



**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

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

OFFICE USE ONLY

APPLICATION #: OSP-0748

HCAI Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Greenheck Fan Corporation

Manufacturer's Technical Representative: Mark VanderKooy

Mailing Address: 1100 Greenheck Drive, Schofield, WI 54476

Telephone: (715) 841-8538

Email: Mark.VanderKooy@greenheck.com

Product Information

Product Name: Exhaust/Smoke Control Fans

Product Type: NA

Product Model Number: See Attachment

General Description: Vektor-H centrifugal exhaust fans, 1 fan, 2 fan or 3 fan system.

Mounting Description: Rigid, Floor Mounted on curb. Weatherhoods use vertical supports for bearing.

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: TRU Compliance, by Structural Integrity Associates

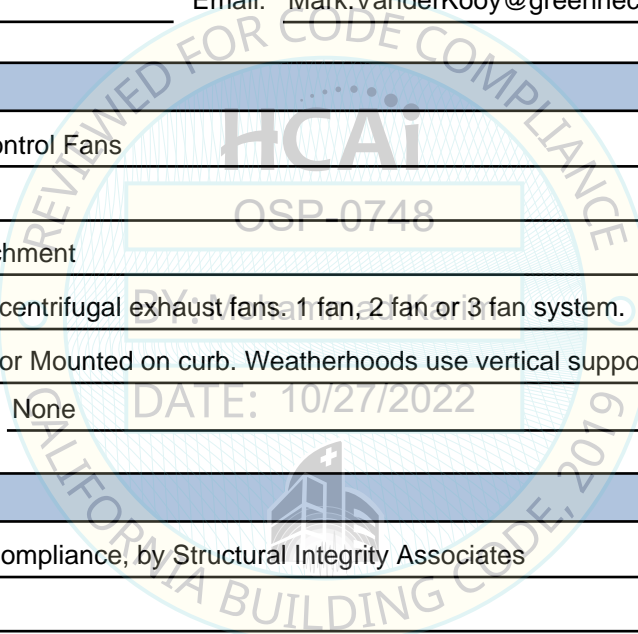
Contact Person: Dan Zentner

Mailing Address: 233 SW Wilson Ave, Suite 101, Bend, OR 97702

Telephone: (541) 292-5839

Email: dzentner@structint.com

Title: Program Manager





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

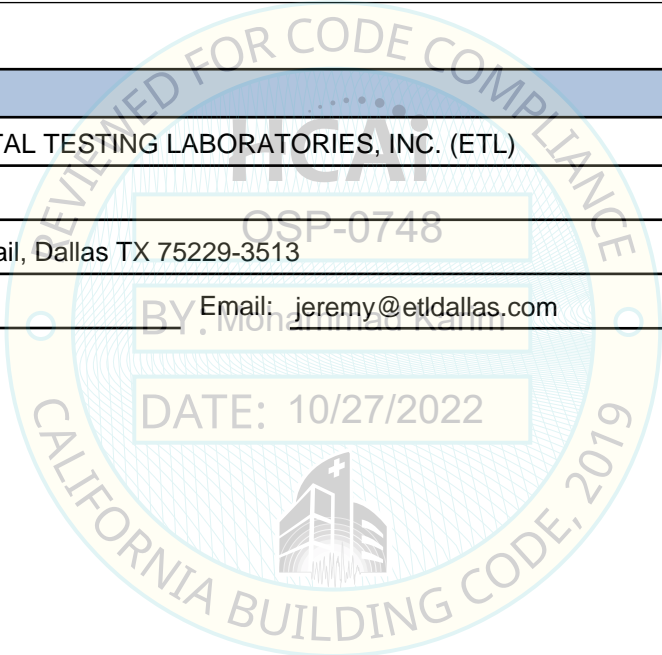
Company Name: STRUCTURAL INTEGRITY ASSOCIATES, INC.
Name: Andrew Coughlin California License Number: S6082
Mailing Address: 5215 Hellyer Ave, Suite 101, San Jose, CA 95138-1025
Telephone: (415) 635-8461 Email: acoughlin@structint.com

Certification Method

GR-63-Core ICC-ES AC156 IEEE 344 IEEE 693 NEBS 3
 Other (Please Specify): _____

Testing Laboratory

Company Name: ENVIRONMENTAL TESTING LABORATORIES, INC. (ETL)
Contact Person: Jeremy Lange
Mailing Address: 11034 Indian Trail, Dallas TX 75229-3513
Telephone: (972) 247-9657 Email: jeremy@etldallas.com





