APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0395-10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ 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: Date: 9/28/16

Title: President Company Name: The VMC Group

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

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	---
				Interpolated	29.68	30.00	30.00	---	129
	160B/160BE		160/160E		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	---
				Interpolated	31.81	30.00	30.00	---	170
	180B/180BMP/180BHP		180/180MP/180HP		34.31	36.00	36.00	---	195
	210B/210BHP		210/210HP		37.61	45.00	45.00	---	210
	240B/240BHP		240/240HP		39.56	45.00	45.00	---	230
	300B/300BHP		300/300HP	UUT 18-2	48.25	54.00	54.00	370	---
				UUT 18-1	48.25	54.00	54.00	400	---

1. Max Weight included fan and motor only

Table 2 - Certified Roof Mounted 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		
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	UUT 23	29.50	29.50	43.11	110	---
				Interpolated	29.50	29.50	53.11	---	121
	24E4, 24E8, 24B105, 24Z5		24B105	UUT 1	32.50	32.50	44.99	172	---
				Interpolated	32.50	32.50	54.99	---	187
	30E4, 30E8, 30B105, 30Z5		30B105		40.50	40.50	58.68	---	239
	36E4, 36E8, 36B206, 36Z5		36B206		46.50	46.50	63.61	---	329
	42E4, 42E8, 42B304, 42Z5		42B304		52.50	52.50	74.51	---	417
	48E4, 48E8, 48B304, 48Z5		48B304	UUT 24	58.50	58.50	77.51	480	---
				UUT 2	58.50	58.50	77.51	522	---
				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		40.50	40.50	62.25	---	244
				UUT 25	40.50	40.50	56.25	268	---
	36E4, 36E8, 36B206, 36L1, 36L2, 36Z5		36B206	UUT 3	46.50	46.50	53.61	242	---
				Interpolated	46.50	46.50	66.25	---	266
	42E4, 42E8, 42B304, 42L1, 42L2, 42Z5		42B304		52.50	52.50	72.23	---	448
	48E4, 48E8, 48B304, 48L1, 48L2, 48Z5		48B304		58.50	58.50	75.23	---	483
	60C3, 60C6, 60L1, 60L2, 60Z5		N/A	UUT 4	70.50	70.50	88.05	536	---
				Interpolated	70.50	70.50	86.05	---	590
	54C3, 54C6, 54B406, 54L1, 54L2, 54Z5		54B406		64.50	64.50	83.05	---	527
				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	UUT 5	46.50	61.75	58.44	430	---
				Interpolated	46.50	71.75	68.44	---	469
	42E4, 42E8, 42B304, 42L1, 42L2, 42Z5		N/A		52.50	70.00	74.42	---	849
	48E4, 48E8, 48B304, 48L1, 48L2, 48Z5		N/A		58.50	76.00	77.42	---	957
	54C3, 54C6, 54B406, 54L1, 54L2, 54Z5		N/A		64.50	83.50	81.67	---	991
	60C3, 60C6, 60L1, 60L2, 60Z5		N/A	UUT 6	70.50	89.50	84.67	934	---
				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	---
				Interpolated	27.50	27.50	40.38	---	70
	130B, 130BE		130		27.50	27.50	41.25	---	72
	140B, 140BE		140		27.50	27.50	41.50	---	74
	150B, 150BE		150		30.44	30.44	44.75	---	86
	160B, 160BE		160		30.44	30.44	45.25	---	86
	170B, 170BE		170		38.38	38.38	47.25	---	97
	180B, 180BE		180	UUT 8	38.38	38.38	48.25	150	---

Table 2 - Certified Roof Mounted Exhausters (Continued)

