



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY
APPLICATION #: OSP - 0395-10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: [] New [X] Renewal

Manufacturer Information

Manufacturer: Twin City Fan Companies, Ltd.

Manufacturer's Technical Representative: Matt Settergren

Mailing Address: 5959 Trenton Lane North, Minneapolis, MN 55442-32374

Telephone: (763) 551-7535 Email: msettergren@tcf.com

Product Information

Product Name: Roof and Wall Exhausters

Product Type: Exhaust Centrifugal Fans

Product Model Number: Varies - See Attached Tables
(List all unique product identification numbers and/or part numbers)

General Description: Wall hung and roof curb mounted exhaust fans available in Direct and Belt Drive configurations.
Seismic enhancements made to the test units and modifications required to address anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigid base mounted and rigid wall mounted

Applicant Information

Applicant Company Name: The VMC Group

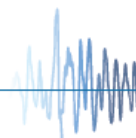
Contact Person: John P. Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: 973-838-1780 Email: john.giuliano@thevmcgroup.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant: [Handwritten Signature] Date: 9/28/16
Title: President Company Name: The VMC Group





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

STATE OF CALIFORNIA – HEALTH AND HUMAN SERVICES AGENCY
OSH-FD-759 (REV 12/16/15)

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

Company Name: The VMC Group

Name: Mr. Ken Tarlow California License Number: SE2851

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: 973-838-1780 Email: ken.tarlow@thevmcgroup.com

Supports and Attachments Preapproval

- Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)
- Supports and attachments are not preapproved

Certification Method

- Testing in accordance with: ICC-ES AC156
- Other (Please Specify): _____

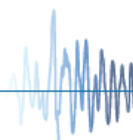
Testing Laboratory

Company Name: Twin City Fan Companies, Ltd Test Lab

Contact Name: Matt Settergren

Mailing Address: 5959 Trenton Lane North, Minneapolis, MN 55442-32374

Telephone: (763) 551-7535 Email: msettergren@tcf.com





OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT FACILITIES DEVELOPMENT DIVISION

STATE OF CALIFORNIA – HEALTH AND HUMAN SERVICES AGENCY
OSH-FD-759 (REV 12/16/15)

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Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: Yes No

Design Basis of Equipment or Components (F_p/W_p) = 1.5 ($S_{DS}=2.0g$, $z/h=1.0$); 1.13 ($S_{DS}=2.5g$, $z/h=0.0$)

S_{DS} (Design spectral response acceleration at short period, g) = 2.0 ($z/h=1.0$); 2.5 ($z/h=0.0$)

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

R_p (Equipment or component response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0 ($S_{DS} = 2.0g$); 0.0 ($S_{DS} = 2.5g$)

Equipment or Component Natural Frequencies (Hz) = See Attached Tables

Overall dimensions and weight (or range thereof) = See Attached Tables

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: Yes No

Design Basis of Equipment or Components (V/W) = _____

S_{DS} (Design spectral response acceleration at short period, g) = _____

S_{D1} (Design spectral response acceleration at 1 second period, g) = _____

R (Response modification coefficient) = _____

Ω_0 (System overstrength factor) = _____

C_d (Deflection amplification factor) = _____

I_p (Importance factor) = 1.5

Height to Center of Gravity above base = _____

Equipment or Component Natural Frequencies (Hz) = _____

Overall dimensions and weight (or range thereof) = _____

Tank(s) designed in accordance with ASME BPVC, 2015: Yes No

List of Attachments Supporting Special Seismic Certification

Test Report(s) Drawings Calculations Manufacturer's Catalog

Other(s) (Please Specify): _____

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature:  Date: 11/3/2016

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to : S_{DS} (g) = See Above z/h = See Above

Condition of Approval (if applicable): _____

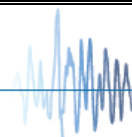


Table 1 - Certified Wall Mounted Centrifugal Exhausters

Twin City		Aerovent		Testing Scope	Max Dimensions (in)			Tested Weight (lb)	Max Weight (lb) ¹
Approved Model	Size	Approved Model	Size		Depth	Width	Height		
DCRW DCRWR	071B/072B/073B/073BE	ATDW ATDWR	071/072/073/073E	Extrapolated	26.44	22.00	22.00	---	91
	081B/082B/083B/083BE		081/082/083/083E		26.44	22.00	22.00	---	91
	091B/092B/093B/093BE		091/092/093/093E		28.13	22.00	22.00	---	111
	110B/110BE		110/110E		30.31	30.00	30.00	---	114
	120B/120BE		120/120E		29.19	30.00	30.00	---	117
	140B/140BE		140/140E	UUT 13-2	32.56	30.00	30.00	84	---
				UUT 13-1	38.56	30.00	30.00	86	---
	160B/160BE		160/160E	Interpolated	29.68	30.00	30.00	---	129
					31.81	30.00	30.00	---	160
	180B/180BE		180/180E	UUT 14-2	39.17	36.00	36.00	138	---
UUT 14-1		39.17		36.00	36.00	150	---		
Extrapolated		31.17		36.00	36.00	---	164		
BCRW BCRWR	110B	AWX AWXR	110	Extrapolated	30.56	30.00	30.00	---	140
	120B		120		29.19	30.00	30.00	---	145
	140B/140BHP		140/140HP		30.58	30.00	30.00	---	159
	160B/160BMP/160BHP		160/160MP/160HP	UUT 17-2	39.81	30.00	30.00	124	---
				UUT 17-1	39.81	30.00	30.00	126	---
	180B/180BMP/180BHP		180/180MP/180HP	Interpolated	31.81	30.00	30.00	---	170
					34.31	36.00	36.00	---	195
					37.61	45.00	45.00	---	210
	210B/210BHP		210/210HP	39.56	45.00	45.00	---	230	
	240B/240BHP		240/240HP	UUT 18-2	48.25	54.00	54.00	370	---
300B/300BHP	300/300HP	UUT 18-1	48.25	54.00	54.00	400	---		

1. Max Weight included fan and motor only

Table 2 - Certified Roof Mounted Exhausters

Approved Model	Twin City		Aerovent		Testing Scope	Max Dimensions (in)			Tested Weight (lb)	Max Weight (lb) ¹	
	Size		Size			Depth	Width	Height			
	Approved Model	Size	Approved Model	Size							
LUD	14E4, 14E8, 14B105		BSD53	14B105	Extrapolated	21.50	21.50	46.39	---	90	
	16E4, 16E8, 16B105			16B105		24.50	24.50	47.39	---	104	
	18E4, 18E8, 18B105			18B105		26.50	26.50	48.39	---	119	
	21E4, 21E8, 21B105			21B105	21B105	UUT 23	29.50	29.50	43.11	110	---
	24E4, 24E8, 24B105, 24Z5			24B105	24B105	Interpolated	29.50	29.50	53.11	---	121
	30E4, 30E8, 30B105, 30Z5			30B105	30B105	UUT 1	32.50	32.50	44.99	172	---
	36E4, 36E8, 36B206, 36Z5			36B206	36B206	Interpolated	32.50	32.50	54.99	---	187
	42E4, 42E8, 42B304, 42Z5			42B304	42B304		40.50	40.50	58.68	---	239
	48E4, 48E8, 48B304, 48Z5			48B304	48B304		46.50	46.50	63.61	---	329
				48B304	48B304		52.50	52.50	74.51	---	417
		48B304	48B304	UUT 24	58.50	58.50	77.51	480	---		
		48B304	48B304	UUT 2	58.50	58.50	77.51	522	---		
		48B304	48B304	Extrapolated	58.50	58.50	77.51	---	572		
LUB	21E4, 21E8, 21B105, 21L1, 21L2		BSB53	21B105	Extrapolated	29.50	29.50	55.95	---	155	
	24E4, 24E8, 24B105, 24L1, 24L2, 24Z5			24B105		32.50	32.50	57.69	---	200	
	30E4, 30E8, 30B105, 30L1, 30L2, 30Z5			30B105		30B105	40.50	40.50	62.25	---	244
	36E4, 36E8, 36B206, 36L1, 36L2, 36Z5			36B206	36B206	UUT 25	40.50	40.50	56.25	268	---
	42E4, 42E8, 42B304, 42L1, 42L2, 42Z5			42B304	42B304	UUT 3	46.50	46.50	53.61	242	---
	48E4, 48E8, 48B304, 48L1, 48L2, 48Z5			48B304	48B304	Interpolated	46.50	46.50	66.25	---	266
	60C3, 60C6, 60L1, 60L2, 60Z5			N/A	N/A		52.50	52.50	72.23	---	448
	54C3, 54C6, 54B406, 54L1, 54L2, 54Z5			54B406	54B406	58.50	58.50	75.23	---	483	
				N/A	N/A	UUT 4	70.50	70.50	88.05	536	---
				54B406	54B406	Interpolated	70.50	70.50	86.05	---	590
		54B406	54B406	UUT 26	64.50	64.50	83.05	672	---		
LUBMO LUBSH	21E4, 21E8, 21B105, 21L1, 21L2		N/A	N/A	Extrapolated	29.50	42.75	58.20	---	290	
	24E4, 24E8, 24B105, 24L1, 24L2, 24Z5			N/A		32.50	45.75	59.94	---	345	
	30E4, 30E8, 30B105, 30L1, 30L2, 30Z5			N/A		40.50	55.75	64.44	---	407	
	36E4, 36E8, 36B206, 36L1, 36L2, 36Z5			N/A	N/A	UUT 5	46.50	61.75	58.44	430	---
	42E4, 42E8, 42B304, 42L1, 42L2, 42Z5			N/A	N/A	Interpolated	46.50	71.75	68.44	---	469
	48E4, 48E8, 48B304, 48L1, 48L2, 48Z5			N/A	N/A		52.50	70.00	74.42	---	849
	54C3, 54C6, 54B406, 54L1, 54L2, 54Z5			N/A	N/A		58.50	76.00	77.42	---	957
	60C3, 60C6, 60L1, 60L2, 60Z5			N/A	N/A		64.50	83.50	81.67	---	991
				N/A	N/A	UUT 6	70.50	89.50	84.67	934	---
				N/A	N/A	Extrapolated	70.50	89.50	84.67	---	1025
DCRD	060B, 060BE		ACXD	060	Extrapolated	18.50	18.50	33.63	---	32	
	070B, 070BE			070		18.50	18.50	33.63	---	32	
	080B, 080BE			080		18.50	18.50	33.63	---	34	
	085B, 085BE			085		21.00	21.00	37.31	---	45	
	090B, 090BE			090		21.00	21.00	37.31	---	45	
	095B, 095BE			95		21.00	21.00	37.31	---	45	
	100B, 100BE			100		21.00	21.00	35.31	---	52	
	120B, 120BE			120		UUT 7	27.50	27.50	30.38	70	---
	130B, 130BE			130	Interpolated	27.50	27.50	40.38	---	70	
	140B, 140BE			140		27.50	27.50	41.25	---	72	
	150B, 150BE			150		27.50	27.50	41.50	---	74	
	160B, 160BE			160		30.44	30.44	44.75	---	86	
	170B, 170BE			170		30.44	30.44	45.25	---	86	
	180B, 180BE			180		38.38	38.38	47.25	---	97	
				180		UUT 8	38.38	38.38	48.25	150	---

Table 2 - Certified Roof Mounted Exhausters (Continued)

