



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

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

OFFICE USE ONLY

APPLICATION #: OSP-0502

OSHPD 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: QEI-9-300 to QEI-60-300

General Description: Inline mixed flow fans. BY: Mohammad Karim

Mounting Description: Base mounted or Ceiling suspended with spring isolators.

Tested Seismic Enhancements: None DATE: 08/02/2021

Applicant Information

Applicant Company Name: TRU Compliance, by Structural Integrity Associates, Inc.

Contact Person: Galen Reid

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

Telephone: (541) 604-7225 Email: greid@structint.com

Title: Manager, TRU Compliance





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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): _____

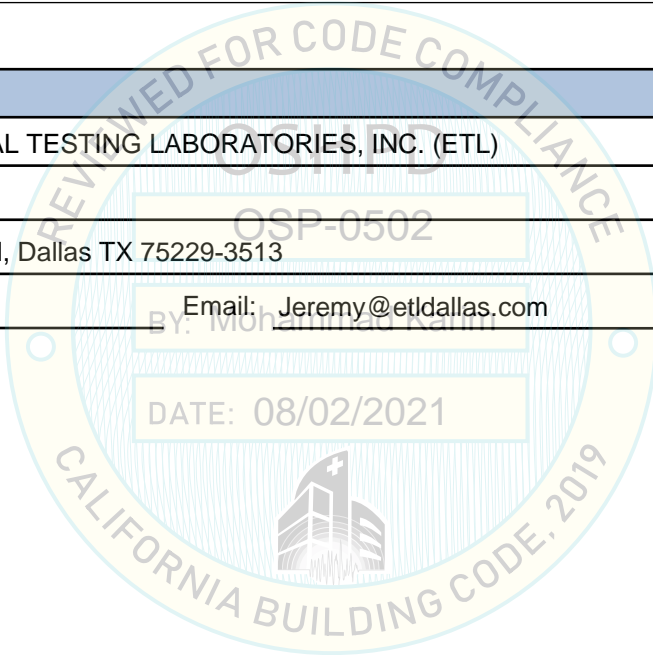
Testing Laboratory

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) = 4.5 (SDS = 2.0g); 2.4 (SDS = 3.2g)

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

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 2

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

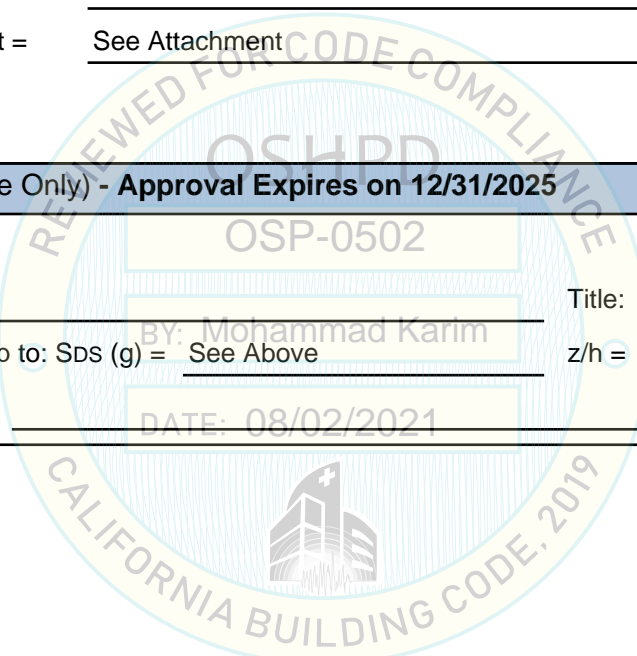
OSHPD Approval (For Office Use Only) - Approval Expires on 12/31/2025

Date: 8/2/2021

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: 08/02/2021



SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16028



Manufacturer: Greenheck Fan Corporation	TABLE 1
Model Line: QEI	

Certified Product Construction Summary:
UL-705; 300 construction; Belt Drive, Carbon Steel shaft; Carbon steel housing; Carbon steel wheel

Certified Options Summary:
Motor Cover, Bolted access door, Copper and nylon extended lube lines, Inlet and outlet guard, Slip fit inlet & outlet, Punched inlet & outlet flanges, Belt guard, Belt tube, Mounting base, 80k and 200k bearings, Ceiling hung with motor in position E, G, or C.