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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.50 (SDS = 2.0, z/h = 1); 1.44 (SDS = 3.2, z/h = 0)

SDS (Design spectral response acceleration at short period, g) = 2.0 at z/h=1, 3.2 at z/h=0

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

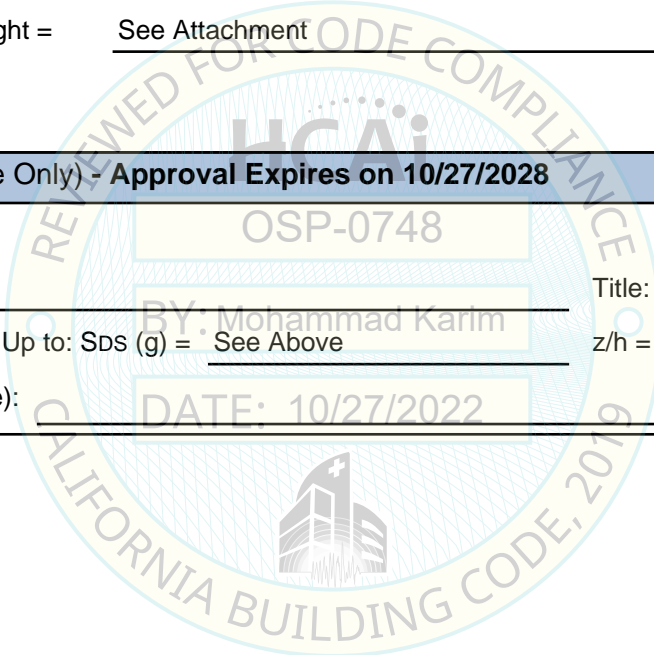
HCAI Approval (For Office Use Only) - Approval Expires on 10/27/2028

Date: 10/27/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: SDS (g) = See Above z/h = See Above

Condition of Approval (if applicable): DATE: 10/27/2022



SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	TABLE 1
Model Line: Vektor-H	

Certified Product Construction Summary:
12 ga. carbon steel housing, curb mounting required.

Certified Options Summary:
Curb mounted (12" - 24" tall curb). Direct drive fans. 1 fan system (1x1), 2 fan system (2x1), 3 fan system (3x1). Plenum required for 2x1 and 3x1. Plenum optional for 1x1.

Mounting Configuration:
Base mounted - rigid on curb up to 24". Weatherhoods use vertical supports for bearing.
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2022 **Seismic Certification Limits:** $S_{DS} = 2.0g \quad z/h=1.0$ $I_p = 1.5$
 $S_{DS} = 3.2g \quad z/h=0.0$

Model Line	Model	Dimensions (in) ³			Weight (lb) ³	Notes	UUT
		Depth ²	Width ²	Height ¹			
Vektor-H (1x1)	Vektor-H-10	68.0	22.0	151.0	626		Extrap.
	Vektor-H-12	39.5	22.5	147.0	442	UUT dimensions and weights	1A
		70.0	22.5	123.0	537	UUT dimensions and weights	1B
		68.0	22.0	151.0	642	Maximum available	Interp.
	Vektor-H-13	45.0	24.5	123.0	444	UUT dimensions and weights	2
		68.0	24.0	151.0	671	Maximum available	Interp.
	Vektor-H-14	72.0	28.0	151.0	740		Interp.
	Vektor-H-16	72.0	28.0	151.0	813		Interp.
	Vektor-H-18	78.0	34.0	151.0	983		Interp.
	Vektor-H-20	56.5	34.5	154.25	845	UUT dimensions and weights	4A
82.0		34.5	154.25	983	UUT dimensions and weights	4B	
78.0		34.0	151.0	1,028	Maximum available	Interp.	
Vektor-H (2x1)	Vektor-H-10	68.0	49.0	151.0	1,137		Interp.
	Vektor-H-12	68.0	49.0	151.0	1,157		Interp.
	Vektor-H-13	68.0	53.0	151.0	1,274		Interp.
	Vektor-H-14	72.0	61.0	151.0	1,289		Interp.
	Vektor-H-16	72.0	61.0	151.0	1,549		Interp.
	Vektor-H-18	78.0	73.0	151.0	1,863		Interp.
	Vektor-H-20	78.0	73.0	151.0	1,953		Interp.

Additional Notes:
1. Height listed does not include curb height.
2. Depth and width dimensions do not include curb flange. Curb flange is 5" on all sides.
3. Maximum certified dimensions and weights are listed unless otherwise noted. Dimensions and weights may be lower depending on selected options (weatherhood type, nozzle type, stack extension height).

