APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0355 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☒ New ☐ Renewal

Manufacturer Information

Manufacturer: Twin City Fan Companies

Manufacturer's Technical Representative: Jason Emiliusen

Mailing Address: 5959 Trenton Lane North

Telephone: 763-551-7614 Email: jemiliusen@tcf.com

Product Information

Product Name: Plenum & Housed Fans

Product Type: E Series & Commercial Duty Plenum Fans and Airfoil & Backward Inclined Housed Fans

Product Model Number: See Certified Product tables 1 and 2
(List all unique product identification numbers and/or part numbers)

General Description: Vibration isolated plenum and housed fans, See certified product tables 1 & 2.
Seismic enhancement made to the test units and modifications required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Base mounted with spring isolators and seismic restraints.

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: March 25, 2016

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: 980 9th Street, 16th Floor, Sacramento, CA 95814

Telephone: 916-449-9918 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: Evan Jones

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

Telephone: 763-551-7694 Email: ejones@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) = 4.5 (S_{DS} = 2.0, z/h = 1); 1.88 (S_{DS} = 2.5, z/h = 0); 5.63 (S_{DS} = 2.5, z/h = 1)

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

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

R_p (Equipment or component response modification factor) = 2

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = See Attached Tables

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, 2010: ☐ 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: April 28, 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 Plenum Fans - Carbon Steel Construction

Fan Size	Twin City Approved Model	Aerovent Approval Model	Arrangement	Max Dimensions (in)			Tested Weight	Max Weight[1] (lb)	Testing Scope	S_{DS}[2]	z/h[2]
				Depth	Width	Height					
122	EPF EPQ	CPLF CPLQ	3	22.51	49.97	23.64	---	418	Extrapolated	2.5	1
150				26.06	54.97	26.00	248	---	UUT 1P	2.5	1
150				26.06	54.97	26.00	---	452	Interpolated	2.5	1
165				27.53	59.97	28.36	---	469			
182				30.64	64.96	30.73	---	828			
200				32.28	72.46	34.27	---	912			
222				35.96	79.96	37.82	---	1105			
245				41.99	67.32	39.17	---	1190			
270				44.97	75.24	43.78	---	1448			
300				49.12	83.16	48.38	---	1953			
330				54.01	91.08	52.99	---	2213			
365				64.06	76.81	57.26	---	2859			
402				71.96	84.34	62.87	---	3452			
445				78.55	93.38	69.61	---	4331			
490				85.81	102.42	76.34	---	4649			
542				93.05	114.47	85.33	---	5127			
600				101.12	114.47	85.33	---	5986			
660				112.06	122.75	91.50	7000	7000	UUT 2P	2.5	1
122			3HA	19.01	20.00	36.81	---	294	Extrapolated	2.5	1
150				22.19	22.00	38.81	170	---	UUT 3P	2.5	1
150				22.19	22.00	40.38		316	Interpolated	2.5	1
165				23.25	24.00	40.81	---	331			
182				25.37	26.00	42.88	---	362			
200				27.00	29.00	45.88	---	382			
222				29.88	32.00	55.38	---	490			
245				31.12	34.00	57.38	---	532			
270				33.12	38.00	62.88	---	807			
300				36.81	42.00	66.88	---	896			
330				40.51	46.00	75.38	---	1223			
365				43.31	51.00	80.38	---	1376			
402				46.94	56.00	85.50	---	1476			
445				50.56	62.00	93.38	---	2185			
490				54.44	68.00	99.38	---	2349			
542				60.69	76.00	107.38	2848	2848	UUT 4P	2.5	1
122			3VA	20.00	38.75	19.01	---	294	Extrapolated	2.5	1
150				22.00	40.75	22.01	160	---	UUT 5P	2.5	1
150				22.00	40.75	22.01	---	316	Interpolated	2.5	1
165				24.00	48.75	23.25	---	331			
182				26.00	50.75	25.76	---	362			
200				29.00	53.75	27.69	---	382			
222				32.00	60.31	30.44	---	490			
245				34.00	62.31	31.69	---	532			
270				38.00	67.81	33.69	---	807			
300				42.00	71.81	37.37	---	896			
330				46.00	80.00	39.88	---	1223			
365				51.00	85.00	43.75	---	1376			
402				56.00	90.00	47.26	---	1476			
445				62.00	94.00	51.25	---	2185			
490				68.00	98.00	55.44	2338	2338	UUT 6P	2.5	1
122	EPFN EPQN	CPLFN CPLQN	4	25.94	20.00	20.00	---	181	Extrapolated	2.5	1
150				27.94	22.00	22.00	128	---	UUT 7P	2.5	1
150				27.94	22.00	22.00	---	200	Interpolated	2.5	1
165				29.19	24.00	24.00	---	218			
182				34.38	26.00	26.00	---	339			
200				36.25	29.00	29.00	---	363			
222				42.81	32.00	32.00	---	500			
245				44.82	34.00	34.00	---	536			
270				49.32	38.00	38.00	---	808			
300				56.56	42.00	42.00	---	1080			
330				57.32	46.00	46.00	---	1215			
365				67.50	51.00	51.00	---	1783			
402				70.38	56.00	56.00	---	1954			
445				80.50	62.00	62.00	---	2808			
490				84.00	68.00	68.00	---	3030			
542				88.00	76.00	76.00	---	3415			
600				93.62	76.00	76.00	---	3556			
660				98.26	81.50	81.50	5400	5400	UUT 8P	2.5	1
182			4V	26.00	38.00	35.50	188	---	UUT 9P	2.5	1
182				26.00	38.00	37.38	---	319	Interpolated	2.5	1
200				29.00	41.00	38.44	---	340			
222				32.00	44.00	45.50	---	472			
245				34.00	46.00	47.38	---	504			
270				38.00	50.00	51.63	---	735			
300				42.00	54.00	54.25	---	820			
330				46.00	58.00	60.01	---	1103			
365				51.00	63.00	70.56	---	1837			
402				56.00	68.00	73.38	---	1939			
445				62.00	74.00	77.69	---	2319			
490				68.00	80.00	81.06	2462	2462	UUT 10P	2.5	1
122	EPLFN EPLQN	CLPLFN CLPLQN	4	25.50	27.84	20.00	---	155	Extrapolated	2.5	1
150				29.78	27.84	20.00	116	---	UUT 11P	2.5	1
150				29.78	29.84	22.00	---	243	Interpolated	2.5	1
165				34.32	31.84	24.00	---	356			
182				39.94	33.84	26.00	---	377			
200				41.23	36.84	29.00	---	398			
222				43.56	39.84	32.00	---	456			
245				45.99	41.84	34.00	---	554			
270				49.37	45.84	38.00	---	670			
300				52.40	49.84	42.00	---	911			
330				57.77	53.84	46.00	---	1121			
365				60.40	58.84	51.00	---	1274			
402				65.45	63.84	56.00	---	1672			
445				70.15	69.84	62.00	---	1988			
490				73.97	75.84	68.00	2450	2450	UUT 12P	2.5	1

Notes
(1) Max Weight Includes Unit and Largest Motor Only
(2) Certification is limited to the lower rating on either the Certified Fan Tables, as listed above, or as listed on the Certified Subcomponents Tables.
(3) All units are base mounted on spring isolators with integral snubbers.

Table 2a - Certified Housed Fans - Carbon Steel / Stainless Steel Construction

Fan Size	Twin City Approved Model	Aerovent Approval Model	Arrangement	Max Dimensions (in)			Tested Weight	Max Weight[1] (lb)	Testing Scope	S_{DS}[2]	z/h[2]
				Depth	Width	Height					
122	BC-SWSI BAE-SWSI BAF-SWSI	CB-SWSI CAE-SWSI	1	31.49	45.19	29.68	---	441	Extrapolated	2.0 2.5	1 0
135				33.75	48.69	32.50	314	---	1H	2.5	1
135				33.75	48.69	32.50	---	582	Ineterpolated	2.0 2.5	1 0
150				36.57	53.05	35.94	---	730			
165				37.89	57.16	39.40	---	1034			
182				41.90	63.40	43.12	---	1141			
200				44.96	67.84	47.28	---	1304			
222				48.97	68.82	49.76	---	1649			
245				53.23	70.88	53.66	---	1851			
270				58.57	72.38	60.58	---	2325			
300				65.38	74.68	67.11	---	2749			
330				71.12	86.63	72.13	---	3158			
365				75.91	89.06	74.47	---	3606			
402				83.38	96.92	82.73	---	4061			
445				92.33	107.39	90.82	---	4727			
490				99.14	117.32	103.68	---	5194			
542				103.66	129.34	110.16	---	6326			
600				105.62	137.13	121.58	7760	7760	2H	2.0 2.5	1 0
105			4	22.44	23.87	27.94	---	180	Extrapolated	2.5	1
122				32.44	26.69	31.25	142	---	4H	2.5	1
122				32.44	26.69	33.88	---	198	Ineterpolated	2.5	1
135				27.63	29.32	34.13	---	264			
150				29.19	32.44	38.06	---	304			
165				34.69	35.56	41.25	---	406			
182				41.26	39.56	45.81	---	736			
200				42.44	43.25	49.75	---	783			
222				44.82	47.94	55.50	---	837			
245				46.37	52.75	61.00	---	912			
270				50.50	58.25	66.94	---	1148			
300				52.69	64.56	67.81	---	1621			
330				61.56	71.13	74.40	1862	1862	5H	2.5	1
122			9, 9F	44.50	64.06	41.75	---	459	Extrapolated	2.0 2.5	1 0
135				45.62	64.69	43.38	294	---	7H	2.5	1
135				45.62	64.69	43.38	---	488	Ineterpolated	2.0 2.5	1 0
150				49.76	65.94	47.38	---	642			
165				51.00	68.51	49.56	---	691			
182				56.01	76.75	55.56	---	1180			
200				57.37	80.00	58.25	---	1281			
222				61.25	88.81	64.38	---	1482			
245				63.00	92.76	67.56	---	1614			
270				65.00	97.63	70.88	---	1795			
300				69.38	103.88	75.50	---	2051			
330				79.88	114.38	82.63	---	2810			
365				89.25	124.38	90.31	---	3804			
402				94.25	130.19	95.75	---	4304			
445				99.75	138.38	102.31	---	4973			
490				103.13	146.75	108.25	---	5489			
542				107.37	156.81	119.31	---	6650			
600				114.00	167.19	131.69	6902	6902	11H	2.0 2.5	1 0
402			10	65.19	93.13	89.06	---	2249	Extrapolated	2.5	1
445				71.25	101.69	97.88	1620	---	13H	2.5	1
445				71.25	101.69	97.88	---	2678	Interpolated	2.5	1
490				72.19	112.00	107.94	---	3248			
542				86.86	122.82	118.88	3552	3552	14H	2.5	1
122	BC-DWSI BAE-DWSI BAF-DWSI	CB-DWDI CAE-DWDI	3	44.43	32.69	32.25	---	815	Extrapolated		
135				53.19	37.58	32.50	358, 312	---	16H, 18H	2.5	1
135				53.19	46.17	32.50		904	Interpolated	2.0 2.5	1 0
150				56.31	51.19	35.95	---	1247			
165				61.84	56.21	39.32	---	1531			
182				67.84	61.67	43.30	---	1580			
200				73.38	66.71	47.22	---	1852			
222				81.13	73.76	52.93	---	2363			
245				88.00	80.00	58.16	---	2648			
270				96.39	87.63	64.07	---	2875			
300				106.18	96.53	70.83	---	3329			
330				114.38	103.92	77.86	---	3506			
365				122.86	113.81	85.74	---	3989			
402				136.01	123.86	94.96	---	4579			
445				145.73	137.30	104.31	---	5382			
490				158.78	149.94	114.59	---	5693			
542				171.30	165.30	119.31	7220	7220	19H	2.0 2.5	1 0

Notes

(1) Max Weight Includes Unit and Largest Motor Only

(2) Certification is limited to the lower rating on either the Certified Fan Tables, as listed above, or as listed on the Certified Subcomponents Tables.

(3) All units are base mounted on spring isolators with integral snubbers.

Table 2b - Certified Housed Fans - Aluminum Construction

Fan Size	Twin City Approved Model	Aerovent Approval Model	Arrangement	Max Dimensions (in)			Tested Weight	Max Weight[1] (lb)	Testing Scope	S_{DS}[2]	z/h^2
				Depth	Width	Height					
122	BC-SWSI BAE-SWSI BAF-SWSI	CB-SWSI CAE-SWSI	1	31.49	45.19	29.68	---	332	Interpolated	2.0 2.5	1 0
135				33.75	48.69	32.50	---	478			
150				36.57	53.05	35.94	---	533			
165				37.89	57.16	39.40	---	552			
182				41.90	63.40	43.12	---	723			
200				44.96	67.84	47.28	---	895			
222				48.97	68.82	49.76	---	985			
245				53.23	70.88	53.66	---	1083			
270				58.57	72.38	60.58	---	1513			
300				65.38	74.68	67.11	---	1891			
330				71.12	86.63	72.13	---	2727			
365				75.91	89.06	74.47	---	3187			
402				83.38	96.92	82.73	---	3455			
445				92.33	107.39	90.82	---	3762			
490				99.14	117.32	103.68	---	4449			
542				103.66	129.34	110.16	---	5025			
600				105.62	137.13	121.58	---	5554			
660				112.50	155.50	136.88	6910	6910	3H	2.0 2.5	1 0
105			4	22.44	23.87	27.94	---	159	Interpolated	2.5	1
122				25.25	26.69	31.25	---	171			
135				27.63	29.32	34.13	---	274			
150				29.19	32.44	38.06	---	293			
165				34.69	35.56	41.25	---	400			
182				41.26	39.56	45.81	---	570			
200				42.44	43.25	49.75	---	597			
222				44.82	47.94	55.50	---	675			
245				46.37	52.75	61.00	---	730			
270				50.50	58.25	66.94	---	882			
300				52.69	64.56	67.81	---	976			
330				61.56	71.13	74.40	---	1217			
365				63.38	78.51	83.30	1508	1508	6H	2.5	1
122			9, 9F	44.50	64.06	41.75	---	285	Interpolated	2.0 2.5	1 0
135				45.62	64.69	43.38	---	432			
150				49.76	65.94	47.38	---	453			
165				51.00	68.51	49.56	---	498			
182				56.01	76.75	55.56	---	637			
200				57.37	80.00	58.25	---	835			
222				61.25	88.81	64.38	---	894			
245				63.00	92.76	67.56	---	1022			
270				65.00	97.63	70.88	---	1421			
300				69.38	103.88	75.50	---	1587			
330				79.88	114.38	82.63	---	1722			
365				89.25	124.38	90.31	---	2591			
402				94.25	130.19	95.75	---	3000			
445				99.75	138.38	102.31	---	3331			
490				103.13	146.75	108.25	---	3589			
542				107.37	156.81	119.31	---	4359			
600				114.00	167.19	131.69	---	4963			
660				116.63	178.00	143.94	5208	5208	9H	2.0 2.5	1 0
402			10	65.19	93.13	89.06	---	1387	Interpolated	2.5	1
445				71.25	101.69	97.88	---	1552			
490				72.19	112.00	107.94	---	1951			
542				86.86	122.82	118.88	---	2475			
600				91.38	134.88	131.25	2988	2988	15H	2.5	1
122	BC-DWSI BAE-DWSI BAF-DWSI	CB-DWDI CAE-DWDI	3	44.43	32.69	32.25	---	430	Interpolated	2.0 2.5	1 0
135				53.19	37.58	32.50	---	544			
150				56.31	51.19	35.95	---	602			
165				61.84	56.21	39.32	---	657			
182				67.84	61.67	43.30	---	786			
200				73.38	66.71	47.22	---	815			
222				81.13	73.76	52.93	---	958			
245				88.00	80.00	58.16	---	1066			
270				96.39	87.63	64.07	---	1592			
300				106.18	96.53	70.83	---	2096			
330				114.38	103.92	77.86	---	2279			
365				122.86	113.81	85.74	---	2566			
402				136.01	123.86	94.96	---	3291			
445				145.73	137.30	104.31	---	4183			
490				158.78	149.94	114.59	---	4620			
542				171.30	165.30	119.31	5630	5630	17H	2.0 2.5	1 0

Notes

(1) Max Weight Includes Unit and Largest Motor Only

(2) Certification is limited to the lower rating on either the Certified Fan Tables, as listed above, or as listed on the Certified Subcomponents Tables.

(3) All units are base mounted on spring isolators with integral snubbers.

Table 3 - Certified Configurations: Belt Driven Plenum Fans

Twin City Fan Model: EPF, EPQ
Aerovent Model: CPLF, CPLQ
Arrangement: 3 Horizontal
Drive Type: Belt

Plenum Fan	HP	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	UUT	Sds[1]	z/h[1]
	Motor Wt	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840	1120	1160	1540	1730			
Size	122	X	X	X	X	X	X	X													Extrapolated		
Weight	79																						
Size	150	X	X	X	X	X	X	X													1P		
Weight	101																						
Size	165	X	X	X	X	X	X	X													Interpolated	2.5	1
Weight	116																						
Size	182	X	X	X	X	X	X	X	X	X	X												
Weight	164																						
Size	200	X	X	X	X	X	X	X	X	X	X	X											
Weight	186																						
Size	222		X	X	X	X	X	X	X	X	X	X	X										
Weight	238																						
Size	245		X	X	X	X	X	X	X	X	X	X	X										
Weight	277																						
Size	270		X	X	X	X	X	X	X	X	X	X	X	X									
Weight	429																						
Size	300		X	X	X	X	X	X	X	X	X	X	X	X	X								
Weight	524																						
Size	330			X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	654																						
Size	365			X	X	X	X	X	X	X	X	X	X	X	X	X	X						
Weight	811																						
Size	402				X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Weight	986																						
Size	445				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Weight	1431																						
Size	490					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	1633																						
Size	542					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	1987																						
Size	600						X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	2231																						
Size	660						X	X	X	X	X	X	X	X	X	X	X	X	X	X	2P		
Weight	2810																						

Arrangement	Fan Class	Fan Sizes	UUT
3	I	122 - 660	1P
	III	122 - 660	
	III	182 - 660	2P

Wheel Material	Fan Sizes	UUT
Aluminum (std)	122 - 245	1P
Aluminum (optional)	270 - 660	
Steel (std)	270 - 660	2P

Fan Base Material	UUT
A36 Steel	1P, 2P

Housing Material	UUT
A36 Steel	1P, 2P

Wheel	UUT
9-bladed	1P
12-bladed	2P

Motor Position	UUT
W	1P
X	2P
Y	
Z	

Note:

(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.

Table 4 - Certified Configurations: Belt Driven Plenum Fans

Twin City Fan Model: EPF, EPQ
Aerovent Model: CPLF, CPLQ
Arrangement: 3HA Horizontal & 3VA Vertical
Drive Type: Belt

Plenum Fan	HP	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	UUT	SDS[1]	z/h[1]
	Motor Wt	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840			
Size	122	X	X	X	X	X	X	X									Extrapolated		
Weight	79																		
Size	150	X	X	X	X	X	X	X									3P, 5P		
Weight	101																		
Size	165	X	X	X	X	X	X	X									Interpolated	2.5	1
Weight	116																		
Size	182	X	X	X	X	X	X	X											
Weight	164																		
Size	200	X	X	X	X	X	X	X											
Weight	186																		
Size	222		X	X	X	X	X	X	X	X									
Weight	238																		
Size	245		X	X	X	X	X	X	X	X									
Weight	277																		
Size	270		X	X	X	X	X	X	X	X	X	X							
Weight	429																		
Size	300		X	X	X	X	X	X	X	X	X	X							
Weight	524																		
Size	330			X	X	X	X	X	X	X	X	X	X	X					
Weight	654																		
Size	365			X	X	X	X	X	X	X	X	X	X	X					
Weight	811																		
Size	402				X	X	X	X	X	X	X	X	X	X					
Weight	986																		
Size	445				X	X	X	X	X	X	X	X	X	X	X	X			
Weight	1431																		
Size	490					X	X	X	X	X	X	X	X	X	X	X	6P		
Weight	1633																		
Size	542					X	X	X	X	X	X	X	X	X	X	X	4P		
Weight	1987																		

Arrangement	Fan Class	Fan Sizes	UUT
3HA	I	122 - 542	3P
	II	122 - 542	4P
3VA	I	122 - 542	5P
	II	122 - 542	6P

Fan Base Material	UUT
A36 Steel	3P,4P 5P,6P

Housing Material	UUT
A36 Steel	3P,4P 5P,6P

Seismic Gusset Thick.	Material	Arr.	Fan Sizes	UUT
N/A	A36 Steel	3HA	122 - 150	3P
12-Gauge			165 - 200	
10-Gauge			222 - 330	
7-Gauge			365 - 542	4P

Wheel	UUT
9-bladed	3P, 5P
12-bladed	4P, 6P

Wheel Material	Fan Sizes	UUT
Aluminum (std)	122 - 245	3P, 5P
Aluminum (optional)	270 - 542	
Steel (std)	270 - 542	4P, 6P

Motor Position	UUT
W	N/A
X	N/A
Y	N/A
Z	N/A

Note:
(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.

Table 5 - Certified Configurations: Direct Driven Plenum Fans

Twin City Fan Model: EPFN, EPQN **Arrangement:** 4 Horizontal & 4 Vertical
Aerovent Model: CPLFN, CPLQN **Drive Type:** Direct

Plenum Fan	HP	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	UUT	SDS[1]	z/h[1]
	Motor Wt	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840	1120	1160	1540	1730			
Size	122	X	X	X	X	X															Extrapolated		
Weight	79																						
Size	150	X	X	X	X	X															7P		
Weight	101																						
Size	165	X	X	X	X	X															Interpolated		
Weight	116																						
Size	182	X	X	X	X	X	X	X													9P		
Weight	164																						
Size	200	X	X	X	X	X	X	X													Interpolated	2.5	1
Weight	186																						
Size	222	X	X	X	X	X	X	X	X	X													
Weight	238																						
Size	245	X	X	X	X	X	X	X	X	X													
Weight	277																						
Size	270		X	X	X	X	X	X	X	X	X	X											
Weight	429																						
Size	300		X	X	X	X	X	X	X	X	X	X	X	X									
Weight	524																						
Size	330		X	X	X	X	X	X	X	X	X	X	X	X									
Weight	654																						
Size	365			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Weight	811																						
Size	402				X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Weight	986																						
Size	445				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	1431																						
Size	490					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	10P		
Weight	1633																						
Size	542					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
Weight	1987																						
Size	600						X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	2231																						
Size	660						X	X	X	X	X	X	X	X	X	X	X	X	X	X	8P		
Weight	2810																						

Arrangement	Fan Class	Fan Sizes	UUT
4	I	122 - 660	7P
	II	122 - 660	
	III	182 - 660	8P
4V	I	182 - 490	9P
	II	182 - 490	10P

Housing Material	UUT
A36 Steel	7P,8P 9P,10P

Fan Base Material	UUT
A36 Steel	7P,8P 9P,10P

Wheel	UUT
9-bladed	7P,9P
12-bladed	8P,10P

Seismic Gusset Thick.	Material	Arr.	Fan Sizes	UUT
N/A	A36 Steel	4V	122 - 165	
7-Gauge			182 - 330	9P
0.25 Inch			365 - 490	10P

Special Wheel Width/Diameter Construction	Description	UUT
Special Width (50 - 105%)	50% Width	7P
	105% Width	9P
Special Diameter (97 - 101%)	97% Diameter	8P
	101% Diameter	10P

Wheel Material	Fan Sizes	UUT
Aluminum (std)	122 - 660	7P-10P

Motor Position	UUT
W	N/A
X	N/A
Y	N/A
Z	N/A

Note:

(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.

