three VK-H-36-A200-X fans with standard nozzle cones mounted on a VK-H-36-A200-X-3x1 bypass air plenum which was then mounted on a 3 piece VKCURB-56.63/182.44-S24 Curb mounted on a W8x15 steel I-beam base. Aluminum wheel, Steel Housing, Arrangement 9.
Options/ Subcomponent Summary:	Each fan had a Fan Outlet Nozzle, Access Door, motor cover, bearing cover, 3X1 bypass air plenum, disconnect switch, Spark B BISW wheel, isolation damper (controlled), isolation damper actuator, Bypass damper (controlled), bypass damper actuator, drain connection, weatherhood (2 full size and one just for the actuator), and 2 of the 3 fans had a bypass air damper in the weatherhood. Fan 1: Baldor, 20Hp, 460/230/208V; Fan 2: Marathon, 20Hp, 460/230V; Fan 3: WEG, 20Hp, 460/230/208V. Belt Drive. UL Listing: **UL/cUL-705**

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6038	184	87	145.5	Fan 1; 7.1, Fan 2; 7.1, Fan.3; 7.1	Fan 1; 7.9, Fan 2; 7.8, Fan.3; 7.8	Fan 1; 15.0, Fan 2; 15.6, Fan.3; 15.3

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:

The unit was anchored using fasteners centered on the 5" curb flange with 7.5" center to center between screws. 5/16"-24 Dril-Flex Self Drilling/Tapping Screws with 3/16" Min. thread engagement into A36 steel with 5/8" min. edge distance were used.

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UUT # 2

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Vektor-H Lab Exhaust Fans
Model Number:	VK-H-36-A200-X-1x1
Product Construction Summary:	One VK-H-36-A200-X fan with attenuating nozzle cone mounted on a VK-H-36-X1 bypass air plenum which was then mounted on a GPFHL57-G12 Curb mounted on a W8x15 steel I-beam base. Aluminum Wheel, Steel Housing, Arrangement 9
Options/ Subcomponent Summary:	UL/cUL-705, Attenuating Outlet Nozzle, Access Door, Motor Cover, Bearing cover, 1x1 Bypass Air Plenum, drain connection, Bypass Damper Attenuating Weatherhood, Disconnect Switches, 12" Roof Curb, Motor: WEG, 20Hp, 460/230/208V. Belt Drive.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
2321	58.25	106	145	4.0	5.0	14.4

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:

The unit was anchored using fasteners centered on the 5" curb flange with 7.5" center to center between screws. 5/16"-24 Dril-Flex Self Drilling/Tapping Screws with 3/16" Min. thread engagement into A36 steel with 5/8" min. edge distance were used.

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UUT # 3

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Vektor-H Lab Exhaust Fans
Model Number:	VK-H-18-A50-UL762-1x1
Product Construction Summary:	One VK-H-18-A50-UL762-1x1 fan with standard nozzle cone mounted on a bypass air plenum which was then mounted on a GPFHLV33-G18 Curb mounted to wood decking on the shake table. Aluminum wheel, steel housing, Arrangement 9.
Options/ Subcomponent Summary:	UL-762, Fan Outlet Nozzle, Access Door, Motor Cover, Bearing Cover, Stack Extension, 1x1 Bypass Air Plenum, drain connection, Disconnect Switches, 18" Roof Curb (Vented), Motor: Marathon Electric, 5Hp, 460/230/208V. Belt Drive.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
667	38.5	48.25	124.5	5.0	4.0	15.0

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:

The unit was anchored using eight 3/8" wood lag screws per side through the curb flange into 4x4 backing lumber.

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UUT # 4

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Vektor-H Lab Exhaust Fans
Model Number:	VK-H-9-M20-X-1x1
Product Construction Summary:	One VK-H-9-M20-X fan with standard nozzle cone mounted on a GPFHL21-G12 Curb mounted to wood decking on the shake table. Aluminum wheel, steel housing, Arrangement 9.
Options/ Subcomponent Summary:	UL/cUL-705, Fan Outlet Nozzle, Access Door, Motor Cover, Bearing cover, drain connection, Stack Extension, Sure-Aire, Isolation Damper (Gravity), Disconnect Switch, 12" Roof Curb, Motor: Baldor, 2Hp, 460/230/208V. Belt Drive.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
363	27	32.5	123.5	4.1	4.1	11.1

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:

The unit was anchored using four 3/8" wood lag screws per side through the curb flange into 4x4 backing lumber.

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UUT # 5

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Mixed Flow Inline Ventilation Fans
Model Number:	QEI-60-II-1000-HTUL
Product Construction Summary:	Belt drive Mixed Flow Inline fan base mounted on a structural base on seismic spring isolators with motor in Position G. Steel wheel, steel housing, Arrangement 9.
Options/ Subcomponent Summary:	HT-UL, Bolted Access Door, Extended Life Bearings L(10)-200K, Belt Tube, Motor Cover, Structural Base, Inlet Guard, Outlet Guard, Seismic Flange Welds, Motor: WEG, 100Hp, 460/230/208V. Belt Drive.

UUT Properties

Weight (lb)	**Dimensions (in)**			**Lowest Natural Frequency (Hz)**		
	Depth	**Width**	**Height**	**Front-Back**	**Side-Side**	**Vertical**
5678	106	117.5	101	2.6	3.2	6.9

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 2010	ICC-ES AC-156	2.28	1.0	1.5	4.76	3.58	3.17	2.36

Test Mounting Details:

The unit was anchored to four VMC MSH-1E-2000 seismic spring isolators using one grade 8 5/8"-11 bolt at each isolator (one of each corner, 4 total).