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	TABLE 1
Model Line: Vektor-H	

Certified Product Construction Summary:
12 ga. carbon steel housing, curb mounting required.

Certified Options Summary:
Curb mounted (12" - 24" tall curb). Direct drive fans. 1 fan system (1x1), 2 fan system (2x1), 3 fan system (3x1). Plenum required for 2x1 and 3x1. Plenum optional for 1x1.

Mounting Configuration:
Base mounted - rigid on curb up to 24". Weatherhoods use vertical supports for bearing.
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2022 **Seismic Certification Limits:** $S_{DS} = 2.0g \quad z/h=1.0$ $I_p = 1.5$
 $S_{DS} = 3.2g \quad z/h=0.0$

Model Line	Model	Dimensions (in) ³			Weight (lb) ³	Notes	UUT
		Depth ²	Width ²	Height ¹			
Vektor-H (3x1)	Vektor-H-10	68.0	76.0	151.0	1,591		Interp.
	Vektor-H-12	68.0	76.0	151.0	1,621		Interp.
	Vektor-H-13	68.0	82.0	151.0	1,781		Interp.
	Vektor-H-14	72.0	94.0	151.0	1,915		Interp.
	Vektor-H-16	72.0	94.0	151.0	2,161		Interp.
	Vektor-H-18	78.0	112.0	151.0	2,638		Interp.
	Vektor-H-20	82.0	112.0	122.75	2,649	UUT dimensions and weights	3
		78.0	112.0	151.0	2,649	Maximum available	Interp.

Additional Notes:
 1. Height listed does not include curb height.
 2. Depth and width dimensions do not include curb flange. Curb flange is 5" on all sides.
 3. Maximum certified dimensions and weights are listed unless otherwise noted. Dimensions and weights may be lower depending on selected options (weatherhood type, nozzle type, stack extension height).

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	Table Description: Fan Motors	TABLE 2
Model Line: Vektor-H		

Building Code: CBC 2022	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$ $S_{DS} = 3.2 g$ $z/h = 0.0$	$I_p = 1.5$
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Component Type	Manufacturer	Model	Description ¹	Notes	UUT
Fan Motor	Baldor	0.5 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 37 lbs.		Extrap.
		0.75 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 37 lbs.		Extrap.
		1 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 37 lbs.		Extrap.
		1.5 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 43 lbs.	UUT: 208-230/460V	2
		2 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 48 lbs.	UUT1A & 1B: 575V	1A, 1B
		3 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 78 lbs.		Interp.
		5 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 93 lbs.		Interp.
		7.5 HP	3 Ø, 208-600V, TEFC, 2 or 4 pole, 129 lbs.	UUT3: 208-230/460V (qty 3); UUT4A & 4B: 575V, 129 lbs.	3, 4A, 4B

Additional notes:
1. Listed weights are the maximum for each HP. Weight may be less based on voltage and RPM.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

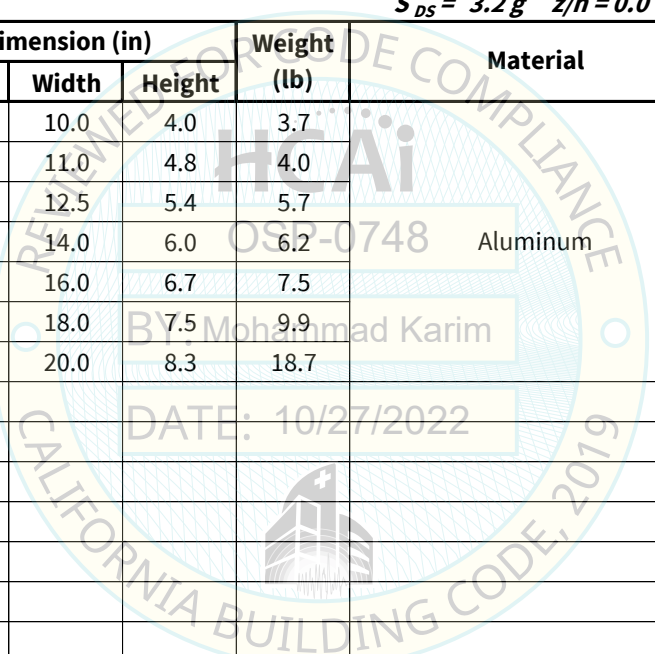
2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	Table Description: Fan Wheels	TABLE 3
Model Line: Vektor-H		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0 g \quad z/h = 1.0$ $S_{DS} = 3.2 g \quad z/h = 0.0$
		$I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Fan Wheel (Greenheck)	Size 10	10.0	10.0	4.0	3.7	Aluminum	Backward-curved, tabbed construction	Extrap.
	Size 12	11.0	11.0	4.8	4.0		Backward-curved, tabbed construction	1A, 1B
	Size 13	12.5	12.5	5.4	5.7		Backward-curved, tabbed construction	2
	Size 14	14.0	14.0	6.0	6.2		Backward-curved, welded construction	Interp.
	Size 16	16.0	16.0	6.7	7.5		Backward-curved, welded construction	Interp.
	Size 18	18.0	18.0	7.5	9.9		Backward-curved, welded construction	3
	Size 20	20.0	20.0	8.3	18.7		Backward-curved, welded construction	3, 4A, 4B