Approved Model	Twin City		Aerovent		Testing Scope	Max Dimensions (in)			Tested Weight (lb)	Max Weight (lb) ¹			
	Size	Approved Model	Size	Approved Model		Depth	Width	Height					
BCRD BCRD-E	070D	ACXD	070		Extrapolated	25.88	25.88	40.13	---	70			
	075D		075			25.88	25.88	40.13	---	70			
	085D		085			25.88	25.88	41.94	---	95			
	100D/100DHP		100/100HP			27.50	27.50	41.94	---	107			
	120D		120			30.44	30.44	46.13	---	130			
	140D/140DHP		140/140HP			30.44	30.44	46.25	---	163			
	160D/160DHP		160/160HP			32.63	32.63	47.00	---	173			
	180D/180DHP		180/180HP			38.38	38.38	51.88	---	182			
	210D/210DHP		210/210HP			39.54	39.54	50.06	182	---			
	240D/240DHP		240/240HP			Interpolated	38.38	38.38	52.06	---	189		
	300D/300DHP		300/300HP		Interpolated	43.13	43.13	53.88	---	196			
	360D/360DHP		360/360HP		Interpolated	51.38	51.38	56.88	---	401			
	420D		420		Interpolated	60.75	60.75	62.38	---	572			
	480D		480		Interpolated	65.81	65.81	65.81	---	604			
DCRU DCRUR	071B, 072B, 073B, 073BE	ATD ATDR	071, 072, 073		Extrapolated	22.00	22.00	42.44	---	70			
	081B, 082B, 083B, 083BE		081, 082, 083			22.00	22.00	42.44	---	70			
	091B, 092B, 093B, 093BE		091, 092, 093		UUT 11	22.00	22.00	34.13	64	---			
	110B, 110BE		110		Interpolated	22.00	22.00	44.13	---	70			
	120B, 120BE		120			30.00	30.00	46.31	---	118			
	140B, 140BE		140			30.00	30.00	45.19	---	127			
	160B, 160BE		160			30.00	30.00	45.68	---	132			
	180B, 180BE		180		UUT 12	36.00	36.00	47.17	128	---			
	BCRU BCRUR BCRUSH		110B		ATB ATBR	110		Extrapolated	36.00	36.00	47.17	---	140
			120B			120			30.00	30.00	46.56	---	153
140B/140BHP		140/140HP	30.00	30.00		45.19			---	158			
160B/160BMP/160BHP		160/160MP/160HP	UUT 15	30.00		30.00		46.58	---	166			
180B/180BMP/180BHP		180/180MP/180HP	Interpolated	30.00		30.00		47.81	---	171			
210B/210BHP		210/210HP		36.00		36.00		50.31	---	223			
240B/240BHP		240/240HP		45.00		45.00		53.61	---	252			
300B/300BHP		300/300HP		45.00		45.00		55.56	---	323			
360B/360BHP		360/360HP		54.00		54.00		56.25	---	459			
420B		420		63.00		63.00		61.88	---	629			
480B	480	69.00	69.00	64.75	---	642							
DCLH DCLP	060, 060E	N/A	060		Extrapolated	75.00	75.00	57.00	598	---			
	070, 070E		070			26.13	24.00	32.75	---	71			
	080, 080E		080			26.13	24.00	32.75	---	71			
	085, 085E		085			26.13	28.00	32.75	---	76			
	090, 090E		090			26.13	28.00	33.88	---	80			
	095, 095E		095			26.13	28.00	33.88	---	80			
	100, 100E		100			26.13	30.00	36.88	---	94			
	120, 120E		120		UUT 19	26.63	30.00	27.13	111	---			
	BCLH BCLP		100, 100E		N/A	100		Extrapolated	28.00	28.00	36.25	122	---
			120, 120E			120			28.00	28.00	36.25	122	---
140, 140E		140	Extrapolated	28.00		30.00			37.13	---	122		
160, 160E		160	38.63	28.00		37.88			---	138			
180, 180E		180	38.63	28.00		38.63			---	147			
210, 210E		210	40.00	35.00		38.88		---	185				
240, 240E		240	40.00	35.00		39.25		---	191				
300, 300E		300	51.13	40.00		42.50		---	222				
360, 360E		360	UUT 21	51.13		46.25		35.63	238	---			
420, 420E		420	Interpolated	51.13		43.00		43.13	---	238			
480, 480E	480	51.13		46.25	47.38	---	313						
UUT 22	63.13	52.50		47.13	---	388							
Extrapolated	63.75	62.50		55.75	---	463							
			75.13	70.63	57.13	---	538						
			76.50	66.00	59.38	615	---						
			87.13	75.63	61.38	---	615						

1. Max Weight included fan and motor only

Table 3 - Certified Direct Driven General Purpose Ventilator Fan Configuration

Twin City Model: LUD

Drive Type: Direct

Aerovent Model: BSD53

Ventilator	HP Motor Wt	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	MFR	UUT
Size 14											Twin City Fan	Extrapolated
Weight 69		X	X									
Size 16		X	X	X								
Weight 78												
Size 18			X	X	X							
Weight 87												
Size 21				X	X	X	X					23
Weight 102												
Size 24		X	X	X	X	X	X	X	X			1
Weight 122												
Size 30				X	X	X	X	X				Interpolated
Weight 176												
Size 36						X	X	X	X	X		
Weight 215												
Size 42							X	X	X	X		
Weight 303												
Size 48								X	X	X	2, 24	
Weight 458												

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	1
		Straight Sided	23
12"	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
	Galv Steel	Self-Flashing	
		Straight Sided	
Aluminum	Self-Flashing	24	
	Straight Sided		
18"	Galv Steel	Self-Flashing	2
		Straight Sided	
	Aluminum	Self-Flashing	24
		Straight Sided	2

Windband			
Gauge	Material	Sizes	UUT
20	Galv Steel	14 - 48	1, 23
0.040	Aluminum	14 - 48	2, 24

Butterfly Dampers		
Material	Sizes	UUT
Galv Steel	14 - 48	1, 23
Aluminum	14 - 48	2, 24

Stack Caps		
Material	Sizes	UUT
Galv Steel	14 - 48	1, 23
Aluminum	14 - 48	2, 24

Table 4 - Certified Belt Driven General Purpose Ventilator Fan (w/ Motor Below Fan) Configuration

Twin City Model: LUB

Drive Type: Belt

Aerovent Model: BSB53

Ventilator	HP Motor Wt	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	MFR	UUT
Size 21	123	X	X	X	X									Twin City Fan	Extrapolated
Weight 140		X	X	X	X	X	X								
Size 30	200	X	X	X	X	X	X	X	X	X					25
Weight 242			X	X	X	X	X	X	X	X					3
Size 42	405		X	X	X	X	X	X	X	X	X				Interpolated
Weight 48				X	X	X	X	X	X	X	X	X			
Size 54	415				X	X	X	X	X	X	X	X			26
Weight 497					X	X	X	X	X	X	X	X	X		
Size 60	585				X	X	X	X	X	X	X	X	X		4
Weight 585					X	X	X	X	X	X	X	X	X		

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	3
		Straight Sided	
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
12"	Galv Steel	Self-Flashing	25
		Straight Sided	
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
18"	Galv Steel	Self-Flashing	Interpolated
		Straight Sided	
	Aluminum	Self-Flashing	4, 26
		Straight Sided	

Windband			
Gauge	Material	Sizes	UUT
20	Galv Steel	21 - 48	3, 25
18	Galv Steel	54 - 60	Interpolated
0.040	Aluminum	21 - 48	
0.063	Aluminum	54 - 60	4, 26

Butterfly Dampers		
Material	Sizes	UUT
Galv Steel	21 - 60	3, 25
Aluminum	21 - 60	4, 26

Stack Caps		
Material	Sizes	UUT
Galv Steel	21 - 60	3, 25
Aluminum	21 - 60	4, 26

**Table 5 - Certified Belt Driven General Purpose Exhaust & UL Smoke Control System Fan
(w/ Motor Out of Airstream) Configuration**

Twin City Model: LUBMO

Description: Motor Located Out of Airstream

Drive Type: Belt

Twin City Model: LUBSH

Description: Motor Located Out of Airstream & Specifically Design for Smoke Control

Drive Type: Belt

Ventilator	HP Motor Wt	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	MFR	UUT
Size 21	258	X	X	X	X									Twin City Fan	Extrapolated
Weight 24	285	X	X	X	X	X	X								
Size 30	395	X	X	X	X	X	X	X	X	X					
Weight 36	462		X	X	X	X	X	X	X	X					
Size 42	673		X	X	X	X	X	X	X	X	X				Interpolated
Weight 48	753			X	X	X	X	X	X	X	X	X			
Size 54	925				X	X	X	X	X	X	X	X	X		
Weight 60	1044				X	X	X	X	X	X	X	X	X		

Roof Curb				
Height	Material	Models	Base Style	UUT
8"	Galv Steel	LUBMO	Self-Flashing	Extrapolated
			Straight Sided	
		LUBSH	Self-Flashing	5
12"	Aluminum	LUBMO	Self-Flashing	Interpolated
			Straight Sided	
		LUBSH	Self-Flashing	
	Galv Steel	LUBMO	Self-Flashing	
			Straight Sided	
		LUBSH	Self-Flashing	
18"	Galv Steel	LUBMO	Straight Sided	6
			Self-Flashing	
		LUBSH	Self-Flashing	
18"	Aluminum	LUBMO	Self-Flashing	6
			Straight Sided	

Windband				
Gauge	Material	Sizes	Models	UUT
20	Galv Steel	21 - 48	LUBMO	Extrapolated
			LUBSH	5
18	Galv Steel	54 - 60	LUBMO	Interpolated
			LUBSH	
0.040	Aluminum	21 - 48	LUBMO	6
0.063		54 - 60		

Butterfly Dampers			
Material	Sizes	Models	UUT
Galv Steel	21 - 60	LUBMO	Extrapolated
		LUBSH	5
Aluminum	21 - 60	LUBMO	6

Stack Caps			
Material	Sizes	Models	UUT
Galv Steel	21 - 60	LUBMO	Extrapolated
	21 - 60	LUBSH	5
Aluminum	21 - 60	LUBMO	6

Housing Panels				
Gauge	Material	Sizes	Models	UUT
18	Galv Steel	21 - 48	LUBMO	Extrapolated
			LUBSH	5
16	Galv Steel	54 - 60	LUBMO	Interpolated
			LUBSH	
0.063	Aluminum	21 - 60	LUBMO	6

Table 6 - Certified Direct Driven Downblast Roof Exhauster Fan Configuration

Twin City Model: DCRD Drive Type: Direct Aerovent Model: ACXD

Exhauster	HP	1/15	1/8	1/4	1/3	1/2	3/4	1	Mounting	UUT
	Motor Wt	8	9	11	13	16	18	20		
Size 60			X	X					Base	Extrapolated
Weight 21			X	X						
Size 70			X	X						
Weight 21			X	X						
Size 80			X	X						
Weight 23			X	X						
Size 85			X	X						
Weight 34			X	X						
Size 90			X	X						
Weight 34			X	X						
Size 95			X	X						
Weight 34			X	X						
Size 100	X	X	X	X						
Weight 39	X	X	X	X	X					
Size 120	X	X	X	X	X	X				7
Weight 41	X	X	X	X	X	X				Interpolated
Size 130			X				X			
Weight 54			X				X			
Size 140			X				X			
Weight 56			X				X			
Size 150			X					X		
Weight 66			X					X		
Size 160			X		X			X		
Weight 66			X		X			X		
Size 170			X		X			X		
Weight 77			X		X			X		
Size 180					X			X		
Weight 80					X			X		

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	Extrapolated
		Straight Sided	
12"	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
	Galv Steel	Self-Flashing	
		Straight Sided	
18"	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Straight Sided	8

Outer Construction			
Component	Material	Sizes	UUT
Top Cover	.032 Aluminum	60-180	7,8
Motor Housing Band	.040 Aluminum	60-180	7,8
Shroud	.063 Aluminum	60-180	7,8

