



APPLICATION FOR PREAPPROVAL SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.

OSP – 0148 – 10

Check whether application is: NEW RENEWAL

1.0 Greenheck Fan Corporation David Mayer
Manufacturer *Manufacturer's Technical Representative*

400 Ross Ave Schofield, WI 54476

Mailing Address

715-355-3939

Telephone

david.mayer@greenheck.com

E-mail Address

2.0 Spun Aluminum Exhaust Fans Centrifugal Ventilation Fans
Product Name *Product Type*

Various product lines are included in this listing: See attached Tables # 1 through # 8

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

General Description: Air handling fans including centrifugal and propeller, inline and rooftop, supply and exhaust fans.

3.0 Tobolski Watkins Engineering, Inc. Matthew Tobolski, Ph.D., P.E.
Applicant Company Name *Contact Person*

3710 Ruffin Road, San Diego, CA 92123

Mailing Address

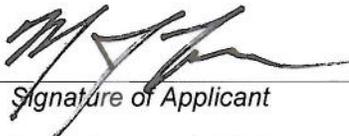
858-381-5843

Telephone

mtobolski@tobolskiwatkins.com

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

05/13/2011

Date

President and CEO

Title

Tobolski Watkins Engineering, Inc.

Company Name

1/22



Registered Design Professional Preparing the Report

4.0

ANCO Engineers, Inc.

Company Name

John C. Stoessel

Contact Name

C 37259

California License Number

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

Mailing Address

(818) 591-9001

Telephone

john@ancoengineers.com

E-mail Address

California Licensed Structural Engineer Review and Acceptance of the Report

5.0

Tobolski Watkins Engineering Inc.

Company Name

Derrick Watkins

Contact Name

S 5257

California License Number

3170 Ruffin Road, San Diego, CA 92123

Mailing Address

(858) 381-5843

Telephone

dwatkins@tobolskiwatkins.com

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.

Company Name

Paul Ibanez

Contact Name

1965-A 33rd Street, Boulder, CO 80301

Mailing Address

(303)443-7580 x239

Telephone

paul@ancoengineers.com

E-mail:

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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) = **1.7g**

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) = **6**

I_p (Importance factor) = **1.5**

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

Equipment or Component fundamental period(s) = **See Attached UUT Summary Sheets**

Building period limits (if any) = none

Overall dimensions and weight (or range thereof) = **See Attached Tables #1 through # 8**

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15: Yes No

Design Basis of Equipment or Components (VM) =

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

11.0 List of attachments supporting the special seismic certification of equipment or components:

11.0 OSHPD Approval (For Office Use Only)	
 Signature & Date M. R. Karim, SHFR	5/15/2011 December 31, 2016 Approval Expiration Date
Name & Title	S_{DS} (g) = 2.28 z/h = 1.0 Special Seismic Certification Valid Up to
Condition of Approval (if any): Fan and fan mounted accessories shown in Tables # 1 through # 8 are approved. Roof curbs and anchorage are not approved & are shown in attachments for information only.	

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UUT - 1

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: S-CUBE-480-75-F

Product Construction Summary:
Spun aluminum housing, steel wheel, belt drive upblast exhaust fan

Options/Subcomponent Summary:
Dual drives; UL-listed power vents for smoke control systems (500F/4 hrs + 100F/15 min); NEMA 3R junction box with switch; Heat baffle; Bearings w/ grease fittings (L10 life of 100,000 hours – L50 average life 500,000 hours)

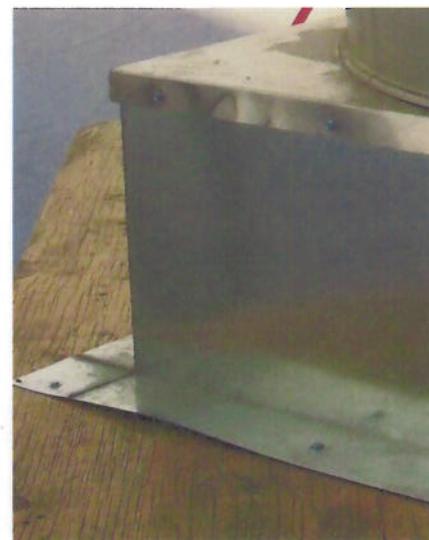
UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
603	76.0	76.0	51.0	3.8	3.5	5.8