Mounting Configuration:
Ceiling mounted - spring vibration isolated
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0 g$ $z/h = 1.0$ $I_p = 1.5$
 $S_{DS} = 3.2 g$ $z/h = 0.0$

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
QEI	QEI-9-300	28.5	32.0	40.3	293		Interp.
	QEI-12-300	30.1	32.0	40.3	305		Interp.
	QEI-15-300	34.0	36.5	44.9	410		Interp.
	QEI-16-300	34.0	38.0	47.8	432		Interp.
	QEI-18-300	39.5	41.0	51.6	628		Interp.
	QEI-20-300	41.5	43.0	54.3	687		Interp.
	QEI-22-300	44.0	46.0	57.6	874		Interp.
	QEI-24-300	49.0	49.0	64.3	1010		48
	QEI-27-300	53.0	52.0	67.0	1153		Interp.
	QEI-30-300	60.5	65.0	77.0	1180		Interp.
	QEI-33-300	65.0	68.0	81.0	1892		Interp.
	QEI-36-300	69.0	73.0	87.5	2184		Interp.
	QEI-40-300	75.5	85.0	96.3	3028		Interp.
	QEI-44-300	80.5	91.0	104.8	3513		Interp.
	QEI-49-300	86.5	97.0	111.3	4590		Interp.
	QEI-54-300	93.5	105.0	122.3	5199		Interp.
	QEI-60-300	102.4	113.0	126.5	5812		63

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16028



Manufacturer: Greenheck Fan Corporation	TABLE 2
Model Line: QEI	

Certified Product Construction Summary:
UL-705; 300 construction; Belt Drive, Carbon Steel shaft; Carbon steel housing; Carbon steel wheel

Certified Options Summary:
Motor Cover, Bolted access door, Copper and nylon extended lube lines, Inlet and outlet guard, Slip fit inlet & outlet, Punched inlet & outlet flanges, Belt guard, Belt tube, Mounting base, 80k and 200k bearings, Base mounted with motor in positions A, G, or C.

Mounting Configuration:
Base mounted - spring vibration isolated
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0 g$ $z/h = 1.0$ $I_p = 1.5$
 $S_{DS} = 3.2 g$ $z/h = 0.0$

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
QEI	QEI-9-300	28.5	32.0	40.3	293		Interp.
	QEI-12-300	30.1	32.0	40.3	305		Interp.
	QEI-15-300	34.0	36.5	44.9	410		Interp.
	QEI-16-300	34.0	38.0	47.8	432		Interp.
	QEI-18-300	39.5	41.0	51.6	628		Interp.
	QEI-20-300	41.5	43.0	54.3	687		Interp.
	QEI-22-300	44.0	46.0	57.6	874		Interp.
	QEI-24-300	49.0	49.0	64.3	1010		47
	QEI-27-300	53.0	52.0	67.0	1153		Interp.
	QEI-30-300	60.5	65.0	77.0	1180		Interp.
	QEI-33-300	65.0	68.0	81.0	1892		Interp.
	QEI-36-300	69.0	73.0	87.5	2184		Interp.
	QEI-40-300	75.5	85.0	96.3	3028		Interp.
	QEI-44-300	80.5	91.0	104.8	3513		Interp.
	QEI-49-300	86.5	97.0	111.3	4590		Interp.
	QEI-54-300	93.5	105.0	122.3	5199		Interp.
	QEI-60-300	102.4	113.0	126.5	5812		49

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16028



Manufacturer: Greenheck Fan Corporation	Table Description: Motors	TABLE 3
Model Line: QEI		

Building Code: CBC 2019	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
Motor	Baldor	56T	Fan sizes 9-36; 2 hp; 208-600V		Interp.
		143T	Fan sizes 9-36; 1.5 hp; 208-600V		Interp.
		145T	Fan sizes 9-36; 3 hp; 208-600V		Interp.
		182T	Fan sizes 9-40; 5 hp; 208-600V		Interp.
		184T	Fan sizes 9-40; 7.5 hp; 208-600V		Interp.
		213T	Fan sizes 15-44; 10 hp; 208-600V		Interp.
		215T	Fan sizes 15-54; 15 hp; 208-600V		Interp.
		254T	Fan sizes 18-60; 20 hp; 208-600V		Interp.
		256T	Fan sizes 22-60; 25 hp; 208-600V		Interp.
		284T	Fan sizes 24-60; 30 hp; 208-600V	UUT: 25 hp; 575V	47,48
		286T	Fan sizes 27-60; 40 hp; 208-600V		Interp.
		324T	Fan sizes 30-60; 50 hp; 208-600V		Interp.
		326T	Fan sizes 36-60; 60 hp; 208-600V		Interp.
		364T	Fan sizes 40-60; 75 hp; 208-600V		Interp.
		365T	Fan sizes 44-60; 100 hp; 208-600V		Interp.
		404T	Fan sizes 49-60; 100 hp; 208-600V		Interp.
		405T	Fan sizes 49-60; 100 hp; 208-600V	UUT: 100 hp; 230/460V	49,63

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16028



Manufacturer: Greenheck Fan Corporation	Table Description: Fan wheels	TABLE 4
Model Line: QEI		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$
 $S_{DS} = 3.2g$ $z/h = 0.0$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
QEI (Greenheck)	15		15		20	Carbon Steel		Interp.
	18.25		18.25		24	Carbon Steel		Interp.
	20		20		30	Carbon Steel		Interp.
	22.25		22.25		37	Carbon Steel		Interp.
	24.5		24.5		46	Carbon Steel		Interp.
	27		27		56	Carbon Steel		Interp.
	30		30		73	Carbon Steel		47,48
	33		33		89	Carbon Steel		Interp.
	36.5		36.5		135	Carbon Steel		Interp.
	40.25		40.25		171	Carbon Steel		Interp.
	44.5		44.5		228	Carbon Steel		Interp.
	49		49		348	Carbon Steel		Interp.
	54.25		54.25		421	Carbon Steel		Interp.
	60		60		515	Carbon Steel		Interp.
	66		66		630	Carbon Steel		Interp.
73		73		780	Carbon Steel		49,63	