Twin City		Aerovent		Testing Scope	Max Dimensions (in)			Tested Weight (lb)	Max Weight (lb)[1]
Approved Model	Size	Approved Model	Size		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
				UUT 9	39.54	39.54	50.06	182	---
	210D/210DHP		210/210HP	Interpolated	38.38	38.38	52.06	---	189
	240D/240DHP		240/240HP	UUT 27	34.00	34.00	47.88	178	---
				Interpolated	43.13	43.13	53.88	---	196
	300D/300DHP		300/300HP		51.38	51.38	56.88	---	401
	360D/360DHP		360/360HP		60.75	60.75	62.38	---	572
	420D		420		65.81	65.81	65.81	---	604
	480D		480	UUT 10	74.06	74.06	68.25	588	---
				Extrapolated	74.06	74.06	68.25	---	641
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	---
				Interpolated	22.00	22.00	44.13	---	70
	110B, 110BE		110		30.00	30.00	46.31	---	118
	120B, 120BE		120		30.00	30.00	45.19	---	127
	140B, 140BE		140		30.00	30.00	45.68	---	132
	160B, 160BE		160		30.00	30.00	47.81	---	136
	180B, 180BE		180	UUT 12	36.00	36.00	47.17	128	---
				Extrapolated	36.00	36.00	47.17	---	140
BCRU BCRUR BCRUSH	110B	ATB ATBR	110	Extrapolated	30.00	30.00	46.56	---	153
	120B		120		30.00	30.00	45.19	---	158
	140B/140BHP		140/140HP		30.00	30.00	46.58	---	166
	160B/160BMP/160BHP		160/160MP/160HP	UUT 15	30.00	30.00	40.00	158	---
				Interpolated	30.00	30.00	47.81	---	171
	180B/180BMP/180BHP		180/180MP/180HP		36.00	36.00	50.31	---	223
	210B/210BHP		210/210HP		45.00	45.00	53.61	---	252
	240B/240BHP		240/240HP		45.00	45.00	55.56	---	323
	300B/300BHP		300/300HP		54.00	54.00	56.25	---	459
	360B/360BHP		360/360HP		63.00	63.00	61.88	---	629
	420B		420		69.00	69.00	64.75	---	642
	480B		480	UUT 16	75.00	75.00	57.00	598	---
				Extrapolated	75.00	75.00	67.13	---	653
DCLH DCLP	060, 060E	N/A	060	Extrapolated	26.13	24.00	32.75	---	71
	070, 070E		070		26.13	24.00	32.75	---	71
	080, 080E		080		26.13	28.00	32.75	---	76
	085, 085E		085		26.13	28.00	33.88	---	80
	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	---
				UUT 20	28.00	28.00	36.25	122	---
				Extrapolated	28.00	30.00	37.13	---	122
BCLH BCLP	100, 100E	N/A	100	Extrapolated	38.63	28.00	37.88	---	138
	120, 120E		120		38.63	28.00	38.63	---	147
	140, 140E		140		40.00	35.00	38.88	---	185
	160, 160E		160		40.00	35.00	39.25	---	191
	180, 180E		180		51.13	40.00	42.50	---	222
	210, 210E		210	UUT 21	51.13	46.25	35.63	238	---
				Interpolated	51.13	43.00	43.13	---	238
	240, 240E		240		51.13	46.25	47.38	---	313
	300, 300E		300		63.13	52.50	47.13	---	388
	360, 360E		360		63.75	62.50	55.75	---	463
	420, 420E		420		75.13	70.63	57.13	---	538
	480, 480E		480	UUT 22	76.50	66.00	59.38	615	---
				Extrapolated	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	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	MFR	UUT
	Motor Wt	19	21	26	32	54	60	63	92	114		
Size	14	X	X								Twin City Fan	Extrapolated
Weight	69											
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
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
12"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		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	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	MFR	UUT
	Motor Wt	19	21	26	32	54	60	63	92	114	176	204	255		
Size	21	X	X	X	X									Twin City Fan	Extrapolated
Weight	123														
Size	24	X	X	X	X	X	X								
Weight	140														
Size	30	X	X	X	X	X	X	X	X	X					25
Weight	200														
Size	36		X	X	X	X	X	X	X	X					3
Weight	242														
Size	42		X	X	X	X	X	X	X	X	X				Interpolated
Weight	405														
Size	48			X	X	X	X	X	X	X	X	X			
Weight	415														
Size	54				X	X	X	X	X	X	X	X	X		26
Weight	497														
Size	60				X	X	X	X	X	X	X	X	X		4
Weight	585														

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

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	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	MFR	UUT
	Motor Wt	19	21	26	32	54	60	63	92	114	176	204	255		
Size	21	X	X	X	X									Twin City Fan	Extrapolated
Weight	258														
Size	24	X	X	X	X	X	X								
Weight	285														
Size	30	X	X	X	X	X	X	X	X	X					
Weight	395														
Size	36		X	X	X	X	X	X	X	X					5
Weight	462														
Size	42		X	X	X	X	X	X	X	X	X				Interpolated
Weight	673														
Size	48			X	X	X	X	X	X	X	X	X			
Weight	753														
Size	54				X	X	X	X	X	X	X	X	X		
Weight	925														
Size	60				X	X	X	X	X	X	X	X	X		6
Weight	1044														

Roof Curb

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

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	
0.063		54 - 60		6

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	Extapolated
			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									
Size	70		X	X						
Weight	21									
Size	80		X	X						
Weight	23									
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	39									
Size	120	X	X	X	X	X				7
Weight	41									
Size	130			X			X			Interpolated
Weight	54									
Size	140			X			X			
Weight	56									
Size	150			X				X		
Weight	66									
Size	160			X		X		X		
Weight	66									
Size	170			X		X		X		
Weight	77									
Size	180					X		X		8
Weight	80									