Table 6 - Certified Configurations: Direct Driven Plenum Fans

Twin City Fan Model: EPLFN, EPLQN **Arrangement:** 4 Horizontal
Aerovent Model: CLPLFN, CLPLQN **Drive Type:** Direct

Plenum Fan	HP	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	UUT	SDS[1]	z/h[1]
	Motor Wt	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840	1120	1160			
Size	122	X	X	X	X	X													Extrapolated	2.5	1
Weight	67																				
Size	150	X	X	X	X	X	X	X											11P		
Weight	83																				
Size	165	X	X	X	X	X	X	X	X	X									Interpolated		
Weight	116																				
Size	182	X	X	X	X	X	X	X	X	X											
Weight	140																				
Size	200	X	X	X	X	X	X	X	X	X											
Weight	165																				
Size	222	X	X	X	X	X	X	X	X	X											
Weight	233																				
Size	245				X	X	X	X	X	X	X	X									
Weight	283																				
Size	270						X	X	X	X	X	X									
Weight	344																				
Size	300						X	X	X	X	X	X	X	X							
Weight	430																				
Size	330								X	X	X	X	X	X	X	X					
Weight	518																				
Size	365								X	X	X	X	X	X	X	X					
Weight	685																				
Size	402								X	X	X	X	X	X	X	X	X	X			
Weight	910																				
Size	445								X	X	X	X	X	X	X	X	X	X			
Weight	1200																				
Size	490								X	X	X	X	X	X	X	X	X	X	12P		
Weight	1427																				

Arrangement	Fan Class	Fan Sizes	UUT
4	II	122 -490	11P 12P

Housing Material	UUT
A36 Steel	11P 12P

Fan Base Material	UUT
A36 Steel	11P 12P

Wheel Material	Fan Sizes	UUT
Aluminum (std)	122 - 490	11P 12P

Motor Position	UUT
W, Z	N/A
X, Y	N/A

Wheel	UUT
9-bladed	11P
12-bladed	12P

Motor Position	UUT
W	N/A
X	N/A
Y	N/A
Z	N/A

Note:

(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.

Table 7 - Certified Subcomponents: miscellaneous Components

Description	Availability	Material / Model / TCF Drawing #	Manufacturer	Test Unit
Round Inlet Collar	EPF, EPQ, EPFN, EPQN	A36 Steel	TCF	5P,6P
Extended Life Bearings	EPF, EPQ	Unified SAF Bearings / Imperial	Dodge	2P
Belt Guard - OSHA Type	EPF, EPQ	A36 Steel	TCF	1P
Belt Guard - Quick Access	EPF, EPQ	A36 Steel	TCF	3P
Extended Lube Lines	EPF, EPQ	1/4" OD Copper Tubing / 1/4" Black Nylaflo LM	TCF	4P
Aero Acoustic Diffuser	EPF, EPQ, EPFN, EPQN	Galvanized Steel	TCF	7P
Piezometer Ring	EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN	1/4" OD Copper Tubing / 1/4" Black Nylon Tubing	TCF	8P
Pressure Transducer/Transmitter	EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN	Series DH Digihelic	Dwyer	8P
Shaft Grounding Ring	EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN	SGR Rings	Aegis	10P
Inlet Screen	EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN	Steel Wire	TCF	10P,12P
Protective Enclosure	EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN	Steel Wire	TCF	11P
Stainless Steel Nameplate	EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN	Stainless Steel	TCF	9P
Thrust Restraint Brackets	EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN	Galvanized Steel	TCF	11P

Table 8 - Certified Subcomponents: Plenum Fan Wheels

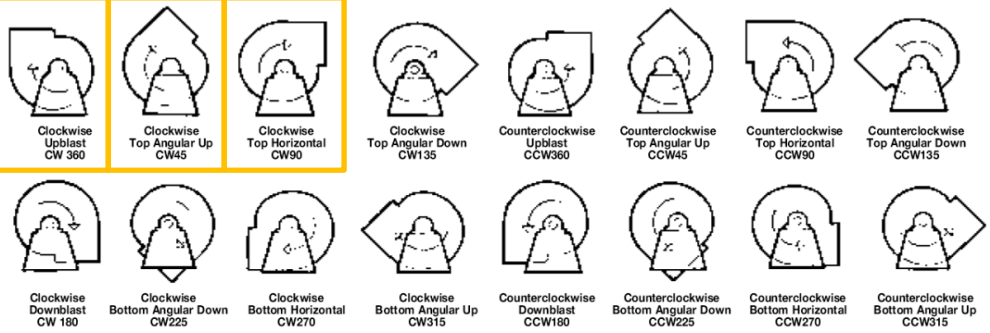
Model	Drive	Arrangement	Reference Tables	Size	Shaft Diameter	Material	UUT
EPF EPQ	Belt	3 Horizontal 3HA Horizontal 3VA Vertical	1,3,4	122	1.00" - 1.19"	Aluminum	Extrapolated
				150	1.00" - 1.19"	Aluminum	1P, 3P, 5P
				165	1.00" - 1.19"	Aluminum	Interpolated
				182	1.19" - 1.69"	Aluminum	
				200	1.19" - 1.69"	Aluminum	
				222	1.44" - 1.94"	Aluminum	
				238	1.44" - 1.94"	Aluminum	
				270	1.44" - 2.19"	Carbon Steel	
						Aluminum	
				300	1.94 - 2.19"	Carbon Steel	
						Aluminum	
				330	1.69" - 2.44"	Carbon Steel	
						Aluminum	
				365	1.94" - 2.44"	Carbon Steel	
						Aluminum	
				402	1.94" - 2.69"	Carbon Steel	
						Aluminum	
				445	2.19" - 2.94"	Carbon Steel	
						Aluminum	
				490	2.19" - 2.94"	Carbon Steel	6P
						Aluminum	Interpolated
				542	2.44" - 3.44"	Carbon Steel	4P
						Aluminum	Interpolated
		3 Horizontal	1,3	600	2.69" - 3.94"	Carbon Steel	
						Aluminum	
				660	2.94" - 3.94"	Carbon Steel	2P
						Aluminum	Extrapolated
EPFN EPQN	Direct	4 Horizontal 4 Vertical	1,5	122	0.625" - 1.125"	Aluminum	Extrapolated
				150	0.625" - 1.375"	Aluminum	7P
				165	0.625" - 1.625"	Aluminum	Interpolated
				182	0.625" - 1.625"	Aluminum	9P
				200	0.625" - 1.625"	Aluminum	Interpolated
				222	0.625" - 1.625"	Aluminum	
				245	0.625" - 1.875"	Aluminum	
				270	0.875" - 1.875"	Aluminum	
				300	0.875" - 2.125"	Aluminum	
				330	0.875" - 2.375"	Aluminum	
				365	0.875" - 2.875"	Aluminum	
				402	1.125" - 2.875"	Aluminum	
				445	1.125" - 3.375"	Aluminum	
				490	1.125" - 3.375"	Aluminum	10P
				542	1.125" - 3.375"	Aluminum	Interpolated
				600	1.375" - 3.375"	Aluminum	
				660	1.375" - 3.375"	Aluminum	8P
EPLFN EPLQN	Direct	4 Horizontal	1,6	122	0.625" - 1.125"	Aluminum	11P
				150	0.625" - 1.375"	Aluminum	Interpolated
				165	0.625" - 1.625"	Aluminum	
				182	0.625" - 1.625"	Aluminum	
				200	0.625" - 1.625"	Aluminum	
				222	0.625" - 1.625"	Aluminum	
				245	0.625" - 1.875"	Aluminum	
				270	0.875" - 1.875"	Aluminum	
				300	0.875" - 2.125"	Aluminum	
				330	0.875" - 2.375"	Aluminum	
				365	0.875" - 2.875"	Aluminum	
				402	1.125" - 2.875"	Aluminum	
				445	1.125" - 3.375"	Aluminum	
				490	1.125" - 3.375"	Aluminum	12P

Table 9 - Certified Configurations: Belt Driven Housed Fans

Twin City Fan Models: BC-SWSI, BAE-SWSI, BAF-SWSI
Aerovent Model: CB-SWSI, CAE-SWSI
Arrangement: 1
Drive Type: Belt

Backward Inclined Fan	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150	200	UUT	SDS[1]	z/h[1]
	Motor Wt	19	19	27	27	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840	1120	1160	1540	1730			
Size	122	X	X	X	X	X	X	X	X	X	X	X													Extrapolated	2.0	1
Weight	139																									2.5	0
Size	135	X	X	X	X	X	X	X	X	X	X	X	X	X											1H	2.5	1
Weight	159																										
Size	150	X	X	X	X	X	X	X	X	X	X	X	X	X											Interpolated	2.0	1
Weight	198																									2.5	0
Size	165	X	X	X	X	X	X	X	X	X	X	X	X	X													
Weight	224																										
Size	182	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Weight	293																										
Size	200	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Weight	343																										
Size	222		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Weight	442																										
Size	245		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Weight	620																										
Size	270			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	740																										
Size	300			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	950																										
Size	330				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	1157																										
Size	365				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Weight	1387																										
Size	402					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	1719																										
Size	445					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	2112																										
Size	490						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	2478																										
Size	542						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	3509																										
Size	600							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2H		
Weight	4429																										
Size	660								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3H		
Weight	5283																										
Size	730								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Extrapolated		
Weight	6365																										

UUT 1H	UUT 2H	UUT 3H
Clockwise Upblast CW 360	Clockwise Top Angular Up CW45	Clockwise Top Horizontal CW90



Fan Base Material	UUT
A36 Steel	1H-3H

Housing Material	UUT
Carbon Steel	1H
Stainless Steel	2H
Aluminum	3H

Motor Position	UUT
W	1H
X	3H
Y	
Z	2H

Arrangement	Fan Class	Fan Sizes	UUT
1	I	122-730	1H
	II		
	III		2H,3H

Wheel Material	Fan Sizes	UUT
Carbon Steel	122-730	1H
Stainless Steel		2H
Aluminum		3H

Fan Type	UUT
Backward Inclined	1H,3H
Airfoil	2H

Wheel	UUT
9-bladed	1H-3H

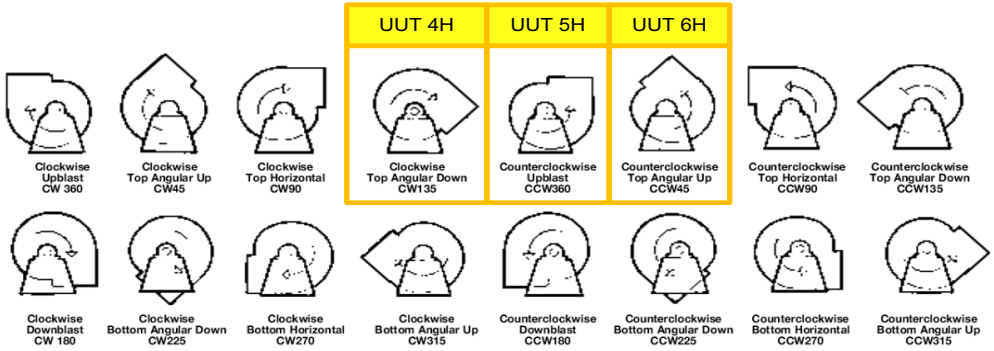
Motor Position	UUT
W or Z	1H,2H
X or Y	3H

Note:
(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.
(2) Housed Fans are certified for all discharge configurations.

Table 10 - Certified Configurations: Direct Driven Housed Fans

Twin City Fan Models: BC-SWSI, BAE-SWSI, BAF-SWSI **Arrangement:** 4
Aerovent Model: CB-SWSI, CAE-SWSI **Drive Type:** Direct

Backward Inclined Fan	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	UUT	SDS^1	z/h^1
	Motor Wt	19	19	27	27	29	32	48	110	115	165	180	280	315	380	415	490	560			
Size	105	X	X	X	X	X	X	X											Extrapolated		
Weight	102																				
Size	122				X	X	X	X											4H		
Weight	117																				
Size	135				X	X	X	X	X	X									Interpolated	2.5	1
Weight	134																				
Size	150				X	X	X	X	X	X											
Weight	164																				
Size	165				X	X	X	X	X	X	X	X									
Weight	192																				
Size	182				X	X	X	X	X	X	X	X	X	X							
Weight	248																				
Size	200						X	X	X	X	X	X	X	X							
Weight	291																				
Size	222						X	X	X	X	X	X	X	X							
Weight	376																				
Size	245								X	X	X	X	X	X							
Weight	464																				
Size	270								X	X	X	X	X	X	X	X					
Weight	548																				
Size	300								X	X	X	X	X	X	X	X					
Weight	659																				
Size	330										X	X	X	X	X	X	X	X	5H		
Weight	812																				
Size	365											X	X	X	X	X	X	X	6H		
Weight	1026																				



Arrangement	Fan Class	Fan Sizes	UUT
4	I	105-365	4H
	II		5H,6H

Wheel Material	Fan Sizes	UUT
Carbon Steel	105-365	4H
Stainless Steel		5H
Aluminum		6H

Fan Base Material	UUT
A36 Steel	4H-6H

Housing Material	UUT
Carbon Steel	4H
Stainless Steel	5H
Aluminum	6H

Special Wheel Width/Diameter Construction	Description	UUT
Special Width (50 - 105%)	50% Width	4
	105% Width	6
Special Diameter (97 - 101%)	97% Diameter	6
	101% Diameter	4

Motor Position	UUT
W	N/A
X	N/A
Y	N/A
Z	N/A

Fan Type	UUT
Backward Inclined	5H
Airfoil	4H,6H

Wheel	UUT
9-bladed	4H-6H

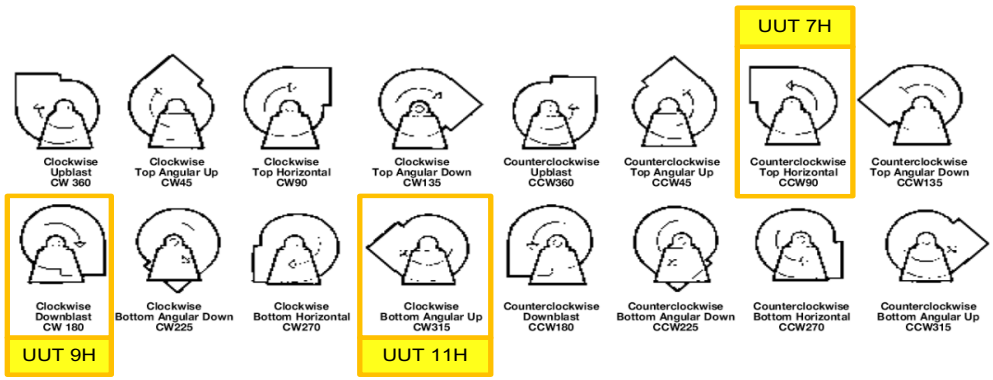
Note:
(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.
(2) Housed Fans are certified for all discharge configurations.

Table 11 - Certified Configurations: Belt Driven Housed Fans

Twin City Fan Models: BC-SWSI, BAE-SWSI, BAF-SWSI
Aerovent Model: CB-SWSI, CAE-SWSI

Arrangement: 9,9F
Drive Type: Belt

Backward Inclined Fan	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150	200	UUT	S_{DS}[1]	z/h[1]
	Motor Wt	19	19	27	27	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840	1120	1160	1540	1730			
Size	122	X	X	X	X	X	X	X	X	X	X	X													Extrapolated	2.0	1
Weight	139																									2.5	0
Size	135	X	X	X	X	X	X	X	X	X	X	X	X	X											7H	2.5	1
Weight	159																										
Size	150	X	X	X	X	X	X	X	X	X	X	X	X	X											Interpolated		
Weight	198																										
Size	165	X	X	X	X	X	X	X	X	X	X	X	X	X													
Weight	224																										
Size	182	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Weight	293																										
Size	200	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Weight	343																										
Size	222		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Weight	442																										
Size	245		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Weight	620																										
Size	270			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	740																										
Size	300			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	950																										
Size	330				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						2.0	1
Weight	1157																									2.5	0
Size	365				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Weight	1387																										
Size	402					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	1719																										
Size	445					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	2112																										
Size	490						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	2478																										
Size	542						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	3509																										
Size	600							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	11H		
Weight	4429																										
Size	660								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	9H		
Weight	5283																										
Size	730									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Extrapolated		
Weight	6365																										



Fan Base Material	UUT
A36 Steel	7H,9H,11H

Housing Material	UUT
Carbon Steel	7H
Stainless Steel	11H
Aluminum	9H

Motor Position	UUT
W	N/A
X	N/A
Y	N/A
Z	N/A

Arrangement	Fan Class	Fan Sizes	UUT
9	I	122-730	7H
	II		
	III		9H,11H

Wheel Material	Fan Sizes	UUT
Carbon Steel	122-730	7H
Stainless Steel		11H
Aluminum		9H

Fan Type	UUT
Backward Inclined	7H,9H
Airfoil	11H

Wheel	UUT
9-bladed	7H,9H,11H

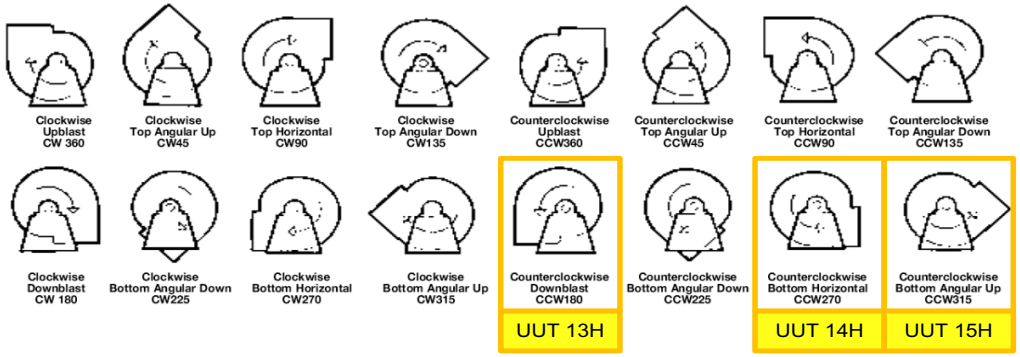
Note:
(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.
(2) Housed Fans are certified for all discharge configurations.

Table 12 - Certified Configurations: Belt Driven Housed Fans

Twin City Fan Models: BC-SWSI, BAE-SWSI, BAF-SWSI
Aerovent Model: CB-SWSI, CAE-SWSI

Arrangement: 10
Drive Type: Belt

Backward Inclined Fan	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	UUT	SDS[1]	z/h[1]
	Motor Wt	19	19	27	27	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840			
Size	402					X	X	X	X	X	X	X	X	X	X	X					Extrapolated		
Weight	1403																						
Size	445					X	X	X	X	X	X	X	X	X	X	X					13H		
Weight	1678																						
Size	490						X	X	X	X	X	X	X	X	X	X	X	X			Interpolated	2.5	1
Weight	2101																						
Size	542						X	X	X	X	X	X	X	X	X	X	X	X	X	X	14H		
Weight	2508																						
Size	600							X	X	X	X	X	X	X	X	X	X	X	X	X	15H		
Weight	3630																						



Arrangement	Fan Class	Fan Sizes	UUT
10	I	402-600	
	II		13H-15H

Wheel Material	Fan Sizes	UUT
Carbon Steel	402-600	13H
Stainless Steel		14H
Aluminum		15H

Fan Base Material	UUT
A36 Steel	13H-15H

Housing Material	UUT
Carbon Steel	13H
Stainless Steel	14H
Aluminum	15H

Motor Position	UUT
W	N/A
X	N/A
Y	N/A
Z	N/A

Fan Type	UUT
Backward Inclined	14H
Airfoil	13H,15H

Wheel	UUT
9-bladed	13H - 15H

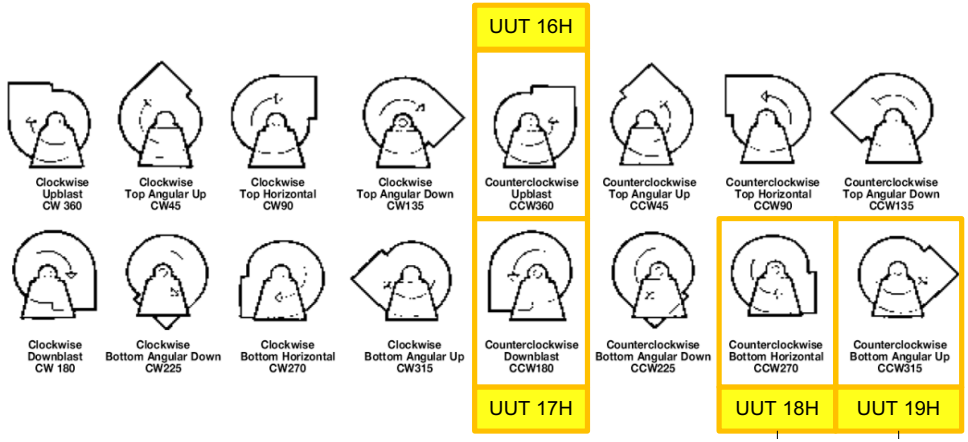
Note:
(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.
(2) Housed Fans are certified for all discharge configurations.

Table 13 - Certified Configurations: Belt Driven Housed Fans

Twin City Fan Models: BC-SWSI, BAE-SWSI, BAF-SWSI
Aerovent Model: CB-SWSI, CAE-SWSI

Arrangement: 3
Drive Type: Belt

Backward Inclined Fan	HP	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150	200	UUT	Sds[1]	z/h[1]
	Motor Wt	19	19	27	27	29	32	48	110	115	165	180	280	315	380	415	490	560	800	840	1120	1160	1540	1730			
Size	122	X	X	X	X	X	X	X	X	X	X	X													Extrapolated	2.0	1
Weight	284																									2.5	0
Size	135	X	X	X	X	X	X	X	X	X	X	X	X												16H, 18H	2.5	1
Weight	312																										
Size	150		X	X	X	X	X	X	X	X	X	X	X												Interpolated	2.0	1
Weight	372																									2.5	0
Size	165		X	X	X	X	X	X	X	X	X	X	X	X													
Weight	422																										
Size	182			X	X	X	X	X	X	X	X	X	X	X	X												
Weight	464																										
Size	200			X	X	X	X	X	X	X	X	X	X	X	X												
Weight	628																										
Size	222				X	X	X	X	X	X	X	X	X	X	X	X											
Weight	801																										
Size	245				X	X	X	X	X	X	X	X	X	X	X	X	X										
Weight	884																										
Size	270				X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Weight	1080																										
Size	300					X	X	X	X	X	X	X	X	X	X	X	X	X	X								
Weight	1473																										
Size	330						X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	1626																										
Size	365						X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Weight	2043																										
Size	402							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Weight	2554																										
Size	445							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	3175																										
Size	490								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Weight	3472																										
Size	542								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17H, 19H		
Weight	4400																										
Size	600									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Extrapolated		
Weight	6189																										



Motor Position	UUT
W	16H
X	17H
Y	18H
Z	19H

Fan Base Material	UUT
A36 Steel	16H-19H

Housing Material	UUT
Carbon Steel	18H
Stainless Steel	16H,19H
Aluminum	17H

Arrangement	Fan Class	Fan Sizes	UUT
3	I	122-660	16H,18H
	II		
	III		17H,19H

Wheel Material	Fan Sizes	UUT
Carbon Steel	122-660	18H
Stainless Steel		16H,19H
Aluminum		17H

Special Wheel Width/Diameter Construction	Description	UUT
Special Width (50 - 105%)	50% Width	18H
	105% Width	19H
Special Diameter (97 - 101%)	97% Diameter	16H
	101% Diameter	17H

Fan Type	UUT
Backward Inclined	16H,17H
Airfoil	18H,19H

Wheel	UUT
9-bladed	16H-19H

Note:
(1) Certification level is limited to the lower rating on either the Certified Subcomponent Tables, as listed above, or as listed on the Certified Fan Tables.
(2) Housed Fans are certified for all discharge configurations.