UUT Highest Passed Seismic Run Information

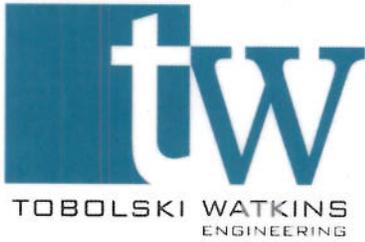
Building Code	Test Criteria	S _{ps}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Mounted on GPF57-G18 roof curb using ungraded ¼" sheet metal screws at ½ the spacing specified in Greenheck installation manual (required upgrade). Roof curb mounted to table using ¼" ungraded sheet metal screws at 16" o.c.

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UUT - 2

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: CUE-200-B

Product Construction Summary:

Spun aluminum housing, aluminum wheel, direct drive upblast exhaust fan

Options/Subcomponent Summary:

NEMA 1 junction box with switch

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
144	36.0	36.0	31.5	7.8	8.3	13.8

UUT Highest Passed Seismic Run Information

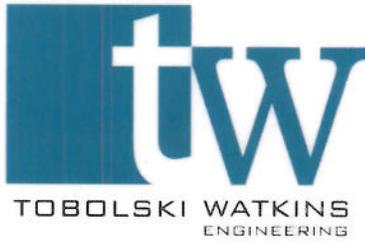
Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Mounted on GPF30-G12 roof curb using ungraded ¼" sheet metal screws at ½ the spacing specified in Greenheck installation manual (required upgrade). Roof curb mounted to table using ¼" ungraded sheet metal screws at 16" o.c.

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UUT - 3

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: G-060-D

Product Construction Summary:

Spun aluminum housing, aluminum wheel, direct drive downblast fan.

Options/Subcomponent Summary:

NEMA 1 junction box with switch

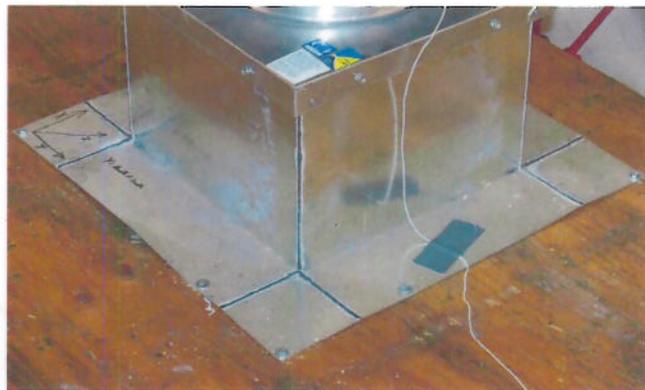
UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
13	20.0	20.0	13.5	16.5	16.5	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}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Mounted on GPR17-G18 roof curb using ungraded ¼" sheet metal screws at spacing specified in Greenheck installation manual. Roof curb mounted to table using ¼" ungraded sheet metal screws at 16" o.c.

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UUT - 4

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: USGF-140-10-6

Product Construction Summary:
Steel housing, steel wheel, belt drive upblast grease exhaust fan

Options/Subcomponent Summary:
UL/cUL 762 listed "Power Ventilators for Restaurant Exhaust Applications"; NEMA 3R junction box with switch; Coated with Permatector, Gray (fan and attached accessories); Non-stick coated wheel (teflon); Clean out port; Heat baffle; Bearings with grease fittings (L10 life of 100,000 hours – L50 average life of 500,000 hours)

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
143	31.5	32.0	31.0	6.3	5.1	10.7

UUT Highest Passed Seismic Run Information

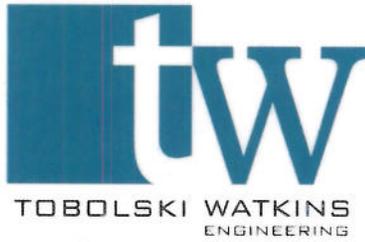
Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Mounted on GPFV-19G roof curb using ungraded ¼" sheet metal screws at ½ the spacing specified in Greenheck installation manual (required upgrade). Roof curb mounted to table using ¼" ungraded sheet metal screws at 16" o.c.