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	Extrapolated
		Straight Sided	7
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
12"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	
		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	X										BCRD	Base	Extrapolated
Weight	51											BCRD-E		
Size	75	X										BCRD		
Weight	51											BCRD-E		
Size	85	X										BCRD		
Weight	76											BCRD-E		
Size	100	X	X	X								BCRD		
Weight	81											BCRD-E		
Size	100 Hi Pr	X	X	X								BCRD		
Weight	81											BCRD-E		
Size	120	X	X	X								BCRD		
Weight	104											BCRD-E		
Size	140	X	X	X	X	X						BCRD		
Weight	109											BCRD-E		
Size	140 Hi Pr	X	X	X	X	X						BCRD		
Weight	109											BCRD-E		
Size	160	X	X	X	X	X						BCRD		
Weight	119											BCRD-E		
Size	160 Hi Pr	X	X	X	X	X						BCRD		
Weight	119											BCRD-E		
Size	180	X	X	X	X	X	X	X				BCRD		
Weight	138											BCRD-E		
Size	180 Hi Pr	X	X	X	X	X	X	X				BCRD		9
Weight	138											BCRD-E		
Size	210	X	X	X	X	X	X	X	X			BCRD		Interpolated
Weight	160											BCRD-E		
Size	210 Hi Pr	X	X	X	X	X	X	X	X			BCRD		
Weight	160											BCRD-E		
Size	240	X	X	X	X	X	X	X	X			BCRD		
Weight	208											BCRD-E		
Size	240 Hi Pr	X	X	X	X	X	X	X	X			BCRD		27
Weight	208											BCRD-E		
Size	300	X	X	X	X	X	X	X	X	X		BCRD		
Weight	287													
Size	300 Hi Pr	X	X	X	X	X	X	X	X	X		BCRD		
Weight	287													
Size	360		X	X	X	X	X	X	X	X	X	BCRD		
Weight	396													
Size	360 Hi Pr		X	X	X	X	X	X	X	X	X	BCRD		
Weight	396													
Size	420			X	X	X	X	X	X	X	X	BCRD		
Weight	494													
Size	480			X	X	X	X	X	X	X	X	BCRD		10
Weight	508													

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	9
		Straight Sided	Interpolated
	Aluminum	Self-Flashing	27
		Straight Sided	Interpolated
18"	Galv Steel	Self-Flashing	
		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	11
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
12"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	12
		Straight Sided	Extrapolated

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					
Weight	111								
Size	110	X			X				
Weight	114								
Size	120	X	X			X			
Weight	117								
Size	140	X			X		X		13-1, 13-2
Weight	129								
Size	160		X		X		X		Interpolated
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			14-2

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 **Description:** Wall Mounted Exhaust

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						Interpolated
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				
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		18-1, 18-2
Weight	258											

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	X	X	X								Base	Extrapolated
Weight	127												
Size	120	X	X	X									
Weight	132												
Size	140	X	X	X	X	X							
Weight	141												
Size	140 Hi Pr	X	X	X	X	X							
Weight	141												
Size	160	X	X	X	X	X							
Weight	151												
Size	160 Md Pr	X	X	X	X	X							
Weight	151												
Size	160 Hi Pr	X	X	X	X	X							15
Weight	151												
Size	180	X	X	X	X	X	X	X					Interpolated
Weight	160												
Size	180 Md Pr	X	X	X	X	X	X	X					
Weight	160												
Size	180 Hi Pr	X	X	X	X	X	X	X					
Weight	160												
Size	210	X	X	X	X	X	X	X					
Weight	189												
Size	210 Hi Pr	X	X	X	X	X	X	X					
Weight	189												
Size	240	X	X	X	X	X	X	X					
Weight	209												
Size	240 Hi Pr	X	X	X	X	X	X	X	X	X			
Weight	209												
Size	300	X	X	X	X	X	X	X	X	X			
Weight	345												
Size	300 Hi Pr	X	X	X	X	X	X	X	X	X			
Weight	345												
Size	360	X	X	X	X	X	X	X	X	X			
Weight	515												
Size	360 Hi Pr	X	X	X	X	X	X	X	X	X			
Weight	515												
Size	420	X	X	X	X	X	X	X	X	X	X		
Weight	533												
Size	480	X	X	X	X	X	X	X	X	X	X		16
Weight	647												

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	
		Straight Sided	15
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	16