Table 14 - Certified Subcomponents: Miscellaneous Components

Description	Availability	Material / Model / TCF Drawing #	Manufacturer	Test Unit
Access Door - Bolted & Hinged	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	A36 Steel / Aluminum / SST	TCF	18H,9H
Drain	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	A36 Steel / Aluminum / SST	TCF	5H
Flanged Inlet & Outlet Punched	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	A36 Steel / Aluminum / SST	TCF	4H, 5H, 6H
Shaft & Bearing Guard	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	A36 Steel / SST	TCF	14H
Belt Guard - OSHA & Quick Access Type	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	A36 Steel / SST	TCF	3H,16H
Pressure transducer/transmitter	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	Series DH Digihelic	Dwyer	7H
Weather Cover	BC-SW, BAE-SW, BAF-SW	A 36 Steel / SST	TCF	13H
Shaft Seal	`	AL Cover Plate - Tetraglas Seal	TCF	11H
Extended Lube Lines	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	1/4" OD Copper Tubing / 1/4" Black Nylaflo LM	TCF	17H
Piezometer Ring	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	1/4" OD Copper Tubing / 1/4" Black Nylon Tubing	TCF	7H
Split Housing	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	A36 Steel / Aluminum / SST	TCF	2H
High Temperature Construction	BC-SW, BAE-SW, BAF-SW	A36 Steel	TCF	1H
Spark Resistant Construction - Type A,B & C	BC-SW, BAE-SW, BAF-SW	refer to AMCA 99-0401	TCF	15H, 4H
Outler Damper - Opposed & Parallel Blade	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	A36 Steel / SST	TCF	6H,5H
UL 705	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	refer to UL-705.6	TCF	13H
SS Nameplates	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	Stainless Steeel	TCF	19H
Bearing Upgrade	BC-SW, BAE-SW, BAF-SW, BC-DW, BAE-DW, BAF-DW	Unified SAF Bearings / Imperial	Dodge	19H

Table 15 - Certified Subcomponents: Housed fan Wheels

Model	Drive	Arrangement	Reference Tables	Size	Shaft Diameter	Material	UUT
BC-SWSI BAE-SWSI BAF-SWSI	Direct	4	2,10	105	.625" - .875"	Carbon Steel	Extrapolated
						Stainless Steel	
						Aluminum	
				122	.875" - 1.125"	Carbon Steel	4H
						Stainless Steel	Interpolated
						Aluminum	
				135	.875" - 1.375"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				150	.875" - 1.375"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				165	.875" - 1.625"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				182	.875" - 1.875"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				200	1.125" - 1.875"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				222	1.125" - 1.875"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				245	1.375" - 1.875"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				270	1.375" - 2.125"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				300	1.375" - 2.125"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				330	1.625" - 2.375"	Carbon Steel	
						Stainless Steel	5H
						Aluminum	Interpolated
				365	1.875" - 2.375"	Carbon Steel	
						Stainless Steel	
						Aluminum	6H

Table 15 - Certified Subcomponents: Housed Fan Wheels (Continued)

Model	Drive	Arrangement	Reference Tables	Size	Shaft Diameter	Material	UUT
BC-SWSI BAE-SWSI BAF-SWSI	Belt	1 9, 9F 10	2,9,11,12	122	1.00" - 1.437"	Carbon Steel	Extrapolated
						Stainless Steel	
						Aluminum	
				135	1.00" - 1.437"	Carbon Steel	1H, 7H
						Stainless Steel	Interpolated
						Aluminum	
				150	1.00" - 1.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				165	1.00" - 1.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				182	1.00" - 1.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				200	1.187" - 1.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				222	1.437" - 1.937"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				245	1.437" - 1.937"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				270	1.437" - 2.187"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				300	1.437" - 2.187"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				330	1.687" - 2.437"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				365	1.687" - 2.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				402	1.937" - 2.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				445	1.937" - 3.437"	Carbon Steel	13H
						Stainless Steel	Interpolated
						Aluminum	
				490	2.187" - 3.437"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				542	2.437" - 3.937"	Carbon Steel	
						Stainless Steel	14H
						Aluminum	Interpolated
				600	2.937" - 4.437"	Carbon Steel	
						Stainless Steel	
						Aluminum	15H
		1 9	2,9,11	660	2.937" - 4.437"	Carbon Steel	Interpolated
						Stainless Steel	2H,11H
						Aluminum	Interpolated
				730	3.437" - 4.937"	Carbon Steel	
						Stainless Steel	
						Aluminum	3H,9H

Table 15 - Certified Subcomponents: Housed Fan Wheels (Continued)

Model	Drive	Arrangement	Reference Tables	Size	Shaft Diameter	Material	UUT
BC-SWSI BAE-SWSI BAF-SWSI	Belt	3	2,13	122	1.187" - 1.437"	Carbon Steel	Extrapolated
						Stainless Steel	
						Aluminum	
				135	1.187" - 1.687"	Carbon Steel	18H
						Stainless Steel	16H
						Aluminum	Interpolated
				150	1.437" - 1.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				165	1.437" - 1.937"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				182	1.687" - 1.937"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				200	1.687" - 2.187"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				222	1.937" - 2.437"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				245	2.187" - 2.437"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				270	2.187" - 2.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				300	2.437" - 2.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				330	2.437" - 2.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				365	2.437" - 2.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				402	2.437" - 2.687"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				445	2.437" - 2.937"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				490	2.687" - 3.437"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				542	2.937" - 3.437"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				600	3.437" - 3.937"	Carbon Steel	
						Stainless Steel	
						Aluminum	
				660	3.437" - 3.937"	Carbon Steel	
						Stainless Steel	19H
						Aluminum	17H

Table 16 - Certified Subcomponents: Motors

Motor Drive Configuration	HP	Voltage (V)	Weight (lbs.)	Manufacturer	UUT
Belt	1 1/2	230	32	Baldor	1P
	200	460	1730		2P
	200	460	1730		3H
	200	460	1730		17H
	1/3	115	19	Marathon	18H
	1/3	230	19		1H
	1 1/2	230	32		5P
	1 1/2	230	32	Teco	3P
	1 1/2	230	32		13H
	75	230	840		15H
	60	460	800	Toshiba	6P
	60	230	800		14H
	200	460	1730		19H
	75	460	840	Siemens	4P
	100	460	1120		9H
	100	460	1120		11H
	1/3	115	19	Weg	16H
	1/3	230	19		7H
	150	460	1540		2H
Direct	40	230	460	Marathon	5H
	40	460	490		6H
	1	230	29	Teco	11P
	2	230	48		9P
	125	460	1160		12P
	150	460	1540		10P
	1	230	29	Weg	4H
	1	230	29		7P

Table 17 - Plenum Fans UUT Overview

Special Seismic Certification Test Units

Manufacturer:
Twin City Fan Companies, Ltd.

Product Line:
EPF, EPQ, EPFN, EPQN, EPLFN, EPLQN

Certified Product Line Construction:
Aluminum Wheel, Carbon Steel Wheel, Direct and Belt Driven, Single Horizontal Inlet, Single Vertical Inlet, Class I, II, and III Construction

Certified Options:
OSHA Belt Gaurds Standard and Quick Access / Extended Life Bearings / Inlet Collar / Aero Acoustic Diffuser / Special Width Construction / Piezometer Flow Measurement Ring, Pressure Transducer-Transmitter with Display / SS Nameplate / Special Diameter Construction / Protective Enclosure / Thrust Restraint Brackets / Inlet Screen / Shaft Grounding Ring / Baldor, Teco, Siemens, Marathon, and WorldWide Electric Motors

Certified Mounting Description:
The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick steel adaptor plate per VMC hardware recommendations, which used 3/8-16 UNC A325 bolts. The adaptor plates were mounted to the table using 5/8-11 UNC A325 hardware.

Product Line	Model Tested	Dimensions (inches)			Weight (lbm)	Notes:	UUT ID:
		Depth	Width	Height			
EPF	150	26.06	54.97	26.00	248		UUT-1P
EPQ	660	112.06	122.75	91.50	7000		UUT-2P
EPF	150	22.19	22.00	38.81	170		UUT-3P
EPQ	542	60.36	76.00	107.38	2848		UUT-4P
EPF	150	22.00	40.75	22.01	160		UUT-5P
EPQ	490	68.00	98.00	55.44	2338		UUT-6P
EPFN	150	27.97	22.00	22.00	128		UUT-7P
EPQN	660	98.26	81.50	81.50	5400		UUT-8P
EPFN	182	26.00	38.00	35.50	188		UUT-9P
EPQN	490	68.00	80.00	81.06	2462		UUT-10P
EPLFN	150	29.78	27.84	20.00	116		UUT-11P
EPLQN	490	73.97	75.84	68.00	2450		UUT-12P

Table 18 - Housed Fans UUT Overview

Special Seismic Certification Test Units

Manufacturer:
Twin City Fan Companies, Ltd.

Product Line:
BC - SWSI, BC -DWDI, BAE - SWSI, BAE - DWDI, BAF - SWSI, BAF - DWDI

Certified Product Line Construction:
Carbon Steel Wheel, Stainless Steel Wheel, Aluminum Wheel, Carbon Steel Housing, Stainless Steel Housing, Aluminum Housing, Direct and Belt Drive, Single Horizontal Inlet, Double Horizontal Inlet, Horizontal Shaft, Class I, II and III Construction

Certified Options:
High Temp Package / Split Housing / OSHA Belt Guard / Type A & B Spark Resistant Construction / Special Width Construction / Special Diameter Construction / Drain / Parralel and Opposed Blade Outlet Damper / Flanged Outlet / Pressure Tranducer - Transmitter / Piezometer Ring / Access Door / Bolted Pedestal / Shaft Seal / Weather Cover / Shaft and Bearing Guard / UL 705 / Quick Access Belt Guard / Extended Lube Lines / Access Door - Bolted / SS Nameplates / Bearing Upgrade / Marathon, Weg, Baldor, Seimens, Teco, Toshiba Motors

Certified Mounting Description:
The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick steel adaptor plate per VMC hardware recommendations, which used 3/8-16 UNC A325 bolts. The adaptor plates were mounted to the table using 5/8-11 UNC A325 hardware.

Product Line	Model Tested	Dimensions (inches)			Weight (lbm)	Notes:	UUT ID:
		Depth	Width	Height			
BC - SWSI	135	33.75	48.69	32.50	314		UUT-1H
BAE - SWSI	600	98.50	137.19	121.58	7760		UUT-2H
BC-SWSI	660	111.32	155.50	136.88	6910		UUT-3H
BAE - SWSI	122	32.44	21.75	25.69	142		UUT-4H
BC-SWSI	330	61.56	56.86	56.25	1862		UUT-5H
BAF-SWSI	365	59.38	59.61	83.30	1508		UUT-6H
BC - SWSI	135	33.38	46.50	37.03	294		UUT-7H
BC - SWSI	660	116.63	125.69	121.32	5208		UUT-9H
BAE - SWSI	600	114.00	129.27	109.59	6902		UUT-11H
BAF - SWSI	445	71.25	83.81	73.63	1620		UUT-13H
BC - SWSI	542	86.86	89.75	101.44	3552		UUT-14H
BAE - SWSI	600	91.38	126.63	100.00	2988		UUT-15H
BC - DWDI	135	31.88	53.19	29.00	358		UUT-16H
BC - DWDI	542	119.54	126.87	101.80	5630		UUT-17H
BAF - DWDI	135	37.58	47.88	32.50	312		UUT-18H
BAE - DWDI	542	165.30	171.30	78.05	7220		UUT-19H

UUT 1P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPF, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
150

Product Construction Summary:
Aluminum Wheel, Steel Housing, Belt Driven, Base Mounted, Arrangement 3 with Motor Position W, Horizontal Shaft Rotation Axis

Option / Component Summary:
Qty (4) VMC MSS-1C-100 Seismic Spring Isolators, Motor: Baldor EM3154T, 1.5 HP, 208-230/460V, Belt Drive
OSHA Belt Guard Painted OSHA Yellow

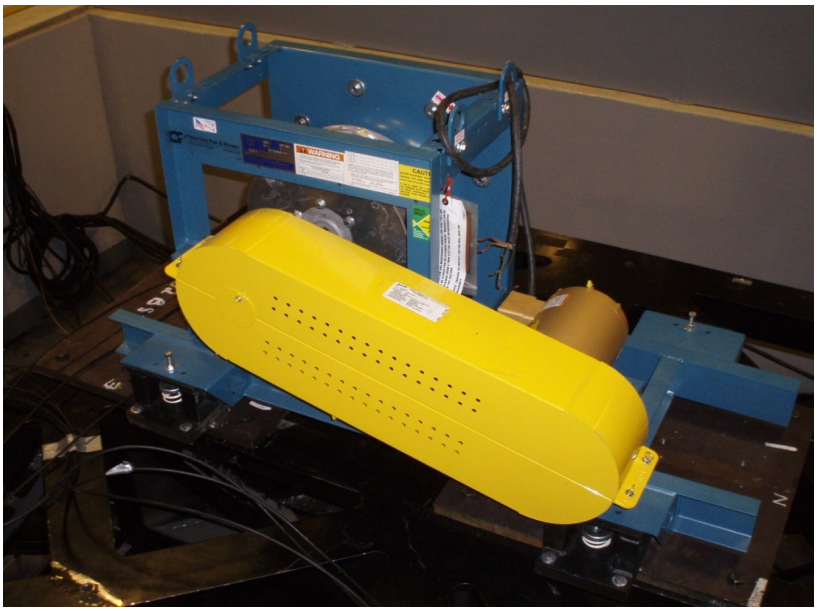
UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
26.06	54.97	26.00	248	lbm	6.00	5.32	13.90

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 3/8-16 UNC Grade A307 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 2P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPQ, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
660

Product Construction Summary:
Steel Wheel, Steel Housing, Belt Driven, Base Mounted, Arrangement 3 with Motor Position X, Horizontal Shaft Rotation Axis

Option / Component Summary:
Qty (2) VMC MSSH-1E-2575N, Qty (1) VMC MSSH-1E-1700N, Qty (1) VMC MSSH-1E-3250N Seismic Spring Isolators,
Motor: Baldor ECP4407TR-4, 200 HP, 460V, Belt Drive
Extended Life Bearings

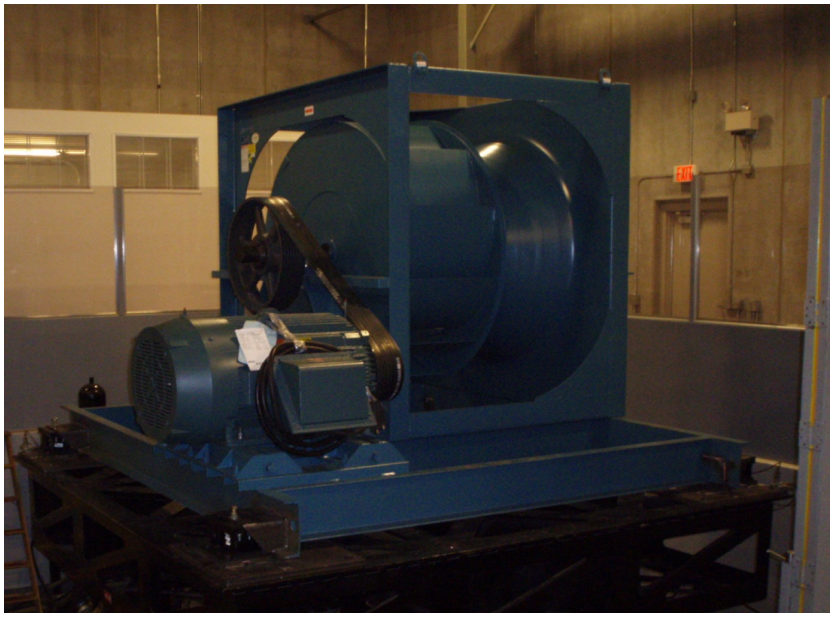
UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
112.06	122.75	91.50	7000	lbm	3.65	2.90	8.60

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 5/8-11 UNC Grade A325 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 3P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPF, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
150

Product Construction Summary:
Aluminum Wheel, Steel Housing, Belt Driven, Base Mounted, Arrangement 3HA with Motor Position S, Horizontal Shaft Rotation Axis

Option / Component Summary:
Qty (4) VMC MSS-1C-100 Seismic Spring Isolators, Motor: Teco DTP1/54, 1.5 HP, 230/460V, Belt Drive
OSHA Belt Guard - Quick Access - Painted OSHA Yellow

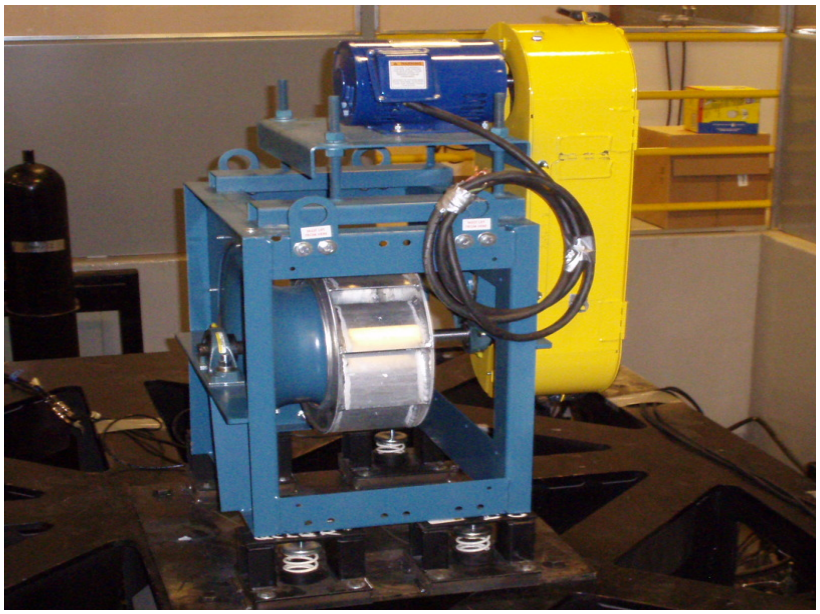
UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
22.19	22.00	38.81	170	lbm	3.20	3.15	19.40

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 3/8-16 UNC Grade A307 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 4P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPQ, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
542

Product Construction Summary:
Steel Wheel, Steel Housing, Belt Driven, Base Mounted, Arrangement 3HA with Motor Position S, Horizontal Motor Shaft Rotation Axis

Option / Component Summary:
Qty (4) VMC MSSH-1E-1000 Seismic Spring Isolators, Motor: Siemens 1LE23213CB212AA3, 75 HP, 230/460V, Belt Drive.
Extended Lube Lines

UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
60.36	76.00	107.38	2848	lbm	2.40	3.00	7.05

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 5/8-11 UNC Grade A325 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 5P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPF, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
150

Product Construction Summary:
Aluminum Wheel, Steel Housing, Belt Driven, Base Mounted, Arrangement 3VA with Motor Position S, Vertical Shaft Rotation Axis

Option / Component Summary:
Qty (2) VMC MSS-1C-50 and Qty (2) VMC MSS-1C-100 Seismic Spring Isolators, Motor: Marathon U759, 1.5 HP, 230/460V, Belt Drive
Round Inlet Collar

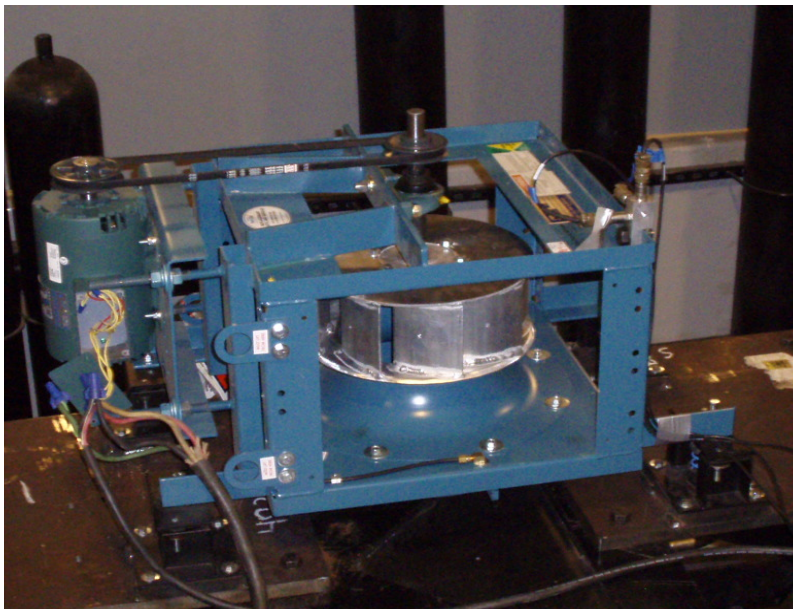
UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
22.00	40.75	22.01	160	lbm	5.40	6.75	11.50

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 3/8-16 UNC Grade A307 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 6P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPQ, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
490

Product Construction Summary:
Steel Wheel, Steel Housing, Belt Driven, Base Mounted, Arrangement 3VA with Motor Position S, Vertical Shaft Rotation Axis
Inlet Collar - Round

Option / Component Summary:
Qty (2) VMC MSSH-1E-530N and Qty (2) VMC MSSH-1E-1200N Seismic Spring Isolators, Belt Drive,
Motor: Toshiba 0604SDSR41A-P, 60 HP, 230/460V,
Round Inlet Collar

UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
68.00	98.00	55.44	2338	lbm	4.95	4.40	7.00

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 5/8-11 UNC Grade A325 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 7P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPFN, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
150

Product Construction Summary:
Aluminum Wheel, Steel Housing, Direct Drive, Base Mounted, Arrangement 4, Horizontal Motor Shaft Rotation Axis

Option / Component Summary:
Qty (4) VMC MSS-1C-50 Seismic Spring Isolators, Motor: WEG 00118OT3E143T, 1 HP, 230/460V, Direct Drive
Aero Acoustic Diffuser, Special Width Construction