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	Table Description: Dampers	TABLE 4
Model Line: Vektor-H		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g \quad z/h = 1.0$	$I_p = 1.5$
		$S_{DS} = 3.2g \quad z/h = 0.0$	

Model Line (Manufacturer)	Model	Dimension (in)			Weight ¹ (lb)	Description	Notes	UUT
		Depth	Width	Height				
Bypass Dampers (Greenheck)	VCD-23	5.0	6.0	6.0	4.0	Carbon steel Manual or Actuated - Opposed Blades	UUT1A & 1B: actuated	1A, 1B
		5.0	8.0	8.0	5.0		UUT2: actuated	2
		5.0	10.0	10.0	8.0		Interp.	
		5.0	11.0	11.0	9.0		Interp.	
		5.0	12.0	12.0	9.0		UUT3: actuated	3
		5.0	13.0	13.0	11.0		Interp.	
		5.0	14.0	14.0	11.0		Interp.	
		5.0	16.0	16.0	14.0		UUT4A & 4B: manual quadrant	4A, 4B
Isolation Dampers (Greenheck)	EMV-11	11.1	15.0	15.0	9.0	Aluminum Gravity - Parallel Blades		Extrap.
		11.1	17.0	17.0	13.0			2
		11.1	21.0	21.0	18.0			Interp.
		11.1	27.0	27.0	26.0			4A, 4B
	VCD-23	5.0	18.0	18.0	17.0	Carbon steel Actuated - Parallel Blades		1A, 1B
		5.0	20.0	20.0	20.0			Interp.
		5.0	24.0	24.0	25.0			Interp.
		5.0	30.0	30.0	35.0			3

Additional notes:
1. Weights do not include actuators (where applicable).

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation Model Line: Vektor-H		Table Description: Nozzles			TABLE 5	
Building Code: CBC 2022		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	
Standard Nozzle (Carbon Steel)	Greenheck	Vektor-H-10 nozzle	4" outlet diameter, 43" height, 39 lbs.		Extrap.	
			...		Extrap.	
			10" outlet diameter, 43" height, 39 lbs.		Extrap.	
		Vektor-H-12 nozzle	4" outlet diameter, 43" height, 39 lbs.		Extrap.	
			...		Extrap.	
			12" outlet diameter, 43" height, 42 lbs.		Extrap.	
		Vektor-H-13 nozzle	8" outlet diameter, 43" height, 46 lbs.		Extrap.	
			9" outlet diameter, 43" height, 46 lbs.		2	
			...		Interp.	
			13" outlet diameter, 43" height, 46 lbs.		Interp.	
		Vektor-H-14 nozzle	8" outlet diameter, 43" height, 56 lbs.		Interp.	
			...		Interp.	
			14" outlet diameter, 43" height, 56 lbs.		Interp.	
		Vektor-H-16 nozzle	8" outlet diameter, 43" height, 56 lbs.		Interp.	
			...		Interp.	
			16" outlet diameter, 43" height, 56 lbs.		Interp.	
		Vektor-H-18 nozzle	9" outlet diameter, 43" height, 66 lbs.		Interp.	
			...		Interp.	
			19" outlet diameter, 43" height, 66 lbs.		Interp.	
		Vektor-H-20 nozzle	9" outlet diameter, 43" height, 66 lbs.		Interp.	
...			Interp.			
19" outlet diameter, 43" height, 66 lbs.			4A			

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	Table Description: Nozzles	TABLE 5
Model Line: Vektor-H		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$	
		$S_{DS} = 3.2g$ $z/h = 0.0$		