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 Exhuaster 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			19
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			20
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	
		Straight Sided	15
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	16

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	X	X									Base	Hooded	Extrapolated
Weight	89													
Size	120	X	X	X										
Weight	92													
Size	140	X	X	X	X	X								
Weight	94													
Size	160	X	X	X	X	X								
Weight	99													
Size	180	X	X	X	X	X	X	X						
Weight	114													
Size	210	X	X	X	X	X	X	X						21
Weight	125													
Size	240	X	X	X	X	X	X	X						Extrapolated
Weight	145													
Size	300	X	X	X	X	X	X	X	X	X				
Weight	193													
Size	360		X	X	X	X	X	X	X	X				
Weight	249													
Size	420			X	X	X	X	X	X	X	X			
Weight	312													
Size	480			X	X	X	X	X	X	X	X			
Weight	379													
Size	100	X	X									Base	Penthouse	Extrapolated
Weight	66													
Size	120	X	X	X										
Weight	68													
Size	140	X	X	X	X	X								
Weight	69													
Size	160	X	X	X	X	X								
Weight	75													
Size	180	X	X	X	X	X	X	X						
Weight	96													
Size	210	X	X	X	X	X	X	X						
Weight	106													
Size	240	X	X	X	X	X	X	X						
Weight	123													
Size	300	X	X	X	X	X	X	X	X	X				
Weight	163													
Size	360		X	X	X	X	X	X	X	X				
Weight	198													
Size	420			X	X	X	X	X	X	X	X			
Weight	266													
Size	480			X	X	X	X	X	X	X	X			22
Weight	314													

Roof Curb			
Height	Material	Base Style	UUT
8"	Galv Steel	Self-Flashing	Extrapolated
		Straight Sided	21
	Aluminum	Self-Flashing	Interpolated
		Straight Sided	
12"	Galv Steel	Self-Flashing	
		Straight Sided	
	Aluminum	Self-Flashing	
		Straight Sided	
18"	Galv Steel	Self-Flashing	
		Straight Sided	
	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	21
	12-Gauge Galv Steel	420-480	Hooded Penthouse	22
Curb Cap	.063 Aluminum	100-160	Hooded Penthouse	Extrapolated
	.080 Aluminum	180-360	Hooded Penthouse	21
	.100 Aluminum	420-480	Hooded Penthouse	22

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				13-1, 13-2
			160	16.50				Interpolated
			180	18.25				14-1, 14-2
BCRW BCRWR AWX AWXR	Belt	9	110	12.25	Aluminum		0.75	Extrapolated
			120	13.50			0.75	
			140	15.00			0.75	
			160	16.75			0.75	17-1, 17-2
			180	19.44			0.75	Interpolated
			210	25.06			0.75	
			240	28.25			0.75	
			300	31.81			1.19	18-1, 18-2
			360	39.81			1.44	Extrapolated
			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		0.75	Extrapolated
						Aluminum		1.00	
				24	24.00	Galvanized Steel		0.75	
						Aluminum		1.00	
						Carbon Steel		1.00	
				30	30.00	Galvanized Steel		0.75	
								1.00	
						Aluminum		1.00	25
						Carbon Steel		1.00	Interpolated
				36	36.00	Galvanized Steel		0.75	3
								1.00	Interpolated
						Aluminum		1.00	
						Carbon Steel		1.00	5
				42	42.00	Galvanized Steel		1.00	Interpolated
								1.19	
						Aluminum		1.19	
						Carbon Steel		1.19	
				48	48.00	Galvanized Steel		1.00	
								1.19	
						Aluminum		1.44	
						Carbon Steel		1.44	
				54	54.00	Galvanized Steel		1.00	
								1.19	
						Aluminum		1.44	26
						Carbon Steel		1.44	Interpolated
				60	60.00	Galvanized Steel		1.19	
								1.50	6
						Aluminum		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	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	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	
				180	19.80	Aluminum		N/A	8
BCRD BCRD-E	Belt	9	5	70	8.63	Aluminum		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	
				240HP	28.25	Aluminum		0.75	27
				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		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
					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		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		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 ControllerAluminum 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 Hurrican 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