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UUT # 6

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Mixed Flow Inline Ventilation Fans
Model Number:	QEI-12-I-75-G
Product Construction Summary:	Belt drive Mixed Flow Inline fan suspended from seismic spring isolators with motor in Position E.
Options/ Subcomponent Summary:	UL-762, Spark B Resistant Construction, Spark C Resistant Construction, Bolted Access Door, Inlet & Outlet Flange, Inlet & Outlet Companion Flange, Copper Lube Lines, Belt Tube, Motor Cover, Drain Connection

UUT Properties

Weight (lb)	**Dimensions (in)**			**Lowest Natural Frequency (Hz)**		
	Depth	**Width**	**Height**	**Front-Back**	**Side-Side**	**Vertical**
250	30.5	20.25	36.25	N/A	N/A	N/A

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:

The unit was anchored to the ceiling fixture using four VMC HRS-1D-175 spring hangers with ¾”-10 threaded rod cut to 26” long and was also restrained by four VMC SB-250 sway bracing kits.

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UUT # 7

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Mixed Flow Inline Ventilation Fans
Model Number:	QEID-12-50-M50-X
Product Construction Summary:	Direct drive Mixed Flow Inline fan suspended from seismic spring isolators.
Options/ Subcomponent Summary:	Bolted Access Door, Universal Mounting System, UL/cUL-705, Sure Aire Flow probes, Extended Motor Wiring.

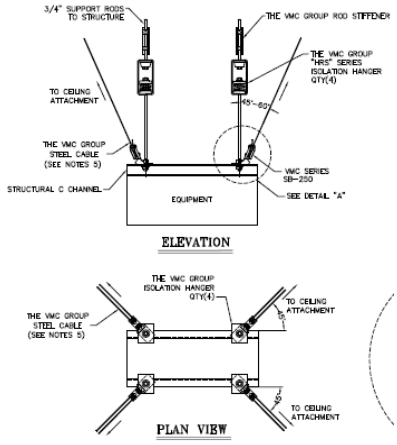
UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
199	31.25	20.25	22.25	N/A	N/A	N/A

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:



The unit was anchored to the ceiling fixture using four VMC HRS-1D-120 spring hangers with ¾"-10 threaded rod cut to 26" long and was also restrained by four VMC SB-250 sway bracing kits.

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UUT # 8

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Mixed Flow Inline Ventilation Fans
Model Number:	QEI-60-II-1000-HTUL
Product Construction Summary:	Belt drive Mixed Flow Inline fan Suspended mounted from a structural base on seismic spring isolators with motor in Position C.
Options/ Subcomponent Summary:	HT-UL, Bolted Access Door, Extended Life Bearings L(10)-200K, Belt Tube, Structural Base, Inlet Guard, Outlet Guard, Seismic Flange Welds, Motor: WEG, 100Hp, 460/230/208V. Belt Drive.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
5678	106	117.5	101	N/A	N/A	N/A

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	1.53	0.62

Test Mounting Details:

The unit was anchored to the ceiling fixture using four Mason RW30N-D-2150 spring hangers with ¾”-10 threaded rod cut to 26” long and was also restrained by four SCB-4 sway bracing kits with 3/8” diameter Steel Aircraft Cable.

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UUT # 9

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Mixed Flow Inline Ventilation Fans
Model Number:	QEI-12-I-75-G
Product Construction Summary:	Belt drive Mixed Flow Inline fan, base mounted on seismic spring isolators with motor in Position A. Aluminum wheel, Steel housing with aluminum inlet cone, Arrangement 9.
Options/ Subcomponent Summary:	UL-762, Spark B Resistant Construction, Spark C Resistant Construction, Bolted Access Door, Inlet & Outlet Flange, Inlet & Outlet Companion Flange, Copper Lube Lines, Belt Tube, Motor Cover, Drain Connection, Motor: Baldor, 7.5Hp, 460/230/208V. Belt Drive.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
250	30.5	20.25	36.25	5.2	7.2	16.2

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:

The unit was anchored to the table using four VMC MS-1C-150 spring isolators which were welded to the table surface.

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UUT # 10

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3298.05

Manufacturer:	Greenheck Fan Corporation (Schofield, WI, USA)
Model Line:	Mixed Flow Inline Ventilation Fans
Model Number:	QEID-54-75-C1000
Product Construction Summary:	Direct drive Mixed Flow Inline fan base mounted on VMC MSH-1E-1700 seismic spring isolators. Steel wheel, steel housing, Arrangement 4.
Options/ Subcomponent Summary:	Quick Opening Access Door, Sure-Aire, Inlet & Outlet Flange, Inlet & Outlet Guards, Copper LubeLines, Motor: Marathon Electric, 100Hp, 460V. Direct Drive.

UUT Properties

Weight (lb)	**Dimensions (in)**			**Lowest Natural Frequency (Hz)**		
	Depth	**Width**	**Height**	**Front-Back**	**Side-Side**	**Vertical**
4350	86.5	82	80	3.7	6.1	10.5

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 2010	ICC-ES AC-156	2.28	1.0	1.5	3.65	2.74	2.44	1.83

Test Mounting Details:

The unit was anchored using four VMC MSH-1E-1700 seismic spring isolators. The fan was bolted to the isolators using 5/8”-11 bolts into a tapped transfer block (since the fan had a single bolt hole, but the isolators had a 4 bolt pattern) and the isolators were welded to steel plates on the table surface.