Table 7 -Certified Belt Driven Downblast Roof Exhauster Fan Configuration

Twin City Model: BCRD

Description: Aluminum Spun Outer Construction

Drive Type: Belt

Aerovent Model: ACXD

Twin City Model: BCRD-E

Description: Endurex™ Polymeric Outer Construction

Drive Type: Belt

Exhauster	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	Model Availability	Mounting	UUT
	Motor Wt	19	21	26	32	54	60	63	92	114	176			
Size 70												BCRD	Base	Extrapolated
Weight 51	X											BCRD-E		
Size 75												BCRD		
Weight 51	X											BCRD-E		
Size 85												BCRD		
Weight 76	X											BCRD-E		
Size 100												BCRD		
Weight 81	X	X	X									BCRD-E		
Size 100 Hi Pr												BCRD		
Weight 81	X	X	X									BCRD-E		
Size 120												BCRD		
Weight 104	X	X	X									BCRD-E		
Size 140												BCRD		
Weight 109	X	X	X	X	X							BCRD-E		
Size 140 Hi Pr												BCRD		
Weight 109	X	X	X	X	X							BCRD-E		
Size 160												BCRD		
Weight 119	X	X	X	X	X							BCRD-E		
Size 160 Hi Pr												BCRD		
Weight 119	X	X	X	X	X							BCRD-E		
Size 180												BCRD		
Weight 138	X	X	X	X	X	X	X					BCRD-E		
Size 180 Hi Pr												BCRD		
Weight 138	X	X	X	X	X	X	X					BCRD-E		
Size 210												BCRD		
Weight 160	X	X	X	X	X	X	X	X				BCRD-E		
Size 210 Hi Pr												BCRD		
Weight 160	X	X	X	X	X	X	X	X				BCRD-E		
Size 240												BCRD		
Weight 208	X	X	X	X	X	X	X	X				BCRD-E		
Size 240 Hi Pr												BCRD		
Weight 208	X	X	X	X	X	X	X	X				BCRD-E		
Size 300												BCRD		
Weight 287	X	X	X	X	X	X	X	X	X			BCRD		
Size 300 Hi Pr												BCRD		
Weight 287	X	X	X	X	X	X	X	X	X			BCRD		
Size 360												BCRD		
Weight 396		X	X	X	X	X	X	X	X	X		BCRD		
Size 360 Hi Pr												BCRD		
Weight 396		X	X	X	X	X	X	X	X	X		BCRD		
Size 420												BCRD		
Weight 494			X	X	X	X	X	X	X	X	X	BCRD		
Size 480												BCRD		
Weight 508			X	X	X	X	X	X	X	X	X	BCRD		

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	Extrapolated
		Straight Sided	
	Aluminum	Self-Flashing	
12"	Galv Steel	Self-Flashing	9
		Straight Sided	Interpolated
	Aluminum	Self-Flashing	27
18"	Galv Steel	Self-Flashing	Interpolated
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	10

Outer Construction			
Component	Material	Model / Sizes	UUT
Top Cover	.032 Aluminum	BCRD / 70-240	Extrapolated
	.040 Aluminum	BCRD / 300-480	10, 27
	.150 Endurex	BCRD-E / 070-240	9
Motor Housing Band	.040 Aluminum	BCRD / 70-480	10, 27
Shroud	.063 Aluminum	BCRD / 70-240	Extrapolated
	.080 Aluminum	BCRD / 300-360	
	.090 Aluminum	BCRD / 420-480	10, 27
	.150 Endurex	BCRD-E / 70-240	9

Table 8 - Certified Base Mounted Direct Driven Upblast Roof Exhauster Fan Configuration

Twin City Model: DCRU

Description: Base Mounted General Exhaust (Clean Air)

Drive Type: Direct

Aerovent Model: ATD

Twin City Model: DCRUR

Description: Base Mounted Kitchen Exhaust (Grease-Laden Air)

Drive Type: Direct

Aerovent Model: ATDR

Exhauster	HP	1/8	1/4	1/3	1/2	3/4	1	Mounting	UUT
	Motor Wt	9	11	13	16	18	20		
Size 71-73		X	X					Base	Extrapolated
Weight 91									
Size 81-83		X	X	X					
Weight 91									
Size 91-93		X	X	X					11
Weight 111									
Size 110		X			X				Interpolated
Weight 114									
Size 120		X	X			X			
Weight 117									
Size 140		X			X		X		
Weight 129									
Size 160			X		X		X		
Weight 160									
Size 180					X		X		12
Weight 164									

Roof Curb					
Height	Material	Base Style	UUT		
8"	Galv Steel	Self-Flashing	Extrapolated		
		Straight Sided			
12"	Aluminum	Self-Flashing	Interpolated		
		Straight Sided			
	Galv Steel	Self-Flashing			
		Straight Sided			
18"	Aluminum	Self-Flashing		12	
		Straight Sided			
	Galv Steel	Self-Flashing			Extrapolated
		Straight Sided			

Motor Cooling Tubes				
MFR	Tube Diameter	Tube Material	Tube Qty	UUT
TCF	4"	Aluminum	1	11,12

Construction			
Component	Material	Sizes	UUT
Top Cover	.032 Aluminum	71-180	11,12
Motor Housing Band	.040 Aluminum	71-180	11,12
Shroud	.063 Aluminum	71-180	11,12
Curb Cap	.063 Aluminum	71-180	11,12

Table 9 - Certified Wall Mounted Direct Driven Centrifugal Exhausters Fan Configuration

Twin City Models: DCRW, DCRWR

Aerovent Models: ATDW, ATDWR

Description: Wall Mounted Exhaust

Motors	HP	1/8	1/4	1/3	1/2	3/4	1	Mounting	UUT
	Motor Wt	9	11	13	16	18	20		
Size 71-73		X	X					Wall	Extrapolated
Weight 91									
Size 81-83		X	X	X					
Weight 91									
Size 91-93		X	X	X					13-1, 13-2
Weight 111									
Size 110		X			X				Interpolated
Weight 114									
Size 120		X	X			X			
Weight 117									
Size 140		X			X		X		
Weight 129									
Size 160			X		X		X		
Weight 160									
Size 180					X		X		14-1, 14-2
Weight 164									

Construction			
Component	Material	Sizes	UUT
Top Cover	.032 Aluminum	71-180	13-1, 13-2, 14-1, 14-2
Motor Housing Band	.040 Aluminum	71-180	13-1, 13-2, 14-1, 14-2
Shroud	.063 Aluminum	71-180	13-1, 13-2, 14-1, 14-2
Curb Base*	.063 Aluminum	71-180	13-1, 13-2, 14-1, 14-2

* Curb Base is a wall mounted component

Motor Cooling Tubes			
Tube Diameter	Tube Material	Tube Qty	UUT
4"	Aluminum	1	13-1, 13-2, 14-1, 14-2

All Components manufactured by Twin City Fan

Motor					
MFR	Phase	Voltage	Type	HP	UUT
McMillan	1	115	EC	1/2	13-1
					14-1
Twin City Fan	1	115	PSC	1	13-2
					230

Mounting Adapter		
Length	Material	UUT
4"	0.160" Aluminum	13-2
10"	0.160" Aluminum	13-1, 14-1, 14-2

Table 10 - Certified Wall Mounted Belt Driven Centrifugal Exhauster Fan Configuration

Twin City Models: BCRW, BCRWR

Aerovent Models: AWX, AWXR

Motors	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	Mounting	UUT		
	Motor Wt	19	21	26	32	54	60	63	92	114				
Size 110		X	X	X							Wall	Extrapolated		
Weight 114														
Size 120		X	X	X										
Weight 119														
Size 140		X	X	X	X	X								
Weight 127														
Size 140 Hi Pr		X	X	X	X	X								
Weight 127														
Size 160		X	X	X	X	X								17-1, 17-2
Weight 132														
Size 160 Md Pr		X	X	X	X	X								
Weight 132														
Size 160 Hi Pr		X	X	X	X	X								
Weight 132														
Size 180		X	X	X	X	X	X	X						
Weight 140														
Size 180 Md Pr		X	X	X	X	X	X	X						
Weight 140														
Size 180 Hi Pr		X	X	X	X	X	X	X					Interpolated	
Weight 140														
Size 210		X	X	X	X	X	X	X						
Weight 147														
Size 210 Hi Pr		X	X	X	X	X	X	X						
Weight 147														
Size 240		X	X	X	X	X	X	X						
Weight 167														
Size 240 Hi Pr		X	X	X	X	X	X	X	X	X				
Weight 167														
Size 300		X	X	X	X	X	X	X	X	X				
Weight 258														
Size 300 Hi Pr		X	X	X	X	X	X	X	X	X				
Weight 258												18-1, 18-2		

Description: Wall Mounted Exhaust

Construction			
Component	Material	Sizes	UUT
Top Cover	.032 Aluminum	110-300	17-1, 17-2, 18-1, 18-2
Motor Housing Band	.040 Aluminum	110-300	17-1, 17-2, 18-1, 18-2
Shroud	.063 Aluminum	110-180	17-1, 17-2
	0.080 Aluminum	210-240	Interpolated
	0.125 Aluminum	300	18-1, 18-2
Curb Base	.063 Aluminum	110-160	17-1, 17-2
	.080 Aluminum	180-300	18-1, 18-2

* Curb Base is a wall mounted component

Motor Cooling Tubes				
MFR	Tube Diameter	Tube Material	Tube Qty	UUT
TCF	4"	Aluminum	1 (Up to Size 240)	17-1, 17-2
			2 (Size 300)	18-1, 18-2

All Components manufactured by Twin City Fan

Motor				
MFR	Phase	Voltage	Type	UUT
Baldor	3	230	Induction	17-1
		460		18-2
TECO	3	230	Induction	17-2
		460		18-1

Table 11 - Certified Base Mounted Belt Driven Upblast Roof Exhauster Fan Configuration

Twin City Model: BCRU

Description: Base Mounted General Exhaust (Clean Air)

Drive Type: Belt

Aerovent Model: ATB

Twin City Model: BCRUR

Description: Base Mounted Kitchen Exhaust (Grease-Laden Air)

Drive Type: Belt

Aerovent Model: ATBR

Twin City Mode: BCRUSH

Description: Base Mounted Smoke & Heat Exhaust

Drive Type: Belt

Exhauster	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	Mounting	UUT
	Motor Wt	19	21	26	32	54	60	63	92	114	176		
Size 110												Base	Extrapolated
Weight 127	X	X	X										
Size 120													
Weight 132	X	X	X										
Size 140													
Weight 141	X	X	X	X	X								
Size 140 Hi Pr													
Weight 141	X	X	X	X	X								
Size 160													
Weight 151	X	X	X	X	X								
Size 160 Md Pr													
Weight 151	X	X	X	X	X								
Size 160 Hi Pr													
Weight 151	X	X	X	X	X	X							
Size 180													
Weight 160	X	X	X	X	X	X	X						
Size 180 Md Pr													
Weight 160	X	X	X	X	X	X	X						
Size 180 Hi Pr													
Weight 160	X	X	X	X	X	X	X						
Size 210													
Weight 189	X	X	X	X	X	X	X						
Size 210 Hi Pr													
Weight 189	X	X	X	X	X	X	X						
Size 240													
Weight 209	X	X	X	X	X	X	X						
Size 240 Hi Pr													
Weight 209	X	X	X	X	X	X	X	X	X				
Size 300													
Weight 345	X	X	X	X	X	X	X	X	X	X			
Size 300 Hi Pr													
Weight 345	X	X	X	X	X	X	X	X	X	X			
Size 360													
Weight 515	X	X	X	X	X	X	X	X	X	X			
Size 360 Hi Pr													
Weight 515	X	X	X	X	X	X	X	X	X	X			
Size 420													
Weight 533	X	X	X	X	X	X	X	X	X	X	X		
Size 480													
Weight 647	X	X	X	X	X	X	X	X	X	X	X		