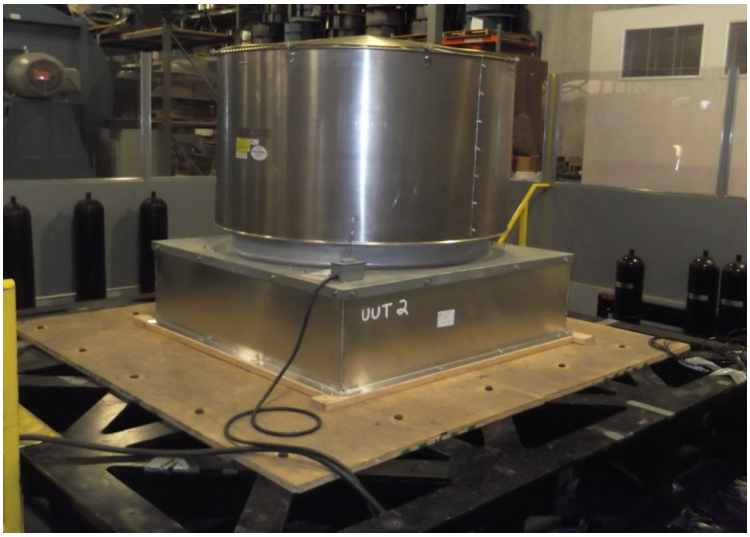
UUT PROPERTIES

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

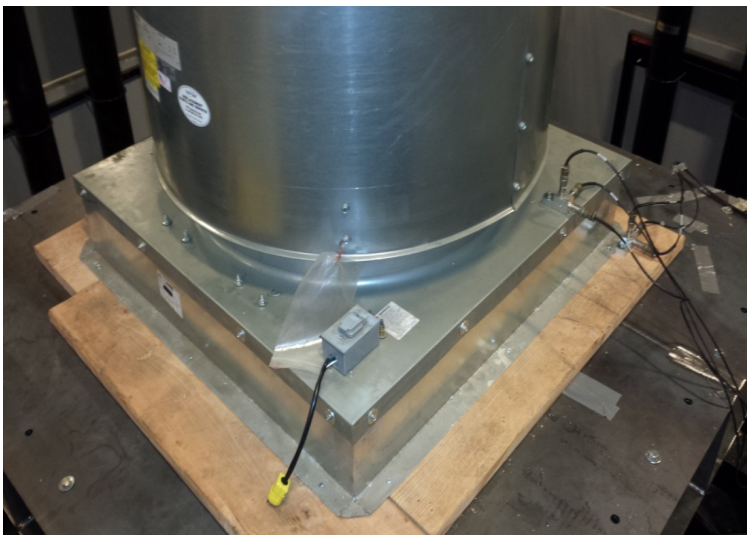
UUT PROPERTIES

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 Contstruction, 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 Birdsreen, 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