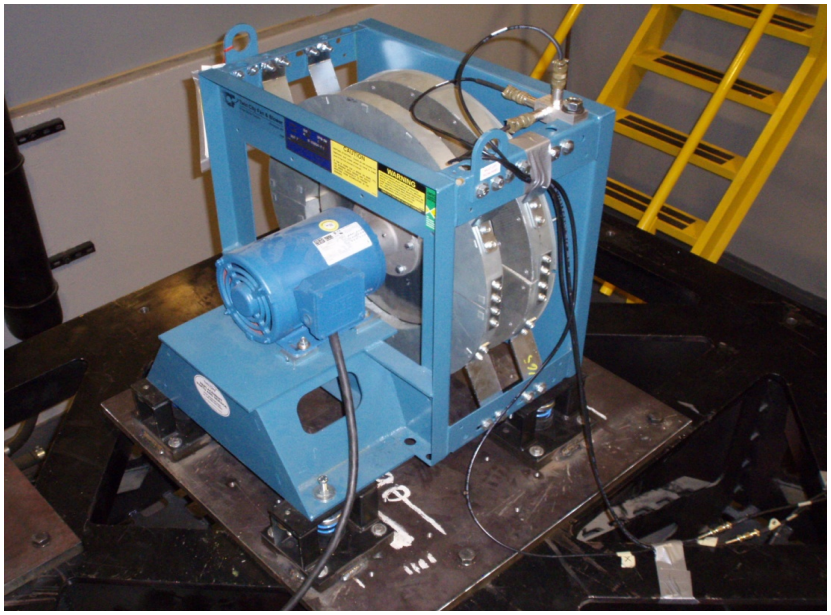
UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
27.97	22.00	22.00	128	lbm	7.60	6.25	21.30

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 3/8-16 UNC Grade A307 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 8P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPQN, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
660

Product Construction Summary:
Aluminum Wheel, Steel Housing, Direct Drive, Base Mounted, Arrangement 4, Horizontal Motor Shaft Rotation Axis

Option / Component Summary:
Qty (6) VMC MSSH-1E-1700N Seismic Spring Isolators, Motor: Worldwide Electric, WWE200-9-449TBB, 200 HP, 460V, Direct Drive
Piezometer Ring, Pressure Transducer/Transmitter with Display, Special Width Construction

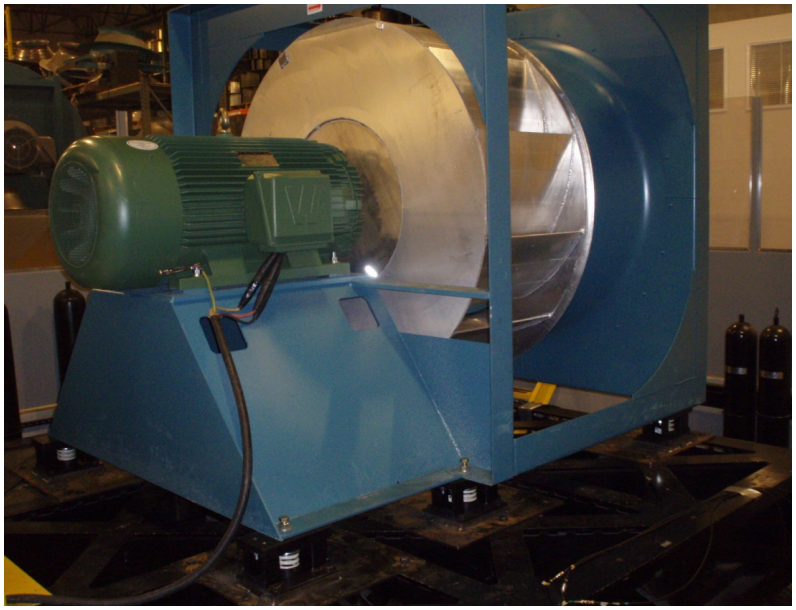
UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
98.26	81.50	81.50	5400	lbm	2.85	3.35	6.90

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (6) 5/8-11 UNC Grade A325 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 9P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPFN, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
182

Product Construction Summary:
Aluminum Wheel, Steel Housing, Direct Drive, Base Mounted, Arrangement 4, Vertical Motor Shaft Rotation Axis

Option / Component Summary:
Qty (4) VMC MSS-1C-50 Seismic Spring Isolators, Motor: Teco DHP0024, 2 HP, 230/460V, Direct Drive
Stainless Steel Nameplate, Special Diameter 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)
26.00	38.00	35.50	188	lbm	7.35	12.25	19.20

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 3/8-16 UNC Grade A307 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 10P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPQN, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
490

Product Construction Summary:
Aluminum Wheel, Steel Housing, Direct Drive, Base Mounted, Arrangement 4, Vertical Motor Shaft Rotation Axis

Option / Component Summary:
Qty (4) VMC MSSH-1E-1400N Seismic Spring Isolators, Motor: Teco E0508, 50 HP, 230/460V, Direct Drive
Inlet Screen, Shaft Grounding Ring, Special Diameter Construction, Inlet Screen

UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
68.00	80.00	81.06	2462	lbm	4.15	4.45	8.05

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 5/8-11 UNC Grade A325 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 11P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPLFN, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
150

Product Construction Summary:
Aluminum Wheel, Steel Housing, Direct Drive, Base Mounted, Arrangement 4, Horizontal Motor Shaft Rotation Axis

Option / Component Summary:
Qty (4) VMC MSS-1C-50 Seismic Spring Isolators, Motor: Teco DTP0014, 1 HP, 230/460V, Direct Drive
Protective Enclosure, Thrust Restraint Brackets

UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
29.78	27.84	20.00	116	lbm	10.00	7.75	13.90

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 3/8-16 UNC Grade A307 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT 12P

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5959 Trenton Lane North, Plymouth, MN 55442

Product Line:
EPLQN, Plenum Fans

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
490

Product Construction Summary:
Aluminum Wheel, Steel Housing, Direct Drive, Base Mounted, Arrangement 4, Horizontal Motor Shaft Rotation Axis

Option / Component Summary:
Qty (2) VMC MSSH-1E-530N and Qty (2) VMC MSSH-1E-825N Seismic Spring Isolators, Motor: Teco EP1004, 100 HP, 460V, Direct Drive
Inlet Screen

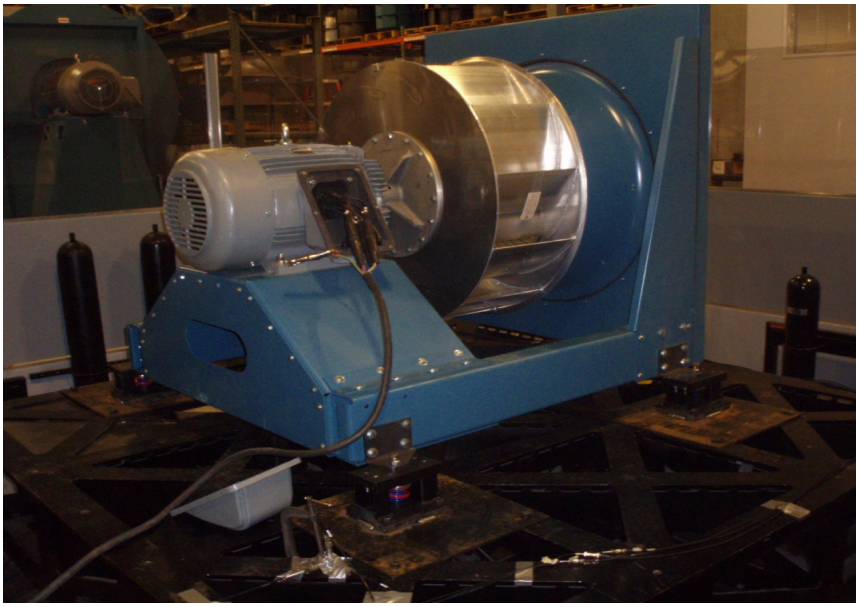
UUT PROPERTIES

Dimensions (inches)			Weight		Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height			Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
73.97	75.84	68.00	2450	lbm	3.95	4.40	6.85

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. Field installation should have an air gap of 1/4". The isolators were each bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using Qty. (4) 5/8-11 UNC Grade A325 bolts, which were welded to an adaptor plate.

All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-1H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - SW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
135

Product Construction Summary:
Carbon Steel Wheel, Carbon Steel Housing, Belt Driven, Arrangement 1 Motor Position W, Class I Construction, Horizontal Shaft Rotation Axis

Option / Component Summary:
Qty (2) VMC MSS-1C-100 and Qty (2) VMC MSS-1C-150 Seismic Spring Isolators, High Temp Construction, 1/3 HP 1800 RPM Single Phase, 60 Hz 240V Marathon

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
33.75	48.69	32.50	314	5.65	5.75	9.10

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-2H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAE - SW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
600

Product Construction Summary:
Stainless Steel Wheel, Stainless Steel Housing, Arrangment 1 with Motor Position Z, Belt Driven, Class III Construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (6) VMC MSSH-1E-2000 Seismic Spring Isolators, Split Housing,
Motor: Weg #15018ET3GRB445T 150 HP 1800 RPM TEFC PREM EFF 3/60/460V

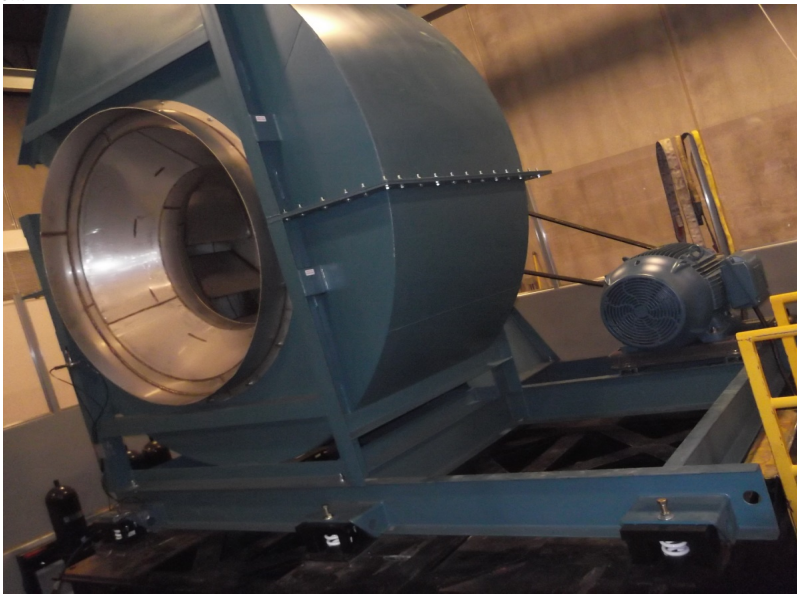
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
98.50	137.19	121.58	7760	2.77	3.96	9.20

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	2.0	1.0	1.5	3.20	2.40	1.34	0.54
		2.5	0.0	1.5	2.50	1.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-3H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - SW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
660

Product Construction Summary:
Aluminum Wheel, Aluminum Housing, Arrangment 1 with Motor Position X, Single Wide Single Inlet, Belt Driven, Class 3 construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (6) VMC MSSH-1E-1700N and Qty (2) VMC MSSH-1E-1000 Seismic Spring Isolators, OSHA Belt Guard, Motor: Baldor #EM2563T-4 200 HP 1800 RPM 3/60/460V 445T ODP PREM EFF

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
111.32	155.50	136.88	6910	3.17	4.26	8.40

SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

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

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-4H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAE - SW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
122

Product Construction Summary:
Aluminum Wheel, Carbon Steel Housing, Arrangment 4, Single Wide Single Inlet, Direct Drive, Class 1 Construction
Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (2) VMC MSS-1C-50 and Qty (2) VMC MSS-1C-100 Seismic Spring Isolators, Type B Spark Resistant Construction,
Special Width Wheel, Special Diameter Wheel
Flanged Inlet Punched, Motor: TECO 1 HP 1800 RPM 1/60/230V 143T ODP

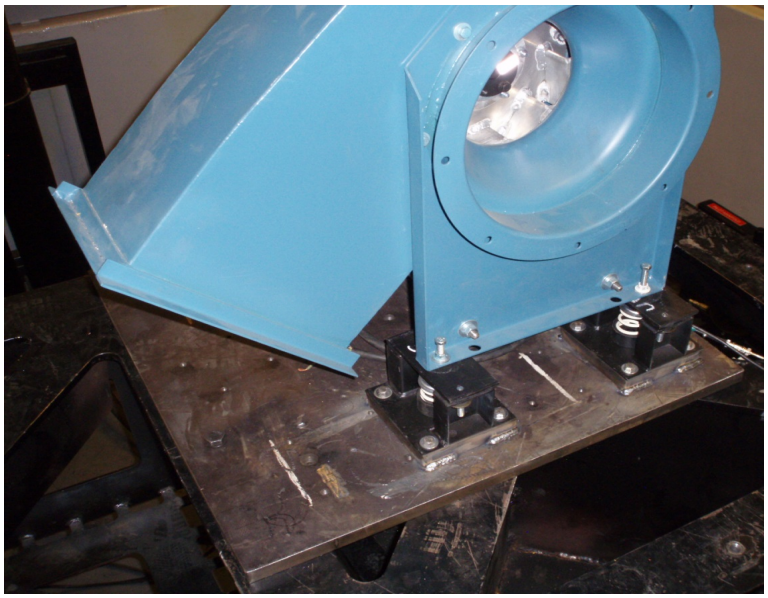
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
32.44	21.75	25.69	142	7.30	5.00	9.65

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-5H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - SW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
330

Product Construction Summary:
Stainless Steel Wheel, Stainless Steel Housing, Arrangment 4, Single Wide Single Inlet, Direct Drive, Class 2 Construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (4) VMC MSSH-1E-530N and Qty(2) VMC MSSH-1E-825N Seismic Spring Isolators, Drain, Outlet Damper - Parallel Blade, Flanged Outlet Punched
Motor: Marathon #GT1035 40 HP 1200 RPM TEFC PREM EFF 3/60/230-460V

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
61.56	56.86	56.25	1862	5.10	5.15	9.65

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-6H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAF - SW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
365

Product Construction Summary:
Aluminum Wheel, Aluminum Housing, Arrangment 4, Single Wide Single Inlet, Direct Drive, Class 2 Construction
Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (4) VMC MSSH-1E-650 and Qty (2) VMC MSSH-1E-530N Seismic Spring Isolators, Outlet Damper - Opposed Blade,
Flanged Outlet Punched, Motor: Marathon #GT1035 40 HP 1200 RPM TEFC PREM EFF 3/60/230-460V
Special Width Wheel, Special Diameter Wheel

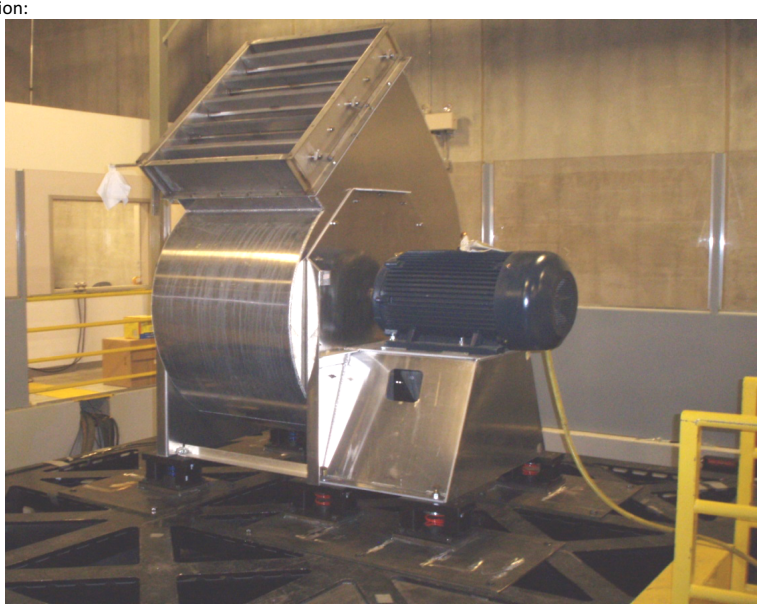
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
59.38	59.61	83.30	1508	4.35	10.00	4.40

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-7H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - SW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
135

Product Construction Summary:
Carbon Steel Wheel, Carbon Steel Housing, Arrangment 9 with motor position L, Single Wide Single Inlet, Belt Drive, Class 1 Construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (2) VMC MSS-1C-100 and Qty (2) VMC MSS-1C-150 Seismic Spring Isolators,
Pressure Transducer / Transmitter, Piezometer Ring,
Motor: Weg #33180S1BC56 1/3 HP 1800 RPM ODP 1/60/230V

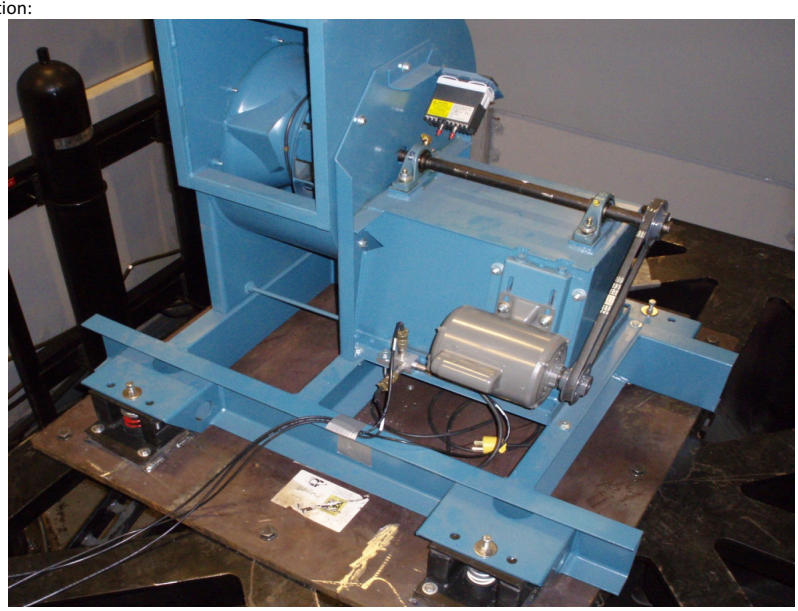
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
33.38	46.50	37.03	294	6.10	5.40	12.50

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-9H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - SW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
660

Product Construction Summary:
Aluminum Wheel, Aluminum Housing, Arrangment 9 with Motor Position L, Single Wide Single Inlet, Belt Drive, Class 3 Construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Access Door - Hinged, Bolted Pedestal, Motor: Siemens #SD100 100 HP 1800 RPM 3/60/230-460V 405T TEFC PREM EFF, Qty (5) VMC MSSH-1E-2000 and Qty(3) VMC MSSH-1E-530N Seismic Spring Isolators

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
116.63	125.69	121.32	5208	3.80	4.92	8.07

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	2.0	1.0	1.5	3.20	2.40	1.34	0.54
		2.5	0.0	1.5	2.50	1.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-11H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAE - SW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
600

Product Construction Summary:
Stainless Steel Wheel, Stainless Steel Housing, Arrangment 9 with motor position R, Single Wide Single Inlet, Belt Drive, Class 3 Construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (4) VMC MSSH-1E-2990 Seismic Spring Isolators, Shaft Seal, Motor: Siemens 100 HP 1800 RPM TEFC PREM EFF 3/60/460V

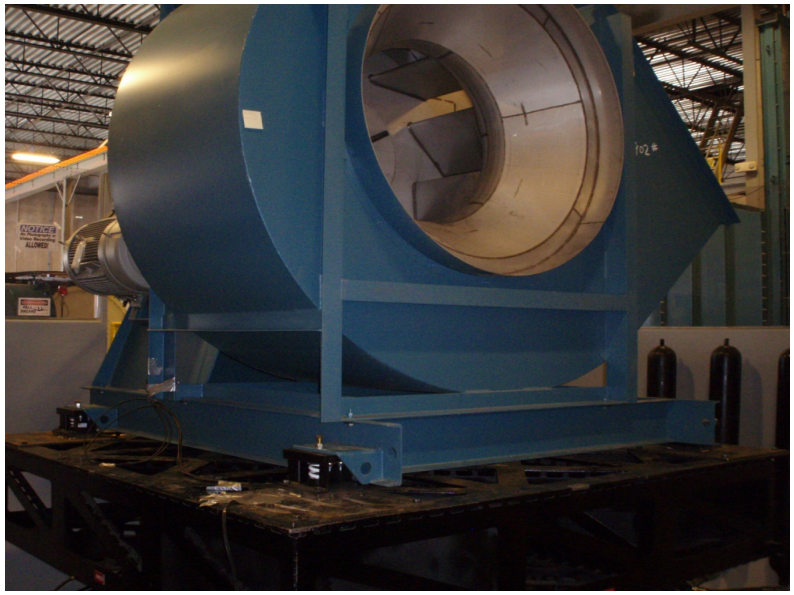
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
114.00	129.27	109.59	6902	11.20	2.56	6.90

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	2.0	1.0	1.5	3.20	2.40	1.34	0.54
		2.5	0.0	1.5	2.50	1.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-13H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAF - SW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
445

Product Construction Summary:
Carbon Steel Wheel, Carbon Steel Housing, Arrangment 10, Single Wide Single Inlet, Belt Drive, Class 2 Construction
Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (4) VMC MSSH-1E-530N and Qty (2) VMC MSSH-1E-1000 Seismic Spring Isolators, Weather Cover, UL 705 Construction,
Motor: Teco #DTP1/56 1 1/2 HP 1200 RPM ODP PREM EFF 3/60/230-460V

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
71.25	83.81	73.63	1620	5.90	8.40	14.60

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-14H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - SW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
542

Product Construction Summary:
Stainless Steel Wheel, Stainless Steel Housing, Arrangment 10, Single Wide Single Inlet, Belt Drive, Class 2 Construction
Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (4) VMC MSSH-1E-1200N and Qty (2) VMC MSSH-1E-825N Seismic Spring Isolators, Shaft and Bearing Guard,
Motor: Toshiba 60HP 1800 RPM TEFC PREM EFF 3/60/230-460V

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
86.86	89.75	101.44	3552	18.80	4.45	14.60

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-15H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAE - SW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
600

Product Construction Summary:
Aluminum Wheel, Aluminum Housing, Arrangment 10, Single Wide Single Inlet, Belt Drive, Class 2 Construction
Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (4) VMC MSSH-1E-1400 and Qty (2) VMC MSSH-1E-2000 Seismic Spring Isolators, Type A Spark Resistant Construction,
Motor: Teco #EP0754 75HP 1800 RPM TEFC PREM EFF 3/60/230-460V

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
91.38	126.63	100.00	2988	4.40	5.75	14.60

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-16H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - DW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
135

Product Construction Summary:
Stainless Steel Wheel, Stainless Steel Housing, Arrangment 3 with Motor Position W, Double Wide Double Inlet, Belt Drive, Class 1 Construction Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (2) VMC MSS-1C-100 and Qty (2) VMC MSS-1C-150 Seismic Spring Isolators, Belt Guard - Quick Access, Special Diameter Wheel, Motor: Weg 1/3HP 1800 RPM ODP 1/60/115-230V