Component Type	Manufacturer	Model	Description	Notes	UUT
Attenuated Nozzle (Carbon Steel)	Greenheck	Vektor-H-10 nozzle	5" outlet diameter, 43" height, 65 lbs.		1B
			...		Interp.
		Vektor-H-12 nozzle	10" outlet diameter, 43" height, 65 lbs.		Interp.
			5" outlet diameter, 43" height, 65 lbs.		Interp.
		Vektor-H-13 nozzle	...		Interp.
			12" outlet diameter, 43" height, 65 lbs.		Interp.
		Vektor-H-14 nozzle	8" outlet diameter, 43" height, 70 lbs.		Interp.
			...		Interp.
		Vektor-H-16 nozzle	13" outlet diameter, 43" height, 70 lbs.		Interp.
			...		Interp.
		Vektor-H-18 nozzle	8" outlet diameter, 43" height, 85 lbs.		Interp.
			...		Interp.
		Vektor-H-20 nozzle	14" outlet diameter, 43" height, 85 lbs.		Interp.
			...		Interp.
		Vektor-H-20 nozzle	8" outlet diameter, 43" height, 85 lbs.		Interp.
			...		Interp.
			16" outlet diameter, 43" height, 85 lbs.		Interp.
		Vektor-H-20 nozzle	9" outlet diameter, 43" height, 100 lbs.		Interp.
			...		Interp.
			19" outlet diameter, 43" height, 100 lbs.		Interp.
Vektor-H-20 nozzle	9" outlet diameter, 43" height, 100 lbs.		Interp.		
	...		Interp.		
	16" outlet diameter, 43" height, 100 lbs.		4B		
Vektor-H-20 nozzle	...		Interp.		
	19" outlet diameter, 43" height, 100 lbs.		3		

**SPECIAL SEISMIC CERTIFICATION
CERTIFIED SUBCOMPONENT MATRIX**

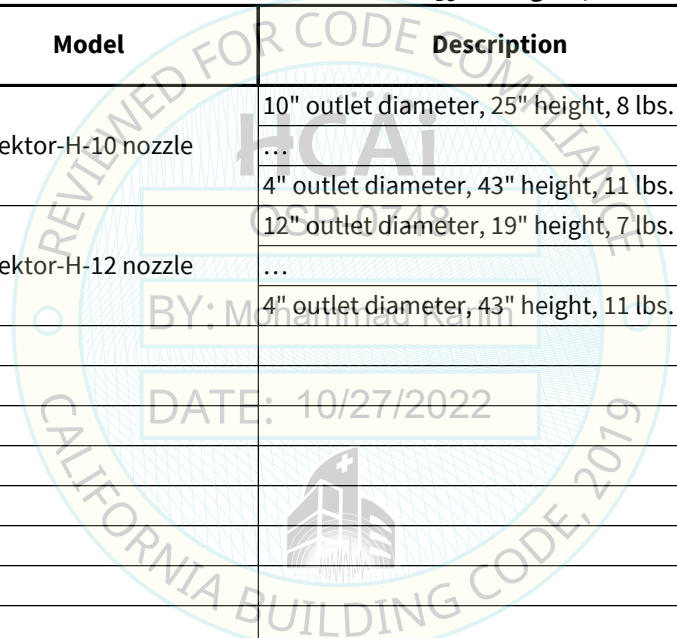
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Manufacturer:	Greenheck Fan Corporation	Table Description: Nozzles	TABLE 5
Model Line:	Vektor-H		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0g \quad z/h = 1.0$	$I_p = 1.5$
		$S_{DS} = 3.2g \quad z/h = 0.0$	

Component Type	Manufacturer	Model	Description	Notes	UUT
Plastic Nozzle	Greenheck	Vektor-H-10 nozzle	10" outlet diameter, 25" height, 8 lbs.	Same as tested w/ top section removed	Interp.
			...	Same as tested w/ top section removed	Interp.
		Vektor-H-12 nozzle	4" outlet diameter, 43" height, 11 lbs.	Same as tested plastic nozzle	Interp.
			12" outlet diameter, 19" height, 7 lbs.	Same as tested w/ top section removed	Interp.
			...	Same as tested w/ top section removed	Interp.
			4" outlet diameter, 43" height, 11 lbs.		1A