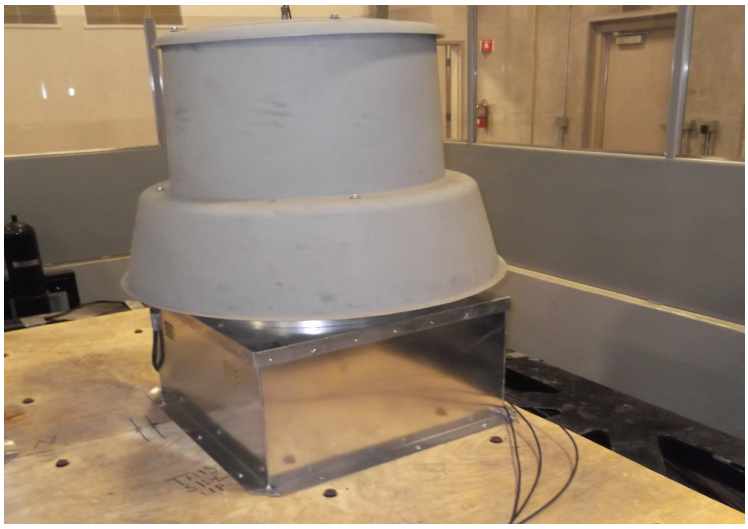
UUT PROPERTIES

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

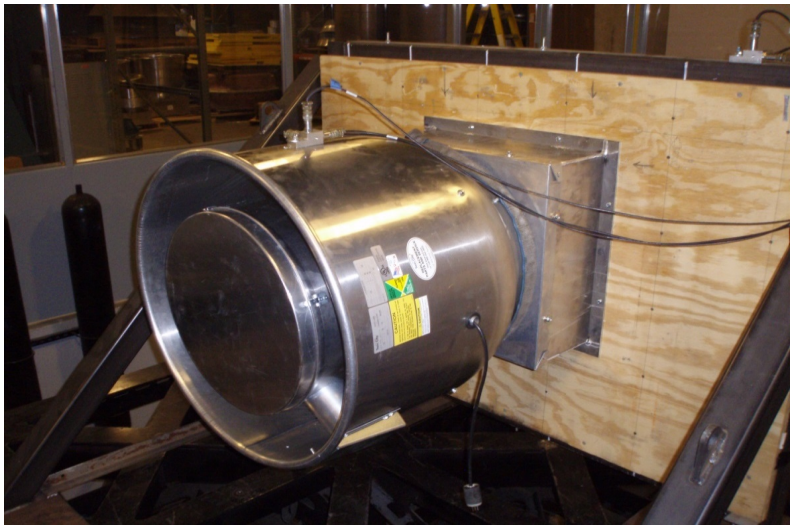
UUT PROPERTIES

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

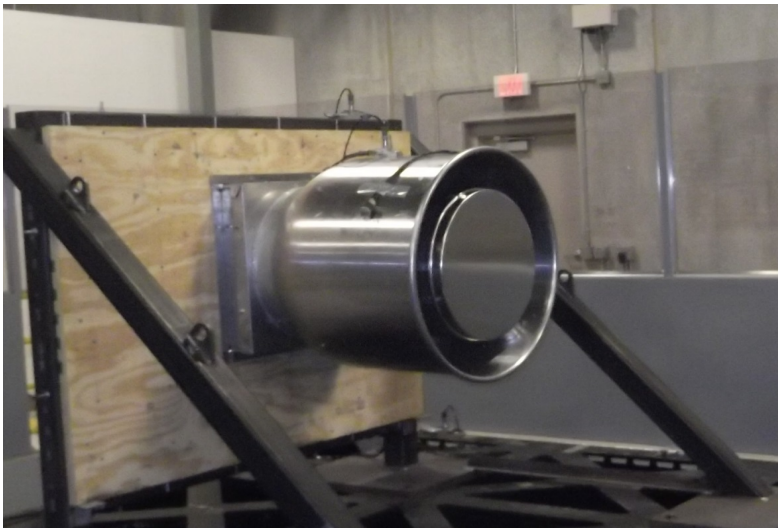
UUT PROPERTIES

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

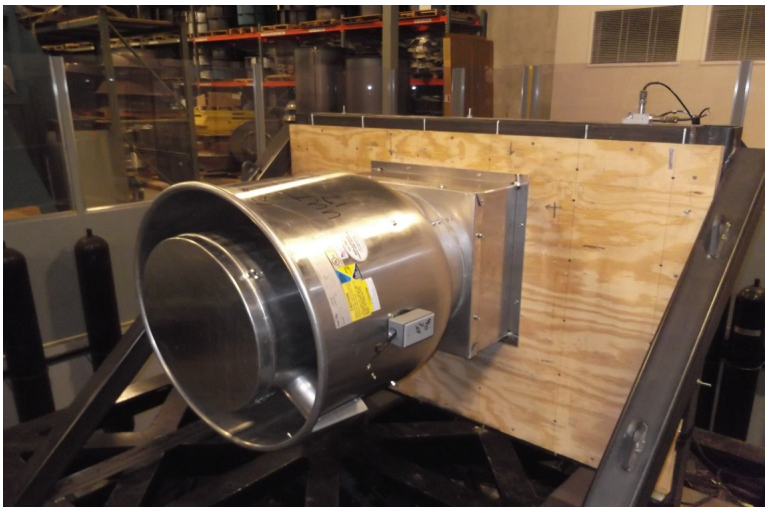
UUT PROPERTIES

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

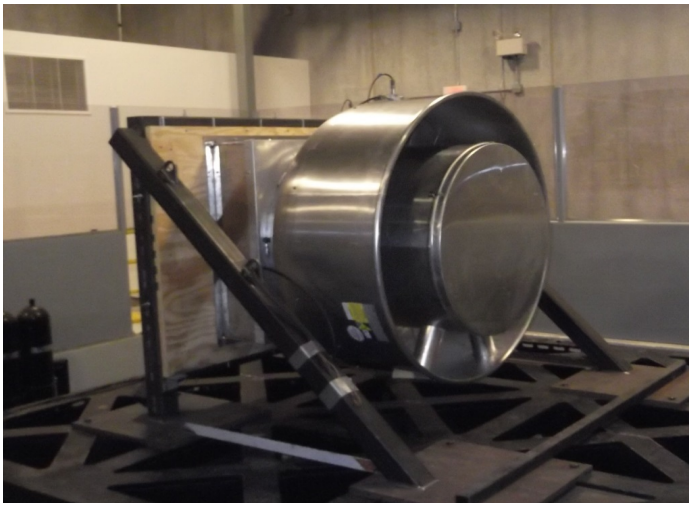