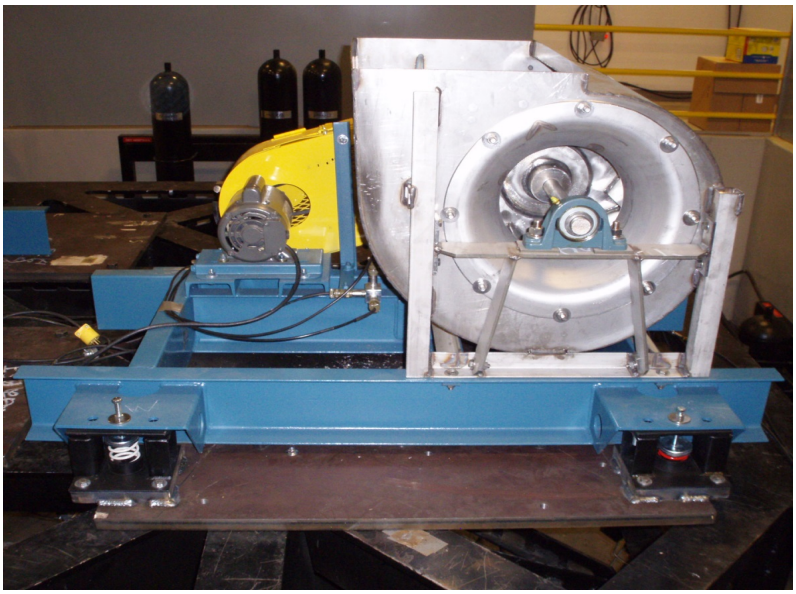
UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
31.88	53.19	29.00	358	6.00	8.90	10.45

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:



The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-17H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BC - DW Flat-Blade Backward Inclined Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
542

Product Construction Summary:
Aluminum Wheel, Aluminum Housing, Arrangment 3 with Motor Position X, Double Wide Double Inlet, Belt Drive, Class 3 Constructionm, Horizontal Shaft Rotation Housing

Option / Component Summary:
Extended Lube Lines, Special Diameter Wheel, Motor: Baldor #EM2558T 150HP 1800 RPM 444T ODP PREM EFF 3/60/460V, Qty (5) VMC MSSH-1E-1400 and Qty (3) VMC MSSH-1E-825N Seismic Spring Isolators

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
119.54	126.87	101.80	5630	4.56	5.33	10.00

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	2.0	1.0	1.5	3.20	2.40	1.34	0.54
		2.5	0.0	1.5	2.50	1.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-18H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAF - DW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
135

Product Construction Summary:
Carbon Steel Wheel, Carbon Steel Housing, Arrangment 3 with Motor Position Y, Double Wide Double Inlet, Belt Drive, Class 3 Construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (1) VMC MSS-1C-100, Qty (2) VMC MSS-1C-150 and Qty (1) VMC MSS-1C-250 Seismic Spring Isolators,
Access Door - Bolted, Special Width Wheel
Motor: Baldor #L1301 1/3 HP 1800 RPM ODP 1/60/115-230V

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
37.58	47.88	32.50	312	6.60	6.50	9.65

SEISMIC PARAMETERS

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	1.0	1.5	4.00	3.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

UUT-19H

Unit Under Test (UUT) Summary Sheet

Manufacturer:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Product Line:
BAE - DW Airfoil Centrifugal Fan

Testing Laboratory:
Twin City Fan Companies, Ltd., 5955 Trenton Lane North, Plymouth, MN 55442

Model Number:
542

Product Construction Summary:
Stainless Steel Wheel, Stainless Steel Housing, Arrangment 3 with Motor Position Y, Double Wide Double Inlet, Belt Drive, Class 3 Construction, Horizontal Shaft Rotation Housing

Option / Component Summary:
Qty (4) VMC MSSH-1E-2000 and Qty(2) VMC MSSH-1E-1400 Seismic Spring Isolators, Stainless Steel Nameplates, Bearing Upgrade, Special Width Wheel
Motor: Toshiba #B1504VLF4USH 150 HP 1800 RPM ODP PREM EFF 3/60/460V

UUT PROPERTIES

Dimensions (inches)			Weight	Lowest Natural Frequencies (Hz) +/-		
Depth	Width	Height		Front-Back (Horizontal X)	Side-Side (Horizontal Y)	Up-Down (Vertical Z)
171.30	165.30	78.05	7220	2.71	2.77	6.60

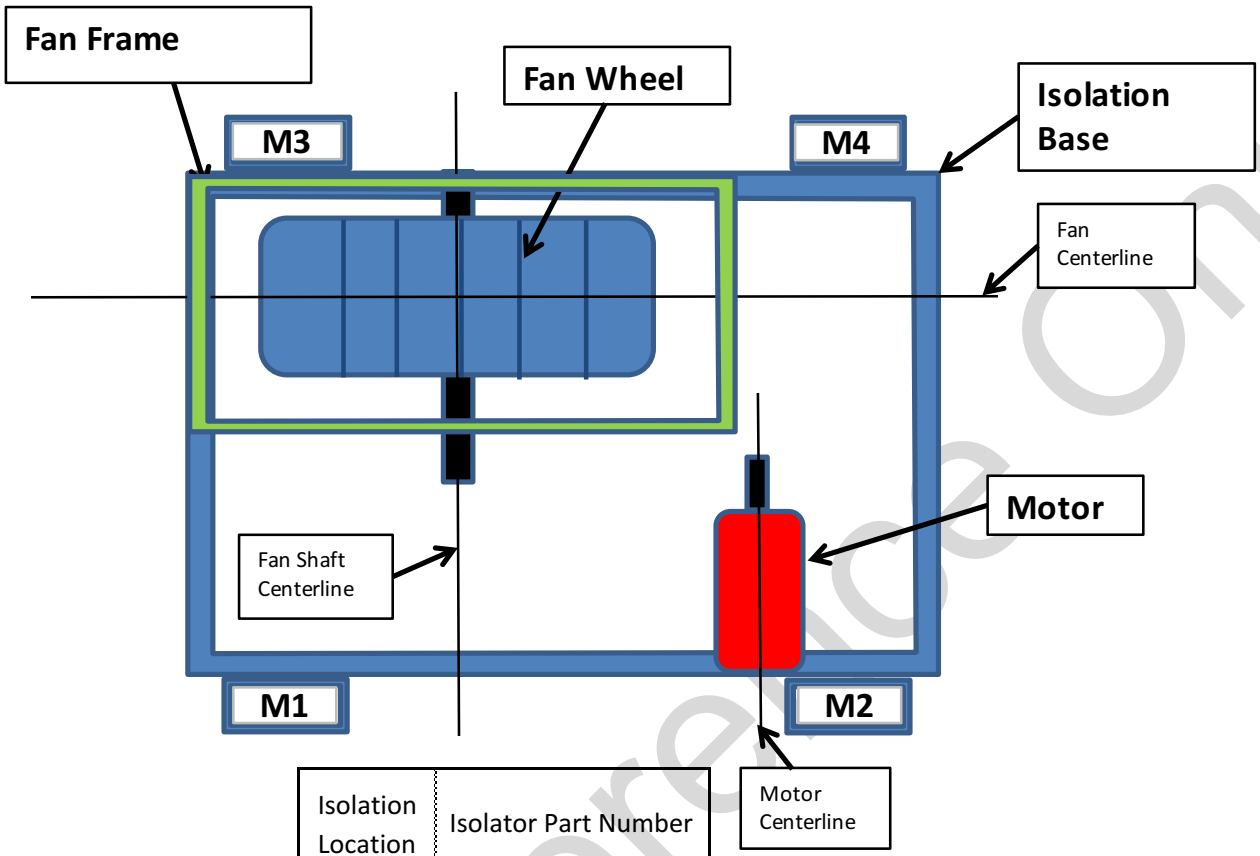
SEISMIC PARAMETERS (refer to ASCE 7-10 Supplement)

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	2.0	1.0	1.5	3.20	2.40	1.34	0.54
		2.5	0.0	1.5	2.50	1.00	1.68	0.68

Unit Mounting Description / Configuration:

The fans were secured to the isolators using the supplied bolt and jam-nut. The spacing and deflection of the isolators were set as close to manufacturer recommendations as possible. The isolators were bolted to a 1.00" thick carbon steel pad per VMC hardware recommendations using a quantity of (4) 5/8-11 UNC A325 bolts. The pads were welded to adaptor plates, which were mounted directly to the table.
All units were filled with contents and maintained structural integrity and functionality after the ICC-ES AC 156 test

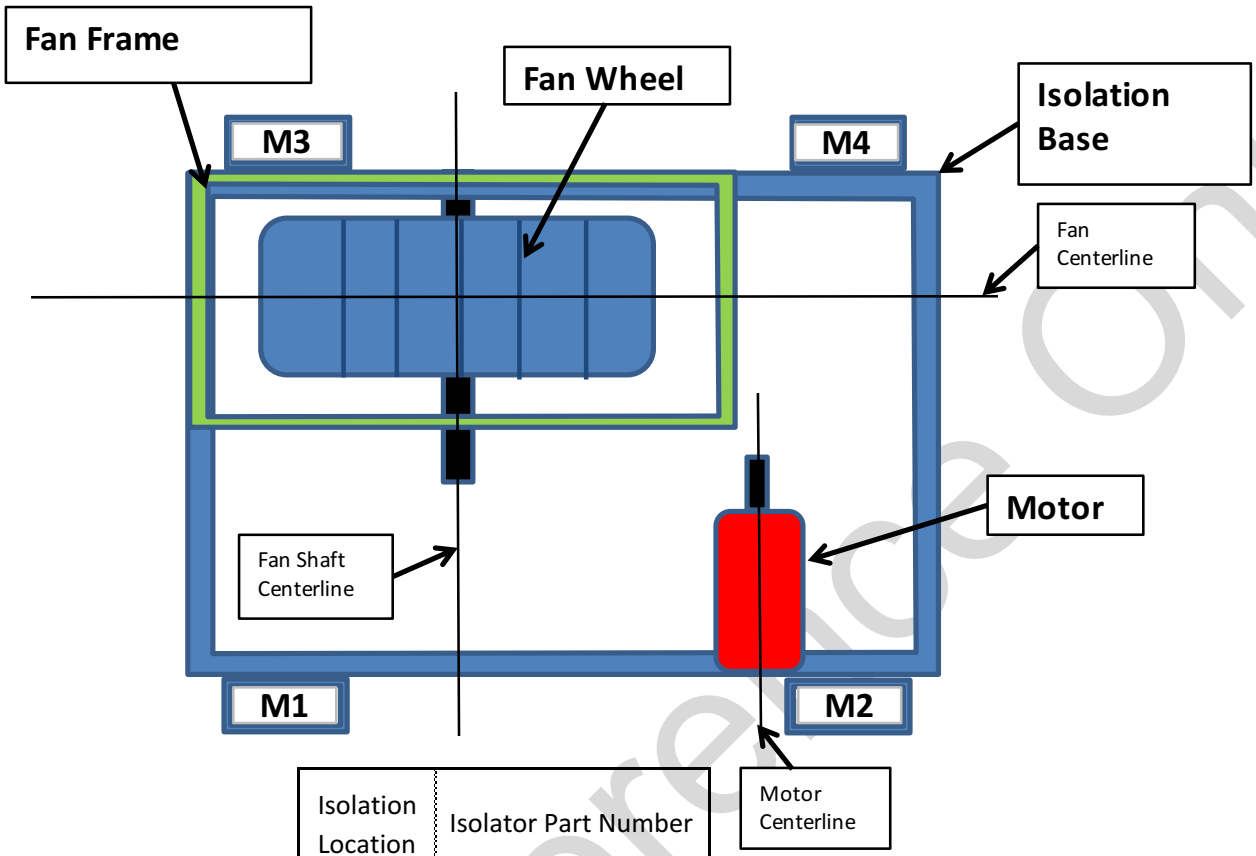
Tested UUT-1P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-100
M2	MSS-1C-100
M3	MSS-1C-100
M4	MSS-1C-100

For Reference Only

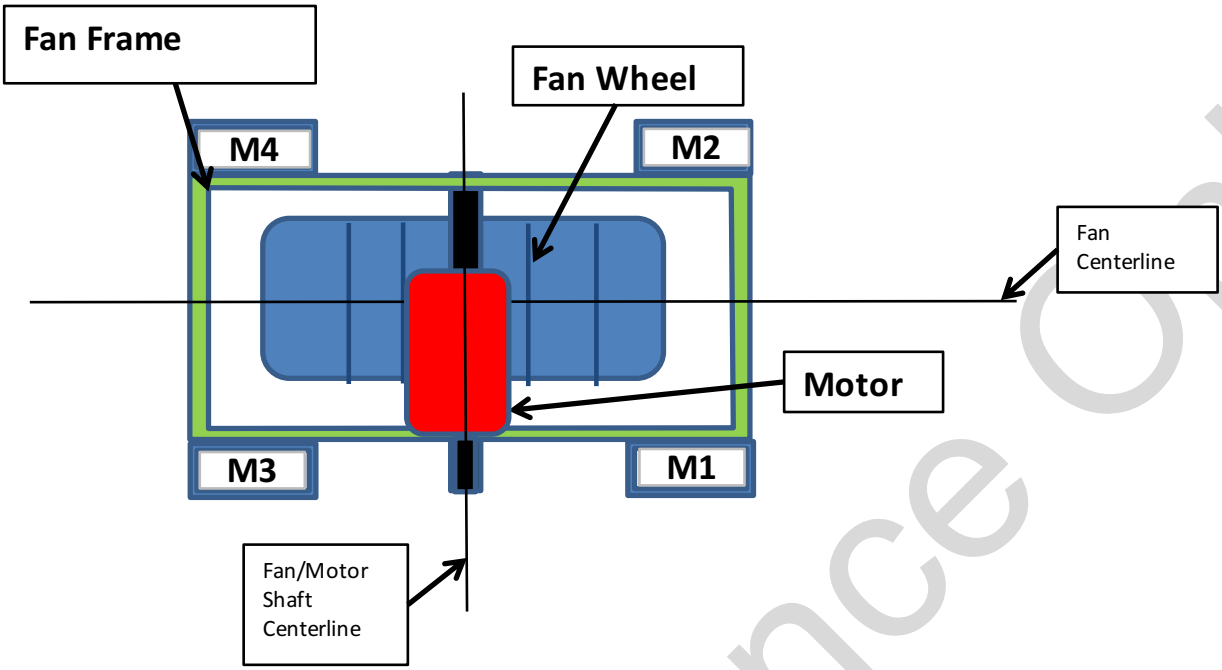
Tested UUT-2P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-2575N
M2	MSSH-1E-3250N
M3	MSSH-1E-1700N
M4	MSSH-1E-2575N

For Reference Only

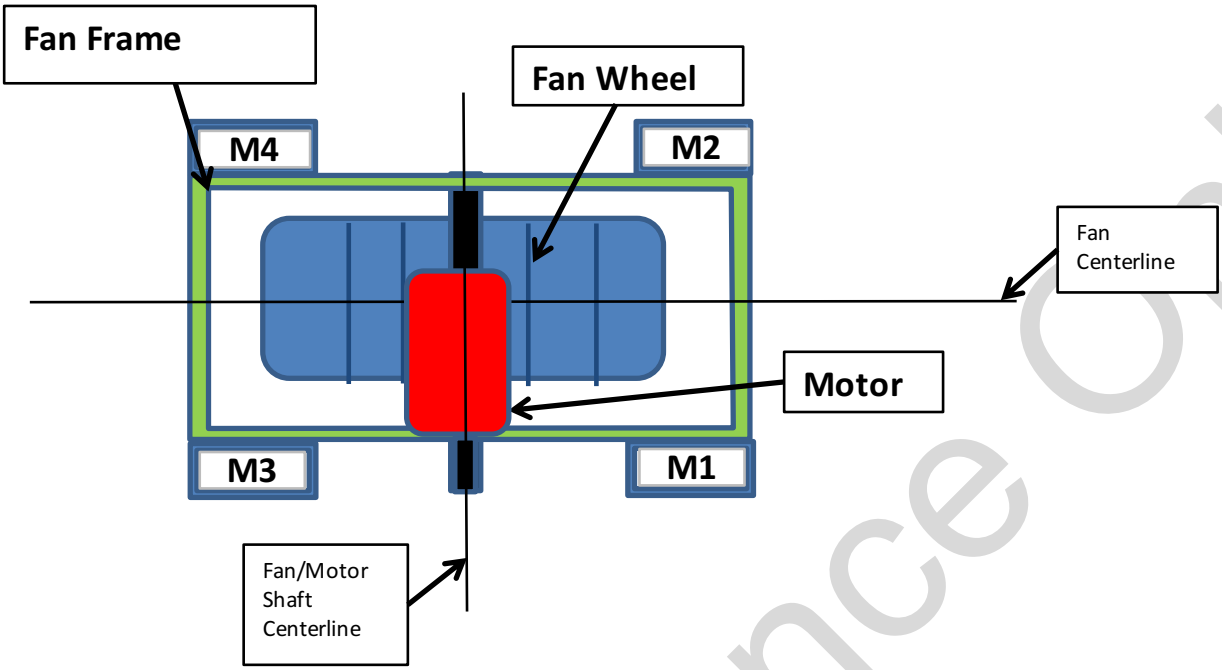
Tested UUT-3P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-100
M2	MSS-1C-100
M3	MSS-1C-100
M4	MSS-1C-100

For Reference Only

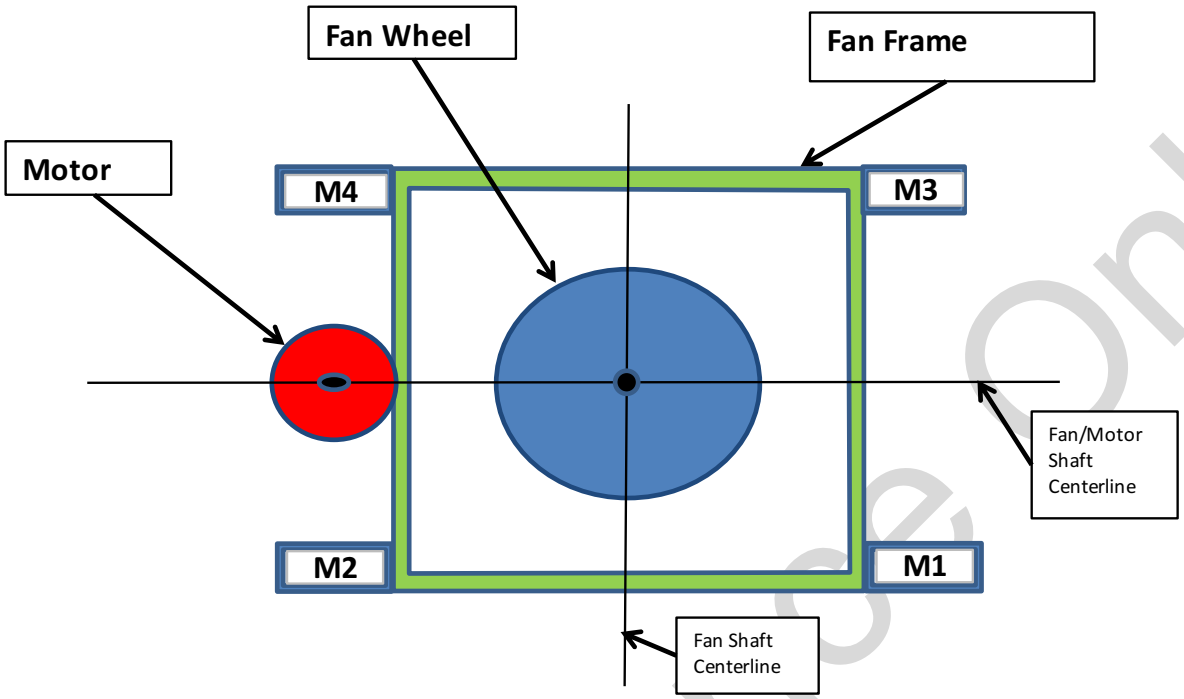
Tested UUT-4P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-1000
M2	MSSH-1E-1000
M3	MSSH-1E-1000
M4	MSSH-1E-1000

For Reference Only

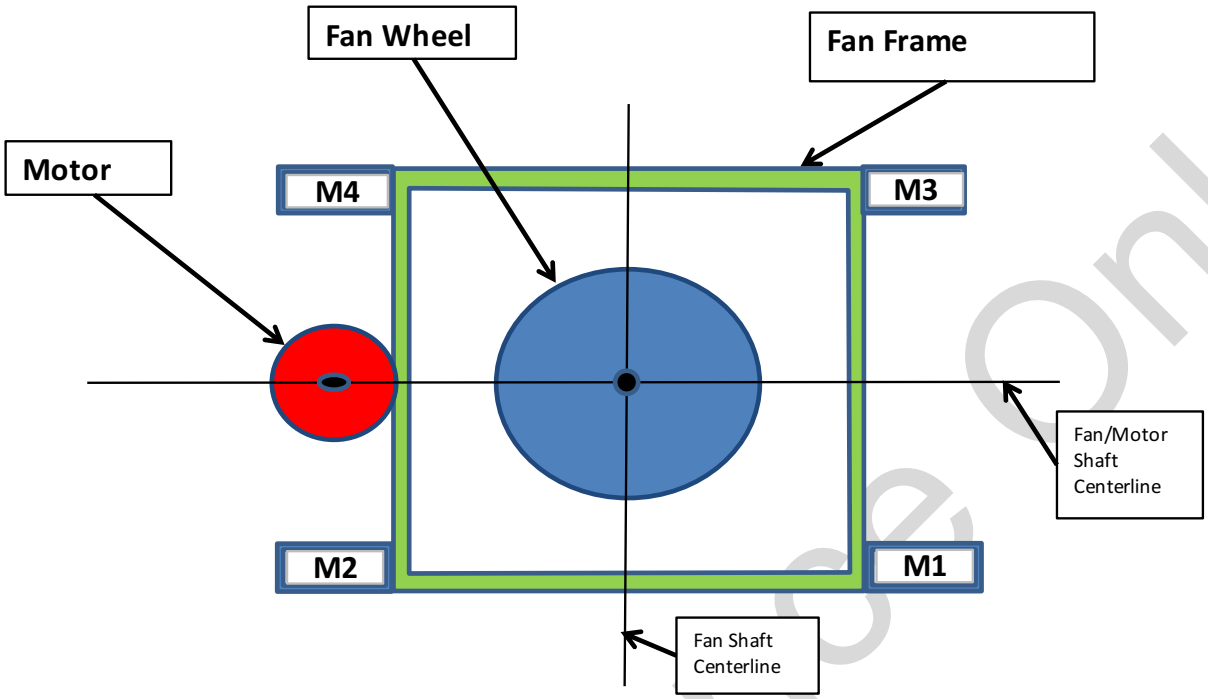
Tested UUT-5P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-50
M2	MSS-1C-100
M3	MSS-1C-50
M4	MSS-1C-100