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation Model Line: Vektor-H		Table Description: Options/Accessories			TABLE 6	
Building Code: CBC 2022		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	
Disconnect Switch (NEMA 3R)	Square D	HU361 RB	30 A Disconnect Switch, 8.82 lbs.		1A, 1B, 3	
	Hubbell	13R89D	30 A Disconnect Switch, 1.55 lbs		2, 4A, 4B	
Actuator	Belimo	TFB24	24V Actuator, 1.4 lbs.		1A,1B	
		TFB24-MFT	24V Actuator, 1.6 lbs.		1A,1B,2,3	
		FSLF24-SC	24V Actuator, 4.2 lbs.		3	
		FSLF120	120V Actuator, 4.1 lbs.		3	
	Honeywell	MS4104F1010	120V Actuator, 5 lbs.		3	
		MS7505A2030	24V Actuator, 3 lbs.		3	
Transformer	Wabash	CL75J21	24V Transformer, 3 lbs.		1A, 1B	
		CT0050-E01	110V Transformer, 2.72 lbs.		3	
Weatherhood	Greenheck	Vektor-H-10 Weatherhood	Standard or attenuated, carbon steel		Extrap.	
		Vektor-H-12 Weatherhood		UUT1A: standard, UUT1B: attenuated	1A, 1B	
		Vektor-H-13 Weatherhood		UUT2: standard	2	
		Vektor-H-14 Weatherhood			Interp.	
		Vektor-H-16 Weatherhood			Interp.	
		Vektor-H-18 Weatherhood			Interp.	
		Vektor-H-20 Weatherhood		UUT3: attenuated, UUT4A: standard, UUT4B: attenuated	3, 4A, 4B	

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

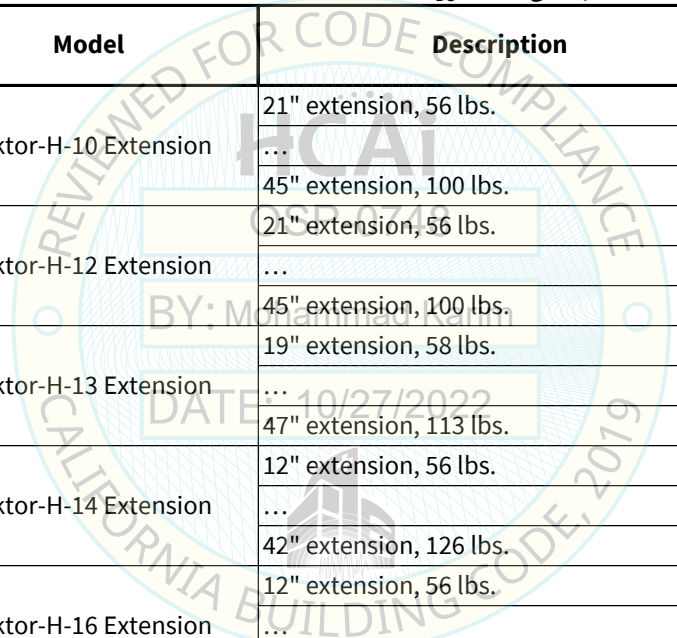
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Manufacturer:	Greenheck Fan Corporation	Table Description: Options/Accessories	TABLE 6
Model Line:	Vektor-H		

Building Code: CBC 2022	Seismic Certification Limits:	$S_{DS} = 2.0 g \quad z/h = 1.0$	$I_p = 1.5$
		$S_{DS} = 3.2 g \quad z/h = 0.0$	

Component Type	Manufacturer	Model	Description	Notes	UUT
Discharge Stack Extension (carbon steel, welded)	Greenheck	Vektor-H-10 Extension	21" extension, 56 lbs.		Extrap.
			...		Extrap.
			45" extension, 100 lbs.		Extrap.
		Vektor-H-12 Extension	21" extension, 56 lbs.		1B
			...		Interp.
			45" extension, 100 lbs.		1A
		Vektor-H-13 Extension	19" extension, 58 lbs.		2
			...		Interp.
			47" extension, 113 lbs.		Interp.
		Vektor-H-14 Extension	12" extension, 56 lbs.		Interp.
			...		Interp.
			42" extension, 126 lbs.		Interp.
		Vektor-H-16 Extension	12" extension, 56 lbs.		Interp.
			...		Interp.
			42" extension, 126 lbs.		Interp.
		Vektor-H-18 Extension	7" extension, 58 lbs.		Interp.
			...		Interp.
			38" extension, 148 lbs.		Interp.
Vektor-H-20 Extension	7" extension, 58 lbs.		3		
	...		Interp.		
	38" extension, 148 lbs.		4A, 4B		