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UUT - 5

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: CUBE-098-4

Product Construction Summary:

Spun aluminum housing, aluminum wheel, belt drive upblast exhaust fan

Options/Subcomponent Summary:

NEMA 1 junction box with switch

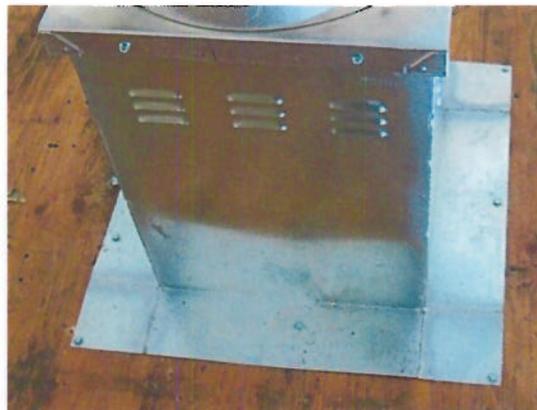
UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
53	25.0	25.0	26.5	7.1	4.9	15.3

UUT Highest Passed Seismic Run Information

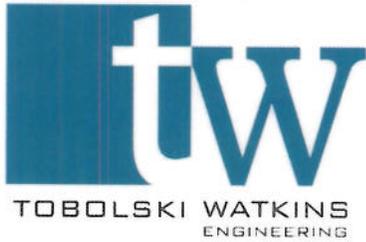
Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Mounted on GPFV-19-G24 roof curb using ungraded ¼" sheet metal screws at spacing specified in Greenheck installation manual. Roof curb mounted to table using ¼" ungraded sheet metal screws at 16" o.c.

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UUT - 6

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: GB-540-150

Product Construction Summary:

Spun aluminum housing, aluminum wheel, belt drive downblast fan.

Options/Subcomponent Summary:

NEMA 1 junction box with switch; Bearings with grease fittings (L10 life of 100,000 hours – L50 average life of 500,000 hours)

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
634	86.0	86.0	61.0	4.1	3.6	4.8

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}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Mounted on SDCurb-64-S24 roof curb using ungraded ¼" sheet metal screws at spacing specified in Greenheck installation manual. Roof curb mounted to table using ¼" ungraded sheet metal screws at 16" o.c.

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UUT - 7

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: CW-200-B

Product Construction Summary:
Spun aluminum housing, aluminum wheel, direct drive wall mount exhaust fan

Options/Subcomponent Summary:
NEMA 1 junction box with switch; Birdscreen (galvanized)

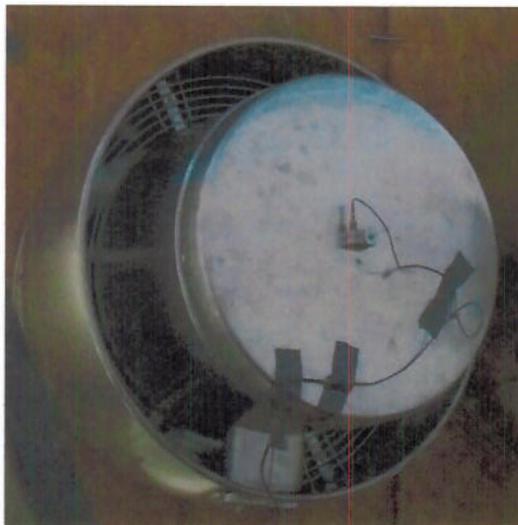
UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
148	36.0	36.0	30.0	11.1	7.5	10.3

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}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Wall mounted using 1/4" lag screws into plywood at locations per Greenheck installation manual. Unit mounted to rigid simulated wall fixture.

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UUT - 8

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: CWB-098-4

Product Construction Summary:

Spun aluminum housing, aluminum wheel, belt drive wall mount exhaust fan

Options/Subcomponent Summary:

NEMA 1 junction box with switch; Birdscreen (galvanized)

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
53	26.0	26.0	25.0	7.1	9.9	8.8

UUT Highest Passed Seismic Run Information

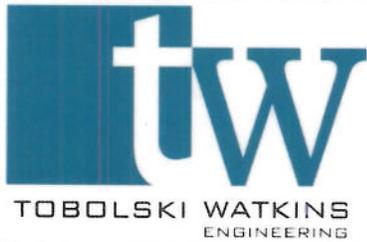
Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Wall mounted using 1/4" lag screws into plywood at locations per Greenheck installation manual. Unit mounted to flexible simulated wall fixture.