For Reference Only

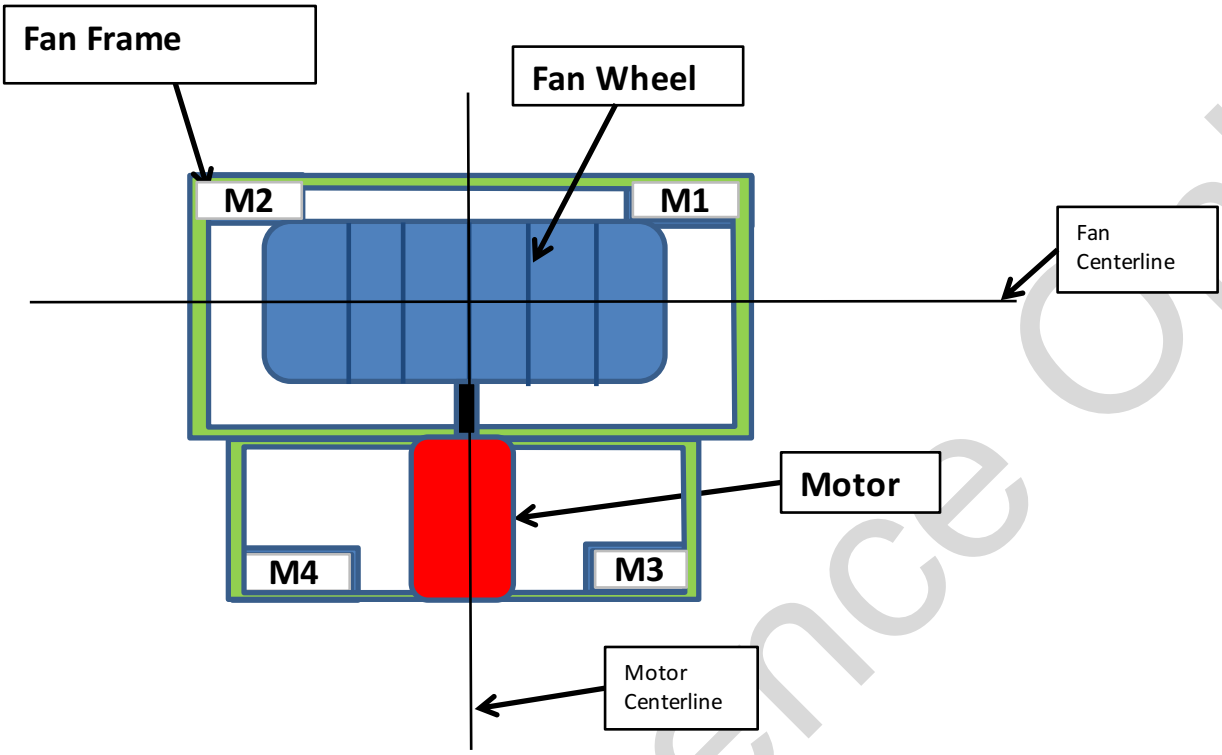
Tested UUT-6P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-530N
M2	MSSH-1E-1200N
M3	MSSH-1E-530N
M4	MSSH-1E-1200N

For Reference Only

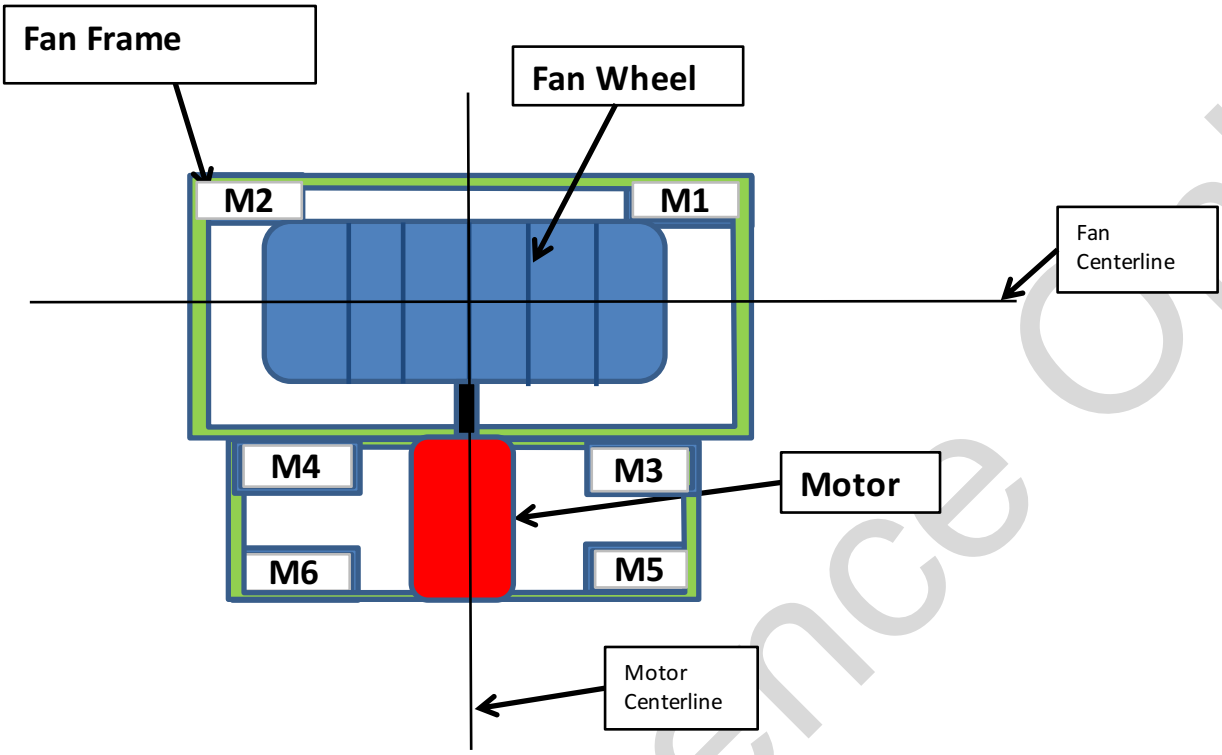
Tested UUT-7P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-50
M2	MSS-1C-50
M3	MSS-1C-50
M4	MSS-1C-50

For Reference Only

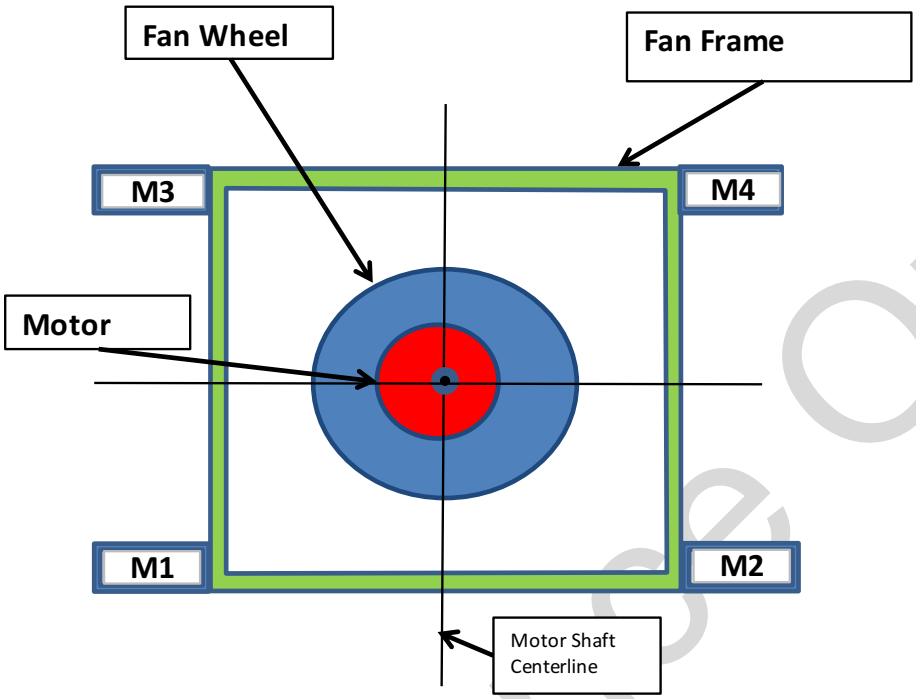
Tested UUT-8P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-1700N
M2	MSSH-1E-1700N
M3	MSSH-1E-1700N
M4	MSSH-1E-1700N
M5	MSSH-1E-1700N
M6	MSSH-1E-1700N

For Reference Only

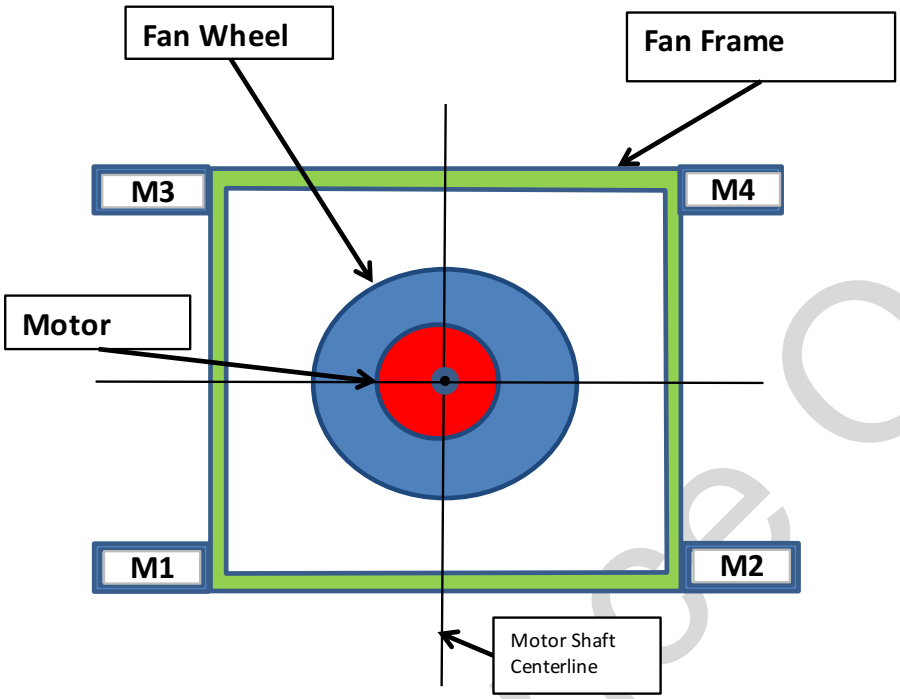
Tested UUT-9P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-50
M2	MSS-1C-50
M3	MSS-1C-50
M4	MSS-1C-50

For Reference Only

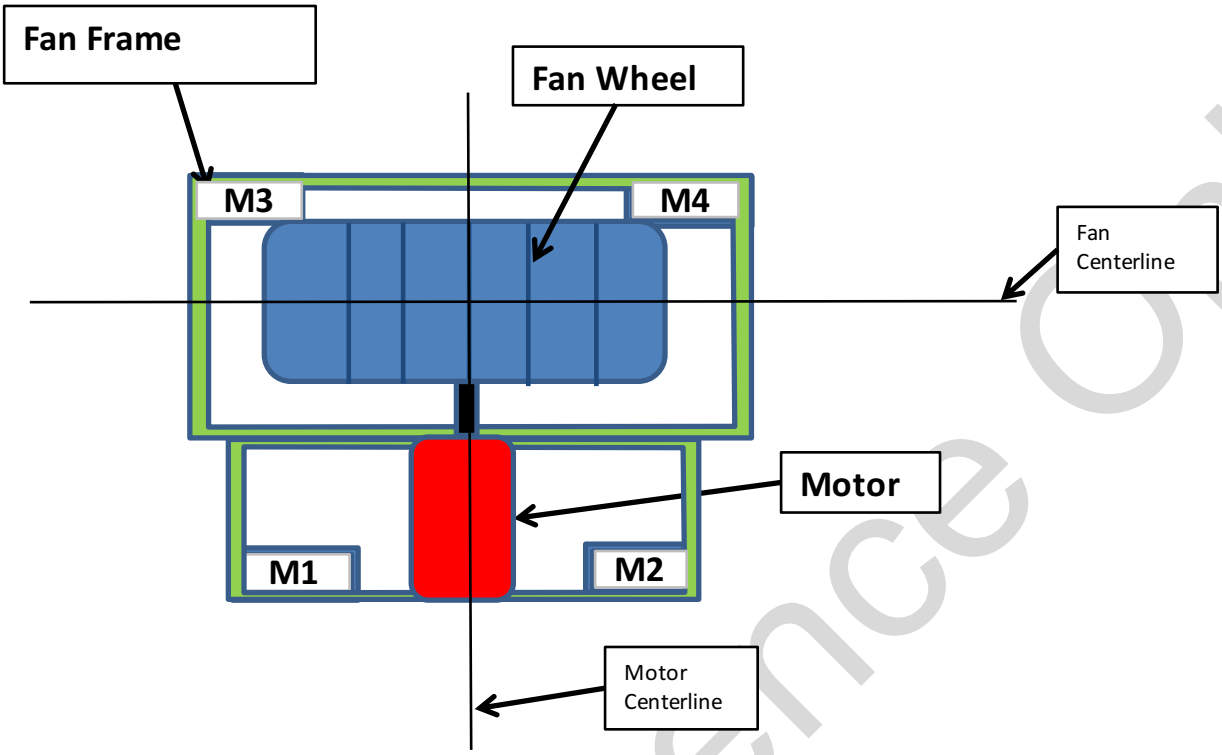
Tested UUT-10P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-1400
M2	MSSH-1E-1400
M3	MSSH-1E-1400
M4	MSSH-1E-1400

For Reference Only

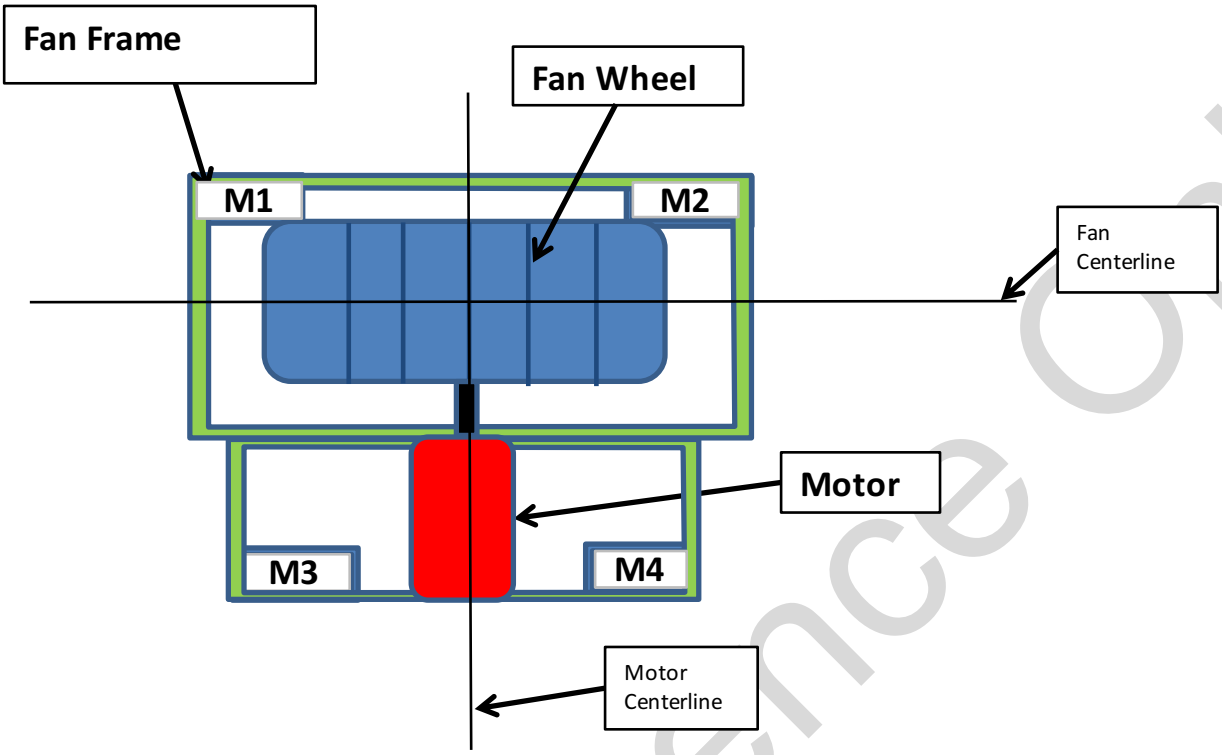
Tested UUT-11P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-50
M2	MSS-1C-50
M3	MSS-1C-50
M4	MSS-1C-50

For Reference Only

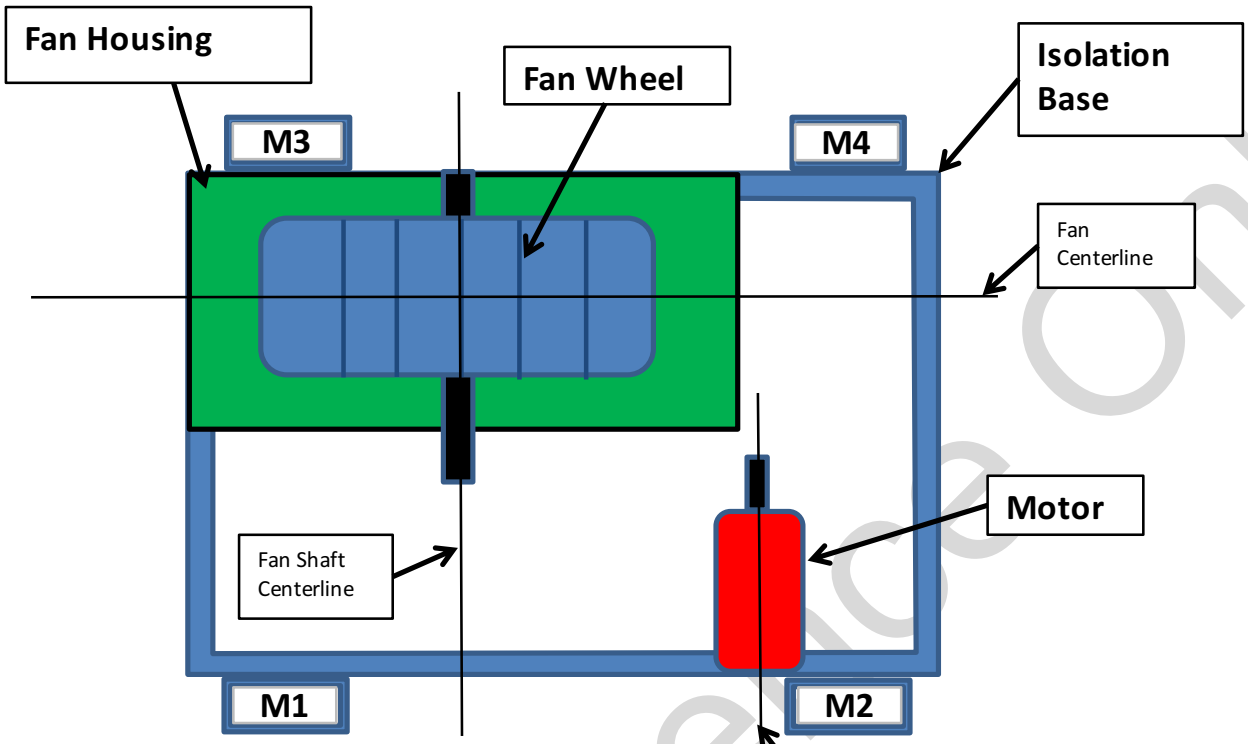
Tested UUT-12P Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-530N
M2	MSSH-1E-530N
M3	MSSH-1E-825N
M4	MSSH-1E-825N

For Reference Only

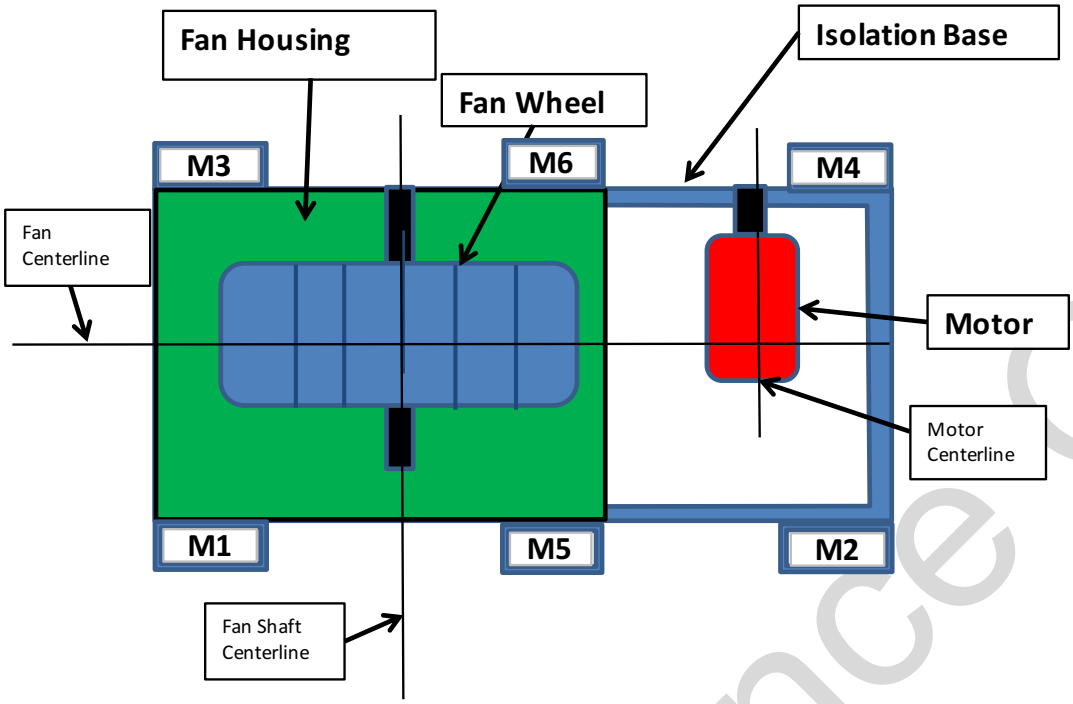
Tested UUT-1H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-150
M2	MSS-1C-100
M3	MSS-1C-150
M4	MSS-1C-100

For Reference Only

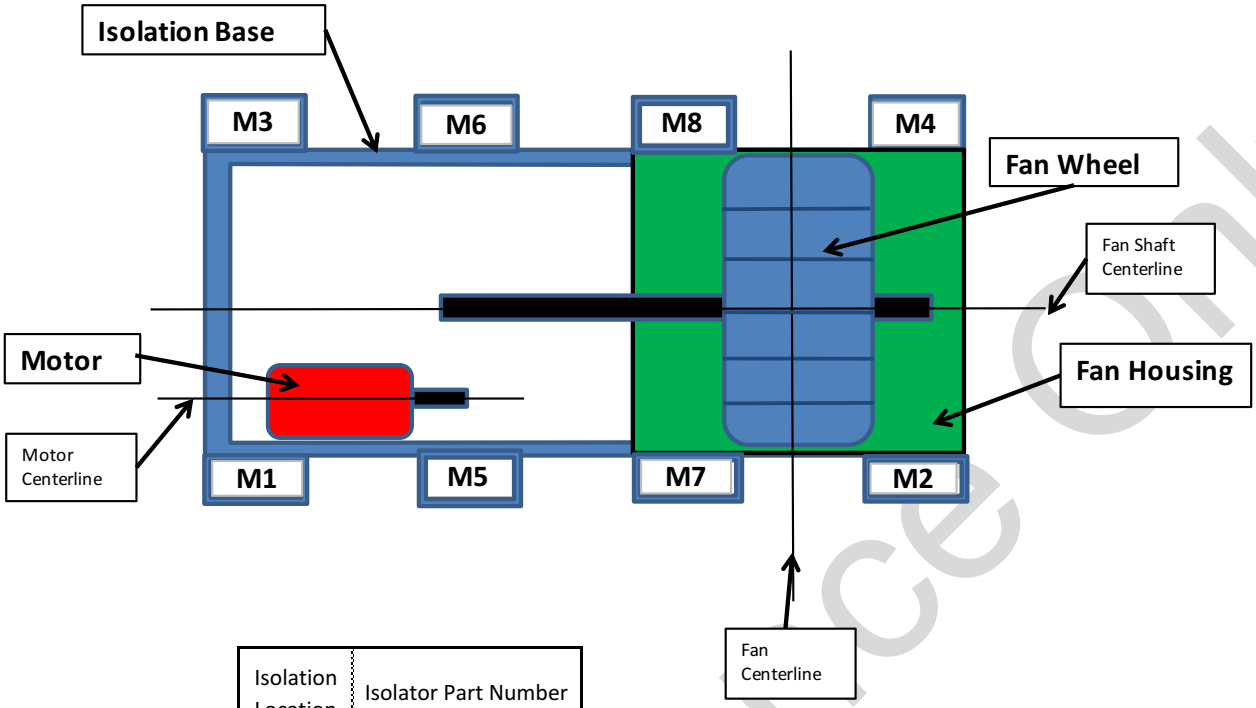
Tested UUT-2H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-2000
M2	MSSH-1E-2000
M3	MSSH-1E-2000
M4	MSSH-1E-2000
M5	MSSH-1E-2000
M6	MSSH-1E-2000