UNIT UNDER TEST (UUT) SUMMARY SHEET



2100730-CR-001-R1

Manufacturer:		Greenheck Fan Corporation						
Model Line:		Vektor-H						
UUT	Unit Description	Report Number	Testing Lab	Year Tested	ISO 17025 Accredited?	S _{DS}	z/h	I _p
1A	Vektor-H-12 (1x1)	2100730-TR-001	Environmental Testing Laboratory (ETL)	2022	Yes	2.0 3.2	1.0 0.0	1.5
1B	Vektor-H-12 (1x1)	2100730-TR-001	Environmental Testing Laboratory (ETL)	2022	Yes	2.0 3.2	1.0 0.0	1.5
2	Vektor-H-13 (1x1)	2100730-TR-001	Environmental Testing Laboratory (ETL)	2022	Yes	2.0 3.2	1.0 0.0	1.5
3	Vektor-H-20 (3x1)	2100730-TR-001	Environmental Testing Laboratory (ETL)	2022	Yes	2.0 3.2	1.0 0.0	1.5
4A	Vektor-H-20 (1x1)	2100730-TR-001	Environmental Testing Laboratory (ETL)	2022	Yes	2.0 3.2	1.0 0.0	1.5
4B	Vektor-H-20 (1x1)	2100730-TR-001	Environmental Testing Laboratory (ETL)	2022	Yes	2.0 3.2	1.0 0.0	1.5
Notes:								

UNIT UNDER TEST (UUT) SUMMARY SHEET



2100730-CR-001-R1

Manufacturer: Greenheck Fan Corporation	UUT 1A
Model Line: Vektor-H	
Model Number: VK-H-12-X1	
Serial Number: N/A	

Product Construction Summary:
Vektor-H fan size 12, 1x1 configuration.
12ga. carbon steel housing, aluminum fan wheel.

Options/Subcomponent Summary:
Baldor 2HP fan motor, Greenheck size 12 fan wheel, Greenheck 6"Wx6"H VCD-23 actuated bypass damper, Greenheck 18"Wx18"H VCD-23 actuated isolation damper, Belimo TFB24 actuator, Belimo TFB24-MFT actuator, Greenheck 4" diameter plastic nozzle, Square D HU361 RB disconnect switch, Wabash CL75J21 transformer, Greenheck size 12 standard weatherhood, Greenheck 45" stack extension.

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
442	39.5	22.5	147.0	26.3	23.7	>33.3

<i>UUT Highest Passed Seismic Run Information</i>									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85	
		3.2	0.0						

Test Mounting Details:



UUT was mounted to 24" roof curb using (12) 5/16" thread cutting screws. Roof curb was mounted to a 6" wood base using (20) 5/8" lag bolts (ASTM Grade A307-A). Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	UUT 1B
Model Line: Vektor-H	
Model Number: VK-H-12-X1	
Serial Number: N/A	

Product Construction Summary:
Vektor-H fan size 12, 1x1 configuration.
12ga. carbon steel housing, aluminum fan wheel.

Options/Subcomponent Summary:
Baldor 2HP fan motor, Greenheck size 12 fan wheel, Greenheck 6"Wx6"H VCD-23 actuated bypass damper, Greenheck 18"Wx18"H VCD-23 actuated isolation damper, Belimo TFB24 actuator, Belimo TFB24-MFT actuator, Greenheck 5" diameter attenuated nozzle, Square D HU361 RB disconnect switch, Wabash CL75J21 transformer, Greenheck size 12 attenuated weatherhood, Greenheck 21" stack extension.

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
537	70.0	22.5	123.0	6.4	25.8	>33.3

<i>UUT Highest Passed Seismic Run Information</i>									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85	
		3.2	0.0						

Test Mounting Details:



UUT was mounted to 24" roof curb using (12) 5/16" thread cutting screws. Roof curb was mounted to a 6" wood base using (20) 5/8" lag bolts (ASTM Grade A307-A). The weatherhood used two vertical supports which bear on the 6" wood base but were not positively attached to it. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET



2100730-CR-001-R1

Manufacturer: Greenheck Fan Corporation	UUT 2
Model Line: Vektor-H	
Model Number: VK-H-13-X1	
Serial Number: N/A	

Product Construction Summary:
Vektor-H fan size 13, 1x1 configuration.
12ga. carbon steel housing, aluminum fan wheel.