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UUT - 9

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: CWB-300-30

Product Construction Summary:

Spun aluminum housing, aluminum wheel, belt drive wall mount exhaust fan

Options/Subcomponent Summary:

NEMA 1 junction box with switch; Birdscreen (galvanized); Bearings with grease fittings (L10 life of 100,000 hours – L50 average life of 500,000 hours)

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
328	51.0	51.0	39.0	6.9	9.8	8.8

UUT Highest Passed Seismic Run Information

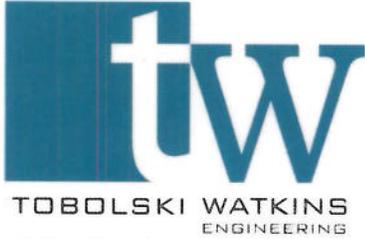
Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Wall mounted using 3/4" lag screws into plywood at locations per Greenheck installation manual. Unit mounted to flexible simulated wall fixture.

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UUT - 10

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: Spun Aluminum Fans

Model Number: CW-060-D

Product Construction Summary:

Spun aluminum housing, aluminum wheel, direct drive wall mount exhaust fan

Options/Subcomponent Summary:

NEMA 1 junction box with switch; Birdscreen (galvanized)

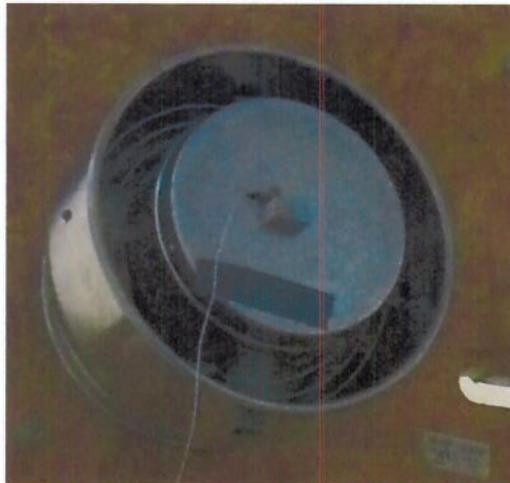
UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
17	15.8	15.8	13.3	9.9	9.7	10.3

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}
IBC 2009	ICC-ES AC 156	2.28g	1.0	1.5	3.64g	2.74g	2.43g	1.82g

Test Mounting Details:



Wall mounted using 1/4" lag screws into plywood at locations per Greenheck installation manual. Unit mounted to rigid simulated wall fixture.

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Table 1

**Special Seismic Certification
Certified Product Matrix**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck (Accurex)

Model Line: G and XRED Spun Aluminum Rooftop Exhaust Fans

Certified Product Construction Summary:

Spun aluminum housing, aluminum wheel, direct drive downblast exhaust fan

Certified Options Summary:

XP/HP pressure level, Curb seal, Non-stick wheel, Cleanout port, Disconnect switches, Birdscreen, UL705, UL762, ULSmoke, Coatings
Fans are also sold under Accurex brand as "XRED" series (replace "G" with "XRED" for model number)

Certified Mounting Summary:

Mounted to Greenheck roof curb (GPF, GPFV or SDCURB or similar) ≤ 24" tall. Recommend securing fan to curb using sheet metal screws at ½ the manufacturer's specified spacing. SEOR to specify curb, mounting of unit to curb and mounting curb to structure.