Roof Curb				
Height	Material	Base Style	UUT	
8"	Galv Steel	Self-Flashing	Extrapolated	
		Straight Sided		
	Aluminum	Self-Flashing		
		Straight Sided		
12"	Galv Steel	Self-Flashing	15	
		Straight Sided		
	Aluminum	Self-Flashing		Interpolated
		Straight Sided		
18"	Galv Steel	Self-Flashing	Interpolated	
		Straight Sided		
	Aluminum	Self-Flashing		16
		Straight Sided		

Construction			
Component	Material	Sizes	UUT
Top Cover	.032 Aluminum	110-300	15
	.040 Aluminum	360-480	16
Motor Housing Band	.040 Aluminum	110-480	15,16
Shroud	.063 Aluminum	110-180	15
	0.080 Aluminum	210-240	Interpolated
	0.125 Aluminum	300-480	16
Curb Cap	.063 Aluminum	110-160	15
	.080 Aluminum	180-360	Interpolated
	.100 Aluminum	420-480	16

MFR	Tube Diameter	Motor Cooling Tubes		
		Tube Material	Tube Qty	UUT
TCF	4"	Aluminum	1 (BCRU/R 110 - 240)	Extrapolated
			2 (BCRU/R 300 - 480)	16
			3 (BCRUSH 110 - 240)	15
			4 (BCRUSH 300 - 480)	Extrapolated

Table 12 - Certified Direct Driven Low Profile Centrifugal Roof Exhauster Fan Configuration

Twin City Model: DCLH

Drive Type: Direct

Twin City Model: DCLP

Drive Type: Direct

Exhauster	HP	1/15	1/8	1/4	1/3	1/2	Mounting	Enclosure Style	UUT
	Motor Wt	8	9	11	13	16			
Size 60			X	X			Base	Hooded	Extrapolated
Weight 46									
Size 70			X	X					
Weight 46									
Size 80			X	X					
Weight 50									
Size 85			X	X					
Weight 53									
Size 90			X	X					
Weight 53									
Size 95			X	X					
Weight 53									
Size 100		X	X	X	X				
Weight 62									
Size 120		X	X	X	X	X			
Weight 65									
Size 60			X	X			Base	Penthouse	Extrapolated
Weight 30									
Size 70			X	X					
Weight 30									
Size 80			X	X					
Weight 31									
Size 85			X	X					
Weight 34									
Size 90			X	X					
Weight 34									
Size 95			X	X					
Weight 34									
Size 100		X	X	X	X				
Weight 37									
Size 120		X	X	X	X	X			
Weight 43									

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	Extrapolated
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	
12"	Galv Steel	Self-Flashing	15
		Straight Sided	
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	16
		Straight Sided	

Outer Construction				
Component	Material	Sizes	Enc. Style	UUT
Enclosure	22-Gauge Galv Steel	60-120	Hooded	19
	.081 Aluminum		Penthouse	20
Framework	16-Gauge Galv Steel	60-120	Hooded Penthouse	19,20
Curb Cap	.063 Aluminum	60-120	Hooded Penthouse	19,20

Table 13 - Certified Hooded Style Belt Driven Low Profile Centrifugal Roof Exhuaster Fan Configuration

Twin City Model: BCLH

Drive Type: Belt

Twin City Model: BCLP

Drive Type: Belt

Exhauster	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	Mounting	Enclosure Style	UUT															
	Motor Wt	19	21	26	32	54	60	63	92	114	176																		
Size 100												Base	Hooded	Extrapolated															
Weight 89		X	X												21														
Size 120		X	X	X												Extrapolated													
Weight 92		X	X	X													21												
Size 140		X	X	X	X	X												Extrapolated											
Weight 94		X	X	X	X	X													21										
Size 160		X	X	X	X	X														Extrapolated									
Weight 99		X	X	X	X	X															21								
Size 180		X	X	X	X	X	X															Extrapolated							
Weight 114		X	X	X	X	X	X																21						
Size 210		X	X	X	X	X	X																	Extrapolated					
Weight 125		X	X	X	X	X	X																		21				
Size 240		X	X	X	X	X	X																			Extrapolated			
Weight 145		X	X	X	X	X	X																				21		
Size 300		X	X	X	X	X	X	X	X																			Extrapolated	
Weight 193		X	X	X	X	X	X	X	X					21															
Size 360			X	X	X	X	X	X	X						Extrapolated														
Weight 249			X	X	X	X	X	X	X							21													
Size 420				X	X	X	X	X	X	X							Extrapolated												
Weight 312				X	X	X	X	X	X	X								21											
Size 480				X	X	X	X	X	X	X	X								Base										Penthouse
Weight 379				X	X	X	X	X	X	X	X									22									
Size 100		X	X																		22								
Weight 66		X	X																			22							
Size 120		X	X	X																			22						
Weight 68		X	X	X																				22					
Size 140		X	X	X	X	X																			22				
Weight 69		X	X	X	X	X																				22			
Size 160		X	X	X	X	X						22																	
Weight 75		X	X	X	X	X							22																
Size 180		X	X	X	X	X	X							22															
Weight 96		X	X	X	X	X	X								22														
Size 210		X	X	X	X	X	X									22													
Weight 106		X	X	X	X	X	X										22												
Size 240		X	X	X	X	X	X											22											
Weight 123		X	X	X	X	X	X												22										
Size 300		X	X	X	X	X	X	X	X											22									
Weight 163		X	X	X	X	X	X	X	X												22								
Size 360			X	X	X	X	X	X	X													22							
Weight 198			X	X	X	X	X	X	X														22						
Size 420				X	X	X	X	X	X	X														22					
Weight 266				X	X	X	X	X	X	X															22				
Size 480				X	X	X	X	X	X	X	X															22			
Weight 314				X	X	X	X	X	X	X	X	22																	

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	Extrapolated
		Straight Sided	
12"	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		Straight Sided	
18"	Aluminum	Self-Flashing	22
		Straight Sided	
			Extrapolated

Outer Construction				
Component	Material	Sizes	Enc. Style	UUT
Enclosure	22-Gauge Galv Steel	100-480	Hooded	21
	.081 Aluminum	100-480	Penthouse	22
Framework	16-Gauge Galv Steel	100	Hooded Penthouse	Extrapolated
	14-Gauge Galv Steel	120-360	Hooded Penthouse	
	12-Gauge Galv Steel	420-480	Hooded Penthouse	22
Curb Cap	.063 Aluminum	100-160	Hooded Penthouse	Extrapolated
	.080 Aluminum	180-360	Hooded Penthouse	
	.100 Aluminum	420-480	Hooded Penthouse	

Table 14 - Certified Subcomponents: Wall Mounted Exhausters Miscellaneous Components

Description	Available Models	Material	Manufacturer	UUT
NEMA 1 Disconnect Switch	DCRW, DCRWR, BCRW, BCRWR	Galvanized Steel	Carling, McGill	17-1, 17-2
NEMA 3R Disconnect Switch	DCRW, DCRWR, BCRW, BCRWR	Steel	GE, Levitin, Hubbell	13-1, 13-2
NEMA 4 Disconnect Switch	DCRW, DCRWR, BCRW, BCRWR	Polycarbonate	Salzer	14-1, 14-2
NEMA 7/9 Disconnect Switch	DCRW, DCRWR, BCRW, BCRWR	Cast Aluminum	Killark	18-1, 18-2
Speed Controller	DCRW, DCRWR	Galvanized Steel	Belimo, K/B Electronics	13-1, 13-2
Galvanized Steel Bird Screen	DCRW, DCRWR, BCRW, BCRWR	Galvanized Steel	TCF	13-1, 18-1, 18-2
Aluminum Bird Screen	DCRW, DCRWR, BCRW, BCRWR	Aluminum	TCF	13-2, 14-1, 14-2, 17-1, 17-2
Aluminum Insect Screen	DCRW, DCRWR, BCRW, BCRWR	Aluminum	TCF	14-1, 14-2
Motor & Drive Assembly Rubber Isolators	DCRW, DCRWR, BCRW, BCRWR	Neoprene	TCF	13, 14, 17, 18
Stainless Steel Shaft	DCRW, DCRWR, BCRW, BCRWR	Stainless Steel	TCF	18-1, 18-2
Stainless Steel Hardware	DCRW, DCRWR, BCRW, BCRWR	Stainless Steel	TCF	13-2, 18-1, 18-2
Performance Baffle	DCRW, DCRWR, BCRW, BCRWR	Aluminum	TCF	14-1, 14-2
Motorized Backdraft Dampers	DCRW, DCRWR, BCRW, BCRWR	Galvanized Steel Frame / Aluminum Damper Blades	Air Conditioning Products	14-1, 14-2, 17-1, 17-2
Automatic Backdraft Dampers	DCRW, DCRWR, BCRW, BCRWR	Galvanized Steel Frame / Aluminum Damper Blades	Air Conditioning Products	13-1, 18-1, 18-2

Table 15 - Certified Subcomponents: Wall Mounted Exhausters Wheels

Model	Drive	Arrangement	Size	Wheel Diameter	Material	Manufacturer	Shaft Diameter	UUT
DCRW DCRWR ATDW ATDWR	Direct	4	71	8.38	Aluminum	TCF	N/A	Extrapolated
			72	8.38				
			73	8.38				
			81	8.52				
			82	8.52				
			83	8.52				
			91	11.23				
			92	11.23				
			93	11.23				
			110	12.25				
			120	13.50				
			140	15.00				
			BCRW BCRWR AWX AWXR	Belt				
180	18.25	Interpolated						
110	12.25	14-1, 14-2						
120	13.50	0.75						
140	15.00	0.75						
160	16.75	0.75						
180	19.44	0.75						
210	25.06	0.75						
240	28.25	0.75						
300	31.81	1.19						
360	39.81	1.44						
420	44.56	1.44						
480	50.06	1.44						

Table 16 - Certified Subcomponents: Curb Mounted Exhausters Miscellaneous Components