UUT PROPERTIES

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

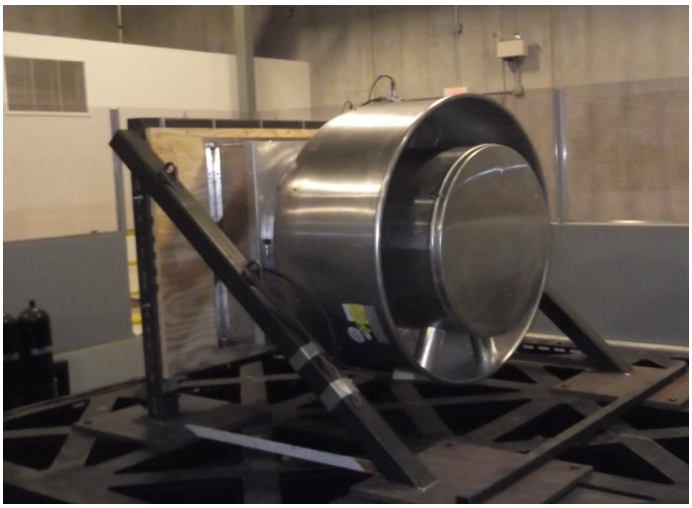
UUT PROPERTIES

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

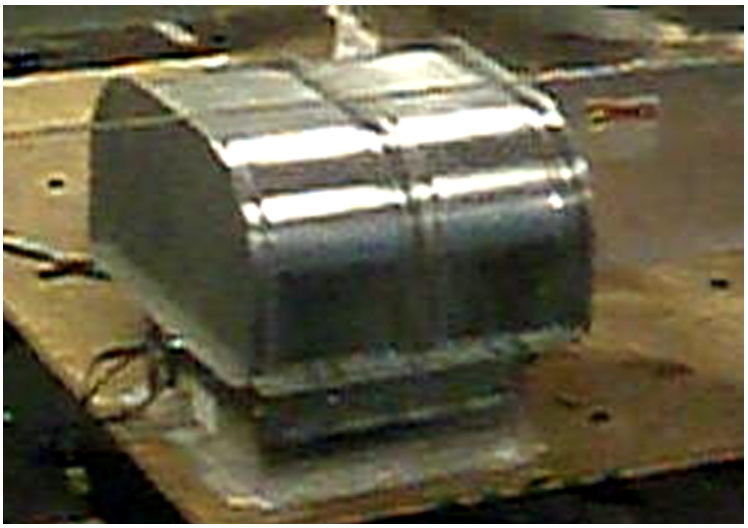
UUT PROPERTIES

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

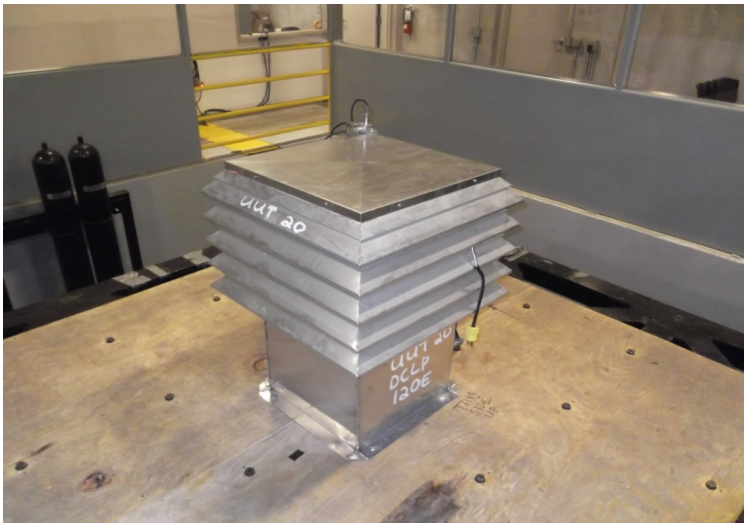
UUT PROPERTIES

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

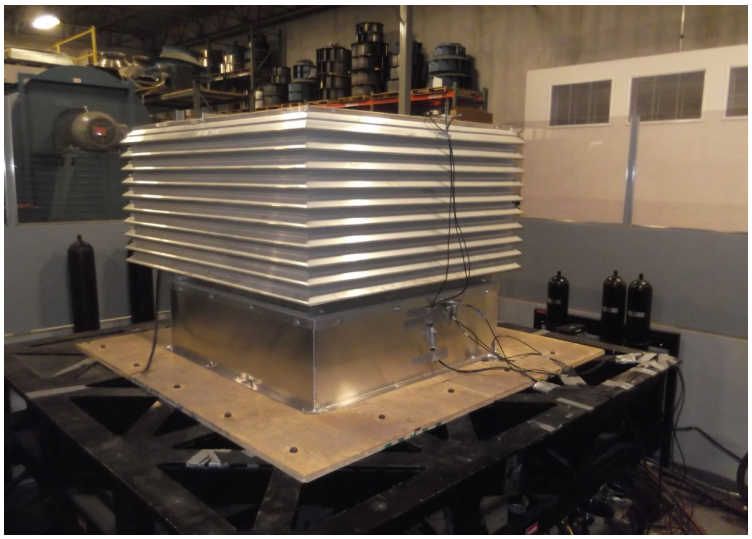