Building Code: IBC 2009/CBC 2010

Seismic Certification Limits:

$S_{DS} = 2.28g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Greenheck "G" Series Accurex "XRED" Series	G-060	20.0	20.0	16.0	16		3
	G-065	20.0	20.0	16.0	16		
	G-070	20.0	20.0	16.0	16		
	G-075	20.0	20.0	16.0	16		
	G-080	22.0	22.0	20.0	30		
	G-085	22.0	22.0	20.0	30		
	G-090	22.0	22.0	20.0	30		
	G-095	22.0	22.0	20.0	30		
	G-097	25.0	25.0	34.0	49		
	G-098	25.0	25.0	34.0	49		
	G-099	25.0	25.0	34.0	49		
	G-101	25.0	25.0	30.0	70		
	G-103	25.0	25.0	30.0	70		
	G-121	25.0	25.0	30.0	70		
	G-123	25.0	25.0	30.0	70		
	G-131	29.0	29.0	30.0	70		
	G-133	29.0	29.0	30.0	60		
	G-141	29.0	29.0	30.0	63		
	G-143	29.0	29.0	36.0	63		
	G-150	36.0	36.0	32.0	70		
G-160	36.0	36.0	32.0	70			
G-163	29.0	29.0	38.0	72			
G-170	36.0	36.0	32.0	70			
G-180	36.0	36.0	32.0	70			

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Table 2

**Special Seismic Certification
Certified Product Matrix**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck (Accurex)

Model Line: GB and XREB Spun Aluminum Rooftop Exhaust Fans

Certified Product Construction Summary:

Spun aluminum housing, aluminum wheel, belt drive downblast exhaust fan

Certified Options Summary:

XP/HP pressure level, Curb seal, Non-stick wheel, Cleanout port, Disconnect switches, Birdscreen, UL705, UL762, ULSmoke, Coatings
Fans are also sold under Accurex brand as "XREB" series (replace "GB" with "XREB" for model number)

Certified Mounting Summary:

Mounted to Greenheck roof curb (GPF, GPFV or SDCURB or similar) ≤ 24" tall. Recommend securing fan to curb using sheet metal screws at ½ the manufacturer's specified spacing. SEOR to specify curb, mounting of unit to curb and mounting curb to structure.

Building Code: IBC 2009/CBC 2010

Seismic Certification Limits:

$S_{DS} = 2.28g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Greenheck "GB" Series Accurex "XREB" Series	GB-071	25.0	25.0	34.0	49		
	GB-081	25.0	25.0	34.0	49		
	GB-091	25.0	25.0	34.0	49		
	GB-101	25.0	25.0	34.0	49		
	GB-121	25.0	25.0	34.0	49		
	GB-131	29.0	29.0	36.0	60		
	GB-141	29.0	29.0	36.0	63		
	GB-161	29.0	29.0	38.0	72		
	GB-180	36.0	36.0	40.0	95		
	GB-200	36.0	36.0	40.0	105		
	GB-220	43.0	43.0	44.0	123		
	GB-240	43.0	43.0	44.0	123		
	GB-260	50.0	50.0	48.0	231		
	GB-300	50.0	50.0	48.0	242		
	GB-330	59.0	59.0	50.0	284		
	GB-360	59.0	59.0	50.0	299		
	GB-420	66.0	66.0	56.0	458		
	GB-480	74.0	74.0	60.0	560		
	GB-540	74.0	74.0	60.0	634		6

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Table 3

**Special Seismic Certification
Certified Product Matrix**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck (Accurex)

Model Line: CUE and XRUD Spun Aluminum Rooftop Exhaust Fans

Certified Product Construction Summary:

Spun aluminum housing, aluminum wheel, direct drive upblast exhaust fan

Certified Options Summary:

XP/HP pressure level, Curb seal, Non-stick wheel, Cleanout port, Disconnect switches, Birdscreen, UL705, UL762, ULSmoke, Coatings
Fans are also sold under Accurex brand as "XRUD" series (replace "CUE" with "XRUD" for model number)

Certified Mounting Summary:

Mounted to Greenheck roof curb (GPF, GPFV or SDCURB or similar) ≤ 24" tall. Recommend securing fan to curb using sheet metal screws at ½ the manufacturer's specified spacing. SEOR to specify curb, mounting of unit to curb and mounting curb to structure.