Description	Available Models	Manufacturer	Test Unit
Inlet Safety Guard	LUD, LUB, LUBMO, LUBSH	TCF	1, 5, 25
Fusible Link Assembly	LUD, LUB, LUBMO, LUBSH	Reed Air Products	5, 24, 25
Magnetic Damper Latches	LUD, LUB, LUBMO, LUBSH	TCF	3, 24, 25
Belt Tube	LUBMO, LUBSH	TCF	5
Motor Cover	LUBMO, LUBSH	TCF	5, 6
Extended Lube Lines	BCRD, BCRD-E, BCRU/R/SH, BCLH/P, LUB, LUBMO, LUBSH	TCF	3, 25, 26
Curb Hinge	BCRD, BCRD-E, BCRU/R/SH, BCLH/P, LUB, LUD	TCF	11
Retaining Chain	BCRD, BCRD-E, BCRU/R/SH, BCLH/P, LUB, LUD	TCF	11
Security Hasp	BCRD, BCRD-E, BCRU/R/SH, BCLH/P, LUB, LUD	TCF	11
Variable Speed Controller	DCRD, DCRU, DCRUR, DCLH, DCLP	KB Electronics, Belimo	7, 8, 11, 12, 20
2-Speed Switch	BCRD, BCRD-E, BCRU, BCRUR, BCLH, BCLP, LUB, LUBMO, LUBSH	Malloy	10, 16, 22
Firestat	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P	Johnson Controls	9, 11, 21
NEMA 1 Disconnect Switch	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	Carling, McGill	5, 7, 11, 16, 19, 22, 27
NEMA 3R Disconnect Switch	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	GE, Levitin, Hubbell	1, 2, 3, 6, 8, 12, 15, 20, 23, 24, 25, 26
NEMA 4 Disconnect Switch	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	Salzar	9, 21
NEMA 7/9 Disconnect Switch	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	Killark	10
Galvanized Steel Bird Screen	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	TCF	2, 7, 8, 10, 11, 14, 16, 19, 20, 21, 22, 23, 26, 27
Aluminum Bird Screen	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	TCF	9
Aluminum Insect Screen	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P	TCF	6, 10, 21
Motor & Drive Assembly Rubber Isolators	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P	TCF	7, 8, 9, 10, 11, 12, 15, 16, 19, 20, 21, 22, 27
Stainless Steel Shaft	BCRD, BCRD-E, BCRU/R/SH, BCLH/P, LUB, LUBMO, LUBSH	TCF	10, 22, 27
Automatic Belt Tensioner	BCRD, BCRD-E, BCRU/R/SH, BCLH/P, LUB, LUBMO, LUBSH	Fenner	10, 15, 21
Stainless Steel Hardware	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P	TCF	10, 20, 27
Tie Down Brackets	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	TCF	4, 8, 12, 24, 25
Performance Baffle	DCRD, BCRD, BCRD-E, DCRU, BCRU	TCF	7, 20
Aluminum Nameplate	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	Retterbush	1, 15, 21, 24
Stainless Steel Nameplate	DCRD, BCRD, BCRD-E, DCRU/R, BCRU/R/SH, DCLH/P, BCLH/P, LUB, LUD, LUBMO, LUBSH	Retterbush	2, 10
Drain Connection	DCRUR, BCRUR	TCF	12
Motorized Backdraft Dampers	DCRD, BCRD, BCRD-E, DCRU, BCRU, DCLH/P, BCLH/P	Air Conditioning Products	8, 10, 12, 15, 19, 22
Automatic Backdraft Dampers	DCRD, BCRD, BCRD-E, DCRU, BCRU, DCLH/P, BCLH/P	Air Conditioning Products	9, 11, 16, 20, 21
2-Groove Drive	BCRD, BCRD-E, BCRU/R/SH, BCLH/P, LUB, LUBMO, LUBSH	TCF	5, 15

Table 17 - Certified Subcomponents: Curb Mounted Exhausters Wheels

Model	Drive	Arrangement	Reference Tables	Size	Propeller Diameter	Material	Manufacturer	Shaft Diameter	UUT
LUD	Direct	4	1	14	14.00	Aluminum	TCF	N/A	Extrapolated
				16	16.00	Aluminum			
				18	18.00	Aluminum			
				21	21.00	Aluminum			23
				24	24.00	Aluminum			Interpolated
						Carbon Steel			1
				30	30.00	Aluminum			Interpolated
						Carbon Steel			
				36	36.00	Aluminum			
						Carbon Steel			
				42	42.00	Aluminum			
						Carbon Steel			
48	48.00	Aluminum	2,24						
		Carbon Steel	Extrapolated						
LUB LUBMO LUBSH	Belt	9	2 & 3	21	21.00	Galvanized Steel	TCF	0.75	Extrapolated
						Aluminum		1.00	
				24	24.00	Galvanized Steel		0.75	
						Aluminum		1.00	
						Carbon Steel		1.00	
						Galvanized Steel		0.75	
				30	30.00	Galvanized Steel		1.00	25
						Aluminum		1.00	Interpolated
						Carbon Steel		0.75	3
				36	36.00	Galvanized Steel		1.00	Interpolated
						Aluminum		1.00	
						Carbon Steel		1.00	5
				42	42.00	Galvanized Steel		1.00	Interpolated
						Aluminum		1.19	
						Carbon Steel		1.19	
				48	48.00	Galvanized Steel		1.19	
						Aluminum		1.44	
						Carbon Steel		1.44	
				54	54.00	Galvanized Steel		1.00	26
						Aluminum		1.19	
						Carbon Steel		1.44	
				60	60.00	Galvanized Steel		1.19	Interpolated
						Aluminum		1.50	6
						Carbon Steel		1.69	4
		Carbon Steel	1.69	Extrapolated					

Table 17 (Continued) - Certified Subcomponents: Curb Mounted Exhausters Wheels

Model	Drive	Arrangement	Reference Tables	Size	Propeller Diameter	Material	Manufacturer	Shaft Diameter	UUT	
DCRD	Direct	4	4	60	8.38	Aluminum		N/A	Extrapolated	
				70	8.38	Aluminum		N/A		
				80	8.52	Aluminum		N/A		
				85	11.23	Aluminum		N/A		
				90	11.23	Aluminum		N/A		
				95	11.23	Aluminum		N/A		
				100	12.06	Aluminum		N/A		
				120	12.70	Aluminum		N/A	7	
				130	14.22	Aluminum		N/A	Interpolated	
				140	14.86	Aluminum		N/A		
				150	16.26	Aluminum		N/A		
				160	17.21	Aluminum		N/A		
				170	18.36	Aluminum		N/A	8	
				180	19.80	Aluminum		N/A		
BCRD BCRD-E	Belt	9	5	70	8.63	Aluminum	TCF	0.75	Extrapolated	
				75	8.63	Aluminum		0.75		
				85	10.50	Aluminum		0.75		
				100	12.25	Aluminum		0.75		
				100HP	10.50	Aluminum		0.75		
				120	13.50	Aluminum		0.75		
				140	15.00	Aluminum		0.75		
				140HP	10.50	Aluminum		0.75		
				160	16.50	Aluminum		0.75		
				160HP	13.50	Aluminum		0.75		
				180	22.78	Aluminum		0.75		
				180HP	16.50	Aluminum		0.75	9	
				210	25.06	Aluminum		0.75	Interpolated	
				210HP	25.06	Aluminum		0.75		
				240	28.25	Aluminum		0.75	27	
				240HP	28.25	Aluminum		0.75		
				300	31.81	Aluminum		1.19		Interpolated
				300HP	31.81	Aluminum		1.19		
				360	39.81	Aluminum		1.44		
				360HP	39.81	Aluminum		1.44		
420	44.56	Aluminum	1.44							
480	50.06	Aluminum	1.44	10						

Table 17 (Continued) - Certified Subcomponents: Curb Mounted Exhausters Wheels

Model	Drive	Arrangement	Reference Tables	Size	Wheel Diameter	Material	Manufacturer	Shaft Diameter	UUT
DCRU DCRUR DCRW DCRWR	Direct	4	6, 7	71-73	8.38	Aluminum	TCF	N/A	Extrapolated
				81-83	8.52	Aluminum		N/A	
				91-92	11.23	Aluminum		N/A	
				93	11.23	Aluminum		N/A	11
				110	12.25	Aluminum		N/A	Interpolated
				120	13.50	Aluminum		N/A	
				140	15.00	Aluminum		N/A	13
				160	16.50	Aluminum		N/A	Interpolated
				180	18.25	Aluminum		N/A	12, 14
BCRU BCRUR BCRW BCRWR BCRUSH	Belt	9	8, 9	110	12.25	Aluminum, Carbon Steel	TCF	0.75	Extrapolated
				120	13.50	Aluminum, Carbon Steel		0.75	
				140	15.00	Aluminum, Carbon Steel		0.75	
				160	12.25	Aluminum, Carbon Steel		0.75	15
				160	16.75	Aluminum, Carbon Steel		0.75	17
				180	19.44	Aluminum, Carbon Steel		0.75	Interpolated
				210	25.06	Aluminum, Carbon Steel		0.75	
				240	28.25	Aluminum, Carbon Steel		0.75	
				300	31.81	Aluminum, Carbon Steel		1.19	18
				360	39.81	Aluminum, Carbon Steel		1.44	Interpolated
				420	44.56	Aluminum, Carbon Steel		1.44	
				480	50.06	Aluminum, Carbon Steel		1.44	16
DCLH DCLP	Direct	4	10	60	8.38	Aluminum	TCF	N/A	Extrapolated
				70	8.38	Aluminum		N/A	
				80	8.52	Aluminum		N/A	
				85	11.23	Aluminum		N/A	
				90	11.23	Aluminum		N/A	
				95	11.23	Aluminum		N/A	
				100	12.06	Aluminum		N/A	
				120	12.70	Aluminum		N/A	19, 20
BCLH BCLP	Belt	9	11	70	8.63	Aluminum	TCF	0.75	Extrapolated
				75	8.63	Aluminum		0.75	
				85	10.50	Aluminum		0.75	
				100	12.25	Aluminum		0.75	
				120	13.50	Aluminum		0.75	
				140	15.00	Aluminum		0.75	
				160	16.50	Aluminum		0.75	
				180	22.78	Aluminum		0.75	
				210	25.06	Aluminum		0.75	21
				240	28.25	Aluminum		0.75	Interpolated
				300	31.81	Aluminum		1.19	
				360	39.81	Aluminum		1.44	
				420	44.56	Aluminum		1.44	
				480	50.06	Aluminum		1.44	22

Table 18 - Certified Subcomponents: Wall Mounted Exhaust Fan Motors

Motor Drive Configuration	HP	Voltage (V)	Weight (lbs.)	Manufacturer	UUT
Belt	1	230	54	Baldor	17-1
	5	460	114		18-2
	1	230	54	TECO	17-2
	5	460	114		18-1
Direct	1/2	115	16	McMillan	13-1
	1	115	20		14-1
	1/2	115	16	Twin City Fan	13-2
	1	230	20		14-2

Table 19 - Certified Subcomponents: Roof Curb Mounted Exhaust Fan Motors

Motor Drive Configuration	HP	Voltage (V)	Weight (lbs.)	Manufacturer	UUT
Belt	1	115	54	Baldor	15
	1 1/2	230	60		27
	7 1/2	460	176		10
	15	460	255		6
	1	230	54	TECO	3
	7 1/2	230	176		16
	15	460	255		26
	1	115	54	Twin City Fan	21
	2	460	63		9
	1	230	54	Marathon	5
	5	230	114		25
	5	460	114		4
	7 1/2	230	176		22
Direct	1	115	32	Baldor	1
	5	230	114		24
	1/2	115	16	TECO	19
	5	460	114		2
	1/2	115	26	Marathon	23
	1/2	115	16	McMillan	20
	1/3	115	13		7
	1	115	20		12
	1	115	20	Twin City Fan	8
1/3	230	13	11		

Table 20 - UUT Overview



Special Seismic Certification Test Units

Manufacturer: Twin City Fan Companies, Ltd.