For Reference Only

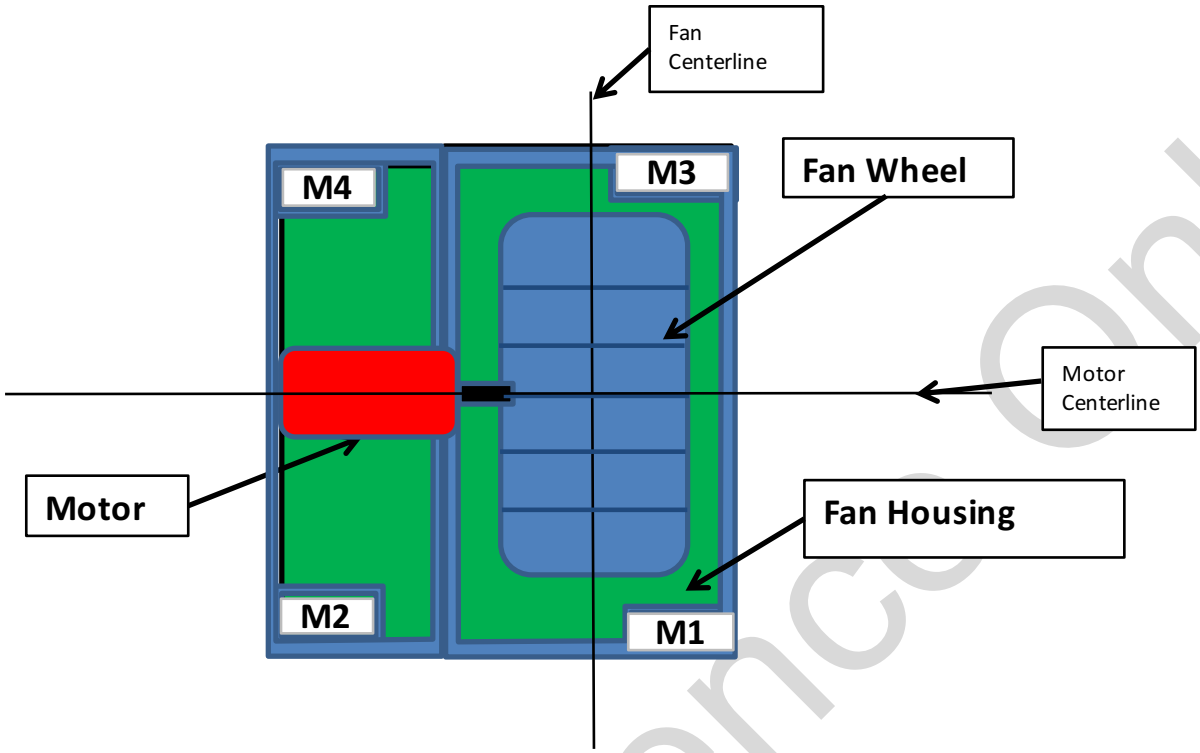
Tested UUT-3H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-1700N
M2	MSSH-1E-1700N
M3	MSSH-1E-1700N
M4	MSSH-1E-1000
M5	MSSH-1E-1700N
M6	MSSH-1E-1700N
M7	MSSH-1E-1700N
M8	MSSH-1E-1000

For Reference Only

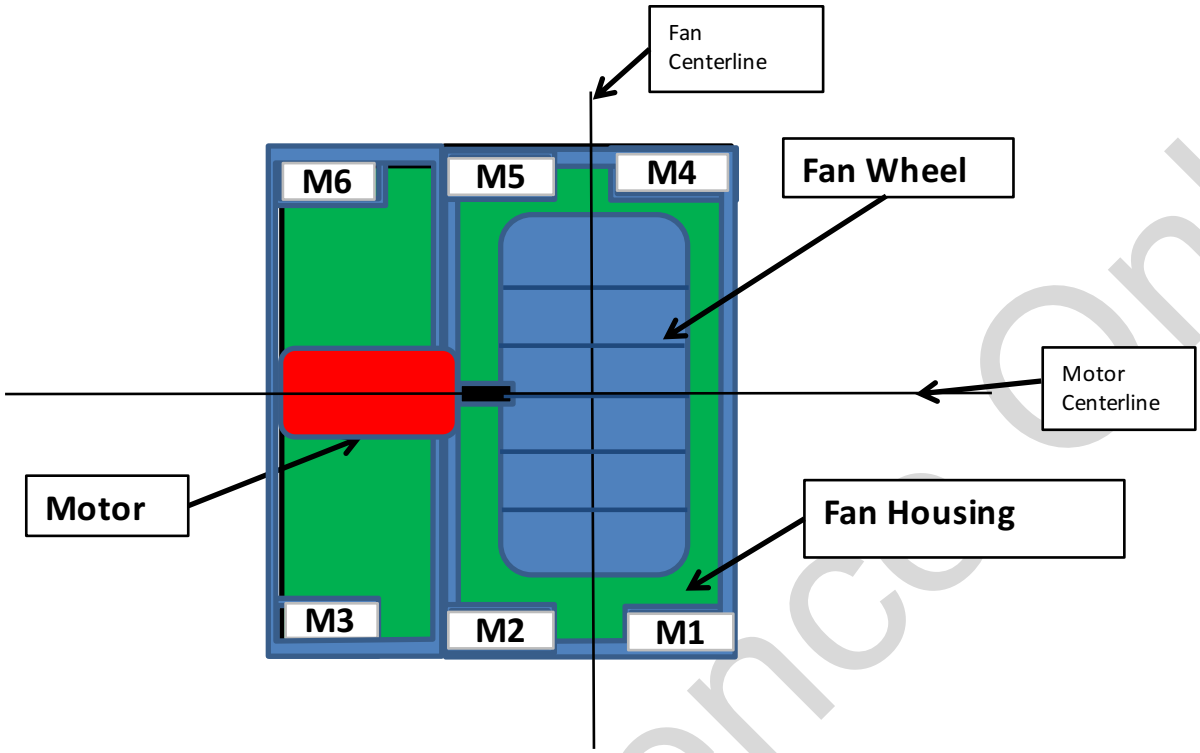
Tested UUT-4H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-50
M2	MSS-1C-100
M3	MSS-1C-50
M4	MSS-1C-100

For Reference Only

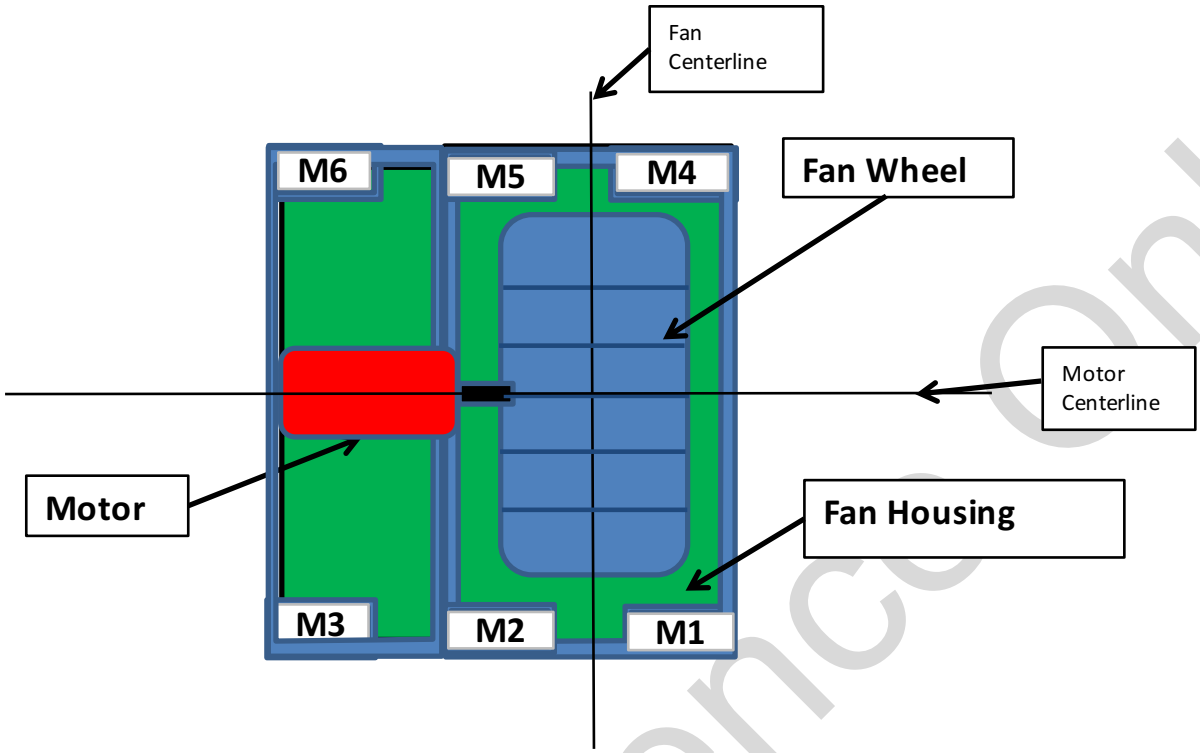
Tested UUT-5H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-530N
M2	MSSH-1E-530N
M3	MSSH-1E-825N
M4	MSSH-1E-530N
M5	MSSH-1E-530N
M6	MSSH-1E-825N

For Reference Only

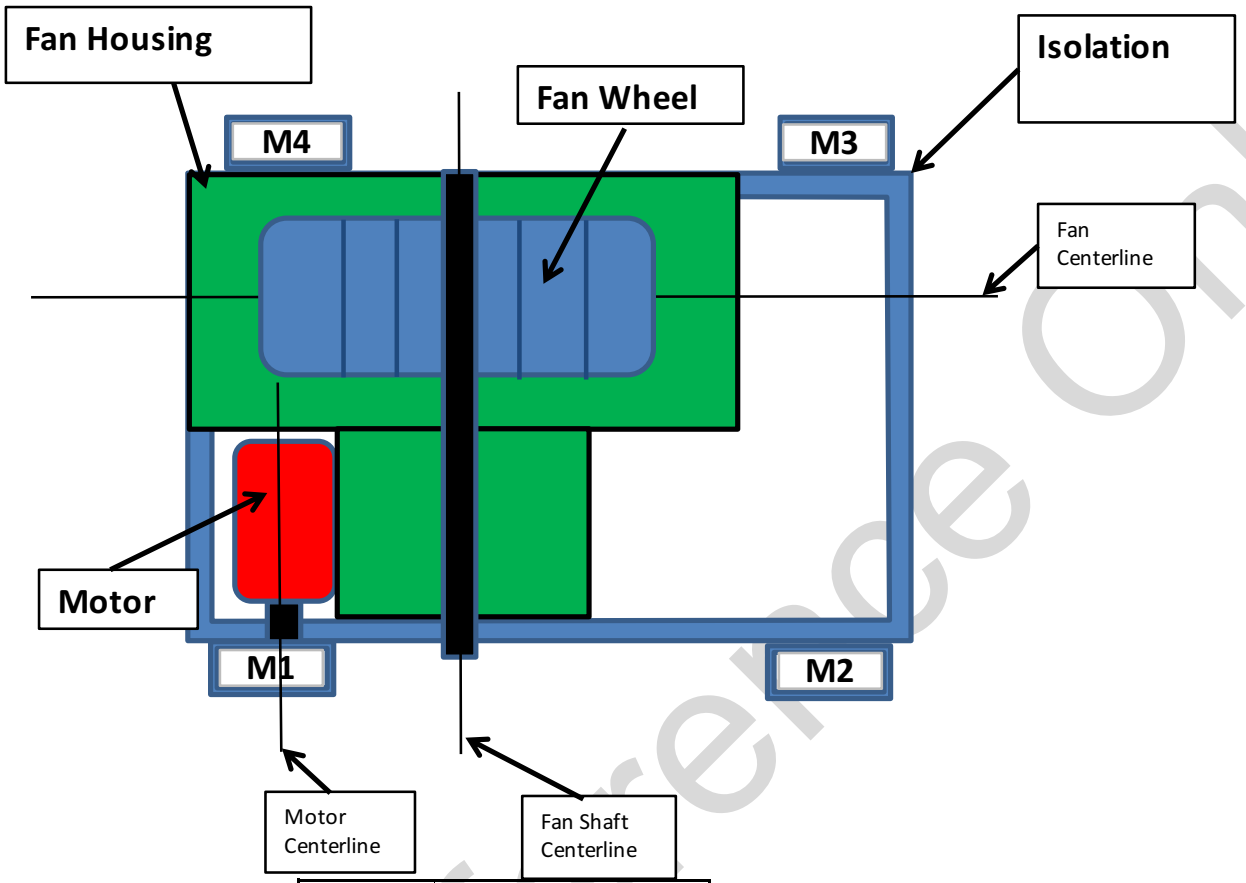
Tested UUT-6H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-530N
M2	MSSH-1E-650
M3	MSSH-1E-650
M4	MSSH-1E-530N
M5	MSSH-1E-650
M6	MSSH-1E-650

For Reference Only

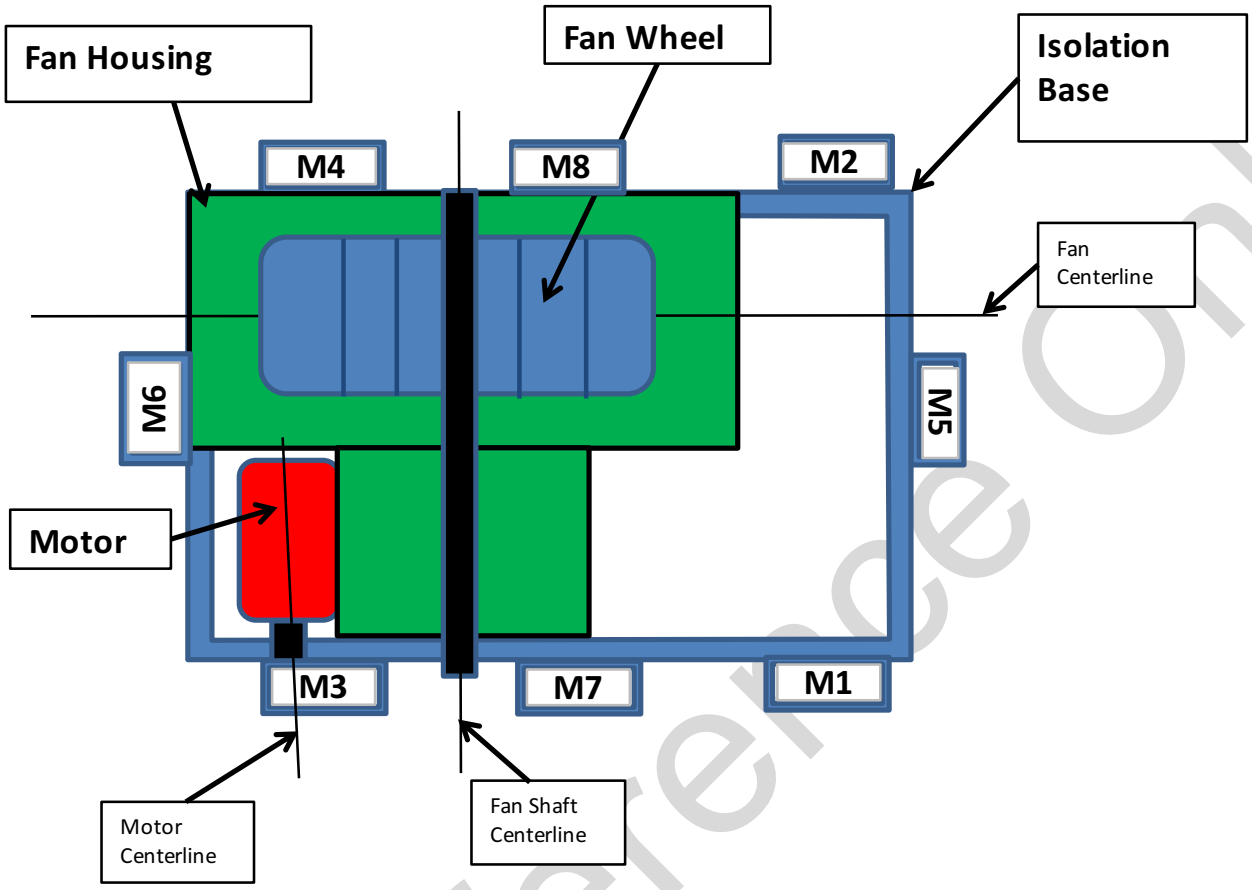
Tested UUT-7H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-100
M2	MSS-1C-150
M3	MSS-1C-100
M4	MSS-1C-150

For Reference Only

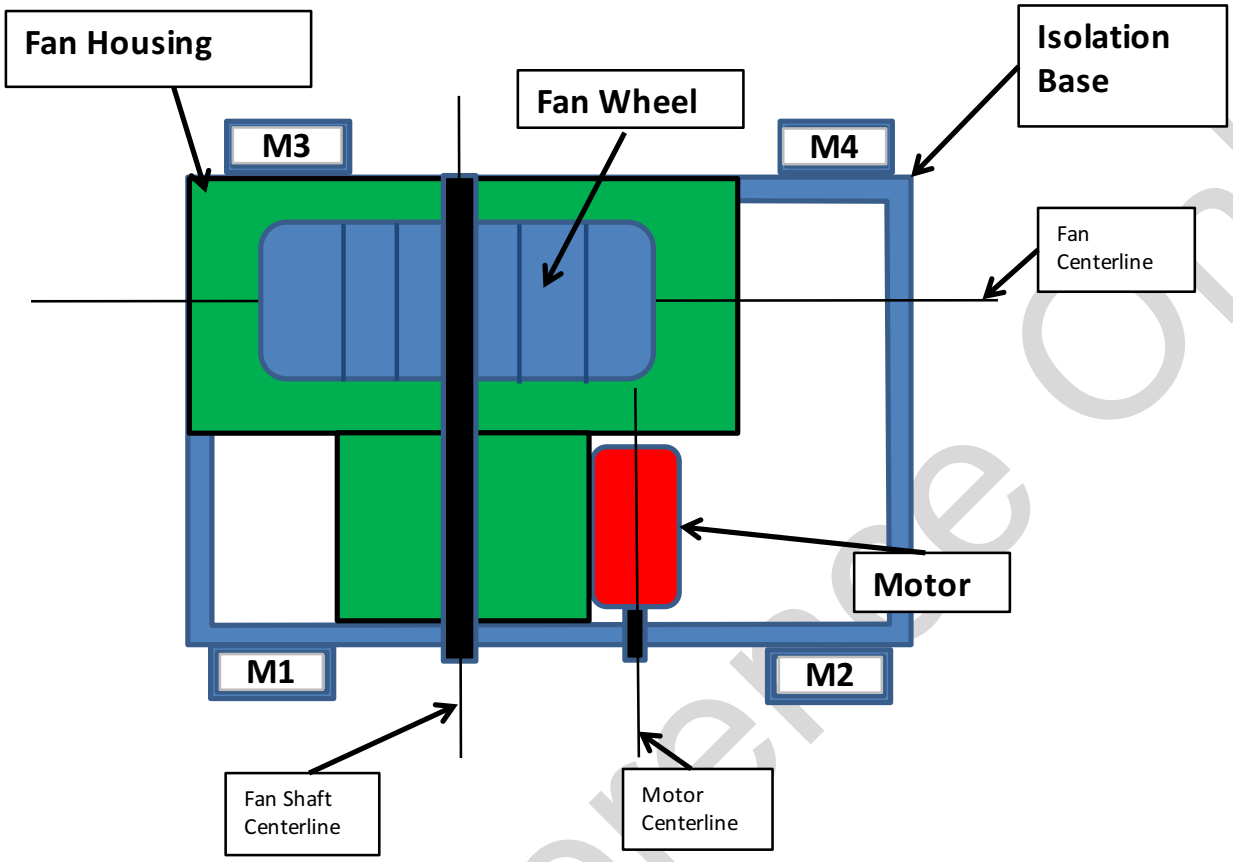
Tested UUT-9H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-530N
M2	MSSH-1E-530N
M3	MSSH-1E-2000
M4	MSSH-1E-2000
M5	MSSH-1E-530N
M6	MSSH-1E-2000
M7	MSSH-1E-2000
M8	MSSH-1E-2000

For Reference Only

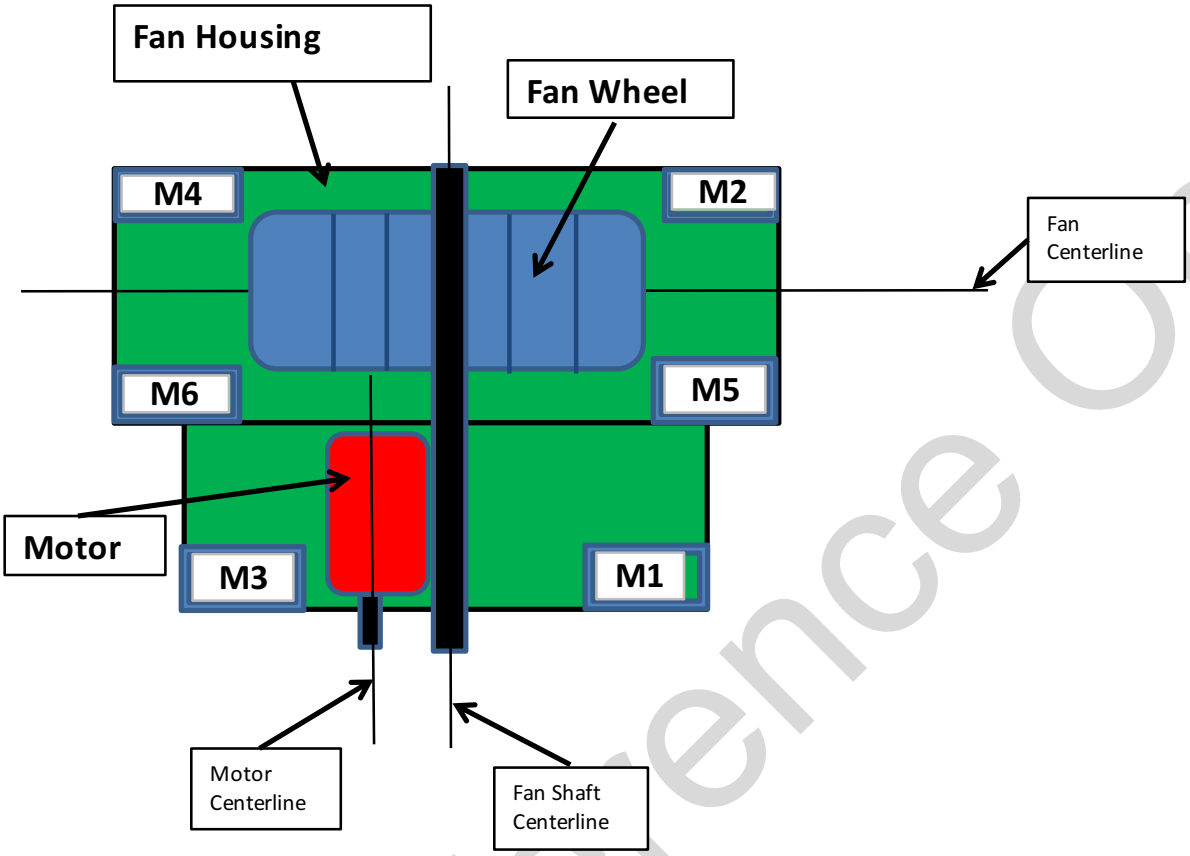
Tested UUT-11H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-2990N
M2	MSSH-1E-2990N
M3	MSSH-1E-2990N
M4	MSSH-1E-2990N