UUT PROPERTIES

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

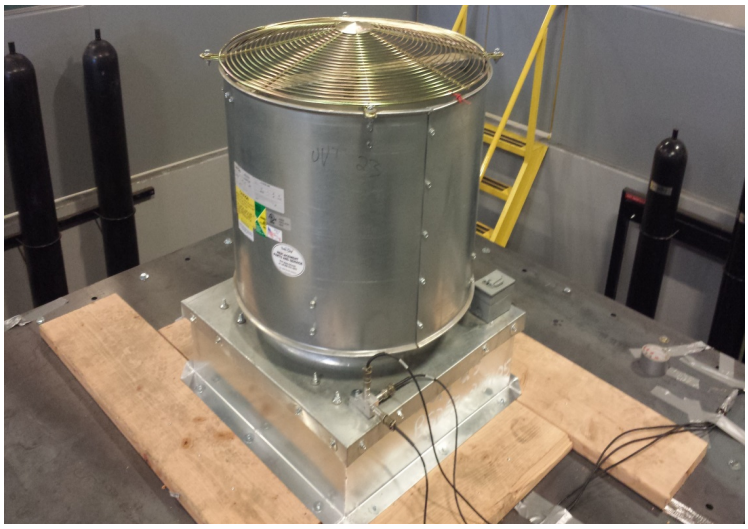
UUT PROPERTIES

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" Glavanized 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

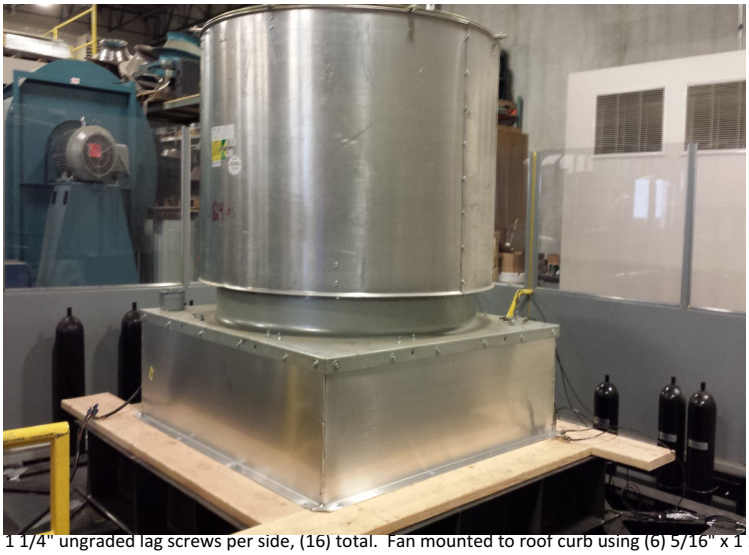
UUT PROPERTIES

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

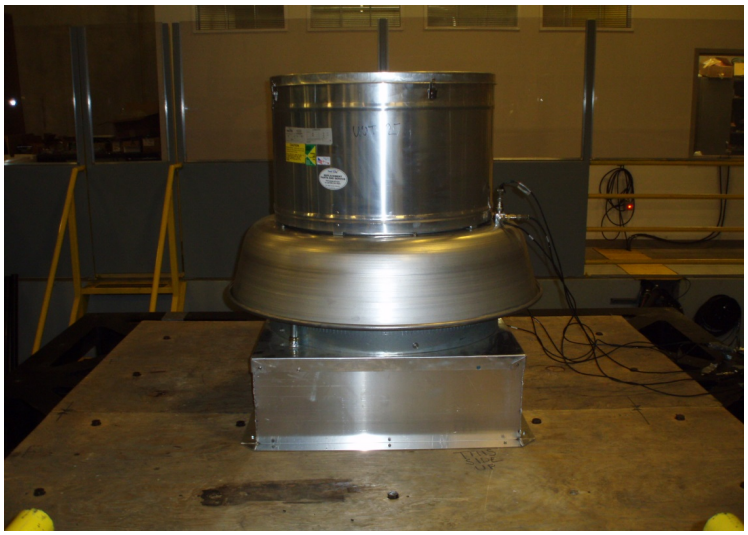
UUT PROPERTIES

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.