Product Line: Axial Upblast Roof Ventilators, Centrifugal Roof Exhausters & Centrifugal Wall Exhausters

Certified Product Line Construction:
Axial Upblast Aluminum and Carbon Steel Wheel, Aluminum and Carbon Steel Housing, Direct and Belt Drive, Single Vertical Inlet, Vertical Shaft Orientation
Centrifugal Roof Aluminum and Carbon Steel Wheel, Aluminum and Carbon Steel Housing, Direct and Belt Drive, Single Vertical Inlet, Vertical Shaft Orientation
Centrifugal Wall Aluminum Wheel, Spun Aluminum Housing, Direct and Belt Drive, Single Horizontal Inlet, Horizontal Shaft Orientation

Certified Options: Nema 1,3R, 4, and 7/9 disconnect Switches // Speed Controller Aluminum and Zinc Coated Birdscreen / Aluminum Backdraft Damper / Aluminum Motorized Damper / Performance Baffle / Aluminum Insect Screen / Stainless Steel Hardware / Stainless Steel Shaft / Inlet Safety Guard / Aluminum & Galvanized Carbon Steel Self-Flashing & Straight Sided Roof Curbs / Tie Down Brackets / Drain Connection / Aluminum & Stainless Steel Nameplate / Magnetic Damper Latch / Extended Lube Lines / Belt Tube / Motor Cover / 2-Groove Drive / Fusible Link / Miami-Dade Hurricane Construction / UL Smoke & Heat Construction / UL 762 Restaurant Construction / UL 705 Construction / AMCA Spark B Resistant Construction / Firestat / Automatic Belt Tensioner / Retaining Chain / Security Hasp / Curb Hinge / 2-Speed Switch / McMillan, TCF, Baldor, Marathon and Teco-Westinghouse motors

Certified Mounting Description:
Axial Upblast The fans were secured to roof curbs which were fastened to test structure using lag bolts.
Centrifugal Roof The fans were secured to roof curbs which were fastened to test structure using lag bolts.
Centrifugal Wall The fans were secured to the plywood constructed wall mount using the optional extended mounting bracket secured in 8 mounting locations using lag bolts.
 SEOR to specify curb, mounting of unit to curb and mounting of curb to structure with similar configuration and equivalent strength & stiffness to the tested units.

Product Line	Model Tested	Dimensions (inches)			Weight (lbm)	Notes:	UUT ID:
		Depth	Width	Height			
Axial Upblast	24Z5 LUD	32.50	32.50	44.99	172 lbs.		UUT 1
Axial Upblast	48E4 LUD	58.50	58.50	77.51	522 lbs.		UUT 2
Axial Upblast	36L2 LUB	46.50	46.50	53.61	242 lbs.		UUT 3
Axial Upblast	60C6 LUB	70.50	70.50	88.05	536 lbs.		UUT 4
Axial Upblast	36Z5 LUBSH	46.50	61.75	58.44	430 lbs.		UUT 5
Axial Upblast	60L2 LUBMO	70.50	89.50	84.67	934 lbs.		UUT 6
Centrifugal Roof	120BE DCRD	27.50	27.50	30.38	70 lbs.		UUT 7
Centrifugal Roof	180B DCRD	38.38	38.38	48.25	150 lbs.		UUT 8
Centrifugal Roof	180DHP BCRD-E	39.54	39.54	50.06	182 lbs.		UUT 9
Centrifugal Roof	480D BCRD	74.06	74.06	68.25	588 lbs.		UUT 10
Centrifugal Roof	093B DCRU	22.00	22.00	34.13	64 lbs.		UUT 11
Centrifugal Roof	180B DCRUR	36.00	36.00	47.17	128 lbs.		UUT 12
Wall Exhauster	140BE DCRW	38.56	30.00	30.00	86 lbs.		UUT 13-1
Wall Exhauster	140B DCRWR	32.56	30.00	30.00	84 lbs.		UUT 13-2
Wall Exhauster	180BE DCRWR	39.17	36.00	36.00	150 lbs.		UUT 14-1
Wall Exhauster	180B DCRWR	39.17	36.00	36.00	138 lbs.		UUT 14-2
Centrifugal Roof	160BHP BCRUSH	30.00	30.00	47.81	158 lbs.		UUT 15
Centrifugal Roof	480B BCRU	75.00	75.00	67.13	598 lbs.		UUT 16
Wall Exhauster	160B BCRWR	39.81	30.00	30.00	126 lbs.		UUT 17-1
Wall Exhauster	160B BCRWR	39.81	30.00	30.00	124 lbs.		UUT 17-2
Wall Exhauster	300BHP BCRW	48.25	54.00	54.00	400 lbs.		UUT 18-1
Wall Exhauster	300BHP BCRW	48.25	54.00	54.00	370 lbs.		UUT 18-2
Centrifugal Roof	120 DCLH	26.63	30.00	27.13	111 lbs.		UUT 19
Centrifugal Roof	120E DCLP	28.00	28.00	36.25	122 lbs.		UUT 20
Centrifugal Roof	210 BCLH	51.13	46.25	35.63	238 lbs.		UUT 21
Centrifugal Roof	480B BCLP	76.50	66.00	59.38	615 lbs.		UUT 22
Axial Upblast	21B105 BSD53	29.50	29.50	43.11	110 lbs.		UUT 23
Axial Upblast	48B304 BSD53	58.50	58.50	77.51	480 lbs.		UUT 24
Axial Upblast	30B105 BSB53	40.50	40.50	56.25	268 lbs.		UUT 25
Axial Upblast	54B406 BSB53	64.50	64.50	83.05	672 lbs.		UUT 26
Centrifugal Roof	240DHP BCRD	34.00	34.00	47.88	178 lbs.		UUT 27

UUT 1



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	LUD 24Z5
Product Construction Summary:	Carbon Steel Wheel, Galvanized Carbon Steel Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Inlet Safety Guard, 8" Galvanized Carbon Steel Self-Flashing Roof Curb, NEMA 3R Disconnect Switch, Aluminum Nameplate, UL 705 Construction, 1 HP Baldor Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
32.50	32.50	44.99	172 lbs	16.07	16.07	16.70

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 2



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	LUD 48E4
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Discharge Birdscreen, 18" Aluminum Straight Sided Roof Curb, NEMA 3R Disconnect Switch, Stainless Steel Nameplate, UL 705 Construction, 5 HP Teco-Westinghouse Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
58.50	58.50	77.51	522 lbs	8.36	8.53	8.70

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (4) 1/4" x 1 1/4" ungraded lag screws per side, (16) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 3



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	LUB 36L2
Product Construction Summary:	Galvanized Carbon Steel Wheel, Galvanized Carbon Steel Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Magnetic Damper Latch, 8" Galvanized Carbon Steel Self-Flashing Roof Curb, NEMA 3R Disconnect Switch, Extended Lube Lines, UL 705 Construction, 1 HP Teco-Westinghouse Motor

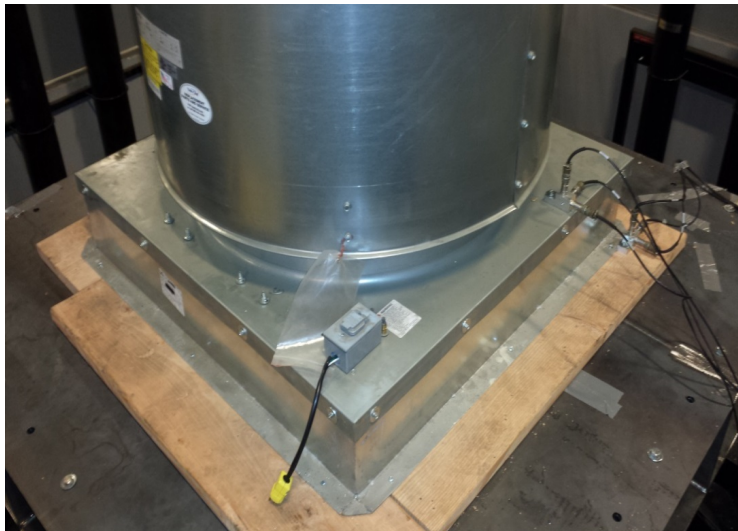
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
46.50	46.50	53.61	242 lbs	11.50	7.57	11.94

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 4



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	LUB 60C6
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Tie Down Brackets, 18" Aluminum Self-Flashing Roof Curb, NEMA 4 Disconnect Switch, UL 705 Construction 5 HP Marathon Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
70.50	70.50	88.05	536 lbs.	15.44	10.00	12.90

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (5) 1/4" x 1 1/4" ungraded lag screws per side, (20) total. Fan mounted to roof curb using (6) 5/16" x 1 1/4" ungraded lag screws per side, (24) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 5



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	LUBSH 36Z5
Product Construction Summary:	Painted Carbon Steel Wheel, Galvanized Carbon Steel Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Belt Tube, Motor Cover, 8" Galvanized Carbon Steel Self-Flashing Roof Curb, 2-Groove Drive, Fusible Link, NEMA 1 Disconnect Switch, Inlet Safety Guard, UL Smoke & Heat Construction, 1 HP Marathon Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
46.50	61.75	58.44	430 lbs	8.20	7.88	7.73

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (6) 5/16" x 1 1/4" ungraded lag screws per side, (24) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 6

Unit Under Test (UUT) Summary Sheet



Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	LUBMO 60L2
Product Construction Summary:	Steel Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Motor Cover, 18" High Aluminum Self-Flashing Roof Curb, NEMA 3R Disconnect Switch, Aluminum Insect Screen, UL 705 Construction, 15 HP Baldor Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
70.50	89.50	84.67	934 lbs.	6.09	7.13	6.46

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (5) 1/4" x 1 1/4" ungraded lag screws per side, (20) total. Fan mounted to roof curb using (6) 5/16" x 1 1/4" ungraded lag screws per side, (24) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 7

Unit Under Test (UUT) Summary Sheet



Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	DCRD 120BE
Product Construction Summary:	Aluminum Wheel, Aluminum Steel Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Backdraft Damper, 8" Galvanized Carbon Steel Self-Flashing Roof Curb, NEMA 1 Disconnect Switch, 'Speed Controller, 'Performance Baffle, UL 705 Construction, '1/2 HP McMillan Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
27.50	27.50	30.38	70 lbs.	12.17	13.18	13.18

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 8



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	DCRD 180B
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Motorized Backdraft Damper, 18" Aluminum Straight Sided Roof Curb, NEMA 3R Disconnect Switch, Tie Down Brackets, Speed Controller, Miami-Dade Hurricane Construction, UL 705 Construction, 1 HP TCF Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
38.38	38.38	48.25	150 lbs	5.00	6.46	5.19

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 9



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	BCRD-E 180DHP
Product Construction Summary:	Aluminum Wheel, Endurex Polymeric Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Aluminum Birdscreen, Backdraft Damper, AMCA B Spark Resistant Construction, 12" Galvanized Carbon Steel Self-Flashing Roof Curb, NEMA 4 Disconnect Switch, Firestat, UL 705 Construction, 2 HP TCF Motor

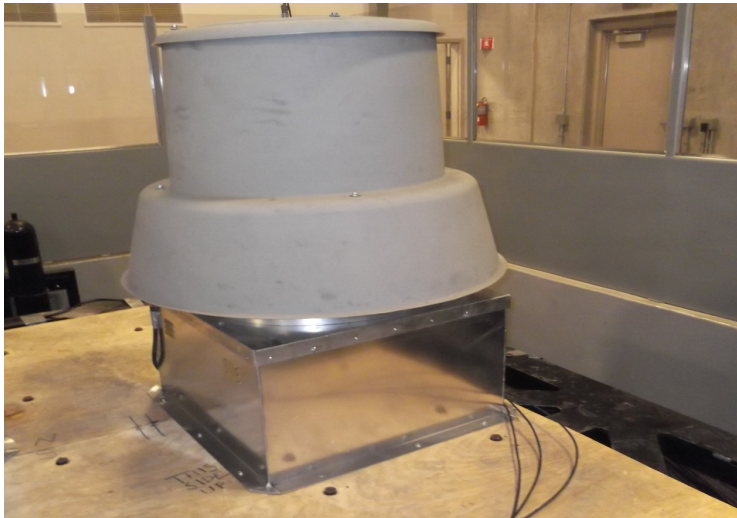
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
39.54	39.54	50.06	182 lbs.	5.85	6.21	6.09

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 10



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	BCRD 480D
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Aluminum Insect Screen, Motorized Backdraft Damper, 18" Aluminum Straight Sided Roof Curb, NEMA 7/9, Disconnect Switch, Stainless Steel Shaft, Stainless Steel Nameplate, Stainless Steel Hardware, Automatic Belt Tensioner, UL 705 Construction, '7 1/2 HP Baldor Motor