UNIT UNDER TEST (UUT) SUMMARY SHEET



TRU PROJECT NO. 16028

Manufacturer:	Greenheck Fan Corporation	UUT 47
Model Line:	QEI	
Model Number:	QEI-24-300	
Serial Number:		N/A

Product Construction Summary:
UL-705; 300 construction; Belt Drive, Carbon Steel shaft; Carbon steel housing; Carbon steel wheel

Options/Subcomponent Summary:
25 Hp Motor; Motor Cover; Bolted access door; Belt Guard; Belt tube; Inlet and outlet guard; Punched inlet & outlet flanges; Copper and nylon extended lube lines; Mounting base; Motor in position G.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1010	49	49	64.3	4.2	4.2	6.5

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 2019	ICC-ES AC156	2.0 g	1.0	1.5	3.2	2.4	2.13	0.85
		3.2 g	0.0					

Test Mounting Details:



Floor mounted - isolated using (4) VMC MSH-1E-530N isolators w/ (1) 1/2" Grade 8 bolt attaching Isolator to unit & (2) 5/8" Grade 8 bolts attaching isolator to table.
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



TRU PROJECT NO. 16028

Manufacturer:	Greenheck Fan Corporation	UUT 48
Model Line:	QEI	
Model Number:	QEI-24-300	
Serial Number:		N/A

Product Construction Summary:
UL-705; 300 construction; Belt Drive, Carbon Steel shaft; Carbon steel housing; Carbon steel wheel

Options/Subcomponent Summary:
25 Hp Motor; Motor Cover; Bolted access door; Belt Guard; Belt tube; Inlet and outlet guard; Punched inlet & outlet flanges; Copper and nylon extended lube lines; Mounting base; Motor in position G.

<i>UUT Properties</i>						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1010	49	49	64.3	N/A	N/A	N/A

<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 2019	ICC-ES AC156	2.0 g	1.0	1.5	3.2	2.4	2.13	0.85	
		3.2 g	0.0						

Test Mounting Details:



Ceiling suspended - isolated using (4) 5/8" Ø A307 threaded rods w/ rod stiffeners & (2) Mason RW30N-B-410 & (2) Mason RW30N-B 336 isolators & (4) 3/8" Ø diag. cable braces w/ Mason SCB-3/SCBH-3 clips at ends.
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



TRU PROJECT NO. 16028

Manufacturer:	Greenheck Fan Corporation	UUT 49
Model Line:	QEI	
Model Number:	QEI-60-300	

Product Construction Summary:
UL-705; 300 construction; Belt Drive, Carbon Steel shaft; Carbon steel housing; Carbon steel wheel

Options/Subcomponent Summary:
100 Hp Motor; Motor Cover; Bolted access door; Belt Guard; Belt tube; Inlet and outlet guard; Punched inlet & outlet flanges; Copper and nylon extended lube lines; Mounting base; Motor in position C.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
5812	102.4	113.0	126.5	2.5	2.1	4.3

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 2019	ICC-ES AC156	2.0 g	1.0	1.5	3.2	2.4	2.13	0.85
		3.2 g	0.0					

Test Mounting Details:



Floor mounted - isolated using (4) Mason SSLFH-C-1750 isolators w/ (1) 1/2" Grade 8 bolt attaching Isolator to unit & (4) 5/8" Grade 8 bolts attaching isolator to table.
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



TRU PROJECT NO. 16028

Manufacturer:	Greenheck Fan Corporation	UUT 63
Model Line:	QEI	
Model Number:	QEI-60-300	

Product Construction Summary:
UL-705; 300 construction; Belt Drive, Carbon Steel shaft; Carbon steel housing; Carbon steel wheel

Options/Subcomponent Summary:
100 Hp Motor; Motor Cover; Bolted access door; Belt Guard; Belt tube; Inlet and outlet guard; Punched inlet & outlet flanges; Copper and nylon extended lube lines; Mounting base; Motor in position E.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
5812	102.4	113.0	126.5	N/A	N/A	N/A

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 2019	ICC-ES AC156	2.0 g	1.0	1.5	3.2	2.4	2.13	0.85
		3.2 g	0.0					

Test Mounting Details:



Ceiling suspended - isolated using (4) 7/8" Ø A307 threaded rods w/ rod stiffeners & (4) Mason RW30N-D-2150 isolators & (16) 3/8" Ø diag. cable braces w/ Mason SCB-4 Brackets at ends.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.