Building Code: IBC 2009/CBC 2010

Seismic Certification Limits:

$S_{DS} = 2.28g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT	
		Depth	Width	Height				
Greenheck "CUE" Series Accurex "XRUD" Series	CUE-060	19.0	19.0	16.0	24			
	CUE-065	19.0	19.0	16.0	24			
	CUE-070	19.0	19.0	16.0	24			
	CUE-075	19.0	19.0	16.0	24			
	CUE-080	21.0	21.0	17.0	30			
	CUE-085	21.0	21.0	17.0	30			
	CUE-090	21.0	21.0	17.0	30			
	CUE-095	21.0	21.0	17.0	30			
	CUE-098	25.0	25.0	36.0	58			
	CUE-099	25.0	25.0	36.0	58			
	CUE-101	25.0	25.0	36.0	58			
	CUE-121	25.0	25.0	36.0	69			
	CUE-131	25.0	25.0	36.0	69			
	CUE-141	29.0	29.0	40.0	88			
	CUE-161	29.0	29.0	40.0	88			
	CUE-180	36.0	36.0	40.0	133			
		CUE-200	36.0	36.0	40.0	144		2

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Table 4

**Special Seismic Certification
Certified Product Matrix**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck (Accurex)

Model Line: CUBE and XRUB Spun Aluminum Rooftop Exhaust Fans

Certified Product Construction Summary:

Spun aluminum housing, aluminum wheel, belt drive upblast exhaust fan

Certified Options Summary:

XP/HP pressure level, Curb seal, Non-stick wheel, Cleanout port, Disconnect switches, Birdscreen, UL705, UL762, ULSmoke, Coatings
Fans are also sold under Accurex brand as "XRUB" series (replace "CUBE" with "XRUB" for model number)

Certified Mounting Summary:

Mounted to Greenheck roof curb (GPF, GPFV or SDCURB or similar) ≤ 24" tall. Recommend securing fan to curb using sheet metal screws at ½ the manufacturer's specified spacing. SEOR to specify curb, mounting of unit to curb and mounting curb to structure.

Building Code: IBC 2009/CBC 2010

Seismic Certification Limits:

$S_{DS} = 2.28g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Greenheck "CUBE" Series Accurex "XRUB" Series	CUBE-098	25.0	25.0	36.0	60		5
	CUBE-099	25.0	25.0	36.0	60		
	CUBE-101	25.0	25.0	36.0	60		
	CUBE-121	25.0	25.0	36.0	60		
	CUBE-131	25.0	25.0	36.0	60		
	CUBE-141	29.0	29.0	40.0	72		
	CUBE-161	29.0	29.0	40.0	78		
	CUBE-180	36.0	36.0	42.0	110		
	CUBE-200	36.0	36.0	42.0	125		
	CUBE-220	43.0	43.0	44.0	155		
	CUBE-240	43.0	43.0	44.0	168		
	CUBE-300	50.0	50.0	48.0	274		
	CUBE-360	59.0	59.0	54.0	378		
	CUBE-420	66.0	66.0	56.0	477		
	CUBE-480	75.0	75.0	62.0	589		

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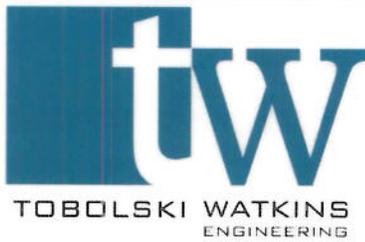


Table 5

**Special Seismic Certification
Certified Product Matrix**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck

Model Line: S-CUBE Spun Aluminum Rooftop Exhaust Fans

Certified Product Construction Summary:
Spun aluminum housing, steel wheel, belt drive upblast exhaust fan

Certified Options Summary:
XP/HP pressure level, Curb seal, Non-stick wheel, Cleanout port, Disconnect switches, Birdscreen, UL705, UL762, ULSmoke, Coatings

Certified Mounting Summary:
Mounted to Greenheck roof curb (GPF, GPFV or SDCURB or similar) ≤ 24" tall. Recommend securing fan to curb using sheet metal screws at ½ the manufacturer's specified spacing. SEOR to specify curb, mounting of unit to curb and mounting curb to structure.