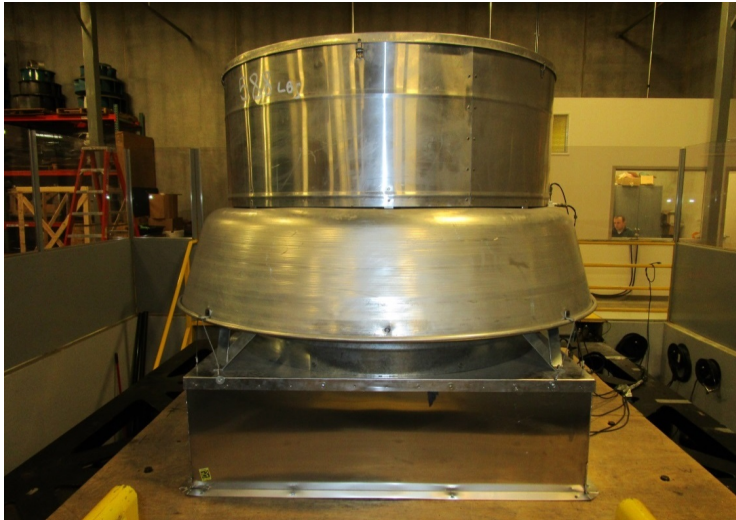
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
74.06	74.06	68.25	588 lbs.	5.10	6.20	6.95

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (4) 1/4" x 1 1/4" ungraded lag screws per side, (16) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 11



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	DCRU 093B
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Backdraft Damper, 8" Galvanized Carbon Steel Straight Sided Roof Curb, NEMA 1 Disconnect Switch, Firestat, Speed Controller, Drain, Retaining Chain, Security Hasp, Curb Hinge, UL 705 Construction, 1/3 HP TCF Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
22.00	22.00	34.13	64 lbs.	7.00	9.41	9.41

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using curb hinge with (5) 5/16" x 1 1/4" ungraded lag screws on fan and (5) on curb hinge. Opposite side of curb has security hasp and lock are riveted to curb with 3/16" rivets. All units were filled with contents and maintained structural integrity and functionality.

UUT 12



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	DCRUR 180B
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Tie Down Brackets, Backdraft Damper, 18" Aluminum Self-Flashing Roof Curb, NEMA 3R Disconnect Switch, Speed Controller,, Motorized Backdraft Damper, Miami-Dade Hurricane Construction, Drain Connection, UL 762 Construction, '1 HP McMillan Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
36.00	36.00	47.17	128	11.70	12.92	12.17

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 13-1



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	140BE DCRW
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Direct Drive, Single Horizontal Inlet, Horizontal Motor Shaft
Option / Component Summary:	Speed Controller, Nema 3R Disconnect Switch, Aluminum Backdraft Damper, Zinc Plated Carbon Steel Birdscreen, UL 705 Construction 0.160" Thick Aluminum 10" Mounting Bracket, 1/2 HP McMillan Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
38.56	30.00	30.00	86 lbs	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2.0	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 10" mounting bracket using 5/16-18 UNC grade 5 steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 13-2



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	140B DCRWR
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Direct Drive, Single Horizontal Inlet, Horizontal Motor Shaft
Option / Component Summary:	Speed Controller, Nema 3R Disconnect Switch, Aluminum Birdscreen, Stainless Steel Hardware, UL 705 Construction Type B Spark Resistant Construction, Restaurant Construction, 0.160" Thick Aluminum 4" Mounting Bracket, 1/2 HP TCF Motor

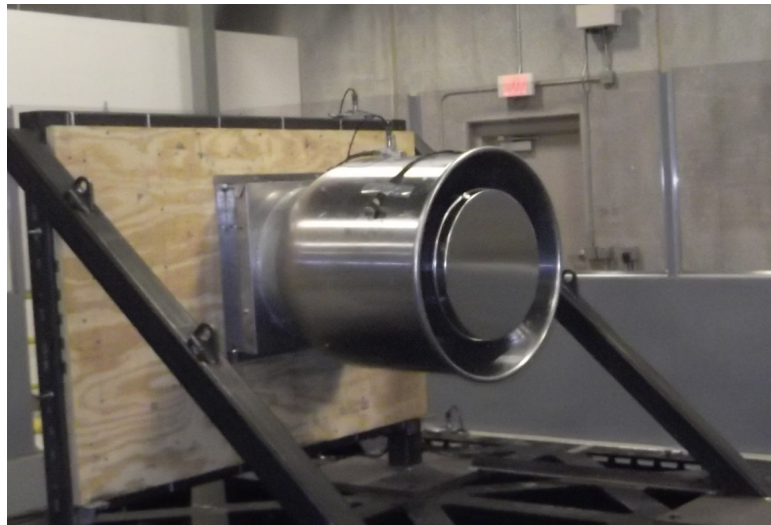
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
32.56	30.00	30.00	84 lbs	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 4" mounting bracket using 5/16-18 UNC grade 5 steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 14-1



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	180BE DCRWR
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Direct Drive, Single Horizontal Inlet, Horizontal Motor Shaft
Option / Component Summary:	Nema 4 Disconnect Switch, Motorized Aluminum Damper, Aluminum Birdscreen, Aluminum Insect Screen, Performance Baffle, 0.160" Thick Aluminum 10" Mounting Bracket, 1 HP McMillon Motor, UL 762 Restaurant Construction

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
39.17	36.00	36.00	150 lbs	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 10" mounting bracket using 5/16-18 UNC 316 stainless steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 14-2



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	180B DCRWR
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Direct Drive, Single Horizontal Inlet, Horizontal Motor Shaft
Option / Component Summary:	Nema 4 Disconnect Switch, Motorized Aluminum Damper, Aluminum Birdscreen, Aluminum Insect Screen, Performance Baffle, 0.160" Thick Aluminum 10" Mounting Bracket, 1 HP TCF Motor, UL 762 Restaurant Construction

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
39.17	36.00	36.00	138 lbs	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 10" mounting bracket using 5/16-18 UNC 316 stainless steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 15



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	BCRUSH 160BHP
Product Construction Summary:	Carbon Steel Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Motorized Backdraft Damper, 12" Galvanized Carbon Steel Vented Straight Sided Roof Curb, NEMA 3R Disconnect Switch,, Two-Groove Drive, Drain, Aluminum Nameplate, Automatic Belt Tensioner, UL Smoke & Heat Construction, 1 HP Baldor Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
30.00	30.00	40.00	158 lbs.	4.92	4.43	4.70

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 16

Unit Under Test (UUT) Summary Sheet



Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	BCRU 480B
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Backdraft Damper, 18" Aluminum Self-Flashing Roof Curb, NEMA 1 Disconnect Switch, Drain, Two-Speed Switch, UL 705 Construction, '7 1/2 HP Teco-Westinghouse Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
75.00	75.00	57.00	598 lbs.	5.09	4.70	4.80

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (4) 1/4" x 1 1/4" ungraded lag screws per side, (16) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 17-1



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	160B BCRWR
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Belt Drive, Single Horizontal Inlet, Horizontal Shaft
Option / Component Summary:	Nema 1 Disconnect Switch, Motorized Aluminum Damper, Aluminum Birdscreen, 0.160" Thick Aluminum 10" Mounting Bracket, 1 HP Baldor Motor, UL 762 Restaurant Construction

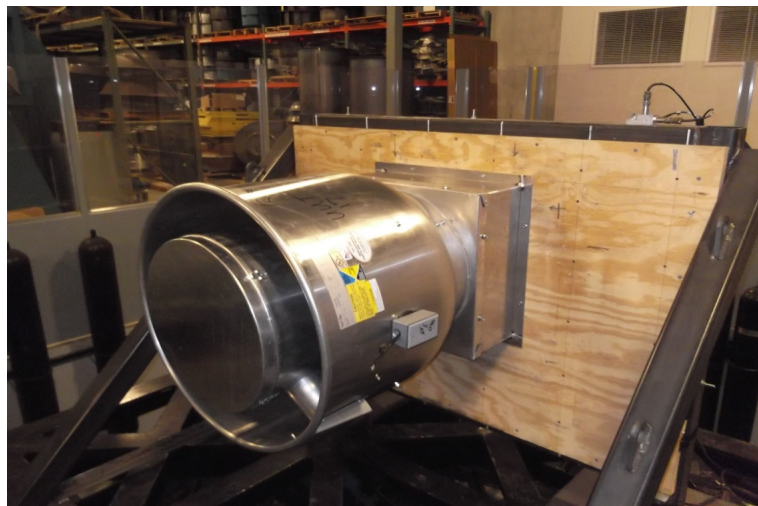
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
39.81	30.00	30.00	126 lbs	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 10" mounting bracket using 5/16-18 UNC 316 stainless steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 17-2



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	160B BCRWR
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Belt Drive, Single Horizontal Inlet, Horizontal Shaft
Option / Component Summary:	Nema 1 Disconnect Switch, Motorized Aluminum Damper, Aluminum Birdscreen, 0.160" Thick Aluminum 10" Mounting Bracket, 1 HP Teco Motor, UL 762 Restaurant Construction

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
39.81	30.00	30.00	124 lbs	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 10" mounting bracket using 5/16-18 UNC 316 stainless steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 18-1



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	300BHP BCRW
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Belt Drive, Single Horizontal Inlet, Horizontal Shaft
Option / Component Summary:	Nema 7/9 Disconnect Switch, Aluminum Backdraft Damper, Mounting Bracket, 5 HP Teco Motor, Zinc Plated Birdscreen, Type B Spark Resistant Construction, Stainless Steel Shaft, Stainless Steel Hardware, UL 705 Construction, 0.160" Thick Aluminum 10" Mounting Bracket

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
48.25	54.00	54.00	400 lbs	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 10" mounting bracket using 5/16-18 UNC grade 5 steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 18-2



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Wall Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	300BHP BCRW
Product Construction Summary:	Aluminum Wheel, Spun Aluminum Housing, Belt Drive, Single Horizontal Inlet, Horizontal Shaft
Option / Component Summary:	Nema 7/9 Disconnect Switch, Aluminum Backdraft Damper, Mounting Bracket, 5 HP Baldor Motor, Zinc Plated Birdscreen,, Type B Spark Resistant Construction, Stainless Steel Shaft, Stainless Steel Hardware, UL 705 Construction, 0.160" Thick Aluminum 10" Mounting Bracket

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
48.25	54.00	54.00	370	N/A	N/A	N/A

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



The fan was mounted to the 0.160" thick aluminum 10" mounting bracket using 5/16-18 UNC grade 5 steel cap screws, 2 per side, total 8 into rivet nuts. The mounting brackets were secured using 2 per side, 8 total, 1/4" X 1 1/4" wood lag screws to double layered 3/4" plywood, 1 1/2" total thickness. The plywood was reinforced and attached to a wooden 2X4 structure with studs 12" on center. The plywood was anchored to the 2X4 structure using 3" flat plywood screws to the studs and 3" serrated-thread screws to the perimeter 2X4's. The perimeter 2X4's were anchored to a 4" X4" tubular steel wall mount structure using 10 - 3/8"-16 7" UNC grade 5 carriage bolts. The A36 tubular steel wall mount structure was secured to the table using 16 total 5/8-11 UNC Grade A326 hardware. All units were filled with contents and maintained structural integrity and functionality.