For Reference Only

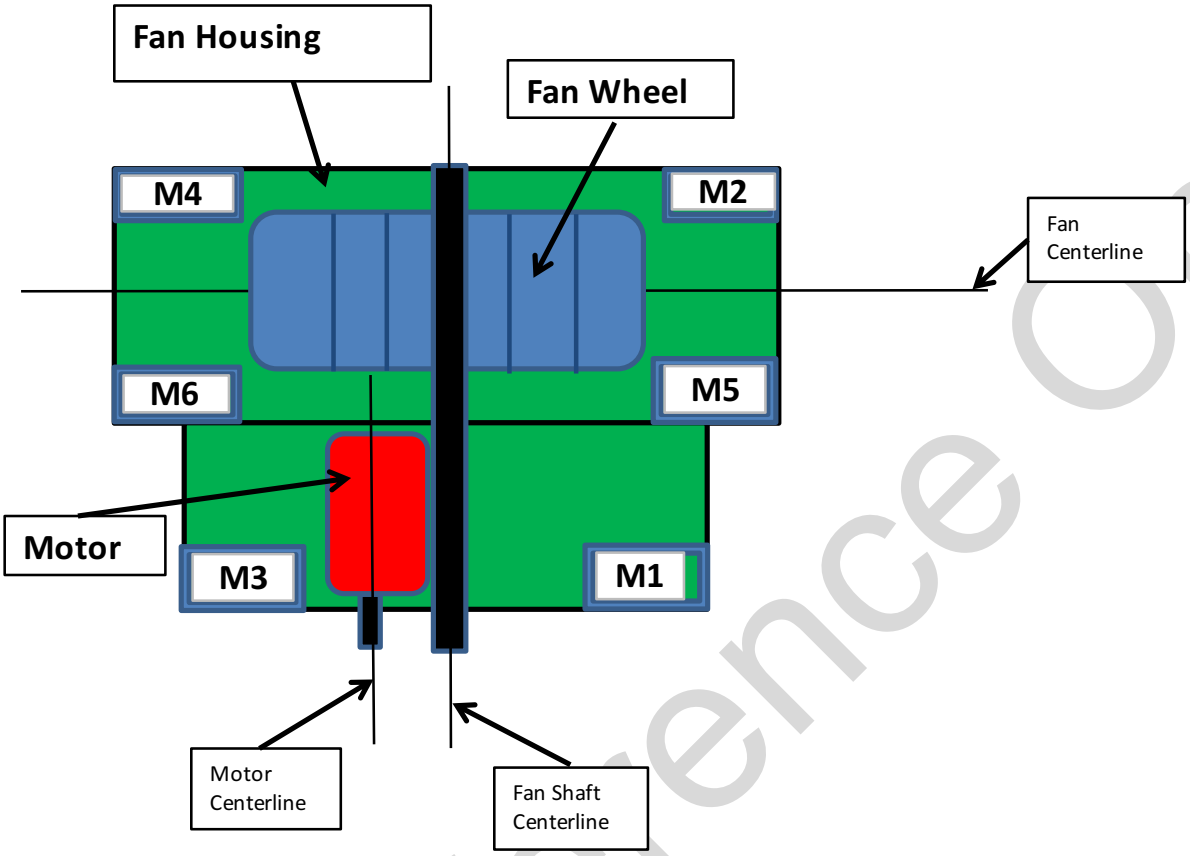
Tested UUT-13H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-530N
M2	MSSH-1E-1000
M3	MSSH-1E-1000
M4	MSSH-530N
M5	MSSH-530N
M6	MSSH-530N

For Reference Only

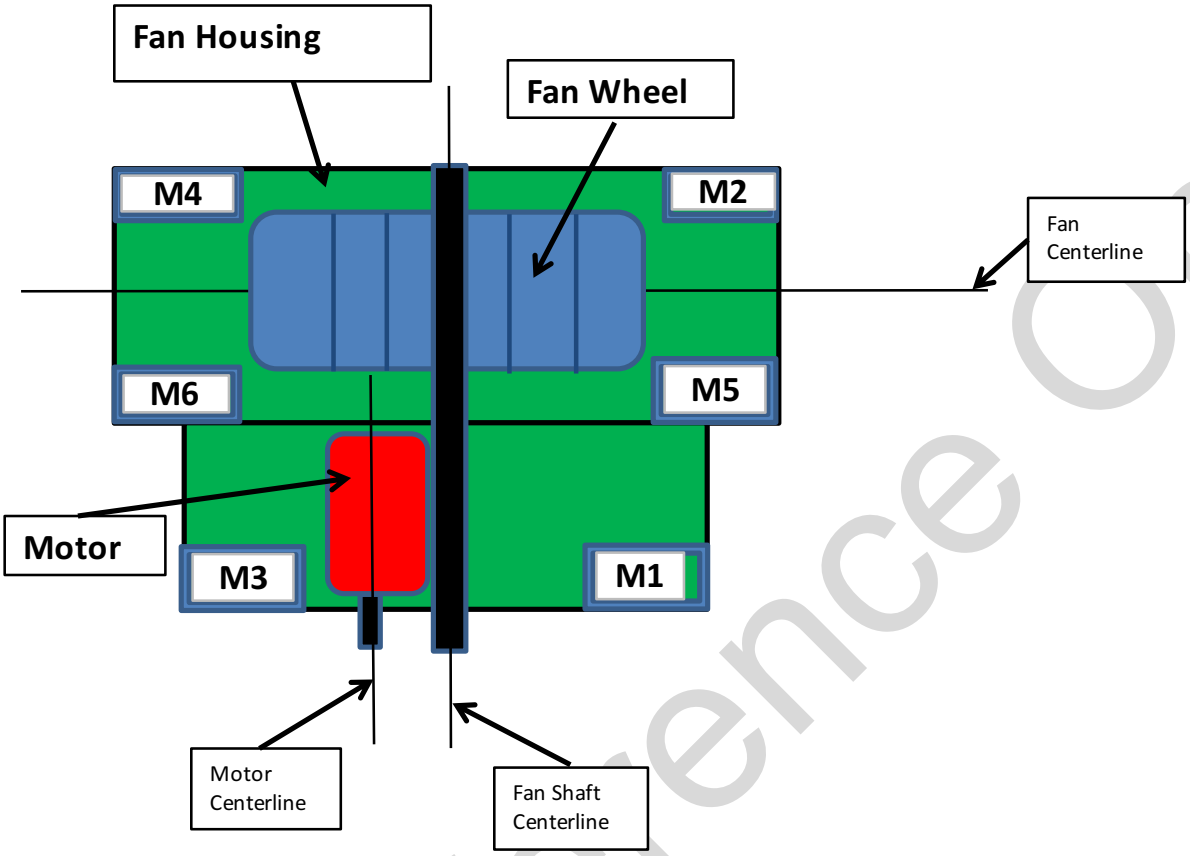
Tested UUT-14H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-825N
M2	MSSH-1E-1200N
M3	MSSH-1E-1200N
M4	MSSH-1E-825N
M5	MSSH-1E-1200N
M6	MSSH-1E-1200N

For Reference Only

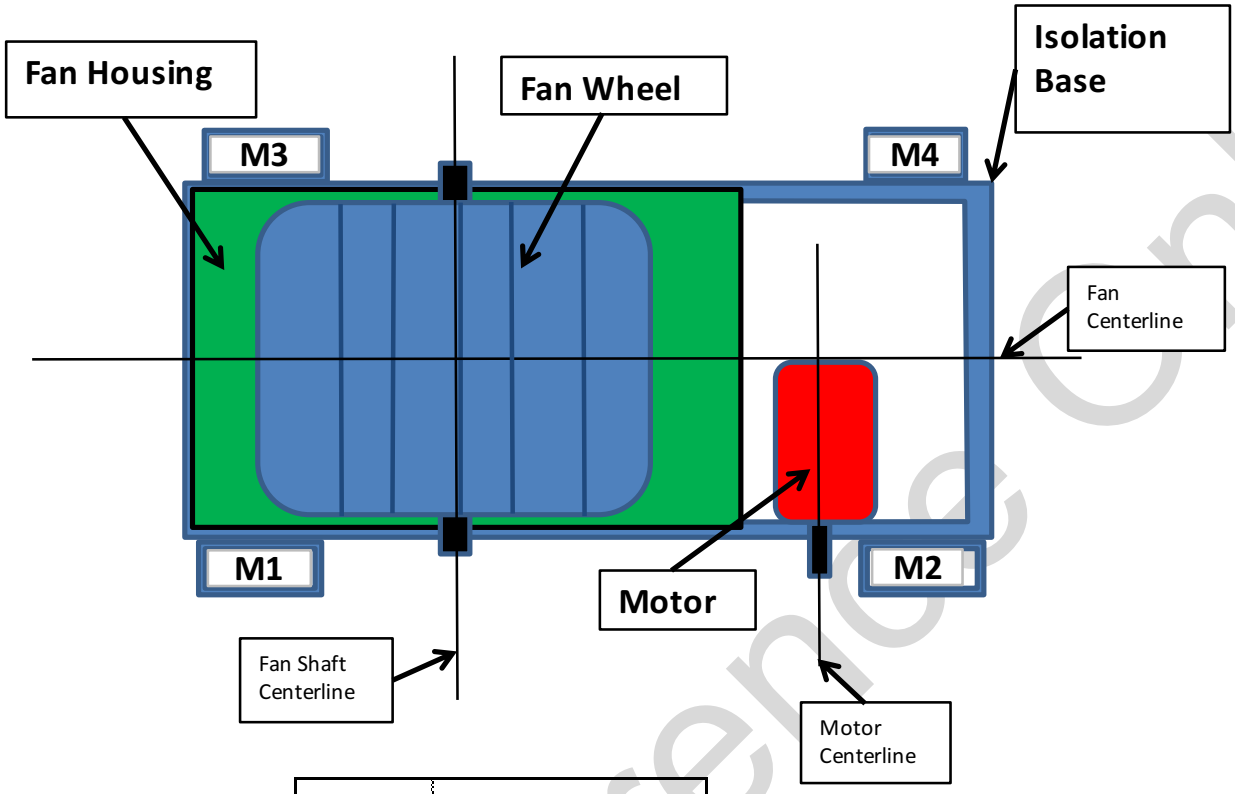
Tested UUT-15H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-1400
M2	MSSH-1E-1400
M3	MSSH-1E-2000
M4	MSSH-1E-1400
M5	MSSH-1E-1400
M6	MSSH-1E-2000

For Reference Only

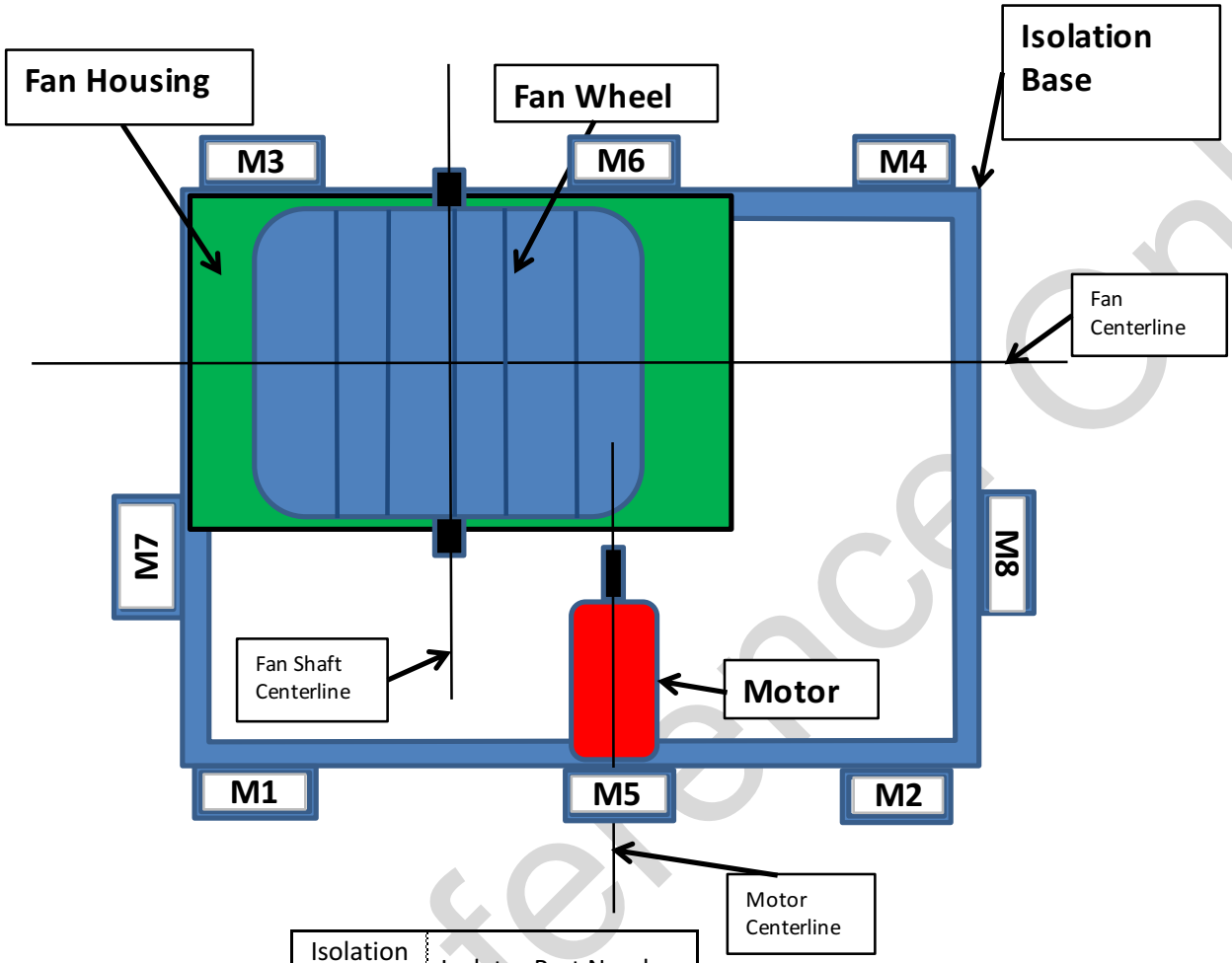
Tested UUT-16H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-150
M2	MSS-1C-100
M3	MSS-1C-150
M4	MSS-1C-100

For Reference Only

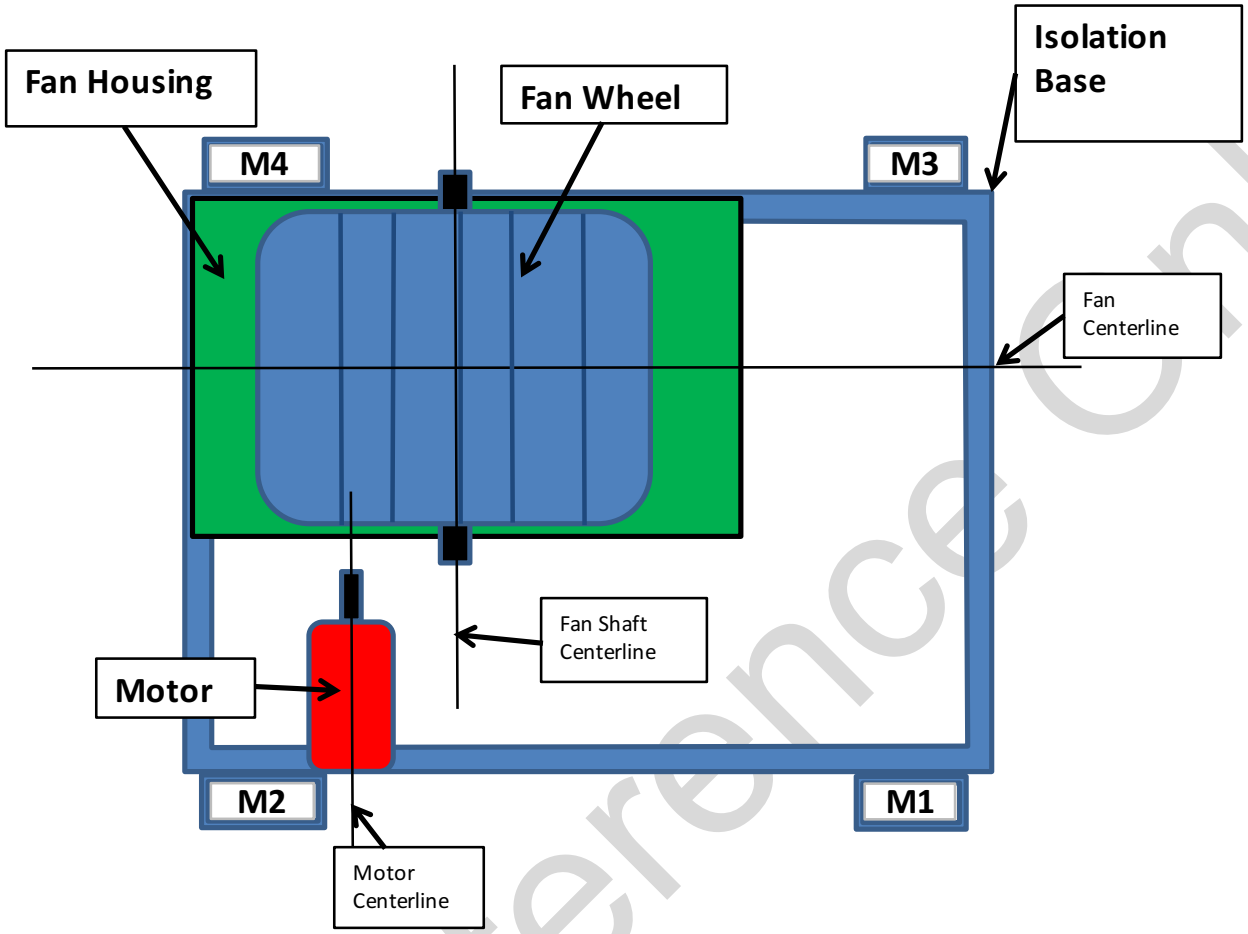
Tested UUT-17H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-1400
M2	MSSH-1E-1400
M3	MSSH-1E-825N
M4	MSSH-1E-825N
M5	MSSH-1E-1400
M6	MSSH-1E-825N
M7	MSSH-1E-1400
M8	MSSH-1E-1400

For Reference Only

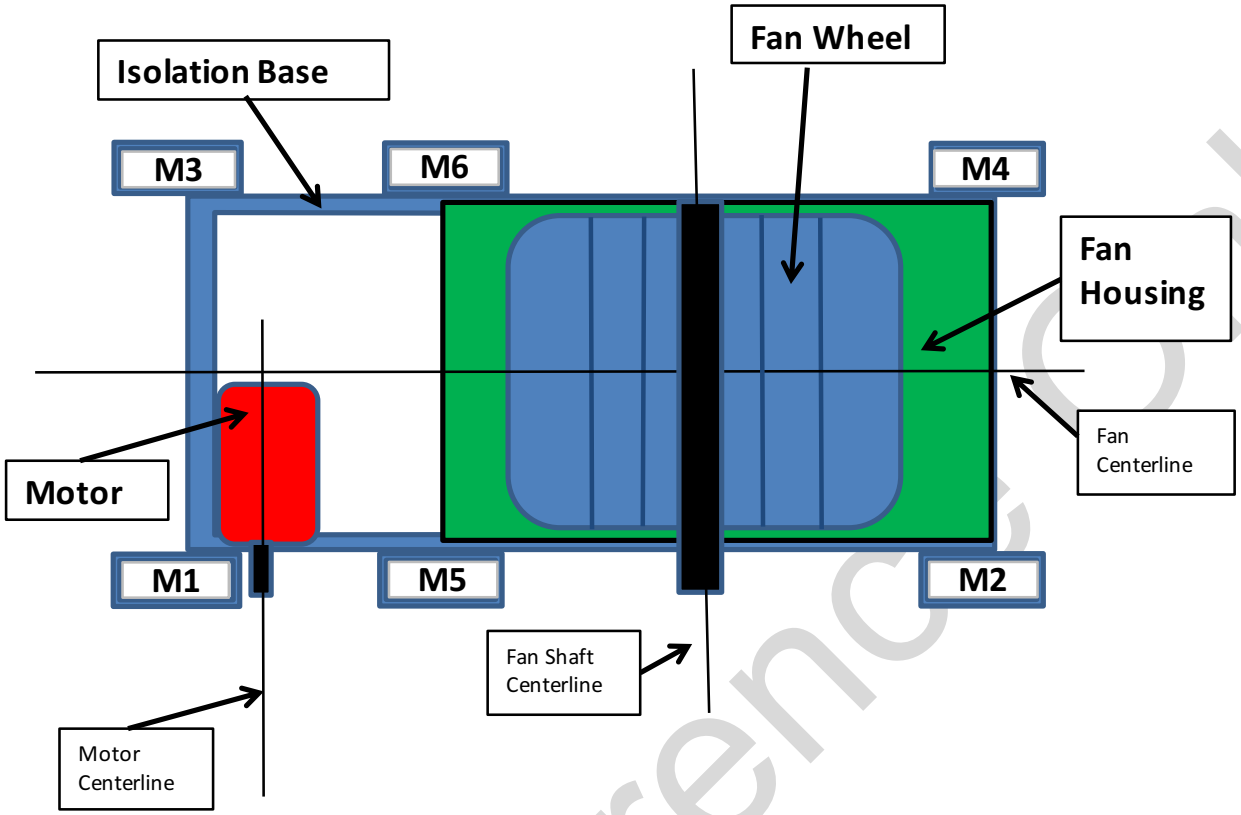
Tested UUT-18H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSS-1C-150
M2	MSS-1C-250
M3	MSS-1C-100
M4	MSS-1C-150

For Reference Only

Tested UUT-19H Spring Vibration Isolation Plan



Isolation Location	Isolator Part Number
M1	MSSH-1E-2000
M2	MSSH-1E-2000
M3	MSSH-1E-1400
M4	MSSH-1E-2000
M5	MSSH-1E-2000
M6	MSSH-1E-1400

For Reference Only