Building Code: IBC 2009/CBC 2010 **Seismic Certification Limits:** $S_{DS} = 2.28g$ $z/h = 1.0$ $I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Greenheck "S-CUBE" Series	S-CUBE-101	25.0	25.0	36.0	51		
	S-CUBE-121	25.0	25.0	36.0	64		
	S-CUBE-131	25.0	25.0	36.0	64		
	S-CUBE-141	29.0	29.0	40.0	77		
	S-CUBE-161	29.0	29.0	40.0	82		
	S-CUBE-180	36.0	36.0	42.0	117		
	S-CUBE-200	36.0	36.0	42.0	133		
	S-CUBE-220	43.0	43.0	44.0	165		
	S-CUBE-240	43.0	43.0	44.0	179		
	S-CUBE-300	50.0	50.0	48.0	291		
	S-CUBE-360	59.0	59.0	54.0	401		
	S-CUBE-420	66.0	66.0	56.0	507		
	S-CUBE-480	75.0	75.0	62.0	603		1

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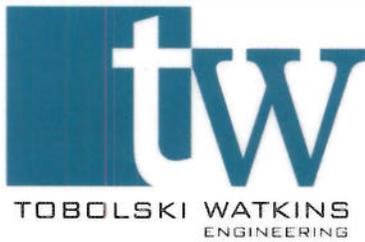


Table 7

**Special Seismic Certification
Certified Product Matrix**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck (Accurex)

Model Line: CW and XSED Spun Aluminum Wall Mount Exhaust Fans

Certified Product Construction Summary:

Spun aluminum housing, aluminum wheel, direct drive wall mount exhaust fan

Certified Options Summary:

XP/HP pressure level, Curb seal, Non-stick wheel, Cleanout port, Disconnect switches, Birdscreen, UL705, UL762, ULSmoke, Coatings
Fans are also sold under Accurex brand as "XSED" series (replace "CW" with "XSED" for model number)

Certified Mounting Summary:

Wall mounted using screws per manufacturer's specified locations. SEOR to specify screw type and location.

Building Code: IBC 2009/CBC 2010

Seismic Certification Limits:

$S_{DS} = 2.28g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Greenheck "CW" Series Accurex "XSED" Series	CW-060	19.0	19.0	16.0	20		10
	CW-065	19.0	19.0	16.0	20		
	CW-070	19.0	19.0	16.0	20		
	CW-075	19.0	19.0	16.0	20		
	CW-080	21.0	21.0	17.0	30		
	CW-085	21.0	21.0	17.0	30		
	CW-090	21.0	21.0	17.0	30		
	CW-095	21.0	21.0	17.0	30		
	CW-098	25.0	25.0	36.0	61		
	CW-099	25.0	25.0	36.0	61		
	CW-101	25.0	25.0	36.0	61		
	CW-121	25.0	25.0	36.0	73		
	CW-131	25.0	25.0	36.0	73		
	CW-141	29.0	29.0	40.0	93		
	CW-161	29.0	29.0	40.0	93		
	CW-180	36.0	36.0	40.0	140		
	CW-200	36.0	36.0	40.0	148		7

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Table 8

**Special Seismic Certification
Certified Product Matrix**

TWEI Project No.: 2011-0175-CO-001_r0

Manufacturer: Greenheck (Accurex)

Model Line: CWB and XSEB Spun Aluminum Wall Mount Exhaust Fans

Certified Product Construction Summary:

Spun aluminum housing, aluminum wheel, belt drive wall mount exhaust fan

Certified Options Summary:

XP/HP pressure level, Curb seal, Non-stick wheel, Cleanout port, Disconnect switches, Birdscreen, UL705, UL762, ULSmoke, Coatings
Fans are also sold under Accurex brand as "XSEB" series (replace "CWB" with "XSEB" for model number)

Certified Mounting Summary:

Wall mounted using screws per manufacturer's specified locations. SEOR to specify screw type and location.

Building Code: IBC 2009/CBC 2010

Seismic Certification Limits:

$S_{DS} = 2.28g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Greenheck "CWB" Series Accurex "XSEB" Series	CWB-098	25.0	25.0	36.0	60		8
	CWB-099	25.0	25.0	36.0	60		
	CWB-101	25.0	25.0	36.0	60		
	CWB-121	25.0	25.0	36.0	75		
	CWB-131	25.0	25.0	36.0	75		
	CWB-141	29.0	29.0	40.0	90		
	CWB-161	29.0	29.0	40.0	97		
	CWB-180	36.0	36.0	42.0	138		
	CWB-200	36.0	36.0	42.0	156		
	CWB-220	43.0	43.0	44.0	194		
	CWB-240	43.0	43.0	44.0	210		
	CWB-300	50.0	50.0	48.0	328		9

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