UUT 19



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	DCLH 120
Product Construction Summary:	Aluminum Wheel, Galvanized Carbon Steel Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Motorized Backdraft Damper, NEMA 1 Disconnect Switch, 8" Galvanized Carbon Steel Self-Flashing Roof Curb, UL 705 Construction 1/2 HP Teco-Westinghouse motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
26.63	30.00	27.13	111 lbs.	13.18	13.98	14.55

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 20



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	DCLP 120E
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Direct Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Backdraft Damper, NEMA 3R Disconnect Switch, 18" Aluminum Straight Sided Roof Curb, Stainless Steel Hardware, Performance Baffle, Speed Controller, UL 705 Construction 1/2 HP McMillan Motor

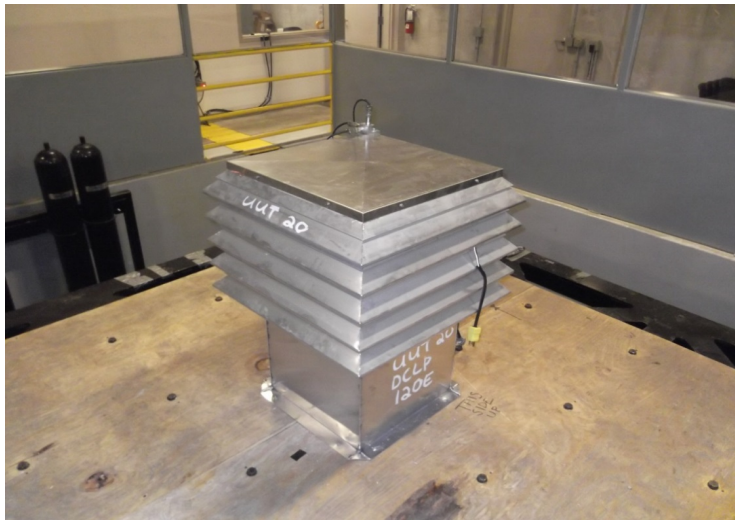
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
28.00	28.00	36.25	122 lbs.	12.18	13.44	12.92

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (2) 1/4" x 1 1/4" ungraded lag screws per side, (8) total. Fan mounted to roof curb using (3) 5/16" x 1 1/4" ungraded lag screws per side, (12) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 21



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	BCLH 210
Product Construction Summary:	Aluminum Wheel, Galvanized Carbon Steel Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Backdraft Damper, 12" Galvanized Carbon Steel Self-Flashing Roof Curb, NEMA 4 Disconnect Switch, Automatic Belt Tensioner, Aluminum Insect Sreen, Aluminum Nameplate, Firestat 1 HP TCF Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
51.13	46.25	35.63	238 lbs.	12.18	12.42	15.14

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 22



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	BCLP 480B
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, AMCA B Spark Resistant Construction, Motorized Backdraft Damper, 18" Aluminum Self-Flashing Roof Curb, NEMA 1 Disconnect Switch, Two-Speed Switch, Stainless Steel Shaft, UL 705 Construction, '7 1/2 HP Marathon Motor

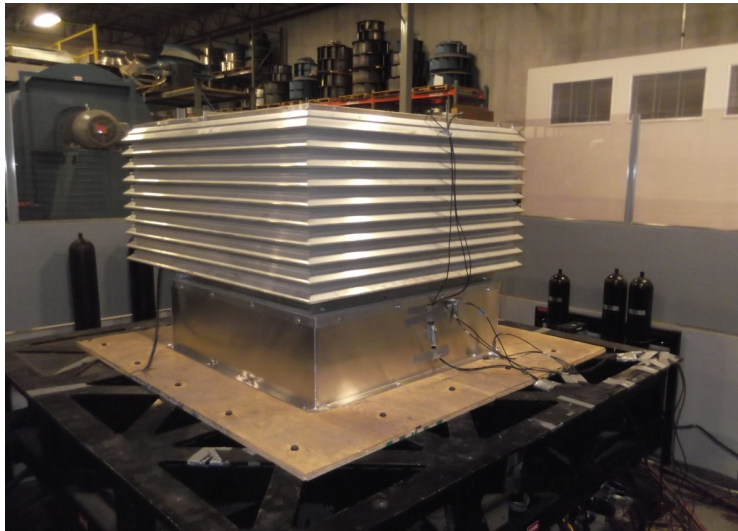
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
76.50	66.00	59.38	615 lbs.	4.90	6.21	6.33

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (4) 1/4" x 1 1/4" ungraded lag screws per side, (16) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 23



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	21B105 BSD53
Product Construction Summary:	Aluminum Wheel, Galvanized Carbon Steel Housing, Direct Drive, Single Vertical Inlet, Vertical Shaft Orientation
Option / Component Summary:	Nema 3R Disconnect Switch, Galvanized Carbon Steel Birdscreen, 8" Galvanized Carbon Steel Straight Sided Roof Curb, UL 705 Construction, 1/2 HP Marathon Motor

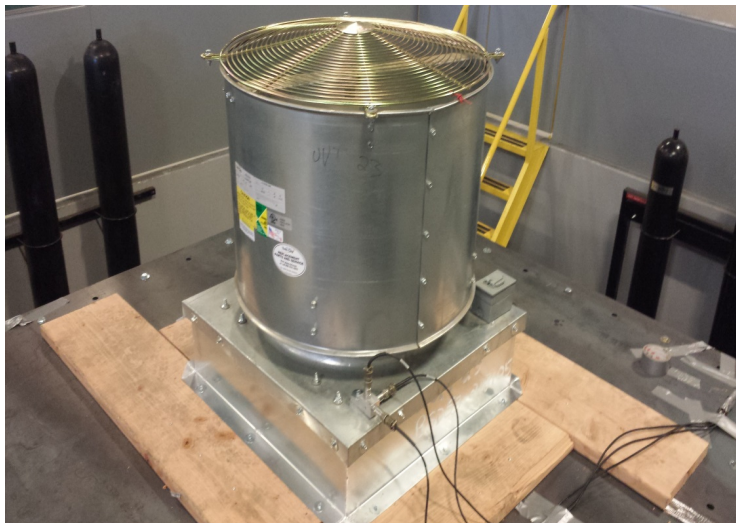
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
29.50	29.50	43.11	110 lbs.	14.00	14.00	11.00

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 24



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	48B304 BSD53
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Direct Drive, Single Vertical Inlet, Vertical Shaft Orientation
Option / Component Summary:	Nema 3R Disconnect Switch, Tie Down Brackets, Fusible Link, Magnetic Damper Latch, Aluminum Nameplate, 18" Aluminum Self-Flashing Roof Curb, UL 705 Construction 5 HP Baldor Motor

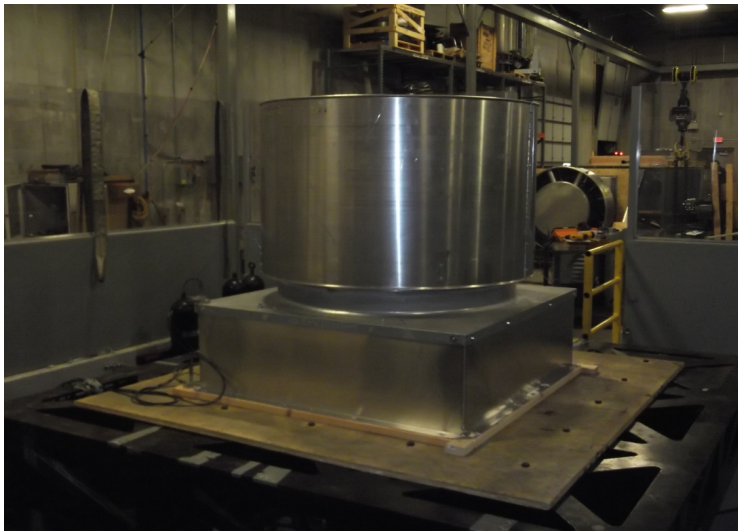
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
58.50	58.50	77.51	480 lbs	10.10	10.10	12.20

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (4) 1/4" x 1 1/4" ungraded lag screws per side, (16) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 25



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	30B105 BSB53
Product Construction Summary:	Aluminum Wheel, Galvanized Carbon Steel Housing, Belt Drive, Single Vertical Inlet, Vertical Shaft Orientation
Option / Component Summary:	Nema 3R Disconnect Switch, Inlet Safety Guard, Tie Down Brackets, Fusible Link, Magnetic Damper Latch External Lube Lines, 12" Galvanized Carbon Steel Straight Side Roof Curb, UL 705 Construction 5 HP Marathon Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
40.50	40.50	56.25	268 lbs	12.92	15.14	12.67

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (4) 5/16" x 1 1/4" ungraded lag screws per side, (16) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 26



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Axial Upblast Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	54B406 BSB53
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Shaft Orientation
Option / Component Summary:	Nema 3R Disconnect Switch, Galvanized Carbon Steel Birdscreen, 18" Aluminum Self-Flashing Roof Curb, UL 705 Construction, External Lube Lines, 15 HP Teco-Westinghouse Motor

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
64.50	64.50	83.05	672 lbs.	7.87	7.13	7.87

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (4) 1/4" x 1 1/4" ungraded lag screws per side, (16) total. Fan mounted to roof curb using (6) 5/16" x 1 1/4" ungraded lag screws per side, (24) total. All units were filled with contents and maintained structural integrity and functionality.

UUT 27



Unit Under Test (UUT) Summary Sheet

Manufacturer:	Twin City Fan Companies Elkton Facility, 201 Badger Street North, Elkton, SD 57026
Product Line:	Centrifugal Roof Exhausters
Testing Laboratory:	Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442
Model Number:	BCRD 240DHP
Product Construction Summary:	Aluminum Wheel, Aluminum Housing, Belt Drive, Single Vertical Inlet, Vertical Motor Shaft Orientation
Option / Component Summary:	Galvanized Carbon Steel Birdscreen, Stainless Steel Shaft, Stainless Steel Hardware, 12" Aluminum Self-Flashing Roof Curb, NEMA 1 Disconnect, Switch, UL 705 Construction, 1 1/2 HP Baldor Motor

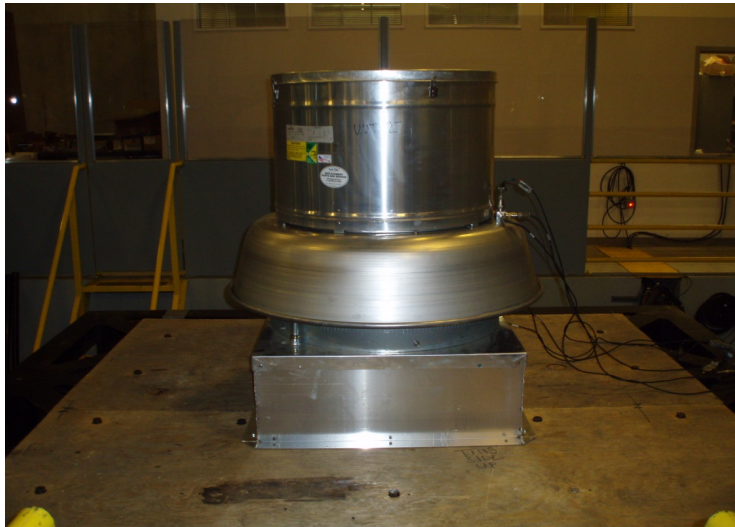
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
34.00	34.00	47.88	178 lbs.	7.10	7.80	7.50

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

Building Code	Test Criteria	Sds (g)	Z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.5	0.0	1.5	2.50	1.00	1.68	0.68
		2	1.0	1.5	3.20	2.40	1.34	0.54

Unit Mounting Description / Configuration:



Roof curb mounted to table using (3) 1/4" x 1 1/4" ungraded lag screws per side, (12) total. Fan mounted to roof curb using (2) 5/16" x 1 1/4" ungraded lag screws per side, (8) total. All units were filled with contents and maintained structural integrity and functionality.