Options/Subcomponent Summary:
Baldor 1.5HP fan motor, Greenheck size 13 fan wheel, Greenheck 8"Wx8"H VCD-23 actuated bypass damper, Greenheck 17"Wx17"H EMV-11 gravity isolation damper, Belimo TFB24-MFT actuator, Greenheck 9" diameter standard nozzle, Hubbell 13R89D disconnect switch, Greenheck size 13 standard weatherhood, Greenheck 19" stack extension.

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
444	45.0	24.5	123.0	8.4	9.6	9.3

<i>UUT Highest Passed Seismic Run Information</i>									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85	
		3.2	0.0						

Test Mounting Details:



UUT was mounted to 24" roof curb using (12) 5/16" thread cutting screws. Roof curb was mounted to a 6" wood base using (20) 5/8" lag bolts (ASTM Grade A307-A). Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation

Model Line: Vektor-H

Model Number: VK-H-20-X3

Serial Number: N/A

UUT 3

Product Construction Summary:

Vektor-H fan size 20, 3x1 configuration.
12ga. carbon steel housing, aluminum fan wheels.

Options/Subcomponent Summary:

Baldor 7.5HP fan motors, Greenheck size 20 fan wheel (x2), Greenheck size 18 fan wheel (x1), Greenheck 12"Wx12"H VCD-23 actuated bypass dampers, Greenheck 30"Wx30"H VCD-23 actuated isolation dampers, Belimo TFB24-MFT actuator, Belimo FSLF24-SC actuator, Belimo FSLF120 actuator, Honeywell MS4104F1010 actuator, Honeywell MS7505A2030 actuator, Greenheck 19" diameter attenuated nozzles, Square D HU361 RB disconnect switches, Wabash CT0050-E01 transformer, Greenheck size 20 attenuated weatherhoods, Greenheck 7" stack extensions.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
2,649	82.0	112.0	122.75	6.6	>33.3	29.8

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Test Mounting Details:



UUT was mounted to 24" roof curb using (36) 5/16" thread cutting screws. Roof curb was mounted to a 6" wood base using (40) 5/8" lag bolts (ASTM Grade A307-A). Each weatherhood used two vertical supports which bear on the table but were not positively attached to it. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

2100730-CR-001-R1



Manufacturer: Greenheck Fan Corporation	UUT 4A
Model Line: Vektor-H	
Model Number: VK-H-20-X1	
Serial Number: N/A	

Product Construction Summary:
Vektor-H fan size 20, 1x1 configuration.
12ga. carbon steel housing, aluminum fan wheel.

Options/Subcomponent Summary:
Baldor 7.5HP fan motor, Greenheck size 20 fan wheel, Greenheck 16"Wx16"H VCD-23 manual bypass damper, Greenheck 27"Wx27"H EMV-11 gravity isolation damper, Greenheck 19" diameter standard nozzle, Hubbell 13R89D disconnect switch, Greenheck size 20 standard weatherhood, Greenheck 38" stack extension.

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
845	56.5	34.5	154.25	6.8	26.4	>33.3

<i>UUT Highest Passed Seismic Run Information</i>									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85	
		3.2	0.0						

Test Mounting Details:



UUT was mounted to 24" roof curb using (16) 5/16" thread cutting screws. Roof curb was mounted to a 6" wood base using (24) 5/8" lag bolts (ASTM Grade A307-A). Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET



2100730-CR-001-R1

Manufacturer: Greenheck Fan Corporation	UUT 4B
Model Line: Vektor-H	
Model Number: VK-H-20-X1	
Serial Number: N/A	

Product Construction Summary:
Vektor-H fan size 20, 1x1 configuration.
12ga. carbon steel housing, aluminum fan wheel.

Options/Subcomponent Summary:
Baldor 7.5HP fan motor, Greenheck size 20 fan wheel, Greenheck 16"Wx16"H VCD-23 manual bypass damper, Greenheck 27"Wx27"H EMV-11 gravity isolation damper, Greenheck 16" diameter attenuated nozzle, Hubbell 13R89D disconnect switch, Greenheck size 20 attenuated weatherhood, Greenheck 38" stack extension.

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
983	82.0	34.5	154.25	7.0	6.8	>33.3

UUT Highest Passed Seismic Run Information									
Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85	
		3.2	0.0						

Test Mounting Details:



UUT was mounted to 24" roof curb using (16) 5/16" thread cutting screws. Roof curb was mounted to a 6" wood base using (24) 5/8" lag bolts (ASTM Grade A307-A). The weatherhood used two vertical supports which bear on the 6" wood base but were not positively attached to it. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.